

The specimen details

Diameter of bolt	$d$ (mm)	20
Diameter of bolt hole	$d_0$ (mm)	22
End distance	$e_1$ (mm)	60
Edge distance	$e_2$ (mm)	50
Spacing between centres of bolts in the direction of load transfer	$p_1$ (mm)	60
Spacing between rows of bolts	$p_2$ (mm)	103
Thickness of end plate	$t_p$ (mm)	10
Horizontal distance of lever arm	$B_L$ (mm)	490
Vertical distance of lever arm	$D_L$ (mm)	51.7

Steel Grade	S275	S355	
Dimension of Members	UB305x16 5x40	UC254x25 4x89	
Depth of Section	$D$ (mm)	303.4	260.3
Width of Section	$B$ (mm)	165	256.3
Thickness of Web	$t$ (mm)	6	10.3
Thickness of Flange	$T$ (mm)	10.2	17.3
Root Radius	$r$ (mm)	8.9	12.7
Depth between Fillets	$d$ (mm)	265.2	200.3

Nominal Temperature

450°C

Time (minute)	Thermocouple Average(°C)	Jack Displacement (mm)	Load Angle α(°)	Beam Rotation (°)	Column Rotation (°)	Connection Rotation (°)	Force Rotation (°)	F3 from F1 (kN)	F3 from F2 (kN)	F3 Average (kN)	Tension (kN)	Shear (kN)	Moment (kN*m)
0	448.534	0.007											
1	448.682	-0.002											
2	448.795	-0.002											
3	448.884	-0.001	46.72	0.000	0.000	0.000	67.709	-2.10	3.23	0.56	0.39	0.41	229.95
4	448.946	1.320	46.73	0.009	0.010	-0.001	67.691	-0.93	4.19	1.63	1.12	1.19	666.14
5	449.022	2.865	46.51	0.014	-0.015	0.029	67.900	-1.11	5.09	1.99	1.37	1.44	810.60
6	449.095	4.460	46.96	0.018	0.020	-0.002	67.450	-0.71	4.76	2.02	1.38	1.48	828.87
7	449.186	6.045	47.24	0.103	0.018	0.085	67.090	-0.64	4.46	1.91	1.30	1.40	784.75
8	449.293	7.615	47.16	0.239	0.015	0.224	67.025	-0.98	4.90	1.96	1.33	1.43	804.17
9	449.381	9.190	47.10	0.344	0.021	0.323	66.979	-0.80	4.06	1.63	1.11	1.19	669.39
10	449.488	10.775	47.04	0.464	0.000	0.464	66.919	-0.80	3.95	1.58	1.07	1.15	646.35
11	449.609	12.369	46.99	0.598	0.029	0.569	66.838	-0.61	4.02	1.70	1.16	1.24	697.65
12	449.694	13.940	46.92	0.720	0.008	0.712	66.783	-0.65	4.50	1.93	1.31	1.41	788.63
13	449.786	15.533	46.87	0.840	0.005	0.835	66.714	-0.85	4.87	2.01	1.37	1.47	822.91
14	449.838	17.125	46.96	0.944	0.019	0.925	66.519	-0.77	5.08	2.15	1.47	1.57	882.23
15	449.907	18.761	46.96	1.052	0.013	1.039	66.421	-0.62	4.79	2.09	1.42	1.52	854.47
16	450.000	20.331	46.95	1.139	0.011	1.128	66.335	-0.20	4.24	2.02	1.38	1.47	826.66
17	450.140	21.876	46.97	1.208	0.023	1.184	66.255	-0.20	5.21	2.50	1.71	1.83	1025.61
18	450.264	23.070	46.94	1.272	0.027	1.245	66.217	0.89	5.62	3.26	2.22	2.38	1333.74
19	450.373	24.549	46.93	1.350	0.039	1.311	66.149	1.13	6.55	3.84	2.62	2.81	1573.54
20	450.399	26.191	46.87	1.474	0.034	1.439	66.082	1.64	6.59	4.11	2.81	3.00	1684.12
21	450.481	27.800	46.83	1.598	0.034	1.563	65.996	1.69	6.52	4.10	2.81	2.99	1678.60
22	450.545	29.380	46.78	1.701	0.042	1.659	65.949	1.44	6.47	3.96	2.71	2.88	1617.61

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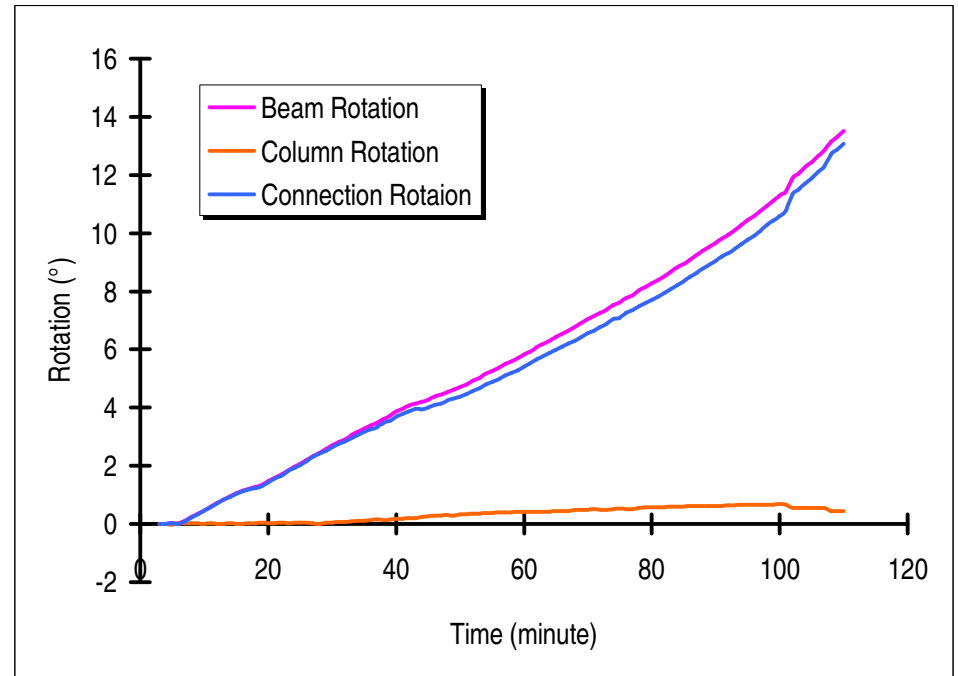
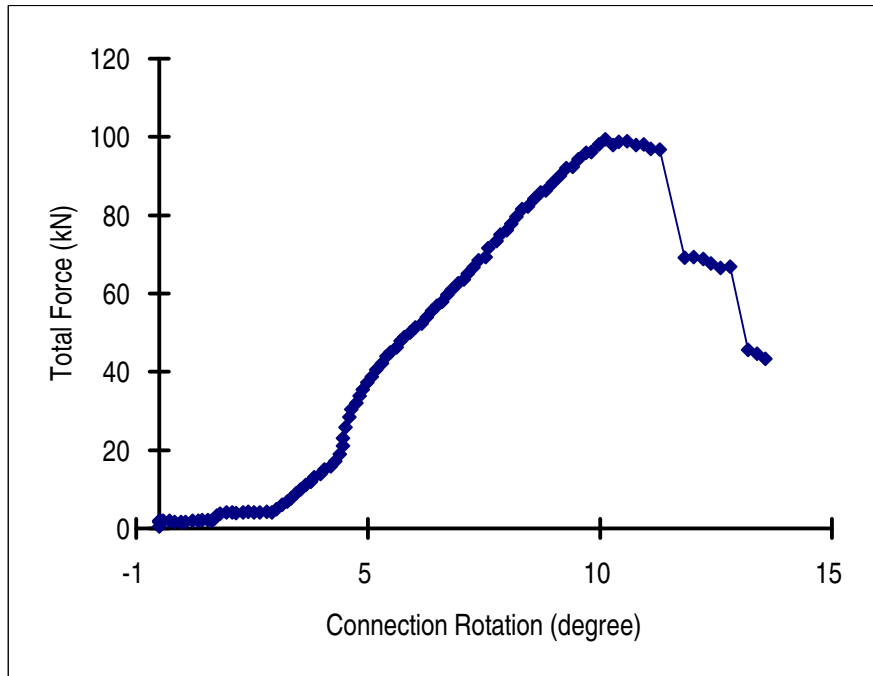
23	450.618	31.027	46.73	1.831	0.029	1.801	65.871	1.58	6.72	4.15	2.84	3.02	1693.55
24	450.735	32.613	46.68	1.954	0.043	1.911	65.791	2.18	6.34	4.26	2.92	3.10	1738.05
25	450.803	34.191	46.63	2.077	0.041	2.036	65.723	2.02	6.03	4.03	2.76	2.93	1642.03
26	450.878	35.783	46.58	2.202	0.036	2.165	65.642	2.23	6.02	4.12	2.83	3.00	1680.72
27	450.904	37.291	46.53	2.339	0.026	2.312	65.562	2.24	6.11	4.17	2.87	3.03	1700.27
28	450.977	38.844	46.52	2.438	0.009	2.429	65.468	1.56	6.51	4.03	2.78	2.93	1642.83
29	451.059	40.358	46.41	2.568	0.047	2.521	65.450	3.05	6.91	4.98	3.44	3.61	2025.71
30	451.140	41.854	46.32	2.700	0.050	2.650	65.411	4.03	7.95	5.99	4.14	4.33	2431.88
31	451.236	43.439	46.22	2.823	0.068	2.755	65.384	4.96	8.77	6.87	4.75	4.96	2785.15
32	451.283	45.049	46.17	2.917	0.079	2.837	65.339	5.95	9.44	7.69	5.33	5.55	3116.95
33	451.338	46.635	46.07	3.053	0.098	2.955	65.307	7.20	10.87	9.04	6.27	6.51	3656.86
34	451.377	48.261	45.99	3.162	0.109	3.052	65.281	8.07	11.95	10.01	6.96	7.20	4044.94
35	451.414	49.831	45.91	3.278	0.117	3.161	65.242	9.30	12.83	11.06	7.70	7.95	4465.35
36	451.491	51.369	45.80	3.393	0.127	3.266	65.237	10.32	13.64	11.98	8.35	8.59	4828.52
37	451.559	52.968	45.74	3.484	0.153	3.330	65.203	11.89	14.16	13.02	9.09	9.33	5244.29
38	451.629	54.588	45.64	3.611	0.136	3.474	65.176	12.31	15.38	13.84	9.68	9.90	5565.77
39	451.682	56.125	45.56	3.720	0.164	3.555	65.153	13.47	16.49	14.98	10.49	10.69	6013.42
40	451.710	57.702	45.42	3.871	0.178	3.693	65.135	14.70	17.13	15.92	11.17	11.34	6377.77
41	451.739	59.256	45.33	3.974	0.188	3.786	65.124	15.98	18.30	17.14	12.05	12.19	6859.44
42	451.790	60.776	45.23	4.082	0.199	3.883	65.113	18.36	19.52	18.94	13.34	13.45	7567.90
43	451.826	62.249	45.17	4.149	0.195	3.953	65.111	20.73	21.38	21.05	14.84	14.93	8404.59
44	451.913	63.524	45.13	4.205	0.253	3.952	65.090	22.68	23.29	22.99	16.22	16.29	9171.46
45	451.942	64.908	45.07	4.278	0.264	4.014	65.082	25.29	26.41	25.85	18.26	18.30	10304.28
46	451.984	66.407	44.99	4.376	0.285	4.091	65.066	27.91	28.95	28.43	20.11	20.10	11318.74
47	451.993	67.928	44.95	4.438	0.294	4.144	65.043	30.03	30.71	30.37	21.50	21.46	12083.74
48	452.077	69.440	44.87	4.545	0.302	4.243	65.010	31.86	32.20	32.03	22.70	22.60	12729.03
49	452.167	70.956	44.83	4.613	0.293	4.319	64.982	34.12	33.69	33.90	24.04	23.90	13465.92
50	452.240	72.398	44.75	4.712	0.326	4.385	64.967	35.28	35.65	35.46	25.18	24.97	14066.41
51	452.233	73.958	44.69	4.811	0.335	4.475	64.932	37.63	36.91	37.27	26.50	26.21	14770.01
52	452.277	75.535	44.61	4.925	0.344	4.581	64.892	39.15	38.32	38.73	27.57	27.20	15330.70

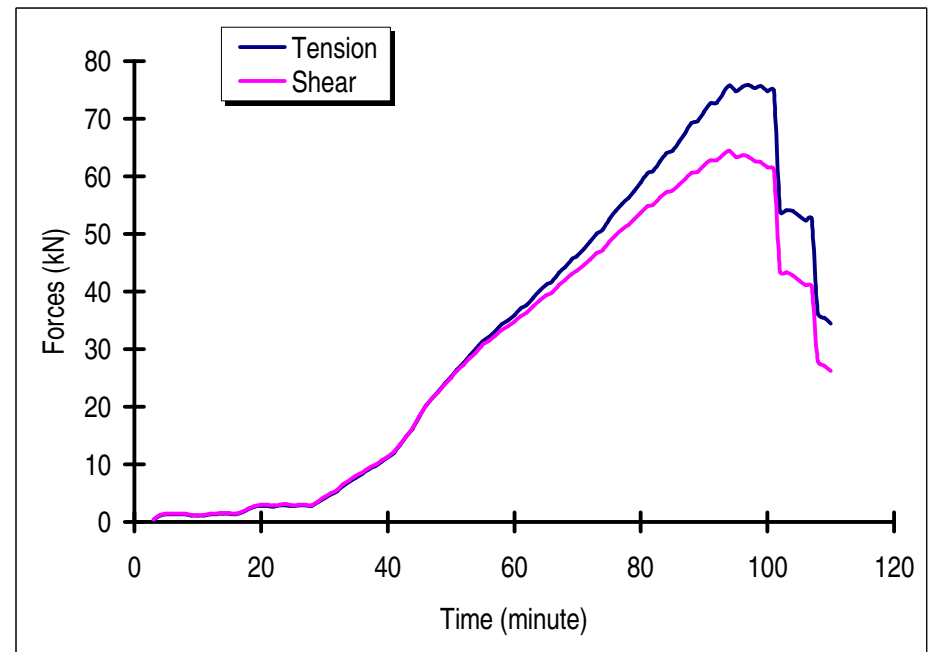
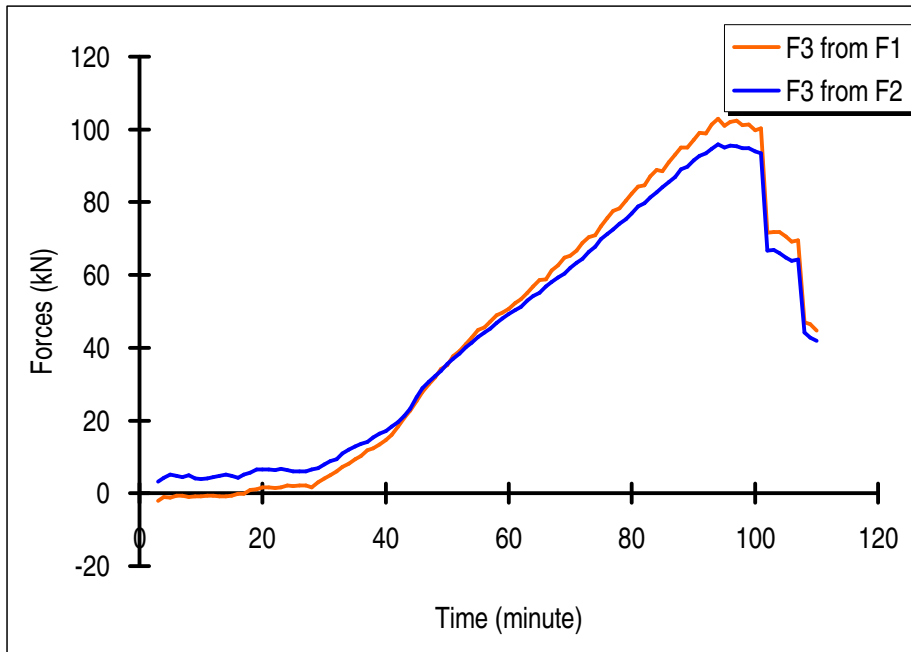
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53	452.268	77.024	44.57	5.025	0.353	4.671	64.832	41.04	40.12	40.58	28.91	28.48	16052.53
54	452.355	78.658	44.45	5.170	0.375	4.795	64.809	42.83	41.42	42.12	30.07	29.50	16631.95
55	452.406	80.268	44.41	5.263	0.369	4.894	64.752	44.97	42.89	43.93	31.38	30.74	17334.69
56	452.530	81.886	44.35	5.368	0.392	4.975	64.710	45.59	44.23	44.91	32.11	31.39	17703.23
57	452.594	83.493	44.26	5.503	0.392	5.110	64.662	47.23	45.29	46.26	33.13	32.29	18213.04
58	452.586	84.999	44.23	5.596	0.392	5.204	64.607	48.96	46.76	47.86	34.30	33.38	18831.60
59	452.498	86.490	44.18	5.705	0.425	5.280	64.540	49.58	48.07	48.83	35.01	34.03	19198.39
60	452.484	88.042	44.08	5.832	0.422	5.410	64.521	50.71	49.26	49.99	35.91	34.77	19621.27
61	452.556	89.603	44.02	5.932	0.412	5.520	64.479	52.36	50.44	51.40	36.96	35.72	20157.77
62	452.723	91.108	43.94	6.072	0.421	5.651	64.413	53.30	51.29	52.30	37.65	36.29	20486.06
63	452.893	92.632	43.88	6.177	0.418	5.759	64.375	55.06	52.99	54.03	38.94	37.44	21140.83
64	452.900	94.159	43.76	6.305	0.430	5.875	64.366	56.85	54.20	55.52	40.10	38.40	21686.52
65	452.826	95.632	43.68	6.429	0.447	5.982	64.316	58.56	55.19	56.87	41.13	39.28	22188.09
66	452.728	97.137	43.67	6.537	0.445	6.092	64.219	58.79	56.88	57.83	41.83	39.93	22557.31
67	452.720	98.627	43.57	6.647	0.444	6.202	64.210	61.18	58.17	59.67	43.23	41.13	23238.77
68	452.824	100.221	43.47	6.783	0.477	6.306	64.178	62.69	59.30	61.00	44.27	41.96	23714.45
69	452.924	101.838	43.36	6.912	0.476	6.436	64.157	64.77	60.44	62.61	45.52	42.99	24299.81
70	453.074	103.395	43.32	7.041	0.482	6.559	64.065	65.24	61.93	63.58	46.26	43.63	24663.82
71	453.163	104.937	43.23	7.151	0.499	6.652	64.048	66.64	63.36	65.00	47.36	44.52	25176.00
72	453.149	106.427	43.14	7.270	0.491	6.779	64.021	68.87	64.38	66.62	48.62	45.55	25765.49
73	453.174	107.949	43.02	7.376	0.495	6.880	64.036	70.48	66.42	68.45	50.05	46.70	26420.18
74	453.225	109.501	42.91	7.534	0.499	7.035	63.985	70.84	67.84	69.34	50.79	47.21	26717.19
75	453.317	111.030	42.85	7.622	0.538	7.084	63.960	73.42	69.82	71.62	52.51	48.70	27566.44
76	453.462	112.544	42.70	7.780	0.513	7.267	63.946	75.61	71.27	73.44	53.97	49.81	28202.15
77	453.532	114.075	42.62	7.866	0.516	7.350	63.945	77.66	72.47	75.06	55.24	50.82	28784.01
78	453.607	115.646	42.52	8.040	0.549	7.490	63.869	78.27	74.18	76.23	56.18	51.52	29184.09
79	453.573	117.222	42.42	8.152	0.566	7.586	63.853	80.38	75.34	77.86	57.48	52.53	29762.51
80	453.509	118.799	42.31	8.268	0.574	7.694	63.850	82.38	76.95	79.66	58.91	53.62	30393.75
81	453.533	120.369	42.17	8.396	0.575	7.821	63.859	84.34	78.91	81.63	60.50	54.80	31073.48
82	453.529	121.938	42.10	8.528	0.579	7.948	63.800	84.59	79.79	82.19	60.98	55.10	31249.48

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83	453.585	123.454	41.96	8.673	0.592	8.081	63.795	87.15	81.24	84.20	62.61	56.30	31937.30
84	453.625	125.046	41.79	8.816	0.599	8.217	63.824	88.88	82.78	85.83	64.00	57.20	32463.08
85	453.617	126.568	41.74	8.931	0.596	8.334	63.753	88.54	84.20	86.37	64.44	57.50	32642.06
86	453.497	128.119	41.57	9.100	0.613	8.487	63.755	90.97	85.60	88.29	66.05	58.58	33270.11
87	453.376	129.617	41.40	9.253	0.623	8.630	63.779	93.13	87.01	90.07	67.57	59.56	33840.15
88	453.314	131.171	41.21	9.391	0.614	8.777	63.826	94.94	89.01	91.98	69.19	60.60	34447.22
89	453.312	132.668	41.15	9.534	0.624	8.910	63.747	95.04	89.76	92.40	69.58	60.80	34567.96
90	453.325	134.222	41.00	9.670	0.629	9.041	63.761	97.20	91.48	94.34	71.20	61.89	35201.05
91	453.410	135.831	40.82	9.825	0.629	9.196	63.785	99.12	92.80	95.96	72.62	62.73	35697.17
92	453.485	137.393	40.77	9.942	0.631	9.311	63.717	98.82	93.43	96.13	72.80	62.77	35727.35
93	453.531	139.002	40.60	10.105	0.631	9.474	63.727	101.44	94.66	98.05	74.45	63.80	36330.97
94	453.457	140.652	40.38	10.286	0.670	9.616	63.767	102.91	95.94	99.42	75.74	64.41	36698.84
95	453.356	142.310	40.29	10.444	0.663	9.781	63.695	101.00	95.02	98.01	74.76	63.38	36121.47
96	453.259	143.869	40.13	10.577	0.671	9.906	63.726	101.99	95.60	98.79	75.54	63.67	36304.23
97	453.220	145.545	39.89	10.752	0.664	10.088	63.782	102.47	95.46	98.97	75.93	63.47	36218.68
98	453.329	147.210	39.77	10.946	0.673	10.273	63.708	101.09	94.86	97.98	75.30	62.68	35779.53
99	453.419	148.790	39.55	11.109	0.670	10.439	63.769	101.35	94.89	98.12	75.66	62.48	35686.33
100	453.506	150.415	39.43	11.284	0.687	10.597	63.714	99.79	93.97	96.88	74.83	61.53	35159.62
101	453.467	152.063	39.21	11.440	0.657	10.783	63.779	100.31	93.41	96.86	75.05	61.23	35010.63
102	453.401	154.188	38.84	11.878	0.546	11.332	63.707	71.59	66.64	69.11	53.83	43.35	24813.67
103	453.381	155.795	38.72	12.058	0.542	11.516	63.655	71.77	66.80	69.29	54.06	43.33	24815.95
104	453.372	157.381	38.44	12.275	0.555	11.720	63.712	71.87	65.92	68.89	53.96	42.83	24548.66
105	453.396	158.998	38.30	12.438	0.550	11.888	63.691	70.56	64.76	67.66	53.10	41.93	24044.39
106	453.486	160.679	38.12	12.648	0.547	12.101	63.662	69.20	63.88	66.54	52.35	41.07	23565.84
107	453.624	162.352	37.84	12.851	0.547	12.304	63.736	69.56	64.24	66.90	52.83	41.04	23567.91
108	453.623	164.394	37.68	13.147	0.448	12.699	63.604	46.95	44.26	45.60	36.09	27.87	16015.42
109	453.585	165.916	37.47	13.325	0.446	12.879	63.636	46.44	42.74	44.59	35.39	27.13	15597.03
110	453.531	166.547	37.28	13.510	0.443	13.067	63.638	44.73	41.87	43.30	34.45	26.23	15090.35







Photographs after Test

