

**UNIVERSITY OF MANITOBA**

**"IN-SITU CHARACTERIZATION OF MATERIAL PROPERTIES  
FOR  
THE DESIGN AND EVALUATION OF FLEXIBLE PAVEMENTS."**

A Thesis  
Presented to the Faculty of Graduate Studies  
in Partial Fulfilment of the Requirements for  
The Degree of **Doctor of Philosophy**  
in  
in the Department of Civil and Geological Engineering

by

**Gani Venkataraman GANAPATHY.**

**VOL.3: DATA AND RESULTS (TABLES)**

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**BY**

**GANI VENKATARAMAN GANAPATHY**

**A Thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements for the degree of**

**DOCTOR OF PHILOSOPHY**

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ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 558 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	1	7	3	5	MIN	AVG	MAX
EY1	2019	1314	1095	1211	1097	1095	1347	2019
EY2	156	154	152	167	170	152	160	170
EY3	107	105	110	104	107	104	107	110

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR

DEFL.(mm) DISTANCE(mm)

UY1	-0.554250	-0.620081	-0.642854	-0.600019	-0.610132	-0.538	0
UY2	-0.318248	-0.328212	-0.322121	-0.310356	-0.309067	-0.371	300
UY3	-0.183712	-0.187653	-0.178920	-0.179525	-0.180242	-0.219	614
UY4	-0.139440	-0.144569	-0.136347	-0.139398	-0.141538	-0.138	914
UY5	-0.118547	-0.123516	-0.115506	-0.119016	-0.121825	-0.099	1219
UY6	-0.105690	-0.110343	-0.102565	-0.105952	-0.109226	-0.078	1524
UY7	-0.096940	-0.101363	-0.093820	-0.096912	-0.100539	-0.063	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	9	3	4	MIN	AVG	MAX
EY1	4310	3000	5293	8631	7256	3000	5698	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	155	144	119	100	132	155

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR

DEFL.(mm) DISTANCE(mm)

UY1	-0.406584	-0.397573	-0.373437	-0.351908	-0.321778	-0.538	0
UY2	-0.252623	-0.227231	-0.232537	-0.244814	-0.211844	-0.371	300
UY3	-0.138058	-0.122325	-0.118330	-0.143701	-0.118842	-0.219	614
UY4	-0.093017	-0.084389	-0.071077	-0.095012	-0.077359	-0.138	914
UY5	-0.072588	-0.065039	-0.050299	-0.071959	-0.057076	-0.099	1219
UY6	-0.061051	-0.052342	-0.039337	-0.059868	-0.045129	-0.078	1524
UY7	-0.053553	-0.043255	-0.032541	-0.052566	-0.037073	-0.063	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	9	1	3	10	MIN	AVG	MAX
EY1	4310	5917	3000	8631	5609	3000	5493	8631
EY2	162	154	200	152	154	152	164	200
EY3	141	139	100	144	157	100	136	157

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR

DEFL.(mm) DISTANCE(mm)

UY1	-0.406584	-0.377513	-0.397573	-0.351908	-0.374467	-0.538	0
UY2	-0.252623	-0.245386	-0.227231	-0.244814	-0.238236	-0.371	300
UY3	-0.138058	-0.133944	-0.122325	-0.143701	-0.125751	-0.219	614
UY4	-0.093017	-0.085758	-0.084389	-0.095012	-0.078478	-0.138	914
UY5	-0.072588	-0.063883	-0.065039	-0.071959	-0.057666	-0.099	1219
UY6	-0.061051	-0.052117	-0.052342	-0.059868	-0.046792	-0.078	1524
UY7	-0.053553	-0.044717	-0.043255	-0.052566	-0.040110	-0.063	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 797 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	6	2	13	14	MIN	AVG	MAX
EY1	1548	1699	1092	1613	2159	1092	1622	2159
EY2	151	151	151	151	151	151	151	151
EY3	104	103	109	95	102	95	103	109

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.868682	-0.854100	-0.931414	-0.880309	-0.804943	-0.809	0
UY2	-0.478475	-0.480301	-0.472601	-0.497728	-0.471509	-0.553	300
UY3	-0.276030	-0.279091	-0.266889	-0.295092	-0.274127	-0.332	614
UY4	-0.211374	-0.213666	-0.204521	-0.229174	-0.207109	-0.209	914
UY5	-0.180069	-0.182089	-0.173796	-0.196748	-0.175269	-0.149	1219
UY6	-0.160613	-0.162474	-0.154717	-0.176260	-0.155633	-0.117	1524
UY7	-0.147370	-0.149097	-0.141820	-0.162125	-0.142218	-0.093	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	9	10	3	MIN	AVG	MAX
EY1	4310	3000	6063	5333	8631	3000	5467	8631
EY2	162	200	154	154	152	152	164	200
EY3	141	100	132	184	144	100	140	184

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.580730	-0.567860	-0.545053	-0.534211	-0.502636	-0.809	0
UY2	-0.360825	-0.324558	-0.358917	-0.334175	-0.349671	-0.553	300
UY3	-0.197191	-0.174719	-0.200443	-0.172505	-0.205250	-0.332	614
UY4	-0.132858	-0.120534	-0.131089	-0.106632	-0.135707	-0.209	914
UY5	-0.103678	-0.092896	-0.099219	-0.078727	-0.102780	-0.149	1219
UY6	-0.087201	-0.074761	-0.081890	-0.064744	-0.085510	-0.117	1524
UY7	-0.076490	-0.061782	-0.070899	-0.056445	-0.075080	-0.093	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	12	9	10	7	MIN	AVG	MAX
EY1	2032	1198	1684	5517	4310	1198	2948	5517
EY2	151	152	154	152	162	151	154	162
EY3	105	110	73	57	141	57	97	141

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.814019	-0.898198	-0.916245	-0.771927	-0.580730	-0.809	0
UY2	-0.470895	-0.461766	-0.542810	-0.574460	-0.360825	-0.553	300
UY3	-0.272948	-0.258590	-0.341093	-0.407328	-0.197191	-0.332	614
UY4	-0.207732	-0.197427	-0.273093	-0.329939	-0.132858	-0.209	914
UY5	-0.177210	-0.167795	-0.237721	-0.288934	-0.103678	-0.149	1219
UY6	-0.158536	-0.149478	-0.214176	-0.262565	-0.087201	-0.117	1524
UY7	-0.145864	-0.137122	-0.197303	-0.243579	-0.076490	-0.093	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1134 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	10	2	4	9	MIN	AVG	MAX
EY1	2384	1511	1089	1067	1035	1035	1417	2384
EY2	151	151	151	151	151	151	151	151
EY3	83	73	78	82	98	73	83	98

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.147070	-1.271610	-1.344680	-1.353700	-1.338130	-1.072	0
UY2	-0.695069	-0.706822	-0.692093	-0.694539	-0.668110	-0.739	300
UY3	-0.414630	-0.412717	-0.395537	-0.398312	-0.373480	-0.491	614
UY4	-0.314671	-0.314949	-0.301548	-0.305376	-0.283944	-0.310	914
UY5	-0.265263	-0.263450	-0.251380	-0.256289	-0.238483	-0.214	1219
UY6	-0.233660	-0.228898	-0.217859	-0.223812	-0.209460	-0.167	1524
UY7	-0.211418	-0.204068	-0.193968	-0.200831	-0.189456	-0.133	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	12	1	11	9	MIN	AVG	MAX
EY1	4310	4059	3000	4423	6491	3000	4457	6491
EY2	162	154	200	153	154	153	165	200
EY3	141	213	100	214	119	100	157	214

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.826284	-0.812823	-0.807971	-0.793739	-0.793508	-1.072	0
UY2	-0.513395	-0.477807	-0.461792	-0.474601	-0.538920	-0.739	300
UY3	-0.280570	-0.233495	-0.248596	-0.234387	-0.316676	-0.491	614
UY4	-0.189035	-0.143831	-0.171499	-0.143718	-0.216425	-0.310	914
UY5	-0.147517	-0.107961	-0.132176	-0.107232	-0.169110	-0.214	1219
UY6	-0.124072	-0.090385	-0.106372	-0.089515	-0.142856	-0.167	1524
UY7	-0.108833	-0.080159	-0.087906	-0.079282	-0.125955	-0.133	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	14	13	9	10	MIN	AVG	MAX
EY1	2385	2914	2910	1684	4809	1684	2940	4809
EY2	152	151	151	154	152	151	152	154
EY3	108	109	116	73	57	57	93	116

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.105660	-1.052050	-1.023490	-1.309850	-1.142080	-1.072	0
UY2	-0.656636	-0.647400	-0.619747	-0.773703	-0.831876	-0.739	300
UY3	-0.381055	-0.378723	-0.352056	-0.485592	-0.580317	-0.491	614
UY4	-0.287098	-0.281806	-0.256726	-0.388795	-0.468811	-0.310	914
UY5	-0.243722	-0.237309	-0.213776	-0.338387	-0.410316	-0.214	1219
UY6	-0.217541	-0.210899	-0.188636	-0.304810	-0.372261	-0.167	1524
UY7	-0.199847	-0.193157	-0.171890	-0.280744	-0.344652	-0.133	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1295 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	6	8	16	15	MIN	AVG	MAX
EY1	9955	9862	9975	9975	9974	9862	9948	9975
EY2	151	151	151	151	151	151	151	151
EY3	108	119	142	144	145	108	132	145

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEF. (mm)</u>					<u>SENSOR DISTANCE (mm)</u>	
UY1	-0.867975	-0.882440	-0.827916	-0.820872	-0.818115	-1.251	0
UY2	-0.642827	-0.654897	-0.604037	-0.597647	-0.594934	-0.897	300
UY3	-0.417981	-0.429797	-0.382294	-0.376569	-0.373983	-0.561	614
UY4	-0.301762	-0.315382	-0.270065	-0.264982	-0.262571	-0.360	914
UY5	-0.242806	-0.258730	-0.215537	-0.211110	-0.208892	-0.248	1219
UY6	-0.210020	-0.228108	-0.187080	-0.183235	-0.181196	-0.196	1524
UY7	-0.189348	-0.209258	-0.170226	-0.166838	-0.164949	-0.154	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	13	11	12	15	MIN	AVG	MAX
EY1	9315	9760	9157	9759	9062	9062	9411	9760
EY2	584	440	357	295	294	294	394	584
EY3	238	208	239	247	218	208	230	247

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEF. (mm)</u>					<u>SENSOR DISTANCE (mm)</u>	
UY1	-0.327540	-0.388637	-0.436706	-0.470909	-0.490269	-1.251	0
UY2	-0.197141	-0.240534	-0.266335	-0.293485	-0.305075	-0.897	300
UY3	-0.114586	-0.136236	-0.141060	-0.151871	-0.159903	-0.561	614
UY4	-0.083394	-0.094839	-0.091935	-0.093114	-0.100194	-0.360	914
UY5	-0.066866	-0.073732	-0.068808	-0.066200	-0.072383	-0.248	1219
UY6	-0.055712	-0.060068	-0.054969	-0.051137	-0.056336	-0.196	1524
UY7	-0.047549	-0.050277	-0.045545	-0.041366	-0.045671	-0.154	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	2	6	10	9	MIN	AVG	MAX
EY1	7977	8625	8528	9587	9688	7977	8881	9688
EY2	539	401	215	214	250	214	334	539
EY3	69	128	202	236	237	69	175	237

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEF. (mm)</u>					<u>SENSOR DISTANCE (mm)</u>	
UY1	-0.696677	-0.524508	-0.666609	-0.626077	-0.579058	-1.251	0
UY2	-0.546922	-0.359288	-0.450705	-0.423828	-0.387833	-0.897	300
UY3	-0.451821	-0.241777	-0.267708	-0.246998	-0.228022	-0.561	614
UY4	-0.412252	-0.193497	-0.188262	-0.168621	-0.160086	-0.360	914
UY5	-0.387627	-0.167318	-0.152364	-0.133680	-0.129935	-0.248	1219
UY6	-0.368781	-0.149365	-0.133334	-0.115947	-0.114105	-0.196	1524
UY7	-0.353732	-0.135967	-0.121550	-0.105439	-0.104335	-0.154	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 558 kPa					LOAD 2: 797 kPa					LOAD 3: 1134 kPa					LOAD 4: 1295 kPa												
DEPTH	DEPTH RATIO	10	1	7	3	5	AVG.	STRESS RATIO	15	6	2	13	14	AVG.	STRESS RATIO	16	10	2	4	9	AVG.	STRESS RATIO	7	6	8	16	15	AVG.	STRESS RATIO
(mm)	z/ao							p/po							p/po							p/po							p/po
28	0.187	-0.485	-0.495	-0.499	-0.499	-0.502	-0.496	0.889	-0.701	-0.697	-0.713	-0.699	-0.689	-0.700	0.878	-0.975	-0.998	-1.015	-1.016	-1.017	-1.004	0.886	-1.051	-1.051	-1.051	-1.052	-1.052	-1.051	0.812
83	0.553	-0.305	-0.335	-0.349	-0.348	-0.357	-0.339	0.607	-0.462	-0.453	-0.500	-0.457	-0.429	-0.460	0.578	-0.595	-0.658	-0.707	-0.711	-0.717	-0.678	0.598	-0.495	-0.499	-0.496	-0.495	-0.495	-0.496	0.383
209	1.393	-0.144	-0.166	-0.175	-0.174	-0.181	-0.168	0.301	-0.221	-0.214	-0.247	-0.218	-0.198	-0.220	0.276	-0.272	-0.319	-0.354	-0.356	-0.359	-0.332	0.293	-0.172	-0.174	-0.172	-0.172	-0.172	-0.173	0.133
407	2.713	-0.068	-0.075	-0.077	-0.076	-0.079	-0.075	0.134	-0.099	-0.097	-0.106	-0.098	-0.093	-0.099	0.124	-0.129	-0.145	-0.155	-0.155	-0.156	-0.148	0.131	-0.101	-0.102	-0.100	-0.102	-0.102	-0.102	0.078
605	4.033	-0.037	-0.039	-0.040	-0.039	-0.040	-0.039	0.070	-0.053	-0.052	-0.055	-0.052	-0.051	-0.052	0.066	-0.070	-0.075	-0.079	-0.079	-0.081	-0.077	0.068	-0.063	-0.064	-0.063	-0.065	-0.065	-0.064	0.050
803	5.353	-0.023	-0.024	-0.025	-0.024	-0.024	-0.024	0.043	-0.032	-0.031	-0.034	-0.031	-0.031	-0.032	0.040	-0.042	-0.044	-0.046	-0.047	-0.048	-0.045	0.040	-0.042	-0.043	-0.043	-0.044	-0.045	-0.044	0.034
1001	6.673	-0.015	-0.015	-0.016	-0.015	-0.015	-0.015	0.027	-0.021	-0.020	-0.022	-0.020	-0.020	-0.021	0.026	-0.027	-0.027	-0.028	-0.029	-0.031	-0.028	0.025	-0.029	-0.030	-0.031	-0.032	-0.032	-0.031	0.024
1600	10.667	-0.006	-0.007	-0.007	-0.006	-0.007	-0.007	0.012	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	0.011	-0.012	-0.012	-0.012	-0.012	-0.013	-0.012	0.011	-0.014	-0.014	-0.015	-0.015	-0.015	-0.015	0.011
2600	17.333	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.005	-0.005	-0.004	0.004	-0.005	-0.005	-0.006	-0.006	-0.006	-0.005	0.004

MAXIMUM DEFLECTION

DEPTH	DEPTH RATIO	7	1	9	3	4	AVG.	STRESS RATIO	7	1	9	10	3	AVG.	STRESS RATIO	7	12	1	11	9	AVG.	STRESS RATIO	9	13	11	12	15	AVG.	STRESS RATIO
(mm)	z/ao							p/po							p/po							p/po							p/po
28	0.187	-0.469	-0.481	-0.464	-0.455	-0.461	-0.466	0.835	-0.670	-0.687	-0.659	-0.662	-0.649	-0.665	0.835	-0.953	-0.952	-0.978	-0.949	-0.935	-0.953	0.841	-1.114	-1.097	-1.088	-1.077	-1.080	-1.091	0.843
83	0.553	-0.260	-0.294	-0.244	-0.222	-0.242	-0.252	0.452	-0.371	-0.420	-0.338	-0.348	-0.317	-0.359	0.450	-0.528	-0.529	-0.598	-0.519	-0.474	-0.530	0.467	-0.677	-0.636	-0.612	-0.579	-0.585	-0.618	0.477
209	1.393	-0.108	-0.135	-0.099	-0.080	-0.094	-0.103	0.185	-0.155	-0.192	-0.133	-0.141	-0.114	-0.147	0.184	-0.220	-0.226	-0.274	-0.218	-0.183	-0.224	0.198	-0.303	-0.271	-0.261	-0.234	-0.240	-0.262	0.202
407	2.713	-0.054	-0.063	-0.053	-0.046	-0.049	-0.053	0.095	-0.077	-0.090	-0.073	-0.077	-0.065	-0.076	0.096	-0.109	-0.119	-0.128	-0.116	-0.101	-0.115	0.101	-0.138	-0.128	-0.134	-0.123	-0.126	-0.130	0.100
605	4.033	-0.031	-0.034	-0.032	-0.028	-0.029	-0.031	0.055	-0.044	-0.048	-0.044	-0.046	-0.041	-0.045	0.056	-0.063	-0.071	-0.068	-0.069	-0.061	-0.066	0.059	-0.073	-0.070	-0.076	-0.072	-0.073	-0.073	0.056
803	5.353	-0.020	-0.020	-0.021	-0.019	-0.018	-0.020	0.035	-0.028	-0.028	-0.029	-0.031	-0.027	-0.029	0.036	-0.040	-0.047	-0.041	-0.047	-0.040	-0.043	0.038	-0.042	-0.042	-0.048	-0.046	-0.047	-0.045	0.035
1001	6.673	-0.014	-0.012	-0.015	-0.014	-0.012	-0.013	0.024	-0.019	-0.018	-0.020	-0.022	-0.019	-0.020	0.025	-0.027	-0.034	-0.025	-0.034	-0.027	-0.029	0.026	-0.025	-0.026	-0.031	-0.032	-0.031	-0.029	0.022
1600	10.667	-0.006	-0.006	-0.007	-0.006	-0.006	-0.006	0.011	-0.009	-0.008	-0.009	-0.010	-0.009	-0.009	0.011	-0.013	-0.016	-0.011	-0.016	-0.013	-0.014	0.012	-0.011	-0.012	-0.014	-0.015	-0.014	-0.013	0.010
2600	17.333	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003	0.004	-0.005	-0.005	-0.004	-0.005	-0.005	-0.005	0.004	-0.005	-0.005	-0.005	-0.006	-0.005	-0.005	0.004

RMS VALUE OF DEFLECTIONS

DEPTH	DEPTH RATIO	7	9	1	3	10	AVG.	STRESS RATIO	13	12	9	10	7	AVG.	STRESS RATIO	12	14	13	9	10	AVG.	STRESS RATIO	8	2	6	10	9	AVG.	STRESS RATIO
(mm)	z/ao							p/po							p/po							p/po							p/po
28	0.187	-0.469	-0.462	-0.481	-0.455	-0.463	-0.466	0.835	-0.691	-0.710	-0.698	-0.661	-0.670	-0.696	0.861	-0.975	-0.966	-0.966	-0.993	-0.945	-0.969	0.855	-1.118	-1.098	-1.070	-1.065	-1.070	-1.084	0.837
83	0.553	-0.260	-0.238	-0.294	-0.222	-0.241	-0.251	0.450	-0.433	-0.487	-0.454	-0.346	-0.371	-0.418	0.525	-0.594	-0.567	-0.565	-0.649	-0.506	-0.576	0.508	-0.690	-0.632	-0.552	-0.541	-0.560	-0.595	0.459
209	1.393	-0.108	-0.094	-0.135	-0.080	-0.096	-0.103	0.184	-0.204	-0.242	-0.217	-0.134	-0.155	-0.190	0.239	-0.274	-0.252	-0.254	-0.310	-0.207	-0.260	0.229	-0.311	-0.273	-0.215	-0.205	-0.220	-0.245	0.189
407	2.713	-0.054	-0.051	-0.063	-0.046	-0.053	-0.053	0.096	-0.098	-0.108	-0.099	-0.067	-0.077	-0.090	0.113	-0.134	-0.124	-0.128	-0.142	-0.108	-0.127	0.112	-0.137	-0.130	-0.116	-0.112	-0.120	-0.123	0.095
605	4.033	-0.031	-0.031	-0.034	-0.028	-0.032	-0.031	0.056	-0.053	-0.057	-0.052	-0.038	-0.044	-0.049	0.061	-0.074	-0.070	-0.072	-0.074	-0.061	-0.070	0.062	-0.068	-0.070	-0.069	-0.069	-0.073	-0.070	0.054
803	5.353	-0.020	-0.020	-0.020	-0.019	-0.021	-0.020	0.036	-0.033	-0.035	-0.030	-0.022	-0.028	-0.030	0.037	-0.046	-0.044	-0.045	-0.043	-0.036	-0.043	0.038	-0.034	-0.040	-0.046	-0.046	-0.048	-0.043	0.033
1001	6.673	-0.014	-0.014	-0.012	-0.014	-0.015	-0.014	0.025	-0.021	-0.022	-0.019	-0.014	-0.019	-0.019	0.024	-0.030	-0.029	-0.030	-0.027	-0.022	-0.028	0.024	-0.017	-0.023	-0.032	-0.033	-0.034	-0.028	0.021
1600	10.667	-0.006	-0.007	-0.006	-0.006	-0.007	-0.006	0.011	-0.009	-0.010	-0.008	-0.006	-0.009	-0.008	0.011	-0.013	-0.013	-0.013	-0.011	-0.010	-0.012	0.011	-0.007	-0.010	-0.015	-0.016	-0.015	-0.013	0.010
2600	17.333	-0.002	-0.002	-0.002	-0.002	-0.003	-0.002	0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.005	-0.005	-0.004	-0.004	-0.004	0.004	-0.003	-0.004	-0.005	-0.006	-0.006	-0.005	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 578 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	16	5	9	13	MIN	AVG	MAX
EY1	2357	1905	2089	2680	1898	1898	2186	2680
EY2	151	159	153	152	161	151	155	161
EY3	154	156	146	154	154	146	153	156

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR  
DEFL.(mm) DISTANCE(mm)

UY1	-0.490032	-0.503290	-0.510094	-0.477128	-0.503428	-0.486	0
UY2	-0.287371	-0.281841	-0.294038	-0.287046	-0.281861	-0.309	300
UY3	-0.157179	-0.152659	-0.160976	-0.158506	-0.153010	-0.171	614
UY4	-0.109910	-0.108549	-0.114261	-0.110864	-0.109264	-0.103	914
UY5	-0.088883	-0.088859	-0.093552	-0.090095	-0.089778	-0.075	1219
UY6	-0.077138	-0.077670	-0.081875	-0.078769	-0.078689	-0.060	1524
UY7	-0.069664	-0.070494	-0.074389	-0.071640	-0.071561	-0.049	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	10	3	9	MIN	AVG	MAX
EY1	4310	3000	8441	8631	1684	1684	5213	8631
EY2	162	200	154	152	154	152	164	200
EY3	141	100	141	144	73	73	120	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR  
DEFL.(mm) DISTANCE(mm)

UY1	-0.395771	-0.388864	-0.341132	-0.340345	-0.637615	-0.486	0
UY2	-0.254988	-0.230322	-0.246958	-0.244444	-0.389234	-0.309	300
UY3	-0.144242	-0.126804	-0.154207	-0.149408	-0.247520	-0.171	614
UY4	-0.097217	-0.087011	-0.105680	-0.099970	-0.197399	-0.103	914
UY5	-0.075446	-0.066966	-0.081052	-0.075346	-0.171874	-0.075	1219
UY6	-0.063366	-0.054064	-0.067680	-0.062323	-0.155129	-0.060	1524
UY7	-0.055625	-0.044864	-0.059571	-0.054599	-0.143141	-0.049	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	3	4	6	MIN	AVG	MAX
EY1	4310	3000	8631	7256	8528	3000	6345	8631
EY2	162	200	152	189	215	152	183	215
EY3	141	100	144	119	202	100	141	202

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED SENSOR  
DEFL.(mm) DISTANCE(mm)

UY1	-0.395771	-0.388864	-0.340345	-0.311489	-0.279491	-0.486	0
UY2	-0.254988	-0.230322	-0.244444	-0.211997	-0.195410	-0.309	300
UY3	-0.144242	-0.126804	-0.149408	-0.123313	-0.120321	-0.171	614
UY4	-0.097217	-0.087011	-0.099970	-0.080688	-0.085017	-0.103	914
UY5	-0.075446	-0.066966	-0.075346	-0.059251	-0.068409	-0.075	1219
UY6	-0.063366	-0.054064	-0.062323	-0.046784	-0.059658	-0.060	1524
UY7	-0.055625	-0.044864	-0.054599	-0.038511	-0.054348	-0.049	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 828 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	1	2	15	6	MIN	AVG	MAX
EY1	1648	1875	1808	1502	1672	1502	1701	1875
EY2	152	152	151	154	151	151	152	154
EY3	128	140	141	130	151	128	138	151

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.779834	-0.741742	-0.750016	-0.785179	-0.760692	-0.718	0
UY2	-0.425668	-0.410921	-0.411704	-0.416183	-0.410258	-0.448	300
UY3	-0.225747	-0.214800	-0.214197	-0.217280	-0.212060	-0.254	614
UY4	-0.159251	-0.148220	-0.148269	-0.153025	-0.146692	-0.156	914
UY5	-0.129124	-0.118768	-0.119339	-0.123850	-0.117983	-0.112	1219
UY6	-0.111447	-0.101966	-0.102889	-0.106652	-0.101768	-0.088	1524
UY7	-0.099802	-0.091092	-0.092269	-0.095317	-0.091415	-0.073	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	7	1	11	9	MIN	AVG	MAX
EY1	6729	4310	3000	8562	1684	1684	4857	8562
EY2	154	162	200	153	154	153	165	200
EY3	75	141	100	112	73	73	100	141

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.669972	-0.566952	-0.557058	-0.522751	-0.913399	-0.718	0
UY2	-0.509265	-0.365277	-0.329943	-0.387382	-0.557588	-0.448	300
UY3	-0.358496	-0.206631	-0.181650	-0.252153	-0.354579	-0.254	614
UY4	-0.281831	-0.139265	-0.124645	-0.180072	-0.282779	-0.156	914
UY5	-0.241471	-0.108079	-0.095931	-0.142541	-0.246214	-0.112	1219
UY6	-0.217229	-0.090773	-0.077448	-0.121469	-0.222226	-0.088	1524
UY7	-0.200759	-0.079684	-0.064269	-0.108234	-0.205054	-0.073	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	10	1	3	4	MIN	AVG	MAX
EY1	4310	6802	3000	8631	7256	3000	6000	8631
EY2	162	154	200	152	189	152	171	200
EY3	141	75	100	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.566952	-0.608609	-0.557058	-0.487553	-0.446217	-0.718	0
UY2	-0.365277	-0.450890	-0.329943	-0.350173	-0.303691	-0.448	300
UY3	-0.206631	-0.301861	-0.181650	-0.214031	-0.176649	-0.254	614
UY4	-0.139265	-0.225161	-0.124645	-0.143210	-0.115587	-0.156	914
UY5	-0.108079	-0.184334	-0.095931	-0.107935	-0.084878	-0.112	1219
UY6	-0.090773	-0.159655	-0.077448	-0.089280	-0.067020	-0.088	1524
UY7	-0.079684	-0.142846	-0.064269	-0.078214	-0.055168	-0.073	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1173 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	7	16	3	8	MIN	AVG	MAX
EY1	2007	1707	2926	2763	1574	1574	2195	2926
EY2	151	151	151	152	151	151	151	152
EY3	167	172	104	151	176	104	154	176

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.031140	-1.068500	-0.985759	-0.965761	-1.085460	-0.991	0
UY2	-0.581506	-0.579299	-0.617683	-0.589272	-0.576128	-0.636	300
UY3	-0.310391	-0.302145	-0.356950	-0.332547	-0.296676	-0.365	614
UY4	-0.216595	-0.210059	-0.253522	-0.235427	-0.205595	-0.224	914
UY5	-0.175542	-0.169942	-0.204530	-0.192125	-0.165998	-0.160	1219
UY6	-0.152845	-0.147778	-0.175467	-0.168148	-0.144164	-0.125	1524
UY7	-0.138600	-0.133943	-0.155858	-0.152929	-0.130594	-0.103	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	10	3	9	MIN	AVG	MAX
EY1	4310	3000	8441	8631	1684	1684	5213	8631
EY2	162	200	154	152	154	152	164	200
EY3	141	100	141	144	73	73	120	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.803182	-0.789165	-0.692815	-0.690700	-1.293980	-0.991	0
UY2	-0.517476	-0.467419	-0.501698	-0.496078	-0.789916	-0.636	300
UY3	-0.292727	-0.257337	-0.313475	-0.303211	-0.502320	-0.365	614
UY4	-0.197293	-0.176581	-0.215001	-0.202880	-0.400604	-0.224	914
UY5	-0.153111	-0.135902	-0.165029	-0.152908	-0.348803	-0.160	1219
UY6	-0.128596	-0.109718	-0.137901	-0.126479	-0.314820	-0.125	1524
UY7	-0.112886	-0.091048	-0.121453	-0.110803	-0.290493	-0.103	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	10	1	3	14	MIN	AVG	MAX
EY1	4310	8441	3000	8631	8512	3000	6579	8631
EY2	162	154	200	152	153	152	164	200
EY3	141	75	100	144	129	75	118	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.803182	-0.823313	-0.789165	-0.690700	-0.666151	-0.991	0
UY2	-0.517476	-0.628128	-0.467419	-0.496078	-0.474730	-0.636	300
UY3	-0.292727	-0.431488	-0.257337	-0.303211	-0.285349	-0.365	614
UY4	-0.197293	-0.323972	-0.176581	-0.202880	-0.185427	-0.224	914
UY5	-0.153111	-0.264998	-0.135902	-0.152908	-0.133966	-0.160	1219
UY6	-0.128596	-0.229394	-0.109718	-0.126479	-0.105453	-0.125	1524
UY7	-0.112886	-0.205432	-0.091048	-0.110803	-0.087802	-0.103	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1347 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	5	7	2	13	MIN	AVG	MAX
EY1	9502	9468	9615	9660	9845	9468	9618	9845
EY2	190	184	176	168	168	168	177	190
EY3	179	166	190	188	178	166	180	190

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.687754	-0.710060	-0.703797	-0.720948	-0.705491	-1.120	0
UY2	-0.498113	-0.516986	-0.508563	-0.525034	-0.511539	-0.721	300
UY3	-0.316146	-0.329701	-0.317696	-0.330257	-0.317089	-0.417	614
UY4	-0.223935	-0.233862	-0.219945	-0.228855	-0.214967	-0.258	914
UY5	-0.178492	-0.186333	-0.172203	-0.178972	-0.164314	-0.182	1219
UY6	-0.154339	-0.160982	-0.147590	-0.153390	-0.138120	-0.146	1524
UY7	-0.139864	-0.145739	-0.133394	-0.138827	-0.123074	-0.118	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	11	14	15	12	MIN	AVG	MAX
EY1	9315	9157	8570	9617	9759	8570	9284	9759
EY2	584	355	309	291	279	279	264	584
EY3	238	239	247	228	247	228	240	247

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.322175	-0.427652	-0.459642	-0.467242	-0.471531	-1.120	0
UY2	-0.200409	-0.270624	-0.289528	-0.303359	-0.306163	-0.721	300
UY3	-0.118799	-0.148146	-0.153367	-0.164748	-0.164473	-0.417	614
UY4	-0.086125	-0.096292	-0.094956	-0.102371	-0.100113	-0.258	914
UY5	-0.069028	-0.071597	-0.067761	-0.072839	-0.069867	-0.182	1219
UY6	-0.057705	-0.057162	-0.052530	-0.056404	-0.053432	-0.146	1524
UY7	-0.049451	-0.047463	-0.042644	-0.045810	-0.043105	-0.118	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	2	10	11	6	9	MIN	AVG	MAX
EY1	8625	9587	9883	8528	9688	8528	9262	9883
EY2	401	298	283	215	167	167	273	401
EY3	128	236	247	202	237	128	210	247

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.517774	-0.522599	-0.523681	-0.651340	-0.640728	-1.120	0
UY2	-0.365086	-0.358963	-0.360323	-0.455392	-0.445535	-0.721	300
UY3	-0.250271	-0.222421	-0.220713	-0.280402	-0.251720	-0.417	614
UY4	-0.200081	-0.162131	-0.158117	-0.198128	-0.151395	-0.258	914
UY5	-0.173018	-0.134177	-0.129370	-0.159423	-0.102830	-0.182	1219
UY6	-0.154843	-0.118917	-0.114121	-0.139029	-0.078682	-0.146	1524
UY7	-0.141366	-0.109215	-0.104680	-0.126655	-0.065489	-0.118	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L

DISTRIBUTION OF VERTICAL STRESSES

SET	DEPTH (mm)	RATIO z/ao	LOAD 1: 578 kPa					AVG.	STRE RATIO p/po	LOAD 2: 828 kPa					AVG.	STRES RATIO p/po	LOAD 3: 1173 kPa					AVG.	STRES RATIO p/po	LOAD 4: 1347 kPa					AVG.	STRES RATIO p/po
			11	16	5	9	13			8	1	2	15	6			4	7	16	3	8			4	5	7	2	13		
S1	30	0.19	-0.495	-0.501	-0.498	-0.492	-0.501	-0.498	0.861	-0.720	-0.716	-0.717	-0.724	-0.720	-0.720	0.869	-1.013	-1.020	-0.994	-0.998	-1.024	-1.010	0.861	-1.101	-1.099	-1.097	-1.096	-1.095	-1.098	0.815
S25	90	0.57	-0.293	-0.309	-0.299	-0.282	-0.309	-0.299	0.516	-0.449	-0.436	-0.439	-0.460	-0.448	-0.447	0.540	-0.616	-0.638	-0.561	-0.573	-0.649	-0.607	0.518	-0.526	-0.521	-0.520	-0.512	-0.508	-0.517	0.384
S49	232	1.46	-0.123	-0.136	-0.129	-0.118	-0.136	-0.129	0.222	-0.203	-0.194	-0.197	-0.212	-0.201	-0.201	0.243	-0.266	-0.282	-0.230	-0.236	-0.289	-0.260	0.222	-0.176	-0.174	-0.171	-0.166	-0.165	-0.170	0.126
S73	426	2.68	-0.056	-0.061	-0.060	-0.057	-0.062	-0.059	0.102	-0.094	-0.091	-0.094	-0.098	-0.092	-0.094	0.113	-0.120	-0.125	-0.110	-0.110	-0.128	-0.119	0.101	-0.097	-0.098	-0.096	-0.094	-0.095	-0.096	0.071
S97	630	3.96	-0.032	-0.034	-0.033	-0.033	-0.034	-0.033	0.057	-0.051	-0.051	-0.052	-0.053	-0.051	-0.052	0.062	-0.067	-0.069	-0.062	-0.062	-0.070	-0.066	0.056	-0.060	-0.061	-0.060	-0.060	-0.061	-0.060	0.045
S121	834	5.25	-0.020	-0.021	-0.021	-0.021	-0.022	-0.021	0.036	-0.032	-0.032	-0.033	-0.033	-0.032	-0.033	0.039	-0.043	-0.044	-0.039	-0.040	-0.045	-0.042	0.036	-0.040	-0.041	-0.042	-0.041	-0.042	-0.041	0.031
S145	1038	6.53	-0.014	-0.014	-0.014	-0.015	-0.015	-0.014	0.025	-0.022	-0.022	-0.022	-0.022	-0.022	-0.022	0.027	-0.030	-0.031	-0.025	-0.028	-0.031	-0.029	0.025	-0.029	-0.029	-0.030	-0.030	-0.030	-0.030	0.022
S169	1640	10.31	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	0.012	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	0.012	-0.014	-0.014	-0.012	-0.013	-0.014	-0.013	0.011	-0.014	-0.014	-0.015	-0.015	-0.015	-0.015	0.011
S193	2640	16.60	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.004

MAXIMUM DEFLECTION

SET	DEPTH (mm)	RATIO z/ao	LOAD 1: 578 kPa					AVG.	STRE RATIO p/po	LOAD 2: 828 kPa					AVG.	STRES RATIO p/po	LOAD 3: 1173 kPa					AVG.	STRES RATIO p/po	LOAD 4: 1347 kPa					AVG.	STRES RATIO p/po
			7	1	10	3	9			12	7	1	11	9			7	1	10	3	9			9	11	14	15	12		
S1	30	0.19	-0.483	-0.495	-0.471	-0.470	-0.503	-0.484	0.838	-0.679	-0.692	-0.710	-0.674	-0.720	-0.695	0.839	-0.981	-1.005	-0.956	-0.953	-1.020	-0.983	0.838	-1.152	-1.126	-1.124	-1.116	-1.113	-1.126	0.836
S25	90	0.57	-0.258	-0.291	-0.222	-0.222	-0.316	-0.262	0.453	-0.332	-0.369	-0.417	-0.316	-0.453	-0.377	0.456	-0.523	-0.591	-0.451	-0.451	-0.641	-0.531	0.453	-0.673	-0.609	-0.594	-0.575	-0.572	-0.604	0.449
S49	232	1.46	-0.100	-0.125	-0.072	-0.073	-0.142	-0.102	0.177	-0.116	-0.143	-0.179	-0.103	-0.204	-0.149	0.180	-0.202	-0.253	-0.146	-0.148	-0.289	-0.208	0.177	-0.282	-0.240	-0.231	-0.216	-0.210	-0.236	0.175
S73	426	2.68	-0.050	-0.058	-0.039	-0.042	-0.065	-0.051	0.088	-0.064	-0.071	-0.084	-0.057	-0.093	-0.074	0.089	-0.101	-0.119	-0.080	-0.085	-0.132	-0.103	0.088	-0.129	-0.124	-0.121	-0.117	-0.112	-0.120	0.089
S97	630	3.96	-0.029	-0.032	-0.024	-0.026	-0.034	-0.029	0.050	-0.038	-0.042	-0.045	-0.035	-0.049	-0.042	0.051	-0.059	-0.064	-0.049	-0.054	-0.070	-0.059	0.050	-0.069	-0.072	-0.071	-0.069	-0.067	-0.070	0.052
S121	834	5.25	-0.019	-0.019	-0.016	-0.018	-0.020	-0.018	0.032	-0.024	-0.027	-0.027	-0.024	-0.029	-0.026	0.032	-0.038	-0.038	-0.033	-0.037	-0.041	-0.038	0.032	-0.040	-0.045	-0.046	-0.045	-0.044	-0.044	0.033
S145	1038	6.53	-0.013	-0.012	-0.012	-0.013	-0.013	-0.012	0.021	-0.015	-0.018	-0.017	-0.016	-0.018	-0.017	0.021	-0.026	-0.024	-0.023	-0.026	-0.026	-0.025	0.021	-0.024	-0.030	-0.031	-0.031	-0.031	-0.029	0.022
S169	1640	10.31	-0.006	-0.005	-0.006	-0.006	-0.006	-0.006	0.010	-0.007	-0.009	-0.008	-0.008	-0.008	-0.008	0.010	-0.013	-0.011	-0.012	-0.013	-0.011	-0.012	0.010	-0.011	-0.014	-0.015	-0.015	-0.015	-0.014	0.010
S193	2640	16.60	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.004	-0.005	-0.005	-0.004	-0.005	0.004	-0.005	-0.005	-0.006	-0.006	-0.006	-0.005	0.004

RMS VALUE OF DEFLECTIONS

SET	DEPTH (mm)	RATIO z/ao	LOAD 1: 578 kPa					AVG.	STRE RATIO p/po	LOAD 2: 828 kPa					AVG.	STRES RATIO p/po	LOAD 3: 1173 kPa					AVG.	STRES RATIO p/po	LOAD 4: 1347 kPa					AVG.	STRES RATIO p/po
			7	1	3	4	6			7	10	1	3	4			7	10	1	3	14			2	10	11	6	9		
S1	30	0.19	-0.483	-0.495	-0.470	-0.476	-0.476	-0.480	0.830	-0.692	-0.679	-0.710	-0.673	-0.682	-0.687	0.830	-0.981	-0.955	-1.005	-0.953	-0.956	-0.970	0.827	-1.136	-1.116	-1.113	-1.109	-1.096	-1.114	0.827
S25	90	0.57	-0.258	-0.291	-0.222	-0.241	-0.237	-0.250	0.432	-0.369	-0.330	-0.417	-0.318	-0.345	-0.356	0.430	-0.523	-0.448	-0.591	-0.451	-0.451	-0.493	0.420	-0.629	-0.580	-0.570	-0.552	-0.511	-0.569	0.422
S49	232	1.46	-0.100	-0.125	-0.073	-0.086	-0.085	-0.094	0.162	-0.143	-0.114	-0.179	-0.104	-0.123	-0.133	0.160	-0.202	-0.146	-0.253	-0.148	-0.146	-0.179	0.153	-0.253	-0.219	-0.212	-0.197	-0.165	-0.209	0.155
S73	426	2.68	-0.050	-0.058	-0.042	-0.045	-0.046	-0.048	0.084	-0.071	-0.061	-0.084	-0.060	-0.065	-0.068	0.082	-0.101	-0.082	-0.119	-0.085	-0.079	-0.093	0.079	-0.121	-0.118	-0.117	-0.107	-0.093	-0.111	0.083
S97	630	3.96	-0.029	-0.032	-0.026	-0.027	-0.028	-0.028	0.049	-0.042	-0.036	-0.045	-0.038	-0.038	-0.040	0.048	-0.059	-0.049	-0.064	-0.054	-0.049	-0.055	0.047	-0.065	-0.070	-0.071	-0.065	-0.060	-0.066	0.049
S121	834	5.25	-0.019	-0.019	-0.018	-0.017	-0.019	-0.018	0.032	-0.027	-0.023	-0.027	-0.026	-0.025	-0.025	0.031	-0.038	-0.031	-0.038	-0.037	-0.033	-0.035	0.030	-0.038	-0.046	-0.047	-0.044	-0.042	-0.043	0.032
S145	1038	6.53	-0.013	-0.012	-0.013	-0.011	-0.013	-0.012	0.022	-0.018	-0.015	-0.017	-0.018	-0.016	-0.017	0.021	-0.026	-0.021	-0.024	-0.026	-0.023	-0.024	0.020	-0.022	-0.032	-0.033	-0.031	-0.031	-0.030	0.022
S169	1640	10.31	-0.006	-0.005	-0.006	-0.006	-0.006	-0.006	0.010	-0.009	-0.007	-0.008	-0.009	-0.008	-0.008	0.010	-0.013	-0.010	-0.011	-0.013	-0.012	-0.012	0.010	-0.010	-0.015	-0.015	-0.015	-0.016	-0.014	0.010
S193	2640	16.60	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003	0.004	-0.005	-0.004	-0.004	-0.005	-0.005	-0.005	0.004	-0.004	-0.005	-0.006	-0.006	-0.006	-0.005	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 588 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	12	4	1	5	MIN	AVG	MAX
EY1	3695	3851	3924	4336	4095	3695	3980	4336
EY2	154	153	152	154	152	152	153	154
EY3	185	193	190	157	189	157	183	193

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.414432	-0.408773	-0.405884	-0.404441	-0.401709	-0.405	0
UY2	-0.253439	-0.251483	-0.250316	-0.258094	-0.249946	-0.271	300
UY3	-0.131996	-0.131132	-0.129872	-0.141041	-0.130671	-0.147	614
UY4	-0.083992	-0.083145	-0.080977	-0.091745	-0.081572	-0.083	914
UY5	-0.063749	-0.063044	-0.060115	-0.069917	-0.060502	-0.057	1219
UY6	-0.053537	-0.053084	-0.049631	-0.058505	-0.049923	-0.045	1524
UY7	-0.047468	-0.047262	-0.043452	-0.051515	-0.043699	-0.037	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	3	4	11	MIN	AVG	MAX
EY1	4310	3000	8631	7256	8563	3000	6352	8631
EY2	162	200	152	189	153	152	171	200
EY3	141	100	144	119	225	100	146	225

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.402485	-0.394782	-0.346254	-0.316455	-0.312456	-0.405	0
UY2	-0.259341	-0.233646	-0.248718	-0.215303	-0.216894	-0.271	300
UY3	-0.146726	-0.128489	-0.152052	-0.125174	-0.123211	-0.147	614
UY4	-0.098911	-0.088163	-0.101757	-0.081903	-0.075839	-0.083	914
UY5	-0.076791	-0.067929	-0.076708	-0.060188	-0.053671	-0.057	1219
UY6	-0.064527	-0.054934	-0.063464	-0.047586	-0.043095	-0.045	1524
UY7	-0.056673	-0.045672	-0.055612	-0.039229	-0.037531	-0.037	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	9	3	4	MIN	AVG	MAX
EY1	4310	3000	2993	8631	7256	2993	5238	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	222	144	119	100	145	222

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.402485	-0.394782	-0.410148	-0.346254	-0.316455	-0.405	0
UY2	-0.259341	-0.233646	-0.229247	-0.248718	-0.215303	-0.271	300
UY3	-0.146726	-0.128489	-0.103119	-0.152052	-0.125174	-0.147	614
UY4	-0.098911	-0.088163	-0.056799	-0.101757	-0.081903	-0.083	914
UY5	-0.076791	-0.067929	-0.038034	-0.076708	-0.060188	-0.057	1219
UY6	-0.064527	-0.054934	-0.028779	-0.063464	-0.047586	-0.045	1524
UY7	-0.056673	-0.045672	-0.023421	-0.055612	-0.039229	-0.037	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 844 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	5	8	13	16	MIN	AVG	MAX
EY1	4179	3253	2926	5435	5594	2926	4277	5594
EY2	153	160	158	151	152	151	155	160
EY3	134	163	176	135	134	134	149	176

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.575971	-0.602889	-0.621812	-0.550312	-0.544139	-0.574	0
UY2	-0.363630	-0.360573	-0.364529	-0.367224	-0.365540	-0.389	300
UY3	-0.195092	-0.187529	-0.187442	-0.208974	-0.209261	-0.216	614
UY4	-0.122625	-0.120194	-0.120585	-0.135747	-0.136045	-0.125	914
UY5	-0.088756	-0.090301	-0.091319	-0.100703	-0.100780	-0.085	1219
UY6	-0.069882	-0.073966	-0.075483	-0.081478	-0.081421	-0.068	1524
UY7	-0.057769	-0.063663	-0.065617	-0.069379	-0.069249	-0.055	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	3	12	4	MIN	AVG	MAX
EY1	4310	3000	8631	8448	7256	3000	6329	8631
EY2	162	200	152	154	189	152	171	200
EY3	141	100	144	157	119	100	132	157

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.577717	-0.566660	-0.497003	-0.461698	-0.454231	-0.574	0
UY2	-0.372251	-0.335370	-0.357004	-0.321398	-0.309040	-0.389	300
UY3	-0.210607	-0.184430	-0.218251	-0.183602	-0.179672	-0.216	614
UY4	-0.141974	-0.126547	-0.146059	-0.112752	-0.117561	-0.125	914
UY5	-0.110223	-0.097503	-0.110104	-0.077955	-0.086392	-0.085	1219
UY6	-0.092621	-0.078851	-0.091095	-0.059829	-0.068303	-0.068	1524
UY7	-0.081347	-0.065557	-0.079824	-0.049219	-0.056309	-0.055	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	7	1	3	10	MIN	AVG	MAX
EY1	5079	4310	3000	8631	8441	3000	5892	8631
EY2	154	162	200	152	154	152	164	200
EY3	124	141	100	144	75	75	117	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.557421	-0.577717	-0.566660	-0.497003	-0.550197	-0.574	0
UY2	-0.367046	-0.372251	-0.335370	-0.357004	-0.409529	-0.389	300
UY3	-0.206505	-0.210607	-0.184430	-0.218251	-0.267779	-0.216	614
UY4	-0.133515	-0.141974	-0.126547	-0.146059	-0.190356	-0.125	914
UY5	-0.098422	-0.110223	-0.097503	-0.110104	-0.147937	-0.085	1219
UY6	-0.078728	-0.092621	-0.078851	-0.091095	-0.122319	-0.068	1524
UY7	-0.066039	-0.081347	-0.065557	-0.079824	-0.105043	-0.055	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 1192 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	4	7	9	10	MIN	AVG	MAX
EY1	3985	4013	4585	4861	4972	3985	4483	4972
EY2	155	153	152	152	152	152	153	155
EY3	136	163	164	162	164	136	158	164

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.838433	-0.839131	-0.808144	-0.797403	-0.791203	-0.826	0
UY2	-0.525055	-0.522480	-0.517512	-0.513267	-0.512800	-0.539	300
UY3	-0.281486	-0.277653	-0.281007	-0.278216	-0.280167	-0.305	614
UY4	-0.180746	-0.177923	-0.179274	-0.176853	-0.178919	-0.181	914
UY5	-0.135351	-0.134427	-0.133592	-0.132036	-0.134080	-0.121	1219
UY6	-0.110534	-0.111707	-0.109682	-0.109078	-0.111237	-0.097	1524
UY7	-0.094694	-0.097793	-0.095137	-0.095286	-0.097597	-0.079	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	12	3	4	MIN	AVG	MAX
EY1	4310	3000	8448	8631	7256	3000	6329	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	75	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.815923	-0.800307	-0.779393	-0.701929	-0.641520	-0.826	0
UY2	-0.525738	-0.473650	-0.580703	-0.504204	-0.436464	-0.539	300
UY3	-0.297444	-0.260475	-0.381201	-0.308241	-0.253754	-0.305	614
UY4	-0.200513	-0.178726	-0.272352	-0.206283	-0.166034	-0.181	914
UY5	-0.155671	-0.137706	-0.212630	-0.155502	-0.122013	-0.121	1219
UY6	-0.130811	-0.111363	-0.176493	-0.128655	-0.096466	-0.097	1524
UY7	-0.114888	-0.092587	-0.152098	-0.112737	-0.079526	-0.079	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	14	3	10	MIN	AVG	MAX
EY1	4310	3000	6108	8631	8441	3000	6098	8631
EY2	162	200	153	152	154	152	164	200
EY3	141	100	137	144	75	75	119	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.815923	-0.800307	-0.735451	-0.701929	-0.777056	-0.826	0
UY2	-0.525738	-0.473650	-0.494978	-0.504204	-0.578387	-0.539	300
UY3	-0.297444	-0.260475	-0.280180	-0.308241	-0.378190	-0.305	614
UY4	-0.200513	-0.178726	-0.177815	-0.206283	-0.268844	-0.181	914
UY5	-0.155671	-0.137706	-0.128213	-0.155502	-0.208935	-0.121	1219
UY6	-0.130811	-0.111363	-0.101084	-0.128655	-0.172753	-0.097	1524
UY7	-0.114888	-0.092587	-0.084123	-0.112737	-0.148355	-0.079	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 1360 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	15	8	14	7	MIN	AVG	MAX
EY1	4007	4197	3765	4174	3768	3765	3982	4197
EY2	151	151	151	151	151	151	151	151
EY3	134	125	152	133	153	125	139	153

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.957705	-0.960424	-0.968034	-0.943629	-0.966645	-0.947	0
UY2	-0.599350	-0.611414	-0.598156	-0.593670	-0.596417	-0.605	300
UY3	-0.317227	-0.331788	-0.313732	-0.314272	-0.311827	-0.344	614
UY4	-0.199192	-0.212520	-0.197319	-0.195922	-0.195766	-0.206	914
UY5	-0.145869	-0.157777	-0.145720	-0.142214	-0.144629	-0.138	1219
UY6	-0.116836	-0.127598	-0.118204	-0.112998	-0.117506	-0.112	1524
UY7	-0.098376	-0.108212	-0.101087	-0.094439	-0.100684	-0.092	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	12	3	4	MIN	AVG	MAX
EY1	4310	3000	8448	8631	7256	3000	6329	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	75	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.930919	-0.913101	-0.888839	-0.800859	-0.731936	-0.947	0
UY2	-0.599836	-0.540406	-0.662389	-0.575267	-0.497979	-0.605	300
UY3	-0.339366	-0.297187	-0.434915	-0.351684	-0.289518	-0.344	614
UY4	-0.228773	-0.203915	-0.310742	-0.235356	-0.189435	-0.206	914
UY5	-0.177611	-0.157114	-0.242593	-0.177419	-0.139209	-0.138	1219
UY6	-0.149247	-0.127059	-0.201356	-0.146787	-0.110062	-0.112	1524
UY7	-0.131080	-0.105636	-0.173522	-0.128626	-0.090735	-0.092	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	10	9	3	MIN	AVG	MAX
EY1	4310	3000	5523	3567	8631	3000	5006	8631
EY2	162	200	154	154	152	152	164	200
EY3	141	100	220	205	144	100	162	220

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.930919	-0.913101	-0.844099	-0.911096	-0.800859	-0.947	0
UY2	-0.599836	-0.540406	-0.552338	-0.532115	-0.575267	-0.605	300
UY3	-0.339366	-0.297187	-0.301750	-0.250213	-0.351684	-0.344	614
UY4	-0.228773	-0.203915	-0.191130	-0.140460	-0.235356	-0.206	914
UY5	-0.177611	-0.157114	-0.143620	-0.094839	-0.177419	-0.138	1219
UY6	-0.149247	-0.127059	-0.121264	-0.072183	-0.146787	-0.112	1524
UY7	-0.131080	-0.105636	-0.109065	-0.058945	-0.128626	-0.092	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN			LOAD 1: 588 kPa					LOAD 2: 844 kPa					LOAD 3: 1192 kPa					LOAD 4: 1360 kPa												
SET	DEPTH (mm)	DEPTH RATIO z/ao	2	12	4	1	5	AVG.	STRESS RATIO p/po	9	5	8	13	16	AVG.	STRESS RATIO p/po	16	4	7	9	10	AVG.	STRESS RATIO p/po	12	15	8	14	7	AVG.	STRESS RATIO p/po
S1	30	0.20	-0.493	-0.492	-0.492	-0.490	-0.491	-0.492	0.837	-0.706	-0.714	-0.717	-0.698	-0.698	-0.707	0.837	-0.997	-0.996	-0.991	-0.988	-0.988	-0.992	0.832	-1.137	-1.134	-1.140	-1.135	-1.140	-1.137	0.836
S25	90	0.60	-0.267	-0.264	-0.263	-0.258	-0.260	-0.262	0.446	-0.375	-0.399	-0.408	-0.355	-0.351	-0.378	0.448	-0.534	-0.538	-0.520	-0.514	-0.509	-0.523	0.439	-0.603	-0.597	-0.612	-0.597	-0.611	-0.604	0.444
S49	224	1.49	-0.107	-0.105	-0.103	-0.100	-0.101	-0.103	0.175	-0.142	-0.161	-0.167	-0.127	-0.125	-0.145	0.171	-0.211	-0.210	-0.196	-0.194	-0.191	-0.200	0.168	-0.237	-0.232	-0.241	-0.233	-0.242	-0.237	0.174
S73	432	2.88	-0.055	-0.055	-0.053	-0.052	-0.052	-0.053	0.091	-0.070	-0.077	-0.079	-0.064	-0.064	-0.073	0.084	-0.110	-0.109	-0.100	-0.104	-0.104	-0.105	0.088	-0.124	-0.122	-0.122	-0.123	-0.124	-0.123	0.090
S97	640	4.27	-0.033	-0.033	-0.031	-0.031	-0.031	-0.032	0.054	-0.040	-0.044	-0.045	-0.038	-0.038	-0.041	0.049	-0.064	-0.064	-0.059	-0.063	-0.063	-0.063	0.053	-0.073	-0.072	-0.072	-0.072	-0.073	-0.072	0.053
S121	848	5.65	-0.022	-0.022	-0.021	-0.020	-0.021	-0.021	0.036	-0.026	-0.029	-0.029	-0.025	-0.025	-0.027	0.031	-0.042	-0.042	-0.039	-0.042	-0.042	-0.041	0.035	-0.047	-0.046	-0.047	-0.047	-0.048	-0.047	0.035
S145	1056	7.04	-0.015	-0.015	-0.015	-0.014	-0.015	-0.015	0.025	-0.018	-0.020	-0.020	-0.017	-0.017	-0.018	0.022	-0.028	-0.030	-0.028	-0.030	-0.030	-0.029	0.024	-0.032	-0.032	-0.033	-0.032	-0.033	-0.032	0.024
S169	1660	11.07	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	0.012	-0.009	-0.009	-0.010	-0.009	-0.008	-0.009	0.011	-0.013	-0.014	-0.013	-0.014	-0.014	-0.014	0.012	-0.015	-0.015	-0.016	-0.015	-0.016	-0.015	0.011
S193	2660	17.73	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.003	-0.004	-0.004	-0.003	-0.003	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.004

MAXIMUM DEFECTION

SET	DEPTH (mm)	DEPTH RATIO z/ao	7	1	3	4	11	AVG.	STRESS RATIO p/po	7	1	3	12	4	AVG.	STRESS RATIO p/po	7	1	12	3	4	AVG.	STRESS RATIO p/po	7	1	12	3	4	AVG.	STRESS RATIO p/po
S1	30	0.20	-0.492	-0.504	-0.478	-0.484	-0.479	-0.487	0.829	-0.706	-0.723	-0.686	-0.687	-0.695	-0.699	0.829	-0.997	-1.022	-0.971	-0.969	-0.981	-0.988	0.829	-1.138	-1.166	-1.108	-1.105	-1.120	-1.127	0.829
S25	90	0.60	-0.262	-0.297	-0.226	-0.245	-0.224	-0.251	0.427	-0.377	-0.426	-0.325	-0.325	-0.352	-0.361	0.427	-0.532	-0.601	-0.458	-0.458	-0.497	-0.509	0.427	-0.607	-0.686	-0.522	-0.523	-0.567	-0.581	0.427
S49	224	1.49	-0.101	-0.126	-0.074	-0.087	-0.074	-0.092	0.157	-0.145	-0.181	-0.106	-0.107	-0.125	-0.133	0.157	-0.204	-0.256	-0.148	-0.149	-0.176	-0.187	0.157	-0.233	-0.292	-0.168	-0.170	-0.201	-0.213	0.157
S73	432	2.88	-0.050	-0.058	-0.042	-0.045	-0.043	-0.048	0.081	-0.072	-0.084	-0.060	-0.061	-0.065	-0.068	0.081	-0.101	-0.118	-0.080	-0.085	-0.092	-0.095	0.080	-0.115	-0.135	-0.092	-0.097	-0.105	-0.109	0.080
S97	640	4.27	-0.029	-0.031	-0.026	-0.027	-0.028	-0.028	0.048	-0.041	-0.045	-0.038	-0.039	-0.038	-0.040	0.048	-0.059	-0.064	-0.048	-0.053	-0.054	-0.055	0.047	-0.067	-0.073	-0.054	-0.061	-0.062	-0.063	0.047
S121	848	5.65	-0.019	-0.019	-0.018	-0.017	-0.019	-0.018	0.031	-0.027	-0.027	-0.026	-0.026	-0.024	-0.026	0.031	-0.038	-0.038	-0.030	-0.036	-0.034	-0.035	0.030	-0.043	-0.043	-0.034	-0.041	-0.039	-0.040	0.030
S145	1056	7.04	-0.013	-0.012	-0.013	-0.011	-0.014	-0.013	0.021	-0.018	-0.017	-0.018	-0.019	-0.016	-0.018	0.021	-0.026	-0.024	-0.020	-0.026	-0.023	-0.024	0.020	-0.029	-0.027	-0.022	-0.029	-0.026	-0.027	0.020
S169	1660	11.07	-0.006	-0.005	-0.006	-0.005	-0.007	-0.006	0.010	-0.009	-0.008	-0.009	-0.009	-0.008	-0.009	0.010	-0.012	-0.011	-0.010	-0.013	-0.011	-0.011	0.010	-0.014	-0.012	-0.011	-0.015	-0.013	-0.013	0.010
S193	2660	17.73	-0.002	-0.002	-0.002	-0.002	-0.003	-0.002	0.004	-0.003	-0.003	-0.004	-0.004	-0.003	-0.003	0.004	-0.005	-0.004	-0.004	-0.005	-0.005	-0.005	0.004	-0.006	-0.005	-0.005	-0.006	-0.005	-0.005	0.004

RMS VALUE OF DEFECTION

SET	DEPTH (mm)	DEPTH RATIO z/ao	7	1	9	3	4	AVG.	STRESS RATIO p/po	12	7	1	3	10	AVG.	STRESS RATIO p/po	7	1	14	3	10	AVG.	STRESS RATIO p/po	7	1	10	9	3	AVG.	STRESS RATIO p/po
S1	30	0.20	-0.492	-0.504	-0.498	-0.478	-0.484	-0.491	0.835	-0.700	-0.706	-0.723	-0.686	-0.687	-0.701	0.830	-0.997	-1.022	-0.982	-0.969	-0.971	-0.988	0.829	-1.138	-1.166	-1.124	-1.143	-1.105	-1.135	0.835
S25	90	0.60	-0.262	-0.297	-0.280	-0.226	-0.245	-0.262	0.445	-0.362	-0.377	-0.426	-0.325	-0.322	-0.362	0.429	-0.532	-0.601	-0.491	-0.458	-0.455	-0.507	0.426	-0.607	-0.686	-0.566	-0.622	-0.523	-0.601	0.442
S49	224	1.49	-0.101	-0.126	-0.116	-0.074	-0.087	-0.101	0.171	-0.132	-0.145	-0.181	-0.106	-0.105	-0.134	0.158	-0.204	-0.256	-0.172	-0.149	-0.149	-0.186	0.156	-0.233	-0.292	-0.208	-0.250	-0.170	-0.231	0.170
S73	432	2.88	-0.050	-0.058	-0.058	-0.042	-0.045	-0.051	0.086	-0.066	-0.072	-0.084	-0.060	-0.059	-0.068	0.081	-0.101	-0.118	-0.089	-0.085	-0.083	-0.095	0.080	-0.115	-0.135	-0.114	-0.128	-0.097	-0.118	0.087
S97	640	4.27	-0.029	-0.031	-0.034	-0.026	-0.027	-0.029	0.050	-0.038	-0.041	-0.045	-0.038	-0.035	-0.040	0.047	-0.059	-0.064	-0.053	-0.053	-0.050	-0.056	0.047	-0.067	-0.073	-0.071	-0.076	-0.061	-0.069	0.051
S121	848	5.65	-0.019	-0.019	-0.023	-0.018	-0.017	-0.019	0.032	-0.025	-0.027	-0.027	-0.026	-0.022	-0.025	0.030	-0.038	-0.038	-0.035	-0.036	-0.032	-0.036	0.030	-0.043	-0.043	-0.049	-0.051	-0.041	-0.045	0.033
S145	1056	7.04	-0.013	-0.012	-0.016	-0.013	-0.011	-0.013	0.022	-0.017	-0.018	-0.017	-0.018	-0.015	-0.017	0.020	-0.026	-0.024	-0.024	-0.026	-0.021	-0.024	0.020	-0.029	-0.027	-0.035	-0.036	-0.029	-0.031	0.023
S169	1660	11.07	-0.006	-0.005	-0.008	-0.006	-0.005	-0.006	0.011	-0.008	-0.009	-0.008	-0.009	-0.007	-0.008	0.010	-0.012	-0.011	-0.012	-0.013	-0.010	-0.012	0.010	-0.014	-0.012	-0.017	-0.017	-0.015	-0.015	0.011
S193	2660	17.73	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003	0.004	-0.005	-0.004	-0.005	-0.005	-0.004	-0.005	0.004	-0.006	-0.005	-0.006	-0.006	-0.006	-0.006	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 576 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	3	1	15	10	MIN	AVG	MAX
EY1	1738	1867	4374	2629	2045	1738	2531	4374
EY2	151	151	152	151	151	151	151	152
EY3	134	154	127	158	159	127	147	159

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.522336	-0.510002	-0.417950	-0.462462	-0.492353	-0.452	0
UY2	-0.278022	-0.275010	-0.271652	-0.266589	-0.268010	-0.313	300
UY3	-0.138168	-0.137221	-0.153948	-0.135612	-0.131813	-0.180	614
UY4	-0.091577	-0.091091	-0.103544	-0.088150	-0.085561	-0.106	914
UY5	-0.070557	-0.070898	-0.080244	-0.067726	-0.065593	-0.071	1219
UY6	-0.058291	-0.059543	-0.067348	-0.056625	-0.054532	-0.056	1524
UY7	-0.050251	-0.052302	-0.059071	-0.049640	-0.047532	-0.044	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	7	1	3	4	MIN	AVG	MAX
EY1	8441	4310	3000	8631	7256	3000	6328	8631
EY2	154	162	200	152	189	152	171	200
EY3	75	141	100	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.407911	-0.394840	-0.389334	-0.339300	-0.311418	-0.452	0
UY2	-0.313073	-0.254412	-0.231083	-0.243677	-0.212146	-0.313	300
UY3	-0.217839	-0.143777	-0.127413	-0.148820	-0.123463	-0.180	614
UY4	-0.165710	-0.096864	-0.087437	-0.099532	-0.080785	-0.106	914
UY5	-0.136896	-0.075117	-0.067138	-0.074986	-0.059230	-0.071	1219
UY6	-0.119354	-0.063025	-0.054009	-0.061995	-0.046642	-0.056	1524
UY7	-0.107498	-0.055268	-0.044645	-0.054281	-0.038275	-0.044	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	11	3	10	MIN	AVG	MAX
EY1	4310	3000	8563	8631	8441	3000	6589	8631
EY2	162	200	153	152	154	152	164	200
EY3	141	100	136	144	75	75	119	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.394840	-0.389334	-0.359360	-0.339300	-0.425881	-0.452	0
UY2	-0.254412	-0.231083	-0.264613	-0.243677	-0.328594	-0.313	300
UY3	-0.143777	-0.127413	-0.170651	-0.148820	-0.230759	-0.180	614
UY4	-0.096864	-0.087437	-0.121743	-0.099532	-0.177519	-0.106	914
UY5	-0.075117	-0.067138	-0.097288	-0.074986	-0.148344	-0.071	1219
UY6	-0.063025	-0.054009	-0.084259	-0.061995	-0.130696	-0.056	1524
UY7	-0.055268	-0.044645	-0.076461	-0.054281	-0.118802	-0.044	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 824 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	10	15	7	8	MIN	AVG	MAX
EY1	5109	5176	3436	5608	5583	3436	4982	5608
EY2	151	151	151	152	152	151	151	152
EY3	139	145	135	143	146	135	142	146

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.583146	-0.572076	-0.614592	-0.551269	-0.549586	-0.633	0
UY2	-0.396211	-0.383381	-0.376502	-0.371470	-0.369520	-0.449	300
UY3	-0.236796	-0.222928	-0.198965	-0.214667	-0.212745	-0.265	614
UY4	-0.164894	-0.151480	-0.127668	-0.143062	-0.141261	-0.159	914
UY5	-0.131417	-0.118864	-0.095430	-0.109891	-0.108210	-0.107	1219
UY6	-0.113460	-0.101704	-0.077530	-0.092372	-0.090807	-0.083	1524
UY7	-0.102318	-0.091188	-0.066032	-0.081637	-0.080181	-0.067	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	7	1	3	4	MIN	AVG	MAX
EY1	8441	4310	3000	8631	7256	3000	6328	8631
EY2	154	162	200	152	189	152	171	200
EY3	75	141	100	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.580574	-0.564841	-0.556963	-0.485388	-0.445501	-0.633	0
UY2	-0.444899	-0.363950	-0.330577	-0.348593	-0.303487	-0.449	300
UY3	-0.308650	-0.205681	-0.182271	-0.212895	-0.176620	-0.265	614
UY4	-0.234059	-0.138569	-0.125083	-0.142386	-0.115567	-0.159	914
UY5	-0.192819	-0.107459	-0.096045	-0.107271	-0.084732	-0.107	1219
UY6	-0.167706	-0.090161	-0.077262	-0.088687	-0.066724	-0.083	1524
UY7	-0.150728	-0.079064	-0.063867	-0.077653	-0.054755	-0.067	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	7	1	3	4	MIN	AVG	MAX
EY1	8457	4310	3000	8631	7256	3000	6331	8631
EY2	154	162	200	152	189	152	171	200
EY3	76	141	100	144	119	76	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.536874	-0.564841	-0.556963	-0.485388	-0.445501	-0.633	0
UY2	-0.399114	-0.363950	-0.330577	-0.348593	-0.303487	-0.449	300
UY3	-0.260390	-0.205681	-0.182271	-0.212895	-0.176620	-0.265	614
UY4	-0.184475	-0.138569	-0.125083	-0.142386	-0.115567	-0.159	914
UY5	-0.142578	-0.107459	-0.096045	-0.107271	-0.084732	-0.107	1219
UY6	-0.117093	-0.090161	-0.077262	-0.088687	-0.066724	-0.083	1524
UY7	-0.099869	-0.079064	-0.063867	-0.077653	-0.054755	-0.067	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1173 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	2	3	4	13	MIN	AVG	MAX
EY1	3018	3433	2348	1870	1681	1681	2470	3433
EY2	151	151	151	151	151	151	151	151
EY3	164	162	195	194	198	162	183	198

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.932193	-0.906040	-0.965975	-1.029090	-1.044850	-0.907	0
UY2	-0.565795	-0.567754	-0.548745	-0.555692	-0.554362	-0.627	300
UY3	-0.308744	-0.319691	-0.282582	-0.279464	-0.279737	-0.378	614
UY4	-0.211335	-0.221674	-0.189348	-0.188368	-0.189570	-0.230	914
UY5	-0.168984	-0.178290	-0.150179	-0.150130	-0.150744	-0.153	1219
UY6	-0.146244	-0.154949	-0.129605	-0.129786	-0.129692	-0.120	1524
UY7	-0.132112	-0.140432	-0.117158	-0.117427	-0.116805	-0.094	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	7	1	3	4	MIN	AVG	MAX
EY1	8441	4310	3000	8631	7256	3000	6328	8631
EY2	154	162	200	152	189	152	171	200
EY3	75	141	100	144	119	75	116	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.827792	-0.804076	-0.792862	-0.690971	-0.634190	-0.907	0
UY2	-0.634654	-0.518099	-0.470591	-0.496237	-0.432027	-0.627	300
UY3	-0.440702	-0.292796	-0.259470	-0.303065	-0.251426	-0.378	614
UY4	-0.334526	-0.197259	-0.178061	-0.202692	-0.164514	-0.230	914
UY5	-0.275828	-0.152973	-0.136724	-0.152705	-0.120620	-0.153	1219
UY6	-0.240087	-0.128347	-0.109986	-0.126250	-0.094985	-0.120	1524
UY7	-0.215926	-0.112550	-0.090918	-0.110542	-0.077946	-0.094	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	14	1	3	13	MIN	AVG	MAX
EY1	4310	8754	3000	8631	5441	3000	6027	8754
EY2	162	154	200	152	154	152	165	200
EY3	141	75	100	144	147	75	121	147

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.804076	-0.788958	-0.792862	-0.690971	-0.734571	-0.907	0
UY2	-0.518099	-0.598804	-0.470591	-0.496237	-0.479436	-0.627	300
UY3	-0.292796	-0.405063	-0.259470	-0.303065	-0.258744	-0.378	614
UY4	-0.197259	-0.297708	-0.178061	-0.202692	-0.158554	-0.230	914
UY5	-0.152973	-0.238002	-0.136724	-0.152705	-0.112193	-0.153	1219
UY6	-0.128347	-0.201614	-0.109986	-0.126250	-0.087630	-0.120	1524
UY7	-0.112550	-0.177038	-0.090918	-0.110542	-0.072525	-0.094	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1341 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	4	9	13	8	MIN	AVG	MAX
EY1	1191	1651	1152	1145	1136	1136	1255	1651
EY2	151	151	152	151	151	151	151	152
EY3	147	141	152	150	146	141	147	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.354740	-1.251450	-1.356630	-1.362770	-1.360610	-1.288	0
UY2	-0.684926	-0.677431	-0.677268	-0.678614	-0.674743	-0.697	300
UY3	-0.353898	-0.353519	-0.348535	-0.346563	-0.342272	-0.427	614
UY4	-0.250509	-0.247501	-0.246296	-0.243779	-0.239164	-0.263	914
UY5	-0.203531	-0.200636	-0.199657	-0.197108	-0.192061	-0.177	1219
UY6	-0.176314	-0.173799	-0.172662	-0.170126	-0.164649	-0.137	1524
UY7	-0.158781	-0.156449	-0.155320	-0.152794	-0.146949	-0.109	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	13	8	6	9	MIN	AVG	MAX
EY1	1064	1189	6045	1684	5198	1064	3036	6045
EY2	151	152	152	154	152	151	152	154
EY3	159	149	56	73	146	56	117	159

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.332660	-1.358000	-1.211290	-1.485290	-0.931984	-1.288	0
UY2	-0.602290	-0.668192	-0.930175	-0.908062	-0.623762	-0.697	300
UY3	-0.265447	-0.334311	-0.670062	-0.577595	-0.362669	-0.427	614
UY4	-0.166662	-0.234090	-0.537176	-0.460315	-0.247403	-0.263	914
UY5	-0.122714	-0.189512	-0.464145	-0.400078	-0.195304	-0.177	1219
UY6	-0.097611	-0.163921	-0.417500	-0.360383	-0.168090	-0.137	1524
UY7	-0.081648	-0.147520	-0.384255	-0.331964	-0.151457	-0.109	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	14	9	15	16	MIN	AVG	MAX
EY1	1556	1299	3375	5675	6062	1299	3593	6062
EY2	152	168	154	151	151	151	156	168
EY3	242	108	219	151	144	108	173	242

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.176160	-1.344080	-0.966588	-0.920775	-0.917637	-1.288	0
UY2	-0.595175	-0.743185	-0.578253	-0.636209	-0.644047	-0.697	300
UY3	-0.280529	-0.445589	-0.298006	-0.386164	-0.398235	-0.427	614
UY4	-0.181335	-0.346273	-0.191225	-0.270824	-0.282187	-0.263	914
UY5	-0.140471	-0.296434	-0.146742	-0.217313	-0.227460	-0.177	1219
UY6	-0.119374	-0.264914	-0.124465	-0.189372	-0.198642	-0.137	1524
UY7	-0.107035	-0.243187	-0.111439	-0.172534	-0.181196	-0.109	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 576 kPa					LOAD 2: 824 kPa					LOAD 3: 1173 kPa					LOAD 4: 1341 kPa												
DEPTH	DEPTH z/ao	2	3	1	15	10	AVG.	STRESS RATIO p/po	16	10	15	7	8	AVG.	STRESS RATIO p/po	16	2	3	4	13	AVG.	STRESS RATIO p/po	7	4	9	13	8	AVG.	STRESS RATIO p/po
12	0.20						-0.493	0.855	-0.682	-0.681	-0.693	-0.679	-0.680	-0.683	0.829	-0.992	-0.987	-1.004	-1.015	-1.022	-1.004	0.856	-1.186	-1.166	-1.189	-1.189	-1.189	-1.184	0.883
30	0.60	-0.500	-0.498	-0.479	-0.490	-0.496	-0.292	0.507	-0.348	-0.350	-0.380	-0.344	-0.345	-0.353	0.429	-0.564	-0.550	-0.595	-0.627	-0.643	-0.596	0.508	-0.784	-0.727	-0.795	-0.792	-0.792	-0.778	0.580
90	1.45	-0.142	-0.138	-0.099	-0.122	-0.134	-0.127	0.220	-0.130	-0.132	-0.155	-0.128	-0.128	-0.134	0.163	-0.233	-0.221	-0.256	-0.279	-0.287	-0.255	0.218	-0.369	-0.334	-0.374	-0.374	-0.375	-0.365	0.272
218	2.76	-0.068	-0.066	-0.053	-0.061	-0.065	-0.063	0.109	-0.070	-0.073	-0.080	-0.071	-0.071	-0.073	0.088	-0.116	-0.109	-0.123	-0.131	-0.129	-0.122	0.104	-0.164	-0.160	-0.164	-0.166	-0.167	-0.164	0.122
414	4.07	-0.038	-0.037	-0.032	-0.036	-0.037	-0.036	0.062	-0.042	-0.044	-0.047	-0.044	-0.044	-0.044	0.054	-0.067	-0.064	-0.071	-0.074	-0.072	-0.070	0.059	-0.089	-0.089	-0.089	-0.090	-0.090	-0.090	0.067
610	5.37	-0.024	-0.024	-0.021	-0.023	-0.024	-0.023	0.040	-0.028	-0.030	-0.030	-0.029	-0.029	-0.029	0.036	-0.044	-0.042	-0.047	-0.049	-0.047	-0.046	0.039	-0.056	-0.057	-0.056	-0.057	-0.057	-0.057	0.042
806	6.68	-0.016	-0.016	-0.014	-0.016	-0.016	-0.016	0.027	-0.020	-0.021	-0.021	-0.021	-0.021	-0.021	0.025	-0.031	-0.029	-0.033	-0.034	-0.033	-0.032	0.027	-0.038	-0.039	-0.038	-0.039	-0.038	-0.038	0.029
1002	10.67	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	0.013	-0.009	-0.010	-0.010	-0.010	-0.010	-0.010	0.012	-0.014	-0.014	-0.015	-0.016	-0.015	-0.015	0.013	-0.017	-0.017	-0.017	-0.017	-0.017	-0.017	0.019
1600	17.33	-0.003	-0.003	-0.002	-0.003	-0.003	-0.003	0.004	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH z/ao	10	7	1	3	4	AVG.	STRESS RATIO p/po	10	7	1	3	4	AVG.	STRESS RATIO p/po	10	7	1	3	4	AVG.	STRESS RATIO p/po	16	13	8	6	9	AVG.	STRESS RATIO p/po
30	0.20	-0.469	-0.482	-0.494	-0.468	-0.474	-0.477	0.829	-0.672	-0.689	-0.706	-0.670	-0.678	-0.683	0.829	-0.956	-0.981	-1.005	-0.953	-0.966	-0.972	0.829	-1.193	-1.186	-1.103	-1.166	-1.108	-1.151	0.858
90	0.60	-0.221	-0.257	-0.290	-0.221	-0.240	-0.246	0.427	-0.316	-0.368	-0.415	-0.317	-0.343	-0.352	0.427	-0.450	-0.523	-0.591	-0.451	-0.489	-0.501	0.427	-0.810	-0.791	-0.547	-0.733	-0.572	-0.690	0.515
218	1.45	-0.072	-0.101	-0.126	-0.073	-0.087	-0.092	0.159	-0.103	-0.144	-0.181	-0.105	-0.124	-0.131	0.159	-0.147	-0.205	-0.257	-0.149	-0.177	-0.187	0.159	-0.393	-0.379	-0.198	-0.335	-0.217	-0.304	0.227
414	2.76	-0.039	-0.052	-0.061	-0.043	-0.047	-0.048	0.084	-0.056	-0.074	-0.087	-0.062	-0.067	-0.069	0.084	-0.080	-0.105	-0.124	-0.088	-0.095	-0.098	0.084	-0.180	-0.176	-0.110	-0.157	-0.121	-0.149	0.111
610	4.07	-0.024	-0.030	-0.033	-0.028	-0.028	-0.029	0.050	-0.034	-0.044	-0.048	-0.039	-0.040	-0.041	0.050	-0.048	-0.062	-0.068	-0.056	-0.057	-0.058	0.050	-0.098	-0.096	-0.064	-0.084	-0.074	-0.083	0.062
806	5.37	-0.015	-0.020	-0.020	-0.019	-0.018	-0.018	0.032	-0.022	-0.028	-0.029	-0.027	-0.026	-0.026	0.032	-0.031	-0.040	-0.041	-0.039	-0.037	-0.037	0.032	-0.062	-0.061	-0.039	-0.050	-0.050	-0.052	0.039
1002	6.68	-0.010	-0.014	-0.013	-0.014	-0.012	-0.012	0.021	-0.014	-0.020	-0.018	-0.019	-0.017	-0.018	0.021	-0.020	-0.028	-0.026	-0.028	-0.025	-0.025	0.021	-0.042	-0.041	-0.024	-0.031	-0.035	-0.035	0.026
1600	10.67	-0.005	-0.006	-0.006	-0.007	-0.006	-0.006	0.010	-0.007	-0.009	-0.008	-0.009	-0.008	-0.008	0.010	-0.010	-0.013	-0.012	-0.013	-0.012	-0.012	0.010	-0.019	-0.018	-0.011	-0.013	-0.016	-0.015	0.012
2600	17.33	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003	0.004	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.006	-0.006	-0.005	-0.005	-0.006	-0.006	0.004

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH z/ao	7	1	11	3	10	AVG.	STRESS RATIO p/po	13	7	1	3	4	AVG.	STRESS RATIO p/po	7	14	1	3	13	AVG.	STRESS RATIO p/po	13	14	9	15	16	AVG.	STRESS RATIO p/po
30	0.20	-0.482	-0.494	-0.469	-0.468	-0.469	-0.476	0.827	-0.671	-0.689	-0.706	-0.670	-0.678	-0.683	0.829	-0.981	-0.954	-1.005	-0.953	-0.970	-0.973	0.829	-1.172	-1.189	-1.130	-1.106	-1.104	-1.140	0.850
90	0.60	-0.257	-0.290	-0.220	-0.221	-0.222	-0.242	0.420	-0.316	-0.368	-0.415	-0.317	-0.343	-0.352	0.427	-0.523	-0.445	-0.591	-0.451	-0.490	-0.500	0.426	-0.745	-0.793	-0.631	-0.554	-0.546	-0.654	0.488
218	1.45	-0.101	-0.126	-0.073	-0.073	-0.074	-0.089	0.155	-0.104	-0.144	-0.181	-0.105	-0.124	-0.132	0.160	-0.205	-0.145	-0.257	-0.149	-0.184	-0.188	0.160	-0.338	-0.368	-0.257	-0.203	-0.197	-0.273	0.203
414	2.76	-0.052	-0.061	-0.043	-0.043	-0.042	-0.048	0.084	-0.058	-0.074	-0.087	-0.062	-0.067	-0.070	0.084	-0.105	-0.082	-0.124	-0.088	-0.102	-0.100	0.085	-0.153	-0.157	-0.130	-0.111	-0.109	-0.132	0.098
610	4.07	-0.030	-0.033	-0.028	-0.028	-0.026	-0.029	0.050	-0.035	-0.044	-0.048	-0.039	-0.040	-0.041	0.050	-0.062	-0.050	-0.068	-0.056	-0.063	-0.060	0.051	-0.086	-0.083	-0.077	-0.068	-0.067	-0.076	0.057
806	5.37	-0.020	-0.020	-0.019	-0.019	-0.017	-0.019	0.033	-0.023	-0.028	-0.029	-0.027	-0.026	-0.026	0.032	-0.040	-0.032	-0.041	-0.039	-0.042	-0.039	0.033	-0.057	-0.050	-0.052	-0.046	-0.045	-0.050	0.037
1002	6.68	-0.014	-0.013	-0.013	-0.014	-0.011	-0.013	0.022	-0.015	-0.020	-0.018	-0.019	-0.017	-0.018	0.022	-0.028	-0.021	-0.026	-0.028	-0.030	-0.026	0.022	-0.040	-0.033	-0.037	-0.033	-0.032	-0.035	0.026
1600	10.67	-0.006	-0.006	-0.006	-0.007	-0.005	-0.006	0.011	-0.007	-0.009	-0.008	-0.009	-0.008	-0.008	0.010	-0.013	-0.010	-0.012	-0.013	-0.014	-0.012	0.011	-0.019	-0.014	-0.017	-0.015	-0.015	-0.016	0.012
2600	17.33	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003	0.004	-0.005	-0.004	-0.005	-0.005	-0.005	-0.005	0.004	-0.007	-0.005	-0.006	-0.006	-0.006	-0.006	0.004

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 ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 574 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
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CALCULATED MODULI (MPa)

SET	14	13	12	6	9	MIN	AVG	MAX
EY1	3867	3922	3552	3533	3811	3533	3737	3922
EY2	151	151	151	151	151	151	151	151
EY3	167	166	158	163	165	158	164	167

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.432896	-0.430327	-0.444616	-0.441698	-0.435617	-0.420	0
UY2	-0.257446	-0.256115	-0.259384	-0.257990	-0.260123	-0.270	300
UY3	-0.129989	-0.128912	-0.128974	-0.128304	-0.133358	-0.140	614
UY4	-0.081996	-0.080851	-0.081044	-0.080528	-0.085356	-0.079	914
UY5	-0.061424	-0.060252	-0.060398	-0.060022	-0.064435	-0.057	1219
UY6	-0.050451	-0.049274	-0.049170	-0.048947	-0.053101	-0.047	1524
UY7	-0.043636	-0.042455	-0.042092	-0.042006	-0.046003	-0.038	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
 =====

CALCULATED MODULI (MPa)

SET	7	1	9	3	4	MIN	AVG	MAX
EY1	4310	3000	4395	8631	7256	3000	5518	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	164	144	119	100	134	164

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.418243	-0.408973	-0.400040	-0.361999	-0.331005	-0.420	0
UY2	-0.259867	-0.233747	-0.241625	-0.251833	-0.217918	-0.270	300
UY3	-0.142017	-0.125833	-0.121385	-0.147822	-0.122249	-0.140	614
UY4	-0.095684	-0.086808	-0.073636	-0.097736	-0.079578	-0.079	914
UY5	-0.074669	-0.066904	-0.052425	-0.074022	-0.058713	-0.057	1219
UY6	-0.062802	-0.053843	-0.040909	-0.061584	-0.046423	-0.047	1524
UY7	-0.055088	-0.044496	-0.033677	-0.054073	-0.038136	-0.038	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	7	1	3	9	4	MIN	AVG	MAX
EY1	4310	3000	8631	2883	7256	2883	5216	8631
EY2	162	200	152	154	189	152	171	200
EY3	141	100	144	222	119	100	145	222

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.418243	-0.408973	-0.361999	-0.430632	-0.331005	-0.420	0
UY2	-0.259867	-0.233747	-0.251833	-0.228368	-0.217918	-0.270	300
UY3	-0.142017	-0.125833	-0.147822	-0.097527	-0.122249	-0.140	614
UY4	-0.095684	-0.086808	-0.097736	-0.053870	-0.079578	-0.079	914
UY5	-0.074669	-0.066904	-0.074022	-0.036561	-0.058713	-0.057	1219
UY6	-0.062802	-0.053843	-0.061584	-0.027847	-0.046423	-0.047	1524
UY7	-0.055088	-0.044496	-0.054073	-0.022722	-0.038136	-0.038	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 825 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	11	10	14	6	16	MIN	AVG	MAX
EY1	6385	6379	7062	6527	5929	5929	6456	7062
EY2	151	151	151	151	151	151	151	151
EY3	108	117	110	137	150	108	124	150

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.562980	-0.552934	-0.544296	-0.552297	-0.557837	-0.584	0
UY2	-0.370474	-0.362913	-0.364131	-0.365246	-0.360204	-0.385	300
UY3	-0.203330	-0.197505	-0.202347	-0.202204	-0.193647	-0.205	614
UY4	-0.128050	-0.122922	-0.127103	-0.129369	-0.122440	-0.120	914
UY5	-0.092017	-0.087532	-0.090724	-0.095806	-0.090918	-0.083	1219
UY6	-0.071521	-0.067735	-0.070221	-0.077804	-0.074484	-0.070	1524
UY7	-0.058046	-0.054919	-0.056887	-0.066560	-0.064389	-0.057	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	3	9	1	4	7	MIN	AVG	MAX
EY1	8631	5272	3000	7256	4310	3000	5694	8631
EY2	152	151	200	189	162	151	171	200
EY3	144	143	100	119	141	100	129	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.520295	-0.567670	-0.587809	-0.475748	-0.601133	-0.584	0
UY2	-0.361956	-0.359417	-0.335960	-0.313210	-0.373502	-0.385	300
UY3	-0.212461	-0.189970	-0.180857	-0.175707	-0.204119	-0.205	614
UY4	-0.140474	-0.118219	-0.124768	-0.114375	-0.137525	-0.120	914
UY5	-0.106391	-0.085400	-0.096160	-0.084387	-0.107320	-0.083	1219
UY6	-0.088514	-0.067427	-0.077387	-0.066723	-0.090264	-0.070	1524
UY7	-0.077718	-0.056031	-0.063953	-0.054812	-0.079178	-0.057	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	3	15	1	7	4	MIN	AVG	MAX
EY1	8631	9683	3000	4310	7256	3000	6576	9683
EY2	152	151	200	162	189	151	171	200
EY3	144	157	100	141	119	100	132	157

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.520295	-0.491665	-0.587809	-0.601133	-0.475748	-0.584	0
UY2	-0.361956	-0.346533	-0.335960	-0.313210	-0.373502	-0.385	300
UY3	-0.212461	-0.204283	-0.180857	-0.204119	-0.175707	-0.205	614
UY4	-0.140474	-0.133134	-0.124768	-0.137525	-0.114375	-0.120	914
UY5	-0.106391	-0.098945	-0.096160	-0.107320	-0.084387	-0.083	1219
UY6	-0.088514	-0.081288	-0.077387	-0.090264	-0.066723	-0.070	1524
UY7	-0.077718	-0.070937	-0.063953	-0.079178	-0.054812	-0.057	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26; STA. 6 + 500 R; LOAD 1167 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	5	11	12	9	MIN	AVG	MAX
EY1	3290	3352	3441	3223	3720	3223	3405	3720
EY2	151	153	151	151	151	151	152	153
EY3	190	184	204	210	197	184	197	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.906444	-0.893329	-0.902990	-0.909842	-0.881616	-0.893	0
UY2	-0.523416	-0.518502	-0.527397	-0.523945	-0.525006	-0.530	300
UY3	-0.260642	-0.260975	-0.266604	-0.261340	-0.269199	-0.288	614
UY4	-0.166034	-0.167231	-0.172439	-0.168062	-0.173897	-0.170	914
UY5	-0.126104	-0.126899	-0.133296	-0.129526	-0.133728	-0.119	1219
UY6	-0.105014	-0.105189	-0.113090	-0.109694	-0.112877	-0.099	1524
UY7	-0.092132	-0.091746	-0.100976	-0.097863	-0.100299	-0.082	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	1	9	3	4	MIN	AVG	MAX
EY1	4310	3000	6346	8631	7256	3000	5909	8631
EY2	162	200	154	152	189	152	171	200
EY3	141	100	117	144	119	100	124	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.850329	-0.831483	-0.801382	-0.735980	-0.672966	-0.893	0
UY2	-0.528335	-0.475231	-0.535699	-0.512003	-0.443050	-0.530	300
UY3	-0.288735	-0.255830	-0.305266	-0.300536	-0.248545	-0.288	614
UY4	-0.194536	-0.176490	-0.201799	-0.198707	-0.161789	-0.170	914
UY5	-0.151809	-0.136023	-0.152873	-0.150495	-0.119369	-0.119	1219
UY6	-0.127683	-0.109468	-0.125546	-0.125207	-0.094383	-0.099	1524
UY7	-0.112000	-0.090464	-0.107854	-0.109935	-0.077534	-0.082	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	15	12	3	MIN	AVG	MAX
EY1	4310	3000	5771	1909	8631	1909	4724	8631
EY2	162	200	154	154	152	152	164	200
EY3	141	100	133	159	144	100	135	159

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.850329	-0.831483	-0.788721	-1.021930	-0.735980	-0.893	0
UY2	-0.528335	-0.475231	-0.507228	-0.518027	-0.512003	-0.530	300
UY3	-0.288735	-0.255830	-0.272203	-0.236534	-0.300536	-0.288	614
UY4	-0.194536	-0.176490	-0.170610	-0.146492	-0.198707	-0.170	914
UY5	-0.151809	-0.136023	-0.123721	-0.106462	-0.150495	-0.119	1219
UY6	-0.127683	-0.109468	-0.097916	-0.083529	-0.125207	-0.099	1524
UY7	-0.112000	-0.090464	-0.081432	-0.068827	-0.109935	-0.082	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 1340 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	14	9	7	10	MIN	AVG	MAX
EY1	5163	4887	5555	5605	5580	4887	5358	5605
EY2	151	151	151	151	151	151	151	151
EY3	118	124	125	126	125	118	124	126

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.943394	-0.943914	-0.928988	-0.926089	-0.928145	-0.951	0
UY2	-0.598132	-0.591520	-0.596365	-0.595311	-0.596552	-0.585	300
UY3	-0.317617	-0.310711	-0.319517	-0.319163	-0.320147	-0.322	614
UY4	-0.197988	-0.192722	-0.200055	-0.199686	-0.200631	-0.192	914
UY5	-0.141808	-0.137598	-0.144713	-0.144320	-0.145178	-0.137	1219
UY6	-0.109840	-0.106289	-0.113996	-0.113632	-0.114378	-0.113	1524
UY7	-0.088882	-0.085839	-0.094213	-0.093894	-0.094538	-0.095	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	9	3	4	MIN	AVG	MAX
EY1	3000	4310	5902	8631	7256	3000	5820	8631
EY2	200	162	163	152	189	152	173	200
EY3	100	141	101	144	119	100	121	144

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.954745	-0.976385	-0.913368	-0.845084	-0.772729	-0.951	0
UY2	-0.545680	-0.606657	-0.601577	-0.587904	-0.508729	-0.585	300
UY3	-0.293756	-0.331538	-0.340505	-0.345089	-0.285390	-0.322	614
UY4	-0.202654	-0.223375	-0.225373	-0.228164	-0.185773	-0.192	914
UY5	-0.156187	-0.174314	-0.169309	-0.172805	-0.137065	-0.137	1219
UY6	-0.125696	-0.146611	-0.136129	-0.143768	-0.108375	-0.113	1524
UY7	-0.103875	-0.128604	-0.113618	-0.126233	-0.089028	-0.095	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	7	3	9	14	MIN	AVG	MAX
EY1	3000	4310	8631	4294	5672	3000	5182	8631
EY2	200	162	152	163	162	152	168	200
EY3	100	141	144	167	133	100	137	167

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.954745	-0.976385	-0.845084	-0.894831	-0.963244	-0.952	0
UY2	-0.545680	-0.606657	-0.587904	-0.523265	-0.640814	-0.585	300
UY3	-0.293756	-0.331538	-0.345089	-0.248702	-0.377951	-0.322	614
UY4	-0.202654	-0.223375	-0.228164	-0.144287	-0.267443	-0.192	914
UY5	-0.156187	-0.174314	-0.172805	-0.099436	-0.217219	-0.137	1219
UY6	-0.125696	-0.146611	-0.143768	-0.075353	-0.189592	-0.113	1524
UY7	-0.103875	-0.128604	-0.126233	-0.060212	-0.171861	-0.095	1829



ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 614 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	6	12	3	14	MIN	AVG	MAX
EY1	4119	3721	3489	3027	3293	3027	3530	4119
EY2	19300	18963	16131	18626	19168	16131	18438	19300
EY3	312	362	279	393	320	279	333	393
EX3	720	936	478	966	856	478	791	966
EY4	231	241	242	246	235	231	239	246.33
EX4	366	455	214	503	468	214	401	503.08
R3	2.31	2.59	1.72	2.45	2.67	1.72	2.35	2.67
R4	1.58	1.89	0.89	2.04	1.99	0.89	1.68	2.04

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.098192	-0.100567	-0.108614	-0.102255	-0.104265	-0.098	0
UY2	-0.077616	-0.078750	-0.084486	-0.076862	-0.080522	-0.083	300
UY3	-0.069346	-0.070711	-0.074639	-0.068721	-0.072267	-0.075	614
UY4	-0.061569	-0.063278	-0.065398	-0.061262	-0.064574	-0.063	914
UY5	-0.054764	-0.056877	-0.057350	-0.054909	-0.057936	-0.054	1219
UY6	-0.049143	-0.051666	-0.050741	-0.049788	-0.052532	-0.048	1524
UY7	-0.044674	-0.047572	-0.045520	-0.045800	-0.048294	-0.041	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	8	2	4	10	MIN	AVG	MAX
EY1	1864	4525	5236	4860	3531	1864	4003	5236
EY2	17831	12044	11315	12874	10639	10639	12940	17831
EY3	264	531	363	413	488	264	412	531
EX3	412	394	670	1069	934	394	696	1069
EY4	246	230	188	211	157	157	206	246
EX4	534	433	327	155	304	155	351	534
R3	1.56	0.74	1.84	2.59	1.91	0.74	1.73	2.59
R4	2.18	1.88	1.74	0.74	1.93	0.74	1.69	2.18

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.097341	-0.108247	-0.112608	-0.116285	-0.117419	-0.098	0
UY2	-0.056999	-0.085497	-0.091513	-0.095014	-0.090306	-0.083	300
UY3	-0.047191	-0.075360	-0.080885	-0.085049	-0.079030	-0.075	614
UY4	-0.038184	-0.066664	-0.071499	-0.076063	-0.069140	-0.063	914
UY5	-0.030601	-0.059493	-0.063515	-0.068264	-0.060730	-0.054	1219
UY6	-0.024585	-0.053835	-0.057022	-0.061790	-0.053850	-0.048	1524
UY7	-0.019990	-0.049497	-0.051901	-0.056583	-0.048370	-0.041	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 614 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	13	10	2	5	MIN	AVG	MAX
EY1	4525	1864	3531	5236	2839	1864	3599	5235.87
EY2	12044	17831	10639	11315	4352	4352	11236	17830.50
EY3	531	264	488	363	399	264	409	531.24
EX3	394	151	934	670	517	151	533	934.15
EY4	230	246	157	188	219	157	208	245.50
EX4	433	569	304	327	378	304	402	569.44
R3	0.74	0.57	1.91	1.84	1.30	0.57	1.27	1.91
R4	1.88	2.32	1.93	1.74	1.73	1.73	1.92	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.108247	-0.122194	-0.117419	-0.112608	-0.130567	0
UY2	-0.085497	-0.081729	-0.090306	-0.091513	-0.087538	300
UY3	-0.075360	-0.071683	-0.079030	-0.080885	-0.069852	614
UY4	-0.066664	-0.062477	-0.069140	-0.071499	-0.056991	914
UY5	-0.059493	-0.054764	-0.060730	-0.063515	-0.047388	1219
UY6	-0.053835	-0.048683	-0.053850	-0.057022	-0.040335	1524
UY7	-0.049497	-0.044069	-0.048370	-0.051901	-0.035211	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 872 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	6	10	7	1	MIN	AVG	MAX
EY1	4282	4853	4920	4048	4525	4048	4526	4920
EY2	15003	12373	13498	16121	12044	12044	13808	16121
EY3	220	399	459	435	531	220	409	531
EX3	372	389	419	263	394	263	367	419
EY4	238	237	237	223	230	223	233	238
EX4	568	489	502	506	433	433	499	568
R3	1.69	0.98	0.91	0.60	0.74	0.60	0.98	1.69
R4	2.38	2.06	2.12	2.27	1.88	1.88	2.14	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.150784	-0.149238	-0.144872	-0.149954	-0.153733	-0.144	0
UY2	-0.118637	-0.118615	-0.115521	-0.118976	-0.121422	-0.123	300
UY3	-0.104420	-0.104301	-0.102174	-0.106100	-0.107026	-0.109	614
UY4	-0.091593	-0.091912	-0.090543	-0.094431	-0.094676	-0.094	914
UY5	-0.080771	-0.081671	-0.080861	-0.084526	-0.084492	-0.078	1219
UY6	-0.072156	-0.073604	-0.073172	-0.076563	-0.076456	-0.071	1524
UY7	-0.065556	-0.067443	-0.067251	-0.070380	-0.070295	-0.060	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	8	2	4	10	MIN	AVG	MAX
EY1	1864	4525	5236	4860	3531	1864	4003	5236
EY2	17831	12044	11315	12874	10639	10639	12940	17831
EY3	264	531	363	413	488	264	412	531
EX3	384	394	670	1069	934	384	690	1069
EY4	246	230	188	211	157	157	206	246
EX4	569	433	327	155	304	155	358	569
R3	1.45	0.74	1.84	2.59	1.91	0.74	1.71	2.59
R4	2.32	1.88	1.74	0.74	1.93	0.74	1.72	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.135755	-0.153733	-0.159926	-0.165147	-0.166758	-0.144	0
UY2	-0.078463	-0.121422	-0.129967	-0.134939	-0.128252	-0.123	300
UY3	-0.064550	-0.107026	-0.114872	-0.120785	-0.112238	-0.109	614
UY4	-0.051798	-0.094676	-0.101543	-0.108024	-0.098193	-0.094	914
UY5	-0.041084	-0.084492	-0.090204	-0.096948	-0.086249	-0.078	1219
UY6	-0.032603	-0.076456	-0.080983	-0.087754	-0.076477	-0.071	1524
UY7	-0.026142	-0.070295	-0.073710	-0.080360	-0.068694	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 872 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	10	2	4	5	MIN	AVG	MAX
EY1	4525	3531	5236	4860	2839	2839	4198	5236
EY2	12044	10639	11315	12874	4352	4352	10245	12874
EY3	531	488	363	413	399	363	439	531
EX3	394	934	670	1069	517	394	717	1069
EY4	230	157	188	211	219	157	201	230
EX4	433	304	327	155	378	155	319	433
R3	0.74	1.91	1.84	2.59	1.30	0.74	1.68	2.59
R4	1.88	1.93	1.74	0.74	1.73	0.74	1.60	1.93

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.153733	-0.166758	-0.159926	-0.165147	-0.185431	-0.144	0
UY2	-0.121422	-0.128252	-0.129967	-0.134939	-0.124320	-0.123	300
UY3	-0.107026	-0.112238	-0.114872	-0.120785	-0.099203	-0.109	614
UY4	-0.094676	-0.098193	-0.101543	-0.108024	-0.080938	-0.094	914
UY5	-0.084492	-0.086249	-0.090204	-0.096948	-0.067300	-0.078	1219
UY6	-0.076456	-0.076477	-0.080983	-0.087754	-0.057284	-0.071	1524
UY7	-0.070295	-0.068694	-0.073710	-0.080360	-0.050006	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 1219 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	3	4	1	5	MIN	AVG	MAX
EY1	5694	5574	4551	4525	4362	4362	4941	5694
EY2	9001	6248	5535	12044	4663	4663	7498	12044
EY3	355	428	481	531	460	355	451	531
EX3	650	644	556	394	1136	394	676	1136
EY4	239	235	240	230	245	230	238	245
EX4	506	470	495	433	580	433	497	580
R3	1.83	1.51	1.15	0.74	2.47	0.74	1.54	2.47
R4	2.12	2.00	2.07	1.88	2.36	1.88	2.09	2.36

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.214629	-0.231453	-0.240236	-0.214908	-0.236385	-0.219	0
UY2	-0.169005	-0.177404	-0.177564	-0.169740	-0.169434	-0.173	300
UY3	-0.146330	-0.150909	-0.149059	-0.149615	-0.140491	-0.155	614
UY4	-0.127862	-0.130889	-0.128210	-0.132351	-0.120302	-0.131	914
UY5	-0.113052	-0.115442	-0.112514	-0.118114	-0.105429	-0.110	1219
UY6	-0.101621	-0.103797	-0.100904	-0.106881	-0.094563	-0.100	1524
UY7	-0.093019	-0.095163	-0.092421	-0.098268	-0.086669	-0.085	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	2	4	10	7	MIN	AVG	MAX
EY1	4525	5236	4860	3531	4743	3531	4579	5236
EY2	12044	11315	12874	10639	17834	10639	12941	17834
EY3	531	363	413	488	157	157	390	531
EX3	394	670	1069	934	275	275	668	1069
EY4	230	188	211	157	175	157	192	230
EX4	433	327	155	304	136	136	271	433
R3	0.74	1.84	2.59	1.91	1.75	0.74	1.77	2.59
R4	1.88	1.74	0.74	1.93	0.78	0.74	1.41	1.93

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.214908	-0.223566	-0.230865	-0.233118	-0.240582	-0.219	0
UY2	-0.169740	-0.181685	-0.188635	-0.179288	-0.198974	-0.173	300
UY3	-0.149615	-0.160584	-0.168850	-0.156901	-0.178474	-0.155	614
UY4	-0.132351	-0.141950	-0.151010	-0.137267	-0.158277	-0.131	914
UY5	-0.118114	-0.126099	-0.135527	-0.120570	-0.139750	-0.110	1219
UY6	-0.106881	-0.113209	-0.122675	-0.106910	-0.123741	-0.100	1524
UY7	-0.098268	-0.103042	-0.112337	-0.096030	-0.110475	-0.085	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 1219 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	8	10	13	2	4	MIN	AVG	MAX
EY1	4525	3531	1864	5236	4860	1864	4003	5236
EY2	12044	10639	17831	11315	12874	10639	12940	17831
EY3	531	488	264	363	413	264	412	531
EX3	394	934	151	670	1069	151	644	1069
EY4	230	157	246	188	211	157	206	246
EX4	433	304	569	327	155	155	358	569
R3	0.74	1.91	0.57	1.84	2.59	0.57	1.53	2.59
R4	1.88	1.93	2.32	1.74	0.74	0.74	1.72	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.214908	-0.233118	-0.236490	-0.223566	-0.230865	-0.219	0
UY2	-0.169740	-0.179288	-0.161899	-0.181685	-0.188635	-0.173	300
UY3	-0.149615	-0.156901	-0.142575	-0.160584	-0.168850	-0.155	614
UY4	-0.132351	-0.137267	-0.124613	-0.141950	-0.151010	-0.131	914
UY5	-0.118114	-0.120570	-0.109457	-0.126099	-0.135527	-0.110	1219
UY6	-0.106881	-0.106910	-0.097457	-0.113209	-0.122675	-0.100	1524
UY7	-0.098268	-0.096030	-0.088330	-0.103042	-0.112337	-0.085	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 1374 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	8	1	13	6	MIN	AVG	MAX
EY1	5159	4968	4525	5702	4746	4525	5020	5702
EY2	10154	11919	12044	10986	6032	6032	10227	12044
EY3	387	442	531	489	649	387	500	649
EX3	244	298	394	265	366	244	313	394
EY4	231	233	230	225	237	225	231	237
EX4	478	440	433	448	452	433	451	478
R3	0.63	0.67	0.74	0.54	0.56	0.54	0.63	0.74
R4	2.07	1.89	1.88	1.99	1.91	1.88	1.95	2.07

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.247978	-0.240548	-0.242235	-0.243629	-0.262049	-0.232	0
UY2	-0.196817	-0.192044	-0.191323	-0.196302	-0.194963	-0.197	300
UY3	-0.171324	-0.168913	-0.168639	-0.172685	-0.164034	-0.176	614
UY4	-0.149858	-0.148970	-0.149180	-0.152674	-0.141027	-0.151	914
UY5	-0.132420	-0.132500	-0.133133	-0.136210	-0.123496	-0.124	1219
UY6	-0.118883	-0.119524	-0.120471	-0.123227	-0.110406	-0.114	1524
UY7	-0.108680	-0.109611	-0.110763	-0.113278	-0.100771	-0.096	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	13	2	4	10	MIN	AVG	MAX
EY1	4525	1864	5236	4860	3531	1864	4003	5236
EY2	12044	17831	11315	12874	10639	10639	12940	17831
EY3	531	264	363	413	488	264	413	531
EX3	394	151	670	1069	934	151	644	1069
EY4	230	246	188	211	157	157	206	246
EX4	433	569	327	155	304	155	358	569
R3	0.74	0.57	1.84	2.59	1.91	0.57	1.53	2.59
R4	1.88	2.32	1.74	0.74	1.93	0.74	1.72	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.242235	-0.215939	-0.251993	-0.260220	-0.262759	-0.232	0
UY2	-0.191323	-0.125390	-0.204787	-0.212621	-0.202085	-0.197	300
UY3	-0.168639	-0.102919	-0.181002	-0.190320	-0.176852	-0.176	614
UY4	-0.149180	-0.082325	-0.160000	-0.170212	-0.154721	-0.151	914
UY5	-0.133133	-0.065070	-0.142133	-0.152759	-0.135901	-0.124	1219
UY6	-0.120471	-0.051469	-0.127604	-0.138273	-0.120504	-0.114	1524
UY7	-0.110763	-0.041160	-0.116144	-0.126621	-0.108241	-0.096	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950: LOAD 1374 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	10	2	13	4	MIN	AVG	MAX
EY1	4525	3531	5236	1864	4860	1864	4003	5236
EY2	12044	10639	11315	17831	12874	10639	12940	17831
EY3	531	488	363	264	413	264	412	531
EX3	394	934	670	151	1069	151	644	1069
EY4	230	157	188	246	211	157	206	246
EX4	433	304	327	569	155	155	358	569
R3	0.74	1.91	1.84	0.57	2.59	0.57	1.53	2.59
R4	1.88	1.93	1.74	2.32	0.74	0.74	1.72	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.242235	-0.262759	-0.251993	-0.266843	-0.260220	-0.232000	0
UY2	-0.191323	-0.202085	-0.204787	-0.182768	-0.212621	-0.197000	300
UY3	-0.168639	-0.176852	-0.181002	-0.160987	-0.190320	-0.176000	614
UY4	-0.149180	-0.154721	-0.160000	-0.140743	-0.170212	-0.151000	914
UY5	-0.133133	-0.135901	-0.142133	-0.123660	-0.152759	-0.124000	1219
UY6	-0.120471	-0.120504	-0.127604	-0.110136	-0.138273	-0.114000	1524
UY7	-0.110763	-0.108241	-0.116144	-0.099848	-0.126621	-0.096000	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 558 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	3	15	4	2	MIN	AVG	MAX
EY1	1260	2056	5439	1325	2060	1260	2428	5439
EY2	151	151	151	151	152	151	151	152
EX2	426	324	344	213	438	213	349	438
EY3	64	61	57	53	51	51	57	64
EX3	121	152	142	132	125	121	134	152
R2	2.82	2.14	2.28	1.41	2.89	1.41	2.31	2.89
R3	1.90	2.47	2.47	2.49	2.47	1.90	2.36	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.545736	-0.508734	-0.425786	-0.554114	-0.540296	-0.538	0
UY2	-0.292361	-0.297649	-0.297660	-0.276095	-0.340245	-0.371	300
UY3	-0.176260	-0.178664	-0.195745	-0.141372	-0.228082	-0.219	614
UY4	-0.139661	-0.138116	-0.152015	-0.096793	-0.188735	-0.138	914
UY5	-0.120038	-0.117493	-0.130152	-0.072747	-0.168030	-0.099	1219
UY6	-0.106593	-0.103818	-0.116499	-0.056341	-0.153970	-0.078	1524
UY7	-0.096707	-0.093900	-0.106769	-0.044324	-0.143565	-0.063	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	15	13	11	7	MIN	AVG	MAX
EY1	1216	1752	7399	1517	4452	1216	3267	7399
EY2	153	159	168	162	183	153	165	183
EX2	254	233	170	385	304	170	269	385
EY3	145	133	57	64	54	54	91	145
EX3	153	131	39	64	87	39	95	153
R2	1.66	1.47	1.01	2.37	1.66	1.01	1.64	2.37
R3	1.05	0.99	0.68	1.00	1.60	0.68	1.06	1.60

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.530422	-0.498877	-0.495153	-0.489671	-0.439594	-0.538	0
UY2	-0.255772	-0.265170	-0.383534	-0.265277	-0.304191	-0.371	300
UY3	-0.131420	-0.142674	-0.282136	-0.153858	-0.208031	-0.219	614
UY4	-0.095397	-0.104502	-0.231479	-0.115407	-0.168764	-0.138	914
UY5	-0.078577	-0.086668	-0.203263	-0.094015	-0.147881	-0.099	1219
UY6	-0.068510	-0.075821	-0.184641	-0.079013	-0.133760	-0.078	1524
UY7	-0.061892	-0.068539	-0.170998	-0.067750	-0.123220	-0.063	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 558 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	12	11	1	5	MIN	AVG	MAX
EY1	4452	1517	8172	3000	8528	1517	5134	8528
EY2	183	162	162	200	215	162	184	215
EX2	304	334	104	200	491	104	287	491
EY3	54	64	65	100	202	54	97	202
EX3	87	113	116	100	339	87	151	339
R2	1.66	2.06	0.64	1.00	2.28	0.64	1.53	2.28
R3	1.60	1.77	1.78	1.00	1.68	1.00	1.56	1.78

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.439594	-0.474415	-0.390584	-0.397573	-0.256267	-0.538	0
UY2	-0.304191	-0.245135	-0.278582	-0.227231	-0.171646	-0.371	300
UY3	-0.208031	-0.131482	-0.171028	-0.122325	-0.103389	-0.219	614
UY4	-0.168764	-0.093005	-0.116316	-0.084389	-0.074940	-0.138	914
UY5	-0.147881	-0.072225	-0.087514	-0.065039	-0.062171	-0.099	1219
UY6	-0.133760	-0.058025	-0.070233	-0.052342	-0.055288	-0.078	1524
UY7	-0.123220	-0.047571	-0.058556	-0.043255	-0.050959	-0.063	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 797 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	4	12	14	13	MIN	AVG	MAX
EY1	4902	3257	4593	4245	4813	3257	4362	4902
EY2	151	166	152	153	151	151	155	166
EX2	81	132	127	152	129	81	124	152
EY3	102	90	84	90	107	84	95	107
EX3	158	141	134	154	108	108	139	158
R2	0.54	0.80	0.84	0.99	0.85	0.54	0.80	0.99
R3	1.55	1.57	1.60	1.72	1.00	1.00	1.49	1.72

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.716061	-0.742801	-0.727545	-0.703922	-0.683891	-0.809	0
UY2	-0.484648	-0.476240	-0.499605	-0.472746	-0.461970	-0.553	300
UY3	-0.293982	-0.295575	-0.320706	-0.298199	-0.285372	-0.332	614
UY4	-0.213885	-0.228647	-0.246553	-0.228219	-0.211680	-0.209	914
UY5	-0.178118	-0.197195	-0.211541	-0.195589	-0.177340	-0.149	1219
UY6	-0.158860	-0.178179	-0.191067	-0.176544	-0.157750	-0.117	1524
UY7	-0.146659	-0.165213	-0.177312	-0.163776	-0.144868	-0.093	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	12	13	1	11	MIN	AVG	MAX
EY1	4452	1517	2570	3000	8172	1517	3942	8172
EY2	183	162	188	200	162	162	179	200
EX2	304	103	286	200	104	103	199	304
EY3	54	64	85	100	65	54	74	100
EX3	87	67	123	100	135	67	102	135
R2	1.66	0.63	1.52	1.00	0.64	0.63	1.09	1.66
R3	1.60	1.05	1.45	1.00	2.06	1.00	1.43	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.627879	-1.005980	-0.569777	-0.567860	-0.524664	-0.809	0
UY2	-0.434481	-0.602107	-0.316691	-0.324558	-0.361789	-0.553	300
UY3	-0.297134	-0.388104	-0.169951	-0.174719	-0.206911	-0.332	614
UY4	-0.241048	-0.314135	-0.118715	-0.120534	-0.129244	-0.209	914
UY5	-0.211221	-0.274375	-0.092367	-0.092896	-0.088872	-0.149	1219
UY6	-0.191051	-0.247606	-0.074812	-0.074761	-0.064852	-0.117	1524
UY7	-0.175997	-0.228381	-0.062077	-0.061782	-0.048697	-0.093	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 797 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	16	15	6	13	MIN	AVG	MAX
EY1	2018	3461	1291	4452	1548	1291	2554	4452
EY2	161	154	160	183	153	153	162	183
EX2	273	385	417	304	401	273	356	417
EY3	51	52	51	54	103	51	62	103
EX3	117	126	84	87	196	84	122	196
R2	1.70	2.49	2.61	1.66	2.62	1.66	2.22	2.62
R3	2.28	2.44	1.65	1.60	1.90	1.60	1.97	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.771993	-0.664783	-0.858434	-0.627879	-0.685978	-0.809	0
UY2	-0.466224	-0.439774	-0.507191	-0.434481	-0.355548	-0.553	300
UY3	-0.295443	-0.287084	-0.345259	-0.297134	-0.195218	-0.332	614
UY4	-0.236168	-0.229315	-0.291600	-0.241048	-0.147582	-0.209	914
UY5	-0.204601	-0.200098	-0.261340	-0.211221	-0.124688	-0.149	1219
UY6	-0.182866	-0.180645	-0.239837	-0.191051	-0.110206	-0.117	1524
UY7	-0.166714	-0.166238	-0.223571	-0.175997	-0.100179	-0.093	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1134 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	14	12	8	10	MIN	AVG	MAX
EY1	1209	1052	1066	2491	1057	1052	1375	2491
EY2	152	192	152	151	157	151	161	192
EX2	348	150	310	319	442	150	314	442
EY3	81	98	72	93	89	72	86	98
EX3	169	220	173	166	175	166	181	220
R2	2.30	0.78	2.04	2.11	2.82	0.78	2.01	2.82
R3	2.10	2.25	2.40	1.78	1.97	1.78	2.10	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.183950	-1.203630	-1.242900	-0.996926	-1.114620	-1.072	0
UY2	-0.652229	-0.602550	-0.680838	-0.610039	-0.578765	-0.799	300
UY3	-0.410241	-0.357590	-0.434829	-0.378143	-0.351654	-0.491	614
UY4	-0.332467	-0.283230	-0.355384	-0.296763	-0.279802	-0.310	914
UY5	-0.292359	-0.245362	-0.313614	-0.257438	-0.242481	-0.214	1219
UY6	-0.266352	-0.221380	-0.286196	-0.233000	-0.218251	-0.167	1524
UY7	-0.248010	-0.204905	-0.266690	-0.216104	-0.201169	-0.133	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	4	5	6	15	16	MIN	AVG	MAX
EY1	8172	1517	2570	1462	2205	1462	3185	8172
EY2	162	162	188	160	182	160	171	188
EX2	104	103	164	144	170	103	137	170
EY3	65	64	85	120	123	64	92	123
EX3	42	135	89	71	142	42	96	142
R2	0.64	0.63	0.87	0.90	0.93	0.63	0.80	0.93
R3	0.65	2.10	1.05	0.59	1.15	0.59	1.11	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.010480	-1.152890	-0.979478	-1.170100	-0.943900	-1.072	0
UY2	-0.776719	-0.579505	-0.586400	-0.607151	-0.512533	-0.799	300
UY3	-0.550704	-0.278481	-0.350526	-0.324382	-0.272039	-0.491	614
UY4	-0.432639	-0.177655	-0.265701	-0.232936	-0.193182	-0.310	914
UY5	-0.367174	-0.125520	-0.221747	-0.186904	-0.155620	-0.214	1219
UY6	-0.325604	-0.091329	-0.192602	-0.157625	-0.132441	-0.167	1524
UY7	-0.296353	-0.067175	-0.171661	-0.137478	-0.116675	-0.133	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1134 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	15	5	12	10	MIN	AVG	MAX
EY1	3327	3509	2018	1256	1277	1256	2277	3509
EY2	152	153	161	153	153	152	154	161
EX2	87	117	233	254	393	87	217	393
EY3	77	79	51	51	60	51	63	79
EX3	171	191	117	92	109	92	136	191
R2	0.58	0.76	1.45	1.66	2.56	0.58	1.40	2.56
R3	2.22	2.44	2.28	1.82	1.83	1.82	2.11	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.132730	-1.082430	-1.127210	-1.199740	-1.125930	-1.072	0
UY2	-0.720237	-0.699537	-0.678254	-0.637970	-0.618988	-0.799	300
UY3	-0.424544	-0.425868	-0.426348	-0.373592	-0.382048	-0.491	614
UY4	-0.312580	-0.321972	-0.338669	-0.285627	-0.304762	-0.310	914
UY5	-0.261448	-0.274288	-0.292012	-0.236405	-0.262775	-0.214	1219
UY6	-0.231479	-0.246234	-0.259979	-0.201799	-0.233827	-0.167	1524
UY7	-0.211367	-0.227321	-0.236255	-0.175912	-0.212411	-0.133	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1295 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	14	1	15	11	MIN	AVG	MAX
EY1	9972	9975	9955	9973	9952	9952	9965	9975
EY2	151	181	154	151	152	151	158	181
EX2	452	541	442	342	450	342	446	541
EY3	89	82	92	92	94	82	90	94
EX3	141	143	201	128	151	128	153	201
R2	2.99	2.99	2.87	2.26	2.97	2.26	2.82	2.99
R3	1.58	1.74	2.19	1.39	1.61	1.39	1.70	2.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.806387	-0.764151	-0.797390	-0.833692	-0.813992	-1.251	0
UY2	-0.609707	-0.579701	-0.600361	-0.629127	-0.615622	-0.897	300
UY3	-0.423448	-0.413390	-0.415536	-0.432270	-0.428959	-0.561	614
UY4	-0.331901	-0.334751	-0.326137	-0.333710	-0.338165	-0.360	914
UY5	-0.286105	-0.295067	-0.282387	-0.283886	-0.293307	-0.248	1219
UY6	-0.259833	-0.271149	-0.257881	-0.255356	-0.267882	-0.196	1524
UY7	-0.242380	-0.254467	-0.241908	-0.236576	-0.251146	-0.154	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	15	12	4	9	MIN	AVG	MAX
EY1	9050	6981	6855	5768	3395	3395	6410	9050
EY2	678	637	627	694	649	627	657	694
EX2	1370	1651	1757	609	1112	609	1300	1757
EY3	243	227	218	176	112	112	195	243
EX3	246	529	492	360	215	215	368	529
R2	2.02	2.59	2.80	0.88	1.71	0.88	2.00	2.80
R3	1.01	2.32	2.26	2.04	1.91	1.01	1.91	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.297371	-0.332815	-0.337177	-0.351177	-0.394558	-1.251	0
UY2	-0.184775	-0.207815	-0.211714	-0.195642	-0.212110	-0.897	300
UY3	-0.121094	-0.143688	-0.148021	-0.118611	-0.139061	-0.561	614
UY4	-0.098760	-0.122825	-0.127539	-0.091723	-0.113491	-0.360	914
UY5	-0.086538	-0.111800	-0.116611	-0.076249	-0.097303	-0.248	1219
UY6	-0.077885	-0.104219	-0.109000	-0.065213	-0.084975	-0.196	1524
UY7	-0.071334	-0.098602	-0.103318	-0.056921	-0.075233	-0.154	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L: LOAD 1295 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	1	4	8	10	MIN	AVG	MAX
EY1	9680	8625	8528	9630	9624	8528	9217	9680
EY2	297	401	215	205	297	205	283	401
EX2	656	896	491	572	833	491	689	896
EY3	135	128	202	213	222	128	180	222
EX3	212	201	339	476	386	201	323	476
R2	2.21	2.23	2.28	2.79	2.81	2.21	2.46	2.81
R3	1.57	1.58	1.68	2.23	1.74	1.57	1.76	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.563778	-0.517543	-0.594742	-0.539489	-0.467251	-1.251	0
UY2	-0.406920	-0.370476	-0.398354	-0.361486	-0.312820	-0.897	300
UY3	-0.285326	-0.271222	-0.239944	-0.211836	-0.196622	-0.561	614
UY4	-0.234065	-0.233107	-0.173920	-0.148938	-0.150268	-0.360	914
UY5	-0.208583	-0.213258	-0.144287	-0.122171	-0.128915	-0.248	1219
UY6	-0.192732	-0.199773	-0.128311	-0.108907	-0.116625	-0.196	1524
UY7	-0.181512	-0.189679	-0.118264	-0.101066	-0.108454	-0.154	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 400 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD 1: 558 kPa

LOAD 2: 797 kPa

LOAD 3: 1134 kPa

LOAD 4: 1295 kPa

DEPTH (mm)	DEPTH RATIO (z/r0)	6	3	15	4	2	AVG	STRESS RATIO (p/p0)	15	4	12	14	13	AVG	STRESS RATIO (p/p0)	14	12	8	10	AVG	STRESS RATIO (p/p0)	13	14	1	15	11	AVG	STRESS RATIO (p/p0)	
28	0.2	-0.509	-0.493	-0.471	-0.499	-0.496	-0.494	0.885	-0.655	-0.675	-0.663	-0.668	-0.662	-0.667	0.837	-1.024	-1.033	-0.992	-1.041	-1.022	0.902	-1.083	-1.090	-1.082	-1.072	-1.082	-1.082	-1.082	0.835
83	0.6	-0.368	-0.324	-0.264	-0.344	-0.328	-0.325	0.583	-0.333	-0.391	-0.359	-0.370	-0.356	-0.369	0.463	-0.742	-0.744	-0.627	-0.761	-0.718	0.633	-0.576	-0.598	-0.575	-0.546	-0.578	-0.574	0.444	
209	1.4	-0.190	-0.151	-0.105	-0.164	-0.146	-0.151	0.271	-0.133	-0.173	-0.146	-0.153	-0.143	-0.154	0.193	-0.376	-0.345	-0.268	-0.355	-0.336	0.296	-0.255	-0.273	-0.251	-0.218	-0.256	-0.250	0.193	
407	2.7	-0.090	-0.071	-0.054	-0.070	-0.065	-0.070	0.125	-0.074	-0.085	-0.075	-0.077	-0.074	-0.078	0.097	-0.158	-0.135	-0.116	-0.142	-0.138	0.121	-0.170	-0.178	-0.167	-0.138	-0.171	-0.163	0.126	
605	4.0	-0.048	-0.039	-0.031	-0.036	-0.035	-0.038	0.067	-0.044	-0.047	-0.043	-0.044	-0.043	-0.044	0.056	-0.080	-0.070	-0.064	-0.074	-0.072	0.063	-0.108	-0.109	-0.106	-0.086	-0.108	-0.102	0.079	
803	5.4	-0.028	-0.023	-0.019	-0.021	-0.020	-0.022	0.040	-0.030	-0.029	-0.028	-0.028	-0.028	-0.028	0.035	-0.049	-0.041	-0.039	-0.044	-0.043	0.038	-0.072	-0.070	-0.071	-0.057	-0.072	-0.068	0.052	
1001	6.7	-0.017	-0.015	-0.012	-0.013	-0.012	-0.014	0.025	-0.021	-0.019	-0.018	-0.018	-0.019	-0.019	0.023	-0.031	-0.026	-0.025	-0.028	-0.027	0.024	-0.046	-0.043	-0.047	-0.037	-0.047	-0.044	0.034	
1600	10.7	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007	0.013	-0.011	-0.009	-0.009	-0.009	-0.009	-0.009	0.011	-0.015	-0.012	-0.012	-0.013	-0.013	0.012	-0.014	-0.013	-0.015	-0.014	-0.014	-0.014	0.011	
2600	17.3	-0.003	-0.004	-0.003	-0.005	-0.003	-0.004	0.007	-0.004	-0.004	-0.004	-0.004	-0.003	-0.003	0.004	-0.006	-0.006	-0.005	-0.006	-0.006	0.005	-0.006	-0.006	-0.006	-0.005	-0.005	-0.006	0.004	

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r0)	16	15	13	11	7	AVG	STRESS RATIO (p/p0)	7	12	13	1	11	AVG	STRESS RATIO (p/p0)	5	6	15	16	AVG	STRESS RATIO (p/p0)	14	15	12	4	9	AVG	STRESS RATIO (p/p0)
28	0.2	-0.504	-0.494	-0.460	-0.503	-0.476	-0.487	0.873	-0.680	-0.697	-0.698	-0.687	-0.647	-0.682	0.856	-0.991	-0.979	-1.000	-0.986	-0.989	0.872	-1.146	-1.165	-1.169	-1.147	-1.193	-1.168	0.902
83	0.6	-0.356	-0.328	-0.232	-0.348	-0.279	-0.309	0.553	-0.398	-0.453	-0.446	-0.420	-0.314	-0.408	0.512	-0.644	-0.604	-0.669	-0.628	-0.636	0.561	-0.760	-0.809	-0.826	-0.778	-0.897	-0.827	0.639
209	1.4	-0.181	-0.160	-0.086	-0.160	-0.114	-0.140	0.251	-0.163	-0.222	-0.207	-0.192	-0.113	-0.184	0.231	-0.316	-0.280	-0.323	-0.296	-0.304	0.268	-0.376	-0.416	-0.448	-0.379	-0.455	-0.425	0.328
407	2.7	-0.084	-0.076	-0.044	-0.067	-0.051	-0.064	0.115	-0.073	-0.100	-0.096	-0.090	-0.064	-0.088	0.110	-0.144	-0.129	-0.142	-0.137	-0.138	0.122	-0.187	-0.208	-0.235	-0.163	-0.188	-0.198	0.153
605	4.0	-0.046	-0.041	-0.025	-0.034	-0.027	-0.035	0.062	-0.039	-0.052	-0.052	-0.048	-0.038	-0.047	0.060	-0.076	-0.068	-0.074	-0.074	-0.073	0.064	-0.099	-0.112	-0.127	-0.082	-0.091	-0.103	0.080
803	5.4	-0.029	-0.026	-0.014	-0.019	-0.016	-0.021	0.037	-0.022	-0.030	-0.031	-0.028	-0.025	-0.029	0.036	-0.046	-0.040	-0.044	-0.045	-0.044	0.039	-0.056	-0.066	-0.075	-0.046	-0.048	-0.059	0.046
1001	6.7	-0.019	-0.017	-0.008	-0.011	-0.009	-0.013	0.023	-0.013	-0.019	-0.019	-0.018	-0.017	-0.018	0.023	-0.029	-0.025	-0.028	-0.030	-0.028	0.025	-0.031	-0.039	-0.044	-0.027	-0.025	-0.034	0.026
1600	10.7	-0.007	-0.007	-0.004	-0.005	-0.005	-0.005	0.010	-0.007	-0.008	-0.009	-0.008	-0.012	-0.009	0.012	-0.019	-0.011	-0.012	-0.014	-0.014	0.012	-0.011	-0.013	-0.013	-0.015	-0.012	-0.013	0.010
2600	17.3	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.004	-0.003	-0.007	-0.004	0.005	-0.010	-0.004	-0.004	-0.005	-0.006	0.005	-0.004	-0.006	-0.006	-0.008	-0.007	-0.007	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r0)	7	12	11	1	5	AVG	STRESS RATIO (p/p0)	12	16	15	6	13	AVG	STRESS RATIO (p/p0)	15	5	12	10	AVG	STRESS RATIO (p/p0)	16	1	4	8	10	AVG	STRESS RATIO (p/p0)
28	0.2	-0.476	-0.501	-0.454	-0.481	-0.470	-0.476	0.854	-0.703	-0.692	-0.726	-0.680	-0.721	-0.705	0.884	-0.952	-0.996	-1.021	-1.031	-1.000	0.882	-1.099	-1.122	-1.090	-1.094	-1.105	-1.103	0.852
83	0.6	-0.279	-0.345	-0.217	-0.294	-0.259	-0.279	0.500	-0.461	-0.428	-0.521	-0.398	-0.511	-0.465	0.583	-0.536	-0.648	-0.718	-0.734	-0.659	0.581	-0.615	-0.688	-0.600	-0.609	-0.634	-0.633	0.489
209	1.4	-0.114	-0.159	-0.078	-0.135	-0.101	-0.117	0.210	-0.218	-0.205	-0.257	-0.163	-0.275	-0.225	0.282	-0.231	-0.305	-0.349	-0.359	-0.311	0.274	-0.243	-0.317	-0.235	-0.277	-0.254	-0.271	0.209
407	2.7	-0.051	-0.066	-0.044	-0.063	-0.053	-0.055	0.099	-0.101	-0.113	-0.115	-0.073	-0.142	-0.111	0.139	-0.117	-0.140	-0.152	-0.160	-0.142	0.125	-0.119	-0.166	-0.124	-0.178	-0.129	-0.149	0.115
605	4.0	-0.027	-0.034	-0.026	-0.034	-0.032	-0.031	0.055	-0.054	-0.064	-0.059	-0.039	-0.079	-0.060	0.076	-0.067	-0.074	-0.078	-0.084	-0.076	0.067	-0.068	-0.091	-0.075	-0.114	-0.076	-0.089	0.069
803	5.4	-0.016	-0.020	-0.017	-0.020	-0.021	-0.019	0.034	-0.031	-0.039	-0.033	-0.022	-0.050	-0.036	0.045	-0.042	-0.043	-0.044	-0.048	-0.045	0.039	-0.041	-0.053	-0.049	-0.080	-0.048	-0.058	0.044
1001	6.7	-0.009	-0.012	-0.012	-0.012	-0.015	-0.012	0.022	-0.019	-0.023	-0.019	-0.013	-0.032	-0.022	0.027	-0.029	-0.026	-0.026	-0.029	-0.027	0.024	-0.026	-0.030	-0.034	-0.057	-0.032	-0.038	0.030
1600	10.7	-0.005	-0.007	-0.007	-0.006	-0.007	-0.006	0.011	-0.009	-0.010	-0.007	-0.007	-0.012	-0.009	0.011	-0.015	-0.013	-0.013	-0.013	-0.014	0.012	-0.011	-0.011	-0.015	-0.020	-0.014	-0.015	0.011
2600	17.3	-0.002	-0.003	-0.004	-0.002	-0.003	-0.003	0.005	-0.005	-0.005	-0.003	-0.003	-0.005	-0.004	0.005	-0.007	-0.007	-0.007	-0.006	-0.007	0.006	-0.005	-0.005	-0.006	-0.007	-0.006	-0.006	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 578 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	13	12	14	7	MIN	AVG	MAX
EY1	6316	7837	6860	7623	7387	6316	7204	7837
EY2	160	158	162	166	165	158	162	166
EX2	124	128	150	130	139	124	134	150
EY3	120	122	124	131	123	120	124	131
EX3	83	79	86	86	95	79	86	95
R2	0.78	0.81	0.93	0.79	0.84	0.78	0.83	0.93
R3	0.69	0.65	0.69	0.66	0.77	0.65	0.69	0.77

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.401306	-0.372555	-0.379149	-0.372009	-0.370040	-0.486	0
UY2	-0.285542	-0.270477	-0.271619	-0.270543	-0.267344	-0.309	300
UY3	-0.179549	-0.171104	-0.172392	-0.173654	-0.170309	-0.171	614
UY4	-0.127396	-0.119215	-0.123096	-0.124103	-0.121121	-0.103	914
UY5	-0.101160	-0.092238	-0.098105	-0.098770	-0.096036	-0.075	1219
UY6	-0.086252	-0.076854	-0.083838	-0.084476	-0.081820	-0.060	1524
UY7	-0.076640	-0.067019	-0.074607	-0.075390	-0.072720	-0.049	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	7	12	1	5	MIN	AVG	MAX
EY1	8172	4452	1517	3000	8528	1517	5134	8528
EY2	162	183	162	200	215	162	184	215
EX2	104	304	402	200	491	104	300	491
EY3	65	54	64	100	202	54	97	202
EX3	134	87	111	100	339	87	154	339
R2	0.64	1.66	2.48	1.00	2.28	0.64	1.61	2.48
R3	2.06	1.60	1.73	1.00	1.68	1.00	1.61	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.452146	-0.432703	-0.559832	-0.388864	-0.250241	-0.486	0
UY2	-0.350064	-0.307946	-0.347623	-0.230322	-0.173270	-0.309	300
UY3	-0.248313	-0.214497	-0.237842	-0.126804	-0.107883	-0.171	614
UY4	-0.193708	-0.173871	-0.199364	-0.087011	-0.078379	-0.103	914
UY5	-0.164433	-0.152347	-0.179201	-0.066966	-0.064682	-0.075	1219
UY6	-0.147178	-0.138119	-0.165675	-0.054064	-0.057380	-0.060	1524
UY7	-0.135806	-0.127602	-0.155772	-0.044864	-0.052877	-0.049	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 578 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	7	11	12	5	MIN	AVG	MAX
EY1	3000	4452	8172	1517	8528	1517	5134	8528
EY2	200	183	162	162	215	162	184	215
EX2	200	304	104	402	491	104	300	491
EY3	100	54	205	64	202	54	125	205
EX3	100	87	423	135	339	87	217	423
R2	1.00	1.66	0.64	2.48	2.28	0.64	1.61	2.48
R3	1.00	1.60	2.06	2.10	1.68	1.00	1.69	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.388864	-0.432703	-0.323172	-0.551319	-0.250241	-0.486	0
UY2	-0.230322	-0.307946	-0.224644	-0.339192	-0.173270	-0.309	300
UY3	-0.126804	-0.214497	-0.128704	-0.229631	-0.107883	-0.171	614
UY4	-0.087011	-0.173871	-0.080682	-0.191453	-0.078379	-0.103	914
UY5	-0.066966	-0.152347	-0.058496	-0.171621	-0.064682	-0.075	1219
UY6	-0.054064	-0.138119	-0.048058	-0.158422	-0.057380	-0.060	1524
UY7	-0.044864	-0.127602	-0.042624	-0.148813	-0.052877	-0.049	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 828 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	5	9	14	8	MIN	AVG	MAX
EY1	2180	2570	4050	1521	5473	1521	3159	5473
EY2	178	188	184	265	159	159	195	265
EX2	152	195	173	251	119	119	178	251
EY3	135	85	93	61	102	61	95	135
EX3	142	90	85	38	67	38	84	142
R2	0.86	1.03	0.94	0.95	0.75	0.75	0.91	1.03
R3	1.05	1.06	0.92	0.62	0.66	0.62	0.86	1.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.672029	-0.660736	-0.601856	-0.640392	-0.649659	-0.718	0
UY2	-0.382633	-0.409148	-0.399854	-0.358818	-0.466013	-0.448	300
UY3	-0.209080	-0.250816	-0.247279	-0.229665	-0.303295	-0.254	614
UY4	-0.148393	-0.190738	-0.182580	-0.181002	-0.225245	-0.156	914
UY5	-0.120431	-0.159971	-0.150100	-0.150299	-0.185820	-0.112	1219
UY6	-0.103886	-0.139823	-0.129822	-0.127007	-0.162751	-0.088	1524
UY7	-0.092883	-0.125307	-0.115556	-0.108716	-0.147413	-0.073	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	7	13	1	11	MIN	AVG	MAX
EY1	1517	4452	2570	3000	8172	1517	3942	8172
EY2	162	183	188	200	162	162	179	200
EX2	103	304	286	200	104	103	199	304
EY3	160	54	85	100	65	54	93	160
EX3	170	87	123	100	135	87	123	170
R2	0.63	1.66	1.52	1.00	0.64	0.63	1.09	1.66
R3	1.06	1.60	1.45	1.00	2.06	1.00	1.43	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.801797	-0.619859	-0.559759	-0.557058	-0.506301	-0.718	0
UY2	-0.422982	-0.441141	-0.322905	-0.322943	-0.359964	-0.448	300
UY3	-0.216578	-0.307273	-0.177556	-0.181650	-0.213911	-0.254	614
UY4	-0.150072	-0.249075	-0.123468	-0.124645	-0.135270	-0.156	914
UY5	-0.121155	-0.218242	-0.096063	-0.095931	-0.092859	-0.112	1219
UY6	-0.105058	-0.197859	-0.078179	-0.077448	-0.067681	-0.088	1524
UY7	-0.094926	-0.182793	-0.065270	-0.064269	-0.050997	-0.073	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 828 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	1	13	7	12	11	MIN	AVG	MAX
EY1	3000	1540	4452	1515	8172	1515	3736	8172
EY2	200	271	183	163	175	163	198	271
EX2	200	170	304	406	112	112	238	406
EY3	100	62	54	63	65	54	69	100
EX3	100	133	87	134	42	42	99	134
R2	1.00	0.63	1.66	2.49	0.64	0.63	1.28	2.49
R3	1.00	2.15	1.60	2.11	0.65	0.65	1.30	2.15

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.557058	-0.599800	-0.619859	-0.782271	-0.675348	-0.718	0
UY2	-0.329943	-0.297764	-0.441141	-0.479283	-0.531678	-0.448	300
UY3	-0.181650	-0.159712	-0.307273	-0.323080	-0.388912	-0.254	614
UY4	-0.124645	-0.111300	-0.249075	-0.268506	-0.310357	-0.156	914
UY5	-0.095931	-0.082945	-0.218242	-0.240054	-0.265417	-0.112	1219
UY6	-0.077448	-0.062620	-0.197859	-0.221069	-0.236622	-0.088	1524
UY7	-0.064269	-0.047368	-0.182793	-0.207221	-0.216311	-0.073	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1173 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	5	9	13	15	MIN	AVG	MAX
EY1	1533	2570	4050	3191	3386	1533	2946	4050
EY2	159	188	184	212	178	159	184	212
EX2	258	194	172	199	152	152	195	258
EY3	59	85	93	79	85	59	80	93
EX3	40	90	86	80	94	40	78	94
R2	1.62	1.03	0.94	0.94	0.85	0.85	1.08	1.62
R3	0.67	1.06	0.92	1.01	1.10	0.67	0.95	1.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.107430	-0.936438	-0.852766	-0.863958	-0.958183	-0.991	0
UY2	-0.625371	-0.579848	-0.566390	-0.558229	-0.631487	-0.636	300
UY3	-0.367724	-0.355394	-0.350033	-0.355876	-0.397335	-0.365	614
UY4	-0.275006	-0.270226	-0.258293	-0.275367	-0.301959	-0.224	914
UY5	-0.223145	-0.226617	-0.212263	-0.232774	-0.254430	-0.160	1219
UY6	-0.186161	-0.198065	-0.183544	-0.204182	-0.224640	-0.125	1524
UY7	-0.158015	-0.177497	-0.163350	-0.183183	-0.203693	-0.103	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	7	1	15	14	MIN	AVG	MAX
EY1	8172	4452	3000	3413	7399	3000	5287	8172
EY2	162	183	200	194	263	162	200	263
EX2	104	304	200	230	180	104	203	304
EY3	65	54	100	111	57	54	78	111
EX3	42	87	100	96	39	39	73	100
R2	0.64	1.66	1.00	1.19	0.68	0.64	1.03	1.66
R3	0.65	1.60	1.00	0.87	0.68	0.65	0.96	1.60

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.986649	-0.878133	-0.789165	-0.771631	-0.680470	-0.991	0
UY2	-0.777509	-0.624950	-0.467419	-0.475952	-0.496081	-0.636	300
UY3	-0.565428	-0.435303	-0.257337	-0.273629	-0.335432	-0.365	614
UY4	-0.447001	-0.352856	-0.176581	-0.193646	-0.253590	-0.224	914
UY5	-0.379321	-0.309176	-0.135902	-0.153937	-0.204625	-0.160	1219
UY6	-0.336514	-0.280300	-0.109718	-0.128942	-0.169878	-0.125	1524
UY7	-0.306730	-0.258957	-0.091048	-0.111321	-0.143311	-0.103	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1173 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	13	14	7	12	MIN	AVG	MAX
EY1	3000	1540	1609	4452	1515	1515	2423	4452
EY2	200	274	165	183	163	163	197	274
EX2	200	172	154	304	406	154	247	406
EY3	100	62	219	54	63	54	100	219
EX3	100	133	142	87	134	87	119	142
R2	1.00	0.63	0.93	1.66	2.49	0.63	1.34	2.49
R3	1.00	2.15	0.65	1.60	2.11	0.65	1.30	2.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.789165	-0.842288	-0.950289	-0.878133	-1.108220	-0.991	0
UY2	-0.467419	-0.418465	-0.450545	-0.624950	-0.678984	-0.636	300
UY3	-0.257337	-0.225443	-0.184581	-0.435303	-0.457697	-0.365	614
UY4	-0.176581	-0.157481	-0.101527	-0.352856	-0.380384	-0.224	914
UY5	-0.135902	-0.117582	-0.066007	-0.309176	-0.340077	-0.160	1219
UY6	-0.109718	-0.088953	-0.046486	-0.280300	-0.313181	-0.125	1524
UY7	-0.091048	-0.067442	-0.034395	-0.258957	-0.293563	-0.103	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1347 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	9	5	12	MIN	AVG	MAX
EY1	9624	9755	9692	9901	8715	8715	9538	9901
EY2	215	242	200	164	224	164	209	242
EX2	405	532	359	448	412	359	431	532
EY3	151	137	166	164	134	134	150	166
EX3	138	141	147	100	124	100	130	147
R2	1.88	2.20	1.80	2.73	1.84	1.80	2.09	2.73
R3	0.91	1.03	0.89	0.61	0.93	0.61	0.87	1.03

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.643640	-0.617479	-0.648965	-0.678921	-0.654143	-1.120	0
UY2	-0.475886	-0.460716	-0.476074	-0.502216	-0.477983	-0.724	300
UY3	-0.324039	-0.323389	-0.316328	-0.331002	-0.324707	-0.417	614
UY4	-0.249627	-0.257853	-0.237010	-0.242379	-0.251689	-0.258	914
UY5	-0.211992	-0.224646	-0.197195	-0.197153	-0.214560	-0.182	1219
UY6	-0.190284	-0.204925	-0.174838	-0.171955	-0.192444	-0.146	1524
UY7	-0.175997	-0.191494	-0.160567	-0.156099	-0.177399	-0.118	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	14	11	15	9	MIN	AVG	MAX
EY1	8239	9620	8641	9877	5481	5481	8372	9877
EY2	679	652	541	499	682	499	611	682
EX2	1600	1444	1617	1060	2026	1060	1549	2026
EY3	250	249	249	250	246	246	249	250
EX3	615	620	611	507	577	507	586	620
R2	2.35	2.22	2.99	2.12	2.97	2.12	2.53	2.99
R3	2.46	2.49	2.45	2.03	2.35	2.03	2.36	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.225234	-0.226972	-0.268854	-0.310653	-0.310748	-1.120	0
UY2	-0.118758	-0.126349	-0.155614	-0.194384	-0.184676	-0.724	300
UY3	-0.058325	-0.064246	-0.085182	-0.115041	-0.125490	-0.417	614
UY4	-0.036332	-0.040908	-0.059067	-0.084456	-0.106642	-0.258	914
UY5	-0.024984	-0.029111	-0.046257	-0.069779	-0.096698	-0.182	1219
UY6	-0.017472	-0.021443	-0.038131	-0.060698	-0.089824	-0.146	1524
UY7	-0.011993	-0.015896	-0.032347	-0.054304	-0.084705	-0.118	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L: LOAD 1347 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	1	7	5	8	MIN	AVG	MAX
EY1	9657	8625	9658	9652	9112	8625	9341	9658
EY2	420	401	631	426	434	401	462	631
EX2	860	896	1278	975	819	819	965	1278
EY3	128	128	172	160	171	128	152	172
EX3	98	201	129	290	311	98	206	311
R2	2.05	2.23	2.02	2.29	1.89	1.89	2.10	2.29
R3	0.77	1.58	0.75	1.82	1.82	0.75	1.34	1.82

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.513462	-0.515886	-0.384746	-0.427114	-0.444200	-1.120	0
UY2	-0.386136	-0.379090	-0.278334	-0.303309	-0.312712	-0.724	300
UY3	-0.291629	-0.281536	-0.210409	-0.214078	-0.219719	-0.417	614
UY4	-0.251002	-0.241547	-0.183708	-0.177121	-0.182474	-0.258	914
UY5	-0.229155	-0.220935	-0.168945	-0.158407	-0.163993	-0.182	1219
UY6	-0.214237	-0.207299	-0.158410	-0.146437	-0.152221	-0.146	1524
UY7	-0.202923	-0.197182	-0.150265	-0.137786	-0.143736	-0.118	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 600 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN" LOAD 1: 578 kPa

DEPT (mm)	DEPTH RATIO (z/ro)	11	13	12	14	7	AVG
30	0.2	-0.474	-0.471	-0.474	-0.472	-0.473	-0.473
90	0.6	-0.232	-0.224	-0.233	-0.226	-0.228	-0.229
222	1.5	-0.082	-0.075	-0.081	-0.077	-0.078	-0.078
426	2.8	-0.044	-0.041	-0.043	-0.042	-0.042	-0.042
630	4.2	-0.026	-0.025	-0.025	-0.025	-0.025	-0.025
834	5.6	-0.017	-0.016	-0.016	-0.017	-0.017	-0.017
1038	6.9	-0.012	-0.011	-0.011	-0.011	-0.011	-0.011
1640	10.9	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
2640	17.6	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002

LOAD 2: 828 kPa

DEPT (mm)	DEPTH RATIO (z/ro)	15	5	9	14	8	AVG
30	0.2	-0.714	-0.714	-0.696	-0.744	-0.681	-0.710
90	0.6	-0.432	-0.428	-0.380	-0.518	-0.338	-0.419
222	1.5	-0.191	-0.185	-0.153	-0.245	-0.123	-0.179
426	2.8	-0.088	-0.084	-0.076	-0.099	-0.066	-0.083
630	4.2	-0.048	-0.045	-0.042	-0.047	-0.039	-0.044
834	5.6	-0.030	-0.027	-0.026	-0.024	-0.025	-0.026
1038	6.9	-0.020	-0.016	-0.016	-0.012	-0.016	-0.016
1640	10.9	-0.009	-0.007	-0.007	-0.004	-0.008	-0.007
2640	17.6	-0.004	-0.003	-0.003	-0.002	-0.003	-0.003

LOAD 3: 1173 kPa

DEPT (mm)	DEPTH RATIO (z/ro)	16	5	9	13	15	AVG
30	0.2	-1.040	-1.011	-0.986	-1.004	-0.991	-1.006
90	0.6	-0.688	-0.607	-0.538	-0.588	-0.555	-0.595
222	1.5	-0.319	-0.262	-0.217	-0.251	-0.229	-0.255
426	2.8	-0.146	-0.120	-0.108	-0.116	-0.111	-0.120
630	4.2	-0.075	-0.064	-0.060	-0.062	-0.061	-0.064
834	5.6	-0.041	-0.038	-0.037	-0.036	-0.037	-0.038
1038	6.9	-0.022	-0.023	-0.023	-0.021	-0.024	-0.023
1640	10.9	-0.008	-0.011	-0.011	-0.010	-0.011	-0.010
2640	17.6	-0.003	-0.004	-0.004	-0.004	-0.005	-0.004

LOAD 4: 1347 kPa

DEPT (mm)	DEPTH RATIO (z/ro)	1	7	9	5	12	AVG
30	0.2	-1.119	-1.128	-1.114	-1.116	-1.124	-1.120
90	0.6	-0.566	-0.589	-0.556	-0.557	-0.582	-0.570
222	1.5	-0.195	-0.215	-0.187	-0.190	-0.206	-0.199
426	2.8	-0.101	-0.115	-0.097	-0.110	-0.104	-0.105
630	4.2	-0.060	-0.068	-0.059	-0.069	-0.060	-0.063
834	5.6	-0.038	-0.043	-0.038	-0.045	-0.037	-0.040
1038	6.9	-0.025	-0.027	-0.026	-0.030	-0.024	-0.026
1640	10.9	-0.012	-0.011	-0.012	-0.012	-0.011	-0.012
2640	17.6	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005

MAXIMUM DEFLECTION

DEPT (mm)	DEPTH RATIO (z/ro)	11	7	12	1	5	AVG
30	0.2	-0.468	-0.490	-0.518	-0.495	-0.484	-0.491
90	0.6	-0.220	-0.277	-0.347	-0.291	-0.257	-0.278
222	1.5	-0.072	-0.105	-0.151	-0.125	-0.093	-0.109
426	2.8	-0.041	-0.048	-0.064	-0.058	-0.050	-0.052
630	4.2	-0.025	-0.026	-0.034	-0.032	-0.030	-0.029
834	5.6	-0.016	-0.015	-0.020	-0.019	-0.020	-0.018
1038	6.9	-0.011	-0.009	-0.012	-0.012	-0.014	-0.012
1640	10.9	-0.006	-0.005	-0.005	-0.005	-0.006	-0.006
2640	17.6	-0.003	-0.002	-0.002	-0.002	-0.003	-0.003

DEPT (mm)	DEPTH RATIO (z/ro)	12	7	13	1	11	AVG
30	0.2	-0.719	-0.703	-0.720	-0.710	-0.671	-0.704
90	0.6	-0.450	-0.397	-0.443	-0.417	-0.315	-0.404
222	1.5	-0.209	-0.151	-0.190	-0.179	-0.103	-0.166
426	2.8	-0.096	-0.068	-0.086	-0.084	-0.058	-0.079
630	4.2	-0.053	-0.037	-0.047	-0.045	-0.036	-0.044
834	5.6	-0.034	-0.021	-0.028	-0.027	-0.024	-0.027
1038	6.9	-0.023	-0.013	-0.017	-0.017	-0.016	-0.017
1640	10.9	-0.011	-0.007	-0.009	-0.008	-0.012	-0.009
2640	17.6	-0.004	-0.003	-0.004	-0.003	-0.007	-0.004

DEPT (mm)	DEPTH RATIO (z/ro)	11	7	1	15	14	AVG
30	0.2	-0.950	-0.995	-1.005	-1.002	-0.969	-0.984
90	0.6	-0.446	-0.562	-0.591	-0.580	-0.490	-0.534
222	1.5	-0.145	-0.214	-0.253	-0.240	-0.183	-0.207
426	2.8	-0.081	-0.097	-0.119	-0.113	-0.094	-0.101
630	4.2	-0.048	-0.053	-0.064	-0.062	-0.050	-0.055
834	5.6	-0.030	-0.030	-0.038	-0.037	-0.027	-0.033
1038	6.9	-0.019	-0.018	-0.024	-0.024	-0.014	-0.020
1640	10.9	-0.009	-0.009	-0.011	-0.010	-0.006	-0.009
2640	17.6	-0.003	-0.005	-0.004	-0.004	-0.002	-0.004

DEPT (mm)	DEPTH RATIO (z/ro)	16	14	11	15	9	AVG
30	0.2	-1.191	-1.178	-1.182	-1.162	-1.227	-1.188
90	0.6	-0.765	-0.729	-0.737	-0.694	-0.881	-0.761
222	1.5	-0.319	-0.301	-0.307	-0.297	-0.482	-0.341
426	2.8	-0.134	-0.134	-0.145	-0.153	-0.250	-0.163
630	4.2	-0.072	-0.073	-0.081	-0.087	-0.135	-0.090
834	5.6	-0.042	-0.044	-0.049	-0.054	-0.081	-0.054
1038	6.9	-0.027	-0.028	-0.032	-0.035	-0.047	-0.034
1640	10.9	-0.021	-0.021	-0.020	-0.017	-0.014	-0.019
2640	17.6	-0.012	-0.012	-0.011	-0.008	-0.007	-0.010

RMS VALUE OF DEFLECTIONS

DEPT (mm)	DEPTH RATIO (z/ro)	1	7	11	12	5	AVG
30	0.2	-0.495	-0.490	-0.469	-0.518	-0.484	-0.491
90	0.6	-0.291	-0.277	-0.217	-0.347	-0.257	-0.278
222	1.5	-0.125	-0.105	-0.072	-0.151	-0.093	-0.109
426	2.8	-0.058	-0.048	-0.042	-0.064	-0.050	-0.052
630	4.2	-0.032	-0.026	-0.027	-0.034	-0.030	-0.030
834	5.6	-0.019	-0.015	-0.019	-0.020	-0.020	-0.019
1038	6.9	-0.012	-0.009	-0.014	-0.012	-0.014	-0.012
1640	10.9	-0.005	-0.005	-0.009	-0.005	-0.006	-0.006
2640	17.6	-0.002	-0.002	-0.004	-0.003	-0.003	-0.003

DEPT (mm)	DEPTH RATIO (z/ro)	1	13	7	12	11	AVG
30	0.2	-0.710	-0.736	-0.703	-0.742	-0.672	-0.713
90	0.6	-0.417	-0.504	-0.397	-0.497	-0.320	-0.427
222	1.5	-0.179	-0.245	-0.151	-0.216	-0.106	-0.179
426	2.8	-0.084	-0.105	-0.068	-0.091	-0.058	-0.081
630	4.2	-0.045	-0.052	-0.037	-0.048	-0.034	-0.043
834	5.6	-0.027	-0.029	-0.021	-0.028	-0.021	-0.025
1038	6.9	-0.017	-0.018	-0.013	-0.017	-0.013	-0.016
1640	10.9	-0.008	-0.011	-0.007	-0.008	-0.006	-0.008
2640	17.6	-0.003	-0.007	-0.003	-0.004	-0.002	-0.004

DEPT (mm)	DEPTH RATIO (z/ro)	1	13	14	7	12	AVG
30	0.2	-1.005	-1.044	-1.025	-0.995	-1.052	-1.024
90	0.6	-0.591	-0.717	-0.654	-0.562	-0.705	-0.646
222	1.5	-0.253	-0.349	-0.300	-0.214	-0.306	-0.284
426	2.8	-0.119	-0.149	-0.139	-0.097	-0.128	-0.126
630	4.2	-0.064	-0.074	-0.076	-0.053	-0.068	-0.067
834	5.6	-0.038	-0.042	-0.048	-0.030	-0.040	-0.040
1038	6.9	-0.024	-0.025	-0.033	-0.018	-0.024	-0.025
1640	10.9	-0.011	-0.016	-0.013	-0.009	-0.011	-0.012
2640	17.6	-0.004	-0.009	-0.004	-0.005	-0.005	-0.006

DEPT (mm)	DEPTH RATIO (z/ro)	14	1	7	5	8	AVG
30	0.2	-1.154	-1.160	-1.175	-1.156	-1.156	-1.160
90	0.6	-0.667	-0.684	-0.731	-0.669	-0.677	-0.685
222	1.5	-0.286	-0.295	-0.332	-0.263	-0.289	-0.293
426	2.8	-0.152	-0.156	-0.167	-0.125	-0.151	-0.150
630	4.2	-0.083	-0.087	-0.088	-0.070	-0.085	-0.083
834	5.6	-0.047	-0.051	-0.048	-0.041	-0.051	-0.048
1038	6.9	-0.025	-0.029	-0.024	-0.025	-0.032	-0.027
1640	10.9	-0.009	-0.010	-0.008	-0.011	-0.012	-0.010
2640	17.6	-0.004	-0.005	-0.004	-0.006	-0.005	-0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26; STA. 5 + 900 R: LOAD 588 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	16	15	9	8	MIN	AVG	MAX
EY1	2265	3600	2069	1821	3263	1821	2604	3600
EY2	178	169	176	169	174	169	173	178
EX2	174	155	168	190	143	143	166	190
EY3	150	159	155	152	154	150	154	159
EX3	133	150	149	148	178	133	152	178
R2	0.98	0.91	0.96	1.12	0.82	0.82	0.96	1.12
R3	0.89	0.94	0.97	0.97	1.15	0.89	0.98	1.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.439641	-0.412176	-0.449353	-0.464476	-0.406691	-0.405	0
UY2	-0.243746	-0.254821	-0.242271	-0.244527	-0.240154	-0.271	300
UY3	-0.125470	-0.139956	-0.121092	-0.121453	-0.122953	-0.147	614
UY4	-0.083535	-0.094227	-0.079171	-0.079825	-0.077757	-0.083	914
UY5	-0.064061	-0.073577	-0.059935	-0.060621	-0.057545	-0.057	1219
UY6	-0.052520	-0.062147	-0.048658	-0.049285	-0.046326	-0.045	1524
UY7	-0.044845	-0.054857	-0.041240	-0.041810	-0.039153	-0.037	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	13	12	7	11	MIN	AVG	MAX
EY1	3000	2570	8225	4452	8172	2570	5284	8225
EY2	200	188	162	183	162	162	179	200
EX2	200	286	103	304	104	103	199	304
EY3	100	85	142	54	65	54	89	142
EX3	100	122	149	87	134	87	118	149
R2	1.00	1.52	0.63	1.66	0.64	0.63	1.09	1.66
R3	1.00	1.44	1.05	1.60	2.06	1.00	1.43	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.394782	-0.433748	-0.375126	-0.438999	-0.359362	-0.405	0
UY2	-0.233646	-0.265054	-0.274458	-0.312234	-0.254488	-0.271	300
UY3	-0.128489	-0.161595	-0.174845	-0.217363	-0.149948	-0.147	614
UY4	-0.088163	-0.123491	-0.123075	-0.176250	-0.094088	-0.083	914
UY5	-0.067929	-0.104391	-0.097347	-0.154586	-0.064216	-0.057	1219
UY6	-0.054934	-0.091987	-0.083804	-0.140326	-0.046540	-0.045	1524
UY7	-0.045672	-0.083050	-0.075824	-0.129805	-0.034806	-0.037	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 588 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	12	11	5	7	MIN	AVG	MAX
EY1	3000	1517	8172	8528	4452	1517	5134	8528
EY2	200	162	162	215	183	162	184	215
EX2	200	402	104	491	304	104	300	491
EY3	100	64	205	202	54	54	125	205
EX3	100	135	346	339	87	87	201	346
R2	1.00	2.48	0.64	2.28	1.66	0.64	1.61	2.48
R3	1.00	2.10	1.69	1.68	1.60	1.00	1.61	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.394782	-0.441178	-0.308527	-0.254509	-0.438999	-0.405	0
UY2	-0.233646	-0.223189	-0.208177	-0.176260	-0.312234	-0.271	300
UY3	-0.128489	-0.111327	-0.110210	-0.109768	-0.217363	-0.147	614
UY4	-0.088163	-0.074045	-0.060857	-0.079762	-0.176250	-0.083	914
UY5	-0.067929	-0.054876	-0.037779	-0.065836	-0.154586	-0.057	1219
UY6	-0.054934	-0.041946	-0.026727	-0.058417	-0.140326	-0.045	1524
UY7	-0.045672	-0.032436	-0.020871	-0.053844	-0.129805	-0.037	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 844 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	15	12	1	3	MIN	AVG	MAX
EY1	2322	2546	2065	3000	2549	2065	2496	3000
EY2	197	213	206	200	187	187	200	213
EX2	207	198	180	200	204	180	198	207
EY3	106	90	89	100	115	89	100	115
EX3	90	67	104	100	108	67	94	108
R2	1.05	0.93	0.88	1.00	1.09	0.88	0.99	1.09
R3	0.84	0.75	1.17	1.00	0.94	0.75	0.94	1.17

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.603464	-0.596051	-0.642488	-0.566660	-0.591632	-0.574	0
UY2	-0.340879	-0.349013	-0.358250	-0.335370	-0.334325	-0.389	300
UY3	-0.185422	-0.199243	-0.198765	-0.184430	-0.174322	-0.216	614
UY4	-0.128623	-0.142436	-0.141723	-0.126547	-0.115746	-0.125	914
UY5	-0.099753	-0.112144	-0.112055	-0.097503	-0.087217	-0.085	1219
UY6	-0.080973	-0.091612	-0.092350	-0.078851	-0.069311	-0.068	1524
UY7	-0.067566	-0.076522	-0.078135	-0.065557	-0.056797	-0.055	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	13	11	5	MIN	AVG	MAX
EY1	3000	4452	8143	8172	8528	3000	6459	8528
EY2	200	183	164	162	215	162	185	215
EX2	200	304	226	104	491	104	265	491
EY3	100	54	146	205	202	54	142	205
EX3	100	87	90	423	339	87	208	423
R2	1.00	1.66	1.38	0.64	2.28	0.64	1.39	2.28
R3	1.00	1.60	0.62	2.06	1.68	0.62	1.39	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.566660	-0.630127	-0.488655	-0.477332	-0.365316	-0.574	0
UY2	-0.335370	-0.448172	-0.353859	-0.330566	-0.252999	-0.389	300
UY3	-0.184430	-0.311997	-0.225641	-0.188565	-0.157559	-0.216	614
UY4	-0.126547	-0.252984	-0.160740	-0.118038	-0.114488	-0.125	914
UY5	-0.097503	-0.221889	-0.128105	-0.085604	-0.094500	-0.085	1219
UY6	-0.078851	-0.201420	-0.109964	-0.070343	-0.083851	-0.068	1524
UY7	-0.065557	-0.186318	-0.098501	-0.062374	-0.077286	-0.055	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 844 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	16	10	12	7	MIN	AVG	MAX
EY1	3000	3631	1595	4652	1515	1515	2879	4652
EY2	200	201	198	166	176	166	188	201
EX2	200	207	258	137	176	137	195	258
EY3	100	98	136	120	100	98	111	136
EX3	100	109	85	76	211	76	116	211
R2	1.00	1.03	1.30	0.83	1.00	0.83	1.03	1.30
R3	1.00	1.11	0.62	0.63	2.11	0.62	1.10	2.11

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.566660	-0.537222	-0.614231	-0.626737	-0.674695	-0.574	0
UY2	-0.335370	-0.329075	-0.301247	-0.425098	-0.324684	-0.389	300
UY3	-0.184430	-0.183738	-0.146748	-0.259705	-0.144349	-0.216	614
UY4	-0.126547	-0.125847	-0.095949	-0.186479	-0.086104	-0.125	914
UY5	-0.097503	-0.097076	-0.070022	-0.151140	-0.058398	-0.085	1219
UY6	-0.078851	-0.078870	-0.053072	-0.130669	-0.041295	-0.068	1524
UY7	-0.065557	-0.065946	-0.041062	-0.117052	-0.029615	-0.055	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 1192 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	10	8	5	4	2	MIN	AVG	MAX
EY1	3406	3991	2053	4548	3056	2053	3411	4548
EY2	156	159	160	176	185	156	167	185
EX2	165	175	223	169	181	165	183	223
EY3	141	112	86	111	115	86	113	141
EX3	251	180	123	92	117	92	153	251
R2	1.05	1.10	1.39	0.96	0.98	0.96	1.10	1.39
R3	1.78	1.61	1.43	0.83	1.02	0.83	1.33	1.78

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.852256	-0.828467	-0.941155	-0.765387	-0.812520	-0.826	0
UY2	-0.515508	-0.528786	-0.527205	-0.489799	-0.476516	-0.539	300
UY3	-0.271149	-0.298978	-0.280516	-0.271570	-0.250499	-0.305	614
UY4	-0.175461	-0.202541	-0.190233	-0.176520	-0.163983	-0.181	914
UY5	-0.133422	-0.157353	-0.145322	-0.129825	-0.122515	-0.121	1219
UY6	-0.110805	-0.131657	-0.116767	-0.101853	-0.097157	-0.097	1524
UY7	-0.096669	-0.114837	-0.096626	-0.082746	-0.079675	-0.079	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	1	13	7	11	12	MIN	AVG	MAX
EY1	3000	2570	4452	8172	1517	1517	3942	8172
EY2	200	192	183	162	162	162	180	200
EX2	200	291	304	104	103	103	200	304
EY3	100	85	54	65	208	54	102	208
EX3	100	123	87	135	219	87	133	219
R2	1.00	1.52	1.66	0.64	0.63	0.63	1.09	1.66
R3	1.00	1.45	1.60	2.06	1.05	1.00	1.43	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.800307	-0.796254	-0.889943	-0.727697	-1.106790	-0.826	0
UY2	-0.473650	-0.458393	-0.632964	-0.517143	-0.562570	-0.539	300
UY3	-0.260475	-0.252364	-0.440640	-0.307115	-0.267775	-0.305	614
UY4	-0.178726	-0.176031	-0.357295	-0.194181	-0.175139	-0.181	914
UY5	-0.137706	-0.137394	-0.313378	-0.133421	-0.136878	-0.121	1219
UY6	-0.111363	-0.112165	-0.284470	-0.097440	-0.116815	-0.097	1524
UY7	-0.092587	-0.093932	-0.263142	-0.073626	-0.104814	-0.079	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 1192 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	13	14	12	5	MIN	AVG	MAX
EY1	3000	1540	1609	1515	8528	1515	3238	8528
EY2	200	183	191	176	215	176	193	215
EX2	200	198	460	176	491	176	305	491
EY3	100	126	127	100	202	100	131	202
EX3	100	78	158	211	339	78	177	339
R2	1.00	1.08	2.41	1.00	2.28	1.00	1.56	2.41
R3	1.00	0.62	1.25	2.11	1.68	0.62	1.33	2.11

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.800307	-0.955887	-0.877547	-0.953471	-0.515943	-0.826	0
UY2	-0.473650	-0.479320	-0.485486	-0.460167	-0.357316	-0.539	300
UY3	-0.260475	-0.236536	-0.292569	-0.205612	-0.222524	-0.305	614
UY4	-0.178726	-0.153920	-0.228674	-0.122908	-0.161694	-0.181	914
UY5	-0.137706	-0.111718	-0.197069	-0.083455	-0.133464	-0.121	1219
UY6	-0.111363	-0.084407	-0.177047	-0.059098	-0.118424	-0.097	1524
UY7	-0.092587	-0.065202	-0.163091	-0.042466	-0.109153	-0.079	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R: LOAD 1360 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	15	14	11	6	MIN	AVG	MAX
EY1	4728	4761	4669	4585	4361	4361	4621	4761
EY2	154	153	159	163	167	153	159	167
EX2	92	94	146	185	169	92	137	185
EY3	158	157	139	131	119	119	141	158
EX3	166	210	120	99	107	99	140	210
R2	0.60	0.61	0.92	1.13	1.01	0.60	0.85	1.13
R3	1.05	1.34	0.86	0.76	0.90	0.76	0.98	1.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.945652	-0.939634	-0.912547	-0.894481	-0.930686	-0.947	0
UY2	-0.603158	-0.598953	-0.587551	-0.575118	-0.600663	-0.605	300
UY3	-0.313365	-0.311436	-0.321733	-0.320045	-0.341566	-0.344	614
UY4	-0.186698	-0.187141	-0.205389	-0.210085	-0.231163	-0.206	914
UY5	-0.131195	-0.133887	-0.151069	-0.158020	-0.178677	-0.138	1219
UY6	-0.103467	-0.108009	-0.121056	-0.128190	-0.148219	-0.112	1524
UY7	-0.087151	-0.093074	-0.101884	-0.108465	-0.127876	-0.092	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	12	13	11	MIN	AVG	MAX
EY1	3000	4452	1517	1523	8172	1517	3733	8172
EY2	200	183	162	162	162	162	174	200
EX2	200	304	338	233	104	104	236	338
EY3	100	54	64	213	65	54	99	213
EX3	100	87	135	182	42	42	109	182
R2	1.00	1.66	2.08	1.44	0.64	0.64	1.36	2.08
R3	1.00	1.60	2.10	0.86	0.65	0.65	1.24	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.913101	-1.015370	-1.057160	-1.095570	-1.141040	-0.947	0
UY2	-0.540406	-0.722174	-0.537217	-0.557635	-0.898787	-0.605	300
UY3	-0.297187	-0.502744	-0.267786	-0.278786	-0.653408	-0.344	614
UY4	-0.203915	-0.407653	-0.177145	-0.188177	-0.516723	-0.206	914
UY5	-0.157114	-0.357546	-0.130539	-0.147524	-0.438879	-0.138	1219
UY6	-0.127059	-0.324563	-0.099248	-0.124585	-0.389778	-0.112	1524
UY7	-0.105636	-0.300229	-0.076328	-0.110184	-0.355645	-0.092	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26; STA. 5 + 900 R; LOAD 1360 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	15	16	13	12	MIN	AVG	MAX
EY1	3000	3348	1609	1540	1517	1517	2203	3348
EY2	200	194	161	164	162	161	176	200
EX2	200	323	391	103	402	103	284	402
EY3	100	114	133	138	208	100	139	208
EX3	100	99	155	296	436	99	217	436
R2	1.00	1.67	2.42	0.63	2.48	0.63	1.64	2.48
R3	1.00	0.87	1.17	2.15	2.10	0.87	1.46	2.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.913101	-0.814625	-1.089280	-1.193460	-0.915117	-0.947	0
UY2	-0.540406	-0.483625	-0.604211	-0.567217	-0.419450	-0.605	300
UY3	-0.297187	-0.262874	-0.349970	-0.227640	-0.169372	-0.344	614
UY4	-0.203915	-0.177796	-0.264137	-0.119989	-0.090007	-0.206	914
UY5	-0.157114	-0.135905	-0.223065	-0.073904	-0.055200	-0.138	1219
UY6	-0.127059	-0.109382	-0.197987	-0.048480	-0.035971	-0.112	1524
UY7	-0.105636	-0.090517	-0.181002	-0.032561	-0.024149	-0.092	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 5 + 900 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA OF BASIN"		LOAD 1: 588 kPa					LOAD 2: 844 kPa					LOAD 3: 1192 kPa					LOAD 4: 1360 kPa										
DEPTH (mm)	DEPTH RATIO (z/ro)	3	16	15	9	8	AVG	STRESS RATIO (p/po)	8	15	12	1	3	AVG	STRESS RATIO (p/po)	8	5	4	2	AVG	STRESS RATIO (p/po)	15	14	11	6	AVG	STRESS RATIO (p/po)
30	0.2	-0.508	-0.496	-0.510	-0.514	-0.497	-0.505	0.859	-0.733	-0.730	-0.735	-0.723	-0.728	-0.730	0.865	-1.002	-1.039	-0.997	-1.016	-1.013	0.850	-1.117	-1.130	-1.137	-1.137	-1.130	0.831
90	0.6	-0.309	-0.274	-0.314	-0.324	-0.278	-0.309	0.510	-0.453	-0.446	-0.464	-0.426	-0.439	-0.445	0.528	-0.544	-0.644	-0.531	-0.587	-0.576	0.483	-0.552	-0.590	-0.608	-0.610	-0.590	0.434
224	1.5	-0.134	-0.110	-0.137	-0.143	-0.115	-0.128	0.217	-0.197	-0.195	-0.208	-0.181	-0.190	-0.194	0.230	-0.209	-0.270	-0.206	-0.247	-0.233	0.196	-0.202	-0.223	-0.235	-0.238	-0.225	0.165
432	2.9	-0.060	-0.053	-0.061	-0.062	-0.055	-0.058	0.099	-0.087	-0.086	-0.091	-0.084	-0.088	-0.087	0.103	-0.100	-0.114	-0.103	-0.117	-0.109	0.091	-0.111	-0.114	-0.122	-0.121	-0.117	0.086
640	4.3	-0.032	-0.030	-0.033	-0.034	-0.031	-0.032	0.055	-0.046	-0.045	-0.047	-0.045	-0.047	-0.046	0.054	-0.057	-0.061	-0.058	-0.065	-0.060	0.051	-0.068	-0.067	-0.071	-0.070	-0.069	0.051
848	5.7	-0.020	-0.019	-0.021	-0.021	-0.020	-0.020	0.034	-0.027	-0.025	-0.028	-0.027	-0.029	-0.027	0.032	-0.036	-0.037	-0.036	-0.040	-0.037	0.031	-0.046	-0.043	-0.045	-0.044	-0.045	0.033
1056	7.0	-0.013	-0.013	-0.014	-0.014	-0.014	-0.014	0.023	-0.017	-0.015	-0.017	-0.017	-0.018	-0.017	0.020	-0.025	-0.024	-0.023	-0.026	-0.024	0.020	-0.034	-0.030	-0.029	-0.029	-0.030	0.022
1660	11.1	-0.006	-0.006	-0.006	-0.006	-0.007	-0.006	0.011	-0.007	-0.006	-0.008	-0.008	-0.008	-0.007	0.009	-0.014	-0.013	-0.010	-0.012	-0.012	0.010	-0.020	-0.014	-0.013	-0.013	-0.015	0.011
2160	14.4	-0.002	-0.002	-0.002	-0.002	-0.003	-0.002	0.004	-0.003	-0.002	-0.004	-0.003	-0.003	-0.003	0.004	-0.007	-0.006	-0.004	-0.005	-0.005	0.004	-0.008	-0.005	-0.004	-0.005	-0.006	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	1	13	12	7	11	AVG	STRESS RATIO (p/po)	1	7	13	11	5	AVG	STRESS RATIO (p/po)	13	7	11	12	AVG	STRESS RATIO (p/po)	7	12	13	11	AVG	STRESS RATIO (p/po)
30	0.2	-0.504	-0.512	-0.477	-0.499	-0.475	-0.493	0.839	-0.723	-0.716	-0.694	-0.684	-0.707	-0.705	0.835	-1.038	-1.012	-0.966	-1.035	-1.013	0.849	-1.154	-1.216	-1.205	-1.102	-1.169	0.860
90	0.6	-0.297	-0.315	-0.220	-0.282	-0.221	-0.267	0.454	-0.426	-0.405	-0.339	-0.322	-0.375	-0.373	0.442	-0.640	-0.571	-0.454	-0.648	-0.578	0.485	-0.652	-0.818	-0.789	-0.517	-0.694	0.510
224	1.5	-0.126	-0.136	-0.072	-0.106	-0.070	-0.102	0.174	-0.181	-0.153	-0.118	-0.106	-0.135	-0.139	0.164	-0.273	-0.215	-0.148	-0.299	-0.234	0.196	-0.246	-0.388	-0.343	-0.167	-0.286	0.210
432	2.9	-0.058	-0.063	-0.041	-0.048	-0.040	-0.050	0.085	-0.084	-0.068	-0.067	-0.061	-0.071	-0.070	0.083	-0.122	-0.096	-0.083	-0.137	-0.110	0.092	-0.110	-0.183	-0.141	-0.092	-0.132	0.097
640	4.3	-0.031	-0.034	-0.026	-0.026	-0.024	-0.028	0.048	-0.045	-0.037	-0.041	-0.039	-0.043	-0.041	0.049	-0.066	-0.052	-0.050	-0.075	-0.061	0.051	-0.060	-0.098	-0.077	-0.054	-0.072	0.053
848	5.7	-0.019	-0.020	-0.018	-0.015	-0.016	-0.017	0.030	-0.027	-0.021	-0.027	-0.028	-0.029	-0.026	0.031	-0.039	-0.030	-0.033	-0.049	-0.038	0.032	-0.034	-0.058	-0.049	-0.034	-0.044	0.032
1056	7.0	-0.012	-0.012	-0.013	-0.009	-0.011	-0.011	0.019	-0.017	-0.013	-0.018	-0.021	-0.020	-0.018	0.021	-0.024	-0.018	-0.023	-0.034	-0.025	0.021	-0.020	-0.036	-0.034	-0.021	-0.028	0.020
1660	11.1	-0.005	-0.006	-0.006	-0.005	-0.009	-0.006	0.010	-0.008	-0.007	-0.008	-0.013	-0.009	-0.009	0.010	-0.013	-0.009	-0.017	-0.016	-0.014	0.012	-0.010	-0.020	-0.015	-0.010	-0.014	0.010
2160	14.4	-0.002	-0.003	-0.003	-0.002	-0.005	-0.003	0.005	-0.003	-0.003	-0.003	-0.006	-0.004	-0.004	0.005	-0.006	-0.005	-0.009	-0.006	-0.007	0.006	-0.006	-0.010	-0.006	-0.004	-0.006	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	1	12	11	5	7	AVG	STRESS RATIO (p/po)	1	16	10	12	7	AVG	STRESS RATIO (p/po)	13	14	12	5	AVG	STRESS RATIO (p/po)	15	16	13	12	AVG	STRESS RATIO (p/po)
30	0.2	-0.504	-0.528	-0.477	-0.493	-0.499	-0.500	0.851	-0.723	-0.717	-0.751	-0.701	-0.743	-0.727	0.861	-1.054	-1.073	-1.049	-0.998	-1.044	0.876	-1.173	-1.215	-1.179	-1.219	-1.197	0.880
90	0.6	-0.297	-0.361	-0.221	-0.262	-0.282	-0.284	0.483	-0.426	-0.408	-0.505	-0.362	-0.483	-0.437	0.517	-0.698	-0.731	-0.682	-0.530	-0.661	0.554	-0.697	-0.804	-0.739	-0.817	-0.764	0.562
224	1.5	-0.126	-0.177	-0.073	-0.094	-0.106	-0.115	0.196	-0.181	-0.170	-0.235	-0.138	-0.222	-0.189	0.224	-0.314	-0.324	-0.313	-0.191	-0.285	0.239	-0.295	-0.342	-0.340	-0.355	-0.333	0.245
432	2.9	-0.058	-0.086	-0.042	-0.050	-0.048	-0.057	0.097	-0.084	-0.082	-0.104	-0.072	-0.099	-0.098	0.104	-0.131	-0.137	-0.137	-0.100	-0.126	0.106	-0.142	-0.142	-0.156	-0.151	-0.148	0.109
640	4.3	-0.031	-0.046	-0.027	-0.030	-0.026	-0.032	0.055	-0.045	-0.045	-0.054	-0.042	-0.052	-0.048	0.056	-0.068	-0.073	-0.073	-0.061	-0.069	0.058	-0.079	-0.078	-0.085	-0.085	-0.082	0.060
848	5.7	-0.019	-0.028	-0.019	-0.020	-0.015	-0.020	0.034	-0.027	-0.027	-0.032	-0.026	-0.032	-0.029	0.034	-0.040	-0.044	-0.045	-0.040	-0.042	0.036	-0.047	-0.047	-0.055	-0.055	-0.051	0.038
1056	7.0	-0.012	-0.017	-0.014	-0.014	-0.009	-0.013	0.022	-0.017	-0.017	-0.019	-0.017	-0.022	-0.018	0.022	-0.025	-0.028	-0.030	-0.028	-0.028	0.023	-0.029	-0.031	-0.039	-0.039	-0.034	0.025
1660	11.1	-0.005	-0.009	-0.010	-0.006	-0.005	-0.007	0.012	-0.008	-0.008	-0.007	-0.008	-0.015	-0.009	0.011	-0.009	-0.012	-0.021	-0.013	-0.014	0.012	-0.012	-0.014	-0.029	-0.028	-0.021	0.015
2160	14.4	-0.002	-0.004	-0.005	-0.003	-0.002	-0.003	0.006	-0.003	-0.003	-0.002	-0.003	-0.008	-0.004	0.005	-0.003	-0.005	-0.011	-0.005	-0.006	0.005	-0.004	-0.006	-0.015	-0.013	-0.009	0.007

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 576 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	14	16	12	8	MIN	AVG	MAX
EY1	2041	2392	1655	1250	1025	1025	1673	2392
EY2	151	151	151	151	151	151	151	151
EX2	234	255	222	234	278	222	244	278
EY3	101	125	125	119	91	91	112	125
EX3	90	83	90	84	67	67	83	90
R2	1.55	1.69	1.47	1.55	1.84	1.47	1.62	1.84
R3	0.89	0.66	0.72	0.71	0.74	0.66	0.74	0.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.481944	-0.457336	-0.520158	-0.546738	-0.559990	-0.452	0
UY2	-0.275844	-0.269283	-0.288231	-0.283393	-0.279232	-0.313	300
UY3	-0.150378	-0.148619	-0.158676	-0.152063	-0.150233	-0.180	614
UY4	-0.104754	-0.104196	-0.114817	-0.109052	-0.107445	-0.106	914
UY5	-0.082336	-0.083098	-0.093885	-0.087691	-0.084600	-0.071	1219
UY6	-0.068187	-0.070205	-0.080969	-0.074127	-0.069221	-0.056	1524
UY7	-0.058283	-0.061350	-0.072147	-0.064733	-0.058101	-0.044	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	12	13	15	14	MIN	AVG	MAX
EY1	4452	1517	4514	2708	7399	1517	4118	7399
EY2	183	162	188	194	168	162	179	194
EX2	304	397	212	192	157	157	252	397
EY3	54	64	85	129	57	54	78	129
EX3	87	64	72	137	39	39	80	137
R2	1.66	2.45	1.13	0.99	0.93	0.93	1.43	2.45
R3	1.60	1.00	0.85	1.06	0.68	0.68	1.04	1.60

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.433814	-0.483308	-0.404632	-0.400557	-0.391217	-0.452	0
UY2	-0.309204	-0.268342	-0.277106	-0.231940	-0.289576	-0.313	300
UY3	-0.215515	-0.156143	-0.178297	-0.125542	-0.191477	-0.180	614
UY4	-0.174584	-0.116599	-0.134890	-0.086492	-0.138292	-0.106	914
UY5	-0.152650	-0.094948	-0.112244	-0.067798	-0.107429	-0.071	1219
UY6	-0.138022	-0.079769	-0.097667	-0.056361	-0.086998	-0.056	1524
UY7	-0.127173	-0.068341	-0.087188	-0.048544	-0.072121	-0.044	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 576 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS

CALCULATED MODULI (MPa)

SET	1	13	12	11	7	MIN	AVG	MAX
EY1	3000	4514	8225	8172	4452	3000	5673	8225
EY2	200	188	162	162	183	162	179	200
EX2	200	164	103	104	304	103	175	304
EY3	100	112	80	205	54	54	110	205
EX3	100	143	158	291	87	87	156	291
R2	1.00	0.87	0.63	0.64	1.66	0.63	0.96	1.66
R3	1.00	1.27	1.99	1.42	1.60	1.00	1.45	1.99

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.389334	-0.357257	-0.427000	-0.327757	-0.433814	-0.452	0
UY2	-0.231083	-0.224655	-0.327327	-0.229460	-0.309204	-0.313	300
UY3	-0.127413	-0.122209	-0.227495	-0.133539	-0.215515	-0.180	614
UY4	-0.087437	-0.078882	-0.174290	-0.085405	-0.174584	-0.106	914
UY5	-0.067138	-0.057971	-0.146435	-0.062980	-0.152650	-0.071	1219
UY6	-0.054009	-0.045573	-0.130587	-0.052251	-0.138022	-0.056	1524
UY7	-0.044645	-0.037191	-0.120483	-0.046535	-0.127173	-0.044	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 824 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	12	14	6	5	MIN	AVG	MAX
EY1	1521	2074	2217	2570	1517	1517	1980	2570
EY2	206	200	196	188	162	162	191	206
EX2	212	188	225	222	103	103	190	225
EY3	92	91	88	85	64	64	84	92
EX3	55	97	80	83	135	55	90	135
R2	1.03	0.94	1.15	1.18	0.63	0.63	0.99	1.18
R3	0.60	1.06	0.92	0.98	2.10	0.60	1.13	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.701771	-0.670545	-0.656685	-0.649761	-0.795670	-0.633	0
UY2	-0.386456	-0.393635	-0.394686	-0.403867	-0.416171	-0.449	300
UY3	-0.229674	-0.235709	-0.241552	-0.249635	-0.204037	-0.265	614
UY4	-0.174587	-0.178870	-0.185252	-0.190860	-0.129276	-0.159	914
UY5	-0.143594	-0.149232	-0.155486	-0.160242	-0.091110	-0.107	1219
UY6	-0.121890	-0.129548	-0.135425	-0.139913	-0.066309	-0.083	1524
UY7	-0.105842	-0.115392	-0.120789	-0.125153	-0.048808	-0.067	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	13	12	15	14	MIN	AVG	MAX
EY1	4452	4514	1517	2708	7399	1517	4118	7399
EY2	183	188	162	194	168	162	179	194
EX2	304	213	391	240	213	213	272	391
EY3	54	85	64	100	57	54	72	100
EX3	87	72	64	87	39	39	70	87
R2	1.66	1.13	2.41	1.24	1.26	1.13	1.54	2.41
R3	1.60	0.85	1.00	0.87	0.68	0.68	1.00	1.60

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.620595	-0.578675	-0.692581	-0.564501	-0.558444	-0.633	0
UY2	-0.442334	-0.396293	-0.387376	-0.329387	-0.418339	-0.449	300
UY3	-0.308307	-0.255000	-0.227734	-0.181592	-0.285944	-0.265	614
UY4	-0.249753	-0.192934	-0.170149	-0.125510	-0.215601	-0.159	914
UY5	-0.218375	-0.160555	-0.138499	-0.096641	-0.175232	-0.107	1219
UY6	-0.197448	-0.139710	-0.116463	-0.077689	-0.148517	-0.083	1524
UY7	-0.181929	-0.124724	-0.099933	-0.064040	-0.128946	-0.067	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 824 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS

CALCULATED MODULI (MPa)

SET	1	13	7	12	5	MIN	AVG	MAX
EY1	3000	1523	4452	1517	8528	1517	3804	8528
EY2	200	162	183	173	215	162	187	215
EX2	200	172	304	111	491	111	255	491
EY3	100	116	54	82	202	54	111	202
EX3	100	70	87	171	339	70	153	339
R2	1.00	1.06	1.66	0.64	2.28	0.64	1.33	2.28
R3	1.00	0.61	1.60	2.09	1.68	0.61	1.39	2.09

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.556963	-0.795135	-0.620595	-0.855844	-0.357049	-0.633	0
UY2	-0.330577	-0.440497	-0.442334	-0.486638	-0.247179	-0.449	300
UY3	-0.182271	-0.251024	-0.308307	-0.287437	-0.153760	-0.265	614
UY4	-0.125083	-0.186038	-0.249753	-0.220600	-0.111680	-0.159	914
UY5	-0.096045	-0.153336	-0.218375	-0.188001	-0.092131	-0.107	1219
UY6	-0.077262	-0.132445	-0.197448	-0.167545	-0.081691	-0.083	1524
UY7	-0.063867	-0.117910	-0.181929	-0.153453	-0.075242	-0.067	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1173 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	11	3	7	5	MIN	AVG	MAX
EY1	2751	1679	4121	3413	3895	1679	3172	4121
EY2	151	153	158	177	156	151	159	177
EX2	229	208	200	205	159	159	200	229
EY3	51	53	61	60	58	51	57	61
EX3	94	99	93	92	88	88	93	99
R2	1.51	1.36	1.27	1.16	1.02	1.02	1.27	1.51
R3	1.86	1.88	1.52	1.54	1.52	1.52	1.66	1.88

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.943265	-1.065470	-0.881175	-0.882134	-0.943438	-0.907	0
UY2	-0.581226	-0.597733	-0.589604	-0.567621	-0.633527	-0.627	300
UY3	-0.333059	-0.332455	-0.361198	-0.343981	-0.390635	-0.378	614
UY4	-0.232550	-0.234554	-0.260069	-0.251073	-0.282785	-0.230	914
UY5	-0.179878	-0.182014	-0.207506	-0.202029	-0.226415	-0.153	1219
UY6	-0.144846	-0.146249	-0.173910	-0.169408	-0.190247	-0.120	1524
UY7	-0.119066	-0.119859	-0.149794	-0.145446	-0.164283	-0.094	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	11	13	1	12	MIN	AVG	MAX
EY1	4452	8172	2570	3000	1517	1517	3942	8172
EY2	183	162	188	200	162	162	179	200
EX2	304	104	211	200	103	103	184	304
EY3	54	65	146	100	64	54	86	146
EX3	87	42	146	100	135	42	102	146
R2	1.66	0.64	1.12	1.00	0.63	0.63	1.01	1.66
R3	1.60	0.65	1.00	1.00	2.10	0.65	1.27	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.883445	-0.992149	-0.821595	-0.792862	-1.137520	-0.907	0
UY2	-0.629682	-0.782591	-0.470693	-0.470591	-0.588807	-0.627	300
UY3	-0.438888	-0.569365	-0.253862	-0.259470	-0.284024	-0.378	614
UY4	-0.355534	-0.449770	-0.176149	-0.178061	-0.178896	-0.230	914
UY5	-0.310866	-0.380954	-0.139778	-0.136724	-0.125553	-0.153	1219
UY6	-0.281076	-0.337191	-0.117976	-0.109986	-0.090764	-0.120	1524
UY7	-0.258984	-0.306694	-0.103312	-0.090918	-0.066192	-0.094	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1173 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS

CALCULATED MODULI(MPa)

SET	1	13	7	12	5	MIN	AVG	MAX
EY1	3000	1523	4452	1506	8528	1506	3807	8528
EY2	200	162	183	169	215	162	186	215
EX2	200	173	304	107	491	107	255	491
EY3	100	117	54	82	202	54	111	202
EX3	100	71	87	171	339	71	154	339
R2	1.00	1.06	1.66	0.63	2.28	0.63	1.33	2.28
R3	1.00	0.61	1.60	2.09	1.68	0.61	1.39	2.09

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.792862	-1.127330	-0.883445	-1.236040	-0.508276	-0.907	0
UY2	-0.470591	-0.623653	-0.629682	-0.701835	-0.351871	-0.627	300
UY3	-0.259470	-0.354786	-0.438888	-0.411931	-0.218884	-0.378	614
UY4	-0.178061	-0.262586	-0.355534	-0.314745	-0.158982	-0.230	914
UY5	-0.136724	-0.216245	-0.310866	-0.267675	-0.131152	-0.153	1219
UY6	-0.109986	-0.186688	-0.281076	-0.238306	-0.116291	-0.120	1524
UY7	-0.090918	-0.166147	-0.258984	-0.218147	-0.107111	-0.094	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1341 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	11	1	6	16	MIN	AVG	MAX
EY1	2570	8223	3000	4452	3376	2570	4324	8223
EY2	188	164	200	183	225	164	192	225
EX2	164	105	200	304	200	105	195	304
EY3	85	65	100	54	102	54	91	102
EX3	78	41	100	87	90	41	79	100
R2	0.87	0.64	1.00	1.66	0.89	0.64	1.01	1.66
R3	0.92	0.64	1.00	1.60	0.88	0.64	1.01	1.60

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.031660	-0.925087	-0.906417	-1.009970	-0.842264	-1.288	0
UY2	-0.612098	-0.690099	-0.537991	-0.719866	-0.507425	-0.697	300
UY3	-0.343352	-0.449175	-0.296632	-0.501747	-0.286556	-0.427	614
UY4	-0.239584	-0.312257	-0.203564	-0.406454	-0.199597	-0.263	914
UY5	-0.185397	-0.232248	-0.156305	-0.355389	-0.154177	-0.177	1219
UY6	-0.149534	-0.180665	-0.125738	-0.321333	-0.124200	-0.137	1524
UY7	-0.123661	-0.144380	-0.103939	-0.296076	-0.102563	-0.109	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	13	10	11	6	MIN	AVG	MAX
EY1	1752	1751	8172	1517	4452	1517	3529	8172
EY2	159	222	162	162	183	159	177	222
EX2	107	151	104	103	304	103	154	304
EY3	127	57	65	64	54	54	74	127
EX3	116	58	42	135	87	42	88	135
R2	0.67	0.68	0.64	0.63	1.66	0.63	0.86	1.66
R3	0.92	1.03	0.65	2.10	1.60	0.65	1.26	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.316240	-1.179360	-1.134250	-1.555320	-1.009970	-1.288	0
UY2	-0.735491	-0.684082	-0.894675	-0.937991	-0.719866	-0.697	300
UY3	-0.397834	-0.419168	-0.650911	-0.593544	-0.501747	-0.427	614
UY4	-0.285617	-0.318899	-0.514188	-0.472952	-0.406454	-0.263	914
UY5	-0.235555	-0.259268	-0.435515	-0.411987	-0.355389	-0.177	1219
UY6	-0.206442	-0.215943	-0.385485	-0.372656	-0.321333	-0.137	1524
UY7	-0.187332	-0.183148	-0.350620	-0.344995	-0.296076	-0.109	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 300 R: LOAD 1341 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS

CALCULATED MODULI (MPa)

SET	16	15	13	12	1	MIN	AVG	MAX
EY1	1077	1237	1751	1540	3000	1077	1721	3000
EY2	157	169	168	244	200	157	188	244
EX2	433	360	242	153	200	153	278	433
EY3	119	108	125	62	100	62	103	125
EX3	119	86	84	133	100	84	105	133
R2	2.77	2.12	1.44	0.63	1.00	0.63	1.59	2.77
R3	1.00	0.80	0.68	2.15	1.00	0.68	1.13	2.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.222480	-1.188430	-1.082280	-1.017490	-0.906417	-1.288	0
UY2	-0.644539	-0.641545	-0.591786	-0.516803	-0.537991	-0.697	300
UY3	-0.383987	-0.384707	-0.321817	-0.274541	-0.296632	-0.427	614
UY4	-0.298873	-0.299255	-0.226939	-0.188154	-0.203564	-0.263	914
UY5	-0.255884	-0.254686	-0.179235	-0.138540	-0.156305	-0.177	1219
UY6	-0.228554	-0.225277	-0.148795	-0.103540	-0.125738	-0.137	1524
UY7	-0.209589	-0.204264	-0.127529	-0.077562	-0.103939	-0.109	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 4 + 950

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 576 kPa					LOAD 2: 824 kPa					LOAD 3: 1173 kPa					LOAD 4: 1341 kPa											
DEPTH (mm)	DEPTH RATIO z/ao	11	14	16	12	8	AVG.	STRESS RATIO p/po	15	12	14	6	5	AVG.	STRESS RATIO p/po	11	3	7	5	AVG.	STRESS RATIO p/po	12	11	1	6	16	AVG.	STRESS RATIO p/po
30	0.20	-0.502	-0.499	-0.506	-0.514	-0.521	-0.508	0.882	-0.731	-0.718	-0.718	-0.712	-0.715	-0.719	0.872	-1.029	-0.986	-0.997	-0.984	-1.001	0.853	-1.150	-1.087	-1.149	-1.138	-1.146	-1.134	0.846
90	0.60	-0.309	-0.302	-0.323	-0.345	-0.364	-0.329	0.571	-0.489	-0.449	-0.449	-0.431	-0.447	-0.453	0.550	-0.656	-0.539	-0.572	-0.533	-0.578	0.493	-0.682	-0.503	-0.676	-0.642	-0.674	-0.636	0.474
218	1.45	-0.136	-0.133	-0.149	-0.162	-0.174	-0.151	0.262	-0.233	-0.205	-0.202	-0.189	-0.210	-0.208	0.252	-0.287	-0.209	-0.237	-0.209	-0.237	0.202	-0.301	-0.166	-0.294	-0.248	-0.292	-0.260	0.194
414	2.76	-0.064	-0.067	-0.071	-0.073	-0.076	-0.070	0.122	-0.103	-0.094	-0.093	-0.088	-0.098	-0.095	0.116	-0.123	-0.102	-0.114	-0.103	-0.111	0.095	-0.142	-0.094	-0.141	-0.115	-0.139	-0.126	0.094
610	4.07	-0.035	-0.038	-0.039	-0.040	-0.040	-0.038	0.067	-0.053	-0.050	-0.050	-0.047	-0.053	-0.051	0.061	-0.065	-0.057	-0.062	-0.058	-0.061	0.052	-0.077	-0.056	-0.077	-0.063	-0.075	-0.070	0.052
806	5.37	-0.021	-0.024	-0.024	-0.024	-0.023	-0.023	0.040	-0.030	-0.030	-0.029	-0.028	-0.032	-0.030	0.036	-0.038	-0.035	-0.037	-0.035	-0.036	0.031	-0.045	-0.035	-0.047	-0.036	-0.044	-0.042	0.031
1002	6.68	-0.014	-0.015	-0.016	-0.015	-0.014	-0.015	0.025	-0.017	-0.018	-0.017	-0.017	-0.021	-0.018	0.022	-0.024	-0.022	-0.023	-0.022	-0.023	0.019	-0.028	-0.022	-0.029	-0.022	-0.027	-0.026	0.019
1600	10.67	-0.006	-0.006	-0.006	-0.006	-0.005	-0.006	0.010	-0.007	-0.008	-0.007	-0.007	-0.014	-0.009	0.011	-0.014	-0.012	-0.012	-0.012	-0.013	0.011	-0.012	-0.009	-0.013	-0.011	-0.012	-0.011	0.008
2600	17.33	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.002	-0.003	-0.003	-0.003	-0.007	-0.004	0.004	-0.008	-0.006	-0.006	-0.006	-0.007	0.006	-0.005	-0.003	-0.005	-0.006	-0.005	-0.005	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO z/ao	7	12	13	15	14	AVG.	STRESS RATIO p/po	7	13	12	15	14	AVG.	STRESS RATIO p/po	11	13	1	12	AVG.	STRESS RATIO p/po	15	13	10	11	6	AVG.	STRESS RATIO p/po
30	0.20	-0.489	-0.517	-0.485	-0.495	-0.472	-0.491	0.853	-0.699	-0.693	-0.738	-0.712	-0.679	-0.704	0.855	-0.950	-1.013	-1.005	-1.015	-0.996	0.849	-1.153	-1.174	-1.086	-1.164	-1.138	-1.143	0.852
90	0.60	-0.276	-0.349	-0.264	-0.295	-0.229	-0.283	0.491	-0.395	-0.378	-0.493	-0.432	-0.336	-0.407	0.493	-0.446	-0.611	-0.591	-0.627	-0.568	0.484	-0.694	-0.754	-0.510	-0.727	-0.642	-0.666	0.496
218	1.45	-0.106	-0.166	-0.106	-0.129	-0.079	-0.117	0.204	-0.152	-0.151	-0.218	-0.188	-0.116	-0.165	0.200	-0.147	-0.269	-0.257	-0.293	-0.236	0.202	-0.317	-0.358	-0.168	-0.342	-0.248	-0.287	0.214
414	2.76	-0.049	-0.079	-0.053	-0.061	-0.042	-0.057	0.099	-0.071	-0.076	-0.094	-0.087	-0.059	-0.077	0.094	-0.083	-0.127	-0.124	-0.139	-0.115	0.098	-0.155	-0.161	-0.095	-0.160	-0.115	-0.137	0.102
610	4.07	-0.027	-0.042	-0.030	-0.034	-0.024	-0.031	0.054	-0.039	-0.042	-0.049	-0.047	-0.034	-0.042	0.051	-0.050	-0.071	-0.068	-0.074	-0.064	0.054	-0.086	-0.081	-0.057	-0.086	-0.063	-0.075	0.056
806	5.37	-0.016	-0.024	-0.018	-0.021	-0.014	-0.018	0.032	-0.022	-0.025	-0.028	-0.028	-0.019	-0.025	0.030	-0.031	-0.044	-0.041	-0.045	-0.039	0.033	-0.054	-0.045	-0.036	-0.053	-0.036	-0.045	0.033
1002	6.68	-0.009	-0.013	-0.011	-0.014	-0.008	-0.011	0.019	-0.013	-0.016	-0.016	-0.017	-0.011	-0.015	0.018	-0.020	-0.029	-0.026	-0.030	-0.025	0.021	-0.037	-0.025	-0.023	-0.033	-0.022	-0.028	0.021
1600	10.67	-0.005	-0.005	-0.005	-0.006	-0.003	-0.005	0.008	-0.007	-0.007	-0.007	-0.007	-0.005	-0.007	0.008	-0.009	-0.013	-0.012	-0.020	-0.013	0.011	-0.017	-0.011	-0.011	-0.016	-0.011	-0.013	0.010
2600	17.33	-0.002	-0.002	-0.002	-0.002	-0.001	-0.002	0.004	-0.004	-0.003	-0.003	-0.003	-0.002	-0.003	0.003	-0.004	-0.005	-0.005	-0.010	-0.006	0.005	-0.006	-0.005	-0.004	-0.007	-0.006	-0.005	0.004

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	1	13	12	11	7	AVG.	STRESS RATIO p/po	1	13	7	12	5	AVG.	STRESS RATIO p/po	13	7	12	5	AVG.	STRESS RATIO p/po	16	15	13	12	1	AVG.	STRESS RATIO p/po
30	0.20	-0.494	-0.482	-0.467	-0.467	-0.489	-0.480	0.833	-0.706	-0.724	-0.699	-0.717	-0.690	-0.707	0.858	-1.031	-0.995	-1.019	-0.982	-1.006	0.858	-1.221	-1.212	-1.181	-1.187	-1.149	-1.190	0.887
90	0.60	-0.290	-0.260	-0.214	-0.216	-0.276	-0.251	0.436	-0.415	-0.469	-0.395	-0.452	-0.367	-0.419	0.509	-0.668	-0.562	-0.640	-0.522	-0.597	0.509	-0.860	-0.841	-0.759	-0.796	-0.676	-0.787	0.587
218	1.45	-0.126	-0.104	-0.070	-0.073	-0.106	-0.096	0.167	-0.181	-0.215	-0.152	-0.214	-0.135	-0.179	0.218	-0.306	-0.217	-0.303	-0.192	-0.255	0.217	-0.389	-0.390	-0.335	-0.390	-0.294	-0.368	0.268
414	2.76	-0.061	-0.054	-0.041	-0.043	-0.049	-0.050	0.086	-0.087	-0.096	-0.071	-0.100	-0.073	-0.085	0.103	-0.136	-0.101	-0.142	-0.104	-0.121	0.103	-0.162	-0.169	-0.145	-0.173	-0.141	-0.158	0.118
610	4.07	-0.033	-0.031	-0.026	-0.028	-0.027	-0.029	0.050	-0.048	-0.051	-0.039	-0.054	-0.045	-0.047	0.057	-0.072	-0.055	-0.077	-0.064	-0.067	0.057	-0.087	-0.090	-0.078	-0.088	-0.077	-0.084	0.063
806	5.37	-0.020	-0.020	-0.018	-0.020	-0.016	-0.019	0.032	-0.029	-0.031	-0.022	-0.033	-0.030	-0.029	0.035	-0.043	-0.032	-0.048	-0.043	-0.041	0.035	-0.052	-0.053	-0.047	-0.051	-0.047	-0.050	0.037
1002	6.68	-0.013	-0.013	-0.012	-0.015	-0.009	-0.012	0.022	-0.018	-0.019	-0.013	-0.022	-0.021	-0.019	0.023	-0.028	-0.019	-0.031	-0.030	-0.027	0.023	-0.033	-0.032	-0.030	-0.031	-0.029	-0.031	0.023
1600	10.67	-0.006	-0.007	-0.007	-0.008	-0.005	-0.006	0.011	-0.008	-0.008	-0.007	-0.011	-0.010	-0.009	0.011	-0.012	-0.010	-0.016	-0.014	-0.013	0.011	-0.014	-0.013	-0.012	-0.020	-0.013	-0.014	0.011
2600	17.33	-0.002	-0.003	-0.003	-0.003	-0.002	-0.003	0.005	-0.003	-0.003	-0.004	-0.005	-0.004	-0.004	0.004	-0.004	-0.005	-0.007	-0.005	-0.005	0.004	-0.005	-0.005	-0.004	-0.011	-0.005	-0.006	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 574 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	15	6	1	11	MIN	AVG	MAX
EY1	2632	2789	4791	3000	2120	2120	3067	4791
EY2	188	187	174	200	181	174	186	200
EX2	201	164	166	200	174	164	181	201
EY3	112	110	115	100	135	100	114	135
EX3	101	144	89	100	113	89	109	144
R2	1.07	0.88	0.95	1.00	0.96	0.88	0.97	1.07
R3	0.90	1.32	0.78	1.00	0.83	0.78	0.97	1.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.424889	-0.428440	-0.387377	-0.408973	-0.452895	-0.420	0
UY2	-0.235012	-0.235950	-0.241592	-0.233747	-0.233855	-0.270	300
UY3	-0.122020	-0.118480	-0.130044	-0.125833	-0.112516	-0.140	614
UY4	-0.082187	-0.077541	-0.083899	-0.086808	-0.072334	-0.079	914
UY5	-0.062219	-0.057829	-0.061388	-0.066904	-0.052895	-0.057	1219
UY6	-0.049356	-0.045522	-0.047710	-0.053843	-0.040801	-0.047	1524
UY7	-0.040291	-0.037025	-0.038313	-0.044496	-0.032553	-0.038	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	13	7	12	11	MIN	AVG	MAX
EY1	3000	2570	4452	8121	8172	2570	5263	8172
EY2	200	188	183	162	162	162	179	200
EX2	200	286	304	103	104	103	199	304
EY3	100	146	54	203	133	54	127	203
EX3	100	211	87	203	274	87	175	274
R2	1.00	1.52	1.66	0.63	0.64	0.63	1.09	1.66
R3	1.00	1.45	1.60	1.00	2.06	1.00	1.42	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.408973	-0.396898	-0.452199	-0.359852	-0.334181	-0.420	0
UY2	-0.233747	-0.216176	-0.312914	-0.245705	-0.218136	-0.270	300
UY3	-0.125833	-0.113005	-0.213996	-0.139554	-0.110204	-0.140	614
UY4	-0.086808	-0.078880	-0.173603	-0.090022	-0.059286	-0.079	914
UY5	-0.066904	-0.063017	-0.152122	-0.067939	-0.035746	-0.057	1219
UY6	-0.053843	-0.053457	-0.137595	-0.057316	-0.023701	-0.047	1524
UY7	-0.044496	-0.047039	-0.126753	-0.051417	-0.016584	-0.038	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 574 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	11	12	5	7	MIN	AVG	MAX
EY1	3000	8172	1517	8528	4452	1517	5134	8528
EY2	200	162	162	215	183	162	184	215
EX2	200	104	402	491	304	104	300	491
EY3	100	205	208	202	54	54	154	208
EX3	100	329	436	339	87	87	258	436
R2	1.00	0.64	2.48	2.28	1.66	0.64	1.61	2.48
R3	1.00	1.60	2.10	1.68	1.60	1.00	1.60	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.408973	-0.325910	-0.397573	-0.263615	-0.452199	-0.420	0
UY2	-0.233747	-0.212542	-0.167995	-0.176568	-0.312914	-0.270	300
UY3	-0.125833	-0.107201	-0.060237	-0.106353	-0.213996	-0.140	614
UY4	-0.086808	-0.058272	-0.030464	-0.077089	-0.173603	-0.079	914
UY5	-0.066904	-0.036735	-0.018006	-0.063954	-0.152122	-0.057	1219
UY6	-0.053843	-0.026608	-0.011267	-0.056873	-0.137595	-0.047	1524
UY7	-0.044496	-0.021134	-0.007208	-0.052420	-0.126753	-0.038	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 825 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	1	11	14	7	MIN	AVG	MAX
EY1	3438	3000	3151	4845	3248	3000	3536	4845
EY2	162	200	186	174	189	162	182	200
EX2	227	200	202	201	285	200	223	285
EY3	142	100	102	130	102	100	115	142
EX3	153	100	132	116	95	95	119	153
R2	1.40	1.00	1.08	1.16	1.51	1.00	1.23	1.51
R3	1.08	1.00	1.30	0.89	0.93	0.89	1.04	1.30

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.593837	-0.587809	-0.588471	-0.561695	-0.557271	-0.584	0
UY2	-0.346061	-0.335960	-0.335250	-0.356154	-0.323052	-0.385	300
UY3	-0.179291	-0.180857	-0.174678	-0.200998	-0.174850	-0.205	614
UY4	-0.118925	-0.124768	-0.116827	-0.138942	-0.120714	-0.120	914
UY5	-0.091751	-0.096160	-0.088499	-0.109976	-0.093371	-0.083	1219
UY6	-0.076011	-0.077387	-0.070527	-0.092984	-0.075471	-0.070	1524
UY7	-0.065610	-0.063953	-0.057906	-0.081556	-0.062584	-0.057	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	1	12	7	5	MIN	AVG	MAX
EY1	8172	3000	1517	4452	8528	1517	5134	8528
EY2	162	200	162	183	215	162	184	215
EX2	104	200	366	304	491	104	293	491
EY3	205	100	208	54	202	54	154	208
EX3	423	100	435	87	339	87	277	435
R2	0.64	1.00	2.25	1.66	2.28	0.64	1.57	2.28
R3	2.06	1.00	2.09	1.60	1.68	1.00	1.69	2.09

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.500063	-0.587809	-0.643223	-0.649938	-0.378890	-0.584	0
UY2	-0.334157	-0.335960	-0.311312	-0.449745	-0.253778	-0.385	300
UY3	-0.181556	-0.180857	-0.152203	-0.307573	-0.152860	-0.205	614
UY4	-0.111850	-0.124768	-0.104625	-0.249516	-0.110798	-0.120	914
UY5	-0.081786	-0.096160	-0.083710	-0.218642	-0.091920	-0.083	1219
UY6	-0.067951	-0.077387	-0.072170	-0.197763	-0.081743	-0.070	1524
UY7	-0.060594	-0.063953	-0.065125	-0.182180	-0.075342	-0.057	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 574 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	12	13	5	2	MIN	AVG	MAX
EY1	3000	1515	1540	8528	8625	1515	4641	8625
EY2	200	163	164	215	401	163	229	401
EX2	200	254	457	491	896	200	460	896
EY3	100	164	246	202	128	100	168	246
EX3	100	347	140	339	201	100	225	347
R2	1.00	1.56	2.79	2.28	2.23	1.00	1.97	2.79
R3	1.00	2.11	0.57	1.68	1.58	0.57	1.39	2.11

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.587809	-0.639855	-0.565331	-0.378890	-0.329709	-0.584	0
UY2	-0.335960	-0.281429	-0.246050	-0.253778	-0.236018	-0.385	300
UY3	-0.180857	-0.108315	-0.095853	-0.152860	-0.172786	-0.205	614
UY4	-0.124768	-0.057970	-0.053379	-0.110798	-0.148505	-0.120	914
UY5	-0.096160	-0.035952	-0.034432	-0.091920	-0.135859	-0.083	1219
UY6	-0.077387	-0.023569	-0.023394	-0.081743	-0.127269	-0.070	1524
UY7	-0.063953	-0.015811	-0.016312	-0.075342	-0.120838	-0.057	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 1167 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	14	4	6	13	MIN	AVG	MAX
EY1	4828	2515	3295	3603	2259	2259	3300	4828
EY2	158	193	185	187	189	158	182	193
EX2	100	165	153	171	204	100	159	204
EY3	127	128	89	106	82	82	106	128
EX3	77	118	83	100	69	69	89	118
R2	0.64	0.86	0.83	0.91	1.08	0.64	0.86	1.08
R3	0.61	0.92	0.94	0.94	0.85	0.61	0.85	0.94

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.869074	-0.910299	-0.899015	-0.830251	-0.944225	-0.893	0
UY2	-0.543531	-0.505090	-0.536296	-0.491613	-0.529123	-0.530	300
UY3	-0.278822	-0.268873	-0.294564	-0.261937	-0.294320	-0.288	614
UY4	-0.165625	-0.188598	-0.202388	-0.174709	-0.210445	-0.170	914
UY5	-0.112029	-0.149825	-0.155364	-0.131716	-0.165031	-0.119	1219
UY6	-0.081298	-0.125634	-0.124723	-0.104593	-0.133847	-0.099	1524
UY7	-0.061141	-0.109034	-0.102838	-0.085595	-0.110920	-0.082	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	13	1	11	12	MIN	AVG	MAX
EY1	4452	2570	3000	8172	1517	1517	3942	8172
EY2	183	188	200	162	162	162	179	200
EX2	304	286	200	104	103	103	199	304
EY3	54	85	100	65	207	54	102	207
EX3	87	123	100	135	216	87	132	216
R2	1.66	1.52	1.00	0.64	0.63	0.63	1.09	1.66
R3	1.60	1.45	1.00	2.06	1.05	1.00	1.43	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.919366	-0.833364	-0.831483	-0.768235	-1.141640	-0.893	0
UY2	-0.636185	-0.464386	-0.475231	-0.529746	-0.555695	-0.530	300
UY3	-0.435076	-0.250344	-0.255830	-0.302967	-0.257768	-0.288	614
UY4	-0.352952	-0.175098	-0.176490	-0.189244	-0.170153	-0.170	914
UY5	-0.309279	-0.136311	-0.136023	-0.130131	-0.133770	-0.119	1219
UY6	-0.279745	-0.110506	-0.109468	-0.094959	-0.114426	-0.099	1524
UY7	-0.257702	-0.091802	-0.090464	-0.071304	-0.102762	-0.082	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 1167 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	13	12	5	7	MIN	AVG	MAX
EY1	3000	1523	1515	8528	4452	1515	3804	8528
EY2	200	162	163	215	183	162	185	215
EX2	200	130	146	491	304	130	254	491
EY3	100	128	177	202	54	54	132	202
EX3	100	78	373	339	87	78	195	373
R2	1.00	0.80	0.89	2.28	1.66	0.80	1.33	2.28
R3	1.00	0.61	2.11	1.68	1.60	0.61	1.40	2.11

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.831483	-1.115730	-0.993655	-0.535957	-0.919366	-0.893	0
UY2	-0.475231	-0.545411	-0.435309	-0.358980	-0.636185	-0.530	300
UY3	-0.255830	-0.254517	-0.159701	-0.216227	-0.435076	-0.288	614
UY4	-0.176490	-0.159517	-0.080928	-0.156729	-0.352952	-0.170	914
UY5	-0.136023	-0.112055	-0.048392	-0.130025	-0.309279	-0.119	1219
UY6	-0.109468	-0.082195	-0.031080	-0.115629	-0.279745	-0.099	1524
UY7	-0.090464	-0.061838	-0.020647	-0.106575	-0.257702	-0.082	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 1340 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	1	9	6	8	MIN	AVG	MAX
EY1	5066	3000	2468	2549	3320	2468	3281	5066
EY2	161	200	182	187	188	161	184	200
EX2	104	200	207	171	215	104	179	215
EY3	130	100	106	106	100	100	108	130
EX3	83	100	96	108	90	83	96	108
R2	0.65	1.00	1.13	0.91	1.15	0.65	0.97	1.15
R3	0.64	1.00	0.90	1.03	0.90	0.64	0.89	1.03

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.963399	-0.954745	-1.040080	-1.054810	-0.973631	-0.952	0
UY2	-0.601631	-0.545680	-0.576998	-0.588438	-0.580292	-0.585	300
UY3	-0.306816	-0.293756	-0.306119	-0.311746	-0.324743	-0.322	614
UY4	-0.181844	-0.202654	-0.212138	-0.215541	-0.229912	-0.192	914
UY5	-0.123497	-0.156187	-0.164905	-0.167757	-0.182218	-0.137	1219
UY6	-0.090319	-0.125696	-0.134244	-0.137105	-0.151267	-0.113	1524
UY7	-0.068602	-0.103875	-0.112531	-0.115602	-0.129158	-0.095	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	14	7	11	13	MIN	AVG	MAX
EY1	3000	1751	4452	8172	8143	1751	5104	8172
EY2	200	168	183	162	284	162	199	284
EX2	200	218	304	104	178	104	201	304
EY3	100	230	54	205	62	54	130	230
EX3	100	155	87	357	133	87	166	357
R2	1.00	1.29	1.66	0.64	0.63	0.63	1.04	1.66
R3	1.00	0.68	1.60	1.74	2.15	0.68	1.43	2.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.954745	-1.028600	-1.055660	-0.820120	-0.658603	-0.952	0
UY2	-0.545680	-0.485467	-0.730496	-0.550498	-0.436867	-0.585	300
UY3	-0.293756	-0.206393	-0.499573	-0.302220	-0.257028	-0.322	614
UY4	-0.202654	-0.119026	-0.405275	-0.188450	-0.175220	-0.192	914
UY5	-0.156187	-0.079428	-0.355127	-0.139051	-0.130146	-0.137	1219
UY6	-0.125696	-0.056760	-0.321215	-0.116080	-0.099644	-0.113	1524
UY7	-0.103875	-0.042423	-0.295905	-0.103731	-0.077038	-0.095	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R: LOAD 1340 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	11	16	10	15	MIN	AVG	MAX
EY1	3000	4837	2469	1607	2307	1607	2844	4837
EY2	200	165	208	162	162	162	179	208
EX2	200	106	260	253	111	106	186	260
EY3	100	135	101	139	121	100	119	139
EX3	100	84	137	90	138	84	110	138
R2	1.00	0.64	1.25	1.56	0.68	0.64	1.03	1.56
R3	1.00	0.62	1.35	0.65	1.14	0.62	0.95	1.35

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.954745	-0.959586	-0.920370	-1.106640	-1.177720	-0.952	0
UY2	-0.545680	-0.590608	-0.495434	-0.541887	-0.630882	-0.585	300
UY3	-0.293756	-0.296601	-0.260123	-0.255642	-0.298588	-0.322	614
UY4	-0.202654	-0.174535	-0.180032	-0.162854	-0.185732	-0.192	914
UY5	-0.156187	-0.117938	-0.138939	-0.116662	-0.134161	-0.137	1219
UY6	-0.125696	-0.085697	-0.111781	-0.087415	-0.103624	-0.113	1524
UY7	-0.103875	-0.064573	-0.092309	-0.067260	-0.083384	-0.095	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

BRANDON: RWY 08-26: STA. 6 + 500 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 574 kPa					LOAD 2: 875 kPa					LOAD 3: 1167 kPa					LOAD 4: 1340 kPa												
DEPTH (mm)	DEPTH RATIO z/ao	4	15	6	1	11	AVG.	STRESS RATIO p/po	13	1	11	14	7	AVG.	STRESS RATIO p/po	7	14	4	6	5	AVG.	STRESS RATIO p/po	3	1	9	6	8	AVG.	STRESS RATIO p/po
28	0.19	-0.498	-0.494	-0.481	-0.495	-0.501	-0.494	0.860	-0.706	-0.711	-0.709	-0.694	-0.714	-0.707	0.857	-0.965	-1.009	-0.994	-0.992	-0.984	-0.989	0.847	-1.106	-1.156	-1.165	-1.158	-1.150	-1.147	0.856
83	0.55	-0.310	-0.301	-0.263	-0.303	-0.320	-0.299	0.521	-0.417	-0.435	-0.429	-0.385	-0.439	-0.421	0.510	-0.502	-0.626	-0.581	-0.576	-0.533	-0.564	0.483	-0.567	-0.707	-0.732	-0.716	-0.689	-0.682	0.509
209	1.39	-0.142	-0.138	-0.109	-0.139	-0.151	-0.136	0.236	-0.183	-0.199	-0.194	-0.162	-0.198	-0.187	0.227	-0.204	-0.293	-0.260	-0.254	-0.209	-0.244	0.209	-0.227	-0.323	-0.341	-0.333	-0.310	-0.307	0.229
407	2.71	-0.065	-0.066	-0.054	-0.065	-0.069	-0.064	0.111	-0.091	-0.093	-0.092	-0.084	-0.095	-0.091	0.110	-0.109	-0.137	-0.125	-0.123	-0.103	-0.119	0.102	-0.123	-0.151	-0.159	-0.156	-0.149	-0.148	0.110
605	4.03	-0.035	-0.036	-0.031	-0.035	-0.037	-0.034	0.060	-0.052	-0.050	-0.050	-0.048	-0.052	-0.050	0.061	-0.064	-0.074	-0.067	-0.067	-0.058	-0.066	0.056	-0.072	-0.081	-0.085	-0.084	-0.081	-0.080	0.060
803	5.35	-0.021	-0.022	-0.019	-0.021	-0.022	-0.021	0.036	-0.033	-0.029	-0.031	-0.030	-0.031	-0.031	0.037	-0.041	-0.045	-0.040	-0.041	-0.035	-0.040	0.035	-0.046	-0.048	-0.051	-0.050	-0.048	-0.049	0.036
1001	6.67	-0.013	-0.014	-0.012	-0.013	-0.014	-0.013	0.023	-0.022	-0.018	-0.020	-0.020	-0.019	-0.020	0.024	-0.027	-0.029	-0.025	-0.026	-0.022	-0.026	0.022	-0.031	-0.030	-0.032	-0.032	-0.030	-0.031	0.023
1600	10.67	-0.006	-0.007	-0.005	-0.006	-0.006	-0.006	0.010	-0.010	-0.008	-0.010	-0.009	-0.008	-0.009	0.011	-0.010	-0.013	-0.011	-0.012	-0.012	-0.012	0.010	-0.013	-0.013	-0.013	-0.014	-0.013	-0.013	0.010
2600	17.33	-0.002	-0.003	-0.002	-0.002	-0.002	-0.002	0.004	-0.004	-0.003	-0.004	-0.003	-0.003	-0.003	0.004	-0.003	-0.005	-0.004	-0.004	-0.006	-0.004	0.004	-0.004	-0.005	-0.005	-0.006	-0.005	-0.005	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO z/ao	1	13	7	12	11	AVG.	STRESS RATIO p/po	11	1	12	7	5	AVG.	STRESS RATIO p/po	7	13	1	11	12	AVG.	STRESS RATIO p/po	1	14	7	11	13	AVG.	STRESS RATIO p/po
28	0.19	-0.495	-0.503	-0.490	-0.467	-0.466	-0.484	0.843	-0.670	-0.711	-0.743	-0.704	-0.694	-0.705	0.854	-0.996	-1.022	-1.006	-0.948	-1.015	-0.997	0.855	-1.156	-1.186	-1.143	-1.088	-1.110	-1.137	0.848
83	0.55	-0.303	-0.321	-0.287	-0.223	-0.227	-0.272	0.474	-0.326	-0.435	-0.514	-0.412	-0.382	-0.414	0.502	-0.583	-0.653	-0.616	-0.460	-0.627	-0.588	0.504	-0.707	-0.788	-0.670	-0.529	-0.594	-0.657	0.491
209	1.39	-0.139	-0.147	-0.117	-0.081	-0.082	-0.113	0.197	-0.119	-0.199	-0.237	-0.168	-0.150	-0.175	0.212	-0.238	-0.298	-0.282	-0.166	-0.293	-0.255	0.219	-0.323	-0.365	-0.273	-0.193	-0.244	-0.280	0.209
407	2.71	-0.065	-0.068	-0.053	-0.047	-0.047	-0.056	0.097	-0.068	-0.093	-0.101	-0.076	-0.079	-0.084	0.101	-0.107	-0.135	-0.131	-0.093	-0.139	-0.121	0.104	-0.151	-0.156	-0.123	-0.111	-0.126	-0.133	0.100
605	4.03	-0.035	-0.037	-0.028	-0.030	-0.029	-0.032	0.055	-0.044	-0.050	-0.056	-0.041	-0.048	-0.048	0.058	-0.057	-0.072	-0.070	-0.056	-0.074	-0.066	0.057	-0.081	-0.085	-0.066	-0.071	-0.070	-0.074	0.055
803	5.35	-0.021	-0.023	-0.016	-0.021	-0.020	-0.020	0.035	-0.031	-0.029	-0.036	-0.023	-0.031	-0.030	0.037	-0.033	-0.043	-0.042	-0.037	-0.045	-0.040	0.034	-0.048	-0.053	-0.038	-0.050	-0.042	-0.044	0.034
1001	6.67	-0.013	-0.015	-0.010	-0.015	-0.015	-0.014	0.024	-0.023	-0.018	-0.025	-0.014	-0.022	-0.020	0.025	-0.019	-0.026	-0.026	-0.025	-0.030	-0.025	0.022	-0.030	-0.036	-0.022	-0.037	-0.026	-0.030	0.023
1600	10.67	-0.006	-0.007	-0.005	-0.008	-0.011	-0.007	0.013	-0.014	-0.008	-0.012	-0.007	-0.010	-0.010	0.012	-0.010	-0.013	-0.012	-0.018	-0.020	-0.015	0.012	-0.013	-0.015	-0.011	-0.021	-0.017	-0.015	0.011
2600	17.33	-0.002	-0.003	-0.002	-0.003	-0.006	-0.003	0.006	-0.006	-0.003	-0.005	-0.004	-0.004	-0.004	0.005	-0.005	-0.006	-0.005	-0.010	-0.010	-0.007	0.006	-0.005	-0.004	-0.006	-0.008	-0.010	-0.007	0.005

RMS VALUE OF DEFLECTION

DEPTH (mm)	DEPTH RATIO z/ao	1	11	12	5	7	AVG.	STRESS RATIO p/po	1	12	13	5	2	AVG.	STRESS RATIO p/po	1	13	12	5	5	AVG.	STRESS RATIO p/po	1	11	16	10	15	AVG.	STRESS RATIO p/po
28	0.19	-0.495	-0.467	-0.520	-0.483	-0.490	-0.491	0.855	-0.711	-0.737	-0.750	-0.694	-0.715	-0.722	0.875	-1.006	-1.026	-1.028	-0.982	-0.982	-1.005	0.861	-1.156	-1.108	-1.176	-1.193	-1.148	-1.156	0.863
83	0.55	-0.303	-0.223	-0.369	-0.266	-0.287	-0.290	0.504	-0.435	-0.505	-0.540	-0.382	-0.438	-0.460	0.558	-0.616	-0.683	-0.680	-0.541	-0.522	-0.608	0.521	-0.707	-0.575	-0.761	-0.806	-0.691	-0.708	0.528
209	1.39	-0.139	-0.081	-0.193	-0.104	-0.117	-0.127	0.221	-0.199	-0.248	-0.295	-0.150	-0.202	-0.219	0.265	-0.282	-0.329	-0.332	-0.212	-0.192	-0.269	0.231	-0.323	-0.234	-0.358	-0.378	-0.322	-0.323	0.241
407	2.71	-0.065	-0.047	-0.097	-0.055	-0.053	-0.063	0.110	-0.093	-0.114	-0.153	-0.079	-0.106	-0.109	0.132	-0.131	-0.144	-0.152	-0.112	-0.104	-0.129	0.110	-0.151	-0.126	-0.162	-0.163	-0.155	-0.151	0.113
605	4.03	-0.035	-0.030	-0.056	-0.033	-0.028	-0.036	0.063	-0.050	-0.063	-0.087	-0.048	-0.058	-0.061	0.074	-0.070	-0.076	-0.083	-0.067	-0.064	-0.072	0.062	-0.081	-0.073	-0.086	-0.087	-0.085	-0.082	0.062
803	5.35	-0.021	-0.021	-0.037	-0.022	-0.016	-0.023	0.041	-0.029	-0.041	-0.056	-0.031	-0.034	-0.038	0.046	-0.042	-0.046	-0.054	-0.044	-0.043	-0.046	0.039	-0.048	-0.047	-0.051	-0.052	-0.054	-0.050	0.038
1001	6.67	-0.013	-0.016	-0.026	-0.015	-0.010	-0.016	0.028	-0.018	-0.029	-0.037	-0.022	-0.019	-0.025	0.030	-0.026	-0.029	-0.039	-0.031	-0.030	-0.031	0.026	-0.030	-0.031	-0.032	-0.033	-0.036	-0.032	0.024
1600	10.67	-0.006	-0.010	-0.014	-0.007	-0.005	-0.008	0.014	-0.008	-0.018	-0.011	-0.010	-0.007	-0.011	0.013	-0.012	-0.011	-0.027	-0.014	-0.014	-0.015	0.013	-0.013	-0.013	-0.016	-0.013	-0.018	-0.014	0.011
2600	17.33	-0.002	-0.004	-0.005	-0.003	-0.002	-0.003	0.006	-0.003	-0.008	-0.002	-0.004	-0.003	-0.004	0.005	-0.005	-0.003	-0.013	-0.005	-0.005	-0.006	0.005	-0.005	-0.004	-0.007	-0.004	-0.007	-0.005	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 514 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	4	7	11	9	MIN	AVG	MAX
EY1	2991	3854	3804	4744	4074	2991	3893	4744
EY2	151	151	151	151	151	151	151	151
EY3	71	81	81	69	99	69	80	99

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-0.930626	-0.862277	-0.861023	-0.842308	-0.795886	-1.334	0
UY2	-0.467530	-0.424679	-0.421239	-0.420822	-0.367102	-0.739	300
UY3	-0.368734	-0.327574	-0.323710	-0.318124	-0.273816	-0.516	450
UY4	-0.319366	-0.281232	-0.277068	-0.266688	-0.231730	-0.366	600
UY5	-0.261191	-0.228854	-0.224457	-0.206406	-0.186856	-0.212	900
UY6	-0.226788	-0.198546	-0.194069	-0.170501	-0.161769	-0.159	1200
UY7	-0.205229	-0.179830	-0.175297	-0.148055	-0.146524	-0.128	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	15	9	10	11	MIN	AVG	MAX
EY1	1185	1473	1692	1194	1179	1179	1345	1692
EY2	151	151	151	151	151	151	151	151
EY3	63	93	92	118	131	63	99	131

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-1.022180	-0.887040	-0.881873	-0.835137	-0.812398	-1.334	0
UY2	-0.475100	-0.367016	-0.371954	-0.303740	-0.283779	-0.739	300
UY3	-0.380030	-0.279759	-0.283880	-0.223233	-0.205287	-0.516	450
UY4	-0.327036	-0.236850	-0.240935	-0.185654	-0.169772	-0.366	600
UY5	-0.260316	-0.188025	-0.191986	-0.145444	-0.132953	-0.212	900
UY6	-0.219950	-0.160420	-0.164226	-0.123614	-0.113323	-0.159	1200
UY7	-0.194576	-0.143631	-0.147318	-0.110563	-0.101635	-0.128	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	13	11	14	16	MIN	AVG	MAX
EY1	1696	2350	4542	2945	2675	1696	2842	4542
EY2	151	151	151	151	151	151	151	151
EY3	56	63	68	82	94	56	73	94

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-1.070510	-0.979710	-0.892266	-0.876131	-0.836626	-1.334	0
UY2	-0.554399	-0.493291	-0.468650	-0.415213	-0.369305	-0.739	300
UY3	-0.453954	-0.393839	-0.366140	-0.319928	-0.277517	-0.516	450
UY4	-0.398788	-0.341835	-0.315018	-0.274040	-0.234568	-0.366	600
UY5	-0.328964	-0.277821	-0.255420	-0.221561	-0.186777	-0.212	900
UY6	-0.285942	-0.239123	-0.219932	-0.191248	-0.159792	-0.159	1200
UY7	-0.258355	-0.214649	-0.197638	-0.172549	-0.143353	-0.128	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 704 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	12	8	14	16	MIN	AVG	MAX
EY1	2977	2151	2802	4594	2374	2151	2980	4594
EY2	151	159	154	151	169	151	157	169
EY3	58.12	59.23	62.95	63.92	64.64	58.12	61.77	64.64

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR		
	DEFL.(mm)					DISTANCE(mm)		
UY1	-1.365670	-1.361570	-1.327390	-1.270990	-1.270540	-1.973	0	
UY2	-0.733485	-0.709237	-0.689485	-0.695110	-0.662804	-1.106	300	
UY3	-0.592777	-0.578446	-0.555007	-0.552773	-0.540338	-0.758	450	
UY4	-0.518742	-0.507335	-0.485096	-0.480875	-0.474586	-0.543	600	
UY5	-0.427371	-0.417181	-0.399043	-0.396369	-0.391902	-0.303	900	
UY6	-0.371247	-0.361640	-0.346910	-0.345548	-0.341233	-0.227	1200	
UY7	-0.335190	-0.326098	-0.313914	-0.313330	-0.308909	-0.180	1500	

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	7	10	3	4	MIN	AVG	MAX
EY1	1692	2471	3439	4391	3781	1692	3155	4391
EY2	151	158	151	151	175	151	157	175
EY3	68.15	117.97	137.08	120.37	102.09	68.15	109.13	137.08

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR		
	DEFL.(mm)					DISTANCE(mm)		
UY1	-1.345540	-1.010960	-0.972100	-0.968442	-0.899479	-1.973	0	
UY2	-0.637687	-0.394562	-0.372455	-0.398090	-0.364233	-1.106	300	
UY3	-0.507918	-0.276696	-0.253699	-0.272078	-0.249749	-0.758	450	
UY4	-0.439372	-0.222411	-0.204260	-0.217136	-0.194629	-0.543	600	
UY5	-0.355383	-0.164459	-0.155696	-0.161796	-0.132441	-0.303	900	
UY6	-0.305282	-0.132985	-0.130104	-0.132063	-0.097009	-0.227	1200	
UY7	-0.273941	-0.114169	-0.114924	-0.114346	-0.075437	-0.180	1500	

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	13	12	11	14	MIN	AVG	MAX
EY1	1012	1022	1078	1267	2320	1012	1340	2320
EY2	151	151	152	154	151	151	152	154
EY3	50.30	50.32	50.35	50.53	50.30	50.30	50.36	50.53

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR		
	DEFL.(mm)					DISTANCE(mm)		
UY1	-1.596100	-1.593100	-1.578970	-1.554890	-1.496950	-1.973	0	
UY2	-0.834669	-0.836366	-0.837004	-0.827452	-0.829065	-1.106	300	
UY3	-0.696395	-0.697491	-0.697965	-0.690129	-0.685801	-0.758	450	
UY4	-0.615594	-0.616473	-0.617013	-0.610743	-0.607093	-0.543	600	
UY5	-0.509990	-0.510725	-0.511466	-0.507070	-0.506220	-0.303	900	
UY6	-0.443703	-0.444266	-0.444935	-0.441786	-0.442820	-0.227	1200	
UY7	-0.400848	-0.401221	-0.401683	-0.399395	-0.401511	-0.180	1500	

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 939 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	12	10	14	13	MIN	AVG	MAX
EY1	4205	4583	4607	4980	4966	4205	4668	4980
EY2	341	227	178	151	180	151	215	341
EY3	79.19	66.80	84.59	83.26	90.34	66.80	80.84	90.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-1.052440	-1.369910	-1.394820	-1.508050	-1.306040	-2.881	0
UY2	-0.628468	-0.798285	-0.720255	-0.771096	-0.651769	-1.620	300
UY3	-0.537962	-0.665998	-0.564996	-0.589635	-0.498524	-1.096	450
UY4	-0.482904	-0.592330	-0.488531	-0.502810	-0.423669	-0.771	600
UY5	-0.406392	-0.495944	-0.399897	-0.408028	-0.338043	-0.423	900
UY6	-0.355651	-0.434400	-0.347575	-0.353705	-0.287885	-0.312	1200
UY7	-0.321448	-0.393991	-0.314840	-0.320024	-0.256676	-0.258	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	13	16	14	12	MIN	AVG	MAX
EY1	2035	4809	4871	4900	4235	2035	4170	4900
EY2	320	267	264	261	268	261	276	320
EY3	199.57	199.24	199.31	199.57	197.82	197.82	199.10	199.57

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.717779	-0.740989	-0.746345	-0.750136	-0.752152	-2.881	0
UY2	-0.243280	-0.264620	-0.267072	-0.267069	-0.264462	-1.620	300
UY3	-0.169931	-0.172972	-0.173991	-0.173338	-0.173996	-1.096	450
UY4	-0.132184	-0.131733	-0.132224	-0.131576	-0.132829	-0.771	600
UY5	-0.088596	-0.087555	-0.087744	-0.087286	-0.088315	-0.423	900
UY6	-0.064066	-0.063432	-0.063536	-0.063217	-0.063970	-0.312	1200
UY7	-0.049391	-0.049116	-0.049182	-0.048958	-0.049520	-0.258	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	15	11	9	10	MIN	AVG	MAX
EY1	4980	4989	4947	4812	4943	4812	4934	4989
EY2	498	499	494	474	493	474	492	499
EY3	66.82	54.44	51.13	53.92	51.30	51.13	55.52	66.82

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.977660	-1.104940	-1.116680	-1.126600	-1.156080	-2.881	0
UY2	-0.676039	-0.800560	-0.810197	-0.811929	-0.843849	-1.620	300
UY3	-0.606563	-0.728216	-0.736347	-0.736950	-0.769591	-1.096	450
UY4	-0.559863	-0.678070	-0.684784	-0.685432	-0.717650	-0.771	600
UY5	-0.489365	-0.600292	-0.604158	-0.605939	-0.636619	-0.423	900
UY6	-0.438387	-0.542474	-0.543735	-0.547032	-0.576220	-0.312	1200
UY7	-0.401565	-0.499752	-0.498787	-0.503613	-0.531474	-0.258	1500



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 684 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	16	12	9	13	14	MIN	AVG	MAX
EY1	1593	4662	4378	3857	3768	1593	3652	4662
EY2	152	152	161	154	154	152	154	161
EY3	58	63	77	90	97	58	77	97

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE(mm)

UY1	-1.288370	-1.129210	-1.090770	-1.069820	-1.046850	-1.846	0
UY2	-0.606307	-0.575108	-0.561795	-0.504853	-0.479533	-0.953	300
UY3	-0.480447	-0.441233	-0.440552	-0.382196	-0.357980	-0.636	450
UY4	-0.412188	-0.374313	-0.382229	-0.325436	-0.302585	-0.463	600
UY5	-0.325640	-0.295350	-0.315919	-0.263586	-0.243457	-0.298	900
UY6	-0.271376	-0.246893	-0.276462	-0.228139	-0.210143	-0.229	1200
UY7	-0.235986	-0.215586	-0.251355	-0.206033	-0.189521	-0.178	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	7	3	11	9	12	MIN	AVG	MAX
EY1	2471	4391	2311	3722	4267	2311	3433	4391
EY2	158	151	151	151	151	151	152	158
EY3	118	120	181	118	175	118	143	181

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE(mm)

UY1	-0.974609	-0.936145	-0.930155	-0.919989	-0.880877	-1.846	0
UY2	-0.380929	-0.385284	-0.310379	-0.349281	-0.331996	-0.953	300
UY3	-0.266996	-0.263128	-0.203632	-0.228798	-0.218219	-0.636	450
UY4	-0.214702	-0.209798	-0.161244	-0.176060	-0.173614	-0.463	600
UY5	-0.159743	-0.156970	-0.123518	-0.122618	-0.135376	-0.298	900
UY6	-0.129902	-0.128766	-0.105451	-0.093818	-0.117012	-0.229	1200
UY7	-0.111799	-0.111749	-0.094829	-0.076468	-0.106156	-0.178	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	12	13	11	10	7	MIN	AVG	MAX
EY1	1035	1016	1107	1406	2471	1016	1407	2471
EY2	151	151	151	152	158	151	153	158
EY3	51	51	55	69	118	51	69	118

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE(mm)

UY1	-1.501140	-1.506200	-1.452240	-1.289390	-0.974609	-1.846	0
UY2	-0.771377	-0.777549	-0.736247	-0.599277	-0.380929	-0.953	300
UY3	-0.644565	-0.651471	-0.608848	-0.478708	-0.266996	-0.636	450
UY4	-0.572761	-0.579775	-0.538142	-0.415619	-0.214702	-0.463	600
UY5	-0.480046	-0.486742	-0.448531	-0.339310	-0.159743	-0.298	900
UY6	-0.420992	-0.427332	-0.392038	-0.293180	-0.129902	-0.229	1200
UY7	-0.382010	-0.388081	-0.354872	-0.263666	-0.111799	-0.178	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 924 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	13	10	15	5	MIN	AVG	MAX
EY1	4515	1577	4282	1689	1525	1525	2718	4515
EY2	151	151	151	151	151	151	151	151
EY3	71	82	76	83	121	71	87	121

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-1.575760	-1.646500	-1.545100	-1.592070	-1.466540	-2.549	0
UY2	-0.824242	-0.733644	-0.783028	-0.682547	-0.555485	-1.358	300
UY3	-0.647264	-0.575156	-0.608856	-0.523141	-0.407725	-0.905	450
UY4	-0.561846	-0.496764	-0.526015	-0.444413	-0.340942	-0.646	600
UY5	-0.464885	-0.406362	-0.433174	-0.353612	-0.272109	-0.411	900
UY6	-0.407031	-0.353663	-0.378496	-0.300753	-0.235373	-0.306	1200
UY7	-0.370147	-0.320579	-0.343899	-0.267675	-0.213147	-0.241	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	3	11	9	4	MIN	AVG	MAX
EY1	2471	4391	2411	3775	3781	2411	3366	4391
EY2	158	151	151	151	175	151	157	175
EY3	118	120	180	114	102	102	127	180

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-1.316580	-1.264620	-1.252150	-1.250720	-1.163860	-2.549	0
UY2	-0.514588	-0.520471	-0.421293	-0.481418	-0.468778	-1.358	300
UY3	-0.360679	-0.355453	-0.276330	-0.317605	-0.321059	-0.905	450
UY4	-0.290036	-0.283412	-0.218842	-0.245350	-0.250890	-0.646	600
UY5	-0.215793	-0.212047	-0.167696	-0.171446	-0.173004	-0.411	900
UY6	-0.175482	-0.173947	-0.143169	-0.131296	-0.128246	-0.306	1200
UY7	-0.151026	-0.150960	-0.128746	-0.107025	-0.100406	-0.241	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	12	11	10	7	MIN	AVG	MAX
EY1	1016	1035	1107	1406	2471	1016	1407	2471
EY2	151	151	151	152	158	151	153	158
EY3	51	51	55	69	118	51	69	118

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-2.038760	-2.027810	-1.961800	-1.741800	-1.316580	-2.549	0
UY2	-1.056370	-1.042030	-0.994580	-0.809549	-0.514588	-1.358	300
UY3	-0.883639	-0.870722	-0.822479	-0.646676	-0.360679	-0.905	450
UY4	-0.785830	-0.773725	-0.726964	-0.561450	-0.290036	-0.646	600
UY5	-0.659467	-0.648481	-0.605911	-0.458367	-0.215793	-0.411	900
UY6	-0.578764	-0.568708	-0.529595	-0.396051	-0.175482	-0.306	1200
UY7	-0.525331	-0.516048	-0.479389	-0.356181	-0.151026	-0.241	1500



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 500 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	14	13	12	9	MIN	AVG	MAX
EY1	2199	3537	1710	1538	1390	1390	2075	3537
EY2	151	151	151	151	225	151	165	225
EY3	68	64	101	106	81	64	84	106

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.883526	-0.883271	-0.808108	-0.808344	-0.703227	-1.188	0
UY2	-0.434192	-0.480790	-0.344380	-0.336057	-0.349717	-0.654	300
UY3	-0.339461	-0.382867	-0.258830	-0.250823	-0.287112	-0.432	450
UY4	-0.291890	-0.334136	-0.219478	-0.211563	-0.252122	-0.295	600
UY5	-0.235268	-0.277501	-0.176997	-0.169650	-0.207185	-0.173	900
UY6	-0.201031	-0.243140	-0.153304	-0.146561	-0.178893	-0.136	1200
UY7	-0.179165	-0.221072	-0.138762	-0.132454	-0.160453	-0.112	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	7	3	12	9	MIN	AVG	MAX
EY1	1692	2471	4391	3086	3778	1692	3084	4391
EY2	151	158	151	151	151	151	152	158
EY3	105	118	120	177	166	105	137	177

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.792829	-0.688393	-0.655135	-0.634660	-0.622601	-1.188	0
UY2	-0.327583	-0.280894	-0.284744	-0.231544	-0.239408	-0.654	300
UY3	-0.242515	-0.195779	-0.193906	-0.147648	-0.154314	-0.432	450
UY4	-0.203631	-0.156955	-0.153621	-0.114044	-0.119951	-0.295	600
UY5	-0.162053	-0.116695	-0.114717	-0.084768	-0.090071	-0.173	900
UY6	-0.139068	-0.094853	-0.094066	-0.070684	-0.075430	-0.136	1200
UY7	-0.125027	-0.081624	-0.081611	-0.062448	-0.066782	-0.112	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	1	3	4	9	MIN	AVG	MAX
EY1	1735	3244	1526	2432	2758	1526	2339	3244
EY2	151	151	151	220	151	151	164	220
EY3	68	70	85	59	93	59	78	93

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.908306	-0.856308	-0.857573	-0.782834	-0.784019	-1.188	0
UY2	-0.442741	-0.450565	-0.385107	-0.451889	-0.364044	-0.654	300
UY3	-0.350363	-0.353968	-0.297290	-0.381878	-0.273288	-0.432	450
UY4	-0.303694	-0.306648	-0.254802	-0.342195	-0.231489	-0.295	600
UY5	-0.247806	-0.252743	-0.206427	-0.289068	-0.186528	-0.173	900
UY6	-0.214081	-0.220566	-0.178424	-0.254001	-0.161062	-0.136	1200
UY7	-0.192576	-0.200049	-0.160955	-0.230284	-0.145305	-0.112	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31; STA. 5 + 480 L; LOAD 704 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	6	4	10	8	MIN	AVG	MAX
EY1	2034	1324	2227	1474	1913	1324	1794	2227
EY2	151	151	151	155	156	151	153	156
EY3	73	83	76	113	108	73	91	113

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.240130	-1.245410	-1.219910	-1.098250	-1.070810	-1.703	0
UY2	-0.605910	-0.565427	-0.598802	-0.446808	-0.453907	-0.929	300
UY3	-0.476274	-0.440575	-0.469058	-0.331570	-0.336224	-0.613	450
UY4	-0.412587	-0.378991	-0.406124	-0.278863	-0.282694	-0.418	600
UY5	-0.338319	-0.308538	-0.333715	-0.223139	-0.225838	-0.241	900
UY6	-0.294164	-0.267650	-0.290939	-0.192704	-0.194441	-0.188	1200
UY7	-0.266210	-0.242040	-0.263936	-0.174173	-0.175241	-0.153	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	3	14	10	11	16	MIN	AVG	MAX
EY1	1692	1848	3618	1188	1331	1188	1935	3618
EY2	151	151	151	151	151	151	151	151
EY3	68	75	70	115	143	68	94	143

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.293540	-1.256120	-1.197380	-1.141350	-1.052350	-1.703	0
UY2	-0.628333	-0.614566	-0.637909	-0.447166	-0.377964	-0.929	300
UY3	-0.498380	-0.483956	-0.501050	-0.330593	-0.267314	-0.613	450
UY4	-0.432404	-0.418733	-0.434022	-0.276943	-0.220024	-0.418	600
UY5	-0.353212	-0.343215	-0.358369	-0.220719	-0.173889	-0.241	900
UY6	-0.305418	-0.298507	-0.313325	-0.190374	-0.150146	-0.188	1200
UY7	-0.274946	-0.270077	-0.284600	-0.171993	-0.135949	-0.153	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	11	9	7	3	MIN	AVG	MAX
EY1	1952	1244	4482	2471	4391	1244	2908	4482
EY2	151	151	152	158	151	151	153	158
EY3	55	51	68	118	120	51	82	120

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.401140	-1.491860	-1.148910	-0.969258	-0.922431	-1.703	0
UY2	-0.751891	-0.801927	-0.637991	-0.395498	-0.400920	-0.929	300
UY3	-0.615012	-0.665470	-0.501416	-0.275657	-0.273020	-0.613	450
UY4	-0.542974	-0.590312	-0.432632	-0.220993	-0.216299	-0.418	600
UY5	-0.453187	-0.494574	-0.355252	-0.164306	-0.161521	-0.241	900
UY6	-0.396938	-0.433650	-0.308743	-0.133553	-0.132444	-0.188	1200
UY7	-0.360139	-0.393274	-0.278655	-0.114926	-0.114908	-0.153	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 962 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	3	14	1	2	MIN	AVG	MAX
EY1	4793	4740	4557	4746	4077	4077	4582	4793
EY2	259	240	186	196	200	186	216	259
EY3	108	122	122	132	134	108	124	134

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

UY1	-1.014850	-1.008010	-1.151190	-1.087340	-1.092870	-2.414	0
UY2	-0.537752	-0.503809	-0.542534	-0.507277	-0.500115	-1.325	300
UY3	-0.428378	-0.389444	-0.399312	-0.371907	-0.368611	-0.872	450
UY4	-0.373292	-0.334311	-0.334188	-0.310677	-0.309025	-0.586	600
UY5	-0.307943	-0.272119	-0.266941	-0.247851	-0.247021	-0.331	900
UY6	-0.268024	-0.235511	-0.229483	-0.213063	-0.212634	-0.254	1200
UY7	-0.242274	-0.212400	-0.206427	-0.191702	-0.191520	-0.205	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	2	10	11	5	6	MIN	AVG	MAX
EY1	4389	4809	4946	3527	4346	3527	4403	4946
EY2	310	224	212	203	191	191	228	310
EY3	108	175	194	166	164	108	161	194

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

UY1	-0.866850	-0.901705	-0.906883	-0.976254	-1.051750	-2.414	0
UY2	-0.445315	-0.379370	-0.368647	-0.376598	-0.457211	-1.325	300
UY3	-0.351909	-0.264711	-0.249806	-0.249890	-0.322523	-0.872	450
UY4	-0.302116	-0.214613	-0.199907	-0.193500	-0.264132	-0.586	600
UY5	-0.239489	-0.164665	-0.153213	-0.136760	-0.208307	-0.331	900
UY6	-0.199737	-0.137780	-0.129089	-0.106639	-0.179253	-0.254	1200
UY7	-0.173494	-0.121524	-0.114661	-0.088616	-0.161812	-0.205	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	13	12	8	2	MIN	AVG	MAX
EY1	1750	4189	1194	4101	4389	1194	3124	4389
EY2	471	452	492	398	310	310	424	492
EY3	104	115	107	65	108	65	100	115

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

UY1	-0.848674	-0.773342	-0.822476	-1.074240	-0.866850	-2.414	0
UY2	-0.498190	-0.455329	-0.466656	-0.716967	-0.445315	-1.325	300
UY3	-0.432874	-0.389205	-0.403640	-0.635513	-0.351909	-0.872	450
UY4	-0.391808	-0.351007	-0.363128	-0.585146	-0.302116	-0.586	600
UY5	-0.334154	-0.299537	-0.305599	-0.512249	-0.239489	-0.331	900
UY6	-0.294692	-0.265202	-0.266133	-0.460146	-0.199737	-0.254	1200
UY7	-0.267419	-0.241734	-0.238960	-0.422599	-0.173494	-0.205	1500



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 511 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	6	3	11	8	MIN	AVG	MAX
EY1	4067	4477	4843	4608	3247	3247	4248	4843
EY2	151	151	151	151	151	151	151	151
EY3	106	119	126	128	137	106	123	137

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.726772	-0.693005	-0.673721	-0.675712	-0.693757	-0.815	0
UY2	-0.343727	-0.321116	-0.310649	-0.306965	-0.290324	-0.454	300
UY3	-0.251085	-0.229136	-0.218836	-0.215789	-0.201813	-0.315	450
UY4	-0.209714	-0.188659	-0.178589	-0.176230	-0.164417	-0.229	600
UY5	-0.169052	-0.150523	-0.141607	-0.140000	-0.129728	-0.151	900
UY6	-0.147034	-0.130540	-0.122608	-0.121470	-0.112144	-0.115	1200
UY7	-0.133444	-0.118351	-0.111089	-0.110262	-0.101594	-0.094	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	10	3	4	11	MIN	AVG	MAX
EY1	2471	4598	4391	3781	3835	2471	3815	4598
EY2	158	151	151	175	151	151	157	175
EY3	118	86	120	102	186	86	122	186

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.698599	-0.675796	-0.666377	-0.612449	-0.606860	-0.815	0
UY2	-0.285471	-0.308501	-0.289947	-0.258001	-0.221714	-0.454	300
UY3	-0.198944	-0.211786	-0.197438	-0.175669	-0.134723	-0.315	450
UY4	-0.159526	-0.165184	-0.156328	-0.136821	-0.099577	-0.229	600
UY5	-0.119139	-0.116261	-0.117046	-0.095084	-0.070234	-0.151	900
UY6	-0.097322	-0.088227	-0.096379	-0.071133	-0.056745	-0.115	1200
UY7	-0.083975	-0.070413	-0.083821	-0.056035	-0.048948	-0.094	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	3	9	4	1	MIN	AVG	MAX
EY1	2471	4391	4050	3781	2000	2000	3339	4391
EY2	158	151	151	175	200	151	167	200
EY3	118	120	124	102	100	100	113	124

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.698599	-0.666377	-0.639849	-0.612449	-0.601803	-0.815	0
UY2	-0.285471	-0.289947	-0.257040	-0.258001	-0.240251	-0.454	300
UY3	-0.198944	-0.197438	-0.165445	-0.175669	-0.170685	-0.315	450
UY4	-0.159526	-0.156328	-0.125247	-0.136821	-0.136044	-0.229	600
UY5	-0.119139	-0.117046	-0.086859	-0.095084	-0.095672	-0.151	900
UY6	-0.097322	-0.096379	-0.066716	-0.071133	-0.071537	-0.115	1200
UY7	-0.083975	-0.083821	-0.054541	-0.056035	-0.056055	-0.094	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 711 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	16	8	14	11	MIN	AVG	MAX
EY1	2046	3930	4947	4544	4298	2046	3953	4947
EY2	151	151	151	151	151	151	151	151
EY3	109	101	103	102	114	101	106	114

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-1.093320	-1.038030	-1.002610	-1.003020	-0.983677	-1.151	0
UY2	-0.469366	-0.494339	-0.495959	-0.483631	-0.458271	-0.633	300
UY3	-0.345700	-0.365363	-0.364222	-0.353062	-0.329837	-0.442	450
UY4	-0.290019	-0.307438	-0.303829	-0.293842	-0.272981	-0.323	600
UY5	-0.232807	-0.249359	-0.244867	-0.235313	-0.218447	-0.212	900
UY6	-0.201852	-0.217468	-0.212980	-0.203323	-0.189495	-0.162	1200
UY7	-0.182837	-0.197684	-0.193228	-0.183482	-0.171760	-0.129	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	10	3	4	9	MIN	AVG	MAX
EY1	2471	4707	4391	3781	3944	2471	3859	4707
EY2	158	151	151	175	151	151	157	175
EY3	118	86	120	102	179	86	121	179

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.972023	-0.952319	-0.927190	-0.852155	-0.851288	-1.151	0
UY2	-0.397201	-0.444729	-0.403429	-0.358980	-0.320122	-0.633	300
UY3	-0.276808	-0.310129	-0.274713	-0.244424	-0.198358	-0.442	450
UY4	-0.221963	-0.245244	-0.217513	-0.190371	-0.148753	-0.323	600
UY5	-0.165768	-0.177329	-0.162857	-0.132299	-0.107007	-0.212	900
UY6	-0.135412	-0.138464	-0.134101	-0.098974	-0.087611	-0.162	1200
UY7	-0.116842	-0.113757	-0.116628	-0.077966	-0.076349	-0.129	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	9	7	3	4	8	MIN	AVG	MAX
EY1	4482	2471	4391	3781	4101	2471	3845	4482
EY2	152	158	151	175	398	151	207	398
EY3	68	118	120	102	65	65	94	120

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-1.142870	-0.972023	-0.927190	-0.852155	-0.769796	-1.151	0
UY2	-0.632352	-0.397201	-0.403429	-0.358980	-0.511204	-0.633	300
UY3	-0.497200	-0.276808	-0.274713	-0.244424	-0.454315	-0.442	450
UY4	-0.430091	-0.221963	-0.217513	-0.190371	-0.420479	-0.323	600
UY5	-0.356064	-0.165768	-0.162857	-0.132299	-0.372412	-0.212	900
UY6	-0.311573	-0.135412	-0.134101	-0.098974	-0.337724	-0.162	1200
UY7	-0.282377	-0.116842	-0.116628	-0.077966	-0.312304	-0.129	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 982 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	6	5	11	1	MIN	AVG	MAX
EY1	4389	4346	3527	4946	2000	2000	3841	4946
EY2	310	191	203	164	200	164	214	310
EY3	108	164	166	194	100	108	146	194

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.865796	-1.070150	-0.991171	-1.081800	-1.156500	-1.621	0
UY2	-0.441490	-0.466641	-0.383384	-0.435850	-0.461696	-0.899	300
UY3	-0.348986	-0.329205	-0.254405	-0.280887	-0.328009	-0.616	450
UY4	-0.300886	-0.269282	-0.196910	-0.217534	-0.261439	-0.452	600
UY5	-0.241468	-0.212504	-0.139654	-0.165413	-0.183856	-0.294	900
UY6	-0.203453	-0.183316	-0.109440	-0.141421	-0.137474	-0.222	1200
UY7	-0.177880	-0.165745	-0.091202	-0.127402	-0.107722	-0.178	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	2	5	10	8	6	MIN	AVG	MAX
EY1	4389	3527	4809	4101	4346	3527	4234	4809
EY2	310	203	178	398	191	178	256	398
EY3	108	166	175	65	164	65	135	175

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.865796	-0.991171	-1.008190	-1.063210	-1.070150	-1.621	0
UY2	-0.441490	-0.383384	-0.382414	-0.706052	-0.466641	-0.899	300
UY3	-0.348986	-0.254405	-0.236392	-0.627478	-0.329205	-0.616	450
UY4	-0.300886	-0.196910	-0.174585	-0.580746	-0.269282	-0.452	600
UY5	-0.241468	-0.139654	-0.118784	-0.514358	-0.212504	-0.294	900
UY6	-0.203453	-0.109440	-0.091021	-0.466449	-0.183316	-0.222	1200
UY7	-0.177880	-0.091202	-0.074590	-0.431340	-0.165745	-0.178	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	9	2	8	6	5	MIN	AVG	MAX
EY1	4870	4389	4101	4346	3527	3527	4246	4870
EY2	453	310	398	191	203	191	311	453
EY3	176	108	65	164	166	65	136	176

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.550036	-0.865796	-1.063210	-1.070150	-0.991171	-1.621	0
UY2	-0.250445	-0.441490	-0.706052	-0.466641	-0.383384	-0.899	300
UY3	-0.188964	-0.348986	-0.627478	-0.329205	-0.254405	-0.616	450
UY4	-0.156829	-0.300886	-0.580746	-0.269282	-0.196910	-0.452	600
UY5	-0.117593	-0.241468	-0.514358	-0.212504	-0.139654	-0.294	900
UY6	-0.092899	-0.203453	-0.466449	-0.183316	-0.109440	-0.222	1200
UY7	-0.076452	-0.177880	-0.431340	-0.165745	-0.091202	-0.178	1500



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 498 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	11	8	15	14	MIN	AVG	MAX
EY1	4984	4987	4985	4935	3564	3564	4691	4987
EY2	151	151	164	157	151	151	155	164
EY3	60	63	62	69	84	60	68	84

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLE.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.820957	-0.855326	-0.807637	-0.798283	-0.787691	-1.144	0
UY2	-0.455157	-0.492223	-0.460060	-0.440838	-0.392118	-0.559	300
UY3	-0.352885	-0.391144	-0.365623	-0.344941	-0.298047	-0.372	450
UY4	-0.299787	-0.339402	-0.316332	-0.296574	-0.253521	-0.271	600
UY5	-0.237920	-0.280512	-0.257970	-0.241489	-0.204943	-0.174	900
UY6	-0.200198	-0.245052	-0.222010	-0.208503	-0.177010	-0.132	1200
UY7	-0.176008	-0.222323	-0.198748	-0.187567	-0.159697	-0.107	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	10	11	7	3	MIN	AVG	MAX
EY1	1692	2038	1881	2471	4391	1692	2495	4391
EY2	151	151	151	158	151	151	152	158
EY3	83	149	163	118	120	83	127	163

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLE.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.859567	-0.693000	-0.691533	-0.687947	-0.653874	-1.144	0
UY2	-0.389894	-0.249838	-0.244325	-0.280502	-0.284015	-0.559	300
UY3	-0.300693	-0.168941	-0.165864	-0.195634	-0.193545	-0.372	450
UY4	-0.257014	-0.135398	-0.134340	-0.156795	-0.153385	-0.271	600
UY5	-0.206659	-0.103164	-0.105168	-0.116252	-0.114335	-0.174	900
UY6	-0.177464	-0.086564	-0.090469	-0.094248	-0.093541	-0.132	1200
UY7	-0.159380	-0.076722	-0.081738	-0.081007	-0.081066	-0.107	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	11	9	13	14	MIN	AVG	MAX
EY1	1864	4605	3899	1621	3421	1621	3082	4605
EY2	151	151	151	185	151	151	158	185
EY3	64	58	69	59	82	58	67	82

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLE.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.938383	-0.853751	-0.847530	-0.894265	-0.803826	-1.144	0
UY2	-0.475752	-0.475097	-0.459208	-0.485865	-0.403709	-0.559	300
UY3	-0.380001	-0.372509	-0.361102	-0.405672	-0.308673	-0.372	450
UY4	-0.330401	-0.319093	-0.312373	-0.360342	-0.263079	-0.271	600
UY5	-0.270285	-0.255790	-0.256735	-0.301018	-0.212942	-0.174	900
UY6	-0.233846	-0.216879	-0.223562	-0.263317	-0.184015	-0.132	1200
UY7	-0.210609	-0.191841	-0.202587	-0.238651	-0.165995	-0.107	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 703 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	8	16	14	5	MIN	AVG	MAX
EY1	4863	4839	3119	3984	4405	3119	4242	4863
EY2	151	151	151	151	151	151	151	151
EY3	65	71	67	84	72	65	72	84

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.171630	-1.158840	-1.119530	-1.099750	-1.085120	-1.553	0
UY2	-0.650358	-0.638325	-0.530500	-0.555647	-0.551115	-0.785	300
UY3	-0.508698	-0.498779	-0.391314	-0.421233	-0.411811	-0.532	450
UY4	-0.436823	-0.429421	-0.320667	-0.357212	-0.342436	-0.390	600
UY5	-0.354751	-0.352311	-0.236727	-0.288037	-0.263960	-0.244	900
UY6	-0.305460	-0.306815	-0.186070	-0.248368	-0.217436	-0.184	1200
UY7	-0.274111	-0.278076	-0.154057	-0.223744	-0.188191	-0.149	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	12	6	9	8	MIN	AVG	MAX
EY1	1967	1057	1192	1190	1160	1057	1313	1967
EY2	152	152	177	154	151	151	157	177
EY3	62	70	65	92	104	62	79	104

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.342360	-1.242910	-1.231240	-1.204070	-1.164870	-1.553	0
UY2	-0.698327	-0.520080	-0.605786	-0.513779	-0.462404	-0.785	300
UY3	-0.564105	-0.392679	-0.492002	-0.396568	-0.343945	-0.532	450
UY4	-0.494389	-0.324310	-0.428064	-0.339013	-0.287529	-0.390	600
UY5	-0.408824	-0.240113	-0.345907	-0.273474	-0.225860	-0.244	900
UY6	-0.356588	-0.189637	-0.294774	-0.236054	-0.191722	-0.184	1200
UY7	-0.323232	-0.158069	-0.261899	-0.213062	-0.171035	-0.149	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	9	11	12	7	MIN	AVG	MAX
EY1	1952	4482	1244	2907	2471	1244	2611	4482
EY2	151	152	151	151	158	151	153	158
EY3	55	68	51	52	118	51	69	118

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.413610	-1.156780	-1.505950	-1.401460	-0.971138	-1.553	0
UY2	-0.760519	-0.643609	-0.811475	-0.802037	-0.395970	-0.785	300
UY3	-0.621654	-0.505785	-0.672897	-0.658162	-0.276166	-0.532	450
UY4	-0.547492	-0.435663	-0.595389	-0.581830	-0.221339	-0.390	600
UY5	-0.454426	-0.356037	-0.495986	-0.486660	-0.164107	-0.244	900
UY6	-0.396511	-0.308310	-0.433152	-0.426919	-0.133045	-0.184	1200
UY7	-0.359015	-0.277700	-0.391958	-0.387991	-0.114353	-0.149	1500

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 972 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	8	6	7	10	MIN	AVG	MAX
EY1	4794	3989	4693	4704	4905	3989	4617	4905
EY2	261	244	238	226	305	226	255	305
EY3	130	140	139	139	158	130	141	158

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-0.950827	-0.995046	-0.984193	-1.018620	-0.827253	-2.093	0
UY2	-0.471135	-0.473872	-0.471331	-0.486281	-0.406966	-1.123	300
UY3	-0.364141	-0.362898	-0.357077	-0.366487	-0.316659	-0.754	450
UY4	-0.311774	-0.310028	-0.303394	-0.311004	-0.272671	-0.552	600
UY5	-0.251643	-0.251375	-0.244616	-0.251570	-0.222530	-0.344	900
UY6	-0.216245	-0.217796	-0.211031	-0.218028	-0.193257	-0.252	1200
UY7	-0.194079	-0.196997	-0.190294	-0.197400	-0.174957	-0.204	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	10	2	5	9	MIN	AVG	MAX
EY1	4943	4795	4389	3527	4861	3527	4503	4943
EY2	267	265	310	203	161	161	241	310
EY3	197	189	108	166	191	108	170	197

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-0.784771	-0.785136	-0.886369	-0.988761	-1.060340	-2.093	0
UY2	-0.323738	-0.317573	-0.457145	-0.380860	-0.408113	-1.123	300
UY3	-0.226847	-0.218833	-0.361151	-0.252893	-0.249013	-0.754	450
UY4	-0.183690	-0.174199	-0.309189	-0.195858	-0.182371	-0.552	600
UY5	-0.138864	-0.127144	-0.243370	-0.138111	-0.125351	-0.344	900
UY6	-0.114312	-0.101197	-0.201888	-0.107408	-0.098243	-0.252	1200
UY7	-0.099515	-0.085553	-0.174805	-0.089145	-0.082604	-0.204	1500

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	11	7	14	15	MIN	AVG	MAX
EY1	4623	4990	4982	3840	4991	3840	4685	4991
EY2	498	496	488	499	497	488	496	499
EY3	51	51	55	51	61	51	54	61

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-0.880019	-0.869673	-0.825886	-0.866307	-0.779569	-2.093	0
UY2	-0.580097	-0.568434	-0.521112	-0.551616	-0.482978	-1.123	300
UY3	-0.505864	-0.493486	-0.446036	-0.476461	-0.410506	-0.754	450
UY4	-0.454779	-0.442324	-0.395380	-0.423945	-0.362148	-0.552	600
UY5	-0.374648	-0.362428	-0.317128	-0.341134	-0.288151	-0.344	900
UY6	-0.313624	-0.301963	-0.258522	-0.278196	-0.233240	-0.252	1200
UY7	-0.267615	-0.256572	-0.214921	-0.230912	-0.192704	-0.204	1500



ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 514 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	5	14	10	11	MIN	AVG	MAX
EY1	2701	4947	3790	4585	4111	2701	4027	4947
EY2	154	154	161	162	167	154	160	167
EX2	101	226	195	173	182	101	175	226
EY3	59	69	69	72	71	59	68	72
EX3	90	71	96	88	96	71	88	96
R2	0.66	1.47	1.21	1.06	1.08	0.66	1.10	1.47
R3	1.53	1.03	1.39	1.23	1.36	1.03	1.31	1.53

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.022370	-0.836609	-0.844573	-0.827748	-0.826125	-1.334	0
UY2	-0.522341	-0.460345	-0.443260	-0.437468	-0.436106	-0.739	300
UY3	-0.416859	-0.367314	-0.353670	-0.344745	-0.347366	-0.516	450
UY4	-0.363741	-0.320619	-0.309215	-0.298793	-0.303280	-0.366	600
UY5	-0.300958	-0.265738	-0.256689	-0.245499	-0.251429	-0.212	900
UY6	-0.263740	-0.232334	-0.224998	-0.213664	-0.220255	-0.159	1200
UY7	-0.240312	-0.210864	-0.204809	-0.193496	-0.200445	-0.128	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	15	10	6	11	MIN	AVG	MAX
EY1	2044	2067	4824	2534	4829	2044	3260	4829
EY2	160	156	160	171	160	156	161	171
EX2	142	133	158	284	155	133	175	284
EY3	66	71	84	53	82	53	71	84
EX3	120	166	71	85	130	71	114	166
R2	0.89	0.85	0.99	1.66	0.97	0.85	1.07	1.66
R3	1.81	2.33	0.84	1.60	1.59	0.84	1.63	2.33

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.928863	-0.876462	-0.812455	-0.803452	-0.788284	-1.334	0
UY2	-0.452703	-0.382132	-0.419083	-0.417560	-0.396483	-0.739	300
UY3	-0.361743	-0.292408	-0.324026	-0.335975	-0.304485	-0.516	450
UY4	-0.315829	-0.249211	-0.277222	-0.290981	-0.261563	-0.366	600
UY5	-0.261542	-0.199684	-0.224301	-0.232365	-0.215119	-0.212	900
UY6	-0.229301	-0.170929	-0.193460	-0.194208	-0.188499	-0.159	1200
UY7	-0.208932	-0.153088	-0.174191	-0.168578	-0.171958	-0.128	1500

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 514 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	9	15	16	7	MIN	AVG	MAX
EY1	1028	1450	1059	1064	1090	1028	1138	1450
EY2	151	151	151	151	151	151	151	151
EX2	156	195	252	248	241	156	218	252
EY3	51	51	51	51	52	51	51	52
EX3	126	50	103	127	127	50	107	127
R2	1	1	2	2	2	1	1	2
R3	2	1	2	2	2	1	2	2

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.072560	-1.092660	-1.008940	-0.992203	-0.991007	-1.334	0
UY2	-0.528509	-0.589098	-0.515964	-0.500184	-0.497885	-0.739	300
UY3	-0.434872	-0.493485	-0.430104	-0.416811	-0.414062	-0.516	450
UY4	-0.383701	-0.438599	-0.382172	-0.371034	-0.368218	-0.366	600
UY5	-0.319950	-0.366120	-0.320395	-0.312657	-0.309961	-0.212	900
UY6	-0.280557	-0.319963	-0.281090	-0.275749	-0.273236	-0.159	1200
UY7	-0.255130	-0.289766	-0.255243	-0.251562	-0.249213	-0.128	1500

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 704 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	8	12	5	3	MIN	AVG	MAX
EY1	1217	1179	1140	1310	1303	1140	1230	1310
EY2	151	151	151	152	151	151	151	152
EX2	99	102	132	120	112	99	113	132
EY3	55	56	56	57	58	55	56	58
EX3	36	41	71	87	120	36	71	120
R2	0.66	0.67	0.87	0.79	0.74	0.66	0.75	0.87
R3	0.64	0.73	1.28	1.52	2.07	0.64	1.25	2.07

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.598490	-1.626570	-1.489010	-1.489960	-1.457650	-1.973	0
UY2	-0.760560	-0.796831	-0.716500	-0.717437	-0.678743	-1.106	300
UY3	-0.603724	-0.644439	-0.579293	-0.584249	-0.545321	-0.758	450
UY4	-0.510902	-0.556434	-0.502736	-0.512482	-0.475816	-0.543	600
UY5	-0.391200	-0.444558	-0.406475	-0.423746	-0.392308	-0.303	900
UY6	-0.318935	-0.377143	-0.347781	-0.370355	-0.342658	-0.227	1200
UY7	-0.273701	-0.334827	-0.310527	-0.336739	-0.311457	-0.180	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	5	8	15	16	14	MIN	AVG	MAX
EY1	4872	3625	4941	3689	4416	3625	4309	4941
EY2	157	151	153	158	160	151	156	160
EX2	110	299	231	242	233	110	223	299
EY3	61	53	56	56	58	53	57	61
EX3	128	131	100	134	124	100	123	134
R2	0.70	1.98	1.51	1.54	1.46	0.70	1.44	1.98
R3	2.10	2.47	1.79	2.40	2.14	1.79	2.18	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.229270	-1.188420	-1.180680	-1.173760	-1.154810	-1.973	0
UY2	-0.640153	-0.661788	-0.664290	-0.639841	-0.641869	-1.106	300
UY3	-0.500096	-0.542914	-0.536901	-0.520621	-0.521358	-0.758	450
UY4	-0.432948	-0.482991	-0.472546	-0.460767	-0.460953	-0.543	600
UY5	-0.357099	-0.410234	-0.395725	-0.388720	-0.389072	-0.303	900
UY6	-0.312427	-0.364399	-0.347885	-0.343916	-0.344547	-0.227	1200
UY7	-0.284514	-0.333991	-0.316560	-0.314551	-0.315417	-0.180	1500



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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 939 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	3	12	4	11 **
EY1	4077	1405	1319	2095 **
EY2	231	222	237	195 **
EX2	683	659	694	574 **
EY3	62	62	68	63 **
EX3	146	153	112	146 **
R2	2.96	2.96	2.93	2.94 **
R3	2.34	2.46	1.64	2.33 **

MIN	AVG	MAX
1319	2176	4077
192	215	237
548	631	694
62	64	68
112	142	153
2.85	2.93	2.96
1.64	2.22	2.46

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

UY1	-1.145190	-1.238990	-1.185020	-1.299470 **
UY2	-0.692047	-0.697585	-0.657380	-0.723671 **
UY3	-0.592789	-0.600648	-0.560486	-0.611794 **
UY4	-0.539082	-0.545010	-0.503479	-0.551231 **
UY5	-0.468497	-0.469736	-0.425856	-0.472610 **
UY6	-0.421041	-0.419147	-0.373373	-0.421115 **
UY7	-0.388001	-0.384312	-0.337109	-0.386078 **

**OBSERVE SENSOR**  
**DEFL.(mm) DISTANCE(mm)**

-2.881	0
-1.620	300
-1.096	450
-0.771	600
-0.423	900
-0.312	1200
-0.258	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	11	12	4	9 6
EY1	1106	2609	3119	2065 **
EY2	476	494	496	467 **
EX2	1256	722	435	801 **
EY3	186	196	145	97 **
EX3	449	485	296	185 **
R2	2.64	1.46	0.88	1.71 **
R3	2.41	2.47	2.04	1.91 **

MIN	AVG	MAX
1106	2342	3119
445	476	496
435	824	1256
97	144	196
185	323	485
0.88	1.75	2.64
1.91	2.18	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

UY1	-0.533600	-0.536627	-0.564912	-0.606949 **
UY2	-0.246631	-0.247224	-0.244756	-0.296158 **
UY3	-0.206028	-0.202442	-0.188456	-0.239743 **
UY4	-0.183055	-0.178336	-0.155943	-0.203695 **
UY5	-0.153657	-0.148652	-0.113721	-0.151904 **
UY6	-0.135021	-0.130452	-0.087243	-0.116091 **
UY7	-0.122795	-0.118790	-0.070208	-0.091334 **

**OBSERVE SENSOR**  
**DEFL.(mm) DISTANCE(mm)**

-2.881	0
-1.620	300
-1.096	450
-0.771	600
-0.423	900
-0.312	1200
-0.258	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 030 R: LOAD 939 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	11	16	7	9 **
EY1	2703.02	2710.35	3958.57	2377.64 **
EY2	355.99	352.03	258.21	242.80 **
EX2	1055.56	750.90	589.07	685.27 **
EY3	55.37	55.21	68.06	66.02 **
EX3	79.76	97.02	161.69	134.73 **
R2	2.97	2.13	2.28	2.82 **
R3	1.44	1.76	2.38	2.04 **

MIN	AVG	MAX
2377.64	3018.00	3958.57
215.57	284.92	355.99
526.44	721.45	1055.56
55.21	62.58	68.23
79.76	121.95	161.69
2.13	2.53	2.97
1.44	1.92	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-1.052100	-1.088660	-1.072060	-1.140100 **
UY2	-0.716672	-0.718237	-0.635913	-0.669643 **
UY3	-0.649201	-0.643462	-0.544369	-0.579420 **
UY4	-0.604956	-0.595109	-0.494409	-0.528178 **
UY5	-0.536996	-0.522583	-0.427770	-0.457918 **
UY6	-0.486458	-0.469790	-0.383223	-0.410363 **
UY7	-0.449024	-0.431404	-0.352644	-0.377500 **

OBSERVE      SENSOR  
DEFL.(mm) DISTANCE(mm)

-2.881	0
-1.620	300
-1.096	450
-0.771	600
-0.423	900
-0.312	1200
-0.258	1500

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 030 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 514 kPa

LOAD 2: 704 kPa

LOAD 3: 939 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	16	5	14	10	11	AVG.	STRESS RATIO (p/po)	16	8	12	5	3	AVG.	STRESS RATIO (p/po)	3	12	4	11	15	AVG.	STRESS RATIO (p/po)
11	0.07	-0.481	-0.478	-0.482	-0.477	-0.480	-0.480	0.933	-0.674	-0.675	-0.678	-0.675	-0.675	-0.676	0.960	-0.898	-0.924	-0.917	-0.912	-0.910	-0.916	0.975
34	0.23	-0.408	-0.390	-0.406	-0.390	-0.399	-0.399	0.775	-0.613	-0.616	-0.624	-0.617	-0.614	-0.617	0.876	-0.786	-0.883	-0.863	-0.833	-0.829	-0.852	0.907
119	0.79	-0.285	-0.260	-0.278	-0.263	-0.272	-0.272	0.528	-0.445	-0.446	-0.446	-0.449	-0.443	-0.446	0.633	-0.516	-0.654	-0.603	-0.576	-0.565	-0.599	0.638
265	1.77	-0.141	-0.124	-0.134	-0.127	-0.132	-0.131	0.256	-0.211	-0.211	-0.206	-0.216	-0.214	-0.212	0.301	-0.221	-0.297	-0.252	-0.254	-0.244	-0.262	0.279
412	2.75	-0.068	-0.058	-0.063	-0.061	-0.062	-0.062	0.121	-0.091	-0.093	-0.092	-0.099	-0.100	-0.095	0.135	-0.094	-0.124	-0.101	-0.110	-0.107	-0.110	0.117
985	6.57	-0.015	-0.013	-0.014	-0.014	-0.014	-0.014	0.027	-0.019	-0.020	-0.020	-0.021	-0.023	-0.021	0.029	-0.021	-0.024	-0.023	-0.024	-0.024	-0.024	0.025
1985	13.23	-0.003	-0.002	-0.003	-0.003	-0.003	-0.003	0.005	-0.003	-0.003	-0.004	-0.004	-0.005	-0.004	0.005	-0.006	-0.007	-0.006	-0.006	-0.006	-0.006	0.007
2985	19.90	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.002	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.005	-0.004	-0.005	-0.005	-0.005	0.005
3985	26.57	-0.002	-0.001	-0.002	-0.002	-0.002	-0.002	0.003	-0.002	-0.002	-0.002	-0.002	-0.003	-0.002	0.003	-0.004	-0.004	-0.003	-0.004	-0.004	-0.004	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	13	15	10	6	11	AVG.	STRESS RATIO (p/po)	5	8	15	16	14	AVG.	STRESS RATIO (p/po)	11	12	4	9	6	AVG.	STRESS RATIO (p/po)
11	0.07	-0.489	-0.488	-0.474	-0.490	-0.475	-0.483	0.940	-0.643	-0.665	-0.654	-0.662	-0.657	-0.656	0.932	-0.934	-0.920	-0.909	-0.921	-0.914	-0.916	0.975
34	0.23	-0.431	-0.431	-0.384	-0.431	-0.383	-0.412	0.801	-0.511	-0.565	-0.535	-0.561	-0.545	-0.543	0.772	-0.935	-0.882	-0.844	-0.884	-0.851	-0.865	0.921
119	0.79	-0.300	-0.307	-0.255	-0.286	-0.259	-0.281	0.548	-0.354	-0.375	-0.354	-0.376	-0.360	-0.364	0.517	-0.771	-0.663	-0.606	-0.651	-0.584	-0.626	0.667
265	1.77	-0.141	-0.151	-0.122	-0.122	-0.129	-0.133	0.259	-0.186	-0.171	-0.167	-0.174	-0.166	-0.173	0.245	-0.374	-0.314	-0.279	-0.286	-0.242	-0.280	0.299
412	2.75	-0.066	-0.073	-0.059	-0.052	-0.065	-0.063	0.123	-0.093	-0.078	-0.078	-0.080	-0.077	-0.081	0.115	-0.162	-0.143	-0.121	-0.110	-0.095	-0.117	0.125
985	6.57	-0.015	-0.019	-0.014	-0.013	-0.015	-0.015	0.030	-0.022	-0.018	-0.018	-0.019	-0.018	-0.019	0.027	-0.030	-0.031	-0.033	-0.027	-0.024	-0.029	0.031
1985	13.23	-0.003	-0.004	-0.002	-0.004	-0.003	-0.003	0.006	-0.005	-0.005	-0.004	-0.005	-0.004	-0.005	0.007	-0.007	-0.007	-0.010	-0.009	-0.008	-0.009	0.009
2985	19.90	-0.002	-0.003	-0.002	-0.003	-0.002	-0.002	0.005	-0.003	-0.004	-0.003	-0.004	-0.003	-0.003	0.005	-0.005	-0.005	-0.006	-0.006	-0.006	-0.006	0.006
3985	26.57	-0.002	-0.002	-0.001	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.006	-0.005	-0.005	-0.005	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	8	9	15	16	7	AVG.	STRESS RATIO (p/po)	12	16	10	4	13	AVG.	STRESS RATIO (p/po)	11	16	7	9	13	AVG.	STRESS RATIO (p/po)
11	0.07	-0.497	-0.497	-0.501	-0.501	-0.501	-0.499	0.972	-0.641	-0.646	-0.642	-0.648	-0.647	-0.645	0.916	-0.932	-0.919	-0.908	-0.923	-0.905	-0.914	0.973
34	0.23	-0.461	-0.457	-0.470	-0.473	-0.472	-0.467	0.908	-0.502	-0.515	-0.503	-0.520	-0.518	-0.511	0.726	-0.918	-0.871	-0.819	-0.878	-0.808	-0.844	0.899
119	0.79	-0.326	-0.330	-0.340	-0.348	-0.346	-0.338	0.658	-0.342	-0.341	-0.348	-0.349	-0.349	-0.346	0.491	-0.732	-0.643	-0.580	-0.661	-0.557	-0.610	0.650
265	1.77	-0.149	-0.152	-0.155	-0.162	-0.161	-0.156	0.303	-0.174	-0.161	-0.185	-0.169	-0.173	-0.172	0.245	-0.342	-0.284	-0.271	-0.314	-0.254	-0.281	0.299
412	2.75	-0.066	-0.064	-0.067	-0.072	-0.071	-0.068	0.132	-0.083	-0.073	-0.093	-0.080	-0.085	-0.083	0.118	-0.120	-0.103	-0.116	-0.131	-0.111	-0.115	0.123
985	6.57	-0.016	-0.013	-0.014	-0.015	-0.015	-0.015	0.029	-0.019	-0.016	-0.023	-0.019	-0.020	-0.019	0.027	-0.017	-0.018	-0.023	-0.023	-0.023	-0.022	0.023
1985	13.23	-0.004	-0.002	-0.003	-0.004	-0.004	-0.003	0.007	-0.003	-0.003	-0.005	-0.003	-0.004	-0.004	0.005	-0.005	-0.006	-0.006	-0.006	-0.006	-0.006	0.006
2985	19.90	-0.003	-0.002	-0.002	-0.003	-0.003	-0.002	0.005	-0.003	-0.002	-0.004	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.005	-0.004	-0.004	-0.004	0.005
3985	26.57	-0.002	-0.001	-0.002	-0.002	-0.002	-0.002	0.004	-0.002	-0.002	-0.003	-0.002	-0.003	-0.002	0.003	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	0.004

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 684 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	16	13	12	7	15	MIN	AVG	MAX
EY1	2510	1178	1224	1263	1141	1141	1463	2510
EY2	151	151	151	151	151	151	151	151
EX2	119	195	196	214	208	119	186	214
EY3	50	51	51	51	51	50	51	51
EX3	118	101	96	79	89	79	97	118
R2	0.79	1.29	1.30	1.42	1.38	0.79	1.24	1.42
R3	2.35	1.99	1.90	1.56	1.75	1.56	1.91	2.35

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED    SENSOR  
DEFL.(mm)   DISTANCE(mm)

UY1	-1.364750	-1.356940	-1.347830	-1.346760	-1.357260	-1.846	0
UY2	-0.708205	-0.689526	-0.683924	-0.694883	-0.695987	-0.953	300
UY3	-0.574251	-0.572849	-0.566700	-0.580449	-0.582701	-0.636	450
UY4	-0.507307	-0.510432	-0.503873	-0.518278	-0.521364	-0.463	600
UY5	-0.428357	-0.432695	-0.425333	-0.438825	-0.443578	-0.298	900
UY6	-0.380130	-0.383455	-0.375455	-0.387735	-0.393829	-0.229	1200
UY7	-0.348622	-0.350645	-0.342186	-0.353513	-0.360605	-0.178	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	14	16	11	3	12	MIN	AVG	MAX
EY1	2178	2250	1683	4824	2815	1683	2750	4824
EY2	156	156	154	160	163	154	158	163
EX2	96	123	110	158	172	96	132	172
EY3	58	66	90	84	93	58	78	93
EX3	79	43	171	71	114	43	96	171
R2	0.61	0.79	0.72	0.99	1.06	0.61	0.83	1.06
R3	1.36	0.65	1.90	0.84	1.22	0.65	1.19	1.90

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED    SENSOR  
DEFL.(mm)   DISTANCE(mm)

UY1	-1.398330	-1.324980	-1.184890	-1.064600	-1.029430	-1.846	0
UY2	-0.697457	-0.668230	-0.477723	-0.547233	-0.464625	-0.953	300
UY3	-0.559596	-0.533339	-0.359032	-0.423446	-0.352264	-0.636	450
UY4	-0.489657	-0.461778	-0.304750	-0.363435	-0.299100	-0.463	600
UY5	-0.406892	-0.373844	-0.247398	-0.296800	-0.240537	-0.298	900
UY6	-0.357298	-0.319873	-0.215778	-0.257722	-0.207052	-0.229	1200
UY7	-0.325563	-0.284964	-0.196327	-0.232860	-0.186065	-0.178	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 684 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	12	14	10	2	16	MIN	AVG	MAX
EY1	1137	1108	1120	1902	1404	1108	1334	1902
EY2	151	151	151	156	235	151	169	235
EX2	121	135	103	150	153	103	132	153
EY3	56	58	55	68	57	55	59	68
EX3	34	39	103	54	39	34	54	103
R2	0.81	0.89	0.68	0.96	0.65	0.65	0.80	0.96
R3	0.61	0.66	1.86	0.79	0.69	0.61	0.92	1.86

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED DEFLECTIONS (mm)    SENSOR DISTANCE (mm)

UY1	-1.494660	-1.477710	-1.416080	-1.292900	-1.220440	-1.846	0
UY2	-0.733724	-0.728710	-0.630118	-0.641647	-0.677387	-0.953	300
UY3	-0.593370	-0.597648	-0.503287	-0.516434	-0.577601	-0.636	450
UY4	-0.512868	-0.522816	-0.436239	-0.450582	-0.514113	-0.463	600
UY5	-0.409131	-0.426450	-0.354860	-0.370125	-0.426072	-0.298	900
UY6	-0.343829	-0.366105	-0.305593	-0.320890	-0.368041	-0.229	1200
UY7	-0.301189	-0.326925	-0.274173	-0.289067	-0.329102	-0.178	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 924 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	11	6	3	8	4	MIN	AVG	MAX
EY1	1033	1073	1739	1566	1617	1033	1406	1739
EY2	151	151	151	151	151	151	151	151
EX2	96	124	123	123	121	96	117	124
EY3	52	51	51	51	52	51	52	52
EX3	48	84	53	73	119	48	75	119
R2	0.63	0.83	0.82	0.82	0.80	0.63	0.78	0.83
R3	0.92	1.64	1.03	1.41	2.31	0.92	1.46	2.31

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

**OBSERVED DEFLECTION (mm)**    **SENSOR DISTANCE (mm)**

UY1	-2.142490	-2.007810	-2.010900	-1.949190	-1.891260	-2.549	0
UY2	-1.041470	-0.985387	-1.045310	-0.973163	-0.922394	-1.358	300
UY3	-0.853949	-0.810524	-0.863653	-0.797472	-0.752797	-0.905	450
UY4	-0.747288	-0.715757	-0.764952	-0.703496	-0.666078	-0.646	600
UY5	-0.611572	-0.598622	-0.639787	-0.586004	-0.561177	-0.411	900
UY6	-0.527953	-0.525997	-0.561496	-0.512971	-0.496860	-0.306	1200
UY7	-0.474305	-0.478635	-0.510465	-0.465498	-0.455192	-0.241	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	16	14	10	11	8	MIN	AVG	MAX
EY1	1975	1115	1079	1227	1118	1079	1303	1975
EY2	152	152	151	153	155	151	153	155
EX2	97	115	98	162	172	97	129	172
EY3	51	51	51	52	51	51	51	52
EX3	46	110	119	87	95	46	91	119
R2	0.64	0.76	0.64	1.06	1.11	0.64	0.84	1.11
R3	0.90	2.17	2.33	1.67	1.85	0.90	1.78	2.33

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

**OBSERVED DEFLECTION (mm)**    **SENSOR DISTANCE (mm)**

UY1	-2.084920	-1.986980	-1.986220	-1.867530	-1.861560	-2.549	0
UY2	-1.087460	-0.964407	-0.908619	-0.932630	-0.935648	-1.358	300
UY3	-0.892386	-0.789254	-0.736378	-0.770129	-0.780406	-0.905	450
UY4	-0.786005	-0.696260	-0.645248	-0.682424	-0.695907	-0.646	600
UY5	-0.651327	-0.583558	-0.534419	-0.572843	-0.589477	-0.411	900
UY6	-0.568064	-0.514404	-0.466944	-0.503909	-0.522079	-0.306	1200
UY7	-0.514353	-0.469399	-0.423655	-0.458453	-0.477492	-0.241	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 120 L: LOAD 684 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	7	4	9	12	14	MIN	AVG	MAX
EY1	1873	2534	4445	4957	4984	1873	3759	4984
EY2	160	171	199	152	151	151	167	199
EX2	158	284	177	343	335	158	260	343
EY3	84	53	66	98	96	53	80	98
EX3	71	85	137	185	183	71	132	185
R2	0.99	1.66	0.89	2.25	2.22	0.89	1.60	2.25
R3	0.84	1.60	2.06	1.88	1.91	0.84	1.66	2.06

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.580930	-1.404180	-1.351030	-1.155550	-1.151030	-2.549	0
UY2	-0.737482	-0.723269	-0.734850	-0.544057	-0.536321	-1.358	300
UY3	-0.578896	-0.582274	-0.598199	-0.405139	-0.397065	-0.905	450
UY4	-0.498453	-0.506984	-0.530135	-0.344018	-0.336020	-0.646	600
UY5	-0.404843	-0.411184	-0.450086	-0.280961	-0.272671	-0.411	900
UY6	-0.349669	-0.348253	-0.400748	-0.245370	-0.236645	-0.306	1200
UY7	-0.314660	-0.304999	-0.368277	-0.222911	-0.213863	-0.241	1500

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 120 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 2: 684 kPa

LOAD 3: 924 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	16	13	12	7	15	AVG.	STRESS RATIO (p/po)	11	6	3	8	4	AVG.	STRESS RATIO (p/po)
11	0.05	-0.643	-0.662	-0.661	-0.663	-0.665	-0.659	0.963	-0.887	-0.890	-0.879	-0.882	-0.881	-0.884	0.956
34	0.15	-0.552	-0.610	-0.608	-0.616	-0.620	-0.601	0.879	-0.812	-0.819	-0.784	-0.794	-0.790	-0.800	0.866
129	0.57	-0.365	-0.414	-0.412	-0.430	-0.435	-0.411	0.601	-0.571	-0.562	-0.541	-0.551	-0.549	-0.555	0.601
298	1.32	-0.157	-0.168	-0.167	-0.179	-0.181	-0.170	0.249	-0.245	-0.235	-0.231	-0.236	-0.240	-0.237	0.257
466	2.07	-0.068	-0.069	-0.068	-0.072	-0.073	-0.070	0.102	-0.098	-0.098	-0.093	-0.097	-0.103	-0.098	0.106
1050	4.67	-0.017	-0.017	-0.017	-0.016	-0.016	-0.017	0.024	-0.023	-0.023	-0.022	-0.023	-0.025	-0.023	0.025
2050	9.11	-0.005	-0.004	-0.004	-0.004	-0.004	-0.004	0.006	-0.004	-0.006	-0.004	-0.005	-0.006	-0.005	0.006
3050	13.56	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.003	-0.004	-0.003	-0.004	-0.005	-0.004	0.004
4050	18.00	-0.003	-0.003	-0.003	-0.002	-0.002	-0.003	0.004	-0.003	-0.003	-0.003	-0.003	-0.004	-0.003	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	14	16	11	3	12	AVG.	STRESS RATIO (p/po)	16	14	10	11	8	AVG.	STRESS RATIO (p/po)
11	0.05	-0.644	-0.646	-0.650	-0.631	-0.645	-0.643	0.940	-0.870	-0.888	-0.886	-0.891	-0.895	-0.886	0.959
34	0.15	-0.559	-0.561	-0.580	-0.509	-0.556	-0.553	0.809	-0.759	-0.814	-0.813	-0.820	-0.833	-0.808	0.874
129	0.57	-0.380	-0.372	-0.400	-0.324	-0.365	-0.368	0.538	-0.524	-0.557	-0.574	-0.562	-0.584	-0.560	0.606
298	1.32	-0.169	-0.155	-0.180	-0.140	-0.156	-0.160	0.234	-0.230	-0.235	-0.252	-0.232	-0.244	-0.239	0.258
466	2.07	-0.075	-0.065	-0.084	-0.063	-0.071	-0.072	0.105	-0.094	-0.100	-0.108	-0.095	-0.099	-0.099	0.107
1050	4.67	-0.017	-0.016	-0.022	-0.016	-0.018	-0.018	0.026	-0.022	-0.025	-0.028	-0.023	-0.023	-0.024	0.026
2050	9.11	-0.004	-0.003	-0.005	-0.003	-0.004	-0.004	0.005	-0.004	-0.006	-0.007	-0.006	-0.006	-0.006	0.006
3050	13.56	-0.003	-0.002	-0.003	-0.002	-0.003	-0.003	0.004	-0.003	-0.004	-0.005	-0.004	-0.004	-0.004	0.004
4050	18.00	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.003	-0.002	-0.004	-0.004	-0.003	-0.003	-0.003	0.004

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	12	14	10	2	16	AVG.	STRESS RATIO (p/po)	7	4	9	12	14	AVG.	STRESS RATIO (p/po)
11	0.05	-0.658	-0.660	-0.656	-0.651	-0.659	-0.657	0.960	-0.881	-0.880	-0.861	-0.872	-0.874	-0.873	0.945
34	0.15	-0.602	-0.610	-0.602	-0.578	-0.610	-0.600	0.878	-0.783	-0.771	-0.718	-0.736	-0.744	-0.751	0.812
129	0.57	-0.408	-0.426	-0.424	-0.386	-0.428	-0.415	0.606	-0.515	-0.487	-0.466	-0.495	-0.512	-0.495	0.536
298	1.32	-0.166	-0.177	-0.186	-0.160	-0.176	-0.173	0.253	-0.211	-0.186	-0.199	-0.236	-0.250	-0.216	0.234
466	2.07	-0.066	-0.068	-0.079	-0.067	-0.063	-0.068	0.100	-0.092	-0.075	-0.086	-0.114	-0.121	-0.098	0.106
1050	4.67	-0.016	-0.017	-0.020	-0.016	-0.015	-0.017	0.024	-0.023	-0.021	-0.021	-0.027	-0.028	-0.024	0.026
2050	9.11	-0.003	-0.003	-0.005	-0.003	-0.003	-0.003	0.005	-0.005	-0.006	-0.006	-0.006	-0.006	-0.006	0.006
3050	13.56	-0.002	-0.002	-0.003	-0.002	-0.002	-0.003	0.004	-0.003	-0.004	-0.004	-0.004	-0.005	-0.004	0.005
4050	18.00	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.003	-0.002	-0.004	-0.004	-0.004	-0.004	-0.003	0.004

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 500 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	10	16	14	6	4	MIN	AVG	MAX
EY1	4808	3786	4902	4841	4824	3786	4632	4902
EY2	156	157	158	160	160	156	158	160
EX2	109	111	183	143	158	109	141	183
EY3	63	67	62	67	84	62	68	84
EX3	61	96	87	153	71	61	94	153
R2	0.70	0.70	1.15	0.89	0.99	0.70	0.89	1.15
R3	0.97	1.43	1.41	2.31	0.84	0.84	1.39	2.31

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-0.889653	-0.847050	-0.788618	-0.756166	-0.750900	-1.188	0
UY2	-0.504002	-0.437516	-0.447089	-0.404277	-0.403013	-0.654	300
UY3	-0.398994	-0.338668	-0.355894	-0.312773	-0.311385	-0.432	450
UY4	-0.345731	-0.291094	-0.309977	-0.268724	-0.266244	-0.295	600
UY5	-0.285723	-0.238131	-0.257810	-0.221666	-0.217030	-0.173	900
UY6	-0.249936	-0.206961	-0.225883	-0.194195	-0.188328	-0.136	1200
UY7	-0.227060	-0.187326	-0.204933	-0.176602	-0.170100	-0.112	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	12	10	16	13	5	MIN	AVG	MAX
EY1	1243	1345	1306	2405	4083	1243	2077	4083
EY2	151	151	166	152	157	151	156	166
EX2	119	158	108	161	110	108	131	161
EY3	53	53	60	59	61	53	57	61
EX3	128	56	77	117	103	56	96	128
R2	0.79	1.05	0.65	1.06	0.70	0.65	0.83	1.06
R3	2.44	1.04	1.29	1.98	1.68	1.04	1.69	2.44

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-1.001340	-0.899104	-0.874454	-0.847120	-0.839270	-1.188	0
UY2	-0.479276	-0.410529	-0.374660	-0.422425	-0.444964	-0.654	300
UY3	-0.385552	-0.314537	-0.279869	-0.330204	-0.344303	-0.432	450
UY4	-0.337750	-0.261812	-0.229001	-0.284583	-0.294754	-0.295	600
UY5	-0.280339	-0.194108	-0.166505	-0.231405	-0.239724	-0.173	900
UY6	-0.245341	-0.151070	-0.128499	-0.199038	-0.207109	-0.136	1200
UY7	-0.222767	-0.122794	-0.104255	-0.178011	-0.186259	-0.112	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 500 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	12	16	14	15	13	MIN	AVG	MAX
EY1	1310	1052	1112	1038	1392	1038	1181	1392
EY2	153	151	151	151	152	151	152	153
EX2	301	451	448	184	438	184	364	451
EY3	54	53	53	77	61	53	60	77
EX3	50	130	124	189	110	50	121	189
R2	1.96	2.99	2.96	1.22	2.88	1.22	2.40	2.99
R3	0.93	2.44	2.32	2.44	1.80	0.93	1.99	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.941527	-0.822528	-0.816971	-0.830690	-0.768731	-1.188	0
UY2	-0.523789	-0.424172	-0.419651	-0.349806	-0.389993	-0.654	300
UY3	-0.440189	-0.353546	-0.347226	-0.270441	-0.319919	-0.432	450
UY4	-0.394123	-0.316722	-0.309471	-0.232524	-0.284328	-0.295	600
UY5	-0.334374	-0.269738	-0.261641	-0.190303	-0.239390	-0.173	900
UY6	-0.294990	-0.239123	-0.230554	-0.165900	-0.210490	-0.136	1200
UY7	-0.268018	-0.218238	-0.209342	-0.150487	-0.191017	-0.112	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 704 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	3	13	4	9	2	MIN	AVG	MAX
EY1	1030	1357	1481	2322	1082	1030	1454	2322
EY2	151	151	151	151	151	151	151	151
EX2	92	183	133	143	159	92	142	183
EY3	54	57	66	69	73	54	64	73
EX3	104	140	160	125	176	104	141	176
R2	0.61	1.21	0.88	0.95	1.06	0.61	0.94	1.21
R3	1.95	2.47	2.41	1.83	2.39	1.83	2.21	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED      SENSOR  
DEFL.(mm)    DISTANCE(mm)

UY1	-1.546160	-1.299140	-1.275320	-1.225720	-1.235330	-1.703	0
UY2	-0.742318	-0.642658	-0.583395	-0.602131	-0.536944	-0.929	300
UY3	-0.599974	-0.521049	-0.458658	-0.472264	-0.420478	-0.613	450
UY4	-0.526029	-0.459785	-0.399148	-0.410763	-0.364491	-0.418	600
UY5	-0.437828	-0.386871	-0.331684	-0.341976	-0.301710	-0.241	900
UY6	-0.384886	-0.342175	-0.292026	-0.301595	-0.265225	-0.188	1200
UY7	-0.351058	-0.312976	-0.266873	-0.275953	-0.242148	-0.153	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	14	15	7	11	10	MIN	AVG	MAX
EY1	1223	1468	1173	1525	1154	1154	1308	1525
EY2	152	154	152	154	152	152	153	154
EX2	118	205	270	209	108	108	182	270
EY3	72	60	53	60	88	53	67	88
EX3	78	108	130	105	214	78	127	214
R2	0.78	1.33	1.78	1.36	0.71	0.71	1.19	1.78
R3	1.08	1.80	2.44	1.75	2.45	1.08	1.90	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED      SENSOR  
DEFL.(mm)    DISTANCE(mm)

UY1	-1.359890	-1.260490	-1.258560	-1.248520	-1.226920	-1.703	0
UY2	-0.630502	-0.652375	-0.660415	-0.649471	-0.499039	-0.929	300
UY3	-0.498510	-0.532903	-0.546307	-0.530164	-0.373927	-0.613	450
UY4	-0.431894	-0.471259	-0.486546	-0.468753	-0.316041	-0.418	600
UY5	-0.354003	-0.397190	-0.413389	-0.395013	-0.255342	-0.241	900
UY6	-0.308231	-0.351376	-0.367098	-0.349370	-0.222161	-0.188	1200
UY7	-0.279460	-0.321191	-0.336006	-0.319270	-0.201803	-0.153	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 704 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	16	13	15	14	5	MIN	AVG	MAX
EY1	1639	4468	2383	2927	4023	1639	3088	4468
EY2	151	151	152	152	152	151	151	152
EX2	94	98	180	175	306	94	171	306
EY3	58	56	66	67	60	56	61	67
EX3	95	125	107	105	53	53	97	125
R2	0.62	0.65	1.18	1.15	2.02	0.62	1.13	2.02
R3	1.64	2.25	1.61	1.57	0.89	0.89	1.59	2.25

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.443220	-1.260600	-1.201190	-1.175310	-1.147340	-1.703	0
UY2	-0.717108	-0.694989	-0.621913	-0.618263	-0.678441	-0.929	300
UY3	-0.572795	-0.547635	-0.496144	-0.490380	-0.556995	-0.613	450
UY4	-0.500660	-0.476740	-0.434618	-0.428353	-0.494546	-0.418	600
UY5	-0.416547	-0.399615	-0.364062	-0.358437	-0.419542	-0.241	900
UY6	-0.366567	-0.354066	-0.321673	-0.316700	-0.371395	-0.188	1200
UY7	-0.334761	-0.325130	-0.294260	-0.289787	-0.338725	-0.153	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 962 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	15	7	2	6	4	MIN	AVG	MAX
EY1	4188	4221	4942	4543	4778	4188	4535	4942
EY2	306	330	241	232	228	228	267	330
EX2	516	551	580	414	443	414	501	580
EY3	74	72	78	84	77	72	77	84
EX3	136	180	191	209	193	136	182	209
R2	1.69	1.67	2.41	1.79	1.94	1.67	1.90	2.41
R3	1.84	2.49	2.43	2.49	2.49	1.84	2.35	2.49

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.977651	-0.943734	-0.991891	-1.027630	-1.054170	-2.414	0
UY2	-0.595195	-0.582408	-0.582054	-0.569659	-0.602967	-1.325	300
UY3	-0.509740	-0.503765	-0.484412	-0.464167	-0.496159	-0.872	450
UY4	-0.463135	-0.460924	-0.435365	-0.412485	-0.443167	-0.586	600
UY5	-0.401720	-0.404085	-0.376480	-0.352066	-0.380509	-0.331	900
UY6	-0.359980	-0.365265	-0.338529	-0.314322	-0.340792	-0.250	1200
UY7	-0.330689	-0.337941	-0.312527	-0.289133	-0.313982	-0.205	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	11	13	4	12	9	MIN	AVG	MAX
EY1	1106	2558	3119	2640	2065	1106	2298	3119
EY2	476	399	496	494	467	399	467	496
EX2	1256	1160	435	526	801	435	836	1256
EY3	186	197	145	196	97	97	164	197
EX3	449	487	296	485	185	185	380	487
R2	2.64	2.91	0.88	1.07	1.71	0.88	1.84	2.91
R3	2.41	2.48	2.04	2.47	1.91	1.91	2.26	2.48

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.535876	-0.539206	-0.555350	-0.561261	-0.592772	-2.414	0
UY2	-0.247278	-0.251066	-0.243504	-0.255453	-0.288178	-1.325	300
UY3	-0.206238	-0.201962	-0.186781	-0.206567	-0.232847	-0.872	450
UY4	-0.184001	-0.177986	-0.155395	-0.181515	-0.199276	-0.586	600
UY5	-0.156038	-0.149837	-0.115262	-0.151721	-0.151745	-0.331	900
UY6	-0.138193	-0.132788	-0.089715	-0.133648	-0.118325	-0.250	1200
UY7	-0.126248	-0.121632	-0.072883	-0.122000	-0.094628	-0.205	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 480 L: LOAD 962 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	13	8	1	14	5	MIN	AVG	MAX
EY1	3254	4003	4389	2605	2613	2605	3373	4389
EY2	433	419	310	459	492	310	422	492
EX2	1253	1203	692	998	1068	692	1043	1253
EY3	76	102	108	125	136	76	109	136
EX3	189	253	170	304	335	170	250	335
R2	2.90	2.87	2.23	2.17	2.17	2.17	2.47	2.90
R3	2.47	2.48	1.58	2.43	2.47	1.58	2.29	2.48

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-0.763751	-0.671716	-0.813383	-0.622638	-0.582812	-2.414	0
UY2	-0.499705	-0.405293	-0.460396	-0.345937	-0.319778	-1.325	300
UY3	-0.447844	-0.351738	-0.385342	-0.296623	-0.274743	-0.872	450
UY4	-0.417642	-0.322701	-0.347032	-0.269318	-0.249631	-0.586	600
UY5	-0.373891	-0.283703	-0.298794	-0.232997	-0.216108	-0.331	900
UY6	-0.342047	-0.256806	-0.267414	-0.208547	-0.193572	-0.250	1200
UY7	-0.318640	-0.237680	-0.246095	-0.191578	-0.177983	-0.205	1500

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 480 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 500 kPa

LOAD 2: 704 kPa

LOAD 3: 962 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 500 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 704 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 962 kPa					AVG.	STRESS RATIO (p/po)
		10	16	14	6	4			3	13	4	9	2			15	7	2	6	4		
12	0.05	-0.451	-0.456	-0.457	-0.455	-0.456	-0.455	0.910	-0.672	-0.674	-0.669	-0.659	-0.677	-0.670	0.952	-0.915	-0.918	-0.908	-0.906	-0.905	-0.910	0.946
37	0.16	-0.342	-0.358	-0.354	-0.351	-0.353	-0.352	0.703	-0.605	-0.602	-0.590	-0.556	-0.616	-0.594	0.844	-0.787	-0.800	-0.755	-0.757	-0.751	-0.770	0.800
132	0.59	-0.221	-0.238	-0.221	-0.222	-0.221	-0.225	0.449	-0.417	-0.405	-0.405	-0.371	-0.425	-0.405	0.575	-0.504	-0.524	-0.470	-0.487	-0.477	-0.492	0.512
296	1.32	-0.105	-0.115	-0.098	-0.103	-0.099	-0.104	0.208	-0.189	-0.174	-0.183	-0.168	-0.188	-0.180	0.256	-0.205	-0.218	-0.198	-0.214	-0.207	-0.208	0.216
459	2.04	-0.049	-0.055	-0.045	-0.049	-0.047	-0.049	0.098	-0.084	-0.076	-0.084	-0.078	-0.086	-0.082	0.116	-0.081	-0.087	-0.086	-0.096	-0.091	-0.088	0.092
1040	4.62	-0.012	-0.014	-0.011	-0.014	-0.012	-0.013	0.025	-0.020	-0.019	-0.021	-0.019	-0.022	-0.020	0.029	-0.019	-0.019	-0.021	-0.023	-0.022	-0.021	0.022
2040	9.07	-0.002	-0.003	-0.003	-0.004	-0.002	-0.003	0.006	-0.005	-0.005	-0.005	-0.004	-0.005	-0.005	0.007	-0.006	-0.006	-0.006	-0.007	-0.006	-0.006	0.006
3040	13.51	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002	0.004	-0.003	-0.004	-0.004	-0.003	-0.004	-0.003	0.005	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	0.005
4040	17.96	-0.001	-0.002	-0.002	-0.002	-0.001	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 500 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 704 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 962 kPa					AVG.	STRESS RATIO (p/po)
		12	10	16	13	5			14	15	7	11	10			11	13	4	12	9		
12	0.05	-0.476	-0.478	-0.476	-0.469	-0.456	-0.471	0.942	-0.671	-0.673	-0.678	-0.673	-0.672	-0.674	0.957	-0.955	-0.944	-0.925	-0.932	-0.940	-0.939	0.976
37	0.16	-0.425	-0.426	-0.424	-0.394	-0.354	-0.405	0.809	-0.597	-0.594	-0.609	-0.591	-0.599	-0.598	0.849	-0.947	-0.892	-0.841	-0.867	-0.887	-0.887	0.922
132	0.59	-0.292	-0.286	-0.288	-0.256	-0.229	-0.270	0.541	-0.407	-0.381	-0.390	-0.377	-0.407	-0.392	0.557	-0.742	-0.644	-0.571	-0.609	-0.617	-0.636	0.662
296	1.32	-0.130	-0.121	-0.127	-0.111	-0.108	-0.119	0.239	-0.180	-0.154	-0.154	-0.152	-0.184	-0.165	0.234	-0.330	-0.290	-0.242	-0.267	-0.249	-0.276	0.286
459	2.04	-0.057	-0.049	-0.055	-0.050	-0.051	-0.053	0.105	-0.081	-0.067	-0.066	-0.066	-0.088	-0.074	0.104	-0.136	-0.131	-0.101	-0.117	-0.092	-0.115	0.120
1040	4.62	-0.015	-0.012	-0.014	-0.013	-0.013	-0.013	0.027	-0.019	-0.017	-0.017	-0.017	-0.024	-0.019	0.027	-0.028	-0.028	-0.030	-0.029	-0.025	-0.028	0.029
2040	9.07	-0.004	-0.003	-0.003	-0.004	-0.003	-0.003	0.007	-0.004	-0.004	-0.005	-0.004	-0.006	-0.005	0.006	-0.007	-0.007	-0.010	-0.007	-0.009	-0.008	0.008
3040	13.51	-0.003	-0.002	-0.002	-0.003	-0.002	-0.002	0.005	-0.003	-0.003	-0.003	-0.003	-0.004	-0.003	0.005	-0.005	-0.005	-0.006	-0.005	-0.006	-0.006	0.006
4040	17.96	-0.002	-0.001	-0.002	-0.002	-0.002	-0.002	0.004	-0.002	-0.003	-0.003	-0.002	-0.003	-0.003	0.004	-0.004	-0.004	-0.006	-0.004	-0.005	-0.005	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 500 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 704 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 962 kPa					AVG.	STRESS RATIO (p/po)
		12	16	14	15	13			16	13	15	14	5			13	8	1	14	5		
12	0.05	-0.481	-0.490	-0.488	-0.483	-0.490	-0.486	0.973	-0.663	-0.635	-0.662	-0.657	-0.656	-0.655	0.930	-0.948	-0.935	-0.924	-0.942	-0.945	-0.939	0.976
37	0.16	-0.430	-0.465	-0.455	-0.442	-0.462	-0.451	0.902	-0.570	-0.476	-0.557	-0.539	-0.527	-0.534	0.758	-0.908	-0.857	-0.819	-0.889	-0.904	-0.876	0.910
132	0.59	-0.276	-0.342	-0.321	-0.307	-0.345	-0.318	0.636	-0.386	-0.313	-0.359	-0.345	-0.325	-0.346	0.491	-0.685	-0.595	-0.563	-0.635	-0.668	-0.629	0.654
296	1.32	-0.108	-0.154	-0.140	-0.136	-0.161	-0.139	0.279	-0.177	-0.157	-0.154	-0.151	-0.137	-0.155	0.221	-0.305	-0.257	-0.253	-0.272	-0.293	-0.276	0.287
459	2.04	-0.043	-0.065	-0.059	-0.062	-0.069	-0.060	0.119	-0.081	-0.076	-0.070	-0.069	-0.059	-0.071	0.101	-0.112	-0.102	-0.107	-0.109	-0.117	-0.109	0.114
1040	4.62	-0.011	-0.013	-0.013	-0.016	-0.013	-0.013	0.027	-0.019	-0.020	-0.017	-0.017	-0.014	-0.018	0.025	-0.018	-0.020	-0.022	-0.023	-0.023	-0.021	0.022
2040	9.07	-0.002	-0.004	-0.004	-0.004	-0.003	-0.003	0.007	-0.004	-0.005	-0.004	-0.004	-0.003	-0.004	0.006	-0.006	-0.006	-0.005	-0.007	-0.007	-0.006	0.006
3040	13.51	-0.002	-0.003	-0.003	-0.003	-0.002	-0.002	0.005	-0.003	-0.003	-0.003	-0.003	-0.002	-0.003	0.004	-0.005	-0.005	-0.004	-0.005	-0.005	-0.005	0.005
4040	17.96	-0.001	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.002	-0.003	-0.002	-0.002	-0.002	-0.002	0.003	-0.004	-0.004	-0.003	-0.004	-0.004	-0.004	0.004

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 511 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	16	15	12	2	MIN	AVG	MAX
EY1	1039	1014	1028	1126	1160	1014	1073	1160
EY2	151	151	151	151	151	151	151	151
EX2	109	243	325	230	201	109	221	325
EY3	84	56	55	76	80	55	70	84
EX3	196	67	66	148	196	66	135	196
R2	0.72	1.61	2.16	1.52	1.33	0.72	1.47	2.16
R3	2.33	1.19	1.21	1.95	2.46	1.19	1.83	2.46

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED    SENSOR  
DEFL.(mm)   DISTANCE(mm)

UY1	-0.890898	-0.812668	-0.798415	-0.791613	-0.791031	-0.815	0
UY2	-0.350209	-0.347058	-0.361452	-0.334294	-0.327559	-0.454	300
UY3	-0.258600	-0.264320	-0.282110	-0.253569	-0.245455	-0.315	450
UY4	-0.215528	-0.220234	-0.239911	-0.214200	-0.206209	-0.229	600
UY5	-0.170348	-0.164043	-0.185935	-0.169753	-0.163565	-0.151	900
UY6	-0.145628	-0.127548	-0.150320	-0.143592	-0.139297	-0.115	1200
UY7	-0.130329	-0.102778	-0.125682	-0.126670	-0.123844	-0.094	1500

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	14	7	12	1	MIN	AVG	MAX
EY1	1222	1306	2534	1848	2000	1222	1782	2534
EY2	153	152	171	160	200	152	167	200
EX2	338	324	284	355	200	200	300	355
EY3	58	78	53	82	100	53	74	100
EX3	141	126	85	174	100	85	125	174
R2	2.21	2.13	1.66	2.22	1.00	1.00	1.85	2.22
R3	2.42	1.63	1.60	2.13	1.00	1.00	1.75	2.42

CALCULATED AND OBSERVED DEFLECTIONS (mm)

OBSERVED    SENSOR  
DEFL.(mm)   DISTANCE(mm)

UY1	-0.819888	-0.787310	-0.741798	-0.711512	-0.601803	-0.815	0
UY2	-0.413589	-0.383448	-0.391058	-0.347344	-0.240251	-0.454	300
UY3	-0.336395	-0.306575	-0.313733	-0.274715	-0.170685	-0.315	450
UY4	-0.297168	-0.268649	-0.273621	-0.240017	-0.136044	-0.229	600
UY5	-0.250716	-0.225608	-0.224192	-0.201622	-0.095672	-0.151	900
UY6	-0.221618	-0.199925	-0.191769	-0.179060	-0.071537	-0.115	1200
UY7	-0.201834	-0.183029	-0.169194	-0.164299	-0.056055	-0.094	1500

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 511 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	7	16	12	13	MIN	AVG	MAX
EY1	2146.57	2534.05	4943.41	4829.34	4949.06	2146.57	3880.49	4949.06
EY2	153.42	170.86	152.66	160.02	153.08	152.66	158.01	170.86
EX2	135.01	284.31	283.58	285.47	277.87	135.01	253.25	285.47
EY3	72.66	53.37	76.79	81.95	57.53	53.37	68.46	81.95
EX3	161.71	85.14	187.06	186.76	140.72	85.14	152.38	187.06
R2	0.88	1.66	1.86	1.78	1.82	0.88	1.60	1.86
R3	2.23	1.60	2.44	2.28	2.45	1.60	2.20	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.856487	-0.741798	-0.681721	-0.660894	-0.761945	-0.815	0
UY2	-0.406750	-0.391058	-0.366481	-0.349527	-0.441128	-0.454	300
UY3	-0.314968	-0.313733	-0.284352	-0.270449	-0.356346	-0.315	450
UY4	-0.272012	-0.273621	-0.245731	-0.233704	-0.315362	-0.229	600
UY5	-0.225904	-0.224192	-0.206286	-0.196085	-0.270859	-0.151	900
UY6	-0.199554	-0.191769	-0.183776	-0.174600	-0.243742	-0.115	1200
UY7	-0.182750	-0.169194	-0.169162	-0.160697	-0.225505	-0.094	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 711 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	15	12	13	11	14	MIN	AVG	MAX
EY1	1992	1472	1896	1699	2326	1472	1877	2326
EY2	151	151	151	151	151	151	151	151
EX2	138	104	237	283	309	104	214	309
EY3	51	51	53	53	53	51	52	53
EX3	74	51	64	64	55	51	61	74
R2	0.92	0.69	1.58	1.88	2.05	0.69	1.42	2.05
R3	1.45	1.01	1.21	1.19	1.03	1.01	1.18	1.45

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-1.183040	-1.327870	-1.101490	-1.074560	-1.038760	-1.151	0
UY2	-0.527198	-0.585150	-0.517174	-0.503133	-0.508797	-0.633	300
UY3	-0.389320	-0.439343	-0.395762	-0.388079	-0.392732	-0.442	450
UY4	-0.318561	-0.361134	-0.333245	-0.328767	-0.333453	-0.323	600
UY5	-0.232218	-0.262138	-0.254452	-0.253154	-0.257996	-0.212	900
UY6	-0.177642	-0.199703	-0.202891	-0.203253	-0.207653	-0.162	1200
UY7	-0.141270	-0.158738	-0.167579	-0.168841	-0.172629	-0.129	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

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**CALCULATED MODULI (MPa)**

SET	12	15	16	11	7	MIN	AVG	MAX
EY1	1229	1961	1806	1848	2534	1229	1876	2534
EY2	153	151	153	160	171	151	158	171
EX2	273	248	265	240	284	240	262	284
EY3	67	81	68	82	53	53	70	82
EX3	164	84	167	187	85	84	137	187
R2	1.79	1.64	1.74	1.50	1.66	1.50	1.67	1.79
R3	2.45	1.04	2.46	2.28	1.60	1.04	1.96	2.46

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-1.143290	-1.114740	-1.101140	-1.041780	-1.032130	-1.151	0
UY2	-0.557459	-0.551926	-0.546627	-0.489059	-0.544113	-0.633	300
UY3	-0.448190	-0.435941	-0.435126	-0.381321	-0.436525	-0.442	450
UY4	-0.394057	-0.379491	-0.381389	-0.330732	-0.380713	-0.323	600
UY5	-0.332297	-0.315557	-0.321188	-0.275781	-0.311938	-0.212	900
UY6	-0.295157	-0.277416	-0.285289	-0.244137	-0.266825	-0.162	1200
UY7	-0.270576	-0.252510	-0.261619	-0.223756	-0.235415	-0.129	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 711 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	14	13	16	3	9	MIN	AVG	MAX
EY1	1712.77	1025.65	1608.49	2534.05	1075.73	1025.65	1591.34	2534.05
EY2	151.82	151.84	154.23	170.86	155.39	151.82	156.83	170.86
EX2	136.30	426.36	319.90	284.31	361.27	136.30	305.63	426.36
EY3	90.71	97.63	87.63	53.37	96.11	53.37	85.09	97.63
EX3	86.47	74.58	133.42	85.14	131.89	74.58	102.30	133.42
R2	0.90	2.81	2.07	1.66	2.32	0.90	1.95	2.81
R3	0.95	0.76	1.52	1.60	1.37	0.76	1.24	1.60

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-1.203510	-1.046190	-1.037150	-1.032130	-1.032730	0
UY2	-0.535066	-0.480159	-0.489209	-0.544113	-0.462749	300
UY3	-0.408393	-0.378012	-0.383659	-0.436525	-0.362401	450
UY4	-0.348730	-0.326925	-0.333219	-0.380713	-0.313781	600
UY5	-0.283558	-0.268047	-0.277314	-0.311938	-0.259761	900
UY6	-0.246629	-0.232773	-0.244728	-0.266825	-0.228547	1200
UY7	-0.223518	-0.209644	-0.223630	-0.235415	-0.208481	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 982 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	5	13	14	11	12	MIN	AVG	MAX
EY1	3609	4647	3923	3445	1729	1729	3471	4647
EY2	445	385	401	345	381	345	391	445
EX2	1211	1143	1172	997	1128	997	1130	1211
EY3	97	104	121	111	113	97	109	121
EX3	239	257	207	265	279	207	249	279
R2	2.72	2.97	2.92	2.89	2.97	2.72	2.89	2.97
R3	2.45	2.47	1.71	2.39	2.47	1.71	2.30	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.669690	-0.674091	-0.649494	-0.708316	-0.694789	-1.621	0
UY2	-0.409072	-0.400467	-0.376604	-0.393412	-0.374702	-0.899	300
UY3	-0.360507	-0.345080	-0.324609	-0.334082	-0.323805	-0.616	450
UY4	-0.334320	-0.317158	-0.297929	-0.304565	-0.296573	-0.452	600
UY5	-0.298581	-0.281018	-0.262852	-0.266973	-0.260702	-0.294	900
UY6	-0.273377	-0.256401	-0.238976	-0.242014	-0.236409	-0.222	1200
UY7	-0.255051	-0.238866	-0.222051	-0.224571	-0.219244	-0.178	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	11	12	4	9	6	MIN	AVG	MAX
EY1	1106	2267	3119	2065	2813	1106	2274	3119
EY2	476	494	496	467	445	445	476	496
EX2	1256	1434	435	801	906	435	966	1434
EY3	186	196	145	97	98	97	144	196
EX3	449	485	296	185	200	185	323	485
R2	2.64	2.90	0.88	1.71	2.04	0.88	2.03	2.90
R3	2.41	2.47	2.04	1.91	2.05	1.91	2.18	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.456468	-0.466433	-0.555145	-0.584340	-0.633231	-1.621	0
UY2	-0.165549	-0.219734	-0.241047	-0.279224	-0.345895	-0.899	300
UY3	-0.124455	-0.181466	-0.184724	-0.225446	-0.290685	-0.616	450
UY4	-0.102693	-0.162041	-0.154322	-0.194004	-0.259604	-0.452	600
UY5	-0.075744	-0.137994	-0.116157	-0.150487	-0.218082	-0.294	900
UY6	-0.058507	-0.122620	-0.091677	-0.119637	-0.189012	-0.222	1200
UY7	-0.046804	-0.112139	-0.075217	-0.097300	-0.167884	-0.178	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 660 L: LOAD 982 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	6	13	12	2	8	MIN	AVG	MAX
EY1	2813	1568	2544	4389	3869	1568	3036	4389
EY2	445	482	359	310	290	290	377	482
EX2	906	1210	1042	692	771	692	924	1210
EY3	98	145	86	108	162	86	120	162
EX3	200	346	212	170	85	85	203	346
R2	2.04	2.51	2.90	2.23	2.66	2.04	2.47	2.90
R3	2.05	2.39	2.47	1.58	0.52	0.52	1.80	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.633231	-0.579430	-0.792226	-0.813256	-0.738210	0
UY2	-0.345895	-0.300499	-0.469679	-0.458504	-0.368911	300
UY3	-0.290685	-0.257717	-0.411718	-0.383988	-0.291162	450
UY4	-0.259604	-0.234385	-0.380659	-0.347047	-0.252608	600
UY5	-0.218082	-0.204124	-0.338619	-0.301595	-0.206129	900
UY6	-0.189012	-0.183848	-0.309251	-0.272003	-0.176641	1200
UY7	-0.167884	-0.169624	-0.288033	-0.251585	-0.156653	1500

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 660 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 511 kPa

LOAD 2: 711 kPa

LOAD 3: 982 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	7	16	15	12	2	AVG.	STRESS RATIO (p/po)	15	12	13	11	14	AVG.	STRESS RATIO (p/po)	5	13	14	11	12	AVG.	STRESS RATIO (p/po)
12	0.05	-0.489	-0.496	-0.496	-0.492	-0.491	-0.493	0.965	-0.669	-0.672	-0.679	-0.685	-0.680	-0.677	0.952	-0.962	-0.956	-0.963	-0.962	-0.975	-0.964	0.981
37	0.16	-0.439	-0.459	-0.459	-0.446	-0.441	-0.449	0.879	-0.570	-0.582	-0.595	-0.614	-0.596	-0.592	0.832	-0.913	-0.881	-0.911	-0.907	-0.965	-0.916	0.933
142	0.63	-0.287	-0.311	-0.306	-0.287	-0.279	-0.294	0.575	-0.363	-0.384	-0.388	-0.410	-0.396	-0.388	0.546	-0.665	-0.625	-0.672	-0.665	-0.752	-0.676	0.688
326	1.45	-0.117	-0.121	-0.117	-0.111	-0.107	-0.114	0.224	-0.143	-0.154	-0.154	-0.165	-0.164	-0.156	0.219	-0.275	-0.269	-0.289	-0.290	-0.318	-0.288	0.294
509	2.26	-0.053	-0.046	-0.044	-0.047	-0.047	-0.047	0.093	-0.058	-0.059	-0.059	-0.063	-0.062	-0.060	0.085	-0.100	-0.104	-0.110	-0.116	-0.120	-0.110	0.112
1100	4.89	-0.016	-0.012	-0.011	-0.014	-0.015	-0.014	0.027	-0.017	-0.015	-0.015	-0.015	-0.014	-0.015	0.021	-0.018	-0.019	-0.019	-0.021	-0.022	-0.020	0.020
2100	9.33	-0.005	-0.003	-0.003	-0.004	-0.005	-0.004	0.008	-0.005	-0.004	-0.004	-0.004	-0.003	-0.004	0.006	-0.006	-0.006	-0.005	-0.006	-0.006	-0.006	0.006
3100	13.78	-0.003	-0.002	-0.002	-0.003	-0.003	-0.003	0.005	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.005	-0.004	-0.005	-0.005	-0.005	0.005
4100	18.22	-0.002	-0.002	-0.002	-0.002	-0.003	-0.002	0.004	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.004	-0.004	-0.003	-0.004	-0.004	-0.004	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	13	14	7	12	1	AVG.	STRESS RATIO (p/po)	12	15	16	11	7	AVG.	STRESS RATIO (p/po)	11	12	4	9	6	AVG.	STRESS RATIO (p/po)
12	0.05	-0.492	-0.491	-0.483	-0.488	-0.486	-0.488	0.955	-0.684	-0.675	-0.678	-0.677	-0.672	-0.677	0.952	-0.973	-0.973	-0.944	-0.958	-0.950	-0.960	0.977
37	0.16	-0.441	-0.438	-0.410	-0.426	-0.426	-0.428	0.838	-0.612	-0.582	-0.588	-0.590	-0.570	-0.589	0.828	-0.962	-0.957	-0.856	-0.902	-0.865	-0.909	0.925
142	0.63	-0.268	-0.265	-0.245	-0.258	-0.274	-0.262	0.512	-0.375	-0.355	-0.358	-0.368	-0.340	-0.359	0.505	-0.724	-0.735	-0.556	-0.601	-0.533	-0.630	0.641
326	1.45	-0.096	-0.096	-0.088	-0.096	-0.107	-0.097	0.189	-0.137	-0.134	-0.134	-0.143	-0.123	-0.134	0.188	-0.292	-0.313	-0.213	-0.220	-0.184	-0.244	0.249
509	2.26	-0.040	-0.041	-0.035	-0.042	-0.045	-0.040	0.079	-0.058	-0.057	-0.058	-0.063	-0.049	-0.057	0.080	-0.113	-0.126	-0.084	-0.077	-0.067	-0.093	0.095
1100	4.89	-0.012	-0.011	-0.010	-0.012	-0.012	-0.011	0.022	-0.017	-0.015	-0.017	-0.018	-0.014	-0.016	0.023	-0.035	-0.026	-0.027	-0.022	-0.020	-0.026	0.026
2100	9.33	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	0.006	-0.005	-0.004	-0.005	-0.005	-0.005	-0.005	0.007	-0.011	-0.007	-0.010	-0.009	-0.008	-0.009	0.009
3100	13.78	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.003	-0.003	-0.004	-0.003	-0.003	-0.003	0.005	-0.008	-0.005	-0.006	-0.006	-0.006	-0.006	0.006
4100	18.22	-0.002	-0.002	-0.002	-0.002	-0.001	-0.002	0.004	-0.003	-0.002	-0.003	-0.003	-0.003	-0.003	0.004	-0.007	-0.005	-0.006	-0.005	-0.005	-0.005	0.006

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	14	7	16	12	13	AVG.	STRESS RATIO (p/po)	14	13	16	3	9	AVG.	STRESS RATIO (p/po)	6	13	12	2	8	AVG.	STRESS RATIO (p/po)
12	0.05	-0.479	-0.483	-0.471	-0.473	-0.472	-0.475	0.930	-0.672	-0.688	-0.681	-0.672	-0.688	-0.680	0.957	-0.950	-0.970	-0.967	-0.942	-0.942	-0.954	0.972
37	0.16	-0.406	-0.410	-0.366	-0.372	-0.369	-0.385	0.753	-0.584	-0.627	-0.601	-0.570	-0.628	-0.602	0.847	-0.865	-0.949	-0.931	-0.831	-0.827	-0.881	0.897
142	0.63	-0.256	-0.245	-0.213	-0.222	-0.220	-0.231	0.452	-0.379	-0.392	-0.372	-0.340	-0.399	-0.377	0.530	-0.533	-0.700	-0.692	-0.550	-0.526	-0.600	0.611
326	1.45	-0.103	-0.088	-0.086	-0.092	-0.091	-0.092	0.180	-0.155	-0.142	-0.141	-0.123	-0.150	-0.142	0.200	-0.184	-0.278	-0.290	-0.227	-0.207	-0.237	0.242
509	2.26	-0.046	-0.035	-0.039	-0.042	-0.040	-0.040	0.079	-0.068	-0.059	-0.062	-0.049	-0.065	-0.060	0.085	-0.067	-0.104	-0.106	-0.091	-0.082	-0.090	0.092
1100	4.89	-0.013	-0.010	-0.012	-0.012	-0.011	-0.011	0.022	-0.018	-0.016	-0.017	-0.014	-0.017	-0.016	0.023	-0.020	-0.022	-0.019	-0.019	-0.020	-0.020	0.020
2100	9.33	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.007	-0.004	-0.004	-0.004	-0.005	-0.004	-0.004	0.006	-0.008	-0.007	-0.006	-0.005	-0.004	-0.006	0.006
3100	13.78	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.005	-0.003	-0.002	-0.003	-0.003	-0.003	-0.003	0.004	-0.006	-0.005	-0.005	-0.004	-0.003	-0.004	0.004
4100	18.22	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.004	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002	0.003	-0.005	-0.004	-0.004	-0.003	-0.002	-0.004	0.004

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 498 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI(MPa)**

SET	12	14	13	9	4	MIN	AVG	MAX
EY1	1572	1131	2855	4233	3414	1131	2641	4233
EY2	151	151	151	151	151	151	151	151
EX2	98	147	153	138	91	91	125	153
EY3	51	50	53	52	51	50	51	53
EX3	124	119	122	113	123	113	120	124
R2	0.65	0.98	1.02	0.92	0.60	0.60	0.83	1.02
R3	2.45	2.36	2.30	2.19	2.42	2.19	2.34	2.45

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.969454	-0.971656	-0.875633	-0.855308	-0.959776	-1.144	0
UY2	-0.448740	-0.467351	-0.458402	-0.468908	-0.517940	-0.559	300
UY3	-0.349777	-0.377314	-0.363312	-0.368871	-0.412058	-0.372	450
UY4	-0.299517	-0.329720	-0.316212	-0.318930	-0.360383	-0.271	600
UY5	-0.238614	-0.270396	-0.260572	-0.261404	-0.301087	-0.174	900
UY6	-0.201883	-0.233570	-0.226414	-0.226269	-0.265622	-0.132	1200
UY7	-0.178670	-0.209770	-0.204362	-0.203641	-0.243234	-0.107	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI(MPa)**

SET	11	15	16	8	9	MIN	AVG	MAX
EY1	2044	4141	4282	4824	4829	2044	4024	4829
EY2	160	151	151	160	160	151	156	160
EX2	142	225	221	158	155	142	180	225
EY3	66	56	52	84	82	52	68	84
EX3	153	138	129	71	117	71	121	153
R2	0.89	1.49	1.47	0.99	0.97	0.89	1.16	1.49
R3	2.30	2.45	2.48	0.84	1.43	0.84	1.90	2.48

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.854495	-0.804453	-0.802963	-0.753083	-0.737428	-1.144	0
UY2	-0.416331	-0.453752	-0.452730	-0.404773	-0.388150	-0.559	300
UY3	-0.328534	-0.365284	-0.362535	-0.312736	-0.298127	-0.372	450
UY4	-0.285804	-0.322110	-0.317719	-0.267016	-0.255500	-0.271	600
UY5	-0.236853	-0.272829	-0.265609	-0.216749	-0.210505	-0.174	900
UY6	-0.207909	-0.242516	-0.233101	-0.187499	-0.184738	-0.132	1200
UY7	-0.189547	-0.222715	-0.211724	-0.169074	-0.168632	-0.107	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 498 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	13	10	14	3	12	MIN	AVG	MAX
EY1	1210	2091	1758	1848	1818	1210	1745	2091
EY2	152	154	152	160	156	152	155	160
EX2	117	175	195	155	268	117	182	268
EY3	67	60	53	82	59	53	64	82
EX3	69	115	120	67	142	67	103	142
R2	0.77	1.13	1.28	0.97	1.72	0.77	1.17	1.72
R3	1.03	1.90	2.28	0.82	2.38	0.82	1.68	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.992585	-0.877155	-0.850248	-0.846308	-0.798470	-1.144	0
UY2	-0.468808	-0.450054	-0.423334	-0.411960	-0.404667	-0.559	300
UY3	-0.373548	-0.360840	-0.334862	-0.323227	-0.324411	-0.372	450
UY4	-0.323891	-0.315983	-0.288784	-0.277930	-0.283605	-0.271	600
UY5	-0.264088	-0.262740	-0.232445	-0.224752	-0.234417	-0.174	900
UY6	-0.228663	-0.230306	-0.197213	-0.193402	-0.203858	-0.132	1200
UY7	-0.206506	-0.209363	-0.174030	-0.173688	-0.183753	-0.107	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 703 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	15	13	16	14	12	MIN	AVG	MAX
EY1	1072	1083	1019	2310	1098	1019	1316	2310
EY2	151	151	151	151	151	151	151	151
EX2	130	161	92	134	177	92	139	177
EY3	56	53	77	53	53	53	58	77
EX3	138	129	117	129	129	117	129	138
R2	0.86	1.07	0.61	0.89	1.17	0.61	0.92	1.17
R3	2.45	2.43	1.53	2.45	2.45	1.53	2.26	2.45

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-1.298810	-1.296390	-1.322930	-1.247050	-1.248880	-1.533	0
UY2	-0.561977	-0.596388	-0.524479	-0.612113	-0.564803	-0.785	300
UY3	-0.433205	-0.470690	-0.388490	-0.475183	-0.442047	-0.532	450
UY4	-0.366759	-0.404530	-0.321107	-0.406807	-0.377369	-0.390	600
UY5	-0.286826	-0.323186	-0.245186	-0.325852	-0.297200	-0.244	900
UY6	-0.238665	-0.273009	-0.202374	-0.276568	-0.266568	-0.184	1200
UY7	-0.208122	-0.240607	-0.176288	-0.244900	-0.236449	-0.149	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

**CALCULATED MODULI (MPa)**

SET	13	14	15	12	11	MIN	AVG	MAX
EY1	1733	2799	2734	3140	1010	1010	2283	3140
EY2	151	151	154	151	151	151	151	154
EX2	158	110	116	120	257	110	152	257
EY3	50	51	51	51	52	50	51	52
EX3	90	101	102	106	120	90	104	120
R2	1.05	0.73	0.75	0.79	1.70	0.73	1.00	1.70
R3	1.78	1.99	2.01	2.09	2.32	1.78	2.04	2.32

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-1.413160	-1.396080	-1.378340	-1.358460	-1.325410	-1.533	0
UY2	-0.753152	-0.755869	-0.747929	-0.745262	-0.680680	-0.785	300
UY3	-0.621539	-0.611314	-0.605490	-0.602341	-0.567069	-0.532	450
UY4	-0.552673	-0.539020	-0.533660	-0.531167	-0.506271	-0.390	600
UY5	-0.466685	-0.453012	-0.448006	-0.447155	-0.429266	-0.244	900
UY6	-0.412968	-0.400682	-0.395703	-0.395892	-0.380296	-0.184	1200
UY7	-0.378032	-0.367269	-0.362105	-0.363032	-0.347890	-0.149	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 498 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	8	12	7	5	16	MIN	AVG	MAX
EY1	1848	2216	4824	2534	3269	1848	2938	4824
EY2	160	157	160	171	154	154	160	171
EX2	155	249	158	284	408	155	251	408
EY3	82	62	84	53	77	53	72	84
EX3	67	57	71	85	137	57	83	137
R2	0.97	1.59	0.99	1.66	2.65	0.97	1.57	2.65
R3	0.82	0.92	0.84	1.60	1.78	0.82	1.19	1.78

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.194690	-1.230910	-1.063090	-1.057980	-0.972518	-1.533	0
UY2	-0.581542	-0.673308	-0.571397	-0.563786	-0.513382	-0.785	300
UY3	-0.456282	-0.552027	-0.441473	-0.452514	-0.406330	-0.532	450
UY4	-0.392339	-0.487835	-0.376932	-0.392379	-0.354498	-0.390	600
UY5	-0.317270	-0.407223	-0.305973	-0.315519	-0.295871	-0.244	900
UY6	-0.273015	-0.356166	-0.264682	-0.265270	-0.260544	-0.184	1200
UY7	-0.245186	-0.322481	-0.238673	-0.231180	-0.237508	-0.149	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 972 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**

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**CALCULATED MODULI (MPa)**

SET	1	13	4	9	16	MIN	AVG	MAX
EY1	4389	4850	4793	4864	4138	4138	4607	4864
EY2	310	284	272	328	233	233	285	328
EX2	692	605	729	838	554	554	683	838
EY3	108	116	115	117	115	108	114	117
EX3	170	173	195	192	157	157	177	195
R2	2.23	2.13	2.68	2.56	2.38	2.13	2.39	2.68
R3	1.58	1.50	1.69	1.64	1.36	1.36	1.55	1.69

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-0.831262	-0.840636	-0.826595	-0.758814	-0.938167	-2.093	0
UY2	-0.471574	-0.462738	-0.454218	-0.432209	-0.492649	-1.123	300
UY3	-0.394517	-0.377556	-0.371229	-0.361377	-0.394653	-0.754	450
UY4	-0.354489	-0.334600	-0.330400	-0.324932	-0.347328	-0.552	600
UY5	-0.303577	-0.282696	-0.281238	-0.278853	-0.291798	-0.344	900
UY6	-0.270579	-0.250088	-0.250324	-0.248952	-0.257817	-0.252	1200
UY7	-0.248377	-0.228485	-0.229828	-0.228761	-0.235742	-0.204	1500

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

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**CALCULATED MODULI (MPa)**

SET	12	11	4	9	6	MIN	AVG	MAX
EY1	2657	1106	3119	2065	2813	1106	2352	3119
EY2	494	476	496	467	445	445	476	496
EX2	758	1256	435	801	906	435	831	1256
EY3	196	186	145	97	98	97	144	196
EX3	485	449	296	185	200	185	323	485
R2	1.54	2.64	0.88	1.71	2.04	0.88	1.76	2.64
R3	2.47	2.41	2.04	1.91	2.05	1.91	2.18	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-0.539505	-0.546795	-0.567499	-0.610549	-0.656146	-2.093	0
UY2	-0.253671	-0.253150	-0.250151	-0.299508	-0.363402	-1.123	300
UY3	-0.207206	-0.211085	-0.191946	-0.242001	-0.305130	-0.754	450
UY4	-0.182926	-0.187900	-0.159238	-0.206330	-0.270507	-0.552	600
UY5	-0.153281	-0.158458	-0.117109	-0.155429	-0.222406	-0.344	900
UY6	-0.135018	-0.139724	-0.090484	-0.119929	-0.188926	-0.252	1200
UY7	-0.123187	-0.127318	-0.073152	-0.095083	-0.165263	-0.204	1500

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**ST.ANDREWS: RWY 13-31: STA. 5 + 840 L: LOAD 498 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	11	2	14	6	16	MIN	AVG	MAX
EY1	2557	4389	4739	2813	3949	2557	3689	4739
EY2	473	310	419	445	376	310	405	473
EX2	594	692	1108	906	906	594	841	1108
EY3	77	108	139	98	136	77	112	139
EX3	73	170	275	200	251	73	194	275
R2	1.25	2.23	2.64	2.04	2.41	1.25	2.11	2.64
R3	0.94	1.58	1.98	2.05	1.84	0.94	1.68	2.05

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.950906	-0.831262	-0.609375	-0.656146	-0.672374	-2.093	0
UY2	-0.621617	-0.471574	-0.344144	-0.363402	-0.366598	-1.123	300
UY3	-0.554137	-0.394517	-0.290246	-0.305130	-0.306383	-0.754	450
UY4	-0.509236	-0.354489	-0.262009	-0.270507	-0.275076	-0.552	600
UY5	-0.441971	-0.303577	-0.225554	-0.222406	-0.235225	-0.344	900
UY6	-0.393570	-0.270579	-0.201648	-0.188926	-0.209542	-0.252	1200
UY7	-0.358848	-0.248377	-0.185400	-0.165263	-0.192322	-0.204	1500

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

ST.ANDREWS: RWY 13-31: STA. 5 + 840 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 498 kPa

LOAD 2: 703 kPa

LOAD 3: 972 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	12	14	13	9	4	AVG.	STRESS RATIO (p/po)	15	13	16	14	12	AVG.	STRESS RATIO (p/po)	1	13	4	9	16	AVG.	STRESS RATIO (p/po)
12	0.08	-0.469	-0.478	-0.464	-0.455	-0.453	-0.464	0.932	-0.674	-0.676	-0.672	-0.658	-0.678	-0.672	0.955	-0.935	-0.924	-0.933	-0.936	-0.930	-0.931	0.958
37	0.25	-0.404	-0.433	-0.383	-0.354	-0.351	-0.385	0.773	-0.609	-0.613	-0.605	-0.552	-0.617	-0.599	0.852	-0.830	-0.789	-0.816	-0.830	-0.812	-0.815	0.839
126	0.84	-0.284	-0.305	-0.259	-0.236	-0.240	-0.265	0.532	-0.426	-0.425	-0.427	-0.373	-0.431	-0.417	0.593	-0.582	-0.521	-0.567	-0.580	-0.567	-0.563	0.580
280	1.87	-0.138	-0.141	-0.125	-0.118	-0.124	-0.129	0.259	-0.197	-0.191	-0.206	-0.175	-0.195	-0.193	0.274	-0.274	-0.236	-0.275	-0.274	-0.277	-0.267	0.275
433	2.89	-0.064	-0.063	-0.058	-0.056	-0.061	-0.061	0.122	-0.090	-0.086	-0.099	-0.081	-0.087	-0.089	0.126	-0.120	-0.107	-0.127	-0.121	-0.130	-0.121	0.124
1010	6.73	-0.017	-0.015	-0.015	-0.014	-0.015	-0.015	0.031	-0.025	-0.023	-0.025	-0.022	-0.024	-0.024	0.034	-0.023	-0.024	-0.025	-0.023	-0.026	-0.024	0.025
2010	13.40	-0.005	-0.004	-0.004	-0.004	-0.003	-0.004	0.008	-0.007	-0.007	-0.005	-0.006	-0.007	-0.006	0.009	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.005
3010	20.07	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.006	-0.005	-0.004	-0.003	-0.004	-0.005	-0.004	0.006	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004
4010	26.73	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	0.005	-0.004	-0.004	-0.003	-0.004	-0.004	-0.004	0.005	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	11	15	16	8	9	AVG.	STRESS RATIO (p/po)	13	14	15	12	11	AVG.	STRESS RATIO (p/po)	12	11	4	9	6	AVG.	STRESS RATIO (p/po)
12	0.08	-0.469	-0.463	-0.462	-0.454	-0.454	-0.460	0.924	-0.668	-0.649	-0.651	-0.648	-0.684	-0.660	0.939	-0.948	-0.965	-0.935	-0.950	-0.942	-0.948	0.976
37	0.25	-0.403	-0.373	-0.370	-0.352	-0.350	-0.369	0.742	-0.585	-0.529	-0.534	-0.523	-0.636	-0.562	0.799	-0.893	-0.960	-0.851	-0.898	-0.861	-0.893	0.918
126	0.84	-0.273	-0.250	-0.248	-0.225	-0.231	-0.245	0.493	-0.408	-0.363	-0.364	-0.357	-0.456	-0.389	0.554	-0.650	-0.766	-0.590	-0.638	-0.569	-0.643	0.661
280	1.87	-0.127	-0.123	-0.123	-0.106	-0.116	-0.119	0.239	-0.190	-0.179	-0.176	-0.176	-0.207	-0.186	0.264	-0.299	-0.359	-0.263	-0.271	-0.228	-0.284	0.292
433	2.89	-0.060	-0.059	-0.058	-0.051	-0.058	-0.057	0.115	-0.084	-0.084	-0.082	-0.083	-0.091	-0.085	0.121	-0.134	-0.154	-0.113	-0.103	-0.089	-0.119	0.122
1010	6.73	-0.015	-0.013	-0.014	-0.013	-0.014	-0.014	0.028	-0.018	-0.020	-0.019	-0.019	-0.019	-0.019	0.027	-0.030	-0.030	-0.032	-0.027	-0.024	-0.028	0.029
2010	13.40	-0.004	-0.003	-0.004	-0.002	-0.003	-0.003	0.006	-0.004	-0.004	-0.004	-0.004	-0.005	-0.004	0.006	-0.007	-0.007	-0.010	-0.010	-0.008	-0.008	0.009
3010	20.07	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.005	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.005	-0.005	-0.005	-0.007	-0.006	-0.006	-0.006	0.006
4010	26.73	-0.002	-0.002	-0.002	-0.001	-0.002	-0.002	0.004	-0.002	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.006	-0.005	-0.005	-0.005	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	13	10	14	3	12	AVG.	STRESS RATIO (p/po)	8	12	7	5	16	AVG.	STRESS RATIO (p/po)	11	2	14	6	16	AVG.	STRESS RATIO (p/po)
12	0.08	-0.475	-0.470	-0.474	-0.472	-0.476	-0.473	0.950	-0.666	-0.668	-0.641	-0.665	-0.663	-0.660	0.939	-0.943	-0.935	-0.944	-0.942	-0.944	-0.942	0.969
37	0.25	-0.423	-0.403	-0.411	-0.408	-0.416	-0.412	0.828	-0.576	-0.578	-0.496	-0.567	-0.551	-0.554	0.788	-0.877	-0.830	-0.862	-0.861	-0.865	-0.859	0.884
126	0.84	-0.297	-0.270	-0.268	-0.272	-0.274	-0.276	0.555	-0.384	-0.386	-0.318	-0.362	-0.348	-0.360	0.512	-0.615	-0.582	-0.618	-0.569	-0.623	-0.601	0.619
280	1.87	-0.139	-0.122	-0.115	-0.121	-0.119	-0.123	0.248	-0.171	-0.171	-0.150	-0.151	-0.154	-0.159	0.227	-0.255	-0.274	-0.291	-0.228	-0.293	-0.268	0.276
433	2.89	-0.063	-0.056	-0.051	-0.056	-0.054	-0.056	0.113	-0.079	-0.074	-0.073	-0.064	-0.073	-0.073	0.103	-0.088	-0.120	-0.127	-0.089	-0.129	-0.111	0.114
1010	6.73	-0.014	-0.014	-0.014	-0.014	-0.014	-0.014	0.028	-0.019	-0.017	-0.018	-0.017	-0.018	-0.018	0.025	-0.018	-0.023	-0.024	-0.024	-0.025	-0.023	0.023
2010	13.40	-0.002	-0.003	-0.004	-0.002	-0.004	-0.003	0.007	-0.003	-0.003	-0.003	-0.005	-0.004	-0.004	0.006	-0.005	-0.005	-0.006	-0.008	-0.006	-0.006	0.006
3010	20.07	-0.002	-0.002	-0.003	-0.002	-0.003	-0.002	0.005	-0.003	-0.003	-0.002	-0.003	-0.003	-0.003	0.004	-0.003	-0.004	-0.004	-0.006	-0.004	-0.004	0.004
4010	26.73	-0.001	-0.002	-0.003	-0.001	-0.002	-0.002	0.004	-0.002	-0.002	-0.002	-0.003	-0.003	-0.002	0.003	-0.003	-0.003	-0.004	-0.005	-0.003	-0.004	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 685 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	9	11	10	7	MIN	AVG	MAX
EY1	8176	5612	6233	3222	9256	3222	6500	9256
EY2	6993	5381	4862	6969	2532	2532	5347	6993
EY3	2121	2072	1898	2784	2381	1898	2251	2784
EY4	469	391	414	477	422	391	435	477
EY5	234	216	225	154	187	154	203	234
EY6	171	178	181	195	183	171	182	195

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.287255	-0.307920	-0.314545	-0.322413	-0.283965	-0.266	0
UY2	-0.246918	-0.254185	-0.263007	-0.254584	-0.238950	-0.240	300
UY3	-0.225176	-0.226843	-0.236149	-0.226067	-0.213408	-0.226	450
UY4	-0.166489	-0.156170	-0.167471	-0.155357	-0.147765	-0.172	1000
UY5	-0.138977	-0.124502	-0.137156	-0.123597	-0.118227	-0.137	1400
UY6	-0.119871	-0.103248	-0.116928	-0.101972	-0.097972	-0.109	1800
UY7	-0.104996	-0.087220	-0.101709	-0.085487	-0.082348	-0.085	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	3	1	10	14	MIN	AVG	MAX
EY1	9550	7238	8854	9136	9142	7238	8784	9550
EY2	3382	2830	4515	2200	2121	2121	3010	4515
EY3	2868	2544	1776	2660	2116	1776	2393	2868
EY4	498	389	423	495	495	389	460	498
EY5	194	187	195	141	239	141	191	239
EY6	159	177	154	187	171	154	169	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.267830	-0.269019	-0.269788	-0.272599	-0.257772	-0.266	0
UY2	-0.227705	-0.220178	-0.227382	-0.228903	-0.213330	-0.240	300
UY3	-0.205471	-0.193808	-0.203382	-0.204411	-0.188645	-0.226	450
UY4	-0.147258	-0.125660	-0.139146	-0.141354	-0.127910	-0.172	1000
UY5	-0.119828	-0.094481	-0.109164	-0.112159	-0.101412	-0.137	1400
UY6	-0.100234	-0.072981	-0.088115	-0.091562	-0.083109	-0.109	1800
UY7	-0.084507	-0.056379	-0.071477	-0.075339	-0.068677	-0.085	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	7	12	9	15	MIN	AVG	MAX
EY1	9136	9256	9256	5612	7753	5612	8203	9256
EY2	2229	2532	3088	5381	2478	2229	3142	5381
EY3	2660	2381	1905	2072	2062	1905	2216	2660
EY4	495	422	494	391	496	391	460	496
EY5	141	187	220	216	226	141	198	226
EY6	187	183	137	178	122	122	161	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.286135	-0.283965	-0.278064	-0.307920	-0.281930	-0.266	0
UY2	-0.242579	-0.238950	-0.234577	-0.254185	-0.233233	-0.240	300
UY3	-0.218194	-0.213408	-0.210052	-0.226843	-0.206979	-0.226	450
UY4	-0.155474	-0.147765	-0.146688	-0.156170	-0.141655	-0.172	1000
UY5	-0.126480	-0.118227	-0.117641	-0.124502	-0.112019	-0.137	1400
UY6	-0.106028	-0.097972	-0.097074	-0.103248	-0.090823	-0.109	1800
UY7	-0.089894	-0.082348	-0.080532	-0.087220	-0.073528	-0.085	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 1130 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	16	9	15	7	MIN	AVG	MAX
EY1	9466	8878	5612	7928	9256	5612	8228	9466
EY2	6494	6993	5381	3473	2532	2532	4975	6993
EY3	1346	2241	2072	1696	2381	1346	1947	2381
EY4	458	469	391	384	422	384	425	469
EY5	241	157	216	179	187	157	196	241
EY6	173	176	178	174	183	173	177	183

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
UY1	-0.454421	-0.478495
UY2	-0.390414	-0.414520
UY3	-0.354306	-0.378983
UY4	-0.256844	-0.279582
UY5	-0.211786	-0.230984
UY6	-0.180673	-0.196454
UY7	-0.156476	-0.169289

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	3	1	10	7	MIN	AVG	MAX
EY1	8141	7238	8854	9136	9256	7238	8525	9256
EY2	3083	2830	4515	2220	2532	2220	3036	4515
EY3	2113	2544	1776	2660	2381	1776	2295	2660
EY4	495	389	423	495	422	389	445	495
EY5	239	187	195	141	187	141	190	239
EY6	171	177	154	187	183	154	174	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
UY1	-0.421603	-0.443783
UY2	-0.348782	-0.363213
UY3	-0.309597	-0.319712
UY4	-0.211473	-0.207293
UY5	-0.167764	-0.155859
UY6	-0.137422	-0.120392
UY7	-0.113468	-0.093005

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	7	12	15	13	MIN	AVG	MAX
EY1	9136	9256	9256	8107	8461	8107	8843	9256
EY2	2299	2532	2924	2407	2593	2299	2551	2924
EY3	2660	2381	1905	1988	1984	1905	2184	2660
EY4	495	422	494	474	495	422	476	495
EY5	141	187	199	214	195	141	187	214
EY6	187	183	140	139	132	132	156	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
UY1	-0.471069	-0.468439
UY2	-0.399606	-0.394181
UY3	-0.359615	-0.352046
UY4	-0.256462	-0.243758
UY5	-0.208664	-0.195031
UY6	-0.174926	-0.161618
UY7	-0.148307	-0.135844

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 1483 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	10	7	9	13	14
EY1	9136	9256	5612	7573	6810
EY2	6325	2532	5381	3256	2149
EY3	2660	2381	2072	2376	2189
EY4	495	422	391	445	498
EY5	141	187	216	169	166
EY6	187	183	178	153	158

MIN	AVG	MAX
5612	7677	9256
2149	3929	6325
2072	2338	2660
391	450	498
141	176	216
153	172	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.582847	-0.614774	-0.666636	-0.620057	-0.674116
UY2	-0.503690	-0.517319	-0.550301	-0.516601	-0.559151
UY3	-0.459840	-0.462021	-0.491108	-0.460374	-0.499408
UY4	-0.336179	-0.319906	-0.338102	-0.313692	-0.356506
UY5	-0.274736	-0.255957	-0.269542	-0.245243	-0.293311
UY6	-0.230485	-0.212106	-0.223529	-0.196957	-0.248789
UY7	-0.195285	-0.178281	-0.188829	-0.158724	-0.213191

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.547	0
-0.495	300
-0.471	450
-0.357	1000
-0.285	1400
-0.229	1800
-0.180	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	15	3	1	10	14
EY1	8137	7238	8854	9136	6723
EY2	2495	2830	4515	2246	3311
EY3	1390	2544	1776	2660	1809
EY4	495	389	423	495	498
EY5	228	187	195	141	199
EY6	192	177	154	187	175

MIN	AVG	MAX
6723	8017	9136
2246	3079	4515
1390	2038	2660
389	460	498
141	190	228
154	177	192

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.571560	-0.582416	-0.584081	-0.589115	-0.612646
UY2	-0.467925	-0.476677	-0.492273	-0.494853	-0.503385
UY3	-0.411369	-0.419586	-0.440315	-0.442034	-0.446996
UY4	-0.274978	-0.272049	-0.301247	-0.305789	-0.309764
UY5	-0.217526	-0.204548	-0.236336	-0.242610	-0.249562
UY6	-0.178720	-0.158001	-0.190765	-0.198021	-0.207884
UY7	-0.148650	-0.122059	-0.154744	-0.162895	-0.175069

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.547	0
-0.495	300
-0.471	450
-0.357	1000
-0.285	1400
-0.229	1800
-0.180	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	15	10	12	7	1
EY1	9148	9136	9255	9256	8854
EY2	2229	2382	2261	2532	4515
EY3	2074	2660	1836	2381	1776
EY4	495	495	494	422	423
EY5	221	141	228	187	195
EY6	165	187	166	183	154

MIN	AVG	MAX
8854	9130	9256
2229	2784	4515
1776	2145	2660
422	466	495
141	194	228
154	171	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.605201	-0.616826	-0.604699	-0.614774	-0.584081
UY2	-0.507393	-0.523614	-0.505619	-0.517319	-0.492273
UY3	-0.452826	-0.471477	-0.449870	-0.462021	-0.440315
UY4	-0.317201	-0.336561	-0.312101	-0.319906	-0.301247
UY5	-0.257588	-0.273875	-0.252416	-0.255957	-0.236336
UY6	-0.216442	-0.229600	-0.211516	-0.212106	-0.190765
UY7	-0.184080	-0.194658	-0.179457	-0.178281	-0.154744

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.547	0
-0.495	300
-0.471	450
-0.357	1000
-0.285	1400
-0.229	1800
-0.180	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 685 kPa

LOAD 2: 1130 kPa

LOAD 3: 1409 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	16	9	11	10	7	AVG.	STRESS RATIO (p/po)	14	16	9	15	7	AVG.	STRESS RATIO (p/po)	10	7	9	13	14	AVG.	STRESS RATIO (p/po)
19	0.08	-0.668	-0.670	-0.668	-0.675	-0.663	-0.669	0.976	-1.099	-1.101	-1.105	-1.097	-1.093	-1.099	0.973	-1.446	-1.435	-1.450	-1.442	-1.440	-1.442	1.024
57	0.25	-0.633	-0.638	-0.633	-0.658	-0.612	-0.635	0.927	-1.030	-1.040	-1.052	-1.023	-1.010	-1.031	0.913	-1.365	-1.326	-1.381	-1.351	-1.346	-1.354	0.961
95	0.42	-0.572	-0.583	-0.573	-0.622	-0.534	-0.577	0.842	-0.918	-0.937	-0.962	-0.905	-0.881	-0.920	0.814	-1.229	-1.156	-1.262	-1.203	-1.195	-1.209	0.858
133	0.59	-0.483	-0.499	-0.484	-0.559	-0.430	-0.491	0.717	-0.757	-0.786	-0.823	-0.741	-0.709	-0.763	0.676	-1.030	-0.930	-1.081	-0.998	-0.988	-1.005	0.714
171	0.76	-0.380	-0.401	-0.383	-0.479	-0.323	-0.394	0.574	-0.579	-0.614	-0.662	-0.566	-0.534	-0.591	0.523	-0.806	-0.700	-0.869	-0.775	-0.772	-0.784	0.557
205	0.91	-0.292	-0.314	-0.298	-0.394	-0.252	-0.310	0.452	-0.434	-0.468	-0.518	-0.434	-0.415	-0.454	0.402	-0.619	-0.545	-0.680	-0.607	-0.619	-0.614	0.436
235	1.04	-0.224	-0.244	-0.233	-0.308	-0.211	-0.244	0.356	-0.330	-0.358	-0.403	-0.348	-0.347	-0.357	0.316	-0.480	-0.456	-0.529	-0.496	-0.525	-0.497	0.353
265	1.18	-0.167	-0.185	-0.179	-0.233	-0.173	-0.188	0.274	-0.249	-0.267	-0.305	-0.274	-0.286	-0.276	0.245	-0.363	-0.375	-0.401	-0.398	-0.439	-0.395	0.280
300	1.33	-0.128	-0.141	-0.139	-0.174	-0.137	-0.144	0.210	-0.197	-0.203	-0.232	-0.215	-0.226	-0.215	0.190	-0.274	-0.297	-0.305	-0.309	-0.353	-0.307	0.218
340	1.51	-0.073	-0.078	-0.079	-0.092	-0.074	-0.079	0.115	-0.120	-0.113	-0.128	-0.121	-0.123	-0.121	0.107	-0.146	-0.161	-0.168	-0.164	-0.190	-0.166	0.118
440	1.96	-0.048	-0.052	-0.052	-0.059	-0.048	-0.052	0.076	-0.078	-0.073	-0.085	-0.080	-0.080	-0.079	0.070	-0.094	-0.104	-0.112	-0.106	-0.117	-0.107	0.076
600	2.67	-0.033	-0.036	-0.036	-0.039	-0.033	-0.035	0.051	-0.053	-0.049	-0.059	-0.055	-0.054	-0.054	0.048	-0.062	-0.070	-0.077	-0.070	-0.074	-0.071	0.050
760	3.38	-0.023	-0.026	-0.026	-0.026	-0.023	-0.025	0.036	-0.038	-0.038	-0.042	-0.039	-0.038	-0.038	0.034	-0.043	-0.050	-0.056	-0.048	-0.049	-0.049	0.035
920	4.09	-0.018	-0.020	-0.020	-0.020	-0.018	-0.019	0.028	-0.030	-0.028	-0.034	-0.031	-0.030	-0.030	0.027	-0.034	-0.039	-0.044	-0.038	-0.038	-0.039	0.027
1163	5.17	-0.015	-0.017	-0.017	-0.018	-0.016	-0.017	0.024	-0.025	-0.024	-0.029	-0.027	-0.026	-0.026	0.023	-0.030	-0.034	-0.038	-0.032	-0.032	-0.033	0.024
1288	5.72	-0.013	-0.015	-0.015	-0.015	-0.014	-0.014	0.021	-0.022	-0.021	-0.025	-0.023	-0.022	-0.023	0.020	-0.027	-0.029	-0.032	-0.028	-0.028	-0.029	0.020
1413	6.28	-0.011	-0.013	-0.013	-0.014	-0.012	-0.013	0.018	-0.019	-0.019	-0.021	-0.020	-0.020	-0.020	0.018	-0.024	-0.026	-0.028	-0.025	-0.024	-0.025	0.018
2000	8.89	-0.007	-0.008	-0.008	-0.009	-0.008	-0.008	0.012	-0.012	-0.012	-0.013	-0.013	-0.013	-0.013	0.011	-0.016	-0.017	-0.018	-0.016	-0.016	-0.016	0.012

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	AVG.	STRESS RATIO (p/po)	14	3	1	10	7	AVG.	STRESS RATIO (p/po)	15	3	1	10	14	AVG.	STRESS RATIO (p/po)
19	0.08			-1.098	-1.099	-1.097	-1.094	-1.093	-1.096	0.970	-1.437	-1.442	-1.440	-1.436	-1.444	-1.440	1.022
57	0.25			-1.025	-1.029	-1.023	-1.012	-1.010	-1.020	0.903	-1.332	-1.350	-1.343	-1.328	-1.358	-1.342	0.953
95	0.42			-0.907	-0.915	-0.902	-0.882	-0.881	-0.897	0.794	-1.166	-1.201	-1.184	-1.158	-1.217	-1.185	0.841
133	0.59			-0.746	-0.757	-0.736	-0.711	-0.709	-0.732	0.648	-0.944	-0.994	-0.966	-0.934	-1.018	-0.971	0.689
171	0.76			-0.577	-0.588	-0.558	-0.539	-0.534	-0.559	0.495	-0.718	-0.772	-0.732	-0.708	-0.801	-0.746	0.530
205	0.91			-0.453	-0.463	-0.423	-0.425	-0.415	-0.436	0.386	-0.562	-0.608	-0.555	-0.558	-0.633	-0.583	0.414
235	1.04			-0.374	-0.381	-0.334	-0.359	-0.347	-0.359	0.318	-0.469	-0.499	-0.439	-0.471	-0.519	-0.480	0.340
265	1.18			-0.304	-0.307	-0.261	-0.299	-0.286	-0.291	0.258	-0.388	-0.403	-0.342	-0.392	-0.420	-0.389	0.276
300	1.33			-0.242	-0.237	-0.205	-0.236	-0.226	-0.229	0.203	-0.319	-0.311	-0.270	-0.310	-0.336	-0.309	0.219
340	1.51			-0.134	-0.123	-0.119	-0.125	-0.123	-0.125	0.110	-0.187	-0.162	-0.156	-0.164	-0.189	-0.171	0.122
440	1.96			-0.085	-0.080	-0.076	-0.080	-0.080	-0.080	0.071	-0.117	-0.104	-0.100	-0.105	-0.117	-0.109	0.077
600	2.67			-0.056	-0.054	-0.051	-0.052	-0.054	-0.053	0.047	-0.077	-0.071	-0.067	-0.068	-0.076	-0.072	0.051
760	3.38			-0.039	-0.038	-0.036	-0.035	-0.038	-0.037	0.033	-0.053	-0.050	-0.047	-0.046	-0.051	-0.050	0.035
920	4.09			-0.030	-0.030	-0.028	-0.028	-0.030	-0.029	0.026	-0.041	-0.040	-0.037	-0.037	-0.040	-0.039	0.028
1163	5.17			-0.025	-0.026	-0.024	-0.025	-0.026	-0.025	0.022	-0.035	-0.035	-0.031	-0.033	-0.034	-0.034	0.024
1288	5.72			-0.021	-0.023	-0.021	-0.022	-0.022	-0.022	0.019	-0.030	-0.030	-0.027	-0.029	-0.030	-0.029	0.021
1413	6.28			-0.018	-0.020	-0.018	-0.020	-0.020	-0.019	0.017	-0.026	-0.026	-0.024	-0.026	-0.026	-0.026	0.018
2000	8.89			-0.012	-0.013	-0.012	-0.013	-0.013	-0.012	0.011	-0.017	-0.017	-0.015	-0.017	-0.016	-0.017	0.012

NO COMPUTATIONS

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS LOAD 1: 685 kPa

LOAD 2: 1130 kPa

LOAD 3: 1400 kPa

DEPTH (mm)	LOAD 1: 685 kPa						LOAD 2: 1130 kPa						LOAD 3: 1400 kPa									
	DEPTH RATIO (z/ro)	10	7	12	9	15	AVG.	DEPTH RATIO (p/po)	10	7	12	15	13	AVG.	DEPTH RATIO (p/po)	15	10	12	7	1	AVG.	DEPTH RATIO (p/po)
19	0.08	-0.663	-0.663	-0.664	-0.670	-0.665	-0.665	0.971	-1.095	-1.093	-1.094	-1.095	-1.095	-1.095	0.969	-1.435	-1.437	-1.434	-1.435	-1.440	-1.436	1.019
57	0.25	-0.613	-0.612	-0.615	-0.638	-0.619	-0.620	0.905	-1.013	-1.010	-1.013	-1.017	-1.017	-1.014	0.897	-1.325	-1.331	-1.320	-1.326	-1.343	-1.329	0.943
95	0.42	-0.535	-0.534	-0.539	-0.583	-0.547	-0.547	0.799	-0.884	-0.881	-0.886	-0.893	-0.893	-0.887	0.785	-1.154	-1.163	-1.145	-1.156	-1.184	-1.160	0.824
133	0.59	-0.431	-0.430	-0.436	-0.499	-0.449	-0.449	0.656	-0.714	-0.709	-0.716	-0.727	-0.727	-0.719	0.636	-0.930	-0.940	-0.916	-0.930	-0.966	-0.937	0.665
171	0.76	-0.327	-0.323	-0.330	-0.401	-0.347	-0.346	0.505	-0.542	-0.534	-0.540	-0.555	-0.555	-0.545	0.483	-0.703	-0.714	-0.687	-0.700	-0.732	-0.707	0.502
205	0.91	-0.258	-0.252	-0.255	-0.314	-0.274	-0.271	0.395	-0.427	-0.415	-0.419	-0.436	-0.436	-0.427	0.378	-0.552	-0.562	-0.537	-0.545	-0.555	-0.550	0.391
235	1.04	-0.218	-0.211	-0.211	-0.244	-0.230	-0.223	0.325	-0.360	-0.347	-0.347	-0.365	-0.364	-0.357	0.316	-0.467	-0.473	-0.455	-0.456	-0.439	-0.438	0.325
265	1.18	-0.181	-0.173	-0.172	-0.185	-0.190	-0.180	0.263	-0.298	-0.286	-0.284	-0.301	-0.300	-0.294	0.260	-0.390	-0.391	-0.380	-0.375	-0.342	-0.376	0.267
300	1.33	-0.143	-0.137	-0.137	-0.141	-0.152	-0.142	0.208	-0.236	-0.226	-0.228	-0.241	-0.240	-0.234	0.207	-0.315	-0.309	-0.310	-0.297	-0.270	-0.300	0.213
340	1.51	-0.076	-0.074	-0.078	-0.078	-0.083	-0.078	0.114	-0.125	-0.123	-0.128	-0.133	-0.133	-0.128	0.114	-0.175	-0.163	-0.177	-0.161	-0.156	-0.166	0.118
440	1.96	-0.048	-0.048	-0.050	-0.052	-0.052	-0.050	0.073	-0.080	-0.080	-0.082	-0.086	-0.083	-0.082	0.073	-0.113	-0.104	-0.114	-0.104	-0.100	-0.107	0.076
600	2.67	-0.031	-0.033	-0.033	-0.036	-0.034	-0.033	0.048	-0.052	-0.054	-0.053	-0.056	-0.054	-0.054	0.048	-0.075	-0.068	-0.076	-0.070	-0.067	-0.071	0.050
760	3.38	-0.021	-0.023	-0.022	-0.026	-0.023	-0.023	0.034	-0.035	-0.038	-0.036	-0.038	-0.036	-0.037	0.032	-0.052	-0.046	-0.052	-0.050	-0.047	-0.049	0.035
920	4.09	-0.017	-0.018	-0.017	-0.020	-0.017	-0.018	0.026	-0.027	-0.030	-0.028	-0.029	-0.027	-0.028	0.025	-0.040	-0.036	-0.040	-0.039	-0.037	-0.038	0.027
1163	5.17	-0.015	-0.016	-0.014	-0.017	-0.014	-0.015	0.022	-0.024	-0.026	-0.024	-0.025	-0.023	-0.024	0.021	-0.033	-0.031	-0.034	-0.034	-0.031	-0.033	0.023
1288	5.72	-0.013	-0.014	-0.012	-0.015	-0.012	-0.013	0.019	-0.021	-0.022	-0.020	-0.021	-0.020	-0.021	0.018	-0.028	-0.028	-0.029	-0.029	-0.027	-0.028	0.020
1413	6.28	-0.011	-0.012	-0.010	-0.013	-0.010	-0.011	0.017	-0.019	-0.020	-0.017	-0.018	-0.017	-0.018	0.016	-0.024	-0.025	-0.025	-0.026	-0.024	-0.025	0.017
2000	8.89	-0.007	-0.008	-0.007	-0.008	-0.006	-0.007	0.011	-0.012	-0.013	-0.011	-0.011	-0.011	-0.012	0.010	-0.016	-0.016	-0.016	-0.017	-0.015	-0.016	0.011

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 733 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	12	14	11	1	MIN	AVG	MAX
EY1	4774	9649	9677	8209	6939	4774	7850	9677
EY2	4161	2659	2849	6037	1906	2659	3722	6037
EY3	1733	1411	2840	2131	2960	1411	2215	2960
EY4	363	252	253	258	434	252	312	434
EY5	205	250	246	249	236	205	237	250
EY6	173	199	199	196	152	152	184	199

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.394683	-0.386347
UY2	-0.322798	-0.325582
UY3	-0.285871	-0.288196
UY4	-0.195706	-0.191996
UY5	-0.158721	-0.152671
UY6	-0.135157	-0.128841
UY7	-0.118001	-0.112679

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	8	13	15	9	MIN	AVG	MAX
EY1	6264	6939	9020	9309	5612	5612	7429	9309
EY2	2765	2906	2123	2182	5381	2123	3072	5381
EY3	1532	2960	1807	1673	2072	1532	2009	2960
EY4	477	434	494	495	391	391	458	495
EY5	167	236	149	153	216	149	184	236
EY6	138	152	181	179	178	138	166	181

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.368747	-0.363533
UY2	-0.302297	-0.303669
UY3	-0.267262	-0.271945
UY4	-0.185909	-0.196252
UY5	-0.151708	-0.164490
UY6	-0.128147	-0.143453
UY7	-0.109497	-0.127487

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	11	8	6	2	MIN	AVG	MAX
EY1	8599	6793	6939	6264	4902	4902	6699	8599
EY2	2227	2649	2906	2765	6360	2227	3381	6360
EY3	1844	1446	2960	1532	2164	1446	1989	2960
EY4	494	482	434	477	424	424	462	494
EY5	228	190	236	167	138	138	192	236
EY6	92	147	152	138	122	92	130	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.368162	-0.380847
UY2	-0.308182	-0.316110
UY3	-0.274864	-0.281630
UY4	-0.197795	-0.202928
UY5	-0.165613	-0.170756
UY6	-0.143264	-0.148962
UY7	-0.125208	-0.131921

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1166 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	13	15	6	8
EY1	7852	4774	3971	6264	6939
EY2	5249	4161	5226	2765	2906
EY3	1127	1733	1513	1532	2960
EY4	342	363	394	477	434
EY5	133	210	224	167	236
EY6	134	174	171	138	152

MIN	AVG	MAX
3971	5960	7852
2765	4061	5249
1127	1733	2960
342	402	477
133	194	236
134	154	174

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.602206	-0.624038	-0.624524	-0.586574	-0.578281
UY2	-0.514094	-0.509773	-0.506101	-0.480871	-0.483053
UY3	-0.462164	-0.451132	-0.448546	-0.425139	-0.432589
UY4	-0.319432	-0.308292	-0.310114	-0.295729	-0.312183
UY5	-0.252631	-0.249963	-0.254507	-0.241325	-0.261658
UY6	-0.206244	-0.212939	-0.219292	-0.203846	-0.228195
UY7	-0.170169	-0.186055	-0.193567	-0.174179	-0.202796

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.567	0
-0.486	300
-0.454	450
-0.329	1000
-0.254	1400
-0.201	1800
-0.155	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	6	9	11	7
EY1	6939	6264	5612	7041	9256
EY2	2906	2765	5381	2672	2532
EY3	2960	1532	2072	1481	2381
EY4	434	477	391	477	422
EY5	236	167	216	193	187
EY6	152	138	178	146	183

MIN	AVG	MAX
5612	7022	9256
2532	3251	5381
1481	2085	2960
391	440	477
167	200	236
138	159	183

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.578281	-0.586574	-0.544514	-0.533018	-0.520924
UY2	-0.483053	-0.480871	-0.447223	-0.432638	-0.430880
UY3	-0.432589	-0.425139	-0.396313	-0.378637	-0.379714
UY4	-0.312183	-0.295729	-0.267366	-0.253546	-0.256499
UY5	-0.261658	-0.241325	-0.212371	-0.201877	-0.204585
UY6	-0.228195	-0.203846	-0.176602	-0.166793	-0.169946
UY7	-0.202796	-0.174179	-0.150197	-0.139292	-0.143607

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.567	0
-0.486	300
-0.454	450
-0.329	1000
-0.254	1400
-0.201	1800
-0.155	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	12	8	11	13
EY1	6264	8856	6939	6793	8158
EY2	2765	2227	2906	2649	2149
EY3	1532	1841	2960	1446	1913
EY4	477	494	434	482	495
EY5	167	228	236	190	231
EY6	138	98	152	147	95

MIN	AVG	MAX
6264	7402	8856
2149	2539	2906
1446	1938	2960
434	476	495
167	210	236
95	126	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.586574	-0.569775	-0.578281	-0.605822	-0.546943
UY2	-0.480871	-0.475671	-0.483053	-0.502843	-0.449921
UY3	-0.425139	-0.423105	-0.432589	-0.447996	-0.396899
UY4	-0.295729	-0.301269	-0.312183	-0.322802	-0.275518
UY5	-0.241325	-0.250508	-0.261658	-0.271626	-0.224974
UY6	-0.203846	-0.215397	-0.228195	-0.236958	-0.189855
UY7	-0.174179	-0.187159	-0.202796	-0.209849	-0.161472

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.567	0
-0.486	300
-0.454	450
-0.329	1000
-0.254	1400
-0.201	1800
-0.155	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1485 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	10	8	5	9
EY1	6264	3370	6939	2768	5612
EY2	2765	6325	2906	2270	5381
EY3	1532	2660	2960	2265	2072
EY4	477	495	434	429	391
EY5	167	141	236	178	216
EY6	138	187	152	170	178

MIN	AVG	MAX
2768	4991	6939
2270	3929	6325
1532	2298	2960
391	445	495
141	188	236
138	165	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.747052	-0.734105	-0.736490	-0.818981	-0.693485
UY2	-0.612430	-0.590175	-0.615209	-0.620479	-0.569576
UY3	-0.541451	-0.525589	-0.550939	-0.535531	-0.504738
UY4	-0.376636	-0.362489	-0.397592	-0.353592	-0.340513
UY5	-0.307348	-0.290041	-0.333244	-0.280976	-0.270473
UY6	-0.259615	-0.240338	-0.290625	-0.232755	-0.224918
UY7	-0.221832	-0.201879	-0.258279	-0.195935	-0.191289

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.691	0
-0.599	300
-0.560	450
-0.406	1000
-0.314	1400
-0.248	1800
-0.190	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	10	13	7	12
EY1	5612	9136	9487	9256	9736
EY2	5381	2197	2137	2532	2048
EY3	2072	1125	1505	2381	2527
EY4	391	495	496	422	498
EY5	216	141	236	187	136
EY6	178	179	186	183	194

MIN	AVG	MAX
5612	8645	9736
2048	2859	5381
1125	1922	2527
391	461	498
136	183	236
178	184	194

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.693485	-0.679409	-0.668939	-0.663441	-0.647978
UY2	-0.569576	-0.559318	-0.551009	-0.548762	-0.536309
UY3	-0.504738	-0.490533	-0.484385	-0.483599	-0.473277
UY4	-0.340513	-0.327819	-0.334072	-0.326674	-0.324584
UY5	-0.270473	-0.259412	-0.275537	-0.260556	-0.260307
UY6	-0.224918	-0.212360	-0.237381	-0.216441	-0.215322
UY7	-0.191289	-0.175402	-0.208482	-0.182895	-0.179612

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.691	0
-0.599	300
-0.560	450
-0.406	1000
-0.314	1400
-0.248	1800
-0.190	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	12	10	8	9
EY1	6264	8770	9136	6939	5612
EY2	2765	2227	2322	2906	5381
EY3	1532	1845	2660	2960	2072
EY4	477	494	495	434	391
EY5	167	228	141	236	216
EY6	138	113	187	152	178

MIN	AVG	MAX
5612	7344	9136
2227	3120	5381
1532	2214	2960
391	458	495
141	198	236
113	154	187

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.747052	-0.691583	-0.674831	-0.736490	-0.693485
UY2	-0.612430	-0.571336	-0.564226	-0.615209	-0.569576
UY3	-0.541451	-0.504380	-0.502136	-0.550939	-0.504738
UY4	-0.376636	-0.349962	-0.351428	-0.397592	-0.340513
UY5	-0.307348	-0.286238	-0.285063	-0.333244	-0.270473
UY6	-0.259615	-0.242589	-0.238851	-0.290625	-0.224918
UY7	-0.221832	-0.207852	-0.202490	-0.258279	-0.191289

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.691	0
-0.599	300
-0.560	450
-0.406	1000
-0.314	1400
-0.248	1800
-0.190	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN								LOAD 1: 733 kPa								LOAD 2: 1166 kPa								LOAD 3: 1485 kPa							
DEPTH	DEPTH RATIO	2	12	14	11	1	AVG.	STRESS RATIO	3	13	15	6	8	AVG.	STRESS RATIO	6	10	8	5	9	AVG.	STRESS RATIO									
(mm)	(z/ro)							(p/po)							(p/po)							(p/po)									
20	0.09	-0.715	-0.702	-0.704	-0.710	-0.710	-0.708	0.966	-1.129	-1.137	-1.141	-1.129	-1.130	-1.133	0.972	-1.438	-1.462	-1.439	-1.455	-1.448	-1.448	0.975									
59	0.26	-0.675	-0.629	-0.636	-0.659	-0.658	-0.652	0.889	-1.044	-1.074	-1.091	-1.044	-1.047	-1.060	0.909	-1.329	-1.418	-1.334	-1.395	-1.369	-1.369	0.922									
98	0.44	-0.608	-0.521	-0.535	-0.576	-0.578	-0.564	0.769	-0.907	-0.967	-0.999	-0.911	-0.919	-0.941	0.807	-1.160	-1.329	-1.170	-1.285	-1.234	-1.236	0.832									
137	0.61	-0.510	-0.394	-0.413	-0.462	-0.472	-0.450	0.614	-0.723	-0.811	-0.857	-0.739	-0.750	-0.776	0.666	-0.941	-1.174	-0.955	-1.116	-1.035	-1.044	0.703									
174	0.77	-0.402	-0.294	-0.312	-0.346	-0.374	-0.346	0.471	-0.541	-0.640	-0.682	-0.584	-0.595	-0.608	0.522	-0.743	-0.959	-0.758	-0.926	-0.812	-0.840	0.565									
212	0.94	-0.301	-0.223	-0.239	-0.244	-0.295	-0.260	0.355	-0.386	-0.479	-0.504	-0.460	-0.468	-0.459	0.394	-0.585	-0.719	-0.597	-0.742	-0.599	-0.649	0.437									
250	1.11	-0.215	-0.164	-0.175	-0.160	-0.223	-0.187	0.256	-0.262	-0.342	-0.353	-0.352	-0.355	-0.333	0.286	-0.448	-0.507	-0.453	-0.576	-0.419	-0.480	0.324									
285	1.27	-0.161	-0.125	-0.127	-0.111	-0.170	-0.139	0.189	-0.196	-0.256	-0.265	-0.279	-0.270	-0.253	0.217	-0.355	-0.371	-0.344	-0.448	-0.308	-0.365	0.246									
315	1.40	-0.133	-0.103	-0.097	-0.090	-0.134	-0.112	0.152	-0.169	-0.212	-0.224	-0.236	-0.213	-0.211	0.181	-0.300	-0.301	-0.272	-0.360	-0.254	-0.297	0.200									
414	1.84	-0.064	-0.054	-0.053	-0.051	-0.062	-0.057	0.077	-0.080	-0.102	-0.108	-0.103	-0.099	-0.098	0.084	-0.131	-0.135	-0.126	-0.152	-0.122	-0.133	0.090									
582	2.59	-0.043	-0.039	-0.039	-0.038	-0.042	-0.040	0.055	-0.053	-0.069	-0.073	-0.064	-0.066	-0.065	0.056	-0.081	-0.085	-0.084	-0.095	-0.083	-0.086	0.058									
750	3.33	-0.031	-0.030	-0.031	-0.030	-0.029	-0.030	0.041	-0.037	-0.049	-0.051	-0.042	-0.046	-0.045	0.039	-0.053	-0.055	-0.059	-0.063	-0.059	-0.058	0.039									
918	4.08	-0.023	-0.023	-0.023	-0.023	-0.021	-0.023	0.031	-0.027	-0.036	-0.037	-0.029	-0.033	-0.033	0.028	-0.038	-0.039	-0.042	-0.045	-0.044	-0.042	0.028									
1500	6.67	-0.017	-0.017	-0.018	-0.018	-0.016	-0.017	0.023	-0.022	-0.027	-0.028	-0.023	-0.025	-0.025	0.021	-0.029	-0.031	-0.032	-0.034	-0.033	-0.032	0.021									
2500	11.11	-0.013	-0.013	-0.014	-0.014	-0.012	-0.013	0.018	-0.018	-0.021	-0.021	-0.018	-0.019	-0.019	0.017	-0.023	-0.025	-0.024	-0.027	-0.026	-0.025	0.017									
3500	15.56	-0.011	-0.011	-0.011	-0.011	-0.009	-0.011	0.014	-0.014	-0.017	-0.017	-0.014	-0.015	-0.015	0.013	-0.018	-0.020	-0.019	-0.022	-0.021	-0.020	0.013									
4500	20.00	-0.007	-0.007	-0.007	-0.007	-0.006	-0.007	0.009	-0.010	-0.011	-0.011	-0.009	-0.010	-0.010	0.009	-0.012	-0.014	-0.012	-0.014	-0.014	-0.013	0.009									
5500	24.44	-0.004	-0.004	-0.004	-0.004	-0.003	-0.004	0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.005	-0.007	-0.008	-0.007	-0.008	-0.008	-0.008	0.005									

MAXIMUM DEFLECTION

DEPTH	DEPTH RATIO	8	6	9	11	7	AVG.	STRESS RATIO	9	10	13	7	12	AVG.	STRESS RATIO								
(mm)	(z/ro)							(p/po)							(p/po)								
20	0.09	-0.718	-0.714	-0.716	-0.719	-0.722	-0.718	0.979	-1.130	-1.129	-1.137	-1.126	-1.121	-1.129	0.968	-1.448	-1.425	-1.423	-1.427	-1.425	-1.430	0.963	
59	0.26	-0.664	-0.648	-0.655	-0.666	-0.666	0.908	1.690	-2.305	-1.047	-1.044	-1.075	-1.035	-1.015	-1.043	0.895	-1.369	-1.281	-1.276	-1.293	-1.280	-1.300	0.875
98	0.44	-0.581	-0.549	-0.563	-0.581	-0.581	0.793	1.476	-2.013	-0.919	-0.911	-0.969	-0.895	-0.859	-0.910	0.781	-1.234	-1.070	-1.064	-1.094	-1.070	-1.107	0.745
137	0.61	-0.473	-0.429	-0.447	-0.469	-0.469	0.640	1.191	-1.624	-0.750	-0.739	-0.813	-0.718	-0.673	-0.739	0.633	-1.035	-0.827	-0.821	-0.858	-0.831	-0.874	0.589
174	0.77	-0.372	-0.329	-0.347	-0.361	-0.361	0.492	0.916	-1.249	-0.595	-0.584	-0.637	-0.564	-0.524	-0.581	0.498	-0.812	-0.641	-0.640	-0.667	-0.655	-0.683	0.460
212	0.94	-0.289	-0.256	-0.270	-0.270	-0.270	0.368	0.685	-0.934	-0.468	-0.460	-0.471	-0.446	-0.418	-0.452	0.388	-0.599	-0.513	-0.520	-0.532	-0.536	-0.540	0.364
250	1.11	-0.217	-0.193	-0.201	-0.193	-0.263	0.490	0.668	-0.668	-0.355	-0.352	-0.329	-0.343	-0.323	-0.340	0.292	-0.419	-0.403	-0.414	-0.411	-0.428	-0.415	0.280
285	1.27	-0.168	-0.152	-0.150	-0.145	-0.198	0.368	0.685	-0.503	-0.270	-0.279	-0.242	-0.273	-0.252	-0.263	0.226	-0.308	-0.328	-0.338	-0.320	-0.341	-0.327	0.220
315	1.40	-0.139	-0.128	-0.117	-0.121	-0.164	0.306	0.618	-0.418	-0.213	-0.236	-0.199	-0.231	-0.204	-0.217	0.186	-0.254	-0.283	-0.288	-0.260	-0.278	-0.273	0.184
414	1.84	-0.065	-0.060	-0.058	-0.058	-0.080	0.148	0.488	-0.202	-0.099	-0.103	-0.096	-0.102	-0.093	-0.099	0.085	-0.122	-0.124	-0.132	-0.119	-0.119	-0.123	0.083
582	2.59	-0.042	-0.040	-0.041	-0.040	-0.054	0.101	0.368	-0.137	-0.066	-0.064	-0.065	-0.065	-0.061	-0.064	0.055	-0.083	-0.076	-0.086	-0.078	-0.073	-0.079	0.053
750	3.33	-0.029	-0.029	-0.030	-0.028	-0.039	0.072	0.306	-0.098	-0.046	-0.042	-0.046	-0.043	-0.042	-0.044	0.038	-0.059	-0.049	-0.058	-0.053	-0.047	-0.053	0.036
918	4.08	-0.021	-0.021	-0.022	-0.021	-0.029	0.053	0.253	-0.073	-0.033	-0.029	-0.034	-0.031	-0.031	-0.032	0.027	-0.044	-0.036	-0.042	-0.039	-0.034	-0.039	0.026
1500	6.67	-0.015	-0.016	-0.017	-0.016	-0.022	0.041	0.204	-0.056	-0.025	-0.023	-0.026	-0.023	-0.023	-0.024	0.021	-0.033	-0.029	-0.032	-0.030	-0.027	-0.030	0.020
2500	11.11	-0.012	-0.013	-0.013	-0.013	-0.017	0.032	0.156	-0.044	-0.019	-0.018	-0.020	-0.018	-0.019	-0.019	0.016	-0.026	-0.024	-0.025	-0.024	-0.022	-0.024	0.016
3500	15.56	-0.009	-0.010	-0.010	-0.010	-0.014	0.026	0.108	-0.035	-0.015	-0.014	-0.016	-0.014	-0.015	-0.015	0.013	-0.021	-0.020	-0.020	-0.019	-0.018	-0.020	0.013
4500	20.00	-0.006	-0.007	-0.007	-0.007	-0.009	0.017	0.072	-0.023	-0.010	-0.009	-0.011	-0.009	-0.010	-0.010	0.008	-0.014	-0.013	-0.013	-0.013	-0.012	-0.013	0.009
5500	24.44	-0.003	-0.004	-0.004	-0.004	-0.005	0.010	0.048	-0.013	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.005	-0.008	-0.008	-0.007	-0.008	-0.008	-0.008	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS LOAD 1: 733 kPa

LOAD 2: 1166 kPa

LOAD 3: 1485 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 733 kPa					AVG. STRESS RATIO (p/po)	LOAD 2: 1166 kPa					AVG. STRESS RATIO (p/po)	LOAD 3: 1485 kPa					AVG. STRESS RATIO (p/po)		
		12	11	8	6	2		6	12	8	11	13		6	12	10	8	9			
20	0.09	-0.705	-0.708	-0.710	-0.710	-0.717	0.968	-1.129	-1.120	-1.130	-1.127	-1.122	-1.125	0.965	-1.438	-1.427	-1.429	-1.439	-1.448	-1.436	0.967
59	0.26	-0.638	-0.651	-0.658	-0.656	-0.683	0.897	-1.044	-1.013	-1.047	-1.036	-1.020	-1.032	0.885	-1.329	-1.291	-1.296	-1.334	-1.369	-1.324	0.891
98	0.44	-0.540	-0.563	-0.578	-0.572	-0.624	0.785	-0.911	-0.855	-0.919	-0.896	-0.869	-0.890	0.763	-1.160	-1.091	-1.099	-1.170	-1.234	-1.151	0.775
137	0.61	-0.425	-0.453	-0.472	-0.464	-0.532	0.640	-0.739	-0.670	-0.750	-0.721	-0.689	-0.714	0.612	-0.941	-0.856	-0.866	-0.955	-1.035	-0.931	0.627
174	0.77	-0.334	-0.357	-0.374	-0.367	-0.421	0.505	-0.584	-0.525	-0.595	-0.568	-0.544	-0.563	0.483	-0.743	-0.672	-0.680	-0.758	-0.812	-0.733	0.494
212	0.94	-0.270	-0.283	-0.295	-0.289	-0.309	0.394	-0.460	-0.425	-0.468	-0.450	-0.441	-0.449	0.385	-0.585	-0.543	-0.547	-0.597	-0.599	-0.574	0.387
250	1.11	-0.213	-0.218	-0.223	-0.221	-0.213	0.297	-0.352	-0.336	-0.355	-0.347	-0.348	-0.348	0.298	-0.448	-0.429	-0.427	-0.453	-0.419	-0.435	0.293
285	1.27	-0.171	-0.175	-0.170	-0.175	-0.156	0.231	-0.279	-0.269	-0.270	-0.278	-0.279	-0.275	0.236	-0.355	-0.344	-0.334	-0.344	-0.308	-0.337	0.227
315	1.40	-0.143	-0.149	-0.134	-0.148	-0.128	0.191	-0.236	-0.225	-0.213	-0.237	-0.232	-0.228	0.196	-0.300	-0.288	-0.268	-0.272	-0.254	-0.276	0.186
414	1.84	-0.064	-0.065	-0.062	-0.064	-0.058	0.086	-0.103	-0.101	-0.099	-0.104	-0.103	-0.102	0.087	-0.131	-0.130	-0.119	-0.126	-0.122	-0.126	0.085
582	2.59	-0.041	-0.041	-0.042	-0.040	-0.037	0.055	-0.064	-0.064	-0.066	-0.065	-0.065	-0.065	0.056	-0.081	-0.083	-0.074	-0.084	-0.083	-0.081	0.055
750	3.33	-0.027	-0.027	-0.029	-0.026	-0.024	0.036	-0.042	-0.043	-0.046	-0.043	-0.043	-0.043	0.037	-0.053	-0.055	-0.048	-0.059	-0.059	-0.055	0.037
918	4.08	-0.018	-0.019	-0.021	-0.019	-0.018	0.026	-0.029	-0.029	-0.033	-0.031	-0.029	-0.030	0.026	-0.038	-0.039	-0.035	-0.042	-0.044	-0.039	0.027
1500	6.67	-0.013	-0.015	-0.016	-0.014	-0.014	0.020	-0.023	-0.021	-0.025	-0.023	-0.021	-0.023	0.019	-0.029	-0.028	-0.027	-0.032	-0.033	-0.030	0.020
2500	11.11	-0.010	-0.011	-0.012	-0.011	-0.011	0.015	-0.018	-0.016	-0.019	-0.018	-0.015	-0.017	0.015	-0.023	-0.021	-0.022	-0.024	-0.026	-0.023	0.016
3500	15.56	-0.007	-0.009	-0.009	-0.009	-0.009	0.012	-0.014	-0.012	-0.015	-0.015	-0.012	-0.013	0.012	-0.018	-0.016	-0.018	-0.019	-0.021	-0.019	0.012
4500	20.00	-0.005	-0.006	-0.006	-0.006	-0.006	0.008	-0.009	-0.008	-0.010	-0.009	-0.008	-0.009	0.008	-0.012	-0.011	-0.012	-0.012	-0.014	-0.012	0.008
5500	24.44	-0.003	-0.003	-0.003	-0.004	-0.004	0.005	-0.006	-0.005	-0.006	-0.006	-0.005	-0.005	0.005	-0.007	-0.006	-0.008	-0.007	-0.008	-0.007	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 795 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	2	14	4	16	MIN	AVG	MAX
EY1	2752	4902	2883	7852	7520	2752	5182	7852
EY2	4604	6360	3246	5249	2195	2195	4331	6360
EY3	2844	2164	2778	1127	1413	1127	2065	2844
EY4	334	424	285	342	451	285	367	451
EY5	155	138	168	133	144	133	148	168
EY6	146	122	147	134	147	122	139	147

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.465728	-0.412232
UY2	-0.371700	-0.347919
UY3	-0.331557	-0.316405
UY4	-0.230710	-0.232658
UY5	-0.184778	-0.191965
UY6	-0.153661	-0.162521
UY7	-0.130113	-0.138713

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	6	8	11	15	MIN	AVG	MAX
EY1	7018	6264	6939	6793	8097	6264	7022	8097
EY2	2276	2765	2906	2649	2126	2126	2544	2906
EY3	1155	1532	2960	1446	1433	1155	1705	2960
EY4	494	477	434	482	494	434	476	494
EY5	242	167	236	190	243	167	216	243
EY6	164	138	152	130	147	130	146	164

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.381423	-0.380034
UY2	-0.315277	-0.313691
UY3	-0.280704	-0.279472
UY4	-0.204386	-0.198662
UY5	-0.173910	-0.163062
UY6	-0.153409	-0.137941
UY7	-0.137387	-0.117756

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	2	11	16	8	6	MIN	AVG	MAX
EY1	4902	6793	6327	6939	6264	4902	6245	6939
EY2	6360	2649	2045	2906	2765	2045	3345	6360
EY3	2164	1446	1740	2960	1532	1446	1969	2960
EY4	424	482	497	434	477	424	463	497
EY5	138	190	247	236	167	138	196	247
EY6	122	147	145	152	138	122	141	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.412232	-0.400987
UY2	-0.347919	-0.336333
UY3	-0.316405	-0.302528
UY4	-0.232658	-0.224052
UY5	-0.191965	-0.190538
UY6	-0.162521	-0.167330
UY7	-0.138713	-0.148931

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1202 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	15	16	11	13
EY1	7997	5480	3115	8582	3969
EY2	6660	3914	5178	5842	7216
EY3	2788	1326	1118	2841	2952
EY4	253	333	251	252	251
EY5	171	138	132	183	144
EY6	105	102	122	102	137

MIN	AVG	MAX
3115	5828	8582
3914	5762	7216
1118	2205	2952
251	268	333
132	154	183
102	113	137

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.607344	-0.650776	-0.753184	-0.571084	-0.618483
UY2	-0.530608	-0.540401	-0.606158	-0.495213	-0.511993
UY3	-0.486322	-0.481063	-0.534650	-0.458055	-0.460059
UY4	-0.352356	-0.324806	-0.347355	-0.317865	-0.310353
UY5	-0.281408	-0.250989	-0.262298	-0.247735	-0.235335
UY6	-0.229379	-0.198535	-0.204928	-0.196274	-0.182638
UY7	-0.187789	-0.156624	-0.161604	-0.155025	-0.142215

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.561	0
-0.513	300
-0.496	450
-0.441	1000
-0.208	1400
-0.175	1800
-0.142	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	8	6	11	13
EY1	8529	6939	6264	5686	9056
EY2	2158	2906	2765	2642	2247
EY3	1129	2960	1532	1422	1145
EY4	493	434	477	483	490
EY5	238	236	167	179	239
EY6	148	152	138	140	149

MIN	AVG	MAX
5686	7295	9056
2158	2544	2906
1129	1638	2960
434	475	493
167	212	239
138	145	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.558894	-0.564354	-0.574593	-0.546249	-0.578614
UY2	-0.465899	-0.475885	-0.474285	-0.440079	-0.489333
UY3	-0.414631	-0.430627	-0.422547	-0.386661	-0.439624
UY4	-0.297768	-0.320228	-0.300366	-0.263539	-0.324970
UY5	-0.250249	-0.270338	-0.246541	-0.210394	-0.277980
UY6	-0.217988	-0.235727	-0.208559	-0.173133	-0.246079
UY7	-0.192540	-0.208645	-0.178041	-0.143244	-0.220969

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.561	0
-0.513	300
-0.496	450
-0.441	1000
-0.208	1400
-0.175	1800
-0.142	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	2	13	12	6	11
EY1	4902	8420	9256	6264	6793
EY2	6360	2149	2227	2765	2649
EY3	2164	1949	1872	1532	1446
EY4	424	495	494	477	482
EY5	138	231	228	167	190
EY6	122	90	92	138	147

MIN	AVG	MAX
4902	7127	9256
2149	3238	6360
1446	1793	2164
424	474	495
138	191	231
90	118	147

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.623274	-0.579900	-0.584744	-0.574593	-0.596964
UY2	-0.526036	-0.490477	-0.498623	-0.474285	-0.499255
UY3	-0.478388	-0.442089	-0.450772	-0.422547	-0.448178
UY4	-0.351768	-0.327316	-0.335649	-0.300366	-0.329506
UY5	-0.290242	-0.275652	-0.283839	-0.246541	-0.278676
UY6	-0.245723	-0.238056	-0.246291	-0.208559	-0.243389
UY7	-0.209727	-0.206705	-0.215106	-0.178041	-0.215371

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.561	0
-0.513	300
-0.496	450
-0.441	1000
-0.208	1400
-0.175	1800
-0.142	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1484 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	15	14	11	8
EY1	4902	3640	4833	5731	6939
EY2	6360	3008	2062	2649	2906
EY3	2164	1294	1873	1446	2960
EY4	424	495	498	482	434
EY5	138	140	132	157	236
EY6	122	177	117	147	152

MIN	AVG	MAX
3640	5209	6939
2062	3397	6360
1294	1948	2960
424	467	498
132	161	236
117	143	177

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.769500	-0.777437	-0.811046	-0.783107	-0.696757
UY2	-0.649449	-0.616255	-0.663544	-0.651435	-0.587531
UY3	-0.590622	-0.544339	-0.593398	-0.584897	-0.531656
UY4	-0.434296	-0.385194	-0.437175	-0.431393	-0.395356
UY5	-0.358335	-0.317837	-0.367345	-0.365122	-0.333762
UY6	-0.303372	-0.271271	-0.316370	-0.318815	-0.291031
UY7	-0.258930	-0.234710	-0.274132	-0.281941	-0.257595

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.673	0
-0.619	300
-0.598	450
-0.534	1000
-0.355	1400
-0.215	1800
-0.174	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	8	12	6	10
EY1	5612	6939	4240	6264	9136
EY2	5381	2906	6039	2765	2197
EY3	2072	2960	2413	1532	2660
EY4	391	434	497	477	495
EY5	216	236	226	167	141
EY6	178	152	160	138	164

MIN	AVG	MAX
4240	6438	9136
2197	3858	6039
1532	2327	2960
391	459	497
141	197	236
138	158	178

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.654252	-0.696757	-0.644969	-0.709397	-0.626545
UY2	-0.540420	-0.587531	-0.521971	-0.585557	-0.524379
UY3	-0.483144	-0.531656	-0.466810	-0.521680	-0.468444
UY4	-0.335714	-0.395356	-0.330776	-0.370835	-0.331413
UY5	-0.269069	-0.333762	-0.269845	-0.304382	-0.267986
UY6	-0.224074	-0.291031	-0.227821	-0.257489	-0.222411
UY7	-0.190015	-0.257595	-0.194895	-0.219811	-0.185755

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.673	0
-0.619	300
-0.598	450
-0.534	1000
-0.355	1400
-0.215	1800
-0.174	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	6	8	2	11
EY1	9256	6264	6939	4902	6793
EY2	2227	2765	2906	6360	2649
EY3	1868	1532	2960	2164	1446
EY4	494	477	434	424	482
EY5	228	167	236	138	190
EY6	95	138	152	122	147

MIN	AVG	MAX
4902	6831	9256
2227	3381	6360
1446	1994	2960
424	462	494
138	192	236
95	131	152

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.703805	-0.709397	-0.696757	-0.769500	-0.737017
UY2	-0.597466	-0.585557	-0.587531	-0.649449	-0.616385
UY3	-0.538384	-0.521680	-0.531656	-0.590622	-0.553324
UY4	-0.396311	-0.370835	-0.395356	-0.434296	-0.406811
UY5	-0.332463	-0.304382	-0.333762	-0.358335	-0.344056
UY6	-0.286266	-0.257489	-0.291031	-0.303372	-0.300491
UY7	-0.247972	-0.219811	-0.257595	-0.258930	-0.265898

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.673	0
-0.619	300
-0.598	450
-0.534	1000
-0.355	1400
-0.215	1800
-0.174	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 795 kPa						LOAD 2: 1202 kPa						LOAD 3: 1484 kPa								
DEPTH (mm)	DEPTH RATIO (z/ro)	15	2	14	4	16	AVG.	STRESS RATIO (p/po)	9	15	16	11	13	AVG.	STRESS RATIO (p/po)	2	15	14	11	8	AVG.	STRESS RATIO (p/po)
27	0.12	-0.779	-0.773	-0.776	-0.760	-0.753	-0.768	0.966	-1.157	-1.154	-1.171	-1.153	-1.175	-1.162	0.967	-1.442	-1.439	-1.424	-1.420	-1.421	-1.429	0.963
82	0.36	-0.736	-0.712	-0.723	-0.665	-0.644	-0.696	0.876	-1.036	-1.027	-1.084	-1.020	-1.102	-1.054	0.877	-1.329	-1.317	-1.268	-1.250	-1.257	-1.284	0.865
137	0.61	-0.640	-0.593	-0.616	-0.508	-0.485	-0.568	0.715	-0.821	-0.810	-0.909	-0.796	-0.942	-0.856	0.712	-1.107	-1.092	-1.016	-0.979	-0.992	-1.037	0.699
184	0.82	-0.518	-0.458	-0.494	-0.363	-0.361	-0.439	0.552	-0.605	-0.602	-0.699	-0.582	-0.738	-0.645	0.537	-0.856	-0.859	-0.796	-0.745	-0.761	-0.804	0.541
222	0.99	-0.402	-0.343	-0.388	-0.262	-0.291	-0.337	0.424	-0.439	-0.452	-0.508	-0.427	-0.543	-0.474	0.394	-0.640	-0.679	-0.653	-0.595	-0.610	-0.635	0.428
261	1.16	-0.295	-0.243	-0.291	-0.182	-0.229	-0.248	0.312	-0.298	-0.327	-0.347	-0.295	-0.370	-0.327	0.272	-0.454	-0.523	-0.524	-0.464	-0.474	-0.488	0.329
304	1.35	-0.206	-0.172	-0.204	-0.132	-0.177	-0.179	0.224	-0.195	-0.238	-0.245	-0.195	-0.242	-0.223	0.185	-0.321	-0.402	-0.404	-0.358	-0.347	-0.366	0.247
351	1.56	-0.139	-0.126	-0.135	-0.104	-0.135	-0.129	0.161	-0.129	-0.180	-0.186	-0.128	-0.158	-0.156	0.130	-0.236	-0.313	-0.302	-0.276	-0.242	-0.274	0.184
456	2.03	-0.093	-0.087	-0.090	-0.075	-0.094	-0.088	0.110	-0.088	-0.126	-0.132	-0.087	-0.106	-0.108	0.090	-0.162	-0.215	-0.203	-0.191	-0.163	-0.187	0.126
618	2.75	-0.042	-0.035	-0.043	-0.032	-0.038	-0.038	0.048	-0.046	-0.054	-0.059	-0.046	-0.052	-0.051	0.043	-0.066	-0.080	-0.073	-0.074	-0.073	-0.073	0.049
780	3.47	-0.030	-0.024	-0.032	-0.023	-0.025	-0.027	0.034	-0.035	-0.037	-0.043	-0.035	-0.039	-0.038	0.031	-0.045	-0.052	-0.046	-0.049	-0.051	-0.049	0.033
943	4.19	-0.023	-0.018	-0.025	-0.018	-0.019	-0.021	0.026	-0.028	-0.029	-0.034	-0.027	-0.031	-0.030	0.025	-0.034	-0.040	-0.034	-0.037	-0.039	-0.037	0.025
1100	4.89	-0.019	-0.016	-0.021	-0.015	-0.016	-0.017	0.022	-0.023	-0.024	-0.028	-0.023	-0.027	-0.025	0.021	-0.029	-0.034	-0.028	-0.031	-0.032	-0.031	0.021
1250	5.56	-0.016	-0.013	-0.017	-0.013	-0.014	-0.015	0.019	-0.019	-0.020	-0.024	-0.019	-0.023	-0.021	0.018	-0.025	-0.029	-0.023	-0.026	-0.026	-0.026	0.018
1400	6.22	-0.014	-0.012	-0.015	-0.012	-0.012	-0.013	0.016	-0.017	-0.017	-0.021	-0.016	-0.020	-0.018	0.015	-0.022	-0.026	-0.020	-0.022	-0.022	-0.022	0.015
1550	6.89	-0.009	-0.008	-0.009	-0.008	-0.008	-0.008	0.010	-0.011	-0.011	-0.013	-0.011	-0.013	-0.012	0.010	-0.014	-0.016	-0.013	-0.014	-0.014	-0.014	0.010
2125	9.44	-0.005	-0.004	-0.005	-0.004	-0.004	-0.004	0.006	-0.006	-0.006	-0.007	-0.006	-0.007	-0.007	0.006	-0.008	-0.009	-0.008	-0.008	-0.008	-0.008	0.005
3125	13.89	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.005	-0.005	-0.004	-0.005	-0.005	0.004	-0.006	-0.006	-0.006	-0.006	-0.005	-0.006	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	12	8	6	11	13	AVG.	STRESS RATIO (p/po)	9	8	12	6	10	AVG.	STRESS RATIO (p/po)							
27	0.12	-0.776	-0.765	-0.766	-0.761	-0.756	-0.765	0.962	-1.133	-1.151	-1.149	-1.151	-1.132	-1.143	0.949	-1.436	-1.421	-1.448	-1.418	-1.404	-1.425	0.961
82	0.36	-0.724	-0.685	-0.691	-0.669	-0.655	-0.685	0.861	-0.952	-1.018	-1.007	-1.015	-0.949	-0.988	0.820	-1.307	-1.257	-1.351	-1.243	-1.195	-1.270	0.856
137	0.61	-0.616	-0.549	-0.563	-0.520	-0.501	-0.550	0.692	-0.698	-0.803	-0.783	-0.797	-0.694	-0.755	0.627	-1.067	-0.992	-1.148	-0.967	-0.897	-1.014	0.683
184	0.82	-0.488	-0.419	-0.442	-0.385	-0.376	-0.422	0.531	-0.513	-0.616	-0.592	-0.607	-0.507	-0.567	0.471	-0.814	-0.761	-0.907	-0.731	-0.673	-0.777	0.524
222	0.99	-0.372	-0.323	-0.354	-0.295	-0.301	-0.329	0.414	-0.417	-0.494	-0.472	-0.484	-0.411	-0.455	0.378	-0.613	-0.610	-0.692	-0.582	-0.552	-0.610	0.411
261	1.16	-0.269	-0.240	-0.274	-0.218	-0.236	-0.247	0.311	-0.333	-0.384	-0.366	-0.377	-0.327	-0.357	0.297	-0.440	-0.474	-0.504	-0.452	-0.442	-0.462	0.311
304	1.35	-0.189	-0.178	-0.202	-0.159	-0.181	-0.182	0.229	-0.265	-0.281	-0.280	-0.291	-0.260	-0.275	0.229	-0.314	-0.347	-0.363	-0.346	-0.334	-0.341	0.230
351	1.56	-0.133	-0.134	-0.143	-0.117	-0.139	-0.133	0.167	-0.212	-0.196	-0.215	-0.224	-0.208	-0.211	0.175	-0.230	-0.242	-0.266	-0.265	-0.239	-0.248	0.167
456	2.03	-0.090	-0.093	-0.097	-0.081	-0.096	-0.091	0.115	-0.151	-0.132	-0.149	-0.155	-0.148	-0.147	0.122	-0.160	-0.163	-0.184	-0.184	-0.161	-0.170	0.115
618	2.75	-0.039	-0.037	-0.043	-0.036	-0.038	-0.039	0.049	-0.062	-0.059	-0.058	-0.061	-0.061	-0.060	0.050	-0.073	-0.073	-0.079	-0.072	-0.065	-0.072	0.049
780	3.47	-0.027	-0.025	-0.031	-0.025	-0.025	-0.027	0.034	-0.043	-0.042	-0.039	-0.040	-0.042	-0.041	0.034	-0.053	-0.051	-0.054	-0.048	-0.044	-0.050	0.034
943	4.19	-0.021	-0.019	-0.023	-0.020	-0.019	-0.020	0.026	-0.032	-0.032	-0.029	-0.030	-0.031	-0.031	0.026	-0.041	-0.039	-0.041	-0.036	-0.034	-0.038	0.026
1100	4.89	-0.018	-0.016	-0.019	-0.016	-0.016	-0.017	0.021	-0.025	-0.026	-0.024	-0.025	-0.025	-0.025	0.021	-0.035	-0.032	-0.033	-0.030	-0.029	-0.032	0.021
1250	5.56	-0.015	-0.014	-0.016	-0.014	-0.014	-0.014	0.018	-0.021	-0.021	-0.020	-0.021	-0.021	-0.021	0.017	-0.029	-0.026	-0.027	-0.025	-0.025	-0.027	0.018
1400	6.22	-0.013	-0.012	-0.013	-0.012	-0.012	-0.012	0.015	-0.017	-0.018	-0.017	-0.018	-0.017	-0.017	0.015	-0.025	-0.022	-0.023	-0.022	-0.022	-0.023	0.015
1550	6.89	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	0.010	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	0.009	-0.016	-0.014	-0.015	-0.014	-0.015	-0.015	0.010
2125	9.44	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.005	-0.009	-0.008	-0.008	-0.008	-0.008	-0.008	0.005
3125	13.89	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.005	-0.004	-0.004	0.004	-0.006	-0.005	-0.006	-0.006	-0.006	-0.006	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS LOAD 1: 795 kPa

LOAD 2: 1202 kPa

LOAD 3: 1484 kPa

DEPTH (mm)	LOAD 1: 795 kPa						LOAD 2: 1202 kPa						LOAD 3: 1484 kPa									
	DEPTH RATIO (z/r <sub>o</sub> )	2	11	16	8	6	AVG	DEPTH RATIO (z/r <sub>o</sub> )	2	13	12	6	11	AVG	DEPTH RATIO (z/r <sub>o</sub> )	12	6	8	2	11	AVG	DEPTH RATIO (z/r <sub>o</sub> )
27	0.12	-0.773	-0.757	-0.757	-0.761	-0.760	-0.762	0.958	-1.168	-1.137	-1.134	-1.149	-1.145	-1.147	0.951	-1.400	-1.418	-1.421	-1.442	-1.414	-1.419	0.956
82	0.36	-0.712	-0.658	-0.659	-0.673	-0.666	-0.673	0.847	-1.076	-0.970	-0.957	-1.007	-0.994	-1.001	0.831	-1.182	-1.243	-1.257	-1.329	-1.228	-1.248	0.841
137	0.61	-0.593	-0.505	-0.510	-0.531	-0.518	-0.531	0.668	-0.896	-0.729	-0.708	-0.783	-0.764	-0.776	0.644	-0.874	-0.967	-0.992	-1.107	-0.943	-0.977	0.658
184	0.82	-0.458	-0.380	-0.390	-0.408	-0.392	-0.406	0.510	-0.693	-0.547	-0.525	-0.592	-0.574	-0.586	0.487	-0.648	-0.731	-0.761	-0.856	-0.709	-0.741	0.499
222	0.99	-0.343	-0.304	-0.320	-0.327	-0.312	-0.321	0.404	-0.518	-0.448	-0.430	-0.472	-0.459	-0.465	0.386	-0.530	-0.582	-0.610	-0.640	-0.567	-0.586	0.395
261	1.16	-0.243	-0.237	-0.257	-0.254	-0.242	-0.247	0.310	-0.367	-0.359	-0.344	-0.366	-0.359	-0.359	0.298	-0.424	-0.452	-0.474	-0.454	-0.443	-0.449	0.303
304	1.35	-0.172	-0.184	-0.199	-0.186	-0.186	-0.185	0.233	-0.260	-0.277	-0.266	-0.280	-0.278	-0.272	0.226	-0.328	-0.346	-0.347	-0.321	-0.343	-0.337	0.227
351	1.56	-0.126	-0.142	-0.151	-0.129	-0.142	-0.138	0.174	-0.191	-0.207	-0.201	-0.215	-0.216	-0.206	0.171	-0.248	-0.265	-0.242	-0.236	-0.266	-0.251	0.169
456	2.03	-0.087	-0.099	-0.105	-0.087	-0.098	-0.095	0.120	-0.131	-0.142	-0.139	-0.149	-0.150	-0.142	0.118	-0.172	-0.184	-0.163	-0.162	-0.185	-0.173	0.117
618	2.75	-0.035	-0.040	-0.043	-0.039	-0.039	-0.039	0.049	-0.053	-0.057	-0.056	-0.058	-0.060	-0.057	0.047	-0.069	-0.072	-0.073	-0.066	-0.074	-0.071	0.048
780	3.47	-0.024	-0.027	-0.030	-0.028	-0.026	-0.027	0.034	-0.036	-0.037	-0.037	-0.039	-0.040	-0.038	0.031	-0.046	-0.048	-0.051	-0.045	-0.050	-0.048	0.032
943	4.19	-0.018	-0.020	-0.022	-0.021	-0.019	-0.020	0.025	-0.028	-0.027	-0.027	-0.029	-0.030	-0.028	0.023	-0.033	-0.036	-0.039	-0.034	-0.037	-0.036	0.024
1100	4.89	-0.016	-0.017	-0.018	-0.017	-0.016	-0.017	0.021	-0.024	-0.021	-0.021	-0.024	-0.025	-0.023	0.019	-0.026	-0.030	-0.032	-0.029	-0.031	-0.030	0.020
1250	5.56	-0.013	-0.014	-0.014	-0.014	-0.013	-0.014	0.017	-0.020	-0.016	-0.017	-0.020	-0.021	-0.019	0.016	-0.021	-0.025	-0.026	-0.025	-0.026	-0.025	0.017
1400	6.22	-0.012	-0.012	-0.012	-0.012	-0.012	-0.012	0.015	-0.017	-0.013	-0.013	-0.017	-0.018	-0.016	0.013	-0.017	-0.022	-0.022	-0.022	-0.022	-0.021	0.014
1550	6.89	-0.008	-0.007	-0.007	-0.008	-0.007	-0.008	0.009	-0.011	-0.009	-0.009	-0.011	-0.011	-0.010	0.009	-0.011	-0.014	-0.014	-0.014	-0.014	-0.013	0.009
2125	9.44	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.005	-0.005	-0.006	-0.006	-0.006	0.005	-0.007	-0.008	-0.008	-0.008	-0.008	-0.008	0.005
3125	13.89	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.006	-0.005	-0.006	-0.005	-0.005	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 758 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	12	9	11	1
EY1	2555	5582	8543	7307	8314
EY2	7104	6846	7382	6676	5891
EY3	1566	1008	1015	1012	1194
EY4	287	344	333	336	395
EY5	181	148	222	230	176
EY6	102	112	121	120	87

MIN	AVG	MAX
2555	6460	8543
5891	6780	7382
1008	1159	1566
287	339	395
148	191	230
87	108	121

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.542159	-0.511585	-0.461378	-0.455325	-0.457493
UY2	-0.444091	-0.438724	-0.401013	-0.389888	-0.394690
UY3	-0.396389	-0.397683	-0.364800	-0.351759	-0.358629
UY4	-0.276691	-0.293794	-0.270995	-0.255470	-0.268977
UY5	-0.227699	-0.249948	-0.231476	-0.215808	-0.230030
UY6	-0.196090	-0.220754	-0.205862	-0.190237	-0.202893
UY7	-0.172298	-0.198284	-0.186699	-0.171060	-0.180953

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.660	0
-0.467	300
-0.416	450
-0.268	1000
-0.200	1400
-0.157	1800
-0.130	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	4	13	11	2	5
EY1	8314	5285	6469	4902	2768
EY2	5891	2442	2642	6360	2270
EY3	1194	1721	1609	2164	2265
EY4	395	485	483	424	429
EY5	176	190	180	138	178
EY6	87	131	145	122	170

MIN	AVG	MAX
2768	5548	8314
2270	3921	6360
1194	1791	2265
395	443	485
138	172	190
87	131	170

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.457493	-0.430556	-0.407681	-0.407442	-0.405842
UY2	-0.394690	-0.348408	-0.330296	-0.339796	-0.305100
UY3	-0.358629	-0.309311	-0.291795	-0.305213	-0.263241
UY4	-0.268977	-0.228004	-0.211178	-0.218532	-0.175308
UY5	-0.230030	-0.195304	-0.179003	-0.180023	-0.140237
UY6	-0.202893	-0.172823	-0.157047	-0.153124	-0.116890
UY7	-0.180953	-0.154851	-0.139648	-0.131642	-0.098916

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.660	0
-0.467	300
-0.416	450
-0.268	1000
-0.200	1400
-0.157	1800
-0.130	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	4	14	10	11
EY1	6481	8314	6309	9136	6338
EY2	2247	5891	2236	6325	2649
EY3	1905	1194	1919	2660	1605
EY4	492	395	493	494	482
EY5	140	176	139	141	190
EY6	94	87	101	93	130

MIN	AVG	MAX
6309	7316	9136
2236	3869	6325
1194	1856	2660
395	471	494
139	157	190
87	101	130

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.469556	-0.457493	-0.463635	-0.417891	-0.425874
UY2	-0.389198	-0.394690	-0.384743	-0.370080	-0.347815
UY3	-0.349601	-0.358629	-0.346363	-0.343456	-0.308978
UY4	-0.265558	-0.268977	-0.265807	-0.272862	-0.227472
UY5	-0.229610	-0.230030	-0.231471	-0.238843	-0.194843
UY6	-0.203661	-0.202893	-0.206664	-0.213816	-0.172468
UY7	-0.182073	-0.180953	-0.186023	-0.192955	-0.154605

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.660	0
-0.467	300
-0.416	450
-0.268	1000
-0.200	1400
-0.157	1800
-0.130	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1141 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	8	1	6	16
EY1	3171	2580	2616	3833	2626
EY2	5787	6328	6671	6927	4830
EY3	1360	1991	2008	2192	1072
EY4	257	274	278	268	426
EY5	217	232	228	234	242
EY6	89	120	130	126	82

MIN	AVG	MAX
2580	2965	3833
4830	6109	6927
1072	1724	2192
257	301	426
217	231	242
82	110	130

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.779729	-0.779234	-0.757285	-0.716978	-0.771521
UY2	-0.638347	-0.636524	-0.617428	-0.601900	-0.622297
UY3	-0.564519	-0.568135	-0.550070	-0.541453	-0.553850
UY4	-0.376189	-0.395757	-0.379897	-0.381657	-0.403992
UY5	-0.298120	-0.325849	-0.311339	-0.313629	-0.346813
UY6	-0.247726	-0.282082	-0.268862	-0.270443	-0.308062
UY7	-0.209779	-0.250292	-0.238385	-0.239216	-0.276569

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.956	0
-0.682	300
-0.609	450
-0.396	1000
-0.293	1400
-0.231	1800
-0.190	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	4	14	15	11	2
EY1	8314	4986	5407	6459	4902
EY2	5891	2063	2114	2642	6360
EY3	1194	1843	1450	1595	2164
EY4	395	494	490	483	424
EY5	176	169	225	180	138
EY6	87	117	161	145	122

MIN	AVG	MAX
4902	6013	8314
2063	3814	6360
1194	1649	2164
395	457	494
138	178	225
87	117	161

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.688654	-0.660293	-0.618166	-0.613827	-0.613313
UY2	-0.594118	-0.524959	-0.485212	-0.497107	-0.511487
UY3	-0.539836	-0.462133	-0.422070	-0.439025	-0.459430
UY4	-0.404884	-0.335161	-0.298276	-0.317511	-0.328952
UY5	-0.346259	-0.283636	-0.251972	-0.269075	-0.270984
UY6	-0.305410	-0.247589	-0.221397	-0.236038	-0.230494
UY7	-0.272385	-0.218308	-0.197681	-0.209863	-0.198158

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.956	0
-0.682	300
-0.609	450
-0.396	1000
-0.293	1400
-0.231	1800
-0.190	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	4	11	13	2
EY1	3371	8314	5731	7271	4902
EY2	2266	5891	2649	2492	6360
EY3	2248	1194	1645	1365	2164
EY4	493	395	482	480	424
EY5	213	176	157	163	138
EY6	89	87	130	134	122

MIN	AVG	MAX
3371	5918	8314
2266	3932	6360
1194	1723	2248
395	454	493
138	170	213
87	112	134

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.703190	-0.688654	-0.656268	-0.634547	-0.613313
UY2	-0.561838	-0.594118	-0.534545	-0.515947	-0.511487
UY3	-0.501480	-0.539836	-0.474875	-0.455144	-0.459430
UY4	-0.376288	-0.404884	-0.348656	-0.328634	-0.328952
UY5	-0.324319	-0.346259	-0.297172	-0.278304	-0.270984
UY6	-0.287431	-0.305410	-0.261454	-0.243645	-0.230494
UY7	-0.256881	-0.272385	-0.232776	-0.215902	-0.198158

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.956	0
-0.682	300
-0.609	450
-0.396	1000
-0.293	1400
-0.231	1800
-0.190	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1506 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	4	15	13	11	16
EY1	8314	5076	4861	5731	5213
EY2	5891	2445	2418	2649	2106
EY3	1194	1723	1748	1625	1147
EY4	395	443	485	482	495
EY5	176	187	198	190	185
EY6	87	130	123	130	135

MIN	AVG	MAX
4861	5839	8314
2106	3102	5891
1147	1488	1748
395	460	495
176	187	198
87	121	135

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.908951	-0.896830	-0.883760	-0.860230	-0.877068
UY2	-0.784174	-0.724730	-0.715313	-0.700551	-0.691119
UY3	-0.712527	-0.642340	-0.636584	-0.622935	-0.603080
UY4	-0.534405	-0.470741	-0.473926	-0.461906	-0.435189
UY5	-0.457026	-0.402477	-0.408572	-0.397800	-0.372200
UY6	-0.403108	-0.356156	-0.363479	-0.353804	-0.329054
UY7	-0.359519	-0.319537	-0.327234	-0.318604	-0.294358

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-1.203	0
-0.869	300
-0.776	450
-0.508	1000
-0.377	1400
-0.298	1800
-0.247	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	4	12	11	2	5
EY1	8314	4459	5686	4902	2768
EY2	5891	2158	2642	6360	2270
EY3	1194	1840	1499	2164	2265
EY4	395	493	483	424	429
EY5	176	138	180	138	178
EY6	87	101	146	122	170

MIN	AVG	MAX
2768	5226	8314
2158	3864	6360
1194	1792	2265
395	445	493
138	162	180
87	125	170

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.908951	-0.882656	-0.825828	-0.809509	-0.806330
UY2	-0.784174	-0.698575	-0.663237	-0.675109	-0.606175
UY3	-0.712527	-0.613830	-0.583734	-0.606399	-0.523008
UY4	-0.534405	-0.437517	-0.418939	-0.434182	-0.348302
UY5	-0.457026	-0.362944	-0.354059	-0.357671	-0.278625
UY6	-0.403108	-0.309320	-0.310013	-0.304227	-0.232237
UY7	-0.359519	-0.264899	-0.275209	-0.261547	-0.196528

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-1.203	0
-0.869	300
-0.776	450
-0.508	1000
-0.377	1400
-0.298	1800
-0.247	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	12	4	14	11	15
EY1	3371	8314	2960	5731	2802
EY2	2266	5891	2155	2649	2109
EY3	2153	1194	1175	1608	1434
EY4	493	395	494	482	494
EY5	219	176	232	157	210
EY6	89	87	111	136	118

MIN	AVG	MAX
2802	4636	8314
2109	3014	5891
1175	1513	2153
395	471	494
157	199	232
87	108	136

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.923090	-0.908951	-0.906850	-0.852796	-0.874775
UY2	-0.735331	-0.784174	-0.685582	-0.691588	-0.653913
UY3	-0.654976	-0.712527	-0.590130	-0.612514	-0.560916
UY4	-0.489135	-0.534405	-0.408440	-0.445879	-0.381026
UY5	-0.420710	-0.457026	-0.340966	-0.378388	-0.312346
UY6	-0.372211	-0.403108	-0.294750	-0.331795	-0.265130
UY7	-0.332049	-0.359519	-0.257234	-0.294557	-0.226958

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-1.203	0
-0.869	300
-0.776	450
-0.508	1000
-0.377	1400
-0.298	1800
-0.247	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN							LOAD 1: 758 kPa							LOAD 2: 1141 kPa							LOAD 3: 1506 kPa						
DEPTH (mm)	DEPTH RATIO (z/r0)	4	12	9	11	1	AVG.	STRESS RATIO (p/p0)	14	8	1	6	16	AVG.	STRESS RATIO (p/p0)	4	15	13	11	16	AVG.	STRESS RATIO (p/p0)					
54	0.24	-0.750	-0.743	-0.739	-0.740	-0.738	-0.742	0.979	-1.125	-1.129	-1.129	-1.126	-1.127	-1.127	0.988	-1.467	-1.473	-1.475	-1.471	-1.468	-1.471	0.977					
91	0.40	-0.729	-0.699	-0.682	-0.687	-0.681	-0.696	0.918	-1.082	-1.099	-1.100	-1.085	-1.088	-1.091	0.956	-1.354	-1.382	-1.390	-1.374	-1.365	-1.373	0.912					
129	0.57	-0.685	-0.621	-0.588	-0.599	-0.588	-0.616	0.813	-0.996	-1.035	-1.035	-1.002	-1.009	-1.015	0.890	-1.169	-1.234	-1.248	-1.218	-1.204	-1.215	0.806					
168	0.75	-0.590	-0.505	-0.465	-0.479	-0.472	-0.502	0.662	-0.839	-0.897	-0.895	-0.850	-0.862	-0.869	0.761	-0.938	-1.054	-1.070	-1.033	-1.022	-1.023	0.680					
206	0.92	-0.455	-0.374	-0.338	-0.352	-0.357	-0.375	0.495	-0.640	-0.703	-0.699	-0.654	-0.676	-0.674	0.591	-0.709	-0.874	-0.890	-0.853	-0.850	-0.835	0.554					
245	1.09	-0.325	-0.261	-0.231	-0.245	-0.257	-0.264	0.348	-0.455	-0.512	-0.505	-0.467	-0.504	-0.489	0.428	-0.510	-0.701	-0.716	-0.681	-0.687	-0.659	0.438					
285	1.27	-0.236	-0.194	-0.170	-0.182	-0.194	-0.195	0.258	-0.331	-0.371	-0.365	-0.333	-0.392	-0.358	0.314	-0.386	-0.552	-0.566	-0.539	-0.556	-0.520	0.345					
325	1.44	-0.183	-0.159	-0.140	-0.150	-0.159	-0.158	0.209	-0.257	-0.278	-0.275	-0.247	-0.324	-0.276	0.242	-0.316	-0.432	-0.445	-0.428	-0.456	-0.415	0.276					
439	1.95	-0.141	-0.130	-0.116	-0.123	-0.130	-0.128	0.169	-0.199	-0.207	-0.205	-0.182	-0.267	-0.212	0.186	-0.258	-0.337	-0.348	-0.339	-0.373	-0.331	0.220					
627	2.79	-0.063	-0.057	-0.054	-0.057	-0.054	-0.057	0.075	-0.091	-0.093	-0.094	-0.085	-0.110	-0.095	0.083	-0.108	-0.131	-0.134	-0.130	-0.141	-0.129	0.085					
814	3.62	-0.041	-0.037	-0.037	-0.038	-0.034	-0.037	0.049	-0.061	-0.064	-0.065	-0.059	-0.068	-0.063	0.056	-0.067	-0.080	-0.080	-0.078	-0.083	-0.078	0.052					
1002	4.45	-0.028	-0.025	-0.026	-0.027	-0.022	-0.025	0.034	-0.043	-0.045	-0.046	-0.043	-0.043	-0.044	0.039	-0.043	-0.051	-0.051	-0.049	-0.052	-0.049	0.033					
1170	5.20	-0.021	-0.018	-0.020	-0.020	-0.016	-0.019	0.025	-0.032	-0.035	-0.035	-0.033	-0.030	-0.033	0.029	-0.031	-0.037	-0.036	-0.036	-0.037	-0.036	0.024					
1320	5.87	-0.017	-0.015	-0.016	-0.016	-0.013	-0.015	0.020	-0.025	-0.028	-0.029	-0.027	-0.023	-0.026	0.023	-0.025	-0.031	-0.030	-0.029	-0.030	-0.029	0.019					
1470	6.53	-0.014	-0.013	-0.013	-0.013	-0.010	-0.013	0.017	-0.020	-0.023	-0.023	-0.022	-0.018	-0.021	0.019	-0.021	-0.025	-0.025	-0.024	-0.025	-0.024	0.016					
1620	7.20	-0.012	-0.011	-0.011	-0.011	-0.009	-0.011	0.014	-0.016	-0.019	-0.019	-0.018	-0.014	-0.017	0.015	-0.017	-0.021	-0.021	-0.021	-0.021	-0.020	0.013					
2195	9.76	-0.007	-0.007	-0.007	-0.007	-0.006	-0.007	0.009	-0.010	-0.012	-0.012	-0.012	-0.009	-0.011	0.010	-0.011	-0.014	-0.013	-0.013	-0.014	-0.013	0.009					
3195	14.20	-0.004	-0.004	-0.004	-0.004	-0.003	-0.004	0.005	-0.006	-0.006	-0.006	-0.006	-0.005	-0.006	0.005	-0.007	-0.008	-0.007	-0.007	-0.008	-0.007	0.005					

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r0)	4	14	15	11	2	AVG.	STRESS RATIO (p/p0)	4	12	11	2	5	AVG.	STRESS RATIO (p/p0)
54	0.24	-0.744	-0.740	-0.739	-0.741	-0.739	-0.741	0.928	-1.111	-1.115	-1.113	-1.112	-1.123	-1.115	0.977
91	0.40	-0.707	-0.690	-0.685	-0.692	-0.684	-0.692	0.867	-1.026	-1.047	-1.038	-1.032	-1.074	-1.043	0.914
129	0.57	-0.644	-0.605	-0.597	-0.608	-0.596	-0.610	0.764	-0.886	-0.938	-0.919	-0.907	-0.982	-0.926	0.812
168	0.75	-0.552	-0.489	-0.490	-0.495	-0.491	-0.503	0.631	-0.711	-0.808	-0.783	-0.764	-0.834	-0.780	0.684
206	0.92	-0.442	-0.365	-0.385	-0.376	-0.388	-0.391	0.490	-0.537	-0.681	-0.652	-0.629	-0.655	-0.631	0.553
245	1.09	-0.336	-0.259	-0.291	-0.271	-0.295	-0.290	0.364	-0.386	-0.556	-0.527	-0.502	-0.486	-0.491	0.431
285	1.27	-0.256	-0.194	-0.224	-0.201	-0.229	-0.221	0.277	-0.293	-0.442	-0.421	-0.397	-0.363	-0.383	0.336
325	1.44	-0.199	-0.159	-0.179	-0.158	-0.184	-0.176	0.220	-0.240	-0.346	-0.336	-0.315	-0.280	-0.303	0.266
439	1.95	-0.154	-0.130	-0.142	-0.124	-0.148	-0.140	0.175	-0.196	-0.269	-0.268	-0.250	-0.214	-0.239	0.210
627	2.79	-0.063	-0.056	-0.058	-0.053	-0.059	-0.058	0.073	-0.082	-0.104	-0.107	-0.097	-0.086	-0.095	0.083
814	3.62	-0.039	-0.035	-0.036	-0.034	-0.036	-0.036	0.045	-0.051	-0.061	-0.066	-0.058	-0.052	-0.058	0.051
1002	4.45	-0.025	-0.023	-0.024	-0.023	-0.023	-0.024	0.030	-0.033	-0.038	-0.043	-0.037	-0.034	-0.037	0.032
1170	5.20	-0.018	-0.017	-0.017	-0.017	-0.017	-0.017	0.022	-0.024	-0.027	-0.031	-0.027	-0.025	-0.027	0.024
1320	5.87	-0.015	-0.014	-0.014	-0.014	-0.014	-0.014	0.018	-0.019	-0.022	-0.026	-0.023	-0.021	-0.022	0.019
1470	6.53	-0.012	-0.012	-0.012	-0.011	-0.011	-0.012	0.015	-0.016	-0.018	-0.021	-0.019	-0.018	-0.018	0.016
1620	7.20	-0.010	-0.010	-0.010	-0.009	-0.010	-0.010	0.012	-0.013	-0.015	-0.018	-0.016	-0.016	-0.016	0.014
2195	9.76	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006	0.008	-0.009	-0.010	-0.011	-0.011	-0.010	-0.010	0.009
3195	14.20	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.005	-0.006	-0.006	-0.006	-0.006	-0.006	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS LOAD 1: 758 kPa

LOAD 2: 1141 kPa

LOAD 3: 1506 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 758 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 1141 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 1506 kPa					AVG.	STRESS RATIO (p/po)
		16	4	14	10	11			12	4	11	13	2			12	4	14	11	15		
54	0.24	-0.739	-0.738	-0.740	-0.743	-0.739	-0.740	0.976	-1.124	-1.111	-1.115	-1.108	-1.123	-1.116	0.978	-1.483	-1.467	-1.481	-1.471	-1.483	-1.477	0.981
91	0.40	-0.685	-0.681	-0.687	-0.697	-0.687	-0.687	0.907	-1.079	-1.026	-1.041	-1.016	-1.074	-1.047	0.918	-1.423	-1.354	-1.413	-1.373	-1.422	-1.397	0.928
129	0.57	-0.603	-0.588	-0.606	-0.617	-0.603	-0.604	0.796	-0.995	-0.886	-0.922	-0.877	-0.982	-0.932	0.817	-1.311	-1.169	-1.291	-1.215	-1.309	-1.259	0.836
168	0.75	-0.513	-0.472	-0.516	-0.511	-0.509	-0.504	0.665	-0.873	-0.711	-0.782	-0.732	-0.834	-0.786	0.689	-1.149	-0.938	-1.118	-1.030	-1.144	-1.076	0.714
206	0.92	-0.429	-0.357	-0.432	-0.400	-0.419	-0.407	0.537	-0.738	-0.537	-0.645	-0.602	-0.655	-0.635	0.557	-0.970	-0.709	-0.930	-0.849	-0.961	-0.884	0.587
245	1.09	-0.348	-0.257	-0.351	-0.297	-0.334	-0.317	0.418	-0.603	-0.386	-0.514	-0.480	-0.486	-0.494	0.433	-0.792	-0.510	-0.751	-0.676	-0.782	-0.702	0.466
285	1.27	-0.275	-0.194	-0.278	-0.220	-0.264	-0.246	0.325	-0.477	-0.293	-0.406	-0.382	-0.363	-0.384	0.337	-0.627	-0.386	-0.606	-0.534	-0.628	-0.556	0.369
325	1.44	-0.215	-0.159	-0.217	-0.166	-0.209	-0.193	0.255	-0.367	-0.240	-0.321	-0.308	-0.280	-0.303	0.266	-0.484	-0.316	-0.494	-0.424	-0.503	-0.444	0.295
439	1.95	-0.166	-0.130	-0.168	-0.125	-0.166	-0.151	0.199	-0.279	-0.196	-0.253	-0.247	-0.214	-0.238	0.209	-0.370	-0.258	-0.402	-0.335	-0.402	-0.353	0.235
627	2.79	-0.063	-0.054	-0.062	-0.050	-0.065	-0.059	0.078	-0.107	-0.082	-0.097	-0.096	-0.086	-0.093	0.082	-0.142	-0.108	-0.158	-0.129	-0.157	-0.139	0.092
814	3.62	-0.037	-0.034	-0.036	-0.030	-0.039	-0.035	0.046	-0.063	-0.051	-0.058	-0.057	-0.052	-0.056	0.049	-0.084	-0.067	-0.095	-0.077	-0.093	-0.083	0.055
1002	4.45	-0.022	-0.022	-0.021	-0.019	-0.025	-0.022	0.029	-0.039	-0.033	-0.036	-0.036	-0.034	-0.035	0.031	-0.052	-0.043	-0.059	-0.048	-0.058	-0.052	0.034
1170	5.20	-0.015	-0.016	-0.015	-0.013	-0.018	-0.016	0.020	-0.027	-0.024	-0.026	-0.026	-0.025	-0.026	0.022	-0.036	-0.031	-0.041	-0.035	-0.041	-0.037	0.024
1320	5.87	-0.013	-0.013	-0.013	-0.011	-0.015	-0.013	0.017	-0.021	-0.019	-0.022	-0.022	-0.021	-0.021	0.019	-0.028	-0.025	-0.032	-0.029	-0.033	-0.030	0.020
1470	6.53	-0.010	-0.010	-0.011	-0.009	-0.012	-0.011	0.014	-0.017	-0.016	-0.019	-0.019	-0.018	-0.018	0.015	-0.022	-0.021	-0.026	-0.025	-0.026	-0.024	0.016
1620	7.20	-0.009	-0.009	-0.009	-0.008	-0.010	-0.009	0.012	-0.014	-0.013	-0.016	-0.016	-0.016	-0.015	0.013	-0.018	-0.017	-0.021	-0.021	-0.022	-0.020	0.013
2195	9.76	-0.006	-0.006	-0.006	-0.005	-0.007	-0.006	0.008	-0.009	-0.009	-0.010	-0.010	-0.010	-0.010	0.008	-0.012	-0.011	-0.013	-0.014	-0.014	-0.013	0.009
3195	14.20	-0.003	-0.003	-0.003	-0.003	-0.004	-0.003	0.005	-0.005	-0.005	-0.006	-0.006	-0.006	-0.006	0.005	-0.007	-0.007	-0.007	-0.008	-0.008	-0.007	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 788 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	4	16	14	10	3
EY1	2543	2517	2523	2517	2552
EY2	2057	2014	2024	5855	6136
EY3	30319	29274	26548	29401	48716
EY4	268	265	255	342	252
EY5	249	227	175	214	215
EY6	91	125	83	99	94

MIN	AVG	MAX
2517	2530	2552
2014	3617	6136
26548	32852	48716
252	277	342
175	216	249
83	98	125

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.356957	-0.352962	-0.348400	-0.365427	-0.386479
UY2	-0.290766	-0.285603	-0.280129	-0.317571	-0.342227
UY3	-0.275326	-0.269936	-0.263347	-0.306439	-0.333342
UY4	-0.232808	-0.228104	-0.215408	-0.267661	-0.301662
UY5	-0.203228	-0.199650	-0.181675	-0.240466	-0.278216
UY6	-0.177683	-0.175584	-0.152239	-0.216761	-0.257078
UY7	-0.154352	-0.154114	-0.125114	-0.194956	-0.237068

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.530	0
-0.376	300
-0.344	450
-0.238	1000
-0.188	1400
-0.157	1800
-0.127	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	6	4	3	15	7
EY1	5376	8290	8445	9492	8114
EY2	2328	5050	5202	2904	6756
EY3	25562	36939	42379	47155	25300
EY4	366	451	268	485	406
EY5	196	230	172	246	190
EY6	84	94	93	103	97

MIN	AVG	MAX
5376	7944	9492
2328	4448	6756
25300	35467	47155
268	395	485
172	207	246
84	94	103

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.389782	-0.356520	-0.348030	-0.334510	-0.332749
UY2	-0.340048	-0.328914	-0.320950	-0.301328	-0.305045
UY3	-0.324489	-0.319716	-0.311902	-0.290851	-0.294754
UY4	-0.283275	-0.291467	-0.282943	-0.264566	-0.261462
UY5	-0.255229	-0.271492	-0.261818	-0.246048	-0.238419
UY6	-0.230859	-0.253666	-0.242638	-0.229577	-0.218043
UY7	-0.208287	-0.236791	-0.224242	-0.213986	-0.198903

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.530	0
-0.376	300
-0.344	450
-0.238	1000
-0.188	1400
-0.157	1800
-0.127	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	6	7	3	11	4
EY1	5376	8114	8445	4612	8290
EY2	2328	6756	5202	4553	5050
EY3	25562	25300	42379	32385	36939
EY4	366	406	268	260	451
EY5	196	190	172	226	230
EY6	84	97	93	96	94

MIN	AVG	MAX
4612	6968	8445
2328	4778	6756
25300	32513	42379
260	350	451
172	203	230
84	93	97

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.389782	-0.332749	-0.348030	-0.318273	-0.356520
UY2	-0.340048	-0.305045	-0.320950	-0.281048	-0.328914
UY3	-0.324489	-0.294754	-0.311902	-0.270161	-0.319716
UY4	-0.283275	-0.261462	-0.282943	-0.234685	-0.291467
UY5	-0.255229	-0.238419	-0.261818	-0.209495	-0.271492
UY6	-0.230859	-0.218043	-0.242638	-0.187219	-0.253666
UY7	-0.208287	-0.198903	-0.224242	-0.166414	-0.236791

OBSERVED DEF.(mm)	SENSOR DISTANCE(mm)
-0.530	0
-0.376	300
-0.344	450
-0.238	1000
-0.188	1400
-0.157	1800
-0.127	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1182 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	14	7	5	15
EY1	2550	2687	3361	2638	2517
EY2	2055	2902	2058	2186	2330
EY3	25531	25456	30978	27233	28761
EY4	251	251	316	251	251
EY5	183	172	154	249	133
EY6	90	87	88	113	93

MIN	AVG	MAX
2517	2750	3361
2055	2306	2902
25456	27592	30978
251	264	316
133	178	249
87	94	113

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.549869	-0.547548	-0.537995	-0.528222	-0.595721
UY2	-0.441201	-0.453531	-0.444933	-0.426086	-0.492116
UY3	-0.413586	-0.428846	-0.420563	-0.401070	-0.466174
UY4	-0.339006	-0.355743	-0.355733	-0.334601	-0.392833
UY5	-0.288145	-0.305458	-0.310107	-0.290201	-0.341621
UY6	-0.244484	-0.261918	-0.270001	-0.252831	-0.296995
UY7	-0.204764	-0.221990	-0.232677	-0.219495	-0.255939

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.745	0
-0.526	300
-0.483	450
-0.337	1000
-0.265	1400
-0.221	1800
-0.179	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	15	6	4	3
EY1	4110	6363	5376	8290	8445
EY2	2248	2895	2328	5050	5202
EY3	38427	46127	25562	36939	42379
EY4	277	329	366	451	268
EY5	248	244	196	230	172
EY6	81	83	84	94	93

MIN	AVG	MAX
4110	6517	8445
2248	3545	5202
25562	37887	46127
268	338	451
172	218	248
81	87	94

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.641426	-0.621795	-0.584673	-0.534780	-0.522045
UY2	-0.565143	-0.565090	-0.510072	-0.493372	-0.481424
UY3	-0.545176	-0.548462	-0.486734	-0.479574	-0.467853
UY4	-0.491920	-0.504147	-0.424913	-0.437201	-0.424414
UY5	-0.453786	-0.472252	-0.382844	-0.407238	-0.392727
UY6	-0.419971	-0.443619	-0.346289	-0.380500	-0.363957
UY7	-0.388264	-0.416409	-0.312430	-0.355187	-0.336363

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.745	0
-0.526	300
-0.483	450
-0.337	1000
-0.265	1400
-0.221	1800
-0.179	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	11	15	7	14
EY1	5376	4612	2998	8114	8533
EY2	2328	4553	6635	6756	2770
EY3	25562	32385	44791	25300	44823
EY4	366	260	253	406	253
EY5	196	226	243	190	244
EY6	84	96	84	97	86

MIN	AVG	MAX
2998	5927	8533
2328	4608	6756
25300	34572	44823
253	308	406
190	220	244
84	89	97

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.584673	-0.477410	-0.475709	-0.499123	-0.534873
UY2	-0.510072	-0.421571	-0.411482	-0.457568	-0.481304
UY3	-0.486734	-0.405241	-0.396820	-0.442132	-0.464319
UY4	-0.424913	-0.352027	-0.347082	-0.392193	-0.419836
UY5	-0.382844	-0.314243	-0.311020	-0.357628	-0.387910
UY6	-0.346289	-0.280828	-0.278667	-0.327065	-0.359237
UY7	-0.312430	-0.249621	-0.248034	-0.298354	-0.331909

OBSERVED DEF. (mm)	SENSOR DISTANCE (mm)
-0.745	0
-0.526	300
-0.483	450
-0.337	1000
-0.265	1400
-0.221	1800
-0.179	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1463 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	15	14	11	2
EY1	3617	3902	4019	4532	4736
EY2	5559	4835	4628	7182	7091
EY3	25601	30400	25506	30316	32999
EY4	275	267	321	310	323
EY5	136	148	140	131	132
EY6	120	111	141	155	139

MIN	AVG	MAX
3617	4161	4736
4628	5859	7182
25506	28964	32999
267	299	323
131	137	148
111	133	155

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.591060	-0.585710	-0.610703	-0.535707	-0.586245
UY2	-0.515281	-0.511116	-0.533556	-0.474967	-0.527432
UY3	-0.493390	-0.489641	-0.510861	-0.456870	-0.509990
UY4	-0.417618	-0.417893	-0.437064	-0.393074	-0.448437
UY5	-0.364495	-0.367032	-0.386467	-0.348075	-0.404518
UY6	-0.318116	-0.322198	-0.342983	-0.308647	-0.365670
UY7	-0.275470	-0.280559	-0.303586	-0.272323	-0.329528

OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
-0.866	0
-0.622	300
-0.574	450
-0.404	1000
-0.320	1400
-0.269	1800
-0.219	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	11	6	13	4
EY1	2875	3845	5376	7399	8290
EY2	4191	4392	2328	6635	5050
EY3	47771	41241	25562	37002	36939
EY4	260	294	366	261	451
EY5	211	244	196	219	230
EY6	81	83	84	81	94

MIN	AVG	MAX
2875	5557	8290
2328	4519	6635
25562	37703	47771
260	326	451
196	220	244
81	85	94

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.769183	-0.760731	-0.723669	-0.678713	-0.661914
UY2	-0.683910	-0.687086	-0.631333	-0.630460	-0.610662
UY3	-0.665450	-0.668360	-0.602446	-0.614120	-0.593585
UY4	-0.604652	-0.607405	-0.525928	-0.557653	-0.541138
UY5	-0.559553	-0.563152	-0.473858	-0.516424	-0.504052
UY6	-0.518744	-0.523537	-0.428613	-0.479014	-0.470957
UY7	-0.479915	-0.486141	-0.386705	-0.443181	-0.439626

OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
-0.866	0
-0.622	300
-0.574	450
-0.404	1000
-0.320	1400
-0.269	1800
-0.219	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	6	15	7	5
EY1	4612	5376	2998	8114	5258
EY2	4553	2328	6635	6756	2121
EY3	32385	25562	44791	25300	36329
EY4	260	366	253	406	461
EY5	226	196	243	190	168
EY6	96	84	84	97	154

MIN	AVG	MAX
2998	5272	8114
2121	4478	6756
25300	32873	44791
260	349	461
168	205	243
84	103	154

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.590905	-0.723669	-0.588821	-0.617781	-0.561168
UY2	-0.521793	-0.631333	-0.509319	-0.566346	-0.471559
UY3	-0.501580	-0.602446	-0.491167	-0.547241	-0.446475
UY4	-0.435715	-0.525928	-0.429599	-0.485430	-0.386040
UY5	-0.388949	-0.473858	-0.384961	-0.442648	-0.344547
UY6	-0.347590	-0.428613	-0.344916	-0.404819	-0.308767
UY7	-0.308964	-0.386705	-0.307000	-0.369283	-0.276110

OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
-0.866	0
-0.622	300
-0.574	450
-0.404	1000
-0.320	1400
-0.269	1800
-0.219	2250



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIO LOAD 1: 788 kPa

LOAD 2: 1182 kPa

LOAD 3: 1463 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 788 kPa					AVG.	LOAD 2: 1182 kPa					AVG.	LOAD 3: 1463 kPa					AVG.	STRESS RATIO (p/po)	
		6	7	3	11	4		6	11	15	7	14		11	6	15	7	5			
54	0.24	-0.784	-0.784	-0.785	-0.787	-0.785	0.996	-1.175	-1.180	-1.181	-1.176	-1.174	-1.177	0.996	-1.460	-1.455	-1.462	-1.456	-1.456	-1.458	0.996
91	0.40	-0.779	-0.779	-0.784	-0.790	-0.782	0.994	-1.169	-1.185	-1.194	-1.169	-1.164	-1.176	0.995	-1.467	-1.447	-1.477	-1.447	-1.450	-1.458	0.996
122	0.57	-0.765	-0.762	-0.774	-0.784	-0.768	0.978	-1.148	-1.176	-1.200	-1.143	-1.140	-1.161	0.983	-1.456	-1.421	-1.485	-1.415	-1.426	-1.441	0.985
168	0.75	-0.737	-0.724	-0.744	-0.758	-0.735	0.938	-1.105	-1.137	-1.176	-1.086	-1.097	-1.120	0.948	-1.407	-1.368	-1.455	-1.344	-1.376	-1.390	0.950
206	0.92	-0.701	-0.675	-0.706	-0.719	-0.694	0.887	-1.052	-1.078	-1.128	-1.012	-1.048	-1.063	0.900	-1.335	-1.302	-1.396	-1.253	-1.313	-1.320	0.902
245	1.09	-0.661	-0.620	-0.662	-0.674	-0.648	0.829	-0.992	-1.011	-1.067	-0.930	-0.993	-0.999	0.845	-1.251	-1.228	-1.320	-1.152	-1.245	-1.239	0.847
285	1.27	-0.440	-0.402	-0.434	-0.442	-0.424	0.544	-0.660	-0.663	-0.708	-0.603	-0.660	-0.659	0.557	-0.820	-0.817	-0.876	-0.747	-0.833	-0.819	0.560
325	1.44	-0.144	-0.127	-0.130	-0.136	-0.133	0.170	-0.216	-0.205	-0.221	-0.190	-0.202	-0.207	0.175	-0.253	-0.267	-0.273	-0.236	-0.271	-0.260	0.178
439	1.95	-0.029	-0.026	-0.018	-0.023	-0.025	0.031	-0.044	-0.035	-0.032	-0.039	-0.029	-0.036	0.030	-0.044	-0.055	-0.040	-0.048	-0.053	-0.048	0.033
627	2.79	-0.018	-0.016	-0.013	-0.016	-0.015	0.020	-0.035	-0.029	-0.027	-0.030	-0.025	-0.029	0.024	-0.036	-0.043	-0.033	-0.037	-0.041	-0.038	0.026
814	3.62	-0.014	-0.012	-0.010	-0.013	-0.012	0.015	-0.027	-0.024	-0.022	-0.023	-0.021	-0.023	0.020	-0.030	-0.033	-0.027	-0.029	-0.032	-0.030	0.021
1002	4.45	-0.010	-0.009	-0.008	-0.010	-0.009	0.012	-0.021	-0.019	-0.018	-0.018	-0.017	-0.019	0.016	-0.024	-0.026	-0.022	-0.023	-0.026	-0.024	0.016
1170	5.20	-0.008	-0.008	-0.007	-0.008	-0.007	0.010	-0.016	-0.015	-0.014	-0.014	-0.013	-0.014	0.012	-0.019	-0.019	-0.017	-0.018	-0.021	-0.019	0.013
1320	5.87	-0.006	-0.005	-0.005	-0.006	-0.005	0.007	-0.012	-0.012	-0.011	-0.011	-0.010	-0.011	0.010	-0.015	-0.015	-0.013	-0.014	-0.018	-0.015	0.010
1470	6.53	-0.004	-0.003	-0.003	-0.004	-0.003	0.004	-0.008	-0.008	-0.008	-0.008	-0.007	-0.008	0.007	-0.010	-0.010	-0.009	-0.010	-0.012	-0.010	0.007

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 685 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	7	1	4	8	MIN	AVG	MAX
EY1	9277	9804	9179	7635	8640	7635	8907	9804
EY2	3777	2262	2877	4076	4574	2262	3513	4574
EY3	2981	2978	2925	2155	2950	2155	2798	2981
EY4	251	251	255	302	254	251	263	302
EX4	736	729	678	403	658	403	641	736
EY5	205	151	235	247	237	151	215	247
EX5	263	144	535	391	453	144	357	535
EY6	183	197	190	198	179	179	189	198
EX6	234	187	431	313	343	187	302	431
R4	2.93	2.90	2.66	1.34	2.59	1.34	2.48	2.93
R5	1.28	0.95	2.28	1.59	1.91	0.95	1.60	2.28
R6	0.56	1.04	0.70	0.55	0.79	0.55	0.73	1.04

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.291409	-0.301072	-0.288423	-0.302298	-0.295518	-0.266	0
UY2	-0.250449	-0.257432	-0.244728	-0.255022	-0.254147	-0.240	300
UY3	-0.227296	-0.232150	-0.220049	-0.229057	-0.231195	-0.226	450
UY4	-0.164126	-0.164528	-0.155869	-0.161547	-0.168847	-0.172	1000
UY5	-0.134343	-0.132820	-0.127564	-0.132200	-0.140064	-0.137	1400
UY6	-0.114015	-0.110893	-0.109231	-0.113382	-0.120967	-0.109	1800
UY7	-0.098699	-0.094096	-0.096108	-0.099922	-0.107031	-0.085	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	5	11	4	9	MIN	AVG	MAX
EY1	9763	7787	3989	7880	9162	3989	7716	9763
EY2	2332	4765	2213	4193	2528	2213	3206	4765
EY3	1976	2386	2741	2497	1843	1843	2289	2741
EY4	356	475	431	466	352	352	416	475
EX4	981	1055	884	818	247	247	797	1055
EY5	148	142	195	131	241	131	171	241
EX5	213	206	373	102	485	102	276	485
EY6	199	163	200	155	170	155	177	200
EX6	287	236	383	121	343	121	274	383
R4	2.76	2.22	2.05	1.75	0.70	0.70	1.90	2.76
R5	1.44	1.45	1.92	0.78	2.01	0.78	1.52	2.01
R6	2.26	2.21	1.98	1.03	1.68	1.03	1.83	2.26

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.260387	-0.272139	-0.257545	-0.281470	-0.287958	-0.266	0
UY2	-0.218148	-0.230294	-0.190745	-0.240230	-0.239996	-0.240	300
UY3	-0.194199	-0.208881	-0.161946	-0.218541	-0.211760	-0.226	450
UY4	-0.133646	-0.155272	-0.100875	-0.161300	-0.138557	-0.172	1000
UY5	-0.106988	-0.130724	-0.076318	-0.133415	-0.107618	-0.137	1400
UY6	-0.088874	-0.113257	-0.060027	-0.112813	-0.088122	-0.109	1800
UY7	-0.074962	-0.099159	-0.047606	-0.095720	-0.074293	-0.085	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 685 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	4	5	6	12	11	MIN	AVG	MAX
EY1	7880	7787	6939	9556	9835	6939	8399	9835
EY2	4193	4765	2906	2083	2030	2030	3195	4765
EY3	2497	2386	2960	2543	2946	2386	2666	2960
EY4	466	475	434	447	464	434	487	475
EX4	818	1055	450	1239	719	450	856	1239
EY5	131	142	236	174	134	131	163	236
EX5	102	206	445	224	289	102	253	445
EY6	155	163	152	200	200	152	174	200
EX6	121	236	286	258	432	121	267	432
R4	1.75	2.22	1.04	2.77	1.55	1.04	1.87	2.77
R5	0.78	1.45	1.89	1.29	2.16	0.78	1.51	2.16
R6	1.03	2.21	1.51	1.09	1.47	1.03	1.46	2.21

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.281470	-0.272139	-0.300358	-0.261208	-0.266535	-0.266	0
UY2	-0.240230	-0.230294	-0.251785	-0.220388	-0.224058	-0.240	300
UY3	-0.218541	-0.208881	-0.226679	-0.198513	-0.200499	-0.226	450
UY4	-0.161300	-0.155272	-0.164893	-0.146688	-0.142851	-0.172	1000
UY5	-0.133415	-0.130724	-0.138085	-0.124418	-0.117745	-0.137	1400
UY6	-0.112813	-0.113257	-0.120174	-0.108999	-0.100617	-0.109	1800
UY7	-0.095720	-0.099159	-0.106586	-0.096800	-0.087440	-0.085	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**  
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**REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 1130 kPa**

**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	13	11	15	5	14	MIN	AVG	MAX
EY1	9254	3994	9884	7787	9497	3994	8083	9884
EY2	2110	2226	2128	4765	2086	2086	2663	4765
EY3	1105	2741	2209	2386	1335	1105	1955	2741
EY4	384	432	382	475	380	380	410	475
EX4	960	884	1107	1055	1006	884	1002	1107
EY5	194	195	142	142	177	142	170	195
EX5	291	373	279	206	298	206	289	373
EY6	199	200	200	163	200	163	192	200
EX6	300	383	393	236	337	236	330	393
R4	2.50	2.05	2.90	2.22	2.65	2.05	2.46	2.90
R5	1.50	1.92	1.97	1.45	1.69	1.45	1.70	1.97
R6	0.83	1.98	0.54	2.21	0.71	0.54	1.25	2.21

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.435477	-0.424491	-0.436699	-0.448930	-0.456789	-0.430	0
UY2	-0.358249	-0.314473	-0.367364	-0.379901	-0.381808	-0.387	300
UY3	-0.314406	-0.267035	-0.328534	-0.344577	-0.339320	-0.367	614
UY4	-0.208670	-0.166360	-0.232534	-0.256142	-0.236224	-0.280	914
UY5	-0.165703	-0.125858	-0.191019	-0.215646	-0.193754	-0.233	1219
UY6	-0.137772	-0.098989	-0.163036	-0.186832	-0.165999	-0.180	1524
UY7	-0.116863	-0.078501	-0.141684	-0.163576	-0.145227	-0.141	1829

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**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	4	5	12	11	6	MIN	AVG	MAX
EY1	7880	7787	6799	9835	6939	6799	7848	9835
EY2	4193	4765	2083	2030	2906	2030	3195	4765
EY3	2497	2386	2538	2946	2960	2386	2665	2960
EY4	466	475	429	465	434	429	454	475
EX4	818	1055	993	695	450	450	802	1055
EY5	131	142	143	134	236	131	157	236
EX5	102	206	185	289	445	102	245	445
EY6	155	163	200	200	152	152	174	200
EX6	121	236	258	432	286	121	267	432
R4	1.75	2.22	2.32	1.49	1.04	1.04	1.76	2.32
R5	0.78	1.45	1.29	2.16	1.89	0.78	1.51	2.16
R6	1.03	2.21	1.09	1.47	1.51	1.03	1.46	2.21

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.464324	-0.448930	-0.479104	-0.429713	-0.495482	-0.430	0
UY2	-0.396292	-0.379901	-0.394821	-0.361545	-0.415354	-0.387	300
UY3	-0.360513	-0.344577	-0.352043	-0.323921	-0.373938	-0.367	614
UY4	-0.266087	-0.256142	-0.252988	-0.232128	-0.272013	-0.280	914
UY5	-0.220086	-0.215646	-0.210699	-0.192036	-0.227790	-0.233	1219
UY6	-0.186100	-0.186832	-0.181610	-0.164461	-0.198244	-0.180	1524
UY7	-0.157904	-0.163576	-0.158827	-0.143054	-0.175827	-0.141	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 1483 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	5	13	11	15	MIN	AVG	MAX
EY1	7880	7787	9440	9421	9913	7787	8888	9913
EY2	4193	4765	2042	2094	3684	2042	3356	4765
EY3	2497	2386	2146	2741	2558	2146	2466	2741
EY4	466	475	446	255	481	255	425	481
EX4	818	1055	1292	721	542	542	886	1292
EY5	131	142	235	151	245	131	181	245
EX5	102	206	253	220	348	102	226	348
EY6	155	163	168	200	190	155	175	200
EX6	121	236	181	291	269	121	220	291
R4	1.75	2.22	2.90	2.83	1.13	1.13	2.16	2.90
R5	0.78	1.45	1.08	1.46	1.42	0.78	1.24	1.46
R6	1.03	2.21	2.44	1.02	2.48	1.02	1.84	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.609373	-0.589170	-0.583746	-0.631265	-0.562497	-0.547	0
UY2	-0.520089	-0.498579	-0.490985	-0.533081	-0.479004	-0.495	300
UY3	-0.473133	-0.452219	-0.440847	-0.475863	-0.432851	-0.471	614
UY4	-0.349210	-0.336158	-0.322919	-0.324621	-0.314644	-0.357	914
UY5	-0.288839	-0.283012	-0.273016	-0.255959	-0.262120	-0.285	1219
UY6	-0.244235	-0.245197	-0.238572	-0.210085	-0.226622	-0.229	1524
UY7	-0.207231	-0.214675	-0.211139	-0.176342	-0.199539	-0.180	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	12	1	13	5	MIN	AVG	MAX
EY1	9945	9520	8854	9924	7787	7787	9206	9945
EY2	2030	2089	4515	2035	4765	2030	3087	4765
EY3	1614	2274	1776	1581	2386	1581	1926	2386
EY4	378	379	423	379	475	378	407	475
EX4	976	1042	1108	1062	1055	976	1049	1108
EY5	132	145	195	132	142	132	149	195
EX5	274	298	99	273	206	99	230	298
EY6	172	200	154	200	163	154	178	200
EX6	356	412	78	412	236	78	299	412
R4	2.58	2.75	2.62	2.80	2.22	2.22	2.60	2.80
R5	2.07	2.06	0.51	2.06	1.45	0.51	1.63	2.07
R6	0.53	0.73	1.44	0.54	2.21			

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.541949	-0.525423	-0.523896	-0.522071	-0.589170	-0.547	0
UY2	-0.447526	-0.432577	-0.434263	-0.427939	-0.498579	-0.495	300
UY3	-0.394206	-0.381586	-0.384994	-0.375052	-0.452219	-0.471	614
UY4	-0.263487	-0.257881	-0.255728	-0.246761	-0.336158	-0.357	914
UY5	-0.207333	-0.204766	-0.194341	-0.192515	-0.283012	-0.285	1219
UY6	-0.169012	-0.168784	-0.149579	-0.155950	-0.245197	-0.229	1524
UY7	-0.139154	-0.141101	-0.112545	-0.127805	-0.214675	-0.180	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 5 + 510 R: LOAD 1483 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	5	4	12	14	11	MIN	AVG	MAX
EY1	7787	7880	9130	9429	9852	7787	8815	9852
EY2	4765	4193	2077	2054	2027	2027	3023	4765
EY3	2386	2497	2615	2529	2895	2386	2585	2895
EY4	475	466	452	460	458	452	462	475
EX4	1055	818	1262	1316	961	818	1082	1316
EY5	142	131	174	193	134	131	155	193
EX5	206	102	283	354	303	102	250	354
EY6	163	155	200	200	200	155	183	200
EX6	236	121	326	367	453	121	301	453
R4	2.22	1.75	2.79	2.86	2.10	1.75	2.35	2.86
R5	1.45	0.78	1.63	1.84	2.27	0.78	1.59	2.27
R6	2.21	1.03	1.32	1.59	1.45	1.03	1.52	2.21
						-0.212	614	

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	OBSERVED DEF.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.589170	-0.609373	-0.556700	-0.547837	-0.548488	-0.547	0
UY2	-0.498579	-0.520089	-0.464885	-0.457411	-0.460203	-0.495	300
UY3	-0.452219	-0.473133	-0.416150	-0.409355	-0.411916	-0.471	614
UY4	-0.336158	-0.349210	-0.302672	-0.298774	-0.295580	-0.357	914
UY5	-0.283012	-0.288839	-0.254919	-0.253095	-0.245256	-0.285	1219
UY6	-0.245197	-0.244235	-0.222299	-0.222198	-0.210664	-0.229	1524
UY7	-0.214675	-0.207231	-0.196779	-0.198172	-0.183699	-0.180	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 685 kPa

LOAD 2: 1130 kPa

LOAD 3: 1483 kPa

DEPTH (mm)	DEPTH RATIO (z/r0)	15	7	1	4	8	AVG.	STRESS RATIO (p/p0)	AVG.	STRESS RATIO (p/p0)	4	5	13	11	15	AVG.	STRESS RATIO (p/p0)
19	0.13	-0.665	-0.663	-0.664	-0.666	-0.667	-0.665	0.971			-1.446	-1.446	-1.435	-1.434	-1.439	-1.440	0.971
57	0.38	-0.622	-0.611	-0.616	-0.625	-0.627	-0.620	0.906			-1.365	-1.367	-1.325	-1.319	-1.342	-1.343	0.906
95	0.63	-0.553	-0.532	-0.541	-0.558	-0.562	-0.549	0.802			-1.229	-1.235	-1.155	-1.140	-1.186	-1.189	0.802
133	0.89	-0.456	-0.427	-0.440	-0.463	-0.469	-0.451	0.658			-1.034	-1.044	-0.933	-0.908	-0.972	-0.978	0.659
171	1.14	-0.351	-0.321	-0.335	-0.358	-0.365	-0.346	0.505			-0.818	-0.830	-0.713	-0.679	-0.745	-0.757	0.510
205	1.37	-0.273	-0.251	-0.261	-0.276	-0.283	-0.269	0.392			-0.647	-0.658	-0.572	-0.533	-0.580	-0.598	0.403
235	1.57	-0.221	-0.211	-0.217	-0.219	-0.226	-0.219	0.319			-0.525	-0.535	-0.496	-0.453	-0.476	-0.497	0.335
265	1.77	-0.175	-0.174	-0.177	-0.171	-0.176	-0.174	0.255			-0.418	-0.429	-0.425	-0.380	-0.384	-0.407	0.275
300	2.00	-0.133	-0.135	-0.137	-0.131	-0.132	-0.134	0.195			-0.326	-0.339	-0.352	-0.304	-0.302	-0.324	0.219
340	2.27	-0.063	-0.064	-0.068	-0.070	-0.065	-0.066	0.096			-0.166	-0.180	-0.199	-0.170	-0.165	-0.176	0.119
440	2.93	-0.042	-0.041	-0.047	-0.047	-0.044	-0.044	0.065			-0.099	-0.110	-0.128	-0.125	-0.108	-0.114	0.077
600	4.00	-0.030	-0.029	-0.035	-0.034	-0.033	-0.032	0.047			-0.061	-0.070	-0.084	-0.092	-0.074	-0.077	0.052
760	5.07	-0.023	-0.021	-0.027	-0.026	-0.025	-0.024	0.036			-0.038	-0.046	-0.055	-0.069	-0.055	-0.053	0.035
920	6.13	-0.018	-0.016	-0.022	-0.021	-0.021	-0.020	0.029			-0.028	-0.034	-0.038	-0.053	-0.045	-0.040	0.027
1163	7.75	-0.016	-0.014	-0.019	-0.018	-0.018	-0.017	0.025			-0.025	-0.030	-0.032	-0.046	-0.039	-0.034	0.023
1288	8.59	-0.014	-0.013	-0.017	-0.016	-0.015	-0.015	0.022			-0.022	-0.027	-0.027	-0.041	-0.034	-0.030	0.020
1413	9.42	-0.012	-0.011	-0.015	-0.014	-0.013	-0.013	0.019			-0.020	-0.024	-0.023	-0.037	-0.030	-0.027	0.018
2000	13.33	-0.008	-0.007	-0.009	-0.009	-0.009	-0.008	0.012			-0.013	-0.016	-0.015	-0.021	-0.017	-0.017	0.011
3000	20.00	-0.003	-0.003	-0.004	-0.003	-0.003	-0.003	0.005			-0.005	-0.007	-0.006	-0.007	-0.006	-0.006	0.004

NO COMPUTATIONS

MAXIMUM DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r0)						AVG.	STRESS RATIO (p/p0)	13	11	15	14	AVG.	STRESS RATIO (p/p0)	14	12	1	13	5	AVG.	STRESS RATIO (p/p0)
19	0.13	-0.675	-0.674	-0.674	-0.673	-0.673	-0.674	0.984	-1.091	-1.106	-1.093	-1.091	-1.097	0.971	-1.432	-1.435	-1.441	-1.432	-1.446	-1.437	0.969
57	0.38	-0.634	-0.629	-0.630	-0.627	-0.627	-0.630	0.919	-1.001	-1.058	-1.007	-1.002	-1.022	0.904	-1.316	-1.325	-1.349	-1.316	-1.367	-1.334	0.900
95	0.63	-0.567	-0.558	-0.559	-0.554	-0.553	-0.558	0.815	-0.862	-0.975	-0.874	-0.864	-0.903	0.799	-1.136	-1.155	-1.199	-1.137	-1.235	-1.172	0.790
133	0.89	-0.473	-0.460	-0.462	-0.454	-0.452	-0.460	0.672	-0.683	-0.848	-0.701	-0.687	-0.743	0.657	-0.904	-0.932	-0.989	-0.905	-1.044	-0.955	0.644
171	1.14	-0.369	-0.357	-0.358	-0.350	-0.348	-0.356	0.520	-0.508	-0.704	-0.530	-0.513	-0.577	0.511	-0.676	-0.708	-0.764	-0.677	-0.830	-0.731	0.493
205	1.37	-0.289	-0.281	-0.282	-0.275	-0.273	-0.280	0.409	-0.396	-0.586	-0.421	-0.402	-0.461	0.408	-0.530	-0.563	-0.593	-0.532	-0.658	-0.575	0.388
235	1.57	-0.235	-0.232	-0.234	-0.228	-0.226	-0.231	0.337	-0.338	-0.499	-0.362	-0.345	-0.390	0.345	-0.453	-0.482	-0.481	-0.456	-0.535	-0.481	0.325
265	1.77	-0.187	-0.188	-0.191	-0.186	-0.184	-0.187	0.273	-0.287	-0.419	-0.308	-0.293	-0.327	0.289	-0.383	-0.407	-0.386	-0.385	-0.429	-0.398	0.268
300	2.00	-0.144	-0.148	-0.148	-0.147	-0.144	-0.146	0.213	-0.243	-0.333	-0.254	-0.247	-0.267	0.236	-0.315	-0.330	-0.312	-0.318	-0.339	-0.323	0.218
340	2.27	-0.071	-0.074	-0.075	-0.077	-0.074	-0.074	0.109	-0.157	-0.166	-0.150	-0.156	-0.153	0.136	-0.172	-0.172	-0.183	-0.174	-0.180	-0.176	0.119
440	2.93	-0.044	-0.047	-0.051	-0.049	-0.049	-0.048	0.070	-0.107	-0.101	-0.103	-0.108	-0.101	0.089	-0.107	-0.108	-0.117	-0.109	-0.110	-0.110	0.074
600	4.00	-0.030	-0.031	-0.037	-0.034	-0.035	-0.033	0.048	-0.074	-0.067	-0.071	-0.075	-0.068	0.060	-0.072	-0.073	-0.073	-0.073	-0.070	-0.072	0.049
760	5.07	-0.020	-0.021	-0.028	-0.024	-0.025	-0.024	0.035	-0.051	-0.047	-0.048	-0.052	-0.047	0.041	-0.053	-0.054	-0.043	-0.053	-0.046	-0.050	0.033
920	6.13	-0.016	-0.016	-0.023	-0.019	-0.020	-0.019	0.027	-0.036	-0.037	-0.034	-0.036	-0.034	0.030	-0.045	-0.045	-0.026	-0.045	-0.034	-0.039	0.026
1163	7.75	-0.014	-0.014	-0.020	-0.017	-0.018	-0.016	0.024	-0.030	-0.033	-0.029	-0.031	-0.029	0.026	-0.042	-0.041	-0.022	-0.041	-0.030	-0.035	0.024
1288	8.59	-0.012	-0.013	-0.017	-0.014	-0.015	-0.014	0.021	-0.026	-0.029	-0.026	-0.027	-0.026	0.023	-0.038	-0.038	-0.019	-0.038	-0.027	-0.032	0.021
1413	9.42	-0.011	-0.011	-0.015	-0.013	-0.014	-0.013	0.018	-0.023	-0.026	-0.023	-0.023	-0.023	0.020	-0.035	-0.034	-0.016	-0.035	-0.024	-0.029	0.019
2000	13.33	-0.007	-0.008	-0.009	-0.008	-0.009	-0.008	0.012	-0.016	-0.020	-0.015	-0.015	-0.016	0.014	-0.023	-0.023	-0.009	-0.024	-0.016	-0.019	0.013
3000	20.00	-0.003	-0.003	-0.004	-0.003	-0.004	-0.003	0.005	-0.006	-0.009	-0.006	-0.006	-0.006	0.006	-0.010	-0.010	-0.003	-0.010	-0.007	-0.008	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 510 R

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	STRESS										STRESS									
		4	5	6	12	11	AVG.	RATIO (p/p <sub>0</sub> )	4	5	12	6	AVG.	RATIO (p/p <sub>0</sub> )	5	4	12	14	11	AVG.	RATIO (p/p <sub>0</sub> )
19	0.13	-0.668	-0.668	-0.667	-0.663	-0.662	-0.666	0.972	-1.102	-1.102	-1.098	-1.100	-1.099	0.972	-1.446	-1.446	-1.436	-1.436	-1.435	-1.440	0.971
57	0.38	-0.630	-0.631	-0.627	-0.614	-0.610	-0.623	0.909	-1.040	-1.041	-1.027	-1.035	-1.030	0.912	-1.367	-1.365	-1.330	-1.327	-1.323	-1.342	0.905
95	0.63	-0.568	-0.570	-0.563	-0.536	-0.529	-0.553	0.808	-0.936	-0.941	-0.913	-0.928	-0.918	0.812	-1.235	-1.229	-1.163	-1.159	-1.148	-1.187	0.800
133	0.89	-0.477	-0.482	-0.471	-0.434	-0.425	-0.458	0.668	-0.788	-0.795	-0.758	-0.777	-0.763	0.675	-1.044	-1.034	-0.945	-0.939	-0.922	-0.977	0.659
171	1.14	-0.378	-0.383	-0.372	-0.333	-0.321	-0.357	0.522	-0.623	-0.632	-0.597	-0.613	-0.599	0.530	-0.830	-0.818	-0.727	-0.721	-0.701	-0.759	0.512
205	1.37	-0.299	-0.304	-0.296	-0.267	-0.256	-0.284	0.415	-0.493	-0.501	-0.485	-0.488	-0.478	0.423	-0.658	-0.647	-0.587	-0.581	-0.561	-0.607	0.409
235	1.57	-0.242	-0.247	-0.245	-0.230	-0.221	-0.237	0.346	-0.400	-0.408	-0.417	-0.404	-0.398	0.352	-0.535	-0.525	-0.509	-0.505	-0.486	-0.512	0.345
265	1.77	-0.193	-0.198	-0.199	-0.196	-0.188	-0.195	0.285	-0.319	-0.327	-0.354	-0.329	-0.327	0.290	-0.429	-0.418	-0.436	-0.434	-0.416	-0.427	0.288
300	2.00	-0.151	-0.157	-0.154	-0.160	-0.152	-0.155	0.226	-0.248	-0.258	-0.286	-0.254	-0.259	0.229	-0.339	-0.326	-0.357	-0.357	-0.338	-0.344	0.232
340	2.27	-0.077	-0.083	-0.080	-0.083	-0.082	-0.081	0.118	-0.127	-0.137	-0.150	-0.133	-0.135	0.120	-0.180	-0.166	-0.190	-0.191	-0.178	-0.181	0.122
440	2.93	-0.046	-0.051	-0.054	-0.050	-0.053	-0.051	0.074	-0.075	-0.084	-0.093	-0.089	-0.084	0.075	-0.110	-0.099	-0.119	-0.120	-0.112	-0.112	0.076
600	4.00	-0.028	-0.033	-0.038	-0.033	-0.035	-0.033	0.049	-0.046	-0.054	-0.060	-0.062	-0.055	0.049	-0.070	-0.061	-0.078	-0.080	-0.075	-0.073	0.049
760	5.07	-0.018	-0.021	-0.028	-0.022	-0.025	-0.023	0.033	-0.029	-0.035	-0.040	-0.046	-0.038	0.033	-0.046	-0.038	-0.053	-0.055	-0.052	-0.049	0.033
920	6.13	-0.013	-0.016	-0.023	-0.017	-0.019	-0.017	0.025	-0.021	-0.026	-0.029	-0.038	-0.029	0.026	-0.034	-0.028	-0.039	-0.043	-0.041	-0.037	0.025
1163	7.75	-0.011	-0.014	-0.020	-0.015	-0.017	-0.015	0.022	-0.019	-0.023	-0.025	-0.032	-0.025	0.022	-0.030	-0.025	-0.034	-0.038	-0.036	-0.033	0.022
1288	8.59	-0.010	-0.012	-0.017	-0.013	-0.015	-0.013	0.020	-0.017	-0.020	-0.022	-0.028	-0.022	0.020	-0.027	-0.022	-0.030	-0.033	-0.033	-0.029	0.019
1413	9.42	-0.009	-0.011	-0.015	-0.012	-0.014	-0.012	0.017	-0.015	-0.018	-0.020	-0.024	-0.020	0.018	-0.024	-0.020	-0.027	-0.029	-0.030	-0.026	0.017
2000	13.33	-0.006	-0.008	-0.009	-0.007	-0.009	-0.008	0.011	-0.010	-0.013	-0.013	-0.014	-0.013	0.012	-0.016	-0.013	-0.018	-0.018	-0.020	-0.017	0.011
3000	20.00	-0.002	-0.003	-0.003	-0.003	-0.004	-0.003	0.005	-0.004	-0.005	-0.005	-0.006	-0.005	0.005	-0.007	-0.005	-0.007	-0.007	-0.009	-0.007	0.005

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 733 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	15	1	5	13	2	MIN	AVG	MAX
EY1	8422	6741	7935	6359	7584	6359	7408	8422
EY2	7209	5939	6382	7273	4836	4836	6328	7273
EY3	2883	2635	2561	2938	2696	2561	2743	2938
EY4	255	275	272	281	326	255	282	326
EX4	299	331	338	211	415	211	319	415
EY5	207	206	200	150	211	150	195	211
EX5	153	294	233	109	294	109	216	294
EY6	189	146	156	193	159	146	169	193
EX6	139	208	182	140	222	139	178	222
R4	1.17	1.20	1.24	0.75	1.27	0.75	1.13	1.27
R5	0.74	1.43	1.17	0.73	1.39	0.73	1.09	1.43
R6	1.03	1.09	1.20	1.79	1.41	1.03	1.31	1.79

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.363345	-0.370574	-0.375422	-0.402600	-0.364394	-0.369	0
UY2	-0.314597	-0.314182	-0.324325	-0.344873	-0.311183	-0.316	300
UY3	-0.285561	-0.282492	-0.294593	-0.311714	-0.281493	-0.295	450
UY4	-0.200940	-0.196300	-0.211151	-0.215294	-0.203643	-0.214	1000
UY5	-0.160327	-0.157841	-0.172555	-0.168808	-0.169516	-0.164	1400
UY6	-0.133157	-0.133073	-0.147105	-0.137507	-0.147346	-0.130	1800
UY7	-0.113403	-0.115362	-0.128610	-0.114654	-0.131195	-0.101	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	11	3	8	7	2	MIN	AVG	MAX
EY1	3998	8773	9528	5598	7714	3998	7122	9528
EY2	2301	2650	2813	6699	2385	2301	3370	6699
EY3	2729	2518	2987	1859	1695	1695	2357	2987
EY4	288	428	270	424	278	270	338	428
EX4	578	608	533	1044	578	533	668	1044
EY5	195	201	156	248	194	156	199	248
EX5	110	109	111	555	155	109	208	555
EY6	196	88	115	93	199	88	138	199
EX6	111	48	81	208	159	48	121	208
R4	2.01	1.42	1.98	2.46	2.08	1.42	1.99	2.46
R5	0.57	0.54	0.71	2.24	0.80	0.54	0.97	2.24
R6	2.34	1.41	2.47	2.02	2.04	1.41	2.06	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.368892	-0.374134	-0.381604	-0.387446	-0.347112	-0.369	0
UY2	-0.284610	-0.319491	-0.326328	-0.333600	-0.282627	-0.316	300
UY3	-0.243791	-0.288899	-0.293345	-0.307490	-0.245897	-0.295	450
UY4	-0.149108	-0.212672	-0.204703	-0.245198	-0.156046	-0.214	1000
UY5	-0.109494	-0.177221	-0.162577	-0.219605	-0.118558	-0.164	1400
UY6	-0.083246	-0.151019	-0.132729	-0.202719	-0.094240	-0.130	1800
UY7	-0.063409	-0.128874	-0.109021	-0.189705	-0.076330	-0.101	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 733 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	12	16	11	MIN	AVG	MAX
EY1	9528	8773	8163	7635	3806	3806	7581	9528
EY2	2813	2650	2247	2124	2094	2094	2386	2813
EY3	2987	2518	1816	1864	2741	1816	2385	2987
EY4	270	428	269	373	281	269	314	428
EX4	533	608	623	974	540	533	656	974
EY5	156	201	204	167	194	156	184	204
EX5	111	109	230	264	109	109	165	264
EY6	115	88	169	132	200	88	141	200
EX6	81	48	190	208	113	48	128	208
R4	1.98	1.42	2.31	2.61	1.92	1.42	2.05	2.61
R5	0.71	0.54	1.13	1.58	0.57	0.54	0.90	1.58
R6	2.47	1.41	2.13	2.33	2.35	1.41	2.14	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>	
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>	
UY1	-0.381604	-0.374134	-0.370788	-0.375510	-0.417336	-0.369	0
UY2	-0.326328	-0.319491	-0.306719	-0.313857	-0.328521	-0.316	300
UY3	-0.293345	-0.288899	-0.270075	-0.280781	-0.285698	-0.295	450
UY4	-0.204703	-0.212672	-0.181982	-0.206235	-0.188150	-0.214	1000
UY5	-0.162577	-0.177221	-0.145993	-0.176047	-0.148043	-0.164	1400
UY6	-0.132729	-0.151019	-0.122918	-0.155752	-0.121778	-0.130	1800
UY7	-0.109021	-0.128874	-0.106034	-0.139924	-0.102173	-0.101	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1166 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	14	15	4	3	MIN	AVG	MAX
EY1	6741	6818	7588	7174	7390	6741	7142	7588
EY2	5939	4588	5527	6383	4796	4588	5447	6383
EY3	2635	2492	2422	2698	2762	2422	2602	2762
EY4	275	266	268	302	352	266	292	352
EX4	331	403	271	315	462	271	356	462
EY5	206	207	207	183	216	183	204	216
EX5	294	350	328	333	277	277	317	350
EY6	146	145	144	164	155	144	151	164
EX6	208	245	229	298	199	199	236	298
R4	1.20	1.51	1.01	1.04	1.31	1.01	1.23	1.51
R5	1.43	1.70	1.59	1.82	1.28	1.28	1.56	1.82
R6	1.09	1.19	1.01	1.14	1.56	1.01	1.20	1.56

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.589481	0
UY2	-0.499776	300
UY3	-0.449367	614
UY4	-0.312259	914
UY5	-0.251081	1219
UY6	-0.211682	1524
UY7	-0.183509	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	12	2	3	6	MIN	AVG	MAX
EY1	4054	7593	7714	8773	6939	4054	7015	8773
EY2	2362	2292	2385	2650	2906	2192	2519	2906
EY3	2725	1820	1695	2518	2960	1695	2343	2960
EY4	304	319	278	428	434	278	353	434
EX4	604	720	578	608	450	450	592	720
EY5	196	213	194	201	236	194	208	236
EX5	111	115	155	109	445	109	187	445
EY6	195	199	199	88	152	88	166	199
EX6	110	107	159	48	286	48	142	286
R4	1.99	2.25	2.08	1.42	1.04	1.04	1.76	2.25
R5	0.57	0.54	0.80	0.54	1.89	0.54	0.87	1.89
R6	1.92	0.55	2.04	1.41	1.51	0.55	1.49	2.04

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.574064	0
UY2	-0.443043	300
UY3	-0.379923	614
UY4	-0.234036	914
UY5	-0.172888	1219
UY6	-0.132108	1524
UY7	-0.101046	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1166 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	6	12	4	MIN	AVG	MAX
EY1	9528	8773	6939	8163	7880	6939	8256	9528
EY2	2813	2650	2906	2247	4193	2147	2962	4193
EY3	2987	2518	2960	1898	2497	1898	2572	2987
EY4	270	428	434	269	466	269	374	466
EX4	533	608	450	615	818	450	605	818
EY5	156	201	236	204	131	131	186	236
EX5	111	109	445	230	102	102	199	445
EY6	115	88	152	199	155	88	142	199
EX6	81	48	286	224	121	48	152	286
R4	1.98	1.42	1.04	2.28	1.75	1.04	1.69	2.28
R5	0.71	0.54	1.89	1.13	0.78	0.54	1.01	1.89
R6	2.47	1.41	1.51	1.74	1.03	1.03	1.63	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.607026	-0.595144	-0.535513	-0.560522	-0.508535	-0.567	0
UY2	-0.519098	-0.508222	-0.441979	-0.458992	-0.431017	-0.486	300
UY3	-0.466630	-0.459558	-0.392983	-0.401035	-0.389541	-0.454	614
UY4	-0.325626	-0.338302	-0.278892	-0.262072	-0.283612	-0.329	914
UY5	-0.258614	-0.281910	-0.233047	-0.205699	-0.233938	-0.254	1219
UY6	-0.211135	-0.240229	-0.203753	-0.169959	-0.197742	-0.201	1524
UY7	-0.173422	-0.205003	-0.182198	-0.144223	-0.167881	-0.155	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1485 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	8	6	4	3	MIN	AVG	MAX
EY1	8499	9528	6939	7880	8773	6939	8324	9528
EY2	2094	2813	2906	4193	2650	2094	2931	4193
EY3	2741	2987	2960	2497	2518	2497	2741	2987
EY4	278	270	434	466	428	270	375	466
EX4	382	533	450	818	608	382	559	818
EY5	231	156	236	131	201	131	191	236
EX5	184	111	445	102	109	102	190	445
EY6	200	115	152	155	88	88	142	200
EX6	159	81	286	121	48	48	139	286
R4	1.37	1.98	1.04	1.75	1.42	1.04	1.51	1.98
R5	0.80	0.71	1.89	0.78	0.54	0.54	0.94	1.89
R6	2.04	2.47	1.51	1.03	1.41	1.03	1.69	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.744909	-0.773099	-0.682021	-0.647663	-0.757966
UY2	-0.615379	-0.661116	-0.562897	-0.548937	-0.647263
UY3	-0.540723	-0.594294	-0.500497	-0.496114	-0.585286
UY4	-0.359136	-0.414713	-0.355192	-0.361203	-0.430856
UY5	-0.283808	-0.329367	-0.296805	-0.297939	-0.359036
UY6	-0.235623	-0.268898	-0.259497	-0.251841	-0.305952
UY7	-0.200850	-0.220867	-0.232044	-0.213810	-0.261089

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

-0.691	0
-0.599	300
-0.560	614
-0.406	914
-0.314	1219
-0.248	1524
-0.190	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	6	2	11	9	MIN	AVG	MAX
EY1	8281	6939	7714	3806	9162	3806	7180	9162
EY2	2267	2906	2385	2094	2528	2094	2436	2906
EY3	1774	2960	1695	2741	1843	1695	2203	2960
EY4	334	434	278	362	352	278	352	434
EX4	755	450	578	580	247	247	522	755
EY5	208	236	194	215	241	194	219	241
EX5	158	445	155	122	485	122	273	485
EY6	199	152	199	200	170	152	184	200
EX6	151	286	159	113	343	113	210	343
R4	2.26	1.04	2.08	1.60	0.70	0.70	1.54	2.26
R5	0.76	1.89	0.80	0.57	2.01	0.57	1.21	2.01
R6	2.17	1.51	2.04	0.55	1.68			

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.690772	-0.682021	-0.703222	-0.714598	-0.667304
UY2	-0.566918	-0.562897	-0.572581	-0.540880	-0.544656
UY3	-0.497727	-0.500497	-0.498167	-0.460277	-0.472373
UY4	-0.335517	-0.355192	-0.316137	-0.283324	-0.297240
UY5	-0.269284	-0.296805	-0.240189	-0.211130	-0.229330
UY6	-0.225753	-0.259497	-0.190922	-0.162873	-0.188705
UY7	-0.192882	-0.232044	-0.154639	-0.125805	-0.160886

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

-0.691	0
-0.599	300
-0.560	614
-0.406	914
-0.314	1219
-0.248	1524
-0.190	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 L: LOAD 1485 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	4	11	12	8	MIN	AVG	MAX
EY1	6939	7880	3806	8552	9528	3806	7341	9528
EY2	2906	4193	2094	2292	2813	2094	2860	4193
EY3	2960	2497	2545	1848	2987	1848	2568	2987
EY4	434	466	443	273	270	270	377	466
EX4	450	818	565	615	533	450	596	818
EY5	236	131	194	208	156	131	185	236
EX5	445	102	109	236	111	102	201	445
EY6	152	155	200	199	115	115	164	200
EX6	286	121	113	226	81	81	165	286
R4	1.04	1.75	1.28	2.25	1.98	1.04	1.66	2.25
R5	1.89	0.78	0.57	1.14	0.71	0.57	1.01	1.89
R6	1.51	1.03	2.35	2.11	2.47	1.03	1.89	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.682021	-0.647663	-0.780093	-0.703471	-0.773099	-0.691	0
UY2	-0.562897	-0.548937	-0.607085	-0.577914	-0.661116	-0.599	300
UY3	-0.500497	-0.496114	-0.528118	-0.505755	-0.594294	-0.560	614
UY4	-0.355192	-0.361203	-0.359782	-0.331902	-0.414713	-0.406	914
UY5	-0.296805	-0.297939	-0.291069	-0.261216	-0.329367	-0.314	1219
UY6	-0.259497	-0.251841	-0.244184	-0.216356	-0.268898	-0.248	1524
UY7	-0.232044	-0.213810	-0.207534	-0.184012	-0.220867	-0.190	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

LOAD 1: 733 kPa

LOAD 2: 1166 kPa

LOAD 3: 1485 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 733 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 1166 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 1485 kPa					AVG.	STRESS RATIO (p/po)
		15	1	5	13	2			1	14	15	4	3			11	8	6	4	3		
20	0.09	-0.712	-0.713	-0.712	-0.714	-0.712	-0.713	0.972	-1.135	-1.133	-1.132	-1.135	-1.133	-1.133	0.972	-1.425	-1.429	-1.439	-1.442	-1.431	-1.433	0.965
59	0.26	-0.666	-0.670	-0.666	-0.675	-0.664	-0.668	0.911	-1.066	-1.059	-1.055	-1.066	-1.059	-1.061	0.910	-1.286	-1.296	-1.335	-1.346	-1.306	-1.314	0.885
98	0.44	-0.589	-0.598	-0.590	-0.606	-0.587	-0.594	0.810	-0.951	-0.938	-0.930	-0.951	-0.939	-0.942	0.808	-1.082	-1.097	-1.172	-1.191	-1.117	-1.132	0.762
137	0.61	-0.479	-0.494	-0.481	-0.504	-0.480	-0.488	0.665	-0.785	-0.769	-0.755	-0.786	-0.772	-0.774	0.663	-0.842	-0.857	-0.958	-0.980	-0.887	-0.905	0.609
174	0.77	-0.362	-0.380	-0.367	-0.385	-0.372	-0.373	0.509	-0.605	-0.596	-0.574	-0.603	-0.602	-0.596	0.511	-0.654	-0.661	-0.761	-0.774	-0.697	-0.709	0.478
212	0.94	-0.255	-0.275	-0.262	-0.269	-0.277	-0.268	0.365	-0.437	-0.443	-0.412	-0.433	-0.452	-0.435	0.373	-0.523	-0.518	-0.600	-0.598	-0.557	-0.559	0.377
250	1.11	-0.165	-0.185	-0.175	-0.171	-0.196	-0.178	0.243	-0.295	-0.311	-0.276	-0.290	-0.322	-0.299	0.256	-0.404	-0.389	-0.457	-0.445	-0.430	-0.425	0.286
285	1.27	-0.111	-0.130	-0.122	-0.112	-0.142	-0.123	0.168	-0.207	-0.225	-0.193	-0.202	-0.236	-0.212	0.182	-0.308	-0.292	-0.349	-0.339	-0.335	-0.324	0.218
315	1.40	-0.087	-0.103	-0.096	-0.086	-0.112	-0.097	0.132	-0.163	-0.178	-0.153	-0.160	-0.187	-0.168	0.144	-0.240	-0.224	-0.276	-0.273	-0.268	-0.256	0.173
414	1.84	-0.047	-0.054	-0.050	-0.046	-0.055	-0.050	0.068	-0.085	-0.092	-0.083	-0.084	-0.092	-0.087	0.075	-0.110	-0.105	-0.131	-0.109	-0.110	-0.113	0.076
582	2.59	-0.034	-0.039	-0.036	-0.033	-0.039	-0.036	0.049	-0.062	-0.067	-0.061	-0.062	-0.065	-0.063	0.054	-0.076	-0.070	-0.090	-0.065	-0.066	-0.074	0.050
750	3.33	-0.026	-0.030	-0.027	-0.025	-0.029	-0.027	0.037	-0.047	-0.051	-0.048	-0.047	-0.047	-0.048	0.041	-0.055	-0.047	-0.066	-0.040	-0.040	-0.050	0.033
918	4.08	-0.020	-0.023	-0.021	-0.020	-0.022	-0.021	0.028	-0.036	-0.038	-0.037	-0.037	-0.035	-0.037	0.031	-0.041	-0.032	-0.051	-0.027	-0.025	-0.035	0.024
1500	6.67	-0.015	-0.017	-0.016	-0.016	-0.017	-0.016	0.022	-0.027	-0.029	-0.028	-0.029	-0.026	-0.028	0.024	-0.031	-0.024	-0.040	-0.022	-0.018	-0.027	0.018
2500	11.11	-0.012	-0.013	-0.012	-0.013	-0.013	-0.013	0.017	-0.021	-0.023	-0.022	-0.023	-0.021	-0.022	0.019	-0.024	-0.018	-0.031	-0.018	-0.013	-0.021	0.014
3500	15.56	-0.010	-0.011	-0.010	-0.011	-0.011	-0.010	0.014	-0.017	-0.018	-0.018	-0.019	-0.016	-0.018	0.015	-0.020	-0.015	-0.025	-0.015	-0.010	-0.017	0.011
4500	20.00	-0.006	-0.007	-0.007	-0.007	-0.007	-0.007	0.009	-0.012	-0.012	-0.012	-0.013	-0.010	-0.012	0.010	-0.013	-0.009	-0.015	-0.010	-0.006	-0.011	0.007
5500	24.44	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.007	-0.008	-0.007	-0.008	-0.006	-0.007	0.006	-0.007	-0.005	-0.009	-0.006	-0.004	-0.006	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 733 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 1166 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 1485 kPa					AVG.	STRESS RATIO (p/po)
		11	12	2	3	6			12	6	2	11	9									
20	0.09	-0.709	-0.710	-0.708	-0.711	-0.713	-0.710	0.969	-1.137	-1.124	-1.123	-1.124	-1.130	-1.127	0.967	-1.429	-1.439	-1.430	-1.448	-1.424	-1.434	0.966
59	0.26	-0.653	-0.657	-0.652	-0.660	-0.668	-0.658	0.898	-1.074	-1.025	-1.022	-1.025	-1.048	-1.039	0.891	-1.297	-1.335	-1.302	-1.369	-1.280	-1.317	0.887
98	0.44	-0.565	-0.575	-0.564	-0.579	-0.596	-0.576	0.785	-0.819	-0.696	-0.687	-0.696	-0.752	-0.730	0.626	-0.869	-0.958	-0.874	-1.051	-0.819	-0.914	0.616
137	0.61	-0.451	-0.466	-0.451	-0.473	-0.495	-0.467	0.637	-0.667	-0.548	-0.534	-0.548	-0.598	-0.579	0.496	-0.683	-0.761	-0.680	-0.863	-0.621	-0.722	0.486
174	0.77	-0.344	-0.362	-0.347	-0.369	-0.394	-0.363	0.496	-0.531	-0.438	-0.421	-0.437	-0.471	-0.460	0.394	-0.549	-0.600	-0.536	-0.697	-0.482	-0.573	0.386
212	0.94	-0.255	-0.275	-0.262	-0.279	-0.305	-0.275	0.375	-0.408	-0.341	-0.321	-0.338	-0.359	-0.353	0.303	-0.430	-0.457	-0.409	-0.546	-0.361	-0.441	0.297
250	1.11	-0.179	-0.199	-0.188	-0.200	-0.227	-0.199	0.271	-0.311	-0.269	-0.250	-0.263	-0.274	-0.273	0.234	-0.342	-0.349	-0.318	-0.423	-0.276	-0.342	0.230
285	1.27	-0.128	-0.148	-0.140	-0.148	-0.169	-0.147	0.200	-0.239	-0.219	-0.203	-0.211	-0.217	-0.218	0.187	-0.281	-0.276	-0.258	-0.330	-0.227	-0.275	0.185
315	1.40	-0.099	-0.117	-0.112	-0.119	-0.131	-0.116	0.158	-0.098	-0.097	-0.093	-0.087	-0.103	-0.095	0.082	-0.126	-0.131	-0.118	-0.135	-0.122	-0.126	0.085
414	1.84	-0.049	-0.054	-0.054	-0.057	-0.059	-0.055	0.075	-0.063	-0.063	-0.063	-0.052	-0.071	-0.062	0.053	-0.083	-0.090	-0.080	-0.085	-0.089	-0.085	0.058
582	2.59	-0.035	-0.036	-0.038	-0.039	-0.040	-0.037	0.051	-0.042	-0.041	-0.044	-0.031	-0.052	-0.042	0.036	-0.056	-0.066	-0.056	-0.055	-0.071	-0.061	0.041
750	3.33	-0.025	-0.025	-0.028	-0.027	-0.028	-0.027	0.036	-0.029	-0.027	-0.031	-0.020	-0.040	-0.030	0.025	-0.038	-0.051	-0.040	-0.039	-0.062	-0.046	0.031
918	4.08	-0.018	-0.018	-0.021	-0.020	-0.021	-0.019	0.026	-0.022	-0.020	-0.024	-0.014	-0.031	-0.022	0.019	-0.029	-0.040	-0.030	-0.029	-0.051	-0.036	0.024
1500	6.67	-0.014	-0.013	-0.016	-0.016	-0.016	-0.015	0.020	-0.018	-0.016	-0.019	-0.010	-0.024	-0.017	0.015	-0.023	-0.031	-0.024	-0.023	-0.041	-0.028	0.019
2500	11.11	-0.011	-0.010	-0.013	-0.013	-0.012	-0.012	0.016	-0.014	-0.013	-0.016	-0.008	-0.019	-0.014	0.012	-0.019	-0.025	-0.020	-0.018	-0.033	-0.023	0.015
3500	15.56	-0.009	-0.008	-0.010	-0.010	-0.010	-0.009	0.013	-0.008	-0.009	-0.010	-0.005	-0.012	-0.009	0.008	-0.012	-0.015	-0.013	-0.010	-0.019	-0.014	0.009
4500	20.00	-0.006	-0.005	-0.007	-0.007	-0.006	-0.006	0.008	-0.004	-0.005	-0.006	-0.003	-0.007	-0.005	0.004	-0.007	-0.009	-0.007	-0.005	-0.011	-0.008	0.005
5500	24.44	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	0.005	-0.004	-0.005	-0.006	-0.003	-0.007	-0.005	0.004	-0.007	-0.009	-0.007	-0.005	-0.011	-0.008	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 5 + 990 R

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTLOAD 1: 733 kPa

LOAD 2: 1166 kPa

LOAD/AREA

DEPTH (mm)	DEPTH RATIO (z/ro)						STRESS							STRESS							STRESS	
		8	3	12	16	11	AVG.	RATIO (p/po)	8	3	6	12	4	AVG.	RATIO (p/po)	6	4	11	12	8	AVG.	RATIO (p/po)
20	0.09	-0.705	-0.707	-0.705	-0.707	-0.714	-0.707	0.965	-1.122	-1.124	-1.130	-1.121	-1.133	-1.126	0.966	-1.439	-1.442	-1.448	-1.427	-1.429	-1.437	0.968
59	0.26	-0.639	-0.645	-0.638	-0.645	-0.673	-0.648	0.884	-1.017	-1.025	-1.048	-1.015	-1.057	-1.033	0.886	-1.335	-1.346	-1.368	-1.290	-1.296	-1.327	0.894
98	0.44	-0.541	-0.551	-0.539	-0.553	-0.604	-0.558	0.761	-0.861	-0.877	-0.920	-0.858	-0.935	-0.890	0.763	-1.172	-1.191	-1.236	-1.088	-1.097	-1.157	0.779
137	0.61	-0.423	-0.438	-0.421	-0.443	-0.509	-0.447	0.609	-0.673	-0.696	-0.752	-0.671	-0.769	-0.712	0.611	-0.958	-0.980	-1.051	-0.848	-0.857	-0.939	0.632
174	0.77	-0.326	-0.344	-0.328	-0.353	-0.415	-0.353	0.482	-0.519	-0.548	-0.598	-0.522	-0.608	-0.559	0.479	-0.761	-0.774	-0.867	-0.658	-0.661	-0.744	0.501
212	0.94	-0.256	-0.275	-0.261	-0.288	-0.333	-0.283	0.385	-0.406	-0.437	-0.471	-0.417	-0.470	-0.440	0.378	-0.600	-0.598	-0.707	-0.524	-0.518	-0.590	0.397
250	1.11	-0.192	-0.212	-0.202	-0.229	-0.258	-0.219	0.298	-0.306	-0.338	-0.359	-0.323	-0.349	-0.335	0.287	-0.457	-0.445	-0.560	-0.405	-0.389	-0.451	0.304
285	1.27	-0.144	-0.165	-0.158	-0.185	-0.197	-0.170	0.232	-0.229	-0.263	-0.274	-0.252	-0.266	-0.257	0.220	-0.349	-0.339	-0.441	-0.317	-0.292	-0.347	0.234
315	1.40	-0.111	-0.132	-0.128	-0.152	-0.150	-0.135	0.184	-0.176	-0.211	-0.217	-0.203	-0.214	-0.204	0.175	-0.276	-0.273	-0.353	-0.256	-0.224	-0.276	0.186
414	1.84	-0.052	-0.054	-0.059	-0.068	-0.062	-0.059	0.081	-0.083	-0.087	-0.103	-0.093	-0.086	-0.090	0.077	-0.131	-0.109	-0.142	-0.117	-0.105	-0.121	0.081
582	2.59	-0.035	-0.033	-0.040	-0.045	-0.040	-0.039	0.053	-0.055	-0.052	-0.071	-0.065	-0.051	-0.059	0.050	-0.090	-0.065	-0.086	-0.081	-0.070	-0.079	0.053
750	3.33	-0.023	-0.020	-0.029	-0.030	-0.027	-0.026	0.035	-0.037	-0.031	-0.052	-0.047	-0.031	-0.040	0.034	-0.066	-0.040	-0.054	-0.059	-0.047	-0.053	0.036
918	4.08	-0.016	-0.013	-0.022	-0.020	-0.019	-0.018	0.024	-0.025	-0.020	-0.040	-0.036	-0.021	-0.028	0.024	-0.051	-0.027	-0.037	-0.045	-0.032	-0.038	0.026
1500	6.67	-0.012	-0.009	-0.017	-0.016	-0.015	-0.014	0.019	-0.019	-0.014	-0.031	-0.028	-0.017	-0.022	0.019	-0.040	-0.022	-0.029	-0.035	-0.024	-0.030	0.020
2500	11.11	-0.009	-0.006	-0.013	-0.012	-0.012	-0.011	0.015	-0.014	-0.010	-0.024	-0.022	-0.014	-0.017	0.015	-0.031	-0.018	-0.023	-0.028	-0.018	-0.024	0.016
3500	15.56	-0.007	-0.005	-0.011	-0.010	-0.010	-0.009	0.012	-0.012	-0.008	-0.019	-0.018	-0.012	-0.014	0.012	-0.025	-0.015	-0.019	-0.023	-0.015	-0.019	0.013
4500	20.00	-0.005	-0.003	-0.007	-0.006	-0.006	-0.005	0.007	-0.007	-0.005	-0.012	-0.011	-0.008	-0.009	0.007	-0.015	-0.010	-0.012	-0.014	-0.009	-0.012	0.008
5500	24.44	-0.003	-0.002	-0.004	-0.004	-0.003	-0.003	0.004	-0.004	-0.003	-0.007	-0.006	-0.005	-0.005	0.004	-0.009	-0.006	-0.007	-0.008	-0.005	-0.007	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 795 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	13	4	15	3	MIN	AVG	MAX
EY1	6135	6248	5846	6769	7278	5846	6455	7278
EY2	6580	6378	7195	6055	6223	6055	6486	7195
EY3	2165	2418	2528	2788	2700	2165	2520	2788
EY4	253	253	254	251	268	251	256	268
EX4	541	536	461	534	450	450	504	541
EY5	210	203	220	239	195	195	214	239
EX5	224	313	294	150	303	150	257	313
EY6	129	111	146	152	143	111	136	152
EX6	137	172	195	95	221	95	164	221
R4	2.13	2.12	1.81	2.13	1.68	1.68	1.97	2.13
R5	1.06	1.54	1.34	0.63	1.55	0.63	1.23	1.55
R6	0.60	0.57	0.65	0.99	1.24	0.57	0.81	1.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.410165	0
UY2	-0.354142	300
UY3	-0.324386	450
UY4	-0.240905	1000
UY5	-0.200376	1400
UY6	-0.172254	1800
UY7	-0.150693	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	3	7	11	2	MIN	AVG	MAX
EY1	9528	8773	5598	3806	7714	3806	7084	9528
EY2	2813	2650	6699	2094	2385	2094	3328	6699
EY3	2987	2518	1859	2136	1695	1695	2239	2987
EY4	270	428	424	463	278	270	373	463
EX4	533	608	1044	1308	578	533	814	1308
EY5	156	201	248	231	194	156	206	248
EX5	111	109	555	131	155	109	212	555
EY6	115	88	93	200	199	88	139	200
EX6	81	48	208	113	159	48	122	208
R4	1.98	1.42	2.46	2.83	2.08	1.42	2.15	2.83
R5	0.71	0.54	2.24	0.57	0.80	0.54	0.97	2.24
R6	2.47	1.41	2.02	2.35	2.04	1.41	2.06	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.383530	0
UY2	-0.330496	300
UY3	-0.299876	450
UY4	-0.216325	1000
UY5	-0.174161	1400
UY6	-0.142965	1800
UY7	-0.117387	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 795 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	12	15	11	MIN	AVG	MAX
EY1	9528	8773	8163	3820	3806	3806	6818	9528
EY2	2813	2650	2247	2059	2094	2059	2373	2813
EY3	2987	2518	1820	2084	2103	1820	2303	2987
EY4	270	428	348	281	463	270	358	463
EX4	533	608	805	448	369	369	553	808
EY5	156	201	182	138	151	138	166	201
EX5	111	109	205	193	85	85	141	205
EY6	115	88	169	126	200	88	139	200
EX6	81	48	190	177	113	48	122	190
R4	1.98	1.42	2.31	1.59	0.80	0.80	1.62	2.31
R5	0.71	0.54	1.13	1.40	0.57	0.54	0.87	1.40
R6	2.47	1.41	1.74	1.74	2.35	1.41	1.94	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.383530	-0.387757	-0.362788	-0.470410	-0.400295	-0.381	0
UY2	-0.330496	-0.334204	-0.303081	-0.378577	-0.311523	-0.347	300
UY3	-0.299876	-0.304905	-0.270736	-0.335018	-0.270937	-0.334	450
UY4	-0.216325	-0.230065	-0.194424	-0.233720	-0.179642	-0.294	1000
UY5	-0.174161	-0.192949	-0.161703	-0.189563	-0.139477	-0.145	1400
UY6	-0.142965	-0.164478	-0.139416	-0.159543	-0.111466	-0.122	1800
UY7	-0.117387	-0.139839	-0.122144	-0.136464	-0.089546	-0.101	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1202 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	2	1	8	16	MIN	AVG	MAX
EY1	4891	5832	3540	5432	8916	3540	5721	8916
EY2	7427	7414	7131	6019	7472	6019	7093	7472
EY3	1150	1202	1905	1425	1036	1036	1343	1908
EY4	252	252	257	252	251	251	253	257
EX4	178	160	291	259	420	160	262	420
EY5	180	185	178	168	145	145	171	185
EX5	348	449	392	412	122	122	344	449
EY6	115	125	99	152	179	99	134	179
EX6	222	302	219	372	150	150	253	372
R4	0.71	0.64	1.13	1.03	1.67	0.64	1.03	1.67
R5	1.93	2.43	2.21	2.45	0.84	0.84	1.97	2.45
R6	2.29	2.41	2.17	2.39	2.25	2.17	2.30	2.41

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-0.642179	-0.631501	-0.643133	-0.638431	-0.599984	-0.561	0
UY2	-0.537703	-0.536640	-0.526465	-0.540271	-0.525588	-0.513	300
UY3	-0.481201	-0.483628	-0.470720	-0.487399	-0.481463	-0.496	450
UY4	-0.322835	-0.333897	-0.318877	-0.342908	-0.352751	-0.441	1000
UY5	-0.250361	-0.265419	-0.249296	-0.278072	-0.289134	-0.208	1400
UY6	-0.203167	-0.221311	-0.203225	-0.236665	-0.244715	-0.175	1800
UY7	-0.169133	-0.190084	-0.169159	-0.207680	-0.210767	-0.142	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	3	11	2	6	MIN	AVG	MAX
EY1	9528	8773	3806	7714	6939	3806	7352	9528
EY2	2813	2650	2094	2385	2906	2094	2570	2906
EY3	2987	2518	2136	1695	2960	1695	2459	2987
EY4	270	428	463	278	434	270	375	463
EX4	533	608	1308	578	450	450	696	1308
EY5	156	201	231	194	236	156	204	236
EX5	111	109	131	155	445	109	190	445
EY6	115	88	200	199	152	88	151	200
EX6	81	48	113	159	286	48	137	286
R4	1.98	1.42	2.83	2.08	1.04	1.04	1.87	2.83
R5	0.71	0.54	0.57	0.80	1.89	0.54	0.90	1.89
R6	2.47	1.41	2.35	2.04	1.51	1.41	1.96	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-0.579879	-0.586270	-0.528655	-0.528092	-0.521962	-0.561	0
UY2	-0.499693	-0.505299	-0.402916	-0.432835	-0.435003	-0.513	300
UY3	-0.453397	-0.461001	-0.350390	-0.380031	-0.391059	-0.496	450
UY4	-0.327073	-0.347847	-0.245026	-0.249281	-0.286525	-0.441	1000
UY5	-0.263322	-0.291730	-0.201357	-0.191885	-0.241184	-0.208	1400
UY6	-0.216156	-0.248683	-0.170604	-0.153371	-0.210749	-0.175	1800
UY7	-0.177483	-0.211430	-0.145669	-0.124376	-0.187613	-0.142	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1202 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	11	16	6	MIN	AVG	MAX
EY1	9528	8773	3806	8312	6939	3806	7472	9528
EY2	2813	2650	2094	2171	2906	2094	2527	2906
EY3	2987	2518	2102	1880	2960	1880	2489	2987
EY4	270	428	463	319	434	270	383	463
EX4	533	608	369	765	450	349	545	765
EY5	156	201	151	175	236	151	184	236
EX5	111	109	85	246	445	85	199	445
EY6	115	88	200	181	152	88	147	200
EX6	81	48	113	255	286	48	157	286
R4	1.98	1.42	0.80	2.40	1.04	0.80	1.53	2.40
R5	0.71	0.54	0.57	1.41	1.89	0.54	1.02	1.89
R6	2.47	1.41	2.35	2.11	1.51	1.41	1.97	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>	
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>	
UY1	-0.579879	-0.586270	-0.601766	-0.542097	-0.521962	-0.561	0
UY2	-0.499693	-0.505299	-0.469094	-0.450992	-0.435003	-0.513	300
UY3	-0.453397	-0.461001	-0.408405	-0.401177	-0.391059	-0.496	450
UY4	-0.327073	-0.347847	-0.271289	-0.283236	-0.286525	-0.441	1000
UY5	-0.263322	-0.291730	-0.210772	-0.233134	-0.241184	-0.208	1400
UY6	-0.216156	-0.248683	-0.168516	-0.199645	-0.210749	-0.175	1800
UY7	-0.177483	-0.211430	-0.135425	-0.174303	-0.187613	-0.142	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1484 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	8	3	11	6	4	MIN	AVG	MAX
EY1	9528	8773	3806	6939	7880	3806	7385	9528
EY2	2813	2650	2094	2906	4193	2094	2931	4193
EY3	2987	2518	2166	2960	2497	2166	2626	2987
EY4	270	428	463	434	466	270	412	466
EX4	533	608	369	450	818	369	556	818
EY5	156	201	231	236	131	131	191	236
EX5	111	109	131	445	102	102	180	445
EY6	115	88	200	152	155	88	142	200
EX6	81	48	113	286	121	48	130	286
R4	1.98	1.42	0.80	1.04	1.75	0.80	1.40	1.98
R5	0.71	0.54	0.57	1.89	0.78	0.54	0.90	1.89
R6	2.47	1.41	2.35	1.51	1.03	1.03	1.75	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>		
	UY1	UY2	UY3	UY4	UY5	UY6	UY7	DEFL.(mm)	DISTANCE(mm)
	-0.715923	-0.616925	-0.559768	-0.403807	-0.325100	-0.266868	-0.219122	-0.673	0
	-0.723814	-0.623847	-0.569156	-0.429455	-0.360172	-0.307026	-0.261034	-0.619	300
	-0.760743	-0.592352	-0.516338	-0.352380	-0.284061	-0.237808	-0.202151	-0.598	450
	-0.644419	-0.537059	-0.482805	-0.353747	-0.297768	-0.260192	-0.231629	-0.534	1000
	-0.603845	-0.513767	-0.467235	-0.347314	-0.288773	-0.245267	-0.208983	-0.255	1400
								-0.215	1800
								-0.174	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	11	2	6	8	9	MIN	AVG	MAX
EY1	3806	7714	6939	9528	9162	3806	7430	9528
EY2	2094	2385	2906	2813	2528	2094	2545	2906
EY3	2136	1695	2960	2987	1843	1695	2324	2987
EY4	463	278	434	270	352	270	359	463
EX4	1308	578	450	533	247	247	623	1308
EY5	231	194	236	156	241	156	212	241
EX5	131	155	445	111	485	111	265	485
EY6	200	199	152	115	170	115	167	200
EX6	113	159	286	81	343	81	196	343
R4	2.83	2.08	1.04	1.98	0.70	0.70	1.72	2.83
R5	0.57	0.80	1.89	0.71	2.01	0.57	1.19	2.01
R6	2.35	2.04	1.51	2.47	1.68			

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>		
	UY1	UY2	UY3	UY4	UY5	UY6	UY7	DEFL.(mm)	DISTANCE(mm)
	-0.652682	-0.497444	-0.432595	-0.302511	-0.248597	-0.210630	-0.179844	-0.673	0
	-0.651987	-0.534382	-0.469189	-0.307764	-0.236903	-0.189353	-0.153556	-0.619	300
	-0.644419	-0.537059	-0.482805	-0.353747	-0.297768	-0.260192	-0.231629	-0.598	450
	-0.715923	-0.616925	-0.559768	-0.403807	-0.325100	-0.266868	-0.219122	-0.534	1000
	-0.625357	-0.515985	-0.452991	-0.296853	-0.231789	-0.190708	-0.161499	-0.255	1400
								-0.215	1800
								-0.174	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L: LOAD 1484 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	6	14	16	MIN	AVG	MAX
EY1	9528	8773	6939	7469	6831	6831	7908	9528
EY2	2813	2650	2906	2254	2200	2200	2565	2906
EY3	2987	2518	2960	1683	1814	1683	2392	2987
EY4	270	428	434	272	264	264	334	434
EX4	533	608	450	541	496	450	526	608
EY5	156	201	236	203	177	156	195	236
EX5	111	109	445	278	193	109	227	445
EY6	115	88	152	169	177	88	140	177
EX6	81	48	286	231	193	48	168	286
R4	1.98	1.42	1.04	1.99	1.88	1.04	1.66	1.99
R5	0.71	0.54	1.89	1.36	1.09	0.54	1.12	1.89
R6	2.47	1.41	1.51	2.15	2.07	1.41	1.92	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.715923	-0.723814	-0.644419	-0.680060	-0.683206	-0.673	0
UY2	-0.616925	-0.623847	-0.537059	-0.556312	-0.555703	-0.619	300
UY3	-0.559768	-0.569156	-0.482805	-0.487922	-0.486250	-0.598	450
UY4	-0.403807	-0.429455	-0.353747	-0.322410	-0.315199	-0.534	1000
UY5	-0.325100	-0.360172	-0.297768	-0.252231	-0.240272	-0.255	1400
UY6	-0.266868	-0.307026	-0.260192	-0.206330	-0.190300	-0.215	1800
UY7	-0.219122	-0.261034	-0.231629	-0.172481	-0.152990	-0.174	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 795 kPa					LOAD 2: 1202 kPa					LOAD 3: 1484 kPa										
DEPTH (mm)	DEPTH RATIO (z/r0)	12	13	4	15	3	AVG.	STRESS RATIO (p/p0)	15	2	1	8	16	AVG.	STRESS RATIO (p/p0)	8	3	11	6	4	AVG.	STRESS RATIO (p/p0)
27	0.12	-0.769	-0.770	-0.772	-0.768	-0.767	-0.769	0.968	-1.164	-1.160	-1.175	-1.161	-1.151	-1.162	0.967	-1.406	-1.409	-1.432	-1.422	-1.426	-1.419	0.956
82	0.36	-0.700	-0.702	-0.710	-0.696	-0.691	-0.700	0.880	-1.060	-1.045	-1.102	-1.050	-1.014	-1.054	0.877	-1.201	-1.212	-1.295	-1.258	-1.270	-1.247	0.840
137	0.61	-0.569	-0.574	-0.587	-0.563	-0.556	-0.570	0.717	-0.860	-0.833	-0.941	-0.845	-0.780	-0.852	0.709	-0.900	-0.920	-1.061	-0.994	-1.009	-0.977	0.658
184	0.82	-0.430	-0.435	-0.448	-0.426	-0.418	-0.431	0.542	-0.630	-0.600	-0.732	-0.623	-0.550	-0.627	0.522	-0.666	-0.692	-0.843	-0.764	-0.770	-0.747	0.503
222	0.99	-0.316	-0.322	-0.328	-0.318	-0.311	-0.319	0.401	-0.430	-0.408	-0.530	-0.444	-0.381	-0.439	0.365	-0.532	-0.560	-0.691	-0.613	-0.604	-0.600	0.404
261	1.16	-0.220	-0.226	-0.227	-0.225	-0.220	-0.224	0.281	-0.269	-0.255	-0.357	-0.297	-0.250	-0.285	0.237	-0.411	-0.442	-0.551	-0.478	-0.458	-0.468	0.315
304	1.35	-0.154	-0.157	-0.155	-0.156	-0.152	-0.155	0.195	-0.179	-0.168	-0.241	-0.204	-0.176	-0.194	0.161	-0.298	-0.331	-0.418	-0.351	-0.338	-0.347	0.234
351	1.56	-0.112	-0.112	-0.109	-0.108	-0.105	-0.109	0.138	-0.138	-0.129	-0.174	-0.153	-0.138	-0.146	0.122	-0.201	-0.236	-0.304	-0.246	-0.244	-0.246	0.166
456	2.03	-0.081	-0.080	-0.077	-0.075	-0.073	-0.077	0.097	-0.104	-0.098	-0.124	-0.113	-0.099	-0.108	0.089	-0.133	-0.155	-0.208	-0.168	-0.159	-0.164	0.111
618	2.75	-0.043	-0.043	-0.042	-0.039	-0.039	-0.041	0.052	-0.059	-0.058	-0.065	-0.062	-0.047	-0.058	0.048	-0.060	-0.056	-0.084	-0.078	-0.058	-0.067	0.045
780	3.47	-0.031	-0.032	-0.032	-0.028	-0.029	-0.030	0.038	-0.047	-0.047	-0.051	-0.050	-0.034	-0.046	0.038	-0.040	-0.034	-0.057	-0.058	-0.036	-0.045	0.030
943	4.19	-0.022	-0.024	-0.024	-0.019	-0.023	-0.022	0.028	-0.040	-0.042	-0.042	-0.042	-0.027	-0.038	0.032	-0.029	-0.022	-0.042	-0.048	-0.026	-0.033	0.022
1100	4.89	-0.018	-0.019	-0.019	-0.015	-0.019	-0.018	0.023	-0.034	-0.037	-0.035	-0.036	-0.024	-0.033	0.027	-0.024	-0.017	-0.035	-0.040	-0.023	-0.028	0.019
1250	5.56	-0.014	-0.016	-0.016	-0.012	-0.016	-0.015	0.019	-0.029	-0.032	-0.030	-0.031	-0.020	-0.028	0.024	-0.020	-0.014	-0.029	-0.034	-0.020	-0.023	0.016
1400	6.22	-0.012	-0.013	-0.013	-0.010	-0.013	-0.012	0.016	-0.025	-0.028	-0.026	-0.027	-0.018	-0.025	0.020	-0.017	-0.011	-0.024	-0.028	-0.017	-0.020	0.013
1550	6.89	-0.008	-0.009	-0.009	-0.007	-0.009	-0.008	0.010	-0.019	-0.020	-0.019	-0.017	-0.012	-0.018	0.015	-0.011	-0.007	-0.015	-0.017	-0.012	-0.012	0.008
2125	9.44	-0.004	-0.005	-0.005	-0.004	-0.005	-0.005	0.006	-0.012	-0.012	-0.013	-0.010	-0.007	-0.011	0.009	-0.006	-0.004	-0.008	-0.010	-0.007	-0.007	0.005
3125	13.89	-0.003	-0.004	-0.003	-0.003	-0.004	-0.003	0.004	-0.009	-0.009	-0.009	-0.007	-0.005	-0.008	0.006	-0.004	-0.003	-0.005	-0.007	-0.005	-0.005	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r0)	8	3	11	2	6	AVG.	STRESS RATIO (p/p0)	11	2	6	8	9	AVG.	STRESS RATIO (p/p0)
27	0.12	-0.760	-0.761	-0.761	-0.766	-0.766	-0.763	0.959	-1.139	-1.141	-1.164	-1.140	-1.152	-1.147	0.953
82	0.36	-0.670	-0.674	-0.675	-0.692	-0.691	-0.681	0.856	-0.973	-0.982	-1.063	-0.976	-1.019	-1.003	0.834
137	0.61	-0.525	-0.532	-0.534	-0.561	-0.561	-0.543	0.682	-0.729	-0.745	-0.886	-0.735	-0.805	-0.780	0.649
184	0.82	-0.392	-0.402	-0.405	-0.432	-0.433	-0.413	0.519	-0.539	-0.561	-0.717	-0.545	-0.619	-0.596	0.496
222	0.99	-0.300	-0.311	-0.312	-0.336	-0.338	-0.319	0.402	-0.431	-0.454	-0.597	-0.436	-0.496	-0.483	0.402
261	1.16	-0.220	-0.231	-0.231	-0.252	-0.255	-0.238	0.299	-0.333	-0.358	-0.487	-0.339	-0.387	-0.381	0.317
304	1.35	-0.156	-0.167	-0.169	-0.181	-0.185	-0.172	0.216	-0.241	-0.268	-0.381	-0.256	-0.285	-0.286	0.238
351	1.56	-0.110	-0.119	-0.123	-0.126	-0.132	-0.122	0.153	-0.163	-0.192	-0.282	-0.187	-0.199	-0.204	0.170
456	2.03	-0.076	-0.081	-0.086	-0.085	-0.090	-0.084	0.105	-0.107	-0.125	-0.183	-0.127	-0.136	-0.136	0.113
618	2.75	-0.037	-0.036	-0.042	-0.040	-0.040	-0.039	0.049	-0.049	-0.045	-0.066	-0.058	-0.064	-0.056	0.047
780	3.47	-0.026	-0.025	-0.030	-0.028	-0.028	-0.029	0.035	-0.033	-0.027	-0.040	-0.041	-0.047	-0.038	0.031
943	4.19	-0.019	-0.018	-0.022	-0.021	-0.021	-0.020	0.025	-0.023	-0.018	-0.026	-0.031	-0.038	-0.027	0.023
1100	4.89	-0.015	-0.014	-0.018	-0.017	-0.018	-0.016	0.021	-0.019	-0.014	-0.021	-0.026	-0.032	-0.023	0.019
1250	5.56	-0.013	-0.012	-0.015	-0.014	-0.015	-0.014	0.017	-0.016	-0.011	-0.018	-0.022	-0.027	-0.019	0.016
1400	6.22	-0.011	-0.010	-0.013	-0.012	-0.013	-0.012	0.015	-0.014	-0.009	-0.015	-0.019	-0.023	-0.016	0.013
1550	6.89	-0.007	-0.006	-0.008	-0.008	-0.008	-0.008	0.009	-0.009	-0.006	-0.011	-0.012	-0.014	-0.010	0.009
2125	9.44	-0.004	-0.004	-0.005	-0.005	-0.004	-0.004	0.005	-0.005	-0.003	-0.006	-0.007	-0.008	-0.006	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 290 L

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFELEC LOAD 1: 795 kPa

LOAD 2: 1202 kPa

LOAD 3: 1484 kPa

DEPTH (mm)	DEPTH		LOAD 1: 795 kPa					STRESS		LOAD 2: 1202 kPa					STRESS		LOAD 3: 1484 kPa					STRESS	
	RATIO	(z/r <sub>0</sub> )	8	3	12	15	11	AVG.	RATIO	8	3	11	16	6	AVG.	RATIO	8	3	6	14	16	AVG.	RATIO
27	0.12	-0.753	-0.755	-0.753	-0.766	-0.767	-0.759	0.955	-1.139	-1.141	-1.160	-1.137	-1.152	-1.146	0.953	-1.406	-1.409	-1.422	-1.405	-1.410	-1.410	-1.410	0.950
82	0.36	-0.643	-0.649	-0.643	-0.690	-0.694	-0.664	0.835	-0.973	-0.982	-1.049	-0.967	-1.019	-0.998	0.830	-1.201	-1.212	-1.258	-1.200	-1.217	-1.218	-1.218	0.820
137	0.61	-0.482	-0.493	-0.483	-0.561	-0.568	-0.517	0.651	-0.729	-0.745	-0.858	-0.724	-0.805	-0.772	0.643	-0.900	-0.920	-0.994	-0.900	-0.926	-0.928	-0.928	0.625
184	0.82	-0.357	-0.371	-0.363	-0.440	-0.450	-0.396	0.498	-0.539	-0.561	-0.680	-0.542	-0.619	-0.588	0.489	-0.666	-0.692	-0.764	-0.668	-0.693	-0.696	-0.696	0.469
222	0.99	-0.285	-0.300	-0.296	-0.356	-0.366	-0.321	0.403	-0.431	-0.454	-0.553	-0.443	-0.496	-0.475	0.395	-0.532	-0.560	-0.613	-0.537	-0.555	-0.560	-0.560	0.377
261	1.16	-0.220	-0.237	-0.237	-0.279	-0.291	-0.253	0.318	-0.333	-0.358	-0.438	-0.354	-0.387	-0.374	0.311	-0.411	-0.442	-0.478	-0.422	-0.433	-0.437	-0.437	0.294
304	1.35	-0.159	-0.177	-0.183	-0.207	-0.219	-0.189	0.238	-0.241	-0.268	-0.330	-0.273	-0.285	-0.279	0.232	-0.298	-0.331	-0.351	-0.320	-0.324	-0.325	-0.325	0.219
351	1.56	-0.108	-0.127	-0.137	-0.145	-0.159	-0.135	0.170	-0.163	-0.192	-0.239	-0.203	-0.199	-0.199	0.166	-0.201	-0.236	-0.246	-0.236	-0.233	-0.231	-0.231	0.155
456	2.03	-0.071	-0.083	-0.095	-0.095	-0.107	-0.090	0.114	-0.107	-0.125	-0.161	-0.140	-0.136	-0.134	0.111	-0.133	-0.155	-0.168	-0.164	-0.159	-0.155	-0.155	0.105
618	2.75	-0.032	-0.030	-0.042	-0.041	-0.041	-0.037	0.047	-0.049	-0.045	-0.062	-0.064	-0.064	-0.057	0.047	-0.060	-0.056	-0.078	-0.079	-0.074	-0.069	-0.069	0.047
780	3.47	-0.022	-0.018	-0.029	-0.029	-0.027	-0.025	0.031	-0.033	-0.027	-0.040	-0.046	-0.047	-0.039	0.032	-0.040	-0.034	-0.058	-0.059	-0.054	-0.049	-0.049	0.033
943	4.19	-0.015	-0.012	-0.021	-0.022	-0.020	-0.018	0.023	-0.023	-0.018	-0.030	-0.034	-0.038	-0.029	0.024	-0.029	-0.022	-0.048	-0.047	-0.042	-0.037	-0.037	0.025
1100	4.89	-0.013	-0.009	-0.017	-0.018	-0.017	-0.015	0.019	-0.019	-0.014	-0.026	-0.029	-0.032	-0.024	0.020	-0.024	-0.017	-0.040	-0.039	-0.035	-0.031	-0.031	0.021
1250	5.56	-0.011	-0.007	-0.015	-0.016	-0.015	-0.013	0.016	-0.016	-0.011	-0.022	-0.025	-0.027	-0.020	0.017	-0.020	-0.014	-0.034	-0.033	-0.030	-0.026	-0.026	0.018
1400	6.22	-0.009	-0.006	-0.013	-0.014	-0.012	-0.011	0.014	-0.014	-0.009	-0.019	-0.022	-0.023	-0.017	0.014	-0.017	-0.011	-0.028	-0.028	-0.026	-0.022	-0.022	0.015
1550	6.89	-0.006	-0.004	-0.008	-0.009	-0.007	-0.007	0.009	-0.009	-0.006	-0.011	-0.014	-0.014	-0.011	0.009	-0.011	-0.007	-0.017	-0.018	-0.017	-0.014	-0.014	0.009
2125	9.44	-0.003	-0.002	-0.004	-0.005	-0.004	-0.004	0.005	-0.005	-0.003	-0.006	-0.007	-0.008	-0.006	0.005	-0.006	-0.004	-0.010	-0.010	-0.009	-0.008	-0.008	0.005
3125	13.89	-0.002	-0.002	-0.003	-0.004	-0.002	-0.003	0.003	-0.003	-0.002	-0.004	-0.005	-0.006	-0.004	0.003	-0.004	-0.003	-0.007	-0.007	-0.006	-0.006	-0.006	0.004

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 758 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	6	1	9	3	12	MIN	AVG	MAX
EY1	2670	3492	4814	2923	3091	2670	3398	4814
EY2	2757	7071	2181	5084	2166	2166	3853	7071
EY3	2742	2923	2932	2920	2945	2742	2892	2945
EY4	280	255	312	329	258	255	287	329
EX4	732	358	908	528	752	358	656	908
EY5	247	238	217	233	227	217	233	247
EX5	203	166	268	399	133	133	234	399
EY6	101	99	86	91	84	84	92	101
EX6	82	69	106	155	50	50	92	155
R4	2.62	1.40	2.91	1.61	2.92	1.40	2.29	2.92
R5	0.82	0.70	1.24	1.71	0.59	0.59	1.01	1.71
R6	2.25	2.16	2.45	1.92	2.43	1.92	2.24	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.487893	0
UY2	-0.385901	300
UY3	-0.342252	450
UY4	-0.242935	1000
UY5	-0.201445	1400
UY6	-0.173580	1800
UY7	-0.151761	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	8	3	7	11	2	MIN	AVG	MAX
EY1	5598	8773	6741	3824	7714	3824	6530	8773
EY2	6699	2650	5939	2619	2385	2385	4058	6699
EY3	1859	2518	2635	1916	1695	1695	2124	2635
EY4	424	428	275	490	278	275	379	490
EX4	1044	608	331	838	578	331	680	1044
EY5	248	201	206	215	194	194	213	248
EX5	555	109	294	165	155	109	256	555
EY6	93	88	146	189	199	88	143	199
EX6	208	48	208	145	159	48	154	208
R4	2.46	1.42	1.20	1.71	2.08	1.20	1.77	2.46
R5	2.24	0.54	1.43	0.77	0.80	0.54	1.16	2.24
R6	2.02	1.41	1.09	2.38	2.04	1.09	1.79	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.406050	0
UY2	-0.347018	300
UY3	-0.318052	450
UY4	-0.252361	1000
UY5	-0.226382	1400
UY6	-0.209143	1800
UY7	-0.195597	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 758 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	15	8	3	7	11	MIN	AVG	MAX
EY1	2716	5598	8773	6741	3824	2716	5531	8773
EY2	4756	6699	2650	5939	2618	2618	4532	6699
EY3	2114	1859	2518	2635	1964	1859	2218	2635
EY4	287	424	428	275	453	275	373	453
EX4	723	1044	608	331	629	331	667	1044
EY5	132	248	201	206	215	132	200	248
EX5	102	555	109	294	150	102	242	555
EY6	115	93	88	146	186	88	125	186
EX6	89	208	48	208	130	48	137	208
R4	2.52	2.46	1.42	1.20	1.39	1.20	1.80	2.52
R5	0.77	2.24	0.54	1.43	0.70	0.54	1.14	2.24
R6	2.48	2.02	1.41	1.09	2.40	1.09	1.88	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.435340	-0.406050	-0.389664	-0.385709	-0.384354	0
UY2	-0.342998	-0.347018	-0.325371	-0.324656	-0.295960	300
UY3	-0.301320	-0.318052	-0.292087	-0.290762	-0.257308	450
UY4	-0.199989	-0.252361	-0.215971	-0.201345	-0.178362	1000
UY5	-0.156185	-0.226382	-0.180943	-0.161955	-0.147214	1400
UY6	-0.126037	-0.209143	-0.154794	-0.136499	-0.126159	1800
UY7	-0.102052	-0.195597	-0.132423	-0.118104	-0.109600	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1141 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	6	10	14	1	MIN	AVG	MAX
EY1	2994	5790	4620	5696	3004	2994	4421	5790
EY2	3425	7048	7128	5358	7400	3425	6072	7400
EY3	1091	2124	1353	1583	1369	1091	1504	2124
EY4	251	251	251	266	252	251	254	266
EX4	162	131	288	244	298	131	224	298
EY5	250	150	249	249	166	150	213	250
EX5	250	372	567	583	295	250	413	583
EY6	80	105	81	81	84	80	86	105
EX6	81	259	184	189	150	81	173	259
R4	0.64	0.52	1.15	0.92	1.18	0.52	0.88	1.18
R5	1.00	2.47	2.28	2.34	1.78	1.00	1.97	2.47
R6	1.50	1.84	0.81	0.76	1.25	0.76	1.23	1.84

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.861822	0
UY2	-0.686162	300
UY3	-0.595694	450
UY4	-0.381875	1000
UY5	-0.298493	1400
UY6	-0.245792	1800
UY7	-0.206208	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	11	3	7	15	MIN	AVG	MAX
EY1	5598	3824	8773	6741	2629	2629	5513	8773
EY2	6699	2619	2650	5939	2175	2175	4016	6699
EY3	1859	1966	2518	2635	2278	1859	2251	2635
EY4	424	423	428	275	336	275	377	428
EX4	1044	568	608	331	584	331	627	1044
EY5	248	134	201	206	132	132	184	248
EX5	555	94	109	294	227	94	256	555
EY6	93	193	88	146	197	88	143	197
EX6	208	135	48	208	339	48	188	339
R4	2.46	1.34	1.42	1.20	1.74	1.20	1.83	2.46
R5	2.24	0.70	0.54	1.43	1.72	0.54	1.33	2.24
R6	2.02	2.40	1.41	1.09	1.84	1.09	1.75	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.611217	0
UY2	-0.522358	300
UY3	-0.478756	450
UY4	-0.379873	1000
UY5	-0.340768	1400
UY6	-0.314819	1800
UY7	-0.294428	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1141 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	8	15	3	13	MIN	AVG	MAX
EY1	4163	5598	8734	8773	4575	4163	6369	8773
EY2	2393	6699	2120	2650	2550	2120	3783	6699
EY3	2127	1859	2230	2518	2076	1859	2162	2518
EY4	385	424	485	428	454	385	435	485
EX4	916	1044	1182	608	990	608	948	1182
EY5	133	248	131	201	134	131	169	248
EX5	291	555	239	109	285	109	296	555
EY6	126	93	90	88	110	88	101	136
EX6	275	208	166	48	234	48	186	275
R4	2.38	2.46	2.44	1.42	2.18	1.42	2.18	2.46
R5	2.19	2.24	1.83	0.54	2.13	0.54	1.79	2.24
R6	1.74	2.02	0.89	1.41	2.35	0.89	1.68	2.35

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL.(mm)					DISTANCE(mm)	
UY1	-0.644791	-0.611217	-0.607197	-0.586552	-0.593249	-0.956	0
UY2	-0.514099	-0.522358	-0.506492	-0.489773	-0.474107	-0.682	300
UY3	-0.456117	-0.478756	-0.457856	-0.439672	-0.421203	-0.609	450
UY4	-0.337034	-0.379873	-0.362229	-0.325096	-0.312943	-0.396	1000
UY5	-0.289569	-0.340768	-0.322813	-0.272369	-0.269100	-0.293	1400
UY6	-0.257529	-0.314819	-0.294387	-0.233008	-0.238654	-0.231	1800
UY7	-0.232338	-0.294428	-0.270549	-0.199333	-0.213990	-0.190	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1506 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	3	11	7	12	MIN	AVG	MAX
EY1	5598	8773	3824	6741	6744	3824	6336	8773
EY2	6699	2650	2618	5939	3749	2618	4331	6699
EY3	1859	2518	2315	2635	2374	1859	2340	2635
EY4	424	428	496	275	404	275	405	496
EX4	1044	608	408	331	977	331	673	1044
EY5	248	201	134	206	140	134	186	248
EX5	555	109	94	294	197	94	250	555
EY6	93	88	193	146	142	88	132	193
EX6	208	48	135	208	201	48	160	208
R4	2.46	1.42	0.82	1.20	2.42	0.82	1.66	2.46
R5	2.24	0.54	0.70	1.43	1.41	0.54	1.27	2.24
R6	2.02	1.41	2.40	1.09	1.87	1.09	1.76	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.806743	-0.774187	-0.821485	-0.766329	-0.706279	0
UY2	-0.689457	-0.646449	-0.642147	-0.645029	-0.582984	300
UY3	-0.631907	-0.580321	-0.562275	-0.577688	-0.522321	450
UY4	-0.501393	-0.429093	-0.391346	-0.400033	-0.385141	1000
UY5	-0.449778	-0.359498	-0.319926	-0.321774	-0.326731	1400
UY6	-0.415528	-0.307546	-0.270739	-0.271197	-0.286259	1800
UY7	-0.388614	-0.263099	-0.232169	-0.234651	-0.253906	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	3	7	10	11	MIN	AVG	MAX
EY1	5598	8773	6741	4093	3824	3824	5806	8773
EY2	6699	2650	5939	2716	2939	2650	4189	6699
EY3	1859	2518	2635	2853	2465	1859	2466	2853
EY4	424	428	275	316	380	275	365	428
EX4	1044	608	331	878	1085	331	789	1085
EY5	248	201	206	133	134	133	184	248
EX5	555	109	294	297	94	94	270	555
EY6	93	88	146	113	193	88	126	193
EX6	208	48	208	252	135	48	170	252
R4	2.46	1.42	1.20	2.78	2.85	1.20	2.14	2.85
R5	2.24	0.54	1.43	2.23	0.70	0.54	1.43	2.24
R6	2.02	1.41	1.09	1.95	2.40			

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.806743	-0.774187	-0.766329	-0.753126	-0.742768	0
UY2	-0.689457	-0.646449	-0.645029	-0.590747	-0.577997	300
UY3	-0.631907	-0.580321	-0.577688	-0.517843	-0.506547	450
UY4	-0.501393	-0.429093	-0.400033	-0.355822	-0.353946	1000
UY5	-0.449778	-0.359498	-0.321774	-0.287830	-0.290850	1400
UY6	-0.415528	-0.307546	-0.271197	-0.241915	-0.247524	1800
UY7	-0.388614	-0.263099	-0.234651	-0.206162	-0.213132	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R: LOAD 1506 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	3	7	13	11
EY1	5598	8773	6741	4214	3824
EY2	6699	2650	5939	3009	2618
EY3	1859	2518	2635	2272	2240
EY4	424	428	275	493	496
EX4	1044	608	331	1396	408
EY5	248	201	206	138	215
EX5	555	109	294	181	150
EY6	93	88	146	125	193
EX6	208	48	208	164	135
R4	2.46	1.42	1.20	2.83	0.82
R5	2.24	0.54	1.43	1.32	0.70
R6	2.02	1.41	1.09	1.82	2.40

MIN	AVG	MAX
3824	5830	8773
2618	4183	6699
1859	2305	2635
275	423	496
331	787	1396
138	201	248
109	258	555
88	129	193
48	153	208
0.82	1.75	2.83
0.54	1.25	2.24
1.09	1.75	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.806743	-0.774187	-0.766329	-0.725396	-0.751756	0
UY2	-0.689457	-0.646449	-0.645029	-0.574906	-0.577617	300
UY3	-0.631907	-0.580321	-0.577688	-0.511292	-0.499554	450
UY4	-0.501393	-0.429093	-0.400033	-0.382080	-0.332713	1000
UY5	-0.449778	-0.359498	-0.321774	-0.328679	-0.265862	1400
UY6	-0.415528	-0.307546	-0.271197	-0.290490	-0.221423	1800
UY7	-0.388614	-0.263099	-0.234651	-0.258675	-0.187302	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 758 kPa					LOAD 2: 1141 kPa					LOAD 3: 1506 kPa										
DEPTH (mm)	DEPTH RATIO (z/ro)	6	1	9	3	12	AVG.	STRESS RATIO (p/po)	11	6	10	14	1	AVG.	STRESS RATIO (p/po)	8	3	11	7	12	AVG.	STRESS RATIO (p/po)
54	0.24	-0.749	-0.750	-0.744	-0.751	-0.748	-0.748	0.987	-1.121	-1.120	-1.122	-1.119	-1.127	-1.122	0.983	-1.481	-1.466	-1.481	-1.477	-1.475	-1.476	0.980
91	0.40	-0.728	-0.728	-0.705	-0.732	-0.722	-0.723	0.954	-1.066	-1.060	-1.067	-1.053	-1.089	-1.067	0.935	-1.413	-1.350	-1.416	-1.395	-1.391	-1.393	0.925
129	0.57	-0.684	-0.684	-0.642	-0.690	-0.670	-0.674	0.889	-0.965	-0.950	-0.963	-0.935	-1.013	-0.965	0.846	-1.287	-1.174	-1.301	-1.250	-1.249	-1.252	0.832
168	0.75	-0.608	-0.593	-0.561	-0.607	-0.590	-0.592	0.781	-0.809	-0.781	-0.792	-0.767	-0.859	-0.802	0.702	-1.090	-0.990	-1.137	-1.043	-1.065	-1.065	0.707
206	0.92	-0.515	-0.470	-0.479	-0.495	-0.501	-0.492	0.649	-0.628	-0.584	-0.588	-0.583	-0.650	-0.607	0.532	-0.860	-0.824	-0.956	-0.814	-0.875	-0.866	0.575
245	1.09	-0.419	-0.347	-0.395	-0.382	-0.411	-0.391	0.515	-0.461	-0.401	-0.406	-0.416	-0.455	-0.428	0.375	-0.647	-0.663	-0.774	-0.597	-0.692	-0.675	0.448
285	1.27	-0.327	-0.249	-0.312	-0.286	-0.321	-0.299	0.395	-0.343	-0.274	-0.293	-0.301	-0.330	-0.308	0.270	-0.499	-0.516	-0.607	-0.431	-0.538	-0.518	0.344
325	1.44	-0.246	-0.180	-0.233	-0.212	-0.240	-0.222	0.293	-0.267	-0.194	-0.232	-0.229	-0.259	-0.236	0.207	-0.403	-0.391	-0.465	-0.314	-0.415	-0.397	0.264
439	1.95	-0.179	-0.126	-0.167	-0.154	-0.175	-0.160	0.211	-0.209	-0.137	-0.183	-0.175	-0.202	-0.181	0.159	-0.317	-0.291	-0.353	-0.226	-0.312	-0.300	0.199
627	2.79	-0.077	-0.051	-0.062	-0.063	-0.082	-0.067	0.088	-0.097	-0.070	-0.090	-0.085	-0.094	-0.087	0.076	-0.121	-0.104	-0.134	-0.103	-0.115	-0.115	0.077
814	3.62	-0.051	-0.034	-0.039	-0.042	-0.053	-0.044	0.058	-0.066	-0.053	-0.065	-0.061	-0.065	-0.062	0.054	-0.077	-0.060	-0.078	-0.073	-0.071	-0.072	0.048
1002	4.45	-0.033	-0.023	-0.026	-0.029	-0.032	-0.029	0.038	-0.046	-0.045	-0.050	-0.048	-0.046	-0.047	0.041	-0.051	-0.034	-0.048	-0.054	-0.045	-0.046	0.031
1170	5.20	-0.021	-0.017	-0.018	-0.022	-0.019	-0.019	0.025	-0.034	-0.046	-0.044	-0.043	-0.035	-0.040	0.035	-0.038	-0.022	-0.035	-0.042	-0.033	-0.034	0.023
1320	5.87	-0.016	-0.013	-0.014	-0.018	-0.013	-0.015	0.020	-0.026	-0.044	-0.037	-0.037	-0.028	-0.035	0.030	-0.031	-0.017	-0.031	-0.035	-0.028	-0.028	0.019
1470	6.53	-0.012	-0.010	-0.011	-0.014	-0.010	-0.012	0.015	-0.021	-0.039	-0.030	-0.031	-0.023	-0.029	0.025	-0.025	-0.014	-0.026	-0.030	-0.025	-0.024	0.016
1620	7.20	-0.010	-0.009	-0.009	-0.012	-0.008	-0.009	0.012	-0.016	-0.034	-0.024	-0.025	-0.019	-0.024	0.021	-0.021	-0.011	-0.023	-0.025	-0.022	-0.020	0.014
2195	9.76	-0.006	-0.006	-0.006	-0.007	-0.005	-0.006	0.008	-0.011	-0.017	-0.014	-0.013	-0.013	-0.013	0.012	-0.013	-0.007	-0.015	-0.017	-0.015	-0.014	0.009
3195	14.20	-0.003	-0.003	-0.004	-0.005	-0.002	-0.004	0.005	-0.006	-0.009	-0.008	-0.008	-0.008	-0.008	0.007	-0.009	-0.004	-0.008	-0.010	-0.009	-0.008	0.005

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	8	11	3	7	15	AVG.	STRESS RATIO (p/po)	8	3	7	10	11	AVG.	STRESS RATIO (p/po)							
54	0.24	-0.765	-0.760	-0.753	-0.758	-0.760	-0.759	1.002	-1.122	-1.122	-1.111	-1.119	-1.126	-1.120	0.982	-1.481	-1.466	-1.477	-1.483	-1.483	-1.478	0.981
91	0.40	-0.744	-0.726	-0.693	-0.716	-0.727	-0.721	0.951	-1.071	-1.072	-1.023	-1.057	-1.090	-1.062	0.931	-1.413	-1.350	-1.395	-1.422	-1.426	-1.401	0.930
129	0.57	-0.701	-0.661	-0.603	-0.642	-0.667	-0.655	0.864	-0.975	-0.982	-0.890	-0.947	-1.016	-0.962	0.843	-1.287	-1.174	-1.250	-1.308	-1.321	-1.268	0.842
168	0.75	-0.615	-0.560	-0.508	-0.536	-0.582	-0.560	0.739	-0.826	-0.854	-0.750	-0.790	-0.898	-0.824	0.722	-1.090	-0.990	-1.043	-1.145	-1.161	-1.086	0.721
206	0.92	-0.501	-0.442	-0.423	-0.418	-0.488	-0.454	0.599	-0.652	-0.713	-0.624	-0.617	-0.760	-0.673	0.590	-0.860	-0.824	-0.814	-0.965	-0.979	-0.888	0.590
245	1.09	-0.387	-0.332	-0.340	-0.307	-0.395	-0.352	0.465	-0.490	-0.574	-0.502	-0.452	-0.620	-0.528	0.463	-0.647	-0.663	-0.597	-0.783	-0.796	-0.697	0.463
285	1.27	-0.294	-0.256	-0.265	-0.221	-0.313	-0.270	0.356	-0.378	-0.452	-0.391	-0.326	-0.487	-0.407	0.357	-0.499	-0.516	-0.431	-0.610	-0.628	-0.537	0.357
325	1.44	-0.225	-0.207	-0.201	-0.161	-0.244	-0.208	0.274	-0.305	-0.350	-0.296	-0.238	-0.368	-0.312	0.273	-0.403	-0.391	-0.314	-0.456	-0.483	-0.409	0.272
439	1.95	-0.167	-0.163	-0.149	-0.116	-0.188	-0.157	0.207	-0.240	-0.268	-0.220	-0.172	-0.272	-0.234	0.205	-0.317	-0.291	-0.226	-0.327	-0.359	-0.304	0.202
627	2.79	-0.065	-0.062	-0.054	-0.053	-0.068	-0.060	0.080	-0.092	-0.096	-0.079	-0.078	-0.099	-0.089	0.078	-0.121	-0.104	-0.103	-0.119	-0.126	-0.115	0.076
814	3.62	-0.040	-0.039	-0.031	-0.038	-0.041	-0.038	0.050	-0.058	-0.056	-0.045	-0.055	-0.063	-0.055	0.049	-0.077	-0.060	-0.073	-0.076	-0.075	-0.072	0.048
1002	4.45	-0.024	-0.026	-0.017	-0.028	-0.025	-0.024	0.032	-0.039	-0.034	-0.026	-0.041	-0.043	-0.037	0.032	-0.051	-0.034	-0.054	-0.051	-0.044	-0.047	0.031
1170	5.20	-0.016	-0.020	-0.011	-0.022	-0.018	-0.017	0.023	-0.029	-0.024	-0.016	-0.032	-0.035	-0.027	0.024	-0.038	-0.022	-0.042	-0.038	-0.030	-0.034	0.023
1320	5.87	-0.013	-0.016	-0.009	-0.018	-0.015	-0.014	0.019	-0.024	-0.021	-0.013	-0.027	-0.031	-0.023	0.020	-0.031	-0.017	-0.035	-0.033	-0.026	-0.028	0.019
1470	6.53	-0.011	-0.013	-0.007	-0.015	-0.013	-0.012	0.016	-0.019	-0.019	-0.010	-0.022	-0.027	-0.020	0.017	-0.025	-0.014	-0.030	-0.029	-0.023	-0.024	0.016
1620	7.20	-0.010	-0.011	-0.006	-0.013	-0.011	-0.010	0.013	-0.016	-0.017	-0.008	-0.019	-0.025	-0.017	0.015	-0.021	-0.011	-0.025	-0.026	-0.020	-0.021	0.014
2195	9.76	-0.006	-0.007	-0.004	-0.009	-0.007	-0.007	0.009	-0.010	-0.011	-0.005	-0.013	-0.018	-0.012	0.010	-0.013	-0.007	-0.017	-0.021	-0.014	-0.015	0.010
3195	14.20	-0.003	-0.005	-0.002	-0.005	-0.004	-0.004	0.005	-0.007	-0.006	-0.003	-0.008	-0.010	-0.007	0.006	-0.009	-0.004	-0.010	-0.015	-0.008	-0.009	0.006

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 6 + 890 R

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLEC LOAD 1: 758 kPa

LOAD 2: 1141 kPa

LOAD 3: 1506 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 758 kPa					AVG.	STRESS RATIO (p/po)	LOAD 2: 1141 kPa					AVG.	STRESS RATIO (p/po)	LOAD 3: 1506 kPa					AVG.	STRESS RATIO (p/po)
		15	8	3	7	11			14	8	15	3	13			8	3	7	13	11		
54	0.24	-0.750	-0.746	-0.738	-0.743	-0.745	-0.744	0.982	-1.121	-1.122	-1.108	-1.111	-1.121	-1.117	0.979	-1.481	-1.466	-1.477	-1.483	-1.482	-1.478	0.981
91	0.40	-0.730	-0.711	-0.680	-0.702	-0.713	-0.707	0.933	-1.068	-1.071	-1.017	-1.023	-1.067	-1.049	0.920	-1.413	-1.350	-1.395	-1.423	-1.417	-1.400	0.929
129	0.57	-0.687	-0.648	-0.591	-0.629	-0.654	-0.642	0.847	-0.976	-0.975	-0.886	-0.890	-0.971	-0.940	0.824	-1.287	-1.174	-1.250	-1.314	-1.299	-1.265	0.840
168	0.75	-0.603	-0.549	-0.498	-0.525	-0.570	-0.549	0.724	-0.851	-0.826	-0.757	-0.750	-0.844	-0.806	0.706	-1.090	-0.990	-1.043	-1.154	-1.129	-1.081	0.718
206	0.92	-0.492	-0.433	-0.415	-0.410	-0.478	-0.445	0.588	-0.719	-0.652	-0.645	-0.624	-0.709	-0.670	0.587	-0.860	-0.824	-0.814	-0.974	-0.941	-0.883	0.586
245	1.09	-0.379	-0.326	-0.334	-0.301	-0.387	-0.345	0.455	-0.587	-0.490	-0.535	-0.502	-0.578	-0.539	0.472	-0.647	-0.663	-0.597	-0.796	-0.756	-0.692	0.459
285	1.27	-0.289	-0.251	-0.260	-0.217	-0.306	-0.265	0.349	-0.467	-0.378	-0.432	-0.391	-0.461	-0.426	0.373	-0.499	-0.516	-0.431	-0.637	-0.589	-0.534	0.355
325	1.44	-0.221	-0.203	-0.197	-0.158	-0.240	-0.204	0.269	-0.364	-0.305	-0.340	-0.296	-0.362	-0.334	0.292	-0.403	-0.391	-0.314	-0.503	-0.448	-0.412	0.273
439	1.95	-0.164	-0.160	-0.146	-0.114	-0.185	-0.154	0.203	-0.277	-0.240	-0.262	-0.220	-0.279	-0.256	0.224	-0.317	-0.291	-0.226	-0.385	-0.340	-0.312	0.207
627	2.79	-0.063	-0.061	-0.052	-0.052	-0.067	-0.059	0.078	-0.107	-0.092	-0.091	-0.079	-0.106	-0.095	0.083	-0.121	-0.104	-0.103	-0.132	-0.137	-0.119	0.079
814	3.62	-0.039	-0.039	-0.030	-0.037	-0.040	-0.037	0.049	-0.067	-0.058	-0.053	-0.045	-0.064	-0.057	0.050	-0.077	-0.060	-0.073	-0.076	-0.084	-0.074	0.049
1002	4.45	-0.024	-0.026	-0.017	-0.027	-0.025	-0.024	0.031	-0.043	-0.039	-0.032	-0.026	-0.039	-0.036	0.031	-0.051	-0.034	-0.054	-0.045	-0.054	-0.048	0.032
1170	5.20	-0.016	-0.019	-0.011	-0.021	-0.018	-0.017	0.022	-0.032	-0.029	-0.023	-0.016	-0.027	-0.025	0.022	-0.038	-0.022	-0.042	-0.031	-0.041	-0.035	0.023
1320	5.87	-0.013	-0.016	-0.009	-0.018	-0.015	-0.014	0.018	-0.027	-0.024	-0.020	-0.013	-0.023	-0.021	0.019	-0.031	-0.017	-0.035	-0.027	-0.034	-0.029	0.019
1470	6.53	-0.011	-0.013	-0.007	-0.015	-0.012	-0.012	0.015	-0.023	-0.019	-0.017	-0.010	-0.020	-0.018	0.016	-0.025	-0.014	-0.030	-0.024	-0.028	-0.024	0.016
1620	7.20	-0.010	-0.010	-0.006	-0.013	-0.011	-0.010	0.013	-0.020	-0.016	-0.015	-0.008	-0.017	-0.015	0.013	-0.021	-0.011	-0.025	-0.021	-0.024	-0.020	0.014
2195	9.76	-0.006	-0.007	-0.004	-0.009	-0.007	-0.006	0.009	-0.013	-0.010	-0.010	-0.005	-0.013	-0.010	0.009	-0.013	-0.007	-0.017	-0.014	-0.015	-0.013	0.009
3195	14.20	-0.003	-0.004	-0.002	-0.005	-0.004	-0.004	0.005	-0.008	-0.007	-0.006	-0.003	-0.009	-0.006	0.006	-0.009	-0.004	-0.010	-0.008	-0.008	-0.008	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 788 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	8	5	2	4	MIN	AVG	MAX
EY1	4235	4623	5776	3334	6359	3334	4865	6359
EY2	2137	2714	4179	4062	6946	2137	4008	6946
EY3	30204	25538	25301	31057	31584	25301	28737	31584
EY4	267	444	274	289	251	251	305	444
EX4	135	345	236	151	273	135	228	345
EY5	132	138	137	137	131	131	135	138
EX5	89	72	71	71	67	67	74	89
EY6	87	85	107	95	109	85	97	109
EX6	59	44	55	49	56	44	53	59
R4	1.03	2.50	1.72	1.10	2.07	1.03	1.68	2.50
R5	0.68	0.52	0.52	0.52	0.51	0.51	0.55	0.68
R6	0.68	0.52	0.52	0.52	0.51	0.51	0.55	0.68

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.373373	-0.530
UY2	-0.318654	-0.376
UY3	-0.302437	-0.344
UY4	-0.256889	-0.238
UY5	-0.223992	-0.188
UY6	-0.194510	-0.157
UY7	-0.166624	-0.127

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	3	4	14	6	11	MIN	AVG	MAX
EY1	8192	6845	5367	7681	4765	4765	6570	8192
EY2	5925	4109	3551	5786	6998	3551	5274	6998
EY3	39770	26490	28941	36895	48426	26490	36104	48426
EY4	266	256	455	464	287	256	346	464
EX4	434	151	598	491	301	151	395	598
EY5	174	186	161	132	249	132	181	249
EX5	381	111	348	223	270	111	267	381
EY6	83	146	109	122	89	83	110	146
EX6	181	87	235	205	97	87	161	235
R4	1.63	0.59	1.31	1.06	1.05	0.59	1.13	1.63
R5	2.19	0.60	2.16	1.68	1.08	0.60	1.54	2.19
R6	2.19	0.60	2.16	1.68	1.08	0.60	1.54	2.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.362034	-0.530
UY2	-0.335968	-0.376
UY3	-0.327284	-0.344
UY4	-0.299539	-0.238
UY5	-0.279803	-0.188
UY6	-0.262198	-0.157
UY7	-0.245587	-0.127

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 788 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	3	4	16	12	6
EY1	8192	6845	7488	5367	7681
EY2	5925	4109	4853	3551	5786
EY3	39770	26490	38512	28941	36895
EY4	266	256	254	455	464
EX4	434	151	212	598	491
EY5	174	186	183	161	132
EX5	381	110	390	349	222
EY6	83	146	81	109	122
EX6	181	87	172	235	205
R4	1.63	0.59	0.83	1.31	1.06
R5	2.19	0.59	2.13	2.16	1.68
R6	2.19	0.60	2.13	2.16	1.68

MIN	AVG	MAX
5367	7114	8192
3551	4845	5925
26490	34122	39770
254	339	464
151	377	598
132	167	186
110	290	390
81	108	146
87	176	235
0.59	1.09	1.63
0.59	1.75	2.19
0.60	1.75	2.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.362034	-0.299824	-0.391081	-0.297014	-0.290499
UY2	-0.335968	-0.265050	-0.362026	-0.257566	-0.263867
UY3	-0.327284	-0.252901	-0.352496	-0.245796	-0.255088
UY4	-0.299539	-0.215130	-0.322960	-0.212610	-0.226940
UY5	-0.279803	-0.189012	-0.302014	-0.190359	-0.206980
UY6	-0.262198	-0.166259	-0.283392	-0.171335	-0.189238
UY7	-0.245587	-0.145316	-0.265886	-0.154055	-0.172583

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

-0.530	0
-0.376	300
-0.344	450
-0.238	1000
-0.188	1400
-0.157	1800
-0.127	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1182 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	1	6	3	13	4
EY1	6105	3322	6634	6870	7027
EY2	4340	6825	4376	5371	2507
EY3	26501	25380	26234	26168	25342
EY4	269	344	282	327	255
EX4	400	260	324	663	686
EY5	240	236	209	237	247
EX5	126	120	153	151	295
EY6	112	110	107	123	88
EX6	59	56	78	78	105
R4	1.486808713	0.7566526441	1.464401072	0.0265551342	6.8758369
R5	0.524229204	0.5090616530	0.729312381	0.6352094151	1.93818484
R6	0.52423261	0.5090623530	0.729311549	0.63520975	1.193824238

	MIN	AVG	MAX
	3322	5991	7027
	2507	4684	6825
	25342	25925	26501
	255	296	344
	260	467	686
	109	134	247
	120	169	295
	88	108	123
	56	75	105
	0.76	1.62	2.69
	0.51	0.72	1.19
	0.51	0.72	1.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.497748	-0.458945	-0.496949	-0.438312	-0.444312
UY2	-0.445316	-0.397798	-0.446175	-0.392606	-0.381344
UY3	-0.427750	-0.380485	-0.428583	-0.376958	-0.360343
UY4	-0.371640	-0.319024	-0.373502	-0.326594	-0.306365
UY5	-0.332100	-0.275516	-0.335047	-0.291558	-0.270176
UY6	-0.297041	-0.237041	-0.301097	-0.260685	-0.238893
UY7	-0.264132	-0.201109	-0.269349	-0.231847	-0.210022

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

	-0.745	0
	-0.526	300
	-0.483	450
	-0.337	1000
	-0.265	1400
	-0.221	1800
	-0.179	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	12	16	2	13	3
EY1	6615	9045	8192	6453	6845
EY2	4733	4639	5925	4467	4109
EY3	28733	29854	39770	26049	26490
EY4	255	252	266	252	256
EX4	203	308	434	148	151
EY5	141	132	174	206	186
EX5	341	328	381	391	111
EY6	81	80	83	80	146
EX6	196	199	181	153	87
R4	0.80	1.22	1.63	0.59	0.59
R5	2.42	2.48	2.19	1.90	0.60
R6	2.42	2.48	2.19	1.90	0.60

	MIN	AVG	MAX
	6453	7430	9045
	4109	4775	5925
	26049	30179	39770
	252	256	266
	148	249	434
	132	168	206
	111	310	391
	80	94	146
	87	163	199
	0.59	0.97	1.63
	0.60	1.92	2.48
	0.60	1.92	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.572188	-0.555003	-0.543051	-0.472041	-0.449736
UY2	-0.521638	-0.510389	-0.503952	-0.418550	-0.397575
UY3	-0.504538	-0.494146	-0.490926	-0.400193	-0.379352
UY4	-0.450651	-0.445107	-0.449308	-0.344472	-0.322694
UY5	-0.413163	-0.411059	-0.419704	-0.306703	-0.283517
UY6	-0.380243	-0.380972	-0.393297	-0.274016	-0.249388
UY7	-0.349629	-0.352757	-0.368381	-0.243945	-0.217974

OBSERVED DEFLECTION (mm)      SENSOR DISTANCE (mm)

	-0.745	0
	-0.526	300
	-0.483	450
	-0.337	1000
	-0.265	1400
	-0.221	1800
	-0.179	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1182 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	16	4	12	6	MIN	AVG	MAX
EY1	3627	8153	6845	5367	7681	3627	6334	8153
EY2	4233	4713	4109	3551	5786	3551	4478	5786
EY3	44081	30209	26490	28941	36895	26490	33323	44081
EY4	252	251	256	455	464	251	336	464
EX4	133	128	151	598	491	128	300	598
EY5	142	134	186	161	132	132	151	186
EX5	293	119	111	348	223	111	219	348
EY6	97	85	146	109	122	85	111	146
EX6	200	76	87	235	205	76	161	235
R4	0.53	0.51	0.59	1.31	1.06	0.51	0.80	1.31
R5	2.06	0.89	0.60	2.16	1.68	0.60	1.48	2.16
R6	2.06	0.89	0.60	2.16	1.68	0.60	1.48	2.16

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>	
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>	
UY1	-0.501717	-0.484155	-0.449736	-0.445521	-0.435749	-0.745	0
UY2	-0.436648	-0.436972	-0.397575	-0.386349	-0.395800	-0.526	300
UY3	-0.420607	-0.419558	-0.379352	-0.368694	-0.382632	-0.483	450
UY4	-0.370185	-0.363571	-0.322694	-0.318914	-0.340409	-0.337	1000
UY5	-0.333920	-0.323293	-0.283517	-0.285539	-0.310470	-0.265	1400
UY6	-0.301768	-0.286889	-0.249388	-0.257003	-0.283856	-0.221	1800
UY7	-0.271763	-0.252066	-0.217974	-0.231083	-0.258874	-0.179	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1463 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	14	1	11	8	9
EY1	3414	3707	3488	2743	2590
EY2	2780	2472	3728	5686	3319
EY3	27917	25382	28490	26817	30537
EY4	251	252	251	251	267
EX4	249	271	293	180	197
EY5	188	188	178	234	144
EX5	98	99	93	119	73
EY6	90	95	90	82	167
EX6	47	50	47	42	84
R4	0.99	1.08	1.17	0.72	0.74
R5	0.52	0.53	0.52	0.51	0.51
R6	0.52	0.53	0.52	0.51	0.51

MIN	AVG	MAX
2590	3188	3707
3472	3597	5686
25382	27819	30817
251	255	267
180	238	293
144	186	234
73	96	119
82	105	167
42	54	84
0.72	0.94	1.17
0.51	0.52	0.53
0.51	0.52	0.53

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.639185	-0.630327	-0.596852	-0.683864	-0.592017
UY2	-0.535927	-0.524447	-0.505284	-0.588347	-0.480626
UY3	-0.506855	-0.493048	-0.478998	-0.562736	-0.452876
UY4	-0.418157	-0.401801	-0.393411	-0.475003	-0.368326
UY5	-0.354796	-0.337767	-0.331772	-0.412358	-0.309883
UY6	-0.298436	-0.281342	-0.276576	-0.356460	-0.259684
UY7	-0.245440	-0.228691	-0.224385	-0.303702	-0.214373

OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
-0.866	0
-0.622	300
-0.574	450
-0.404	1000
-0.320	1400
-0.269	1800
-0.219	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	10	16	1	11	2
EY1	6115	7747	8192	6135	6845
EY2	4732	5149	5925	3963	4109
EY3	28733	25994	39770	32520	26490
EY4	255	251	266	252	256
EX4	282	159	434	171	151
EY5	140	184	174	219	186
EX5	339	363	381	215	111
EY6	81	80	83	80	146
EX6	196	158	181	79	87
R4	1.11	0.63	1.63	0.68	0.59
R5	2.42	1.97	2.19	0.98	0.60
R6	2.42	1.97	2.19	0.98	0.60

MIN	AVG	MAX
6115	7807	8192
3963	4776	5925
25994	30701	39770
251	256	266
151	239	434
140	181	219
111	282	381
80	94	146
79	140	196
0.59	0.93	1.63
0.60	1.63	2.42

CALCULATED AND OBSERVED DEFLECTIONS (mm)

UY1	-0.711437	-0.711125	-0.672152	-0.648523	-0.556653
UY2	-0.646863	-0.652953	-0.623758	-0.582424	-0.492092
UY3	-0.625573	-0.631939	-0.607635	-0.560905	-0.469536
UY4	-0.558362	-0.566009	-0.556123	-0.494495	-0.399409
UY5	-0.511633	-0.520782	-0.519482	-0.447210	-0.350919
UY6	-0.470650	-0.481268	-0.486797	-0.404975	-0.308676
UY7	-0.432592	-0.444612	-0.455957	-0.365031	-0.269793

OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
-0.866	0
-0.622	300
-0.574	450
-0.404	1000
-0.320	1400
-0.269	1800
-0.219	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L: LOAD 1463 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	5	16	15	1	7	MIN	AVG	MAX
EY1	6845	7993	5367	3000	7681	3000	6177	7993
EY2	4109	2586	3551	2000	5786	2000	3607	5786
EY3	26490	43411	28941	30000	36895	26490	33147	43411
EY4	256	252	455	250	464	250	335	464
EX4	151	132	598	250	491	132	324	598
EY5	186	142	161	150	132	132	154	186
EX5	111	285	348	150	223	111	223	348
EY6	146	96	109	100	122	96	115	146
EX6	87	193	235	100	205	87	164	235
R4	0.59	0.52	1.31	1.00	1.06	0.52	0.90	1.31
R5	0.60	2.01	2.16	1.00	1.68	0.60	1.49	2.16
R6	0.60	2.01	2.16	1.00	1.68	0.60	1.49	2.16

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>	
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>	
UY1	-0.556653	-0.652814	-0.551435	-0.562930	-0.539341	-0.866	0
UY2	-0.492092	-0.583379	-0.478196	-0.451769	-0.489895	-0.622	300
UY3	-0.469536	-0.561188	-0.456344	-0.424058	-0.473597	-0.574	450
UY4	-0.399409	-0.504444	-0.394731	-0.343587	-0.421336	-0.404	1000
UY5	-0.350919	-0.464144	-0.353420	-0.285833	-0.384278	-0.320	1400
UY6	-0.308676	-0.428297	-0.318101	-0.235077	-0.351338	-0.269	1800
UY7	-0.269793	-0.394554	-0.286018	-0.188157	-0.320417	-0.219	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 788 kPa					LOAD 2: 1182 kPa					LOAD 3: 1463 kPa										
DEPTH (mm)	DEPTH RATIO (z/ro)	13	8	5	2	4	AVG.	STRESS RATIO (p/po)	1	6	3	13	4	AVG.	STRESS RATIO (p/po)	14	1	11	8	9	AVG.	STRESS RATIO (p/po)
17	0.08	-0.785	-0.785	-0.785	-0.786	-0.786	-0.785	0.997	-1.178	-1.180	-1.177	-1.178	-1.173	-1.177	0.996	-1.460	-1.458	-1.460	-1.461	-1.461	-1.460	0.998
52	0.23	-0.783	-0.783	-0.784	-0.791	-0.786	-0.785	0.997	-1.177	-1.188	-1.171	-1.176	-1.156	-1.174	0.993	-1.467	-1.458	-1.468	-1.473	-1.472	-1.468	1.003
87	0.39	-0.771	-0.770	-0.774	-0.788	-0.774	-0.776	0.984	-1.159	-1.182	-1.145	-1.157	-1.119	-1.152	0.975	-1.462	-1.442	-1.462	-1.475	-1.472	-1.463	1.000
121	0.54	-0.742	-0.740	-0.744	-0.766	-0.741	-0.746	0.947	-1.111	-1.142	-1.090	-1.108	-1.062	-1.103	0.933	-1.421	-1.391	-1.420	-1.438	-1.437	-1.421	0.972
153	0.68	-0.706	-0.701	-0.704	-0.729	-0.694	-0.707	0.897	-1.048	-1.076	-1.022	-1.041	-1.001	-1.038	0.878	-1.359	-1.323	-1.352	-1.370	-1.376	-1.356	0.927
184	0.82	-0.667	-0.659	-0.658	-0.687	-0.642	-0.662	0.841	-0.977	-0.997	-0.949	-0.966	-0.937	-0.965	0.817	-1.285	-1.248	-1.273	-1.284	-1.304	-1.279	0.874
266	1.18	-0.442	-0.435	-0.430	-0.456	-0.416	-0.436	0.553	-0.637	-0.649	-0.618	-0.628	-0.621	-0.631	0.533	-0.852	-0.828	-0.839	-0.850	-0.867	-0.847	0.579
398	1.77	-0.133	-0.138	-0.131	-0.138	-0.124	-0.133	0.168	-0.198	-0.201	-0.193	-0.200	-0.205	-0.199	0.169	-0.267	-0.263	-0.263	-0.262	-0.273	-0.266	0.182
524	2.33	-0.017	-0.023	-0.020	-0.018	-0.017	-0.019	0.024	-0.036	-0.037	-0.036	-0.041	-0.045	-0.039	0.033	-0.042	-0.045	-0.042	-0.040	-0.040	-0.042	0.029
748	3.32	-0.014	-0.017	-0.016	-0.015	-0.013	-0.015	0.019	-0.027	-0.029	-0.028	-0.031	-0.035	-0.030	0.025	-0.034	-0.036	-0.033	-0.033	-0.033	-0.034	0.023
952	4.23	-0.012	-0.012	-0.012	-0.012	-0.011	-0.012	0.015	-0.021	-0.022	-0.022	-0.023	-0.028	-0.023	0.020	-0.021	-0.021	-0.019	-0.020	-0.023	-0.021	0.014
1169	5.20	-0.010	-0.009	-0.009	-0.009	-0.009	-0.009	0.011	-0.015	-0.016	-0.017	-0.017	-0.022	-0.017	0.015	-0.016	-0.016	-0.014	-0.014	-0.020	-0.016	0.011
1386	6.16	-0.008	-0.007	-0.007	-0.007	-0.007	-0.007	0.009	-0.011	-0.012	-0.013	-0.013	-0.016	-0.013	0.011	-0.012	-0.012	-0.011	-0.011	-0.017	-0.013	0.009
1993	8.86	-0.007	-0.005	-0.006	-0.006	-0.006	-0.006	0.008	-0.009	-0.009	-0.011	-0.010	-0.013	-0.010	0.009	-0.007	-0.007	-0.008	-0.007	-0.011	-0.008	0.005
2993	13.30	-0.005	-0.004	-0.005	-0.005	-0.004	-0.005	0.006	-0.007	-0.007	-0.008	-0.007	-0.009	-0.008	0.006	-0.004	-0.004	-0.004	-0.004	-0.006	-0.005	0.003
3993	17.75	-0.003	-0.002	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.005	-0.005	-0.006	-0.005	0.004	-0.003	-0.003	-0.003	-0.003	-0.004	-0.003	0.002
4993	22.19	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.004	-0.003	-0.005	-0.004	0.003	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	AVG.	STRESS RATIO (p/po)	12	16	2	13	3	AVG.	STRESS RATIO (p/po)	10	16	1	11	2	AVG.	STRESS RATIO (p/po)
17	0.08			-1.178	-1.174	-1.178	-1.176	-1.177	-1.176	0.995	-1.458	-1.456	-1.458	-1.457	-1.456	-1.457	0.996
52	0.23			-1.177	-1.163	-1.176	-1.171	-1.171	-1.171	0.991	-1.459	-1.449	-1.456	-1.453	-1.449	-1.453	0.993
87	0.39			-1.161	-1.131	-1.158	-1.149	-1.147	-1.149	0.972	-1.443	-1.422	-1.434	-1.427	-1.420	-1.429	0.977
121	0.54			-1.117	-1.074	-1.111	-1.099	-1.095	-1.099	0.930	-1.391	-1.361	-1.375	-1.366	-1.355	-1.370	0.936
153	0.68			-1.057	-1.008	-1.049	-1.035	-1.031	-1.036	0.876	-1.318	-1.280	-1.298	-1.290	-1.276	-1.292	0.883
184	0.82			-0.988	-0.937	-0.980	-0.963	-0.960	-0.966	0.817	-1.233	-1.190	-1.213	-1.207	-1.188	-1.206	0.824
266	1.18			-0.646	-0.610	-0.641	-0.631	-0.620	-0.630	0.533	-0.809	-0.772	-0.793	-0.792	-0.767	-0.787	0.538
398	1.77			-0.199	-0.190	-0.199	-0.195	-0.187	-0.194	0.164	-0.252	-0.236	-0.246	-0.240	-0.232	-0.241	0.165
524	2.33			-0.035	-0.035	-0.035	-0.035	-0.029	-0.034	0.029	-0.048	-0.042	-0.043	-0.037	-0.036	-0.041	0.028
748	3.32			-0.031	-0.029	-0.029	-0.031	-0.025	-0.029	0.024	-0.041	-0.037	-0.036	-0.032	-0.030	-0.035	0.024
952	4.23			-0.028	-0.024	-0.025	-0.027	-0.021	-0.025	0.021	-0.037	-0.032	-0.031	-0.027	-0.026	-0.030	0.021
1169	5.20			-0.028	-0.021	-0.020	-0.024	-0.017	-0.022	0.019	-0.035	-0.029	-0.025	-0.022	-0.021	-0.026	0.018
1386	6.16			-0.025	-0.018	-0.016	-0.020	-0.014	-0.018	0.016	-0.030	-0.024	-0.020	-0.017	-0.017	-0.022	0.015
1993	8.86			-0.020	-0.015	-0.013	-0.016	-0.011	-0.015	0.013	-0.025	-0.020	-0.016	-0.014	-0.014	-0.018	0.012
2993	13.30			-0.011	-0.011	-0.009	-0.013	-0.009	-0.011	0.009	-0.014	-0.013	-0.011	-0.010	-0.011	-0.012	0.008
3993	17.75			-0.007	-0.008	-0.007	-0.009	-0.005	-0.007	0.006	-0.009	-0.008	-0.008	-0.006	-0.007	-0.008	0.005
4993	22.19			-0.006	-0.006	-0.005	-0.007	-0.004	-0.006	0.005	-0.007	-0.007	-0.007	-0.005	-0.005	-0.006	0.004

NO COMPUTATIONS

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

REGINA: RWY 12-30: STA. 7 + 310 L

DISTRIBUTION OF VERTICAL STRESSES

RMS VALUE OF DEFLECTIONS

LOAD 1: 788 kPa

LOAD 2: 1182 kPa

LOAD 3: 1463 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	LOAD 1: 788 kPa						AVG.	STRESS RATIO (p/po)	LOAD 2: 1182 kPa						AVG.	STRESS RATIO (p/po)	LOAD 3: 1463 kPa						AVG.	STRESS RATIO (p/po)
		3	4	16	12	6	15			16	4	12	6	5	16			15	1	7					
17	0.08	-0.785	-0.784	-0.785	-0.785	-0.785	-0.785	0.996	-1.181	-1.175	-1.177	-1.178	-1.178	-1.178	0.996	-1.456	-1.452	-1.458	-1.462	-1.458	-1.457	0.996			
52	0.23	-0.784	-0.781	-0.782	-0.785	-0.785	-0.783	0.994	-1.192	-1.167	-1.171	-1.177	-1.177	-1.177	0.996	-1.449	-1.433	-1.457	-1.473	-1.457	-1.454	0.994			
87	0.39	-0.772	-0.765	-0.768	-0.775	-0.772	-0.770	0.977	-1.196	-1.141	-1.147	-1.162	-1.158	-1.161	0.982	-1.420	-1.391	-1.438	-1.468	-1.433	-1.430	0.977			
121	0.54	-0.741	-0.730	-0.734	-0.746	-0.739	-0.738	0.937	-1.172	-1.087	-1.095	-1.119	-1.109	-1.116	0.945	-1.355	-1.326	-1.385	-1.428	-1.372	-1.373	0.939			
153	0.68	-0.699	-0.687	-0.692	-0.708	-0.696	-0.697	0.884	-1.126	-1.022	-1.031	-1.062	-1.044	-1.057	0.894	-1.276	-1.258	-1.314	-1.368	-1.293	-1.302	0.890			
184	0.82	-0.653	-0.640	-0.647	-0.665	-0.649	-0.651	0.826	-1.069	-0.951	-0.960	-0.997	-0.973	-0.990	0.838	-1.188	-1.186	-1.234	-1.296	-1.205	-1.222	0.835			
266	1.18	-0.427	-0.413	-0.424	-0.442	-0.423	-0.426	0.540	-0.712	-0.614	-0.620	-0.663	-0.635	-0.649	0.549	-0.767	-0.779	-0.820	-0.849	-0.786	-0.800	0.547			
398	1.77	-0.132	-0.125	-0.129	-0.147	-0.133	-0.133	0.169	-0.216	-0.183	-0.187	-0.221	-0.199	-0.201	0.170	-0.232	-0.240	-0.273	-0.268	-0.246	-0.252	0.172			
524	2.33	-0.023	-0.019	-0.021	-0.034	-0.025	-0.024	0.031	-0.029	-0.023	-0.029	-0.051	-0.037	-0.034	0.029	-0.036	-0.035	-0.063	-0.045	-0.046	-0.045	0.031			
748	3.32	-0.016	-0.014	-0.016	-0.021	-0.016	-0.017	0.021	-0.027	-0.020	-0.025	-0.040	-0.029	-0.028	0.024	-0.030	-0.031	-0.049	-0.038	-0.037	-0.037	0.025			
952	4.23	-0.013	-0.011	-0.013	-0.016	-0.014	-0.014	0.017	-0.026	-0.017	-0.021	-0.031	-0.024	-0.024	0.020	-0.026	-0.027	-0.039	-0.031	-0.030	-0.031	0.021			
1169	5.20	-0.011	-0.009	-0.011	-0.013	-0.012	-0.011	0.014	-0.026	-0.015	-0.017	-0.024	-0.021	-0.021	0.017	-0.021	-0.024	-0.030	-0.026	-0.025	-0.025	0.017			
1386	6.16	-0.009	-0.008	-0.009	-0.011	-0.010	-0.009	0.012	-0.024	-0.013	-0.014	-0.020	-0.017	-0.018	0.015	-0.017	-0.021	-0.024	-0.021	-0.022	-0.021	0.014			
1993	8.86	-0.006	-0.006	-0.006	-0.008	-0.007	-0.007	0.008	-0.021	-0.011	-0.011	-0.016	-0.015	-0.015	0.013	-0.014	-0.018	-0.020	-0.017	-0.018	-0.018	0.012			
2993	13.30	-0.004	-0.004	-0.004	-0.006	-0.004	-0.004	0.006	-0.012	-0.007	-0.009	-0.013	-0.010	-0.010	0.009	-0.011	-0.013	-0.015	-0.012	-0.012	-0.013	0.009			
3993	17.75	-0.004	-0.003	-0.003	-0.005	-0.003	-0.004	0.004	-0.008	-0.005	-0.005	-0.009	-0.006	-0.007	0.006	-0.007	-0.009	-0.011	-0.008	-0.008	-0.008	0.006			
4993	22.19	-0.003	-0.002	-0.003	-0.004	-0.003	-0.003	0.004	-0.006	-0.004	-0.004	-0.007	-0.005	-0.005	0.004	-0.005	-0.007	-0.009	-0.006	-0.006	-0.006	0.004			

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 737 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	1	2	14	15	MIN	AVG	MAX
EY1	5376	3000	8854	2741	2555	2555	4505	8854
EY2	1709	2000	3100	1512	1509	1509	1966	3100
EY3	162	200	363	606	618	162	390	618
EY4	220	150	254	152	151	150	185	254
EY5	210	150	208	166	172	150	181	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.985631	-0.946660	-0.603639	-0.612265	-0.592456	-1.151	0
UY2	-0.614445	-0.594913	-0.410403	-0.404957	-0.387567	-0.773	300
UY3	-0.425126	-0.418294	-0.313868	-0.326533	-0.310252	-0.591	450
UY4	-0.160600	-0.168699	-0.173761	-0.217250	-0.201637	-0.233	1000
UY5	-0.110533	-0.111416	-0.138932	-0.177726	-0.162186	-0.154	1400
UY6	-0.085523	-0.078503	-0.118031	-0.150805	-0.135456	-0.117	1800
UY7	-0.068949	-0.055623	-0.102991	-0.130375	-0.115316	-0.091	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	7	1	11	8	MIN	AVG	MAX
EY1	3232	5376	3000	3257	7880	3000	4549	7880
EY2	1556	1709	2000	1551	2896	1551	1942	2896
EY3	154	162	200	154	562	154	247	562
EY4	279	220	150	169	280	150	220	280
EY5	128	210	150	132	102	102	144	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-1.110230	-0.985631	-0.946660	-1.211790	-0.633182	-1.151	0
UY2	-0.687632	-0.614445	-0.594913	-0.789179	-0.477395	-0.773	300
UY3	-0.474459	-0.425126	-0.418294	-0.576213	-0.405157	-0.591	450
UY4	-0.187850	-0.160600	-0.168699	-0.277248	-0.294310	-0.233	1000
UY5	-0.132696	-0.110533	-0.111416	-0.212938	-0.254749	-0.154	1400
UY6	-0.100830	-0.085523	-0.078503	-0.177025	-0.225682	-0.117	1800
UY7	-0.076913	-0.068949	-0.055623	-0.151846	-0.201536	-0.091	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	16	12	13	MIN	AVG	MAX
EY1	5376	3000	2832	2835	2660	2660	3341	5376
EY2	1709	2000	1522	1522	1510	1510	1653	2000
EY3	162	200	534	557	570	162	405	570
EY4	220	150	175	179	179	150	181	220
EY5	210	150	108	107	103	103	135	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.985631	-0.946660	-0.741012	-0.733222	-0.739396	-1.151	0
UY2	-0.614445	-0.594913	-0.520898	-0.513219	-0.519828	-0.773	300
UY3	-0.425126	-0.418294	-0.433971	-0.427290	-0.434675	-0.591	450
UY4	-0.160600	-0.168699	-0.308355	-0.304890	-0.311530	-0.233	1000
UY5	-0.110533	-0.111416	-0.261019	-0.258267	-0.263456	-0.154	1400
UY6	-0.085523	-0.078503	-0.226921	-0.224547	-0.228541	-0.117	1800
UY7	-0.068949	-0.055623	-0.199442	-0.197353	-0.200352	-0.091	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON; RWY 15-33; STA. 5 + 360 R; LOAD 1090 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	2	6	15	MIN	AVG	MAX
EY1	3000	5376	8854	5899	7508	3000	6127	8854
EY2	2000	1709	3100	4450	1510	1510	2554	4450
EY3	200	162	363	325	441	162	298	441
EY4	150	220	254	242	263	150	226	263
EY5	150	210	208	255	257	150	216	257

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)	
UY1	-1.400080	-1.457720	-0.892764	-0.838646	-0.844347	-1.521	0
UY2	-0.879857	-0.908745	-0.606973	-0.562252	-0.518192	-1.048	300
UY3	-0.618644	-0.628748	-0.464201	-0.414674	-0.383253	-0.823	450
UY4	-0.249500	-0.237522	-0.256987	-0.190670	-0.213180	-0.352	1000
UY5	-0.164781	-0.163475	-0.205476	-0.138604	-0.168710	-0.233	1400
UY6	-0.116104	-0.126486	-0.174564	-0.109237	-0.141914	-0.176	1800
UY7	-0.082265	-0.101974	-0.152320	-0.088922	-0.122971	-0.135	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	14	13	12	MIN	AVG	MAX
EY1	3000	5376	2788	2633	2835	2633	3326	5376
EY2	2000	1709	1520	1512	1522	1512	1653	2000
EY3	200	162	461	628	597	162	409	628
EY4	150	220	267	258	258	150	231	267
EY5	150	210	105	103	107	103	135	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)	
UY1	-1.400080	-1.457720	-1.155770	-1.040930	-1.039290	-1.521	0
UY2	-0.879857	-0.908745	-0.800631	-0.740493	-0.733357	-1.048	300
UY3	-0.618644	-0.628748	-0.657741	-0.627404	-0.616391	-0.823	450
UY4	-0.249500	-0.237522	-0.462877	-0.466094	-0.451364	-0.352	1000
UY5	-0.164781	-0.163475	-0.395526	-0.402767	-0.388443	-0.233	1400
UY6	-0.116104	-0.126486	-0.347272	-0.355677	-0.342167	-0.176	1800
UY7	-0.082265	-0.101974	-0.308162	-0.316628	-0.304097	-0.135	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	14	7	13	2	MIN	AVG	MAX
EY1	3000	2660	5376	8146	8854	2660	5607	8854
EY2	2000	2450	1709	3123	3100	1709	2476	3123
EY3	200	161	162	162	363	161	210	363
EY4	150	256	220	263	254	150	228	263
EY5	150	256	210	112	208	112	187	256

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)	
UY1	-1.400080	-1.391320	-1.457720	-1.355940	-0.892764	-1.521	0
UY2	-0.879857	-0.843251	-0.908745	-0.941322	-0.606973	-1.048	300
UY3	-0.618644	-0.556031	-0.628748	-0.699771	-0.464201	-0.823	450
UY4	-0.249500	-0.161683	-0.237522	-0.294353	-0.256987	-0.352	1000
UY5	-0.164781	-0.096549	-0.163475	-0.202398	-0.205476	-0.233	1400
UY6	-0.116104	-0.066234	-0.126486	-0.150780	-0.174564	-0.176	1800
UY7	-0.082265	-0.046724	-0.101974	-0.112001	-0.152320	-0.135	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD 1: 737 kPa

LOAD 2: 1090 kPa

LOAD 3: 1354 kPa

DEPTH (mm)	DEPTH (z/r0) RATIO	7	1	2	14	15	AVG.	STRESS RATIO (p/p0)	1	7	2	6	15	AVG.	STRESS RATIO (p/p0)	7	2	6	16	AVG.	STRESS RATIO (p/p0)
15	0.07	-0.686	-0.702	-0.692	-0.718	-0.719	-0.703	0.954	-1.038	-1.015	-1.023	-1.037	-1.040	-1.031	0.945	-1.318	-1.328	-1.346	-1.379	-1.344	0.992
54	0.24	-0.560	-0.593	-0.575	-0.668	-0.671	-0.614	0.833	-0.878	-0.829	-0.851	-0.861	-0.920	-0.868	0.796	-1.076	-1.105	-1.118	-1.288	-1.145	0.846
101	0.45	-0.416	-0.450	-0.439	-0.591	-0.593	-0.498	0.676	-0.666	-0.615	-0.649	-0.627	-0.769	-0.665	0.610	-0.799	-0.842	-0.814	-1.140	-0.892	0.659
207	0.92	-0.279	-0.308	-0.301	-0.427	-0.426	-0.348	0.472	-0.456	-0.412	-0.445	-0.414	-0.536	-0.453	0.415	-0.535	-0.578	-0.538	-0.816	-0.612	0.452
369	1.64	-0.168	-0.186	-0.181	-0.235	-0.233	-0.201	0.273	-0.276	-0.248	-0.268	-0.248	-0.302	-0.268	0.246	-0.322	-0.348	-0.322	-0.451	-0.360	0.266
531	2.36	-0.107	-0.114	-0.110	-0.121	-0.120	-0.114	0.155	-0.168	-0.158	-0.162	-0.152	-0.173	-0.163	0.149	-0.206	-0.210	-0.198	-0.244	-0.215	0.159
694	3.08	-0.074	-0.074	-0.070	-0.063	-0.062	-0.069	0.093	-0.109	-0.110	-0.103	-0.100	-0.106	-0.106	0.097	-0.143	-0.134	-0.130	-0.138	-0.137	0.101
803	3.57	-0.054	-0.052	-0.048	-0.039	-0.039	-0.047	0.063	-0.077	-0.080	-0.072	-0.071	-0.073	-0.075	0.069	-0.104	-0.093	-0.092	-0.089	-0.096	0.071
1600	7.11	-0.041	-0.039	-0.036	-0.030	-0.031	-0.035	0.048	-0.058	-0.061	-0.053	-0.055	-0.056	-0.056	0.052	-0.079	-0.069	-0.071	-0.065	-0.072	0.053
2600	11.56	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007	0.009	-0.010	-0.011	-0.009	-0.010	-0.010	-0.010	0.009	-0.014	-0.012	-0.013	-0.012	-0.013	0.010
3600	16.00	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.006	-0.005	-0.006	-0.006	-0.006	0.005	-0.008	-0.007	-0.008	-0.007	-0.008	0.006
4600	20.44	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.006	-0.005	-0.005	-0.005	-0.005	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH (z/r0) RATIO	7	1	14	13	12	AVG.	STRESS RATIO (p/p0)	1	7	14	13	12	AVG.	STRESS RATIO (p/p0)	12	16	11	15	AVG.	STRESS RATIO (p/p0)
15	0.07	-0.693	-0.709	-0.711	-0.724	-0.725	-0.712	0.967	-1.038	-1.015	-1.056	-1.062	-1.060	-0.929	0.853	-1.378	-1.380	-1.377	-1.381	-1.259	0.930
54	0.24	-0.566	-0.599	-0.624	-0.672	-0.675	-0.627	0.851	-0.878	-0.829	-0.966	-0.991	-0.984	-0.771	0.707	-1.286	-1.293	-1.283	-1.294	-1.089	0.804
101	0.45	-0.420	-0.455	-0.511	-0.592	-0.596	-0.515	0.699	-0.666	-0.615	-0.831	-0.877	-0.866	-0.538	0.494	-1.141	-1.149	-1.136	-1.151	-0.774	0.572
207	0.92	-0.282	-0.311	-0.355	-0.427	-0.429	-0.361	0.490	-0.456	-0.412	-0.585	-0.624	-0.614	-0.304	0.279	-0.825	-0.817	-0.821	-0.817	-0.431	0.318
369	1.64	-0.170	-0.188	-0.201	-0.237	-0.237	-0.206	0.280	-0.276	-0.248	-0.324	-0.339	-0.335	-0.171	0.157	-0.459	-0.442	-0.457	-0.440	-0.233	0.172
531	2.36	-0.108	-0.115	-0.112	-0.123	-0.122	-0.116	0.157	-0.168	-0.158	-0.177	-0.177	-0.177	-0.101	0.093	-0.242	-0.231	-0.242	-0.229	-0.128	0.095
694	3.08	-0.075	-0.074	-0.066	-0.064	-0.063	-0.068	0.093	-0.109	-0.110	-0.100	-0.093	-0.094	-0.066	0.060	-0.128	-0.122	-0.129	-0.122	-0.078	0.058
803	3.57	-0.055	-0.052	-0.043	-0.038	-0.038	-0.045	0.062	-0.077	-0.080	-0.061	-0.055	-0.056	-0.047	0.043	-0.075	-0.071	-0.075	-0.071	-0.054	0.040
1600	7.11	-0.041	-0.040	-0.031	-0.028	-0.029	-0.034	0.046	-0.058	-0.061	-0.041	-0.037	-0.038	-0.009	0.008	-0.050	-0.048	-0.051	-0.048	-0.010	0.008
2600	11.56	-0.008	-0.007	-0.006	-0.006	-0.006	-0.006	0.009	-0.010	-0.011	-0.008	-0.007	-0.008	-0.005	0.005	-0.010	-0.010	-0.010	-0.010	-0.007	0.005
3600	16.00	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.006	-0.005	-0.005	-0.005	-0.004	0.004	-0.006	-0.006	-0.006	-0.006	-0.005	0.004
4600	20.44	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	0.004

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH (z/r0) RATIO	7	1	16	12	13	AVG.	STRESS RATIO (p/p0)	1	14	7	13	2	AVG.	STRESS RATIO (p/p0)	16	10	9	11	AVG.	STRESS RATIO (p/p0)
15	0.07	-0.686	-0.702	-0.715	-0.716	-0.717	-0.707	0.960	-1.038	-1.039	-1.015	-1.008	-1.023	-1.025	0.940	-1.347	-1.330	-1.365	-1.345	-1.346	0.994
54	0.24	-0.560	-0.593	-0.660	-0.663	-0.666	-0.628	0.853	-0.878	-0.866	-0.829	-0.780	-0.851	-0.841	0.771	-1.122	-1.050	-1.146	-1.136	-1.109	0.819
101	0.45	-0.416	-0.450	-0.574	-0.581	-0.586	-0.522	0.708	-0.666	-0.629	-0.615	-0.523	-0.649	-0.617	0.566	-0.817	-0.700	-0.819	-0.864	-0.789	0.583
207	0.92	-0.279	-0.308	-0.403	-0.419	-0.423	-0.366	0.497	-0.456	-0.422	-0.412	-0.343	-0.445	-0.416	0.381	-0.553	-0.458	-0.549	-0.595	-0.530	0.392
369	1.64	-0.168	-0.186	-0.217	-0.234	-0.235	-0.208	0.282	-0.276	-0.262	-0.248	-0.227	-0.268	-0.256	0.235	-0.347	-0.304	-0.349	-0.361	-0.338	0.250
531	2.36	-0.107	-0.114	-0.113	-0.122	-0.121	-0.115	0.157	-0.168	-0.170	-0.158	-0.153	-0.162	-0.162	0.149	-0.218	-0.202	-0.219	-0.213	-0.215	0.158
694	3.08	-0.074	-0.074	-0.060	-0.063	-0.062	-0.067	0.090	-0.109	-0.120	-0.110	-0.107	-0.103	-0.110	0.101	-0.147	-0.142	-0.144	-0.132	-0.144	0.106
803	3.57	-0.054	-0.052	-0.036	-0.037	-0.037	-0.043	0.059	-0.077	-0.090	-0.080	-0.074	-0.072	-0.079	0.072	-0.109	-0.106	-0.102	-0.092	-0.105	0.078
1600	7.11	-0.041	-0.039	-0.026	-0.027	-0.027	-0.032	0.043	-0.058	-0.069	-0.061	-0.052	-0.053	-0.058	0.054	-0.087	-0.083	-0.078	-0.072	-0.083	0.061
2600	11.56	-0.007	-0.007	-0.005	-0.005	-0.005	-0.006	0.008	-0.010	-0.012	-0.011	-0.010	-0.009	-0.010	0.010	-0.015	-0.014	-0.013	-0.013	-0.014	0.011
3600	16.00	-0.004	-0.004	-0.003	-0.003	-0.003	-0.004	0.005	-0.006	-0.007	-0.006	-0.006	-0.005	-0.006	0.006	-0.008	-0.008	-0.008	-0.008	-0.008	0.006
4600	20.44	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.005	-0.004	-0.004	-0.004	-0.004	0.004	-0.006	-0.006	-0.005	-0.006	-0.006	0.004

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 732 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	1	2	14	15	MIN	AVG	MAX
EY1	5376	3000	8854	2741	2555	2555	4505	8854
EY2	1709	2000	3100	1512	1509	1509	1966	3100
EY3	162	200	363	606	618	162	390	618
EY4	220	150	254	152	151	150	185	254
EY5	210	150	208	166	172	150	181	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)
UY1	-0.985631	-0.946660	-0.603639	-0.612265	-0.592456	0
UY2	-0.614445	-0.594913	-0.410403	-0.404957	-0.387567	300
UY3	-0.425126	-0.418294	-0.313868	-0.326533	-0.310252	450
UY4	-0.160600	-0.168699	-0.173761	-0.217250	-0.201637	1000
UY5	-0.110533	-0.111416	-0.138932	-0.177726	-0.162186	1400
UY6	-0.085523	-0.078503	-0.118031	-0.150805	-0.135456	1800
UY7	-0.068949	-0.055623	-0.102991	-0.130375	-0.115316	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	7	1	11	8	MIN	AVG	MAX
EY1	3232	5376	3000	3257	7880	3000	4549	7880
EY2	1556	1709	2000	1551	2896	1551	1942	2896
EY3	154	162	200	154	562	154	247	562
EY4	279	220	150	169	280	150	220	280
EY5	128	210	150	132	102	102	144	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)
UY1	-1.110230	-0.985631	-0.946660	-1.211790	-0.633182	0
UY2	-0.687632	-0.614445	-0.594913	-0.789179	-0.477395	300
UY3	-0.474459	-0.425126	-0.418294	-0.576213	-0.405157	450
UY4	-0.187850	-0.160600	-0.168699	-0.277248	-0.294310	1000
UY5	-0.132696	-0.110533	-0.111416	-0.212938	-0.254749	1400
UY6	-0.100830	-0.085523	-0.078503	-0.177025	-0.225682	1800
UY7	-0.076913	-0.068949	-0.055623	-0.151846	-0.201536	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	7	1	16	12	13	MIN	AVG	MAX
EY1	5376	3000	2832	2835	2660	2660	3341	5376
EY2	1709	2000	1522	1522	1510	1510	1653	2000
EY3	162	200	534	557	570	162	405	570
EY4	220	150	175	179	179	150	181	220
EY5	210	150	108	107	103	103	135	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEF. (mm)					SENSOR DISTANCE (mm)
UY1	-0.985631	-0.946660	-0.741012	-0.733222	-0.739396	0
UY2	-0.614445	-0.594913	-0.520898	-0.513219	-0.519828	300
UY3	-0.425126	-0.418294	-0.433971	-0.427290	-0.434675	450
UY4	-0.160600	-0.168699	-0.308355	-0.304890	-0.311530	1000
UY5	-0.110533	-0.111416	-0.261019	-0.258267	-0.263456	1400
UY6	-0.085523	-0.078503	-0.226921	-0.224547	-0.228541	1800
UY7	-0.068949	-0.055623	-0.199442	-0.197353	-0.200352	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1075 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	2	6	15	MIN	AVG	MAX
EY1	3000	5376	8854	5899	7508	3000	6127	8854
EY2	2000	1709	3100	4450	1510	1510	2554	4450
EY3	200	162	363	325	441	162	298	441
EY4	150	220	254	242	263	150	226	263
EY5	150	210	208	255	257	150	216	257

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.400080	-1.457720	-0.892764	-0.838646	-0.844347	-1.312	0
UY2	-0.879857	-0.908745	-0.606973	-0.562252	-0.518192	-0.812	300
UY3	-0.618644	-0.628748	-0.464201	-0.414674	-0.383253	-0.567	450
UY4	-0.249500	-0.237522	-0.256987	-0.190670	-0.213180	-0.230	1000
UY5	-0.164781	-0.163475	-0.205476	-0.138604	-0.168710	-0.154	1400
UY6	-0.116104	-0.126486	-0.174564	-0.109237	-0.141914	-0.115	1800
UY7	-0.082265	-0.101974	-0.152320	-0.088922	-0.122971	-0.087	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	14	13	12	MIN	AVG	MAX
EY1	3000	5376	2788	2633	2835	2633	3326	5376
EY2	2000	1709	1520	1512	1522	1512	1653	2000
EY3	200	162	461	628	597	162	409	628
EY4	150	220	267	258	258	150	231	267
EY5	150	210	105	103	107	103	135	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.400080	-1.457720	-1.155770	-1.040930	-1.039290	-1.312	0
UY2	-0.879857	-0.908745	-0.800631	-0.740493	-0.733357	-0.812	300
UY3	-0.618644	-0.628748	-0.657741	-0.627404	-0.616391	-0.567	450
UY4	-0.249500	-0.237522	-0.462877	-0.466094	-0.451364	-0.230	1000
UY5	-0.164781	-0.163475	-0.395526	-0.402767	-0.388443	-0.154	1400
UY6	-0.116104	-0.126486	-0.347272	-0.355677	-0.342167	-0.115	1800
UY7	-0.082265	-0.101974	-0.308162	-0.316628	-0.304097	-0.087	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	14	7	13	2	MIN	AVG	MAX
EY1	3000	2660	5376	8146	8854	2660	5607	8854
EY2	2000	2450	1709	3123	3100	1709	2476	3123
EY3	200	161	162	162	363	161	210	363
EY4	150	256	220	263	254	150	228	263
EY5	150	256	210	112	208	112	187	256

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.400080	-1.391320	-1.457720	-1.355940	-0.892764	-1.312	0
UY2	-0.879857	-0.843251	-0.908745	-0.941322	-0.606973	-0.812	300
UY3	-0.618644	-0.556031	-0.628748	-0.699771	-0.464201	-0.567	450
UY4	-0.249500	-0.161683	-0.237522	-0.294353	-0.256987	-0.230	1000
UY5	-0.164781	-0.096549	-0.163475	-0.202398	-0.205476	-0.154	1400
UY6	-0.116104	-0.066234	-0.126486	-0.150780	-0.174564	-0.115	1800
UY7	-0.082265	-0.046724	-0.101974	-0.112001	-0.152320	-0.087	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1415 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	6	2	15	5	MIN	AVG	MAX
EY1	3000	5376	8854	2610	8773	2610	5723	8854
EY2	2000	1709	3100	1628	1914	1628	2070	3100
EY3	200	162	363	648	567	162	388	648
EY4	150	220	254	296	257	150	235	296
EY5	150	210	208	216	218	150	200	218

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL (mm)					DISTANCE (mm)	
UY1	-1.817540	-1.892360	-1.158950	-1.004620	-0.978399	-1.517	0
UY2	-1.142200	-1.179700	-0.787951	-0.632550	-0.643479	-0.975	300
UY3	-0.803102	-0.816219	-0.602610	-0.494924	-0.503795	-0.704	450
UY4	-0.323893	-0.308343	-0.333612	-0.318173	-0.314665	-0.309	1000
UY5	-0.213914	-0.212217	-0.266742	-0.260854	-0.256645	-0.212	1400
UY6	-0.150722	-0.164200	-0.226613	-0.222644	-0.218758	-0.158	1800
UY7	-0.106793	-0.132379	-0.197737	-0.193707	-0.190383	-0.119	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	12	16	11	15	MIN	AVG	MAX
EY1	3000	2835	2545	2923	2553	2545	2771	3000
EY2	2000	1522	1508	1527	1508	1508	1613	2000
EY3	200	640	658	632	668	200	560	668
EY4	150	297	278	297	300	150	264	300
EY5	150	107	104	109	106	104	115	150

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL (mm)					DISTANCE (mm)	
UY1	-1.817540	-1.308910	-1.304940	-1.299390	-1.285420	-1.517	0
UY2	-1.142200	-0.922812	-0.925583	-0.912355	-0.911180	-0.975	300
UY3	-0.803102	-0.778138	-0.785060	-0.766654	-0.773087	-0.704	450
UY4	-0.323893	-0.576605	-0.585048	-0.564508	-0.575868	-0.309	1000
UY5	-0.213914	-0.498439	-0.505872	-0.486972	-0.497495	-0.212	1400
UY6	-0.150722	-0.440386	-0.446617	-0.429669	-0.438804	-0.158	1800
UY7	-0.106793	-0.392321	-0.397177	-0.382406	-0.389815	-0.119	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	16	10	9	11	MIN	AVG	MAX
EY1	3874	3834	5489	2660	4671	2660	4106	5489
EY2	3711	3513	3972	4005	3176	3176	3675	4005
EY3	174	233	171	218	305	171	220	305
EY4	164	161	150	150	150	150	155	164
EY5	274	265	189	177	179	177	217	274

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED					SENSOR	
	DEFL (mm)					DISTANCE (mm)	
UY1	-1.604850	-1.435280	-1.659660	-1.663010	-1.308000	-1.517	0
UY2	-1.039790	-0.919206	-1.132390	-1.127950	-0.853700	-0.975	300
UY3	-0.718751	-0.645089	-0.822259	-0.835469	-0.622542	-0.704	450
UY4	-0.228241	-0.246086	-0.306108	-0.393019	-0.278149	-0.309	1000
UY5	-0.144030	-0.166276	-0.199316	-0.296402	-0.188387	-0.212	1400
UY6	-0.108374	-0.126532	-0.148147	-0.243435	-0.134783	-0.158	1800
UY7	-0.087242	-0.101764	-0.115373	-0.207529	-0.097411	-0.119	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD 1: 732 kPa

LOAD 2: 1075 kPa

LOAD 3: 1415 kPa

DEPTH (mm)	DEPTH RATIO (z/ro)	7	1	2	14	15	AVG.	STRESS RATIO (p/po)	1	7	2	6	15	AVG.	STRESS RATIO (p/po)	1	6	2	15	5	AVG.	STRESS RATIO (p/po)
17	0.08	-0.686	-0.702	-0.692	-0.718	-0.719	-0.703	0.961	-1.038	-1.015	-1.023	-1.037	-1.040	-1.031	0.959	-1.347	-1.318	-1.328	-1.379	-1.351	-1.345	0.950
64	0.28	-0.560	-0.593	-0.575	-0.668	-0.671	-0.614	0.838	-0.878	-0.829	-0.851	-0.861	-0.920	-0.868	0.807	-1.139	-1.076	-1.105	-1.288	-1.200	-1.162	0.821
122	0.54	-0.416	-0.450	-0.439	-0.591	-0.593	-0.498	0.680	-0.666	-0.615	-0.649	-0.627	-0.769	-0.665	0.619	-0.865	-0.799	-0.842	-1.140	-1.006	-0.930	0.658
218	0.97	-0.279	-0.308	-0.301	-0.427	-0.426	-0.348	0.476	-0.456	-0.412	-0.445	-0.414	-0.536	-0.453	0.421	-0.592	-0.535	-0.578	-0.816	-0.695	-0.643	0.454
355	1.58	-0.168	-0.186	-0.181	-0.235	-0.233	-0.201	0.274	-0.276	-0.248	-0.268	-0.248	-0.302	-0.268	0.250	-0.358	-0.322	-0.348	-0.451	-0.381	-0.372	0.263
492	2.19	-0.107	-0.114	-0.110	-0.121	-0.120	-0.114	0.156	-0.168	-0.158	-0.162	-0.152	-0.173	-0.163	0.151	-0.218	-0.206	-0.210	-0.244	-0.210	-0.218	0.154
630	2.80	-0.074	-0.074	-0.070	-0.063	-0.062	-0.069	0.094	-0.109	-0.110	-0.103	-0.100	-0.106	-0.106	0.098	-0.142	-0.143	-0.134	-0.138	-0.122	-0.136	0.096
823	3.66	-0.054	-0.052	-0.048	-0.039	-0.039	-0.047	0.064	-0.077	-0.080	-0.072	-0.071	-0.073	-0.075	0.069	-0.100	-0.104	-0.093	-0.089	-0.081	-0.093	0.066
1068	4.75	-0.041	-0.039	-0.036	-0.030	-0.031	-0.035	0.048	-0.058	-0.061	-0.053	-0.055	-0.056	-0.056	0.053	-0.075	-0.079	-0.069	-0.065	-0.061	-0.070	0.049
2690	11.96	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007	0.009	-0.010	-0.011	-0.009	-0.010	-0.010	-0.010	0.009	-0.014	-0.014	-0.012	-0.012	-0.011	-0.013	0.009
3690	16.40	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.006	-0.005	-0.006	-0.006	-0.006	0.005	-0.008	-0.008	-0.007	-0.007	-0.007	-0.007	0.005

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	7	1	14	13	12	AVG.	STRESS RATIO (p/po)	1	7	14	13	12	AVG.	STRESS RATIO (p/po)	1	12	16	11	15	AVG.	STRESS RATIO (p/po)
17	0.08	-0.686	-0.702	-0.704	-0.717	-0.718	-0.705	0.956	-1.038	-1.015	-1.056	-1.062	-1.060	-1.046	0.973	-1.347	-1.378	-1.380	-1.377	-1.381	-	-
64	0.28	-0.560	-0.593	-0.618	-0.666	-0.668	-0.621	0.841	-0.878	-0.829	-0.966	-0.991	-0.984	-0.929	0.865	-1.139	-1.286	-1.293	-1.283	-1.294	-1.259	0.890
122	0.54	-0.416	-0.450	-0.506	-0.586	-0.590	-0.510	0.691	-0.666	-0.615	-0.831	-0.877	-0.866	-0.771	0.717	-0.865	-1.141	-1.149	-1.136	-1.151	-1.009	0.769
218	0.97	-0.279	-0.308	-0.352	-0.423	-0.425	-0.357	0.484	-0.456	-0.412	-0.585	-0.624	-0.614	-0.538	0.501	-0.592	-0.825	-0.817	-0.821	-0.817	-0.774	0.547
355	1.58	-0.168	-0.186	-0.199	-0.235	-0.234	-0.204	0.277	-0.276	-0.248	-0.324	-0.339	-0.335	-0.304	0.283	-0.358	-0.459	-0.442	-0.457	-0.440	-0.431	0.305
492	2.19	-0.107	-0.114	-0.111	-0.122	-0.121	-0.115	0.156	-0.168	-0.158	-0.177	-0.177	-0.177	-0.171	0.159	-0.218	-0.242	-0.231	-0.242	-0.229	-0.233	0.164
630	2.80	-0.074	-0.074	-0.065	-0.063	-0.062	-0.068	0.092	-0.109	-0.110	-0.100	-0.093	-0.094	-0.101	0.094	-0.142	-0.128	-0.122	-0.129	-0.122	-0.128	0.091
823	3.66	-0.054	-0.052	-0.042	-0.038	-0.038	-0.045	0.061	-0.077	-0.080	-0.061	-0.055	-0.056	-0.066	0.061	-0.100	-0.075	-0.071	-0.075	-0.071	-0.078	0.055
1068	4.75	-0.041	-0.039	-0.031	-0.028	-0.029	-0.034	0.046	-0.058	-0.061	-0.041	-0.037	-0.038	-0.047	0.044	-0.075	-0.050	-0.048	-0.051	-0.048	-0.054	0.038
2690	11.96	-0.007	-0.007	-0.006	-0.006	-0.006	-0.006	0.009	-0.010	-0.011	-0.008	-0.007	-0.008	-0.009	0.008	-0.014	-0.010	-0.010	-0.010	-0.010	-0.010	0.007
3690	16.40	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.006	-0.006	-0.005	-0.005	-0.005	-0.005	0.005	-0.008	-0.006	-0.006	-0.006	-0.006	-0.007	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	7	1	16	12	13	AVG.	STRESS RATIO (p/po)	1	14	7	13	2	AVG.	STRESS RATIO (p/po)	15	16	10	9	11	AVG.	STRESS RATIO (p/po)
17	0.08	-0.686	-0.702	-0.715	-0.716	-0.717	-0.707	0.966	-1.038	-1.039	-1.015	-1.008	-1.023	-1.025	0.953	-1.345	-1.347	-1.330	-1.365	-1.345	-1.346	0.952
64	0.28	-0.560	-0.593	-0.660	-0.663	-0.666	-0.628	0.858	-0.878	-0.866	-0.829	-0.780	-0.851	-0.841	0.782	-1.089	-1.122	-1.050	-1.146	-1.136	-1.109	0.784
122	0.54	-0.416	-0.450	-0.574	-0.581	-0.586	-0.522	0.713	-0.666	-0.629	-0.615	-0.523	-0.649	-0.617	0.574	-0.746	-0.817	-0.700	-0.819	-0.864	-0.789	0.558
218	0.97	-0.279	-0.308	-0.403	-0.419	-0.423	-0.366	0.501	-0.456	-0.422	-0.412	-0.343	-0.445	-0.416	0.387	-0.496	-0.553	-0.458	-0.549	-0.595	-0.530	0.375
355	1.58	-0.168	-0.186	-0.217	-0.234	-0.235	-0.208	0.284	-0.276	-0.262	-0.248	-0.227	-0.268	-0.256	0.238	-0.329	-0.347	-0.304	-0.349	-0.361	-0.338	0.239
492	2.19	-0.107	-0.114	-0.113	-0.122	-0.121	-0.115	0.158	-0.168	-0.170	-0.158	-0.153	-0.162	-0.162	0.151	-0.220	-0.218	-0.202	-0.219	-0.213	-0.215	0.152
630	2.80	-0.074	-0.074	-0.060	-0.063	-0.062	-0.067	0.091	-0.109	-0.120	-0.110	-0.107	-0.103	-0.110	0.102	-0.156	-0.147	-0.142	-0.144	-0.132	-0.144	0.102
823	3.66	-0.054	-0.052	-0.036	-0.037	-0.037	-0.043	0.059	-0.077	-0.090	-0.080	-0.074	-0.072	-0.079	0.073	-0.118	-0.109	-0.106	-0.102	-0.092	-0.105	0.075
1068	4.75	-0.041	-0.039	-0.026	-0.027	-0.027	-0.032	0.044	-0.058	-0.069	-0.061	-0.052	-0.053	-0.058	0.054	-0.094	-0.087	-0.083	-0.078	-0.072	-0.083	0.058
2690	11.96	-0.007	-0.007	-0.005	-0.005	-0.005	-0.006	0.008	-0.010	-0.012	-0.011	-0.010	-0.009	-0.010	0.010	-0.016	-0.015	-0.014	-0.013	-0.013	-0.014	0.010
3690	16.40	-0.004	-0.004	-0.003	-0.003	-0.003	-0.004	0.005	-0.006	-0.007	-0.006	-0.006	-0.005	-0.006	0.006	-0.009	-0.008	-0.008	-0.008	-0.008	-0.008	0.006

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 733 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	15	10	13	MIN	AVG	MAX
EY1	3000	5376	3583	4137	2882	2882	3796	5376
EY2	2000	1709	3574	1595	1567	1567	2089	3574
EY3	200	162	352	595	652	162	392	652
EY4	150	220	156	180	153	150	172	220
EY5	150	210	134	134	128	128	151	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.855903	-0.868037	-0.703858	-0.614061	-0.635313	-0.793	0
UY2	-0.568589	-0.570668	-0.525114	-0.439928	-0.456514	-0.594	300
UY3	-0.416853	-0.411871	-0.431017	-0.367802	-0.385179	-0.478	450
UY4	-0.172500	-0.162460	-0.269153	-0.256306	-0.272848	-0.203	1000
UY5	-0.112790	-0.110961	-0.219610	-0.215166	-0.228979	-0.127	1400
UY6	-0.079608	-0.086186	-0.188102	-0.186551	-0.198008	-0.092	1800
UY7	-0.056822	-0.069996	-0.164706	-0.164154	-0.173649	-0.070	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	7	13	11	8	MIN	AVG	MAX
EY1	3000	5376	8146	2641	7880	2641	5409	8146
EY2	2000	1709	2463	4345	2896	1709	2682	4345
EY3	200	162	162	166	562	162	250	562
EY4	150	220	150	150	280	150	190	280
EY5	150	210	112	115	102	102	138	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.855903	-0.868037	-0.884121	-0.972674	-0.585571	-0.793	0
UY2	-0.568589	-0.570668	-0.634369	-0.727944	-0.453799	-0.594	300
UY3	-0.416853	-0.411871	-0.487551	-0.580587	-0.389810	-0.478	450
UY4	-0.172500	-0.162460	-0.214655	-0.303262	-0.284236	-0.203	1000
UY5	-0.112790	-0.110961	-0.142233	-0.232060	-0.247814	-0.127	1400
UY6	-0.079608	-0.086186	-0.102866	-0.193534	-0.221841	-0.092	1800
UY7	-0.056822	-0.069996	-0.075380	-0.166635	-0.200419	-0.070	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	7	14	11	13	MIN	AVG	MAX
EY1	3000	5376	3745	2923	2666	2666	3542	5376
EY2	2000	1709	1838	1527	1514	1514	1718	2000
EY3	200	162	484	622	631	162	420	631
EY4	150	220	191	158	182	150	180	220
EY5	150	210	107	109	110	107	137	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.855903	-0.868037	-0.705115	-0.678931	-0.671715	-0.793	0
UY2	-0.568589	-0.570668	-0.518376	-0.496475	-0.486596	-0.594	300
UY3	-0.416853	-0.411871	-0.435692	-0.423354	-0.413555	-0.478	450
UY4	-0.172500	-0.162460	-0.306452	-0.307546	-0.300966	-0.203	1000
UY5	-0.112790	-0.110961	-0.261148	-0.261780	-0.257343	-0.127	1400
UY6	-0.079608	-0.086186	-0.229560	-0.228920	-0.226041	-0.092	1800
UY7	-0.056822	-0.069996	-0.204454	-0.202566	-0.200846	-0.070	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1083 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	1	7	15	10	2	MIN	AVG	MAX
EY1	3000	5376	6325	4137	8854	3000	5376	8854
EY2	2000	1709	1511	1595	3100	1511	1983	3100
EY3	200	162	591	595	363	162	382	595
EY4	150	220	151	180	254	150	191	254
EY5	150	210	140	134	208	134	168	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.264590	-1.282520	-0.830381	-0.914991	-0.814596	-1.072	0
UY2	-0.840085	-0.843156	-0.581040	-0.653729	-0.581234	-0.082	300
UY3	-0.615896	-0.608535	-0.475976	-0.545029	-0.458416	-0.665	450
UY4	-0.254867	-0.240033	-0.310645	-0.378037	-0.257370	-0.301	1000
UY5	-0.166647	-0.163944	-0.248269	-0.317000	-0.204678	-0.196	1400
UY6	-0.117620	-0.127339	-0.204645	-0.274712	-0.174152	-0.142	1800
UY7	-0.083954	-0.103418	-0.170434	-0.241738	-0.152499	-0.106	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	11	12	13	16	15	MIN	AVG	MAX
EY1	2923	2835	3145	2702	2748	2702	2870	3145
EY2	1527	1522	1513	1508	1508	1508	1516	1527
EY3	649	657	681	674	673	649	667	681
EY4	199	225	273	293	291	199	256	293
EY5	109	107	103	101	101	101	104	109

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.980241	-0.974560	-0.953996	-0.946818	-0.946062	-1.072	0
UY2	-0.711287	-0.706362	-0.695344	-0.680257	-0.679912	-0.082	300
UY3	-0.604630	-0.601224	-0.594924	-0.577998	-0.577618	-0.665	450
UY4	-0.440651	-0.442730	-0.446341	-0.428969	-0.428447	-0.301	1000
UY5	-0.377052	-0.381830	-0.389503	-0.372335	-0.371792	-0.196	1400
UY6	-0.331405	-0.337809	-0.347845	-0.330645	-0.330107	-0.142	1800
UY7	-0.294693	-0.302032	-0.313398	-0.295988	-0.295471	-0.106	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	1	7	2	8	6	MIN	AVG	MAX
EY1	3000	5376	8854	7880	5899	3000	6202	8854
EY2	2000	1709	3100	2896	4450	1709	2831	4450
EY3	200	162	363	562	325	162	322	562
EY4	150	220	254	280	242	150	229	280
EY5	150	210	208	102	255	102	185	255

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.264590	-1.282520	-0.814596	-0.865175	-0.755128	-1.072	0
UY2	-0.840085	-0.843156	-0.581234	-0.670483	-0.534264	-0.082	300
UY3	-0.615896	-0.608535	-0.458416	-0.575940	-0.410362	-0.665	450
UY4	-0.254867	-0.240033	-0.257370	-0.419956	-0.194887	-0.301	1000
UY5	-0.166647	-0.163944	-0.204678	-0.366142	-0.140179	-0.196	1400
UY6	-0.117620	-0.127339	-0.174152	-0.327767	-0.110262	-0.142	1800
UY7	-0.083954	-0.103418	-0.152499	-0.296117	-0.089919	-0.106	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1409 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	13	2	10	MIN	AVG	MAX
EY1	3000	5376	3254	8854	4137	3000	4924	8854
EY2	2000	1709	1509	3100	1595	1509	1983	3100
EY3	200	162	695	363	641	162	412	695
EY4	150	220	168	254	180	150	194	254
EY5	150	210	102	208	134	102	161	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.645250	-1.668570	-1.147130	-1.059800	-1.158580	-0.130	0
UY2	-1.092960	-1.096960	-0.812996	-0.756195	-0.831605	-0.102	300
UY3	-0.801290	-0.791713	-0.681195	-0.596407	-0.696662	-0.836	450
UY4	-0.331586	-0.312286	-0.470257	-0.334843	-0.488400	-0.400	1000
UY5	-0.216810	-0.213293	-0.382815	-0.266289	-0.410709	-0.262	1400
UY6	-0.153026	-0.165670	-0.318455	-0.226574	-0.356461	-0.189	1800
UY7	-0.109225	-0.134549	-0.265808	-0.198403	-0.313981	-0.141	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	11	12	14	16	MIN	AVG	MAX
EY1	2633	2923	2835	2616	2596	2596	2721	2923
EY2	1588	1764	1734	1577	1568	1568	1646	1764
EY3	693	669	676	694	691	669	685	694
EY4	174	186	215	194	184	174	191	215
EY5	103	109	107	118	121	103	112	121

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.302290	-1.251320	-1.244490	-1.210200	-1.209700	-0.130	0
UY2	-0.960517	-0.921810	-0.914136	-0.869669	-0.867822	-0.102	300
UY3	-0.825943	-0.787723	-0.781647	-0.736996	-0.734575	-0.836	450
UY4	-0.612298	-0.575650	-0.577028	-0.532299	-0.528145	-0.400	1000
UY5	-0.525313	-0.492221	-0.497511	-0.451916	-0.447021	-0.262	1400
UY6	-0.461972	-0.432170	-0.439912	-0.394354	-0.389129	-0.189	1800
UY7	-0.410632	-0.383871	-0.393104	-0.348307	-0.343026	-0.141	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	16	14	9	1	MIN	AVG	MAX
EY1	2560	8062	2530	2660	3000	2530	3762	8062
EY2	3822	3887	2558	2297	2000	2000	2913	3887
EY3	250	179	278	275	200	179	236	278
EY4	288	292	297	256	150	150	257	297
EY5	115	105	115	115	150	105	120	150

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.357180	-1.437430	-1.360480	-1.396120	-1.645250	-0.130	0
UY2	-0.950769	-1.070930	-0.920572	-0.930632	-1.092960	-0.102	300
UY3	-0.730417	-0.847828	-0.700119	-0.700528	-0.801290	-0.836	450
UY4	-0.367786	-0.418825	-0.363808	-0.349092	-0.331586	-0.400	1000
UY5	-0.276745	-0.305574	-0.276731	-0.254953	-0.216810	-0.262	1400
UY6	-0.220547	-0.243104	-0.220710	-0.194616	-0.153026	-0.189	1800
UY7	-0.176631	-0.196608	-0.176463	-0.147774	-0.109225	-0.141	2250



ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 789 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	7	15	2	14	MIN	AVG	MAX
EY1	3000	5376	2616	8854	2788	2616	4527	8854
EY2	2000	1709	1509	3100	1520	1509	1968	3100
EY3	200	162	537	363	599	162	372	599
EY4	150	220	155	254	165	150	189	254
EY5	150	210	230	208	240	150	208	240

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.957403	-0.980936	-0.635850	-0.612453	-0.588207	-0.803	0
UY2	-0.623534	-0.632201	-0.409926	-0.428781	-0.379624	-0.520	300
UY3	-0.450334	-0.449240	-0.320359	-0.334089	-0.298807	-0.389	450
UY4	-0.184865	-0.174370	-0.192670	-0.186390	-0.183110	-0.171	1000
UY5	-0.121877	-0.119926	-0.150326	-0.148936	-0.143695	-0.122	1400
UY6	-0.086445	-0.093474	-0.123398	-0.127065	-0.118326	-0.096	1800
UY7	-0.061993	-0.076072	-0.104346	-0.111497	-0.100192	-0.074	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	11	1	8	7	MIN	AVG	MAX
EY1	6912	8174	3000	7880	5376	3000	6268	8174
EY2	4804	4345	2000	2896	1709	1709	3151	4804
EY3	329	166	200	562	162	162	284	562
EY4	182	259	150	280	220	150	218	280
EY5	105	115	150	102	210	102	136	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.695079	-0.915682	-0.957403	-0.635895	-0.980936	-0.803	0
UY2	-0.519233	-0.690878	-0.623534	-0.485109	-0.632201	-0.520	300
UY3	-0.419226	-0.551620	-0.450334	-0.413598	-0.449240	-0.389	450
UY4	-0.239223	-0.291307	-0.184865	-0.301526	-0.174370	-0.171	1000
UY5	-0.184968	-0.230603	-0.121877	-0.264142	-0.119926	-0.122	1400
UY6	-0.149937	-0.199759	-0.086445	-0.237574	-0.093474	-0.096	1800
UY7	-0.122800	-0.177129	-0.061993	-0.215688	-0.076072	-0.074	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	7	2	15	6	MIN	AVG	MAX
EY1	3000	5376	8854	2744	5899	2744	5175	8854
EY2	2000	1709	3100	1508	4450	1508	2553	4450
EY3	200	162	363	667	325	162	343	667
EY4	150	220	254	159	242	150	205	254
EY5	150	210	208	173	255	150	199	255

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.957403	-0.980936	-0.612453	-0.616498	-0.573047	-0.803	0
UY2	-0.623534	-0.632201	-0.428781	-0.418347	-0.397950	-0.520	300
UY3	-0.450334	-0.449240	-0.334089	-0.342674	-0.301363	-0.389	450
UY4	-0.184865	-0.174370	-0.186390	-0.229502	-0.141644	-0.171	1000
UY5	-0.121877	-0.119926	-0.148936	-0.187004	-0.102545	-0.122	1400
UY6	-0.086445	-0.093474	-0.127065	-0.157897	-0.080917	-0.096	1800
UY7	-0.061993	-0.076072	-0.111497	-0.135766	-0.066111	-0.074	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1249 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	6	11	12	5	MIN	AVG	MAX
EY1	8854	5899	2923	3316	8773	2923	5953	8854
EY2	3100	4450	1527	1523	1914	1523	1503	4450
EY3	363	325	685	689	567	325	526	689
EY4	254	242	209	232	257	209	239	257
EY5	208	255	219	216	218	208	223	255

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-0.969523	-0.907144	-0.865714	-0.853653	-0.837249	-1.187	0
UY2	-0.678767	-0.629961	-0.565619	-0.555204	-0.563286	-0.754	300
UY3	-0.528868	-0.477062	-0.452628	-0.443568	-0.445608	-0.580	450
UY4	-0.295058	-0.224225	-0.291905	-0.288838	-0.278739	-0.279	1000
UY5	-0.235768	-0.162330	-0.235823	-0.235955	-0.227625	-0.200	1400
UY6	-0.201145	-0.128094	-0.198803	-0.200863	-0.194699	-0.156	1800
UY7	-0.176501	-0.104655	-0.171487	-0.174617	-0.170259	-0.121	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	8	10	2	6	MIN	AVG	MAX
EY1	2923	7880	4137	8854	5899	2923	5938	8854
EY2	1729	2896	1595	3100	4450	1595	2754	4450
EY3	676	562	653	363	325	325	516	676
EY4	295	280	283	254	242	242	271	295
EY5	110	102	134	208	255	102	162	255

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.052710	-1.006630	-0.980064	-0.969523	-0.907144	-1.187	0
UY2	-0.754895	-0.767935	-0.681133	-0.678767	-0.629961	-0.754	300
UY3	-0.639525	-0.654733	-0.564194	-0.528868	-0.477062	-0.580	450
UY4	-0.475730	-0.477321	-0.402566	-0.295058	-0.224225	-0.279	1000
UY5	-0.415960	-0.418141	-0.346772	-0.235768	-0.162330	-0.200	1400
UY6	-0.372636	-0.376083	-0.307533	-0.201145	-0.128094	-0.156	1800
UY7	-0.336988	-0.341438	-0.276057	-0.176501	-0.104655	-0.121	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	16	9	15	1	MIN	AVG	MAX
EY1	4158	5430	8524	5334	8854	4158	6460	8854
EY2	2784	2250	1815	2561	3100	1815	2502	3100
EY3	214	310	168	217	363	168	254	363
EY4	256	271	289	257	254	254	265	289
EY5	212	274	263	186	208	186	229	274

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL.(mm)					SENSOR DISTANCE(mm)	
UY1	-1.295200	-1.043860	-1.346960	-1.319110	-0.969523	-1.187	0
UY2	-0.869221	-0.675931	-0.847580	-0.896071	-0.678767	-0.754	300
UY3	-0.639251	-0.494593	-0.580408	-0.669162	-0.528868	-0.580	450
UY4	-0.292784	-0.236589	-0.185066	-0.323434	-0.295058	-0.279	1000
UY5	-0.226924	-0.180980	-0.119604	-0.253698	-0.235768	-0.200	1400
UY6	-0.193766	-0.151328	-0.092204	-0.217516	-0.201145	-0.156	1800
UY7	-0.170736	-0.131594	-0.074292	-0.192122	-0.176501	-0.121	2250

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1457 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	6	11	12	5	MIN	AVG	MAX
EY1	8854	5899	2923	2864	8773	2864	5863	8854
EY2	3100	4450	1527	1523	1914	1523	2503	4450
EY3	363	325	685	689	567	325	526	689
EY4	254	242	210	233	257	210	239	257
EY5	208	255	218	215	218	208	223	255

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-1.130980	-1.058210	-1.010000	-0.997433	-0.976679	-1.425	0
UY2	-0.791804	-0.734870	-0.659943	-0.648658	-0.657091	-0.850	300
UY3	-0.616942	-0.556508	-0.528164	-0.519062	-0.519817	-0.664	450
UY4	-0.344195	-0.261566	-0.340837	-0.338652	-0.325158	-0.335	1000
UY5	-0.275031	-0.189364	-0.275507	-0.276702	-0.265533	-0.241	1400
UY6	-0.234643	-0.149425	-0.232370	-0.235527	-0.227123	-0.188	1800
UY7	-0.205895	-0.122083	-0.200521	-0.204686	-0.198613	-0.145	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	11	14	12	8	MIN	AVG	MAX
EY1	3468	2923	2997	4454	7880	2923	4344	7880
EY2	1772	1773	1773	1788	2896	1772	2000	2896
EY3	689	685	689	689	562	562	663	689
EY4	283	277	283	283	280	277	281	283
EY5	102	109	108	107	102	102	106	109

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-1.242930	-1.229840	-1.226530	-1.202700	-1.174270	-1.425	0
UY2	-0.909327	-0.886640	-0.886066	-0.881104	-0.895821	-0.850	300
UY3	-0.778122	-0.752949	-0.753700	-0.752341	-0.763768	-0.664	450
UY4	-0.588437	-0.560359	-0.563871	-0.565343	-0.556811	-0.335	1000
UY5	-0.517905	-0.489044	-0.493730	-0.496592	-0.487776	-0.241	1400
UY6	-0.466235	-0.437324	-0.442696	-0.446509	-0.438713	-0.188	1800
UY7	-0.423328	-0.394864	-0.400611	-0.405093	-0.398298	-0.145	2250

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	4	16	8	3	14	MIN	AVG	MAX
EY1	5444	3156	9061	5915	4242	3156	5564	9061
EY2	2922	2683	3696	4352	2941	2683	3319	4352
EY3	196	210	163	166	196	163	186	210
EY4	297	299	269	290	297	269	291	299
EY5	273	280	293	278	235	235	272	293

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-1.444890	-1.492090	-1.428620	-1.442530	-1.516060	-1.425	0
UY2	-0.953913	-0.964094	-0.993169	-1.001440	-1.005050	-0.850	300
UY3	-0.683144	-0.685753	-0.730559	-0.735359	-0.725092	-0.664	450
UY4	-0.270470	-0.280271	-0.271659	-0.277991	-0.304617	-0.335	1000
UY5	-0.200632	-0.207335	-0.186970	-0.197112	-0.232776	-0.241	1400
UY6	-0.170563	-0.172955	-0.156119	-0.166844	-0.199664	-0.188	1800
UY7	-0.150875	-0.150650	-0.138652	-0.148307	-0.176874	-0.145	2250



ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 737 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	6	8	12	7	MIN	AVG	MAX
EY1	7348	6721	7517	5981	6027	5981	6719	7517
EY2	1666	1680	2220	1971	1579	1579	1824	2220
EY3	154	155	155	154	153	153	154	155
EX3	149	116	116	148	85	85	123	149
EY4	162	174	164	158	192	158	170	192
EX4	221	314	309	189	313	189	269	314
EY5	249	283	236	264	291	236	265	291
EX5	340	385	372	323	614	323	407	614
R3	0.96	0.75	0.75	0.96	0.56	0.56	0.80	0.96
R4	1.36	1.80	1.88	1.19	1.63	1.19	1.57	1.88
R5	1.37	1.36	1.58	1.22	2.11	1.22	1.53	2.11

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.977602	-0.990908	-0.956799	-0.972850	-1.021030	-1.070	0
UY2	-0.607192	-0.598437	-0.608718	-0.608700	-0.597623	-0.588	300
UY3	-0.412761	-0.395077	-0.418446	-0.414394	-0.381018	-0.374	450
UY4	-0.140210	-0.122208	-0.140966	-0.135458	-0.106450	-0.149	1000
UY5	-0.096699	-0.084309	-0.098254	-0.089574	-0.076464	-0.110	1400
UY6	-0.078833	-0.069307	-0.081250	-0.070674		-0.088	1800
UY7	-0.068253	-0.059910	-0.070755	-0.059678		-0.070	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	11	14	12	15	MIN	AVG	MAX
EY1	5889	5601	7621	6677	3494	3494	5856	7621
EY2	1525	1532	1513	1512	1515	1512	1530	1532
EY3	157	159	153	153	152	152	155	159
EX3	237	184	186	105	193	105	181	237
EY4	293	288	245	197	297	197	264	297
EX4	240	257	180	115	623	115	283	623
EY5	120	132	107	154	106	106	124	154
EX5	277	322	122	382	104	104	241	382
R3	1.50	1.16	1.22	0.68	1.27	0.68	1.17	1.50
R4	0.82	0.89	0.74	0.58	2.10	0.58	1.03	2.10
R5	2.30	2.44	1.14	2.48	0.98	0.98	1.87	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.023660	-1.021860	-1.122130	-1.131390	-1.173400	-1.070	0
UY2	-0.658498	-0.635200	-0.747283	-0.715840	-0.758459	-0.588	300
UY3	-0.473322	-0.441264	-0.552126	-0.499730	-0.551389	-0.374	450
UY4	-0.218937	-0.183045	-0.266664	-0.198906	-0.277646	-0.149	1000
UY5	-0.170368	-0.137703	-0.204389	-0.148207	-0.224334	-0.110	1400
UY6	-0.144138	-0.113790	-0.168563	-0.124623	-0.191804	-0.088	1800
UY7	-0.125108	-0.096375	-0.142071	-0.109034	-0.166031	-0.070	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 737 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	9	12	16	7	15	MIN	AVG	MAX
EY1	5959	3310	5151	5423	5548	3310	5078	5959
EY2	1514	1514	1577	1532	1509	1509	1519	1577
EY3	153	153	152	159	152	152	154	159
EX3	264	217	376	282	251	217	278	376
EY4	297	297	187	288	190	187	251	297
EX4	608	319	262	257	126	126	314	608
EY5	108	139	170	132	143	108	138	170
EX5	209	346	370	322	297	209	309	370
R3	1.72	1.41	2.48	1.78	1.65	1.41	1.81	2.48
R4	2.05	1.07	1.40	0.89	0.66	0.66	1.22	2.05
R5	1.94	2.48	2.18	2.44	2.07	1.94	2.22	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.943353	-1.064130	-0.924451	-0.902960	-1.048290	-1.070	0
UY2	-0.589482	-0.658399	-0.580821	-0.541769	-0.678451	-0.588	300
UY3	-0.410255	-0.457830	-0.406480	-0.361679	-0.489970	-0.374	450
UY4	-0.157529	-0.197477	-0.165498	-0.120970	-0.222793	-0.149	1000
UY5	-0.104792	-0.152193	-0.119694	-0.076524	-0.168617	-0.110	1400
UY6	-0.074904	-0.128515	-0.096827	-0.052812	-0.140712	-0.088	1800
UY7	-0.052546	-0.111604	-0.081853	-0.035736	-0.122187	-0.070	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 1090 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	14	5	6	10	MIN	AVG	MAX
EY1	6384	6163	7315	8080	7118	6163	7012	8080
EY2	1952	2094	2075	2587	3007	1952	2343	3007
EY3	174	167	178	169	173	167	171	178
EX3	217	176	217	211	175	175	199	217
EY4	227	225	229	228	231	225	228	231
EX4	375	366	411	469	439	366	412	469
EY5	239	252	224	228	247	224	238	252
EX5	297	357	339	304	312	297	322	357
R3	1.25	1.05	1.22	1.25	1.01	1.01	1.16	1.25
R4	1.65	1.63	1.80	2.05	1.90	1.63	1.81	2.05
R5	1.25	1.41	1.51	1.33	1.26	1.25	1.35	1.51

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.289520	-1.324640	-1.250950	-1.233620	-1.219470	-1.343	0
UY2	-0.816245	-0.833806	-0.791651	-0.806346	-0.805850	-0.795	300
UY3	-0.570461	-0.574829	-0.552244	-0.572087	-0.573576	-0.528	450
UY4	-0.224933	-0.210307	-0.213938	-0.221973	-0.216420	-0.225	1000
UY5	-0.163337	-0.150599	-0.153832	-0.160487	-0.152908	-0.166	1400
UY6	-0.134120	-0.124480	-0.125400	-0.132790	-0.124846	-0.133	1800
UY7	-0.115045	-0.108020	-0.106742	-0.114714	-0.107002	-0.106	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	6	14	3	10	MIN	AVG	MAX
EY1	3000	6608	8993	6866	7246	3000	6543	8993
EY2	2000	1625	1532	3933	3424	1532	2503	3933
EY3	200	177	159	189	305	159	206	305
EX3	200	265	203	344	184	184	239	344
EY4	150	245	213	202	220	150	206	245
EX4	150	489	411	501	462	150	403	501
EY5	150	243	132	122	159	122	161	243
EX5	150	543	322	216	123	123	271	543
R3	1.00	1.50	1.28	1.82	0.60	0.60	1.24	1.82
R4	1.00	2.00	1.93	2.48	2.10	1.00	1.90	2.48
R5	1.00	2.23	2.44	1.76	0.77	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.400080	-1.211750	-1.492870	-1.169320	-1.106640	-1.343	0
UY2	-0.879857	-0.727070	-0.963777	-0.823554	-0.772508	-0.795	300
UY3	-0.618644	-0.485585	-0.693816	-0.625936	-0.595663	-0.528	450
UY4	-0.249500	-0.166641	-0.319917	-0.305257	-0.328674	-0.225	1000
UY5	-0.164781	-0.114199	-0.250777	-0.233306	-0.264316	-0.166	1400
UY6	-0.116104	-0.090248	-0.215007	-0.192959	-0.224868	-0.133	1800
UY7	-0.082265	-0.074820	-0.189465	-0.163178	-0.195425	-0.106	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 1090 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	13	1	5	14	MIN	AVG	MAX
EY1	6466	5451	3000	6608	7445	3000	5794	7445
EY2	1526	1532	2000	1625	1514	1514	1640	2000
EY3	181	159	200	177	153	153	174	200
EX3	354	238	200	265	121	121	236	354
EY4	254	288	150	245	184	150	224	288
EX4	206	257	150	489	377	150	296	489
EY5	125	132	150	243	259	125	182	259
EX5	306	322	150	543	600	150	384	600
R3	1.95	1.50	1.00	1.50	0.79	0.79	1.35	1.95
R4	0.81	0.89	1.00	2.00	2.05	0.81	1.35	2.05
R5	2.45	2.44	1.00	2.23	2.32	1.00	2.09	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.285800	-1.372160	-1.400080	-1.211750	-1.374390	-1.343	0
UY2	-0.803230	-0.822521	-0.879857	-0.727070	-0.793922	-0.795	300
UY3	-0.566497	-0.547856	-0.618644	-0.485585	-0.494634	-0.528	450
UY4	-0.246053	-0.180897	-0.249500	-0.166641	-0.097209	-0.225	1000
UY5	-0.179212	-0.114209	-0.164781	-0.114199	-0.044039	-0.166	1400
UY6	-0.141461	-0.078805	-0.116104	-0.090248	-0.024107	-0.133	1800
UY7	-0.114253	-0.053258	-0.082265	-0.074820	-0.012043	-0.106	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 1415 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	13	16	12	2	MIN	AVG	MAX
EY1	8945	8416	9307	7717	8768	7717	8631	9307
EY2	1815	1869	1756	1561	1516	1516	1703	1869
EY3	206	204	188	170	168	168	187	206
EX3	391	446	346	462	260	260	381	462
EY4	187	189	201	188	203	187	194	203
EX4	325	364	372	443	327	325	366	443
EY5	182	175	200	206	205	175	193	206
EX5	187	158	188	142	243	142	183	243
R3	1.89	2.18	1.85	2.72	1.55	1.55	2.04	2.72
R4	1.74	1.93	1.85	2.35	1.61	1.61	1.90	2.35
R5	1.03	0.90	0.94	0.69	1.19	0.69	0.95	1.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-1.457080	-1.444890	-1.505900	-1.597690	-1.692800	-1.573	0
UY2	-0.935841	-0.932132	-0.952476	-1.020850	-1.058110	-0.972	300
UY3	-0.676559	-0.676731	-0.674945	-0.734677	-0.740993	-0.667	450
UY4	-0.301371	-0.304636	-0.276009	-0.325625	-0.295491	-0.300	1000
UY5	-0.212682	-0.214450	-0.187441	-0.233911	-0.204467	-0.222	1400
UY6	-0.161989	-0.161739	-0.138961	-0.183354	-0.157669	-0.175	1800
UY7	-0.126293	-0.123950	-0.105446	-0.148262	-0.126490	-0.137	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	3	16	9	15	MIN	AVG	MAX
EY1	6608	6866	6876	7246	8909	6608	7301	8909
EY2	1625	3933	1536	3424	3906	1536	2885	3933
EY3	177	189	157	305	161	157	198	305
EX3	265	344	417	184	231	184	288	417
EY4	245	202	286	220	265	202	243	286
EX4	489	501	236	462	583	236	454	583
EY5	243	122	134	159	288	122	189	288
EX5	543	216	252	123	482	123	323	543
R3	1.50	1.82	2.65	0.60	1.43	0.60	1.60	2.65
R4	2.00	2.48	0.83	2.10	2.20	0.83	1.92	2.48
R5	2.23	1.76	1.88	0.77	1.67	0.77	1.66	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTIONS (mm)					SENSOR DISTANCE (mm)	
UY1	-1.573050	-1.517970	-1.664110	-1.436600	-1.369850	-1.573	0
UY2	-0.943856	-1.069110	-1.048060	-1.002840	-0.910936	-0.972	300
UY3	-0.630369	-0.812569	-0.738652	-0.773269	-0.640046	-0.667	450
UY4	-0.216328	-0.396274	-0.295595	-0.426673	-0.202910	-0.300	1000
UY5	-0.148249	-0.302869	-0.198524	-0.343126	-0.131910	-0.222	1400
UY6	-0.117157	-0.250493	-0.144938	-0.291916	-0.106505	-0.175	1800
UY7	-0.097128	-0.211832	-0.107072	-0.253694	-0.091668	-0.137	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 360 R: LOAD 1415 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	6	3	10	14	1	MIN	AVG	MAX
EY1	6608	6866	7246	6956	3000	3000	6135	7246
EY2	1625	3933	3424	1532	2000	1532	2503	3933
EY3	177	189	305	159	200	159	206	305
EX3	265	344	184	225	200	184	243	344
EY4	245	202	220	288	150	150	221	288
EX4	489	501	462	682	150	150	457	682
EY5	243	122	159	287	150	122	192	287
EX5	543	216	123	701	150	123	347	701
R3	1.50	1.82	0.60	1.41	1.00	0.60	1.27	1.82
R4	2.00	2.48	2.10	2.37	1.00	1.00	1.99	2.48
R5	2.23	1.76	0.77	2.44	1.00	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.573050	-1.517970	-1.436600	-1.586150	-1.817540	-1.573	0
UY2	-0.943856	-1.069110	-1.002840	-0.898157	-1.142200	-0.972	300
UY3	-0.630369	-0.812569	-0.773269	-0.555176	-0.803102	-0.667	450
UY4	-0.216328	-0.396274	-0.426673	-0.119221	-0.323893	-0.300	1000
UY5	-0.148249	-0.302869	-0.343126	-0.062247	-0.213914	-0.222	1400
UY6	-0.117157	-0.250493	-0.291916	-0.040664	-0.150722	-0.175	1800
UY7	-0.097128	-0.211832	-0.253694	-0.027087	-0.106793	-0.137	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 360 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN										LOAD 1: 737 kPa					LOAD 2: 1090 kPa					LOAD 3: 1415 kPa				
DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	10	6	8	12	7	AVG.	STRESS RATIO (p/p <sub>0</sub> )	13	14	5	6	10	AVG.	STRESS RATIO (p/p <sub>0</sub> )	3	13	16	12	2	AVG.	STRESS RATIO (p/p <sub>0</sub> )		
15	0.07	-0.680	-0.678	-0.676	-0.683	-0.677	-0.679	0.921	-1.017	-1.014	-1.012	-1.009	-1.013	-1.013	0.929	-1.322	-1.324	-1.317	-1.326	-1.314	-1.321	0.933		
54	0.24	-0.543	-0.535	-0.523	-0.545	-0.529	-0.535	0.726	-0.829	-0.817	-0.819	-0.801	-0.799	-0.813	0.746	-1.099	-1.107	-1.086	-1.110	-1.077	-1.096	0.774		
101	0.45	-0.394	-0.384	-0.361	-0.390	-0.374	-0.381	0.516	-0.611	-0.592	-0.601	-0.568	-0.551	-0.585	0.536	-0.835	-0.842	-0.817	-0.842	-0.809	-0.829	0.586		
207	0.92	-0.268	-0.265	-0.245	-0.264	-0.259	-0.260	0.353	-0.407	-0.399	-0.404	-0.378	-0.362	-0.390	0.358	-0.541	-0.543	-0.528	-0.537	-0.527	-0.535	0.378		
369	1.64	-0.173	-0.175	-0.165	-0.169	-0.177	-0.172	0.233	-0.249	-0.252	-0.251	-0.243	-0.232	-0.245	0.225	-0.305	-0.305	-0.300	-0.303	-0.303	-0.303	0.214		
531	2.36	-0.115	-0.119	-0.114	-0.112	-0.124	-0.117	0.159	-0.162	-0.168	-0.165	-0.164	-0.157	-0.163	0.150	-0.187	-0.186	-0.187	-0.188	-0.190	-0.188	0.133		
694	3.08	-0.084	-0.087	-0.085	-0.081	-0.094	-0.086	0.117	-0.114	-0.122	-0.117	-0.119	-0.115	-0.117	0.108	-0.125	-0.124	-0.126	-0.127	-0.130	-0.127	0.089		
803	3.57	-0.065	-0.068	-0.071	-0.062	-0.079	-0.069	0.093	-0.084	-0.095	-0.089	-0.092	-0.092	-0.090	0.083	-0.092	-0.094	-0.092	-0.092	-0.095	-0.093	0.066		
1600	7.11	-0.052	-0.054	-0.059	-0.050	-0.066	-0.056	0.076	-0.064	-0.076	-0.069	-0.071	-0.073	-0.070	0.065	-0.071	-0.072	-0.070	-0.070	-0.073	-0.071	0.050		
2600	11.56	-0.009	-0.009	-0.009	-0.009	-0.011	-0.009	0.013	-0.011	-0.012	-0.012	-0.012	-0.012	-0.012	0.011	-0.013	-0.012	-0.012	-0.011	-0.015	-0.013	0.009		
3600	16.00	-0.005	-0.005	-0.005	-0.005	-0.006	-0.005	0.007	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	0.006	-0.008	-0.007	-0.007	-0.007	-0.009	-0.008	0.005		
4600	20.44	-0.003	-0.003	-0.004	-0.003	-0.004	-0.004	0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.006	-0.005	-0.005	-0.005	-0.006	-0.005	0.004		

MAXIMUM DEFECTION

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	1	6	14	3	10	AVG.	STRESS RATIO (p/p <sub>0</sub> )	6	3	16	9	15	AVG.	STRESS RATIO (p/p <sub>0</sub> )
15	0.07	-1.038	-1.019	-1.007	-1.025	-1.019	-1.021	0.937	-1.323	-1.330	-1.327	-1.322	-1.314	-1.323	0.935
54	0.24	-0.878	-0.848	-0.816	-0.832	-0.816	-0.838	0.769	-1.100	-1.080	-1.110	-1.059	-1.025	-1.075	0.760
101	0.45	-0.666	-0.645	-0.610	-0.588	-0.580	-0.618	0.567	-0.837	-0.764	-0.839	-0.753	-0.689	-0.776	0.549
207	0.92	-0.456	-0.436	-0.416	-0.389	-0.397	-0.419	0.384	-0.565	-0.505	-0.540	-0.516	-0.452	-0.516	0.364
369	1.64	-0.276	-0.267	-0.262	-0.251	-0.258	-0.263	0.241	-0.347	-0.326	-0.312	-0.335	-0.310	-0.326	0.230
531	2.36	-0.168	-0.175	-0.172	-0.166	-0.166	-0.170	0.156	-0.227	-0.215	-0.197	-0.216	-0.220	-0.215	0.152
694	3.08	-0.109	-0.124	-0.122	-0.114	-0.113	-0.116	0.107	-0.161	-0.148	-0.135	-0.147	-0.169	-0.152	0.107
803	3.57	-0.077	-0.091	-0.088	-0.080	-0.084	-0.084	0.077	-0.118	-0.104	-0.097	-0.109	-0.139	-0.113	0.080
1600	7.11	-0.058	-0.069	-0.064	-0.057	-0.062	-0.062	0.057	-0.090	-0.075	-0.072	-0.081	-0.111	-0.086	0.061
2600	11.56	-0.010	-0.017	-0.013	-0.012	-0.009	-0.012	0.011	-0.022	-0.016	-0.020	-0.012	-0.018	-0.018	0.012
3600	16.00	-0.006	-0.010	-0.008	-0.008	-0.005	-0.007	0.007	-0.013	-0.010	-0.012	-0.007	-0.011	-0.010	0.007
4600	20.44	-0.004	-0.007	-0.006	-0.006	-0.004	-0.005	0.005	-0.010	-0.008	-0.010	-0.005	-0.008	-0.008	0.006

NO COMPUTATIONS

RMS VALUE OF DEFECTIONS

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	9	12	16	7	15	AVG.	STRESS RATIO (p/p <sub>0</sub> )	16	13	1	5	14	AVG.	STRESS RATIO (p/p <sub>0</sub> )	6	3	10	14	1	AVG.	STRESS RATIO (p/p <sub>0</sub> )
15	0.07	-0.689	-0.698	-0.695	-0.692	-0.690	-0.693	0.940	-1.026	-1.021	-1.038	-1.019	-1.003	-1.021	0.937	-1.323	-1.330	-1.322	-1.317	-1.347	-1.328	0.939
54	0.24	-0.571	-0.591	-0.589	-0.583	-0.573	-0.581	0.789	-0.872	-0.851	-0.878	-0.848	-0.796	-0.849	0.779	-1.100	-1.080	-1.059	-1.085	-1.139	-1.093	0.772
101	0.45	-0.429	-0.454	-0.454	-0.451	-0.432	-0.444	0.602	-0.686	-0.652	-0.666	-0.645	-0.576	-0.645	0.592	-0.837	-0.764	-0.753	-0.824	-0.865	-0.808	0.571
207	0.92	-0.280	-0.309	-0.308	-0.313	-0.287	-0.300	0.407	-0.480	-0.450	-0.456	-0.436	-0.396	-0.443	0.407	-0.565	-0.505	-0.516	-0.569	-0.592	-0.549	0.388
369	1.64	-0.165	-0.190	-0.192	-0.198	-0.172	-0.183	0.249	-0.300	-0.283	-0.276	-0.267	-0.260	-0.277	0.254	-0.347	-0.326	-0.335	-0.365	-0.358	-0.346	0.245
531	2.36	-0.105	-0.123	-0.125	-0.130	-0.109	-0.118	0.161	-0.192	-0.186	-0.168	-0.175	-0.179	-0.180	0.165	-0.227	-0.215	-0.216	-0.248	-0.218	-0.225	0.159
694	3.08	-0.073	-0.086	-0.086	-0.091	-0.074	-0.083	0.111	-0.129	-0.130	-0.109	-0.124	-0.134	-0.125	0.115	-0.161	-0.148	-0.147	-0.184	-0.142	-0.156	0.110
803	3.57	-0.053	-0.062	-0.061	-0.063	-0.053	-0.058	0.079	-0.087	-0.092	-0.077	-0.091	-0.112	-0.092	0.084	-0.118	-0.104	-0.109	-0.141	-0.100	-0.114	0.081
1600	7.11	-0.038	-0.045	-0.046	-0.045	-0.040	-0.043	0.058	-0.063	-0.066	-0.058	-0.069	-0.096	-0.070	0.065	-0.090	-0.075	-0.081	-0.110	-0.075	-0.086	0.061
2600	11.56	-0.011	-0.010	-0.010	-0.014	-0.009	-0.011	0.015	-0.017	-0.022	-0.010	-0.017	-0.026	-0.018	0.017	-0.022	-0.016	-0.012	-0.032	-0.014	-0.019	0.013
3600	16.00	-0.007	-0.006	-0.006	-0.009	-0.005	-0.007	0.009	-0.011	-0.013	-0.006	-0.010	-0.015	-0.011	0.010	-0.013	-0.010	-0.007	-0.019	-0.008	-0.011	0.008
4600	20.44	-0.005	-0.005	-0.005	-0.007	-0.004	-0.005	0.007	-0.008	-0.010	-0.004	-0.007	-0.011	-0.008	0.008	-0.010	-0.008	-0.005	-0.014	-0.006	-0.008	0.006

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 732 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	9	11	8	3	MIN	AVG	MAX
EY1	9470	8684	8576	7915	8742	7915	8678	9470
EY2	4775	4875	4909	4605	4533	4533	4739	4909
EY3	152	152	159	156	156	152	155	159
EX3	83	130	118	97	103	83	106	130
EY4	164	177	171	201	198	164	182	201
EX4	410	438	423	487	493	410	450	493
EY5	165	107	122	129	142	107	133	165
EX5	93	159	169	126	99	93	129	169
R3	0.55	0.85	0.75	0.62	0.66	0.55	0.69	0.85
R4	2.50	2.47	2.48	2.42	2.49	2.42	2.47	2.50
R5	0.56	1.49	1.38	0.98	0.70	0.56	1.02	1.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.750409	-0.762453	-0.742970	-0.795468	-0.788072	-1.045	0
UY2	-0.557993	-0.572985	-0.557276	-0.593710	-0.593023	-0.615	300
UY3	-0.432876	-0.451199	-0.437192	-0.465557	-0.468114	-0.417	450
UY4	-0.173373	-0.200570	-0.188664	-0.209985	-0.214485	-0.151	1000
UY5	-0.105783	-0.133907	-0.122688	-0.145917	-0.148958	-0.099	1400
UY6	-0.072921	-0.099929	-0.089669	-0.113901	-0.116140	-0.074	1800
UY7	-0.051180	-0.076273	-0.067350	-0.091557	-0.093551	-0.057	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	14	15	6	3	MIN	AVG	MAX
EY1	3000	5468	6906	6608	6866	3000	5770	6906
EY2	2000	4270	1584	1625	3933	1584	1682	4170
EY3	200	159	170	177	189	159	179	200
EX3	200	226	239	265	344	200	255	344
EY4	150	288	260	245	202	150	129	288
EX4	150	257	565	489	501	150	392	565
EY5	150	132	252	243	122	122	180	252
EX5	150	182	520	543	216	150	322	543
R3	1.00	1.42	1.40	1.50	1.82	1.00	1.43	1.82
R4	1.00	0.89	2.17	2.00	2.48	0.89	1.71	2.48
R5	1.00	1.37	2.07	2.23	1.76	1.00	1.69	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.859889	-0.736443	-0.730815	-0.723031	-0.696386	-1.045	0
UY2	-0.570767	-0.531144	-0.454696	-0.454683	-0.513203	-0.615	300
UY3	-0.418329	-0.406127	-0.311998	-0.316694	-0.404671	-0.417	450
UY4	-0.172371	-0.174201	-0.103595	-0.114064	-0.205500	-0.151	1000
UY5	-0.112064	-0.120829	-0.068197	-0.077704	-0.156027	-0.099	1400
UY6	-0.078658	-0.094208	-0.053378	-0.061587	-0.129512	-0.074	1800
UY7	-0.055816	-0.075097	-0.044015	-0.051206	-0.110366	-0.057	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 732 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	14	6	3	15	MIN	AVG	MAX
EY1	3000	5123	6608	6866	6603	3000	5640	6866
EY2	2000	4270	1625	3933	2206	1625	1807	4170
EY3	200	159	177	189	170	159	179	200
EX3	200	220	265	344	241	200	254	344
EY4	150	288	245	202	222	150	221	288
EX4	150	257	489	501	326	150	345	501
EY5	150	132	243	122	252	122	180	252
EX5	150	182	543	216	531	150	324	543
R3	1.00	1.39	1.50	1.82	1.42	1.00	1.43	1.82
R4	1.00	0.89	2.00	2.48	1.47	0.89	1.57	2.48
R5	1.00	1.37	2.23	1.76	2.11	1.00	1.70	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.859889	-0.743309	-0.723031	-0.696386	-0.704945	-1.045	0
UY2	-0.570767	-0.534565	-0.454683	-0.513203	-0.460503	-0.625	300
UY3	-0.418329	-0.407769	-0.316694	-0.404671	-0.326043	-0.417	450
UY4	-0.172371	-0.174062	-0.114064	-0.205500	-0.110309	-0.151	1000
UY5	-0.112064	-0.120844	-0.077704	-0.156027	-0.069706	-0.099	1400
UY6	-0.078658	-0.094272	-0.061587	-0.129512	-0.052975	-0.074	1800
UY7	-0.055816	-0.075127	-0.051206	-0.110366	-0.043150	-0.057	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1075 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	9	4	15	6	12	MIN	AVG	MAX
EY1	5956	6002	5994	3810	5467	3810	5446	6002
EY2	3778	3364	3783	4574	3161	3161	3732	4574
EY3	155	156	154	152	166	152	157	166
EX3	207	236	183	127	313	127	213	313
EY4	193	159	180	205	181	159	183	205
EX4	449	366	427	440	430	366	432	449
EY5	104	105	107	101	111	101	106	111
EX5	252	252	261	251	271	251	257	271
R3	1.33	1.51	1.19	0.83	1.89	0.83	1.35	1.89
R4	2.33	2.31	2.37	2.15	2.38	2.15	2.31	2.38
R5	2.42	2.40	2.44	2.48	2.45	2.40	2.44	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.108130	-1.095990	-1.153270	-1.114830	-1.051610	-1.312	0
UY2	-0.794220	-0.776062	-0.833727	-0.786528	-0.735359	-0.812	300
UY3	-0.603449	-0.583041	-0.638904	-0.581961	-0.550259	-0.567	450
UY4	-0.246743	-0.221729	-0.271304	-0.196090	-0.218103	-0.230	1000
UY5	-0.161897	-0.132746	-0.182798	-0.108201	-0.138357	-0.154	1400
UY6	-0.119116	-0.087102	-0.138638	-0.064450	-0.096622	-0.115	1800
UY7	-0.088928	-0.055575	-0.108183	-0.033072	-0.067264	-0.087	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	11	16	12	15	13	MIN	AVG	MAX
EY1	5485	8798	6934	6160	6385	5485	6752	8798
EY2	2455	2720	1772	2268	2629	1772	2369	2720
EY3	157	152	153	156	155	152	154	157
EX3	124	153	90	110	110	90	117	153
EY4	236	233	283	214	232	214	240	283
EX4	556	573	696	510	404	404	548	696
EY5	135	110	108	196	181	108	146	196
EX5	329	272	168	483	443	168	339	483
R3	0.80	1.00	0.59	0.71	0.71	0.59	0.76	1.00
R4	2.36	2.45	2.46	2.39	1.74	1.74	2.28	2.46
R5	2.44	2.48	1.55	2.46	2.45	1.55	2.28	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.306500	-1.290810	-1.366760	-1.236510	-1.222100	-1.312	0
UY2	-0.912282	-0.950058	-0.914804	-0.832674	-0.843711	-0.812	300
UY3	-0.687821	-0.749199	-0.667752	-0.604470	-0.624321	-0.567	450
UY4	-0.316536	-0.390286	-0.286608	-0.235860	-0.255250	-0.230	1000
UY5	-0.244304	-0.310375	-0.214384	-0.171263	-0.187168	-0.154	1400
UY6	-0.210075	-0.271210	-0.174046	-0.144640	-0.158833	-0.115	1800
UY7	-0.185784	-0.243307	-0.141521	-0.127322	-0.140310	-0.087	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1075 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	6	14	3	10	MIN	AVG	MAX
EY1	3000	6608	4915	6866	7246	3000	5727	7246
EY2	2000	1625	4270	3933	3424	1625	3050	4270
EY3	200	177	159	189	305	159	206	305
EX3	200	265	208	344	184	184	240	344
EY4	150	245	288	202	220	150	221	288
EX4	150	489	257	501	462	150	372	501
EY5	150	243	132	122	159	122	161	243
EX5	150	543	322	216	123	123	271	543
R3	1.00	1.50	1.31	1.82	0.60	0.60	1.25	1.82
R4	1.00	2.00	0.89	2.48	2.10	0.89	1.69	2.48
R5	1.00	2.23	2.44	1.76	0.77	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.262810	-1.061830	-1.022900	-1.022700	-0.982967	-1.312	0
UY2	-0.838217	-0.667737	-0.712658	-0.753679	-0.718830	-0.812	300
UY3	-0.614350	-0.465091	-0.524999	-0.594292	-0.572485	-0.567	450
UY4	-0.253140	-0.167512	-0.185207	-0.301793	-0.322859	-0.230	1000
UY5	-0.164575	-0.114115	-0.112633	-0.229137	-0.258817	-0.154	1400
UY6	-0.115515	-0.090446	-0.078528	-0.190198	-0.221042	-0.115	1800
UY7	-0.081971	-0.075200	-0.054596	-0.162081	-0.192988	-0.087	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1415 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	8	3	10	14	MIN	AVG	MAX
EY1	8313	8375	8685	7557	9498	7557	8486	9498
EY2	1652	1627	1681	1535	3967	1535	2092	3967
EY3	154	153	155	152	152	152	153	155
EX3	120	157	127	202	106	106	142	202
EY4	292	292	288	298	276	276	289	298
EX4	541	682	666	623	645	541	632	682
EY5	264	291	288	297	297	264	287	297
EX5	202	219	240	489	167	167	263	489
R3	0.78	1.02	0.82	1.33	0.70	0.70	0.93	1.33
R4	1.85	2.34	2.31	2.09	2.34	1.85	2.19	2.34
R5	0.77	0.75	0.83	1.65	0.56	0.56	0.91	1.65

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.640140	-1.542450	-1.548830	-1.521500	-1.321881	-1.517	0
UY2	-1.056480	-0.983382	-0.988874	-0.962220	-0.936744	-0.975	300
UY3	-0.743759	-0.685025	-0.687150	-0.669072	-0.698607	-0.704	450
UY4	-0.271957	-0.238779	-0.236544	-0.235866	-0.261353	-0.309	1000
UY5	-0.192891	-0.166223	-0.166953	-0.165762	-0.177189	-0.212	1400
UY6	-0.159283	-0.136357	-0.139155	-0.139104	-0.145098	-0.158	1800
						-0.119	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	16	5	15	1	MIN	AVG	MAX
EY1	8396	7270	6608	9536	3000	3000	6962	9536
EY2	1540	2222	1625	1515	2000	1515	1780	2222
EY3	159	159	177	153	200	153	170	200
EX3	126	125	265	86	200	86	160	265
EY4	229	231	245	272	150	150	225	272
EX4	540	552	489	662	150	150	478	662
EY5	286	291	243	208	150	150	236	291
EX5	525	495	543	379	150	150	419	543
R3	0.79	0.79	1.50	0.56	1.00	0.56	0.93	1.50
R4	2.36	2.38	2.00	2.43	1.00	1.00	2.03	2.43
R5	1.83	1.70	2.23	1.82	1.00	1.00	1.72	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-1.499420	-1.418390	-1.397660	-1.639610	-1.662220	-1.517	0
UY2	-0.919567	-0.902177	-0.878929	-1.024280	-1.103330	-0.975	300
UY3	-0.611686	-0.615176	-0.612189	-0.698513	-0.808655	-0.704	450
UY4	-0.158501	-0.165035	-0.220492	-0.232508	-0.333204	-0.309	1000
UY5	-0.088970	-0.093294	-0.150207	-0.165040	-0.216627	-0.212	1400
UY6	-0.062595	-0.067423	-0.119052	-0.135611	-0.152050	-0.158	1800
UY7	-0.046060	-0.051769	-0.098984	-0.113402	-0.107896	-0.119	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 630 R: LOAD 1415 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	16	10	4	1	12	MIN	AVG	MAX
EY1	3119	5415	6608	6866	8509	3119	6103	8509
EY2	4517	3031	1625	3933	2816	1625	3184	4517
EY3	193	159	177	189	153	153	174	193
EX3	289	191	265	344	112	112	240	344
EY4	204	288	245	202	179	179	224	288
EX4	305	534	489	501	123	123	390	534
EY5	173	132	243	122	241	122	183	243
EX5	430	322	543	216	598	216	422	598
R3	1.50	1.20	1.50	1.82	0.73	0.73	1.35	1.82
R4	1.49	1.85	2.00	2.48	0.68	0.68	1.70	2.48
R5	2.48	2.44	2.23	1.76	2.48	1.76	2.28	2.48

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.361350	-1.393640	-1.397660	-1.346160	-1.406380	-1.517	0
UY2	-0.961688	-0.935550	-0.878929	-0.992052	-0.939883	-0.975	300
UY3	-0.729122	-0.671754	-0.612189	-0.782254	-0.660573	-0.704	450
UY4	-0.325618	-0.230307	-0.220492	-0.397244	-0.160283	-0.309	1000
UY5	-0.238621	-0.144660	-0.150207	-0.301609	-0.062905	-0.212	1400
UY6	-0.196973	-0.103593	-0.119052	-0.250354	-0.028440	-0.158	1800
UY7	-0.169919	-0.073008	-0.098984	-0.213344	-0.011092	-0.119	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 630 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN							LOAD 1: 732 kPa							LOAD 2: 1075 kPa							LOAD 3: 1415 kPa						
DEPTH (mm)	DEPTH RATIO (z/r0)	6	9	11	8	3	AVG.	STRESS RATIO (p/p0)	9	4	15	6	12	AVG.	STRESS RATIO (p/p0)	6	8	3	10	14	AVG.	STRESS RATIO (p/p0)					
17	0.08	-0.673	-0.677	-0.679	-0.676	-0.676	-0.676	0.924	-1.007	-1.008	-1.005	-1.024	-1.013	-1.012	0.941	-1.297	-1.304	-1.299	-1.312	-1.299	-1.302	0.920					
64	0.28	-0.484	-0.498	-0.499	-0.495	-0.494	-0.494	0.675	-0.778	-0.785	-0.771	-0.793	-0.806	-0.787	0.732	-0.994	-1.013	-0.996	-1.038	-0.948	-0.998	0.705					
122	0.54	-0.260	-0.281	-0.280	-0.277	-0.278	-0.275	0.376	-0.483	-0.498	-0.472	-0.467	-0.531	-0.490	0.456	-0.659	-0.682	-0.658	-0.712	-0.543	-0.651	0.460					
218	0.97	-0.149	-0.166	-0.164	-0.165	-0.164	-0.163	0.221	-0.303	-0.316	-0.292	-0.281	-0.340	-0.307	0.285	-0.438	-0.451	-0.437	-0.465	-0.330	-0.424	0.300					
355	1.58	-0.118	-0.125	-0.124	-0.128	-0.126	-0.124	0.169	-0.222	-0.229	-0.212	-0.211	-0.241	-0.223	0.207	-0.314	-0.320	-0.318	-0.318	-0.259	-0.306	0.216					
492	2.19	-0.093	-0.094	-0.094	-0.099	-0.097	-0.095	0.130	-0.165	-0.168	-0.157	-0.160	-0.175	-0.165	0.153	-0.232	-0.236	-0.239	-0.231	-0.205	-0.229	0.162					
630	2.80	-0.075	-0.073	-0.073	-0.079	-0.077	-0.075	0.103	-0.128	-0.128	-0.122	-0.125	-0.132	-0.127	0.118	-0.181	-0.184	-0.190	-0.179	-0.169	-0.181	0.128					
823	3.66	-0.063	-0.053	-0.056	-0.065	-0.063	-0.060	0.082	-0.099	-0.097	-0.097	-0.095	-0.099	-0.097	0.090	-0.139	-0.138	-0.154	-0.137	-0.144	-0.142	0.101					
1068	4.75	-0.044	-0.034	-0.038	-0.045	-0.043	-0.041	0.056	-0.068	-0.067	-0.068	-0.065	-0.067	-0.067	0.063	-0.095	-0.091	-0.108	-0.094	-0.104	-0.099	0.070					
2690	11.96	-0.005	-0.008	-0.008	-0.006	-0.006	-0.007	0.009	-0.018	-0.019	-0.017	-0.022	-0.019	-0.019	0.018	-0.013	-0.013	-0.013	-0.015	-0.013	-0.014	0.010					
3690	16.40	-0.003	-0.005	-0.005	-0.004	-0.003	-0.004	0.006	-0.011	-0.013	-0.011	-0.014	-0.012	-0.012	0.011	-0.007	-0.007	-0.008	-0.009	-0.007	-0.008	0.006					
4690	20.84	-0.002	-0.004	-0.004	-0.003	-0.003	-0.003	0.004	-0.009	-0.010	-0.009	-0.011	-0.010	-0.010	0.009	-0.005	-0.005	-0.005	-0.007	-0.005	-0.005	0.004					
5690	25.29	-0.001	-0.003	-0.003	-0.002	-0.002	-0.002	0.003	-0.008	-0.009	-0.008	-0.010	-0.008	-0.009	0.008	-0.004	-0.004	-0.004	-0.005	-0.004	-0.004	0.003					

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r0)	AVG.	STRESS RATIO (p/p0)	11	16	12	15	13	AVG.	STRESS RATIO (p/p0)	13	16	5	15	1	AVG.	STRESS RATIO (p/p0)
17	0.08	-0.698	-0.697	-0.695	-0.696	-0.693	-0.696	-0.696	-0.993	0.923	-1.301	-1.302	-1.322	-1.287	-1.345	-1.312	0.927
64	0.28	-0.538	-0.529	-0.536	-0.529	-0.527	-0.532	-0.532	0.727	0.703	-1.004	-0.991	-1.069	-0.963	-1.105	-1.026	0.725
122	0.54	-0.336	-0.314	-0.341	-0.320	-0.327	-0.328	-0.328	0.448	0.444	-0.670	-0.635	-0.753	-0.622	-0.772	-0.690	0.488
218	0.97	-0.211	-0.192	-0.215	-0.198	-0.204	-0.204	-0.204	0.279	0.286	-0.446	-0.418	-0.498	-0.417	-0.513	-0.458	0.324
355	1.58	-0.150	-0.142	-0.152	-0.146	-0.148	-0.148	-0.148	0.202	0.210	-0.321	-0.308	-0.337	-0.314	-0.341	-0.324	0.229
492	2.19	-0.107	-0.106	-0.111	-0.109	-0.110	-0.109	-0.109	0.148	0.158	-0.239	-0.233	-0.239	-0.242	-0.227	-0.236	0.167
630	2.80	-0.080	-0.082	-0.084	-0.083	-0.085	-0.083	-0.083	0.113	0.124	-0.187	-0.187	-0.178	-0.194	-0.157	-0.181	0.128
823	3.66	-0.059	-0.056	-0.061	-0.062	-0.066	-0.061	-0.061	0.083	0.096	-0.147	-0.158	-0.121	-0.162	-0.104	-0.138	0.098
1068	4.75	-0.040	-0.035	-0.040	-0.040	-0.045	-0.040	-0.040	0.055	0.066	-0.107	-0.121	-0.079	-0.117	-0.068	-0.098	0.070
2690	11.96	-0.006	-0.008	-0.009	-0.007	-0.008	-0.008	-0.008	0.011	0.012	-0.023	-0.021	-0.020	-0.019	-0.013	-0.019	0.014
3690	16.40	-0.004	-0.005	-0.006	-0.004	-0.005	-0.005	-0.005	0.006	0.007	-0.013	-0.012	-0.012	-0.011	-0.008	-0.011	0.008
4690	20.84	-0.002	-0.004	-0.004	-0.003	-0.004	-0.003	-0.003	0.005	0.005	-0.010	-0.009	-0.009	-0.008	-0.005	-0.008	0.006
5690	25.29	-0.002	-0.003	-0.004	-0.003	-0.003	-0.003	-0.003	0.004	0.005	-0.008	-0.007	-0.008	-0.007	-0.004	-0.007	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r0)	1	14	6	3	15	AVG.	STRESS RATIO (p/p0)	1	6	14	3	10	AVG.	STRESS RATIO (p/p0)	16	10	4	1	12	AVG.	STRESS RATIO (p/p0)
17	0.08	-0.696	-0.690	-0.684	-0.687	-0.682	-0.688	0.940	-1.022	-1.005	-1.015	-1.010	-1.005	-1.011	0.941	-1.360	-1.324	-1.322	-1.329	-1.297	-1.326	0.937
64	0.28	-0.572	-0.539	-0.553	-0.542	-0.540	-0.549	0.750	-0.839	-0.812	-0.793	-0.796	-0.783	-0.805	0.748	-1.109	-1.033	-1.069	-1.048	-0.961	-1.044	0.738
122	0.54	-0.399	-0.336	-0.390	-0.351	-0.364	-0.368	0.503	-0.586	-0.572	-0.492	-0.516	-0.508	-0.515	0.498	-0.723	-0.665	-0.753	-0.679	-0.577	-0.679	0.480
218	0.97	-0.265	-0.210	-0.258	-0.223	-0.237	-0.239	0.326	-0.389	-0.378	-0.309	-0.328	-0.333	-0.348	0.323	-0.454	-0.431	-0.498	-0.432	-0.359	-0.435	0.307
355	1.58	-0.176	-0.154	-0.174	-0.158	-0.165	-0.165	0.226	-0.259	-0.256	-0.227	-0.232	-0.238	-0.243	0.226	-0.317	-0.314	-0.337	-0.306	-0.267	-0.308	0.218
492	2.19	-0.117	-0.114	-0.124	-0.114	-0.119	-0.118	0.161	-0.172	-0.181	-0.169	-0.167	-0.169	-0.172	0.160	-0.226	-0.234	-0.239	-0.220	-0.199	-0.224	0.158
630	2.80	-0.081	-0.087	-0.092	-0.084	-0.090	-0.087	0.119	-0.119	-0.136	-0.130	-0.124	-0.124	-0.127	0.118	-0.168	-0.181	-0.178	-0.163	-0.155	-0.169	0.120
823	3.66	-0.054	-0.057	-0.063	-0.056	-0.066	-0.059	0.081	-0.079	-0.092	-0.088	-0.082	-0.090	-0.086	0.080	-0.121	-0.125	-0.121	-0.109	-0.115	-0.118	0.083
1068	4.75	-0.035	-0.034	-0.041	-0.035	-0.046	-0.038	0.052	-0.052	-0.060	-0.056	-0.051	-0.057	-0.055	0.051	-0.082	-0.079	-0.079	-0.067	-0.084	-0.078	0.055
2690	11.96	-0.007	-0.008	-0.010	-0.008	-0.011	-0.009	0.012	-0.010	-0.015	-0.020	-0.011	-0.008	-0.013	0.012	-0.018	-0.026	-0.020	-0.015	-0.038	-0.023	0.017
3690	16.40	-0.004	-0.005	-0.006	-0.005	-0.006	-0.005	0.007	-0.006	-0.009	-0.012	-0.007	-0.005	-0.008	0.007	-0.011	-0.016	-0.012	-0.009	-0.020	-0.014	0.010
4690	20.84	-0.003	-0.004	-0.005	-0.004	-0.005	-0.004	0.005	-0.004	-0.007	-0.010	-0.006	-0.004	-0.006	0.006	-0.009	-0.013	-0.009	-0.007	-0.016	-0.011	0.008
5690	25.29	-0.002	-0.003	-0.004	-0.003	-0.004	-0.003	0.005	-0.003	-0.006	-0.009	-0.005	-0.003	-0.005	0.005	-0.007	-0.011	-0.008	-0.006	-0.013	-0.009	0.007

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 733 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	5	10	15	12	11	MIN	AVG	MAX
EY1	3712	8713	2750	3789	4825	2750	4758	8713
EY2	4953	4991	4481	4986	4987	4481	4880	4991
EY3	151	151	151	151	151	151	151	151
EX3	139	80	116	112	159	80	121	159
EY4	156	176	184	236	275	156	205	275
EX4	114	244	328	503	461	114	330	503
EY5	168	119	165	158	175	119	157	175
EX5	419	296	412	394	430	296	390	430
R3	0.92	0.53	0.77	0.74	1.05	0.53	0.80	1.05
R4	0.73	1.39	1.78	2.13	1.67	0.73	1.54	2.13
R5	2.49	2.50	2.50	2.49	2.46	2.46	2.49	2.50

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.840081	-0.799954	-0.832053	-0.778101	-0.719357	-0.793	0
UY2	-0.611946	-0.607138	-0.576837	-0.554030	-0.516832	-0.594	300
UY3	-0.468417	-0.480973	-0.422994	-0.414525	-0.390039	-0.478	450
UY4	-0.189416	-0.220189	-0.152782	-0.156462	-0.151777	-0.203	1000
UY5	-0.125030	-0.155066	-0.102009	-0.104837	-0.102807	-0.127	1400
UY6	-0.097229	-0.125178	-0.080846	-0.083476	-0.082947	-0.092	1800
UY7	-0.081217	-0.105987	-0.067162	-0.069625	-0.070399	-0.070	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	1	6	3	10	15	MIN	AVG	MAX
EY1	3000	6608	6866	7246	5003	3000	5745	7246
EY2	2000	1625	3933	3424	1541	1541	2505	3933
EY3	200	177	189	305	157	157	205	305
EX3	200	265	344	184	170	170	232	344
EY4	150	245	202	220	286	150	221	286
EX4	150	489	501	462	676	150	455	676
EY5	150	243	122	159	135	122	162	243
EX5	150	543	216	123	329	123	272	543
R3	1.00	1.50	1.82	0.60	1.08	0.60	1.20	1.82
R4	1.00	2.00	2.48	2.10	2.36	1.00	1.99	2.48
R5	1.00	2.23	1.76	0.77	2.44	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.855903	-0.723549	-0.691426	-0.662866	-0.925621	-0.793	0
UY2	-0.568589	-0.458587	-0.509633	-0.484629	-0.613463	-0.594	300
UY3	-0.416853	-0.320578	-0.401584	-0.385506	-0.449618	-0.478	450
UY4	-0.172500	-0.115758	-0.203385	-0.217171	-0.207428	-0.203	1000
UY5	-0.112790	-0.078510	-0.154800	-0.174881	-0.164030	-0.127	1400
UY6	-0.079608	-0.062151	-0.129232	-0.150189	-0.143089	-0.092	1800
UY7	-0.056822	-0.051791	-0.110933	-0.131813	-0.127810	-0.070	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 733 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	16	15	13	1	MIN	AVG	MAX
EY1	6175	3779	7126	5452	3000	3000	5107	7126
EY2	4681	4897	4730	4726	2000	2000	4207	4897
EY3	157	153	155	183	200	153	170	200
EX3	119	116	171	129	200	116	147	200
EY4	247	226	236	211	150	150	214	247
EX4	616	563	531	442	150	150	460	616
EY5	104	156	105	117	150	104	126	156
EX5	156	206	150	188	150	150	170	206
R3	0.76	0.76	1.10	0.71	1.00	0.71	0.86	1.10
R4	2.49	2.49	2.25	2.10	1.00	1.00	2.07	2.49
R5	1.50	1.32	1.42	1.61	1.00	1.00	1.37	1.61

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.784936	-0.815543	-0.746566	-0.752115	-0.855903	-0.791	0
UY2	-0.585530	-0.595566	-0.559871	-0.556225	-0.568589	-0.594	300
UY3	-0.459184	-0.458190	-0.441512	-0.434344	-0.416853	-0.478	450
UY4	-0.210027	-0.199870	-0.203854	-0.200336	-0.172500	-0.203	1000
UY5	-0.149198	-0.144722	-0.142801	-0.143637	-0.112790	-0.127	1400
UY6	-0.118926	-0.120032	-0.111991	-0.114691	-0.079608	-0.092	1800
UY7	-0.097253	-0.103309	-0.090264	-0.094050	-0.056822	-0.070	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1083 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	9	16	4	5	14	MIN	AVG	MAX
EY1	3654	3768	6354	6751	3315	3315	4768	6751
EY2	4143	4289	4838	4198	3590	3590	4212	4838
EY3	203	189	160	183	196	160	186	203
EX3	164	135	110	278	141	110	166	278
EY4	157	170	158	185	191	157	172	191
EX4	350	394	393	459	395	350	398	459
EY5	106	105	142	124	117	105	119	142
EX5	189	186	240	242	191	186	210	242
R3	0.80	0.72	0.69	1.52	0.72	0.69	0.89	1.52
R4	2.23	2.31	2.49	2.48	2.07	2.07	2.32	2.49
R5	1.78	1.78	1.69	1.96	1.63	1.63	1.77	1.96

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.152490	-1.184260	-1.129860	-1.050110	-1.174470	-1.072	0
UY2	-0.824897	-0.853130	-0.829410	-0.779614	-0.813334	-0.816	300
UY3	-0.631863	-0.654120	-0.638344	-0.615462	-0.606293	-0.665	450
UY4	-0.283429	-0.289070	-0.254939	-0.306110	-0.254734	-0.301	1000
UY5	-0.197189	-0.201082	-0.158819	-0.229449	-0.176476	-0.196	1400
UY6	-0.149584	-0.153960	-0.113602	-0.189988	-0.134021	-0.142	1800
UY7	-0.115283	-0.120014	-0.085050	-0.162431	-0.102853	-0.106	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	6	3	14	10	1	MIN	AVG	MAX
EY1	6608	6866	8993	7246	3000	3000	6543	8993
EY2	1625	3933	1532	3424	2000	1532	2503	3933
EY3	177	189	159	305	200	159	206	305
EX3	265	344	174	184	200	174	233	344
EY4	245	202	288	220	150	150	221	288
EX4	489	501	682	462	150	150	457	682
EY5	243	122	132	159	150	122	161	243
EX5	543	216	322	123	150	123	271	543
R3	1.50	1.82	1.09	0.60	1.00	0.60	1.20	1.82
R4	2.00	2.48	2.37	2.10	1.00	1.00	1.99	2.48
R5	2.23	1.76	2.44	0.77	1.00	0.77	1.64	2.44

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.069040	-1.021570	-1.161600	-0.979378	-1.264590	-1.072	0
UY2	-0.677557	-0.752978	-0.734997	-0.716034	-0.840085	-0.816	300
UY3	-0.473651	-0.593336	-0.507895	-0.569582	-0.615896	-0.665	450
UY4	-0.171031	-0.300500	-0.168229	-0.320867	-0.254867	-0.301	1000
UY5	-0.115998	-0.228715	-0.107598	-0.258385	-0.166647	-0.196	1400
UY6	-0.091827	-0.190940	-0.078617	-0.221903	-0.117620	-0.142	1800
UY7	-0.076520	-0.163902	-0.056808	-0.194752	-0.083954	-0.106	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1083 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	3	15	14	1	10	MIN	AVG	MAX
EY1	6866	6020	6183	3000	7246	3000	5863	7246
EY2	3933	3562	4765	2000	3424	2000	3537	4765
EY3	189	175	162	200	305	162	206	305
EX3	344	296	263	200	184	184	257	344
EY4	202	219	279	150	220	150	214	279
EX4	501	545	284	150	462	150	388	545
EY5	122	116	105	150	159	105	131	159
EX5	216	191	247	150	123	123	185	247
R3	1.82	1.69	1.62	1.00	0.60	0.60	1.35	1.82
R4	2.48	2.48	1.02	1.00	2.10	1.00	1.82	2.48
R5	1.76	1.64	2.34	1.00	0.77	0.77	1.50	2.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.021570	-1.126410	-0.991150	-1.264590	-0.979378	-1.072	0
UY2	-0.752978	-0.831247	-0.715259	-0.840085	-0.716034	-0.816	300
UY3	-0.593336	-0.656609	-0.544437	-0.615896	-0.569582	-0.665	450
UY4	-0.300500	-0.341469	-0.218282	-0.254867	-0.320867	-0.301	1000
UY5	-0.228715	-0.267038	-0.140662	-0.166647	-0.258385	-0.196	1400
UY6	-0.190940	-0.228345	-0.102187	-0.117620	-0.221903	-0.142	1800
UY7	-0.163902	-0.200450	-0.074667	-0.083954	-0.194752	-0.106	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1409 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	10	4	8	9	MIN	AVG	MAX
EY1	6143	6433	6674	5650	5913	5650	6163	6674
EY2	4667	4264	3903	4371	5000	3903	4441	5000
EY3	165	162	176	162	150	150	163	176
EX3	276	229	314	244	283	229	269	314
EY4	171	200	232	164	202	164	194	232
EX4	426	497	573	407	505	407	482	573
EY5	139	135	115	128	140	115	132	140
EX5	190	169	198	153	308	153	204	308
R3	1.67	1.42	1.79	1.51	1.89	1.42	1.65	1.89
R4	2.49	2.49	2.47	2.49	2.50	2.47	2.49	2.50
R5	1.37	1.25	1.72	1.19	2.19	1.19	1.54	2.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.376790	-1.405140	-1.354660	-1.462930	-1.358050	-1.302	0
UY2	-1.020310	-1.033480	-0.995775	-1.081740	-1.001840	-1.018	300
UY3	-0.798911	-0.804088	-0.780440	-0.845852	-0.777627	-0.836	450
UY4	-0.366257	-0.361540	-0.381691	-0.388246	-0.337918	-0.400	1000
UY5	-0.255615	-0.251090	-0.284567	-0.271566	-0.231849	-0.262	1400
UY6	-0.199646	-0.195671	-0.234071	-0.211619	-0.182747	-0.189	1800
UY7	-0.161916	-0.157828	-0.197794	-0.170435	-0.151365	-0.140	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	3	10	16	6	14	MIN	AVG	MAX
EY1	6866	7246	8992	6608	9069	6608	7756	9069
EY2	3933	3424	3667	1625	2028	1625	1935	1933
EY3	189	305	165	177	162	162	200	305
EX3	344	184	159	265	443	159	279	443
EY4	202	220	274	245	161	161	220	274
EX4	501	462	313	489	401	313	433	501
EY5	122	159	262	243	105	105	179	262
EX5	216	123	629	543	247	123	352	629
R3	1.82	0.60	0.97	1.50	2.73	0.60	1.52	2.73
R4	2.48	2.10	1.14	2.00	2.49	1.14	2.04	2.49
R5	1.76	0.77	2.40	2.23	2.34	0.77	1.90	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.329080	-1.274190	-1.266680	-1.390830	-1.592980	-1.302	0
UY2	-0.979636	-0.931572	-0.896503	-0.881512	-1.164340	-1.018	300
UY3	-0.771939	-0.741035	-0.669865	-0.616227	-0.927967	-0.836	450
UY4	-0.390955	-0.417454	-0.252834	-0.222514	-0.520200	-0.400	1000
UY5	-0.297562	-0.336163	-0.169569	-0.150916	-0.415580	-0.262	1400
UY6	-0.248415	-0.288699	-0.139479	-0.119468	-0.358172	-0.189	1800
UY7	-0.213239	-0.253375	-0.123414	-0.099554	-0.317650	-0.140	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 5 + 840 R: LOAD 1409 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	2	16	13	15	6	MIN	AVG	MAX
EY1	6866	8161	9173	7197	7246	6866	7729	9173
EY2	3933	4760	4730	2165	3424	2165	3802	4760
EY3	189	165	160	162	305	160	196	305
EX3	344	286	437	442	184	184	338	442
EY4	202	161	275	163	220	161	204	275
EX4	501	400	686	405	462	400	491	686
EY5	122	167	106	105	159	105	132	167
EX5	216	319	242	169	123	123	214	319
R3	1.82	1.73	2.73	2.72	0.60	0.60	1.92	2.73
R4	2.48	2.48	2.49	2.49	2.10	2.10	2.41	2.49
R5	1.76	1.91	2.29	1.61	0.77	0.77	1.67	2.29

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.329080	-1.294150	-1.240210	-1.463390	-1.274190	-1.302	0
UY2	-0.979636	-0.958816	-0.942552	-1.026600	-0.931572	-1.018	300
UY3	-0.771939	-0.748783	-0.755744	-0.782851	-0.741035	-0.836	450
UY4	-0.390955	-0.334072	-0.389868	-0.362579	-0.417454	-0.400	1000
UY5	-0.297562	-0.230638	-0.300414	-0.257119	-0.336163	-0.262	1400
UY6	-0.248415	-0.182600	-0.256973	-0.198608	-0.288699	-0.189	1800
UY7	-0.213239	-0.153128	-0.226246	-0.156190	-0.253375	-0.140	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 5 + 840 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN							LOAD 1: 733 kPa							LOAD 2: 1083 kPa							LOAD 3: 1409 kPa						
DEPTH	DEPTH RATIO	5	10	15	12	11	AVG.	STRESS RATIO	9	16	4	5	14	AVG.	STRESS RATIO	10	4	8	9	AVG.	STRESS RATIO						
(mm)	(z/ro)							(p/po)							(p/po)						(p/po)						
20	0.09	-0.685	-0.659	-0.690	-0.685	-0.681	-0.680	0.928	-1.014	-1.012	-0.989	-0.997	-1.013	-1.005	0.928	-1.295	-1.298	-1.302	-1.304	-1.300	0.923						
68	0.30	-0.528	-0.467	-0.539	-0.523	-0.519	-0.515	0.703	-0.797	-0.785	-0.731	-0.768	-0.797	-0.776	0.716	-0.987	-1.006	-1.003	-1.003	-1.000	0.710						
123	0.55	-0.314	-0.252	-0.327	-0.308	-0.310	-0.302	0.412	-0.508	-0.487	-0.424	-0.488	-0.513	-0.484	0.447	-0.610	-0.647	-0.626	-0.616	-0.624	0.443						
224	1.00	-0.187	-0.145	-0.201	-0.186	-0.186	-0.184	0.247	-0.321	-0.304	-0.255	-0.302	-0.331	-0.303	0.279	-0.367	-0.400	-0.383	-0.368	-0.379	0.269						
372	1.65	-0.134	-0.112	-0.149	-0.138	-0.135	-0.134	0.182	-0.224	-0.217	-0.186	-0.208	-0.234	-0.214	0.197	-0.250	-0.273	-0.266	-0.258	-0.261	0.185						
519	2.31	-0.096	-0.087	-0.111	-0.105	-0.101	-0.100	0.136	-0.157	-0.155	-0.137	-0.147	-0.167	-0.153	0.141	-0.179	-0.194	-0.190	-0.189	-0.187	0.133						
667	2.96	-0.071	-0.069	-0.086	-0.083	-0.078	-0.077	0.106	-0.115	-0.116	-0.107	-0.107	-0.124	-0.114	0.105	-0.135	-0.145	-0.143	-0.146	-0.141	0.100						
879	3.91	-0.050	-0.053	-0.064	-0.066	-0.055	-0.055	0.079	-0.085	-0.089	-0.088	-0.071	-0.091	-0.085	0.078	-0.105	-0.102	-0.108	-0.113	-0.105	0.075						
1157	5.14	-0.034	-0.037	-0.044	-0.047	-0.035	-0.039	0.054	-0.057	-0.059	-0.064	-0.043	-0.059	-0.057	0.052	-0.069	-0.062	-0.070	-0.076	-0.068	0.049						
3157	14.03	-0.011	-0.010	-0.011	-0.011	-0.010	-0.011	0.015	-0.013	-0.013	-0.014	-0.011	-0.012	-0.013	0.012	-0.013	-0.014	-0.012	-0.018	-0.014	0.010						
4157	18.48	-0.006	-0.006	-0.007	-0.007	-0.006	-0.007	0.009	-0.008	-0.008	-0.009	-0.007	-0.008	-0.008	0.007	-0.008	-0.009	-0.008	-0.012	-0.009	0.006						
5157	22.92	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.007	-0.007	-0.007	-0.006	-0.006	-0.006	-0.006	0.006	-0.006	-0.007	-0.006	-0.009	-0.007	0.005						

MAXIMUM DEFLECTION

DEPTH	DEPTH RATIO	5	10	16	4	7	AVG.	STRESS RATIO	6	3	14	10	1	AVG.	STRESS RATIO	10	16	6	14	AVG.	STRESS RATIO
(mm)	(z/ro)							(p/po)							(p/po)						(p/po)
20	0.09	-0.688	-0.682	-0.690	-0.691	-0.693	-0.689	0.940	-0.997	-0.999	-0.981	-0.994	-1.015	-0.997	0.921	-1.293	-1.275	-1.297	-1.291	-1.291	0.916
68	0.30	-0.520	-0.502	-0.526	-0.524	-0.547	-0.524	0.715	-0.798	-0.779	-0.757	-0.765	-0.826	-0.785	0.725	-0.995	-0.940	-1.038	-1.017	-1.001	0.710
123	0.55	-0.306	-0.283	-0.314	-0.310	-0.357	-0.314	0.429	-0.565	-0.510	-0.522	-0.502	-0.583	-0.536	0.495	-0.653	-0.570	-0.736	-0.694	-0.663	0.471
224	1.00	-0.183	-0.167	-0.191	-0.188	-0.227	-0.191	0.261	-0.372	-0.324	-0.348	-0.330	-0.386	-0.352	0.325	-0.429	-0.353	-0.483	-0.428	-0.423	0.300
372	1.65	-0.132	-0.126	-0.138	-0.138	-0.154	-0.138	0.188	-0.244	-0.225	-0.240	-0.230	-0.249	-0.238	0.219	-0.299	-0.255	-0.318	-0.270	-0.287	0.204
519	2.31	-0.097	-0.096	-0.102	-0.103	-0.107	-0.101	0.137	-0.170	-0.159	-0.172	-0.160	-0.162	-0.165	0.152	-0.208	-0.190	-0.221	-0.182	-0.202	0.143
667	2.96	-0.073	-0.075	-0.078	-0.079	-0.077	-0.077	0.104	-0.125	-0.116	-0.131	-0.116	-0.111	-0.120	0.111	-0.151	-0.149	-0.163	-0.130	-0.149	0.106
879	3.91	-0.054	-0.056	-0.057	-0.060	-0.052	-0.056	0.076	-0.083	-0.076	-0.090	-0.083	-0.072	-0.081	0.075	-0.108	-0.108	-0.108	-0.086	-0.102	0.072
1157	5.14	-0.035	-0.037	-0.037	-0.040	-0.033	-0.037	0.050	-0.052	-0.045	-0.055	-0.051	-0.045	-0.050	0.046	-0.066	-0.074	-0.068	-0.054	-0.064	0.046
3157	14.03	-0.009	-0.009	-0.009	-0.010	-0.008	-0.009	0.012	-0.015	-0.011	-0.019	-0.008	-0.009	-0.012	0.011	-0.010	-0.018	-0.019	-0.013	-0.015	0.010
4157	18.48	-0.006	-0.005	-0.006	-0.006	-0.005	-0.006	0.008	-0.009	-0.007	-0.012	-0.005	-0.006	-0.008	0.007	-0.006	-0.010	-0.012	-0.009	-0.009	0.007
5157	22.92	-0.004	-0.004	-0.005	-0.005	-0.004	-0.004	0.006	-0.007	-0.005	-0.010	-0.004	-0.004	-0.006	0.006	-0.005	-0.008	-0.009	-0.007	-0.007	0.005

RMS VALUE OF DEFLECTIONS

DEPTH	DEPTH RATIO	11	16	15	13	1	AVG.	STRESS RATIO	3	15	14	1	10	AVG.	STRESS RATIO	16	13	15	6	AVG.	STRESS RATIO
(mm)	(z/ro)							(p/po)							(p/po)						(p/po)
20	0.09	-0.672	-0.685	-0.670	-0.677	-0.687	-0.678	0.925	-0.999	-1.000	-1.000	-1.015	-0.994	-1.001	0.925	-1.288	-1.297	-1.302	-1.293	-1.296	0.920
68	0.30	-0.498	-0.524	-0.498	-0.510	-0.559	-0.518	0.706	-0.779	-0.781	-0.769	-0.826	-0.765	-0.784	0.724	-0.976	-1.004	-1.046	-0.995	-1.007	0.715
123	0.55	-0.289	-0.307	-0.293	-0.304	-0.394	-0.317	0.433	-0.510	-0.511	-0.481	-0.583	-0.502	-0.517	0.478	-0.606	-0.653	-0.739	-0.653	-0.663	0.471
224	1.00	-0.174	-0.185	-0.174	-0.185	-0.261	-0.196	0.267	-0.324	-0.325	-0.303	-0.386	-0.330	-0.334	0.308	-0.378	-0.435	-0.500	-0.429	-0.433	0.307
372	1.65	-0.128	-0.136	-0.123	-0.134	-0.169	-0.138	0.188	-0.225	-0.226	-0.219	-0.249	-0.230	-0.230	0.212	-0.272	-0.332	-0.349	-0.299	-0.309	0.219
519	2.31	-0.095	-0.102	-0.089	-0.098	-0.110	-0.099	0.135	-0.159	-0.162	-0.161	-0.162	-0.160	-0.161	0.148	-0.200	-0.254	-0.246	-0.208	-0.223	0.158
667	2.96	-0.074	-0.078	-0.068	-0.074	-0.075	-0.074	0.100	-0.116	-0.122	-0.121	-0.111	-0.116	-0.117	0.108	-0.153	-0.198	-0.179	-0.151	-0.166	0.118
879	3.91	-0.056	-0.058	-0.048	-0.052	-0.048	-0.052	0.071	-0.076	-0.090	-0.077	-0.072	-0.083	-0.079	0.073	-0.115	-0.128	-0.119	-0.108	-0.114	0.081
1157	5.14	-0.036	-0.037	-0.029	-0.032	-0.031	-0.033	0.045	-0.045	-0.056	-0.045	-0.045	-0.051	-0.048	0.045	-0.079	-0.072	-0.072	-0.066	-0.070	0.049
3157	14.03	-0.007	-0.007	-0.007	-0.008	-0.006	-0.007	0.010	-0.011	-0.010	-0.017	-0.009	-0.008	-0.011	0.010	-0.016	-0.016	-0.015	-0.010	-0.014	0.010
4157	18.48	-0.005	-0.004	-0.005	-0.005	-0.004	-0.004	0.006	-0.007	-0.006	-0.011	-0.006	-0.005	-0.007	0.006	-0.010	-0.010	-0.010	-0.006	-0.009	0.006
5157	22.92	-0.004	-0.003	-0.004	-0.004	-0.003	-0.003	0.005	-0.005	-0.005	-0.009	-0.004	-0.004	-0.005	0.005	-0.008	-0.009	-0.008	-0.005	-0.007	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 789 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	6	2	12	13	MIN	AVG	MAX
EY1	3484	8381	3620	7274	8455	3484	6243	8455
EY2	4032	3786	4748	4781	4814	3786	4432	4814
EY3	151	151	151	151	151	151	151	151
EX3	428	445	445	398	359	359	415	445
EY4	241	197	176	219	190	176	205	241
EX4	255	123	113	137	117	113	149	255
EY5	233	244	286	282	265	233	262	286
EX5	544	601	700	294	488	294	525	700
R3	2.83	2.95	2.95	2.63	2.38	2.38	2.75	2.95
R4	1.06	0.62	0.64	0.63	0.62	0.62	0.71	1.06
R5	2.34	2.46	2.45	1.04	1.84	1.04	2.03	2.46

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-0.795237	-0.738875	-0.783255	-0.737991	-0.738328	-0.803	0
UY2	-0.550524	-0.530398	-0.554155	-0.538505	-0.537978	-0.520	300
UY3	-0.407253	-0.404133	-0.415344	-0.413746	-0.412963	-0.389	450
UY4	-0.163901	-0.168595	-0.164418	-0.174272	-0.170351	-0.171	1000
UY5	-0.114816	-0.112200	-0.108453	-0.117562	-0.110955	-0.122	1400
UY6	-0.093418	-0.086460	-0.083471	-0.092633	-0.084524	-0.096	1800
UY7	-0.080781	-0.071743	-0.069526	-0.078706	-0.070003	-0.074	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	6	3	10	1	MIN	AVG	MAX
EY1	6700	6608	6866	7246	3000	3000	6084	7246
EY2	2441	1625	3933	3424	2000	1625	2685	3933
EY3	159	177	189	305	200	159	206	305
EX3	240	265	344	184	200	184	247	344
EY4	288	245	202	220	150	150	221	288
EX4	682	489	501	462	150	150	457	682
EY5	132	243	122	159	150	122	181	243
EX5	322	543	216	123	150	123	271	543
R3	1.51	1.50	1.82	0.60	1.00	0.60	1.29	1.82
R4	2.37	2.00	2.48	2.10	1.00	1.00	1.99	2.48
R5	2.44	2.23	1.76	0.77	1.00	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFLECTION (mm)					SENSOR DISTANCE (mm)	
UY1	-0.798957	-0.818367	-0.774180	-0.736998	-0.957403	-0.803	0
UY2	-0.517092	-0.508461	-0.559243	-0.527455	-0.623534	-0.520	300
UY3	-0.360841	-0.349847	-0.433449	-0.413330	-0.450334	-0.389	450
UY4	-0.118413	-0.124317	-0.214864	-0.230239	-0.184865	-0.171	1000
UY5	-0.075659	-0.084989	-0.164908	-0.186734	-0.121877	-0.122	1400
UY6	-0.056052	-0.067494	-0.138711	-0.161173	-0.086445	-0.096	1800
UY7	-0.041541	-0.056343	-0.119815	-0.142035	-0.061993	-0.074	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 789 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	3	14	10	1	MIN	AVG	MAX
EY1	6608	6866	6791	7246	3000	3000	6102	7246
EY2	1625	3933	1532	3424	2000	1532	2503	3933
EY3	177	189	159	305	200	159	206	305
EX3	265	344	222	184	200	184	243	344
EY4	245	202	288	220	150	150	221	288
EX4	489	501	682	462	150	150	457	682
EY5	243	122	132	159	150	122	161	243
EX5	543	216	322	123	150	123	271	543
R3	1.50	1.82	1.40	0.60	1.00	0.60	1.26	1.82
R4	2.00	2.48	2.37	2.10	1.00	1.00	1.99	2.48
R5	2.23	1.76	2.44	0.77	1.00	0.77	1.64	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFI.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.818367	-0.774180	-0.878375	-0.736998	-0.957403	-0.803	0
UY2	-0.508461	-0.559243	-0.537592	-0.527455	-0.623534	-0.520	300
UY3	-0.349847	-0.433449	-0.362501	-0.413330	-0.450334	-0.389	450
UY4	-0.124317	-0.214864	-0.116951	-0.230239	-0.184865	-0.171	1000
UY5	-0.084989	-0.164908	-0.076148	-0.186734	-0.121877	-0.122	1400
UY6	-0.067494	-0.138711	-0.056569	-0.161173	-0.086445	-0.096	1800
UY7	-0.056343	-0.119815	-0.041763	-0.142035	-0.061993	-0.074	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1249 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
 =====

**CALCULATED MODULI (MPa)**

SET	3	1	12	5	6	MIN	AVG	MAX
EY1	9097	8909	9938	9374	9143	8909	9292	9938
EY2	4177	3906	2990	4372	4433	2990	3975	4433
EY3	159	161	152	203	216	152	178	216
EX3	251	251	303	278	255	251	268	303
EV4	261	285	297	248	273	248	273	297
EX4	318	282	290	329	304	282	305	329
EY5	282	288	261	271	267	261	274	288
EX5	252	211	150	222	265	150	220	265
R3	1.58	1.56	2.00	1.37	1.18	1.18	1.54	2.00
R4	1.22	0.99	0.98	1.33	1.11	0.98	1.13	1.33
R5	0.90	0.73	0.58	0.82	0.99	0.58	0.80	0.99

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.164700	-1.174240	-1.215940	-1.057820	-1.046890	-1.187	0
UY2	-0.826782	-0.823670	-0.839233	-0.751994	-0.743205	-0.754	300
UY3	-0.620072	-0.612116	-0.618179	-0.569197	-0.563121	-0.580	450
UY4	-0.243211	-0.236988	-0.239423	-0.243365	-0.245845	-0.279	1000
UY5	-0.164106	-0.162475	-0.164651	-0.171827	-0.176863	-0.200	1400
UY6	-0.131732	-0.132990	-0.133492	-0.138925	-0.145132	-0.156	1800
UY7	-0.112843	-0.115753	-0.114012	-0.118135	-0.125170	-0.121	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	8	2	16	5	14	MIN	AVG	MAX
EY1	7246	6866	5773	6608	3901	3901	6079	7246
EY2	3424	3933	2088	1625	2290	1625	2672	3933
EY3	305	189	248	177	264	177	237	305
EX3	184	344	429	265	475	184	339	475
EY4	220	202	273	245	164	164	221	273
EX4	462	501	679	489	408	408	508	679
EY5	159	122	112	243	105	105	148	243
EX5	123	216	213	543	252	123	269	543
R3	0.60	1.82	1.73	1.50	1.79	0.60	1.49	1.82
R4	2.10	2.48	2.49	2.00	2.49	2.00	2.31	2.49
R5	0.77	1.76	1.90	2.23	2.40	0.77	1.81	2.40

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.166680	-1.225540	-1.253340	-1.295490	-1.309330	-1.187	0
UY2	-0.834970	-0.885291	-0.870917	-0.804903	-0.920463	-0.754	300
UY3	-0.654308	-0.686157	-0.680632	-0.553813	-0.726116	-0.580	450
UY4	-0.364473	-0.340133	-0.404796	-0.196796	-0.437090	-0.279	1000
UY5	-0.295603	-0.261052	-0.341900	-0.134539	-0.363085	-0.200	1400
UY6	-0.255140	-0.219582	-0.304552	-0.106844	-0.317220	-0.156	1800
UY7	-0.224844	-0.189669	-0.275887	-0.089192	-0.283007	-0.121	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1249 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	4	2	7	13	MIN	AVG	MAX
EY1	7123	6608	6866	7246	8894	6608	7347	8894
EY2	1826	1625	3933	3424	2812	1625	2724	3933
EY3	182	177	189	305	200	177	210	305
EX3	275	265	344	184	501	184	314	501
EY4	222	245	202	220	170	170	212	245
EX4	414	489	501	462	120	120	397	501
EY5	224	243	122	159	280	122	206	280
EX5	521	543	216	123	676	123	416	676
R3	1.51	1.50	1.82	0.60	2.51	0.60	1.59	2.51
R4	1.87	2.00	2.48	2.10	0.70	0.70	1.83	2.48
R5	2.33	2.23	1.76	0.77	2.41	0.77	1.90	2.41

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.281630	-1.295490	-1.225540	-1.166680	-0.993209	-1.187	0
UY2	-0.818825	-0.804903	-0.885291	-0.834970	-0.656683	-0.754	300
UY3	-0.577765	-0.553813	-0.686157	-0.654308	-0.467380	-0.580	450
UY4	-0.221546	-0.196796	-0.340133	-0.364473	-0.148452	-0.279	1000
UY5	-0.154165	-0.134539	-0.261052	-0.295603	-0.076246	-0.200	1400
UY6	-0.123362	-0.106844	-0.219582	-0.255140	-0.042601	-0.156	1800
UY7	-0.104245	-0.089192	-0.189669	-0.224844	-0.023771	-0.121	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1457 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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CALCULATED MODULI (MPa)

SET	3	9	7	15	10	MIN	AVG	MAX
EY1	9155	9322	9793	9799	7894	7894	9193	9799
EY2	4697	4776	4925	4923	4913	4697	4847	4925
EY3	167	163	156	155	154	154	159	167
EX3	216	200	243	109	106	106	175	243
EY4	299	299	300	243	268	243	282	300
EX4	634	654	717	585	646	585	647	717
EY5	208	184	203	219	277	184	218	277
EX5	474	416	206	514	678	206	457	678
R3	1.30	1.23	1.56	0.70	0.68	0.68	1.10	1.56
R4	2.12	2.19	2.39	2.41	2.41	2.12	2.30	2.41
R5	2.28	2.26	1.01	2.34	2.45	1.01	2.07	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.322050	-1.367290	-1.353140	-1.434420	-1.376630	-1.425	0
UY2	-0.944915	-0.989560	-0.990762	-1.035710	-0.963584	-0.850	300
UY3	-0.713207	-0.755350	-0.763830	-0.782941	-0.705350	-0.664	450
UY4	-0.298535	-0.329987	-0.343592	-0.308888	-0.244914	-0.335	1000
UY5	-0.220026	-0.247624	-0.259278	-0.215998	-0.168246	-0.241	1400
UY6	-0.190344	-0.215838	-0.226003	-0.182641	-0.144211	-0.188	1800
UY7	-0.171998	-0.195747	-0.204461	-0.163793	-0.130001	-0.145	2250

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**

CALCULATED MODULI (MPa)

SET	3	10	16	6	14	MIN	AVG	MAX
EY1	6866	7246	8992	6608	9069	6608	7756	9069
EY2	3933	3424	3909	1625	2028	1625	2984	3933
EY3	189	305	165	177	162	162	200	305
EX3	344	184	249	265	443	184	297	443
EY4	202	220	195	245	161	161	204	245
EX4	501	462	485	489	401	401	468	501
EY5	122	159	262	243	105	105	179	262
EX5	216	123	449	543	247	123	316	543
R3	1.82	0.60	1.51	1.50	2.73	0.60	1.63	2.73
R4	2.48	2.10	2.49	2.00	2.49	2.00	2.31	2.49
R5	1.76	0.77	1.71	2.23	2.34	0.77	1.76	2.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-1.429630	-1.360970	-1.357610	-1.511230	-1.708250	-1.425	0
UY2	-1.032720	-0.974021	-0.962513	-0.938946	-1.226040	-0.850	300
UY3	-0.800425	-0.763271	-0.722685	-0.646042	-0.964489	-0.664	450
UY4	-0.396776	-0.425169	-0.288172	-0.229569	-0.533227	-0.335	1000
UY5	-0.304526	-0.344830	-0.196334	-0.156944	-0.428025	-0.241	1400
UY6	-0.256150	-0.297629	-0.158771	-0.124637	-0.370409	-0.188	1800
UY7	-0.221255	-0.262287	-0.137939	-0.104045	-0.329640	-0.145	2250

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 140 L: LOAD 1457 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	14	5	15	13	MIN	AVG	MAX
EY1	3962	7630	6608	9372	9162	3962	7346	9372
EY2	1575	1792	1625	2295	4020	1575	2262	4020
EY3	232	219	177	168	157	157	191	232
EX3	308	263	265	190	209	190	247	308
EY4	227	189	245	211	286	189	232	286
EX4	560	445	489	459	676	445	526	676
EY5	151	286	243	219	203	151	221	286
EX5	141	699	543	400	175	141	392	699
R3	1.33	1.20	1.50	1.13	1.34	1.13	1.30	1.50
R4	2.46	2.36	2.00	2.18	2.36	2.00	2.27	2.46
R5	0.94	2.44	2.23	1.82	0.86	0.86	1.66	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-1.518760	-1.377430	-1.511230	-1.534540	-1.451050	-1.425	0
UY2	-0.952765	-0.866205	-0.938946	-1.024610	-1.036880	-0.850	300
UY3	-0.682479	-0.606216	-0.646042	-0.739007	-0.786196	-0.664	450
UY4	-0.317941	-0.233693	-0.229569	-0.284188	-0.343223	-0.335	1000
UY5	-0.239844	-0.163734	-0.156944	-0.201208	-0.257171	-0.241	1400
UY6	-0.193427	-0.131941	-0.124637	-0.166459	-0.221575	-0.188	1800
UY7	-0.158213	-0.113374	-0.104045	-0.144908	-0.197502	-0.145	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6+140 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 789 kPa					LOAD 2: 1249 kPa					LOAD 3: 1457 kPa										
DEPTH (mm)	DEPTH RATIO (z/ro)	1	6	2	12	13	AVG.	DEPTH RATIO (p/ro)	3	1	12	5	6	AVG.	DEPTH RATIO (p/ro)	3	9	7	15	10	AVG.	DEPTH RATIO (p/ro)
20	0.09	-0.754	-0.735	-0.756	-0.740	-0.734	-0.744	0.943	-1.154	-1.154	-1.152	-1.158	-1.158	-1.155	0.925	-1.347	-1.345	-1.348	-1.334	-1.346	-1.344	0.922
68	0.30	-0.616	-0.570	-0.614	-0.574	-0.561	-0.587	0.744	-0.878	-0.882	-0.894	-0.891	-0.891	-0.887	0.710	-1.018	-1.011	-1.017	-0.969	-0.989	-1.001	0.687
123	0.55	-0.409	-0.365	-0.397	-0.359	-0.347	-0.376	0.476	-0.554	-0.568	-0.602	-0.575	-0.576	-0.575	0.460	-0.635	-0.623	-0.632	-0.560	-0.572	-0.604	0.415
224	1.00	-0.247	-0.214	-0.234	-0.211	-0.201	-0.221	0.280	-0.342	-0.363	-0.398	-0.361	-0.361	-0.365	0.292	-0.401	-0.391	-0.399	-0.341	-0.349	-0.376	0.258
372	1.65	-0.157	-0.135	-0.147	-0.137	-0.128	-0.141	0.179	-0.234	-0.255	-0.283	-0.243	-0.240	-0.251	0.201	-0.289	-0.283	-0.292	-0.254	-0.265	-0.277	0.190
519	2.31	-0.107	-0.092	-0.099	-0.095	-0.087	-0.096	0.122	-0.167	-0.185	-0.205	-0.170	-0.166	-0.178	0.143	-0.214	-0.212	-0.219	-0.194	-0.203	-0.208	0.143
667	2.96	-0.078	-0.066	-0.069	-0.069	-0.063	-0.069	0.087	-0.125	-0.139	-0.154	-0.124	-0.122	-0.133	0.106	-0.167	-0.167	-0.170	-0.155	-0.162	-0.164	0.113
879	3.91	-0.052	-0.044	-0.047	-0.046	-0.043	-0.046	0.059	-0.082	-0.090	-0.094	-0.082	-0.082	-0.086	0.069	-0.119	-0.128	-0.112	-0.133	-0.123	-0.123	0.084
1157	5.14	-0.032	-0.030	-0.032	-0.030	-0.029	-0.031	0.039	-0.050	-0.053	-0.051	-0.050	-0.051	-0.051	0.041	-0.074	-0.082	-0.062	-0.097	-0.082	-0.079	0.054
3157	14.03	-0.009	-0.010	-0.010	-0.007	-0.009	-0.009	0.011	-0.010	-0.010	-0.009	-0.010	-0.010	-0.010	0.008	-0.015	-0.014	-0.011	-0.016	-0.017	-0.015	0.010
4157	18.48	-0.005	-0.006	-0.006	-0.004	-0.005	-0.005	0.007	-0.006	-0.006	-0.005	-0.006	-0.006	-0.006	0.005	-0.009	-0.009	-0.007	-0.010	-0.010	-0.009	0.006
5157	22.92	-0.004	-0.005	-0.004	-0.003	-0.004	-0.004	0.005	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003	-0.007	-0.007	-0.005	-0.007	-0.008	-0.007	0.005

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/ro)	14	6	3	10	1	AVG.	DEPTH RATIO (p/ro)	8	2	16	5	14	AVG.	DEPTH RATIO (p/ro)	3	10	16	6	14	AVG.	DEPTH RATIO (p/ro)
20	0.09	-0.745	-0.737	-0.744	-0.737	-0.741	-0.740	0.938	-1.163	-1.169	-1.179	-1.164	-1.192	-1.174	0.940	-1.364	-1.357	-1.349	-1.358	-1.353	-1.356	0.931
68	0.30	-0.607	-0.578	-0.601	-0.574	-0.590	-0.492	0.623	-0.909	-0.926	-0.985	-0.945	-1.022	-0.957	0.767	-1.081	-1.060	-1.027	-1.103	-1.082	-1.070	0.735
123	0.55	-0.421	-0.379	-0.412	-0.373	-0.397	-0.331	0.419	-0.613	-0.622	-0.735	-0.687	-0.784	-0.688	0.551	-0.726	-0.715	-0.652	-0.801	-0.757	-0.730	0.501
224	1.00	-0.267	-0.234	-0.261	-0.234	-0.250	-0.208	0.263	-0.409	-0.401	-0.488	-0.455	-0.541	-0.459	0.367	-0.468	-0.477	-0.405	-0.530	-0.472	-0.470	0.323
372	1.65	-0.170	-0.153	-0.169	-0.156	-0.158	-0.135	0.171	-0.278	-0.271	-0.301	-0.291	-0.344	-0.297	0.238	-0.316	-0.324	-0.276	-0.339	-0.289	-0.309	0.212
519	2.31	-0.116	-0.105	-0.116	-0.107	-0.103	-0.091	0.116	-0.189	-0.188	-0.197	-0.197	-0.219	-0.198	0.158	-0.219	-0.220	-0.198	-0.230	-0.191	-0.212	0.145
667	2.96	-0.084	-0.075	-0.085	-0.077	-0.071	-0.065	0.083	-0.134	-0.135	-0.139	-0.143	-0.146	-0.140	0.112	-0.158	-0.157	-0.153	-0.167	-0.134	-0.154	0.105
879	3.91	-0.055	-0.049	-0.056	-0.052	-0.046	-0.043	0.055	-0.093	-0.085	-0.097	-0.091	-0.095	-0.092	0.074	-0.099	-0.109	-0.122	-0.107	-0.086	-0.104	0.072
1157	5.14	-0.033	-0.030	-0.034	-0.032	-0.030	-0.027	0.034	-0.054	-0.048	-0.055	-0.055	-0.058	-0.054	0.043	-0.056	-0.063	-0.086	-0.064	-0.051	-0.064	0.044
3157	14.03	-0.009	-0.009	-0.011	-0.006	-0.008	-0.007	0.009	-0.009	-0.012	-0.010	-0.016	-0.011	-0.011	0.009	-0.014	-0.010	-0.014	-0.019	-0.013	-0.014	0.010
4157	18.48	-0.006	-0.006	-0.007	-0.004	-0.005	-0.004	0.006	-0.005	-0.008	-0.007	-0.010	-0.008	-0.008	0.006	-0.009	-0.006	-0.009	-0.012	-0.009	-0.009	0.006
5157	22.92	-0.005	-0.004	-0.006	-0.003	-0.003	-0.003	0.004	-0.004	-0.006	-0.005	-0.008	-0.006	-0.006	0.005	-0.007	-0.005	-0.007	-0.009	-0.007	-0.007	0.005

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/ro)	6	3	14	10	1	AVG.	DEPTH RATIO (p/ro)	16	4	2	7	13	AVG.	DEPTH RATIO (p/ro)	16	14	5	15	13	AVG.	DEPTH RATIO (p/ro)
20	0.09	-0.735	-0.739	-0.732	-0.735	-0.749	-0.738	0.935	-1.162	-1.164	-1.169	-1.163	-1.169	-1.165	0.933	-1.381	-1.357	-1.358	-1.336	-1.341	-1.355	0.930
68	0.30	-0.597	-0.585	-0.589	-0.574	-0.618	-0.593	0.751	-0.937	-0.945	-0.926	-0.909	-0.945	-0.933	0.747	-1.173	-1.101	-1.103	-1.030	-1.012	-1.084	0.744
123	0.55	-0.434	-0.393	-0.426	-0.387	-0.447	-0.418	0.529	-0.674	-0.687	-0.622	-0.613	-0.674	-0.654	0.524	-0.903	-0.805	-0.801	-0.697	-0.640	-0.769	0.528
224	1.00	-0.287	-0.253	-0.288	-0.258	-0.299	-0.277	0.351	-0.444	-0.455	-0.401	-0.409	-0.456	-0.433	0.347	-0.625	-0.541	-0.530	-0.458	-0.408	-0.512	0.352
372	1.65	-0.184	-0.171	-0.191	-0.176	-0.188	-0.182	0.231	-0.283	-0.291	-0.271	-0.278	-0.308	-0.286	0.229	-0.399	-0.349	-0.339	-0.313	-0.290	-0.338	0.232
519	2.31	-0.125	-0.118	-0.134	-0.119	-0.119	-0.123	0.156	-0.192	-0.197	-0.188	-0.189	-0.206	-0.194	0.156	-0.262	-0.235	-0.230	-0.222	-0.213	-0.233	0.160
667	2.96	-0.090	-0.085	-0.100	-0.085	-0.080	-0.088	0.112	-0.140	-0.143	-0.135	-0.134	-0.138	-0.138	0.111	-0.185	-0.172	-0.167	-0.169	-0.164	-0.171	0.118
879	3.91	-0.058	-0.053	-0.065	-0.059	-0.050	-0.057	0.072	-0.099	-0.091	-0.085	-0.093	-0.082	-0.090	0.072	-0.127	-0.128	-0.107	-0.126	-0.108	-0.119	0.082
1157	5.14	-0.035	-0.030	-0.036	-0.034	-0.030	-0.033	0.042	-0.065	-0.055	-0.048	-0.054	-0.054	-0.055	0.044	-0.072	-0.089	-0.064	-0.083	-0.060	-0.074	0.051
3157	14.03	-0.010	-0.007	-0.013	-0.005	-0.006	-0.008	0.011	-0.016	-0.016	-0.012	-0.009	-0.026	-0.016	0.012	-0.010	-0.017	-0.019	-0.015	-0.011	-0.015	0.010
4157	18.48	-0.006	-0.005	-0.009	-0.003	-0.004	-0.005	0.007	-0.010	-0.010	-0.008	-0.005	-0.015	-0.010	0.008	-0.007	-0.011	-0.012	-0.009	-0.007	-0.009	0.006
5157	22.92	-0.005	-0.004	-0.007	-0.003	-0.003	-0.004	0.005	-0.008	-0.008	-0.006	-0.004	-0.012	-0.008	0.006	-0.005	-0.008	-0.009	-0.007	-0.005	-0.007	0.005

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 470 L; LOAD 782 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	8	2	15	6	MIN	AVG	MAX
EY1	9223	8994	9037	8748	7542	7542	8709	9223
EY2	4735	4816	4658	4003	4920	4003	4626	4920
EY3	160	190	157	221	246	157	195	246
EX3	438	503	411	523	286	286	432	523
EY4	271	234	263	280	294	234	268	294
EX4	589	520	450	592	654	450	561	654
EY5	107	125	123	104	126	104	117	126
EX5	250	298	291	250	309	250	279	309
R3	2.73	2.65	2.61	2.36	1.16	1.16	2.30	2.73
R4	2.17	2.22	1.71	2.11	2.23	1.71	2.09	2.23
R5	2.34	2.38	2.36	2.40	2.45	2.34	2.39	2.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.805097	-0.746920	-0.816224	-0.739290	-0.714136	-0.755	0
UY2	-0.586146	-0.542637	-0.590309	-0.534365	-0.507943	-0.558	300
UY3	-0.453843	-0.421910	-0.454464	-0.419740	-0.391223	-0.456	450
UY4	-0.223749	-0.217087	-0.219973	-0.237149	-0.205786	-0.228	1000
UY5	-0.173146	-0.171015	-0.169732	-0.195389	-0.165559	-0.165	1400
UY6	-0.147299	-0.146593	-0.144994	-0.171252	-0.142970	-0.134	1800
UY7	-0.128559	-0.129093	-0.127587	-0.152752	-0.125961	-0.105	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	3	16	6	14	MIN	AVG	MAX
EY1	7246	6866	8992	6608	9069	6608	7756	9069
EY2	3424	3933	3769	1625	2028	1625	1956	1933
EY3	305	189	165	177	162	162	200	305
EX3	184	344	427	265	443	184	332	443
EY4	220	202	274	245	166	166	221	274
EX4	462	501	313	489	413	313	436	501
EY5	159	122	262	243	105	105	179	262
EX5	123	216	629	543	247	123	352	629
R3	0.60	1.82	2.59	1.50	2.73	0.60	1.85	2.73
R4	2.10	2.48	1.14	2.00	2.49	1.14	2.04	2.49
R5	0.77	1.76	2.40	2.23	2.34	0.77	1.90	2.40

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.777919	-0.823418	-0.676299	-0.861831	-0.969364	-0.755	0
UY2	-0.541183	-0.577707	-0.442774	-0.518650	-0.678683	-0.558	300
UY3	-0.415877	-0.437375	-0.307397	-0.346502	-0.523400	-0.456	450
UY4	-0.229595	-0.212551	-0.093700	-0.120125	-0.284482	-0.228	1000
UY5	-0.186479	-0.164322	-0.057824	-0.083322	-0.229288	-0.165	1400
UY6	-0.160297	-0.137919	-0.044237	-0.066373	-0.198393	-0.134	1800
UY7	-0.140598	-0.118376	-0.036470	-0.055291	-0.176165	-0.105	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 6 + 470 L: LOAD 782 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	8	2	14	13	5	MIN	AVG	MAX
EY1	7246	6866	9120	4759	6608	4759	6920	9120
EY2	3424	3933	4697	4687	1625	1625	3673	4697
EY3	305	189	162	159	177	159	198	305
EX3	184	344	239	218	265	184	250	344
EY4	220	202	275	276	245	202	243	276
EX4	462	501	684	289	489	289	485	684
EY5	159	122	258	106	243	106	178	258
EX5	123	216	387	248	543	123	303	543
R3	0.60	1.82	1.47	1.37	1.50	0.60	1.35	1.82
R4	2.10	2.48	2.49	1.05	2.00	1.05	2.02	2.49
R5	0.77	1.76	1.50	2.34	2.23	0.77	1.72	2.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.777919	-0.823418	-0.741924	-0.932753	-0.861831	-0.755	0
UY2	-0.541183	-0.577707	-0.510734	-0.650760	-0.518650	-0.558	300
UY3	-0.415877	-0.437375	-0.370824	-0.484400	-0.346502	-0.456	450
UY4	-0.229595	-0.212551	-0.138300	-0.215296	-0.120125	-0.228	1000
UY5	-0.186479	-0.164322	-0.099538	-0.163550	-0.083322	-0.165	1400
UY6	-0.160297	-0.137919	-0.085230	-0.136848	-0.066373	-0.134	1800
UY7	-0.140598	-0.118376	-0.076302	-0.116642	-0.055291	-0.105	2250

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**SASKATOON: RWY 15-33: STA. 6 + 470 L: LOAD 1243 kPa**

**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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CALCULATED MODULI (MPa)

SET	15	12	16	14	13	MIN	AVG	MAX
EY1	4373	9225	9504	9444	9757	4373	8460	9757
EY2	2928	3614	3887	2441	3780	2441	3330	3887
EY3	313	159	181	256	153	153	213	313
EX3	344	422	471	719	253	253	442	719
EY4	261	276	279	191	243	191	250	279
EX4	167	289	314	120	158	120	210	314
EY5	177	255	255	235	219	177	228	255
EX5	221	531	520	374	521	221	433	531
R3	1.10	2.65	2.60	2.80	1.65	1.10	2.16	2.80
R4	0.64	1.05	1.13	0.63	0.65	0.63	0.82	1.13
R5	1.25	2.08	2.04	1.59	2.38	1.25	1.87	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.080590	-1.086810	-0.993585	-0.960869	-1.289570	-1.079	0
UY2	-0.687563	-0.701284	-0.643760	-0.611415	-0.886773	-0.811	300
UY3	-0.492152	-0.478685	-0.441975	-0.432373	-0.644944	-0.675	450
UY4	-0.216195	-0.129880	-0.124326	-0.169327	-0.237288	-0.360	1000
UY5	-0.149089	-0.071661	-0.068179	-0.106792	-0.162367	-0.268	1400
UY6	-0.109206	-0.049117	-0.044733	-0.072266	-0.133635	-0.215	1800
UY7	-0.080840	-0.035594	-0.030439	-0.049776	-0.117566	-0.169	2250

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**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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CALCULATED MODULI (MPa)

SET	9	14	16	3	6	MIN	AVG	MAX
EY1	7246	3576	5892	6866	6608	3576	6037	7246
EY2	3424	2208	3786	3933	1625	1625	2995	3933
EY3	305	592	199	189	177	177	292	592
EX3	184	527	434	344	265	184	351	527
EY4	220	276	189	202	245	189	226	276
EX4	462	289	343	501	489	289	417	501
EY5	159	106	172	122	243	106	161	243
EX5	123	248	325	216	543	123	291	543
R3	0.60	0.89	2.18	1.82	1.50	0.60	1.40	2.18
R4	2.10	1.05	1.82	2.48	2.00	1.05	1.89	2.48
R5	0.77	2.34	1.89	1.76	2.23	0.77	1.80	2.34

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.236510	-1.042740	-1.175480	-1.308830	-1.369890	-1.079	0
UY2	-0.860217	-0.723912	-0.789984	-0.918273	-0.824401	-0.811	300
UY3	-0.661042	-0.592967	-0.573931	-0.695213	-0.550770	-0.675	450
UY4	-0.364945	-0.416278	-0.237577	-0.337853	-0.190940	-0.360	1000
UY5	-0.296411	-0.358096	-0.166692	-0.261193	-0.132442	-0.268	1400
UY6	-0.254795	-0.317780	-0.129445	-0.219223	-0.105501	-0.215	1800
UY7	-0.223483	-0.285695	-0.104112	-0.188161	-0.087885	-0.169	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 470 L: LOAD 1462 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	6	8	9	2	MIN	AVG	MAX
EY1	7445	7351	7580	8137	6682	6682	7439	8137
EY2	4149	4009	3473	4307	4198	3473	4027	4307
EY3	290	342	286	348	227	227	299	348
EX3	555	758	756	787	474	474	666	787
EY4	200	188	194	193	185	185	192	200
EX4	499	468	466	471	459	459	473	499
EY5	109	113	147	110	117	109	119	147
EX5	206	184	186	174	167	167	183	206
R3	1.91	2.22	2.64	2.26	2.09	1.91	2.22	2.64
R4	2.49	2.49	2.40	2.44	2.48	2.40	2.46	2.49
R5	1.89	1.64	1.26	1.58	1.42	1.26	1.56	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.257110	-1.181190	-1.212260	-1.126880	-1.436660	-1.118	0
UY2	-0.903011	-0.857570	-0.855397	-0.817269	-1.028830	-0.931	300
UY3	-0.710268	-0.687731	-0.667480	-0.653815	-0.800506	-0.775	450
UY4	-0.404122	-0.422171	-0.379353	-0.393955	-0.430893	-0.426	1000
UY5	-0.323575	-0.346500	-0.304420	-0.318442	-0.339091	-0.320	1400
UY6	-0.272704	-0.296409	-0.257551	-0.268112	-0.283964	-0.256	1800
UY7	-0.233553	-0.257122	-0.222061	-0.228374	-0.242558	-0.202	2250

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	16	14	4	1	MIN	AVG	MAX
EY1	9624	8260	4060	8822	8854	4060	7924	9624
EY2	3417	3065	1967	2613	3100	1967	1833	3417
EY3	287	347	347	488	363	287	366	488
EX3	763	530	942	362	743	362	668	942
EY4	288	267	175	266	254	175	250	288
EX4	303	509	423	442	557	303	447	557
EY5	123	175	126	241	208	123	175	241
EX5	210	196	64	306	105	64	176	306
R3	2.66	1.53	2.72	0.74	2.04	0.74	1.94	2.72
R4	1.05	1.91	2.41	1.66	2.20	1.05	1.85	2.41
R5	1.71	1.12	0.50	1.27	0.51	0.50	1.02	1.71

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.076840	-1.067030	-1.319040	-0.986000	-0.976219	-1.118	0
UY2	-0.731746	-0.710508	-0.900566	-0.636574	-0.644547	-0.931	300
UY3	-0.548505	-0.531888	-0.713079	-0.475203	-0.480870	-0.775	450
UY4	-0.267614	-0.271427	-0.449712	-0.255340	-0.240693	-0.426	1000
UY5	-0.195676	-0.204568	-0.366263	-0.198451	-0.174884	-0.320	1400
UY6	-0.150058	-0.162787	-0.307274	-0.163722	-0.132159	-0.256	1800
UY7	-0.114504	-0.131169	-0.259180	-0.138471	-0.099061	-0.202	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 470 L: LOAD 1462 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	16	12	14	4	MIN	AVG	MAX
EY1	3874	8441	7820	5809	7246	3874	6638	8441
EY2	4663	3299	3476	3898	3424	3299	3782	4663
EY3	389	305	224	351	305	224	315	389
EX3	320	524	416	964	184	184	482	964
EY4	163	207	203	276	220	163	214	276
EX4	407	515	505	270	462	270	432	515
EY5	109	125	137	123	159	109	130	159
EX5	261	277	295	297	123	123	281	297
R3	0.82	1.72	1.86	2.74	0.60	0.60	1.55	2.74
R4	2.49	2.49	2.49	0.98	2.10	0.98	2.11	2.49
R5	2.41	2.22	2.16	2.42	0.77	0.77	2.00	2.42

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-1.308690	-1.222340	-1.364750	-1.090940	-1.454370	-1.118	0
UY2	-0.923720	-0.851339	-0.939657	-0.763756	-1.011780	-0.931	300
UY3	-0.724978	-0.657922	-0.705785	-0.597780	-0.777509	-0.775	450
UY4	-0.421182	-0.366519	-0.345922	-0.354717	-0.429243	-0.426	1000
UY5	-0.335799	-0.292804	-0.267567	-0.288751	-0.348635	-0.320	1400
UY6	-0.281109	-0.247121	-0.223575	-0.245430	-0.299686	-0.256	1800
UY7	-0.240105	-0.212618	-0.191279	-0.211972	-0.262858	-0.202	2250

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

SASKATOON: RWY 15-33: STA. 6 + 470 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASTN LOAD 1: 782 kPa

LOAD 2: 1243 kPa

LOAD 3: 1462 kPa

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	1	8	2	15	6	AVG.	STRESS RATIO (p/p <sub>0</sub> )	AVG.	STRESS RATIO (p/p <sub>0</sub> )	15	6	8	9	2	AVG.	STRESS RATIO (p/p <sub>0</sub> )
18	0.08	-0.724	-0.728	-0.723	-0.728	-0.729	-0.726	0.929	-1.376	-1.384	-1.380	-1.380	-1.372	-1.378	-1.378	0.943	
58	0.26	-0.567	-0.578	-0.563	-0.586	-0.577	-0.574	0.735	-1.137	-1.169	-1.162	-1.157	-1.120	-1.149	-1.149	0.786	
103	0.46	-0.387	-0.404	-0.383	-0.422	-0.404	-0.400	0.511	-0.847	-0.898	-0.892	-0.880	-0.814	-0.866	-0.866	0.593	
201	0.89	-0.251	-0.265	-0.246	-0.277	-0.268	-0.264	0.334	-0.576	-0.615	-0.612	-0.593	-0.544	-0.588	-0.588	0.402	
354	1.57	-0.169	-0.176	-0.164	-0.174	-0.171	-0.171	0.219	-0.364	-0.377	-0.383	-0.358	-0.346	-0.366	-0.366	0.250	
506	2.25	-0.119	-0.121	-0.115	-0.116	-0.114	-0.117	0.150	-0.233	-0.232	-0.243	-0.219	-0.226	-0.231	-0.231	0.158	
659	2.93	-0.089	-0.088	-0.084	-0.081	-0.081	-0.084	0.108	-0.156	-0.146	-0.158	-0.138	-0.157	-0.151	-0.151	0.103	
874	3.88	-0.063	-0.061	-0.053	-0.050	-0.054	-0.056	0.072	-0.104	-0.085	-0.092	-0.085	-0.109	-0.095	-0.095	0.065	
1151	5.12	-0.038	-0.038	-0.031	-0.028	-0.032	-0.033	0.042	-0.064	-0.050	-0.054	-0.051	-0.068	-0.058	-0.058	0.039	
1790	7.96	-0.009	-0.008	-0.008	-0.008	-0.008	-0.008	0.010	-0.014	-0.012	-0.011	-0.012	-0.012	-0.012	-0.012	0.008	
2790	12.40	-0.006	-0.005	-0.006	-0.005	-0.006	-0.006	0.007	-0.009	-0.008	-0.007	-0.008	-0.008	-0.008	-0.008	0.006	
3790	16.84	-0.005	-0.004	-0.005	-0.004	-0.005	-0.005	0.006	-0.008	-0.007	-0.006	-0.007	-0.006	-0.007	-0.007	0.005	

NO COMPUTATIONS

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	10	3	16	6	14	AVG.	STRESS RATIO (p/p <sub>0</sub> )	15	12	16	14	13	AVG.	STRESS RATIO (p/p <sub>0</sub> )	15	16	14	4	1	AVG.	STRESS RATIO (p/p <sub>0</sub> )
18	0.08	-0.726	-0.730	-0.724	-0.733	-0.729	-0.729	0.932	-1.179	-1.152	-1.156	-1.172	-1.140	-1.160	0.933	-1.375	-1.373	-1.407	-1.373	-1.377	-1.381	0.944
58	0.26	-0.570	-0.583	-0.558	-0.587	-0.588	-0.577	0.738	-0.999	-0.923	-0.932	-1.000	-0.872	-0.945	0.761	-1.155	-1.148	-1.263	-1.163	-1.164	-1.179	0.806
103	0.46	-0.399	-0.412	-0.376	-0.411	-0.431	-0.406	0.519	-0.780	-0.677	-0.686	-0.805	-0.595	-0.708	0.570	-0.898	-0.887	-1.058	-0.934	-0.912	-0.938	0.641
201	0.89	-0.270	-0.275	-0.247	-0.274	-0.293	-0.272	0.348	-0.553	-0.486	-0.492	-0.595	-0.402	-0.506	0.407	-0.640	-0.603	-0.748	-0.664	-0.618	-0.655	0.448
354	1.57	-0.183	-0.184	-0.171	-0.182	-0.187	-0.181	0.232	-0.349	-0.352	-0.353	-0.393	-0.283	-0.346	0.278	-0.421	-0.360	-0.437	-0.403	-0.364	-0.397	0.271
506	2.25	-0.126	-0.126	-0.123	-0.124	-0.125	-0.125	0.160	-0.216	-0.255	-0.254	-0.250	-0.201	-0.235	0.189	-0.274	-0.224	-0.254	-0.246	-0.222	-0.244	0.167
659	2.93	-0.091	-0.090	-0.093	-0.089	-0.089	-0.091	0.116	-0.139	-0.189	-0.186	-0.154	-0.148	-0.163	0.131	-0.179	-0.148	-0.149	-0.157	-0.143	-0.155	0.106
874	3.88	-0.064	-0.060	-0.067	-0.056	-0.059	-0.061	0.078	-0.084	-0.111	-0.114	-0.085	-0.096	-0.098	0.079	-0.097	-0.096	-0.077	-0.094	-0.089	-0.091	0.062
1151	5.12	-0.038	-0.036	-0.043	-0.032	-0.036	-0.037	0.047	-0.051	-0.066	-0.069	-0.055	-0.061	-0.060	0.048	-0.053	-0.058	-0.040	-0.056	-0.051	-0.052	0.035
1790	7.96	-0.007	-0.008	-0.008	-0.009	-0.009	-0.008	0.011	-0.012	-0.020	-0.020	-0.017	-0.017	-0.017	0.014	-0.015	-0.011	-0.007	-0.012	-0.007	-0.011	0.007
2790	12.40	-0.005	-0.005	-0.005	-0.006	-0.006	-0.005	0.007	-0.007	-0.012	-0.012	-0.010	-0.010	-0.010	0.008	-0.010	-0.007	-0.005	-0.008	-0.004	-0.007	0.005
3790	16.84	-0.004	-0.004	-0.004	-0.005	-0.005	-0.004	0.005	-0.006	-0.010	-0.010	-0.008	-0.007	-0.008	0.006	-0.008	-0.006	-0.003	-0.006	-0.003	-0.005	0.004

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	8	2	14	13	5	AVG.	STRESS RATIO (p/p <sub>0</sub> )	9	14	16	3	6	AVG.	STRESS RATIO (p/p <sub>0</sub> )	15	16	12	14	4	AVG.	STRESS RATIO (p/p <sub>0</sub> )
18	0.08	-0.724	-0.729	-0.721	-0.735	-0.726	-0.727	0.930	-1.151	-1.198	-1.170	-1.159	-1.154	-1.166	0.938	-1.399	-1.370	-1.364	-1.401	-1.354	-1.378	0.942
58	0.26	-0.571	-0.584	-0.550	-0.584	-0.596	-0.577	0.738	-0.908	-1.082	-0.962	-0.928	-0.948	-0.966	0.777	-1.181	-1.136	-1.108	-1.233	-1.067	-1.145	0.783
103	0.46	-0.410	-0.417	-0.367	-0.398	-0.457	-0.410	0.524	-0.652	-0.928	-0.711	-0.663	-0.726	-0.736	0.592	-0.891	-0.868	-0.820	-1.011	-0.766	-0.871	0.596
201	0.89	-0.289	-0.284	-0.246	-0.269	-0.317	-0.281	0.359	-0.459	-0.680	-0.495	-0.451	-0.503	-0.517	0.416	-0.623	-0.602	-0.570	-0.757	-0.539	-0.618	0.423
354	1.57	-0.195	-0.190	-0.177	-0.188	-0.202	-0.190	0.243	-0.311	-0.406	-0.334	-0.302	-0.321	-0.335	0.269	-0.394	-0.380	-0.379	-0.500	-0.365	-0.404	0.276
506	2.25	-0.131	-0.130	-0.131	-0.132	-0.135	-0.132	0.169	-0.208	-0.233	-0.226	-0.206	-0.215	-0.218	0.175	-0.244	-0.243	-0.254	-0.314	-0.245	-0.260	0.178
659	2.93	-0.092	-0.092	-0.102	-0.097	-0.097	-0.096	0.123	-0.147	-0.136	-0.159	-0.147	-0.155	-0.149	0.120	-0.159	-0.162	-0.176	-0.193	-0.172	-0.173	0.118
874	3.88	-0.064	-0.058	-0.080	-0.062	-0.063	-0.066	0.084	-0.102	-0.076	-0.104	-0.093	-0.101	-0.095	0.077	-0.110	-0.104	-0.107	-0.101	-0.120	-0.108	0.074
1151	5.12	-0.039	-0.034	-0.054	-0.036	-0.039	-0.040	0.052	-0.061	-0.042	-0.066	-0.054	-0.062	-0.057	0.046	-0.073	-0.064	-0.063	-0.057	-0.072	-0.066	0.045
1790	7.96	-0.006	-0.008	-0.008	-0.010	-0.011	-0.008	0.011	-0.009	-0.011	-0.015	-0.012	-0.017	-0.013	0.010	-0.016	-0.015	-0.016	-0.016	-0.011	-0.015	0.010
2790	12.40	-0.004	-0.005	-0.005	-0.006	-0.007	-0.005	0.007	-0.006	-0.007	-0.010	-0.008	-0.010	-0.008	0.007	-0.011	-0.010	-0.011	-0.011	-0.007	-0.010	0.007
3790	16.84	-0.003	-0.004	-0.003	-0.005	-0.005	-0.004	0.005	-0.004	-0.006	-0.007	-0.006	-0.008	-0.006	0.005	-0.009	-0.009	-0.009	-0.009	-0.005	-0.008	0.005

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 752 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	14	11	7	10	MIN	AVG	MAX
EY1	6762	5933	6313	6024	6064	5933	6219	6762
EY2	3362	5096	3840	4103	3204	3204	3921	5096
EY3	2811	3989	3989	2699	3974	2699	3492	3989
EY4	335	351	251	251	251	251	287	351
EY5	288	264	291	281	267	264	278	291
EY6	245	228	224	238	229	224	233	245

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.173986	-0.169238	-0.177312	-0.188717	-0.189544	-0.118	0
UY2	-0.119942	-0.121238	-0.125557	-0.131872	-0.132977	-0.092	300
UY3	-0.081195	-0.085430	-0.087527	-0.088584	-0.091701	-0.068	614
UY4	-0.056914	-0.061208	-0.062378	-0.060897	-0.064584	-0.049	914
UY5	-0.041543	-0.045141	-0.045959	-0.043608	-0.047070	-0.036	1219
UY6	-0.031662	-0.034493	-0.035221	-0.032796	-0.035799	-0.030	1524
UY7	-0.025218	-0.027425	-0.028157	-0.025953	-0.028528	-0.024	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	10	9	2	8	MIN	AVG	MAX
EY1	7417	5531	4748	7236	6525	4748	6291	7417
EY2	5397	3660	2893	3829	4011	2893	3958	5397
EY3	2993	2844	2776	2164	3080	2164	2771	3080
EY4	349	384	291	423	475	291	385	475
EY5	285	226	297	221	146	146	235	297
EY6	246	207	210	193	204	193	212	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.168255	-0.211218	-0.214041	-0.217676	-0.234971	-0.118	0
UY2	-0.122040	-0.154608	-0.148338	-0.165794	-0.184274	-0.092	300
UY3	-0.086883	-0.115384	-0.105152	-0.127968	-0.146064	-0.068	614
UY4	-0.064031	-0.089979	-0.079085	-0.103616	-0.118923	-0.049	914
UY5	-0.049237	-0.073155	-0.063070	-0.087312	-0.099480	-0.036	1219
UY6	-0.039549	-0.061842	-0.052919	-0.076155	-0.085673	-0.030	1524
UY7	-0.033131	-0.054190	-0.046273	-0.068467	-0.076062	-0.024	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 752 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	9	10	2	14	MIN	AVG	MAX
EY1	7417	4748	5531	7236	6736	4748	6334	7417
EY2	5397	2893	3660	3829	3026	2893	3761	5397
EY3	2993	2776	2844	2164	3707	2164	2897	3707
EY4	349	291	384	423	251	251	340	423
EY5	285	297	226	221	297	221	265	297
EY6	246	210	207	193	102	102	192	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.168255	-0.214041	-0.211218	-0.217676	-0.227607	-0.118	0
UY2	-0.122040	-0.148338	-0.154608	-0.165794	-0.169425	-0.092	300
UY3	-0.086883	-0.105152	-0.115384	-0.127968	-0.127069	-0.068	614
UY4	-0.064031	-0.079085	-0.089979	-0.103616	-0.099542	-0.049	914
UY5	-0.049237	-0.063070	-0.073155	-0.087312	-0.081273	-0.036	1219

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1040 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	7	4	10	3	MIN	AVG	MAX
EY1	7857	7987	7802	7990	6434	6434	7614	7990
EY2	5633	5352	5691	3834	4945	3834	5091	5691
EY3	3966	3465	2175	3957	2453	2175	3203	3966
EY4	499	499	497	499	483	483	496	499
EY5	298	278	299	298	266	266	288	299
EY6	224	245	241	203	230	203	229	245

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.198470	-0.202099	-0.208772	-0.212715	-0.225859	-0.177	0
UY2	-0.144217	-0.145779	-0.148561	-0.151920	-0.159318	-0.143	300
UY3	-0.104739	-0.104239	-0.103957	-0.109958	-0.111705	-0.107	614
UY4	-0.078429	-0.076670	-0.075742	-0.082823	-0.081199	-0.078	914
UY5	-0.060639	-0.058143	-0.057449	-0.064601	-0.061160	-0.058	1219
UY6	-0.048394	-0.045514	-0.045238	-0.052048	-0.047690	-0.047	1524
UY7	-0.039882	-0.036847	-0.036931	-0.043275	-0.038525	-0.037	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	10	9	2	8	MIN	AVG	MAX
EY1	7417	5531	4748	7236	6525	4748	6291	7417
EY2	5397	3660	2893	3829	4011	2893	3958	5397
EY3	2993	2844	2776	2164	3080	2164	2771	3080
EY4	349	384	291	423	475	291	385	475
EY5	285	226	297	221	146	146	235	297
EY6	246	207	210	193	204	193	212	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.232694	-0.292110	-0.296014	-0.301041	-0.324960	-0.177	0
UY2	-0.168779	-0.213820	-0.205148	-0.229290	-0.254848	-0.143	300
UY3	-0.120157	-0.159573	-0.145422	-0.176977	-0.202004	-0.107	614
UY4	-0.088553	-0.124438	-0.109372	-0.143298	-0.164468	-0.078	914
UY5	-0.068094	-0.101171	-0.087225	-0.120750	-0.137579	-0.058	1219
UY6	-0.054696	-0.085526	-0.073186	-0.105321	-0.118483	-0.047	1524
UY7	-0.045820	-0.074943	-0.063994	-0.094688	-0.105192	-0.037	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1040 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	9	10	2	5	MIN	AVG	MAX
EY1	7417	4748	5531	7236	4839	4748	5954	7417
EY2	5397	2893	3660	3829	2088	2088	3573	5397
EY3	2993	2776	2844	2164	2359	2164	2627	2993
EY4	349	291	384	423	461	291	382	461
EY5	285	297	226	221	184	184	243	297
EY6	246	210	207	193	192	192	210	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.232694	-0.296014	-0.292110	-0.301041	-0.331952	-0.177	0
UY2	-0.168779	-0.205148	-0.213820	-0.229290	-0.232886	-0.143	300
UY3	-0.120157	-0.145422	-0.159573	-0.176977	-0.172568	-0.107	614
UY4	-0.088553	-0.109372	-0.124438	-0.143298	-0.135209	-0.078	914
UY5	-0.068094	-0.087225	-0.101171	-0.120750	-0.110200	-0.058	1219

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1342 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	4	11	10	15	MIN	AVG	MAX
EY1	6646	6963	5936	6487	6954	5936	6597	6963
EY2	4142	4238	4838	3773	3764	3764	4151	4838
EY3	2948	3819	3512	2768	3260	2768	3261	3819
EY4	330	251	251	251	257	251	268	330
EY5	299	298	299	282	274	274	290	299
EY6	237	246	247	237	239	237	241	247

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.312654	-0.313310	-0.323141	-0.333535	-0.328744	-0.240	0
UY2	-0.220520	-0.226843	-0.232575	-0.234036	-0.234536	-0.189	300
UY3	-0.153659	-0.159935	-0.163218	-0.159282	-0.162734	-0.141	614
UY4	-0.111523	-0.115488	-0.117550	-0.111787	-0.116109	-0.105	914
UY5	-0.084865	-0.086853	-0.088532	-0.081962	-0.086311	-0.077	1219
UY6	-0.067685	-0.068508	-0.070161	-0.063076	-0.067251	-0.063	1524
UY7	-0.056392	-0.056696	-0.058426	-0.050933	-0.054965	-0.050	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	15	14	10	9	MIN	AVG	MAX
EY1	7417	5724	6736	5531	4748	4748	6031	7417
EY2	5397	5942	5820	3660	2893	2893	4742	5942
EY3	2993	3876	3591	2844	2776	2776	3216	3876
EY4	349	256	253	384	291	253	307	384
EY5	285	299	297	226	297	226	281	299
EY6	246	159	107	207	210	107	186	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.300264	-0.339975	-0.375675	-0.376934	-0.381972	-0.240	0
UY2	-0.217790	-0.250735	-0.289472	-0.275910	-0.264720	-0.189	300
UY3	-0.155049	-0.181356	-0.219651	-0.205911	-0.187651	-0.141	614
UY4	-0.114268	-0.134400	-0.171587	-0.160573	-0.141132	-0.105	914
UY5	-0.087868	-0.103650	-0.139156	-0.130550	-0.112554	-0.077	1219
UY6	-0.070578	-0.083359	-0.116931	-0.110361	-0.094439	-0.063	1524
UY7	-0.059125	-0.069706	-0.101353	-0.096705	-0.082577	-0.050	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1342 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	14	9	13	10	MIN	AVG	MAX
EY1	7417	7835	4748	4081	5531	4081	5922	7835
EY2	5397	3020	2893	5831	3660	2893	4160	5831
EY3	2993	3702	2776	1598	2844	1598	2782	3702
EY4	349	460	291	271	384	271	351	460
EY5	285	169	297	173	226	169	230	297
EY6	246	249	210	249	207	207	232	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.300264	-0.322602	-0.381972	-0.394498	-0.376934	-0.240	0
UY2	-0.217790	-0.231924	-0.264720	-0.279713	-0.275910	-0.189	300
UY3	-0.155049	-0.166804	-0.187651	-0.189309	-0.205911	-0.141	614
UY4	-0.114268	-0.122651	-0.141132	-0.129771	-0.160573	-0.105	914
UY5	-0.087868	-0.091742	-0.112554	-0.091775	-0.130550	-0.077	1219

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1525 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	3	14	5	16	MIN	AVG	MAX
EY1	7920	7527	7667	6874	7295	6874	7456	7920
EY2	2789	2169	2121	3509	5636	2121	3245	5636
EY3	3358	3981	1629	3422	3736	1629	3325	3981
EY4	262	486	290	295	480	262	363	486
EY5	298	294	293	287	142	142	263	298
EY6	211	237	201	226	217	201	218	237

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.384791	-0.370679	-0.425878	-0.402224	-0.390994	-0.281	0
UY2	-0.268841	-0.258629	-0.288883	-0.292395	-0.301717	-0.215	300
UY3	-0.183147	-0.187596	-0.190049	-0.212027	-0.227533	-0.160	614
UY4	-0.129668	-0.144393	-0.133630	-0.161150	-0.172369	-0.119	914
UY5	-0.096137	-0.116363	-0.100017	-0.129110	-0.132152	-0.088	1219
UY6	-0.074885	-0.097736	-0.079122	-0.108722	-0.103356	-0.071	1524
UY7	-0.061178	-0.085220	-0.065584	-0.095522	-0.083234	-0.057	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	4	12	13	9	11	MIN	AVG	MAX
EY1	6158	7527	6144	7504	5075	5075	6482	7527
EY2	2604	2169	3652	2387	4459	2169	3054	4459
EY3	3316	3953	3982	3072	2608	2608	3386	3982
EY4	389	288	260	422	391	260	350	422
EY5	211	294	230	211	252	211	240	294
EY6	221	237	246	228	223	221	231	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.394638	-0.405242	-0.406764	-0.422632	-0.422867	-0.281	0
UY2	-0.275387	-0.283736	-0.293277	-0.303105	-0.306082	-0.215	300
UY3	-0.193691	-0.200279	-0.207674	-0.221528	-0.223830	-0.160	614
UY4	-0.140520	-0.149313	-0.150609	-0.170252	-0.171484	-0.119	914
UY5	-0.104986	-0.117450	-0.113689	-0.136296	-0.138113	-0.088	1219
UY6	-0.081090	-0.097293	-0.090103	-0.113449	-0.116520	-0.071	1524
UY7	-0.065067	-0.084371	-0.075118	-0.098054	-0.102368	-0.057	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R: LOAD 1525 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	12	13	4	9	MIN	AVG	MAX
EY1	6206	7527	7854	6158	7504	6158	7050	7854
EY2	5714	5171	2920	2604	2387	2387	3759	5714
EY3	3824	3981	1854	3316	3072	1854	3109	3981
EY4	270	315	268	389	422	268	333	422
EY5	298	294	298	211	211	211	262	298
EY6	248	237	246	221	228	221	236	248

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.353223	-0.356907	-0.392230	-0.394638	-0.422632	-0.281	0
UY2	-0.258372	-0.267868	-0.269522	-0.275387	-0.303105	-0.215	300
UY3	-0.183126	-0.197173	-0.176998	-0.193691	-0.221528	-0.160	614
UY4	-0.132591	-0.149340	-0.121826	-0.140520	-0.170252	-0.119	914
UY5	-0.100318	-0.118095	-0.088710	-0.104986	-0.136296	-0.088	1219
UY6	-0.079933	-0.097867	-0.068450	-0.081090	-0.113449	-0.071	1524
UY7	-0.066982	-0.084757	-0.055731	-0.065067	-0.098054	-0.057	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 100 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN							LOAD 1: 752 kPa					LOAD 2: 1040 kPa					LOAD 3: 1342 kPa					LOAD 4: 1525 kPa							
DEPTH (mm)	DEPTH RATIO z/ao	6	14	11	7	10	AVG.	STRESS RATIO p/po	13	7	4	10	3	AVG.	STRESS RATIO p/po	6	4	11	10	15	AVG.	STRESS RATIO p/po	15	3	14	5	16	AVG.	STRESS RATIO p/po
24	0.16	-0.708	-0.720	-0.714	-0.713	-0.711	-0.713	0.948	-0.990	-0.988	-0.986	-0.980	-0.990	-0.987	0.949	-1.270	-1.272	-1.281	-1.266	-1.264	-1.271	0.947	-1.416	-1.417	-1.397	-1.436	-1.453	-1.424	0.934
71	0.47	-0.587	-0.626	-0.605	-0.601	-0.599	-0.604	0.803	-0.847	-0.839	-0.830	-0.818	-0.845	-0.836	0.804	-1.068	-1.073	-1.103	-1.056	-1.050	-1.070	0.797	-1.136	-1.142	-1.075	-1.193	-1.244	-1.158	0.759
120	0.80	-0.416	-0.456	-0.437	-0.425	-0.432	-0.433	0.576	-0.612	-0.601	-0.581	-0.589	-0.603	-0.597	0.574	-0.761	-0.763	-0.792	-0.745	-0.742	-0.760	0.567	-0.795	-0.822	-0.727	-0.849	-0.890	-0.817	0.536
170	1.13	-0.262	-0.280	-0.275	-0.256	-0.274	-0.269	0.358	-0.379	-0.370	-0.345	-0.383	-0.367	-0.369	0.355	-0.470	-0.466	-0.475	-0.456	-0.458	-0.465	0.346	-0.515	-0.567	-0.471	-0.536	-0.536	-0.525	0.344
214	1.43	-0.160	-0.162	-0.162	-0.148	-0.162	-0.159	0.211	-0.228	-0.223	-0.209	-0.240	-0.224	-0.225	0.216	-0.281	-0.266	-0.268	-0.268	-0.268	-0.278	0.201	-0.314	-0.373	-0.304	-0.320	-0.308	-0.324	0.212
252	1.68	-0.103	-0.099	-0.096	-0.093	-0.094	-0.097	0.129	-0.148	-0.147	-0.150	-0.154	-0.155	-0.151	0.145	-0.181	-0.157	-0.162	-0.169	-0.163	-0.167	0.124	-0.191	-0.238	-0.212	-0.196	-0.190	-0.205	0.135
340	2.27	-0.065	-0.059	-0.057	-0.059	-0.057	-0.059	0.079	-0.090	-0.090	-0.096	-0.093	-0.097	-0.093	0.089	-0.114	-0.096	-0.100	-0.106	-0.101	-0.103	0.077	-0.120	-0.145	-0.140	-0.123	-0.109	-0.127	0.083
480	3.20	-0.040	-0.037	-0.036	-0.039	-0.038	-0.038	0.051	-0.052	-0.052	-0.055	-0.054	-0.055	-0.054	0.052	-0.071	-0.065	-0.067	-0.068	-0.066	-0.068	0.050	-0.083	-0.088	-0.091	-0.083	-0.060	-0.081	0.053
692	4.61	-0.025	-0.023	-0.023	-0.025	-0.024	-0.024	0.032	-0.030	-0.030	-0.032	-0.031	-0.032	-0.031	0.030	-0.043	-0.042	-0.043	-0.043	-0.042	-0.042	0.032	-0.054	-0.051	-0.056	-0.052	-0.035	-0.050	0.033
875	5.83	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	0.013	-0.011	-0.012	-0.012	-0.011	-0.013	-0.012	0.011	-0.017	-0.017	-0.017	-0.017	-0.017	-0.017	0.013	-0.021	-0.020	-0.021	-0.020	-0.018	-0.020	0.013
1159	7.73	-0.005	-0.005	-0.005	-0.006	-0.006	-0.005	0.007	-0.006	-0.007	-0.007	-0.006	-0.007	-0.007	0.006	-0.009	-0.009	-0.010	-0.009	-0.010	-0.009	0.007	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	0.007
1900	12.67	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.003	-0.003	-0.003	-0.003	-0.004	-0.003	0.003	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.003	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO z/ao	AVG.	STRESS RATIO p/po	12	10	9	2	8	AVG.	STRESS RATIO p/po	12	15	14	10	9	AVG.	STRESS RATIO p/po	NO COMPUTATIONS	AVG.	STRESS RATIO p/po
24	0.16		-0.987	-0.989	-0.988	-0.977	-0.987	-0.986	0.948	-1.273	-1.290	-1.280	-1.276	-1.275	-1.279	0.953				
71	0.47		-0.835	-0.844	-0.841	-0.807	-0.838	-0.833	0.801	-1.077	-1.130	-1.098	-1.089	-1.085	-1.096	0.816				
120	0.80		-0.590	-0.613	-0.612	-0.567	-0.604	-0.597	0.574	-0.762	-0.820	-0.782	-0.791	-0.790	-0.789	0.588				
170	1.13		-0.354	-0.389	-0.393	-0.353	-0.381	-0.374	0.360	-0.457	-0.485	-0.459	-0.502	-0.507	-0.482	0.359				
214	1.43		-0.207	-0.240	-0.242	-0.221	-0.233	-0.229	0.220	-0.268	-0.269	-0.254	-0.309	-0.312	-0.282	0.210				
252	1.68		-0.136	-0.157	-0.154	-0.154	-0.152	-0.150	0.145	-0.175	-0.160	-0.153	-0.202	-0.199	-0.178	0.133				
340	2.27	NO COMPUTATIONS	-0.085	-0.095	-0.096	-0.095	-0.088	-0.092	0.088	-0.110	-0.099	-0.095	-0.123	-0.123	-0.110	0.082				
480	3.20		-0.052	-0.054	-0.060	-0.053	-0.046	-0.053	0.051	-0.067	-0.066	-0.063	-0.070	-0.077	-0.069	0.051				
692	4.61		-0.032	-0.031	-0.036	-0.030	-0.026	-0.031	0.030	-0.041	-0.041	-0.039	-0.041	-0.047	-0.042	0.031				
875	5.83		-0.013	-0.013	-0.013	-0.012	-0.012	-0.013	0.012	-0.016	-0.015	-0.013	-0.017	-0.017	-0.016	0.012				
1159	7.73		-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	0.007	-0.009	-0.008	-0.007	-0.009	-0.009	-0.008	0.006				
1900	12.67		-0.004	-0.004	-0.003	-0.003	-0.004	-0.004	0.003	-0.005	-0.004	-0.004	-0.005	-0.005	-0.004	0.003				

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	AVG.	STRESS RATIO p/po	12	10	9	2	8	AVG.	STRESS RATIO p/po	12	15	14	10	9	AVG.	STRESS RATIO p/po	12	10	9	AVG.	STRESS RATIO p/po									
24	0.16		-0.713	-0.714	-0.715	-0.707	-0.706	-0.711	0.946	-0.987	-0.988	-0.989	-0.977	-0.979	-0.989	0.977	-1.273	-1.255	-1.275	-1.295	-1.276	-1.275	0.950	-1.461	-1.449	-1.411	-1.434	-1.416	-1.434	0.941	
71	0.47		-0.603	-0.608	-0.610	-0.583	-0.583	-0.597	0.795	-0.835	-0.841	-0.844	-0.807	-0.818	-0.818	-0.597	0.574	-1.077	-1.027	-1.085	-1.143	-1.089	-1.084	0.808	-1.269	-1.232	-1.118	-1.190	-1.139	-1.190	0.780
120	0.80		-0.427	-0.443	-0.443	-0.410	-0.417	-0.428	0.569	-0.590	-0.612	-0.613	-0.567	-0.601	-0.380	0.365	-0.762	-0.736	-0.790	-0.812	-0.791	-0.778	0.580	-0.910	-0.876	-0.759	-0.860	-0.812	-0.843	0.553	
170	1.13		-0.256	-0.284	-0.281	-0.255	-0.269	-0.269	0.358	-0.354	-0.393	-0.389	-0.353	-0.410	-0.237	0.228	-0.457	-0.488	-0.507	-0.448	-0.502	-0.481	0.358	-0.535	-0.526	-0.471	-0.567	-0.548	-0.529	0.347	
214	1.43		-0.150	-0.175	-0.173	-0.160	-0.162	-0.164	0.218	-0.207	-0.242	-0.240	-0.221	-0.273	-0.157	0.151	-0.268	-0.309	-0.312	-0.248	-0.309	-0.289	0.215	-0.295	-0.298	-0.290	-0.357	-0.355	-0.319	0.209	
252	1.68		-0.098	-0.111	-0.113	-0.111	-0.096	-0.106	0.141	-0.136	-0.154	-0.157	-0.154	-0.186	-0.096	0.093	-0.175	-0.195	-0.199	-0.173	-0.202	-0.189	0.141	-0.176	-0.179	-0.198	-0.225	-0.231	-0.202	0.132	
340	2.27		-0.062	-0.069	-0.069	-0.069	-0.058	-0.065	0.087	-0.085	-0.096	-0.095	-0.095	-0.111	-0.056	0.053	-0.110	-0.113	-0.123	-0.112	-0.123	-0.116	0.087	-0.111	-0.111	-0.130	-0.134	-0.139	-0.125	0.082	
480	3.20		-0.038	-0.043	-0.039	-0.038	-0.038	-0.039	0.052	-0.052	-0.060	-0.054	-0.053	-0.058	-0.032	0.031	-0.067	-0.061	-0.077	-0.068	-0.070	-0.069	0.051	-0.078	-0.076	-0.085	-0.078	-0.079	-0.079	0.052	
692	4.61		-0.023	-0.026	-0.023	-0.022	-0.023	-0.023	0.031	-0.032	-0.036	-0.031	-0.030	-0.031	-0.013	0.012	-0.041	-0.035	-0.047	-0.042	-0.041	-0.041	0.030	-0.051	-0.049	-0.054	-0.046	-0.046	-0.049	0.032	
875	5.83		-0.009	-0.010	-0.009	-0.009	-0.007	-0.009	0.012	-0.013	-0.013	-0.013	-0.012	-0.012	-0.007	0.007	-0.016	-0.015	-0.017	-0.018	-0.017	-0.017	0.012	-0.021	-0.021	-0.022	-0.020	-0.019	-0.021	0.014	
1159	7.73		-0.005	-0.005	-0.005	-0.005	-0.004	-0.005	0.006	-0.007	-0.007	-0.007	-0.007	-0.007	-0.003	0.003	-0.009	-0.009	-0.009	-0.010	-0.009	-0.009	0.007	-0.012	-0.011	-0.012	-0.011	-0.011	-0.011	0.007	
1900	12.67		-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	0.003	-0.004	-0.003	-0.004	-0.003	-0.003	-0.002	0.002	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.003	-0.006	-0.005	-0.006	-0.006	-0.005	-0.005	0.004	

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 730 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	9	11	16	15	MIN	AVG	MAX
EY1	6659	7417	5764	7182	6829	5764	6770	7417
EY2	5362	5397	5199	4003	4030	4003	4798	5397
EY3	3325	2993	1318	2130	2158	1318	2385	3325
EY4	443	349	433	329	253	253	362	443
EY5	288	285	291	295	293	285	290	295
EY6	230	246	232	201	185	185	219	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.163995	-0.176975	-0.185690	-0.196992	-0.215970	-0.135	0
UY2	-0.115395	-0.125621	-0.125424	-0.136359	-0.150460	-0.109	300
UY3	-0.079969	-0.086611	-0.081757	-0.091527	-0.100497	-0.080	614
UY4	-0.057752	-0.062450	-0.057040	-0.065133	-0.071058	-0.057	914
UY5	-0.043489	-0.047365	-0.042357	-0.049197	-0.053570	-0.040	1219
UY6	-0.034035	-0.037694	-0.033051	-0.039047	-0.042643	-0.031	1524
UY7	-0.027628	-0.031345	-0.026867	-0.032271	-0.035436	-0.024	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	10	9	2	8	MIN	AVG	MAX
EY1	7417	5531	4748	7236	6525	4748	6291	7417
EY2	5397	3660	2893	3829	4011	2893	3958	5397
EY3	2993	2844	2776	2164	3080	2164	2771	3080
EY4	349	384	291	423	475	291	385	475
EY5	285	226	297	221	146	146	235	297
EY6	246	207	210	193	204	193	212	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.180078	-0.224675	-0.227330	-0.232234	-0.249102	-0.135	0
UY2	-0.127857	-0.161297	-0.153987	-0.172592	-0.191621	-0.109	300
UY3	-0.087533	-0.116307	-0.105378	-0.129101	-0.146831	-0.080	614
UY4	-0.062605	-0.088256	-0.077454	-0.102026	-0.116022	-0.057	914
UY5	-0.047212	-0.070462	-0.061001	-0.084562	-0.095011	-0.040	1219
UY6	-0.037468	-0.058932	-0.050774	-0.072996	-0.080895	-0.031	1524
UY7	-0.031138	-0.051346	-0.044089	-0.065226	-0.071600	-0.024	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 730 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	14	9	10	15	MIN	AVG	MAX
EY1	7417	5128	4748	5531	7331	4748	6031	7417
EY2	5397	5778	2893	3660	5930	2893	4732	5930
EY3	2993	3589	2776	2844	3349	2776	3110	3589
EY4	349	252	291	384	251	251	305	384
EY5	285	297	297	226	299	226	281	299
EY6	246	149	210	207	110	110	185	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.180078	-0.211426	-0.227330	-0.224675	-0.220633	-0.135	0
UY2	-0.127857	-0.154652	-0.153987	-0.161297	-0.169144	-0.109	300
UY3	-0.087533	-0.108531	-0.105378	-0.116307	-0.124787	-0.080	614
UY4	-0.062605	-0.078939	-0.077454	-0.088256	-0.095212	-0.057	914
UY5	-0.047212	-0.060324	-0.061001	-0.070462	-0.075695	-0.040	1219
UY6	-0.037468	-0.048201	-0.050774	-0.058932	-0.062361	-0.031	1524
UY7	-0.031138	-0.039968	-0.044089	-0.051346	-0.052924	-0.024	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1001 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	1	13	10	15	MIN	AVG	MAX
EY1	6609	7251	7924	7614	7901	6609	7460	7924
EY2	5668	4899	5137	4205	5690	4205	5120	5690
EY3	3629	3357	3742	3776	3659	3357	3633	3776
EY4	496	489	446	401	364	364	439	496
EY5	295	278	252	298	299	252	284	299
EY6	202	209	213	199	219	199	208	219

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.229474	-0.234730	-0.238019	-0.240047	-0.234462	-0.209	0
UY2	-0.164111	-0.167236	-0.170213	-0.170278	-0.167227	-0.168	300
UY3	-0.115196	-0.116596	-0.118507	-0.118466	-0.114434	-0.124	614
UY4	-0.083941	-0.084004	-0.085138	-0.085548	-0.080950	-0.089	914
UY5	-0.063672	-0.062749	-0.063416	-0.064371	-0.059804	-0.064	1219
UY6	-0.050095	-0.048574	-0.048984	-0.050340	-0.046118	-0.049	1524
UY7	-0.040779	-0.038972	-0.039246	-0.040809	-0.037028	-0.038	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	7	6	16	13	MIN	AVG	MAX
EY1	7417	5531	4748	4763	6604	4748	5813	7417
EY2	5397	3660	2893	5609	2922	2893	4096	5609
EY3	2993	2844	2776	3227	3738	2776	3115	3738
EY4	349	384	291	252	298	252	315	384
EY5	285	226	297	293	297	226	280	297
EY6	246	207	210	148	102	102	183	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.246929	-0.308081	-0.311722	-0.315495	-0.325780	-0.209	0
UY2	-0.175322	-0.221176	-0.211152	-0.235070	-0.237870	-0.168	300
UY3	-0.120029	-0.159484	-0.144498	-0.170018	-0.175592	-0.124	614
UY4	-0.085846	-0.121019	-0.106207	-0.128724	-0.136110	-0.089	914
UY5	-0.064739	-0.096620	-0.083646	-0.103005	-0.109977	-0.064	1219
UY6	-0.051378	-0.080809	-0.069623	-0.086360	-0.091725	-0.049	1524
UY7	-0.042698	-0.070407	-0.060456	-0.075087	-0.078497	-0.038	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1001 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	9	10	13	14	MIN	AVG	MAX
EY1	7417	4748	5531	3350	3102	3102	4830	7417
EY2	5397	2893	3660	5416	4334	2893	4340	5416
EY3	2993	2776	2844	3147	3747	2776	3101	3747
EY4	349	291	384	255	252	252	306	384
EY5	285	297	226	290	297	226	279	297
EY6	246	210	207	142	123	123	186	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.246929	-0.311722	-0.308081	-0.318409	-0.337066	-0.209	0
UY2	-0.175322	-0.211152	-0.221176	-0.226721	-0.238248	-0.168	300
UY3	-0.120029	-0.144498	-0.159484	-0.156803	-0.167191	-0.124	614
UY4	-0.085846	-0.106207	-0.121019	-0.113554	-0.123201	-0.089	914
UY5	-0.064739	-0.083646	-0.096620	-0.087090	-0.095910	-0.064	1219
UY6	-0.051378	-0.069623	-0.080809	-0.070029	-0.077962	-0.049	1524
UY7	-0.042698	-0.060456	-0.070407	-0.058406	-0.065485	-0.038	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1305 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	14	13	15	16	MIN	AVG	MAX
EY1	7417	5576	5262	5342	4794	4794	5678	7417
EY2	5397	5105	5362	4083	4970	4083	4983	5397
EY3	2993	3477	3325	1956	3058	1956	2962	3477
EY4	349	252	253	434	252	252	308	434
EY5	285	290	288	298	293	285	291	298
EY6	246	234	230	245	239	230	239	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.322590	-0.340708	-0.345266	-0.334147	-0.354790	-0.280	0
UY2	-0.229061	-0.238502	-0.241926	-0.218033	-0.246671	-0.225	300
UY3	-0.156561	-0.158087	-0.160201	-0.140602	-0.162726	-0.165	614
UY4	-0.111586	-0.107944	-0.109379	-0.096844	-0.111367	-0.119	914
UY5	-0.083785	-0.077573	-0.078717	-0.070799	-0.080874	-0.085	1219
UY6	-0.066223	-0.058859	-0.059865	-0.054364	-0.062376	-0.067	1524
UY7	-0.054865	-0.046970	-0.047888	-0.043539	-0.050736	-0.052	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	15	16	6	5	MIN	AVG	MAX
EY1	7417	4763	7337	5531	4748	4748	5959	7417
EY2	5397	5609	5896	3660	2893	2893	4691	5896
EY3	2993	3227	3823	2844	2776	2776	3132	3823
EY4	349	252	251	384	291	251	306	384
EY5	285	293	298	226	297	226	280	298
EY6	246	206	190	207	210	190	212	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.321920	-0.372642	-0.401143	-0.401644	-0.406390	-0.280	0
UY2	-0.228567	-0.268304	-0.311997	-0.288346	-0.275278	-0.225	300
UY3	-0.156481	-0.184986	-0.237111	-0.207919	-0.188381	-0.165	614
UY4	-0.111917	-0.133300	-0.188568	-0.157772	-0.138462	-0.119	914
UY5	-0.084400	-0.102264	-0.158131	-0.125963	-0.109049	-0.085	1219
UY6	-0.066981	-0.083110	-0.138769	-0.105351	-0.090768	-0.067	1524
UY7	-0.055665	-0.070768	-0.126101	-0.091790	-0.078816	-0.052	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1305 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	13	9	10	2	MIN	AVG	MAX
EY1	7417	4081	4748	5531	7236	4081	5803	7417
EY2	5397	5831	2893	3660	3829	2893	4322	5831
EY3	2993	1598	2776	2844	2164	1598	2475	2993
EY4	349	468	291	384	423	291	383	468
EY5	285	173	297	226	221	173	240	297
EY6	246	249	210	207	193	193	221	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> DEFL.(mm)	<u>SENSOR</u> DISTANCE(mm)
UY1	-0.321920	-0.375544	-0.406390	-0.401644	-0.415157	-0.180	0
UY2	-0.228567	-0.260819	-0.275278	-0.288346	-0.308537	-0.225	300
UY3	-0.156481	-0.173524	-0.188381	-0.207919	-0.230791	-0.165	614
UY4	-0.111917	-0.118806	-0.138462	-0.157772	-0.182390	-0.119	914
UY5	-0.084400	-0.084234	-0.109049	-0.125963	-0.151169	-0.085	1219
UY6	-0.066981	-0.062153	-0.090768	-0.105351	-0.130493	-0.067	1524
UY7	-0.055665	-0.048013	-0.078816	-0.091790	-0.116602	-0.052	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1479 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	9	4	11	7	MIN	AVG	MAX
EY1	6763	6884	7817	7042	7206	6763	7143	7817
EY2	2039	2553	4869	2032	2040	2032	2707	4869
EY3	2704	3646	2164	3565	3717	2164	3159	3717
EY4	451	303	255	258	258	255	305	451
EY5	299	299	299	299	298	298	299	299
EY6	248	245	232	241	244	232	242	248

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.408303	-0.414723	-0.404357	-0.420614	-0.423016	-0.317	0
UY2	-0.260202	-0.277918	-0.287478	-0.272054	-0.273049	-0.253	300
UY3	-0.172346	-0.186684	-0.191647	-0.174814	-0.175565	-0.186	614
UY4	-0.123402	-0.133122	-0.133572	-0.118472	-0.119396	-0.133	914
UY5	-0.094077	-0.101146	-0.099309	-0.085099	-0.086230	-0.097	1219
UY6	-0.075616	-0.081536	-0.078705	-0.064737	-0.066074	-0.075	1524
UY7	-0.063588	-0.069145	-0.065856	-0.051901	-0.053432	-0.060	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	13	4	11	9	MIN	AVG	MAX
EY1	7527	7854	6158	5075	7504	5075	6824	7854
EY2	5171	2920	2604	4459	2387	2387	3508	5171
EY3	3981	3287	3316	2608	3072	2608	3253	3981
EY4	288	260	389	391	422	260	350	422
EY5	294	298	211	252	211	211	253	298
EY6	237	246	221	223	228	221	231	246

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.384872	-0.416851	-0.426377	-0.446679	-0.455240	-0.317	0
UY2	-0.283099	-0.285374	-0.289697	-0.317955	-0.315180	-0.253	300
UY3	-0.199759	-0.191370	-0.196062	-0.224014	-0.222436	-0.186	614
UY4	-0.146400	-0.136350	-0.137307	-0.167110	-0.165955	-0.133	914
UY5	-0.113607	-0.104127	-0.099931	-0.132594	-0.130206	-0.097	1219
UY6	-0.093392	-0.084684	-0.075937	-0.111091	-0.107154	-0.075	1524
UY7	-0.080678	-0.072470	-0.060457	-0.097322	-0.092160	-0.060	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R: LOAD 1479 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	12	4	11	9	MIN	AVG	MAX
EY1	6301	7527	6158	5075	7504	5075	6513	7527
EY2	5758	5171	2604	4459	2387	2387	4076	5758
EY3	3991	3981	3316	2608	3072	2608	3394	3991
EY4	293	319	389	391	422	293	363	422
EY5	298	294	211	252	211	211	253	298
EY6	247	237	221	223	228	221	231	247

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.389308	-0.392438	-0.426377	-0.446679	-0.455240	-0.317	0
UY2	-0.282398	-0.292344	-0.289697	-0.317955	-0.315180	-0.253	300
UY3	-0.197359	-0.212028	-0.196062	-0.224014	-0.222436	-0.186	614
UY4	-0.144345	-0.160972	-0.137307	-0.167110	-0.165955	-0.133	914
UY5	-0.112477	-0.129452	-0.099931	-0.132594	-0.130206	-0.097	1219
UY6	-0.093022	-0.109744	-0.075937	-0.111091	-0.107154	-0.075	1524
UY7	-0.080752	-0.097110	-0.060457	-0.097322	-0.092160	-0.060	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 300 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN						LOAD 1: 730 kPa					LOAD 1: 1001 kPa					LOAD 1: 1305 kPa					LOAD 1: 1479 kPa								
DEPTH (mm)	DEPTH RATIO	13	9	11	16	15	AVG.	STRESS RATIO	2	1	13	10	15	AVG.	STRESS RATIO	10	14	13	15	16	AVG.	STRESS RATIO	3	9	4	11	7	AVG.	STRESS RATIO
	z/ao						p/po	p/po						p/po	p/po						p/po	p/po						p/po	p/po
17	0.11	-0.706	-0.702	-0.703	-0.698	-0.698	-0.701	0.960	-0.969	-0.965	-0.962	-0.961	-0.963	-0.964	0.963	-1.255	-1.263	-1.265	-1.258	-1.266	-1.261	0.966	-1.405	-1.410	-1.412	-1.402	-1.401	-1.406	0.951
52	0.35	-0.645	-0.634	-0.633	-0.619	-0.618	-0.630	0.862	-0.889	-0.875	-0.869	-0.864	-0.870	-0.873	0.872	-1.130	-1.157	-1.164	-1.142	-1.168	-1.152	0.883	-1.229	-1.245	-1.245	-1.219	-1.217	-1.231	0.832
95	0.63	-0.506	-0.490	-0.479	-0.471	-0.468	-0.483	0.661	-0.700	-0.683	-0.678	-0.672	-0.673	-0.681	0.680	-0.871	-0.903	-0.909	-0.893	-0.914	-0.898	0.688	-0.966	-0.976	-0.926	-0.946	-0.948	-0.953	0.644
145	0.97	-0.322	-0.304	-0.284	-0.292	-0.285	-0.298	0.408	-0.443	-0.435	-0.432	-0.431	-0.418	-0.432	0.431	-0.536	-0.556	-0.555	-0.569	-0.560	-0.555	0.425	-0.672	-0.658	-0.543	-0.640	-0.649	-0.633	0.428
188	1.25	-0.197	-0.182	-0.175	-0.177	-0.168	-0.189	0.246	-0.268	-0.266	-0.260	-0.262	-0.244	-0.260	0.260	-0.316	-0.317	-0.314	-0.360	-0.321	-0.326	0.250	-0.449	-0.412	-0.308	-0.403	-0.410	-0.397	0.268
223	1.49	-0.133	-0.122	-0.134	-0.121	-0.112	-0.124	0.170	-0.176	-0.176	-0.167	-0.165	-0.155	-0.168	0.168	-0.209	-0.194	-0.195	-0.258	-0.202	-0.212	0.162	-0.302	-0.252	-0.206	-0.244	-0.246	-0.250	0.169
385	2.57	-0.067	-0.064	-0.073	-0.066	-0.063	-0.067	0.091	-0.090	-0.089	-0.084	-0.085	-0.082	-0.086	0.086	-0.111	-0.104	-0.105	-0.136	-0.109	-0.113	0.087	-0.154	-0.131	-0.118	-0.129	-0.129	-0.132	0.089
683	4.55	-0.028	-0.029	-0.032	-0.031	-0.031	-0.030	0.042	-0.039	-0.038	-0.037	-0.039	-0.039	-0.039	0.039	-0.052	-0.054	-0.054	-0.059	-0.056	-0.055	0.042	-0.069	-0.067	-0.064	-0.068	-0.069	-0.067	0.045
910	6.07	-0.017	-0.018	-0.019	-0.019	-0.019	-0.018	0.025	-0.024	-0.024	-0.023	-0.024	-0.025	-0.024	0.024	-0.033	-0.034	-0.034	-0.036	-0.036	-0.035	0.027	-0.042	-0.043	-0.041	-0.043	-0.044	-0.043	0.029
1137	7.58	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.009	-0.008	-0.009	-0.008	-0.008	-0.009	-0.008	0.008	-0.012	-0.012	-0.012	-0.012	-0.013	-0.012	0.009	-0.014	-0.015	-0.014	-0.015	-0.015	-0.015	0.010
1650	11.00	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.004
2650	17.67	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.003	-0.002	-0.002	-0.003	-0.002	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO	9	7	6	16	13	AVG.	STRESS RATIO	8	15	16	6	5	AVG.	STRESS RATIO	AVG.	STRESS RATIO														
	z/ao						p/po	p/po						p/po	p/po		p/po	p/po													
17	0.11	-0.718	-0.720	-0.717	-0.715	-0.714	-0.717	0.982	-0.962	-0.965	-0.965	-0.973	-0.958	-0.965	0.964	-1.255	-1.268	-1.258	-1.258	-1.258	-1.259	0.965									
52	0.35	-0.651	-0.657	-0.648	-0.642	-0.638	-0.647	0.887	-0.867	-0.877	-0.875	-0.901	-0.854	-0.875	0.874	-1.130	-1.175	-1.138	-1.143	-1.141	-1.146	0.878									
95	0.63	-0.506	-0.512	-0.501	-0.497	-0.485	-0.500	0.685	-0.668	-0.691	-0.692	-0.705	-0.669	-0.685	0.684	-0.871	-0.919	-0.873	-0.900	-0.902	-0.893	0.684									
145	0.97	-0.317	-0.314	-0.314	-0.316	-0.292	-0.311	0.425	-0.411	-0.449	-0.455	-0.426	-0.443	-0.437	0.436	-0.536	-0.556	-0.525	-0.586	-0.593	-0.559	0.429									
188	1.25	-0.191	-0.182	-0.194	-0.194	-0.166	-0.185	0.254	-0.243	-0.279	-0.282	-0.239	-0.272	-0.263	0.263	-0.317	-0.312	-0.290	-0.364	-0.368	-0.330	0.253									
223	1.49	-0.127	-0.116	-0.136	-0.130	-0.107	-0.123	0.169	-0.160	-0.184	-0.181	-0.148	-0.165	-0.168	0.168	-0.209	-0.194	-0.175	-0.240	-0.236	-0.211	0.162									
385	2.57	-0.066	-0.062	-0.073	-0.068	-0.059	-0.066	0.090	-0.085	-0.092	-0.096	-0.081	-0.085	-0.088	0.088	-0.111	-0.106	-0.095	-0.121	-0.125	-0.111	0.085									
683	4.55	-0.029	-0.030	-0.033	-0.031	-0.030	-0.031	0.042	-0.040	-0.040	-0.046	-0.041	-0.040	-0.041	0.041	-0.052	-0.056	-0.051	-0.052	-0.060	-0.054	0.041									
910	6.07	-0.018	-0.018	-0.020	-0.019	-0.018	-0.019	0.026	-0.025	-0.025	-0.028	-0.025	-0.022	-0.025	0.025	-0.033	-0.035	-0.032	-0.033	-0.036	-0.034	0.026									
1137	7.58	-0.006	-0.006	-0.007	-0.007	-0.006	-0.006	0.009	-0.009	-0.009	-0.009	-0.008	-0.007	-0.008	0.008	-0.012	-0.012	-0.011	-0.012	-0.012	-0.012	0.009									
1650	11.00	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.003	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004									
2650	17.67	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003									

NO COMPUTATIONS

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO	12	14	9	10	15	AVG.	STRESS RATIO	12	9	10	13	14	AVG.	STRESS RATIO	12	13	9	10	2	AVG.	STRESS RATIO	14	12	4	11	9	AVG.	STRESS RATIO
	z/ao						p/po	p/po						p/po	p/po						p/po	p/po						p/po	p/po
17	0.11	-0.702	-0.709	-0.704	-0.704	-0.703	-0.704	0.965	-0.962	-0.965	-0.965	-0.979	-0.979	-0.970	0.969	-1.255	-1.269	-1.258	-1.258	-1.248	-1.258	0.964	-1.431	-1.424	-1.416	-1.431	-1.404	-1.421	0.961
52	0.35	-0.632	-0.656	-0.638	-0.639	-0.634	-0.640	0.877	-0.867	-0.875	-0.877	-0.924	-0.926	-0.894	0.893	-1.130	-1.181	-1.141	-1.143	-1.107	-1.140	0.874	-1.312	-1.286	-1.264	-1.313	-1.230	-1.281	0.866
95	0.63	-0.487	-0.513	-0.505	-0.504	-0.483	-0.498	0.683	-0.668	-0.692	-0.691	-0.738	-0.752	-0.708	0.707	-0.871	-0.920	-0.902	-0.900	-0.850	-0.889	0.681	-1.025	-0.993	-0.995	-1.032	-0.963	-1.001	0.677
145	0.97	-0.300	-0.312	-0.332	-0.328	-0.286	-0.311	0.427	-0.411	-0.455	-0.449	-0.455	-0.484	-0.451	0.450	-0.536	-0.554	-0.593	-0.586	-0.541	-0.562	0.431	-0.630	-0.613	-0.667	-0.651	-0.658	-0.644	0.435
188	1.25	-0.177	-0.174	-0.206	-0.204	-0.158	-0.184	0.252	-0.243	-0.282	-0.279	-0.258	-0.283	-0.269	0.269	-0.317	-0.334	-0.368	-0.364	-0.340	-0.344	0.264	-0.356	-0.351	-0.422	-0.393	-0.427	-0.390	0.264
223	1.49	-0.117	-0.106	-0.132	-0.134	-0.097	-0.117	0.161	-0.160	-0.181	-0.184	-0.161	-0.169	-0.171	0.171	-0.209	-0.246	-0.236	-0.240	-0.238	-0.234	0.179	-0.216	-0.213	-0.267	-0.261	-0.277	-0.247	0.167
385	2.57	-0.062	-0.057	-0.070	-0.067	-0.053	-0.062	0.085	-0.085	-0.096	-0.092	-0.087	-0.089	-0.090	0.090	-0.111	-0.125	-0.125	-0.121	-0.121	-0.120	0.092	-0.118	-0.115	-0.132	-0.136	-0.136	-0.127	0.086
683	4.55	-0.029	-0.030	-0.033	-0.029	-0.027	-0.030	0.041	-0.040	-0.046	-0.040	-0.044	-0.045	-0.043	0.043	-0.052	-0.050	-0.060	-0.052	-0.049	-0.053	0.040	-0.065	-0.062	-0.059	-0.064	-0.059	-0.062	0.042
910	6.07	-0.018	-0.018	-0.020	-0.018	-0.016	-0.018	0.025	-0.025	-0.028	-0.025	-0.026	-0.026	-0.026	0.026	-0.033	-0.032	-0.036	-0.033	-0.031	-0.033	0.025	-0.041	-0.039	-0.039	-0.041	-0.037	-0.039	0.027
1137	7.58	-0.007	-0.006	-0.007	-0.007	-0.005	-0.006	0.008	-0.009	-0.009	-0.009	-0.008	-0.008	-0.009															

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 706 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	16	10	14	7	MIN	AVG	MAX
EY1	3760	3755	4081	3701	5531	3701	4166	5531
EY2	5855	5214	5831	5514	3660	3660	5215	5855
EY3	1515	1498	1598	1463	2844	1463	1784	2844
EY4	21142	21189	21704	25814	30717	21142	24133	30717
EY5	202	176	188	181	235	176	197	235
EY6	223	243	249	245	207	207	233	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.148218	-0.148068	-0.144945	-0.145855	-0.137235	-0.141	0
UY2	-0.106223	-0.105447	-0.105712	-0.103575	-0.100219	-0.119	300
UY3	-0.089035	-0.088163	-0.089357	-0.087270	-0.087017	-0.100	614
UY4	-0.075791	-0.075090	-0.076954	-0.074790	-0.075415	-0.080	914
UY5	-0.064912	-0.064441	-0.066821	-0.064527	-0.065345	-0.062	1219
UY6	-0.056266	-0.056063	-0.058814	-0.056403	-0.056993	-0.052	1524
UY7	-0.049589	-0.049660	-0.052666	-0.050156	-0.050323	-0.041	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	7	11	12	2	MIN	AVG	MAX
EY1	4748	5531	4464	5520	7236	4464	5500	7236
EY2	2893	3660	5505	5344	3829	2893	4246	5505
EY3	2776	2844	3144	2843	2164	2164	2754	3144
EY4	23295	30717	20500	20345	33847	20345	25741	33847
EY5	297	235	299	299	231	231	272	299
EY6	210	207	250	250	193	193	222	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.141236	-0.137241	-0.136254	-0.135354	-0.148186	-0.141	0
UY2	-0.097539	-0.100172	-0.102896	-0.102789	-0.112547	-0.119	300
UY3	-0.082643	-0.086959	-0.089547	-0.089408	-0.099233	-0.100	614
UY4	-0.069864	-0.075379	-0.078350	-0.078387	-0.088017	-0.080	914
UY5	-0.059012	-0.065326	-0.068967	-0.069180	-0.078216	-0.062	1219
UY6	-0.050187	-0.056987	-0.061400	-0.061756	-0.070014	-0.052	1524
UY7	-0.043269	-0.050324	-0.055511	-0.055964	-0.063381	-0.041	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 706 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	12	13	7	16	MIN	AVG	MAX
EY1	4464	5520	7072	5531	7069	4464	5931	7072
EY2	5505	5324	4757	3660	4718	3660	4793	5505
EY3	1216	1187	1063	2844	1208	1063	1504	2844
EY4	20500	20345	20112	30717	20090	20090	22353	30717
EY5	299	299	299	235	300	235	286	300
EY6	250	250	250	207	250	207	241	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.149965	-0.148340	-0.143453	-0.137241	-0.139565	-0.141	0
UY2	-0.108524	-0.108236	-0.103525	-0.100172	-0.101341	-0.119	300
UY3	-0.091115	-0.090944	-0.085807	-0.086959	-0.084335	-0.100	614
UY4	-0.078754	-0.078797	-0.073782	-0.075379	-0.072526	-0.080	914
UY5	-0.068838	-0.069067	-0.064185	-0.065326	-0.063019	-0.062	1219
UY6	-0.061109	-0.061477	-0.056707	-0.056987	-0.055552	-0.052	1524
UY7	-0.055222	-0.055683	-0.050994	-0.050324	-0.049815	-0.041	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 997 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	1	5	6	12	MIN	AVG	MAX
EY1	3889	4408	7084	4779	5520	3889	5136	7084
EY2	4891	3857	4283	5359	3708	3708	4420	5359
EY3	1190	1886	1189	2028	1055	1055	1470	2028
EY4	20269	20824	20210	23711	20091	20091	21021	23711
EY5	292	270	273	178	298	178	262	298
EY6	114	121	104	119	103	103	112	121

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.249649	-0.238854	-0.243549	-0.217013	-0.257901	-0.220	0
UY2	-0.183150	-0.177448	-0.183946	-0.164805	-0.190882	-0.189	300
UY3	-0.153061	-0.151434	-0.155167	-0.140875	-0.159525	-0.158	614
UY4	-0.128599	-0.128715	-0.132185	-0.119792	-0.134787	-0.128	914
UY5	-0.107218	-0.108537	-0.111965	-0.100893	-0.113020	-0.100	1219
UY6	-0.089229	-0.091361	-0.094768	-0.084634	-0.094561	-0.082	1524
UY7	-0.074580	-0.077281	-0.080573	-0.071165	-0.079400	-0.065	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	5	2	8	6	7	MIN	AVG	MAX
EY1	6525	7236	4408	4748	5531	4408	5690	7236
EY2	4011	3829	3857	2893	3660	2893	3650	4011
EY3	3080	2164	1886	2776	2844	1886	2550	3080
EY4	38017	33847	20824	23295	30717	20824	29340	38017
EY5	165	231	270	297	235	165	239	297
EY6	204	193	121	210	207	121	187	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.211083	-0.209266	-0.238854	-0.199450	-0.193810	-0.220	0
UY2	-0.164262	-0.158937	-0.177448	-0.137742	-0.141461	-0.189	300
UY3	-0.147040	-0.140135	-0.151434	-0.116706	-0.122802	-0.158	614
UY4	-0.131921	-0.124296	-0.128715	-0.098661	-0.106449	-0.128	914
UY5	-0.118574	-0.110455	-0.108537	-0.083335	-0.092253	-0.100	1219
UY6	-0.107324	-0.098872	-0.091361	-0.070873	-0.080476	-0.082	1524
UY7	-0.098198	-0.089505	-0.077281	-0.061104	-0.071067	-0.065	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 997 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	1	2	11	12	MIN	AVG	MAX
EY1	4408	4000	7236	4464	5520	4000	5126	7236
EY2	3857	3000	3829	5505	5324	3000	4303	5505
EY3	1886	1800	2164	1216	1187	1187	1651	2164
EY4	20824	30000	33847	20500	20345	20345	25103	33847
EY5	270	200	231	299	299	200	260	299
EY6	121	150	193	250	250	121	192	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.238854	-0.246883	-0.209266	-0.211777	-0.209102	-0.220	0
UY2	-0.177448	-0.178703	-0.158937	-0.153255	-0.152462	-0.189	300
UY3	-0.151434	-0.155161	-0.140135	-0.128671	-0.128042	-0.158	614
UY4	-0.128715	-0.134401	-0.124296	-0.111215	-0.110912	-0.128	914
UY5	-0.108537	-0.116090	-0.110455	-0.097212	-0.097211	-0.100	1219
UY6	-0.091361	-0.100726	-0.098872	-0.086297	-0.086540	-0.082	1524
UY7	-0.077281	-0.088323	-0.089505	-0.077984	-0.078404	-0.065	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 1333 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	1	2	15	5	MIN	AVG	MAX
EY1	4408	4000	7236	4611	6525	4000	5356	7236
EY2	3857	3000	3829	2428	4011	2428	3425	4011
EY3	1886	1800	2164	1070	3080	1070	2000	3080
EY4	20824	30000	33847	33430	38017	20824	31224	38017
EY5	270	200	231	294	165	165	232	294
EY6	121	150	193	250	204	121	183	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.319380	-0.330086	-0.279512	-0.309448	-0.281440	-0.294	0
UY2	-0.237262	-0.238928	-0.212222	-0.203248	-0.218863	-0.254	300
UY3	-0.202446	-0.207452	-0.187091	-0.171865	-0.195899	-0.212	614
UY4	-0.172042	-0.179696	-0.165932	-0.149143	-0.175768	-0.171	914
UY5	-0.145043	-0.155214	-0.147451	-0.130267	-0.158015	-0.132	1219
UY6	-0.122066	-0.134672	-0.131992	-0.115429	-0.143065	-0.111	1524
UY7	-0.103236	-0.118088	-0.119495	-0.104100	-0.130945	-0.087	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	5	2	8	6	7	MIN	AVG	MAX
EY1	6525	7236	4408	4748	5531	4408	5690	7236
EY2	4011	3829	3857	2893	3660	2893	3650	4011
EY3	3080	2164	1886	2776	2844	1886	2550	3080
EY4	38017	33847	20824	23295	30717	20824	29340	38017
EY5	165	231	270	297	235	165	239	297
EY6	204	193	121	210	207	121	187	210

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.282221	-0.279791	-0.319351	-0.266667	-0.259126	-0.294	0
UY2	-0.219620	-0.212500	-0.237250	-0.184163	-0.189134	-0.254	300
UY3	-0.196594	-0.187361	-0.202469	-0.156038	-0.164188	-0.212	614
UY4	-0.176379	-0.166186	-0.172094	-0.131911	-0.142323	-0.171	914
UY5	-0.158535	-0.147679	-0.145115	-0.111420	-0.123343	-0.132	1219
UY6	-0.143494	-0.132193	-0.122150	-0.094758	-0.107597	-0.111	1524
UY7	-0.131292	-0.119669	-0.103326	-0.081697	-0.095017	-0.087	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 1333 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	13	1	2	5	MIN	AVG	MAX
EY1	4408	3350	4000	7236	4839	3350	4767	7236
EY2	3857	5416	3000	3829	2088	2088	3638	5416
EY3	1886	1268	1800	2164	2359	1268	1896	2359
EY4	20824	20205	30000	33847	36859	20205	28347	36859
EY5	270	184	200	231	198	184	216	270
EY6	121	213	150	193	192	121	174	213

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.319351	-0.313941	-0.330086	-0.279791	-0.300682	-0.294	0
UY2	-0.237250	-0.228546	-0.238928	-0.212500	-0.203842	-0.254	300
UY3	-0.202469	-0.192993	-0.207452	-0.187361	-0.176581	-0.211	614
UY4	-0.172094	-0.166566	-0.179696	-0.166186	-0.152635	-0.171	914
UY5	-0.145115	-0.144951	-0.155214	-0.147679	-0.131699	-0.132	1219
UY6	-0.122150	-0.127845	-0.134672	-0.132193	-0.114335	-0.111	1524
UY7	-0.103326	-0.114678	-0.118088	-0.119669	-0.100482	-0.087	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 1423 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	2	8	1	4	MIN	AVG	MAX
EY1	3809	4601	5959	7236	6568	3809	5635	7236
EY2	4098	5171	2659	3829	4363	2659	4024	5171
EY3	2029	2746	3940	2164	1190	1190	2414	3940
EY4	20206	33903	34730	33847	27356	20206	30008	34730
EY5	298	161	282	231	153	153	225	298
EY6	194	152	190	193	168	152	179	194

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.354370	-0.316181	-0.315628	-0.294689	-0.307579	-0.333	0
UY2	-0.264259	-0.244166	-0.233771	-0.222886	-0.225366	-0.290	300
UY3	-0.230518	-0.216230	-0.207712	-0.196205	-0.189975	-0.243	614
UY4	-0.202627	-0.190863	-0.184434	-0.173760	-0.163074	-0.195	914
UY5	-0.179184	-0.168075	-0.163900	-0.154125	-0.139997	-0.153	1219
UY6	-0.160218	-0.148531	-0.146614	-0.137685	-0.120972	-0.126	1524
UY7	-0.145382	-0.132426	-0.132616	-0.124382	-0.105734	-0.100	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	2	8	4	1	MIN	AVG	MAX
EY1	3179	4601	5959	6568	7236	3179	5509	7236
EY2	2196	5171	2659	4363	3829	2196	3644	5171
EY3	2897	2746	3940	1190	2164	1190	2588	3940
EY4	34346	33903	34730	27356	33847	27356	32836	34730
EY5	210	161	282	153	231	153	207	282
EY6	212	152	190	168	193	152	183	212

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.317934	-0.316181	-0.315628	-0.307579	-0.294689	-0.333	0
UY2	-0.209109	-0.244166	-0.233771	-0.225366	-0.222886	-0.290	300
UY3	-0.179263	-0.216230	-0.207712	-0.189975	-0.196205	-0.243	614
UY4	-0.152968	-0.190863	-0.184434	-0.163074	-0.173760	-0.195	914
UY5	-0.130355	-0.168075	-0.163900	-0.139997	-0.154125	-0.153	1219
UY6	-0.111941	-0.148531	-0.146614	-0.120972	-0.137685	-0.126	1524
UY7	-0.097554	-0.132426	-0.132616	-0.105734	-0.124382	-0.100	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R: LOAD 1423 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	2	8	4	1	6	MIN	AVG	MAX
EY1	4601	5959	6568	7236	3179	3179	5509	7236
EY2	5171	2659	4363	3829	2196	2196	3644	5171
EY3	2746	3940	1190	2164	2897	1190	2588	3940
EY4	33903	34730	27356	33847	34346	27356	32836	34730
EY5	161	282	153	231	210	153	207	282
EY6	152	190	168	193	212	152	183	212

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.316181	-0.315628	-0.307579	-0.294689	-0.317934	-0.333	0
UY2	-0.244166	-0.233771	-0.225366	-0.222886	-0.209109	-0.290	300
UY3	-0.216230	-0.207712	-0.189975	-0.196205	-0.179263	-0.243	614
UY4	-0.190863	-0.184434	-0.163074	-0.173760	-0.152968	-0.195	914
UY5	-0.168075	-0.163900	-0.139997	-0.154125	-0.130355	-0.153	1219
UY6	-0.148531	-0.146614	-0.120972	-0.137685	-0.111941	-0.126	1524
UY7	-0.132426	-0.132616	-0.105734	-0.124382	-0.097554	-0.100	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 500 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD1: 706 kPa

LOAD2: 997 kPa

LOAD3: 1333 kPa

LOAD4: 1423 kPa

DEPTH (mm)	LOAD1: 706 kPa						LOAD2: 997 kPa						LOAD3: 1333 kPa						LOAD4: 1423 kPa										
	DEPTH z/ao	12	16	10	14	7	AVG.	DEPTH z/ao	8	1	5	6	12	AVG.	DEPTH z/ao	8	1	2	15	5	AVG.	DEPTH z/ao	14	2	8	1	4	AVG.	
17	0.11	-0.694	-0.693	-0.693	-0.694	-0.692	-0.693	0.982	-0.977	-0.977	-0.966	-0.979	-0.968	-0.973	0.976	-1.307	-1.308	-1.299	-1.296	-1.304	-1.303	0.977	-1.400	-1.402	-1.391	-1.386	-1.382	-1.392	0.978
50	0.33	-0.671	-0.668	-0.668	-0.671	-0.665	-0.669	0.947	-0.935	-0.937	-0.895	-0.942	-0.902	-0.922	0.925	-1.253	-1.257	-1.225	-1.216	-1.246	-1.239	0.930	-1.357	-1.364	-1.327	-1.308	-1.288	-1.329	0.934
90	0.60	-0.579	-0.573	-0.572	-0.579	-0.586	-0.578	0.818	-0.795	-0.813	-0.742	-0.815	-0.747	-0.783	0.785	-1.087	-1.105	-1.058	-1.040	-1.089	-1.076	0.807	-1.195	-1.212	-1.175	-1.129	-1.072	-1.157	0.813
140	0.93	-0.432	-0.425	-0.422	-0.434	-0.470	-0.436	0.618	-0.586	-0.628	-0.545	-0.620	-0.543	-0.584	0.586	-0.840	-0.883	-0.831	-0.811	-0.864	-0.846	0.635	-0.937	-0.960	-0.962	-0.887	-0.790	-0.907	0.638
184	1.23	-0.340	-0.331	-0.327	-0.344	-0.385	-0.345	0.489	-0.460	-0.503	-0.428	-0.493	-0.421	-0.461	0.462	-0.672	-0.731	-0.677	-0.667	-0.701	-0.690	0.517	-0.755	-0.780	-0.795	-0.724	-0.626	-0.736	0.517
222	1.48	-0.297	-0.287	-0.284	-0.303	-0.329	-0.300	0.425	-0.405	-0.432	-0.375	-0.425	-0.366	-0.401	0.402	-0.577	-0.640	-0.588	-0.592	-0.599	-0.599	0.449	-0.651	-0.674	-0.673	-0.628	-0.552	-0.636	0.447
283	1.89	-0.190	-0.183	-0.181	-0.195	-0.204	-0.191	0.270	-0.263	-0.273	-0.243	-0.268	-0.238	-0.257	0.258	-0.365	-0.407	-0.373	-0.390	-0.378	-0.382	0.287	-0.416	-0.431	-0.429	-0.402	-0.363	-0.408	0.287
368	2.45	-0.069	-0.067	-0.066	-0.070	-0.068	-0.068	0.096	-0.089	-0.089	-0.081	-0.085	-0.081	-0.085	0.085	-0.119	-0.133	-0.123	-0.140	-0.122	-0.128	0.096	-0.143	-0.133	-0.136	-0.131	-0.121	-0.133	0.093
465	3.10	-0.021	-0.021	-0.021	-0.021	-0.017	-0.020	0.029	-0.022	-0.022	-0.020	-0.019	-0.020	-0.021	0.021	-0.029	-0.031	-0.030	-0.042	-0.029	-0.032	0.024	-0.043	-0.028	-0.032	-0.032	-0.032	-0.033	0.024
2020	13.47	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.005	-0.005	-0.004	-0.004	-0.004	-0.004	0.004	-0.006	-0.006	-0.006	-0.007	-0.006	-0.006	0.005	-0.007	-0.006	-0.007	-0.007	-0.007	-0.007	0.005
3020	20.13	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003
4020	26.80	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.002

MAXIMUM DEFLECTION

DEPTH (mm)	LOAD1: 706 kPa						LOAD2: 997 kPa						LOAD3: 1333 kPa						LOAD4: 1423 kPa										
	DEPTH z/ao	5	2	8	6	7	AVG.	DEPTH z/ao	5	2	8	6	7	AVG.	DEPTH z/ao	5	2	8	6	7	AVG.	DEPTH z/ao	5	2	8	6	7	AVG.	
17	0.11	-0.693	-0.691	-0.689	-0.693	-0.688	-0.691	0.978	-0.976	-0.971	-0.977	-0.977	-0.978	-0.976	0.979	-1.304	-1.299	-1.307	-1.307	-1.307	-1.305	0.979	-1.401	-1.396	-1.386	-1.386	-1.391	-1.392	ERR
50	0.33	-0.665	-0.659	-0.650	-0.668	-0.650	-0.658	0.933	-0.932	-0.916	-0.937	-0.938	-0.939	-0.933	0.935	-1.246	-1.225	-1.253	-1.255	-1.255	-1.247	0.935	-1.360	-1.346	-1.307	-1.308	-1.322	ERR	ERR
90	0.60	-0.567	-0.557	-0.545	-0.583	-0.554	-0.561	0.795	-0.815	-0.791	-0.813	-0.829	-0.828	-0.815	0.818	-1.089	-1.058	-1.087	-1.108	-1.107	-1.090	0.818	-1.203	-1.193	-1.124	-1.129	-1.143	ERR	ERR
140	0.93	-0.417	-0.408	-0.396	-0.452	-0.423	-0.419	0.594	-0.646	-0.622	-0.628	-0.668	-0.664	-0.646	0.647	-0.864	-0.831	-0.840	-0.893	-0.887	-0.863	0.647	-0.948	-0.961	-0.876	-0.887	-0.894	ERR	ERR
184	1.23	-0.326	-0.318	-0.308	-0.364	-0.337	-0.331	0.468	-0.524	-0.507	-0.503	-0.545	-0.542	-0.524	0.526	-0.701	-0.677	-0.672	-0.729	-0.725	-0.701	0.526	-0.768	-0.787	-0.710	-0.724	-0.726	ERR	ERR
222	1.48	-0.286	-0.278	-0.269	-0.316	-0.290	-0.288	0.408	-0.448	-0.440	-0.432	-0.462	-0.464	-0.449	0.450	-0.599	-0.588	-0.577	-0.618	-0.621	-0.600	0.450	-0.662	-0.674	-0.612	-0.628	-0.629	ERR	ERR
283	1.89	-0.186	-0.180	-0.174	-0.201	-0.184	-0.185	0.262	-0.282	-0.279	-0.273	-0.290	-0.291	-0.283	0.284	-0.377	-0.373	-0.365	-0.387	-0.389	-0.378	0.284	-0.423	-0.430	-0.396	-0.402	-0.407	ERR	ERR
368	2.45	-0.068	-0.067	-0.065	-0.069	-0.065	-0.067	0.095	-0.091	-0.092	-0.089	-0.098	-0.096	-0.093	0.094	-0.121	-0.123	-0.120	-0.131	-0.128	-0.125	0.094	-0.138	-0.135	-0.129	-0.131	-0.135	ERR	ERR
465	3.10	-0.023	-0.022	-0.022	-0.019	-0.020	-0.021	0.030	-0.021	-0.022	-0.022	-0.028	-0.024	-0.024	0.024	-0.028	-0.030	-0.029	-0.038	-0.033	-0.032	0.024	-0.035	-0.030	-0.032	-0.032	-0.035	ERR	ERR
2020	13.47	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.005	-0.006	-0.006	-0.006	-0.007	-0.007	-0.006	0.005	-0.007	-0.007	-0.007	-0.007	-0.007	ERR	ERR
3020	20.13	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	ERR	ERR
4020	26.80	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	ERR	ERR

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	LOAD1: 706 kPa						LOAD2: 997 kPa						LOAD3: 1333 kPa						LOAD4: 1423 kPa										
	DEPTH z/ao	11	12	13	7	16	AVG.	DEPTH z/ao	8	1	2	11	12	AVG.	DEPTH z/ao	11	13	1	2	5	AVG.	DEPTH z/ao	2	8	4	1	6	AVG.	
17	0.11	-0.691	-0.688	-0.684	-0.692	-0.685	-0.688	0.975	-0.977	-0.978	-0.971	-0.976	-0.972	-0.975	0.978	-1.307	-1.310	-1.308	-1.299	-1.302	-1.305	0.979	-1.402	-1.391	-1.382	-1.386	-1.400	-1.392	0.978
50	0.33	-0.659	-0.649	-0.632	-0.665	-0.635	-0.648	0.918	-0.937	-0.940	-0.916	-0.930	-0.917	-0.920	0.931	-1.253	-1.263	-1.257	-1.225	-1.239	-1.247	0.936	-1.364	-1.327	-1.288	-1.308	-1.357	-1.329	0.934
90	0.60	-0.554	-0.542	-0.518	-0.586	-0.522	-0.545	0.771	-0.813	-0.827	-0.791	-0.783	-0.765	-0.798	0.798	-1.087	-1.075	-1.105	-1.058	-1.097	-1.085	0.814	-1.212	-1.175	-1.072	-1.129	-1.214	-1.161	0.816
140	0.93	-0.402	-0.392	-0.371	-0.470	-0.375	-0.402	0.569	-0.628	-0.660	-0.622	-0.567	-0.554	-0.606	0.608	-0.840	-0.783	-0.883	-0.831	-0.901	-0.848	0.636	-0.960	-0.962	-0.790	-0.887	-0.997	-0.919	0.646
184	1.23	-0.313	-0.306	-0.289	-0.384	-0.289	-0.318	0.448	-0.503	-0.546	-0.507	-0.442	-0.432	-0.486	0.487	-0.672	-0.605	-0.731	-0.677	-0.752	-0.688	0.516	-0.780	-0.795	-0.626	-0.724	-0.827	-0.750	0.527
222	1.48	-0.275	-0.270	-0.255	-0.329	-0.252	-0.276	0.391	-0.432	-0.479	-0.440	-0.389	-0.381	-0.424	0.425	-0.577	-0.528	-0.640	-0.588	-0.650	-0.597	0.448	-0.674	-0.673	-0.552	-0.628	-0.706	-0.647	0.455
283	1.89	-0.181	-0.178	-0.168	-0.206	-0.165	-0.179	0.254	-0.273	-0.304	-0.279	-0.256	-0.251	-0.273	0.273	-0.365	-0.345	-0.407	-0.373	-0.414	-0.381	0.286	-0.431	-0.429	-0.363	-0.402	-0.451	-0.415	0.292
368	2.45	-0.068	-0.067	-0.064	-0.068	-0.062	-0.066	0.093	-0.089	-0.100	-0.092	-0.096	-0.095	-0.094	0.095	-0.120	-0.123	-0.133	-0.123	-0.134	-0.127	0.095	-0.133	-0.136	-0.121	-0.131	-0.149	-0.134	0.094
465	3.10	-0.024	-0.024	-0.023	-0.017	-0.022	-0.023	0.031	-0.022	-0.023	-0.022	-0.034	-0.034	-0.027	0.027	-0.029	-0.040	-0.031											

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 688 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	11	13	6	16	MIN	AVG	MAX
EY1	3357	6816	6537	4748	5067	3357	5305	6816
EY2	4726	5932	5945	2893	5182	2893	4936	5945
EY3	3259	1216	1194	2776	1498	1194	1989	3259
EY4	20481	20500	26237	23295	21189	20481	22340	26237
EY5	158	160	261	297	223	158	220	297
EY6	224	250	198	210	247	198	226	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.117776	-0.105672	-0.115408	-0.124029	-0.124974	-0.111	0
UY2	-0.078821	-0.075473	-0.085047	-0.085524	-0.090157	-0.085	300
UY3	-0.067041	-0.061768	-0.071661	-0.073413	-0.076986	-0.069	614
UY4	-0.056962	-0.052387	-0.062248	-0.063746	-0.067483	-0.056	914
UY5	-0.048094	-0.044638	-0.054172	-0.055204	-0.059463	-0.043	1219
UY6	-0.040659	-0.038347	-0.047413	-0.048019	-0.052910	-0.038	1524
UY7	-0.034671	-0.033369	-0.041926	-0.042192	-0.047709	-0.030	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	16	12	15	14	MIN	AVG	MAX
EY1	7851	7911	7871	7974	7893	7851	7900	7974
EY2	5831	5572	5715	5515	5701	5515	5667	5831
EY3	1598	1587	1398	1796	1293	1293	1534	1796
EY4	21704	21037	21494	20338	21230	20338	21161	21704
EY5	296	254	297	299	298	254	289	299
EY6	249	249	249	250	249	249	249	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.115454	-0.115840	-0.117563	-0.118250	-0.119876	-0.111	0
UY2	-0.088636	-0.088415	-0.090111	-0.091576	-0.091547	-0.085	300
UY3	-0.076775	-0.076352	-0.077679	-0.080037	-0.078680	-0.069	614
UY4	-0.068429	-0.067872	-0.069146	-0.071787	-0.069974	-0.056	914
UY5	-0.061393	-0.060736	-0.062018	-0.064808	-0.062753	-0.043	1219
UY6	-0.055583	-0.054864	-0.056162	-0.059046	-0.056863	-0.038	1524
UY7	-0.050915	-0.050158	-0.051475	-0.054415	-0.052177	-0.030	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 688 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	15	9	7	10	MIN	AVG	MAX
EY1	4748	7958	7417	5531	7851	4748	6701	7958
EY2	2893	4966	5397	3660	5831	2893	4550	5831
EY3	2776	1897	2993	2844	1598	1598	2422	2993
EY4	23295	20332	27940	30717	21704	20332	24798	30717
EY5	297	299	287	235	296	235	283	299
EY6	210	249	246	207	249	207	232	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.123976	-0.112705	-0.089856	-0.120920	-0.115454	-0.111	0
UY2	-0.085458	-0.085421	-0.063946	-0.088115	-0.088636	-0.085	300
UY3	-0.073354	-0.073904	-0.054307	-0.077483	-0.076775	-0.069	614
UY4	-0.063709	-0.065623	-0.046677	-0.068830	-0.068429	-0.056	914
UY5	-0.055184	-0.058585	-0.039952	-0.061038	-0.061393	-0.043	1219
UY6	-0.048011	-0.052766	-0.034258	-0.054372	-0.055583	-0.038	1524
UY7	-0.042192	-0.048084	-0.029597	-0.048880	-0.050915	-0.030	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 976 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	1	13	2	11	MIN	AVG	MAX
EY1	3375	4383	3113	3357	4063	3113	3658	4383
EY2	4659	5262	5014	4783	5597	4659	5063	5597
EY3	1915	1220	2017	1050	2720	1050	1785	2720
EY4	24671	20191	36421	23634	30488	20191	27081	36421
EY5	292	300	297	198	298	198	277	300
EY6	161	180	208	194	193	161	187	208

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.186789	-0.182067	-0.182805	-0.201557	-0.173782	-0.171	0
UY2	-0.124589	-0.124772	-0.120610	-0.133441	-0.124091	-0.136	300
UY3	-0.104632	-0.102463	-0.103735	-0.109833	-0.108472	-0.112	614
UY4	-0.088452	-0.086312	-0.090241	-0.093221	-0.095356	-0.090	914
UY5	-0.074026	-0.072491	-0.078192	-0.079072	-0.083542	-0.071	1219
UY6	-0.061727	-0.061017	-0.067973	-0.067434	-0.073392	-0.059	1524
UY7	-0.051628	-0.051777	-0.059640	-0.058167	-0.065010	-0.047	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	16	12	14	6	MIN	AVG	MAX
EY1	5531	7922	7892	7927	4748	4748	6804	7927
EY2	3660	5795	5696	5453	2893	2893	4699	5795
EY3	2844	1429	1515	1566	2776	1429	2026	2844
EY4	30717	20801	21142	20847	23295	20801	23360	30717
EY5	235	298	297	270	297	235	279	298
EY6	207	236	249	249	210	207	230	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.171537	-0.174183	-0.166935	-0.166648	-0.175872	-0.171	0
UY2	-0.125000	-0.134903	-0.128562	-0.127394	-0.121231	-0.136	300
UY3	-0.109918	-0.117124	-0.111366	-0.110163	-0.104061	-0.112	614
UY4	-0.097643	-0.104774	-0.099399	-0.098117	-0.090378	-0.090	914
UY5	-0.086589	-0.094418	-0.089358	-0.087997	-0.078285	-0.071	1219
UY6	-0.077132	-0.085900	-0.081086	-0.079682	-0.068109	-0.059	1524
UY7	-0.069341	-0.079072	-0.074452	-0.073025	-0.059854	-0.047	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 976 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	15	7	10	13	MIN	AVG	MAX
EY1	4748	7958	5531	7851	7954	4748	6808	7958
EY2	2893	4966	3660	5831	4958	2893	4462	5831
EY3	2776	1897	2844	1598	1168	1168	2057	2844
EY4	23295	20332	30717	21704	20299	20299	23269	30717
EY5	297	299	235	296	299	235	285	299
EY6	210	249	207	249	250	207	233	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.175872	-0.159884	-0.171537	-0.163783	-0.173953	-0.171	0
UY2	-0.121231	-0.121179	-0.125000	-0.125740	-0.131527	-0.136	300
UY3	-0.104061	-0.104840	-0.109918	-0.108914	-0.112173	-0.112	614
UY4	-0.090378	-0.093093	-0.097643	-0.097074	-0.099461	-0.090	914
UY5	-0.078285	-0.083110	-0.086589	-0.087092	-0.089012	-0.071	1219
UY6	-0.068109	-0.074853	-0.077132	-0.078850	-0.080551	-0.059	1524
UY7	-0.059854	-0.068213	-0.069341	-0.072228	-0.073857	-0.047	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 1276 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	8	11	16	14	MIN	AVG	MAX
EY1	4748	5531	4081	6080	5965	4081	5181	6080
EY2	2893	3660	5831	4618	5579	2893	4516	5831
EY3	2776	2844	1598	3672	2729	1598	2724	3672
EY4	23295	30717	21704	24935	23868	21704	24904	30717
EY5	297	235	188	295	263	188	256	297
EY6	210	207	249	216	221	207	221	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.229846	-0.223998	-0.242073	-0.223825	-0.192897	-0.232	0
UY2	-0.158404	-0.163159	-0.173807	-0.171109	-0.140044	-0.182	300
UY3	-0.135946	-0.143450	-0.149580	-0.152714	-0.120138	-0.149	614
UY4	-0.118052	-0.127419	-0.131775	-0.137318	-0.104208	-0.119	914
UY5	-0.102243	-0.112990	-0.116745	-0.123530	-0.090166	-0.093	1219
UY6	-0.088944	-0.100650	-0.104460	-0.111724	-0.078251	-0.078	1524
UY7	-0.078159	-0.090488	-0.094728	-0.101990	-0.068493	-0.063	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	6	16	7	2	MIN	AVG	MAX
EY1	7954	4748	7922	5531	7236	4748	6678	7954
EY2	5034	2893	5795	3660	3829	2893	4242	5795
EY3	1168	2776	1429	2844	2164	1168	2076	2844
EY4	20299	23295	20801	30717	33847	20299	25792	33847
EY5	299	297	298	235	231	231	272	299
EY6	250	210	236	207	193	193	219	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.231069	-0.229931	-0.227723	-0.224264	-0.239967	-0.232	0
UY2	-0.175863	-0.158495	-0.176369	-0.163422	-0.184851	-0.182	300
UY3	-0.150633	-0.136047	-0.153125	-0.143704	-0.164800	-0.149	614
UY4	-0.134049	-0.118158	-0.136979	-0.127656	-0.149453	-0.119	914
UY5	-0.120415	-0.102348	-0.123440	-0.113205	-0.135608	-0.093	1219
UY6	-0.109365	-0.089044	-0.112304	-0.100841	-0.123712	-0.078	1524
UY7	-0.100620	-0.078251	-0.103377	-0.090655	-0.113841	-0.063	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 1276 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	9	10	5	13	11	MIN	AVG	MAX
EY1	4748	5531	4839	3432	4408	3432	4592	5531
EY2	2893	3660	2088	5156	3857	1088	3531	5156
EY3	2776	2844	2359	1534	1886	1534	2280	2844
EY4	23295	30717	36859	20726	20824	20726	26484	36859
EY5	297	235	198	191	270	191	238	297
EY6	210	207	192	238	121	121	194	238

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.229931	-0.224264	-0.256384	-0.262049	-0.272409	-0.232	0
UY2	-0.158495	-0.163422	-0.176282	-0.185301	-0.200166	-0.182	300
UY3	-0.136047	-0.143704	-0.153652	-0.159610	-0.173208	-0.149	614
UY4	-0.118158	-0.127656	-0.136302	-0.140554	-0.150894	-0.119	914
UY5	-0.102348	-0.113205	-0.120474	-0.124426	-0.130516	-0.093	1219
UY6	-0.089044	-0.100841	-0.106934	-0.111254	-0.112723	-0.078	1524
UY7	-0.078251	-0.090655	-0.095795	-0.100841	-0.097780	-0.063	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 1391 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	4	9	16	13	MIN	AVG	MAX
EY1	3179	6568	5075	3734	5920	3179	4895	6568
EY2	2196	4363	4459	5925	4882	2196	4365	5925
EY3	2897	1190	2608	3983	3869	1190	2910	3983
EY4	34346	27356	31311	33412	24569	24569	30199	34346
EY5	210	153	257	195	281	153	219	281
EY6	212	168	223	249	245	168	219	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.286447	-0.264539	-0.240476	-0.240545	-0.226651	-0.278	0
UY2	-0.185510	-0.196656	-0.172875	-0.171881	-0.170268	-0.207	300
UY3	-0.160930	-0.168038	-0.151097	-0.153381	-0.151093	-0.169	614
UY4	-0.140994	-0.147789	-0.133773	-0.137142	-0.135140	-0.135	914
UY5	-0.123066	-0.130013	-0.118352	-0.122579	-0.120992	-0.106	1219
UY6	-0.107902	-0.114939	-0.105248	-0.110183	-0.108990	-0.089	1524
UY7	-0.095612	-0.102568	-0.094517	-0.100064	-0.099185	-0.072	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	2	6	4	1	MIN	AVG	MAX
EY1	5959	4601	3179	6568	7236	3179	5509	7236
EY2	2659	5171	2196	4363	3829	2196	3644	5171
EY3	3940	2746	2897	1190	2164	1190	2588	3940
EY4	34730	33903	34346	27356	33847	27356	32836	34730
EY5	282	161	210	153	231	153	207	282
EY6	190	152	212	168	193	152	183	212

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.278232	-0.284855	-0.286447	-0.264539	-0.257874	-0.278	0
UY2	-0.208346	-0.216301	-0.185510	-0.196656	-0.197805	-0.207	300
UY3	-0.186932	-0.194069	-0.160930	-0.168038	-0.176038	-0.169	614
UY4	-0.169718	-0.174910	-0.140994	-0.147789	-0.159422	-0.135	914
UY5	-0.153991	-0.157192	-0.123066	-0.130013	-0.144421	-0.106	1219
UY6	-0.140365	-0.141617	-0.107902	-0.114939	-0.131523	-0.089	1524
UY7	-0.129008	-0.128471	-0.095612	-0.102568	-0.120817	-0.072	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R: LOAD 1391 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	4	9	7	1	MIN	AVG	MAX
EY1	3179	6568	5075	7504	7236	3179	5912	7504
EY2	2196	4363	4459	2387	3829	2196	3447	4459
EY3	2897	1190	2608	3072	2164	1190	2386	3072
EY4	34346	27356	31311	33766	33847	27356	32125	34346
EY5	210	153	257	221	231	153	215	257
EY6	212	168	223	228	193	168	205	228

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.286447	-0.264539	-0.240476	-0.230735	-0.257874	-0.278	0
UY2	-0.185510	-0.196656	-0.172875	-0.162602	-0.197805	-0.207	300
UY3	-0.160930	-0.168038	-0.151097	-0.140466	-0.176038	-0.169	614
UY4	-0.140994	-0.147789	-0.133773	-0.124171	-0.159422	-0.135	914
UY5	-0.123066	-0.130013	-0.118352	-0.109625	-0.144421	-0.106	1219
UY6	-0.107902	-0.114939	-0.105248	-0.097327	-0.131523	-0.089	1524
UY7	-0.095612	-0.102568	-0.094517	-0.087263	-0.120817	-0.072	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 5 + 650 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD 1: 688 kPa

LOAD 2: 976 kPa

LOAD 3: 1276 kPa

LOAD 4: 1391 kPa

DEPTH (mm)	DEPTH RATIO z/a <sub>0</sub>	15	11	13	6	16	AVG.	STRESS RATIO p/p <sub>0</sub>	4	1	13	2	11	AVG.	STRESS RATIO p/p <sub>0</sub>	7	8	11	16	14	AVG.	STRESS RATIO p/p <sub>0</sub>	6	4	9	16	13	AVG.	STRESS RATIO p/p <sub>0</sub>
27	0.18	-0.676	-0.659	-0.661	-0.663	-0.666	-0.665	0.966	-0.956	-0.946	-0.959	-0.951	-0.957	-0.954	0.977	-1.229	-1.230	-1.246	-1.235	-1.238	-1.236	0.968	-1.349	-1.326	-1.350	-1.371	-1.350	-1.349	0.970
80	0.53	-0.622	-0.562	-0.566	-0.579	-0.584	-0.583	0.847	-0.868	-0.834	-0.881	-0.849	-0.873	-0.861	0.882	-1.075	-1.078	-1.120	-1.093	-1.095	-1.092	0.856	-1.203	-1.117	-1.199	-1.274	-1.201	-1.199	0.862
130	0.87	-0.505	-0.412	-0.416	-0.461	-0.446	-0.448	0.651	-0.690	-0.635	-0.709	-0.652	-0.700	-0.677	0.694	-0.854	-0.856	-0.865	-0.869	-0.853	-0.859	0.674	-0.974	-0.828	-0.949	-1.050	-0.959	-0.952	0.684
180	1.20	-0.384	-0.283	-0.286	-0.361	-0.321	-0.327	0.475	-0.511	-0.447	-0.530	-0.459	-0.524	-0.494	0.506	-0.670	-0.667	-0.612	-0.671	-0.629	-0.650	0.509	-0.776	-0.595	-0.722	-0.812	-0.739	-0.729	0.524
223	1.49	-0.306	-0.217	-0.221	-0.295	-0.252	-0.258	0.375	-0.405	-0.348	-0.425	-0.356	-0.417	-0.390	0.400	-0.546	-0.545	-0.474	-0.540	-0.493	-0.519	0.407	-0.641	-0.472	-0.581	-0.658	-0.594	-0.589	0.424
260	1.73	-0.258	-0.192	-0.196	-0.251	-0.222	-0.224	0.325	-0.351	-0.307	-0.372	-0.315	-0.360	-0.341	0.349	-0.465	-0.469	-0.413	-0.457	-0.420	-0.445	0.349	-0.550	-0.419	-0.502	-0.564	-0.502	-0.507	0.365
328	2.19	-0.158	-0.125	-0.126	-0.156	-0.141	-0.141	0.205	-0.223	-0.200	-0.240	-0.207	-0.226	-0.219	0.225	-0.290	-0.292	-0.266	-0.280	-0.262	-0.278	0.218	-0.348	-0.274	-0.321	-0.351	-0.309	-0.321	0.230
423	2.82	-0.051	-0.045	-0.045	-0.052	-0.051	-0.049	0.071	-0.074	-0.070	-0.080	-0.073	-0.074	-0.074	0.076	-0.097	-0.095	-0.094	-0.091	-0.087	-0.093	0.073	-0.113	-0.091	-0.104	-0.111	-0.101	-0.104	0.075
520	3.47	-0.015	-0.016	-0.014	-0.015	-0.017	-0.015	0.022	-0.019	-0.022	-0.020	-0.022	-0.019	-0.020	0.021	-0.028	-0.024	-0.032	-0.025	-0.026	-0.027	0.021	-0.029	-0.024	-0.027	-0.029	-0.029	-0.028	0.020
2070	13.80	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.005	-0.005	-0.005	-0.005	-0.005	-0.004	-0.005	0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.005	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006	0.005
3070	20.47	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO z/a <sub>0</sub>	7	16	12	14	6	AVG.	STRESS RATIO p/p <sub>0</sub>	13	6	16	7	2	AVG.	STRESS RATIO p/p <sub>0</sub>	13	6	16	7	2	AVG.	STRESS RATIO p/p <sub>0</sub>	13	6	16	7	2	AVG.	STRESS RATIO p/p <sub>0</sub>
27	0.18	-0.666	-0.650	-0.651	-0.653	-0.656	-0.655	0.952	-0.941	-0.932	-0.933	-0.931	-0.940	-0.935	0.958	-1.211	-1.229	-1.218	-1.230	-1.217	-1.221	0.957	-1.347	-1.326	-1.350	-1.355	-1.350	-1.346	0.967
80	0.53	-0.613	-0.553	-0.558	-0.571	-0.575	-0.574	0.834	-0.825	-0.786	-0.790	-0.786	-0.822	-0.802	0.821	-1.005	-1.075	-1.028	-1.078	-1.034	-1.044	0.818	-1.204	-1.117	-1.189	-1.274	-1.201	-1.197	0.861
130	0.87	-0.498	-0.405	-0.410	-0.454	-0.440	-0.441	0.641	-0.655	-0.578	-0.580	-0.582	-0.653	-0.610	0.624	-0.728	-0.854	-0.755	-0.856	-0.797	-0.798	0.625	-0.974	-0.829	-0.949	-1.050	-0.959	-0.952	0.685
180	1.20	-0.378	-0.278	-0.282	-0.356	-0.316	-0.322	0.468	-0.510	-0.406	-0.404	-0.416	-0.512	-0.450	0.461	-0.510	-0.670	-0.531	-0.667	-0.613	-0.598	0.469	-0.775	-0.595	-0.722	-0.812	-0.739	-0.728	0.524
223	1.49	-0.301	-0.214	-0.217	-0.290	-0.249	-0.254	0.370	-0.417	-0.316	-0.310	-0.326	-0.418	-0.357	0.366	-0.397	-0.546	-0.413	-0.545	-0.500	-0.480	0.377	-0.641	-0.471	-0.581	-0.657	-0.594	-0.580	0.423
260	1.73	-0.254	-0.189	-0.193	-0.247	-0.219	-0.220	0.320	-0.359	-0.278	-0.270	-0.286	-0.356	-0.310	0.317	-0.352	-0.466	-0.364	-0.469	-0.437	-0.417	0.327	-0.550	-0.418	-0.502	-0.563	-0.502	-0.507	0.364
328	2.19	-0.156	-0.123	-0.124	-0.153	-0.139	-0.139	0.202	-0.223	-0.180	-0.173	-0.183	-0.222	-0.196	0.201	-0.230	-0.290	-0.235	-0.292	-0.276	-0.264	0.207	-0.348	-0.274	-0.321	-0.351	-0.309	-0.321	0.230
423	2.82	-0.051	-0.044	-0.045	-0.052	-0.050	-0.048	0.070	-0.073	-0.065	-0.063	-0.066	-0.074	-0.068	0.070	-0.086	-0.097	-0.086	-0.095	-0.090	-0.091	0.071	-0.113	-0.091	-0.105	-0.111	-0.101	-0.104	0.075
520	3.47	-0.015	-0.015	-0.013	-0.015	-0.016	-0.015	0.022	-0.018	-0.022	-0.022	-0.023	-0.021	-0.021	0.022	-0.031	-0.028	-0.029	-0.024	-0.022	-0.027	0.021	-0.029	-0.024	-0.027	-0.029	-0.029	-0.028	0.020
2070	13.80	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.005	-0.004	-0.004	-0.004	-0.004	-0.005	-0.004	0.004	-0.006	-0.006	-0.006	-0.006	-0.005	-0.006	0.004	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006	0.005
3070	20.47	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.003	-0.004	-0.003	-0.004	0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.003

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/a <sub>0</sub>	6	15	9	7	10	AVG.	STRESS RATIO p/p <sub>0</sub>	6	15	7	10	13	AVG.	STRESS RATIO p/p <sub>0</sub>	9	10	5	13	11	AVG.	STRESS RATIO p/p <sub>0</sub>	6	4	9	7	1	AVG.	STRESS RATIO p/p <sub>0</sub>
27	0.18	-0.663	-0.656	-0.663	-0.663	-0.658	-0.661	0.960	-0.940	-0.931	-0.941	-0.934	-0.926	-0.934	0.957	-1.229	-1.230	-1.217	-1.248	-1.235	-1.232	0.966	-1.349	-1.326	-1.350	-1.312	-1.327	-1.333	0.958
80	0.53	-0.579	-0.555	-0.578	-0.581	-0.559	-0.571	0.829	-0.822	-0.788	-0.825	-0.793	-0.768	-0.799	0.819	-1.075	-1.078	-1.041	-1.129	-1.090	-1.083	0.848	-1.203	-1.117	-1.199	-1.090	-1.127	-1.147	0.825
130	0.87	-0.461	-0.416	-0.452	-0.461	-0.413	-0.441	0.640	-0.653	-0.591	-0.655	-0.586	-0.556	-0.608	0.623	-0.854	-0.856	-0.826	-0.879	-0.851	-0.833	0.669	-0.974	-0.828	-0.949	-0.852	-0.869	-0.894	0.643
180	1.20	-0.361	-0.304	-0.343	-0.360	-0.290	-0.332	0.482	-0.512	-0.431	-0.510	-0.411	-0.390	-0.451	0.462	-0.670	-0.667	-0.666	-0.627	-0.636	-0.653	0.512	-0.776	-0.595	-0.722	-0.691	-0.668	-0.690	0.496
223	1.49	-0.294	-0.240	-0.276	-0.294	-0.223	-0.265	0.386	-0.418	-0.341	-0.417	-0.317	-0.305	-0.359	0.368	-0.546	-0.545	-0.556	-0.487	-0.508	-0.528	0.414	-0.641	-0.472	-0.581	-0.577	-0.546	-0.563	0.405
260	1.73	-0.251	-0.208	-0.238	-0.253	-0.194	-0.229	0.332	-0.356	-0.295	-0.359	-0.276	-0.269	-0.311	0.319	-0.466	-0.469	-0.483	-0.425	-0.438	-0.456	0.358	-0.550	-0.419	-0.502	-0.498	-0.477	-0.489	0.352
328	2.19	-0.156	-0.132	-0.148	-0.157	-0.125	-0.144	0.209	-0.222	-0.187	-0.223	-0.177	-0.176	-0.187	0.202	-0.290	-0.292	-0.306	-0.273	-0.275	-0.287	0.225	-0.348	-0.274	-0.321	-0.316	-0.303	-0.313	0.225
423	2.82	-0.052	-0.047	-0.049	-0.051	-0.045	-0.049	0.071	-0.074	-0.067	-0.073	-0.064	-0.066	-0.069	0.070	-0.097	-0.095	-0.098	-0.096	-0.088	-0.095	0.074	-0.113	-0.091	-0.104	-0.102	-0.098	-0.101	0.073
520	3.47	-0.015	-0.016	-0.014	-0.013	-0.016	-0.015	0.021	-0.021	-0.023	-0.018	-0.022	-0.024	-0.022	0.022	-0.028	-0.024	-0.023	-0.032	-0.021	-0.026	0.020	-0.029	-0.024	-0.027	-0.026	-0.024	-0.026	0.019
2070	13.80	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.005	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.006	-0.006	-0.006	-0.006	-0.005	-0.006	0.004	-0.007	-0.006	-0.006	-0.006	-0.006	-0.006	0.004
3070	20.47	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.004	-0.004	-0.004	-0.004	-0.003									

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 690 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	10	16	14	8	MIN	AVG	MAX
EY1	3760	4081	3755	3701	4408	3701	3941	4408
EY2	5855	5831	5233	5510	3857	3857	5257	5855
EY3	1515	1598	1581	1463	1886	1463	1609	1886
EY4	21142	21704	21189	25476	20824	20824	22067	25476
EY5	202	188	223	181	270	181	213	270
EY6	222	249	243	245	121	121	216	249

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.136355	-0.133214	-0.134414	-0.134644	-0.149793	-0.129	0
UY2	-0.096289	-0.096162	-0.094560	-0.094287	-0.110132	-0.110	300
UY3	-0.082050	-0.082676	-0.080673	-0.080694	-0.095228	-0.093	614
UY4	-0.071283	-0.072613	-0.070295	-0.070547	-0.082719	-0.074	914
UY5	-0.062134	-0.064111	-0.061525	-0.061907	-0.071315	-0.059	1219
UY6	-0.054645	-0.057178	-0.054385	-0.054853	-0.061383	-0.051	1524
UY7	-0.048701	-0.051699	-0.048754	-0.049276	-0.053063	-0.042	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	6	2	15	13	MIN	AVG	MAX
EY1	4464	4748	7236	7985	7938	4464	6474	7985
EY2	5932	2893	3829	5623	5945	2893	4844	5945
EY3	3144	2776	2164	1993	1194	1194	2254	3144
EY4	20500	23295	33847	20099	20430	20099	23634	33847
EY5	187	297	231	299	298	187	263	299
EY6	250	210	193	237	250	193	228	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.126517	-0.126416	-0.132143	-0.124847	-0.124595	-0.129	0
UY2	-0.094935	-0.086974	-0.101332	-0.096886	-0.095173	-0.110	300
UY3	-0.083887	-0.074651	-0.090312	-0.085009	-0.081540	-0.093	614
UY4	-0.074683	-0.064618	-0.081677	-0.076220	-0.072415	-0.074	914
UY5	-0.066695	-0.055787	-0.073899	-0.068740	-0.064908	-0.059	1219
UY6	-0.060045	-0.048383	-0.067233	-0.062551	-0.058832	-0.051	1524
UY7	-0.054712	-0.042401	-0.061715	-0.057568	-0.054029	-0.042	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 690 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	11	14	7	10	MIN	AVG	MAX
EY1	7938	4464	6134	5531	7851	4464	6384	7938
EY2	4814	5932	5600	3660	5831	3660	5168	5932
EY3	1194	3144	1715	2844	1598	1194	2099	3144
EY4	20430	20500	21258	30717	21704	20430	22922	30717
EY5	298	187	270	235	296	187	257	298
EY6	250	250	249	207	249	207	241	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.127173	-0.126517	-0.122875	-0.123230	-0.117836	-0.129	0
UY2	-0.095751	-0.094935	-0.091561	-0.089676	-0.090063	-0.110	300
UY3	-0.081844	-0.083887	-0.079077	-0.078829	-0.077844	-0.093	614
UY4	-0.072637	-0.074683	-0.069939	-0.069808	-0.069197	-0.074	914
UY5	-0.065036	-0.066695	-0.062214	-0.061712	-0.061914	-0.059	1219
UY6	-0.058891	-0.060045	-0.055885	-0.054807	-0.055923	-0.051	1524
UY7	-0.054040	-0.054712	-0.050844	-0.049139	-0.051126	-0.042	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 985 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	1	4	15	10	MIN	AVG	MAX
EY1	3308	4408	3317	4182	3030	3030	3649	4408
EY2	4343	3857	3643	2524	3480	2524	3569	4343
EY3	3554	1886	3550	3867	1354	1354	2842	3867
EY4	20269	20824	20207	20099	27901	20099	21860	27901
EY5	292	270	294	298	299	270	290	299
EY6	110	121	105	102	130	102	114	130

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.221022	-0.213770	-0.224962	-0.228368	-0.239665	-0.204	0
UY2	-0.161313	-0.157154	-0.164671	-0.166072	-0.164659	-0.173	300
UY3	-0.141026	-0.135891	-0.144668	-0.145193	-0.141560	-0.147	614
UY4	-0.122212	-0.118049	-0.125714	-0.126106	-0.122930	-0.120	914
UY5	-0.104754	-0.101783	-0.107961	-0.108307	-0.105994	-0.096	1219
UY6	-0.089331	-0.087615	-0.092196	-0.092537	-0.091414	-0.081	1524
UY7	-0.076286	-0.075746	-0.078825	-0.079155	-0.079350	-0.066	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	5	2	1	13	MIN	AVG	MAX
EY1	4408	6525	7236	4000	7938	4000	6021	7938
EY2	3857	4011	3829	3000	4758	3000	3891	4758
EY3	1886	3080	2164	1800	1194	1194	2025	3080
EY4	20824	38017	33847	30000	20430	20430	28624	38017
EY5	270	165	231	200	298	165	233	298
EY6	121	204	193	150	250	121	183	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.213770	-0.192730	-0.188639	-0.224013	-0.181796	-0.204	0
UY2	-0.157154	-0.150432	-0.144655	-0.161072	-0.136774	-0.173	300
UY3	-0.135891	-0.136228	-0.128924	-0.141501	-0.116906	-0.147	614
UY4	-0.118049	-0.124451	-0.116597	-0.125225	-0.103761	-0.120	914
UY5	-0.101783	-0.113735	-0.105494	-0.110377	-0.092905	-0.096	1219
UY6	-0.087615	-0.104467	-0.095977	-0.097587	-0.084126	-0.081	1524
UY7	-0.075746	-0.096758	-0.088101	-0.087000	-0.077194	-0.066	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 985 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	8	1	2	5	11	MIN	AVG	MAX
EY1	4408	4000	7236	6525	4464	4000	5327	7236
EY2	3857	3000	3829	4011	5932	3000	4126	5932
EY3	1886	1800	2164	3080	3144	1800	2415	3144
EY4	20824	30000	33847	38017	20500	20500	28638	38017
EY5	270	200	231	165	187	165	210	270
EY6	121	150	193	204	250	121	183	250

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.213770	-0.224013	-0.188639	-0.192730	-0.180608	-0.204	0
UY2	-0.157154	-0.161072	-0.144655	-0.150432	-0.135522	-0.173	300
UY3	-0.135891	-0.141501	-0.128924	-0.136228	-0.119752	-0.147	614
UY4	-0.118049	-0.125225	-0.116597	-0.124451	-0.106612	-0.120	914
UY5	-0.101783	-0.110377	-0.105494	-0.113735	-0.095209	-0.096	1219
UY6	-0.087615	-0.097587	-0.095977	-0.104467	-0.085717	-0.081	1524
UY7	-0.075746	-0.087000	-0.088101	-0.096758	-0.078103	-0.066	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 1233 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	8	5	2	16	MIN	AVG	MAX
EY1	4000	4408	6525	7236	6445	4000	5723	7236
EY2	3000	3857	4011	3829	5438	3000	4027	5438
EY3	1800	1886	3080	2164	1181	1181	2022	3080
EY4	30000	20824	38017	33847	20358	20358	28609	38017
EY5	200	270	165	231	280	165	229	280
EY6	150	121	204	193	231	121	180	231

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.280415	-0.267602	-0.240639	-0.235909	-0.234087	-0.271	0
UY2	-0.201626	-0.196720	-0.187706	-0.180851	-0.175097	-0.232	300
UY3	-0.177127	-0.170079	-0.169963	-0.161162	-0.149404	-0.197	614
UY4	-0.156753	-0.147722	-0.155275	-0.145741	-0.131776	-0.161	914
UY5	-0.138168	-0.127344	-0.141920	-0.131856	-0.117116	-0.126	1219
UY6	-0.122157	-0.109598	-0.130380	-0.119959	-0.105206	-0.108	1524
UY7	-0.108904	-0.094732	-0.120787	-0.110117	-0.095774	-0.088	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	1	5	2	4	MIN	AVG	MAX
EY1	4408	4000	6525	7236	6743	4000	5782	7236
EY2	3857	3000	4011	3829	5459	3000	4031	5459
EY3	1886	1800	3080	2164	1036	1036	1993	3080
EY4	20824	30000	38017	33847	32504	20824	31038	38017
EY5	270	200	165	231	225	165	218	270
EY6	121	150	204	193	121	121	158	204

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.267593	-0.280415	-0.241255	-0.236134	-0.307619	-0.271	0
UY2	-0.196722	-0.201626	-0.188308	-0.181076	-0.247793	-0.232	300
UY3	-0.170105	-0.177127	-0.170526	-0.161384	-0.220715	-0.197	614
UY4	-0.147771	-0.156753	-0.155785	-0.145953	-0.201199	-0.161	914
UY5	-0.127409	-0.138168	-0.142371	-0.132054	-0.183672	-0.126	1219
UY6	-0.109675	-0.122157	-0.130769	-0.120142	-0.168430	-0.108	1524
UY7	-0.094817	-0.108904	-0.121120	-0.110283	-0.155646	-0.088	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 1233 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	1	13	8	2	MIN	AVG	MAX
EY1	4408	4000	3350	6525	7236	3350	5104	7236
EY2	3857	3000	5416	4011	3829	3000	4022	5416
EY3	1886	1800	1268	3080	2164	1268	2040	3080
EY4	20824	30000	20205	38017	33847	20205	28579	38017
EY5	270	200	184	165	231	165	210	270
EY6	121	150	213	204	193	121	176	213

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.267593	-0.280415	-0.273828	-0.241255	-0.236134	-0.271	0
UY2	-0.196722	-0.201626	-0.196933	-0.188308	-0.181076	-0.232	300
UY3	-0.170105	-0.177127	-0.169135	-0.170526	-0.161384	-0.197	614
UY4	-0.147771	-0.156753	-0.148780	-0.155785	-0.145953	-0.161	914
UY5	-0.127409	-0.138168	-0.131587	-0.142371	-0.132054	-0.126	1219
UY6	-0.109675	-0.122157	-0.117551	-0.130769	-0.120142	-0.108	1524
UY7	-0.094817	-0.108904	-0.106447	-0.121120	-0.110283	-0.088	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 1217 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	5	14	2	8	1	MIN	AVG	MAX
EY1	6876	3804	4601	5959	7236	3604	5695	7236
EY2	4830	3114	5171	2659	3829	2659	3920	5171
EY3	1290	2025	2746	3940	2164	1290	2433	3940
EY4	31587	20248	33903	34730	33847	20248	30863	34730
EY5	208	298	161	282	231	161	236	298
EY6	109	196	152	190	193	109	168	196

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.305282	-0.276578	-0.251862	-0.247430	-0.229756	-0.312	0
UY2	-0.245739	-0.195508	-0.191692	-0.184458	-0.175426	-0.265	300
UY3	-0.220405	-0.170219	-0.171862	-0.165520	-0.156078	-0.225	614
UY4	-0.201090	-0.150053	-0.154509	-0.149864	-0.140955	-0.183	914
UY5	-0.183389	-0.132568	-0.138495	-0.135611	-0.127323	-0.145	1219
UY6	-0.167851	-0.118086	-0.124451	-0.123298	-0.115632	-0.123	1524
UY7	-0.154694	-0.106501	-0.112629	-0.113068	-0.105953	-0.100	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	5	6	2	8	4	MIN	AVG	MAX
EY1	6876	3179	4601	5959	6568	3179	5437	6876
EY2	4830	2196	5171	2659	4363	2196	3844	5171
EY3	1290	2897	2746	3940	1190	1190	2413	3940
EY4	31587	34346	33903	34730	27356	27356	32384	34730
EY5	208	210	161	282	153	153	203	282
EY6	109	212	152	190	168	109	166	212

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.305282	-0.253544	-0.251862	-0.247430	-0.236562	-0.312	0
UY2	-0.245739	-0.164312	-0.191692	-0.184458	-0.175043	-0.265	300
UY3	-0.220405	-0.142598	-0.171862	-0.165520	-0.149430	-0.225	614
UY4	-0.201090	-0.124542	-0.154509	-0.149864	-0.131056	-0.183	914
UY5	-0.183389	-0.108380	-0.138495	-0.135611	-0.114900	-0.145	1219
UY6	-0.167851	-0.094764	-0.124451	-0.123298	-0.101235	-0.123	1524
UY7	-0.154694	-0.083772	-0.112629	-0.113068	-0.090045	-0.100	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6 + 100 R: LOAD 1217 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	5	2	8	1	4	MIN	AVG	MAX
EY1	6876	4601	5959	7236	6568	4601	6248	7236
EY2	4830	5171	2659	3829	4363	2659	4170	5171
EY3	1290	2746	3940	2164	1190	1190	2266	3940
EY4	31587	33903	34730	33847	27356	27356	32284	34730
EY5	208	161	282	231	153	153	207	282
EY6	109	152	190	193	168	109	162	193

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.305282	-0.251862	-0.247430	-0.229756	-0.236562	-0.312	0
UY2	-0.245739	-0.191692	-0.184458	-0.175426	-0.175043	-0.265	300
UY3	-0.220405	-0.171862	-0.165520	-0.156078	-0.149430	-0.225	614
UY4	-0.201090	-0.154509	-0.149864	-0.140955	-0.131056	-0.183	914
UY5	-0.183389	-0.138495	-0.135611	-0.127323	-0.114900	-0.145	1219
UY6	-0.167851	-0.124451	-0.123298	-0.115632	-0.101235	-0.123	1524
UY7	-0.154694	-0.112629	-0.113068	-0.105953	-0.090045	-0.100	1829

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: RWY. 12-30: STA. 6+100 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN LOAD 1: 690 kPa

LOAD 2: 985 kPa

LOAD 3: 1233 kPa

LOAD 4: 1217 kPa

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 690 kPa					AVG. STRESS RATIO p/po	LOAD 2: 985 kPa					AVG. STRESS RATIO p/po	LOAD 3: 1233 kPa					AVG. STRESS RATIO p/po	LOAD 4: 1217 kPa					AVG. STRESS RATIO p/po				
		12	10	16	14	8		6	1	4	15	10		1	8	5	2	16		5	14	2	8	1					
24	0.16	-0.676	-0.675	-0.675	-0.676	-0.670	-0.674	0.977	-0.970	-0.956	-0.967	-0.954	-0.962	-0.962	0.977	-1.195	-1.197	-1.190	-1.180	-1.185	-1.189	0.965	-1.166	-1.183	-1.191	-1.168	-1.165	-1.175	0.965
72	0.48	-0.627	-0.623	-0.625	-0.626	-0.608	-0.622	0.901	-0.915	-0.869	-0.908	-0.868	-0.888	-0.889	0.903	-1.085	-1.087	-1.067	-1.036	-1.042	-1.064	0.863	-1.020	-1.081	-1.106	-1.038	-1.023	-1.054	0.866
120	0.80	-0.503	-0.495	-0.499	-0.502	-0.489	-0.497	0.721	-0.765	-0.698	-0.762	-0.720	-0.723	-0.734	0.745	-0.884	-0.874	-0.863	-0.824	-0.792	-0.847	0.687	-0.786	-0.886	-0.913	-0.849	-0.813	-0.849	0.698
170	1.13	-0.361	-0.352	-0.358	-0.363	-0.367	-0.360	0.522	-0.591	-0.523	-0.597	-0.575	-0.545	-0.566	0.575	-0.688	-0.655	-0.668	-0.635	-0.553	-0.640	0.519	-0.569	-0.687	-0.700	-0.681	-0.627	-0.653	0.536
213	1.42	-0.283	-0.272	-0.278	-0.286	-0.293	-0.283	0.410	-0.471	-0.418	-0.483	-0.469	-0.441	-0.457	0.463	-0.568	-0.523	-0.542	-0.518	-0.429	-0.518	0.419	-0.452	-0.559	-0.567	-0.563	-0.512	-0.531	0.436
250	1.67	-0.249	-0.237	-0.242	-0.254	-0.253	-0.247	0.358	-0.395	-0.361	-0.406	-0.392	-0.390	-0.389	0.395	-0.500	-0.452	-0.466	-0.452	-0.381	-0.450	0.365	-0.402	-0.483	-0.493	-0.479	-0.447	-0.461	0.379
318	2.12	-0.158	-0.150	-0.153	-0.162	-0.159	-0.156	0.227	-0.241	-0.227	-0.245	-0.238	-0.252	-0.241	0.244	-0.315	-0.284	-0.291	-0.285	-0.248	-0.285	0.231	-0.263	-0.306	-0.313	-0.303	-0.284	-0.294	0.241
412	2.75	-0.056	-0.053	-0.055	-0.057	-0.051	-0.054	0.079	-0.075	-0.073	-0.075	-0.073	-0.082	-0.076	0.077	-0.101	-0.091	-0.092	-0.093	-0.091	-0.093	0.076	-0.082	-0.103	-0.095	-0.095	-0.091	-0.093	0.077
520	3.47	-0.017	-0.016	-0.017	-0.016	-0.012	-0.016	0.023	-0.016	-0.017	-0.016	-0.016	-0.018	-0.017	0.017	-0.022	-0.021	-0.021	-0.022	-0.030	-0.023	0.019	-0.016	-0.030	-0.019	-0.022	-0.021	-0.022	0.018
2080	13.87	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.005	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.006	-0.005	0.004	-0.004	-0.006	-0.005	-0.005	-0.005	-0.005	0.004
3080	20.53	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 690 kPa					AVG. STRESS RATIO p/po	LOAD 2: 985 kPa					AVG. STRESS RATIO p/po	LOAD 3: 1233 kPa					AVG. STRESS RATIO p/po	LOAD 4: 1217 kPa					AVG. STRESS RATIO p/po				
		8	5	2	1	13		8	1	5	2	4		5	2	8	1	4											
24	0.16	-0.956	-0.951	-0.943	-0.955	-0.937	-0.948	0.963	-1.197	-1.195	-1.190	-1.180	-1.183	-1.189	0.964	-1.166	-1.183	-1.191	-1.168	-1.165	-1.175	0.965	-1.166	-1.183	-1.191	-1.168	-1.165	-1.175	0.965
72	0.48	-0.869	-0.853	-0.828	-0.866	-0.803	-0.844	0.857	-1.087	-1.085	-1.067	-1.036	-1.035	-1.062	0.861	-1.020	-1.081	-1.106	-1.038	-1.023	-1.054	0.866	-1.020	-1.081	-1.106	-1.038	-1.023	-1.054	0.866
120	0.80	-0.698	-0.689	-0.658	-0.706	-0.603	-0.671	0.681	-0.874	-0.884	-0.863	-0.824	-0.778	-0.845	0.685	-0.786	-0.886	-0.913	-0.849	-0.813	-0.849	0.698	-0.786	-0.886	-0.913	-0.849	-0.813	-0.849	0.698
170	1.13	-0.523	-0.533	-0.507	-0.549	-0.427	-0.508	0.516	-0.655	-0.688	-0.668	-0.635	-0.536	-0.636	0.516	-0.569	-0.687	-0.700	-0.681	-0.627	-0.653	0.536	-0.569	-0.687	-0.700	-0.681	-0.627	-0.653	0.536
213	1.42	-0.418	-0.433	-0.414	-0.454	-0.334	-0.411	0.417	-0.523	-0.568	-0.542	-0.518	-0.412	-0.513	0.416	-0.452	-0.567	-0.563	-0.512	-0.442	-0.507	0.417	-0.452	-0.567	-0.563	-0.512	-0.442	-0.507	0.417
250	1.67	-0.361	-0.372	-0.361	-0.399	-0.296	-0.358	0.363	-0.452	-0.500	-0.466	-0.452	-0.366	-0.447	0.363	-0.402	-0.483	-0.493	-0.479	-0.447	-0.461	0.379	-0.402	-0.483	-0.493	-0.479	-0.447	-0.461	0.379
318	2.12	-0.227	-0.232	-0.228	-0.252	-0.194	-0.226	0.230	-0.284	-0.315	-0.291	-0.285	-0.240	-0.283	0.230	-0.263	-0.306	-0.313	-0.303	-0.284	-0.294	0.241	-0.263	-0.306	-0.313	-0.303	-0.284	-0.294	0.241
412	2.75	-0.073	-0.073	-0.074	-0.081	-0.071	-0.074	0.075	-0.091	-0.101	-0.092	-0.093	-0.079	-0.091	0.074	-0.082	-0.103	-0.095	-0.095	-0.091	-0.093	0.076	-0.082	-0.103	-0.095	-0.095	-0.091	-0.093	0.076
520	3.47	-0.017	-0.016	-0.017	-0.016	-0.012	-0.016	0.019	-0.021	-0.022	-0.020	-0.022	-0.017	-0.021	0.017	-0.022	-0.021	-0.021	-0.022	-0.030	-0.023	0.019	-0.022	-0.021	-0.022	-0.021	-0.022	0.018	
2080	13.87	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.004	-0.004	-0.006	-0.005	-0.005	-0.006	-0.005	0.004	-0.004	-0.006	-0.005	-0.005	-0.005	0.004	
3080	20.53	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 690 kPa					AVG. STRESS RATIO p/po	LOAD 2: 985 kPa					AVG. STRESS RATIO p/po	LOAD 3: 1233 kPa					AVG. STRESS RATIO p/po	LOAD 4: 1217 kPa					AVG. STRESS RATIO p/po				
		13	11	14	7	10		8	1	2	5	11		11	1	13	8	2		5	2	8	1	4					
24	0.16	-0.656	-0.677	-0.667	-0.667	-0.662	-0.666	0.965	-0.956	-0.955	-0.943	-0.951	-0.967	-0.954	0.969	-1.197	-1.195	-1.208	-1.190	-1.180	-1.194	0.968	-1.166	-1.191	-1.168	-1.165	-1.164	-1.171	0.962
72	0.48	-0.563	-0.633	-0.598	-0.603	-0.581	-0.596	0.863	-0.869	-0.866	-0.828	-0.853	-0.903	-0.864	0.877	-1.087	-1.085	-1.120	-1.067	-1.036	-1.079	0.875	-1.020	-1.106	-1.038	-1.023	-1.013	-1.040	0.855
120	0.80	-0.423	-0.519	-0.468	-0.492	-0.442	-0.469	0.680	-0.698	-0.706	-0.658	-0.689	-0.740	-0.698	0.709	-0.874	-0.884	-0.886	-0.863	-0.824	-0.866	0.702	-0.786	-0.913	-0.849	-0.813	-0.775	-0.827	0.680
170	1.13	-0.299	-0.388	-0.338	-0.385	-0.311	-0.344	0.499	-0.523	-0.549	-0.507	-0.533	-0.554	-0.533	0.542	-0.655	-0.688	-0.621	-0.668	-0.635	-0.653	0.530	-0.569	-0.700	-0.681	-0.627	-0.558	-0.627	0.515
213	1.42	-0.234	-0.306	-0.266	-0.314	-0.240	-0.272	0.394	-0.418	-0.454	-0.414	-0.433	-0.436	-0.431	0.437	-0.523	-0.568	-0.478	-0.542	-0.518	-0.526	0.426	-0.452	-0.567	-0.563	-0.512	-0.442	-0.507	0.417
250	1.67	-0.207	-0.259	-0.232	-0.271	-0.209	-0.236	0.341	-0.361	-0.399	-0.361	-0.372	-0.370	-0.373	0.378	-0.452	-0.500	-0.419	-0.466	-0.452	-0.458	0.371	-0.402	-0.493	-0.479	-0.447	-0.393	-0.443	0.364
318	2.12	-0.135	-0.159	-0.149	-0.168	-0.134	-0.149	0.216	-0.227	-0.252	-0.228	-0.232	-0.227	-0.233	0.237	-0.284	-0.315	-0.272	-0.291	-0.285	-0.289	0.235	-0.263	-0.313	-0.303	-0.284	-0.256	-0.284	0.233
412	2.75	-0.050	-0.052	-0.052	-0.054	-0.048	-0.051	0.074	-0.073	-0.081	-0.074	-0.073	-0.075	-0.075	0.076	-0.091	-0.101	-0.095	-0.092	-0.093	-0.094	0.076	-0.082	-0.095	-0.095	-0.091	-0.084	-0.089	0.073
520	3.47	-0.017	-0.015	-0.017	-0.013	-0.016	-0.016	0.023	-0.017	-0.018	-0.017	-0.016	-0.022	-0.018	0.018	-0.021	-0.022	-0.030	-0.020	-0.022	-0.023	0.019	-0.016	-0.019	-0.022	-0.021	-0.020	-0.020	0.016
2080	13.87	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.004	-0.004	-0.004	-0.005	-0.004	0.004	-0.005	-0.005	-0.006	-0.005	-0.005	-0.005	0.004	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	0.004
3080	20.53	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.00																		

ANSYS FEM ANALYSIS: ISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 588 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	11	16	15	14	MIN	AVG	MAX
EY1	6821	5928	5398	5385	5327	5327	5772	6821
EY2	216	219	252	253	253	216	239	253
EY3	211	231	207	206	206	206	212	231
EY4	161	149	159	160	160	149	158	161

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL.(mm)</u>					<u>SENSOR DISTANCE(mm)</u>	
UY1	-0.276048	-0.281899	-0.281339	-0.281224	-0.281828	-0.277	0
UY2	-0.182285	-0.179883	-0.178001	-0.177898	-0.177890	-0.185	300
UY3	-0.102475	-0.098725	-0.098091	-0.098081	-0.097908	-0.106	614
UY4	-0.065540	-0.063576	-0.062905	-0.062917	-0.062770	-0.062	914
UY5	-0.047718	-0.046935	-0.045606	-0.045605	-0.045480	-0.041	1219
UY6	-0.037817	-0.037391	-0.035634	-0.035624	-0.035507	-0.035	1524
UY7	-0.031484	-0.031014	-0.029151	-0.029139	-0.029025	-0.029	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	2	4	5	9	MIN	AVG	MAX
EY1	6071	7236	4736	5773	4994	4736	5764	7236
EY2	510	383	245	391	499	245	406	510
EY3	206	158	179	221	230	158	199	230
EY4	110	169	199	184	101	101	153	199

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL.(mm)</u>					<u>SENSOR DISTANCE(mm)</u>	
UY1	-0.299357	-0.254005	-0.303129	-0.245581	-0.309768	-0.277	0
UY2	-0.223713	-0.175681	-0.190725	-0.159538	-0.226186	-0.185	300
UY3	-0.168332	-0.110301	-0.106195	-0.097790	-0.170142	-0.106	614
UY4	-0.139951	-0.076159	-0.068899	-0.069886	-0.143021	-0.062	914
UY5	-0.122669	-0.056642	-0.050512	-0.054960	-0.126659	-0.041	1219
UY6	-0.111200	-0.044724	-0.040240	-0.045886	-0.115656	-0.035	1524
UY7	-0.103207	-0.037089	-0.033927	-0.039915	-0.107824	-0.029	1829

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	4	2	10	5	MIN	AVG	MAX
EY1	6958	4736	7236	4431	5773	4431	5827	7236
EY2	202	245	383	208	391	202	286	391
EY3	244	179	158	228	221	158	206	244
EY4	193	199	169	176	184	169	184	199

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL.(mm)</u>					<u>SENSOR DISTANCE(mm)</u>	
UY1	-0.278927	-0.303129	-0.254005	-0.311361	-0.245581	-0.277	0
UY2	-0.184510	-0.190725	-0.175681	-0.188279	-0.159538	-0.185	300
UY3	-0.105402	-0.106195	-0.110301	-0.099951	-0.097790	-0.106	614
UY4	-0.070436	-0.068899	-0.076159	-0.065636	-0.069886	-0.062	914
UY5	-0.054628	-0.050512	-0.056642	-0.050314	-0.054960	-0.041	1219
UY6	-0.046275	-0.040240	-0.044724	-0.041626	-0.045886	-0.035	1524
UY7	-0.041033	-0.033927	-0.037089	-0.035851	-0.039915	-0.029	1829

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**ANSYS FEM ANALYSIS: ISOTROPIC MODEL**  
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**THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 880 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
 =====

**CALCULATED MODULI (MPa)**

SET	14	16	10	15	13	MIN	AVG	MAX
EY1	7640	7225	7539	7056	7738	7856	7439	7738
EY2	238	272	237	291	221	221	252	291
EY3	174	169	184	162	179	162	174	184
EY4	199	200	196	199	199	196	199	200

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.401612	-0.398421	-0.398694	-0.398861	-0.403851	-0.387	0
UY2	-0.272480	-0.269456	-0.268591	-0.269982	-0.273692	-0.274	300
UY3	-0.156767	-0.157203	-0.153621	-0.158691	-0.155804	-0.162	614
UY4	-0.099253	-0.101339	-0.097211	-0.102720	-0.097308	-0.098	914
UY5	-0.070348	-0.072517	-0.068976	-0.073314	-0.068321	-0.066	1219
UY6	-0.054719	-0.056541	-0.053597	-0.056852	-0.052885	-0.055	1524
UY7	-0.045453	-0.046982	-0.044347	-0.047030	-0.043800	-0.045	1829

**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
 =====

**CALCULATED MODULI (MPa)**

SET	2	5	10	7	4	MIN	AVG	MAX
EY1	7236	5773	7529	6071	4736	4736	6269	7539
EY2	383	391	310	510	245	245	368	510
EY3	158	221	228	206	179	158	198	228
EY4	169	184	176	110	199	110	167	199

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.380144	-0.367537	-0.362791	-0.448018	-0.453663	-0.387	0
UY2	-0.262924	-0.238764	-0.242859	-0.334808	-0.285439	-0.274	300
UY3	-0.165076	-0.146353	-0.145278	-0.251926	-0.158932	-0.162	614
UY4	-0.113980	-0.104591	-0.099780	-0.209450	-0.103114	-0.098	914
UY5	-0.084770	-0.082253	-0.076521	-0.183587	-0.075596	-0.066	1219
UY6	-0.066933	-0.068673	-0.062903	-0.166422	-0.060223	-0.055	1524
UY7	-0.055507	-0.059737	-0.054023	-0.154459	-0.050776	-0.045	1829

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
 =====

**CALCULATED MODULI (MPa)**

SET	2	11	5	4	1	MIN	AVG	MAX
EY1	7236	4236	5773	4736	4000	4000	5196	7236
EY2	383	554	391	245	300	245	375	554
EY3	158	141	221	179	200	141	180	221
EY4	169	192	184	199	150	150	179	199

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.380144	-0.378587	-0.367537	-0.453663	-0.464102	-0.387	0
UY2	-0.262924	-0.242139	-0.238764	-0.285439	-0.294185	-0.274	300
UY3	-0.165076	-0.148587	-0.146353	-0.158932	-0.178131	-0.162	614
UY4	-0.113980	-0.099245	-0.104591	-0.103114	-0.127805	-0.098	914
UY5	-0.084770	-0.069328	-0.082253	-0.075596	-0.101429	-0.066	1219
UY6	-0.066933	-0.050712	-0.068673	-0.060223	-0.085502	-0.055	1524
UY7	-0.055507	-0.038987	-0.059737	-0.050776	-0.075021	-0.045	1829

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**ANSYS FEM ANALYSIS: ISOTROPIC MODEL**  
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**THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 1154 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
 =====

**CALCULATED MODULI (MPa)**

SET	9	15	4	12	13	MIN	AVG	MAX
EY1	7595	7043	7710	7971	7984	7043	7660	7984
EY2	218	217	221	253	221	217	226	253
EY3	177	191	209	188	191	177	191	209
EY4	141	148	152	143	148	141	146	152

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFLECTION (mm)	SENSOR DISTANCE (mm)
UY1	-0.557203	-0.558178	-0.541560	-0.532029	-0.554551	-0.542	0
UY2	-0.383913	-0.379467	-0.373431	-0.370602	-0.387235	-0.392	300
UY3	-0.227684	-0.223402	-0.224384	-0.225850	-0.235586	-0.236	614
UY4	-0.148652	-0.147519	-0.151843	-0.152384	-0.159401	-0.147	914
UY5	-0.107335	-0.109006	-0.115472	-0.113573	-0.120223	-0.102	1219
UY6	-0.083508	-0.087016	-0.094927	-0.090977	-0.097971	-0.084	1524
UY7	-0.068288	-0.072909	-0.081759	-0.076471	-0.083857	-0.070	1829

**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
 =====

**CALCULATED MODULI (MPa)**

SET	2	7	4	10	5	MIN	AVG	MAX
EY1	7236	6071	4736	7528	5773	4736	6269	7528
EY2	383	510	245	295	391	245	365	510
EY3	158	206	179	228	221	158	198	228
EY4	169	110	199	176	184	110	167	199

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFLECTION (mm)	SENSOR DISTANCE (mm)
UY1	-0.498507	-0.587514	-0.594917	-0.482259	-0.481974	-0.541	0
UY2	-0.344789	-0.439056	-0.374314	-0.323421	-0.313107	-0.392	300
UY3	-0.216474	-0.330366	-0.208417	-0.193158	-0.191922	-0.236	614
UY4	-0.149469	-0.274665	-0.135219	-0.132191	-0.137157	-0.147	914
UY5	-0.111165	-0.240749	-0.099133	-0.101123	-0.107864	-0.102	1219
UY6	-0.087774	-0.218240	-0.078974	-0.083026	-0.090056	-0.084	1524
UY7	-0.072790	-0.202552	-0.066585	-0.071266	-0.078337	-0.070	1829

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
 =====

**CALCULATED MODULI (MPa)**

SET	10	4	2	1	5	MIN	AVG	MAX
EY1	5402	4736	7236	4000	5773	4000	5429	7236
EY2	208	245	383	300	391	208	305	391
EY3	228	179	158	200	221	158	197	228
EY4	176	199	169	150	184	150	175	199

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFLECTION (mm)	SENSOR DISTANCE (mm)
UY1	-0.574314	-0.594917	-0.498507	-0.608607	-0.481974	-0.542	0
UY2	-0.362469	-0.374314	-0.344789	-0.385783	-0.313107	-0.392	300
UY3	-0.198138	-0.208417	-0.216474	-0.233594	-0.191922	-0.236	614
UY4	-0.129808	-0.135219	-0.149469	-0.167599	-0.137157	-0.147	914
UY5	-0.098838	-0.099133	-0.111165	-0.133011	-0.107864	-0.102	1219
UY6	-0.081613	-0.078974	-0.087774	-0.112124	-0.090056	-0.084	1524
UY7	-0.070323	-0.066585	-0.072790	-0.098380	-0.078337	-0.070	1829



ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 752 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	5	4	15	2	3	MIN	AVG	MAX
EY1	7884	7516	7962	7789	7500	7500	7730	7962
EY2	3146	5831	3662	5772	5106	3146	4703	5831
EY3	3758	3188	1727	3718	3731	1727	3224	3758
EY4	450	271	489	433	288	271	386	489
EX4	1334	774	1461	892	817	774	1056	1461
EY5	281	293	295	280	291	280	288	295
EX5	621	404	425	193	301	193	389	621
EY6	186	216	202	216	213	186	206	216
EX6	462	520	502	419	469	419	475	520
R4	2.96	2.85	2.99	2.06	2.83	2.06	2.74	2.99
R5	2.21	1.38	1.44	0.69	1.04	0.69	1.35	2.21
R6	2.48	2.41	2.49	1.94	2.21	1.94	2.31	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.161163	-0.161857	-0.156958	-0.161342	-0.166503	-0.118	0
UY2	-0.107245	-0.113453	-0.102724	-0.116069	-0.117495	-0.092	300
UY3	-0.074222	-0.075302	-0.068283	-0.081097	-0.079900	-0.068	614
UY4	-0.054619	-0.051470	-0.048468	-0.058213	-0.055992	-0.049	914
UY5	-0.042245	-0.037014	-0.036066	-0.043386	-0.041108	-0.036	1219
UY6	-0.034098	-0.028185	-0.027928	-0.033762	-0.031802	-0.030	1524
UY7	-0.028596	-0.022684	-0.022461	-0.027505	-0.025913	-0.024	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	10	13	2	11	MIN	AVG	MAX
EY1	7881	7553	5187	7236	5090	5090	6589	7881
EY2	2874	5887	5553	3829	2207	2207	4070	5887
EY3	3399	1838	1288	2164	1696	1288	2077	3399
EY4	260	290	355	423	425	260	351	425
EX4	507	457	846	1108	857	457	785	1108
EY5	275	200	199	221	298	199	239	298
EX5	545	379	132	112	452	112	324	545
EY6	244	228	239	193	238	193	228	244
EX6	607	562	480	277	135	135	412	607
R4	1.95	1.57	2.38	2.62	2.01	1.57	2.11	2.62
R5	1.98	1.89	0.66	0.51	1.52	0.51	1.31	1.98
R6	2.49	2.46	2.01	1.44	0.57	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.163797	-0.182954	-0.197639	-0.209084	-0.209154	-0.118	0
UY2	-0.101776	-0.126660	-0.136027	-0.150471	-0.131194	-0.092	300
UY3	-0.060097	-0.080307	-0.088456	-0.108490	-0.087359	-0.068	614
UY4	-0.036114	-0.051956	-0.059269	-0.081658	-0.063406	-0.049	914
UY5	-0.022152	-0.035121	-0.041390	-0.063933	-0.048788	-0.036	1219
UY6	-0.013799	-0.025146	-0.030465	-0.052120	-0.039184	-0.030	1524
UY7	-0.008634	-0.019207	-0.023847	-0.044279	-0.032607	-0.024	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 752 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	16	13	11	2	MIN	AVG	MAX
EY1	7553	7881	5187	5090	7236	5090	6589	7881
EY2	5887	2874	5553	2207	3829	2207	4070	5887
EY3	1838	3399	1288	1696	2164	1288	2077	3399
EY4	290	260	355	425	423	260	351	425
EX4	457	207	846	857	1108	207	695	1108
EY5	200	275	199	298	221	199	239	298
EX5	379	638	132	452	112	112	343	638
EY6	228	244	239	238	193	193	228	244
EX6	562	607	480	135	277	135	412	607
R4	1.57	0.79	2.38	2.01	2.62	0.79	1.88	2.62
R5	1.89	2.32	0.66	1.52	0.51	0.51	1.38	2.32
R6	2.46	2.49	2.01	0.57	1.44	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.168255	-0.214041	-0.211218	-0.217676	-0.227607	-0.118	0
UY2	-0.122040	-0.148338	-0.154608	-0.165794	-0.169425	-0.092	300
UY3	-0.086883	-0.105152	-0.115384	-0.127968	-0.127069	-0.068	614
UY4	-0.064031	-0.079085	-0.089979	-0.103616	-0.099542	-0.049	914
UY5	-0.049237	-0.063070	-0.073155	-0.087312	-0.081273	-0.036	1219
UY6	-0.025146	-0.013475	-0.030465	-0.039184	-0.052120	-0.030	1524
UY7	-0.019207	-0.008382	-0.023487	-0.032607	-0.044279	-0.024	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1040 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	3	7	6	10	MIN	AVG	MAX
EY1	7775	7666	7730	7915	7893	7666	7796	7915
EY2	5885	5869	5566	5964	3083	3083	5273	5964
EY3	1308	1202	1332	1064	2380	1064	1457	2380
EY4	474	459	406	304	488	304	426	488
EX4	909	774	875	544	658	544	752	909
EY5	281	278	285	294	294	278	286	294
EX5	674	658	682	722	499	499	647	722
EY6	225	220	229	195	226	195	219	229
EX6	440	372	454	323	522	323	422	522
R4	1.92	1.69	2.16	1.79	1.35	1.35	1.78	2.16
R5	2.40	2.37	2.40	2.46	1.70	1.70	2.26	2.46
R6	1.96	1.69	1.98	1.65	2.31	1.65	1.92	2.31

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.226661	-0.239834	-0.229050	-0.244126	-0.231341	-0.177	0
UY2	-0.157911	-0.168566	-0.156631	-0.168000	-0.151992	-0.143	300
UY3	-0.108695	-0.116660	-0.104808	-0.108738	-0.102298	-0.107	614
UY4	-0.080730	-0.087331	-0.075819	-0.075272	-0.074259	-0.078	914
UY5	-0.063916	-0.069868	-0.058789	-0.055971	-0.057301	-0.058	1219
UY6	-0.053220	-0.058814	-0.048176	-0.044119	-0.046519	-0.047	1524
UY7	-0.046160	-0.051507	-0.041263	-0.036392	-0.039439	-0.037	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	10	13	2	11	MIN	AVG	MAX
EY1	7881	7553	5187	7236	5090	5090	6589	7881
EY2	2874	5887	5553	3829	2207	2207	4070	5887
EY3	3399	1838	1288	2164	1696	1288	2077	3399
EY4	260	290	355	423	425	260	351	425
EX4	207	457	846	1108	857	207	695	1108
EY5	275	200	199	221	298	199	239	298
EX5	638	379	132	112	452	112	343	638
EY6	244	228	239	193	238	193	228	244
EX6	607	562	480	277	135	135	412	607
R4	0.79	1.57	2.38	2.62	2.01	0.79	1.88	2.62
R5	2.32	1.89	0.66	0.51	1.52	0.51	1.38	2.32
R6	2.49	2.46	2.01	1.44	0.57	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.233029	-0.250873	-0.271010	-0.286703	-0.286798	-0.177	0
UY2	-0.145125	-0.173681	-0.186525	-0.206330	-0.179898	-0.143	300
UY3	-0.084221	-0.110120	-0.121294	-0.148766	-0.119789	-0.107	614
UY4	-0.049633	-0.071243	-0.081271	-0.111972	-0.086945	-0.078	914
UY5	-0.029984	-0.048160	-0.056755	-0.087667	-0.066899	-0.058	1219
UY6	-0.018500	-0.034481	-0.041774	-0.071468	-0.053731	-0.047	1524
UY7	-0.011510	-0.026337	-0.032700	-0.060717	-0.044712	-0.037	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1040 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	13	11	16	2	MIN	AVG	MAX
EY1	7553	5187	5090	7881	7236	5090	6589	7881
EY2	5887	5553	2207	2874	3829	2207	4070	5887
EY3	1838	1288	1696	3399	2164	1288	2077	3399
EY4	290	355	425	297	423	290	358	425
EX4	457	846	857	236	1108	236	701	1108
EY5	200	199	298	275	221	199	239	298
EX5	379	132	452	638	112	112	343	638
EY6	228	239	238	244	193	193	228	244
EX6	562	480	135	607	277	135	412	607
R4	1.57	2.38	2.01	0.79	2.62	0.79	1.88	2.62
R5	1.89	0.66	1.52	2.32	0.51	0.51	1.38	2.32
R6	2.46	2.01	0.57	2.49	1.44	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.232694	-0.296014	-0.292110	-0.301041	-0.331952	-0.177	0
UY2	-0.168779	-0.205148	-0.213820	-0.229290	-0.232886	-0.143	300
UY3	-0.120157	-0.145422	-0.159573	-0.176977	-0.172568	-0.107	614
UY4	-0.088553	-0.109372	-0.124438	-0.143298	-0.135209	-0.078	914
UY5	-0.068094	-0.087225	-0.101171	-0.120750	-0.110200	-0.058	1219
UY6	-0.034481	-0.041774	-0.053731	-0.01851	-0.071468	-0.047	1524
UY7	-0.026337	-0.032700	-0.044712	-0.011609	-0.060717	-0.037	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1342 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	9	1	8	2	MIN	AVG	MAX
EY1	6791	6791	5739	3595	3730	3595	5329	6791
EY2	5154	5861	4165	5574	5494	4165	5250	5861
EY3	2710	3597	3159	2207	2443	2207	2823	3597
EY4	486	489	370	442	463	370	450	489
EX4	1452	1454	985	1297	1344	985	1306	1454
EY5	291	299	297	299	299	291	297	299
EX5	183	348	313	290	281	183	283	348
EY6	244	221	234	198	180	180	216	244
EX6	173	163	395	340	238	163	262	395
R4	2.99	2.97	2.66	2.94	2.90	2.66	2.89	2.99
R5	0.63	1.16	1.05	0.97	0.94	0.63	0.95	1.16
R6	0.71	0.74	1.69	1.72	1.33	0.71	1.23	1.72

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	UY1	UY2	UY3	UY4	UY5	UY6	UY7	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
	-0.310830	-0.288304	-0.317946	-0.328819	-0.331476	-0.222043	-0.158979	-0.240	0
	-0.222043	-0.208405	-0.218823	-0.220727	-0.228079	-0.118526	-0.091694	-0.189	300
	-0.158979	-0.150390	-0.151068	-0.150073	-0.159090	-0.073552	-0.069882	-0.141	614
	-0.118526	-0.112523	-0.110043	-0.108269	-0.116619	-0.061222	-0.057849	-0.105	914
	-0.091694	-0.087218	-0.084983	-0.082630	-0.089487			-0.077	1219
	-0.073552	-0.069882	-0.069314	-0.066213	-0.071435			-0.063	1524
	-0.061222	-0.057849	-0.059292	-0.055372	-0.059116			-0.050	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	10	13	2	11	MIN	AVG	MAX
EY1	7881	7553	5187	7236	5090	5090	6589	7881
EY2	2874	5887	5553	3829	2207	2207	4070	5887
EY3	3399	1838	1288	2164	1696	1288	2077	3399
EY4	260	290	355	423	425	260	351	425
EX4	207	457	846	1108	857	207	695	1108
EY5	275	200	199	221	298	199	239	298
EX5	638	379	132	112	452	112	343	638
EY6	244	228	239	193	238	193	228	244
EX6	607	562	480	277	135	135	412	607
R4	0.79	1.57	2.38	2.62	2.01	0.79	1.88	2.62
R5	2.32	1.89	0.66	0.51	1.52	0.51	1.38	2.32
R6	2.49	2.46	2.01	1.44	0.57	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	UY1	UY2	UY3	UY4	UY5	UY6	UY7	OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
	-0.305593	-0.327062	-0.353314	-0.373774	-0.373898	-0.189857	-0.109926	-0.240	0
	-0.189857	-0.226427	-0.243171	-0.268992	-0.234532	-0.109926	-0.143563	-0.189	300
	-0.109926	-0.143563	-0.158131	-0.193945	-0.156168	-0.064687	-0.092880	-0.141	614
	-0.064687	-0.092880	-0.105953	-0.145978	-0.113349	-0.039051	-0.062785	-0.105	914
	-0.039051	-0.062785	-0.073991	-0.114291	-0.087216	-0.024089	-0.044953	-0.077	1219
	-0.024089	-0.044953	-0.054460	-0.093173	-0.070049			-0.063	1524
	-0.014985	-0.034336	-0.042630	-0.079157	-0.058291			-0.050	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1342 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	10	13	11	16	2	MIN	AVG	MAX
EY1	7553	5187	5090	7881	7236	5090	6589	7881
EY2	5887	5553	2207	2874	3829	2207	4070	5887
EY3	1838	1288	1696	3399	2164	1288	2077	3399
EY4	290	355	425	325	423	290	364	425
EX4	457	846	857	258	1108	258	705	1108
EY5	200	199	298	275	221	199	239	298
EX5	379	132	452	610	112	112	337	610
EY6	228	239	238	244	193	193	228	244
EX6	562	480	135	607	277	135	412	607
R4	1.57	2.38	2.01	0.79	2.62	0.79	1.88	2.62
R5	1.89	0.66	1.52	2.22	0.51	0.51	1.36	2.22
R6	2.46	2.01	0.57	2.49	1.44	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.300264	-0.322602	-0.381972	-0.394498	-0.376934	-0.240	0
UY2	-0.217790	-0.231924	-0.264720	-0.279713	-0.275910	-0.189	300
UY3	-0.155049	-0.166804	-0.187651	-0.189309	-0.205911	-0.141	614
UY4	-0.114268	-0.122651	-0.141132	-0.129771	-0.160573	-0.105	914
UY5	-0.087868	-0.091742	-0.112554	-0.091775	-0.130550	-0.077	1219
UY6	-0.044953	-0.054460	-0.070049	-0.024277	-0.093173	-0.063	1524
UY7	-0.343360	-0.042630	-0.058291	-0.015297	-0.079157	-0.050	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1525 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	2	6	1	9	MIN	AVG	MAX
EY1	7880	7884	5829	7842	7895	5829	7466	7895
EY2	5317	4707	5419	5263	4822	4707	5106	5419
EY3	3715	3368	3905	3623	3570	3368	3636	3905
EY4	296	346	359	278	270	270	310	359
EX4	793	726	1040	700	722	700	796	1040
EY5	228	203	217	188	216	188	210	228
EX5	552	415	535	446	370	370	464	552
EY6	195	210	227	213	223	195	213	227
EX6	439	498	455	496	527	439	483	527
R4	2.68	2.10	2.90	2.52	2.68	2.10	2.57	2.90
R5	2.42	2.05	2.46	2.38	1.71	1.71	2.20	2.46
R6	2.26	2.37	2.01	2.33	2.36	2.01	2.27	2.37

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.350483	-0.349900	-0.339665	-0.355407	-0.354604	-0.281	0
UY2	-0.252559	-0.248768	-0.239860	-0.256563	-0.253525	-0.215	300
UY3	-0.176822	-0.172168	-0.167824	-0.177279	-0.174020	-0.160	614
UY4	-0.128273	-0.122938	-0.121841	-0.125165	-0.122514	-0.119	914
UY5	-0.097552	-0.091380	-0.092566	-0.091765	-0.089942	-0.088	1219
UY6	-0.077997	-0.071127	-0.073805	-0.070572	-0.069483	-0.071	1524
UY7	-0.065449	-0.058171	-0.061760	-0.057253	-0.056686	-0.057	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	10	13	2	11	MIN	AVG	MAX
EY1	7881	7553	5187	7236	5090	5090	6589	7881
EY2	2874	5887	5553	3829	2207	2207	4070	5887
EY3	3399	1838	1288	2164	1696	1288	1077	3399
EY4	260	290	355	423	425	260	351	425
EX4	207	457	846	1108	857	207	695	1108
EY5	275	200	199	221	298	199	239	298
EX5	638	379	132	112	452	112	343	638
EY6	244	228	239	193	238	193	228	244
EX6	607	562	480	277	135	135	412	607
R4	0.79	1.57	2.38	2.62	2.01	0.79	1.88	2.62
R5	2.32	1.89	0.66	0.51	1.52	0.51	1.38	2.32
R6	2.49	2.46	2.01	1.44	0.57	0.57	1.79	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.346368	-0.370525	-0.399033	-0.423155	-0.423254	-0.281	0
UY2	-0.215420	-0.256579	-0.274662	-0.304545	-0.265546	-0.215	300
UY3	-0.125089	-0.162839	-0.179051	-0.219732	-0.177062	-0.160	614
UY4	-0.073838	-0.105477	-0.120358	-0.165513	-0.128654	-0.119	914
UY5	-0.044682	-0.071367	-0.084273	-0.129656	-0.099035	-0.088	1219
UY6	-0.027604	-0.051117	-0.062119	-0.105728	-0.079542	-0.071	1524
UY7	-0.017191	-0.039038	-0.048635	-0.089829	-0.066178	-0.057	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R: LOAD 1525 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	9	12	10	16	15	MIN	AVG	MAX
EY1	7553	5187	5090	7901	7881	5090	6722	7901
EY2	5887	5553	2207	3072	2874	2207	3919	5887
EY3	1838	1288	1696	3393	3399	1288	2323	3399
EY4	290	355	425	261	337	261	334	425
EX4	457	846	857	704	268	268	626	857
EY5	200	199	298	279	275	199	250	298
EX5	379	132	452	653	592	132	442	653
EY6	228	239	238	195	244	195	229	244
EX6	562	480	135	485	607	135	454	607
R4	1.57	2.38	2.01	2.70	0.79	0.79	1.89	2.70
R5	1.89	0.66	1.52	2.34	2.15	0.66	1.71	2.34
R6	2.46	2.01	0.57	2.49	2.49	0.57	2.00	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.353223	-0.356907	-0.392230	-0.394638	-0.422632	-0.281	0
UY2	-0.258372	-0.267868	-0.269522	-0.275387	-0.303105	-0.215	300
UY3	-0.183126	-0.197173	-0.176998	-0.193691	-0.221528	-0.160	614
UY4	-0.132591	-0.149340	-0.121826	-0.140520	-0.170252	-0.119	914
UY5	-0.100318	-0.118095	-0.088710	-0.104986	-0.136296	-0.088	1219
UY6	-0.079933	-0.097867	-0.068450	-0.081090	-0.113449	-0.071	1524
UY7	-0.066982	-0.084757	-0.055731	-0.065067	-0.098054	-0.057	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 100 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF THE BASI LOAD 1: 752 kPa

LOAD 2: 1040 kPa

LOAD 3: 1342 kPa

LOAD 4: 1525 kPa

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 752 kPa					AVG. RATIO p/po	LOAD 2: 1040 kPa					AVG. RATIO p/po	LOAD 3: 1342 kPa					AVG. RATIO p/po	LOAD 4: 1525 kPa					AVG. RATIO p/po				
		5	4	15	2	3		13	3	7	6	10		16	9	1	8	2		10	2	6	1	9					
24	0.16	-0.699	-0.704	-0.697	-0.705	-0.704	-0.702	0.933	-0.960	-0.959	-0.958	-0.956	-0.954	-0.957	0.921	-1.260	-1.265	-1.263	-1.276	-1.276	-1.268	0.945	-1.424	-1.421	-1.437	-1.423	-1.422	-1.425	0.935
71	0.47	-0.627	-0.640	-0.618	-0.642	-0.639	-0.633	0.842	-0.858	-0.855	-0.852	-0.844	-0.843	-0.850	0.818	-1.152	-1.167	-1.159	-1.207	-1.207	-1.178	0.878	-1.289	-1.279	-1.334	-1.286	-1.281	-1.294	0.848
120	0.80	-0.503	-0.497	-0.480	-0.504	-0.501	-0.497	0.661	-0.648	-0.641	-0.642	-0.619	-0.657	-0.641	0.617	-0.912	-0.932	-0.924	-0.978	-0.979	-0.945	0.704	-1.008	-0.996	-1.070	-1.000	-0.995	-1.014	0.665
170	1.13	-0.352	-0.309	-0.316	-0.321	-0.320	-0.324	0.431	-0.390	-0.382	-0.387	-0.353	-0.440	-0.390	0.375	-0.594	-0.610	-0.611	-0.634	-0.638	-0.617	0.460	-0.643	-0.638	-0.698	-0.629	-0.631	-0.648	0.425
214	1.43	-0.239	-0.184	-0.211	-0.196	-0.194	-0.205	0.272	-0.245	-0.238	-0.243	-0.211	-0.290	-0.246	0.236	-0.381	-0.388	-0.389	-0.409	-0.410	-0.395	0.295	-0.390	-0.391	-0.432	-0.375	-0.379	-0.393	0.258
252	1.68	-0.161	-0.118	-0.156	-0.126	-0.121	-0.137	0.182	-0.189	-0.185	-0.186	-0.162	-0.204	-0.185	0.178	-0.266	-0.265	-0.257	-0.297	-0.292	-0.275	0.205	-0.246	-0.251	-0.274	-0.233	-0.235	-0.248	0.162
340	2.27	-0.087	-0.062	-0.083	-0.061	-0.060	-0.071	0.094	-0.105	-0.105	-0.105	-0.095	-0.104	-0.103	0.099	-0.135	-0.142	-0.132	-0.165	-0.158	-0.146	0.109	-0.129	-0.126	-0.136	-0.119	-0.116	-0.125	0.082
480	3.20	-0.038	-0.034	-0.034	-0.025	-0.030	-0.032	0.043	-0.054	-0.053	-0.054	-0.064	-0.047	-0.055	0.052	-0.045	-0.056	-0.058	-0.062	-0.059	-0.056	0.042	-0.092	-0.077	-0.095	-0.085	-0.066	-0.083	0.054
692	4.61	-0.024	-0.022	-0.022	-0.017	-0.020	-0.021	0.028	-0.036	-0.035	-0.036	-0.044	-0.031	-0.036	0.035	-0.028	-0.033	-0.037	-0.037	-0.035	-0.034	0.025	-0.065	-0.056	-0.068	-0.063	-0.047	-0.060	0.039
875	5.83	-0.011	-0.012	-0.011	-0.010	-0.011	-0.011	0.014	-0.013	-0.012	-0.013	-0.013	-0.014	-0.013	0.012	-0.010	-0.010	-0.016	-0.016	-0.013	-0.013	0.010	-0.022	-0.024	-0.022	-0.024	-0.023	-0.023	0.015
1159	7.73	-0.006	-0.006	-0.006	-0.005	-0.006	-0.006	0.008	-0.006	-0.005	-0.006	-0.006	-0.007	-0.006	0.006	-0.004	-0.004	-0.008	-0.008	-0.006	-0.006	0.005	-0.011	-0.012	-0.010	-0.012	-0.012	-0.011	0.007

MAXIMUM DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 752 kPa					AVG. RATIO p/po	LOAD 2: 1040 kPa					AVG. RATIO p/po	LOAD 3: 1342 kPa					AVG. RATIO p/po	LOAD 4: 1525 kPa					AVG. RATIO p/po				
		16	10	13	2	11		16	10	13	2	11		16	10	13	2	11		16	10	13	2	11					
24	0.16	-0.699	-0.699	-0.701	-0.702	-0.701	-0.700	0.459	-0.951	-0.959	-0.968	-0.959	-0.959	-0.959	0.922	-1.239	-1.250	-1.261	-1.250	-1.250	-1.250	0.932	-1.420	-1.425	-1.427	-1.418	-1.414	-1.421	0.932
71	0.47	-0.625	-0.623	-0.631	-0.635	-0.632	-0.629	0.413	-0.832	-0.854	-0.883	-0.856	-0.860	-0.857	0.824	-1.084	-1.114	-1.152	-1.116	-1.121	-1.117	0.833	-1.276	-1.292	-1.302	-1.268	-1.258	-1.279	0.839
120	0.80	-0.485	-0.482	-0.486	-0.501	-0.494	-0.490	0.321	-0.640	-0.640	-0.675	-0.666	-0.683	-0.661	0.635	-0.835	-0.834	-0.881	-0.869	-0.890	-0.862	0.642	-0.977	-0.997	-1.039	-0.986	-0.977	-0.995	0.653
170	1.13	-0.312	-0.307	-0.305	-0.332	-0.319	-0.315	0.207	-0.417	-0.373	-0.402	-0.435	-0.470	-0.419	0.403	-0.545	-0.487	-0.524	-0.567	-0.613	-0.547	0.408	-0.597	-0.616	-0.697	-0.638	-0.633	-0.636	0.417
214	1.43	-0.198	-0.185	-0.194	-0.215	-0.199	-0.198	0.130	-0.253	-0.217	-0.243	-0.281	-0.322	-0.263	0.253	-0.331	-0.283	-0.317	-0.366	-0.420	-0.343	0.256	-0.355	-0.375	-0.454	-0.392	-0.388	-0.393	0.258
252	1.68	-0.137	-0.117	-0.143	-0.148	-0.132	-0.135	0.089	-0.156	-0.153	-0.179	-0.195	-0.233	-0.183	0.176	-0.205	-0.209	-0.233	-0.255	-0.303	-0.239	0.178	-0.236	-0.258	-0.309	-0.244	-0.244	-0.258	0.169
340	2.27	-0.075	-0.064	-0.075	-0.075	-0.065	-0.071	0.046	-0.088	-0.088	-0.092	-0.096	-0.122	-0.097	0.093	-0.116	-0.114	-0.120	-0.125	-0.159	-0.127	0.094	-0.129	-0.131	-0.159	-0.126	-0.128	-0.135	0.088
480	3.20	-0.038	-0.036	-0.030	-0.033	-0.026	-0.033	0.021	-0.051	-0.052	-0.036	-0.031	-0.055	-0.045	0.043	-0.067	-0.068	-0.047	-0.041	-0.071	-0.059	0.044	-0.084	-0.065	-0.088	-0.091	-0.070	-0.080	0.052
692	4.61	-0.026	-0.024	-0.020	-0.020	-0.018	-0.021	0.014	-0.034	-0.038	-0.025	-0.021	-0.032	-0.030	0.029	-0.045	-0.049	-0.032	-0.028	-0.042	-0.039	0.029	-0.060	-0.046	-0.058	-0.065	-0.047	-0.055	0.036
875	5.83	-0.012	-0.013	-0.011	-0.008	-0.009	-0.011	0.007	-0.020	-0.019	-0.016	-0.011	-0.008	-0.015	0.014	-0.027	-0.024	-0.021	-0.015	-0.010	-0.019	0.014	-0.025	-0.024	-0.017	-0.027	-0.026	-0.024	0.015
1159	7.73	-0.006	-0.007	-0.006	-0.004	-0.005	-0.006	0.004	-0.011	-0.009	-0.009	-0.006	-0.003	-0.007	0.007	-0.014	-0.012	-0.011	-0.007	-0.003	-0.010	0.007	-0.012	-0.012	-0.007	-0.014	-0.014	-0.012	0.008

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	LOAD 1: 752 kPa					AVG. RATIO p/po	LOAD 2: 1040 kPa					AVG. RATIO p/po	LOAD 3: 1342 kPa					AVG. RATIO p/po	LOAD 4: 1525 kPa					AVG. RATIO p/po				
		10	16	13	11	2		10	13	11	16	2		10	13	11	16	2		10	13	11	16	15					
24	0.16	-0.699	-0.693	-0.706	-0.699	-0.699	-0.699	0.930	-0.959	-0.968	-0.959	-0.951	-0.959	-0.959	0.922	-1.250	-1.261	-1.250	-1.241	-1.250	-1.250	0.932	-1.417	-1.430	-1.417	-1.412	-1.406	-1.416	0.929
71	0.47	-0.623	-0.607	-0.644	-0.627	-0.624	-0.625	0.831	-0.854	-0.883	-0.860	-0.834	-0.856	-0.857	0.824	-1.114	-1.152	-1.121	-1.089	-1.116	-1.118	0.833	-1.263	-1.305	-1.270	-1.249	-1.235	-1.264	0.829
120	0.80	-0.467	-0.467	-0.493	-0.498	-0.486	-0.482	0.641	-0.640	-0.675	-0.683	-0.645	-0.666	-0.662	0.636	-0.834	-0.881	-0.890	-0.844	-0.869	-0.864	0.643	-0.945	-0.998	-1.009	-0.973	-0.958	-0.977	0.640
170	1.13	-0.272	-0.305	-0.293	-0.343	-0.317	-0.306	0.407	-0.373	-0.402	-0.470	-0.424	-0.435	-0.421	0.405	-0.487	-0.524	-0.613	-0.558	-0.567	-0.550	0.410	-0.551	-0.594	-0.695	-0.647	-0.635	-0.624	0.409
214	1.43	-0.158	-0.185	-0.177	-0.235	-0.205	-0.192	0.255	-0.217	-0.243	-0.322	-0.261	-0.281	-0.265	0.255	-0.283	-0.317	-0.420	-0.347	-0.366	-0.347	0.258	-0.321	-0.359	-0.476	-0.410	-0.396	-0.392	0.257
252	1.68	-0.112	-0.115	-0.131	-0.170	-0.143	-0.134	0.178	-0.153	-0.179	-0.233	-0.164	-0.195	-0.185	0.178	-0.200	-0.233	-0.303	-0.221	-0.255	-0.242	0.181	-0.226	-0.265	-0.344	-0.256	-0.253	-0.269	0.176
340	2.27	-0.064	-0.065	-0.067	-0.089	-0.070	-0.071	0.094	-0.088	-0.092	-0.122	-0.092	-0.096	-0.098	0.094	-0.114	-0.120	-0.159	-0.122	-0.125	-0.128	0.095	-0.129	-0.136	-0.181	-0.133	-0.140	-0.144	0.094
480	3.20	-0.038	-0.038	-0.026	-0.040	-0.023	-0.033	0.044	-0.052	-0.036	-0.055	-0.051	-0.031	-0.045	0.043	-0.068	-0.047	-0.071	-0.066	-0.041	-0.059	0.044	-0.077	-0.053	-0.081	-0.097	-0.074	-0.077	0.050
692	4.61	-0.028	-0.025	-0.018	-0.024	-0.015	-0.022	0.029	-0.038	-0.025	-0.032	-0.034	-0.021	-0.030	0.029	-0.049	-0.032	-0.042	-0.043	-0.028	-0.039	0.029	-0.056	-0.037	-0.048	-0.067	-0.048	-0.051	0.034
875	5.83	-0.014	-0.015	-0.012	-0.006	-0.008	-0.011	0.014	-0.019	-0.016	-0.008	-0.020	-0.011	-0.015	0.014	-0.024	-0.021	-0.010	-0.026	-0.015	-0.019	0.014	-0.027	-0.024	-0.011	-0.029	-0.029	-0.024	0.016
1159	7.73	-0.007	-0.008	-0.006	-0.002	-0.004	-0.005	0.007	-0.009	-0.009	-0.003	-0.011	-0.006	-0.007	0.007	-0.012	-0.011	-0.003	-0.014	-0.007	-0.010	0.007	-0.014	-0.013	-0.004	-0.015	-0.016	-0.012	0.008

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 699 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	15	13	3	8	9	MIN	AVG	MAX
EY1	7494	6251	6476	7442	7764	6251	7085	7764
EY2	3170	4137	2280	2384	2474	2280	2889	4137
EY3	2242	2252	2042	2265	3565	2042	2473	3565
EY4	439	419	278	352	477	278	393	477
EX4	1041	1046	578	247	1381	247	859	1381
EY5	191	220	287	156	285	156	228	287
EX5	189	176	578	310	144	144	179	578
EY6	202	248	213	238	239	202	228	248
EX6	240	508	357	172	540	172	363	540
R4	2.37	2.50	2.08	0.70	2.89	0.70	2.11	2.89
R5	0.78	0.99	0.80	2.01	1.99	0.78	1.31	2.01
R6	1.66	1.19	2.04	1.68	0.72	0.72	1.46	2.04

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.191613	-0.194770	-0.212407	-0.206784	-0.194585	-0.174	0
UY2	-0.133570	-0.138751	-0.138531	-0.136924	-0.136419	-0.142	300
UY3	-0.093773	-0.098096	-0.089102	-0.092254	-0.099660	-0.099	610
UY4	-0.069097	-0.072003	-0.060668	-0.068665	-0.075988	-0.065	914
UY5	-0.053076	-0.054705	-0.043990	-0.055458	-0.059669	-0.047	1219
UY6	-0.043090	-0.034172	-0.047530	-0.048225	-0.050020	-0.036	1524
UY7	-0.035313	-0.028394	-0.042463	-0.040249	-0.044685	-0.029	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	15	7	14	8	MIN	AVG	MAX
EY1	7897	7962	6525	7442	5959	5959	7157	7962
EY2	5670	5910	4011	2384	2659	2384	4127	5910
EY3	1103	3317	3080	2265	3940	1103	2741	3940
EY4	483	318	475	352	434	318	412	483
EX4	1043	879	1055	247	450	247	735	1055
EY5	280	294	146	287	280	146	258	294
EX5	363	644	213	578	528	213	465	644
EY6	227	245	204	213	190	190	216	245
EX6	528	227	450	357	287	227	370	528
R4	2.16	2.77	2.22	0.70	1.04	0.70	1.78	2.77
R5	1.29	2.19	1.45	2.01	1.89	1.29	1.77	2.19
R6	2.32	0.93	2.21	1.68	1.51	0.93	1.73	2.32

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.177991	-0.153621	-0.202240	-0.206784	-0.209259	-0.174	0
UY2	-0.130241	-0.110938	-0.147791	-0.136924	-0.147781	-0.142	300
UY3	-0.095337	-0.078007	-0.109380	-0.092254	-0.109986	-0.099	610
UY4	-0.075358	-0.057412	-0.083981	-0.068665	-0.088011	-0.065	914
UY5	-0.063201	-0.044492	-0.066643	-0.055458	-0.074564	-0.047	1219
UY6	-0.055439	-0.036172	-0.054788	-0.047530	-0.065929	-0.036	1524
UY7	-0.050353	-0.030678	-0.046810	-0.042463	-0.060175	-0.029	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 699 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	13	14	12	10	MIN	AVG	MAX
EY1	4158	6335	6246	7107	7442	4158	6258	7442
EY2	3429	2366	2277	3366	2384	2277	2765	3429
EY3	2347	2264	2246	2144	2265	2144	2253	2347
EY4	497	485	490	438	352	352	452	497
EX4	1481	1437	1456	1209	247	247	1166	1481
EY5	216	212	197	233	287	197	229	287
EX5	509	439	371	255	578	255	430	578
EY6	221	162	157	176	213	157	186	221
EX6	134	368	367	245	357	134	294	368
R4	2.98	2.96	2.97	2.76	0.70	0.70	2.48	2.98
R5	2.36	2.08	1.88	1.10	2.01	1.10	1.89	2.36
R6	0.61	2.27	2.33	1.40	1.68	0.61	1.66	2.33

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.187274	-0.187940	-0.184385	-0.196215	-0.206784	-0.174	0
UY2	-0.125509	-0.123501	-0.119067	-0.139154	-0.136924	-0.142	300
UY3	-0.089248	-0.086770	-0.081622	-0.101166	-0.092254	-0.099	610
UY4	-0.067225	-0.065134	-0.059219	-0.077854	-0.068665	-0.065	914
UY5	-0.052596	-0.050932	-0.044315	-0.062502	-0.055458	-0.047	1219
UY6	-0.042487	-0.041235	-0.034039	-0.052051	-0.047530	-0.036	1524
UY7	-0.035430	-0.034550	-0.026910	-0.044865	-0.042463	-0.029	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 982 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	8	1	12	16	MIN	AVG	MAX
EY1	7910	5349	7685	4709	6315	4709	6394	7910
EY2	5065	3839	2591	5515	3380	2591	4078	5515
EY3	3812	3982	3981	3979	3981	3812	3947	3982
EY4	256	269	270	269	448	256	302	448
EX4	693	461	533	802	1178	461	733	1178
EY5	191	214	167	268	178	167	204	268
EX5	107	147	118	136	91	91	120	147
EY6	227	192	144	248	248	144	212	248
EX6	566	251	356	520	317	251	402	566
R4	2.71	1.71	1.98	2.98	2.63	1.71	2.40	2.98
R5	0.56	0.69	0.71	0.51	0.51	0.51	0.59	0.71
R6	2.49	1.31	2.47	2.09	1.28	1.28	1.93	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.269860	-0.298288	-0.305585	-0.262742	-0.285450	0
UY2	-0.200923	-0.213346	-0.215870	-0.188347	-0.208286	300
UY3	-0.142358	-0.147433	-0.148973	-0.130505	-0.154682	610
UY4	-0.102508	-0.104133	-0.104294	-0.093498	-0.119184	914
UY5	-0.076681	-0.076610	-0.074436	-0.070999	-0.095546	1219
UY6	-0.060530	-0.059324	-0.054662	-0.057595	-0.080054	1524
UY7	-0.050765	-0.048511	-0.041743	-0.049673	-0.070159	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	12	11	16	13	14	MIN	AVG	MAX
EY1	6381	6443	6868	5940	5708	5708	6268	6868
EY2	2360	2453	2270	2272	2258	2258	2323	2453
EY3	1565	1328	1767	2138	1905	1328	1741	2138
EY4	465	449	455	495	439	439	461	495
EX4	1368	1313	1346	1476	1299	1299	1360	1476
EY5	279	274	254	293	283	254	277	293
EX5	587	571	500	641	615	500	583	641
EY6	190	193	172	145	200	145	180	200
EX6	154	157	129	118	270	118	166	270
R4	2.94	2.93	2.96	2.98	2.96	2.93	2.95	2.98
R5	2.11	2.09	1.97	2.19	2.17	1.97	2.10	2.19
R6	0.81	0.81	0.75	0.81	1.35	0.75	0.91	1.35

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.265029	-0.266303	-0.267544	-0.270897	-0.250776	0
UY2	-0.170177	-0.171494	-0.173941	-0.177758	-0.153075	300
UY3	-0.116681	-0.116428	-0.119469	-0.126959	-0.099686	610
UY4	-0.087468	-0.086526	-0.088430	-0.098171	-0.070989	914
UY5	-0.069047	-0.067833	-0.068249	-0.079331	-0.053511	1219
UY6	-0.056531	-0.055218	-0.054258	-0.066051	-0.042084	1524
UY7	-0.047731	-0.046393	-0.044297	-0.056383	-0.034325	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 982 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	13	15	7	14	3	MIN	AVG	MAX
EY1	7685	7899	6525	7442	6476	6476	7205	7899
EY2	2591	2157	4011	2384	2280	2157	2685	4011
EY3	3981	3991	3080	2265	2042	2042	3072	3991
EY4	270	433	475	352	278	270	361	475
EX4	533	1177	1055	247	578	247	718	1177
EY5	167	141	146	287	220	141	192	287
EX5	118	287	213	578	176	118	274	578
EY6	144	228	204	213	248	144	207	248
EX6	356	219	450	357	508	219	378	508
R4	1.98	2.72	2.22	0.70	2.08	0.70	1.94	2.72
R5	0.71	2.04	1.45	2.01	0.80	0.71	1.40	2.04
R6	2.47	0.96	2.21	1.68	2.04	0.96	1.87	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.305585	-0.292428	-0.284120	-0.290503	-0.298403	-0.164	0
UY2	-0.215870	-0.204741	-0.207626	-0.192360	-0.194618	-0.216	300
UY3	-0.148973	-0.149505	-0.153664	-0.129604	-0.125176	-0.151	610
UY4	-0.104294	-0.113932	-0.117982	-0.096465	-0.085230	-0.102	914
UY5	-0.074436	-0.089528	-0.093624	-0.077911	-0.061800	-0.073	1219
UY6	-0.054662	-0.072583	-0.076970	-0.066774	-0.048006	-0.057	1524
UY7	-0.041743	-0.060927	-0.065762	-0.059655	-0.039890	-0.045	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 1297 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	10	14	9	13	3	MIN	AVG	MAX
EY1	7764	5355	7442	4273	6476	4273	6262	7764
EY2	2474	2162	2384	2244	2280	2162	2309	2474
EY3	3565	2127	2265	1159	2042	1159	2231	3565
EY4	477	423	352	476	278	278	401	477
EX4	1381	1240	247	1388	578	247	967	1388
EY5	156	279	287	274	220	156	243	287
EX5	310	141	578	139	176	139	269	578
EY6	238	216	213	205	248	205	224	248
EX6	172	131	357	130	508	130	260	508
R4	2.89	2.93	0.70	2.92	2.08	0.70	2.30	2.93
R5	1.99	0.50	2.01	0.50	0.80	0.50	1.16	2.01
R6	0.72	0.60	1.68	0.64	2.04	0.60	1.14	2.04

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.361054	-0.387393	-0.383689	-0.422346	-0.394123	-0.345	0
UY2	-0.253126	-0.251729	-0.254064	-0.270414	-0.257046	-0.281	300
UY3	-0.18492	-0.171943	-0.171178	-0.185537	-0.165329	-0.199	610
UY4	-0.140996	-0.124489	-0.127409	-0.137444	-0.112569	-0.134	914
UY5	-0.110716	-0.0937099	-0.102903	-0.106445	-0.0816233	-0.095	1219
UY6	-0.0894826	-0.0730375	-0.088193	-0.0855073	-0.0634054	-0.076	1524
UY7	-0.0746824	-0.0589988	-0.0787905	-0.0711741	-0.0526858	-0.060	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	10	12	11	7	MIN	AVG	MAX
EY1	5327	7764	6270	6688	6525	5327	6515	7764
EY2	2316	5438	2465	2494	4011	2316	3345	5438
EY3	1862	1948	1682	1405	3080	1405	1995	3080
EY4	492	477	489	487	475	475	484	492
EX4	1445	1381	1438	1424	1055	1055	1349	1445
EY5	272	161	280	274	146	146	227	280
EX5	608	319	591	571	213	213	460	608
EY6	222	171	213	239	204	171	210	239
EX6	247	124	173	194	450	124	238	450
R4	2.94	2.89	2.94	2.93	2.22	2.22	2.78	2.94
R5	2.24	1.99	2.11	2.09	1.45	1.45	1.97	2.24
R6	1.11	0.72	0.81	0.81	2.21	0.72	1.13	2.21

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.340950	-0.352396	-0.334328	-0.323065	-0.375258	-0.345	0
UY2	-0.213857	-0.262860	-0.212670	-0.203714	-0.274227	-0.281	300
UY3	-0.146265	-0.194824	-0.144832	-0.135229	-0.202955	-0.199	610
UY4	-0.109562	-0.149479	-0.107740	-0.098116	-0.155828	-0.134	914
UY5	-0.086769	-0.117498	-0.084393	-0.075053	-0.123656	-0.095	1219
UY6	-0.071652	-0.094425	-0.068629	-0.059715	-0.101659	-0.076	1524
UY7	-0.061326	-0.077813	-0.057650	-0.049209	-0.086857	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 1297 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	15	13	14	7	10	MIN	AVG	MAX
EY1	7899	7685	7442	6525	7897	6525	7489	7899
EY2	2157	2591	2384	4011	5670	2157	3363	5670
EY3	3991	3981	2265	3080	1103	1103	2884	3991
EY4	433	270	352	475	483	270	402	483
EX4	1177	533	247	1055	1043	247	811	1177
EY5	141	167	287	146	280	141	204	287
EX5	287	118	578	213	363	118	312	578
EY6	228	144	213	204	227	144	203	228
EX6	219	356	357	450	528	219	382	528
R4	2.72	1.98	0.70	2.22	2.16	0.70	1.96	2.72
R5	2.04	0.71	2.01	1.45	1.29	0.71	1.50	2.04
R6	0.96	2.47	1.68	2.21	2.32	0.96	1.93	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.386232	-0.403608	-0.383689	-0.375258	-0.330263	-0.345	0
UY2	-0.270417	-0.285115	-0.254064	-0.274227	-0.241664	-0.281	300
UY3	-0.197463	-0.196760	-0.171178	-0.202955	-0.176898	-0.199	610
UY4	-0.150478	-0.137749	-0.127409	-0.155828	-0.139827	-0.134	914
UY5	-0.118247	-0.098313	-0.102903	-0.123656	-0.117270	-0.095	1219
UY6	-0.095866	-0.072196	-0.088193	-0.101659	-0.102867	-0.076	1524
UY7	-0.080471	-0.055133	-0.078791	-0.086857	-0.093431	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 1472 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	1	3	6	5	MIN	AVG	MAX
EY1	6520	7685	7903	7620	7595	6520	7465	7903
EY2	2146	2591	2139	2039	3551	2039	2493	3551
EY3	3400	3981	3991	3872	3840	3400	3817	3991
EY4	256	270	340	252	252	252	274	340
EX4	700	533	673	243	741	243	578	741
EY5	268	167	268	293	293	167	258	293
EX5	310	118	297	642	626	118	399	642
EY6	130	144	184	106	107	106	134	184
EX6	323	356	459	265	180	180	317	459
R4	2.73	1.98	1.98	0.96	2.94	0.96	2.12	2.94
R5	1.15	0.71	1.11	2.19	2.14	0.71	1.46	2.19
R6	2.49	2.47	2.49	2.49	1.68	1.68	2.33	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.440257	-0.458066	-0.417104	-0.463247	-0.416170	-0.392	0
UY2	-0.293728	-0.323585	-0.283631	-0.316474	-0.306086	-0.321	300
UY3	-0.199911	-0.223308	-0.201534	-0.221842	-0.226005	-0.224	610
UY4	-0.144072	-0.156335	-0.153300	-0.167385	-0.175578	-0.152	914
UY5	-0.109258	-0.111578	-0.123242	-0.134154	-0.143144	-0.109	1219
UY6	-0.086710	-0.081937	-0.103939	-0.112609	-0.121398	-0.086	1524
UY7	-0.071652	-0.062572	-0.091315	-0.097897	-0.106241	-0.069	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	16	13	15	7	MIN	AVG	MAX
EY1	7764	5289	5735	4117	6525	4117	5886	7764
EY2	5438	2379	2473	2126	4011	2126	3286	5438
EY3	1940	2021	2090	2042	3080	1940	2235	3080
EY4	477	491	496	497	475	475	487	497
EX4	1381	1403	1480	1444	1055	1055	1353	1480
EY5	162	286	295	239	146	146	226	295
EX5	322	539	555	503	213	213	426	555
EY6	182	232	170	245	204	170	206	245
EX6	131	502	404	509	450	131	399	509
R4	2.89	2.86	2.98	2.91	2.22	2.22	2.77	2.98
R5	1.99	1.88	1.89	2.10	1.45	1.45	1.86	2.10
R6	0.72	2.17	2.38	2.08	2.21	0.72	1.91	2.38

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.392675	-0.393171	-0.381400	-0.412941	-0.425890	-0.392	0
UY2	-0.291063	-0.249414	-0.245340	-0.254135	-0.311228	-0.321	300
UY3	-0.214051	-0.173193	-0.171287	-0.173495	-0.230339	-0.224	610
UY4	-0.163001	-0.132594	-0.130843	-0.129832	-0.176853	-0.152	914
UY5	-0.127225	-0.108359	-0.105869	-0.103428	-0.140340	-0.109	1219
UY6	-0.101589	-0.093026	-0.089338	-0.086665	-0.115376	-0.086	1524
UY7	-0.083260	-0.083037	-0.077997	-0.075814	-0.098576	-0.069	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 200 L: LOAD 1472 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	14	6	8	10	MIN	AVG	MAX
EY1	5254	7551	5987	7657	7315	5254	6753	7657
EY2	4749	2039	2860	5534	2037	2037	3444	5534
EY3	1059	1908	3081	3548	1048	1048	2129	3548
EY4	448	352	377	416	467	352	412	467
EX4	497	361	693	1219	461	361	646	1219
EY5	290	248	201	197	250	197	237	290
EX5	509	602	327	209	607	209	451	607
EY6	177	235	192	237	228	177	214	237
EX6	177	235	192	237	228	177	214	237
R4	1.11	1.03	1.84	2.93	0.99	0.99	1.58	2.93
R5	1.76	2.43	1.63	1.06	2.43	1.06	1.86	2.43
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.432492	-0.443941	-0.450580	-0.400546	-0.442400	-0.392	0
UY2	-0.302599	-0.290223	-0.316201	-0.304449	-0.277664	-0.321	300
UY3	-0.212607	-0.194143	-0.227169	-0.231099	-0.183038	-0.224	610
UY4	-0.162987	-0.143063	-0.172409	-0.182175	-0.136068	-0.152	914
UY5	-0.133212	-0.113659	-0.137184	-0.149206	-0.108610	-0.109	1219
UY6	-0.113786	-0.095553	-0.113842	-0.126980	-0.090956	-0.086	1524
UY7	-0.100426	-0.083827	-0.098132	-0.112169	-0.079028	-0.069	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 730 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	9	6	5	10	4	MIN	AVG	MAX
EY1	7590	7503	6049	6727	6432	6049	6860	7590
EY2	5902	5850	5442	5933	5675	5442	5761	5933
EY3	3525	3427	1480	3647	2597	1480	2935	3647
EY4	469	486	444	404	383	383	437	486
EX4	1396	1447	1290	1204	990	990	1265	1447
EY5	220	251	292	225	265	220	251	292
EX5	524	615	666	544	466	466	563	666
EY6	129	134	221	123	227	123	167	227
EX6	322	335	549	306	557	306	414	557
R4	2.98	2.97	2.91	2.98	2.59	2.59	2.88	2.98
R5	2.38	2.44	2.28	2.41	1.76	1.76	2.25	2.44
R6	2.49	2.49	2.49	2.49	2.46	2.46	2.49	2.49

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.132719	-0.129104	-0.144433	-0.139388	-0.141844	-0.135	0
UY2	-0.092920	-0.089288	-0.095389	-0.096892	-0.096610	-0.109	300
UY3	-0.064431	-0.061623	-0.063112	-0.066425	-0.064647	-0.080	614
UY4	-0.045135	-0.043358	-0.044398	-0.045850	-0.044439	-0.057	914
UY5	-0.031716	-0.030890	-0.033005	-0.031777	-0.031574	-0.040	1219
UY6	-0.022185	-0.022142	-0.025718	-0.021964	-0.023235	-0.031	1524
UY7	-0.015372	-0.015933	-0.020905	-0.015055	-0.017761	-0.024	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	15	16	9	12	10	MIN	AVG	MAX
EY1	7881	7714	7553	5187	5090	5090	6685	7881
EY2	2976	5152	5887	5553	2207	2207	4355	5887
EY3	3399	2223	1838	1288	1696	1288	2089	3399
EY4	369	291	290	355	425	290	346	425
EX4	293	607	457	846	857	293	612	857
EY5	275	235	200	199	298	199	241	298
EX5	389	479	379	132	452	132	366	479
EY6	244	220	228	239	238	220	234	244
EX6	600	545	562	480	135	135	465	600
R4	0.79	2.08	1.57	2.38	2.01	0.79	1.77	2.38
R5	1.42	2.03	1.89	0.66	1.52	0.66	1.50	2.03
R6	2.46	2.47	2.46	2.01	0.57	0.57	2.00	2.47

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.150696	-0.153111	-0.170845	-0.186737	-0.193236	-0.135	0
UY2	-0.097592	-0.106450	-0.121520	-0.130918	-0.124182	-0.109	300
UY3	-0.060833	-0.069990	-0.081135	-0.089290	-0.084703	-0.080	614
UY4	-0.038625	-0.046535	-0.054870	-0.062475	-0.062772	-0.057	914
UY5	-0.024923	-0.031677	-0.038217	-0.045074	-0.049111	-0.040	1219
UY6	-0.016321	-0.022252	-0.027731	-0.033740	-0.040016	-0.031	1524
UY7	-0.010836	-0.016260	-0.021168	-0.026435	-0.033742	-0.024	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 730 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	15	16	9	12	10	MIN	AVG	MAX
EY1	7881	7714	7553	5187	5090	5090	6685	7881
EY2	3267	5152	5887	5553	2207	2207	4413	5887
EY3	3399	2223	1838	1288	1696	1288	2089	3399
EY4	447	281	290	355	425	281	360	447
EX4	356	586	457	846	857	356	620	857
EY5	275	235	200	199	298	199	241	298
EX5	487	479	379	132	452	132	386	487
EY6	244	220	228	239	238	220	234	244
EX6	600	545	562	480	135	135	464	600
R4	0.79	2.08	1.57	2.38	2.01	0.79	1.77	2.38
R5	1.77	2.03	1.89	0.66	1.52	0.66	1.58	2.03
R6	2.46	2.47	2.46	2.01	0.57	0.57	2.00	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.140798	-0.154338	-0.170845	-0.186737	-0.193236	-0.135	0
UY2	-0.090666	-0.107433	-0.121520	-0.130918	-0.124182	-0.109	300
UY3	-0.056920	-0.070540	-0.081135	-0.089290	-0.084703	-0.080	614
UY4	-0.036652	-0.046768	-0.054870	-0.062475	-0.062772	-0.057	914
UY5	-0.024056	-0.031736	-0.038217	-0.045074	-0.049111	-0.040	1219
UY6	-0.016023	-0.022236	-0.027731	-0.033740	-0.040016	-0.031	1524
UY7	-0.010802	-0.016223	-0.021168	-0.026435	-0.033742	-0.024	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1001 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	11	16	7	4	5	MIN	AVG	MAX
EY1	7593	7889	7990	7989	7989	7593	7890	7990
EY2	5180	5794	5958	5341	5150	5150	5485	5958
EY3	3179	3829	2004	1444	1969	1444	2485	3829
EY4	487	436	375	396	431	375	425	487
EX4	1459	541	1116	1074	831	541	1004	1459
EY5	297	253	254	299	286	253	278	299
EX5	625	601	385	569	606	385	557	625
EY6	233	133	248	222	207	133	209	248
EX6	326	299	298	192	159	159	255	326
R4	2.99	1.24	2.97	2.71	1.93	1.24	2.37	2.99
R5	2.10	2.38	1.51	1.90	2.12	1.51	2.00	2.38
R6	1.40	2.24	1.20	0.86	0.77	0.77	1.29	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.197266	-0.203950	-0.207133	-0.210751	-0.211917	-0.209	0
UY2	-0.139880	-0.146830	-0.148230	-0.148322	-0.150037	-0.168	300
UY3	-0.102236	-0.105131	-0.103801	-0.102964	-0.105404	-0.124	614
UY4	-0.079075	-0.077827	-0.075378	-0.075398	-0.077804	-0.089	914
UY5	-0.064162	-0.059678	-0.056965	-0.057903	-0.060012	-0.064	1219
UY6	-0.054187	-0.047302	-0.044779	-0.046275	-0.048035	-0.049	1524
UY7	-0.047358	-0.038696	-0.036602	-0.038306	-0.039737	-0.038	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	16	9	12	10	MIN	AVG	MAX
EY1	7881	7714	7553	5187	5090	5090	6685	7881
EY2	3049	5152	5887	5553	2207	2207	4370	5887
EY3	3399	2223	1838	1288	1696	1288	2089	3399
EY4	409	328	290	355	425	290	362	425
EX4	325	683	457	846	857	325	633	857
EY5	275	235	200	199	298	199	241	298
EX5	439	479	379	132	452	132	376	479
EY6	244	219	228	239	238	219	233	244
EX6	600	541	562	480	135	135	464	600
R4	0.79	2.08	1.57	2.38	2.01	0.79	1.77	2.38
R5	1.59	2.03	1.89	0.66	1.52	0.66	1.54	2.03
R6	2.46	2.47	2.46	2.01	0.57	0.57	2.00	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.201765	-0.206596	-0.236276	-0.258253	-0.267241	-0.209	0
UY2	-0.129961	-0.143185	-0.168059	-0.181057	-0.171741	-0.168	300
UY3	-0.081198	-0.094719	-0.112208	-0.123486	-0.117142	-0.124	614
UY4	-0.051924	-0.063681	-0.075883	-0.086401	-0.086813	-0.089	914
UY5	-0.033814	-0.043872	-0.052853	-0.062336	-0.067919	-0.064	1219
UY6	-0.022354	-0.031133	-0.038352	-0.046662	-0.055341	-0.049	1524
UY7	-0.014970	-0.022906	-0.029275	-0.036559	-0.046665	-0.038	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1001 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	15	9	12	10	MIN	AVG	MAX
EY1	7714	7881	7553	5187	5090	5090	6685	7881
EY2	5152	3564	5887	5553	2207	2207	4473	5887
EY3	2223	3399	1838	1288	1696	1288	2089	3399
EY4	281	447	290	355	425	281	360	447
EX4	586	356	457	846	857	356	620	857
EY5	235	275	200	199	298	199	241	298
EX5	479	489	379	132	452	132	386	489
EY6	219	244	228	239	238	219	234	244
EX6	543	607	562	480	135	135	465	607
R4	2.08	0.79	1.57	2.38	2.01	0.79	1.77	2.38
R5	2.03	1.78	1.89	0.66	1.52	0.66	1.58	2.03
R6	2.47	2.49	2.46	2.01	0.57	0.57	2.00	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.213608	-0.191655	-0.236276	-0.258253	-0.267241	-0.209	0
UY2	-0.148736	-0.124165	-0.168059	-0.181057	-0.171741	-0.168	300
UY3	-0.097706	-0.078052	-0.112208	-0.123486	-0.117142	-0.124	614
UY4	-0.064820	-0.050091	-0.075883	-0.086401	-0.086813	-0.089	914
UY5	-0.044018	-0.032670	-0.052853	-0.062336	-0.067919	-0.064	1219
UY6	-0.030867	-0.021557	-0.038352	-0.046662	-0.055341	-0.049	1524
UY7	-0.022538	-0.014338	-0.029275	-0.036559	-0.046665	-0.038	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1305 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	8	13	4	7	6	MIN	AVG	MAX
EY1	7987	7989	7952	6967	7980	6967	7775	7989
EY2	4886	2865	5731	4015	5565	2865	4613	5731
EY3	1719	3457	1630	1685	1832	1630	2065	3457
EY4	465	491	314	277	264	264	362	491
EX4	1386	1470	505	824	769	505	991	1470
EY5	286	296	299	300	299	286	296	300
EX5	490	406	673	733	476	406	556	733
EY6	249	205	219	244	250	205	233	250
EX6	127	104	135	250	134	104	150	250
R4	2.98	2.99	1.61	2.98	2.91	1.61	2.69	2.99
R5	1.71	1.37	2.25	2.45	1.59	1.37	1.87	2.45
R6	0.51	0.51	0.61	1.03	0.54	0.51	0.64	1.03

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.264826	-0.264804	-0.283691	-0.289601	-0.268574	-0.280	0
UY2	-0.184287	-0.178345	-0.199195	-0.195119	-0.188948	-0.125	300
UY3	-0.129407	-0.125573	-0.133886	-0.127777	-0.125330	-0.165	614
UY4	-0.096329	-0.092811	-0.093655	-0.087995	-0.084879	-0.119	914
UY5	-0.074808	-0.070170	-0.068570	-0.064151	-0.059572	-0.085	1219
UY6	-0.060016	-0.053800	-0.052318	-0.049379	-0.043435	-0.067	1524
UY7	-0.049558	-0.041794	-0.041388	-0.039891	-0.032817	-0.052	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	15	16	9	12	10	MIN	AVG	MAX
EY1	7881	7714	7553	5187	5090	5090	6685	7881
EY2	3142	5152	5887	5553	2207	2207	4388	5887
EY3	3399	2223	1838	1288	1696	1288	2089	3399
EY4	438	328	290	355	425	290	367	438
EX4	348	683	457	846	857	348	638	857
EY5	275	235	200	199	298	199	241	298
EX5	474	479	379	132	452	132	383	479
EY6	244	217	228	239	238	217	233	244
EX6	607	537	562	480	135	135	464	607
R4	0.79	2.08	1.57	2.38	2.01	0.79	1.77	2.38
R5	1.73	2.03	1.89	0.66	1.52	0.66	1.57	2.03
R6	2.49	2.47	2.46	2.01	0.57	0.57	2.00	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.253451	-0.266910	-0.304886	-0.333246	-0.344844	-0.280	0
UY2	-0.162583	-0.185075	-0.216861	-0.233633	-0.221612	-0.225	300
UY3	-0.101524	-0.122513	-0.144791	-0.159344	-0.151158	-0.165	614
UY4	-0.064959	-0.082437	-0.097919	-0.111491	-0.112022	-0.119	914
UY5	-0.042284	-0.056850	-0.068201	-0.080437	-0.087642	-0.085	1219
UY6	-0.027858	-0.040387	-0.049489	-0.060212	-0.071412	-0.067	1524
UY7	-0.018506	-0.029748	-0.037777	-0.047175	-0.060216	-0.052	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1305 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	16	9	15	12	10	MIN	AVG	MAX
EY1	7714	7553	7881	5187	5090	5090	6685	7881
EY2	5152	5887	3982	5553	2207	2207	4556	5687
EY3	2223	1838	3399	1288	1696	1288	2089	3399
EY4	281	290	447	355	425	281	360	447
EX4	586	457	356	846	857	356	620	857
EY5	235	200	275	199	298	199	241	298
EX5	479	379	433	132	452	132	375	479
EY6	220	228	244	239	238	220	234	244
EX6	543	562	607	480	135	135	465	607
R4	2.08	1.57	0.79	2.38	2.01	0.79	1.77	2.38
R5	2.03	1.89	1.57	0.66	1.52	0.66	1.54	2.03
R6	2.47	2.46	2.49	2.01	0.57	0.57	2.00	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.275573	-0.304886	-0.245658	-0.333246	-0.344844	-0.180	0
UY2	-0.191865	-0.216861	-0.161247	-0.233633	-0.221612	-0.225	300
UY3	-0.126019	-0.144791	-0.102149	-0.159344	-0.151158	-0.165	614
UY4	-0.083587	-0.097919	-0.065690	-0.111491	-0.112022	-0.119	914
UY5	-0.056750	-0.068201	-0.042807	-0.080437	-0.087642	-0.085	1219
UY6	-0.039785	-0.049489	-0.028176	-0.060212	-0.071412	-0.067	1524
UY7	-0.029042	-0.037777	-0.018681	-0.047175	-0.060216	-0.052	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1479 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	13	9	1	6	10	MIN	AVG	MAX
EY1	7937	7724	6350	7571	7921	6350	7500	7937
EY2	5987	5972	5645	5896	5988	5645	5897	5988
EY3	3954	3989	3919	3975	3993	3919	3966	3993
EY4	493	467	331	270	494	270	411	494
EX4	1275	778	989	808	1293	778	1028	1293
EY5	300	299	289	297	295	289	296	300
EX5	191	303	434	675	406	191	402	675
EY6	211	219	222	217	242	211	222	242
EX6	525	547	553	503	460	460	518	553
R4	2.59	1.67	2.99	2.99	2.62	1.67	2.57	2.99
R5	0.64	1.01	1.50	2.28	1.37	0.64	1.36	2.28
R6	2.50	2.50	2.49	2.32	1.90	1.90	2.34	2.50

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.290393	-0.292926	-0.301465	-0.303078	-0.282043	-0.317	0
UY2	-0.212458	-0.211671	-0.214495	-0.219339	-0.205800	-0.253	300
UY3	-0.156403	-0.152765	-0.152289	-0.156400	-0.152566	-0.186	614
UY4	-0.118607	-0.114035	-0.111643	-0.115440	-0.117497	-0.133	914
UY5	-0.092887	-0.088602	-0.085602	-0.089677	-0.094003	-0.097	1219
UY6	-0.075272	-0.071777	-0.068894	-0.073541	-0.078058	-0.075	1524
UY7	-0.063245	-0.060596	-0.058102	-0.063324	-0.067212	-0.060	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	15	16	9	12	10	MIN	AVG	MAX
EY1	7881	7714	7553	5187	5090	5090	6685	7891
EY2	3186	5152	5887	5553	2207	2207	4397	5887
EY3	3399	2223	1838	1288	1696	1288	2089	3399
EY4	437	327	290	355	425	290	367	437
EX4	347	680	457	846	857	347	637	857
EY5	275	235	200	199	298	199	241	298
EX5	492	479	379	132	452	132	387	492
EY6	244	217	228	239	238	217	233	244
EX6	607	537	562	480	135	135	464	607
R4	0.79	2.08	1.57	2.38	2.01	0.79	1.77	2.38
R5	1.79	2.03	1.89	0.66	1.52	0.66	1.58	2.03
R6	2.49	2.47	2.46	2.01	0.57	0.57	2.00	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.285816	-0.303137	-0.346328	-0.377371	-0.391421	-0.317	0
UY2	-0.183404	-0.210280	-0.246384	-0.264538	-0.251572	-0.253	300
UY3	-0.114791	-0.139436	-0.164635	-0.180779	-0.171799	-0.186	614
UY4	-0.073672	-0.094043	-0.111459	-0.126845	-0.127462	-0.133	914
UY5	-0.048109	-0.065001	-0.077710	-0.091755	-0.099785	-0.097	1219
UY6	-0.031791	-0.046260	-0.056426	-0.068816	-0.081321	-0.075	1524
UY7	-0.021176	-0.034114	-0.043082	-0.053969	-0.068567	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R: LOAD 1479 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	9	15	12	10	MIN	AVG	MAX
EY1	7714	7553	7881	5187	5090	5090	6685	7881
EY2	5152	5887	4284	5553	2207	2207	4617	5887
EY3	2223	1838	3399	1288	1696	1288	2089	3399
EY4	281	290	447	355	425	281	360	447
EX4	586	457	356	846	857	356	620	857
EY5	235	200	275	199	298	199	241	298
EX5	479	379	250	132	452	132	338	479
EY6	221	228	244	239	238	221	234	244
EX6	546	562	602	480	135	135	465	602
R4	2.08	1.57	0.79	2.38	2.01	0.79	1.77	2.38
R5	2.03	1.89	0.91	0.66	1.52	0.66	1.40	2.03
R6	2.47	2.46	2.47	2.01	0.57	0.57	2.00	2.47

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.312872	-0.346462	-0.288195	-0.378689	-0.391868	-0.317	0
UY2	-0.217753	-0.246433	-0.193255	-0.265492	-0.251832	-0.253	300
UY3	-0.142941	-0.164535	-0.124189	-0.181073	-0.171771	-0.186	614
UY4	-0.094741	-0.111271	-0.080163	-0.126694	-0.127297	-0.133	914
UY5	-0.064265	-0.077501	-0.052003	-0.091406	-0.099593	-0.097	1219
UY6	-0.045010	-0.056237	-0.033885	-0.068423	-0.081149	-0.075	1524
UY7	-0.032824	-0.042928	-0.022186	-0.053608	-0.068427	-0.060	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 300 R

DISTRIBUTION OF VERTICAL STRESSES

AREA" OF BASIN		LOAD 1: 730 kPa					LOAD 2: 1001 kPa					LOAD 3: 1305 kPa					LOAD 4: 1479 kPa												
DEPTH (mm)	DEPTH RATIO z/ao	9	6	5	10	4	AVG.	STRESS RATIO p/po	11	16	7	4	5	AVG.	STRESS RATIO p/po	8	13	4	7	6	AVG.	STRESS RATIO p/po	13	9	1	6	10	AVG.	STRESS RATIO p/po
17	0.11	-0.719	-0.719	-0.718	-0.722	-0.720	-0.720	0.986	-0.990	-0.990	-0.987	-0.982	-0.983	-0.986	0.985	-1.266	-1.256	-1.265	-1.265	-1.269	-1.264	0.969	-1.457	-1.456	-1.464	-1.456	-1.457	-1.458	0.986
52	0.35	-0.622	-0.622	-0.619	-0.630	-0.624	-0.623	0.854	-0.847	-0.845	-0.835	-0.819	-0.822	-0.834	0.833	-1.055	-1.035	-1.049	-1.051	-1.060	-1.050	0.805	-1.258	-1.254	-1.281	-1.254	-1.259	-1.261	0.853
95	0.63	-0.455	-0.456	-0.443	-0.464	-0.451	-0.454	0.622	-0.620	-0.609	-0.587	-0.568	-0.577	-0.592	0.591	-0.743	-0.758	-0.716	-0.737	-0.730	-0.737	0.565	-0.919	-0.911	-0.942	-0.908	-0.922	-0.920	0.622
145	0.97	-0.287	-0.290	-0.270	-0.292	-0.276	-0.283	0.388	-0.402	-0.376	-0.351	-0.338	-0.351	-0.363	0.363	-0.463	-0.527	-0.410	-0.453	-0.426	-0.456	0.349	-0.580	-0.566	-0.590	-0.562	-0.584	-0.577	0.390
188	1.25	-0.181	-0.185	-0.175	-0.182	-0.170	-0.179	0.245	-0.263	-0.225	-0.218	-0.213	-0.220	-0.228	0.228	-0.302	-0.358	-0.244	-0.288	-0.259	-0.290	0.222	-0.361	-0.343	-0.364	-0.343	-0.365	-0.355	0.240
223	1.49	-0.125	-0.130	-0.136	-0.124	-0.118	-0.127	0.174	-0.188	-0.145	-0.160	-0.161	-0.159	-0.163	0.163	-0.227	-0.241	-0.178	-0.208	-0.191	-0.209	0.160	-0.241	-0.224	-0.243	-0.229	-0.243	-0.236	0.159
385	2.57	-0.083	-0.088	-0.099	-0.083	-0.076	-0.086	0.118	-0.129	-0.089	-0.110	-0.108	-0.104	-0.108	0.108	-0.150	-0.140	-0.117	-0.142	-0.139	-0.137	0.105	-0.151	-0.138	-0.164	-0.160	-0.149	-0.153	0.103
683	4.55	-0.052	-0.056	-0.064	-0.054	-0.048	-0.053	0.075	-0.081	-0.054	-0.069	-0.067	-0.064	-0.067	0.067	-0.086	-0.076	-0.074	-0.098	-0.097	-0.086	0.066	-0.086	-0.084	-0.112	-0.119	-0.089	-0.098	0.066
910	6.07	-0.027	-0.032	-0.034	-0.029	-0.027	-0.030	0.041	-0.036	-0.031	-0.033	-0.041	-0.040	-0.036	0.036	-0.042	-0.042	-0.055	-0.073	-0.048	-0.052	0.040	-0.043	-0.047	-0.057	-0.063	-0.051	-0.052	0.035
1137	7.58	-0.012	-0.014	-0.014	-0.012	-0.012	-0.013	0.018	-0.013	-0.012	-0.013	-0.015	-0.014	-0.013	0.013	-0.014	-0.014	-0.020	-0.029	-0.015	-0.019	0.014	-0.019	-0.020	-0.023	-0.025	-0.023	-0.022	0.015
1650	11.00	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	0.013	-0.008	-0.010	-0.008	-0.007	-0.006	-0.008	0.008	-0.006	-0.005	-0.007	-0.011	-0.006	-0.007	0.005	-0.017	-0.017	-0.018	-0.017	-0.014	-0.017	0.011
2650	17.67	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	0.008	-0.004	-0.007	-0.004	-0.003	-0.003	-0.004	0.004	-0.002	-0.002	-0.003	-0.005	-0.002	-0.003	0.002	-0.011	-0.011	-0.011	-0.010	-0.008	-0.010	0.007
3650	24.33	-0.005	-0.005	-0.004	-0.005	-0.005	-0.005	0.007	-0.003	-0.005	-0.003	-0.002	-0.002	-0.003	0.003	-0.002	-0.001	-0.002	-0.003	-0.002	-0.002	0.002	-0.008	-0.008	-0.008	-0.007	-0.006	-0.007	0.005

MAXIMUM DEFECTION

DEPTH (mm)	DEPTH RATIO z/ao	15	16	9	12	10	AVG.	STRESS RATIO p/po	15	16	9	12	10	AVG.	STRESS RATIO p/po	15	16	9	12	10	AVG.	STRESS RATIO p/po	15	16	9	12	10	AVG.	STRESS RATIO p/po
17	0.11	-0.712	-0.715	-0.715	-0.721	-0.714	-0.715	0.980	-0.971	-0.984	-0.983	-0.996	-0.979	-0.983	0.982	-1.255	-1.270	-1.269	-1.285	-1.263	-1.269	0.972	-1.450	-1.449	-1.451	-1.458	-1.446	-1.451	0.981
52	0.35	-0.600	-0.609	-0.606	-0.627	-0.607	-0.610	0.835	-0.793	-0.827	-0.821	-0.863	-0.815	-0.824	0.823	-1.028	-1.067	-1.060	-1.113	-1.052	-1.064	0.815	-1.233	-1.229	-1.240	-1.259	-1.228	-1.238	0.837
95	0.63	-0.434	-0.436	-0.425	-0.452	-0.441	-0.437	0.599	-0.564	-0.579	-0.563	-0.609	-0.595	-0.582	0.581	-0.733	-0.747	-0.726	-0.785	-0.767	-0.752	0.576	-0.880	-0.868	-0.898	-0.900	-0.897	-0.889	0.601
145	0.97	-0.278	-0.268	-0.250	-0.272	-0.284	-0.270	0.370	-0.369	-0.347	-0.319	-0.350	-0.403	-0.357	0.357	-0.480	-0.447	-0.411	-0.451	-0.520	-0.462	0.354	-0.539	-0.517	-0.563	-0.538	-0.587	-0.549	0.371
188	1.25	-0.176	-0.165	-0.154	-0.167	-0.185	-0.169	0.232	-0.232	-0.210	-0.184	-0.210	-0.276	-0.222	0.222	-0.303	-0.271	-0.238	-0.271	-0.356	-0.288	0.220	-0.328	-0.307	-0.344	-0.325	-0.385	-0.338	0.228
223	1.49	-0.118	-0.115	-0.115	-0.118	-0.131	-0.119	0.164	-0.149	-0.145	-0.130	-0.155	-0.200	-0.156	0.156	-0.197	-0.187	-0.168	-0.200	-0.258	-0.202	0.155	-0.222	-0.207	-0.226	-0.228	-0.268	-0.230	0.156
385	2.57	-0.077	-0.076	-0.081	-0.077	-0.085	-0.079	0.108	-0.095	-0.093	-0.087	-0.097	-0.128	-0.100	0.100	-0.125	-0.120	-0.112	-0.125	-0.165	-0.130	0.099	-0.141	-0.133	-0.147	-0.151	-0.169	-0.148	0.100
683	4.55	-0.048	-0.050	-0.053	-0.046	-0.051	-0.049	0.068	-0.060	-0.061	-0.058	-0.052	-0.075	-0.061	0.061	-0.079	-0.078	-0.075	-0.067	-0.097	-0.079	0.061	-0.087	-0.084	-0.096	-0.097	-0.100	-0.093	0.063
910	6.07	-0.027	-0.033	-0.032	-0.025	-0.029	-0.029	0.040	-0.037	-0.045	-0.042	-0.029	-0.044	-0.039	0.039	-0.048	-0.058	-0.054	-0.037	-0.057	-0.051	0.039	-0.055	-0.054	-0.053	-0.053	-0.058	-0.054	0.037
1137	7.58	-0.012	-0.015	-0.015	-0.011	-0.011	-0.013	0.018	-0.016	-0.023	-0.022	-0.014	-0.015	-0.018	0.018	-0.021	-0.029	-0.028	-0.018	-0.019	-0.023	0.018	-0.027	-0.026	-0.022	-0.023	-0.022	-0.024	0.016
1650	11.00	-0.010	-0.010	-0.010	-0.009	-0.007	-0.009	0.013	-0.015	-0.015	-0.015	-0.013	-0.006	-0.013	0.013	-0.020	-0.020	-0.019	-0.016	-0.008	-0.017	0.013	-0.020	-0.020	-0.020	-0.018	-0.012	-0.018	0.012
2650	17.67	-0.006	-0.006	-0.006	-0.006	-0.004	-0.006	0.008	-0.009	-0.009	-0.009	-0.008	-0.002	-0.007	0.007	-0.012	-0.011	-0.011	-0.010	-0.003	-0.010	0.007	-0.012	-0.012	-0.013	-0.011	-0.006	-0.011	0.007
3650	24.33	-0.005	-0.005	-0.004	-0.004	-0.003	-0.004	0.006	-0.007	-0.006	-0.006	-0.005	-0.002	-0.005	0.005	-0.009	-0.008	-0.008	-0.006	-0.002	-0.007	0.005	-0.009	-0.008	-0.009	-0.007	-0.004	-0.008	0.005

RMS VALUE OF DEFECTIONS

DEPTH (mm)	DEPTH RATIO z/ao	15	16	9	12	10	AVG.	STRESS RATIO p/po	16	15	9	12	10	AVG.	STRESS RATIO p/po	16	9	15	12	10	AVG.	STRESS RATIO p/po	16	9	15	12	10	AVG.	STRESS RATIO p/po
17	0.11	-0.704	-0.711	-0.711	-0.720	-0.708	-0.711	0.974	-0.984	-0.976	-0.983	-0.996	-0.979	-0.984	0.983	-1.269	-1.269	-1.263	-1.285	-1.263	-1.270	0.973	-1.442	-1.442	-1.438	-1.461	-1.435	-1.444	0.976
52	0.35	-0.578	-0.596	-0.594	-0.624	-0.590	-0.596	0.817	-0.824	-0.806	-0.821	-0.863	-0.815	-0.826	0.825	-1.063	-1.060	-1.050	-1.113	-1.052	-1.068	0.818	-1.208	-1.205	-1.200	-1.265	-1.196	-1.215	0.821
95	0.63	-0.413	-0.415	-0.407	-0.440	-0.430	-0.421	0.577	-0.574	-0.575	-0.563	-0.609	-0.595	-0.583	0.582	-0.741	-0.726	-0.749	-0.785	-0.767	-0.754	0.577	-0.842	-0.825	-0.853	-0.893	-0.872	-0.857	0.579
145	0.97	-0.269	-0.246	-0.231	-0.253	-0.291	-0.258	0.353	-0.340	-0.371	-0.319	-0.350	-0.403	-0.356	0.356	-0.438	-0.411	-0.476	-0.451	-0.520	-0.459	0.352	-0.498	-0.468	-0.535	-0.513	-0.590	-0.521	0.352
188	1.25	-0.170	-0.146	-0.133	-0.152	-0.199	-0.160	0.219	-0.202	-0.231	-0.184	-0.210	-0.276	-0.221	0.221	-0.261	-0.238	-0.292	-0.271	-0.356	-0.284	0.217	-0.296	-0.270	-0.324	-0.308	-0.405	-0.321	0.217
223	1.49	-0.111	-0.100	-0.094	-0.112	-0.145	-0.112	0.154	-0.138	-0.151	-0.130	-0.155	-0.200	-0.155	0.155	-0.178	-0.168	-0.190	-0.200	-0.258	-0.199	0.152	-0.202	-0.191	-0.209	-0.227	-0.293	-0.225	0.152
385	2.57	-0.070	-0.064	-0.063	-0.070	-0.093	-0.072	0.099	-0.089	-0.096	-0.087	-0.097	-0.128	-0.099	0.099	-0.115	-0.112	-0.121	-0.125	-0.165	-0.128	0.098	-0.131	-0.127	-0.131	-0.142	-0.188	-0.144	0.097
683	4.55	-0.044	-0.043	-0.042	-0.038	-0.054	-0.044	0.061	-0.060	-0.060	-0.058	-0.052	-0.075	-0.061	0.061	-0.078	-0.075	-0.076	-0.067	-0.097	-0.078	0.060	-0.088	-0.085	-0.081	-0.076	-0.110	-0.088	0.060
910	6.07	-0.027	-0.033	-0.030	-0.021	-0.032	-0.028	0.039	-0.045	-0.037	-0.042	-0.029	-0.044	-0.039	0.039	-0.059	-0.054	-0.046	-0.037	-0.057	-0.050	0.039	-0.067	-0.061	-0.049	-0.042	-0.064	-0.057	0.038
1137	7.58	-0.012	-0.017	-0.016	-0.010	-0.011	-0.013	0.018	-0.023	-0.016	-0.022	-0.014	-0.015	-0.018	0.018	-0.030	-0.028	-0.020	-0.018	-0.019	-0.023	0.018	-0.034	-0.032	-0.022	-0.021	-0.022	-0.026	0.018
1650	11.00	-0.011	-0.011	-0.011	-0.009	-0.011	-0.009	0.013	-0.016	-0.015	-0.015	-0.013	-0.006	-0.															

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 746 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	13	2	5	1	10	MIN	AVG	MAX
EY1	3583	6476	5959	7236	7442	3583	6139	7442
EY2	4839	2280	2659	3829	2384	2280	3198	4839
EY3	3399	2042	3940	2164	2265	2042	2762	3940
EY4	27947	22249	34730	33847	28121	22249	29379	34730
EY5	246	229	282	231	289	229	255	289
EX5	160	405	262	506	191	160	305	506
EY6	196	248	190	193	213	190	208	248
EX6	126	199	358	98	428	98	242	428
R4	1	1	1	1	1	1	1	1
R5	0.65	1.76	0.93	2.20	0.66	0.65	1.24	2.20
R6	0.64	0.80	1.89	0.51	2.01	0.51	1.17	2.01

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.136824	-0.140847	-0.140869	-0.143435	-0.125092	-0.123	0
UY2	-0.098845	-0.088595	-0.098051	-0.104434	-0.076920	-0.104	300
UY3	-0.084711	-0.072801	-0.086176	-0.090555	-0.063525	-0.086	614
UY4	-0.071576	-0.059919	-0.075088	-0.078200	-0.052324	-0.067	914
UY5	-0.059867	-0.049148	-0.065343	-0.067090	-0.042889	-0.051	1219
UY6	-0.049950	-0.040521	-0.057193	-0.057582	-0.035278	-0.041	1524
UY7	-0.041907	-0.033834	-0.050650	-0.049755	-0.029335	-0.033	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	14	12	8	3	2	MIN	AVG	MAX
EY1	7442	6508	5959	6476	7236	5959	6724	7442
EY2	2384	5941	2659	2280	3829	2280	3419	5941
EY3	2265	3757	3940	2042	2164	2042	2833	3940
EY4	28121	32116	34730	22249	33847	22249	30213	34730
EY5	289	227	282	229	231	227	251	289
EX5	191	181	262	405	506	181	309	506
EY6	428	199	358	199	98	98	256	428
EX6	213	105	190	248	193	105	190	248
R4	1	1	1	1	1	1	1	1
R5	0.66	0.80	0.93	1.76	2.20	0.66	1.27	2.20
R6	2.01	1.89	1.89	0.80	0.51	0.51	1.42	2.01

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.125010	-0.131278	-0.140742	-0.140767	-0.143254	-0.123	0
UY2	-0.076818	-0.102379	-0.097906	-0.088498	-0.104239	-0.104	300
UY3	-0.063448	-0.089969	-0.086062	-0.072729	-0.090399	-0.086	614
UY4	-0.052286	-0.078077	-0.075021	-0.059882	-0.078098	-0.067	914
UY5	-0.042875	-0.066990	-0.065311	-0.049133	-0.067030	-0.051	1219
UY6	-0.035278	-0.057139	-0.057184	-0.040520	-0.057553	-0.041	1524
UY7	-0.029342	-0.048763	-0.050656	-0.033839	-0.049747	-0.033	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 746 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	14	1	4	11	12	MIN	AVG	MAX
EY1	7645	6476	5959	7453	7559	5959	7018	7645
EY2	5881	2280	2659	5743	5835	2280	4480	5881
EY3	3942	2042	3940	3888	3915	2042	3545	3942
EY4	20184	22249	34730	20360	20259	20184	23556	34730
EY5	170	229	282	182	176	170	208	282
EX5	399	405	262	405	404	262	375	405
EY6	242	248	190	237	240	190	231	248
EX6	518	199	358	539	516	199	426	539
R4	1	1	1	1	1	1	1	1
R5	2.35	1.76	0.93	2.23	2.30	0.93	1.91	2.35
R6	2.14	0.80	1.89	2.28	2.15	0.80	1.85	2.28

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.118111	-0.140767	-0.140742	-0.128942	-0.129222	0
UY2	-0.089427	-0.088498	-0.097906	-0.099269	-0.099978	300
UY3	-0.077246	-0.072729	-0.086062	-0.087160	-0.087706	614
UY4	-0.067056	-0.059882	-0.075021	-0.076908	-0.077434	914
UY5	-0.058483	-0.049133	-0.065311	-0.068289	-0.068804	1219
UY6	-0.051527	-0.040520	-0.057184	-0.061299	-0.061809	1524
UY7	-0.046078	-0.033839	-0.050656	-0.055824	-0.056331	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1042 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	8	6	14	16	15	MIN	AVG	MAX
EY1	6193	3059	5895	7892	7859	3059	6180	7892
EY2	5991	5967	2383	5491	2390	2383	4444	5991
EY3	1296	1022	1641	1021	1023	1021	1201	1641
EY4	24189	27611	34461	30032	24098	24098	28078	34461
EY5	229	180	155	264	155	155	197	264
EX5	447	220	124	205	408	124	281	447
EY6	122	151	102	143	116	102	127	151
EX6	172	144	205	132	241	132	179	241
R4	1	1	1	1	1	1	1	1
R5	1.95	1.22	0.80	0.78	2.63	0.78	1.48	2.63
R6	1.41	0.96	2.02	0.92	2.08	0.92	1.48	2.08

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.209076	-0.227588	-0.222227	-0.201896	-0.227437	-0.192	0
UY2	-0.152897	-0.154543	-0.145837	-0.146248	-0.145864	-0.165	300
UY3	-0.127289	-0.126660	-0.121749	-0.120746	-0.117232	-0.136	614
UY4	-0.107127	-0.105167	-0.100785	-0.101911	-0.095723	-0.107	914
UY5	-0.089319	-0.086379	-0.081686	-0.085279	-0.076942	-0.082	1219
UY6	-0.074195	-0.070747	-0.065184	-0.071205	-0.061264	-0.066	1524
UY7	-0.061760	-0.058166	-0.051473	-0.059675	-0.048569	-0.051	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	2	4	1	6	12	MIN	AVG	MAX
EY1	6476	5959	7236	7897	7504	5959	7014	7897
EY2	2280	2659	3829	5670	5952	2280	4078	5952
EY3	2042	3940	2164	1103	3229	1103	2496	3940
EY4	22249	34730	33847	38629	20104	20104	29912	38629
EY5	229	282	231	283	197	197	244	283
EX5	477	293	604	610	527	293	502	610
EY6	248	190	193	227	248	190	221	248
EX6	199	358	98	294	426	98	275	426
R4	1	1	1	1	1	1	1	1
R5	2.08	1.04	2.62	2.16	2.68	1.04	2.11	2.68
R6	0.80	1.89	0.51	1.29	1.72	0.51	1.24	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.196374	-0.196509	-0.199781	-0.200673	-0.182376	-0.192	0
UY2	-0.123396	-0.136685	-0.145312	-0.148783	-0.140726	-0.165	300
UY3	-0.101426	-0.120162	-0.126036	-0.128317	-0.123266	-0.136	614
UY4	-0.083527	-0.104758	-0.108905	-0.114260	-0.108987	-0.107	914
UY5	-0.068546	-0.091207	-0.093485	-0.102158	-0.097053	-0.082	1219
UY6	-0.056537	-0.079865	-0.080277	-0.092237	-0.087415	-0.066	1524
UY7	-0.047219	-0.070751	-0.069393	-0.084355	-0.079885	-0.051	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1042 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	4	3	13	7	9	MIN	AVG	MAX
EY1	5388	5911	7927	3695	5987	3695	5782	7927
EY2	5217	4781	5676	3065	2860	2860	4320	5676
EY3	3509	1210	2817	3721	3081	1210	2868	3721
EY4	22365	26946	30200	26246	30124	22365	27176	30200
EY5	264	167	155	223	212	155	204	264
EX5	444	414	293	335	334	293	364	444
EY6	207	179	123	206	192	123	181	207
EX6	130	316	277	388	314	130	285	388
R4	1	1	1	1	1	1	1	1
R5	1.68	2.48	1.89	1.51	1.57	1.51	1.83	2.48
R6	0.63	1.76	2.26	1.89	1.63	0.63	1.63	2.26

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.197132	-0.199107	-0.181821	-0.198821	-0.190520	-0.192	0
UY2	-0.149543	-0.137559	-0.139980	-0.136147	-0.130603	-0.165	300
UY3	-0.129735	-0.114044	-0.121943	-0.116950	-0.112997	-0.136	614
UY4	-0.112061	-0.096561	-0.105978	-0.099934	-0.097046	-0.107	914
UY5	-0.096511	-0.081617	-0.091479	-0.085380	-0.083068	-0.082	1219
UY6	-0.083409	-0.069420	-0.078868	-0.073534	-0.071404	-0.066	1524
UY7	-0.072797	-0.059764	-0.068314	-0.064278	-0.062052	-0.051	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1329 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	1	7	5	12	15	MIN	AVG	MAX
EY1	7236	7897	5959	5270	6358	5270	6544	7897
EY2	3829	5670	2659	5281	5637	2659	4615	5670
EY3	2164	1103	3940	3588	3914	1103	2942	3940
EY4	33847	38629	34730	23404	20712	20712	30264	38629
EY5	231	283	282	255	283	231	267	283
EX5	506	517	262	235	175	175	339	517
EY6	193	227	190	186	229	186	205	229
EX6	98	294	358	233	495	98	295	495
R4	1	1	1	1	1	1	1	1
R5	2.20	1.83	0.93	0.92	0.62	0.62	1.30	2.20
R6	0.51	1.29	1.89	1.25	2.16	0.51	1.42	2.16

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.254852	-0.256008	-0.250418	-0.263632	-0.236311	-0.251	0
UY2	-0.185344	-0.189798	-0.174108	-0.203707	-0.182810	-0.222	300
UY3	-0.160685	-0.163637	-0.153020	-0.179746	-0.161159	-0.183	614
UY4	-0.138779	-0.145661	-0.133371	-0.158208	-0.142768	-0.144	914
UY5	-0.119079	-0.130200	-0.116101	-0.139343	-0.127239	-0.109	1219
UY6	-0.102221	-0.117535	-0.101656	-0.123518	-0.114617	-0.088	1524
UY7	-0.088341	-0.107481	-0.090057	-0.110756	-0.104719	-0.069	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	1	4	6	3	12	MIN	AVG	MAX
EY1	6476	5959	7897	6525	4560	4560	6283	7897
EY2	2280	2659	5670	4011	5835	2280	4091	5835
EY3	2042	3940	1103	3080	3915	1103	2816	3940
EY4	22249	34730	38629	38017	20259	20259	30776	38629
EY5	229	282	283	165	254	165	243	283
EX5	405	262	517	309	585	262	415	585
EY6	248	190	227	204	240	190	222	248
EX6	199	358	294	296	516	199	333	516
R4	1	1	1	1	1	1	1	1
R5	1.76	0.93	1.83	1.88	2.30	0.93	1.74	2.30
R6	0.80	1.89	1.29	1.45	2.15	0.80	1.52	2.15

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.250776	-0.250733	-0.256180	-0.259734	-0.240466	-0.251	0
UY2	-0.157660	-0.174419	-0.189974	-0.197612	-0.180321	-0.222	300
UY3	-0.129567	-0.153320	-0.163821	-0.176614	-0.157534	-0.183	614
UY4	-0.106679	-0.133650	-0.145847	-0.157897	-0.138399	-0.144	914
UY5	-0.087531	-0.116351	-0.130380	-0.141276	-0.122473	-0.109	1219
UY6	-0.072186	-0.101874	-0.117702	-0.127237	-0.109705	-0.088	1524
UY7	-0.060284	-0.090243	-0.107634	-0.115847	-0.099827	-0.069	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1329 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	2	12	8	6	10	MIN	AVG	MAX
EY1	7236	6508	5959	6586	7897	5959	6837	7897
EY2	3829	5941	2659	3595	5670	2659	4339	5941
EY3	2164	3757	3940	3246	1103	1103	2842	3940
EY4	33847	32116	34730	37293	38629	32116	35323	38629
EY5	231	227	282	152	283	152	235	283
EX5	506	181	262	228	517	181	339	517
EY6	193	105	190	194	227	105	182	227
EX6	98	199	358	151	294	98	220	358
R4	1	1	1	1	1	1	1	1
R5	2.20	0.80	0.93	1.50	1.83	0.80	1.45	2.20
R6	0.51	1.89	1.89	0.78	1.29	0.51	1.27	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.255208	-0.233871	-0.250733	-0.264942	-0.256180	-0.251	0
UY2	-0.185702	-0.182389	-0.174419	-0.198053	-0.189974	-0.222	300
UY3	-0.161045	-0.160280	-0.153320	-0.175682	-0.163821	-0.183	614
UY4	-0.139131	-0.139094	-0.133650	-0.154951	-0.145847	-0.144	914
UY5	-0.119414	-0.119342	-0.116351	-0.136247	-0.130380	-0.109	1219
UY6	-0.102532	-0.101793	-0.101874	-0.120203	-0.117702	-0.088	1524
UY7	-0.088624	-0.086871	-0.090243	-0.107003	-0.107634	-0.069	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1501 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	3	1	11	6	9	MIN	AVG	MAX
EY1	5388	7236	7927	3695	7657	3695	6381	7927
EY2	5217	3829	5676	3065	5534	3065	4664	5676
EY3	3509	2164	2817	3721	3548	2164	3152	3721
EY4	22365	33847	30200	26246	33285	22365	29189	33847
EY5	264	231	155	223	210	155	216	264
EX5	444	506	293	335	512	293	418	512
EY6	207	193	123	206	237	123	193	237
EX6	130	98	277	388	251	98	229	388
R4	1	1	1	1	1	1	1	1
R5	1.68	2.20	1.89	1.51	2.44	1.51	1.94	2.44
R6	0.63	0.51	2.26	1.89	1.06	0.51	1.27	2.26

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.283968	-0.301749	-0.261913	-0.286401	-0.259212	-0.239	0
UY2	-0.215417	-0.223355	-0.201641	-0.196120	-0.200268	-0.255	300
UY3	-0.186883	-0.195859	-0.175658	-0.168466	-0.178457	-0.210	614
UY4	-0.161424	-0.171464	-0.152661	-0.143955	-0.159106	-0.165	914
UY5	-0.139024	-0.149471	-0.131775	-0.122990	-0.142129	-0.125	1219
UY6	-0.120150	-0.130608	-0.113609	-0.105925	-0.127871	-0.101	1524
UY7	-0.104864	-0.115046	-0.098407	-0.092593	-0.116342	-0.079	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	13	8	14	7	9	MIN	AVG	MAX
EY1	7200	5147	7728	7657	7927	5147	7132	7927
EY2	5793	4787	5947	5534	5676	4787	5547	5947
EY3	3991	3942	3993	3548	2817	2817	3658	3993
EY4	20104	22135	20060	33285	30200	20060	25157	33285
EY5	214	268	274	210	155	155	224	274
EX5	474	542	664	512	293	155	361	664
EY6	249	231	250	237	123	123	357	664
EX6	617	308	622	251	277	123	316	622
R4	1	1	1	1	1	1	208	622
R5	2.22	2.02	2.43	2.44	1.89	1.09	1.60	2.44
R6	2.48	1.34	2.49	1.06	2.26	1.06	2.06	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.238969	-0.235855	-0.223061	-0.259212	-0.261913	-0.239	0
UY2	-0.180205	-0.165181	-0.165484	-0.200268	-0.201641	-0.255	300
UY3	-0.156134	-0.138759	-0.142184	-0.178457	-0.175658	-0.210	614
UY4	-0.136257	-0.115893	-0.123013	-0.159106	-0.152661	-0.165	914
UY5	-0.119692	-0.096450	-0.107048	-0.142129	-0.131775	-0.125	1219
UY6	-0.106361	-0.080588	-0.094187	-0.127871	-0.113609	-0.101	1524
UY7	-0.095993	-0.068130	-0.084166	-0.116342	-0.098407	-0.079	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 400 L: LOAD 1501 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	16	13	3	5	MIN	AVG	MAX
EY1	5902	7915	7474	5388	3695	3695	6075	7915
EY2	4362	5108	3588	5217	3065	3065	4268	5217
EY3	3960	3993	3985	3509	3721	3509	3834	3993
EY4	21570	20122	20344	22365	26246	20122	22129	26246
EY5	236	279	290	264	223	223	258	290
EY6	410	677	625	444	335	223	378	677
EY7	233	249	246	207	206	206	363	677
EX6	233	249	246	207	206	206	428	249
R4	1	1	1	1	1	1	115	249
R5	1.74	2.42	2.16	1.68	1.51	1.00	1.45	2.42
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.45	2.42

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.269423	-0.267954	-0.276956	-0.289044	-0.298388	-0.139	0
UY2	-0.198959	-0.207571	-0.205526	-0.219824	-0.206783	-0.255	300
UY3	-0.171869	-0.183284	-0.180309	-0.192403	-0.178529	-0.210	614
UY4	-0.148185	-0.162267	-0.158242	-0.168143	-0.152227	-0.165	914
UY5	-0.127889	-0.144305	-0.139424	-0.147075	-0.129276	-0.125	1219
UY6	-0.111209	-0.129520	-0.123998	-0.129525	-0.110263	-0.101	1524
UY7	-0.098012	-0.117781	-0.111807	-0.115454	-0.095175	-0.079	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 706 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	6	14	11	12	MIN	AVG	MAX
EY1	7476	5005	7963	7964	7964	5005	7274	7964
EY2	2087	2023	3056	2021	2024	2021	2242	3056
EY3	3288	3953	3954	3046	2981	2981	3444	3954
EY4	20389	31100	24508	38679	38935	20389	30722	38935
EY5	157	184	206	165	193	157	181	206
EX5	82	93	104	103	129	82	102	129
EY6	224	197	229	248	215	197	223	248
EX6	120	100	116	126	109	100	114	126
R5	0.53	0.51	0.51	0.63	0.67	0.51	0.57	0.67
R6	0.54	0.51	0.51	0.51	0.51	0.51	0.51	0.54

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.156378	-0.163383	-0.143366	-0.145764	-0.143815	-0.141	0
UY2	-0.109972	-0.113207	-0.107098	-0.100780	-0.098727	-0.119	300
UY3	-0.093729	-0.098095	-0.093230	-0.087763	-0.085079	-0.100	614
UY4	-0.080176	-0.084062	-0.081226	-0.076562	-0.073366	-0.080	914
UY5	-0.068711	-0.071753	-0.070836	-0.066827	-0.063038	-0.062	1219
UY6	-0.059348	-0.061463	-0.062176	-0.058748	-0.054349	-0.052	1524
UY7	-0.051942	-0.053196	-0.055208	-0.052269	-0.047293	-0.041	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	7	2	10	8	MIN	AVG	MAX
EY1	6586	6525	7236	7897	5959	5959	6841	7897
EY2	3595	4011	3829	5670	2659	2659	3953	5670
EY3	3246	3080	2164	1103	3940	1103	2706	3940
EY4	37293	38017	33847	38629	34730	33847	36503	38629
EY5	152	165	231	283	282	152	222	283
EX5	228	309	506	517	262	228	364	517
EY6	194	204	193	227	190	190	201	227
EX6	151	296	98	294	358	98	239	358
R5	1.50	1.88	2.20	1.83	0.93	0.93	1.67	2.20
R6	0.78	1.45	0.51	1.29	1.89	0.51	1.18	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.142247	-0.139191	-0.136904	-0.136783	-0.134481	-0.141	0
UY2	-0.106957	-0.106411	-0.100528	-0.102608	-0.094341	-0.119	300
UY3	-0.094242	-0.094543	-0.086499	-0.087911	-0.082259	-0.100	614
UY4	-0.082778	-0.084218	-0.074387	-0.077845	-0.071382	-0.080	914
UY5	-0.072558	-0.075157	-0.063635	-0.069367	-0.061935	-0.061	1219
UY6	-0.063865	-0.067566	-0.054509	-0.062496	-0.054098	-0.052	1524
UY7	-0.056754	-0.061442	-0.047035	-0.057082	-0.047842	-0.041	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 706 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	2	6	10	12	15	MIN	AVG	MAX
EY1	7236	6586	7897	6508	4275	4275	6500	7897
EY2	3829	3595	5670	5941	5438	3595	4895	5941
EY3	2164	3246	1103	3757	3565	1103	2767	3757
EY4	33847	37293	38629	32116	38190	32116	36015	38629
EY5	231	152	283	227	173	152	213	283
EX5	506	228	517	181	167	167	310	517
EY6	193	194	227	105	238	105	191	238
EX6	98	151	294	199	300	98	208	300
R5	2.20	1.50	1.83	0.80	0.97	0.80	1.46	2.20
R6	0.51	0.78	1.29	1.89	1.26	0.51	1.15	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.136904	-0.142247	-0.136783	-0.126442	-0.133000	-0.141	0
UY2	-0.100528	-0.106957	-0.102608	-0.098811	-0.099462	-0.119	300
UY3	-0.086499	-0.094242	-0.087911	-0.086378	-0.087876	-0.100	614
UY4	-0.074387	-0.082778	-0.077845	-0.074655	-0.077616	-0.080	914
UY5	-0.063635	-0.072558	-0.069367	-0.063815	-0.068747	-0.062	1219
UY6	-0.054509	-0.063865	-0.062496	-0.054236	-0.061432	-0.052	1524
UY7	-0.047035	-0.056754	-0.057082	-0.046125	-0.055631	-0.041	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 997 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI(MPa)

SET	5	8	1	16	3	MIN	AVG	MAX
EY1	3747	4307	3317	3489	4883	3317	3949	4883
EY2	2089	2466	2300	2075	3392	2075	2464	3392
EY3	3837	3859	3432	2931	3829	2931	3578	3859
EY4	22016	24107	28310	21334	22389	21334	23631	28310
EY5	292	275	273	244	294	244	275	294
EX5	155	164	168	244	155	155	177	244
EY6	180	182	226	176	245	176	202	245
EX6	96	95	140	92	130	92	111	140
R5	0.53	0.60	0.62	1.00	0.53	0.53	0.65	1.00
R6	0.53	0.52	0.62	0.52	0.53	0.52	0.55	0.62

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.246306	-0.240869	-0.235776	-0.264432	-0.207169	-0.220	0
UY2	-0.171066	-0.174329	-0.163249	-0.184087	-0.153136	-0.189	300
UY3	-0.147039	-0.151681	-0.141698	-0.158193	-0.133440	-0.158	614
UY4	-0.124549	-0.130607	-0.122354	-0.134444	-0.115807	-0.128	914
UY5	-0.104944	-0.112081	-0.105741	-0.113841	-0.100686	-0.100	1219
UY6	-0.088673	-0.096559	-0.092195	-0.096815	-0.088285	-0.082	1524
UY7	-0.075717	-0.084080	-0.081596	-0.083301	-0.078502	-0.065	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI(MPa)

SET	9	15	6	7	1	MIN	AVG	MAX
EY1	5828	3854	6586	6525	4000	3854	5358	6586
EY2	4865	5703	3595	4011	3000	3000	4235	5703
EY3	3453	1579	3246	3080	1800	1579	2631	3453
EY4	21984	29867	37293	38017	30000	21984	31432	38017
EY5	245	177	152	165	200	152	188	245
EX5	295	123	266	365	200	123	250	365
EY6	182	236	194	204	150	150	193	236
EX6	261	525	151	296	150	150	276	525
R5	1.20	0.70	1.75	2.22	1.00	0.70	1.38	2.22
R6	1.43	2.22	0.78	1.45	1.00	0.78	1.38	2.22

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.219330	-0.201133	-0.200754	-0.196377	-0.246883	-0.220	0
UY2	-0.172944	-0.142746	-0.150929	-0.150101	-0.178703	-0.189	300
UY3	-0.153610	-0.121711	-0.132993	-0.133370	-0.155161	-0.158	614
UY4	-0.136838	-0.105902	-0.116824	-0.118818	-0.134401	-0.128	914
UY5	-0.122377	-0.093005	-0.102407	-0.106047	-0.116090	-0.100	1219
UY6	-0.110376	-0.082887	-0.090144	-0.095346	-0.100726	-0.082	1524
UY7	-0.100773	-0.075171	-0.080112	-0.086714	-0.088323	-0.065	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 997 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	6	9	7	10	MIN	AVG	MAX
EY1	4000	6586	5828	6525	7897	4000	6167	7897
EY2	3000	3595	4865	4011	5670	3000	4228	5670
EY3	1800	3246	3453	3080	1103	1103	2536	3453
EY4	30000	37293	21984	38017	38629	21984	33184	38629
EY5	200	152	245	165	283	152	209	283
EX5	200	228	260	309	517	200	303	517
EY6	150	194	182	204	227	150	191	227
EX6	150	151	261	296	294	150	230	296
R5	1.00	1.50	1.06	1.88	1.83	1.00	1.45	1.88
R6	1.00	0.78	1.43	1.45	1.29	0.78	1.19	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.246883	-0.200879	-0.219442	-0.196563	-0.193162	-0.220	0
UY2	-0.178703	-0.151043	-0.173042	-0.150272	-0.144901	-0.189	300
UY3	-0.155161	-0.133086	-0.153681	-0.133511	-0.124146	-0.158	614
UY4	-0.134401	-0.116897	-0.136886	-0.118931	-0.109931	-0.128	914
UY5	-0.116090	-0.102465	-0.122409	-0.106136	-0.097959	-0.100	1219
UY6	-0.100726	-0.090189	-0.110396	-0.095415	-0.088256	-0.082	1524
UY7	-0.088323	-0.080147	-0.100787	-0.086767	-0.080610	-0.065	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 1333 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	4	14	15	3	MIN	AVG	MAX
EY1	4427	3334	6950	3522	3412	3334	4329	6950
EY2	2067	4997	2025	3436	2025	2025	2910	4997
EY3	3190	3830	1625	2476	3808	1625	2986	3830
EY4	20641	20212	20179	23280	20166	20166	20896	23280
EY5	256	289	288	193	290	193	263	290
EX5	265	350	404	104	180	104	260	404
EY6	126	106	107	111	160	106	122	160
EX6	89	59	97	57	88	57	78	97
R5	1.03	1.21	1.40	0.54	0.62	0.54	0.96	1.40
R6	0.71	0.55	0.91	0.51	0.55	0.51	0.65	0.91

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.332235	-0.306240	-0.351000	-0.349751	-0.365866	-0.294	0
UY2	-0.230251	-0.229413	-0.247792	-0.258028	-0.257702	-0.154	300
UY3	-0.194694	-0.195285	-0.209058	-0.220139	-0.221454	-0.212	614
UY4	-0.161535	-0.162099	-0.176452	-0.184765	-0.188221	-0.171	914
UY5	-0.132054	-0.131515	-0.147647	-0.152573	-0.159237	-0.132	1219
UY6	-0.107016	-0.104656	-0.123163	-0.124634	-0.135141	-0.111	1524
UY7	-0.086592	-0.082096	-0.103005	-0.101382	-0.115912	-0.087	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	15	6	7	2	MIN	AVG	MAX
EY1	5828	3854	6586	6525	7236	3854	6006	7236
EY2	4865	5703	3595	4011	3829	3595	4401	5703
EY3	3453	1579	3246	3080	2164	1579	2704	3453
EY4	21984	29867	37293	38017	33847	21984	32202	38017
EY5	245	177	152	165	231	152	194	245
EX5	260	116	228	309	506	116	284	506
EY6	182	236	194	204	193	182	202	236
EX6	261	525	151	296	98	98	266	525
R5	1.06	0.66	1.50	1.88	2.20	0.66	1.46	2.20
R6	1.43	2.22	0.78	1.45	0.51	0.51	1.28	2.22

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.293397	-0.268928	-0.268577	-0.262807	-0.258489	-0.294	0
UY2	-0.231359	-0.190861	-0.201946	-0.200915	-0.189807	-0.154	300
UY3	-0.205473	-0.162731	-0.177938	-0.178506	-0.163320	-0.212	614
UY4	-0.183018	-0.141589	-0.156293	-0.159011	-0.140451	-0.171	914
UY5	-0.163662	-0.124342	-0.136996	-0.141904	-0.120150	-0.132	1219
UY6	-0.147601	-0.110812	-0.120583	-0.127571	-0.102919	-0.111	1524
UY7	-0.134753	-0.100496	-0.107158	-0.116008	-0.088806	-0.087	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 1333 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	1	6	9	7	10	MIN	AVG	MAX
EY1	4000	6586	5828	6525	7897	4000	6167	7897
EY2	3000	3595	4865	4011	5670	3000	4228	5670
EY3	1800	3246	3453	3080	1103	1103	2536	3453
EY4	30000	37293	21984	38017	38629	21984	33184	38629
EY5	200	152	245	165	283	152	209	283
EX5	200	228	260	309	517	200	303	517
EY6	150	194	182	204	227	150	191	227
EX6	150	151	261	296	294	150	230	296
R5	1.00	1.50	1.06	1.88	1.83	1.00	1.45	1.88
R6	1.00	0.78	1.43	1.45	1.29	0.78	1.19	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.330086	-0.268577	-0.293397	-0.262807	-0.258260	-0.194	0
UY2	-0.238928	-0.201946	-0.231359	-0.200915	-0.193734	-0.254	300
UY3	-0.207452	-0.177938	-0.205473	-0.178506	-0.165984	-0.212	614
UY4	-0.179696	-0.156293	-0.183018	-0.159011	-0.146979	-0.171	914
UY5	-0.155214	-0.136996	-0.163662	-0.141904	-0.130972	-0.132	1219
UY6	-0.134672	-0.120583	-0.147601	-0.127571	-0.117999	-0.111	1524
UY7	-0.118088	-0.107158	-0.134753	-0.116008	-0.107777	-0.087	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 1423 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	12	7	1	15	3	MIN	AVG	MAX
EY1	3013	3063	3072	3018	3028	3013	3039	3072
EY2	2930	3481	3625	5524	2663	2663	3645	5524
EY3	2597	1055	1065	1197	1028	1028	1388	2597
EY4	34365	34345	35388	38933	38916	34345	36389	38933
EY5	294	226	215	263	172	172	234	294
EX5	684	524	515	555	425	425	540	684
EY6	100	103	103	101	101	100	102	103
EX6	74	65	69	85	59	59	70	85
R5	2.32	2.32	2.39	2.11	2.48	2.11	2.32	2.48
R6	0.74	0.63	0.67	0.84	0.59	0.59	0.69	0.84

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.372666	-0.384933	-0.387002	-0.360436	-0.394674	-0.333	0
UY2	-0.267282	-0.269232	-0.270535	-0.261599	-0.266176	-0.190	300
UY3	-0.231105	-0.225698	-0.228412	-0.223367	-0.223451	-0.143	614
UY4	-0.196278	-0.189151	-0.192510	-0.191211	-0.186452	-0.195	914
UY5	-0.163941	-0.155660	-0.159613	-0.161674	-0.152140	-0.153	1219
UY6	-0.135501	-0.126611	-0.131121	-0.135924	-0.122235	-0.126	1524
UY7	-0.111591	-0.102412	-0.107407	-0.114333	-0.097259	-0.100	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	16	1	9	12	15	MIN	AVG	MAX
EY1	3635	4000	5828	7685	3257	3257	4881	7685
EY2	2752	3000	4865	2591	5279	2591	3697	5279
EY3	2495	1800	3453	3981	1390	1390	2624	3981
EY4	28153	30000	21984	21571	22189	21571	24779	30000
EY5	187	200	245	183	272	183	217	272
EX5	170	200	260	308	521	170	292	521
EY6	175	150	182	144	112	112	153	182
EX6	158	150	261	102	69	69	148	261
R5	0.91	1.00	1.06	1.68	1.92	0.91	1.31	1.92
R6	0.90	1.00	1.43	0.71	0.62	0.62	0.93	1.43

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.350209	-0.352372	-0.313206	-0.358190	-0.367905	-0.333	0
UY2	-0.252474	-0.255059	-0.246979	-0.278775	-0.272690	-0.190	300
UY3	-0.220160	-0.221459	-0.219346	-0.248399	-0.230652	-0.143	614
UY4	-0.191238	-0.191829	-0.195375	-0.220533	-0.194517	-0.195	914
UY5	-0.165968	-0.165694	-0.174711	-0.195583	-0.162205	-0.153	1219
UY6	-0.144979	-0.143765	-0.157567	-0.174122	-0.134496	-0.126	1524
UY7	-0.128238	-0.126061	-0.143851	-0.156356	-0.111589	-0.100	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 500 R: LOAD 1423 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	16	6	9	3	MIN	AVG	MAX
EY1	4000	6951	5738	5987	5911	4000	5717	6951
EY2	3000	2734	2143	2860	4781	2143	3104	4781
EY3	1800	3466	1147	3081	1210	1147	2141	3466
EY4	30000	27769	32650	30124	26946	26946	29498	32650
EY5	200	276	258	212	167	167	213	276
EX5	200	169	514	334	414	169	326	514
EY6	150	112	160	192	179	112	159	192
EX6	150	112	160	192	179	112	159	192
R5	1.00	0.61	2.00	1.57	2.48	0.61	1.53	2.48
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.352372	-0.325236	-0.375024	-0.329962	-0.315446	-0.333	0
UY2	-0.255059	-0.246111	-0.262163	-0.248416	-0.234595	-0.290	300
UY3	-0.221459	-0.215707	-0.225314	-0.220435	-0.198959	-0.243	614
UY4	-0.191829	-0.187562	-0.197096	-0.196109	-0.172231	-0.195	914
UY5	-0.165694	-0.161793	-0.172488	-0.174930	-0.149499	-0.153	1219
UY6	-0.143765	-0.139243	-0.152117	-0.157289	-0.130863	-0.126	1524
UY7	-0.126061	-0.120293	-0.135798	-0.143128	-0.116027	-0.100	1829



ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 696 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	5	10	1	11	MIN	AVG	MAX
EY1	6476	5959	7343	7236	7453	5959	6893	7453
EY2	2280	2659	5703	3829	5743	2280	4043	5743
EY3	2042	3940	3867	2164	3888	2042	3180	3940
EY4	22249	34730	28026	33847	29805	22249	29731	34730
EY5	229	282	177	231	218	177	227	282
EX5	405	262	116	506	486	116	355	506
EY6	248	190	236	193	237	190	221	248
EX6	199	358	175	98	539	98	274	539
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.76	0.93	0.66	2.20	2.23	0.66	1.56	2.23
R6	0.80	1.89	0.74	0.51	2.28	0.51	1.24	2.28

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.127289	-0.130136	-0.101897	-0.131872	-0.098560	-0.111	0
UY2	-0.082237	-0.091661	-0.075864	-0.097229	-0.072173	-0.095	300
UY3	-0.066839	-0.079943	-0.064766	-0.083684	-0.061975	-0.078	614
UY4	-0.055078	-0.069636	-0.055056	-0.072231	-0.053426	-0.062	914
UY5	-0.045315	-0.060645	-0.046531	-0.062040	-0.046142	-0.048	1219
UY6	-0.037515	-0.053156	-0.039348	-0.053367	-0.040161	-0.040	1524
UY7	-0.031456	-0.047148	-0.033520	-0.046237	-0.035415	-0.031	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	12	3	8	2	MIN	AVG	MAX
EY1	7442	6508	6476	5959	7236	5959	6724	7442
EY2	2384	5941	2280	2659	3829	2280	3419	5941
EY3	2265	3757	2042	3940	2164	2042	2833	3940
EY4	28121	32116	22249	34730	33847	22249	30213	34730
EY5	289	227	229	282	231	227	251	289
EX5	191	181	405	262	506	181	309	506
EY6	213	105	248	190	193	105	190	248
EX6	428	199	199	358	98	98	256	428
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.66	0.80	1.76	0.93	2.20	0.66	1.27	2.20
R6	2.01	1.89	0.80	1.89	0.51	0.51	1.42	2.01

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.113067	-0.122159	-0.127236	-0.130047	-0.131737	-0.111	0
UY2	-0.071653	-0.095222	-0.082172	-0.091559	-0.097084	-0.095	300
UY3	-0.058363	-0.083386	-0.066789	-0.079862	-0.083568	-0.078	614
UY4	-0.048117	-0.072344	-0.055052	-0.069589	-0.072156	-0.062	914
UY5	-0.039548	-0.062105	-0.045305	-0.060623	-0.061996	-0.048	1219
UY6	-0.032664	-0.053032	-0.037514	-0.053151	-0.053345	-0.040	1524
UY7	-0.027280	-0.045325	-0.031459	-0.047152	-0.046230	-0.031	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 696 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	1	4	10	16	9	MIN	AVG	MAX
EY1	6476	5959	7343	7022	7442	5959	6848	7442
EY2	2280	2659	5703	5984	2384	2280	3802	5984
EY3	2042	3940	3867	3992	2265	2042	3221	3992
EY4	22249	34730	20603	20046	28121	20046	25150	34730
EY5	229	282	177	276	289	177	251	289
EX5	405	262	116	620	191	116	319	620
EY6	248	190	236	234	213	190	224	248
EX6	199	358	525	418	428	199	386	525
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.76	0.93	0.66	2.25	0.66	0.66	1.25	2.25
R6	0.80	1.89	2.22	1.79	2.01	0.80	1.74	2.22

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.127236	-0.130047	-0.118954	-0.118375	-0.113067	-0.111	0
UY2	-0.082172	-0.091559	-0.092503	-0.092223	-0.071653	-0.095	300
UY3	-0.066789	-0.079862	-0.081219	-0.081246	-0.058363	-0.078	614
UY4	-0.055052	-0.069589	-0.071908	-0.072064	-0.048117	-0.062	914
UY5	-0.045305	-0.060623	-0.064073	-0.064262	-0.039548	-0.048	1219
UY6	-0.037514	-0.053151	-0.057701	-0.057858	-0.032664	-0.040	1524
UY7	-0.031459	-0.047152	-0.052692	-0.052782	-0.027280	-0.031	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 997 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	13	2	4	11	MIN	AVG	MAX
EY1	4101	6749	7236	6369	6352	4101	6161	7236
EY2	2117	2383	3829	5518	4096	2117	3589	5518
EY3	2167	3035	2164	2494	2571	2164	2486	3035
EY4	25612	32998	33847	30420	23252	23252	29226	33847
EY5	242	223	231	250	213	213	232	250
EX5	405	651	604	438	442	405	508	651
EY6	239	206	193	238	234	193	222	239
EX6	121	104	98	120	118	98	112	121
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.67	2.91	2.62	1.75	2.08	1.67	2.21	2.91
R6	0.50	0.50	0.51	0.50	0.50	0.50	0.51	0.51

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.215076	-0.193475	-0.188470	-0.169208	-0.197208	-0.179	0
UY2	-0.138679	-0.135577	-0.138853	-0.125021	-0.148426	-0.152	300
UY3	-0.114912	-0.116610	-0.119534	-0.106524	-0.128648	-0.125	614
UY4	-0.095414	-0.100101	-0.103226	-0.091134	-0.112067	-0.100	914
UY5	-0.078883	-0.085438	-0.088700	-0.077701	-0.097729	-0.077	1219
UY6	-0.065518	-0.073021	-0.076328	-0.066434	-0.085804	-0.064	1524
UY7	-0.055088	-0.062884	-0.066151	-0.057307	-0.076221	-0.051	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	13	4	10	6	MIN	AVG	MAX
EY1	6476	6785	5959	7343	7897	5959	6892	7897
EY2	2280	5984	2659	5703	5670	2280	4459	5984
EY3	2042	1926	3940	3867	1103	1103	2576	3940
EY4	22249	20070	34730	20603	38629	20070	27256	38629
EY5	229	289	282	177	283	177	252	289
EX5	477	817	293	123	610	123	464	817
EY6	248	231	190	236	227	190	226	248
EX6	199	494	358	525	294	199	374	525
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.08	2.83	1.04	0.70	2.16	0.70	1.76	2.83
R6	0.80	2.14	1.89	2.22	1.29	0.80	1.67	2.22

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.182074	-0.182173	-0.186229	-0.170383	-0.189109	-0.179	0
UY2	-0.117544	-0.138680	-0.131104	-0.132495	-0.142881	-0.152	300
UY3	-0.095552	-0.119974	-0.114365	-0.116337	-0.122619	-0.125	614
UY4	-0.078775	-0.106105	-0.099663	-0.103004	-0.108904	-0.100	914
UY5	-0.064835	-0.094735	-0.086828	-0.091783	-0.097355	-0.077	1219
UY6	-0.053690	-0.085644	-0.076130	-0.082659	-0.087956	-0.064	1524
UY7	-0.045028	-0.078561	-0.067541	-0.075485	-0.080520	-0.051	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 997 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	12	2	8	10	6	MIN	AVG	MAX
EY1	6508	7236	5959	7897	6586	5959	6837	7897
EY2	5941	3829	2659	5670	3595	2659	4339	5941
EY3	3757	2164	3940	1103	3246	1103	2842	3940
EY4	32116	33847	34730	38629	37293	32116	35323	38629
EY5	227	231	282	283	152	152	235	283
EX5	181	506	262	517	228	181	339	517
EY6	105	193	190	227	194	105	182	227
EX6	199	98	358	294	151	98	220	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.80	2.20	0.93	1.83	1.50	0.80	1.45	2.20
R6	1.89	0.51	1.89	1.29	0.78	0.51	1.27	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DFL(mm)	SENSOR DISTANCE(mm)
UY1	-0.174989	-0.188710	-0.186289	-0.189253	-0.196770	-0.179	0
UY2	-0.136403	-0.139070	-0.131155	-0.143010	-0.148217	-0.152	300
UY3	-0.119448	-0.119708	-0.114400	-0.122716	-0.130728	-0.125	614
UY4	-0.103631	-0.103361	-0.099685	-0.108974	-0.115279	-0.100	914
UY5	-0.088964	-0.088807	-0.086840	-0.097406	-0.101456	-0.077	1219
UY6	-0.075967	-0.076415	-0.076137	-0.087992	-0.089654	-0.064	1524
UY7	-0.064926	-0.066223	-0.067544	-0.080547	-0.079956	-0.051	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 1299 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	4	14	13	6	12	MIN	AVG	MAX
EY1	5959	6760	4328	7897	6255	4328	6240	7897
EY2	2659	5530	5673	5670	5281	2659	4963	5673
EY3	3940	3727	3771	1103	3588	1103	3226	3940
EY4	34730	25701	20876	38629	21369	20876	28261	38629
EY5	282	248	285	283	255	248	271	285
EX5	262	299	655	517	287	262	404	655
EY6	190	193	202	227	190	190	201	227
EX6	358	310	244	294	238	238	289	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.93	1.20	2.30	1.83	1.12	0.93	1.48	2.30
R6	1.89	1.60	1.21	1.29	1.25	1.21	1.45	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.242454	-0.218712	-0.224771	-0.246431	-0.250263	-0.232	0
UY2	-0.170622	-0.166684	-0.164810	-0.186176	-0.194707	-0.203	300
UY3	-0.148802	-0.145277	-0.140958	-0.159729	-0.170783	-0.167	614
UY4	-0.129648	-0.126733	-0.120171	-0.141824	-0.150281	-0.133	914
UY5	-0.112938	-0.110557	-0.102164	-0.126760	-0.132476	-0.103	1219
UY6	-0.099020	-0.096984	-0.087207	-0.114508	-0.117583	-0.086	1524
UY7	-0.087852	-0.086005	-0.075262	-0.104822	-0.105571	-0.068	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	1	15	12	13	11	MIN	AVG	MAX
EY1	6476	7760	7861	6996	7829	6476	7384	7861
EY2	2280	5990	5952	5980	5928	2280	5226	5990
EY3	2042	2731	3975	3992	3969	2042	3342	3992
EY4	22249	20043	20104	20049	20133	20043	20516	22249
EY5	229	294	185	264	159	159	226	294
EX5	405	507	415	642	343	343	462	642
EY6	248	249	245	248	247	245	247	249
EX6	199	393	414	398	432	199	367	432
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.76	1.72	2.24	2.43	2.16	1.72	2.06	2.43
R6	0.80	1.58	1.69	1.61	1.75	0.80	1.48	1.75

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.237471	-0.225372	-0.223854	-0.222864	-0.222820	-0.232	0
UY2	-0.153364	-0.174868	-0.175737	-0.174194	-0.173869	-0.203	300
UY3	-0.124653	-0.152968	-0.154720	-0.153608	-0.152817	-0.167	614
UY4	-0.102749	-0.135829	-0.137436	-0.136580	-0.135463	-0.133	914
UY5	-0.084556	-0.121542	-0.122861	-0.122183	-0.120893	-0.103	1219
UY6	-0.070015	-0.109964	-0.110966	-0.110421	-0.109051	-0.086	1524
UY7	-0.058715	-0.100857	-0.101578	-0.101138	-0.099738	-0.068	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 1299 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	12	2	8	10	6	MIN	AVG	MAX
EY1	6508	7236	5959	7897	6586	5959	6837	7897
EY2	5941	3829	2659	5670	3595	2659	4339	5941
EY3	3757	2164	3940	1103	3246	1103	2842	3940
EY4	32116	33847	34730	38629	37293	32116	35323	38629
EY5	227	231	282	283	152	152	235	283
EX5	181	506	262	517	228	181	339	517
EY6	105	193	190	227	194	105	182	227
EX6	199	98	358	294	151	98	220	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.80	2.20	0.93	1.83	1.50	0.80	1.45	2.20
R6	1.89	0.51	1.89	1.29	0.78	0.51	1.27	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.227995	-0.245872	-0.242717	-0.246580	-0.256373	-0.132	0
UY2	-0.177721	-0.181196	-0.170883	-0.186329	-0.193114	-0.203	300
UY3	-0.155630	-0.155969	-0.149053	-0.159888	-0.170327	-0.167	614
UY4	-0.135021	-0.134670	-0.129880	-0.141983	-0.150197	-0.133	914
UY5	-0.115912	-0.115708	-0.113145	-0.126910	-0.132188	-0.103	1219
UY6	-0.098979	-0.099562	-0.099199	-0.114646	-0.116811	-0.086	1524
UY7	-0.084593	-0.086283	-0.088004	-0.104946	-0.104175	-0.068	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 1393 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	14	2	4	5	10	MIN	AVG	MAX
EY1	7297	5388	5738	3695	7927	3695	6009	7927
EY2	2534	5217	2143	3065	5676	2143	3727	5676
EY3	3711	3509	1147	3721	2817	1147	2981	3721
EY4	20526	22365	32650	26246	30200	20526	26397	32650
EY5	176	264	258	223	155	155	215	264
EX5	143	444	514	335	293	143	346	514
EY6	174	207	160	206	123	123	174	207
EX6	144	130	356	388	277	130	259	388
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.81	1.68	2.00	1.51	1.89	0.81	1.58	2.00
R6	0.83	0.63	2.23	1.89	2.26	0.63	1.57	2.26

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.290448	-0.263393	-0.325897	-0.267128	-0.239617	-0.260	0
UY2	-0.211934	-0.199572	-0.219584	-0.182581	-0.185660	-0.231	300
UY3	-0.181959	-0.172651	-0.185141	-0.156082	-0.161242	-0.191	614
UY4	-0.156545	-0.149147	-0.160740	-0.133282	-0.140241	-0.151	914
UY5	-0.134421	-0.128547	-0.139773	-0.113870	-0.121292	-0.118	1219
UY6	-0.115857	-0.111211	-0.122644	-0.098106	-0.104844	-0.098	1524
UY7	-0.100802	-0.097167	-0.109075	-0.085798	-0.091079	-0.077	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	1	2	4	6	9	MIN	AVG	MAX
EY1	5911	5388	3695	5987	7927	3695	5782	7927
EY2	4781	5217	3065	2860	5676	2860	4320	5676
EY3	1210	3509	3721	3081	2817	1210	2868	3721
EY4	26946	22365	26246	30124	30200	22365	27176	30200
EY5	167	264	223	212	155	155	204	264
EX5	414	444	335	334	293	293	364	444
EY6	179	207	206	192	123	123	181	207
EX6	316	130	388	314	277	130	285	388
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.48	1.68	1.51	1.57	1.89	1.51	1.83	2.48
R6	1.76	0.63	1.89	1.63	2.26	0.63	1.63	2.26

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.262968	-0.263393	-0.267128	-0.251654	-0.239617	-0.260	0
UY2	-0.184507	-0.199572	-0.182581	-0.174679	-0.185660	-0.231	300
UY3	-0.151884	-0.172651	-0.156082	-0.149877	-0.161242	-0.191	614
UY4	-0.128298	-0.149147	-0.133282	-0.128669	-0.140241	-0.151	914
UY5	-0.108454	-0.128547	-0.113870	-0.110237	-0.121292	-0.118	1219
UY6	-0.092351	-0.111211	-0.098106	-0.094929	-0.104844	-0.098	1524
UY7	-0.079639	-0.097167	-0.085798	-0.082665	-0.091079	-0.077	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 600 L: LOAD 1393 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	11	7	15	1	10	MIN	AVG	MAX
EY1	7753	5531	7936	7236	7202	5531	7132	7936
EY2	5682	3660	5957	3829	5156	3660	4857	5957
EY3	1193	2844	1055	2164	1534	1055	1758	2844
EY4	20230	30717	22332	33847	20726	20230	25571	33847
EY5	262	235	293	231	191	191	242	293
EX5	650	501	730	506	465	465	571	730
EY6	248	207	202	193	238	193	218	248
EX6	248	207	202	193	238	193	218	248
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.49	2.14	2.49	2.20	2.43	2.14	2.35	2.49
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.264214	-0.259044	-0.253195	-0.287847	-0.238651	-0.260	0
UY2	-0.195033	-0.185221	-0.184525	-0.217909	-0.172553	-0.231	300
UY3	-0.162755	-0.159444	-0.150529	-0.192014	-0.142337	-0.191	614
UY4	-0.140677	-0.137492	-0.127013	-0.170779	-0.120261	-0.151	914
UY5	-0.122932	-0.118380	-0.107663	-0.152172	-0.102032	-0.118	1219
UY6	-0.108942	-0.102464	-0.092070	-0.136556	-0.087371	-0.098	1524
UY7	-0.098129	-0.089683	-0.079784	-0.123870	-0.075884	-0.077	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 688 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	16	9	13	12	MIN	AVG	MAX
EY1	5808	5735	6511	7352	5835	5735	6248	7352
EY2	2555	3040	3596	2124	2424	2124	2748	3596
EY3	2598	1360	2224	3600	3121	1360	2581	3600
EY4	39121	31543	39428	31248	39336	31248	36135	39428
EY5	273	294	253	292	228	228	268	294
EX5	666	304	622	726	500	304	564	726
EY6	130	132	122	108	160	108	130	160
EX6	69	67	64	55	83	55	68	83
R5	2.44	1.04	2.46	2.48	2.20	1.04	2.12	2.48
R6	0.53	0.51	0.52	0.51	0.52	0.51	0.52	0.53

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL(mm)	SENSOR DISTANCE(mm)
UY1	-0.118339	-0.123493	-0.111637	-0.120532	-0.108588	-0.111	0
UY2	-0.080568	-0.083655	-0.079608	-0.085104	-0.071310	-0.085	300
UY3	-0.068232	-0.068508	-0.067675	-0.072141	-0.059675	-0.069	614
UY4	-0.057943	-0.057016	-0.057848	-0.061540	-0.050003	-0.056	914
UY5	-0.048184	-0.046427	-0.048530	-0.051471	-0.040921	-0.043	1219
UY6	-0.039473	-0.037158	-0.040148	-0.042414	-0.032903	-0.038	1524
UY7	-0.032013	-0.029343	-0.032916	-0.034581	-0.026105	-0.030	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	3	12	2	8	10	MIN	AVG	MAX
EY1	6476	6508	7236	5959	7897	5959	6815	7897
EY2	2280	5941	3829	2659	5670	2280	4076	5941
EY3	2042	3757	2164	3940	1103	1103	2601	3940
EY4	22249	32116	33847	34730	38629	22249	32314	38629
EY5	229	227	231	282	283	227	250	283
EX5	405	181	506	262	517	181	374	517
EY6	249	105	191	189	228	105	193	249
EX6	199	199	98	358	294	98	230	358
R5	1.76	0.80	2.20	0.93	1.83	0.80	1.50	2.20
R6	0.80	1.89	0.51	1.89	1.29	0.51	1.28	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL(mm)	SENSOR DISTANCE(mm)
UY1	-0.111900	-0.109207	-0.116777	-0.117662	-0.119736	-0.111	0
UY2	-0.073736	-0.083991	-0.086440	-0.083345	-0.091802	-0.085	300
UY3	-0.060381	-0.074444	-0.075110	-0.073322	-0.079839	-0.069	614
UY4	-0.051049	-0.065886	-0.066218	-0.065251	-0.072105	-0.056	914
UY5	-0.043015	-0.057800	-0.058092	-0.057958	-0.065492	-0.043	1219
UY6	-0.036402	-0.050521	-0.051025	-0.051725	-0.059959	-0.038	1524
UY7	-0.031116	-0.044244	-0.045097	-0.046594	-0.055485	-0.030	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 688 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	3	12	2	8	14	MIN	AVG	MAX
EY1	6476	6508	7236	5959	7442	5959	6724	7442
EY2	2280	5941	3829	2659	2384	2280	3419	5941
EY3	2042	3757	2164	3940	2265	2042	2833	3940
EY4	22249	32116	33847	34730	28121	22249	30213	34730
EY5	229	227	231	282	289	227	251	289
EX5	405	181	506	262	191	181	309	506
EY6	248	105	193	190	213	105	190	248
EX6	199	199	98	358	428	98	256	428
R5	1.76	0.80	2.20	0.93	0.66	0.66	1.27	2.20
R6	0.80	1.89	0.51	1.89	2.01	0.51	1.42	2.01

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.111900	-0.109207	-0.116777	-0.117662	-0.099200	-0.111	0
UY2	-0.073736	-0.083991	-0.086440	-0.083345	-0.064403	-0.085	300
UY3	-0.060381	-0.074444	-0.075110	-0.073322	-0.052706	-0.069	614
UY4	-0.051049	-0.065886	-0.066218	-0.065251	-0.044598	-0.056	914
UY5	-0.043015	-0.057800	-0.058092	-0.057958	-0.037557	-0.043	1219
UY6	-0.036402	-0.050521	-0.051025	-0.051725	-0.031747	-0.038	1524
UY7	-0.031116	-0.044244	-0.045097	-0.046594	-0.027086	-0.030	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 976 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	1	4	12	13	5	MIN	AVG	MAX
EY1	3960	5266	5886	5099	4038	3960	4850	5886
EY2	2431	2128	2028	2029	3307	2028	2385	3307
EY3	2475	1439	2065	1292	1350	1292	1724	2475
EY4	38659	34986	34731	39857	39607	34731	37568	39857
EY5	166	189	151	220	155	151	176	220
EX5	423	453	214	517	446	214	411	517
EY6	226	242	239	248	137	137	218	248
EX6	114	122	120	130	69	69	111	130
R5	2.54	2.39	1.42	2.35	2.88	1.42	2.32	2.88
R6	0.50	0.50	0.50	0.52	0.50	0.50	0.51	0.52

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.186333	-0.184445	-0.182995	-0.185846	-0.198761	-0.171	0
UY2	-0.121393	-0.121407	-0.123984	-0.119331	-0.134780	-0.136	300
UY3	-0.103845	-0.101076	-0.104953	-0.098628	-0.113651	-0.112	614
UY4	-0.089724	-0.087194	-0.091320	-0.085021	-0.097190	-0.090	914
UY5	-0.076868	-0.074851	-0.079114	-0.072906	-0.081804	-0.071	1219
UY6	-0.065867	-0.064476	-0.068785	-0.062744	-0.068206	-0.059	1524
UY7	-0.056830	-0.056069	-0.060347	-0.054535	-0.056689	-0.047	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	10	15	7	8	6	MIN	AVG	MAX
EY1	7897	4473	6525	5959	6586	4473	6288	7897
EY2	5670	5910	4011	2659	3595	2659	4369	5910
EY3	1103	3317	3080	3940	3246	1103	2937	3940
EY4	38629	39574	38017	34730	37293	34730	37648	39574
EY5	283	187	165	282	152	152	214	283
EX5	610	179	365	293	266	179	343	610
EY6	227	245	204	190	194	190	212	245
EX6	294	355	296	358	151	151	291	358
R5	2.16	0.96	2.22	1.04	1.75	0.96	1.63	2.22
R6	1.29	1.45	1.45	1.89	0.78	0.78	1.37	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.169748	-0.169543	-0.174565	-0.166870	-0.175633	-0.171	0
UY2	-0.130130	-0.124622	-0.134079	-0.118194	-0.132519	-0.136	300
UY3	-0.113180	-0.111865	-0.120648	-0.103986	-0.118078	-0.112	614
UY4	-0.102228	-0.101228	-0.109858	-0.092547	-0.106184	-0.090	914
UY5	-0.092862	-0.091727	-0.100062	-0.082208	-0.095240	-0.071	1219
UY6	-0.085024	-0.083659	-0.091606	-0.073371	-0.085684	-0.059	1524
UY7	-0.078685	-0.077074	-0.084584	-0.066095	-0.077659	-0.047	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 976 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI(MPa)

SET	2	8	12	3	10	MIN	AVG	MAX
EY1	7236	5959	6508	6476	7897	5959	6815	7897
EY2	3829	2659	5941	2280	5670	2280	4076	5941
EY3	2164	3940	3757	2042	1103	1103	2601	3940
EY4	33847	34730	32116	22249	38629	22249	32314	38629
EY5	231	282	227	229	283	227	250	283
EX5	506	262	181	405	517	181	374	517
EY6	193	190	105	248	227	105	193	248
EX6	98	358	199	199	294	98	230	358
R5	2.20	0.93	0.80	1.76	1.83	0.80	1.50	2.20
R6	0.51	1.89	1.89	0.80	1.29	0.51	1.28	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL(mm)	SENSOR DISTANCE(mm)
UY1	-0.165660	-0.166915	-0.154922	-0.158741	-0.169858	-0.171	0
UY2	-0.122624	-0.118234	-0.119149	-0.104602	-0.130231	-0.136	300
UY3	-0.106551	-0.104015	-0.105607	-0.085657	-0.113259	-0.112	614
UY4	-0.093937	-0.092565	-0.093466	-0.072418	-0.102288	-0.090	914
UY5	-0.082410	-0.082220	-0.081995	-0.061021	-0.092907	-0.071	1219
UY6	-0.072384	-0.073378	-0.071669	-0.051640	-0.085058	-0.059	1524
UY7	-0.063974	-0.066099	-0.062765	-0.044142	-0.078712	-0.047	1819

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 1391 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	12	6	2	1	MIN	AVG	MAX
EY1	4918	3397	3907	7431	5807	3397	5092	7431
EY2	2494	4113	4216	4451	5871	2494	4229	5871
EY3	1007	1006	1010	1022	1080	1006	1025	1080
EY4	36279	38943	23292	32291	39680	23292	34097	39680
EY5	150	262	151	151	155	150	174	262
EX5	336	636	228	274	385	228	372	636
EY6	125	123	174	106	129	106	132	174
EX6	69	64	126	160	105	64	105	160
R5	2.24	2.42	1.51	1.81	2.48	1.51	2.09	2.48
R6	0.55	0.52	0.72	1.50	0.81	0.52	0.82	1.50

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.294275	-0.279872	-0.299617	-0.257997	-0.257440	-0.278	0
UY2	-0.198868	-0.185021	-0.205070	-0.191077	-0.189120	-0.207	300
UY3	-0.163972	-0.152451	-0.169676	-0.160506	-0.160413	-0.169	614
UY4	-0.139133	-0.127805	-0.144245	-0.139034	-0.139552	-0.135	914
UY5	-0.116181	-0.104843	-0.122210	-0.119832	-0.120607	-0.106	1219
UY6	-0.096045	-0.084501	-0.103833	-0.103141	-0.103996	-0.089	1524
UY7	-0.079087	-0.067266	-0.088995	-0.089137	-0.089991	-0.072	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	15	6	7	13	MIN	AVG	MAX
EY1	5828	3854	6586	6525	7685	3854	6095	7685
EY2	4865	5703	3595	4011	2591	2591	4153	5703
EY3	3453	3867	3246	3080	3981	3080	3525	3981
EY4	21984	34756	37293	38017	21571	21571	30724	38017
EY5	245	177	152	165	183	152	184	245
EX5	260	116	228	309	308	116	244	309
EY6	182	236	194	204	144	144	192	236
EX6	261	294	151	296	102	102	221	296
R5	1.06	0.66	1.50	1.88	1.68	0.66	1.36	1.88
R6	1.43	1.25	0.78	1.45	0.71	0.71	1.12	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	OBSERVED DEFL (mm)					SENSOR DISTANCE (mm)	
UY1	-0.282209	-0.254008	-0.250431	-0.248969	-0.307842	-0.278	0
UY2	-0.221971	-0.187341	-0.188977	-0.191256	-0.243983	-0.207	300
UY3	-0.200076	-0.168935	-0.168377	-0.172090	-0.219574	-0.169	614
UY4	-0.181884	-0.152885	-0.151410	-0.156688	-0.199456	-0.135	914
UY5	-0.165684	-0.138442	-0.135799	-0.142705	-0.180938	-0.106	1219
UY6	-0.151834	-0.126111	-0.122169	-0.130635	-0.164669	-0.089	1524
UY7	-0.140416	-0.116021	-0.110722	-0.120613	-0.150890	-0.072	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 650 R: LOAD 1391 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	7	8	4	3	13	MIN	AVG	MAX
EY1	3695	6442	5388	5911	7927	3695	5872	7927
EY2	3065	3903	5217	4781	5676	3065	4528	5676
EY3	3721	3564	3509	1210	2817	1210	2965	3721
EY4	26246	20379	22365	26946	30200	20379	25227	30200
EY5	223	202	264	167	155	155	202	264
EX5	335	341	444	414	293	293	365	444
EY6	206	134	207	179	123	123	170	207
EX6	206	134	207	179	123	123	170	207
R5	1.51	1.68	1.68	2.48	1.89	1.51	1.85	2.48
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.260462	-0.262990	-0.250233	-0.275465	-0.239094	-0.278	0
UY2	-0.176382	-0.200390	-0.188207	-0.206811	-0.189925	-0.207	300
UY3	-0.153306	-0.175866	-0.166386	-0.178221	-0.169077	-0.169	614
UY4	-0.133409	-0.154880	-0.148120	-0.157882	-0.151443	-0.135	914
UY5	-0.115559	-0.135645	-0.131880	-0.140167	-0.134973	-0.106	1219
UY6	-0.100396	-0.118745	-0.118029	-0.125194	-0.120231	-0.089	1524
UY7	-0.088038	-0.104450	-0.106643	-0.112949	-0.107549	-0.072	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 721 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	5	1	2	12	11	MIN	AVG	MAX
EY1	5959	7236	6476	7453	7343	5959	6893	7453
EY2	2659	3829	2280	5743	5703	2280	4043	5743
EY3	3940	2164	2042	1484	3867	1484	2699	3940
EY4	34730	33847	22249	24304	30899	22249	29206	34730
EY5	282	231	229	182	207	182	226	282
EX5	262	506	405	110	136	110	284	506
EY6	190	193	248	237	236	190	221	248
EX6	358	98	199	539	175	98	274	539
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.93	2.20	1.76	0.61	0.66	0.61	1.23	2.20
R6	1.89	0.51	0.80	2.28	0.74	0.51	1.24	2.28

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.124511	-0.123797	-0.118983	-0.104716	-0.095751	-0.107	0
UY2	-0.088013	-0.091471	-0.078072	-0.073898	-0.070573	-0.092	300
UY3	-0.077458	-0.079496	-0.063984	-0.061055	-0.061187	-0.079	614
UY4	-0.068807	-0.069972	-0.053986	-0.052225	-0.053186	-0.064	914
UY5	-0.061012	-0.061271	-0.045391	-0.044896	-0.045942	-0.051	1219
UY6	-0.054364	-0.053713	-0.038331	-0.038971	-0.039679	-0.045	1524
UY7	-0.048902	-0.047380	-0.032699	-0.034301	-0.034470	-0.037	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	12	3	2	8	MIN	AVG	MAX
EY1	7442	6508	6476	7236	5959	5959	6724	7442
EY2	2384	5941	2280	3829	2659	2280	3419	5941
EY3	2265	3757	2042	2164	3940	2042	2833	3940
EY4	28121	32116	22249	33847	34730	22249	30213	34730
EY5	289	227	229	231	282	227	251	289
EX5	191	181	405	506	262	181	309	506
EY6	213	105	248	193	190	105	190	248
EX6	428	199	199	98	358	98	256	428
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.66	0.80	1.76	2.20	0.93	0.66	1.27	2.20
R6	2.01	1.89	0.80	0.51	1.89	0.51	1.42	2.01

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.105450	-0.115491	-0.118935	-0.123677	-0.124430	-0.107	0
UY2	-0.068083	-0.088898	-0.078013	-0.091341	-0.087919	-0.092	300
UY3	-0.055780	-0.078760	-0.063932	-0.079383	-0.077377	-0.079	614
UY4	-0.047110	-0.069608	-0.053955	-0.069892	-0.068755	-0.064	914
UY5	-0.039596	-0.060971	-0.045376	-0.061221	-0.060983	-0.051	1219
UY6	-0.033405	-0.053203	-0.038325	-0.053685	-0.054352	-0.045	1524
UY7	-0.028447	-0.046512	-0.032699	-0.047369	-0.048902	-0.037	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 721 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	11	12	4	1	14	MIN	AVG	MAX
EY1	7829	7861	5959	6476	7969	5959	7219	7969
EY2	5928	5952	2659	2280	5983	2280	4560	5983
EY3	3969	3975	3940	2042	3992	2042	1584	3992
EY4	20133	20104	34730	22249	20046	20046	23452	34730
EY5	259	267	282	229	272	229	262	282
EX5	138	275	262	405	601	138	336	601
EY6	247	248	190	248	249	190	236	249
EX6	603	563	358	199	432	199	431	603
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.53	1.03	0.93	1.76	2.21	0.53	1.29	2.21
R6	2.44	2.27	1.89	0.80	1.73	0.80	1.83	2.44

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.109334	-0.110001	-0.124430	-0.118935	-0.112659	-0.107	0
UY2	-0.084865	-0.085621	-0.087919	-0.078013	-0.088522	-0.092	300
UY3	-0.075378	-0.076220	-0.077377	-0.063932	-0.079156	-0.079	614
UY4	-0.067807	-0.068714	-0.068755	-0.053955	-0.071627	-0.064	914
UY5	-0.061298	-0.062248	-0.060983	-0.045376	-0.065100	-0.051	1219
UY6	-0.055893	-0.056867	-0.054352	-0.038325	-0.059636	-0.045	1524
UY7	-0.051551	-0.052536	-0.048902	-0.032699	-0.055213	-0.037	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1011 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	9	2	15	11	MIN	AVG	MAX
EY1	3806	5772	7236	3207	6809	3207	5366	7236
EY2	5959	4991	3829	2917	4174	2917	4374	5959
EY3	1606	2146	2164	1312	3490	1312	2143	3490
EY4	25528	26778	33847	33573	38525	25528	31650	38525
EY5	277	192	231	181	246	181	225	277
EX5	469	494	604	145	138	138	370	604
EY6	233	107	193	245	226	107	201	245
EX6	117	193	98	243	246	98	179	246
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.69	2.58	2.62	0.80	0.56	0.56	1.65	2.62
R6	0.50	1.81	0.51	0.99	1.09	0.50	0.98	1.81

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.192095	-0.174761	-0.173180	-0.208200	-0.161569	0
UY2	-0.135972	-0.129596	-0.127855	-0.130654	-0.121186	300
UY3	-0.116559	-0.111636	-0.111125	-0.109877	-0.108146	614
UY4	-0.101455	-0.096750	-0.097853	-0.094912	-0.097322	914
UY5	-0.088213	-0.083026	-0.085722	-0.081909	-0.087489	1219
UY6	-0.077079	-0.070900	-0.075175	-0.071274	-0.079016	1524
UY7	-0.068041	-0.060595	-0.066334	-0.062892	-0.071993	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	3	12	2	8	10	MIN	AVG	MAX
EY1	6476	6508	7236	5959	7897	5959	6815	7897
EY2	2280	5941	3829	2659	5670	2280	4076	5941
EY3	2042	3757	2164	3940	1103	1103	2601	3940
EY4	22249	32116	33847	34730	38629	22249	32314	38629
EY5	229	227	231	282	283	227	250	283
EX5	405	181	506	262	517	181	374	517
EY6	248	105	193	190	227	105	193	248
EX6	199	199	98	358	294	98	230	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.76	0.80	2.20	0.93	1.83	0.80	1.50	2.20
R6	0.80	1.89	0.51	1.89	1.29	0.51	1.28	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.166773	-0.161943	-0.173422	-0.174479	-0.177514	0
UY2	-0.109391	-0.124655	-0.128079	-0.123281	-0.135691	300
UY3	-0.089647	-0.110438	-0.111312	-0.108499	-0.117916	614
UY4	-0.075657	-0.097605	-0.098004	-0.096409	-0.106401	914
UY5	-0.063627	-0.085494	-0.085845	-0.085512	-0.096539	1219
UY6	-0.053740	-0.074603	-0.075278	-0.076214	-0.088298	1524
UY7	-0.045851	-0.065220	-0.066421	-0.068572	-0.081644	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1011 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	2	12	8	10	6	MIN	AVG	MAX
EY1	7236	6508	5959	7897	6586	5959	6837	7897
EY2	3829	5941	2659	5670	3595	2659	4339	5941
EY3	2164	3757	3940	1103	3246	1103	2842	3940
EY4	33847	32116	34730	38629	37293	32116	35323	38629
EY5	231	227	282	283	152	152	235	283
EX5	506	181	262	517	228	181	339	517
EY6	193	105	190	227	194	105	182	227
EX6	98	199	358	294	151	98	220	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.20	0.80	0.93	1.83	1.50	0.80	1.45	2.20
R6	0.51	1.89	1.89	1.29	0.78	0.51	1.27	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DFL(mm)	SENSOR DISTANCE(mm)
UY1	-0.173422	-0.161943	-0.174479	-0.177514	-0.183922	-0.165	0
UY2	-0.128079	-0.124655	-0.123281	-0.135691	-0.138630	-0.145	300
UY3	-0.111312	-0.110438	-0.108499	-0.117916	-0.123518	-0.124	614
UY4	-0.098004	-0.097605	-0.096409	-0.106401	-0.110909	-0.103	914
UY5	-0.085845	-0.085494	-0.085512	-0.096539	-0.099319	-0.083	1219
UY6	-0.075278	-0.074603	-0.076214	-0.088298	-0.089210	-0.071	1524
UY7	-0.066421	-0.065220	-0.068572	-0.081644	-0.080729	-0.058	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1335 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	4	15	6	14	11	MIN	AVG	MAX
EY1	5959	3906	7897	6755	7453	3906	6394	7897
EY2	2659	5959	5670	5830	5743	2659	5172	5959
EY3	3940	3961	1103	3234	3888	1103	3225	3961
EY4	34730	37049	38629	24145	20360	20360	30983	38629
EY5	282	161	283	176	182	161	217	283
EX5	262	165	517	400	405	165	350	517
EY6	190	246	227	240	237	190	228	246
EX6	358	568	294	363	378	294	392	568
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.93	1.03	1.83	2.27	2.23	0.93	1.66	2.27
R6	1.89	2.31	1.29	1.51	1.59	1.29	1.72	2.31

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.230135	-0.228790	-0.234251	-0.225765	-0.222926	-0.220	0
UY2	-0.162532	-0.163583	-0.179022	-0.174279	-0.173825	-0.194	300
UY3	-0.143019	-0.145955	-0.155543	-0.155002	-0.154923	-0.166	614
UY4	-0.127067	-0.130987	-0.140336	-0.139706	-0.139657	-0.138	914
UY5	-0.112696	-0.117823	-0.127315	-0.126455	-0.126450	-0.109	1219
UY6	-0.100440	-0.106807	-0.116441	-0.115382	-0.115420	-0.094	1524
UY7	-0.090371	-0.097946	-0.107663	-0.106434	-0.106507	-0.076	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	1	10	4	6	12	MIN	AVG	MAX
EY1	6476	7343	5959	7897	7861	5959	7107	7897
EY2	2280	5703	2659	5670	5952	2280	4453	5952
EY3	2042	3867	3940	1103	3975	1103	2985	3975
EY4	22249	20603	34730	38629	20104	20104	27263	38629
EY5	229	177	282	283	239	177	242	283
EX5	405	116	262	517	536	116	367	536
EY6	248	236	190	227	248	190	230	248
EX6	199	525	358	294	569	199	389	569
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.76	0.66	0.93	1.83	2.24	0.66	1.48	2.24
R6	0.80	2.22	1.89	1.29	2.30	0.80	1.70	2.30

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.220219	-0.214586	-0.230395	-0.234403	-0.205379	-0.220	0
UY2	-0.144448	-0.166973	-0.162790	-0.179177	-0.159179	-0.194	300
UY3	-0.118377	-0.148551	-0.143271	-0.155705	-0.141290	-0.166	614
UY4	-0.099903	-0.133677	-0.127306	-0.140500	-0.127156	-0.138	914
UY5	-0.084017	-0.120805	-0.112916	-0.127477	-0.115031	-0.109	1219
UY6	-0.070962	-0.110064	-0.100638	-0.116596	-0.104963	-0.094	1524
UY7	-0.060545	-0.101404	-0.090547	-0.107808	-0.096870	-0.076	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1335 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	2	12	8	10	6	MIN	AVG	MAX
EY1	7236	6508	5959	7897	6586	5959	6837	7897
EY2	3829	5941	2659	5670	3595	2659	4339	5941
EY3	2164	3757	3940	1103	3246	1103	2842	3940
EY4	33847	32116	34730	38629	37293	32116	35323	38629
EY5	231	227	282	283	152	152	235	283
EX5	506	181	262	517	228	181	339	517
EY6	193	105	190	227	194	105	182	227
EX6	98	199	358	294	151	98	220	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.20	0.80	0.93	1.83	1.50	0.80	1.45	2.20
R6	0.51	1.89	1.89	1.29	0.78	0.51	1.27	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.229000	-0.213842	-0.230395	-0.234403	-0.242865	-0.220	0
UY2	-0.169126	-0.164603	-0.162790	-0.179177	-0.183057	-0.194	300
UY3	-0.146985	-0.145831	-0.143271	-0.155705	-0.163103	-0.166	614
UY4	-0.129412	-0.128886	-0.127306	-0.140500	-0.146452	-0.138	914
UY5	-0.113356	-0.112893	-0.112916	-0.127477	-0.131148	-0.109	1219
UY6	-0.099402	-0.098511	-0.100638	-0.116596	-0.117799	-0.094	1524
UY7	-0.087707	-0.086121	-0.090547	-0.107808	-0.106601	-0.076	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1388 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	13	8	2	12	16	MIN	AVG	MAX
EY1	7471	7685	6876	6255	6771	6255	7012	7685
EY2	4106	2591	4830	5281	5220	2591	4406	5281
EY3	1248	3981	1290	2841	3258	1248	2524	3981
EY4	20453	21571	31587	21369	21035	20453	23203	31587
EY5	249	183	208	238	231	183	222	249
EX5	405	308	113	274	280	113	276	405
EY6	117	144	109	162	142	109	135	162
EX6	173	102	156	264	269	102	193	269
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.63	1.68	0.54	1.15	1.21	0.54	1.24	1.68
R6	1.49	0.71	1.43	1.63	1.89	0.71	1.43	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.318578	-0.323537	-0.338108	-0.307682	-0.315925	-0.261	0
UY2	-0.247034	-0.253585	-0.269589	-0.247901	-0.258551	-0.222	300
UY3	-0.213274	-0.226739	-0.238560	-0.222711	-0.233500	-0.190	614
UY4	-0.187731	-0.202987	-0.214318	-0.201468	-0.211998	-0.156	914
UY5	-0.165398	-0.181524	-0.192550	-0.182868	-0.192936	-0.125	1219
UY6	-0.146457	-0.162915	-0.173764	-0.167163	-0.176643	-0.107	1524
UY7	-0.130858	-0.147369	-0.158082	-0.154355	-0.163210	-0.087	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	2	7	8	5	3	MIN	AVG	MAX
EY1	6876	5066	7685	5828	6525	5066	6396	7685
EY2	4830	5418	2591	4865	4011	2591	4343	5418
EY3	1290	2288	3981	3453	3080	1290	2818	3981
EY4	31587	33937	21571	21984	38017	21571	29419	38017
EY5	208	297	183	245	165	165	219	297
EX5	113	614	308	260	309	113	321	614
EY6	109	116	144	182	204	109	151	204
EX6	156	260	102	261	296	102	215	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.54	2.07	1.68	1.06	1.88	0.54	1.45	2.07
R6	1.43	2.24	0.71	1.43	1.45	0.71	1.45	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.338108	-0.341707	-0.323537	-0.288198	-0.256491	-0.261	0
UY2	-0.269589	-0.277886	-0.253585	-0.227073	-0.196498	-0.222	300
UY3	-0.238560	-0.253383	-0.226739	-0.202738	-0.175358	-0.190	614
UY4	-0.214318	-0.232049	-0.202987	-0.181899	-0.157440	-0.156	914
UY5	-0.192550	-0.212572	-0.181524	-0.163727	-0.141532	-0.125	1219
UY6	-0.173764	-0.195600	-0.162915	-0.148482	-0.128061	-0.107	1524
UY7	-0.158082	-0.181380	-0.147369	-0.136147	-0.117075	-0.087	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 5 + 915 R: LOAD 1388 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	4	7	2	6	12	MIN	AVG	MAX
EY1	5738	5987	5911	6442	7795	5738	6375	7795
EY2	2143	2860	4781	3903	5066	2143	3751	5066
EY3	1147	3081	1210	3564	3599	1147	2520	3599
EY4	32650	30124	26946	20379	20125	20125	26045	32650
EY5	258	212	167	202	281	167	224	281
EX5	514	334	414	341	658	334	452	658
EY6	160	192	179	134	228	134	179	228
EX6	160	192	179	134	228	134	179	228
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.00	1.57	2.48	1.68	2.34	1.57	2.01	2.48
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>SENSOR</u>
	<u>DEFL.(mm)</u>					<u>DISTANCE(mm)</u>
UY1	-0.338677	-0.301183	-0.286794	-0.276318	-0.248847	0
UY2	-0.240133	-0.227859	-0.214323	-0.210967	-0.195625	300
UY3	-0.206656	-0.202998	-0.182732	-0.183557	-0.173408	614
UY4	-0.182289	-0.182038	-0.159473	-0.159093	-0.154904	914
UY5	-0.160803	-0.163564	-0.139523	-0.137044	-0.138921	1219
UY6	-0.142848	-0.148006	-0.122995	-0.117957	-0.125586	1524
UY7	-0.128330	-0.135372	-0.109707	-0.102054	-0.114834	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 708 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
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CALCULATED MODULI (MPa)

SET	14	1	4	16	5	MIN	AVG	MAX
EY1	6457	7236	6525	6951	5959	5959	6626	7236
EY2	5248	3829	4011	5144	2659	2659	4178	5248
EY3	3638	2164	3080	3743	3940	2164	3313	3940
EY4	21531	33847	38017	21021	34730	21021	29829	38017
EY5	255	231	165	217	282	165	230	282
EX5	302	506	309	227	262	227	321	506
EY6	199	193	204	212	190	190	199	212
EX6	293	98	296	381	358	98	285	381
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.19	2.20	1.88	1.05	0.93	0.93	1.45	2.20
R6	1.47	0.51	1.45	1.80	1.89	0.51	1.42	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.136076	-0.131128	-0.134805	-0.124523	-0.129956	-0.142	0
UY2	-0.106250	-0.096689	-0.103311	-0.095902	-0.091557	-0.117	300
UY3	-0.094186	-0.083446	-0.092215	-0.084146	-0.080072	-0.098	614
UY4	-0.083913	-0.072366	-0.082783	-0.074330	-0.070079	-0.079	914
UY5	-0.075007	-0.062439	-0.074409	-0.065900	-0.061292	-0.063	1219
UY6	-0.067571	-0.053947	-0.067318	-0.058919	-0.053929	-0.053	1524
UY7	-0.061579	-0.046931	-0.061537	-0.053336	-0.047984	-0.042	1829

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 OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
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CALCULATED MODULI (MPa)

SET	6	7	9	10	2	MIN	AVG	MAX
EY1	6586	6525	5828	7897	7236	5828	6814	7897
EY2	3595	4011	4865	5670	3829	3595	4394	5670
EY3	3246	3080	3453	1103	2164	1103	2609	3453
EY4	37293	38017	21984	38629	33847	21984	33954	38629
EY5	152	165	245	283	231	152	215	283
EX5	228	309	260	517	506	228	364	517
EY6	194	204	182	227	193	182	200	227
EX6	151	296	261	294	98	98	220	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.50	1.88	1.06	1.83	2.20	1.06	1.69	2.20
R6	0.78	1.45	1.43	1.29	0.51	0.51	1.09	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.137039	-0.134815	-0.151480	-0.131970	-0.130994	-0.142	0
UY2	-0.103196	-0.103282	-0.119352	-0.099964	-0.096545	-0.117	300
UY3	-0.091277	-0.092170	-0.106562	-0.086052	-0.083328	-0.098	614
UY4	-0.080845	-0.082752	-0.095609	-0.076720	-0.072288	-0.079	914
UY5	-0.071448	-0.074391	-0.086057	-0.068818	-0.062393	-0.063	1219
UY6	-0.063381	-0.067311	-0.078044	-0.062344	-0.053923	-0.053	1524
UY7	-0.056715	-0.061536	-0.071560	-0.057197	-0.046923	-0.042	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 708 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	6	3	16	4	14	MIN	AVG	MAX
EY1	7897	6525	7245	5959	7526	5959	7030	7897
EY2	5670	4011	4799	2659	5965	2659	4621	5965
EY3	1103	3080	2970	3940	3283	1103	2875	3940
EY4	38629	38017	20054	34730	20093	20054	30304	38629
EY5	283	165	174	282	176	165	216	283
EX5	517	309	401	262	225	225	343	517
EY6	227	204	243	190	246	190	222	246
EX6	294	296	479	358	412	294	368	479
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.83	1.88	2.30	0.93	1.28	0.93	1.64	2.30
R6	1.29	1.45	1.97	1.89	1.68	1.29	1.66	1.97

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.131970	-0.134815	-0.125935	-0.129867	-0.122637	-0.142	0
UY2	-0.099964	-0.103282	-0.095743	-0.091455	-0.095457	-0.117	300
UY3	-0.086052	-0.092170	-0.083681	-0.079989	-0.083929	-0.098	614
UY4	-0.076720	-0.082752	-0.074138	-0.070030	-0.074629	-0.079	914
UY5	-0.068818	-0.074391	-0.066161	-0.061268	-0.066796	-0.063	1219
UY6	-0.062344	-0.067311	-0.059704	-0.053921	-0.060404	-0.053	1524
UY7	-0.057197	-0.061536	-0.054635	-0.047987	-0.055353	-0.042	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 978 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	1	7	3	5	MIN	AVG	MAX
EY1	4868	4000	4472	4220	3899	3899	4292	4868
EY2	2257	3000	3226	5369	2241	2241	3219	5369
EY3	2075	1800	2098	1963	1240	1240	1835	2098
EY4	22322	30000	30939	22863	37387	22322	28702	37387
EY5	223	200	161	205	271	161	212	271
EX5	381	200	333	298	175	175	277	381
EY6	113	150	154	162	165	113	149	165
EX6	71	150	100	186	101	71	122	186
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.70	1.00	2.08	1.45	0.65	0.65	1.38	2.08
R6	0.62	1.00	0.65	1.15	0.61	0.61	0.81	1.15

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.244210	-0.234051	-0.223971	-0.217295	-0.238463	-0.223	0
UY2	-0.174379	-0.169146	-0.163564	-0.164780	-0.159808	-0.187	300
UY3	-0.148918	-0.147424	-0.142412	-0.143455	-0.135366	-0.157	614
UY4	-0.126436	-0.128772	-0.123812	-0.125879	-0.116186	-0.127	914
UY5	-0.105990	-0.112120	-0.106993	-0.110520	-0.098967	-0.103	1219
UY6	-0.088257	-0.098010	-0.092545	-0.097611	-0.084402	-0.085	1524
UY7	-0.073454	-0.086502	-0.080614	-0.087139	-0.072551	-0.068	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	5	2	7	3	MIN	AVG	MAX
EY1	7685	5828	6876	5066	6525	5066	6396	7685
EY2	2591	4865	4830	5418	4011	2591	4343	5418
EY3	3981	3453	1290	2288	3080	1290	2818	3981
EY4	21571	21984	31587	33937	38017	21571	29419	38017
EY5	183	245	208	297	165	165	219	297
EX5	362	295	115	731	365	115	374	731
EY6	144	182	109	116	204	109	151	204
EX6	102	261	156	260	296	102	215	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.98	1.20	0.56	2.46	2.22	0.56	1.68	2.46
R6	0.71	1.43	1.43	2.24	1.45	0.71	1.45	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.234726	-0.209158	-0.245477	-0.247885	-0.186077	-0.223	0
UY2	-0.183953	-0.164789	-0.195729	-0.201568	-0.142530	-0.187	300
UY3	-0.164494	-0.147141	-0.173203	-0.183821	-0.127203	-0.157	614
UY4	-0.147277	-0.132029	-0.155604	-0.168373	-0.114216	-0.127	914
UY5	-0.131715	-0.118848	-0.139801	-0.154265	-0.102686	-0.103	1219
UY6	-0.118220	-0.107788	-0.126162	-0.141967	-0.092921	-0.085	1524
UY7	-0.106944	-0.098838	-0.114777	-0.131660	-0.084957	-0.068	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 978 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	1	9	13	6	7	MIN	AVG	MAX
EY1	4000	5828	7685	6586	6525	4000	6125	7685
EY2	3000	4865	2591	3595	4011	2591	3612	4865
EY3	1800	3453	3981	3246	3080	1800	3112	3981
EY4	30000	21984	21571	37293	38017	21571	29773	38017
EY5	200	245	183	152	165	152	189	245
EX5	200	295	362	266	365	200	298	365
EY6	150	182	144	194	204	144	175	204
EX6	150	261	102	151	296	102	192	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.00	1.20	1.98	1.75	2.22	1.00	1.63	2.22
R6	1.00	1.43	0.71	0.78	1.45	0.71	1.07	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.234051	-0.209158	-0.234726	-0.189200	-0.186077	-0.223	0
UY2	-0.169146	-0.164789	-0.183953	-0.142459	-0.142530	-0.187	300
UY3	-0.147424	-0.147141	-0.164494	-0.126011	-0.127203	-0.157	614
UY4	-0.128772	-0.132029	-0.147277	-0.111616	-0.114216	-0.127	914
UY5	-0.112120	-0.118848	-0.131715	-0.098647	-0.102686	-0.103	1219
UY6	-0.098010	-0.107788	-0.118220	-0.087513	-0.092921	-0.085	1524
UY7	-0.086502	-0.098838	-0.106944	-0.078313	-0.084957	-0.068	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 1274 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	12	10	13	14	MIN	AVG	MAX
EY1	5828	6255	7685	7638	7740	5828	7029	7740
EY2	4865	5281	2591	5779	5116	2591	4726	5779
EY3	3453	3588	3981	3941	2939	2939	3580	3981
EY4	21984	21369	21571	20215	20175	20175	21063	21984
EY5	245	240	183	224	238	183	226	245
EX5	260	343	308	426	474	260	362	474
EY6	182	180	144	172	162	144	168	182
EX6	261	294	102	407	369	102	286	407
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.43	1.68	1.90	1.99	1.06	1.61	1.99
R6	1.43	1.63	0.71	2.37	2.28	0.71	1.68	2.37

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL(mm)</u>					<u>SENSOR DISTANCE(mm)</u>
UY1	-0.272276	-0.267981	-0.305710	-0.255016	-0.251123	0
UY2	-0.214466	-0.213838	-0.239547	-0.208193	-0.199529	300
UY3	-0.191460	-0.191724	-0.214153	-0.187703	-0.177237	614
UY4	-0.171770	-0.172770	-0.191693	-0.170304	-0.158822	914
UY5	-0.154608	-0.156226	-0.171406	-0.155065	-0.142760	1219
UY6	-0.140218	-0.142318	-0.153822	-0.142176	-0.129211	1524
UY7	-0.128580	-0.131043	-0.139137	-0.131659	-0.118159	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	5	2	7	3	MIN	AVG	MAX
EY1	7685	5828	6876	5066	6525	5066	6396	7685
EY2	2591	4865	4830	5418	4011	2591	4343	5418
EY3	3981	3453	1290	2288	3080	1290	2818	3981
EY4	21571	21984	31587	33937	38017	21571	29419	38017
EY5	183	245	208	297	165	165	219	297
EX5	308	260	113	614	309	113	321	614
EY6	144	182	109	116	204	109	151	204
EX6	102	261	156	260	296	102	215	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.68	1.06	0.54	2.07	1.88	0.54	1.45	2.07
R6	0.71	1.43	1.43	2.24	1.45	0.71	1.45	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL(mm)</u>					<u>SENSOR DISTANCE(mm)</u>
UY1	-0.306003	-0.272579	-0.319785	-0.323188	-0.242591	0
UY2	-0.239842	-0.214767	-0.254979	-0.262826	-0.185849	300
UY3	-0.214451	-0.191751	-0.225631	-0.239651	-0.165854	614
UY4	-0.191986	-0.172041	-0.202703	-0.219473	-0.148907	914
UY5	-0.171687	-0.154854	-0.182115	-0.201052	-0.133862	1219
UY6	-0.154086	-0.140435	-0.164347	-0.184999	-0.121121	1524
UY7	-0.139382	-0.128768	-0.149515	-0.171550	-0.110731	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 057 L: LOAD 1274 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	1	9	13	4	6	MIN	AVG	MAX
EY1	4000	5828	7685	7182	6586	4000	6256	7685
EY2	3000	4865	2591	2473	3595	2473	3305	4865
EY3	1800	3453	3981	3277	3246	1800	3151	3981
EY4	30000	21984	21571	34273	37293	21571	29024	37293
EY5	200	245	183	239	152	152	204	245
EX5	200	260	308	295	228	200	258	308
EY6	150	182	144	110	194	110	156	194
EX6	150	261	102	60	151	60	145	261
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.00	1.06	1.68	1.24	1.50	1.00	1.30	1.68
R6	1.00	1.43	0.71	0.54	0.78	0.54	0.89	1.43

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.304889	-0.272579	-0.306003	-0.322022	-0.246593	-0.295	0
UY2	-0.220340	-0.214767	-0.239842	-0.251552	-0.185695	-0.251	300
UY3	-0.192043	-0.191751	-0.214451	-0.226127	-0.164248	-0.210	614
UY4	-0.167746	-0.172041	-0.191986	-0.202858	-0.145476	-0.170	914
UY5	-0.146054	-0.154854	-0.171687	-0.181004	-0.128566	-0.134	1219
UY6	-0.127674	-0.140435	-0.154086	-0.161486	-0.114049	-0.114	1524
UY7	-0.112683	-0.128768	-0.139382	-0.144747	-0.102056	-0.091	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R: LOAD 690 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	16	1	13	6	5	MIN	AVG	MAX
EY1	3233	4074	3700	3245	3286	3233	3508	4074
EY2	3253	2951	2832	5296	3527	2832	3572	5296
EY3	2539	3956	2882	3984	3983	2539	3469	3984
EY4	39269	36704	31018	35887	39174	31018	36410	39269
EY5	278	199	183	271	161	161	219	278
EX5	690	485	439	673	340	340	525	690
EY6	102	107	105	102	135	102	110	135
EX6	150	148	184	135	221	135	168	221
R5	2.48	2.43	2.39	2.48	2.11	2.11	2.38	2.48
R6	1.47	1.39	1.75	1.32	1.63	1.32	1.51	1.75

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.148102	-0.141519	-0.141260	-0.139416	-0.142037	0
UY2	-0.101579	-0.100284	-0.095658	-0.101101	-0.099050	300
UY3	-0.088648	-0.088224	-0.081997	-0.089752	-0.087945	614
UY4	-0.076980	-0.077119	-0.069888	-0.078865	-0.077486	914
UY5	-0.065933	-0.066617	-0.058632	-0.068486	-0.067734	1219
UY6	-0.056075	-0.057227	-0.048719	-0.059120	-0.059159	1524
UY7	-0.047668	-0.049202	-0.040354	-0.051054	-0.051956	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	7	15	10	8	MIN	AVG	MAX
EY1	6586	6525	4081	7897	5959	4081	6210	7897
EY2	3595	4011	5379	5670	2659	2659	4263	5670
EY3	3246	3080	3819	1103	3940	1103	3037	3940
EY4	37293	38017	39188	38629	34730	34730	37571	39188
EY5	152	165	151	283	282	151	206	283
EX5	228	309	117	517	262	117	287	517
EY6	194	204	238	227	190	190	211	238
EX6	151	296	298	294	358	151	279	358
R5	1.50	1.88	0.78	1.83	0.93	0.78	1.38	1.88
R6	0.78	1.45	1.25	1.29	1.89	0.78	1.33	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.126609	-0.125541	-0.122964	-0.122200	-0.120106	0
UY2	-0.095315	-0.096242	-0.090840	-0.093147	-0.084677	300
UY3	-0.084916	-0.086538	-0.081759	-0.080880	-0.074550	614
UY4	-0.076130	-0.078567	-0.073742	-0.072906	-0.066133	914
UY5	-0.068065	-0.071348	-0.066499	-0.066062	-0.058562	1219
UY6	-0.061038	-0.065135	-0.060304	-0.060350	-0.052111	1524
UY7	-0.055151	-0.059993	-0.055229	-0.055744	-0.046817	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6+100 R: LOAD 690 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	6	10	15	2	7	MIN	AVG	MAX
EY1	6586	7897	4081	7236	6525	4081	6465	7897
EY2	3595	5670	5379	3829	4011	3595	4497	5670
EY3	3246	1103	3819	2164	3080	1103	2682	3819
EY4	37293	38629	39188	33847	38017	13847	37395	39188
EY5	152	283	151	231	165	151	196	283
EX5	228	517	117	506	309	117	335	517
EY6	194	227	238	193	204	193	211	238
EX6	151	294	335	98	296	98	235	335
R5	1.50	1.83	0.78	2.20	1.88	0.78	1.64	2.20
R6	0.78	1.29	1.41	0.51	1.45	0.51	1.09	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.126609	-0.122200	-0.124427	-0.119630	-0.125541	-0.129	0
UY2	-0.095315	-0.093147	-0.090673	-0.088186	-0.096242	-0.110	300
UY3	-0.084916	-0.080880	-0.081313	-0.076645	-0.086538	-0.093	614
UY4	-0.076130	-0.072906	-0.073136	-0.067374	-0.078567	-0.074	914
UY5	-0.068065	-0.066062	-0.065819	-0.058909	-0.071348	-0.059	1219
UY6	-0.061038	-0.060350	-0.059608	-0.051559	-0.065135	-0.051	1524
UY7	-0.055151	-0.055744	-0.054549	-0.045406	-0.059993	-0.042	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R: LOAD 985 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	12	10	9	15	MIN	AVG	MAX
EY1	5301	4533	7280	6285	6673	4533	6014	7280
EY2	3766	5425	2500	4312	2521	2500	3705	5425
EY3	1180	1041	1525	1134	1057	1041	1187	1525
EY4	22863	20739	20722	23228	20738	20722	21658	23228
EY5	279	242	295	274	295	242	277	295
EX5	169	551	156	159	156	156	238	551
EY6	111	103	109	122	103	103	110	122
EX6	69	105	123	72	55	55	85	123
R5	0.61	2.28	0.53	0.58	0.53	0.53	0.90	2.28
R6	0.62	1.02	1.12	0.60	0.53	0.53	0.78	1.12

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.220012	-0.226123	-0.211313	-0.218036	-0.238024	-0.204	0
UY2	-0.162155	-0.169268	-0.154968	-0.165857	-0.174435	-0.173	300
UY3	-0.137626	-0.144070	-0.132098	-0.142201	-0.146885	-0.147	614
UY4	-0.118397	-0.124688	-0.114763	-0.124195	-0.126374	-0.120	914
UY5	-0.100886	-0.107327	-0.099119	-0.107987	-0.107786	-0.096	1219
UY6	-0.085617	-0.092302	-0.085609	-0.093937	-0.091658	-0.081	1524
UY7	-0.072772	-0.079740	-0.074306	-0.082161	-0.078106	-0.066	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	13	1	6	7	MIN	AVG	MAX
EY1	5828	7685	4000	6586	6525	4000	6125	7685
EY2	4865	2591	3000	3595	4011	2591	3612	4865
EY3	3453	3981	1800	3246	3080	1800	3112	3981
EY4	21984	21571	30000	37293	38017	21571	29773	38017
EY5	245	183	200	152	165	152	189	245
EX5	295	362	200	266	365	200	298	365
EY6	182	144	150	194	204	144	175	204
EX6	261	102	150	151	296	102	192	296
R5	1.20	1.98	1.00	1.75	2.22	1.00	1.63	2.22
R6	1.43	0.71	1.00	0.78	1.45	0.71	1.07	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.202235	-0.222567	-0.224013	-0.180633	-0.179059	-0.204	0
UY2	-0.159006	-0.175383	-0.161072	-0.135967	-0.137243	-0.173	300
UY3	-0.143138	-0.157820	-0.141501	-0.121137	-0.123412	-0.147	614
UY4	-0.129779	-0.142932	-0.125225	-0.108611	-0.112054	-0.120	914
UY5	-0.117926	-0.129258	-0.110377	-0.097110	-0.101768	-0.096	1219
UY6	-0.107829	-0.117264	-0.097587	-0.087089	-0.092915	-0.081	1524
UY7	-0.099538	-0.107127	-0.087000	-0.078693	-0.085586	-0.066	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R: LOAD 985 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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CALCULATED MODULI (MPa)

SET	1	9	6	7	10	MIN	AVG	MAX
EY1	4000	5828	6586	6525	7897	4000	6167	7897
EY2	3000	4865	3595	4011	5670	3000	4228	5670
EY3	1800	3453	3246	3080	1103	1103	2536	3453
EY4	30000	21984	37293	38017	38629	21984	33184	38629
EY5	200	245	152	165	283	152	209	283
EX5	200	260	228	309	517	200	303	517
EY6	150	182	194	204	227	150	191	227
EX6	150	261	151	296	294	150	230	296
R5	1.00	1.06	1.50	1.88	1.83	1.00	1.45	1.88
R6	1.00	1.43	0.78	1.45	1.29	0.78	1.19	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.224013	-0.202330	-0.180739	-0.179215	-0.174445	-0.204	0
UY2	-0.161072	-0.159091	-0.136065	-0.137389	-0.132970	-0.173	300
UY3	-0.141501	-0.143203	-0.121220	-0.123537	-0.115459	-0.147	614
UY4	-0.125225	-0.129826	-0.108679	-0.112157	-0.104075	-0.120	914
UY5	-0.110377	-0.117959	-0.097165	-0.101852	-0.094305	-0.096	1219
UY6	-0.097587	-0.107852	-0.087134	-0.092983	-0.086152	-0.081	1524
UY7	-0.087000	-0.099553	-0.078730	-0.085642	-0.079577	-0.066	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R: LOAD 1217 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	15	9	14	13	MIN	AVG	MAX
EY1	3040	3657	3215	3247	4012	3040	3434	4012
EY2	2211	3642	2678	3838	4010	2211	3276	4010
EY3	1711	1139	2249	1123	1110	1110	1466	2249
EY4	31654	35197	39552	36207	33369	31654	35196	39552
EY5	151	150	150	150	150	150	150	151
EX5	242	139	120	333	207	120	208	333
EY6	102	100	100	100	100	100	101	102
EX6	69	89	124	110	211	69	120	211
R5	1.61	0.92	0.80	2.22	1.38	0.80	1.39	2.22
R6	0.67	0.89	1.23	1.09	2.10	0.67	1.20	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.325949	-0.317493	-0.313741	-0.308488	-0.308043	-0.312	0
UY2	-0.226856	-0.234035	-0.228325	-0.222710	-0.230808	-0.265	300
UY3	-0.198457	-0.205364	-0.205231	-0.194237	-0.203584	-0.225	614
UY4	-0.173379	-0.182474	-0.184149	-0.171735	-0.182690	-0.183	914
UY5	-0.149508	-0.160974	-0.163937	-0.150647	-0.163458	-0.145	1219
UY6	-0.128210	-0.141911	-0.145795	-0.131964	-0.146676	-0.123	1524
UY7	-0.110066	-0.125720	-0.130274	-0.116121	-0.132612	-0.100	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	11	5	4	1	13	MIN	AVG	MAX
EY1	5066	6876	7182	4000	7685	4000	6162	7685
EY2	5418	4830	2473	3000	2591	2473	3662	5418
EY3	2288	1290	3277	1800	3981	1290	2527	3981
EY4	33937	31587	34273	30000	21571	21571	30273	34273
EY5	297	208	239	200	183	183	225	297
EX5	614	113	295	200	308	113	306	614
EY6	116	109	110	150	144	109	126	150
EX6	260	156	60	150	102	60	145	260
R5	2.07	0.54	1.24	1.00	1.68	0.54	1.31	2.07
R6	2.24	1.43	0.54	1.00	0.71	0.54	1.18	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.296407	-0.288795	-0.287391	-0.276776	-0.275230	-0.312	0
UY2	-0.240256	-0.230927	-0.225172	-0.199010	-0.216913	-0.265	300
UY3	-0.220662	-0.205926	-0.203530	-0.174829	-0.195176	-0.225	614
UY4	-0.204035	-0.187051	-0.184754	-0.154719	-0.176744	-0.183	914
UY5	-0.188626	-0.169898	-0.166857	-0.136375	-0.159821	-0.145	1219
UY6	-0.175034	-0.154916	-0.150728	-0.120572	-0.144981	-0.123	1524
UY7	-0.163522	-0.142290	-0.136776	-0.107491	-0.132440	-0.100	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R: LOAD 1217 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	15	1	5	9	MIN	AVG	MAX
EY1	5738	7441	4000	7215	5987	4000	6076	7441
EY2	2143	2811	3000	3272	2860	2143	2817	3272
EY3	1147	3397	1800	2842	3081	1147	2454	3397
EY4	32650	32853	30000	35504	30124	30000	32226	35504
EY5	258	290	200	256	212	200	243	290
EX5	514	683	200	425	334	200	431	683
EY6	160	160	150	115	192	115	155	192
EX6	160	160	150	115	192	115	155	192
R5	2.00	2.36	1.00	1.66	1.57	1.00	1.72	2.36
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.287509	-0.271178	-0.276776	-0.300849	-0.259164	-0.312	0
UY2	-0.205795	-0.214860	-0.199010	-0.244954	-0.196655	-0.265	300
UY3	-0.178095	-0.196282	-0.174829	-0.224605	-0.176426	-0.225	614
UY4	-0.159145	-0.180808	-0.154719	-0.207424	-0.160006	-0.183	914
UY5	-0.142091	-0.166543	-0.136375	-0.191262	-0.145241	-0.145	1219
UY6	-0.127589	-0.154078	-0.120572	-0.176812	-0.132606	-0.123	1524
UY7	-0.115696	-0.143591	-0.107491	-0.164403	-0.122189	-0.100	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 100 R

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN		LOAD 1: 690 kPa					LOAD 2: 985 kPa					LOAD 3: 1233 kPa					LOAD 4: 1217 kPa												
DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	16	1	13	6	5	AVG.	STRESS RATIO (p/p <sub>0</sub> )	2	12	10	9	15	AVG.	STRESS RATIO (p/p <sub>0</sub> )	1	12	14	13	10	AVG.	STRESS RATIO (p/p <sub>0</sub> )	7	15	9	14	13	AVG.	STRESS RATIO (p/p <sub>0</sub> )
24	0.16	-0.676	-0.672	-0.672	-0.682	-0.679	-0.676	0.980	-0.945	-0.955	-0.927	-0.942	-0.927	-0.939	0.954	-1.195	-1.168	-1.191	-1.200	-1.189	-1.189	0.898	-1.182	-1.182	-1.187	-1.187	-1.180	-1.184	0.973
72	0.48	-0.630	-0.619	-0.618	-0.651	-0.641	-0.632	0.916	-0.832	-0.862	-0.781	-0.821	-0.777	-0.815	0.827	-1.085	-0.999	-1.071	-1.102	-1.063	-1.064	0.804	-1.078	-1.073	-1.096	-1.088	-1.067	-1.084	0.891
120	0.80	-0.525	-0.518	-0.512	-0.551	-0.547	-0.531	0.769	-0.645	-0.665	-0.606	-0.626	-0.593	-0.627	0.637	-0.884	-0.779	-0.865	-0.917	-0.846	-0.861	0.651	-0.890	-0.853	-0.914	-0.866	-0.841	-0.880	0.723
170	1.13	-0.413	-0.415	-0.405	-0.428	-0.441	-0.420	0.609	-0.470	-0.459	-0.469	-0.447	-0.448	-0.459	0.466	-0.688	-0.598	-0.668	-0.731	-0.639	-0.671	0.507	-0.703	-0.628	-0.726	-0.630	-0.613	-0.672	0.552
213	1.42	-0.339	-0.343	-0.332	-0.345	-0.367	-0.345	0.500	-0.374	-0.355	-0.383	-0.353	-0.364	-0.366	0.371	-0.568	-0.489	-0.550	-0.598	-0.516	-0.551	0.416	-0.582	-0.505	-0.602	-0.501	-0.492	-0.548	0.450
250	1.67	-0.294	-0.293	-0.284	-0.295	-0.315	-0.296	0.429	-0.330	-0.316	-0.333	-0.312	-0.320	-0.322	0.327	-0.500	-0.430	-0.486	-0.502	-0.453	-0.479	0.362	-0.509	-0.450	-0.525	-0.446	-0.440	-0.481	0.396
318	2.12	-0.185	-0.183	-0.178	-0.182	-0.194	-0.184	0.267	-0.209	-0.205	-0.209	-0.199	-0.203	-0.205	0.208	-0.315	-0.273	-0.311	-0.305	-0.288	-0.301	0.228	-0.322	-0.292	-0.331	-0.291	-0.288	-0.309	0.254
412	2.75	-0.061	-0.057	-0.058	-0.057	-0.062	-0.059	0.086	-0.066	-0.071	-0.068	-0.064	-0.064	-0.066	0.067	-0.101	-0.089	-0.104	-0.095	-0.090	-0.097	0.074	-0.098	-0.091	-0.099	-0.094	-0.094	-0.095	0.078
520	3.47	-0.013	-0.012	-0.014	-0.011	-0.013	-0.013	0.018	-0.013	-0.017	-0.016	-0.013	-0.011	-0.014	0.014	-0.022	-0.020	-0.026	-0.020	-0.017	-0.022	0.017	-0.016	-0.016	-0.017	-0.018	-0.021	-0.017	0.014
2080	13.87	-0.004	-0.004	-0.004	-0.003	-0.004	-0.004	0.006	-0.003	-0.004	-0.004	-0.003	-0.002	-0.003	0.003	-0.005	-0.004	-0.007	-0.004	-0.004	-0.005	0.005	-0.004	-0.004	-0.006	-0.005	-0.005	-0.005	0.004
3080	20.53	-0.003	-0.003	-0.003	-0.002	-0.003	-0.003	0.004	-0.002	-0.003	-0.003	-0.002	-0.001	-0.002	0.002	-0.003	-0.002	-0.004	-0.002	-0.003	-0.003	0.002	-0.002	-0.003	-0.004	-0.004	-0.006	-0.003	0.003
4080	27.20	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.003	-0.001	-0.002	-0.002	-0.001	-0.001	-0.002	0.002	-0.003	-0.002	-0.003	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.003	-0.003	-0.005	-0.002	0.002

MAXIMUM DEFLECTION

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	16	1	13	6	5	AVG.	STRESS RATIO (p/p <sub>0</sub> )	2	12	10	9	15	AVG.	STRESS RATIO (p/p <sub>0</sub> )	1	12	14	13	10	AVG.	STRESS RATIO (p/p <sub>0</sub> )	7	15	9	14	13	AVG.	STRESS RATIO (p/p <sub>0</sub> )
24	0.16	-0.670	-0.666	-0.676	-0.671	-0.672	-0.671	0.973	-0.958	-0.935	-0.955	-0.948	-0.950	-0.690	0.701	-1.170	-1.195	-1.199	-1.171	-1.181	-1.181	0.646	-1.166	-1.170	-1.183	-1.175	-1.174	-1.174	0.964
72	0.48	-0.612	-0.595	-0.630	-0.616	-0.619	-0.614	0.890	-0.875	-0.808	-0.866	-0.848	-0.853	-0.540	0.548	-1.012	-1.085	-1.095	-1.017	-1.034	-1.034	0.509	-1.027	-1.042	-1.083	-1.055	-1.051	-1.052	0.864
120	0.80	-0.504	-0.472	-0.526	-0.506	-0.515	-0.505	0.732	-0.713	-0.653	-0.706	-0.690	-0.689	-0.440	0.446	-0.659	-0.688	-0.682	-0.667	-0.565	-0.674	0.417	-0.823	-0.837	-0.893	-0.841	-0.840	-0.847	0.696
170	1.13	-0.397	-0.355	-0.413	-0.392	-0.407	-0.393	0.570	-0.545	-0.526	-0.549	-0.544	-0.532	-0.377	0.382	-0.452	-0.500	-0.459	-0.476	-0.393	-0.472	0.357	-0.643	-0.645	-0.702	-0.633	-0.637	-0.652	0.536
213	1.42	-0.326	-0.286	-0.338	-0.319	-0.334	-0.320	0.464	-0.434	-0.432	-0.454	-0.446	-0.432	-0.234	0.237	-0.273	-0.315	-0.281	-0.295	-0.252	-0.291	0.220	-0.530	-0.527	-0.581	-0.510	-0.516	-0.533	0.382
250	1.67	-0.282	-0.249	-0.290	-0.275	-0.288	-0.277	0.401	-0.367	-0.361	-0.399	-0.384	-0.371	-0.075	0.076	-0.084	-0.101	-0.093	-0.087	-0.082	-0.091	0.069	-0.465	-0.461	-0.509	-0.445	-0.451	-0.466	0.383
318	2.12	-0.177	-0.160	-0.182	-0.172	-0.178	-0.174	0.252	-0.225	-0.219	-0.252	-0.240	-0.232	-0.017	0.018	-0.018	-0.022	-0.026	-0.012	-0.018	-0.020	0.015	-0.298	-0.292	-0.321	-0.284	-0.288	-0.296	0.244
412	2.75	-0.056	-0.053	-0.058	-0.054	-0.057	-0.056	0.081	-0.074	-0.067	-0.081	-0.074	-0.076	-0.004	0.004	-0.004	-0.005	-0.006	-0.003	-0.006	-0.004	0.003	-0.096	-0.093	-0.100	-0.090	-0.094	-0.094	0.078
520	3.47	-0.012	-0.013	-0.014	-0.011	-0.013	-0.012	0.018	-0.021	-0.015	-0.018	-0.015	-0.018	-0.003	0.003	-0.003	-0.003	-0.004	-0.002	-0.004	-0.003	0.002	-0.020	-0.019	-0.019	-0.017	-0.022	-0.019	0.016
2080	13.87	-0.003	-0.003	-0.004	-0.003	-0.004	-0.003	0.005	-0.005	-0.003	-0.004	-0.004	-0.005	-0.002	0.002	-0.002	-0.003	-0.003	-0.002	-0.003	-0.002	0.002	-0.004	-0.004	-0.005	-0.005	-0.007	-0.005	0.004
3080	20.53	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	0.003	-0.003	-0.002	-0.003	-0.002	-0.003	-0.002	0.002	-0.002	-0.002	-0.003	-0.001	-0.003	-0.002	0.002	-0.003	-0.003	-0.004	-0.003	-0.004	-0.003	0.003
4080	27.20	-0.002	-0.002	-0.002	-0.001	-0.002	-0.002	0.003	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.002	-0.002	-0.003	-0.001	-0.003	-0.002	ERR	-0.002	-0.002	-0.003	-0.003	-0.004	-0.003	0.002

RMS VALUE OF DEFLECTIONS

DEPTH (mm)	DEPTH RATIO (z/r <sub>0</sub> )	6	10	15	2	7	AVG.	STRESS RATIO (p/p <sub>0</sub> )	1	9	6	7	10	AVG.	STRESS RATIO (p/p <sub>0</sub> )	1	9	13	4	7	AVG.	STRESS RATIO (p/p <sub>0</sub> )	6	15	1	5	9	AVG.	STRESS RATIO (p/p <sub>0</sub> )
24	0.16	-0.664	-0.659	-0.679	-0.660	-0.666	-0.666	0.965	-0.955	-0.958	-0.948	-0.950	-0.941	-0.951	0.965	-1.195	-1.199	-1.170	-1.171	-1.190	-1.184	0.895	-1.150	-1.159	-1.180	-1.164	-1.168	-1.163	0.956
72	0.48	-0.594	-0.571	-0.642	-0.580	-0.597	-0.597	0.865	-0.866	-0.875	-0.848	-0.852	-0.816	-0.851	0.864	-1.085	-1.095	-1.012	-1.017	-1.067	-1.052	0.795	-0.976	-1.011	-1.070	-1.021	-1.035	-1.020	0.838
120	0.80	-0.483	-0.427	-0.540	-0.462	-0.482	-0.479	0.694	-0.706	-0.713	-0.690	-0.688	-0.610	-0.682	0.692	-0.884	-0.893	-0.817	-0.824	-0.862	-0.854	0.646	-0.757	-0.821	-0.873	-0.817	-0.838	-0.817	0.671
170	1.13	-0.381	-0.296	-0.422	-0.357	-0.373	-0.366	0.530	-0.549	-0.545	-0.544	-0.532	-0.422	-0.519	0.527	-0.688	-0.682	-0.659	-0.667	-0.666	-0.674	0.509	-0.582	-0.662	-0.679	-0.636	-0.661	-0.640	0.526
213	1.42	-0.313	-0.230	-0.344	-0.292	-0.302	-0.296	0.429	-0.454	-0.434	-0.446	-0.432	-0.328	-0.419	0.425	-0.568	-0.543	-0.540	-0.555	-0.540	-0.552	0.417	-0.477	-0.549	-0.561	-0.518	-0.540	-0.526	0.432
250	1.67	-0.269	-0.206	-0.296	-0.255	-0.260	-0.257	0.373	-0.399	-0.366	-0.384	-0.371	-0.293	-0.363	0.368	-0.500	-0.459	-0.452	-0.476	-0.465	-0.472	0.357	-0.421	-0.471	-0.493	-0.444	-0.461	-0.458	0.376
318	2.12	-0.168	-0.137	-0.186	-0.161	-0.162	-0.163	0.236	-0.252	-0.224	-0.240	-0.232	-0.196	-0.229	0.232	-0.315	-0.281	-0.273	-0.295	-0.290	-0.291	0.220	-0.274	-0.292	-0.311	-0.277	-0.288	-0.288	0.237
412	2.75	-0.052	-0.049	-0.058	-0.051	-0.053	-0.053	0.076	-0.081	-0.074	-0.074	-0.075	-0.070	-0.075	0.076	-0.101	-0.093	-0.084	-0.087	-0.094	-0.091	0.069	-0.094	-0.094	-0.100	-0.087	-0.094	-0.094	0.077
520	3.47	-0.010	-0.014	-0.014	-0.010	-0.012	-0.012	0.018	-0.018	-0.021	-0.015	-0.018	-0.020	-0.018	0.019	-0.022	-0.026	-0.018	-0.012	-0.022	-0.020	0.015	-0.024	-0.022	-0.022	-0.016	-0.023	-0.021	0.017
2080	13.87	-0.003	-0.003	-0.004	-0.002	-0.003	-0.003	0.004	-0.004	-0.005	-0.004	-0.005	-0.004	-0.004	0.004	-0.005	-0.006	-0.004	-0.003	-0.006	-0.004	0.003	-0.005	-0.005	-0.005	-0.004	-0.005	-0.005	0.004
3080	20.53	-0.002	-0.002	-0.002	-0.001	-0.002	-0.002	0.003	-0.003	-0.003	-0.002	-0.003	-0.003	-0.003	0.003	-0.003	-0.004	-0.003	-0.002	-0.004	-0.003	0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	0.003
4080	27.20	-0.001	-0.002	-0.002	-0.001	-0.002	-0.001	0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	0.002	-0.003	-0.003	-0.002	-0.002	-0.003	-0.002	0.002	-0.003	-0.002	-0.003	-0.002	-0.003	-0.003	0.002

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 695 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
 =====

CALCULATED MODULI (MPa)

SET	11	4	1	12	5	MIN	AVG	MAX
EY1	3710	6525	7236	6626	5959	3710	6011	7236
EY2	5743	4011	3829	5146	2659	2659	4278	5743
EY3	3126	3080	2164	3087	3940	2164	3079	3940
EY4	37004	38017	33847	21623	34730	21623	33044	38017
EY5	182	165	231	221	282	165	216	282
EX5	110	309	506	296	262	110	297	506
EY6	237	204	193	200	190	190	204	237
EX6	165	296	98	294	358	98	242	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.61	1.88	2.20	1.34	0.93	0.61	1.39	2.20
R6	0.69	1.45	0.51	1.47	1.89	0.51	1.20	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL.(mm)</u>					<u>SENSOR DISTANCE(mm)</u>
UY1	-0.133252	-0.130173	-0.126196	-0.138097	-0.125433	0
UY2	-0.099819	-0.099349	-0.092355	-0.107980	-0.087705	300
UY3	-0.089126	-0.089208	-0.080274	-0.096372	-0.077297	614
UY4	-0.079645	-0.080486	-0.070036	-0.086599	-0.068053	914
UY5	-0.071134	-0.072637	-0.060731	-0.078097	-0.059811	1219
UY6	-0.063885	-0.065929	-0.052696	-0.070983	-0.052832	1524
UY7	-0.057967	-0.060418	-0.046012	-0.065232	-0.047152	1829

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 OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
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CALCULATED MODULI (MPa)

SET	6	7	10	9	2	MIN	AVG	MAX
EY1	6586	6525	7897	5828	7236	5828	6814	7897
EY2	3595	4011	5670	4865	3829	3595	4394	5670
EY3	3246	3080	1103	3453	2164	1103	2609	3453
EY4	37293	38017	38629	21984	33847	21984	33954	38629
EY5	152	165	283	245	231	152	215	283
EX5	228	309	517	260	506	228	364	517
EY6	194	204	227	182	193	182	200	227
EX6	151	296	294	261	98	98	220	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.50	1.88	1.83	1.06	2.20	1.06	1.69	2.20
R6	0.78	1.45	1.29	1.43	0.51	0.51	1.09	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED DEFL.(mm)</u>					<u>SENSOR DISTANCE(mm)</u>
UY1	-0.131965	-0.130176	-0.127678	-0.146380	-0.126053	0
UY2	-0.098817	-0.099311	-0.096074	-0.115141	-0.092199	300
UY3	-0.087975	-0.089154	-0.083185	-0.103322	-0.080144	614
UY4	-0.078354	-0.080448	-0.074629	-0.093095	-0.069948	914
UY5	-0.069574	-0.072614	-0.067235	-0.084083	-0.060677	1219
UY6	-0.061966	-0.065918	-0.061102	-0.076465	-0.052667	1524
UY7	-0.055635	-0.060416	-0.056182	-0.070261	-0.046001	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 695 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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**CALCULATED MODULI (MPa)**

SET	10	6	3	15	16	MIN	AVG	MAX
EY1	3854	7897	6525	7910	7930	3854	6823	7930
EY2	5703	5670	4011	5969	5977	4011	5466	5977
EY3	1579	1103	3080	1394	1818	1103	1795	3080
EY4	20603	38629	38017	20086	20073	20073	27481	38629
EY5	177	283	165	211	242	165	215	283
EX5	116	517	309	479	561	116	396	561
EY6	236	227	204	247	245	204	232	247
EX6	175	294	296	484	466	175	343	484
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.66	1.83	1.88	2.27	2.32	0.66	1.79	2.32
R6	0.74	1.29	1.45	1.96	1.90	0.74	1.47	1.96

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.147934	-0.127678	-0.130176	-0.123157	-0.120276	-0.137	0
UY2	-0.108760	-0.096074	-0.099311	-0.092676	-0.091487	-0.119	300
UY3	-0.093793	-0.083185	-0.089154	-0.079298	-0.079409	-0.100	614
UY4	-0.082277	-0.074629	-0.080448	-0.070163	-0.070648	-0.080	914
UY5	-0.072539	-0.067235	-0.072614	-0.062709	-0.063377	-0.061	1219
UY6	-0.064615	-0.061102	-0.065918	-0.056770	-0.057512	-0.052	1524
UY7	-0.058367	-0.056182	-0.060416	-0.052147	-0.052902	-0.041	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 972 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	9	4	13	3	2	MIN	AVG	MAX
EY1	3464	3541	6666	3186	3182	3182	4008	6666
EY2	5839	2998	5956	2766	5941	2766	4700	5956
EY3	1102	2395	1026	1891	1138	1026	1510	2395
EY4	23788	28223	20930	26049	23321	20930	24462	28223
EY5	299	289	269	296	295	269	289	299
EX5	155	216	137	471	620	137	320	620
EY6	146	130	111	239	236	111	172	239
EX6	109	323	63	162	167	63	165	323
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.52	0.75	0.51	1.59	2.10	0.51	1.09	2.10
R6	0.74	2.49	0.56	0.68	0.71	0.56	1.04	2.49

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.219750	-0.227131	-0.208959	-0.215434	-0.208036	-0.211	0
UY2	-0.158650	-0.163219	-0.157215	-0.143934	-0.146085	-0.181	300
UY3	-0.134047	-0.144582	-0.130791	-0.124198	-0.123367	-0.151	614
UY4	-0.114925	-0.127970	-0.110549	-0.107821	-0.107073	-0.124	914
UY5	-0.098040	-0.112965	-0.092471	-0.093654	-0.093336	-0.100	1219
UY6	-0.083773	-0.100131	-0.076842	-0.082055	-0.082207	-0.085	1524
UY7	-0.072123	-0.089606	-0.063756	-0.072920	-0.073465	-0.070	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	9	13	6	5	7	MIN	AVG	MAX
EY1	5828	7685	6586	6876	6525	5828	6700	7685
EY2	4865	2591	3595	4830	4011	2591	3978	4865
EY3	3453	3981	3246	1290	3080	1290	3010	3981
EY4	21984	21571	37293	31587	38017	21571	30090	38017
EY5	245	183	152	208	165	152	190	245
EX5	260	308	228	113	309	113	244	309
EY6	182	144	194	109	204	109	167	204
EX6	261	102	151	156	296	102	193	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.68	1.50	0.54	1.88	0.54	1.33	1.88
R6	1.43	0.71	0.78	1.43	1.45	0.71	1.16	1.45

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.204721	-0.230312	-0.184561	-0.239647	-0.182059	-0.211	0
UY2	-0.161032	-0.179489	-0.138202	-0.190152	-0.138892	-0.181	300
UY3	-0.144502	-0.161374	-0.123038	-0.169176	-0.124687	-0.151	614
UY4	-0.130199	-0.145061	-0.109582	-0.152806	-0.112511	-0.124	914
UY5	-0.117595	-0.130170	-0.097303	-0.137884	-0.101555	-0.100	1219
UY6	-0.106941	-0.117169	-0.086663	-0.124892	-0.092190	-0.085	1524
UY7	-0.098264	-0.106251	-0.077809	-0.113979	-0.084495	-0.070	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 972 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	9	6	7	15	13	MIN	AVG	MAX
EY1	5828	6586	6525	7343	7685	5828	6793	7685
EY2	4865	3595	4011	5703	2591	2591	4153	5703
EY3	3453	3246	3080	3867	3981	3080	3525	3981
EY4	21984	37293	38017	20603	21571	20603	27894	38017
EY5	245	152	165	224	183	152	194	245
EX5	260	228	309	472	308	228	315	472
EY6	182	194	204	236	144	144	192	236
EX6	261	151	296	175	102	102	197	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.50	1.88	2.11	1.68	1.06	1.65	2.11
R6	1.43	0.78	1.45	0.74	0.71	0.71	1.02	1.45

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<b>CALCULATED AND OBSERVED DEFLECTIONS (mm)</b>					<b>OBSERVED DEFL.(mm)</b>	<b>SENSOR DISTANCE(mm)</b>
UY1	-0.204721	-0.184561	-0.182059	-0.177694	-0.230312	-0.211	0
UY2	-0.161032	-0.138202	-0.138892	-0.139908	-0.179489	-0.181	300
UY3	-0.144502	-0.123038	-0.124687	-0.124452	-0.161374	-0.151	614
UY4	-0.130199	-0.109582	-0.112511	-0.111198	-0.145061	-0.124	914
UY5	-0.117595	-0.097303	-0.101555	-0.099581	-0.130170	-0.100	1219
UY6	-0.106941	-0.086663	-0.092190	-0.089781	-0.117169	-0.085	1524
UY7	-0.098264	-0.077809	-0.084495	-0.081809	-0.106251	-0.070	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 1190 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	12	6	3	4	MIN	AVG	MAX
EY1	7685	6255	5828	6876	6525	5828	6634	7685
EY2	2591	3810	4865	4830	4011	2591	4021	4865
EY3	3981	2841	3453	1290	3080	1290	2929	3981
EY4	21571	21369	21984	31587	38017	21369	26905	38017
EY5	183	238	245	208	165	165	208	245
EX5	308	340	260	113	309	113	266	340
EY6	144	162	182	109	204	109	160	204
EX6	102	264	261	156	296	102	216	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.68	1.43	1.06	0.54	1.88	0.54	1.32	1.88
R6	0.71	1.63	1.43	1.43	1.45	0.71	1.33	1.63

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.281701	-0.277850	-0.250368	-0.293273	-0.222526	-0.282	0
UY2	-0.219478	-0.218110	-0.196882	-0.232675	-0.169684	-0.140	300
UY3	-0.197298	-0.196220	-0.176651	-0.206991	-0.152311	-0.201	614
UY4	-0.177330	-0.177626	-0.159156	-0.186950	-0.137431	-0.164	914
UY5	-0.159109	-0.161254	-0.143747	-0.168685	-0.124052	-0.131	1219
UY6	-0.143205	-0.147413	-0.130727	-0.152785	-0.112621	-0.113	1524
UY7	-0.129854	-0.136123	-0.120129	-0.139431	-0.103234	-0.093	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	2	7	10	5	MIN	AVG	MAX
EY1	7685	6876	5066	3854	5828	3854	5862	7685
EY2	2591	4830	5418	5703	4865	2591	4681	5703
EY3	3981	1290	2288	1579	3453	1290	2518	3981
EY4	21571	31587	33937	20603	21984	20603	25936	33937
EY5	183	208	297	177	245	177	222	297
EX5	308	113	614	116	260	113	282	614
EY6	144	109	116	236	182	109	157	236
EX6	102	156	260	175	261	102	191	261
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.68	0.54	2.07	0.66	1.06	0.54	1.20	2.07
R6	0.71	1.43	2.24	0.74	1.43	0.71	1.31	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.281966	-0.293395	-0.296201	-0.253297	-0.250636	-0.282	0
UY2	-0.219745	-0.232799	-0.240522	-0.186222	-0.197148	-0.140	300
UY3	-0.197567	-0.207118	-0.220425	-0.160595	-0.176911	-0.201	614
UY4	-0.177596	-0.187077	-0.202806	-0.140878	-0.159400	-0.164	914
UY5	-0.159365	-0.168809	-0.186522	-0.124204	-0.143969	-0.131	1219
UY6	-0.143448	-0.152903	-0.172215	-0.110636	-0.130925	-0.113	1524
UY7	-0.130080	-0.139542	-0.160151	-0.099938	-0.120303	-0.093	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 1190 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	13	9	4	5	7	MIN	AVG	MAX
EY1	7685	5828	7182	6876	6525	5828	6819	7685
EY2	2591	4865	2473	4830	4011	2473	3754	4865
EY3	3981	3453	3277	1290	3080	1290	3016	3981
EY4	21571	21984	34273	31587	38017	21571	29486	38017
EY5	183	245	239	208	165	165	208	245
EX5	308	260	295	113	309	113	257	309
EY6	144	182	110	109	204	109	150	204
EX6	102	261	60	156	296	60	175	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.68	1.06	1.24	0.54	1.88	0.54	1.28	1.88
R6	0.71	1.43	0.54	1.43	1.45	0.54	1.11	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.281966	-0.250636	-0.295136	-0.293395	-0.222891	-0.282	0
UY2	-0.219745	-0.197148	-0.228921	-0.232799	-0.170043	-0.240	300
UY3	-0.197567	-0.176911	-0.207017	-0.207118	-0.152652	-0.201	614
UY4	-0.177596	-0.159400	-0.186633	-0.187077	-0.137745	-0.164	914
UY5	-0.159365	-0.143969	-0.167274	-0.168809	-0.124332	-0.131	1219
UY6	-0.143448	-0.130925	-0.149851	-0.152903	-0.112866	-0.113	1524
UY7	-0.130080	-0.120303	-0.134826	-0.139542	-0.103446	-0.093	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 1189 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	14	2	11	8	MIN	AVG	MAX
EY1	5066	5896	6876	7453	7685	5066	6595	7685
EY2	5418	5828	4830	5743	2591	2591	4882	5828
EY3	2288	3913	1290	3888	3981	1290	3072	3981
EY4	33937	20304	31587	20360	21571	20304	25552	33937
EY5	297	249	208	282	183	183	244	297
EX5	614	139	113	628	308	113	360	628
EY6	116	137	109	116	144	109	124	144
EX6	260	319	156	264	102	102	220	319
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.07	0.56	0.54	2.23	1.68	0.54	1.42	2.23
R6	2.24	2.33	1.43	2.28	0.71	0.71	1.80	2.33

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.295952	-0.283807	-0.293149	-0.306281	-0.281729	-0.333	0
UY2	-0.240320	-0.233839	-0.232604	-0.260066	-0.219560	-0.273	300
UY3	-0.220240	-0.213370	-0.206944	-0.240257	-0.197401	-0.228	614
UY4	-0.202636	-0.195153	-0.186920	-0.222465	-0.177446	-0.186	914
UY5	-0.186365	-0.178841	-0.168667	-0.206246	-0.159231	-0.149	1219
UY6	-0.172070	-0.164810	-0.152774	-0.192033	-0.143327	-0.128	1524
UY7	-0.160016	-0.153199	-0.139425	-0.180055	-0.129971	-0.106	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	2	8	10	5	MIN	AVG	MAX
EY1	5066	6876	7685	3854	5828	3854	5862	7685
EY2	5418	4830	2591	5703	4865	2591	4681	5703
EY3	2288	1290	3981	1579	3453	1290	2518	3981
EY4	33937	31587	21571	20603	21984	20603	25936	33937
EY5	297	208	183	177	245	177	222	297
EX5	614	113	308	116	260	113	282	614
EY6	116	109	144	236	182	109	157	236
EX6	260	156	102	175	261	102	191	261
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.07	0.54	1.68	0.66	1.06	0.54	1.20	2.07
R6	2.24	1.43	0.71	0.74	1.43	0.71	1.31	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.295952	-0.293149	-0.281729	-0.253084	-0.250426	-0.333	0
UY2	-0.240320	-0.232604	-0.219560	-0.186065	-0.196983	-0.273	300
UY3	-0.220240	-0.206944	-0.197401	-0.160460	-0.176762	-0.228	614
UY4	-0.202636	-0.186920	-0.177446	-0.140760	-0.159266	-0.186	914
UY5	-0.186365	-0.168667	-0.159231	-0.124100	-0.143848	-0.149	1219
UY6	-0.172070	-0.152774	-0.143327	-0.110543	-0.130815	-0.128	1524
UY7	-0.160016	-0.139425	-0.129971	-0.099854	-0.120202	-0.106	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 200 L: LOAD 1189 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	4	7	2	14	6	MIN	AVG	MAX
EY1	5738	5987	5911	7297	6442	5738	6275	7297
EY2	2143	2860	4781	5628	3903	2143	3863	5628
EY3	1147	3081	1210	3985	3564	1147	2598	3985
EY4	32650	30124	26946	20526	20379	20379	26125	32650
EY5	258	212	167	280	202	167	224	280
EX5	514	334	414	647	341	334	450	647
EY6	160	192	179	207	134	134	174	207
EX6	160	192	179	207	134	134	174	207
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.00	1.57	2.48	2.31	1.68	1.57	2.01	2.48
R6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.294752	-0.262015	-0.248859	-0.223289	-0.239267	-0.333	0
UY2	-0.206672	-0.197195	-0.184880	-0.179012	-0.181853	-0.273	300
UY3	-0.179216	-0.176740	-0.158578	-0.160768	-0.159109	-0.228	614
UY4	-0.159115	-0.159251	-0.139250	-0.144947	-0.138575	-0.186	914
UY5	-0.141060	-0.143637	-0.122398	-0.130920	-0.119896	-0.149	1219
UY6	-0.125786	-0.130365	-0.108295	-0.118975	-0.103620	-0.128	1524
UY7	-0.113326	-0.119508	-0.096871	-0.109183	-0.089987	-0.106	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 654 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	6	12	14	4	9	MIN	AVG	MAX
EY1	5828	6255	6602	6525	7685	5828	6579	7685
EY2	4865	5281	5488	4011	2591	2591	4447	5488
EY3	3453	3588	3343	3080	3981	3080	3489	3981
EY4	21984	21369	20915	38017	21571	20915	24771	38017
EY5	245	238	252	165	183	165	217	252
EX5	260	340	428	309	308	260	329	428
EY6	182	199	208	204	144	144	187	208
EX6	261	326	333	296	102	102	263	333
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.43	1.69	1.88	1.68	1.06	1.55	1.88
R6	1.43	1.63	1.60	1.45	0.71	0.71	1.36	1.63

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.136848	-0.127121	-0.123242	-0.121555	-0.152680	-0.140	0
UY2	-0.107739	-0.099668	-0.096760	-0.093075	-0.119808	-0.123	300
UY3	-0.096709	-0.089188	-0.086438	-0.083477	-0.107563	-0.104	614
UY4	-0.087253	-0.080323	-0.077849	-0.075395	-0.096845	-0.084	914
UY5	-0.078913	-0.072587	-0.070388	-0.068131	-0.087071	-0.065	1219
UY6	-0.071854	-0.066094	-0.064145	-0.061923	-0.078540	-0.054	1524
UY7	-0.066097	-0.060836	-0.059100	-0.056820	-0.071370	-0.043	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	13	6	7	5	MIN	AVG	MAX
EY1	5828	7685	6586	6525	6876	5828	6700	7685
EY2	4865	2591	3595	4011	4830	2591	3978	4865
EY3	3453	3981	3246	3080	1290	1290	3010	3981
EY4	21984	21571	37293	38017	31587	21571	30090	38017
EY5	245	183	152	165	208	152	190	245
EX5	260	308	228	309	113	113	244	309
EY6	182	436	293	213	79	79	241	436
EX6	261	102	151	296	156	102	193	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.68	1.50	1.88	0.54	0.54	1.33	1.88
R6	1.43	0.71	0.78	1.45	1.43	0.71	1.16	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.136991	-0.152594	-0.123078	-0.121564	-0.159549	-0.140	0
UY2	-0.107801	-0.119710	-0.092524	-0.093048	-0.127226	-0.123	300
UY3	-0.096710	-0.107475	-0.082227	-0.083434	-0.113101	-0.104	614
UY4	-0.087245	-0.096783	-0.073309	-0.075363	-0.102221	-0.084	914
UY5	-0.078906	-0.087031	-0.065184	-0.068112	-0.092360	-0.065	1219
UY6	-0.071850	-0.078518	-0.058149	-0.061915	-0.083786	-0.054	1524
UY7	-0.066095	-0.071362	-0.052291	-0.056818	-0.076588	-0.043	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 654 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	5	3	16	8	6	MIN	AVG	MAX
EY1	5828	6525	6809	7685	7897	5828	6949	7897
EY2	4865	4011	5987	2591	5670	2591	4625	5987
EY3	3453	3080	1312	3981	1103	1103	2586	3981
EY4	21984	38017	20048	21571	38629	20048	28050	38629
EY5	245	165	299	183	283	165	235	299
EX5	260	309	656	308	517	260	410	656
EY6	182	204	227	144	227	144	197	227
EX6	261	296	403	102	294	102	271	403
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.06	1.88	2.19	1.68	1.83	1.06	1.73	2.19
R6	1.43	1.45	1.78	0.71	1.29	0.71	1.33	1.78

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.136991	-0.121564	-0.123010	-0.152594	-0.118842	-0.140	0
UY2	-0.107801	-0.093048	-0.093168	-0.119710	-0.090130	-0.123	300
UY3	-0.096710	-0.083434	-0.080183	-0.107475	-0.077981	-0.104	614
UY4	-0.087245	-0.075363	-0.071253	-0.096783	-0.069957	-0.084	914
UY5	-0.078906	-0.068112	-0.063921	-0.087031	-0.063085	-0.065	1219
UY6	-0.071850	-0.061915	-0.058036	-0.078518	-0.057392	-0.054	1524
UY7	-0.066095	-0.056818	-0.053422	-0.071362	-0.052828	-0.043	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 952 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	7	14	16	1	8	MIN	AVG	MAX
EY1	3245	3517	7398	7920	5197	3245	5455	7920
EY2	3775	3869	2118	5267	2523	2118	3510	5267
EY3	1021	1007	3254	1617	1009	1007	1582	3254
EY4	27020	20641	35183	35370	22531	20641	28149	35370
EY5	205	206	203	200	197	197	202	206
EX5	467	499	492	333	171	171	392	499
EY6	113	151	101	110	103	101	115	151
EX6	93	320	56	229	71	56	154	320
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.28	2.42	2.42	1.66	0.87	0.87	1.93	2.42
R6	0.83	2.13	0.55	2.08	0.69	0.55	1.26	2.13

	<u>OBSERVED</u>					<u>DEFL.(mm)</u>	<u>SENSOR</u>
							<u>DISTANCE(mm)</u>
UY1	-0.242124	-0.250745	-0.202915	-0.225626	-0.284664	-0.221	0
UY2	-0.168543	-0.182489	-0.148344	-0.183955	-0.213374	-0.195	300
UY3	-0.141669	-0.157201	-0.129408	-0.166444	-0.184522	-0.165	614
UY4	-0.120569	-0.139149	-0.112869	-0.152626	-0.162419	-0.133	914
UY5	-0.101461	-0.123842	-0.097182	-0.140033	-0.142456	-0.104	1219
UY6	-0.084998	-0.111336	-0.083075	-0.129054	-0.125219	-0.086	1524
UY7	-0.071346	-0.101433	-0.070893	-0.119808	-0.110838	-0.068	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	8	2	7	10	5	MIN	AVG	MAX
EY1	7685	6876	5066	3854	5828	3854	5862	7685
EY2	2591	4830	5418	5703	4865	2591	4681	5703
EY3	3981	1290	2288	1579	3453	1290	2518	3981
EY4	21571	31587	33937	20603	21984	20603	25936	33937
EY5	183	208	297	177	245	177	222	297
EX5	362	115	731	123	295	115	325	731
EY6	144	109	116	236	182	109	157	236
EX6	102	156	260	175	261	102	191	261
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.98	0.56	2.46	0.70	1.20	0.36	1.38	2.46
R6	0.71	1.43	2.24	0.74	1.43	0.71	1.31	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>DEFL.(mm)</u>	<u>SENSOR</u>
							<u>DISTANCE(mm)</u>
UY1	-0.221960	-0.232240	-0.236194	-0.202399	-0.199330	-0.221	0
UY2	-0.174106	-0.185191	-0.191752	-0.148598	-0.156848	-0.195	300
UY3	-0.156324	-0.164632	-0.175620	-0.128092	-0.140722	-0.165	614
UY4	-0.140785	-0.148796	-0.161682	-0.112423	-0.126960	-0.133	914
UY5	-0.126609	-0.134443	-0.148828	-0.099200	-0.114834	-0.104	1219
UY6	-0.114232	-0.121963	-0.137540	-0.088437	-0.104571	-0.086	1524
UY7	-0.103826	-0.111486	-0.128021	-0.079943	-0.096199	-0.068	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 952 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	13	9	4	5	7	MIN	AVG	MAX
EY1	7685	5828	7182	6876	6525	5828	6819	7685
EY2	2591	4865	2473	4830	4011	2473	3754	4865
EY3	3981	3453	3277	1290	3080	1290	3016	3981
EY4	21571	21984	34273	31587	38017	21571	29486	38017
EY5	183	245	239	208	165	165	208	245
EX5	362	295	339	115	365	115	295	365
EY6	144	182	110	109	204	109	150	204
EX6	102	261	60	156	296	60	175	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.98	1.20	1.42	0.56	2.22	0.56	1.48	2.22
R6	0.71	1.43	0.54	1.43	1.45	0.54	1.11	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.221960	-0.199330	-0.232587	-0.232240	-0.176819	-0.221	0
UY2	-0.174106	-0.156848	-0.181583	-0.185191	-0.135319	-0.195	300
UY3	-0.156324	-0.140722	-0.163868	-0.164632	-0.121344	-0.165	614
UY4	-0.140785	-0.126960	-0.147930	-0.148796	-0.109616	-0.133	914
UY5	-0.126609	-0.114834	-0.132821	-0.134443	-0.099078	-0.104	1219
UY6	-0.114232	-0.104571	-0.119247	-0.121963	-0.090070	-0.086	1524
UY7	-0.103826	-0.096199	-0.107543	-0.111486	-0.082663	-0.068	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 1186 kPa**

**OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.**  
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**CALCULATED MODULI (MPa)**

SET	7	2	8	5	3	MIN	AVG	MAX
EY1	5066	6876	7685	5828	6525	5066	6396	7685
EY2	5418	4830	2591	4865	4011	2591	4343	5418
EY3	2288	1290	3981	3453	3080	1290	2818	3981
EY4	33937	31587	21571	21984	38017	21571	29419	38017
EY5	297	208	183	245	165	165	219	297
EX5	614	113	308	260	309	113	321	614
EY6	116	109	144	182	204	109	151	204
EX6	260	156	102	261	296	102	215	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.07	0.54	1.68	1.06	1.88	0.54	1.45	2.07
R6	2.24	1.43	0.71	1.43	1.45	0.71	1.45	2.24

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.294503	-0.289213	-0.276463	-0.248163	-0.220091	-0.334	0
UY2	-0.239105	-0.230596	-0.216827	-0.195230	-0.168385	-0.301	300
UY3	-0.218938	-0.204978	-0.194637	-0.175124	-0.150968	-0.254	614
UY4	-0.201507	-0.185247	-0.175251	-0.157975	-0.136359	-0.204	914
UY5	-0.185439	-0.167368	-0.157574	-0.142873	-0.123242	-0.158	1219
UY6	-0.171335	-0.151825	-0.142150	-0.130101	-0.112037	-0.132	1524
UY7	-0.159445	-0.138777	-0.129187	-0.119688	-0.102827	-0.104	1829

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**OPTIMIZATION CRITERION: MAXIMUM DEFLECTION**  
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**CALCULATED MODULI (MPa)**

SET	7	2	8	5	11	MIN	AVG	MAX
EY1	5066	6876	7685	5828	4086	4086	5908	7685
EY2	5418	4830	2591	4865	5928	2591	4726	5928
EY3	2288	1290	3981	3453	1565	1290	2515	3981
EY4	33937	31587	21571	21984	20133	20133	25842	33937
EY5	297	208	183	245	195	183	225	297
EX5	614	113	308	260	104	104	280	614
EY6	116	109	144	182	247	109	160	247
EX6	260	156	102	261	603	102	276	603
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.07	0.54	1.68	1.06	0.53	0.53	1.18	2.07
R6	2.24	1.43	0.71	1.43	2.44	0.71	1.65	2.44

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.294492	-0.289334	-0.276723	-0.248427	-0.222386	-0.334	0
UY2	-0.239104	-0.230719	-0.217088	-0.195492	-0.158490	-0.301	300
UY3	-0.218959	-0.205104	-0.194901	-0.175379	-0.134891	-0.254	614
UY4	-0.201550	-0.185373	-0.175512	-0.158215	-0.117842	-0.204	914
UY5	-0.185499	-0.167490	-0.157826	-0.143093	-0.103970	-0.158	1219
UY6	-0.171408	-0.151942	-0.142389	-0.130297	-0.093039	-0.132	1524
UY7	-0.159527	-0.138888	-0.129411	-0.119860	-0.084656	-0.104	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 300 R: LOAD 1186 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

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CALCULATED MODULI (MPa)

SET	4	3	10	12	16	MIN	AVG	MAX
EY1	6876	7182	5066	7685	7688	5066	6899	7688
EY2	4830	2473	5418	2591	2579	2473	3578	5418
EY3	1290	3277	2288	3981	1077	1077	2383	3981
EY4	31587	34273	33937	21571	22620	21571	28797	34273
EY5	208	239	297	183	208	183	227	297
EX5	113	295	614	308	418	113	350	614
EY6	109	110	116	144	102	102	116	144
EX6	156	60	260	102	226	60	161	260
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.54	1.24	2.07	1.68	2.01	0.54	1.51	2.07
R6	1.43	0.54	2.24	0.71	2.20	0.54	1.43	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u>					<u>DEFL.(mm)</u>	<u>SENSOR</u>
							<u>DISTANCE(mm)</u>
UY1	-0.289334	-0.289891	-0.294492	-0.276723	-0.371370	-0.334	0
UY2	-0.230719	-0.226340	-0.239104	-0.217088	-0.296641	-0.301	300
UY3	-0.205104	-0.204245	-0.218959	-0.194901	-0.265701	-0.254	614
UY4	-0.185373	-0.184364	-0.201550	-0.175512	-0.243830	-0.204	914
UY5	-0.167490	-0.165523	-0.185499	-0.157826	-0.224518	-0.158	1219
UY6	-0.151942	-0.148596	-0.171408	-0.142389	-0.208096	-0.132	1524
UY7	-0.138888	-0.134005	-0.159527	-0.129411	-0.194538	-0.104	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 667 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
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CALCULATED MODULI (MPa)

SET	7	1	4	16	5	MIN	AVG	MAX
EY1	7897	7236	6525	6868	5959	5959	6897	7897
EY2	5670	3829	4011	5770	2659	2659	4388	5770
EY3	1103	2164	3080	1518	3940	1103	2361	3940
EY4	38629	33847	38017	20232	34730	20232	33091	38629
EY5	283	231	165	216	282	165	235	283
EX5	517	506	309	399	262	262	399	517
EY6	227	193	204	235	190	190	210	235
EX6	294	98	296	508	358	98	311	508
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.83	2.20	1.88	1.85	0.93	0.93	1.74	2.20
R6	1.29	0.51	1.45	2.16	1.89	0.51	1.46	2.16

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.119567	-0.117758	-0.123056	-0.115287	-0.117864	-0.127	0
UY2	-0.092011	-0.087792	-0.094934	-0.086608	-0.084077	-0.108	300
UY3	-0.079430	-0.075673	-0.084809	-0.073888	-0.073324	-0.090	614
UY4	-0.071101	-0.066070	-0.076600	-0.065042	-0.064627	-0.071	914
UY5	-0.064132	-0.057465	-0.069284	-0.057862	-0.056934	-0.057	1219
UY6	-0.058403	-0.050076	-0.063054	-0.052125	-0.050457	-0.049	1524
UY7	-0.053826	-0.043936	-0.057937	-0.047640	-0.045188	-0.039	1829

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OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
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CALCULATED MODULI (MPa)

SET	6	7	10	8	2	MIN	AVG	MAX
EY1	6586	6525	7897	5959	7236	5959	6841	7897
EY2	3595	4011	5670	2659	3829	2659	3953	5670
EY3	3246	3080	1103	3940	2164	1103	2706	3940
EY4	37293	38017	38629	34730	33847	33847	36503	38629
EY5	152	165	283	282	231	152	222	283
EX5	228	309	517	262	506	228	364	517
EY6	194	204	227	190	193	190	201	227
EX6	151	296	294	358	98	98	239	358
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.50	1.88	1.83	0.93	2.20	0.93	1.67	2.20
R6	0.78	1.45	1.29	1.89	0.51	0.51	1.18	1.89

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.124411	-0.123073	-0.119556	-0.117798	-0.117655	-0.127	0
UY2	-0.094411	-0.094921	-0.092001	-0.084001	-0.087682	-0.108	300
UY3	-0.083471	-0.084778	-0.079424	-0.073260	-0.075579	-0.090	614
UY4	-0.074408	-0.076577	-0.071098	-0.064588	-0.066006	-0.071	914
UY5	-0.066221	-0.069271	-0.064130	-0.056914	-0.057426	-0.057	1219
UY6	-0.059161	-0.063048	-0.058403	-0.050450	-0.050054	-0.049	1524
UY7	-0.053291	-0.057936	-0.053827	-0.045189	-0.043928	-0.039	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 667 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	10	6	3	4	13	MIN	AVG	MAX
EY1	3854	7897	6525	5959	7781	3854	6403	7897
EY2	5703	5670	4011	2659	5973	2659	4803	5973
EY3	1579	1103	3080	3940	3933	1103	2727	3940
EY4	20603	38629	38017	34730	20053	20053	30406	38629
EY5	177	283	165	282	184	165	218	283
EX5	116	517	309	262	443	116	329	517
EY6	236	227	204	190	249	190	221	249
EX6	525	294	296	358	465	294	388	525
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.66	1.83	1.88	0.93	2.41	0.66	1.54	2.41
R6	2.22	1.29	1.45	1.89	1.87	1.29	1.75	2.22

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.131138	-0.119556	-0.123073	-0.117798	-0.106687	-0.127	0
UY2	-0.093445	-0.092001	-0.094921	-0.084001	-0.083822	-0.108	300
UY3	-0.079665	-0.079424	-0.084778	-0.073260	-0.074313	-0.090	614
UY4	-0.069701	-0.071098	-0.076577	-0.064588	-0.066702	-0.071	914
UY5	-0.061619	-0.064130	-0.069271	-0.056914	-0.060203	-0.057	1219
UY6	-0.055234	-0.058403	-0.063048	-0.050450	-0.054829	-0.049	1524
UY7	-0.050322	-0.053827	-0.057936	-0.045189	-0.050527	-0.039	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 955 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	9	12	8	16	11	MIN	AVG	MAX
EY1	3665	3174	5752	5767	6395	3174	4951	6395
EY2	4233	5544	2753	5551	3040	2753	4224	5551
EY3	1757	2687	1884	3765	2520	1757	2523	3765
EY4	34746	38581	22505	39558	24933	22505	32065	39558
EY5	198	214	255	293	183	183	229	293
EX5	580	638	686	194	281	194	476	686
EY6	106	101	121	101	138	101	113	138
EX6	137	69	138	74	245	69	133	245
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.93	2.98	2.69	0.66	1.54	0.66	2.16	2.98
R6	1.30	0.68	1.14	0.74	1.77	0.68	1.13	1.77

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.212537	-0.209175	-0.204012	-0.179006	-0.177590	-0.200	0
UY2	-0.151904	-0.151350	-0.148799	-0.139361	-0.129575	-0.171	300
UY3	-0.130542	-0.132434	-0.126331	-0.123781	-0.110905	-0.142	614
UY4	-0.112609	-0.114759	-0.108737	-0.109164	-0.095998	-0.115	914
UY5	-0.096157	-0.097995	-0.093033	-0.095214	-0.082762	-0.091	1219
UY6	-0.081761	-0.082912	-0.079531	-0.082550	-0.071474	-0.077	1524
UY7	-0.069647	-0.069937	-0.068300	-0.071549	-0.062158	-0.061	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	5	10	8	3	6	MIN	AVG	MAX
EY1	5828	3854	7685	6525	7897	3854	6358	7897
EY2	4865	5703	2591	4011	5670	2591	4568	5703
EY3	3453	1579	3981	3080	1103	1103	2639	3981
EY4	21984	20603	21571	38017	38629	20603	28161	38629
EY5	245	224	183	165	283	165	220	283
EX5	295	156	362	365	610	156	358	610
EY6	182	236	144	204	227	144	199	236
EX6	261	525	102	296	294	102	295	525
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.20	0.70	1.98	2.22	2.16	0.70	1.65	2.22
R6	1.43	2.22	0.71	1.45	1.29	0.71	1.42	2.22

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED</u>					<u>OBSERVED</u>	<u>SENSOR</u>
						<u>DEFL.(mm)</u>	<u>DISTANCE(mm)</u>
UY1	-0.198974	-0.186533	-0.217918	-0.176067	-0.171047	-0.200	0
UY2	-0.156884	-0.132667	-0.173271	-0.135769	-0.131607	-0.171	300
UY3	-0.140455	-0.113171	-0.154930	-0.121269	-0.113626	-0.142	614
UY4	-0.126810	-0.099146	-0.139748	-0.109548	-0.101728	-0.115	914
UY5	-0.114844	-0.087780	-0.125975	-0.099105	-0.091771	-0.091	1219
UY6	-0.104728	-0.078799	-0.113986	-0.090210	-0.083582	-0.077	1524
UY7	-0.096471	-0.071888	-0.103905	-0.082902	-0.077039	-0.061	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 955 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	6	9	7	15	10	MIN	AVG	MAX
EY1	6586	5828	6525	7570	7897	5828	6881	7897
EY2	3595	4865	4011	5379	5670	3595	4704	5670
EY3	3246	3453	3080	3819	1103	1103	2940	3819
EY4	37293	21984	38017	25035	38629	21984	32191	38629
EY5	152	245	165	151	283	151	199	283
EX5	228	260	309	335	517	228	330	517
EY6	194	182	204	238	227	182	209	238
EX6	151	261	296	137	294	137	228	296
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.50	1.06	1.88	2.23	1.83	1.06	1.70	2.23
R6	0.78	1.43	1.45	0.57	1.29	0.57	1.11	1.45

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.178129	-0.199063	-0.176214	-0.167447	-0.171179	-0.200	0
UY2	-0.135176	-0.156962	-0.135906	-0.131671	-0.131726	-0.171	300
UY3	-0.119513	-0.140514	-0.121384	-0.116618	-0.113718	-0.142	614
UY4	-0.106537	-0.126851	-0.109642	-0.104029	-0.101796	-0.115	914
UY5	-0.094814	-0.114872	-0.099182	-0.092878	-0.091821	-0.091	1219
UY6	-0.084706	-0.104747	-0.090272	-0.083354	-0.083620	-0.077	1524
UY7	-0.076301	-0.096484	-0.082952	-0.075500	-0.077068	-0.061	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 1186 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	13	8	11	7	MIN	AVG	MAX
EY1	6876	4003	7685	5639	5066	4003	5854	7685
EY2	4830	2588	2591	3044	5418	2588	3694	5418
EY3	1290	3716	3981	1849	2288	1290	2625	3981
EY4	31587	20083	21571	20360	33937	20083	25507	33937
EY5	208	217	183	224	297	183	226	297
EX5	113	249	308	500	614	113	357	614
EY6	109	145	144	131	116	109	129	145
EX6	156	357	102	299	260	102	235	357
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	0.54	1.15	1.68	2.23	2.07	0.54	1.53	2.23
R6	1.43	2.46	0.71	2.28	2.24	0.71	1.82	2.46

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.285681	-0.309447	-0.270576	-0.318751	-0.294682	-0.310	0
UY2	-0.230015	-0.234302	-0.215108	-0.250739	-0.239373	-0.262	300
UY3	-0.203938	-0.209700	-0.192289	-0.223872	-0.218570	-0.219	614
UY4	-0.184166	-0.189241	-0.173404	-0.203404	-0.201051	-0.176	914
UY5	-0.166547	-0.171335	-0.156283	-0.185643	-0.185064	-0.137	1219
UY6	-0.151316	-0.156324	-0.141385	-0.170737	-0.171092	-0.117	1524
UY7	-0.138566	-0.144193	-0.128866	-0.158590	-0.159339	-0.094	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	7	2	8	5	10	MIN	AVG	MAX
EY1	5066	6876	7685	5828	3854	3854	5862	7685
EY2	5418	4830	2591	4865	5703	2591	4681	5703
EY3	2288	1290	3981	3453	1579	1290	2518	3981
EY4	33937	31587	21571	21984	20603	20603	25936	33937
EY5	297	208	183	245	284	183	243	297
EX5	614	113	308	260	187	113	296	614
EY6	116	109	144	182	236	109	157	236
EX6	260	156	102	261	525	102	261	525
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	2.07	0.54	1.68	1.06	0.66	0.54	1.20	2.07
R6	2.24	1.43	0.71	1.43	2.22	0.71	1.61	2.24

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.294669	-0.285812	-0.270850	-0.247213	-0.230318	-0.310	0
UY2	-0.239371	-0.230148	-0.215385	-0.194929	-0.163540	-0.262	300
UY3	-0.218593	-0.204074	-0.192570	-0.174502	-0.139595	-0.219	614
UY4	-0.201099	-0.184303	-0.173683	-0.157535	-0.122446	-0.176	914
UY5	-0.185131	-0.166680	-0.156553	-0.142658	-0.108550	-0.137	1219
UY6	-0.171172	-0.151444	-0.141644	-0.130084	-0.097567	-0.117	1524
UY7	-0.159429	-0.138687	-0.129110	-0.119822	-0.089110	-0.094	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: RWY 12-30: STA. 6 + 500 R: LOAD 1186 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	3	4	12	10	8	MIN	AVG	MAX
EY1	7182	6876	7685	5066	5828	5066	6527	7685
EY2	2473	4830	2591	5418	4865	2473	4035	5418
EY3	3277	1290	3981	2288	3453	1290	2858	3981
EY4	34273	31587	21571	33937	21984	21571	28670	34273
EY5	239	208	183	297	245	183	234	297
EX5	295	113	308	614	260	113	318	614
EY6	110	109	144	116	182	109	132	182
EX6	60	156	102	260	261	60	168	261
R4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R5	1.24	0.54	1.68	2.07	1.06	0.54	1.32	2.07
R6	0.54	1.43	0.71	2.24	1.43	0.54	1.27	2.24

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.284438	-0.285812	-0.270850	-0.294669	-0.247213	-0.310	0
UY2	-0.225172	-0.230148	-0.215385	-0.239371	-0.194929	-0.262	300
UY3	-0.202076	-0.204074	-0.192570	-0.218593	-0.174502	-0.219	614
UY4	-0.182494	-0.184303	-0.173683	-0.201099	-0.157535	-0.176	914
UY5	-0.164102	-0.166680	-0.156553	-0.185131	-0.142658	-0.137	1219
UY6	-0.147674	-0.151444	-0.141644	-0.171172	-0.130084	-0.117	1524
UY7	-0.133549	-0.138687	-0.129110	-0.159429	-0.119822	-0.094	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 370 R: LOAD 884 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
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CALCULATED MODULI (MPa)

SET	13	6	7	4	2	MIN	AVG	MAX
EY1	6117	7835	7479	7330	4543	4543	6661	7835
EY2	244	487	235	218	320	218	301	487
EX2	346	287	260	187	434	187	303	434
EY3	138	106	134	122	200	106	140	200
EX3	263	260	258	287	407	258	295	407
EY4	135	131	146	145	120	120	135	146
EX4	295	222	291	322	179	179	262	322
R1	1	1	1	1	1	1	1	1
R2	1.42	0.59	1.11	0.86	1.35	0.59	1.07	1.42
R3	1.91	2.45	1.93	2.35	2.03	1.91	2.13	2.45
R4	2.18	1.69	2.00	2.23	1.50	1.50	1.92	2.23

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.432514	-0.383822	-0.433017	-0.450067	-0.421017	-0.400	0
UY2	-0.289328	-0.271409	-0.300838	-0.310616	-0.272271	-0.291	300
UY3	-0.170286	-0.172394	-0.182215	-0.183841	-0.173583	-0.174	614
UY4	-0.112348	-0.116393	-0.121664	-0.119332	-0.132599	-0.108	914
UY5	-0.082234	-0.082817	-0.090120	-0.086303	-0.111425	-0.079	1219
UY6	-0.064922	-0.061750	-0.072327	-0.068042	-0.098278	-0.065	1524
UY7	-0.054263	-0.048259	-0.061590	-0.057193	-0.089349	-0.054	1829

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 OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
 =====

CALCULATED MODULI (MPa)

SET	7	3	9	5	8	MIN	AVG	MAX
EY1	3695	5911	5987	7215	6442	3695	5850	7215
EY2	306	478	286	327	390	286	358	478
EX2	525	373	440	742	536	373	523	742
EY3	236	111	204	192	228	111	194	236
EX3	451	172	353	133	216	133	265	451
EY4	131	135	151	178	102	102	139	178
EX4	198	334	237	294	172	172	247	334
R1	1	1	1	1	1	1	1	1
R2	1.71	0.78	1.54	2.27	1.37	0.78	1.53	2.27
R3	1.91	1.56	1.73	0.69	0.95	0.69	1.37	1.91
R4	1.51	2.48	1.57	1.66	1.68	1.51	1.78	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.410059	-0.422911	-0.424510	-0.368931	-0.366997	-0.400	0
UY2	-0.248224	-0.296509	-0.292389	-0.258903	-0.248732	-0.291	300
UY3	-0.151896	-0.195505	-0.193024	-0.170247	-0.160110	-0.174	614
UY4	-0.115733	-0.139546	-0.148979	-0.124986	-0.117767	-0.108	914
UY5	-0.097679	-0.105482	-0.126913	-0.099424	-0.094186	-0.079	1219
UY6	-0.086389	-0.083920	-0.114024	-0.083763	-0.079213	-0.065	1524
UY7	-0.078604	-0.070153	-0.105743	-0.073803	-0.068997	-0.054	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

THUNDER BAY: TAXI A: STA. 10 + 370 R: LOAD 884 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.  
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**CALCULATED MODULI (MPa)**

SET	3	5	7	1	8	MIN	AVG	MAX
EY1	5911	7215	6442	4000	5987	4000	5911	7215
EY2	478	327	390	300	286	286	356	478
EX2	373	742	536	300	440	300	478	742
EY3	111	192	228	200	204	111	187	228
EX3	172	133	216	200	353	133	215	353
EY4	135	178	102	150	151	102	143	178
EX4	334	294	172	150	237	150	237	334
R1	1	1	1	1	1	1	1	1
R2	0.78	2.27	1.37	1.00	1.54	0.78	1.39	2.27
R3	1.56	0.69	0.95	1.00	1.73	0.69	1.19	1.73
R4	2.48	1.66	1.68	1.00	1.57	1.00	1.68	2.48
						ERR	ERR	ERR

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	CALCULATED AND OBSERVED DEFLECTIONS (mm)					OBSERVED DEFL.(mm)	SENSOR DISTANCE(mm)
UY1	-0.422911	-0.368931	-0.366997	-0.464107	-0.424510	-0.400	0
UY2	-0.296509	-0.258903	-0.248732	-0.293648	-0.292389	-0.291	300
UY3	-0.195505	-0.170247	-0.160110	-0.177498	-0.193024	-0.174	614
UY4	-0.139546	-0.124986	-0.117767	-0.127174	-0.148979	-0.108	914
UY5	-0.105482	-0.099424	-0.094186	-0.101119	-0.126913	-0.079	1219
UY6	-0.083920	-0.083763	-0.079213	-0.085486	-0.114024	-0.065	1524
UY7	-0.070153	-0.073803	-0.068997	-0.075309	-0.105743	-0.054	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 370 R: LOAD 1171 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
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CALCULATED MODULI (MPa)

SET	9	8	1	6	7	MIN	AVG	MAX
EY1	5617	4848	4839	7323	7185	4839	5962	7323
EY2	201	201	209	201	201	201	203	209
EX2	220	265	270	137	174	137	213	270
EY3	128	131	168	113	155	113	139	168
EX3	272	219	290	151	275	151	242	290
EY4	192	192	184	200	199	184	194	200
EX4	208	439	378	496	459	208	396	496
R1	1	1	1	1	1	1	1	1
R2	1.10	1.32	1.30	0.68	0.87	0.68	1.05	1.32
R3	2.13	1.68	1.73	1.34	1.77	1.34	1.73	2.13
R4	1.08	2.28	2.05	2.49	2.30	1.08	2.04	2.49

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.631611	-0.649800	-0.605855	-0.616577	-0.565079	-0.574	0
UY2	-0.413981	-0.418133	-0.381814	-0.418004	-0.378915	-0.420	300
UY3	-0.233854	-0.234878	-0.212450	-0.230533	-0.214578	-0.254	614
UY4	-0.149166	-0.151045	-0.140138	-0.132041	-0.135792	-0.163	914
UY5	-0.106956	-0.109667	-0.106241	-0.081286	-0.098077	-0.102	1219
UY6	-0.083201	-0.086699	-0.087564	-0.053793	-0.078106	-0.085	1524
UY7	-0.068591	-0.072939	-0.076072	-0.038100	-0.066372	-0.066	1829

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 OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
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CALCULATED MODULI (MPa)

SET	9	3	7	10	1	MIN	AVG	MAX
EY1	5987	5911	3695	6164	4000	3695	5152	6164
EY2	286	478	306	420	300	286	358	478
EX2	440	373	525	520	300	300	432	525
EY3	204	111	236	142	200	111	179	236
EX3	353	172	451	83	200	83	252	451
EY4	151	135	131	146	150	131	143	151
EX4	237	334	198	308	150	150	245	334
R1	1	1	1	1	1	1	1	1
R2	1.54	0.78	1.71	1.24	1.00	0.78	1.25	1.71
R3	1.73	1.56	1.91	0.58	1.00	0.58	1.36	1.91
R4	1.57	2.48	1.51	2.10	1.00	1.00	1.73	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.562332	-0.560213	-0.543189	-0.611793	-0.614784	-0.574	0
UY2	-0.387316	-0.392774	-0.328812	-0.443264	-0.388984	-0.420	300
UY3	-0.255691	-0.258977	-0.201211	-0.305448	-0.235125	-0.254	614
UY4	-0.197347	-0.184851	-0.153307	-0.230136	-0.168462	-0.163	914
UY5	-0.168116	-0.139728	-0.129391	-0.185777	-0.133949	-0.102	1219
UY6	-0.151043	-0.111165	-0.114436	-0.158817	-0.113240	-0.085	1524
UY7	-0.140073	-0.092929	-0.104124	-0.142362	-0.099759	-0.066	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: TAXI A: STA. 10 + 370 R: LOAD 1171 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	3	1	16	6	5	MIN	AVG	MAX
EY1	5911	4000	3730	5738	7215	3730	5319	7215
EY2	478	300	509	214	327	214	366	509
EX2	373	300	1268	491	742	300	635	1268
EY3	111	200	105	107	192	105	143	200
EX3	172	200	147	139	133	133	158	200
EY4	135	150	184	163	178	135	162	184
EX4	334	150	459	326	294	150	313	459
R1	1	1	1	1	1	1	1	1
R2	0.78	1.00	2.49	2.29	2.27	0.78	1.77	2.49
R3	1.56	1.00	1.40	1.30	0.69	0.69	1.19	1.56
R4	2.48	1.00	2.49	2.00	1.66	1.00	1.93	2.49

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.560213	-0.614784	-0.515576	-0.648013	-0.488709	-0.574	0
UY2	-0.392774	-0.388984	-0.341642	-0.451803	-0.342959	-0.420	300
UY3	-0.258977	-0.235125	-0.228135	-0.283540	-0.225519	-0.254	614
UY4	-0.184851	-0.168462	-0.164915	-0.194603	-0.165564	-0.163	914
UY5	-0.139728	-0.133949	-0.123694	-0.144418	-0.131703	-0.102	1219
UY6	-0.111165	-0.113240	-0.096365	-0.114330	-0.110958	-0.085	1524
UY7	-0.092929	-0.099759	-0.078568	-0.095890	-0.097764	-0.066	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 880 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	8	13	3	15	MIN	AVG	MAX
EY1	5783	6173	5841	4802	7507	4802	6021	7507
EY2	233	228	282	246	209	209	240	282
EX2	352	347	482	437	456	347	415	482
EY3	158	162	145	145	155	145	153	162
EX3	317	322	281	303	365	281	318	365
EY4	190	192	174	185	197	174	188	197
EY4	190	192	174	185	197	174	188	197
R2	2	2	2	2	2	2	2	2
R3	2.00	1.99	1.94	2.09	2.36	1.94	2.07	2.36
R4	1.56	1.54	1.39	1.42	0.76	0.76	1.33	1.56

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.411988	-0.404633	-0.395100	-0.428270	-0.375905	-0.387	0
UY2	-0.267565	-0.265253	-0.261619	-0.272769	-0.253331	-0.274	300
UY3	-0.152738	-0.152754	-0.157781	-0.157758	-0.145979	-0.162	614
UY4	-0.099975	-0.100964	-0.107882	-0.105815	-0.092333	-0.098	914
UY5	-0.073598	-0.075191	-0.080718	-0.078806	-0.064270	-0.066	1219
UY6	-0.058877	-0.060733	-0.064398	-0.062999	-0.048205	-0.055	1524
UY7	-0.049907	-0.051781	-0.053969	-0.053044	-0.038195	-0.045	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	9	7	8	11	4	MIN	AVG	MAX
EY1	4748	6743	6525	4408	6860	4408	5837	6860
EY2	289	546	401	386	422	289	409	546
EX2	853	958	298	965	1093	298	833	1093
EY3	189	102	204	144	172	102	162	204
EX3	372	79	384	112	126	79	215	384
EY4	116	163	190	104	180	104	151	190
EX4	263	168	357	256	364	168	282	364
R2	3	2	1	3	3	1	2	3
R3	1.97	0.78	1.88	0.77	0.74	0.74	1.23	1.97
R4	2.26	1.03	1.88	2.46	2.02	1.03	1.93	2.46

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.386365	-0.395307	-0.373352	-0.370377	-0.361214	-0.387	0
UY2	-0.249761	-0.294727	-0.252345	-0.238701	-0.259060	-0.274	300
UY3	-0.155412	-0.212116	-0.163500	-0.146293	-0.179515	-0.162	614
UY4	-0.113016	-0.161459	-0.124301	-0.097159	-0.137653	-0.098	914
UY5	-0.089748	-0.127010	-0.104311	-0.066048	-0.112676	-0.066	1219
UY6	-0.075181	-0.103497	-0.092657	-0.045406	-0.097089	-0.055	1524
UY7	-0.065401	-0.087629	-0.085233	-0.031472	-0.087196	-0.045	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 880 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	11	9	10	5	2	MIN	AVG	MAX
EY1	4408	4748	5531	4839	7236	4408	5352	7236
EY2	386	289	366	209	383	209	317	386
EX2	965	853	700	270	706	270	699	965
EY3	144	189	192	168	158	144	170	192
EX3	112	372	371	290	275	112	284	372
EY4	104	116	154	184	169	104	146	184
EX4	256	263	328	378	372	256	319	378
R2	3	3	2	1	2	1	2	3
R3	0.77	1.97	1.93	1.73	1.74	0.77	1.63	1.97
R4	2.46	2.26	2.14	2.05	2.20	2.05	2.22	2.46

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.370377	-0.386365	-0.357509	-0.453198	-0.359422	-0.387	0
UY2	-0.238701	-0.249761	-0.234175	-0.285222	-0.252203	-0.274	300
UY3	-0.146293	-0.155412	-0.148443	-0.157680	-0.168068	-0.162	614
UY4	-0.097159	-0.113016	-0.109729	-0.102746	-0.125615	-0.098	914
UY5	-0.066048	-0.089748	-0.088573	-0.076775	-0.101314	-0.066	1219
UY6	-0.045406	-0.075181	-0.075535	-0.062713	-0.086355	-0.055	1524
UY7	-0.031472	-0.065401	-0.066951	-0.054219	-0.076770	-0.045	1829

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 ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 1154 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.  
 =====

CALCULATED MODULI (MPa)

SET	12	3	7	14	13	MIN	AVG	MAX
EY1	5778	4839	4291	4684	4930	4291	4904	5778
EY2	316	209	266	270	354	209	283	354
EX2	505	270	319	365	355	270	363	505
EY3	117	168	158	145	164	117	181	168
EX3	270	290	205	246	275	205	257	290
EY4	165	184	175	188	187	165	180	188
EX4	146	378	384	408	329	146	329	408
R2	2	1	1	1	1	1	1	2
R3	2.31	1.73	1.29	1.69	1.68	1.29	1.74	2.31
R4	0.88	2.05	2.19	2.17	1.76	0.88	1.81	2.19

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.534450	-0.594307	-0.609706	-0.557297	-0.533468	-0.542	0
UY2	-0.362935	-0.374030	-0.387807	-0.349993	-0.347843	-0.392	300
UY3	-0.228756	-0.206776	-0.229301	-0.197549	-0.217235	-0.236	614
UY4	-0.160087	-0.134737	-0.159057	-0.128120	-0.157948	-0.147	914
UY5	-0.119789	-0.100680	-0.123240	-0.092172	-0.126164	-0.102	1219
UY6	-0.094275	-0.082240	-0.102988	-0.071788	-0.107234	-0.084	1524
UY7	-0.077465	-0.071101	-0.090730	-0.059548	-0.095239	-0.070	1829

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 OPTIMIZATION CRITERION: MAXIMUM DEFLECTION  
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CALCULATED MODULI (MPa)

SET	7	9	3	5	8	MIN	AVG	MAX
EY1	6743	4748	6964	4839	6525	4748	5964	6964
EY2	546	289	433	209	401	209	376	546
EX2	958	853	592	270	298	270	594	958
EY3	102	189	204	168	204	102	173	204
EX3	79	372	148	290	384	79	255	384
EY4	163	116	107	184	190	107	152	190
EX4	168	263	167	378	357	167	267	378
R2	2	3	1	1	1	1	2	3
R3	0.78	1.97	0.72	1.73	1.88	0.72	1.42	1.97
R4	1.03	2.26	1.56	2.05	1.88	1.03	1.76	2.26

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFLECTION (mm)</u>	<u>SENSOR DISTANCE (mm)</u>
UY1	-0.518392	-0.506666	-0.577383	-0.594307	-0.489600	-0.542	0
UY2	-0.386495	-0.327528	-0.435999	-0.374030	-0.330917	-0.392	300
UY3	-0.278161	-0.203802	-0.323870	-0.206776	-0.214408	-0.236	614
UY4	-0.211731	-0.148205	-0.265241	-0.134737	-0.163004	-0.147	914
UY5	-0.166557	-0.117692	-0.230186	-0.100680	-0.136790	-0.102	1219
UY6	-0.135722	-0.098590	-0.207487	-0.082240	-0.121508	-0.084	1524
UY7	-0.114913	-0.085764	-0.192054	-0.071101	-0.111771	-0.070	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: TAXI A: STA. 10 + 740 L: LOAD 1154 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	5	13	9	1	8	MIN	AVG	MAX
EY1	4839	6728	4748	4000	6525	4000	5368	6728
EY2	209	203	289	300	401	203	280	401
EX2	270	512	853	300	298	270	447	853
EY3	168	225	189	200	204	168	197	225
EX3	290	513	372	200	384	200	352	513
EY4	184	197	116	150	190	116	167	197
EX4	378	183	263	150	357	150	266	378
R2	1	3	3	1	1	1	2	3
R3	1.73	2.28	1.97	1.00	1.88	1.00	1.77	2.28
R4	2.05	0.93	2.26	1.00	1.88	0.93	1.62	2.26

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.594307	-0.526807	-0.506666	-0.608607	-0.489600	-0.542	0
UY2	-0.374030	-0.357436	-0.327528	-0.385783	-0.330917	-0.392	300
UY3	-0.206776	-0.222053	-0.203802	-0.233594	-0.214408	-0.236	614
UY4	-0.134737	-0.162528	-0.148205	-0.167599	-0.163004	-0.147	914
UY5	-0.100680	-0.134559	-0.117692	-0.133011	-0.136790	-0.102	1219
UY6	-0.082240	-0.119124	-0.098590	-0.112124	-0.121508	-0.084	1524
UY7	-0.071101	-0.109251	-0.085764	-0.098380	-0.111771	-0.070	1829

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ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI A: STA. 10 + 740 L

DISTRIBUTION OF VERTICAL STRESSES

"AREA" OF BASIN

		LOAD 1 = 588 kPa					LOAD 2 = 880 kPa					LOAD 3 = 1154 kPa										
DEPTH (mm)	DEPTH RATIO (z/r <sub>o</sub> )	13	11	5	4	2	AVG. STRESS RATIO (p/p <sub>o</sub> )	2	8	13	3	15	AVG. STRESS RATIO (p/p <sub>o</sub> )	12	3	7	14	13	AVG. STRESS RATIO (p/p <sub>o</sub> )			
21	0.14	-0.542	-0.543	-0.542	-0.539	-0.542	-0.542	0.921	-0.800	-0.799	-0.805	-0.806	-0.797	-0.801	1.002	-1.057	-1.050	-1.058	-1.057	-1.060	-1.056	0.915
63	0.42	-0.423	-0.423	-0.421	-0.412	-0.421	-0.420	0.714	-0.594	-0.589	-0.608	-0.615	-0.581	-0.597	0.746	-0.805	-0.780	-0.808	-0.805	-0.813	-0.799	0.693
105	0.70	-0.261	-0.263	-0.260	-0.245	-0.260	-0.258	0.438	-0.336	-0.330	-0.356	-0.366	-0.314	-0.340	0.425	-0.478	-0.446	-0.489	-0.482	-0.498	-0.474	0.410
200	1.33	-0.135	-0.135	-0.131	-0.121	-0.132	-0.131	0.222	-0.165	-0.160	-0.174	-0.181	-0.144	-0.165	0.206	-0.231	-0.223	-0.249	-0.243	-0.259	-0.236	0.205
350	2.33	-0.074	-0.070	-0.067	-0.063	-0.067	-0.068	0.116	-0.092	-0.089	-0.088	-0.094	-0.082	-0.089	0.111	-0.108	-0.125	-0.127	-0.125	-0.129	-0.121	0.105
567	3.78	-0.037	-0.033	-0.033	-0.032	-0.033	-0.033	0.057	-0.053	-0.047	-0.043	-0.047	-0.052	-0.049	0.061	-0.051	-0.071	-0.066	-0.067	-0.062	-0.064	0.055
850	5.67	-0.018	-0.017	-0.017	-0.018	-0.017	-0.018	0.030	-0.031	-0.026	-0.023	-0.025	-0.032	-0.027	0.034	-0.028	-0.040	-0.037	-0.039	-0.032	-0.036	0.031
1134	7.56	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	0.019	-0.020	-0.016	-0.015	-0.016	-0.020	-0.017	0.022	-0.018	-0.026	-0.024	-0.026	-0.020	-0.024	0.020
1775	11.83	-0.005	-0.007	-0.007	-0.006	-0.006	-0.006	0.011	-0.011	-0.009	-0.009	-0.009	-0.008	-0.009	0.011	-0.009	-0.015	-0.014	-0.017	-0.012	-0.014	0.012
3775	25.17	-0.001	-0.003	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.003	-0.003	-0.002	-0.003	0.003	-0.003	-0.005	-0.005	-0.006	-0.004	-0.004	0.004
4775	31.83	-0.001	-0.002	-0.002	-0.002	-0.002	-0.002	0.003	-0.003	-0.003	-0.002	-0.002	-0.001	-0.002	0.003	-0.002	-0.004	-0.004	-0.005	-0.003	-0.004	0.003
5775	38.50	-0.001	-0.002	-0.002	-0.001	-0.001	-0.002	0.003	-0.002	-0.002	-0.002	-0.002	-0.001	-0.002	0.003	-0.002	-0.004	-0.004	-0.004	-0.003	-0.003	0.003

MAXIMUM DEFLECTION

		LOAD 1 = 588 kPa					LOAD 2 = 880 kPa					LOAD 3 = 1154 kPa									
DEPTH (mm)	DEPTH RATIO (z/r <sub>o</sub> )	13	11	5	4	2	AVG. STRESS RATIO (p/p <sub>o</sub> )	2	8	13	3	15	AVG. STRESS RATIO (p/p <sub>o</sub> )	12	3	7	14	13	AVG. STRESS RATIO (p/p <sub>o</sub> )		
21	0.14	-0.644	-0.638	-0.597	-0.659	-0.635	-0.634	-0.815	-0.814	-0.801	-0.820	-0.813	-0.812	1.015	-1.067	-1.069	-1.058	-1.050	-1.050	-1.059	0.917
63	0.42	-0.404	-0.398	-0.348	-0.427	-0.393	-0.394	-0.404	-0.398	-0.348	-0.427	-0.393	-0.394	0.492	-0.522	-0.529	-0.480	-0.446	-0.456	-0.487	0.422
105	0.70	-0.203	-0.188	-0.184	-0.206	-0.194	-0.195	-0.203	-0.188	-0.184	-0.206	-0.194	-0.195	0.244	-0.247	-0.266	-0.239	-0.223	-0.241	-0.243	0.211
200	1.33	-0.104	-0.068	-0.104	-0.082	-0.087	-0.089	-0.104	-0.068	-0.104	-0.082	-0.087	-0.089	0.112	-0.090	-0.137	-0.113	-0.125	-0.137	-0.120	0.104
350	2.33	-0.055	-0.027	-0.055	-0.036	-0.037	-0.042	-0.055	-0.027	-0.055	-0.036	-0.037	-0.042	0.053	-0.036	-0.072	-0.053	-0.071	-0.072	-0.061	0.053
567	3.78	-0.031	-0.017	-0.029	-0.021	-0.022	-0.024	-0.031	-0.017	-0.029	-0.021	-0.022	-0.024	0.030	-0.023	-0.040	-0.028	-0.040	-0.038	-0.034	0.029
850	5.67	-0.019	-0.012	-0.017	-0.014	-0.015	-0.016	-0.019	-0.012	-0.017	-0.014	-0.015	-0.016	0.020	-0.016	-0.025	-0.017	-0.026	-0.023	-0.021	0.019
1134	7.56	-0.011	-0.007	-0.008	-0.013	-0.009	-0.010	-0.011	-0.007	-0.008	-0.013	-0.009	-0.010	0.012	-0.010	-0.014	-0.009	-0.015	-0.011	-0.012	0.010
1775	11.83	-0.004	-0.002	-0.003	-0.006	-0.003	-0.004	-0.004	-0.002	-0.003	-0.006	-0.003	-0.004	0.005	-0.003	-0.006	-0.003	-0.005	-0.003	-0.004	0.003
3775	25.17	-0.004	-0.002	-0.002	-0.005	-0.002	-0.003	-0.004	-0.002	-0.002	-0.005	-0.002	-0.003	0.004	-0.002	-0.005	-0.003	-0.004	-0.003	-0.003	0.003
4775	31.83	-0.003	-0.002	-0.002	-0.005	-0.002	-0.003	-0.003	-0.002	-0.002	-0.005	-0.002	-0.003	0.004	-0.002	-0.005	-0.003	-0.004	-0.003	-0.003	0.003
5775	38.50	-0.003	-0.002	-0.002	-0.005	-0.002	-0.003	-0.003	-0.002	-0.002	-0.005	-0.002	-0.003	0.004	-0.002	-0.004	-0.003	-0.004	-0.003	-0.003	0.003

RMS VALUE OF DEFLECTIONS

		LOAD 1 = 588 kPa					LOAD 2 = 880 kPa					LOAD 3 = 1154 kPa							
DEPTH (mm)	DEPTH RATIO (z/r <sub>o</sub> )	11	9	10	5	2	AVG. STRESS RATIO (p/p <sub>o</sub> )	5	13	9	1	8	AVG. STRESS RATIO (p/p <sub>o</sub> )	5	13	9	1	8	AVG. STRESS RATIO (p/p <sub>o</sub> )
21	0.14	-0.820	-0.815	-0.812	-0.801	-0.806	-0.813	1.014	-1.050	-1.049	-1.069	-1.061	-1.050	-1.056	0.915				
63	0.42	-0.659	-0.644	-0.636	-0.595	-0.617	-0.630	0.788	-0.780	-0.779	-0.844	-0.814	-0.783	-0.806	0.693				
105	0.70	-0.427	-0.404	-0.399	-0.340	-0.369	-0.388	0.485	-0.446	-0.437	-0.529	-0.501	-0.456	-0.474	0.410				
200	1.33	-0.206	-0.203	-0.207	-0.170	-0.181	-0.193	0.242	-0.223	-0.206	-0.266	-0.265	-0.241	-0.240	0.208				
350	2.33	-0.082	-0.104	-0.106	-0.095	-0.089	-0.095	0.119	-0.125	-0.120	-0.137	-0.137	-0.137	-0.131	0.114				
567	3.78	-0.036	-0.055	-0.049	-0.054	-0.042	-0.047	0.059	-0.071	-0.071	-0.072	-0.070	-0.072	-0.071	0.062				
850	5.67	-0.021	-0.031	-0.025	-0.031	-0.023	-0.026	0.033	-0.040	-0.039	-0.040	-0.036	-0.038	-0.039	0.033				
1134	7.56	-0.014	-0.019	-0.016	-0.020	-0.015	-0.017	0.021	-0.026	-0.023	-0.025	-0.021	-0.023	-0.024	0.020				
1775	11.83	-0.013	-0.011	-0.010	-0.012	-0.009	-0.013	0.014	-0.015	-0.010	-0.014	-0.010	-0.011	-0.012	0.010				
3775	25.17	-0.006	-0.004	-0.004	-0.004	-0.003	-0.004	0.005	-0.005	-0.003	-0.006	-0.003	-0.003	-0.004	0.003				
4775	31.83	-0.005	-0.004	-0.003	-0.003	-0.003	-0.004	0.005	-0.004	-0.002	-0.005	-0.002	-0.003	-0.003	0.003				
5775	38.50	-0.005	-0.003	-0.003	-0.003	-0.003	-0.003	0.004	-0.004	-0.002	-0.005	-0.002	-0.003	-0.003	0.003				

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI D: STA. 10 + 498 R: LOAD 885 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	2	3	13	1	5	MIN	AVG	MAX
EY1	3327	3110	3091	3386	3074	3074	3198	3386
EY2	260	205	204	224	204	204	219	260
EX2	550	598	583	585	514	514	566	598
EY3	145	176	187	152	156	145	163	187
EX3	114	245	293	132	216	114	200	293
EY4	120	134	123	110	143	110	126	143
EX4	255	276	243	247	318	243	268	318
R1	1	1	1	1	1	1	1	1
R2	2.12	2.92	2.86	2.61	2.52	2.12	2.60	2.92
R3	0.78	1.39	1.57	0.87	1.38	0.78	1.20	1.57
R4	2.12	2.07	1.97	2.25	2.22	1.97	2.13	2.25

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.496019	-0.496060	-0.494779	-0.489120	-0.532894	-0.492	0
UY2	-0.305832	-0.292728	-0.291323	-0.295842	-0.321364	-0.319	300
UY3	-0.175512	-0.161874	-0.162894	-0.161700	-0.182626	-0.176	614
UY4	-0.114761	-0.110270	-0.113929	-0.101306	-0.126475	-0.108	914
UY5	-0.081047	-0.085141	-0.090414	-0.068859	-0.098959	-0.077	1219
UY6	-0.060809	-0.070638	-0.076596	-0.049461	-0.083421	-0.066	1524
UY7	-0.048127	-0.061411	-0.067514	-0.037133	-0.073892	-0.055	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	6	14	1	10	9	MIN	AVG	MAX
EY1	5738	7393	4000	6164	5987	4000	5857	7393
EY2	214	219	300	420	286	214	288	420
EX2	491	161	300	520	440	161	382	520
EY3	107	214	200	142	204	107	173	214
EX3	139	401	200	83	353	83	235	401
EY4	163	111	150	146	151	111	144	163
EX4	326	86	150	308	237	86	221	326
R1	1	1	1	1	1	1	1	1
R2	2.29	0.73	1.00	1.24	1.54	0.73	1.36	2.29
R3	1.30	1.88	1.00	0.58	1.73	0.58	1.30	1.88
R4	2.00	0.78	1.00	2.10	1.57	0.78	1.49	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

						<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.488101	-0.503462	-0.465148	-0.460893	-0.425369	-0.492	0
UY2	-0.339836	-0.370655	-0.294413	-0.333570	-0.293033	-0.319	300
UY3	-0.212767	-0.257387	-0.177976	-0.229565	-0.193428	-0.176	614
UY4	-0.145900	-0.205261	-0.127588	-0.173030	-0.149329	-0.108	914
UY5	-0.108046	-0.179880	-0.101288	-0.139625	-0.127057	-0.077	1219
UY6	-0.085544	-0.165177	-0.085540	-0.119474	-0.114079	-0.066	1524
UY7	-0.071812	-0.155194	-0.075264	-0.107202	-0.105718	-0.055	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI D: STA. 10 + 498 R: LOAD 885 kPa

OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.

CALCULATED MODULI (MPa)

SET	16	1	6	3	7	MIN	AVG	MAX
EY1	3286	4000	5738	5911	3695	3286	4526	5911
EY2	230	300	214	478	306	214	306	478
EX2	557	300	491	373	525	300	449	557
EY3	126	200	107	111	236	107	156	236
EX3	261	200	139	172	451	139	245	451
EY4	112	150	163	135	131	112	138	163
EX4	68	150	326	334	198	68	215	334
R1	1	1	1	1	1	1	1	1
R2	2.42	1.00	2.29	0.78	1.71	0.78	1.64	2.42
R3	2.08	1.00	1.30	1.56	1.91	1.00	1.57	2.08
R4	0.60	1.00	2.00	2.48	1.51	0.60	1.52	2.48

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED</u> <u>DEFL.(mm)</u>	<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.522361	-0.465148	-0.488101	-0.422368	-0.411412	-0.492	0
UY2	-0.326700	-0.294413	-0.339836	-0.295792	-0.249289	-0.319	300
UY3	-0.192849	-0.177976	-0.212767	-0.194665	-0.152641	-0.176	614
UY4	-0.131876	-0.127588	-0.145900	-0.138874	-0.116318	-0.108	914
UY5	-0.097576	-0.101288	-0.108046	-0.104775	-0.097979	-0.077	1219
UY6	-0.075800	-0.085540	-0.085544	-0.083339	-0.086495	-0.066	1524
UY7	-0.061082	-0.075264	-0.071812	-0.069688	-0.078537	-0.055	1829

ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL

THUNDER BAY: TAXI D: STA. 10 + 498 R: LOAD 1155 kPa

OPTIMIZATION CRITERION: "AREA" OF DEFLECTION BASIN.

CALCULATED MODULI (MPa)

SET	14	7	8	2	4	MIN	AVG	MAX
EY1	3099	3071	3118	3673	3054	3054	3203	3673
EY2	245	201	201	201	201	201	210	245
EX2	281	113	290	446	123	113	251	446
EY3	144	241	158	219	147	144	182	241
EX3	169	127	174	192	126	126	158	192
EY4	100	100	100	102	141	100	109	141
EX4	166	159	121	251	276	121	195	276
R1	1	1	1	1	1	1	1	1
R2	1.15	0.56	1.45	2.22	0.61	0.56	1.20	2.22
R3	1.17	0.53	1.10	0.88	0.86	0.53	0.91	1.17
R4	1.65	1.59	1.21	2.46	1.95	1.21	1.77	2.46

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.717732	-0.759360	-0.756592	-0.665395	-0.770942	0
UY2	-0.439795	-0.441361	-0.469828	-0.419755	-0.446565	300
UY3	-0.254491	-0.230534	-0.274458	-0.252197	-0.219626	614
UY4	-0.173616	-0.152787	-0.192212	-0.184840	-0.127783	914
UY5	-0.130247	-0.117027	-0.149909	-0.152334	-0.084657	1219
UY6	-0.103717	-0.095409	-0.124149	-0.133169	-0.060787	1524
UY7	-0.086198	-0.080371	-0.106834	-0.120347	-0.046017	1829

OPTIMIZATION CRITERION: MAXIMUM DEFLECTION

CALCULATED MODULI (MPa)

SET	14	15	6	1	10	MIN	AVG	MAX
EY1	7402	4081	5738	4000	6164	4000	5477	7402
EY2	219	206	214	300	420	206	272	420
EX2	161	505	491	300	520	161	395	520
EY3	133	206	107	200	142	107	158	206
EX3	287	349	139	200	83	83	212	349
EY4	111	103	163	150	146	103	135	163
EX4	86	60	326	150	308	60	186	326
R1	1	1	1	1	1	1	1	1
R2	0.73	2.45	2.29	1.00	1.24	0.73	1.54	2.45
R3	2.15	1.69	1.30	1.00	0.58	0.58	1.34	2.15
R4	0.78	0.58	2.00	1.00	2.10	0.58	1.29	2.10

CALCULATED AND OBSERVED DEFLECTIONS (mm)

	<u>OBSERVED</u> <u>DEFL.(mm)</u>					<u>SENSOR</u> <u>DISTANCE(mm)</u>
UY1	-0.722454	-0.722723	-0.637013	-0.607058	-0.601505	0
UY2	-0.542185	-0.497827	-0.443515	-0.384234	-0.435337	300
UY3	-0.377917	-0.341780	-0.277679	-0.232274	-0.299602	614
UY4	-0.293658	-0.279143	-0.190411	-0.166513	-0.225818	914
UY5	-0.248755	-0.248305	-0.141009	-0.132190	-0.182223	1219
UY6	-0.222328	-0.228975	-0.111642	-0.111637	-0.155924	1524
UY7	-0.205149	-0.215108	-0.093721	-0.098226	-0.139908	1829

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**ANSYS FEM ANALYSIS: X-ANISOTROPIC MODEL**

**THUNDER BAY: TAXI D: STA. 10 + 498 R: LOAD 1155 kPa**

**OPTIMIZATION CRITERION: RMS VALUE OF DEFLECTIONS.**  
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**CALCULATED MODULI (MPa)**

SET	16	6	1	10	3	MIN	AVG	MAX
EY1	3767	5738	4000	6164	5911	3767	5116	6164
EY2	205	214	300	420	478	205	323	478
EX2	447	491	300	520	373	300	426	520
EY3	149	107	200	142	111	107	142	200
EX3	136	139	200	83	172	83	146	200
EY4	190	163	150	146	135	135	157	190
EX4	367	326	150	308	334	150	297	367
R1	1	1	1	1	1	1	1	1
R2	2.18	2.29	1.00	1.24	0.78	0.78	1.50	2.29
R3	0.91	1.30	1.00	0.58	1.56	0.58	1.07	1.56
R4	1.92	2.00	1.00	2.10	2.48	1.00	1.90	2.48

**CALCULATED AND OBSERVED DEFLECTIONS (mm)**

	<u>CALCULATED AND OBSERVED DEFLECTIONS (mm)</u>					<u>OBSERVED DEFL.(mm)</u>	<u>SENSOR DISTANCE(mm)</u>
UY1	-0.668693	-0.637013	-0.607058	-0.601505	-0.551226	-0.685	0
UY2	-0.419055	-0.443515	-0.384234	-0.435337	-0.386034	-0.458	300
UY3	-0.236315	-0.277679	-0.232274	-0.299602	-0.254055	-0.262	614
UY4	-0.155585	-0.190411	-0.166513	-0.225818	-0.181242	-0.165	914
UY5	-0.115516	-0.141009	-0.132190	-0.182223	-0.136740	-0.119	1219
UY6	-0.093712	-0.111642	-0.111637	-0.155924	-0.108764	-0.100	1524
UY7	-0.081115	-0.093721	-0.098226	-0.139908	-0.090948	-0.083	1829

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