

Case-1 - Stress Report

NODE	Bending Stress MPa	Torsion Stress MPa	SIF In Plane	SIF Out Plane	Code Stress MPa	Allowable Stress MPa	Ratio %	Piping Code
2814	39.29	6.71	1.640	1.367	41.52	280.91	14.78	B31.3
2815	39.69	-3.85	1.640	1.367	40.43	280.73	14.40	B31.3
2815	24.78	3.85	1.000	1.000	25.95	280.77	9.24	B31.3
2818	19.54	-3.85	1.000	1.000	21.01	278.32	7.55	B31.3
2818	27.79	3.85	1.640	1.367	28.84	277.60	10.39	B31.3
2816	31.11	-0.04	1.640	1.367	31.11	277.56	11.21	B31.3
2816	31.11	0.04	1.640	1.367	31.11	277.56	11.21	B31.3
2817	30.91	4.08	1.640	1.367	31.97	277.81	11.51	B31.3
2817	22.04	-4.08	1.000	1.000	23.51	278.49	8.44	B31.3
2820	32.23	4.08	1.000	1.000	33.25	280.73	11.84	B31.3
2820	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2830	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2830	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2840	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2840	24.98	-2.80	1.000	1.000	25.59	226.95	11.28	B31.3
215	190.45	2.80	4.770	6.027	190.53	211.99	89.88	B31.3

Case-1 - SIF input

Node: 215  
Type:   
SIF(i): 4.770  
SIF(o): 6.027  
Pad Thk:   
Ftg Ro:   
Crotch R:   
Weld(d):   
Fillet:   
Weld ID:   
Wc:   
N/A:

Case-1: Summary

The SIF values are calculated from FEA for 45 deg lateral branch connection with 14mm thick RF pad and is defined in the Caesar SIF input, the "Type" field is left blank as shown. The SIF are included in the stress calculation and the stresses are within the allowable limit as shown.

Case-2 - SIF input

Node: 215  
Type: 2 - Unreinforced  
SIF(i): 4.770  
SIF(o): 6.027  
Pad Thk:   
Ftg Ro:   
Crotch R:   
Weld(d):   
Fillet:   
Weld ID:   
Wc:   
N/A:

Case-2 & 3 - Stress Report

NODE	Bending Stress MPa	Torsion Stress MPa	SIF In Plane	SIF Out Plane	Code Stress MPa	Allowable Stress MPa	Ratio %	Piping Code
2814	39.29	6.71	1.640	1.367	41.52	280.91	14.78	B31.3
2815	39.69	-3.85	1.640	1.367	40.43	280.73	14.40	B31.3
2815	24.78	3.85	1.000	1.000	25.95	280.77	9.24	B31.3
2818	19.54	-3.85	1.000	1.000	21.01	278.32	7.55	B31.3
2818	27.79	3.85	1.640	1.367	28.84	277.60	10.39	B31.3
2816	31.11	-0.04	1.640	1.367	31.11	277.56	11.21	B31.3
2816	31.11	0.04	1.640	1.367	31.11	277.56	11.21	B31.3
2817	30.91	4.08	1.640	1.367	31.97	277.81	11.51	B31.3
2817	22.04	-4.08	1.000	1.000	23.51	278.49	8.44	B31.3
2820	32.23	4.08	1.000	1.000	33.25	280.73	11.84	B31.3
2820	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2830	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2830	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2830	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2840	0.00	0.00	0.000	0.000	0.00	0.00	0.00	B31.3
2840	24.98	-2.80	1.000	1.000	25.59	226.95	11.28	B31.3
215	220.43	3.24	4.770	6.027	220.50	208.36	105.83	B31.3

Case-3 - SIF input

Node: 215  
Type: 1 - Reinforced  
SIF(i): 4.770  
SIF(o): 6.027  
Pad Thk: 14.000  
Ftg Ro:   
Crotch R:   
Weld(d):   
Fillet:   
Weld ID:   
Wc:   
N/A:

Case-2: Summary

The SIF values are calculated from FEA for 45 deg lateral branch connection with 14mm thick RF pad and is defined in the Caesar SIF input, the "Type" is mentioned as "2-Unreinforced".

In the stress report, the SIF included in stress calculation is same as the SIF input and also in the Case-1 but the stresses are above the allowable limit. My query is how the effect of "2-Unreinforced" is considered in the calculation of stress.

Case-3: Summary

- The SIF values are calculated from FEA for 45 deg lateral branch connection with 14mm thick RF pad and is defined in the Caesar SIF input, the "Type" is mentioned as "1-Reinforced with 14mm thk pad".
- The stress report of case-3 is similar to the stress report of case-2, from which it can be considered that when the SIF are overridden by the user, the "Type" field is used only to determine the "in-plane" versus "out-of-plane" directions as stated by Richard Ay, It does have any other effect in calculating the stress.
- If the above point is agreed, then why in Caesar-II 5.1, technical reference document (Page # 3-28 & 3-29), it is mentioned that to properly override the code-calculated SIF the "Type" should be left blank.
- If the point # 3 is agreed, then why there is no error message related to the SIF "Type" when it is left blank. If there is no need for error message, then for which case the SIF "Type" shall be left blank.