

COMPFIRE

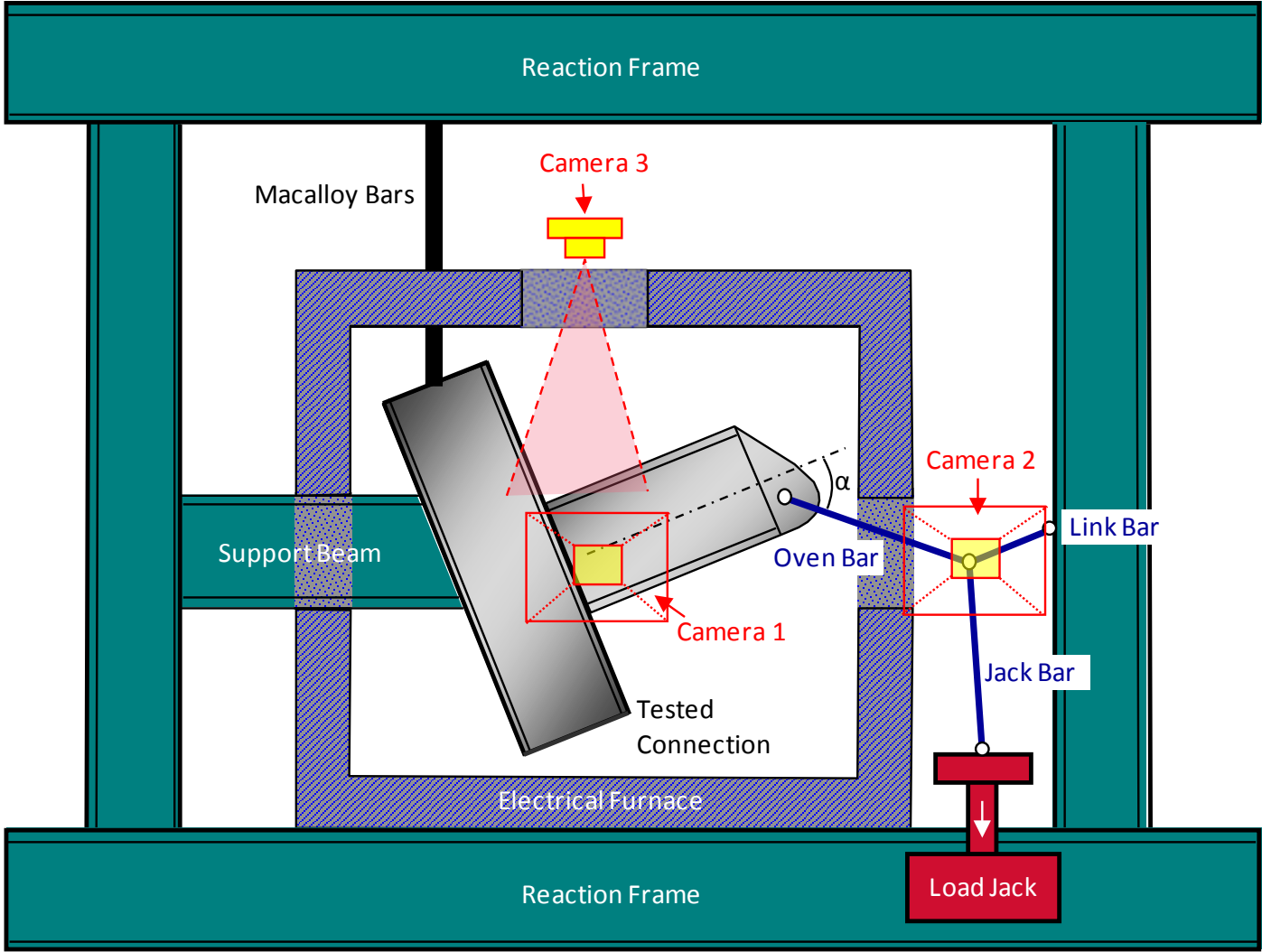
SCFT-FP_20_55_12-11-2010

12 November 2010 Fin Plate Connection to Square Concrete-Filled Tube Test Result

RFSR-CT-2009-0021

Design of joints to composite columns for improved fire robustness

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SCFT-FP_20_55_12-11-2010

12 November 2010 Fin Plate Connection to Square Concrete-Filled Tube Test Result

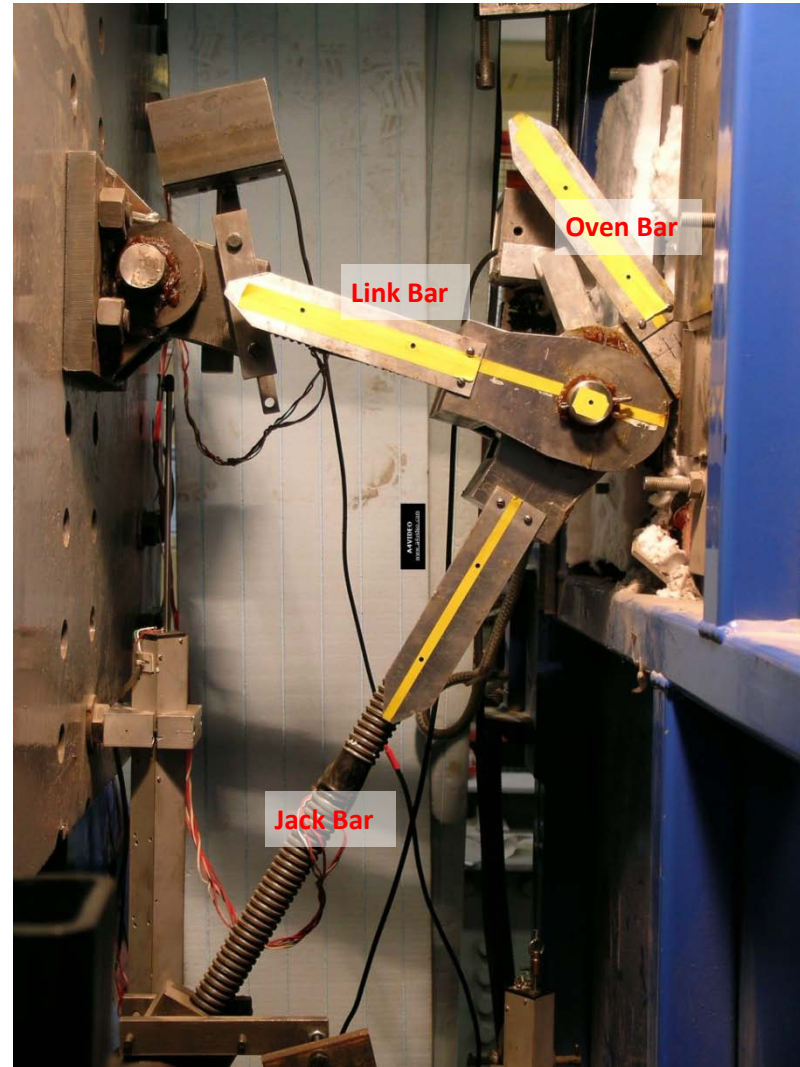
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View of Camera 1



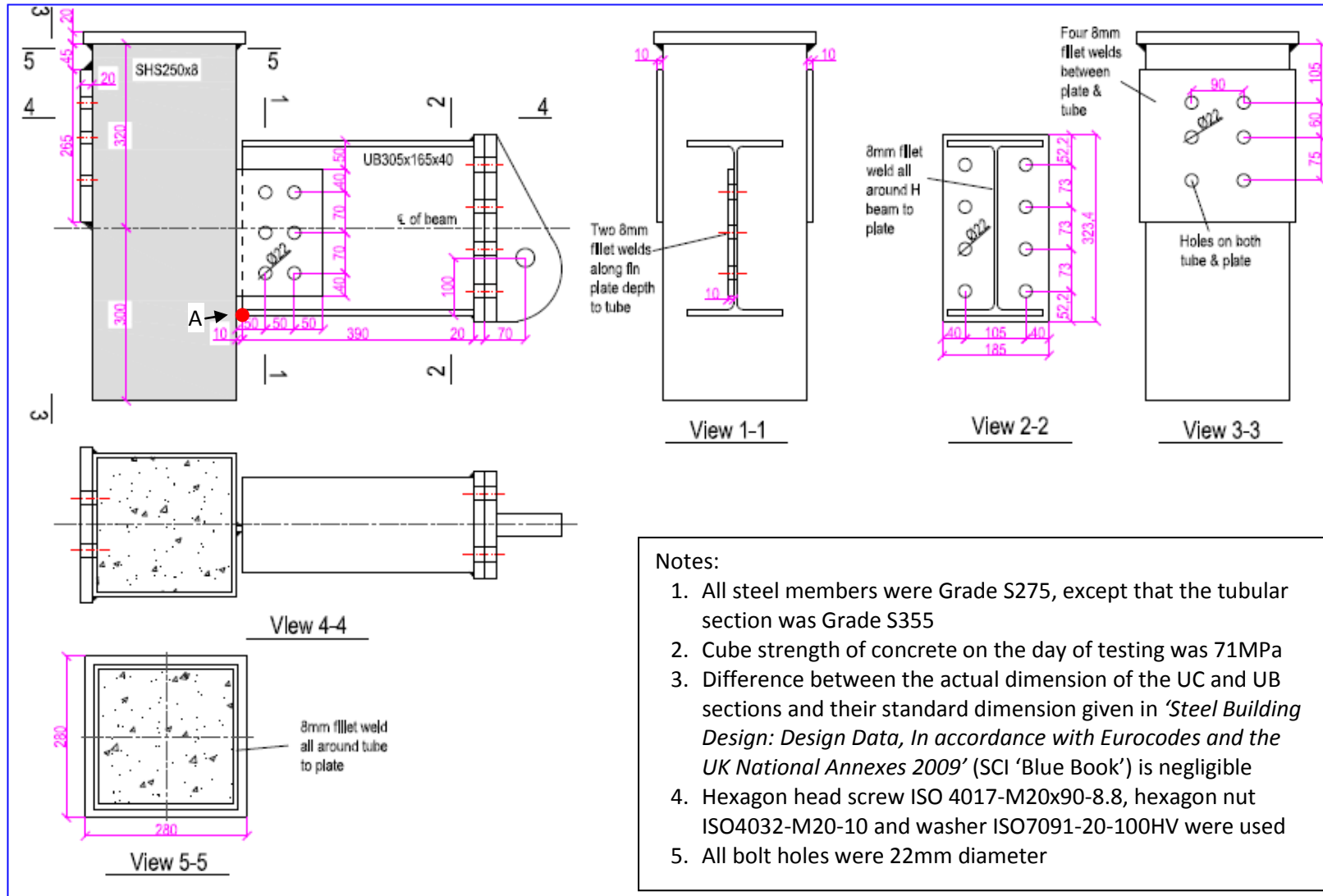
View of Camera 2

*Camera 3 was not necessary in this test.

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SCFT-FP_20_55_12-11-2010

12 November 2010 Fin Plate Connection to Square Concrete-Filled Tube Test Result



COMPFIRE

SCFT-FP_20_55_12-11-2010

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Nominal Temperature: 20°C

Time	Oven Temperature	Jack Displacement	Load Angle	Beam Rotation	Column Rotation	Connection Rotation	Oven Bar Force	Tension	Shear	Moment*
(minute)	(°C)	(mm)	α (°)	(°)	(°)	(°)	(kN)	(kN)	(kN)	(kNm)
0	22.35	-0.01	53.65	0.00	0.00	0.00	2.65	1.57	2.14	1.18
1	22.08	0.89	53.51	0.14	0.09	0.05	4.66	2.77	3.75	2.08
2	22.19	1.78	53.43	0.22	0.10	0.12	6.01	3.58	4.83	2.68
3	22.20	3.12	53.29	0.36	0.11	0.26	6.62	3.96	5.31	2.94
4	22.13	4.52	53.14	0.51	0.11	0.40	7.18	4.31	5.74	3.19
5	22.28	5.77	52.98	0.67	0.12	0.55	7.80	4.69	6.22	3.46
6	22.36	7.09	52.84	0.81	0.12	0.69	8.44	5.10	6.72	3.74
7	22.21	8.46	52.70	0.95	0.13	0.82	9.08	5.50	7.22	4.02
8	22.25	9.77	52.55	1.09	0.13	0.96	9.80	5.96	7.78	4.33
9	22.24	11.01	52.43	1.21	0.15	1.07	10.76	6.56	8.53	4.75
10	22.35	11.76	52.37	1.28	0.16	1.12	11.47	7.00	9.08	5.06
11	22.31	12.83	52.26	1.39	0.17	1.22	12.66	7.75	10.01	5.58
12	22.24	13.72	52.17	1.48	0.18	1.30	13.69	8.40	10.81	6.03
13	22.03	15.01	52.04	1.61	0.19	1.42	15.26	9.39	12.03	6.71
14	22.00	16.08	51.92	1.73	0.20	1.52	16.68	10.29	13.13	7.33
15	22.07	17.39	51.78	1.86	0.21	1.65	18.44	11.41	14.49	8.09
16	21.95	18.63	51.65	2.00	0.23	1.77	20.20	12.53	15.84	8.86
17	22.17	19.78	51.52	2.13	0.24	1.89	21.95	13.66	17.18	9.61
18	22.17	20.98	51.38	2.26	0.25	2.01	23.67	14.77	18.49	10.35
19	22.35	22.12	51.27	2.38	0.26	2.12	25.33	15.85	19.76	11.07
20	22.30	23.27	51.12	2.52	0.28	2.25	27.02	16.96	21.04	11.79
21	22.19	24.48	51.00	2.65	0.28	2.37	28.79	18.12	22.37	12.55



COMPFIRE

SCFT-FP_20_55_12-11-2010

12 November 2010 Fin Plate Connection to Square Concrete-Filled Tube Test Result

22	22.24	25.71	50.87	2.77	0.29	2.48	30.54	19.27	23.69	13.30
23	22.28	26.97	50.74	2.91	0.31	2.60	32.32	20.45	25.02	14.06
24	22.33	28.24	50.60	3.04	0.32	2.72	34.17	21.69	26.41	14.85
25	22.28	29.52	50.47	3.17	0.34	2.83	35.92	22.86	27.71	15.59
26	22.31	30.79	50.33	3.31	0.34	2.97	37.71	24.07	29.03	16.34
27	22.44	32.16	50.20	3.44	0.35	3.10	39.42	25.23	30.29	17.06
28	22.36	33.41	50.06	3.59	0.36	3.23	41.21	26.46	31.60	17.81
29	22.48	34.66	49.92	3.73	0.37	3.36	42.88	27.61	32.81	18.51
30	22.49	35.95	49.77	3.87	0.37	3.50	44.55	28.77	34.01	19.20
31	22.51	37.22	49.63	4.01	0.38	3.63	46.13	29.88	35.15	19.86
32	22.43	38.51	49.49	4.15	0.39	3.76	47.82	31.06	36.36	20.56
33	22.49	39.83	49.35	4.30	0.40	3.90	49.36	32.16	37.44	21.19
34	22.48	41.11	49.20	4.44	0.41	4.03	51.11	33.40	38.70	21.91
35	22.44	42.43	49.07	4.57	0.42	4.15	52.68	34.51	39.80	22.56
36	22.52	43.75	48.93	4.71	0.43	4.28	54.43	35.76	41.04	23.27
37	22.34	45.08	48.78	4.86	0.44	4.42	56.19	37.03	42.27	23.99
38	22.30	46.47	48.64	5.01	0.45	4.56	58.05	38.36	43.57	24.75
39	22.27	47.81	48.48	5.16	0.45	4.71	59.90	39.71	44.86	25.50
40	22.28	49.05	48.35	5.30	0.46	4.83	61.68	40.99	46.08	26.22
41	22.37	50.29	48.20	5.44	0.47	4.97	63.39	42.25	47.25	26.91
42	22.40	51.54	48.06	5.59	0.48	5.11	65.27	43.63	48.55	27.66
43	22.41	52.80	47.91	5.74	0.50	5.24	67.11	44.98	49.80	28.40
44	22.43	54.05	47.76	5.88	0.51	5.38	69.52	46.74	51.47	29.38
45	22.48	55.31	47.62	6.03	0.52	5.51	71.97	48.52	53.16	30.37
46	22.57	56.54	47.48	6.16	0.53	5.63	74.49	50.35	54.90	31.39
47	22.65	57.84	47.34	6.30	0.54	5.76	77.03	52.20	56.65	32.41
48	22.61	59.12	47.19	6.45	0.56	5.89	79.52	54.03	58.34	33.41

COMPFIRE

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12 November 2010 Fin Plate Connection to Square Concrete-Filled Tube Test Result

49	22.49	60.39	47.06	6.58	0.57	6.01	82.08	55.92	60.09	34.43
50	22.50	61.59	46.93	6.71	0.59	6.12	84.79	57.90	61.94	35.52
51	22.49	62.83	46.79	6.85	0.60	6.25	87.46	59.88	63.74	36.58
52	22.40	64.10	46.66	6.98	0.62	6.36	90.18	61.89	65.59	37.67
53	22.46	65.41	46.52	7.13	0.64	6.49	93.07	64.05	67.53	38.82
54	22.57	66.70	46.39	7.25	0.65	6.60	95.93	66.17	69.46	39.96
55	22.58	68.02	46.25	7.39	0.68	6.71	98.81	68.33	71.38	41.09
56	22.58	69.34	46.12	7.52	0.70	6.83	101.74	70.52	73.33	42.25
57	22.58	70.52	45.99	7.65	0.71	6.94	104.70	72.74	75.30	43.42
58	22.50	71.84	45.85	7.79	0.74	7.05	108.05	75.26	77.53	44.74
59	22.50	73.13	45.73	7.91	0.76	7.15	111.67	77.95	79.96	46.18
60	22.52	74.33	45.60	8.05	0.77	7.28	115.26	80.65	82.35	47.59
61	22.37	75.48	45.46	8.18	0.79	7.39	118.84	83.36	84.71	49.00
62	22.41	76.74	45.33	8.32	0.81	7.51	122.27	85.96	86.94	50.33
63	22.39	78.00	45.19	8.45	0.83	7.63	125.59	88.51	89.10	51.62
64	22.48	79.24	45.03	8.61	0.84	7.77	128.74	90.98	91.08	52.82
65	22.54	80.47	44.90	8.75	0.86	7.89	131.71	93.30	92.97	53.96
66	22.33	81.66	44.75	8.90	0.87	8.02	134.48	95.51	94.67	54.99
67	22.38	82.89	44.62	9.03	0.89	8.13	137.13	97.61	96.31	55.99
68	22.46	84.15	44.47	9.17	0.90	8.27	139.65	99.66	97.83	56.92
69	22.27	85.41	44.31	9.33	0.92	8.41	142.00	101.61	99.19	57.77
70	22.51	86.68	44.17	9.48	0.93	8.55	143.73	103.10	100.14	58.38
71	22.64	88.45	43.87	9.77	0.87	8.90	126.72	91.35	87.82	51.29
72	22.69	89.93	43.64	10.00	0.85	9.15	121.23	87.73	83.67	48.93
73	22.55	91.39	43.44	10.21	0.84	9.37	118.32	85.92	81.35	47.64
74	22.68	92.97	43.20	10.44	0.82	9.62	110.88	80.82	75.90	44.52
75	22.60	94.53	42.98	10.67	0.79	9.87	103.91	76.03	70.83	41.60

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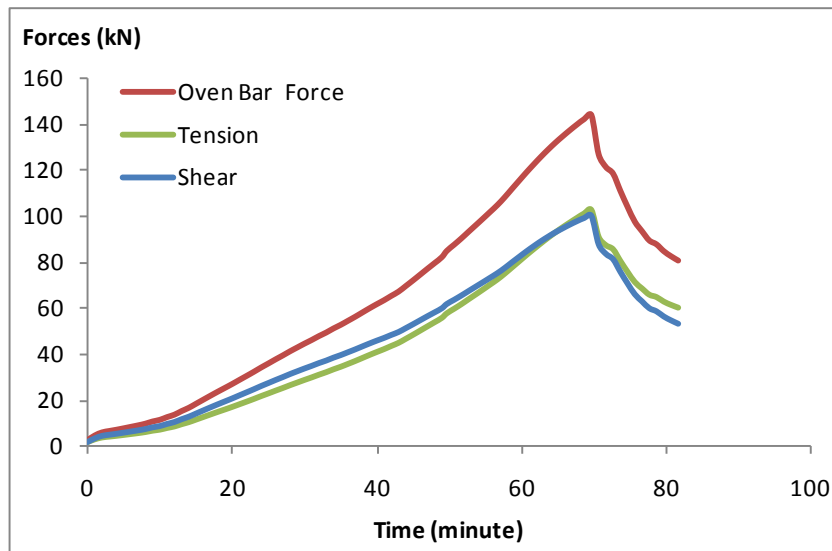
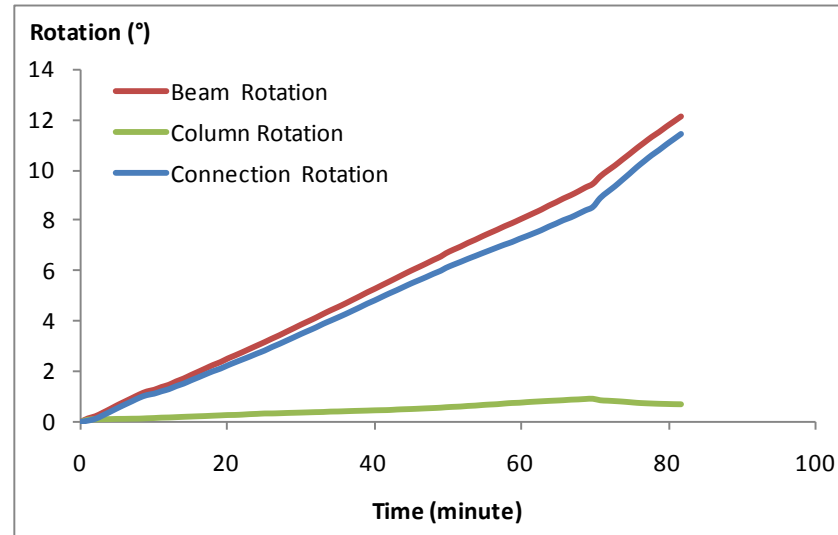
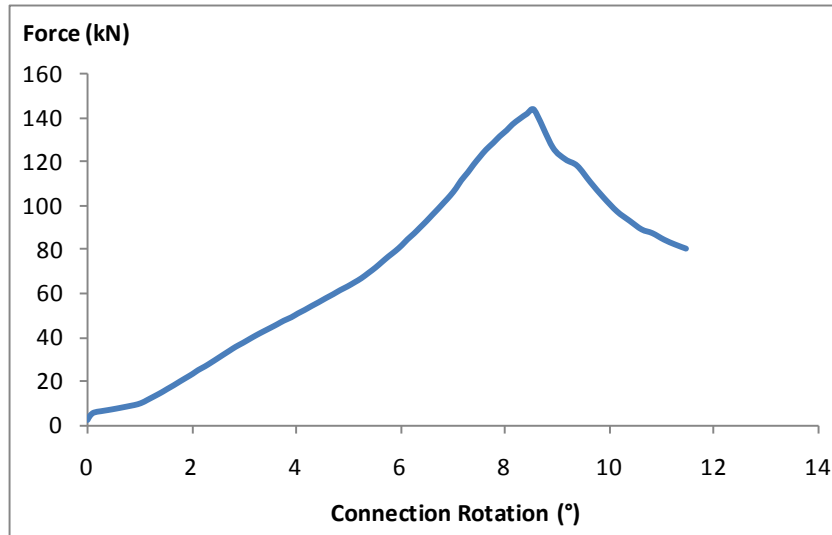
76	22.55	96.02	42.74	10.90	0.77	10.14	97.49	71.60	66.17	38.92
77	22.49	97.55	42.52	11.12	0.75	10.37	93.31	68.77	63.07	37.15
78	22.53	99.02	42.30	11.34	0.74	10.61	89.34	66.08	60.13	35.47
79	22.46	100.47	42.11	11.54	0.73	10.81	87.65	65.02	58.77	34.71
80	22.56	101.95	41.89	11.75	0.72	11.03	84.69	63.05	56.55	33.45
81	22.48	103.35	41.69	11.96	0.71	11.24	82.49	61.61	54.86	32.49
82	22.34	104.70	41.48	12.16	0.71	11.45	80.61	60.39	53.39	31.67

* Moment about Point A on the specimen drawing

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Photographs after Test



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