

Analysis of Barrel Support Saddles and Forces between Modules during Assembly

High Energy Physics Division

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1. Introduction

As the Barrel Tile Calorimeter is constructed, the support saddles and the modules will be subjected to different forces, stresses, and deflections than when completely assembled. The purpose of this analysis is to examine the forces, stresses, and deflections acting on the support saddles and modules at various stages of assembly. The nominal weight of a barrel module is 20 tons. CERN Document number ATL-LB-EA-0001 “Summary of the Structural Analysis of the Barrel Support Saddles” describes in detail the structural analysis of the saddles and the completed barrel assembly. These calculations followed Eurocode 3.

The paper will be divided into the following sections:

1. Introduction
2. Model Description
3. Load Cases
4. Stability of Assembly
5. Forces between Modules
6. Inner Radius Bearing Connection
7. Outer Radius Connections
8. Swivel Bolt Forces and Torque
9. Reaction Forces
10. Deflections
11. Conclusion

Appendix 1 Forces between modules

Appendix 2 Inner Radius Bearing Stresses

Appendix 3 Outer radius Bearing Stresses

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Appendix 5 Girder Bolt Normal Stresses

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Appendix 8 Swivel Bolt Normal Stresses

Appendix 9 Swivel Bolt Thread Shear Stresses in Saddle

Appendix 10 Swivel Bolt Torques

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2. Model Description

In the FE model of the saddle and back cryostat support the Z axis ran along the beam line, the Y axis was in the vertical direction, and the X axis was horizontal.

Software used: COSMOS/M and SolidWorks

Type of Elements: Solid
Number of Elements: 78,355
Material: Stainless Steel, E = 206,000 MPa
Code applied: Eurocode 3

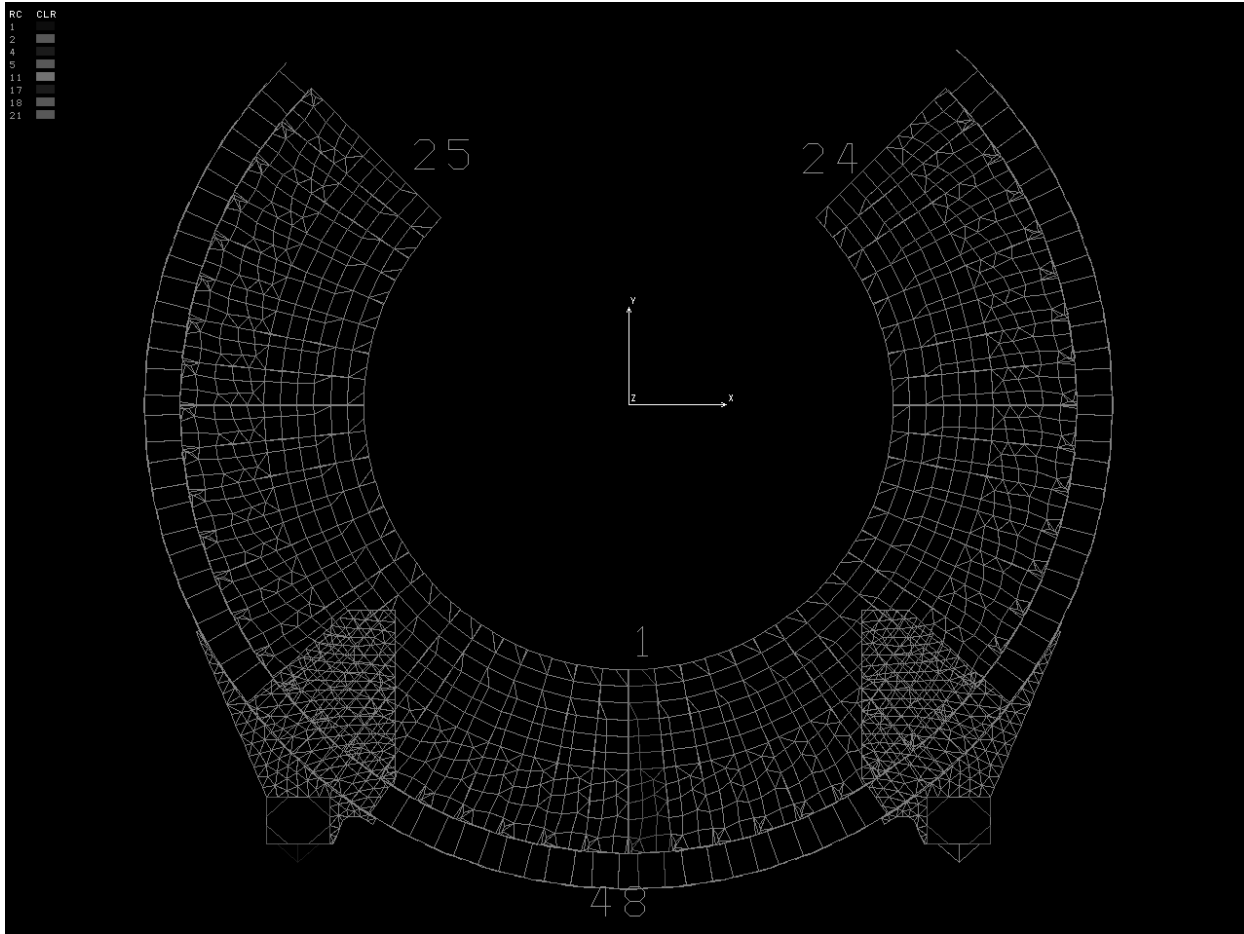
A complete description of how the modules, connections within and between modules, and support saddles were modeled can be found in ANL Technical Report # ANL-HEP-TR-01-097, "Extended Barrel Support Saddle Design and Analysis".

3. Load Cases

There were eight load cases examined to date. All of the loads are at their nominal values. These are described below:

- BA1 - 64 modules in place with cryostat load
- BA2 - 64 modules in place without cryostat load
- BA3 - 48 modules in place without cryostat load
- BA4 - 32 modules in place without cryostat load
- BA5 - 16 modules in place without cryostat load
- BA6 - 16 modules in place without cryostat load and with support cradle
- BA7 - 18 modules in place without cryostat load
- BA8 - 18 modules in place without cryostat load and with support cradle

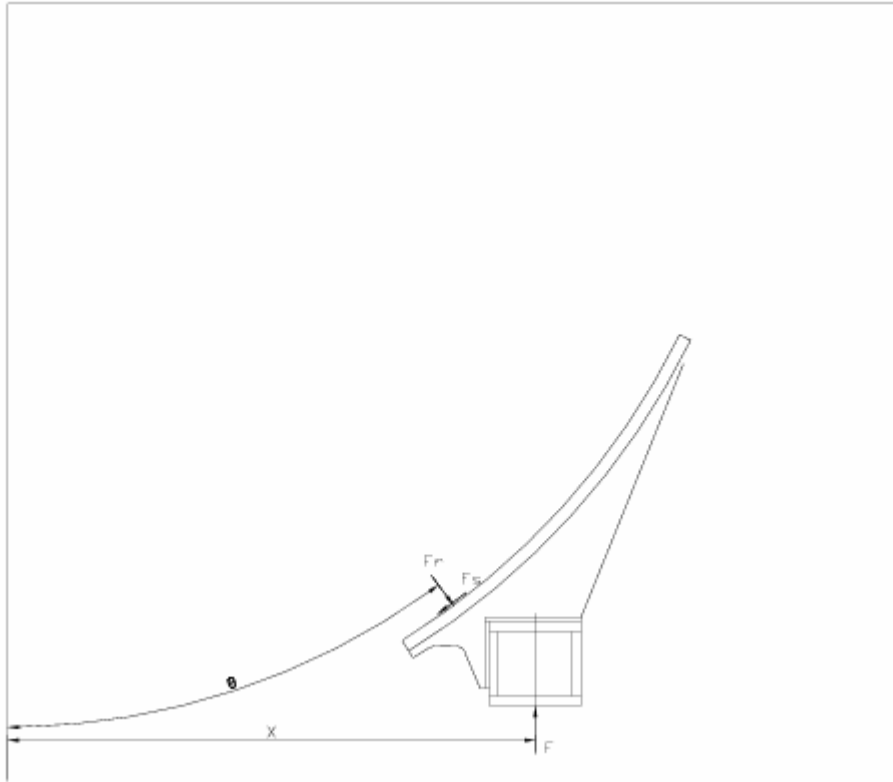
The figure below is an example of how modules are numbered.



4. Stability of Assembly

Static analysis of the saddle shows that the assembly structure is not stable when there are only 16 modules in place and if the support cradle is moved. This load case was examined by performing some simple hand calculations and with a 2D fortran program which solved for the reaction forces on the saddle. With the constraint that the swivel bolt forces must be in compression in both of these load cases it was found that a

static solution was only possible if additional support was provided to the saddles or modules below the



saddle.

Static Analysis of Load Case BA5 - 16 modules in place.

The figure above shows a simplified location of forces being applied to the saddle in load case BA5 in which there are 16 modules in place that are only supported by the saddle. With only 16 modules in place only 1 swivel bolt and the key are in contact. The reaction force F is known is equal to 8 times the weight of a module. The saddle reaction forces Fr and Fs can be easily solved by statics as shown below:

$$\Sigma F_y \quad F_r \cos \theta + F_s \sin \theta = F$$

$$\Sigma F_x \quad F_r \sin \theta = F_s \cos \theta$$

$$F_r = F \cos \theta$$

$$F_s = F \sin \theta$$

However, the sum of the moments about the IP must be equal to zero in order to achieve equilibrium, therefore:

$$\Sigma M_{IP} \quad -RF_s + XF = 0$$

Solving for X we find:

$$X = \frac{RF_s}{F}$$

$$X = R \sin \theta$$

If the angle is:

$$\theta \approx 34^\circ$$

$$X \approx .56R$$

Using $R=4,173\text{mm}$ we find that $X=2,333\text{mm}$ which is not underneath the saddle support beam. If the support point is located at $3,000\text{mm}$ at the center of the support beam then an additional moment [$M=(3000\text{mm}-X)*F$] is needed in order to achieve static equilibrium.

In order to achieve equilibrium during assembly the support cradle that is used to initially assemble the first 12 modules will have to be kept in place. In this case the support cradle carries the entire load of the modules and only a minimal load is applied to the saddles. A further static analysis shows that the structure becomes stable when there are 18 modules in place and the cradle has been removed. The cradle will need to be in place until that point.

Load Case BA5 has 16 modules in place that are supported only by the saddle. The FEA model for this load case gives reasonable values for the forces between modules and on the saddle. However, the reaction forces at the bottom of the saddle support beam do not sum to zero and the application of a very small force in the X direction to the saddle results in extremely large deflections. The FEA model therefore is not in a stable equilibrium as predicted by this static analysis. The results for this model are considered invalid. However, in model BA7 there are 18 modules in place with the cradle support. In this case the FEA model is stable, the forces sum to zero and the application of a force in the X direction does not lead to any perturbations. This is consistent with the static analysis that the structure is stable with 18 modules in place

Static Analysis with Cradle and Saddles in Place

With the support cradle and saddle in place supporting the modules it is not possible to do a static analysis to solve for the forces acting on the cradle, saddle, and modules without making some simplifying assumptions because the entire structure is indeterminate. However, we can examine the equilibrium of the saddle. There are only three forces acting on the saddle as shown in the Figure above and all of these are unknowns. The force F is the force which supports the saddle at the main support beam. When the cradle is not in place F equals the weight of the structure as shown in the static analysis above. However, with the cradle in place F becomes an unknown because a proportion of the weight is carried by the cradle. The value of F depends upon the stiffness of the entire structure. The equilibrium equations for the saddle are described below and are similar to the static analysis above, except that F in this case is an unknown.

$$\Sigma F_y \quad F_r \cos \theta_r + F_s \sin \theta_s + F = 0$$

$$\Sigma F_x \quad F_r \sin \theta_r = F_s \cos \theta_s$$

$$F_s = F_r \frac{\sin \theta_r}{\cos \theta_s}$$

$$\Sigma M_{IP} \quad -RF_s + XF = 0$$

If θ_r and θ_s are equal and we solve these equations to eliminate F_r and F_s from these equations to get:

$$F \left(\frac{\cos^2 \theta}{\sin \theta} + \sin \theta \right) \left(\frac{X}{R} \right) - F = 0$$

This equation is satisfied if F equals zero or if:

$$\frac{X}{R} - \sin \theta = 0$$

In order to achieve stability X must equal 3,000mm and θ must equal the angle of the key. But this is not the case because if R=4173 then $\theta = 45.9^\circ$. However, the angle to the key is 36.56 so the structure cannot be in equilibrium. If we force $\theta = 36.56^\circ$ and solve for X we find that X=2485 which is not under the saddle support beam.

With the geometry that we have it will only be possible to achieve equilibrium with the cradle in place if the forces acting on the saddle are zero. This can only occur if the modules/BARREL is sufficiently stiff so that the entire load is transferred through the modules and to the cradle. If the modules deflect significantly in the region of the saddle then load will be transferred to the saddles.

Load Case BA8 has 16 modules in place with the cradle and saddles. The forces on the saddle are zero and all of the load is transferred to the support cradle in order to achieve equilibrium as predicted by the simple static analysis.

5. Forces Between Modules

The forces between modules for each of the load cases are shown in Appendix 1. These forces are used throughout the remainder of the analysis to evaluate the connections between modules.

6. Inner Radius Bearing Connection

The bearing stress on the inner radius weld bars have been calculated and are shown in Appendix 2. A 5mm wide bearing area of the weld bar is used in this calculation. The force P1, which is the force per unit length, given in Appendix 1 was used in this calculation.

The largest bearing stresses occur are 149 MPa at modules 15-16 in load case BA1 with 64 modules and the cryostat load in place.

Earlier tests on the ability of the front plate to withstand the bearing load at the inner radius have shown that plastic deformation of the front plate occurs when a bearing load of 38tons applied to a submodule (1694 N/mm). Failure of the welds and the front plate occurred in these tests at a maximum load of 85 tons applied to three modules (3,789 N/mm). In these tests the entire bearing load was transferred through the front plate. The front plate bearing load is far below the loads of these tests.

7. Connections Between Modules at the Outer Radius

The modules are connected together at the outer radius of the modules by a series of connecting plates. The details of this connection and the forces acting on it are shown in the figure below. M30 bolts and 33mm diameter pins must resist tension and a shearing forces at the outer radius. At the bottom of the extended barrel the bearing force, P2, results in tension between the modules, this is resisted by replacing a portion of the M30 bolts with 33mm diameter pins in modules 1-6 and 58-64. At the very top of the extended barrel the bearing force, P2, is also tension, however, this is much smaller than at the bottom so it will be resisted

by generating a friction force by the M30 bolts. In the remainder of the detector the bearing force, P2, is compression and this is resisted by the bearing surface between the outer radius of the modules.

7.1 Bearing Force at Outer Radius.

The bearing force at the outer radius, P2, is distributed over a 37.5mm thick plate on the outer radius of the girder. Therefore, the bearing stress can be simply calculated as P2/37.5mm and is listed in Appendix 3. The positions that are in tension have a “T” and the force P2 in those locations are carried by a 33mm diameter pin below the saddle or friction above the saddle. It can be seen in the tables in Appendix 3 that the bearing stresses are all small and well below the acceptable limit of 192 MPa (240MPa yield stress divided by 1.25%).

7.2 Tension Connection at the Outer Radius

The tension force, P2, at the outer radius will be carried by 33mm diameter pins in the modules below the saddle (module #'s 1-6 and 58-64) and by friction throughout the remainder of the Barrel.

The length of the module that a given set of 2 pins carries the force is 350mm. According to EUROCODE 3, chapter 6.5, the maximum design load on the pin connection is the minimal of:

$$F_v = \frac{0.6 \cdot f_{ur} \cdot A}{yMr}$$

$$F_b = \frac{2.5 \cdot a \cdot f_u \cdot d_o \cdot t}{yMr}$$

where:

A = pin section

Fv = shear resistance per shear plane

f_{ur} = ultimate tensile strength of the pin

yMr = safety factor (1.25)

F_b = Bearing resistance

f_u = ultimate tensile strength of the basis material

d_o = diameter of the pin hole

t = plate thickness

a = parameter (see ENV 1993-1-1, pag. 156)

Applying the above mentioned formulas we get the values:

$$F_v = 492 \text{ KN} ; F_b = 355 \text{ kN}$$

So, the design load per pin is 355 kN. For a set of pins the design load is 710 kN which is equivalent to 2,028 N/mm (710kN/350mm). The force P2 is below this value everywhere.

7.3 Tension Connection Carried by Friction

In modules #7 to 57 the tension force at the outer radius, P2, is carried by friction. A pre-stress of 726 MPa is going to be applied to the bolts. Using a safety factor of 1.5 on the pre-stress the normal force from this pre-stress is: $N = S \cdot \text{Area} / 1.5 = 726 \text{MPa} \cdot 539 \text{mm}^2 / 1.5 = 261 \text{ kN}$

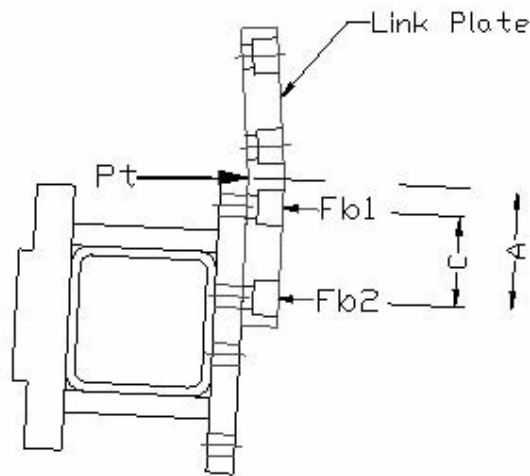
Using a coefficient of friction of .2 the maximum tension load is calculated as:

$$T = \mu N = .2 \cdot 261 \text{ kN} = 52 \text{ kN}$$

Since there are two bolts for every 175mm of length in Z this results in a tension load, P2, of:

$$P2_{\text{max}} = 2T / 175 \text{mm} = 52 \text{kN} \cdot 2 / 175 \text{mm} = 594 \text{N/mm}$$

The value of P2 above the saddle is below this value in all of the load cases as seen in Appendix 1.



Forces Acting on Connecting Plate

7.4 Calculation of the Girder/Link Plate Bolt Stresses

At a given connection between modules the force Pt is resisted as shown in the figure above. Solving for the forces on the bolts we find:

$$F_{b1} = \frac{P_t \cdot L \cdot A}{C}$$

$$F_{b2} = (P_t \cdot L) \cdot \left(1 - \frac{A}{C}\right)$$

$$A = 165\text{mm}$$

$$C = 125\text{mm}$$

P_t is a force distributed over the length of the module in Z. L is the length of the module that a given bolt acting upon, on average this is one bolt per 175mm in the modules 7-57 and 350mm in modules 1-6 and 58-64.

The stress in the bolts is:

$$\sigma = \frac{F}{A}$$

F = bolt force (Fb1 or Fb2) increased by 25% per Eurocode

A = area of bolt = 539mm²

The bolt normal stresses are shown in Appendix 5

A M30 class 10.4 bolt will be used which has a yield stress of 1,000 N/mm². The maximum normal stress 425 MPa which is well below this value so all of the normal stresses on the bolts are within acceptable limits.

It had been planned to apply a pre-stress of 726 N/mm² to the M30 bolts on the link plates in order to achieve the required friction force. A pre-stress of 726 N/mm² would give an additional safety factor of 1.72 (a safety factor of 1.25 per Eurode is already applied) on all of the bolts.

The shear stress of the internal threads of the bolted connection are calculated by:

$$\tau = \frac{F}{A}$$

F = bolt force (Fb1 or Fb2) increased by 25% per Eurocode

A = .87 * pi * D*L = 2,849 mm²

D = minor diameter of the thread = 27.8mm

L = length of engagement = 37.5mm

The shears stresses on the internal threads are shown in Appendix 6.

The maximum allowable shear stress in the girder material is 138Mpa. The maximum shear stress that occurs is in load case BC1 and is 80.4MPa which is below the maximum allowable value.

8. Swivel Bolt Forces and Torques

The force on the saddles from the BARREL also change as the modules are assembled. These are shown in Appendix 7 for each Z position. It should be noted that there are three swivel bolts per Z position. The

forces in Appendix 7, therefore, need to be divided by 3 in order to find the force per swivel bolt. Once again, the maximum loads on the saddle occur in when the entire BARREL has been assembled. There are two special cases; BA6 and BA8 when the support cradle. In both of these load cases the forces on the saddle are zero because the load of the modules is being supported entirely by the support cradle.

8.1 Swivel Bolt stresses

The normal stresses in the swivel bolts are listed in Appendix 8. The swivel bolts are made from 4140 steel with a tensile strength of 675Mpa. Using the Eurocode to calculate the acceptable stress level for the bolt we find them to be 540 Mpa normal stress. The maximum normal stress is 390 MPa which is well below the maximum allowable load.

For the shears stress in the stainless steel (304L) saddle the maximum allowable shear stress is 138Mpa. Appendix 9 lists the shear stress in the saddle swivel bolt threads. The maximum is 36MPa which is well below the allowable stress.

8.2 Swivel Bolt Torques

Swivel bolts support the load of the Barrel on the Saddles. It is important to know the exact force on the swivel bolts during the assembly process. In order to get an estimate of the force acting on the swivel bolts the torque on the bolts will be measured. The relationship between the torque on a bolt and the force applied to a bolt though is complicated and often difficult to predict. Therefore, a series of tests were conducted in order to empirically measure the relationship between torque and force on swivel bolts. Appendix 10 lists the torques for each of the swivel bolts.

9. Reaction Forces

The reaction forces in the vertical direction underneath the saddle are listed for each of the load cases in the tables below. The saddles on the left and right are each supported at 4 points which correspond to the location of the hydraulic jacks which will be used in the final installation for support. In addition, the reaction forces on the cradle for load cases BA6 and BA8 when the cradle is in place are also listed. The reaction forces for the cradle are in the radial direction.

Load Case BA1

	Position	Force (N)
Left Side	Z1	1.8e6
	Z2	2.0e6
	Z3	2.0e6
	Z4	1.8e6
Right Side	Z1	1.8e6
	Z2	2.0e6
	Z3	2.0e6
	Z4	1.8e6

Load Case BA2

	Position	Force (N)
Left Side	Z1	1.9e6

	Z2	1.5e6
	Z3	1.5e6
	Z4	1.9e6
Right Side	Z1	1.9e6
	Z2	1.5e6
	Z3	1.5e6
	Z4	1.9e6

Load Case BA3

	Position	Force (N)
Left Side	Z1	1.4e6
	Z2	1.2e6
	Z3	1.2e6
	Z4	1.4e6
Right Side	Z1	1.4e6
	Z2	1.2e6
	Z3	1.2e6
	Z4	1.4e6

Load Case BA4

	Position	Force (N)
Left Side	Z1	9.9e5
	Z2	7.9e5
	Z3	7.9e5
	Z4	9.9e6
Right Side	Z1	9.9e5
	Z2	7.9e5
	Z3	7.9e5
	Z4	9.9e6

Load Case BA6

	Position	Force (N)
Left Side	Z1	6.9e4
	Z2	4.7e4
	Z3	4.7e4
	Z4	6.9e4
Right Side	Z1	6.2e4
	Z2	4.1e4
	Z3	4.1e4
	Z4	6.2e4

Load Case BA6
Reaction Forces in the Radial Direction on the Cradle (N)

Module #	Front	Back
1	131,480	131,480
2	130,510	130,510
3	128,820	124,980
4	131,570	131,200
5	360,020	362,120
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	370,430	370,380
13	127,080	127,080
14	126,610	122,610
15	129,810	128,360
16	131,550	130,730

Load Case BA7

	Position	Force (N)
Left Side	Z1	5.9e5
	Z2	4.5e5
	Z3	4.5e5
	Z4	5.9e5
Right Side	Z1	6.0e5
	Z2	4.3e5
	Z3	4.3e5
	Z4	6.0e5

Load Case BA8

	Position	Force (N)
Left Side	Z1	9.6e4
	Z2	6.7e4
	Z3	6.7e4
	Z4	9.5e4
Right Side	Z1	8.4e4
	Z2	5.6e4
	Z3	5.6e4
	Z4	8.4e4

Load Case BA8
Reaction Forces in the Radial Direction on the Cradle (N)

Module #	Front	Back
1	133,140	133,140
2	131,030	130,970
3	125,020	124,950
4	111,520	111,380
5	442,440	442,250
6	0	0
7	0	0
8	0	0
9	0	0
10	485,610	485,650
11	92,370	92,380
12	119,670	119,670
13	129,130	129,120
14	132,970	132,960

10. Deflections

The deflections at the module fiducial marks are listed in Appendix 11 for each of the load cases. The deflections at the cryostat support points are shown in the table below for the load cases BA1 and BA2 in which there are 64 modules in place and the cryostat load is transferred to the Barrel. These deflections are important because they indicate how the cryostat support points will move as the cryostat load is applied. This table shows that the cryostat supports are initially deflected outward from the beam line by 1.0mm in the X direction and downward by -.2mm in load case BA2 where 64 modules are in place but the cryostat load has not been transferred yet. When the cryostat load is transferred in load case BA1 the cryostat supports move further away from the beam line by 2.0mm in the X direction and move vertically .6mm in Y from their nominal position. Therefore, the interface between the cryostat and the cryostat supports on the barrel will have to accommodate deflections of approximately 1.0mm in both the X and Y directions.

Load Case	Front Cryostat Support	
	X(mm)	Y (mm)
BA1	2.0	0.6
BA2	1.0	-.2

* positive X values are deflections away from the center of the Barrel

11. Conclusions

This paper examined several load cases which occur during the assembly of the Barrel. The following are the main conclusions:

- The assembly is not stable until 18 modules are in place. Only then can the support cradle be removed.
- The forces between modules are nominal and are far less than the forces in the completed cylinder with 64 modules in place and the cryostat load applied.
- All of the stresses in the connections between modules are within acceptable limits.
- The interface between the cryostat supports and the cryostat move approximately 1.0 mm in the X and Y directions when the load of the cryostat is transferred to the Barrel.

Appendix 1

Forces Between Modules

Load Case BA1

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	370	368	-46	384	463	-46	384	670	-48	386	483	-46	370	368	-46
2	353	377	-66	376	428	-67	375	691	-70	377	453	-67	354	376	-66
3	325	391	-84	363	366	-83	360	711	-89	364	397	-84	326	390	-84
4	286	406	-92	345	255	-90	339	698	-113	345	290	-91	287	406	-93
5	235	365	54	322	112	71	313	484	187	322	114	70	236	362	54
6	196	-273	124	310	11	118	296	-610	-39	309	-33	118	197	-278	124
7	204	-243	296	320	-73	312	305	-575	244	319	-114	316	204	-244	296
8	259	-178	383	355	-95	400	343	-473	360	354	-128	403	259	-177	383
9	359	-114	404	415	-79	424	409	-362	422	415	-107	425	358	-114	405
10	475	-65	348	485	-52	366	484	-263	366	485	-74	366	473	-64	348
11	580	-26	269	549	-21	282	551	-178	281	549	-39	282	579	-25	269
12	659	5	193	598	9	202	600	-107	201	598	-5	202	659	6	193
13	712	30	121	631	37	127	632	-51	126	630	25	127	711	30	121
14	741	48	56	649	59	58	648	-8	58	646	50	58	740	48	56
15	748	61	-4	651	76	-4	649	25	-5	648	69	-4	747	61	-4
16	737	69	-56	641	87	-59	637	47	-60	637	81	-59	736	69	-56
17	709	74	-101	618	93	-106	612	62	-106	614	89	-106	708	73	-101
18	667	75	-138	586	95	-145	578	70	-145	582	91	-145	667	74	-138
19	615	73	-167	545	92	-175	536	73	-176	541	89	-176	614	72	-167
20	553	69	-188	497	86	-197	487	71	-198	493	84	-197	553	68	-188
21	486	63	-201	444	78	-211	434	65	-211	441	76	-211	486	63	-201
22	415	56	-206	389	68	-217	378	57	-217	385	66	-217	415	56	-206
23	344	49	-204	331	56	-214	321	48	-215	329	55	-214	344	48	-204
24	274	41	-195	275	45	-205	265	37	-205	272	44	-205	273	41	-195
25	207	34	-180	220	34	-189	211	27	-189	218	33	-189	207	33	-180
26	147	27	-159	169	24	-166	160	18	-167	167	23	-166	147	27	-159
27	94	22	-133	122	15	-140	115	9	-140	121	14	-140	94	22	-133
28	52	18	-103	82	8	-108	76	3	-108	82	7	-108	52	18	-103
29	21	16	-71	48	4	-74	45	-2	-74	48	2	-74	21	15	-71
30	3	16	-36	22	2	-38	21	-5	-38	23	0	-38	3	15	-36
31	0	18	0	4	3	0	6	-4	0	7	2	0	0	18	0
32	0	19	36	0	5	38	0	-1	38	0	4	38	0	19	36
33	0	22	71	4	11	74	6	5	75	7	10	74	0	22	71
34	3	27	104	22	19	108	21	14	108	24	18	108	3	27	104
35	21	33	133	49	29	140	45	23	140	49	28	140	21	33	133
36	52	41	159	82	41	167	77	34	167	82	40	167	52	41	159
37	95	49	180	123	53	189	116	46	189	122	52	189	95	50	180
38	147	58	195	170	66	205	161	58	205	168	65	205	147	58	195
39	208	66	205	221	78	214	211	69	215	219	77	214	208	67	204
40	274	74	207	276	90	217	265	79	217	273	88	217	274	75	207
41	344	80	201	333	100	211	322	87	212	330	98	211	345	81	201

42	416	85	188	390	107	198	379	91	198	386	104	198	417	86	188
43	487	88	168	446	111	176	435	91	176	442	107	176	487	88	167
44	554	87	138	498	110	146	488	85	146	494	106	146	555	88	139
45	616	83	102	546	105	107	537	73	107	542	100	107	616	83	101
46	669	75	57	587	94	60	579	54	60	583	88	60	669	75	57
47	710	62	4	620	78	5	613	25	5	615	70	5	711	63	4
48	738	45	-55	642	55	-58	637	-13	-57	638	46	-58	738	45	-55
49	749	21	-121	653	26	-127	650	-64	-126	649	14	-127	750	21	-121
50	742	-9	-192	650	-9	-202	649	-127	-201	647	-23	-202	743	-10	-192
51	714	-47	-269	633	-47	-282	633	-206	-280	630	-64	-282	714	-47	-268
52	661	-93	-348	600	-85	-366	601	-299	-366	598	-107	-366	662	-94	-348
53	582	-146	-404	551	-116	-423	551	-400	-422	549	-144	-425	583	-147	-404
54	477	-204	-382	486	-127	-400	484	-483	-361	485	-159	-404	478	-204	-382
55	361	-260	-294	416	-94	-313	409	-534	-246	415	-131	-317	363	-258	-294
56	263	-276	-124	356	5	-121	343	-487	33	354	-29	-122	264	-270	-124
57	208	340	-56	320	125	-71	304	406	-187	319	124	-70	208	341	-56
58	200	424	92	309	267	91	295	698	113	309	303	92	199	424	92
59	238	406	84	322	377	84	312	710	89	323	407	84	237	405	84
60	288	388	66	344	437	67	339	690	69	346	461	67	287	387	67
61	327	375	46	362	469	47	360	670	48	364	488	47	326	375	46
62	354	368	24	376	484	24	375	658	24	378	501	24	354	368	23
63	370	364		384	488		384	653		386	505		370	364	

Load Case BA2

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	146.0	122.0	-	116.0	147.0	-	116.0	313.0	-	116.0	162.0	-	146.0	122.0	-
	0	0	56.30	0	0	57.70	0	0	59.40	0	0	57.70	0	0	56.30
2	131.0	128.0	-	105.0	115.0	-	104.0	324.0	-	105.0	133.0	-	131.0	128.0	-
	0	0	82.00	0	0	83.70	0	0	86.40	0	0	83.70	0	0	82.10
			-			-			-			-			-
3	107.0	137.0	106.0			106.0		333.0	111.0			106.0	107.0	136.0	106.0
	0	0	0	85.60	58.90	0	85.40	0	0	85.50	80.10	0	0	0	0
			-			-			-			-			-
4	74.70	148.0	133.0			114.0		313.0	136.0			114.0	74.80	148.0	133.0
	0	0	0	59.60	46.40	0	59.50	0	0	59.60	20.00	0	74.80	0	0
			-			-			-			-			-
5	32.70	109.0	292.0			180.0		131.0	213.0			177.0		106.0	291.0
	0	0	0	26.90	0	96.80	27.20	0	0	27.00	0	96.40	32.80	0	0
			-			-			-			-			-
6	8.75	556.0				261.0		146.0				296.0		562.0	
	0	0	-3.73	8.10	0	0	8.62	0	68.70	8.22	0	0	8.78	0	-3.68
			-			-			-			-			-
7	32.30	513.0	169.0			339.0		286.0				369.0		286.0	
	0	0	0	26.70	0	0	27.20	0	0	26.80	0	0	32.30	0	0
			-			-			-			-			-
8	77.10	436.0	295.0			351.0		390.0				372.0		437.0	
	0	0	0	62.80	0	0	63.30	0	0	62.90	0	0	77.00	0	0
			-			-			-			-			-
9	154.0	356.0	388.0	124.0	326.0	446.0	125.0	542.0	424.0	124.0	341.0	447.0	154.0	356.0	388.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			-			-			-			-			-
10	252.0	287.0	417.0	202.0	284.0	434.0	202.0	442.0	439.0	202.0	296.0	435.0	252.0	286.0	417.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			-			-			-			-			-
11	355.0	232.0	340.0	284.0	243.0	357.0	283.0	357.0	356.0	284.0	252.0	357.0	355.0	231.0	340.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

12	441.0	185.0	266.0	352.0	203.0	279.0	352.0	285.0	279.0	352.0	210.0	280.0	441.0	184.0	266.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	505.0	146.0	196.0	404.0	167.0	206.0	403.0	224.0	206.0	404.0	172.0	206.0	505.0	146.0	197.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	549.0	116.0	132.0	439.0	134.0	139.0	438.0	176.0	138.0	439.0	139.0	139.0	549.0	116.0	132.0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	574.0	-	-	459.0	107.0	-	458.0	138.0	-	459.0	111.0	-	574.0	-	-
	0	91.30	73.10	0	0	76.70	0	0	76.40	0	0	76.70	0	91.30	73.10
16	581.0	-	-	465.0	-	-	465.0	109.0	-	465.0	-	-	581.0	-	-
	0	72.60	20.40	0	86.20	21.30	0	0	21.10	0	88.80	21.40	0	72.60	20.40
17	573.0	-	-	459.0	-	-	458.0	-	-	459.0	-	-	573.0	-	-
	0	58.30	25.60	0	70.20	26.90	0	87.30	27.10	0	72.30	26.90	0	58.40	25.50
18	552.0	-	-	442.0	-	-	441.0	-	-	442.0	-	-	552.0	-	-
	0	48.20	64.40	0	59.00	67.70	0	72.20	67.80	0	60.80	67.70	0	48.30	64.30
19	520.0	-	-	416.0	-	101.0	416.0	-	101.0	416.0	-	101.0	520.0	-	-
	0	41.40	96.20	0	52.30	0	0	62.60	0	0	53.80	0	0	41.70	95.90
20	478.0	-	120.0	383.0	-	126.0	382.0	-	126.0	383.0	-	126.0	478.0	-	120.0
	0	37.60	0	0	49.30	0	0	57.70	0	0	50.60	0	0	37.90	0
21	430.0	-	137.0	344.0	-	144.0	344.0	-	144.0	344.0	-	144.0	430.0	-	137.0
	0	36.00	0	0	49.40	0	0	56.30	0	0	50.50	0	0	36.40	0
22	376.0	-	147.0	301.0	-	154.0	301.0	-	154.0	301.0	-	154.0	376.0	-	147.0
	0	36.30	0	0	51.80	0	0	57.70	0	0	52.80	0	0	36.70	0
23	321.0	-	150.0	257.0	-	157.0	257.0	-	157.0	257.0	-	157.0	321.0	-	150.0
	0	37.80	0	0	55.90	0	0	61.10	0	0	56.80	0	0	38.30	0
24	264.0	-	146.0	212.0	-	153.0	212.0	-	154.0	212.0	-	153.0	264.0	-	146.0
	0	40.20	0	0	61.00	0	0	65.80	0	0	61.90	0	0	40.70	0
25	210.0	-	137.0	168.0	-	144.0	168.0	-	144.0	168.0	-	144.0	210.0	-	137.0
	0	43.10	0	0	66.50	0	0	71.00	0	0	67.40	0	0	43.50	0
26	158.0	-	122.0	127.0	-	129.0	127.0	-	128.0	127.0	-	128.0	158.0	-	122.0
	0	45.80	0	0	71.90	0	0	76.20	0	0	72.80	0	0	46.20	0
27	112.0	-	104.0	-	-	108.0	-	-	108.0	-	-	108.0	112.0	-	104.0
	0	48.30	0	89.90	76.70	0	90.00	80.90	0	89.90	77.60	0	0	48.70	0
28	72.00	50.30	80.90	57.90	80.40	84.90	58.00	84.60	85.10	57.90	81.40	84.90	72.00	50.70	80.90
29	39.60	51.50	55.50	32.00	82.90	58.20	32.20	87.10	58.20	32.00	83.80	58.20	39.60	51.80	55.50
30	15.80	51.80	27.50	13.00	83.90	29.50	13.10	88.10	29.50	13.00	84.90	29.50	15.80	52.00	27.60
31	1.17	49.20	0.20	1.21	80.40	0.17	1.35	84.60	0.18	1.24	81.40	0.17	1.17	49.30	0.20
32	0.00	49.30	27.80	0.00	80.90	29.80	0.00	85.20	29.90	0.00	81.90	29.90	0.00	49.30	27.80
33	1.23	46.70	55.80	1.27	77.00	58.50	1.42	81.40	58.70	1.31	78.00	58.60	1.23	46.70	55.80
34	16.00	43.40	81.20	13.10	71.80	85.30	13.20	76.40	85.40	13.10	72.80	85.30	16.00	43.30	81.20
			104.0			109.0			109.0			109.0			104.0
35	39.90	39.50	0	32.20	65.60	0	32.30	70.40	0	32.20	66.70	0	39.90	39.30	0
			123.0			129.0			129.0			129.0			122.0
36	72.30	35.30	0	58.20	58.80	0	58.30	63.80	0	58.20	59.90	0	72.30	35.00	0
			137.0			144.0			144.0			144.0			137.0
37	0	31.10	0	90.20	51.90	0	90.30	57.20	0	90.20	53.00	0	0	30.80	0
			146.0			154.0			154.0			154.0			147.0
38	159.0	27.50	0	0	45.40	0	0	51.10	0	0	46.50	0	0	27.00	0
			150.0			157.0			157.0			157.0			150.0
39	210.0	-	150.0	168.0	-	157.0	169.0	-	157.0	168.0	-	157.0	210.0	-	150.0
	0	24.60	0	0	39.80	0	0	46.20	0	0	41.10	0	0	24.20	0

40	265.0	-	147.0	212.0	-	154.0	212.0	-	154.0	212.0	-	154.0	265.0	-	147.0
	0	23.00	0	0	35.90	0	0	43.30	0	0	37.30	0	0	22.60	0
	321.0	-	137.0	257.0	-	144.0	257.0	-	144.0	257.0	-	144.0	321.0	-	137.0
41	0	23.40	0	0	34.40	0	0	43.20	0	0	36.00	0	0	23.00	0
	377.0	-	121.0	302.0	-	127.0	302.0	-	126.0	302.0	-	127.0	377.0	-	120.0
42	0	26.00	0	0	36.10	0	0	46.60	0	0	37.80	0	0	25.60	0
	430.0	-	-	344.0	-	101.0	344.0	-	101.0	344.0	-	101.0	430.0	-	-
43	0	31.50	96.60	0	41.50	0	0	54.40	0	0	43.50	0	0	31.20	96.30
	479.0	-	-	383.0	-	-	383.0	-	-	383.0	-	-	479.0	-	-
44	0	40.50	64.80	0	51.40	68.20	0	67.70	68.40	0	53.80	68.20	0	40.20	64.80
	521.0	-	-	416.0	-	-	416.0	-	-	416.0	-	-	521.0	-	-
45	0	53.40	26.00	0	66.40	27.30	0	87.40	27.60	0	69.20	27.30	0	53.20	25.90
	553.0	-	-	442.0	-	-	442.0	115.0	-	442.0	-	-	553.0	-	-
46	0	70.90	20.00	0	87.00	20.90	0	0	20.60	0	90.50	20.90	0	70.70	20.00
	574.0	-	-	459.0	113.0	-	459.0	150.0	-	459.0	118.0	-	574.0	-	-
47	0	93.50	72.70	0	0	76.30	0	0	75.90	0	0	76.30	0	93.30	72.70
	582.0	122.0	131.0	465.0	146.0	138.0	465.0	195.0	138.0	465.0	152.0	138.0	582.0	122.0	132.0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	574.0	157.0	196.0	459.0	185.0	206.0	459.0	252.0	206.0	459.0	192.0	206.0	574.0	158.0	196.0
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	550.0	201.0	266.0	439.0	228.0	279.0	439.0	321.0	279.0	439.0	236.0	279.0	550.0	201.0	266.0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	506.0	253.0	339.0	404.0	274.0	357.0	404.0	403.0	356.0	404.0	285.0	357.0	506.0	254.0	339.0
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	442.0	315.0	416.0	353.0	320.0	435.0	353.0	499.0	438.0	353.0	335.0	435.0	442.0	316.0	416.0
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	356.0	371.0	393.0	284.0	360.0	448.0	284.0	591.0	425.0	284.0	379.0	448.0	356.0	371.0	393.0
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	253.0	418.0	302.0	203.0	376.0	393.0	203.0	673.0	350.0	203.0	400.0	393.0	253.0	418.0	301.0
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	155.0	451.0	175.0	125.0	353.0	289.0	125.0	731.0	233.0	125.0	383.0	289.0	155.0	449.0	175.0
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	76.70	436.0	-0.20	62.60	267.0	147.0	63.20	716.0	-	62.70	299.0	147.0	76.70	431.0	0.30
56		0	-	0	0	0	0	0	0	0	0	0	0	0	-
	31.40	57.50	286.0	26.20	167.0	-	26.80	206.0	-	26.30	171.0	-	31.50	57.50	286.0
57		129.0	0	0	0	93.00	26.80	71.00	0	26.30	0	93.20	31.50	57.50	0
	8.82	0	133.0	8.12	-	114.0	8.64	341.0	135.0	8.23	-0.80	115.0	8.77	129.0	133.0
58		124.0	105.0	30.20	106.0	0	8.64	0	0	8.23	0	106.0	8.77	0	0
	33.30	0	0	27.20	73.00	0	27.50	356.0	110.0	27.30	97.30	0	33.30	0	0
59		121.0	0	126.0	0	341.0	0	0	0	27.30	146.0	0	33.30	0	0
	75.10	0	81.60	59.90	0	83.80	59.70	0	85.70	59.80	0	83.90	75.10	0	81.70
60		108.0	119.0	154.0	0	324.0	0	324.0	0	59.80	171.0	0	75.10	0	81.70
	131.0	118.0	55.80	85.70	0	57.70	85.50	0	58.80	85.70	0	57.80	131.0	118.0	55.90
61		0	0	105.0	167.0	105.0	105.0	313.0	105.0	105.0	182.0	105.0	131.0	118.0	0
	146.0	118.0	28.30	0	0	29.40	0	0	29.80	0	0	29.40	146.0	0	28.40
62		0	0	116.0	170.0	116.0	116.0	307.0	116.0	116.0	183.0	116.0	146.0	118.0	0
	0	0	-0.12	0	0	0.03	0	0	-0.18	0	0	0.03	0	0	-0.08
63		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Load Case BA3

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	249.00	129.00	-70.20	199.00	168.00	-72.70	199.00	295.00	-74.00	199.00	179.00	-72.70	249.00	129.00	-70.20

2	231.00	131.00	103.00	185.00	140.00	106.00	185.00	300.00	108.00	185.00	154.00	106.00	231.00	131.00	103.00
3	202.00	133.00	133.00	162.00	92.80	136.00	162.00	302.00	139.00	162.00	109.00	136.00	202.00	133.00	133.00
4	163.00	138.00	164.00	130.00	7.83	154.00	130.00	280.00	170.00	130.00	28.10	154.00	163.00	137.00	164.00
5	113.00	102.00	123.00	91.00	-99.90	-16.50	91.20	135.00	66.80	91.10	-97.70	-16.70	113.00	100.00	123.00
6	71.80	400.00	107.00	58.70	170.00	12.80	59.20	553.00	-50.60	58.80	196.00	12.90	71.90	405.00	107.00
7	61.40	372.00	36.90	49.90	236.00	125.00	50.30	541.00	81.20	50.00	258.00	125.00	61.40	374.00	36.50
8	67.40	319.00	141.00	54.80	251.00	205.00	55.30	477.00	175.00	54.90	267.00	206.00	67.40	319.00	141.00
9	99.00	264.00	210.00	79.80	240.00	243.00	80.10	403.00	228.00	79.90	251.00	243.00	99.00	264.00	210.00
10	145.00	218.00	219.00	116.00	216.00	228.00	116.00	336.00	231.00	116.00	225.00	229.00	145.00	217.00	219.00
11	192.00	181.00	164.00	154.00	193.00	172.00	153.00	279.00	172.00	154.00	200.00	173.00	192.00	181.00	164.00
12	227.00	150.00	114.00	181.00	169.00	120.00	181.00	230.00	119.00	181.00	175.00	120.00	227.00	150.00	114.00
13	246.00	125.00	69.80	196.00	147.00	73.40	196.00	190.00	73.00	196.00	151.00	73.40	246.00	125.00	69.80
14	251.00	104.00	31.70	201.00	126.00	33.30	200.00	157.00	33.00	200.00	129.00	33.20	251.00	104.00	31.60
15	244.00	-86.70	0.13	195.00	109.00	0.11	195.00	131.00	-0.13	195.00	111.00	0.10	244.00	-86.90	0.14
16	228.00	-72.60	-24.50	182.00	-92.60	-25.70	182.00	109.00	-25.90	182.00	-94.30	-25.70	228.00	-72.70	-24.40
17	204.00	-60.30	-41.80	163.00	-78.50	-44.00	163.00	-90.00	-44.20	163.00	-79.80	-44.00	204.00	-60.50	-41.80
18	175.00	-49.60	-51.90	140.00	-65.80	-54.60	140.00	-74.00	-54.70	140.00	-66.80	-54.60	175.00	-49.70	-51.90
19	142.00	-39.80	-54.90	113.00	-53.80	-57.70	113.00	-59.50	-57.80	113.00	-54.50	-57.70	142.00	-40.00	-54.80
20	107.00	-30.60	-50.80	86.00	-41.90	-53.50	86.00	-45.70	-53.70	86.00	-42.30	-53.50	107.00	-30.70	-50.80
21	74.10	-21.50	-40.20	59.40	-29.40	-42.30	59.50	-31.80	-42.40	59.50	-29.70	-42.30	74.10	-21.60	-40.20
22	43.80	-12.10	-23.30	35.20	-15.90	-24.60	35.30	-17.00	-24.70	35.30	-16.00	-24.60	43.80	-12.10	-23.30
23	18.50	-0.89	-1.27	15.00	-1.06	-0.98	15.10	-1.14	-0.99	15.00	-1.06	-0.99	18.50	-0.93	-1.26
24	0.00	-9.06	21.60	0.00	-11.60	22.80	0.00	-12.80	23.00	0.00	-11.80	22.90	0.00	-9.09	21.60
25	18.00	-17.00	38.70	14.60	-23.50	40.80	14.70	-26.30	40.90	14.60	-23.90	40.80	18.00	-17.00	38.70
26	42.90	-24.90	49.60	34.50	-34.90	52.20	34.60	-39.70	52.30	34.50	-35.60	52.30	42.90	-24.80	49.60
27	72.80	-33.50	53.90	58.40	-46.50	56.70	58.40	-53.70	56.90	58.40	-47.50	56.70	72.80	-33.30	53.90
28	106.00	-43.20	51.20	84.70	-58.90	53.90	84.70	-69.00	54.10	84.70	-60.20	54.00	106.00	-43.00	51.20
29	140.00	-54.40	41.30	112.00	-72.60	43.50	112.00	-86.70	43.80	112.00	-74.40	43.50	140.00	-54.20	41.40
30	173.00	-67.70	24.20	138.00	-88.40	25.50	138.00	108.00	25.90	138.00	-90.80	25.60	173.00	-67.50	24.20
31	202.00	-83.60	-0.01	162.00	106.00	0.03	161.00	133.00	0.39	162.00	109.00	0.05	202.00	-83.40	-0.01
32	226.00	103.00	-31.20	181.00	128.00	-32.80	181.00	164.00	-32.40	181.00	131.00	-32.80	226.00	103.00	-31.30
33	242.00	126.00	-69.10	194.00	152.00	-72.70	194.00	201.00	-72.10	194.00	157.00	-72.80	242.00	126.00	-69.10
34	249.00	154.00	113.00	199.00	178.00	119.00	199.00	247.00	118.00	199.00	185.00	119.00	249.00	154.00	113.00
35	244.00	189.00	163.00	195.00	206.00	171.00	194.00	303.00	170.00	195.00	215.00	171.00	244.00	189.00	163.00
36	225.00	230.00	217.00	180.00	233.00	227.00	180.00	367.00	229.00	180.00	245.00	228.00	225.00	230.00	217.00
37	191.00	269.00	213.00	153.00	255.00	242.00	152.00	430.00	227.00	152.00	270.00	243.00	191.00	269.00	213.00
38	144.00	299.00	145.00	115.00	261.00	206.00	115.00	485.00	175.00	115.00	279.00	206.00	144.00	299.00	145.00
39	97.90	317.00	-40.50	79.00	236.00	126.00	79.30	521.00	-82.40	79.10	259.00	126.00	98.00	315.00	-40.00
40	66.10	296.00	105.00	53.90	164.00	-12.30	54.40	499.00	49.80	54.00	188.00	-12.60	66.10	293.00	105.00

41	60.10	-12.20	117.00	49.00	-80.50	20.30	49.50	101.00	-60.00	49.10	-83.00	20.20	60.20	-12.00	118.00
42	71.50	128.00	165.00	58.40	27.20	155.00	58.90	308.00	169.00	58.50	49.70	155.00	71.50	128.00	164.00
43	113.00	128.00	133.00	91.10	109.00	136.00	91.20	324.00	139.00	91.10	128.00	136.00	113.00	128.00	133.00
44	163.00	129.00	103.00	130.00	153.00	106.00	130.00	317.00	108.00	130.00	168.00	106.00	163.00	128.00	103.00
45	203.00	129.00	70.20	162.00	176.00	72.90	162.00	306.00	73.80	162.00	189.00	73.00	203.00	129.00	70.20
46	231.00	129.00	35.70	185.00	187.00	37.10	185.00	299.00	37.50	185.00	199.00	37.20	231.00	129.00	35.70
47	249.00	129.00	0.11	199.00	189.00	0.21	199.00	294.00	0.05	199.00	200.00	0.22	249.00	129.00	0.12

Load Case BA4

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	275.00	150.00	-70.70	220.00	205.00	-73.60	220.00	292.00	-74.40	220.00	213.00	-73.60	275.00	150.00	-70.70
2	258.00	150.00	-103.00	206.00	184.00	-107.00	206.00	292.00	-109.00	206.00	193.00	-107.00	258.00	149.00	-103.00
3	229.00	149.00	-133.00	183.00	149.00	-137.00	183.00	290.00	-139.00	183.00	160.00	-137.00	229.00	148.00	-133.00
4	189.00	149.00	-162.00	151.00	88.10	-158.00	151.00	272.00	-169.00	151.00	102.00	-158.00	189.00	148.00	-162.00
5	140.00	122.00	22.30	112.00	11.90	-73.70	112.00	171.00	-18.30	112.00	13.90	-73.80	140.00	120.00	22.00
6	93.00	-214.00	-137.00	75.20	-39.50	-59.20	75.50	-292.00	-102.00	75.30	-56.50	-59.20	93.00	-217.00	-136.00
7	64.90	-198.00	-42.20	52.30	-87.00	13.50	52.60	-288.00	-16.20	52.40	-101.00	13.70	64.80	-199.00	-42.40
8	46.10	-165.00	27.20	37.50	-101.00	66.30	37.80	-249.00	45.70	37.50	-111.00	66.60	46.10	-165.00	27.00
9	43.70	-130.00	74.20	35.30	-96.50	92.90	35.50	-202.00	83.30	35.30	-104.00	93.10	43.60	-130.00	74.10
10	50.40	-101.00	84.90	40.40	-83.10	87.90	40.50	-158.00	89.70	40.40	-88.50	88.10	50.40	-101.00	84.90
11	58.50	-77.10	55.00	46.70	-68.60	58.00	46.60	-120.00	57.50	46.70	-72.40	58.10	58.50	-77.00	55.00
12	59.40	-55.90	31.40	47.30	-52.60	33.20	47.20	-86.20	32.70	47.20	-55.00	33.20	59.40	-55.90	31.40
13	51.90	-37.30	14.20	41.30	-35.70	15.00	41.20	-55.90	14.60	41.30	-37.20	15.00	51.90	-37.30	14.30
14	38.10	-20.00	3.69	30.40	-18.50	3.93	30.30	-28.00	3.62	30.40	-19.20	3.92	38.10	-20.00	3.69
15	20.10	-1.62	0.02	16.00	-1.07	-0.02	16.00	-1.97	0.04	16.00	-1.13	-0.02	20.10	-1.64	0.02
16	0.00	-17.20	-3.39	0.00	-16.60	-3.65	0.00	-24.70	-3.29	0.00	-17.30	-3.64	0.00	-17.30	-3.40
17	20.20	-35.30	-13.70	16.10	-34.10	-14.50	16.00	-54.90	-14.00	16.10	-35.90	-14.50	20.20	-35.30	-13.70
18	38.30	-54.70	-30.60	30.50	-52.10	-32.40	30.40	-88.40	-31.70	30.50	-55.10	-32.40	38.30	-54.70	-30.60
19	52.20	-77.20	-53.90	41.60	-69.70	-57.00	41.50	-126.00	-56.20	41.60	-74.30	-57.00	52.20	-77.20	-53.90
20	59.90	-103.00	-83.30	47.70	-85.90	-86.80	47.60	-169.00	-88.20	47.70	-92.50	-87.00	60.00	-104.00	-83.30
21	59.40	-127.00	-76.10	47.40	-98.00	-92.50	47.30	-209.00	-82.40	47.40	-107.00	-92.70	59.40	-127.00	-76.10
22	51.60	-145.00	-29.80	41.40	-98.30	-66.70	41.50	-243.00	-46.00	41.40	-110.00	-66.90	51.60	-145.00	-29.70
23	44.90	-154.00	39.60	36.30	-78.70	-14.20	36.50	-264.00	15.20	36.40	-92.90	-14.40	44.90	-153.00	39.70
24	47.20	-138.00	134.00	38.40	-27.10	59.20	38.80	-247.00	101.00	38.50	-42.00	59.00	47.30	-135.00	135.00
25	65.90	50.70	-18.50	53.30	32.50	75.60	53.60	156.00	22.30	53.30	31.40	75.60	65.90	51.00	-18.50
26	94.70	147.00	161.00	76.50	107.00	158.00	76.80	297.00	167.00	76.50	123.00	158.00	94.60	147.00	161.00
27	141.00	149.00	132.00	113.00	165.00	136.00	113.00	310.00	138.00	113.00	178.00	136.00	141.00	149.00	132.00
28	191.00	151.00	102.00	152.00	196.00	106.00	152.00	307.00	107.00	152.00	207.00	106.00	191.00	151.00	102.00
29	230.00	152.00	69.60	184.00	213.00	72.50	183.00	302.00	73.10	184.00	222.00	72.60	230.00	152.00	69.60
30	258.00	153.00	35.00	206.00	221.00	36.60	206.00	298.00	36.80	206.00	229.00	36.60	258.00	152.00	35.10
31	276.00	152.00	-0.40	220.00	222.00	-0.40	220.00	294.00	-0.53	220.00	230.00	-0.40	276.00	152.00	-0.43

Load Case BA6

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	12	-52	1	9	-91	1	9	-69	1	9	-89	1	12	-52	1
2	9	-49	3	7	-85	3	7	-62	2	7	-84	2	9	-49	3
3	4	-45	12	3	-76	5	3	-53	9	3	-75	7	4	-45	12
4	0	-37	77	0	-59	96	0	-40	84	0	-49	90	0	-37	77
5	0	-27	56	1	-35	60	1	-22	60	1	-34	60	0	-27	56
6	11	-9	24	9	-17	27	9	-13	26	9	-17	27	11	-9	24
7	10	-1	0	8	-1	0	8	-1	0	8	-1	0	10	-1	0
8	0	-11	1	0	-17	1	0	-15	1	0	-17	1	0	-11	1
9	11	-36	-27	8	-38	-28	8	-29	-28	8	-39	-28	11	-36	-27
10	11	-46	-57	9	-65	-61	9	-50	-61	9	-63	-62	11	-46	-57
11	0	-47	-78	0	-77	-98	0	-54	-85	0	-73	-92	0	-47	-78
12	0	-50	-10	0	-85	-2	0	-62	-8	0	-84	-5	0	-50	-10
13	4	-52	-3	3	-91	-2	4	-69	-2	3	-89	-2	4	-52	-3
14	9	-54	-1	7	-94	-1	7	-73	-1	7	-92	-1	9	-54	-1
15	12	-55	-1	9	-95	-1	9	-74	-1	9	-94	-1	12	-55	-1

Load Case BA7

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	310.00	175.00	-69.70	248.00	235.00	-72.60	248.00	319.00	-73.70	248.00	242.00	-72.60	310.00	176.00	-69.80
2	293.00	175.00	102.00	234.00	218.00	106.00	234.00	316.00	108.00	234.00	226.00	106.00	293.00	176.00	102.00
3	264.00	175.00	131.00	211.00	192.00	136.00	211.00	310.00	138.00	211.00	201.00	136.00	264.00	175.00	131.00
4	225.00	171.00	159.00	180.00	152.00	159.00	180.00	294.00	167.00	180.00	163.00	159.00	225.00	172.00	159.00
5	176.00	142.00	-83.40	141.00	108.00	131.00	141.00	233.00	105.00	141.00	112.00	131.00	176.00	144.00	-83.60
6	125.00	-45.50	175.00	100.00	72.40	131.00	100.00	-20.90	159.00	100.00	67.50	131.00	125.00	-41.10	175.00
7	77.80	-34.00	130.00	62.50	36.90	-85.90	62.60	-21.10	114.00	62.50	35.70	-86.10	77.80	-26.80	130.00
8	35.10	-10.30	121.00	28.50	5.85	15.10	28.70	0.57	-48.30	28.50	9.77	16.00	35.10	-2.85	121.00
9	0.00	10.00	165.00	0.00	22.90	83.00	0.00	2.41	123.00	0.00	21.80	82.80	0.00	9.58	165.00
10	0.00	18.40	216.00	0.00	72.40	156.00	0.00	24.80	191.00	0.00	69.60	156.00	0.00	18.00	216.00
11	20.40	136.00	133.00	17.10	122.00	156.00	17.50	238.00	142.00	17.20	124.00	156.00	20.40	135.00	133.00
12	67.30	186.00	157.00	54.30	165.00	160.00	54.50	311.00	166.00	54.30	176.00	160.00	67.30	186.00	157.00
13	123.00	188.00	131.00	98.40	203.00	136.00	98.40	324.00	138.00	98.40	213.00	136.00	123.00	188.00	131.00
14	177.00	185.00	102.00	141.00	227.00	106.00	141.00	327.00	107.00	141.00	235.00	106.00	177.00	185.00	102.00
15	90.00	183.00	69.70	0.00	241.00	72.50	0.00	326.00	73.30	0.00	249.00	72.50	0.00	183.00	69.70

Load Case BA8

Module #	End 1			Middle 1			Center Saddles			Middle 2			End 2		
	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt	P1	P2	Pt
1	13.20	60.60	-0.29	10.60	102.00	-0.10	10.60	73.00	-0.47	10.60	101.00	-0.18	13.20	60.40	-0.37

2	10.10	56.60	-0.01	8.11	-98.10	-0.74	8.12	66.70	-1.44	8.11	-97.20	-0.96	10.10	56.30	-0.11
3	4.85	50.20	3.62	3.96	-91.50	-8.56	4.02	56.40	-1.05	3.98	-90.10	-5.18	4.85	49.90	3.46
4	0.00	41.20	88.00	0.00	-73.40	113.00	0.00	46.10	96.00	0.00	-64.50	106.00	0.00	40.80	87.60
5	0.00	34.30	71.90	0.00	-48.90	77.60	0.00	31.00	78.20	0.00	-48.50	77.90	0.00	33.80	71.60
6	13.60	24.70	36.90	10.60	-31.10	44.50	10.60	31.70	41.30	10.60	-31.50	44.40	13.50	23.60	36.70
7	17.20	13.70	18.30	13.50	-15.40	21.90	13.40	16.30	20.30	13.50	-15.60	21.80	17.20	12.20	18.00
8	12.20	-1.07	1.11	9.54	-0.81	0.73	9.44	-0.80	0.75	9.51	-0.65	0.74	12.20	0.08	0.55
9	0.00	11.60	12.30	0.00	-16.00	-18.50	0.00	15.70	-15.60	0.00	-16.30	-18.50	0.00	12.00	12.30
10	0.00	24.80	45.50	0.00	-33.80	-47.50	0.00	33.50	-47.50	0.00	-34.30	-47.70	0.00	25.30	45.60
11	12.80	43.70	76.40	10.00	-55.70	-83.10	9.93	39.90	-82.90	10.00	-55.40	-83.60	12.80	43.60	76.50
12	18.30	49.90	91.80	14.40	-83.70	120.00	14.20	57.10	101.00	14.30	-75.70	112.00	18.30	49.80	91.80
13	13.10	49.70	2.99	10.40	-90.80	17.70	10.30	53.70	8.71	10.40	-89.70	13.80	13.10	49.50	2.93
14		56.10	1.72		-97.60	2.12		65.70	3.05		-96.80	2.40		55.90	1.65

Appendix 2

Inner Radius Bearing Stress

Load Case BA1

Front Plate Bearing Stress (P1/5mm)				
Front	Middle1	Center	Middle 2	Back
74.00	76.80	76.80	77.20	74.00
70.60	75.20	75.00	75.40	70.80
65.00	72.60	72.00	72.80	65.20
57.20	69.00	67.80	69.00	57.40
47.00	64.40	62.60	64.40	47.20
39.20	62.00	59.20	61.80	39.40
40.80	64.00	61.00	63.80	40.80
51.80	71.00	68.60	70.80	51.80
71.80	83.00	81.80	83.00	71.60
95.00	97.00	96.80	97.00	94.60
116.00	109.80	110.20	109.80	115.80
131.80	119.60	120.00	119.60	131.80
142.40	126.20	126.40	126.00	142.20
148.20	129.80	129.60	129.20	148.00
149.60	130.20	129.80	129.60	149.40
147.40	128.20	127.40	127.40	147.20
141.80	123.60	122.40	122.80	141.60
133.40	117.20	115.60	116.40	133.40
123.00	109.00	107.20	108.20	122.80
110.60	99.40	97.40	98.60	110.60
97.20	88.80	86.80	88.20	97.20
83.00	77.80	75.60	77.00	83.00
68.80	66.20	64.20	65.80	68.80
54.80	55.00	53.00	54.40	54.60
41.40	44.00	42.20	43.60	41.40
29.40	33.80	32.00	33.40	29.40
18.86	24.40	23.00	24.20	18.84
10.36	16.36	15.26	16.30	10.34
4.16	9.60	8.92	9.68	4.14
0.56	4.38	4.20	4.64	0.55
0.00	0.71	1.22	1.39	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.82	1.23	1.49	0.00
0.59	4.46	4.24	4.74	0.59
4.20	9.72	8.98	9.78	4.22
10.42	16.48	15.34	16.40	10.44
18.96	24.60	23.20	24.40	18.98
29.40	34.00	32.20	33.60	29.40
41.60	44.20	42.20	43.80	41.60
54.80	55.20	53.00	54.60	54.80
68.80	66.60	64.40	66.00	69.00

83.20	78.00	75.80	77.20	83.40
97.40	89.20	87.00	88.40	97.40
110.80	99.60	97.60	98.80	111.00
123.20	109.20	107.40	108.40	123.20
133.80	117.40	115.80	116.60	133.80
142.00	124.00	122.60	123.00	142.20
147.60	128.40	127.40	127.60	147.60
149.80	130.60	130.00	129.80	150.00
148.40	130.00	129.80	129.40	148.60
142.80	126.60	126.60	126.00	142.80
132.20	120.00	120.20	119.60	132.40
116.40	110.20	110.20	109.80	116.60
95.40	97.20	96.80	97.00	95.60
72.20	83.20	81.80	83.00	72.60
52.60	71.20	68.60	70.80	52.80
41.60	64.00	60.80	63.80	41.60
40.00	61.80	59.00	61.80	39.80
47.60	64.40	62.40	64.60	47.40
57.60	68.80	67.80	69.20	57.40
65.40	72.40	72.00	72.80	65.20
70.80	75.20	75.00	75.60	70.80

Load Case BA2

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
29.20	23.20	23.20	23.20	29.20
26.20	21.00	20.80	21.00	26.20
21.40	17.12	17.08	17.10	21.40
14.94	11.92	11.90	11.92	14.96
6.54	5.38	5.44	5.40	6.56
1.75	1.62	1.72	1.64	1.76
6.46	5.34	5.44	5.36	6.46
15.42	12.56	12.66	12.58	15.40
30.80	24.80	25.00	24.80	30.80
50.40	40.40	40.40	40.40	50.40
71.00	56.80	56.60	56.80	71.00
88.20	70.40	70.40	70.40	88.20
101.00	80.80	80.60	80.80	101.00
109.80	87.80	87.60	87.80	109.80
114.80	91.80	91.60	91.80	114.80
116.20	93.00	93.00	93.00	116.20
114.60	91.80	91.60	91.80	114.60
110.40	88.40	88.20	88.40	110.40
104.00	83.20	83.20	83.20	104.00
95.60	76.60	76.40	76.60	95.60
86.00	68.80	68.80	68.80	86.00
75.20	60.20	60.20	60.20	75.20
64.20	51.40	51.40	51.40	64.20
52.80	42.40	42.40	42.40	52.80

42.00	33.60	33.60	33.60	42.00
31.60	25.40	25.40	25.40	31.60
22.40	17.98	18.00	17.98	22.40
14.40	11.58	11.60	11.58	14.40
7.92	6.40	6.44	6.40	7.92
3.16	2.60	2.62	2.60	3.16
0.23	0.24	0.27	0.25	0.23
0.00	0.00	0.00	0.00	0.00
0.25	0.25	0.28	0.26	0.25
3.20	2.62	2.64	2.62	3.20
7.98	6.44	6.46	6.44	7.98
14.46	11.64	11.66	11.64	14.46
22.40	18.04	18.06	18.04	22.40
31.80	25.40	25.40	25.40	31.80
42.00	33.60	33.80	33.60	42.00
53.00	42.40	42.40	42.40	53.00
64.20	51.40	51.40	51.40	64.20
75.40	60.40	60.40	60.40	75.40
86.00	68.80	68.80	68.80	86.00
95.80	76.60	76.60	76.60	95.80
104.20	83.20	83.20	83.20	104.20
110.60	88.40	88.40	88.40	110.60
114.80	91.80	91.80	91.80	114.80
116.40	93.00	93.00	93.00	116.40
114.80	91.80	91.80	91.80	114.80
110.00	87.80	87.80	87.80	110.00
101.20	80.80	80.80	80.80	101.20
88.40	70.60	70.60	70.60	88.40
71.20	56.80	56.80	56.80	71.20
50.60	40.60	40.60	40.60	50.60
31.00	25.00	25.00	25.00	31.00
15.34	12.52	12.64	12.54	15.34
6.28	5.24	5.36	5.26	6.30
1.76	1.62	1.73	1.65	1.75
6.66	5.44	5.50	5.46	6.66
15.02	11.98	11.94	11.96	15.02
21.60	17.14	17.10	17.14	21.60
26.20	21.00	21.00	21.00	26.20

Load Case BA3

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
49.80	39.80	39.80	39.80	49.80
46.20	37.00	37.00	37.00	46.20
40.40	32.40	32.40	32.40	40.40
32.60	26.00	26.00	26.00	32.60
22.60	18.20	18.24	18.22	22.60
14.36	11.74	11.84	11.76	14.38
12.28	9.98	10.06	10.00	12.28

13.48	10.96	11.06	10.98	13.48
19.80	15.96	16.02	15.98	19.80
29.00	23.20	23.20	23.20	29.00
38.40	30.80	30.60	30.80	38.40
45.40	36.20	36.20	36.20	45.40
49.20	39.20	39.20	39.20	49.20
50.20	40.20	40.00	40.00	50.20
48.80	39.00	39.00	39.00	48.80
45.60	36.40	36.40	36.40	45.60
40.80	32.60	32.60	32.60	40.80
35.00	28.00	28.00	28.00	35.00
28.40	22.60	22.60	22.60	28.40
21.40	17.20	17.20	17.20	21.40
14.82	11.88	11.90	11.90	14.82
8.76	7.04	7.06	7.06	8.76
3.70	3.00	3.02	3.00	3.70
0.00	0.00	0.00	0.00	0.00
3.60	2.92	2.94	2.92	3.60
8.58	6.90	6.92	6.90	8.58
14.56	11.68	11.68	11.68	14.56
21.20	16.94	16.94	16.94	21.20
28.00	22.40	22.40	22.40	28.00
34.60	27.60	27.60	27.60	34.60
40.40	32.40	32.20	32.40	40.40
45.20	36.20	36.20	36.20	45.20
48.40	38.80	38.80	38.80	48.40
49.80	39.80	39.80	39.80	49.80
48.80	39.00	38.80	39.00	48.80
45.00	36.00	36.00	36.00	45.00
38.20	30.60	30.40	30.40	38.20
28.80	23.00	23.00	23.00	28.80
19.58	15.80	15.86	15.82	19.60
13.22	10.78	10.88	10.80	13.22
12.02	9.80	9.90	9.82	12.04
14.30	11.68	11.78	11.70	14.30
22.60	18.22	18.24	18.22	22.60
32.60	26.00	26.00	26.00	32.60
40.60	32.40	32.40	32.40	40.60
46.20	37.00	37.00	37.00	46.20
49.80	39.80	39.80	39.80	49.80
51.00	40.60	40.60	40.60	51.00

Load Case BA4

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
55.00	44.00	44.00	44.00	55.00
51.60	41.20	41.20	41.20	51.60
45.80	36.60	36.60	36.60	45.80
37.80	30.20	30.20	30.20	37.80

28.00	22.40	22.40	22.40	28.00
18.60	15.04	15.10	15.06	18.60
12.98	10.46	10.52	10.48	12.96
9.22	7.50	7.56	7.50	9.22
8.74	7.06	7.10	7.06	8.72
10.08	8.08	8.10	8.08	10.08
11.70	9.34	9.32	9.34	11.70
11.88	9.46	9.44	9.44	11.88
10.38	8.26	8.24	8.26	10.38
7.62	6.08	6.06	6.08	7.62
4.02	3.20	3.20	3.20	4.02
0.00	0.00	0.00	0.00	0.00
4.04	3.22	3.20	3.22	4.04
7.66	6.10	6.08	6.10	7.66
10.44	8.32	8.30	8.32	10.44
11.98	9.54	9.52	9.54	12.00
11.88	9.48	9.46	9.48	11.88
10.32	8.28	8.30	8.28	10.32
8.98	7.26	7.30	7.28	8.98
9.44	7.68	7.76	7.70	9.46
13.18	10.66	10.72	10.66	13.18
18.94	15.30	15.36	15.30	18.92
28.20	22.60	22.60	22.60	28.20
38.20	30.40	30.40	30.40	38.20
46.00	36.80	36.60	36.80	46.00
51.60	41.20	41.20	41.20	51.60
55.20	44.00	44.00	44.00	55.20
56.20	45.00	45.00	45.00	56.20

Load Case BA6

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
2.32	1.86	1.86	1.86	2.32
1.76	1.41	1.42	1.41	1.76
0.83	0.68	0.69	0.68	0.83
0.00	0.00	0.00	0.00	0.00
0.04	0.10	0.14	0.11	0.03
2.22	1.73	1.72	1.73	2.22
2.04	1.58	1.56	1.58	2.04
0.00	0.00	0.00	0.00	0.00
2.10	1.63	1.61	1.63	2.10
2.22	1.73	1.71	1.73	2.22
0.00	0.02	0.06	0.03	0.00
0.00	0.00	0.00	0.00	0.00
0.85	0.70	0.71	0.70	0.85
1.78	1.43	1.43	1.43	1.78
2.34	1.87	1.88	1.88	2.34
2.52	2.02	2.02	2.02	2.52

Load Case BA7

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
62.00	49.60	49.60	49.60	62.00
58.60	46.80	46.80	46.80	58.60
52.80	42.20	42.20	42.20	52.80
45.00	36.00	36.00	36.00	45.00
35.20	28.20	28.20	28.20	35.20
25.00	20.00	20.00	20.00	25.00
15.56	12.50	12.52	12.50	15.56
7.02	5.70	5.74	5.70	7.02
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
4.08	3.42	3.50	3.44	4.08
13.46	10.86	10.90	10.86	13.46
24.60	19.68	19.68	19.68	24.60
35.40	28.20	28.20	28.20	35.40

Load Case BA8

Front Plate Bearing Stress (P1/5mm)

Front	Middle1	Center	Middle 2	Back
2.64	2.12	2.12	2.12	2.64
2.02	1.62	1.62	1.62	2.02
0.97	0.79	0.80	0.80	0.97
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
2.72	2.12	2.12	2.12	2.70
3.44	2.70	2.68	2.70	3.44
2.44	1.91	1.89	1.90	2.44
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
2.56	2.00	1.99	2.00	2.56
3.66	2.88	2.84	2.86	3.66
2.62	2.08	2.06	2.08	2.62

Appendix 3

Outer Radius Bearing Stress

Load Case BA1

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
9.81	12.35	17.87	12.88	9.81
10.05	11.41	18.43	12.08	10.03
10.43	9.76	18.96	10.59	10.40
10.83	6.80	18.61	7.73	10.83
9.73	2.99	12.91	3.04	9.65
-7.28	0.30	-16.27	-0.88	-7.41
-6.48	-1.94	-15.33	-3.04	-6.51
-4.75	-2.53	-12.61	-3.41	-4.72
-3.04	-2.11	-9.65	-2.85	-3.04
-1.73	-1.38	-7.01	-1.96	-1.70
-0.69	-0.57	-4.75	-1.03	-0.66
0.14	0.25	-2.85	-0.12	0.16
0.79	0.97	-1.37	0.68	0.80
1.27	1.57	-0.21	1.33	1.28
1.62	2.02	0.65	1.83	1.62
1.84	2.32	1.26	2.17	1.84
1.96	2.49	1.66	2.36	1.95
1.99	2.53	1.87	2.42	1.98
1.94	2.46	1.94	2.37	1.93
1.83	2.30	1.88	2.23	1.82
1.68	2.07	1.74	2.02	1.67
1.50	1.80	1.52	1.75	1.49
1.30	1.50	1.27	1.46	1.29
1.10	1.20	0.99	1.16	1.08
0.90	0.90	0.72	0.87	0.89
0.73	0.63	0.47	0.60	0.71
0.58	0.40	0.25	0.37	0.57
0.48	0.22	0.07	0.19	0.47
0.42	0.10	-0.06	0.07	0.41
0.42	0.04	-0.12	0.01	0.41
0.47	0.08	-0.10	0.04	0.47
0.50	0.14	-0.02	0.11	0.50
0.58	0.30	0.14	0.27	0.58
0.71	0.51	0.36	0.48	0.72
0.88	0.78	0.62	0.75	0.89
1.09	1.09	0.92	1.05	1.09
1.31	1.42	1.23	1.38	1.32
1.54	1.76	1.55	1.72	1.55
1.77	2.09	1.85	2.05	1.78
1.97	2.40	2.11	2.35	1.99
2.14	2.66	2.31	2.60	2.16

2.28	2.85	2.42	2.77	2.28
2.34	2.96	2.41	2.85	2.34
2.33	2.93	2.27	2.83	2.34
2.22	2.80	1.95	2.67	2.22
2.00	2.51	1.43	2.36	2.01
1.66	2.07	0.67	1.87	1.67
1.19	1.46	-0.35	1.22	1.19
0.56	0.68	-1.70	0.38	0.55
-0.25	-0.24	-3.39	-0.61	-0.25
-1.25	-1.25	-5.49	-1.71	-1.26
-2.48	-2.25	-7.97	-2.85	-2.50
-3.89	-3.09	-10.67	-3.84	-3.92
-5.44	-3.39	-12.88	-4.24	-5.44
-6.93	-2.52	-14.24	-3.49	-6.88
-7.36	0.14	-12.99	-0.78	-7.20
9.07	3.33	10.83	3.31	9.09
11.31	7.12	18.61	8.08	11.31
10.83	10.05	18.93	10.85	10.80
10.35	11.65	18.40	12.29	10.32
10.00	12.51	17.87	13.01	10.00
9.81	12.91	17.55	13.36	9.81

Load Case BA2

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
3.25	3.92	8.35	4.32	3.25
3.41	3.07	8.64	3.55	3.41
3.65	1.57	8.88	2.14	3.63
3.95	-1.24	8.35	-0.53	3.95
2.91	-4.80	3.49	-4.72	2.83
-14.83	-6.96	-20.53	-7.89	-14.99
-13.68	-9.04	-19.87	-9.84	-13.73
-11.63	-9.36	-17.33	-9.92	-11.65
-9.49	-8.69	-14.45	-9.09	-9.49
-7.65	-7.57	-11.79	-7.89	-7.63
-6.19	-6.48	-9.52	-6.72	-6.16
-4.93	-5.41	-7.60	-5.60	-4.91
-3.89	-4.45	-5.97	-4.59	-3.89
-3.09	-3.57	-4.69	-3.71	-3.09
-2.43	-2.85	-3.68	-2.96	-2.43
-1.94	-2.30	-2.91	-2.37	-1.94
-1.55	-1.87	-2.33	-1.93	-1.56
-1.29	-1.57	-1.93	-1.62	-1.29
-1.10	-1.39	-1.67	-1.43	-1.11
-1.00	-1.31	-1.54	-1.35	-1.01
-0.96	-1.32	-1.50	-1.35	-0.97
-0.97	-1.38	-1.54	-1.41	-0.98
-1.01	-1.49	-1.63	-1.51	-1.02
-1.07	-1.63	-1.75	-1.65	-1.09

-1.15	-1.77	-1.89	-1.80	-1.16
-1.22	-1.92	-2.03	-1.94	-1.23
-1.29	-2.05	-2.16	-2.07	-1.30
-1.34	-2.14	-2.26	-2.17	-1.35
-1.37	-2.21	-2.32	-2.23	-1.38
-1.38	-2.24	-2.35	-2.26	-1.39
-1.31	-2.14	-2.26	-2.17	-1.31
-1.31	-2.16	-2.27	-2.18	-1.31
-1.25	-2.05	-2.17	-2.08	-1.25
-1.16	-1.91	-2.04	-1.94	-1.15
-1.05	-1.75	-1.88	-1.78	-1.05
-0.94	-1.57	-1.70	-1.60	-0.93
-0.83	-1.38	-1.53	-1.41	-0.82
-0.73	-1.21	-1.36	-1.24	-0.72
-0.66	-1.06	-1.23	-1.10	-0.65
-0.61	-0.96	-1.15	-0.99	-0.60
-0.62	-0.92	-1.15	-0.96	-0.61
-0.69	-0.96	-1.24	-1.01	-0.68
-0.84	-1.11	-1.45	-1.16	-0.83
-1.08	-1.37	-1.81	-1.43	-1.07
-1.42	-1.77	-2.33	-1.85	-1.42
-1.89	-2.32	-3.07	-2.41	-1.89
-2.49	-3.01	-4.00	-3.15	-2.49
-3.25	-3.89	-5.20	-4.05	-3.25
-4.19	-4.93	-6.72	-5.12	-4.21
-5.36	-6.08	-8.56	-6.29	-5.36
-6.75	-7.31	-10.75	-7.60	-6.77
-8.40	-8.53	-13.31	-8.93	-8.43
-9.89	-9.60	-15.76	-10.11	-9.89
-11.15	-10.03	-17.95	-10.67	-11.15
-12.03	-9.41	-19.49	-10.21	-11.97
-11.63	-7.12	-19.09	-7.97	-11.49
-1.53	-4.45	1.89	-4.56	-1.53
3.44	-0.81	9.09	-0.02	3.44
3.31	1.95	9.49	2.59	3.31
3.23	3.36	9.09	3.89	3.20
3.17	4.11	8.64	4.56	3.15
3.15	4.45	8.35	4.85	3.15

Load Case BA3

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	-2.66	3.T	-2.61	T
-10.67	-4.53	-14.75	-5.23	-10.80
-9.92	-6.29	-14.43	-6.88	-9.97

-8.51	-6.69	-12.72	-7.12	-8.51
-7.04	-6.40	-10.75	-6.69	-7.04
-5.81	-5.76	-8.96	-6.00	-5.79
-4.83	-5.15	-7.44	-5.33	-4.83
-4.00	-4.51	-6.13	-4.67	-4.00
-3.33	-3.92	-5.07	-4.03	-3.33
-2.77	-3.36	-4.19	-3.44	-2.77
-2.31	-2.91	-3.49	-2.96	-2.32
-1.94	-2.47	-2.91	-2.51	-1.94
-1.61	-2.09	-2.40	-2.13	-1.61
-1.32	-1.75	-1.97	-1.78	-1.33
-1.06	-1.43	-1.59	-1.45	-1.07
-0.82	-1.12	-1.22	-1.13	-0.82
-0.57	-0.78	-0.85	-0.79	-0.58
-0.32	-0.42	-0.45	-0.43	-0.32
-0.02	-0.03	-0.03	-0.03	-0.02
-0.24	-0.31	-0.34	-0.31	-0.24
-0.45	-0.63	-0.70	-0.64	-0.45
-0.66	-0.93	-1.06	-0.95	-0.66
-0.89	-1.24	-1.43	-1.27	-0.89
-1.15	-1.57	-1.84	-1.61	-1.15
-1.45	-1.94	-2.31	-1.98	-1.45
-1.81	-2.36	-2.88	-2.42	-1.80
-2.23	-2.83	-3.55	-2.91	-2.22
-2.75	-3.41	-4.37	-3.49	-2.75
-3.36	-4.05	-5.36	-4.19	-3.36
-4.11	-4.75	-6.59	-4.93	-4.11
-5.04	-5.49	-8.08	-5.73	-5.04
-6.13	-6.21	-9.79	-6.53	-6.13
-7.17	-6.80	-11.47	-7.20	-7.17
-7.97	-6.96	-12.93	-7.44	-7.97
-8.45	-6.29	-13.89	-6.91	-8.40
-7.89	-4.37	-13.31	-5.01	-7.81
-0.33	-2.15	2.69	-2.21	-0.32
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T

Load Case BA4

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
-5.71	-1.05	-7.79	-1.51	-5.79

-5.28	-2.32	-7.68	-2.69	-5.31
-4.40	-2.69	-6.64	-2.96	-4.40
-3.47	-2.57	-5.39	-2.77	-3.47
-2.69	-2.22	-4.21	-2.36	-2.69
-2.06	-1.83	-3.20	-1.93	-2.05
-1.49	-1.40	-2.30	-1.47	-1.49
-0.99	-0.95	-1.49	-0.99	-0.99
-0.53	-0.49	-0.75	-0.51	-0.53
-0.04	-0.03	-0.05	-0.03	-0.04
-0.46	-0.44	-0.66	-0.46	-0.46
-0.94	-0.91	-1.46	-0.96	-0.94
-1.46	-1.39	-2.36	-1.47	-1.46
-2.06	-1.86	-3.36	-1.98	-2.06
-2.75	-2.29	-4.51	-2.47	-2.77
-3.39	-2.61	-5.57	-2.85	-3.39
-3.87	-2.62	-6.48	-2.93	-3.87
-4.11	-2.10	-7.04	-2.48	-4.08
-3.68	-0.72	-6.59	-1.12	-3.60
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T

Load Case BA6

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
-1.39	-2.41	-1.83	-2.38	-1.38
-1.30	-2.27	-1.66	-2.24	-1.30
-1.19	-2.03	-1.41	-1.99	-1.20
-0.98	-1.57	-1.07	-1.31	-0.98
-0.73	-0.93	-0.59	-0.92	-0.73
-0.24	-0.45	-0.36	-0.45	-0.24
-0.02	-0.03	-0.02	-0.03	-0.02
-0.28	-0.45	-0.39	-0.46	-0.28
-0.95	-1.01	-0.77	-1.05	-0.95
-1.21	-1.72	-1.33	-1.68	-1.21
-1.24	-2.05	-1.43	-1.94	-1.25
-1.32	-2.27	-1.66	-2.23	-1.33
-1.39	-2.41	-1.83	-2.38	-1.39
-1.45	-2.50	-1.93	-2.46	-1.45

Load Case BA7

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
T	T	T	T	T

T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
-1.21	T	-0.56	T	-1.10
-0.91	T	-0.56	T	-0.71
-0.27	T	T	T	-0.08
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T
T	T	T	T	T

Load Case BA8

OR Bearing Stress (P2/37.5mm)

Front	Middle1	Center	Middle 2	Back
-1.62	-2.72	-1.95	-2.69	-1.61
-1.51	-2.62	-1.78	-2.59	-1.50
-1.34	-2.44	-1.50	-2.40	-1.33
-1.10	-1.96	-1.23	-1.72	-1.09
-0.91	-1.30	-0.83	-1.29	-0.90
-0.66	-0.83	-0.85	-0.84	-0.63
-0.37	-0.41	-0.43	-0.42	-0.33
-0.03	-0.02	-0.02	-0.02	0.00
-0.31	-0.43	-0.42	-0.43	-0.32
-0.66	-0.90	-0.89	-0.91	-0.67
-1.17	-1.49	-1.06	-1.48	-1.16
-1.33	-2.23	-1.52	-2.02	-1.33
-1.33	-2.42	-1.43	-2.39	-1.32

Appendix 4 Girder Bolt Forces

Load Case BA1

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-19699.2	-20001.6	-20865.6	-20001.6	-19742.4	5107.2	5185.6	5409.6	5185.6	5118.4
-28598.4	-28771.2	-30240	-28814.4	-28641.6	7414.4	7459.2	7840	7470.4	7425.6
-36374.4	-35985.6	-38491.2	-36115.2	-36417.6	9430.4	9329.6	9979.2	9363.2	9441.6
-39744	-38966.4	-48816	-39268.8	-40046.4	10304	10102.4	12656	10180.8	10382.4
23500.8	30628.8	80784	30153.6	23112	-6092.8	-7940.8	-20944	-7817.6	-5992
53568	50976	-16718.4	50976	53568	-13888	-13216	4334.4	-13216	-13888
127872	134784	105408	136512	127872	-33152	-34944	-27328	-35392	-33152
165456	172800	155520	174096	165456	-42896	-44800	-40320	-45136	-42896
174528	183168	182304	183600	174960	-45248	-47488	-47264	-47600	-45360
150336	158112	158112	158112	150336	-38976	-40992	-40992	-40992	-38976
116208	121824	121392	121824	116208	-30128	-31584	-31472	-31584	-30128
83376	87264	86832	87264	83376	-21616	-22624	-22512	-22624	-21616
52272	54864	54432	54864	52272	-13552	-14224	-14112	-14224	-13552
23976	25142.4	24883.2	25142.4	23976	-6216	-6518.4	-6451.2	-6518.4	-6216
-1658.88	-1797.12	-2008.8	-1805.76	-1645.92	430.08	465.92	520.8	468.16	426.72
-24278.4	-25531.2	-25704	-25574.4	-24278.4	6294.4	6619.2	6664	6630.4	6294.4
-43632	-45792	-45792	-45792	-43632	11312	11872	11872	11872	11312
-59616	-62640	-62640	-62640	-59616	15456	16240	16240	16240	15456
-72144	-75600	-76032	-76032	-72144	18704	19600	19712	19712	18704
-81216	-85104	-85536	-85104	-81216	21056	22064	22176	22064	21056
-86832	-91152	-91152	-91152	-86832	22512	23632	23632	23632	22512
-88992	-93744	-93744	-93744	-88992	23072	24304	24304	24304	23072
-88128	-92448	-92880	-92448	-88128	22848	23968	24080	23968	22848
-84240	-88560	-88560	-88560	-84240	21840	22960	22960	22960	21840
-77760	-81648	-81648	-81648	-77760	20160	21168	21168	21168	20160
-68688	-71712	-72144	-71712	-68688	17808	18592	18704	18592	17808
-57456	-60480	-60480	-60480	-57456	14896	15680	15680	15680	14896
-44496	-46656	-46656	-46656	-44496	11536	12096	12096	12096	11536
-30499.2	-32011.2	-32054.4	-32011.2	-30499.2	7907.2	8299.2	8310.4	8299.2	7907.2
-15379.2	-16200	-16286.4	-16200	-15379.2	3987.2	4200	4222.4	4200	3987.2
39.1824	44.064	51.84	44.064	37.2384	-10.1584	-11.424	-13.44	-11.424	-9.6544
15422.4	16286.4	16416	16286.4	15422.4	-3998.4	-4222.4	-4256	-4222.4	-3998.4
30585.6	32054.4	32184	32097.6	30542.4	-7929.6	-8310.4	-8344	-8321.6	-7918.4
44928	46656	46656	46656	44928	-11648	-12096	-12096	-12096	-11648
57456	60480	60480	60480	57456	-14896	-15680	-15680	-15680	-14896
68688	72144	72144	72144	68688	-17808	-18704	-18704	-18704	-17808
77760	81648	81648	81648	77760	-20160	-21168	-21168	-21168	-20160
84240	88560	88560	88560	84240	-21840	-22960	-22960	-22960	-21840
88560	92448	92880	92448	88128	-22960	-23968	-24080	-23968	-22848
89424	93744	93744	93744	89424	-23184	-24304	-24304	-24304	-23184
86832	91152	91584	91152	86832	-22512	-23632	-23744	-23632	-22512

81216	85536	85536	85536	81216	-21056	-22176	-22176	-22176	-21056
72576	76032	76032	76032	72144	-18816	-19712	-19712	-19712	-18704
59616	63072	63072	63072	60048	-15456	-16352	-16352	-16352	-15568
44064	46224	46224	46224	43632	-11424	-11984	-11984	-11984	-11312
24494.4	25747.2	25963.2	25790.4	24494.4	-6350.4	-6675.2	-6731.2	-6686.4	-6350.4
1857.6	1995.84	2285.28	2021.76	1840.32	-481.6	-517.44	-592.48	-524.16	-477.12
-23803.2	-24926.4	-24580.8	-24926.4	-23803.2	6171.2	6462.4	6372.8	6462.4	6171.2
-52272	-54864	-54432	-54864	-52272	13552	14224	14112	14224	13552
-82944	-87264	-86832	-87264	-82944	21504	22624	22512	22624	21504
-116208	-121824	-120960	-121824	-115776	30128	31584	31360	31584	30016
-150336	-158112	-158112	-158112	-150336	38976	40992	40992	40992	38976
-174528	-182736	-182304	-183600	-174528	45248	47376	47264	47600	45248
-165024	-172800	-155952	-174528	-165024	42784	44800	40432	45248	42784
-127008	-135216	-106272	-136944	-127008	32928	35056	27552	35504	32928
-53568	-52272	14040	-52704	-53568	13888	13552	-3640	13664	13888
-24105.6	-30456	-80784	-30110.4	-24278.4	6249.6	7896	20944	7806.4	6294.4
39700.8	39182.4	48816	39700.8	39571.2	-10292.8	-10158.4	-12656	-10292.8	-10259.2
36417.6	36374.4	38275.2	36374.4	36417.6	-9441.6	-9430.4	-9923.2	-9430.4	-9441.6
28684.8	29030.4	29980.8	29030.4	28728	-7436.8	-7526.4	-7772.8	-7526.4	-7448
19785.6	20131.2	20649.6	20174.4	19785.6	-5129.6	-5219.2	-5353.6	-5230.4	-5129.6
10152	10368	10497.6	10368	10108.8	-2632	-2688	-2721.6	-2688	-2620.8

Load Case BA2

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-24321.6	-24926.4	-25660.8	-24926.4	-24321.6	6305.6	6462.4	6652.8	6462.4	6305.6
-35424	-36158.4	-37324.8	-36158.4	-35467.2	9184	9374.4	9676.8	9374.4	9195.2
-45792	-45792	-47952	-45792	-45792	11872	11872	12432	11872	11872
-57456	-49248	-58752	-49248	-57456	14896	12768	15232	12768	14896
126144	41817.6	92016	41644.8	125712	-32704	-10841.6	-23856	-10796.8	-32592
-1611.36	63072	29678.4	63072	-1589.76	417.76	-16352	-7694.4	-16352	412.16
73008	123552	98928	123552	73008	-18928	-32032	-25648	-32032	-18928
127440	168480	149904	168480	127440	-33040	-43680	-38864	-43680	-33040
167616	192672	183168	193104	167616	-43456	-49952	-47488	-50064	-43456
180144	187488	189648	187920	180144	-46704	-48608	-49168	-48720	-46704
146880	154224	153792	154224	146880	-38080	-39984	-39872	-39984	-38080
114912	120528	120528	120960	114912	-29792	-31248	-31248	-31360	-29792
84672	88992	88992	88992	85104	-21952	-23072	-23072	-23072	-22064
57024	60048	59616	60048	57024	-14784	-15568	-15456	-15568	-14784
31579.2	33134.4	33004.8	33134.4	31579.2	-8187.2	-8590.4	-8556.8	-8590.4	-8187.2
8812.8	9201.6	9115.2	9244.8	8812.8	-2284.8	-2385.6	-2363.2	-2396.8	-2284.8
-11059.2	-11620.8	-11707.2	-11620.8	-11016	2867.2	3012.8	3035.2	3012.8	2856
-27820.8	-29246.4	-29289.6	-29246.4	-27777.6	7212.8	7582.4	7593.6	7582.4	7201.6
-41558.4	-43632	-43632	-43632	-41428.8	10774.4	11312	11312	11312	10740.8
-51840	-54432	-54432	-54432	-51840	13440	14112	14112	14112	13440

-59184	-62208	-62208	-62208	-59184	15344	16128	16128	16128	15344
-63504	-66528	-66528	-66528	-63504	16464	17248	17248	17248	16464
-64800	-67824	-67824	-67824	-64800	16800	17584	17584	17584	16800
-63072	-66096	-66528	-66096	-63072	16352	17136	17248	17136	16352
-59184	-62208	-62208	-62208	-59184	15344	16128	16128	16128	15344
-52704	-55728	-55296	-55296	-52704	13664	14448	14336	14336	13664
-44928	-46656	-46656	-46656	-44928	11648	12096	12096	12096	11648
-34948.8	-36676.8	-36763.2	-36676.8	-34948.8	9060.8	9508.8	9531.2	9508.8	9060.8
-23976	-25142.4	-25142.4	-25142.4	-23976	6216	6518.4	6518.4	6518.4	6216
-11880	-12744	-12744	-12744	-11923.2	3080	3304	3304	3304	3091.2
85.536	74.304	75.6	73.44	84.24	-22.176	-19.264	-19.6	-19.04	-21.84
12009.6	12873.6	12916.8	12916.8	12009.6	-3113.6	-3337.6	-3348.8	-3348.8	-3113.6
24105.6	25272	25358.4	25315.2	24105.6	-6249.6	-6552	-6574.4	-6563.2	-6249.6
35078.4	36849.6	36892.8	36849.6	35078.4	-9094.4	-9553.6	-9564.8	-9553.6	-9094.4
44928	47088	47088	47088	44928	-11648	-12208	-12208	-12208	-11648
53136	55728	55728	55728	52704	-13776	-14448	-14448	-14448	-13664
59184	62208	62208	62208	59184	-15344	-16128	-16128	-16128	-15344
63072	66528	66528	66528	63504	-16352	-17248	-17248	-17248	-16464
64800	67824	67824	67824	64800	-16800	-17584	-17584	-17584	-16800
63504	66528	66528	66528	63504	-16464	-17248	-17248	-17248	-16464
59184	62208	62208	62208	59184	-15344	-16128	-16128	-16128	-15344
52272	54864	54432	54864	51840	-13552	-14224	-14112	-14224	-13440
41731.2	43632	43632	43632	41601.6	-10819.2	-11312	-11312	-11312	-10785.6
27993.6	29462.4	29548.8	29462.4	27993.6	-7257.6	-7638.4	-7660.8	-7638.4	-7257.6
11232	11793.6	11923.2	11793.6	11188.8	-2912	-3057.6	-3091.2	-3057.6	-2900.8
-8640	-9028.8	-8899.2	-9028.8	-8640	2240	2340.8	2307.2	2340.8	2240
-31406.4	-32961.6	-32788.8	-32961.6	-31406.4	8142.4	8545.6	8500.8	8545.6	8142.4
-56592	-59616	-59616	-59616	-57024	14672	15456	15456	15456	14784
-84672	-88992	-88992	-88992	-84672	21952	23072	23072	23072	21952
-114912	-120528	-120528	-120528	-114912	29792	31248	31248	31248	29792
-146448	-154224	-153792	-154224	-146448	37968	39984	39872	39984	37968
-179712	-187920	-189216	-187920	-179712	46592	48720	49056	48720	46592
-169776	-193536	-183600	-193536	-169776	44016	50176	47600	50176	44016
-130464	-169776	-151200	-169776	-130032	33824	44016	39200	44016	33712
-75600	-124848	-100656	-124848	-75600	19600	32368	26096	32368	19600
-86.4	-63504	-30499.2	-63504	129.6	22.4	16464	7907.2	16464	-33.6
-123552	-40176	-88992	-40262.4	-123552	32032	10416	23072	10438.4	32032
57456	49248	58320	49680	57456	-14896	-12768	-15120	-12880	-14896
45360	45792	47520	45792	45360	-11760	-11872	-12320	-11872	-11760
35251.2	36201.6	37022.4	36244.8	35294.4	-9139.2	-9385.6	-9598.4	-9396.8	-9150.4
24105.6	24926.4	25401.6	24969.6	24148.8	-6249.6	-6462.4	-6585.6	-6473.6	-6260.8
12225.6	12700.8	12873.6	12700.8	12268.8	-3169.6	-3292.8	-3337.6	-3292.8	-3180.8

Load Case BA2

Load Case BA3

Bolt Forces

FB1

FB2

Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-30326.4	-31406.4	-31968	-31406.4	-30326.4	7862.4	8142.4	8288	8142.4	7862.4
-44496	-45792	-46656	-45792	-44496	11536	11872	12096	11872	11536
-57456	-58752	-60048	-58752	-57456	14896	15232	15568	15232	14896
-70848	-66528	-73440	-66528	-70848	18368	17248	19040	17248	18368
53136	-7128	28857.6	-7214.4	53136	-13776	1848	-7481.6	1870.4	-13776
-46224	5529.6	-21859.2	5572.8	-46224	11984	-1433.6	5667.2	-1444.8	11984
15940.8	54000	35078.4	54000	15768	-4132.8	-14000	-9094.4	-14000	-4088
60912	88560	75600	88992	60912	-15792	-22960	-19600	-23072	-15792
90720	104976	98496	104976	90720	-23520	-27216	-25536	-27216	-23520
94608	98496	99792	98928	94608	-24528	-25536	-25872	-25648	-24528
70848	74304	74304	74736	70848	-18368	-19264	-19264	-19376	-18368
49248	51840	51408	51840	49248	-12768	-13440	-13328	-13440	-12768
30153.6	31708.8	31536	31708.8	30153.6	-7817.6	-8220.8	-8176	-8220.8	-7817.6
13694.4	14385.6	14256	14342.4	13651.2	-3550.4	-3729.6	-3696	-3718.4	-3539.2
56.16	48.816	-57.456	41.04	59.184	-14.56	-12.656	14.896	-10.64	-15.344
-10584	-11102.4	-11188.8	-11102.4	-10540.8	2744	2878.4	2900.8	2878.4	2732.8
-18057.6	-19008	-19094.4	-19008	-18057.6	4681.6	4928	4950.4	4928	4681.6
-22420.8	-23587.2	-23630.4	-23587.2	-22420.8	5812.8	6115.2	6126.4	6115.2	5812.8
-23716.8	-24926.4	-24969.6	-24926.4	-23673.6	6148.8	6462.4	6473.6	6462.4	6137.6
-21945.6	-23112	-23198.4	-23112	-21945.6	5689.6	5992	6014.4	5992	5689.6
-17366.4	-18273.6	-18316.8	-18273.6	-17366.4	4502.4	4737.6	4748.8	4737.6	4502.4
-10065.6	-10627.2	-10670.4	-10627.2	-10065.6	2609.6	2755.2	2766.4	2755.2	2609.6
-548.64	-424.656	-426.816	-426.816	-544.32	142.24	110.096	110.656	110.656	141.12
9331.2	9849.6	9936	9892.8	9331.2	-2419.2	-2553.6	-2576	-2564.8	-2419.2
16718.4	17625.6	17668.8	17625.6	16718.4	-4334.4	-4569.6	-4580.8	-4569.6	-4334.4
21427.2	22550.4	22593.6	22593.6	21427.2	-5555.2	-5846.4	-5857.6	-5857.6	-5555.2
23284.8	24494.4	24580.8	24494.4	23284.8	-6036.8	-6350.4	-6372.8	-6350.4	-6036.8
22118.4	23284.8	23371.2	23328	22118.4	-5734.4	-6036.8	-6059.2	-6048	-5734.4
17841.6	18792	18921.6	18792	17884.8	-4625.6	-4872	-4905.6	-4872	-4636.8
10454.4	11016	11188.8	11059.2	10454.4	-2710.4	-2856	-2900.8	-2867.2	-2710.4
-5.4	14.04	167.616	20.52	-3.24	1.4	-3.64	-43.456	-5.32	0.84
-13478.4	-14169.6	-13996.8	-14169.6	-13521.6	3494.4	3673.6	3628.8	3673.6	3505.6
-29851.2	-31406.4	-31147.2	-31449.6	-29851.2	7739.2	8142.4	8075.2	8153.6	7739.2
-48816	-51408	-50976	-51408	-48816	12656	13328	13216	13328	12656
-70416	-73872	-73440	-73872	-70416	18256	19152	19040	19152	18256
-93744	-98064	-98928	-98496	-93744	24304	25424	25648	25536	24304
-92016	-104544	-98064	-104976	-92016	23856	27104	25424	27216	23856
-62640	-88992	-75600	-88992	-62640	16240	23072	19600	23072	16240
-17496	-54432	-35596.8	-54432	-17280	4536	14112	9228.8	14112	4480
45360	-5313.6	21513.6	-5443.2	45360	-11760	1377.6	-5577.6	1411.2	-11760
-50544	8769.6	-25920	8726.4	-50976	13104	-2273.6	6720	-2262.4	13216
71280	66960	73008	66960	70848	-18480	-17360	-18928	-17360	-18368
57456	58752	60048	58752	57456	-14896	-15232	-15568	-15232	-14896
44496	45792	46656	45792	44496	-11536	-11872	-12096	-11872	-11536
30326.4	31492.8	31881.6	31536	30326.4	-7862.4	-8164.8	-8265.6	-8176	-7862.4
15422.4	16027.2	16200	16070.4	15422.4	-3998.4	-4155.2	-4200	-4166.4	-3998.4
45.36	92.016	21.6	93.744	50.976	-11.76	-23.856	-5.6	-24.304	-13.216

Load Case BA4

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-30542.4	-31795.2	-32140.8	-31795.2	-30542.4	7918.4	8243.2	8332.8	8243.2	7918.4
-44496	-46224	-47088	-46224	-44496	11536	11984	12208	11984	11536
-57456	-59184	-60048	-59184	-57456	14896	15344	15568	15344	14896
-69984	-68256	-73008	-68256	-69984	18144	17696	18928	17696	18144
9633.6	-31838.4	-7905.6	-31881.6	9504	-2497.6	8254.4	2049.6	8265.6	-2464
-59184	-25574.4	-44064	-25574.4	-58752	15344	6630.4	11424	6630.4	15232
-18230.4	5832	-6998.4	5918.4	-18316.8	4726.4	-1512	1814.4	-1534.4	4748.8
11750.4	28641.6	19742.4	28771.2	11664	-3046.4	-7425.6	-5118.4	-7459.2	-3024
32054.4	40132.8	35985.6	40219.2	32011.2	-8310.4	-10404.8	-9329.6	-10427.2	-8299.2
36676.8	37972.8	38750.4	38059.2	36676.8	-9508.8	-9844.8	-10046.4	-9867.2	-9508.8
23760	25056	24840	25099.2	23760	-6160	-6496	-6440	-6507.2	-6160
13564.8	14342.4	14126.4	14342.4	13564.8	-3516.8	-3718.4	-3662.4	-3718.4	-3516.8
6134.4	6480	6307.2	6480	6177.6	-1590.4	-1680	-1635.2	-1680	-1601.6
1594.08	1697.76	1563.84	1693.44	1594.08	-413.28	-440.16	-405.44	-439.04	-413.28
9.1584	-8.5968	15.768	-8.7696	9.936	-2.3744	2.2288	-4.088	2.2736	-2.576
-1464.48	-1576.8	-1421.28	-1572.48	-1468.8	379.68	408.8	368.48	407.68	380.8
-5918.4	-6264	-6048	-6264	-5918.4	1534.4	1624	1568	1624	1534.4
-13219.2	-13996.8	-13694.4	-13996.8	-13219.2	3427.2	3628.8	3550.4	3628.8	3427.2
-23284.8	-24624	-24278.4	-24624	-23284.8	6036.8	6384	6294.4	6384	6036.8
-35985.6	-37497.6	-38102.4	-37584	-35985.6	9329.6	9721.6	9878.4	9744	9329.6
-32875.2	-39960	-35596.8	-40046.4	-32875.2	8523.2	10360	9228.8	10382.4	8523.2
-12873.6	-28814.4	-19872	-28900.8	-12830.4	3337.6	7470.4	5152	7492.8	3326.4
17107.2	-6134.4	6566.4	-6220.8	17150.4	-4435.2	1590.4	-1702.4	1612.8	-4446.4
57888	25574.4	43632	25488	58320	-15008	-6630.4	-11312	-6608	-15120
-7992	32659.2	9633.6	32659.2	-7992	2072	-8467.2	-2497.6	-8467.2	2072
69552	68256	72144	68256	69552	-18032	-17696	-18704	-17696	-18032
57024	58752	59616	58752	57024	-14784	-15232	-15456	-15232	-14784
44064	45792	46224	45792	44064	-11424	-11872	-11984	-11872	-11424
30067.2	31320	31579.2	31363.2	30067.2	-7795.2	-8120	-8187.2	-8131.2	-7795.2
15120	15811.2	15897.6	15811.2	15163.2	-3920	-4099.2	-4121.6	-4099.2	-3931.2
-173.664	-172.8	-226.8	-172.8	-183.6	45.024	44.8	58.8	44.8	47.6

Load Case BA6

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
449.28	462.24	411.264	453.6	453.6	-116.48	-119.84	-106.624	-117.6	-117.6
1425.6	1084.32	1067.04	1075.68	1425.6	-369.6	-281.12	-276.64	-278.88	-369.6
4968	1948.32	4000.32	3088.8	4968	-1288	-505.12	-1037.12	-800.8	-1288
33134.4	41428.8	36244.8	38793.6	33134.4	-8590.4	-10740.8	-9396.8	-10057.6	-8590.4
23976	25876.8	25963.2	26006.4	23976	-6216	-6708.8	-6731.2	-6742.4	-6216
10540.8	11707.2	11232	11707.2	10540.8	-2732.8	-3035.2	-2912	-3035.2	-2732.8
0	0	0	0	0	0	0	0	0	0
540	412.56	402.624	408.672	540	-140	-106.96	-104.384	-105.952	-140

-11534.4	-11966.4	-12052.8	-11966.4	-11534.4	2990.4	3102.4	3124.8	3102.4	2990.4
-24537.6	-26438.4	-26438.4	-26568	-24537.6	6361.6	6854.4	6854.4	6888	6361.6
-33566.4	-42163.2	-36892.8	-39571.2	-33566.4	8702.4	10931.2	9564.8	10259.2	8702.4
-4242.24	-1045.44	-3296.16	-2285.28	-4242.24	1099.84	271.04	854.56	592.48	1099.84
-1261.44	-946.08	-946.08	-933.12	-1261.44	327.04	245.28	245.28	241.92	327.04
-470.88	-505.44	-492.48	-501.12	-466.56	122.08	131.04	127.68	129.92	120.96
-237.6	-269.136	-270	-266.976	-233.28	61.6	69.776	70	69.216	60.48

Load Case BA7

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-30110.4	-31363.2	-31838.4	-31363.2	-30153.6	7806.4	8131.2	8254.4	8131.2	7817.6
-44064	-45792	-46656	-45792	-44064	11424	11872	12096	11872	11424
-56592	-58752	-59616	-58752	-56592	14672	15232	15456	15232	14672
-68688	-68688	-72144	-68688	-68688	17808	17808	18704	17808	17808
-36028.8	-56592	-45360	-56592	-36115.2	9340.8	14672	11760	14672	9363.2
-75600	-56592	-68688	-56592	-75600	19600	14672	17808	14672	19600
-56160	-37108.8	-49248	-37195.2	-56160	14560	9620.8	12768	9643.2	14560
-52272	6523.2	-20865.6	6912	-52272	13552	-1691.2	5409.6	-1792	13552
71280	35856	53136	35769.6	71280	-18480	-9296	-13776	-9273.6	-18480
93312	67392	82512	67392	93312	-24192	-17472	-21392	-17472	-24192
57456	67392	61344	67392	57456	-14896	-17472	-15904	-17472	-14896
67824	69120	71712	69120	67824	-17584	-17920	-18592	-17920	-17584
56592	58752	59616	58752	56592	-14672	-15232	-15456	-15232	-14672
44064	45792	46224	45792	44064	-11424	-11872	-11984	-11872	-11424
30110.4	31320	31665.6	31320	30110.4	-7806.4	-8120	-8209.6	-8120	-7806.4
15336	15897.6	16027.2	15897.6	15292.8	-3976	-4121.6	-4155.2	-4121.6	-3964.8
62.64	43.2	-10.8	32.4	42.12	-16.24	-11.2	2.8	-8.4	-10.92

Load Case BA8

Bolt Forces

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-125.28	-42.12	-203.04	-77.76	-158.976	32.48	10.92	52.64	20.16	41.216
-5.4	-319.68	-622.08	-415.584	-46.224	1.4	82.88	161.28	107.744	11.984
1563.84	-3697.92	-453.6	-2237.76	1494.72	-405.44	958.72	117.6	580.16	-387.52
38016	48816	41472	45792	37843.2	-9856	-12656	-10752	-11872	-9811.2
31060.8	33523.2	33782.4	33652.8	30931.2	-8052.8	-8691.2	-8758.4	-8724.8	-8019.2
15940.8	19224	17841.6	19180.8	15854.4	-4132.8	-4984	-4625.6	-4972.8	-4110.4
7905.6	9460.8	8769.6	9417.6	7776	-2049.6	-2452.8	-2273.6	-2441.6	-2016
479.52	316.224	322.704	319.68	235.872	-124.32	-81.984	-83.664	-82.88	-61.152
-5313.6	-7992	-6739.2	-7992	-5313.6	1377.6	2072	1747.2	2072	1377.6
-19656	-20520	-20520	-20606.4	-19699.2	5096	5320	5320	5342.4	5107.2
-33004.8	-35899.2	-35812.8	-36115.2	-33048	8556.8	9307.2	9284.8	9363.2	8568
-39657.6	-51840	-43632	-48384	-39657.6	10281.6	13440	11312	12544	10281.6
1291.68	7646.4	3762.72	5961.6	1265.76	-334.88	-1982.4	-975.52	-1545.6	-328.16

743.04	915.84	1317.6	1036.8	712.8	-192.64	-237.44	-341.6	-268.8	-184.8
51.84	-157.68	-34.56	-140.4	23.76	-13.44	40.88	8.96	36.4	-6.16

Appendix 5

Girder Bolt Normal Stress

Load Case BA1

Normal Stress in Bolts (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-45.68	-46.39	-48.39	-46.39	-45.78	11.84	12.03	12.55	12.03	11.87
-66.32	-66.72	-70.13	-66.82	-66.42	17.19	17.30	18.18	17.32	17.22
-84.36	-83.45	-89.27	-83.76	-84.46	21.87	21.64	23.14	21.71	21.90
-92.17	-90.37	-113.21	-91.07	-92.87	23.90	23.43	29.35	23.61	24.08
54.50	71.03	187.35	69.93	53.60	-14.13	-18.42	-48.57	-18.13	-13.90
124.23	118.22	-38.77	118.22	124.23	-32.21	-30.65	10.05	-30.65	-32.21
296.55	312.58	244.45	316.59	296.55	-76.88	-81.04	-63.38	-82.08	-76.88
383.71	400.74	360.67	403.75	383.71	-99.48	-103.90	-93.51	-104.68	-99.48
404.75	424.79	422.78	425.79	405.75	-104.94	-110.13	-109.61	-110.39	-105.19
348.65	366.68	366.68	366.68	348.65	-90.39	-95.06	-95.06	-95.06	-90.39
269.50	282.52	281.52	282.52	269.50	-69.87	-73.25	-72.99	-73.25	-69.87
193.36	202.37	201.37	202.37	193.36	-50.13	-52.47	-52.21	-52.47	-50.13
121.22	127.24	126.23	127.24	121.22	-31.43	-32.99	-32.73	-32.99	-31.43
55.60	58.31	57.71	58.31	55.60	-14.42	-15.12	-14.96	-15.12	-14.42
-3.85	-4.17	-4.66	-4.19	-3.82	1.00	1.08	1.21	1.09	0.99
-56.30	-59.21	-59.61	-59.31	-56.30	14.60	15.35	15.45	15.38	14.60
-101.19	-106.20	-106.20	-106.20	-101.19	26.23	27.53	27.53	27.53	26.23
-138.26	-145.27	-145.27	-145.27	-138.26	35.84	37.66	37.66	37.66	35.84
-167.31	-175.32	-176.33	-176.33	-167.31	43.38	45.45	45.71	45.71	43.38
-188.35	-197.37	-198.37	-197.37	-188.35	48.83	51.17	51.43	51.17	48.83
-201.37	-211.39	-211.39	-211.39	-201.37	52.21	54.81	54.81	54.81	52.21
-206.38	-217.40	-217.40	-217.40	-206.38	53.51	56.36	56.36	56.36	53.51
-204.38	-214.40	-215.40	-214.40	-204.38	52.99	55.58	55.84	55.58	52.99
-195.36	-205.38	-205.38	-205.38	-195.36	50.65	53.25	53.25	53.25	50.65
-180.33	-189.35	-189.35	-189.35	-180.33	46.75	49.09	49.09	49.09	46.75
-159.29	-166.31	-167.31	-166.31	-159.29	41.30	43.12	43.38	43.12	41.30
-133.25	-140.26	-140.26	-140.26	-133.25	34.55	36.36	36.36	36.36	34.55
-103.19	-108.20	-108.20	-108.20	-103.19	26.75	28.05	28.05	28.05	26.75
-70.73	-74.24	-74.34	-74.24	-70.73	18.34	19.25	19.27	19.25	18.34
-35.67	-37.57	-37.77	-37.57	-35.67	9.25	9.74	9.79	9.74	9.25
0.09	0.10	0.12	0.10	0.09	-0.02	-0.03	-0.03	-0.03	-0.02
35.77	37.77	38.07	37.77	35.77	-9.27	-9.79	-9.87	-9.79	-9.27
70.93	74.34	74.64	74.44	70.83	-18.39	-19.27	-19.35	-19.30	-18.36
104.19	108.20	108.20	108.20	104.19	-27.01	-28.05	-28.05	-28.05	-27.01
133.25	140.26	140.26	140.26	133.25	-34.55	-36.36	-36.36	-36.36	-34.55
159.29	167.31	167.31	167.31	159.29	-41.30	-43.38	-43.38	-43.38	-41.30
180.33	189.35	189.35	189.35	180.33	-46.75	-49.09	-49.09	-49.09	-46.75
195.36	205.38	205.38	205.38	195.36	-50.65	-53.25	-53.25	-53.25	-50.65
205.38	214.40	215.40	214.40	204.38	-53.25	-55.58	-55.84	-55.58	-52.99
207.38	217.40	217.40	217.40	207.38	-53.77	-56.36	-56.36	-56.36	-53.77

201.37	211.39	212.39	211.39	201.37	-52.21	-54.81	-55.06	-54.81	-52.21
188.35	198.37	198.37	198.37	188.35	-48.83	-51.43	-51.43	-51.43	-48.83
168.31	176.33	176.33	176.33	167.31	-43.64	-45.71	-45.71	-45.71	-43.38
138.26	146.27	146.27	146.27	139.26	-35.84	-37.92	-37.92	-37.92	-36.10
102.19	107.20	107.20	107.20	101.19	-26.49	-27.79	-27.79	-27.79	-26.23
56.81	59.71	60.21	59.81	56.81	-14.73	-15.48	-15.61	-15.51	-14.73
4.31	4.63	5.30	4.69	4.27	-1.12	-1.20	-1.37	-1.22	-1.11
-55.20	-57.81	-57.01	-57.81	-55.20	14.31	14.99	14.78	14.99	14.31
-121.22	-127.24	-126.23	-127.24	-121.22	31.43	32.99	32.73	32.99	31.43
-192.36	-202.37	-201.37	-202.37	-192.36	49.87	52.47	52.21	52.47	49.87
-269.50	-282.52	-280.52	-282.52	-268.50	69.87	73.25	72.73	73.25	69.61
-348.65	-366.68	-366.68	-366.68	-348.65	90.39	95.06	95.06	95.06	90.39
-404.75	-423.78	-422.78	-425.79	-404.75	104.94	109.87	109.61	110.39	104.94
-382.71	-400.74	-361.67	-404.75	-382.71	99.22	103.90	93.77	104.94	99.22
-294.55	-313.58	-246.46	-317.59	-294.55	76.36	81.30	63.90	82.34	76.36
-124.23	-121.22	32.56	-122.23	-124.23	32.21	31.43	-8.44	31.69	32.21
-55.90	-70.63	-187.35	-69.83	-56.30	14.49	18.31	48.57	18.10	14.60
92.07	90.87	113.21	92.07	91.77	-23.87	-23.56	-29.35	-23.87	-23.79
84.46	84.36	88.76	84.36	84.46	-21.90	-21.87	-23.01	-21.87	-21.90
66.52	67.32	69.53	67.32	66.62	-17.25	-17.45	-18.03	-17.45	-17.27
45.88	46.69	47.89	46.79	45.88	-11.90	-12.10	-12.42	-12.13	-11.90
23.54	24.04	24.35	24.04	23.44	-6.10	-6.23	-6.31	-6.23	-6.08

Load Case BA2

Normal Stress in Bolts (N/mm ²) - force increased by 25%									
FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-56.40	-57.81	-59.51	-57.81	-56.40	14.62	14.99	15.43	14.99	14.62
-82.15	-83.86	-86.56	-83.86	-82.25	21.30	21.74	22.44	21.74	21.32
-106.20	-106.20	-111.21	-106.20	-106.20	27.53	27.53	28.83	27.53	27.53
-133.25	-114.21	-136.25	-114.21	-133.25	34.55	29.61	35.32	29.61	34.55
292.54	96.98	213.40	96.58	291.54	-75.84	-25.14	-55.32	-25.04	-75.58
-3.74	146.27	68.83	146.27	-3.69	0.97	-37.92	-17.84	-37.92	0.96
169.31	286.53	229.42	286.53	169.31	-43.90	-74.29	-59.48	-74.29	-43.90
295.55	390.72	347.64	390.72	295.55	-76.62	-101.30	-90.13	-101.30	-76.62
388.72	446.83	424.79	447.83	388.72	-100.78	-115.84	-110.13	-116.10	-100.78
417.77	434.81	439.81	435.81	417.77	-108.31	-112.73	-114.03	-112.99	-108.31
340.63	357.66	356.66	357.66	340.63	-88.31	-92.73	-92.47	-92.73	-88.31
266.49	279.52	279.52	280.52	266.49	-69.09	-72.47	-72.47	-72.73	-69.09
196.36	206.38	206.38	206.38	197.37	-50.91	-53.51	-53.51	-53.51	-51.17
132.24	139.26	138.26	139.26	132.24	-34.29	-36.10	-35.84	-36.10	-34.29
73.24	76.84	76.54	76.84	73.24	-18.99	-19.92	-19.84	-19.92	-18.99
20.44	21.34	21.14	21.44	20.44	-5.30	-5.53	-5.48	-5.56	-5.30
-25.65	-26.95	-27.15	-26.95	-25.55	6.65	6.99	7.04	6.99	6.62
-64.52	-67.83	-67.93	-67.83	-64.42	16.73	17.58	17.61	17.58	16.70
-96.38	-101.19	-101.19	-101.19	-96.08	24.99	26.23	26.23	26.23	24.91
-120.22	-126.23	-126.23	-126.23	-120.22	31.17	32.73	32.73	32.73	31.17
-137.25	-144.27	-144.27	-144.27	-137.25	35.58	37.40	37.40	37.40	35.58
-147.27	-154.29	-154.29	-154.29	-147.27	38.18	40.00	40.00	40.00	38.18

-150.28	-157.29	-157.29	-157.29	-150.28	38.96	40.78	40.78	40.78	38.96
-146.27	-153.28	-154.29	-153.28	-146.27	37.92	39.74	40.00	39.74	37.92
-137.25	-144.27	-144.27	-144.27	-137.25	35.58	37.40	37.40	37.40	35.58
-122.23	-129.24	-128.24	-128.24	-122.23	31.69	33.51	33.25	33.25	31.69
-104.19	-108.20	-108.20	-108.20	-104.19	27.01	28.05	28.05	28.05	27.01
-81.05	-85.06	-85.26	-85.06	-81.05	21.01	22.05	22.10	22.05	21.01
-55.60	-58.31	-58.31	-58.31	-55.60	14.42	15.12	15.12	15.12	14.42
-27.55	-29.55	-29.55	-29.55	-27.65	7.14	7.66	7.66	7.66	7.17
0.20	0.17	0.18	0.17	0.20	-0.05	-0.04	-0.05	-0.04	-0.05
27.85	29.86	29.96	29.96	27.85	-7.22	-7.74	-7.77	-7.77	-7.22
55.90	58.61	58.81	58.71	55.90	-14.49	-15.19	-15.25	-15.22	-14.49
81.35	85.46	85.56	85.46	81.35	-21.09	-22.16	-22.18	-22.16	-21.09
104.19	109.20	109.20	109.20	104.19	-27.01	-28.31	-28.31	-28.31	-27.01
123.23	129.24	129.24	129.24	122.23	-31.95	-33.51	-33.51	-33.51	-31.69
137.25	144.27	144.27	144.27	137.25	-35.58	-37.40	-37.40	-37.40	-35.58
146.27	154.29	154.29	154.29	147.27	-37.92	-40.00	-40.00	-40.00	-38.18
150.28	157.29	157.29	157.29	150.28	-38.96	-40.78	-40.78	-40.78	-38.96
147.27	154.29	154.29	154.29	147.27	-38.18	-40.00	-40.00	-40.00	-38.18
137.25	144.27	144.27	144.27	137.25	-35.58	-37.40	-37.40	-37.40	-35.58
121.22	127.24	126.23	127.24	120.22	-31.43	-32.99	-32.73	-32.99	-31.17
96.78	101.19	101.19	101.19	96.48	-25.09	-26.23	-26.23	-26.23	-25.01
64.92	68.33	68.53	68.33	64.92	-16.83	-17.71	-17.77	-17.71	-16.83
26.05	27.35	27.65	27.35	25.95	-6.75	-7.09	-7.17	-7.09	-6.73
-20.04	-20.94	-20.64	-20.94	-20.04	5.19	5.43	5.35	5.43	5.19
-72.83	-76.44	-76.04	-76.44	-72.83	18.88	19.82	19.71	19.82	18.88
-131.24	-138.26	-138.26	-138.26	-132.24	34.03	35.84	35.84	35.84	34.29
-196.36	-206.38	-206.38	-206.38	-196.36	50.91	53.51	53.51	53.51	50.91
-266.49	-279.52	-279.52	-279.52	-266.49	69.09	72.47	72.47	72.47	69.09
-339.63	-357.66	-356.66	-357.66	-339.63	88.05	92.73	92.47	92.73	88.05
-416.77	-435.81	-438.81	-435.81	-416.77	108.05	112.99	113.77	112.99	108.05
-393.73	-448.83	-425.79	-448.83	-393.73	102.08	116.36	110.39	116.36	102.08
-302.56	-393.73	-350.65	-393.73	-301.56	78.44	102.08	90.91	102.08	78.18
-175.32	-289.54	-233.43	-289.54	-175.32	45.45	75.06	60.52	75.06	45.45
-0.20	-147.27	-70.73	-147.27	0.30	0.05	38.18	18.34	38.18	-0.08
-286.53	-93.17	-206.38	-93.37	-286.53	74.29	24.16	53.51	24.21	74.29
133.25	114.21	135.25	115.21	133.25	-34.55	-29.61	-35.06	-29.87	-34.55
105.19	106.20	110.20	106.20	105.19	-27.27	-27.53	-28.57	-27.53	-27.27
81.75	83.96	85.86	84.06	81.85	-21.19	-21.77	-22.26	-21.79	-21.22
55.90	57.81	58.91	57.91	56.00	-14.49	-14.99	-15.27	-15.01	-14.52
28.35	29.45	29.86	29.45	28.45	-7.35	-7.64	-7.74	-7.64	-7.38

Load Case BA3

Normal Stress in Bolts (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-70.33	-72.83	-74.14	-72.83	-70.33	18.23	18.88	19.22	18.88	18.23
-103.19	-106.20	-108.20	-106.20	-103.19	26.75	27.53	28.05	27.53	26.75
-133.25	-136.25	-139.26	-136.25	-133.25	34.55	35.32	36.10	35.32	34.55

-164.30	-154.29	-170.32	-154.29	-164.30	42.60	40.00	44.16	40.00	42.60
123.23	-16.53	66.92	-16.73	123.23	-31.95	4.29	-17.35	4.34	-31.95
-107.20	12.82	-50.69	12.92	-107.20	27.79	-3.32	13.14	-3.35	27.79
36.97	125.23	81.35	125.23	36.57	-9.58	-32.47	-21.09	-32.47	-9.48
141.26	205.38	175.32	206.38	141.26	-36.62	-53.25	-45.45	-53.51	-36.62
210.39	243.45	228.42	243.45	210.39	-54.55	-63.12	-59.22	-63.12	-54.55
219.41	228.42	231.43	229.42	219.41	-56.88	-59.22	-60.00	-59.48	-56.88
164.30	172.32	172.32	173.32	164.30	-42.60	-44.68	-44.68	-44.94	-42.60
114.21	120.22	119.22	120.22	114.21	-29.61	-31.17	-30.91	-31.17	-29.61
69.93	73.54	73.14	73.54	69.93	-18.13	-19.06	-18.96	-19.06	-18.13
31.76	33.36	33.06	33.26	31.66	-8.23	-8.65	-8.57	-8.62	-8.21
0.13	0.11	-0.13	0.10	0.14	-0.03	-0.03	0.03	-0.02	-0.04
-24.55	-25.75	-25.95	-25.75	-24.45	6.36	6.68	6.73	6.68	6.34
-41.88	-44.08	-44.28	-44.08	-41.88	10.86	11.43	11.48	11.43	10.86
-52.00	-54.70	-54.80	-54.70	-52.00	13.48	14.18	14.21	14.18	13.48
-55.00	-57.81	-57.91	-57.81	-54.90	14.26	14.99	15.01	14.99	14.23
-50.89	-53.60	-53.80	-53.60	-50.89	13.19	13.90	13.95	13.90	13.19
-40.27	-42.38	-42.48	-42.38	-40.27	10.44	10.99	11.01	10.99	10.44
-23.34	-24.65	-24.75	-24.65	-23.34	6.05	6.39	6.42	6.39	6.05
-1.27	-0.98	-0.99	-0.99	-1.26	0.33	0.26	0.26	0.26	0.33
21.64	22.84	23.04	22.94	21.64	-5.61	-5.92	-5.97	-5.95	-5.61
38.77	40.88	40.98	40.88	38.77	-10.05	-10.60	-10.62	-10.60	-10.05
49.69	52.30	52.40	52.40	49.69	-12.88	-13.56	-13.58	-13.58	-12.88
54.00	56.81	57.01	56.81	54.00	-14.00	-14.73	-14.78	-14.73	-14.00
51.29	54.00	54.20	54.10	51.29	-13.30	-14.00	-14.05	-14.03	-13.30
41.38	43.58	43.88	43.58	41.48	-10.73	-11.30	-11.38	-11.30	-10.75
24.24	25.55	25.95	25.65	24.24	-6.29	-6.62	-6.73	-6.65	-6.29
-0.01	0.03	0.39	0.05	-0.01	0.00	-0.01	-0.10	-0.01	0.00
-31.26	-32.86	-32.46	-32.86	-31.36	8.10	8.52	8.42	8.52	8.13
-69.23	-72.83	-72.23	-72.94	-69.23	17.95	18.88	18.73	18.91	17.95
-113.21	-119.22	-118.22	-119.22	-113.21	29.35	30.91	30.65	30.91	29.35
-163.30	-171.32	-170.32	-171.32	-163.30	42.34	44.42	44.16	44.42	42.34
-217.40	-227.42	-229.42	-228.42	-217.40	56.36	58.96	59.48	59.22	56.36
-213.40	-242.45	-227.42	-243.45	-213.40	55.32	62.86	58.96	63.12	55.32
-145.27	-206.38	-175.32	-206.38	-145.27	37.66	53.51	45.45	53.51	37.66
-40.58	-126.23	-82.55	-126.23	-40.07	10.52	32.73	21.40	32.73	10.39
105.19	-12.32	49.89	-12.62	105.19	-27.27	3.19	-12.94	3.27	-27.27
-117.22	20.34	-60.11	20.24	-118.22	30.39	-5.27	15.58	-5.25	30.65
165.31	155.29	169.31	155.29	164.30	-42.86	-40.26	-43.90	-40.26	-42.60
133.25	136.25	139.26	136.25	133.25	-34.55	-35.32	-36.10	-35.32	-34.55
103.19	106.20	108.20	106.20	103.19	-26.75	-27.53	-28.05	-27.53	-26.75
70.33	73.04	73.94	73.14	70.33	-18.23	-18.94	-19.17	-18.96	-18.23
35.77	37.17	37.57	37.27	35.77	-9.27	-9.64	-9.74	-9.66	-9.27

Load Case BA4

Normal Stress in Bolts (N/mm²) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-70.83	-73.74	-74.54	-73.74	-70.83	18.36	19.12	19.32	19.12	18.36

-103.19	-107.20	-109.20	-107.20	-103.19	26.75	27.79	28.31	27.79	26.75
-133.25	-137.25	-139.26	-137.25	-133.25	34.55	35.58	36.10	35.58	34.55
-162.30	-158.29	-169.31	-158.29	-162.30	42.08	41.04	43.90	41.04	42.08
22.34	-73.84	-18.33	-73.94	22.04	-5.79	19.14	4.75	19.17	-5.71
-137.25	-59.31	-102.19	-59.31	-136.25	35.58	15.38	26.49	15.38	35.32
-42.28	13.53	-16.23	13.73	-42.48	10.96	-3.51	4.21	-3.56	11.01
27.25	66.42	45.78	66.72	27.05	-7.06	-17.22	-11.87	-17.30	-7.01
74.34	93.07	83.45	93.27	74.24	-19.27	-24.13	-21.64	-24.18	-19.25
85.06	88.06	89.87	88.26	85.06	-22.05	-22.83	-23.30	-22.88	-22.05
55.10	58.11	57.61	58.21	55.10	-14.29	-15.06	-14.94	-15.09	-14.29
31.46	33.26	32.76	33.26	31.46	-8.16	-8.62	-8.49	-8.62	-8.16
14.23	15.03	14.63	15.03	14.33	-3.69	-3.90	-3.79	-3.90	-3.71
3.70	3.94	3.63	3.93	3.70	-0.96	-1.02	-0.94	-1.02	-0.96
0.02	-0.02	0.04	-0.02	0.02	-0.01	0.01	-0.01	0.01	-0.01
-3.40	-3.66	-3.30	-3.65	-3.41	0.88	0.95	0.85	0.95	0.88
-13.73	-14.53	-14.03	-14.53	-13.73	3.56	3.77	3.64	3.77	3.56
-30.66	-32.46	-31.76	-32.46	-30.66	7.95	8.42	8.23	8.42	7.95
-54.00	-57.11	-56.30	-57.11	-54.00	14.00	14.81	14.60	14.81	14.00
-83.45	-86.96	-88.36	-87.16	-83.45	21.64	22.55	22.91	22.60	21.64
-76.24	-92.67	-82.55	-92.87	-76.24	19.77	24.03	21.40	24.08	19.77
-29.86	-66.82	-46.09	-67.02	-29.76	7.74	17.32	11.95	17.38	7.71
39.67	-14.23	15.23	-14.43	39.77	-10.29	3.69	-3.95	3.74	-10.31
134.25	59.31	101.19	59.11	135.25	-34.81	-15.38	-26.23	-15.32	-35.06
-18.53	75.74	22.34	75.74	-18.53	4.81	-19.64	-5.79	-19.64	4.81
161.30	158.29	167.31	158.29	161.30	-41.82	-41.04	-43.38	-41.04	-41.82
132.24	136.25	138.26	136.25	132.24	-34.29	-35.32	-35.84	-35.32	-34.29
102.19	106.20	107.20	106.20	102.19	-26.49	-27.53	-27.79	-27.53	-26.49
69.73	72.63	73.24	72.73	69.73	-18.08	-18.83	-18.99	-18.86	-18.08
35.06	36.67	36.87	36.67	35.17	-9.09	-9.51	-9.56	-9.51	-9.12

Load Case BA6

Normal Stress in Bolts (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
1.04	1.07	0.95	1.05	1.05	-0.27	-0.28	-0.25	-0.27	-0.27
3.31	2.51	2.47	2.49	3.31	-0.86	-0.65	-0.64	-0.65	-0.86
11.52	4.52	9.28	7.16	11.52	-2.99	-1.17	-2.41	-1.86	-2.99
76.84	96.08	84.06	89.97	76.84	-19.92	-24.91	-21.79	-23.32	-19.92
55.60	60.01	60.21	60.31	55.60	-14.42	-15.56	-15.61	-15.64	-14.42
24.45	27.15	26.05	27.15	24.45	-6.34	-7.04	-6.75	-7.04	-6.34
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.25	0.96	0.93	0.95	1.25	-0.32	-0.25	-0.24	-0.25	-0.32
-26.75	-27.75	-27.95	-27.75	-26.75	6.94	7.19	7.25	7.19	6.94
-56.91	-61.31	-61.31	-61.61	-56.91	14.75	15.90	15.90	15.97	14.75
-77.84	-97.78	-85.56	-91.77	-77.84	20.18	25.35	22.18	23.79	20.18
-9.84	-2.42	-7.64	-5.30	-9.84	2.55	0.63	1.98	1.37	2.55
-2.93	-2.19	-2.19	-2.16	-2.93	0.76	0.57	0.57	0.56	0.76
-1.09	-1.17	-1.14	-1.16	-1.08	0.28	0.30	0.30	0.30	0.28
-0.55	-0.62	-0.63	-0.62	-0.54	0.14	0.16	0.16	0.16	0.14

Load Case BA7

Normal Stress in Bolts (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-69.83	-72.73	-73.84	-72.73	-69.93	18.10	18.86	19.14	18.86	18.13
-102.19	-106.20	-108.20	-106.20	-102.19	26.49	27.53	28.05	27.53	26.49
-131.24	-136.25	-138.26	-136.25	-131.24	34.03	35.32	35.84	35.32	34.03
-159.29	-159.29	-167.31	-159.29	-159.29	41.30	41.30	43.38	41.30	41.30
-83.55	-131.24	-105.19	-131.24	-83.76	21.66	34.03	27.27	34.03	21.71
-175.32	-131.24	-159.29	-131.24	-175.32	45.45	34.03	41.30	34.03	45.45
-130.24	-86.06	-114.21	-86.26	-130.24	33.77	22.31	29.61	22.36	33.77
-121.22	15.13	-48.39	16.03	-121.22	31.43	-3.92	12.55	-4.16	31.43
165.31	83.15	123.23	82.95	165.31	-42.86	-21.56	-31.95	-21.51	-42.86
216.40	156.29	191.35	156.29	216.40	-56.10	-40.52	-49.61	-40.52	-56.10
133.25	156.29	142.26	156.29	133.25	-34.55	-40.52	-36.88	-40.52	-34.55
157.29	160.30	166.31	160.30	157.29	-40.78	-41.56	-43.12	-41.56	-40.78
131.24	136.25	138.26	136.25	131.24	-34.03	-35.32	-35.84	-35.32	-34.03
102.19	106.20	107.20	106.20	102.19	-26.49	-27.53	-27.79	-27.53	-26.49
69.83	72.63	73.44	72.63	69.83	-18.10	-18.83	-19.04	-18.83	-18.10
35.57	36.87	37.17	36.87	35.47	-9.22	-9.56	-9.64	-9.56	-9.19

Load Case BA8

Normal Stress in Bolts (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-0.29	-0.10	-0.47	-0.18	-0.37	0.08	0.03	0.12	0.05	0.10
-0.01	-0.74	-1.44	-0.96	-0.11	0.00	0.19	0.37	0.25	0.03
3.63	-8.58	-1.05	-5.19	3.47	-0.94	2.22	0.27	1.35	-0.90
88.16	113.21	96.18	106.20	87.76	-22.86	-29.35	-24.94	-27.53	-22.75
72.03	77.74	78.35	78.04	71.73	-18.68	-20.16	-20.31	-20.23	-18.60
36.97	44.58	41.38	44.48	36.77	-9.58	-11.56	-10.73	-11.53	-9.53
18.33	21.94	20.34	21.84	18.03	-4.75	-5.69	-5.27	-5.66	-4.68
1.11	0.73	0.75	0.74	0.55	-0.29	-0.19	-0.19	-0.19	-0.14
-12.32	-18.53	-15.63	-18.53	-12.32	3.19	4.81	4.05	4.81	3.19
-45.58	-47.59	-47.59	-47.79	-45.68	11.82	12.34	12.34	12.39	11.84
-76.54	-83.25	-83.05	-83.76	-76.64	19.84	21.58	21.53	21.71	19.87
-91.97	-120.22	-101.19	-112.21	-91.97	23.84	31.17	26.23	29.09	23.84
3.00	17.73	8.73	13.83	2.94	-0.78	-4.60	-2.26	-3.58	-0.76
1.72	2.12	3.06	2.40	1.65	-0.45	-0.55	-0.79	-0.62	-0.43
0.12	-0.37	-0.08	-0.33	0.06	-0.03	0.09	0.02	0.08	-0.01

Appendix 6

Girder Thread Shear Stress

Load Case BA1

Shear Stress in Girder Threads (N/mm²) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-8.64	-8.78	-9.15	-8.78	-8.66	2.24	2.28	2.37	2.28	2.25
-12.55	-12.62	-13.27	-12.64	-12.57	3.25	3.27	3.44	3.28	3.26
-15.96	-15.79	-16.89	-15.85	-15.98	4.14	4.09	4.38	4.11	4.14
-17.44	-17.10	-21.42	-17.23	-17.57	4.52	4.43	5.55	4.47	4.56
10.31	13.44	35.44	13.23	10.14	-2.67	-3.48	-9.19	-3.43	-2.63
23.50	22.37	-7.34	22.37	23.50	-6.09	-5.80	1.90	-5.80	-6.09
56.10	59.14	46.25	59.89	56.10	-14.55	-15.33	-11.99	-15.53	-14.55
72.59	75.82	68.23	76.38	72.59	-18.82	-19.66	-17.69	-19.80	-18.82
76.57	80.37	79.99	80.55	76.76	-19.85	-20.84	-20.74	-20.88	-19.90
65.96	69.37	69.37	69.37	65.96	-17.10	-17.99	-17.99	-17.99	-17.10
50.99	53.45	53.26	53.45	50.99	-13.22	-13.86	-13.81	-13.86	-13.22
36.58	38.29	38.10	38.29	36.58	-9.48	-9.93	-9.88	-9.93	-9.48
22.93	24.07	23.88	24.07	22.93	-5.95	-6.24	-6.19	-6.24	-5.95
10.52	11.03	10.92	11.03	10.52	-2.73	-2.86	-2.83	-2.86	-2.73
-0.73	-0.79	-0.88	-0.79	-0.72	0.19	0.20	0.23	0.21	0.19
-10.65	-11.20	-11.28	-11.22	-10.65	2.76	2.90	2.92	2.91	2.76
-19.14	-20.09	-20.09	-20.09	-19.14	4.96	5.21	5.21	5.21	4.96
-26.16	-27.48	-27.48	-27.48	-26.16	6.78	7.13	7.13	7.13	6.78
-31.65	-33.17	-33.36	-33.36	-31.65	8.21	8.60	8.65	8.65	8.21
-35.63	-37.34	-37.53	-37.34	-35.63	9.24	9.68	9.73	9.68	9.24
-38.10	-39.99	-39.99	-39.99	-38.10	9.88	10.37	10.37	10.37	9.88
-39.05	-41.13	-41.13	-41.13	-39.05	10.12	10.66	10.66	10.66	10.12
-38.67	-40.56	-40.75	-40.56	-38.67	10.02	10.52	10.57	10.52	10.02
-36.96	-38.86	-38.86	-38.86	-36.96	9.58	10.07	10.07	10.07	9.58
-34.12	-35.82	-35.82	-35.82	-34.12	8.85	9.29	9.29	9.29	8.85
-30.14	-31.46	-31.65	-31.46	-30.14	7.81	8.16	8.21	8.16	7.81
-25.21	-26.54	-26.54	-26.54	-25.21	6.54	6.88	6.88	6.88	6.54
-19.52	-20.47	-20.47	-20.47	-19.52	5.06	5.31	5.31	5.31	5.06
-13.38	-14.04	-14.06	-14.04	-13.38	3.47	3.64	3.65	3.64	3.47
-6.75	-7.11	-7.15	-7.11	-6.75	1.75	1.84	1.85	1.84	1.75
0.02	0.02	0.02	0.02	0.02	0.00	-0.01	-0.01	-0.01	0.00
6.77	7.15	7.20	7.15	6.77	-1.75	-1.85	-1.87	-1.85	-1.75
13.42	14.06	14.12	14.08	13.40	-3.48	-3.65	-3.66	-3.65	-3.47
19.71	20.47	20.47	20.47	19.71	-5.11	-5.31	-5.31	-5.31	-5.11
25.21	26.54	26.54	26.54	25.21	-6.54	-6.88	-6.88	-6.88	-6.54
30.14	31.65	31.65	31.65	30.14	-7.81	-8.21	-8.21	-8.21	-7.81
34.12	35.82	35.82	35.82	34.12	-8.85	-9.29	-9.29	-9.29	-8.85
36.96	38.86	38.86	38.86	36.96	-9.58	-10.07	-10.07	-10.07	-9.58
38.86	40.56	40.75	40.56	38.67	-10.07	-10.52	-10.57	-10.52	-10.02
39.23	41.13	41.13	41.13	39.23	-10.17	-10.66	-10.66	-10.66	-10.17
38.10	39.99	40.18	39.99	38.10	-9.88	-10.37	-10.42	-10.37	-9.88
35.63	37.53	37.53	37.53	35.63	-9.24	-9.73	-9.73	-9.73	-9.24

31.84	33.36	33.36	33.36	31.65	-8.26	-8.65	-8.65	-8.65	-8.21
26.16	27.67	27.67	27.67	26.35	-6.78	-7.17	-7.17	-7.17	-6.83
19.33	20.28	20.28	20.28	19.14	-5.01	-5.26	-5.26	-5.26	-4.96
10.75	11.30	11.39	11.32	10.75	-2.79	-2.93	-2.95	-2.93	-2.79
0.82	0.88	1.00	0.89	0.81	-0.21	-0.23	-0.26	-0.23	-0.21
-10.44	-10.94	-10.78	-10.94	-10.44	2.71	2.84	2.80	2.84	2.71
-22.93	-24.07	-23.88	-24.07	-22.93	5.95	6.24	6.19	6.24	5.95
-36.39	-38.29	-38.10	-38.29	-36.39	9.43	9.93	9.88	9.93	9.43
-50.99	-53.45	-53.07	-53.45	-50.80	13.22	13.86	13.76	13.86	13.17
-65.96	-69.37	-69.37	-69.37	-65.96	17.10	17.99	17.99	17.99	17.10
-76.57	-80.18	-79.99	-80.55	-76.57	19.85	20.79	20.74	20.88	19.85
-72.40	-75.82	-68.42	-76.57	-72.40	18.77	19.66	17.74	19.85	18.77
-55.72	-59.33	-46.63	-60.08	-55.72	14.45	15.38	12.09	15.58	14.45
-23.50	-22.93	6.16	-23.12	-23.50	6.09	5.95	-1.60	6.00	6.09
-10.58	-13.36	-35.44	-13.21	-10.65	2.74	3.46	9.19	3.43	2.76
17.42	17.19	21.42	17.42	17.36	-4.52	-4.46	-5.55	-4.52	-4.50
15.98	15.96	16.79	15.96	15.98	-4.14	-4.14	-4.35	-4.14	-4.14
12.59	12.74	13.15	12.74	12.60	-3.26	-3.30	-3.41	-3.30	-3.27
8.68	8.83	9.06	8.85	8.68	-2.25	-2.29	-2.35	-2.29	-2.25
4.45	4.55	4.61	4.55	4.44	-1.15	-1.18	-1.19	-1.18	-1.15

Load Case BA2

Shear Stress in Girder Threads (N/mm²) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-10.67	-10.94	-11.26	-10.94	-10.67	2.77	2.84	2.92	2.84	2.77
-15.54	-15.86	-16.38	-15.86	-15.56	4.03	4.11	4.25	4.11	4.03
-20.09	-20.09	-21.04	-20.09	-20.09	5.21	5.21	5.45	5.21	5.21
-25.21	-21.61	-25.78	-21.61	-25.21	6.54	5.60	6.68	5.60	6.54
55.35	18.35	40.37	18.27	55.16	-14.35	-4.76	-10.47	-4.74	-14.30
-0.71	27.67	13.02	27.67	-0.70	0.18	-7.17	-3.38	-7.17	0.18
32.03	54.21	43.40	54.21	32.03	-8.30	-14.05	-11.25	-14.05	-8.30
55.91	73.92	65.77	73.92	55.91	-14.50	-19.16	-17.05	-19.16	-14.50
73.54	84.53	80.37	84.72	73.54	-19.07	-21.92	-20.84	-21.97	-19.07
79.04	82.26	83.21	82.45	79.04	-20.49	-21.33	-21.57	-21.38	-20.49
64.44	67.67	67.48	67.67	64.44	-16.71	-17.54	-17.49	-17.54	-16.71
50.42	52.88	52.88	53.07	50.42	-13.07	-13.71	-13.71	-13.76	-13.07
37.15	39.05	39.05	39.05	37.34	-9.63	-10.12	-10.12	-10.12	-9.68
25.02	26.35	26.16	26.35	25.02	-6.49	-6.83	-6.78	-6.83	-6.49
13.86	14.54	14.48	14.54	13.86	-3.59	-3.77	-3.75	-3.77	-3.59
3.87	4.04	4.00	4.06	3.87	-1.00	-1.05	-1.04	-1.05	-1.00
-4.85	-5.10	-5.14	-5.10	-4.83	1.26	1.32	1.33	1.32	1.25
-12.21	-12.83	-12.85	-12.83	-12.19	3.16	3.33	3.33	3.33	3.16
-18.23	-19.14	-19.14	-19.14	-18.18	4.73	4.96	4.96	4.96	4.71
-22.74	-23.88	-23.88	-23.88	-22.74	5.90	6.19	6.19	6.19	5.90
-25.97	-27.29	-27.29	-27.29	-25.97	6.73	7.08	7.08	7.08	6.73
-27.86	-29.19	-29.19	-29.19	-27.86	7.22	7.57	7.57	7.57	7.22
-28.43	-29.76	-29.76	-29.76	-28.43	7.37	7.71	7.71	7.71	7.37
-27.67	-29.00	-29.19	-29.00	-27.67	7.17	7.52	7.57	7.52	7.17

-25.97	-27.29	-27.29	-27.29	-25.97	6.73	7.08	7.08	7.08	6.73
-23.12	-24.45	-24.26	-24.26	-23.12	6.00	6.34	6.29	6.29	6.00
-19.71	-20.47	-20.47	-20.47	-19.71	5.11	5.31	5.31	5.31	5.11
-15.33	-16.09	-16.13	-16.09	-15.33	3.98	4.17	4.18	4.17	3.98
-10.52	-11.03	-11.03	-11.03	-10.52	2.73	2.86	2.86	2.86	2.73
-5.21	-5.59	-5.59	-5.59	-5.23	1.35	1.45	1.45	1.45	1.36
0.04	0.03	0.03	0.03	0.04	-0.01	-0.01	-0.01	-0.01	-0.01
5.27	5.65	5.67	5.67	5.27	-1.37	-1.46	-1.47	-1.47	-1.37
10.58	11.09	11.13	11.11	10.58	-2.74	-2.87	-2.88	-2.88	-2.74
15.39	16.17	16.19	16.17	15.39	-3.99	-4.19	-4.20	-4.19	-3.99
19.71	20.66	20.66	20.66	19.71	-5.11	-5.36	-5.36	-5.36	-5.11
23.31	24.45	24.45	24.45	23.12	-6.04	-6.34	-6.34	-6.34	-6.00
25.97	27.29	27.29	27.29	25.97	-6.73	-7.08	-7.08	-7.08	-6.73
27.67	29.19	29.19	29.19	27.86	-7.17	-7.57	-7.57	-7.57	-7.22
28.43	29.76	29.76	29.76	28.43	-7.37	-7.71	-7.71	-7.71	-7.37
27.86	29.19	29.19	29.19	27.86	-7.22	-7.57	-7.57	-7.57	-7.22
25.97	27.29	27.29	27.29	25.97	-6.73	-7.08	-7.08	-7.08	-6.73
22.93	24.07	23.88	24.07	22.74	-5.95	-6.24	-6.19	-6.24	-5.90
18.31	19.14	19.14	19.14	18.25	-4.75	-4.96	-4.96	-4.96	-4.73
12.28	12.93	12.96	12.93	12.28	-3.18	-3.35	-3.36	-3.35	-3.18
4.93	5.17	5.23	5.17	4.91	-1.28	-1.34	-1.36	-1.34	-1.27
-3.79	-3.96	-3.90	-3.96	-3.79	0.98	1.03	1.01	1.03	0.98
-13.78	-14.46	-14.39	-14.46	-13.78	3.57	3.75	3.73	3.75	3.57
-24.83	-26.16	-26.16	-26.16	-25.02	6.44	6.78	6.78	6.78	6.49
-37.15	-39.05	-39.05	-39.05	-37.15	9.63	10.12	10.12	10.12	9.63
-50.42	-52.88	-52.88	-52.88	-50.42	13.07	13.71	13.71	13.71	13.07
-64.25	-67.67	-67.48	-67.67	-64.25	16.66	17.54	17.49	17.54	16.66
-78.85	-82.45	-83.02	-82.45	-78.85	20.44	21.38	21.52	21.38	20.44
-74.49	-84.91	-80.55	-84.91	-74.49	19.31	22.01	20.88	22.01	19.31
-57.24	-74.49	-66.34	-74.49	-57.05	14.84	19.31	17.20	19.31	14.79
-33.17	-54.78	-44.16	-54.78	-33.17	8.60	14.20	11.45	14.20	8.60
-0.04	-27.86	-13.38	-27.86	0.06	0.01	7.22	3.47	7.22	-0.01
-54.21	-17.63	-39.05	-17.67	-54.21	14.05	4.57	10.12	4.58	14.05
25.21	21.61	25.59	21.80	25.21	-6.54	-5.60	-6.63	-5.65	-6.54
19.90	20.09	20.85	20.09	19.90	-5.16	-5.21	-5.41	-5.21	-5.16
15.47	15.88	16.24	15.90	15.49	-4.01	-4.12	-4.21	-4.12	-4.01
10.58	10.94	11.14	10.96	10.60	-2.74	-2.84	-2.89	-2.84	-2.75
5.36	5.57	5.65	5.57	5.38	-1.39	-1.44	-1.46	-1.44	-1.40

Load Case BA3

Shear Stress in Girder Threads (N/mm²) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-13.31	-13.78	-14.03	-13.78	-13.31	3.45	3.57	3.64	3.57	3.45
-19.52	-20.09	-20.47	-20.09	-19.52	5.06	5.21	5.31	5.21	5.06
-25.21	-25.78	-26.35	-25.78	-25.21	6.54	6.68	6.83	6.68	6.54
-31.08	-29.19	-32.22	-29.19	-31.08	8.06	7.57	8.35	7.57	8.06
23.31	-3.13	12.66	-3.17	23.31	-6.04	0.81	-3.28	0.82	-6.04
-20.28	2.43	-9.59	2.45	-20.28	5.26	-0.63	2.49	-0.63	5.26

6.99	23.69	15.39	23.69	6.92	-1.81	-6.14	-3.99	-6.14	-1.79
26.73	38.86	33.17	39.05	26.73	-6.93	-10.07	-8.60	-10.12	-6.93
39.80	46.06	43.22	46.06	39.80	-10.32	-11.94	-11.20	-11.94	-10.32
41.51	43.22	43.78	43.40	41.51	-10.76	-11.20	-11.35	-11.25	-10.76
31.08	32.60	32.60	32.79	31.08	-8.06	-8.45	-8.45	-8.50	-8.06
21.61	22.74	22.56	22.74	21.61	-5.60	-5.90	-5.85	-5.90	-5.60
13.23	13.91	13.84	13.91	13.23	-3.43	-3.61	-3.59	-3.61	-3.43
6.01	6.31	6.25	6.29	5.99	-1.56	-1.64	-1.62	-1.63	-1.55
0.02	0.02	-0.03	0.02	0.03	-0.01	-0.01	0.01	0.00	-0.01
-4.64	-4.87	-4.91	-4.87	-4.62	1.20	1.26	1.27	1.26	1.20
-7.92	-8.34	-8.38	-8.34	-7.92	2.05	2.16	2.17	2.16	2.05
-9.84	-10.35	-10.37	-10.35	-9.84	2.55	2.68	2.69	2.68	2.55
-10.41	-10.94	-10.96	-10.94	-10.39	2.70	2.84	2.84	2.84	2.69
-9.63	-10.14	-10.18	-10.14	-9.63	2.50	2.63	2.64	2.63	2.50
-7.62	-8.02	-8.04	-8.02	-7.62	1.98	2.08	2.08	2.08	1.98
-4.42	-4.66	-4.68	-4.66	-4.42	1.14	1.21	1.21	1.21	1.14
-0.24	-0.19	-0.19	-0.19	-0.24	0.06	0.05	0.05	0.05	0.06
4.09	4.32	4.36	4.34	4.09	-1.06	-1.12	-1.13	-1.13	-1.06
7.34	7.73	7.75	7.73	7.34	-1.90	-2.00	-2.01	-2.00	-1.90
9.40	9.89	9.91	9.91	9.40	-2.44	-2.57	-2.57	-2.57	-2.44
10.22	10.75	10.78	10.75	10.22	-2.65	-2.79	-2.80	-2.79	-2.65
9.70	10.22	10.25	10.24	9.70	-2.52	-2.65	-2.66	-2.65	-2.52
7.83	8.24	8.30	8.24	7.85	-2.03	-2.14	-2.15	-2.14	-2.03
4.59	4.83	4.91	4.85	4.59	-1.19	-1.25	-1.27	-1.26	-1.19
0.00	0.01	0.07	0.01	0.00	0.00	0.00	-0.02	0.00	0.00
-5.91	-6.22	-6.14	-6.22	-5.93	1.53	1.61	1.59	1.61	1.54
-13.10	-13.78	-13.67	-13.80	-13.10	3.40	3.57	3.54	3.58	3.40
-21.42	-22.56	-22.37	-22.56	-21.42	5.55	5.85	5.80	5.85	5.55
-30.90	-32.41	-32.22	-32.41	-30.90	8.01	8.40	8.35	8.40	8.01
-41.13	-43.03	-43.40	-43.22	-41.13	10.66	11.15	11.25	11.20	10.66
-40.37	-45.87	-43.03	-46.06	-40.37	10.47	11.89	11.15	11.94	10.47
-27.48	-39.05	-33.17	-39.05	-27.48	7.13	10.12	8.60	10.12	7.13
-7.68	-23.88	-15.62	-23.88	-7.58	1.99	6.19	4.05	6.19	1.97
19.90	-2.33	9.44	-2.39	19.90	-5.16	0.60	-2.45	0.62	-5.16
-22.18	3.85	-11.37	3.83	-22.37	5.75	-1.00	2.95	-0.99	5.80
31.27	29.38	32.03	29.38	31.08	-8.11	-7.62	-8.30	-7.62	-8.06
25.21	25.78	26.35	25.78	25.21	-6.54	-6.68	-6.83	-6.68	-6.54
19.52	20.09	20.47	20.09	19.52	-5.06	-5.21	-5.31	-5.21	-5.06
13.31	13.82	13.99	13.84	13.31	-3.45	-3.58	-3.63	-3.59	-3.45
6.77	7.03	7.11	7.05	6.77	-1.75	-1.82	-1.84	-1.83	-1.75

Load Case BA4

Shear Stress in Girder Threads (N/mm²) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-13.40	-13.95	-14.10	-13.95	-13.40	3.47	3.62	3.66	3.62	3.47
-19.52	-20.28	-20.66	-20.28	-19.52	5.06	5.26	5.36	5.26	5.06
-25.21	-25.97	-26.35	-25.97	-25.21	6.54	6.73	6.83	6.73	6.54
-30.71	-29.95	-32.03	-29.95	-30.71	7.96	7.76	8.30	7.76	7.96

4.23	-13.97	-3.47	-13.99	4.17	-1.10	3.62	0.90	3.63	-1.08
-25.97	-11.22	-19.33	-11.22	-25.78	6.73	2.91	5.01	2.91	6.68
-8.00	2.56	-3.07	2.60	-8.04	2.07	-0.66	0.80	-0.67	2.08
5.16	12.57	8.66	12.62	5.12	-1.34	-3.26	-2.25	-3.27	-1.33
14.06	17.61	15.79	17.65	14.04	-3.65	-4.57	-4.09	-4.57	-3.64
16.09	16.66	17.00	16.70	16.09	-4.17	-4.32	-4.41	-4.33	-4.17
10.42	10.99	10.90	11.01	10.42	-2.70	-2.85	-2.83	-2.86	-2.70
5.95	6.29	6.20	6.29	5.95	-1.54	-1.63	-1.61	-1.63	-1.54
2.69	2.84	2.77	2.84	2.71	-0.70	-0.74	-0.72	-0.74	-0.70
0.70	0.74	0.69	0.74	0.70	-0.18	-0.19	-0.18	-0.19	-0.18
0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.64	-0.69	-0.62	-0.69	-0.64	0.17	0.18	0.16	0.18	0.17
-2.60	-2.75	-2.65	-2.75	-2.60	0.67	0.71	0.69	0.71	0.67
-5.80	-6.14	-6.01	-6.14	-5.80	1.50	1.59	1.56	1.59	1.50
-10.22	-10.80	-10.65	-10.80	-10.22	2.65	2.80	2.76	2.80	2.65
-15.79	-16.45	-16.72	-16.49	-15.79	4.09	4.27	4.33	4.28	4.09
-14.42	-17.53	-15.62	-17.57	-14.42	3.74	4.55	4.05	4.56	3.74
-5.65	-12.64	-8.72	-12.68	-5.63	1.46	3.28	2.26	3.29	1.46
7.51	-2.69	2.88	-2.73	7.52	-1.95	0.70	-0.75	0.71	-1.95
25.40	11.22	19.14	11.18	25.59	-6.58	-2.91	-4.96	-2.90	-6.63
-3.51	14.33	4.23	14.33	-3.51	0.91	-3.71	-1.10	-3.71	0.91
30.52	29.95	31.65	29.95	30.52	-7.91	-7.76	-8.21	-7.76	-7.91
25.02	25.78	26.16	25.78	25.02	-6.49	-6.68	-6.78	-6.68	-6.49
19.33	20.09	20.28	20.09	19.33	-5.01	-5.21	-5.26	-5.21	-5.01
13.19	13.74	13.86	13.76	13.19	-3.42	-3.56	-3.59	-3.57	-3.42
6.63	6.94	6.98	6.94	6.65	-1.72	-1.80	-1.81	-1.80	-1.72

Load Case BA6

Shear Stress in Girder Threads (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
0.20	0.20	0.18	0.20	0.20	-0.05	-0.05	-0.05	-0.05	-0.05
0.63	0.48	0.47	0.47	0.63	-0.16	-0.12	-0.12	-0.12	-0.16
2.18	0.85	1.76	1.36	2.18	-0.57	-0.22	-0.46	-0.35	-0.57
14.54	18.18	15.90	17.02	14.54	-3.77	-4.71	-4.12	-4.41	-3.77
10.52	11.35	11.39	11.41	10.52	-2.73	-2.94	-2.95	-2.96	-2.73
4.62	5.14	4.93	5.14	4.62	-1.20	-1.33	-1.28	-1.33	-1.20
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.24	0.18	0.18	0.18	0.24	-0.06	-0.05	-0.05	-0.05	-0.06
-5.06	-5.25	-5.29	-5.25	-5.06	1.31	1.36	1.37	1.36	1.31
-10.77	-11.60	-11.60	-11.66	-10.77	2.79	3.01	3.01	3.02	2.79
-14.73	-18.50	-16.19	-17.36	-14.73	3.82	4.80	4.20	4.50	3.82
-1.86	-0.46	-1.45	-1.00	-1.86	0.48	0.12	0.37	0.26	0.48
-0.55	-0.42	-0.42	-0.41	-0.55	0.14	0.11	0.11	0.11	0.14
-0.21	-0.22	-0.22	-0.22	-0.20	0.05	0.06	0.06	0.06	0.05
-0.10	-0.12	-0.12	-0.12	-0.10	0.03	0.03	0.03	0.03	0.03

Load Case BA7

Shear Stress in Girder Threads (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-13.21	-13.76	-13.97	-13.76	-13.23	3.43	3.57	3.62	3.57	3.43
-19.33	-20.09	-20.47	-20.09	-19.33	5.01	5.21	5.31	5.21	5.01
-24.83	-25.78	-26.16	-25.78	-24.83	6.44	6.68	6.78	6.68	6.44
-30.14	-30.14	-31.65	-30.14	-30.14	7.81	7.81	8.21	7.81	7.81
-15.81	-24.83	-19.90	-24.83	-15.85	4.10	6.44	5.16	6.44	4.11
-33.17	-24.83	-30.14	-24.83	-33.17	8.60	6.44	7.81	6.44	8.60
-24.64	-16.28	-21.61	-16.32	-24.64	6.39	4.22	5.60	4.23	6.39
-22.93	2.86	-9.15	3.03	-22.93	5.95	-0.74	2.37	-0.79	5.95
31.27	15.73	23.31	15.69	31.27	-8.11	-4.08	-6.04	-4.07	-8.11
40.94	29.57	36.20	29.57	40.94	-10.61	-7.67	-9.39	-7.67	-10.61
25.21	29.57	26.91	29.57	25.21	-6.54	-7.67	-6.98	-7.67	-6.54
29.76	30.33	31.46	30.33	29.76	-7.71	-7.86	-8.16	-7.86	-7.71
24.83	25.78	26.16	25.78	24.83	-6.44	-6.68	-6.78	-6.68	-6.44
19.33	20.09	20.28	20.09	19.33	-5.01	-5.21	-5.26	-5.21	-5.01
13.21	13.74	13.89	13.74	13.21	-3.43	-3.56	-3.60	-3.56	-3.43
6.73	6.98	7.03	6.98	6.71	-1.74	-1.81	-1.82	-1.81	-1.74

Load Case BA8

Shear Stress in Girder Threads (N/mm2) - force increased by 25%

FB1					FB2				
Front	Middle1	Center	Middle 2	Back	Front	Middle1	Center	Middle 2	Back
-0.05	-0.02	-0.09	-0.03	-0.07	0.01	0.00	0.02	0.01	0.02
0.00	-0.14	-0.27	-0.18	-0.02	0.00	0.04	0.07	0.05	0.01
0.69	-1.62	-0.20	-0.98	0.66	-0.18	0.42	0.05	0.25	-0.17
16.68	21.42	18.20	20.09	16.60	-4.32	-5.55	-4.72	-5.21	-4.30
13.63	14.71	14.82	14.77	13.57	-3.53	-3.81	-3.84	-3.83	-3.52
6.99	8.43	7.83	8.42	6.96	-1.81	-2.19	-2.03	-2.18	-1.80
3.47	4.15	3.85	4.13	3.41	-0.90	-1.08	-1.00	-1.07	-0.88
0.21	0.14	0.14	0.14	0.10	-0.05	-0.04	-0.04	-0.04	-0.03
-2.33	-3.51	-2.96	-3.51	-2.33	0.60	0.91	0.77	0.91	0.60
-8.62	-9.00	-9.00	-9.04	-8.64	2.24	2.33	2.33	2.34	2.24
-14.48	-15.75	-15.71	-15.85	-14.50	3.75	4.08	4.07	4.11	3.76
-17.40	-22.74	-19.14	-21.23	-17.40	4.51	5.90	4.96	5.50	4.51
0.57	3.35	1.65	2.62	0.56	-0.15	-0.87	-0.43	-0.68	-0.14
0.33	0.40	0.58	0.45	0.31	-0.08	-0.10	-0.15	-0.12	-0.08

Appendix 7 Saddle Forces

Load Case BA1

Left Saddle							Key Force
M6	M8	M9	M10	M11	M12		
Z1	0	0	0	0	0	0	-212,500
Z2	191,200	107,700	41,550	73,380	42,220	0	-654,700
Z3	275,100	437,400	270,100	162,100	29,360	0	-921,200
Z4	247,200	386,000	227,600	140,300	26,040	0	-807,900
Z5	247,000	386,200	227,400	140,300	26,190	0	-808,290
Z6	275,400	437,000	270,500	162,400	29,320	0	-920,900
Z7	190,900	108,100	41,510	73,300	42,290	0	-655,700
Z8	0	0	0	0	0	0	-211,600

Right Saddle							Key Force
M6	M8	M9	M10	M11	M12		
Z1	0	0	0	0	0	0	-212,510
Z2	173,600	87,790	34,630	72,630	43,510	0	-620,700
Z3	284,500	435,800	271,200	162,400	29,640	0	-802,000
Z4	258,700	382,000	225,000	138,100	25,460	0	-681,370
Z5	258,300	382,100	224,800	138,100	25,580	0	-682,040
Z6	285,100	435,800	271,700	162,800	29,590	0	-801,100
Z7	173,500	88,020	34,480	72,440	43,530	0	-620,940
Z8	0	0	0	0	0	0	-211,280

Load Case BA2

Left Saddle							Key Force
M6	M8	M9	M10	M11	M12		
Z1	196,700	140,600	109,100	82,200	43,510	0	-220,500
Z2	221,100	162,000	131,700	101,700	59,460	1,117	-680,400
Z3	253,300	198,000	165,500	130,000	76,500	1,125	-779,800
Z4	253,200	198,000	164,500	128,500	74,970	0	-648,900
Z5	253,200	198,000	164,500	128,500	74,990	0	-648,900
Z6	253,300	198,000	165,500	130,000	76,550	1,126	-779,100
Z7	221,000	162,000	131,700	101,700	59,440	1,129	-681,800
Z8	196,700	140,600	109,200	82,330	43,660	0	-219,100

Right Saddle							Key Force
M6	M8	M9	M10	M11	M12		

Z1	199,800	139,600	106,600	78,540	39,550	0	-128,800
Z2	223,700	161,300	129,700	98,950	56,760	0	-588,700
Z3	247,500	194,500	163,500	129,600	77,240	2,012	-714,000
Z4	246,400	193,800	162,100	127,900	75,560	652	-595,700
Z5	246,300	193,800	162,200	127,900	75,570	693	-595,700
Z6	247,600	194,500	163,600	129,700	77,290	2,003	-712,600
Z7	223,700	161,300	129,600	98,890	56,690	0	-588,700
Z8	199,900	139,700	106,700	78,640	39,640	0	-127,400

Load Case BA3

Left Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	137,700	116,700	87,760	59,870	25,970	0	-165,200
Z2	156,000	133,000	104,800	74,700	38,410	0	-509,600
Z3	180,200	160,300	130,500	96,420	52,490	0	-588,000
Z4	180,100	160,200	129,700	95,350	51,380	0	-490,000
Z5	180,100	160,200	129,700	95,360	54,140	0	-490,000
Z6	180,200	160,300	130,500	96,460	52,530	0	-587,300
Z7	156,000	133,000	104,800	74,700	38,390	0	-510,300
Z8	137,700	116,700	87,800	59,960	26,000	0	-164,500

Right Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	139,000	116,000	87,800	59,900	26,080	0	-95,200
Z2	157,000	132,200	103,100	72,360	35,590	0	-438,200
Z3	174,900	157,200	128,900	96,100	53,260	0	-536,900
Z4	174,000	156,700	127,800	94,920	52,050	0	-448,700
Z5	174,000	156,700	127,800	94,930	52,000	0	-449,400
Z6	174,900	157,000	128,900	96,200	53,290	0	-536,200
Z7	157,000	132,200	103,100	72,310	35,540	0	-438,900
Z8	139,200	115,800	85,830	56,990	22,470	0	-94,500

Load Case BA4

Left Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	91,520	78,250	58,620	39,710	17,550	0	-109,060
Z2	103,900	89,270	70,070	49,620	25,780	0	-340,970
Z3	120,300	107,700	87,290	64,030	34,760	0	-393,190
Z4	120,200	107,600	86,790	63,310	34,010	0	-327,250

Z5	120,200	107,600	86,790	63,320	34,030	0	-327,320
Z6	120,300	107,700	78,300	640,500	34,780	0	-392,980
Z7	103,900	89,260	70,050	49,600	25,770	0	-341,530
Z8	91,510	78,240	58,660	39,780	17,620	0	-108,640

Right Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	92,120	77,400	57,140	37,610	15,040	0	-62,419
Z2	104,200	88,470	68,750	47,870	23,760	0	-292,530
Z3	116,200	105,300	85,960	63,630	35,050	0	-357,770
Z4	115,600	104,900	85,270	62,800	34,250	0	-298,760
Z5	115,600	104,900	85,280	62,810	34,260	0	-298,900
Z6	116,200	105,300	85,990	63,650	35,080	0	-357,280
Z7	104,200	88,480	68,740	47,840	23,730	0	-292,950
Z8	92,160	77,420	57,190	37,660	15,090	0	-61,649

Load Case BA6

Left Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	0	0	0	0	0	0	0
Z2	0	0	0	0	0	0	0
Z3	0	0	0	0	0	0	0
Z4	0	0	0	0	0	0	0
Z5	0	0	0	0	0	0	0
Z6	0	0	0	0	0	0	0
Z7	0	0	0	0	0	0	0
Z8	0	0	0	0	0	0	0

Right Saddle

	M6	M8	M9	M10	M11	M12	Key Force
Z1	0	0	0	0	0	0	0
Z2	0	0	0	0	0	0	0
Z3	0	0	0	0	0	0	0
Z4	0	0	0	0	0	0	0
Z5	0	0	0	0	0	0	0
Z6	0	0	0	0	0	0	0
Z7	0	0	0	0	0	0	0
Z8	0	0	0	0	0	0	0

Load Case BA7

Left Saddle							
	M6	M8	M9	M10	M11	M12	Key Force
Z1	41990	46010	42620	30070	0	0	-61350
Z2	49170	52630	49510	38730	0	0	-198200
Z3	58340	63440	60450	48250	0	0	-220100
Z4	58270	63350	60130	47090	0	0	-176800
Z5	58250	63330	60120	47090	0	0	-176700
Z6	58310	63410	60430	48240	0	0	-219600
Z7	49060	52550	49460	38630	0	0	-198400
Z8	41910	45930	42590	29830	0	0	-60590

Right Saddle							
	M6	M8	M9	M10	M11	M12	Key Force
Z1	19730	59960	86670	0	0	0	-42060
Z2	26640	67100	94240	0	0	0	-183600
Z3	33230	77650	106900	0	0	0	-194300
Z4	32890	77320	106500	0	0	0	-152900
Z5	32870	77330	106500	0	0	0	-153000
Z6	33220	77660	106900	0	0	0	-194300
Z7	26630	67150	94310	0	0	0	-184100
Z8	19730	60020	86790	0	0	0	-41950

Load Case BA8

Left Saddle							
	M6	M8	M9	M10	M11	M12	Key Force
Z1	234	5724	3539	0	0	0	643
Z2	1102	6588	4236	0	0	0	-16080
Z3	2311	7866	5315	0	0	0	-15088
Z4	2284	7848	528	0	0	0	-12050
Z5	2265	7825	5255	0	0	0	-12040
Z6	2285	7828	5272	0	0	0	-14900
Z7	1045	6492	4118	0	0	0	-15830
Z8	177	5620	3412	0	0	0	833

Right Saddle							
	M6	M8	M9	M10	M11	M12	Key Force
Z1	5456	0	0	0	0	0	2563
Z2	6083	0	0	0	0	0	-13310
Z3	7110	0	0	0	0	0	-13020
Z4	7083	0	0	0	0	0	-10530

Z5	7095	0	0	0	0	0	-10550
Z6	71838	0	0	0	0	0	-13130
Z7	6180	0	0	0	0	0	-13600
Z8	5566	0	0	0	0	0	2409

Appendix 8 Swivel Bolt Normal Stress

Load Case BA1

Swivel Bolt Normal Stresses						
	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	170.75	96.18	37.11	65.53	37.70	0.00
Z3	245.68	390.62	241.21	144.76	26.22	0.00
Z4	220.76	344.72	203.26	125.29	23.26	0.00
Z5	220.58	344.90	203.08	125.29	23.39	0.00
Z6	245.95	390.26	241.57	145.03	26.18	0.00
Z7	170.48	96.54	37.07	65.46	37.77	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA2

Swivel Bolt Normal Stresses						
	M6	M8	M9	M10	M11	M12
Z1	175.66	125.56	97.43	73.41	38.86	0.00
Z2	197.45	144.67	117.61	90.82	53.10	1.00
Z3	226.21	176.82	147.80	116.10	68.32	1.00
Z4	226.12	176.82	146.91	114.76	66.95	0.00
Z5	226.12	176.82	146.91	114.76	66.97	0.00
Z6	226.21	176.82	147.80	116.10	68.36	1.01
Z7	197.36	144.67	117.61	90.82	53.08	1.01
Z8	175.66	125.56	97.52	73.52	38.99	0.00

Load Case BA3

Swivel Bolt Normal Stresses						
	M6	M8	M9	M10	M11	M12
Z1	122.97	104.22	78.37	53.47	23.19	0.00
Z2	139.32	118.78	93.59	66.71	34.30	0.00
Z3	160.93	143.16	116.54	86.11	46.88	0.00
Z4	160.84	143.07	115.83	85.15	45.88	0.00
Z5	160.84	143.07	115.83	85.16	48.35	0.00
Z6	160.93	143.16	116.54	86.14	46.91	0.00
Z7	139.32	118.78	93.59	66.71	34.28	0.00

Z8	122.97	104.22	78.41	53.55	23.22	0.00
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Load Case BA4

Swivel Bolt Normal Stresses

	M6	M8	M9	M10	M11	M12
Z1	81.73	69.88	52.35	35.46	15.67	0.00
Z2	92.79	79.72	62.58	44.31	23.02	0.00
Z3	107.43	96.18	77.95	57.18	31.04	0.00
Z4	107.34	96.09	77.51	56.54	30.37	0.00
Z5	107.34	96.09	77.51	56.55	30.39	0.00
Z6	107.43	96.18	69.93	572.00	31.06	0.00
Z7	92.79	79.71	62.56	44.30	23.01	0.00
Z8	81.72	69.87	52.39	35.53	15.74	0.00

Load Case BA6

Swivel Bolt Normal Stresses

	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	0.00	0.00	0.00	0.00	0.00	0.00
Z3	0.00	0.00	0.00	0.00	0.00	0.00
Z4	0.00	0.00	0.00	0.00	0.00	0.00
Z5	0.00	0.00	0.00	0.00	0.00	0.00
Z6	0.00	0.00	0.00	0.00	0.00	0.00
Z7	0.00	0.00	0.00	0.00	0.00	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA7

Swivel Bolt Normal Stresses

	M6	M8	M9	M10	M11	M12
Z1	37.50	41.09	38.06	26.85	0.00	0.00
Z2	43.91	47.00	44.21	34.59	0.00	0.00
Z3	52.10	56.66	53.98	43.09	0.00	0.00
Z4	52.04	56.57	53.70	42.05	0.00	0.00
Z5	52.02	56.56	53.69	42.05	0.00	0.00
Z6	52.07	56.63	53.97	43.08	0.00	0.00
Z7	43.81	46.93	44.17	34.50	0.00	0.00

Z8	37.43	41.02	38.04	26.64	0.00	0.00
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Load Case BA8

	Swivel Bolt Normal Stresses					
	M6	M8	M9	M10	M11	M12
Z1	0.21	5.11	3.16	0.00	0.00	0.00
Z2	0.98	5.88	3.78	0.00	0.00	0.00
Z3	2.06	7.02	4.75	0.00	0.00	0.00
Z4	2.04	7.01	0.47	0.00	0.00	0.00
Z5	2.02	6.99	4.69	0.00	0.00	0.00
Z6	2.04	6.99	4.71	0.00	0.00	0.00
Z7	0.93	5.80	3.68	0.00	0.00	0.00
Z8	0.16	5.02	3.05	0.00	0.00	0.00

Appendix 9 Swivel Bolt Thread Shear Stresses

Load Case BA1

Thread Stresses in Saddle from Swivel Bolt						
	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	15.68	8.83	3.41	6.02	3.46	0.00
Z3	22.56	35.86	22.15	13.29	2.41	0.00
Z4	20.27	31.65	18.66	11.50	2.13	0.00
Z5	20.25	31.66	18.64	11.50	2.15	0.00
Z6	22.58	35.83	22.18	13.31	2.40	0.00
Z7	15.65	8.86	3.40	6.01	3.47	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA2

Thread Stresses in Saddle from Swivel Bolt						
	M6	M8	M9	M10	M11	M12
Z1	16.13	11.53	8.94	6.74	3.57	0.00
Z2	18.13	13.28	10.80	8.34	4.88	0.09
Z3	20.77	16.23	13.57	10.66	6.27	0.09
Z4	20.76	16.23	13.49	10.54	6.15	0.00
Z5	20.76	16.23	13.49	10.54	6.15	0.00
Z6	20.77	16.23	13.57	10.66	6.28	0.09
Z7	18.12	13.28	10.80	8.34	4.87	0.09
Z8	16.13	11.53	8.95	6.75	3.58	0.00

Load Case BA3

Thread Stresses in Saddle from Swivel Bolt						
	M6	M8	M9	M10	M11	M12
Z1	11.29	9.57	7.20	4.91	2.13	0.00
Z2	12.79	10.90	8.59	6.12	3.15	0.00
Z3	14.77	13.14	10.70	7.91	4.30	0.00
Z4	14.77	13.13	10.63	7.82	4.21	0.00
Z5	14.77	13.13	10.63	7.82	4.44	0.00
Z6	14.77	13.14	10.70	7.91	4.31	0.00
Z7	12.79	10.90	8.59	6.12	3.15	0.00
Z8	11.29	9.57	7.20	4.92	2.13	0.00

Load Case BA4

Thread Stresses in Saddle from Swivel Bolt

	M6	M8	M9	M10	M11	M12
Z1	7.50	6.42	4.81	3.26	1.44	0.00
Z2	8.52	7.32	5.74	4.07	2.11	0.00
Z3	9.86	8.83	7.16	5.25	2.85	0.00
Z4	9.86	8.82	7.12	5.19	2.79	0.00
Z5	9.86	8.82	7.12	5.19	2.79	0.00
Z6	9.86	8.83	6.42	52.51	2.85	0.00
Z7	8.52	7.32	5.74	4.07	2.11	0.00
Z8	7.50	6.41	4.81	3.26	1.44	0.00

Load Case BA6

Thread Stresses in Saddle from Swivel Bolt

	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	0.00	0.00	0.00	0.00	0.00	0.00
Z3	0.00	0.00	0.00	0.00	0.00	0.00
Z4	0.00	0.00	0.00	0.00	0.00	0.00
Z5	0.00	0.00	0.00	0.00	0.00	0.00
Z6	0.00	0.00	0.00	0.00	0.00	0.00
Z7	0.00	0.00	0.00	0.00	0.00	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA7

Thread Stresses in Saddle from Swivel Bolt

	M6	M8	M9	M10	M11	M12
Z1	3.44	3.77	3.49	2.47	0.00	0.00
Z2	4.03	4.32	4.06	3.18	0.00	0.00
Z3	4.78	5.20	4.96	3.96	0.00	0.00
Z4	4.78	5.19	4.93	3.86	0.00	0.00
Z5	4.78	5.19	4.93	3.86	0.00	0.00
Z6	4.78	5.20	4.95	3.96	0.00	0.00
Z7	4.02	4.31	4.06	3.17	0.00	0.00
Z8	3.44	3.77	3.49	2.45	0.00	0.00

Load Case BA8

Thread Stresses in Saddle from Swivel Bolt

	M6	M8	M9	M10	M11	M12
Z1	0.02	0.47	0.29	0.00	0.00	0.00
Z2	0.09	0.54	0.35	0.00	0.00	0.00
Z3	0.19	0.64	0.44	0.00	0.00	0.00
Z4	0.19	0.64	0.04	0.00	0.00	0.00
Z5	0.19	0.64	0.43	0.00	0.00	0.00
Z6	0.19	0.64	0.43	0.00	0.00	0.00
Z7	0.09	0.53	0.34	0.00	0.00	0.00
Z8	0.01	0.46	0.28	0.00	0.00	0.00

Appendix 10

Swivel Bolt Torques

Load Case BA1

Torques (Nm)

	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	183.43	98.54	31.29	63.65	31.97	0.00
Z3	268.73	433.73	263.64	153.84	18.89	0.00
Z4	240.36	381.48	220.44	131.68	15.52	0.00
Z5	240.16	381.68	220.23	131.68	15.67	0.00
Z6	269.03	433.33	264.05	154.15	18.85	0.00
Z7	183.12	98.94	31.24	63.56	32.04	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA2

Torques (Nm)

	M6	M8	M9	M10	M11	M12
Z1	189.02	131.99	99.96	72.61	33.28	0.00
Z2	213.83	153.74	122.94	92.44	49.49	0.00
Z3	246.56	190.34	157.30	121.21	66.82	0.00
Z4	246.46	190.34	156.28	119.68	65.26	0.00
Z5	246.46	190.34	156.28	119.68	65.28	0.00
Z6	246.56	190.34	157.30	121.21	66.87	0.00
Z7	213.73	153.74	122.94	92.44	49.47	0.00
Z8	189.02	131.99	100.06	72.75	33.43	0.00

Load Case BA3

Torques (Nm)

	M6	M8	M9	M10	M11	M12
Z1	129.04	107.69	78.27	49.91	15.45	0.00
Z2	147.64	124.26	95.59	64.99	28.09	0.00
Z3	172.25	152.01	121.72	87.07	42.41	0.00
Z4	172.14	151.91	120.90	85.98	41.28	0.00
Z5	172.14	151.91	120.90	85.99	44.09	0.00
Z6	172.25	152.01	121.72	87.11	42.45	0.00
Z7	147.64	124.26	95.59	64.99	28.07	0.00
Z8	129.04	107.69	78.31	50.00	15.48	0.00

Load Case BA4

	Torques (Nm)					
	M6	M8	M9	M10	M11	M12
Z1	82.09	68.60	48.64	29.41	6.89	0.00
Z2	94.67	79.80	60.28	39.49	15.25	0.00
Z3	111.35	98.54	77.79	54.14	24.38	0.00
Z4	111.25	98.44	77.28	53.41	23.62	0.00
Z5	111.25	98.44	77.28	53.42	23.64	0.00
Z6	111.35	98.54	68.65	640.22	24.40	0.00
Z7	94.67	79.79	60.26	39.47	15.24	0.00
Z8	82.08	68.59	48.68	29.49	6.96	0.00

Load Case BA6

	Torques (Nm)					
	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	0.00	0.00	0.00	0.00	0.00	0.00
Z3	0.00	0.00	0.00	0.00	0.00	0.00
Z4	0.00	0.00	0.00	0.00	0.00	0.00
Z5	0.00	0.00	0.00	0.00	0.00	0.00
Z6	0.00	0.00	0.00	0.00	0.00	0.00
Z7	0.00	0.00	0.00	0.00	0.00	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Load Case BA7

	Torques (Nm)					
	M6	M8	M9	M10	M11	M12
Z1	31.73	35.82	32.37	19.61	0.00	0.00
Z2	39.03	42.55	39.38	28.42	0.00	0.00
Z3	48.36	53.54	50.50	38.10	0.00	0.00
Z4	48.28	53.45	50.18	36.92	0.00	0.00
Z5	48.26	53.43	50.17	36.92	0.00	0.00
Z6	48.32	53.51	50.48	38.09	0.00	0.00
Z7	38.92	42.47	39.33	28.32	0.00	0.00
Z8	31.65	35.74	32.34	19.37	0.00	0.00

Load Case BA8

	Torques (Nm)					
	M6	M8	M9	M10	M11	M12
Z1	0.00	0.00	0.00	0.00	0.00	0.00
Z2	0.00	0.00	0.00	0.00	0.00	0.00
Z3	0.00	0.00	0.00	0.00	0.00	0.00
Z4	0.00	0.00	0.00	0.00	0.00	0.00
Z5	0.00	0.00	0.00	0.00	0.00	0.00
Z6	0.00	0.00	0.00	0.00	0.00	0.00
Z7	0.00	0.00	0.00	0.00	0.00	0.00
Z8	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 11

Fiducial Mark Displacements

Load Case BA1				
Displacements (mm)				
Module #	Inner Radius		Outer Radius	
	X	Y	X	Y
1	-0.22	-1.04	-0.20	-1.03
2	-0.24	-0.97	-0.19	-0.95
3	-0.27	-0.87	-0.21	-0.84
4	-0.32	-0.75	-0.25	-0.70
5	-0.39	-0.61	-0.31	-0.55
6	-0.34	-0.69	-0.26	-0.63
7	-0.25	-0.80	-0.16	-0.76
8	0.07	-1.12	0.15	-1.09
9	0.51	-1.49	0.59	-1.45
10	1.03	-1.83	1.09	-1.79
11	1.49	-2.09	1.55	-2.03
12	1.87	-2.24	1.91	-2.18
13	2.15	-2.33	2.17	-2.26
14	2.32	-2.37	2.34	-2.28
15	2.40	-2.38	2.40	-2.29
16	2.39	-2.39	2.37	-2.28
17	2.30	-2.40	2.26	-2.29
18	2.13	-2.43	2.08	-2.32
19	1.92	-2.50	1.85	-2.39
20	1.67	-2.60	1.59	-2.50
21	1.41	-2.75	1.31	-2.65
22	1.14	-2.93	1.03	-2.83
23	0.89	-3.14	0.76	-3.05
24	0.65	-3.37	0.52	-3.29
25	0.45	-3.62	0.31	-3.55
26	0.29	-3.86	0.14	-3.80
27	0.17	-4.09	0.01	-4.05
28	0.08	-4.30	-0.08	-4.26
29	0.03	-4.46	-0.13	-4.44
30	0.00	-4.59	-0.16	-4.58
31	-0.01	-4.66	-0.17	-4.67
32	-0.36	-4.68	-0.17	-4.65
33	-0.37	-4.60	-0.18	-4.55
34	-0.39	-4.47	-0.21	-4.40
35	-0.44	-4.30	-0.27	-4.21
36	-0.53	-4.09	-0.37	-3.99
37	-0.65	-3.86	-0.51	-3.74

38	-0.81	-3.61	-0.69	-3.48
39	-1.02	-3.36	-0.91	-3.22
40	-1.25	-3.12	-1.16	-2.98
41	-1.51	-2.91	-1.43	-2.76
42	-1.78	-2.73	-1.72	-2.57
43	-2.05	-2.58	-2.00	-2.43
44	-2.30	-2.47	-2.27	-2.33
45	-2.52	-2.40	-2.50	-2.26
46	-2.68	-2.36	-2.67	-2.23
47	-2.78	-2.35	-2.78	-2.23
48	-2.80	-2.35	-2.80	-2.23
49	-2.73	-2.34	-2.73	-2.23
50	-2.55	-2.30	-2.56	-2.19
51	-2.28	-2.21	-2.29	-2.11
52	-1.91	-2.05	-1.92	-1.95
53	-1.44	-1.80	-1.46	-1.69
54	-0.93	-1.46	-0.97	-1.35
55	-0.49	-1.09	-0.55	-0.99
56	-0.17	-0.77	-0.27	-0.68
57	-0.07	-0.65	-0.17	-0.57
58	-0.03	-0.58	-0.13	-0.53
59	-0.10	-0.72	-0.20	-0.69
60	-0.16	-0.85	-0.24	-0.83
61	-0.19	-0.95	-0.25	-0.95
62	-0.21	-1.03	-0.25	-1.03
63	-0.21	-1.07	-0.23	-1.07

**Load Case BA2
Displacements (mm)**

Module #	Inner Radius		Outer Radius	
	X	Y	X	Y
1	-0.29	-1.37	-0.22	-1.35
2	-0.35	-1.28	-0.24	-1.24
3	-0.44	-1.17	-0.28	-1.09
4	-0.55	-1.02	-0.35	-0.89
5	-0.68	-0.85	-0.50	-0.63
6	-0.65	-0.96	-0.42	-0.75
7	-0.56	-1.10	-0.36	-0.86
8	-0.30	-1.38	-0.11	-1.14
9	0.10	-1.74	0.28	-1.49
10	0.61	-2.10	0.78	-1.83
11	1.12	-2.42	1.28	-2.11
12	1.56	-2.63	1.69	-2.29
13	1.90	-2.77	1.99	-2.39
14	2.15	-2.85	2.20	-2.44
15	2.31	-2.89	2.30	-2.45
16	2.37	-2.92	2.31	-2.45
17	2.35	-2.94	2.24	-2.47
18	2.26	-2.98	2.09	-2.50

19	2.12	-3.04	1.89	-2.56
20	1.93	-3.14	1.65	-2.67
21	1.72	-3.26	1.39	-2.81
22	1.50	-3.42	1.11	-3.00
23	1.28	-3.61	0.85	-3.23
24	1.07	-3.83	0.60	-3.48
25	0.89	-4.05	0.38	-3.75
26	0.74	-4.29	0.20	-4.03
27	0.62	-4.51	0.06	-4.31
28	0.53	-4.72	-0.05	-4.58
29	0.47	-4.91	-0.12	-4.82
30	0.44	-5.06	-0.15	-5.02
31	0.42	-5.17	-0.17	-5.19
32	-0.78	-5.24	-0.17	-5.16
33	-0.79	-5.12	-0.18	-4.98
34	-0.81	-4.97	-0.23	-4.76
35	-0.87	-4.78	-0.30	-4.51
36	-0.95	-4.56	-0.41	-4.24
37	-1.07	-4.33	-0.57	-3.96
38	-1.22	-4.09	-0.76	-3.67
39	-1.40	-3.85	-0.99	-3.39
40	-1.60	-3.63	-1.24	-3.14
41	-1.82	-3.44	-1.51	-2.92
42	-2.05	-3.27	-1.79	-2.73
43	-2.26	-3.13	-2.06	-2.59
44	-2.45	-3.03	-2.31	-2.49
45	-2.60	-2.97	-2.51	-2.43
46	-2.69	-2.92	-2.65	-2.40
47	-2.72	-2.89	-2.72	-2.39
48	-2.66	-2.86	-2.70	-2.39
49	-2.51	-2.82	-2.59	-2.37
50	-2.27	-2.73	-2.38	-2.32
51	-1.94	-2.60	-2.06	-2.21
52	-1.51	-2.38	-1.66	-2.02
53	-1.00	-2.06	-1.15	-1.73
54	-0.50	-1.70	-0.67	-1.38
55	-0.09	-1.34	-0.30	-1.04
56	0.17	-1.05	-0.07	-0.77
57	0.25	-0.91	-0.01	-0.70
58	0.28	-0.80	0.04	-0.62
59	0.14	-0.98	-0.10	-0.90
60	0.02	-1.13	-0.18	-1.09
61	-0.07	-1.26	-0.22	-1.24
62	-0.14	-1.35	-0.23	-1.35
63	-0.19	-1.40	-0.23	-1.40

**Load Case BA3
Displacements (mm)**

Inner Radius

Outer Radius

Module #	X	Y	X	Y
1	-0.22	-1.34	-0.22	-1.34
2	-0.25	-1.24	-0.23	-1.22
3	-0.30	-1.09	-0.28	-1.07
4	-0.38	-0.90	-0.35	-0.87
5	-0.49	-0.69	-0.49	-0.62
6	-0.50	-0.66	-0.49	-0.63
7	-0.49	-0.66	-0.51	-0.63
8	-0.36	-0.78	-0.37	-0.79
9	-0.12	-0.97	-0.13	-1.00
10	0.18	-1.17	0.18	-1.22
11	0.49	-1.34	0.49	-1.39
12	0.73	-1.44	0.72	-1.50
13	0.90	-1.50	0.90	-1.56
14	1.02	-1.52	1.02	-1.59
15	1.08	-1.53	1.08	-1.60
16	1.09	-1.54	1.09	-1.60
17	1.06	-1.54	1.07	-1.61
18	1.01	-1.55	1.03	-1.62
19	0.94	-1.57	0.97	-1.64
20	0.88	-1.60	0.91	-1.67
21	0.82	-1.63	0.86	-1.69
22	0.78	-1.66	0.82	-1.72
23	0.76	-1.68	0.81	-1.73
24	-1.16	-1.64	-1.19	-1.68
25	-1.18	-1.62	-1.20	-1.67
26	-1.22	-1.60	-1.24	-1.64
27	-1.28	-1.57	-1.30	-1.61
28	-1.35	-1.54	-1.36	-1.58
29	-1.42	-1.52	-1.42	-1.56
30	-1.47	-1.51	-1.47	-1.55
31	-1.50	-1.50	-1.49	-1.54
32	-1.49	-1.50	-1.48	-1.54
33	-1.43	-1.50	-1.41	-1.53
34	-1.32	-1.47	-1.30	-1.49
35	-1.15	-1.42	-1.12	-1.43
36	-0.91	-1.32	-0.88	-1.32
37	-0.61	-1.16	-0.57	-1.14
38	-0.31	-0.96	-0.27	-0.92
39	-0.07	-0.76	-0.05	-0.71
40	0.07	-0.64	0.07	-0.57
41	0.08	-0.64	0.05	-0.59
42	0.06	-0.67	0.03	-0.62
43	-0.05	-0.88	-0.10	-0.88
44	-0.13	-1.07	-0.17	-1.07
45	-0.18	-1.23	-0.21	-1.23

46	-0.21	-1.34	-0.23	-1.34
47	-0.21	-1.39	-0.23	-1.40

**Load Case BA4
Displacements (mm)**

Module #	Inner Radius		Outer Radius	
	X	Y	X	Y
1	-0.11	-1.31	-0.10	-1.31
2	-0.13	-1.21	-0.12	-1.19
3	-0.18	-1.06	-0.16	-1.03
4	-0.26	-0.87	-0.23	-0.83
5	-0.38	-0.65	-0.37	-0.59
6	-0.44	-0.56	-0.41	-0.52
7	-0.49	-0.48	-0.49	-0.44
8	-0.48	-0.49	-0.47	-0.46
9	-0.40	-0.55	-0.40	-0.54
10	-0.29	-0.62	-0.28	-0.62
11	-0.17	-0.69	-0.16	-0.69
12	-0.09	-0.72	-0.08	-0.72
13	-0.04	-0.74	-0.04	-0.74
14	-0.01	-0.74	-0.01	-0.75
15	0.00	-0.75	0.00	-0.75
16	-0.18	-0.72	-0.17	-0.70
17	-0.17	-0.72	-0.17	-0.70
18	-0.15	-0.71	-0.15	-0.69
19	-0.10	-0.70	-0.10	-0.68
20	-0.02	-0.67	-0.02	-0.64
21	0.09	-0.61	0.09	-0.57
22	0.21	-0.53	0.20	-0.49
23	0.28	-0.47	0.27	-0.42
24	0.30	-0.47	0.27	-0.41
25	0.24	-0.54	0.20	-0.51
26	0.18	-0.64	0.14	-0.60
27	0.06	-0.86	0.01	-0.85
28	-0.02	-1.05	-0.06	-1.05
29	-0.07	-1.20	-0.10	-1.20
30	-0.09	-1.31	-0.11	-1.31
31	-0.10	-1.37	-0.11	-1.37

**Load Case BA6
Displacements (mm)**

Module	Inner Radius		Outer Radius	
	X	Y	X	Y

#				
1	-0.79	-0.12	-1.43	-0.28
2	-0.79	-0.20	-1.40	-0.42
3	-0.77	-0.28	-1.36	-0.55
4	-0.14	-0.12	-1.27	-0.78
5	-0.01	-0.37	-1.07	-1.14
6	0.11	-0.58	-0.87	-1.44
7	0.23	-0.73	-0.66	-1.69
8	-1.55	0.26	-1.48	0.22
9	-1.51	0.30	-1.45	0.27
10	-1.46	0.39	-1.39	0.36
11	-1.39	0.51	-1.33	0.48
12	-0.71	0.25	-1.35	0.42
13	-0.74	0.18	-1.40	0.29
14	-0.76	0.11	-1.43	0.15
15	-0.78	0.03	-1.44	0.01

**Load Case BA7
Displacements (mm)**

Module #	Inner Radius		Outer Radius	
	X	Y	X	Y
1	0.02	-1.35	0.02	-1.35
2	0.00	-1.24	0.00	-1.24
3	-0.05	-1.09	-0.05	-1.09
4	-0.13	-0.90	-0.13	-0.90
5	-0.25	-0.68	-0.25	-0.68
6	-0.36	-0.51	-0.36	-0.51
7	-0.49	-0.35	-0.49	-0.35
8	-0.58	-0.25	-0.58	-0.25
9	0.68	-0.21	0.68	-0.21
10	0.59	-0.30	0.59	-0.30
11	0.44	-0.49	0.44	-0.49
12	0.31	-0.69	0.31	-0.69
13	0.19	-0.90	0.19	-0.90
14	0.11	-1.09	0.11	-1.09
15	0.06	-1.24	0.06	-1.24
16	0.04	-1.35	0.04	-1.35
17	0.03	-1.40	0.03	-1.40

**Load Case BA8
Displacements (mm)**

Module #	Inner Radius		Outer Radius	
	X	Y	X	Y
1	-0.32	-0.08	-0.58	-0.14
2	-0.32	-0.11	-0.57	-0.20
3	-0.32	-0.14	-0.56	-0.25

4	0.75	0.27	-0.48	-0.45
5	1.37	0.25	-0.23	-0.90
6	1.56	-0.05	0.07	-1.35
7	1.74	-0.29	0.39	-1.72
8	1.92	-0.48	0.71	-2.05
9	-3.83	-0.09	-1.97	-1.84
10	-3.59	0.13	-1.56	-1.42
11	-3.34	0.41	-1.17	-0.94
12	-3.09	0.75	-0.80	-0.37
13	-1.71	0.53	-0.56	0.10
14	-0.27	0.08	-0.54	0.15
15	-0.28	0.04	-0.56	0.09
16	-0.30	0.01	-0.57	0.03
17	-0.31	-0.02	-0.58	-0.03



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