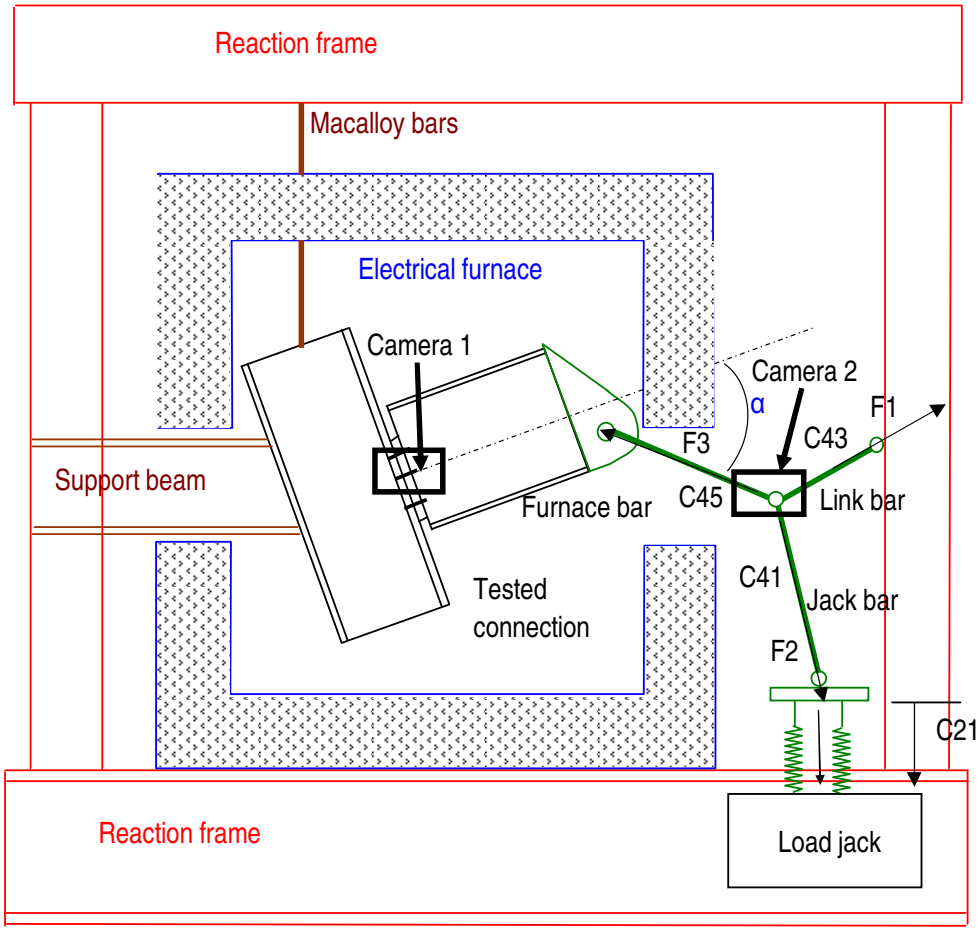
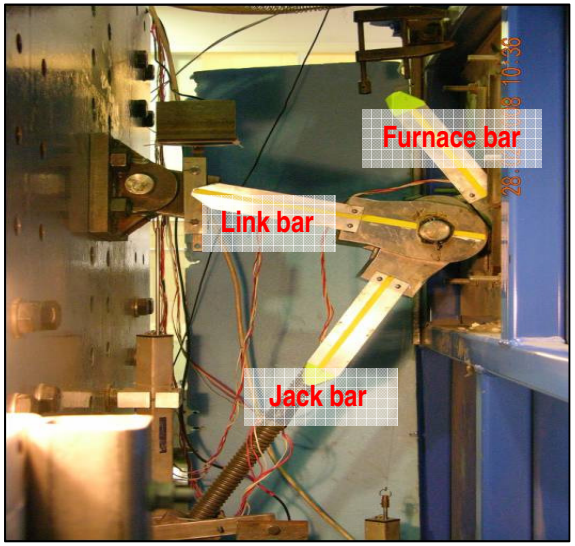
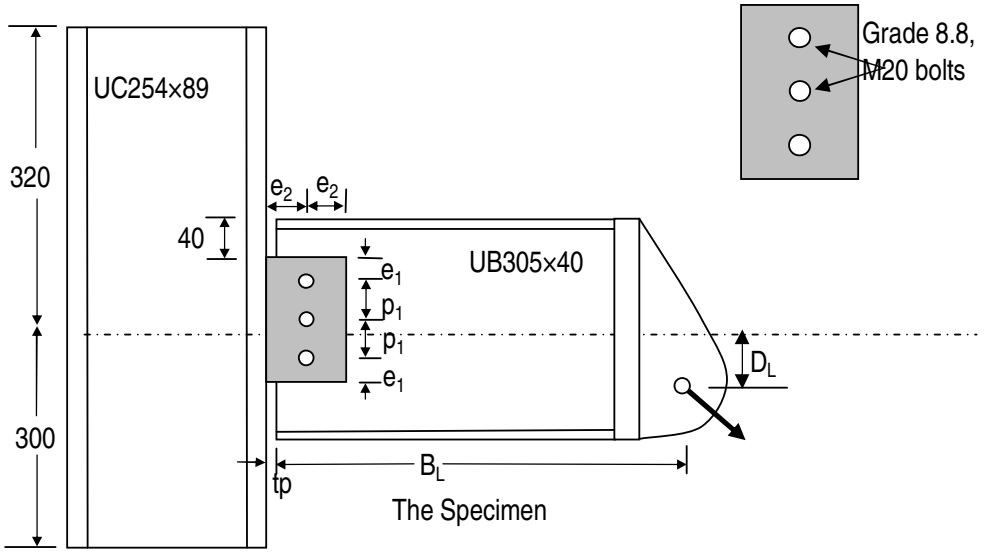
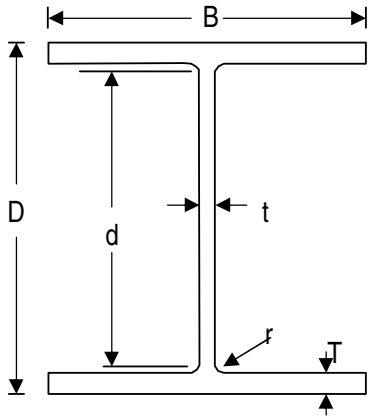

Reaction frame
Macalloy bars
Electrical furnace
Camera 1
Camera 2
α
F1
F3
C43
Support beam
Furnace bar
C45
Link bar
C41
Jack bar
Tested
connection
F2
C21
Reaction frame
Load jack


Camera 1


Furnace bar
Link bar
Jack bar





Diameter of bolt	d (mm)	20
Diameter of bolt hole	d_0 (mm)	22
End distance	e_1 (mm)	40
Edge distance	e_2 (mm)	50
Spacing between centres of bolts in the direction of load transfer	p_1 (mm)	60
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		UB305×165×40	UC254×254×89
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

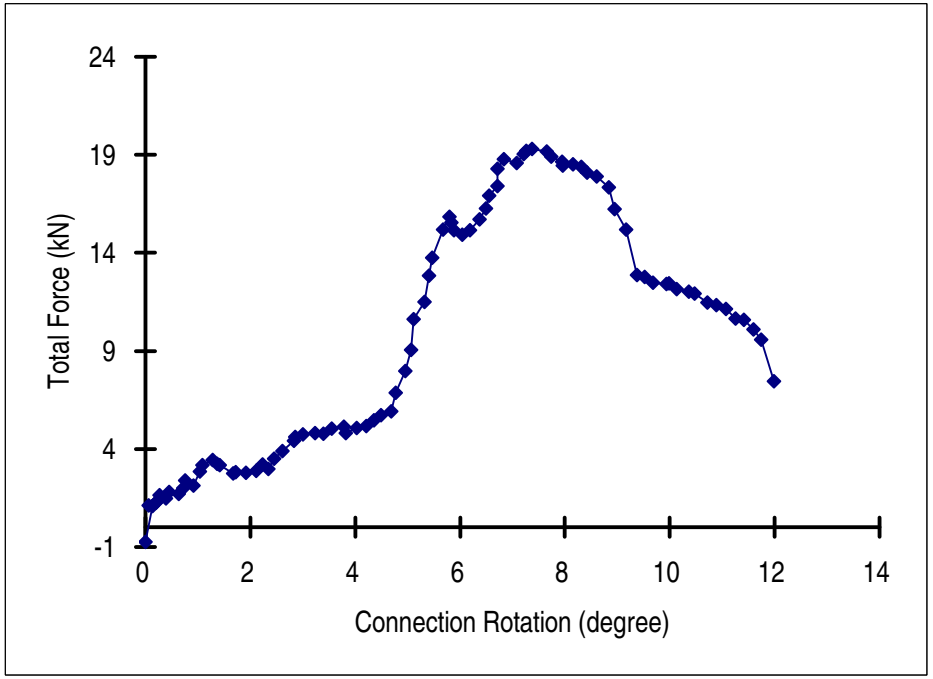
Nominal Temperature **650°C**

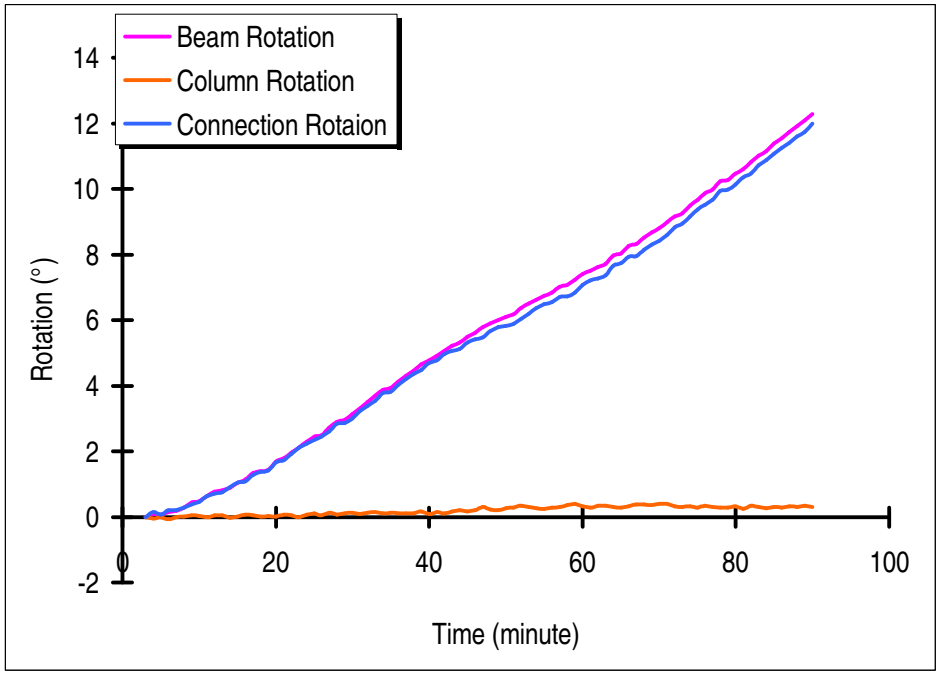
Time	Thermocouple	Jack Displacement	Load Angle	Beam Rotation	Column Rotation	Connection Rotation	Force Rotation	F3 from F1	F3 from F2	F3 Average	Tension	Shear	Moment
(minute)	Average(°C)	(mm)	α(°)	(°)	(°)	(°)	(°)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN*m)
0	647.933	-0.017											
1	648.239	-0.018											
2	648.065	0.008											
3	648.113	0.014	40.45	0.000	0.000	0.000	15.95	-0.41	-1.05	-0.73	-0.56	-0.47	-270.03
4	648.416	1.268	40.52	0.097	-0.042	0.139	16.02	1.29	0.90	1.10	0.83	0.71	405.79
5	648.341	2.628	40.56	0.063	0.000	0.063	16.06	1.44	0.82	1.13	0.86	0.73	417.90
6	648.701	4.137	40.47	0.147	-0.060	0.208	15.97	1.55	1.01	1.28	0.97	0.83	473.74
7	648.612	5.679	40.66	0.181	-0.019	0.199	16.16	1.80	0.73	1.27	0.96	0.83	469.94
8	648.499	7.094	40.69	0.292	0.018	0.273	16.19	1.94	1.33	1.64	1.24	1.07	607.05
9	648.754	8.490	40.83	0.430	0.042	0.388	16.33	2.06	0.91	1.49	1.12	0.97	553.00
10	648.747	10.115	40.89	0.481	0.023	0.457	16.39	2.43	1.16	1.79	1.36	1.17	668.43
11	648.846	11.664	40.88	0.629	0.000	0.629	16.38	2.25	1.15	1.70	1.29	1.11	633.41
12	648.907	13.062	41.01	0.763	0.042	0.722	16.51	2.32	1.70	2.01	1.52	1.32	750.81
13	648.804	14.439	41.08	0.802	0.042	0.760	16.58	2.80	1.99	2.39	1.81	1.57	894.87
14	648.970	15.993	41.46	0.888	-0.023	0.912	16.96	2.74	1.52	2.13	1.60	1.41	802.15
15	648.787	17.505	41.59	1.053	0.018	1.035	17.09	3.22	2.47	2.85	2.13	1.89	1073.15
16	648.997	18.992	41.62	1.141	0.060	1.080	17.12	3.41	2.93	3.17	2.37	2.11	1195.92
17	649.135	20.333	41.77	1.328	0.042	1.286	17.27	3.68	3.19	3.44	2.56	2.29	1298.89
18	648.871	21.797	41.69	1.389	0.018	1.370	17.19	3.57	2.94	3.25	2.43	2.16	1227.70
19	649.167	23.207	41.78	1.442	0.023	1.419	17.28	3.50	2.85	3.17	2.37	2.11	1200.21
20	649.066	24.704	41.82	1.687	0.018	1.669	17.32	3.29	2.19	2.74	2.04	1.83	1036.10
21	649.196	26.067	41.81	1.787	0.060	1.727	17.31	3.47	2.18	2.82	2.10	1.88	1067.87
22	649.342	27.614	41.85	1.956	0.042	1.914	17.35	3.14	2.44	2.79	2.08	1.86	1056.96

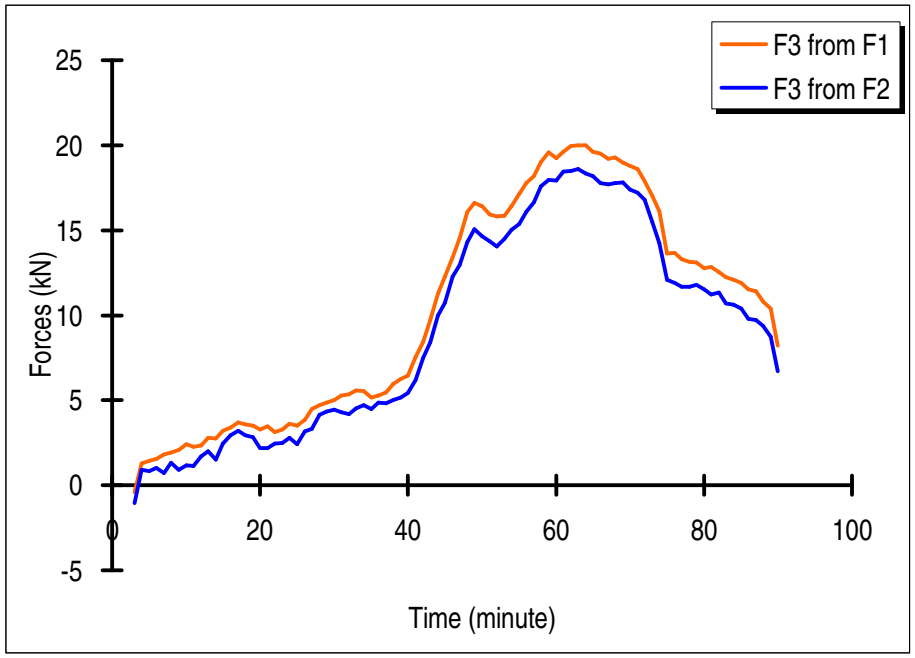
23	649.158	29.097	41.85	2.111	0.000	2.111	17.35	3.29	2.48	2.89	2.15	1.93	1092.47
24	649.304	30.604	41.86	2.290	0.060	2.229	17.36	3.63	2.79	3.21	2.39	2.14	1215.29
25	649.250	32.167	41.91	2.445	0.102	2.343	17.41	3.52	2.43	2.98	2.21	1.99	1128.05
26	649.383	33.682	41.91	2.496	0.042	2.454	17.41	3.85	3.18	3.52	2.62	2.35	1332.87
27	649.427	35.076	41.96	2.727	0.121	2.606	17.46	4.48	3.32	3.90	2.90	2.61	1480.15
28	649.404	36.512	41.98	2.896	0.060	2.836	17.48	4.71	4.15	4.43	3.29	2.96	1680.79
29	649.608	38.027	41.99	2.956	0.102	2.854	17.49	4.86	4.34	4.60	3.42	3.08	1745.52
30	649.452	39.487	42.08	3.126	0.121	3.005	17.58	5.01	4.46	4.74	3.52	3.17	1800.42
31	649.725	41.024	42.21	3.308	0.079	3.229	17.71	5.29	4.30	4.80	3.55	3.22	1826.68
32	649.837	42.388	42.11	3.511	0.121	3.391	17.61	5.35	4.18	4.77	3.54	3.20	1812.53
33	649.571	43.870	42.03	3.694	0.144	3.550	17.53	5.57	4.53	5.05	3.75	3.38	1918.20
34	649.736	45.402	42.10	3.880	0.102	3.778	17.60	5.54	4.70	5.12	3.80	3.43	1947.93
35	649.811	46.925	42.11	3.940	0.121	3.819	17.61	5.17	4.47	4.82	3.58	3.23	1832.89
36	649.675	48.535	42.17	4.131	0.102	4.028	17.67	5.28	4.88	5.08	3.76	3.41	1933.31
37	649.963	49.915	42.16	4.309	0.102	4.206	17.66	5.48	4.83	5.16	3.82	3.46	1963.25
38	649.917	51.340	42.22	4.455	0.102	4.353	17.72	5.96	5.00	5.48	4.06	3.68	2086.98
39	649.995	52.855	42.14	4.649	0.163	4.487	17.64	6.25	5.17	5.71	4.23	3.83	2172.34
40	649.977	54.417	42.25	4.764	0.079	4.685	17.75	6.44	5.42	5.93	4.39	3.99	2261.51
41	649.858	55.941	42.14	4.906	0.139	4.767	17.64	7.52	6.19	6.86	5.08	4.60	2607.95
42	650.058	57.343	42.16	5.059	0.102	4.957	17.66	8.43	7.51	7.97	5.91	5.35	3034.83
43	649.884	58.985	42.20	5.223	0.163	5.060	17.70	9.71	8.41	9.06	6.71	6.09	3451.53
44	649.928	60.413	42.23	5.325	0.204	5.120	17.73	11.27	10.00	10.63	7.87	7.15	4051.35
45	649.941	61.952	42.13	5.489	0.163	5.326	17.63	12.29	10.74	11.51	8.54	7.72	4379.58
46	649.954	63.435	42.13	5.614	0.204	5.409	17.63	13.41	12.28	12.84	9.53	8.62	4886.00
47	650.038	64.934	42.23	5.776	0.307	5.470	17.73	14.53	12.95	13.74	10.17	9.23	5235.28
48	650.135	66.314	42.20	5.901	0.228	5.673	17.70	16.08	14.32	15.20	11.26	10.21	5787.24
49	649.893	67.829	42.20	5.998	0.204	5.794	17.70	16.60	15.06	15.83	11.73	10.63	6028.22
50	650.075	69.304	42.37	6.093	0.265	5.829	17.87	16.43	14.66	15.55	11.49	10.48	5938.41
51	649.992	70.834	42.30	6.173	0.288	5.885	17.80	15.94	14.36	15.15	11.21	10.20	5778.86
52	650.144	72.301	42.35	6.374	0.336	6.039	17.85	15.83	14.04	14.93	11.04	10.06	5700.98

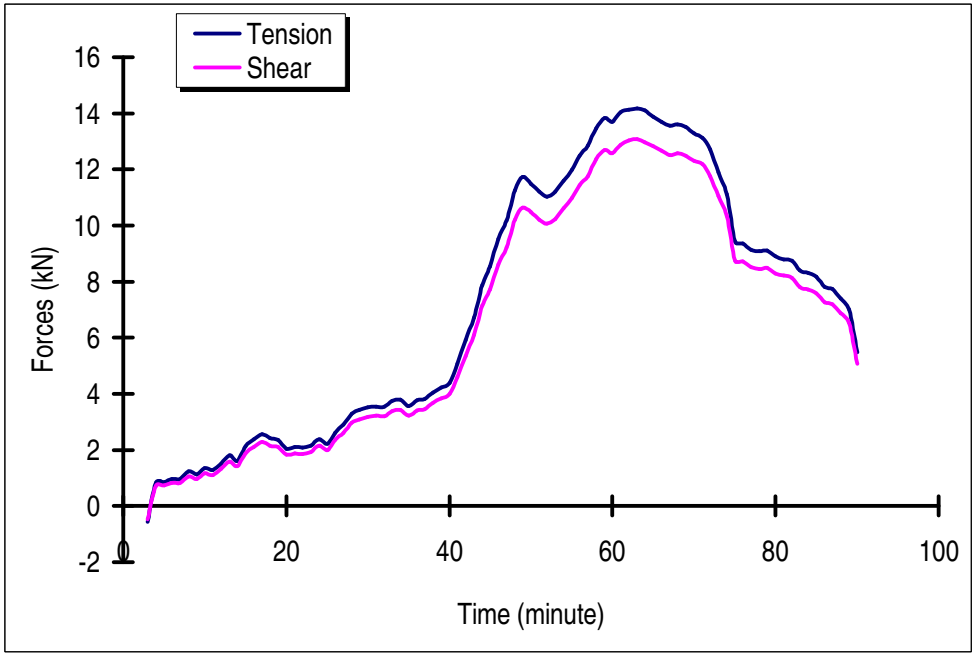
53	650.128	73.678	42.37	6.500	0.307	6.193	17.87	15.85	14.49	15.17	11.21	10.22	5794.28
54	650.171	75.099	42.47	6.632	0.265	6.367	17.97	16.43	15.02	15.73	11.60	10.62	6015.96
55	650.177	76.740	42.47	6.735	0.246	6.489	17.97	17.13	15.38	16.26	11.99	10.98	6219.08
56	649.885	78.247	42.47	6.838	0.288	6.550	17.97	17.76	16.08	16.92	12.48	11.43	6474.03
57	650.186	79.634	42.45	7.016	0.307	6.709	17.95	18.18	16.64	17.41	12.85	11.75	6659.16
58	650.403	81.190	42.55	7.067	0.354	6.713	18.05	19.00	17.57	18.29	13.47	12.36	7004.11
59	650.379	82.769	42.57	7.223	0.391	6.832	18.07	19.56	17.98	18.77	13.82	12.70	7192.21
60	650.313	84.115	42.55	7.407	0.330	7.077	18.05	19.24	17.94	18.59	13.69	12.57	7119.67
61	650.144	85.678	42.52	7.503	0.288	7.215	18.02	19.62	18.44	19.03	14.03	12.86	7287.05
62	650.444	87.177	42.69	7.614	0.349	7.265	18.19	19.94	18.49	19.21	14.12	13.03	7377.16
63	650.547	88.780	42.71	7.716	0.349	7.367	18.21	20.00	18.60	19.30	14.18	13.09	7412.38
64	650.257	90.253	42.59	7.962	0.307	7.655	18.09	19.99	18.35	19.17	14.11	12.97	7348.38
65	650.575	91.705	42.72	8.028	0.288	7.739	18.22	19.63	18.17	18.90	13.89	12.82	7259.60
66	650.335	93.259	42.79	8.270	0.330	7.940	18.29	19.51	17.79	18.65	13.69	12.67	7171.88
67	650.467	94.776	42.69	8.329	0.372	7.957	18.19	19.20	17.68	18.44	13.56	12.50	7080.27
68	650.628	96.082	42.76	8.522	0.372	8.149	18.26	19.27	17.77	18.52	13.60	12.58	7120.08
69	650.262	97.772	42.76	8.677	0.367	8.310	18.26	18.98	17.80	18.39	13.50	12.49	7070.01
70	650.575	99.328	42.79	8.817	0.391	8.426	18.29	18.78	17.41	18.10	13.28	12.29	6959.53
71	650.575	100.659	42.86	8.994	0.391	8.603	18.36	18.61	17.21	17.91	13.13	12.18	6895.23
72	650.570	102.093	42.76	9.164	0.330	8.834	18.26	17.88	16.78	17.33	12.72	11.77	6662.08
73	650.597	103.600	42.86	9.258	0.307	8.952	18.36	17.02	15.46	16.24	11.90	11.05	6253.30
74	650.438	105.147	42.89	9.497	0.330	9.166	18.39	16.11	14.25	15.18	11.12	10.33	5846.98
75	650.684	106.756	42.89	9.667	0.288	9.379	18.39	13.64	12.07	12.86	9.42	8.75	4952.13
76	650.576	108.056	42.96	9.866	0.349	9.517	18.46	13.68	11.90	12.79	9.36	8.71	4931.39
77	650.638	109.603	42.98	9.984	0.307	9.677	18.48	13.30	11.68	12.49	9.14	8.52	4818.72
78	650.755	111.046	42.91	10.228	0.288	9.940	18.41	13.14	11.67	12.41	9.09	8.45	4780.88
79	650.591	112.546	42.98	10.278	0.288	9.990	18.48	13.12	11.80	12.46	9.11	8.49	4806.56
80	650.721	114.037	42.91	10.459	0.330	10.129	18.41	12.78	11.54	12.16	8.91	8.28	4685.56
81	650.688	115.519	43.03	10.606	0.246	10.359	18.53	12.83	11.24	12.04	8.80	8.21	4646.61
82	650.548	116.866	42.96	10.822	0.349	10.474	18.46	12.55	11.33	11.94	8.74	8.14	4604.14

83	650.767	118.470	42.93	11.020	0.307	10.714	18.43	12.23	10.71	11.47	8.40	7.81	4422.08
84	650.593	119.928	42.86	11.155	0.270	10.885	18.36	12.08	10.61	11.35	8.32	7.72	4368.02
85	650.744	121.435	42.86	11.381	0.307	11.075	18.36	11.90	10.39	11.15	8.17	7.58	4291.65
86	650.795	122.951	42.98	11.546	0.288	11.258	18.48	11.52	9.81	10.66	7.80	7.27	4112.92
87	650.678	124.528	42.84	11.737	0.330	11.407	18.34	11.43	9.71	10.57	7.75	7.19	4068.56
88	650.767	126.171	42.91	11.907	0.307	11.600	18.41	10.82	9.36	10.09	7.39	6.87	3888.32
89	650.798	127.775	42.93	12.087	0.349	11.738	18.43	10.40	8.75	9.57	7.01	6.52	3690.59
90	650.863	129.376	42.84	12.292	0.307	11.985	18.34	8.21	6.71	7.46	5.47	5.07	2871.82






F3 from F1
F3 from F2
25
20
15
10
5
0
-5
Forces (kN)
0
20
40
60
80
100
Time (minute)


Tension
Shear
16
14
12
10
8
6
4
2
0
-2
Forces (kN)
0
20
40
60
80
100
Time (minute)