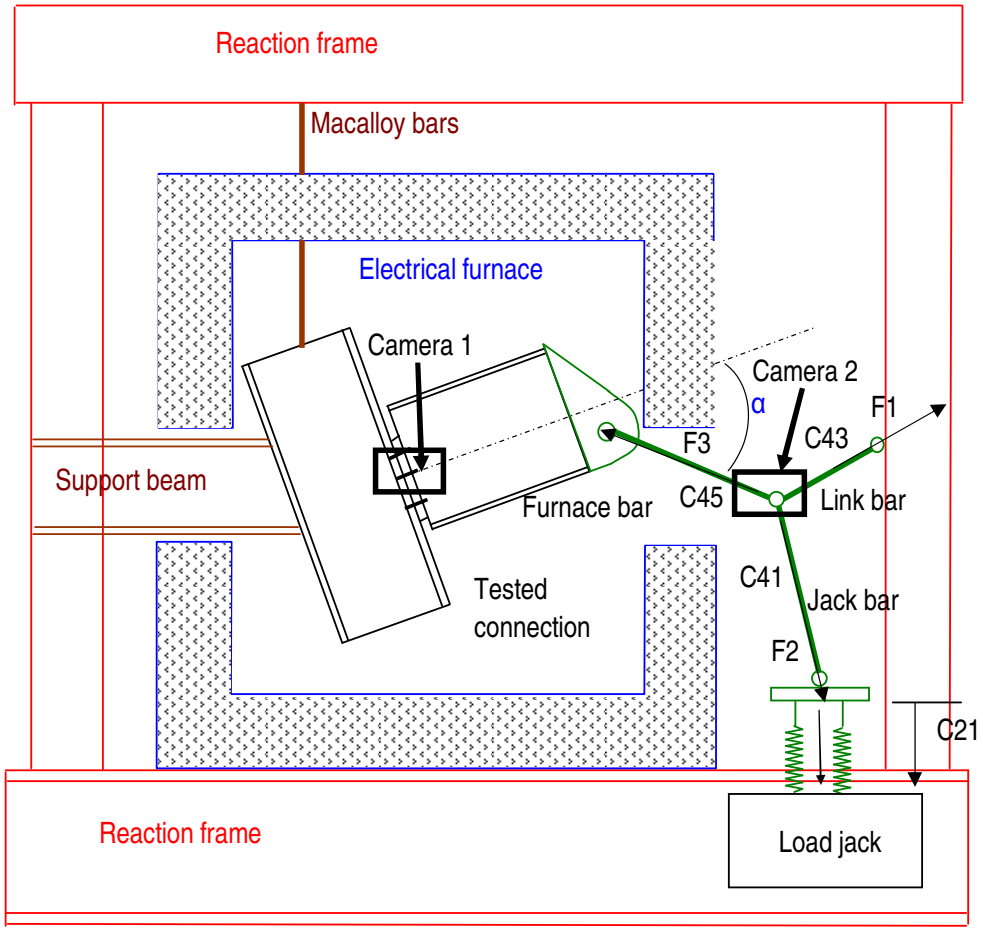
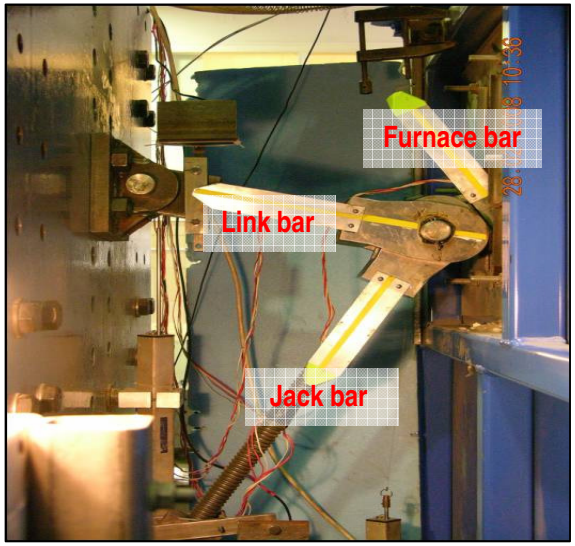
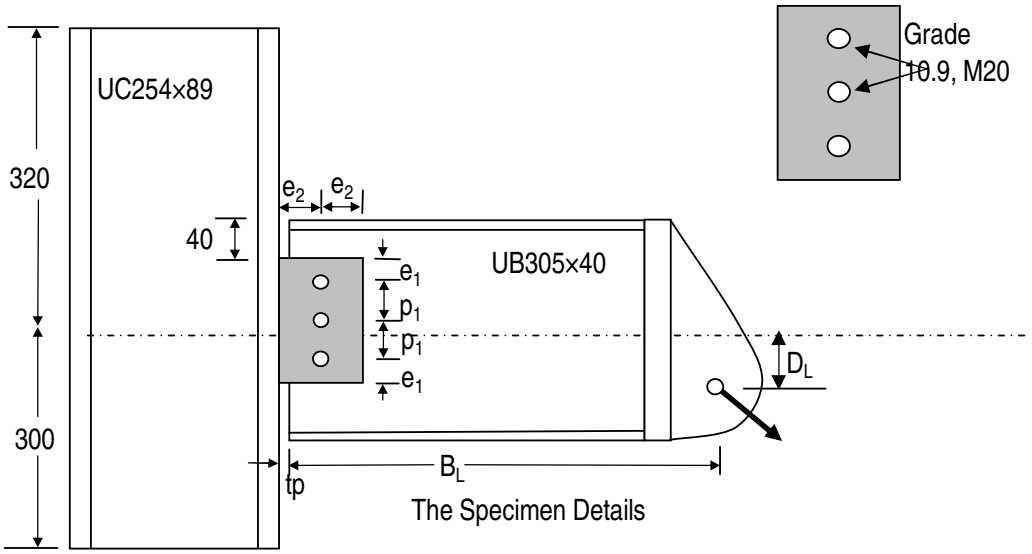
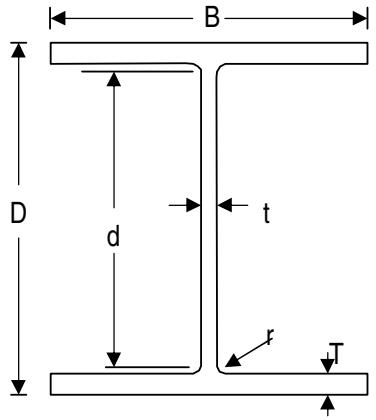

Reaction frame
Macalloy bars
Electrical furnace
Camera 1
Camera 2
α
F1
F3
C43
Support beam
Furnace bar
C45
Link bar
C41
Jack bar
Tested
connection
F2
C21
Reaction frame
Load jack


Camera 1


Furnace bar
Link bar
Jack bar



The Specimen Details



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

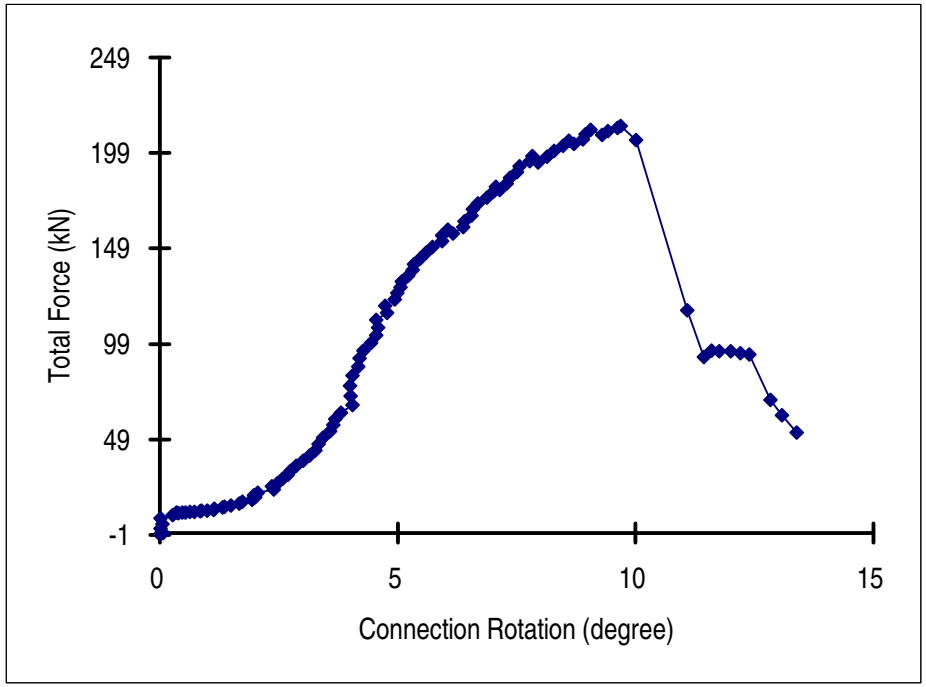
Nominal Temperature **20°C**

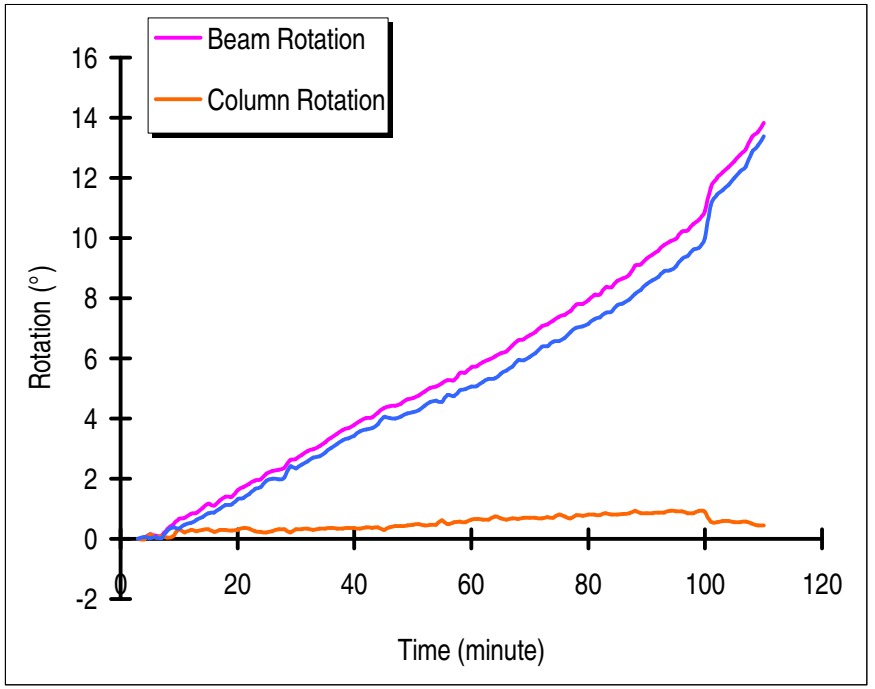
Time	Jack Displacement	Load Angle	Beam Rotation	Column Rotation	Connection Rotation	Force Rotation	F3 from F1	F3 from F2	F3 from Reading	Tension	Shear	Moment
(minute)	(mm)	α(°)	(°)	(°)	(°)	(°)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN*m)
0	0.003											
1	0.003											
2	0.004											
3	0.004	36.53	0.000	0.000	0.000	11.535	-0.18	-2.37	-0.73	-0.59	-0.44	-251.44
4	1.409	36.42	0.047	-0.022	0.069	11.416	0.74	-1.08	0.12	0.10	0.07	41.38
5	3.025	36.77	0.153	0.139	0.014	11.771	2.90	-0.20	2.25	1.81	1.35	777.54
6	4.348	36.92	0.104	0.046	0.057	11.916	5.63	3.55	4.67	3.74	2.81	1616.91
7	6.091	37.06	0.104	0.090	0.014	12.062	9.00	7.09	7.88	6.29	4.75	2734.24
8	7.599	37.09	0.318	0.046	0.272	12.090	10.78	10.05	9.53	7.60	5.74	3307.28
9	9.217	37.38	0.466	0.080	0.385	12.382	11.64	10.91	10.26	8.16	6.23	3584.32
10	10.820	37.43	0.658	0.315	0.344	12.434	11.98	11.54	10.57	8.40	6.43	3695.91
11	12.442	37.54	0.693	0.221	0.472	12.536	12.21	11.34	10.83	8.59	6.60	3792.80
12	14.167	37.73	0.824	0.290	0.534	12.733	12.42	11.60	10.83	8.56	6.63	3807.23
13	15.778	37.75	0.882	0.246	0.637	12.748	12.31	13.14	10.91	8.63	6.68	3838.34
14	17.296	37.86	1.011	0.290	0.721	12.864	12.42	12.71	10.97	8.66	6.73	3866.89
15	18.902	37.94	1.162	0.312	0.850	12.944	12.66	12.53	11.54	9.10	7.10	4073.43
16	20.591	38.22	1.113	0.243	0.870	13.221	12.99	12.86	11.65	9.16	7.21	4135.29
17	22.333	38.24	1.280	0.290	0.991	13.237	13.28	12.68	11.85	9.31	7.33	4205.77
18	23.935	38.24	1.413	0.290	1.123	13.237	13.74	13.26	12.22	9.60	7.56	4336.87
19	25.466	38.43	1.411	0.268	1.143	13.433	14.15	14.40	12.79	10.02	7.95	4555.25
20	27.207	38.47	1.614	0.290	1.325	13.467	14.63	14.37	13.27	10.39	8.25	4730.24
21	28.772	38.63	1.719	0.362	1.357	13.629	15.18	14.80	13.89	10.85	8.67	4967.85
22	30.279	38.68	1.837	0.337	1.500	13.677	15.89	15.71	14.54	11.35	9.09	5204.57

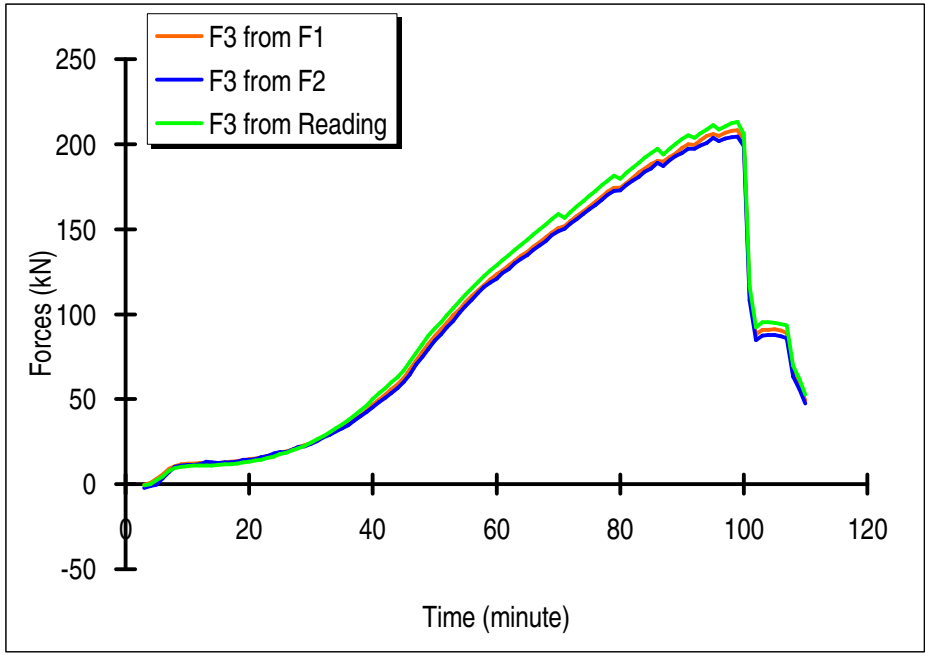
23	31.954	38.78	1.931	0.265	1.666	13.775	16.64	16.50	15.42	12.02	9.66	5529.44
24	33.557	38.78	1.975	0.243	1.732	13.775	17.42	18.04	16.35	12.75	10.24	5863.67
25	35.114	38.99	2.163	0.221	1.942	13.987	18.43	18.72	17.57	13.66	11.05	6324.15
26	36.796	39.00	2.252	0.246	2.006	14.004	19.34	19.03	18.61	14.46	11.71	6702.15
27	38.398	39.04	2.289	0.312	1.977	14.036	20.51	20.42	19.86	15.42	12.51	7155.06
28	39.938	39.15	2.367	0.315	2.053	14.150	21.72	21.75	21.27	16.49	13.43	7679.57
29	41.565	39.23	2.615	0.221	2.394	14.232	22.84	22.18	22.76	17.63	14.40	8231.88
30	43.175	39.22	2.663	0.315	2.348	14.216	24.32	23.64	24.37	18.88	15.41	8809.08
31	44.707	39.21	2.785	0.312	2.473	14.215	25.90	25.47	26.26	20.34	16.60	9491.55
32	46.327	39.39	2.918	0.337	2.581	14.393	27.75	27.52	28.37	21.92	18.00	10288.56
33	47.786	39.26	2.982	0.290	2.692	14.263	29.42	28.99	30.39	23.53	19.23	10995.97
34	49.434	39.41	3.083	0.337	2.746	14.410	31.44	31.02	32.67	25.24	20.74	11850.31
35	50.959	39.52	3.203	0.337	2.867	14.525	33.42	32.95	35.14	27.10	22.36	12773.80
36	52.594	39.59	3.371	0.359	3.012	14.587	35.76	34.78	37.71	29.06	24.03	13725.26
37	54.076	39.52	3.488	0.337	3.152	14.522	38.06	37.42	40.48	31.23	25.76	14716.68
38	55.623	39.51	3.612	0.337	3.275	14.506	40.38	39.96	43.37	33.46	27.59	15760.18
39	57.171	39.59	3.690	0.359	3.331	14.587	43.50	42.45	46.55	35.87	29.66	16941.12
40	58.750	39.70	3.786	0.359	3.428	14.703	46.66	45.12	50.06	38.52	31.98	18258.45
41	60.296	39.64	3.910	0.337	3.574	14.638	49.71	48.24	53.35	41.08	34.03	19432.97
42	61.851	39.88	4.028	0.381	3.647	14.880	52.81	50.75	56.63	43.46	36.31	20718.42
43	63.558	39.80	4.045	0.359	3.686	14.798	55.76	53.38	59.74	45.90	38.24	21824.13
44	65.121	39.85	4.197	0.384	3.814	14.845	58.67	56.50	63.01	48.37	40.37	23037.91
45	66.677	39.95	4.341	0.293	4.048	14.949	62.65	60.25	67.10	51.44	43.09	24580.93
46	68.351	40.04	4.398	0.384	4.015	15.044	67.34	64.42	71.82	54.99	46.21	26356.06
47	69.882	40.14	4.429	0.431	3.999	15.138	72.67	70.40	77.19	59.01	49.76	28372.66
48	71.581	40.19	4.484	0.431	4.054	15.190	78.01	75.05	82.42	62.96	53.19	30321.61
49	73.047	40.22	4.629	0.456	4.173	15.220	82.67	79.65	87.22	66.60	56.32	32104.69
50	74.595	40.35	4.681	0.478	4.203	15.349	87.12	84.43	91.48	69.72	59.23	33752.04
51	76.062	40.41	4.774	0.499	4.274	15.413	91.06	88.25	95.45	72.67	61.88	35254.43
52	77.593	40.47	4.886	0.452	4.433	15.467	95.06	92.34	99.62	75.79	64.65	36829.90

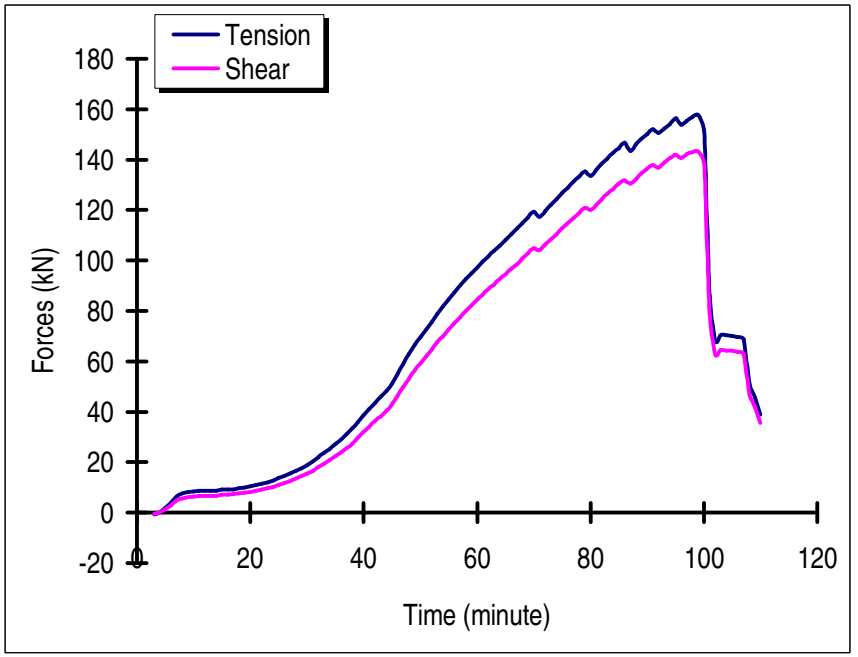
53	78.923	40.66	5.029	0.478	4.552	15.660	99.26	95.90	103.65	78.62	67.53	38449.10
54	80.646	40.53	5.064	0.478	4.587	15.531	102.98	100.86	107.58	81.76	69.91	39817.24
55	82.191	40.69	5.172	0.619	4.554	15.689	106.86	104.70	111.56	84.59	72.73	41405.93
56	83.861	40.72	5.280	0.499	4.781	15.725	110.55	108.45	115.41	87.46	75.30	42861.56
57	85.520	40.69	5.281	0.546	4.735	15.689	114.07	112.44	118.92	90.17	77.53	44137.27
58	87.180	40.75	5.506	0.572	4.934	15.753	117.23	115.81	122.42	92.74	79.92	45488.92
59	88.702	40.94	5.536	0.550	4.986	15.936	120.47	118.57	125.71	94.97	82.37	46859.09
60	90.353	41.00	5.704	0.641	5.063	16.001	123.41	121.04	128.75	97.16	84.47	48043.88
61	91.900	40.93	5.746	0.662	5.084	15.927	125.80	124.09	131.83	99.60	86.36	49132.40
62	93.543	41.06	5.863	0.641	5.223	16.065	128.88	126.38	134.78	101.62	88.54	50351.42
63	95.130	41.07	5.963	0.644	5.318	16.074	131.33	129.89	137.78	103.87	90.52	51479.35
64	96.645	41.13	6.071	0.735	5.336	16.129	134.27	132.51	140.75	106.01	92.58	52638.40
65	98.297	41.13	6.168	0.688	5.480	16.129	136.57	134.84	143.76	108.28	94.56	53765.44
66	99.811	41.22	6.236	0.641	5.596	16.220	139.73	137.73	146.77	110.40	96.72	54978.12
67	101.359	41.20	6.420	0.688	5.732	16.202	142.22	140.32	149.75	112.67	98.64	56076.78
68	102.928	41.27	6.588	0.662	5.926	16.266	145.24	143.15	152.78	114.84	100.77	57273.07
69	104.411	41.26	6.646	0.709	5.936	16.258	147.80	146.53	155.83	117.15	102.76	58409.09
70	106.119	41.30	6.761	0.709	6.052	16.303	150.56	148.85	158.88	119.35	104.87	59597.73
71	107.442	41.58	6.871	0.709	6.162	16.578	151.68	150.21	156.78	117.28	104.05	59088.44
72	109.094	41.60	7.056	0.684	6.372	16.597	154.79	153.45	160.08	119.71	106.27	60348.46
73	110.584	41.64	7.130	0.731	6.399	16.642	157.78	155.73	163.27	122.01	108.49	61597.91
74	112.098	41.58	7.257	0.709	6.547	16.578	160.41	158.94	166.35	124.44	110.40	62695.43
75	113.741	41.65	7.382	0.804	6.578	16.648	163.23	161.59	169.46	126.63	112.62	63942.80
76	115.215	41.72	7.439	0.753	6.686	16.725	165.95	164.14	172.57	128.80	114.85	65199.21
77	116.747	41.69	7.564	0.684	6.880	16.686	168.92	167.30	175.69	131.21	116.85	66336.71
78	118.173	41.72	7.792	0.778	7.014	16.725	172.00	170.07	178.66	133.34	118.91	67499.73
79	119.650	41.76	7.813	0.756	7.057	16.763	174.45	172.28	181.43	135.33	120.84	68592.29
80	121.276	41.96	7.946	0.800	7.147	16.961	174.42	172.89	179.65	133.59	120.12	68145.66
81	122.734	41.96	8.098	0.804	7.294	16.955	177.16	175.85	182.84	135.98	122.24	69350.05
82	124.362	41.94	8.137	0.778	7.359	16.936	179.96	178.64	185.87	138.27	124.22	70476.13

83	125.901	42.00	8.355	0.847	7.508	17.000	183.19	180.72	189.06	140.50	126.50	71760.31
84	127.505	41.94	8.362	0.800	7.562	16.941	185.67	183.74	191.93	142.76	128.28	72777.31
85	128.988	42.06	8.573	0.800	7.774	17.058	188.40	185.53	194.71	144.56	130.43	73977.98
86	130.662	41.94	8.653	0.825	7.828	16.936	190.27	188.87	197.28	146.75	131.84	74800.19
87	132.248	42.32	8.796	0.847	7.949	17.318	189.62	187.25	194.03	143.47	130.63	74039.83
88	133.859	42.15	9.078	0.937	8.141	17.152	192.37	190.59	197.13	146.14	132.29	75012.08
89	135.486	42.23	9.127	0.847	8.280	17.235	194.78	193.12	200.13	148.18	134.52	76262.33
90	136.850	42.27	9.320	0.847	8.473	17.274	197.53	194.71	202.80	150.06	136.42	77330.02
91	138.500	42.17	9.445	0.847	8.599	17.171	199.80	197.26	205.34	152.18	137.85	78162.66
92	140.103	42.27	9.579	0.868	8.711	17.274	199.40	197.44	203.60	150.65	136.96	77635.45
93	141.682	42.36	9.761	0.868	8.893	17.362	202.02	199.03	206.24	152.39	138.97	78755.54
94	143.181	42.36	9.887	0.941	8.946	17.362	204.65	200.78	208.72	154.22	140.64	79702.00
95	144.616	42.23	9.969	0.915	9.053	17.235	206.04	203.63	211.07	156.28	141.88	80429.82
96	146.311	42.47	10.206	0.915	9.291	17.465	204.87	201.97	208.45	153.77	140.73	79735.68
97	147.965	42.44	10.259	0.847	9.412	17.442	206.53	203.18	210.60	155.42	142.12	80528.11
98	149.585	42.36	10.469	0.847	9.622	17.362	208.02	204.15	212.18	156.78	142.97	81022.70
99	151.076	42.28	10.627	0.941	9.686	17.279	208.08	204.29	213.00	157.60	143.29	81224.53
100	152.815	42.47	10.897	0.894	10.003	17.469	202.20	198.75	205.78	151.79	138.94	78717.55
101	155.179	42.51	11.663	0.572	11.092	17.509	111.77	108.27	116.52	85.89	78.73	44601.86
102	157.224	42.62	11.990	0.550	11.440	17.616	88.14	84.94	92.11	67.79	62.37	35322.17
103	158.729	42.45	12.188	0.593	11.595	17.445	90.70	87.41	95.42	70.41	64.40	36487.52
104	160.341	42.43	12.354	0.593	11.761	17.429	90.91	87.61	95.28	70.33	64.28	36425.43
105	161.960	42.44	12.553	0.550	12.003	17.442	91.01	87.86	95.09	70.17	64.17	36359.80
106	163.667	42.49	12.757	0.550	12.207	17.485	90.30	87.17	94.30	69.54	63.69	36083.63
107	165.222	42.47	12.963	0.572	12.391	17.469	89.08	85.85	93.43	68.92	63.08	35740.01
108	167.090	42.40	13.340	0.503	12.837	17.402	66.01	63.44	69.64	51.43	46.96	26611.48
109	168.823	42.49	13.537	0.456	13.082	17.489	58.28	55.91	61.76	45.54	41.71	23633.09
110	170.440	42.41	13.838	0.452	13.386	17.406	49.49	47.37	52.62	38.86	35.49	20109.69


249
199
149
99
49
-1
Total Force (kN)
0
5
10
15
Connection Rotation (degree)


Beam Rotation
Column Rotation
16
14
12
10
8
6
4
2
0
-2
Rotation (°)
0
20
40
60
80
100
120
Time (minute)


F3 from F1
F3 from F2
F3 from Reading
250
200
150
100
50
0
-50
Forces (kN)
0
20
40
60
80
100
120
Time (minute)


Tension
Shear
180
160
140
120
100
80
60
40
20
0
-20
Forces (kN)
0
20
40
60
80
100
120
Time (minute)

Photographs after Test