

COMPFIRE

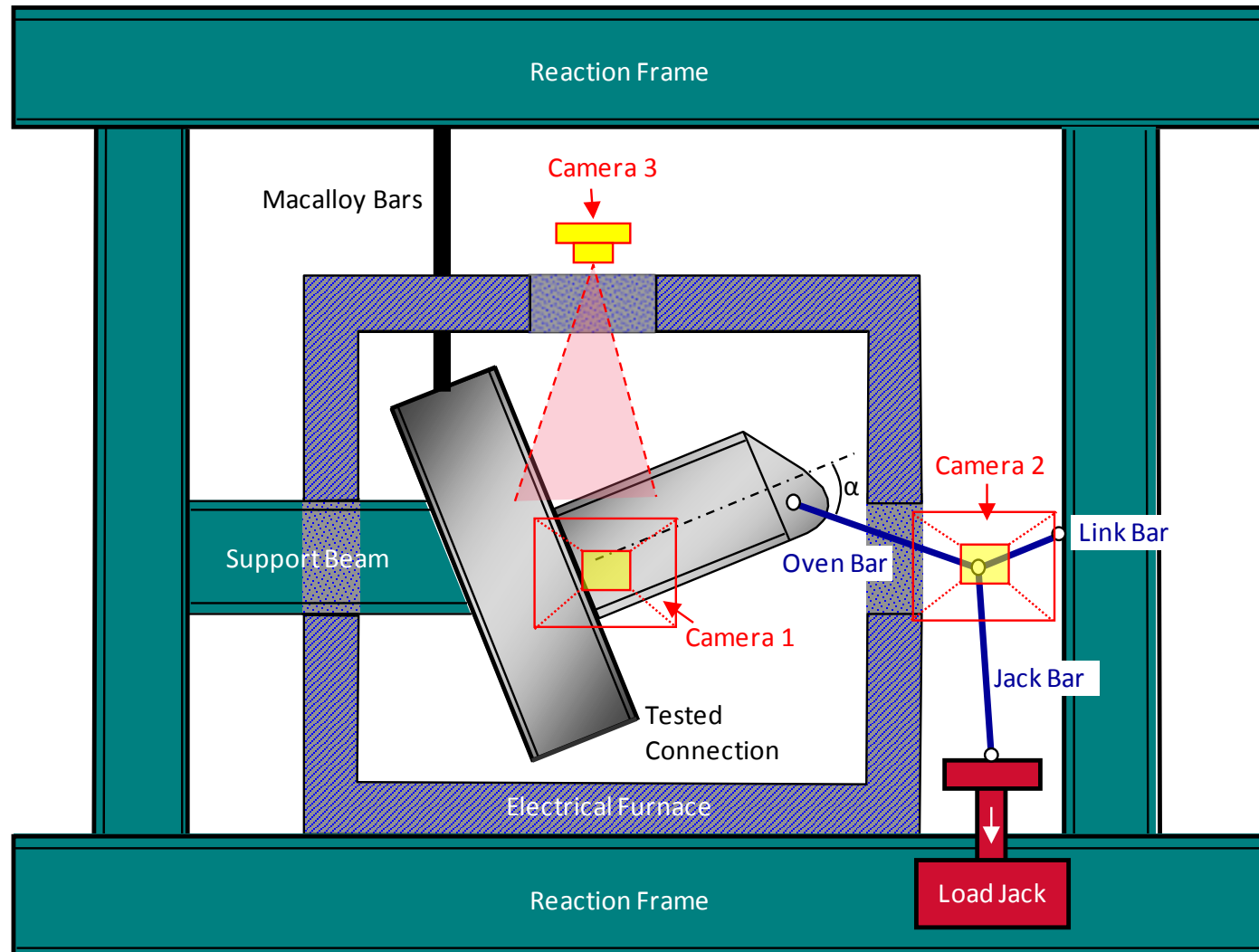
SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

RFSR-CT-2009-0021

Design of joints to composite columns for improved fire robustness

[ftp://openspace.dec.uc.pt/](http://openspace.dec.uc.pt/)



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

RFSR-CT-2009-0021

Design of joints to composite columns for improved fire robustness

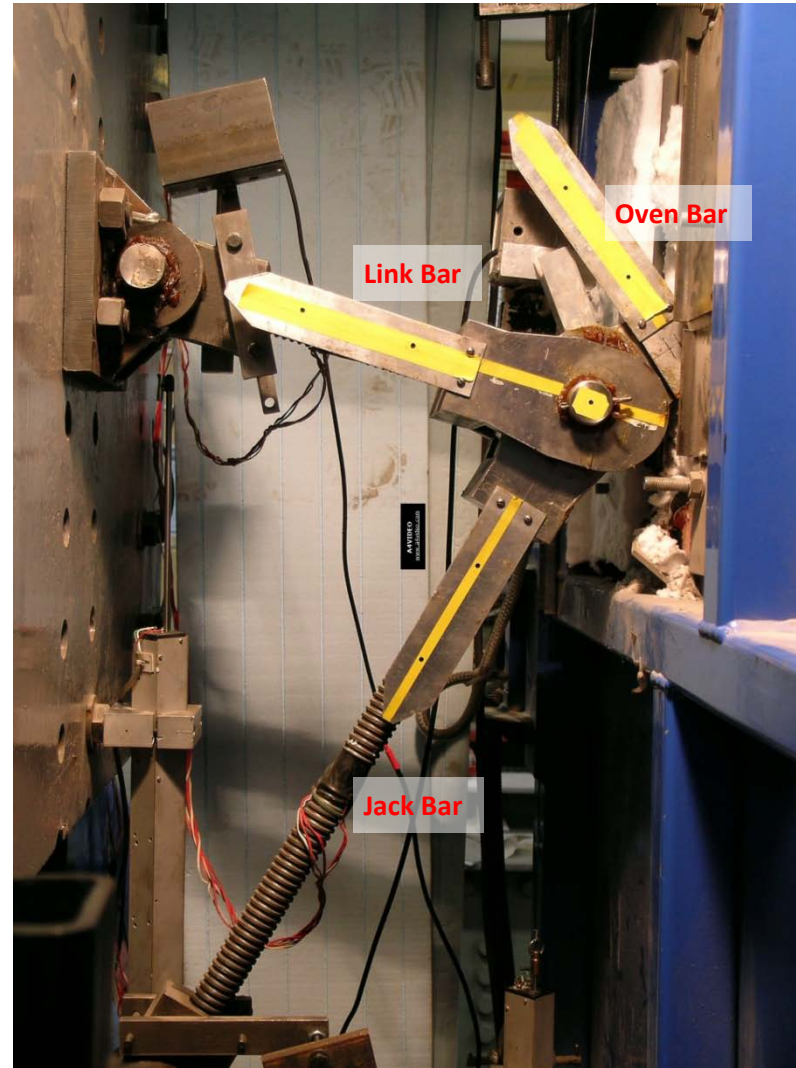
<ftp://openspace.dec.uc.pt/>



View of Camera 1



View of Camera 3

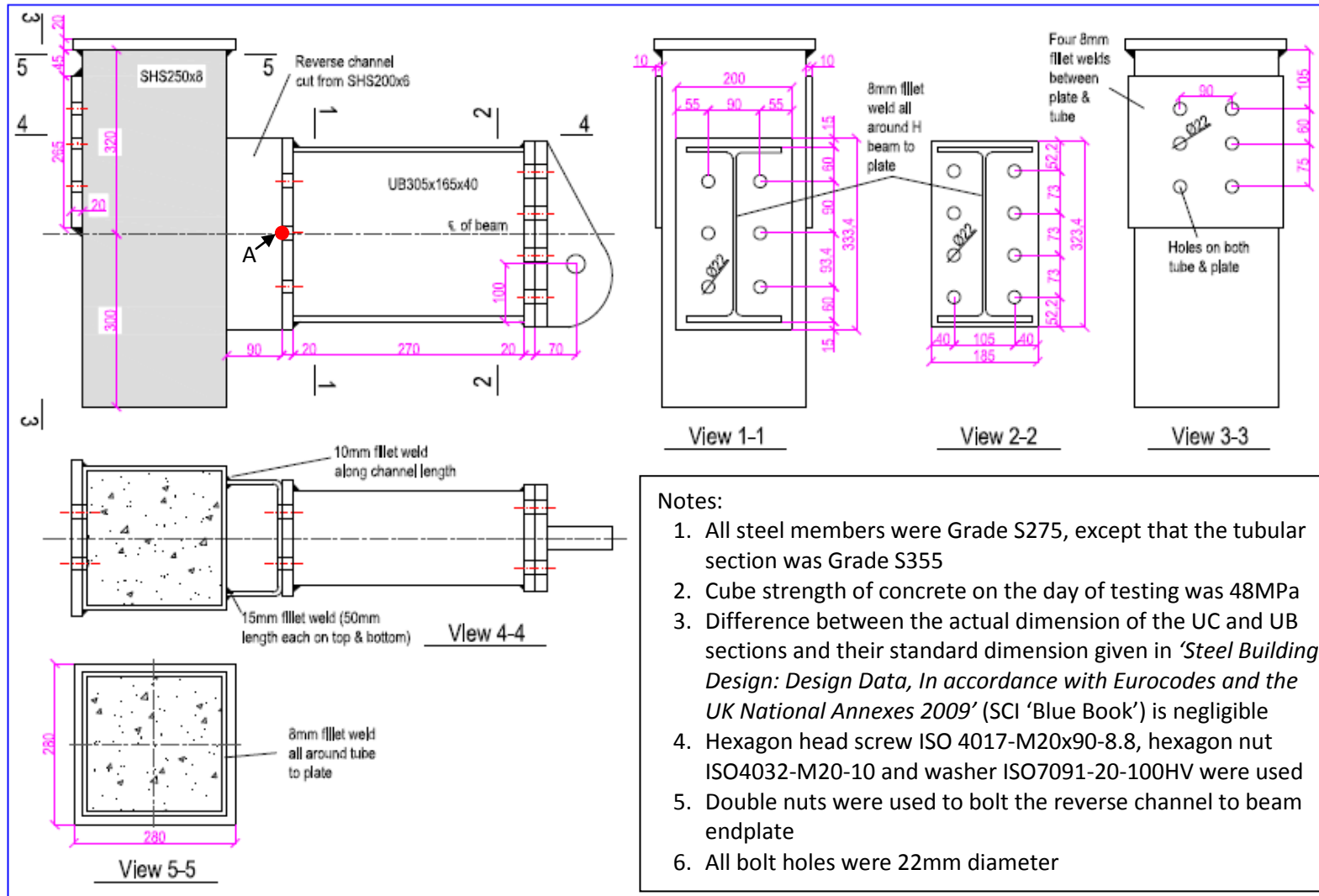


View of Camera 2

COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

Nominal Temperature: 550°C

Time	Temperature*	Jack Displacement	Load Angle	Beam Rotation	Column Rotation	Connection Rotation	Oven Bar Force	Tension	Shear	Moment**
(minute)	Average (°C)	(mm)	α (°)	(°)	(°)	(°)	(kN)	(kN)	(kN)	(kNm)
0	553.03	-0.01	51.64	0.00	0.00	0.00	-8.59	-5.33	-6.74	-2.28
1	553.16	1.15	51.45	0.18	0.15	0.03	-4.93	-3.07	-3.86	-1.31
2	553.26	2.63	51.37	0.26	0.20	0.06	-2.24	-1.40	-1.75	-0.59
3	553.32	4.59	51.32	0.31	0.22	0.09	-0.50	-0.31	-0.39	-0.13
4	553.37	5.99	51.31	0.31	0.23	0.09	-0.45	-0.28	-0.35	-0.12
5	553.43	7.70	51.30	0.31	0.23	0.08	-0.30	-0.19	-0.24	-0.08
6	553.50	9.05	51.28	0.33	0.23	0.09	0.09	0.06	0.07	0.02
7	553.54	10.46	51.22	0.35	0.24	0.11	0.66	0.42	0.52	0.18
8	553.63	12.03	51.16	0.41	0.27	0.13	2.27	1.42	1.77	0.60
9	553.72	13.59	51.08	0.47	0.32	0.15	3.56	2.23	2.77	0.94
10	553.84	15.07	51.00	0.54	0.33	0.21	4.73	2.98	3.68	1.24
11	553.91	16.55	50.95	0.59	0.38	0.22	5.92	3.73	4.60	1.55
12	553.99	18.00	50.85	0.69	0.42	0.27	7.64	4.83	5.93	2.00
13	554.08	19.58	50.75	0.78	0.44	0.34	9.45	5.98	7.32	2.47
14	554.22	21.13	50.69	0.84	0.46	0.38	10.64	6.74	8.23	2.78
15	554.33	22.75	50.61	0.92	0.47	0.44	12.08	7.67	9.34	3.15
16	554.41	24.42	50.54	0.98	0.50	0.49	13.21	8.40	10.20	3.44
17	554.47	25.82	50.43	1.09	0.51	0.58	15.27	9.73	11.77	3.97
18	554.56	27.28	50.31	1.21	0.54	0.67	16.81	10.74	12.94	4.36
19	554.66	29.42	50.20	1.31	0.55	0.76	18.16	11.63	13.95	4.70
20	554.74	30.78	50.06	1.45	0.57	0.88	19.40	12.46	14.88	5.01
21	554.84	32.24	49.93	1.58	0.58	1.01	20.52	13.21	15.70	5.28



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

22	554.89	33.78	49.79	1.71	0.59	1.12	21.67	13.99	16.55	5.57
23	554.94	35.33	49.63	1.87	0.61	1.26	22.43	14.53	17.09	5.74
24	555.12	36.95	49.48	2.01	0.61	1.40	23.22	15.08	17.65	5.93
25	555.17	38.51	49.33	2.17	0.62	1.54	23.99	15.64	18.19	6.11
26	555.33	39.95	49.18	2.31	0.63	1.68	24.63	16.10	18.64	6.25
27	555.47	41.55	49.03	2.47	0.63	1.83	25.48	16.71	19.24	6.45
28	555.47	43.11	48.86	2.63	0.64	1.99	26.17	17.22	19.71	6.60
29	555.58	44.65	48.70	2.79	0.65	2.13	26.74	17.65	20.09	6.72
30	555.74	46.14	48.54	2.95	0.65	2.30	27.20	18.01	20.39	6.82
31	555.83	47.78	48.38	3.12	0.66	2.45	27.81	18.47	20.79	6.94
32	555.94	49.21	48.22	3.28	0.67	2.61	28.53	19.01	21.28	7.10
33	556.07	50.94	48.04	3.45	0.68	2.76	29.02	19.40	21.58	7.20
34	556.18	52.47	47.89	3.60	0.68	2.92	29.67	19.90	22.01	7.34
35	556.21	54.14	47.69	3.79	0.69	3.10	30.24	20.36	22.36	7.45
36	556.26	55.68	47.54	3.94	0.70	3.24	30.61	20.67	22.58	7.51
37	556.34	57.31	47.36	4.12	0.70	3.41	31.28	21.19	23.01	7.65
38	556.42	58.85	47.20	4.28	0.71	3.57	31.88	21.66	23.39	7.77
39	556.47	60.52	47.02	4.46	0.72	3.74	32.50	22.16	23.77	7.89
40	556.54	62.01	46.84	4.64	0.73	3.91	33.10	22.64	24.14	8.00
41	556.58	63.53	46.65	4.81	0.72	4.09	33.37	22.91	24.27	8.04
42	556.62	65.01	46.49	4.99	0.72	4.26	33.99	23.40	24.65	8.16
43	556.72	66.48	46.31	5.16	0.71	4.45	34.66	23.94	25.06	8.29
44	556.88	68.05	46.14	5.33	0.72	4.61	35.21	24.40	25.39	8.39
45	556.96	69.53	45.94	5.52	0.73	4.79	35.93	24.98	25.82	8.52
46	557.04	71.14	45.78	5.69	0.73	4.96	36.51	25.47	26.17	8.63
47	556.99	72.50	45.59	5.88	0.74	5.14	37.17	26.01	26.55	8.75
48	556.63	74.11	45.41	6.06	0.75	5.31	37.49	26.32	26.70	8.79

COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

49	556.41	75.42	45.21	6.26	0.75	5.51	38.32	26.99	27.19	8.94
50	556.40	76.95	45.04	6.43	0.77	5.66	39.30	27.77	27.81	9.13
51	556.51	78.50	44.86	6.61	0.78	5.83	40.07	28.41	28.27	9.27
52	556.65	80.11	44.67	6.80	0.78	6.02	40.84	29.05	28.71	9.41
53	556.64	81.64	44.49	6.98	0.80	6.18	41.17	29.37	28.86	9.45
54	556.55	83.18	44.29	7.17	0.79	6.38	42.16	30.17	29.44	9.63
55	556.45	84.83	44.11	7.35	0.81	6.54	43.13	30.96	30.02	9.81
56	556.46	86.32	43.93	7.54	0.81	6.73	44.10	31.76	30.60	9.98
57	556.55	87.82	43.72	7.74	0.82	6.92	44.73	32.33	30.92	10.08
58	556.66	89.40	43.53	7.93	0.82	7.11	45.79	33.20	31.54	10.27
59	556.73	90.78	43.35	8.12	0.82	7.29	46.75	34.00	32.09	10.44
60	556.80	92.33	43.15	8.32	0.84	7.48	47.68	34.78	32.61	10.59
61	556.74	93.75	42.96	8.51	0.84	7.68	48.35	35.38	32.95	10.69
62	556.72	95.36	42.77	8.71	0.83	7.88	49.62	36.42	33.70	10.92
63	556.73	96.64	42.58	8.90	0.84	8.06	50.51	37.20	34.18	11.06
64	556.90	98.09	42.41	9.07	0.85	8.23	51.77	38.22	34.91	11.29
65	557.02	99.52	42.20	9.29	0.85	8.44	53.05	39.30	35.63	11.51
66	557.09	100.99	42.00	9.48	0.86	8.62	53.77	39.96	35.98	11.61
67	557.15	102.48	41.82	9.68	0.88	8.80	55.04	41.02	36.69	11.82
68	557.13	104.05	41.61	9.88	0.88	9.00	56.46	42.21	37.50	12.07
69	557.16	105.52	41.42	10.08	0.88	9.20	57.94	43.45	38.33	12.32
70	557.25	107.06	41.22	10.28	0.90	9.39	59.35	44.64	39.11	12.55
71	557.28	108.66	41.03	10.49	0.89	9.60	60.81	45.88	39.92	12.80
72	557.34	110.19	40.81	10.70	0.90	9.80	61.80	46.77	40.39	12.93
73	557.37	111.69	40.63	10.89	0.90	9.99	63.30	48.04	41.21	13.18
74	557.44	113.25	40.43	11.09	0.91	10.19	65.06	49.52	42.19	13.47
75	557.48	114.77	40.23	11.30	0.92	10.38	66.81	51.01	43.15	13.76



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

76	557.52	116.31	40.02	11.51	0.94	10.57	67.97	52.05	43.71	13.92
77	557.63	117.88	39.83	11.71	0.96	10.75	69.84	53.63	44.73	14.23
78	557.61	119.28	39.64	11.91	0.99	10.92	71.56	55.11	45.66	14.50
79	557.58	120.61	39.43	12.12	1.00	11.12	73.19	56.54	46.48	14.74
80	557.60	122.08	39.22	12.34	1.01	11.33	74.48	57.70	47.09	14.91
81	557.62	123.44	39.02	12.54	1.04	11.51	76.53	59.46	48.18	15.24
82	557.76	124.72	38.83	12.74	1.06	11.68	78.56	61.20	49.26	15.56
83	557.76	126.03	38.62	12.95	1.06	11.90	80.05	62.55	49.96	15.75
84	557.88	127.58	38.42	13.16	1.08	12.09	81.99	64.24	50.94	16.04
85	557.93	129.03	38.22	13.37	1.08	12.28	83.89	65.91	51.90	16.31
86	557.97	130.63	38.00	13.59	1.12	12.47	85.22	67.15	52.47	16.47
87	558.03	132.01	37.79	13.81	1.13	12.68	87.20	68.91	53.43	16.74
88	558.05	133.65	37.57	14.04	1.14	12.89	88.44	70.10	53.93	16.87
89	558.12	135.16	37.35	14.26	1.15	13.10	90.53	71.96	54.92	17.15
90	558.15	136.59	37.11	14.50	1.17	13.34	91.72	73.14	55.34	17.25
91	558.21	138.27	36.89	14.74	1.18	13.56	93.36	74.68	56.04	17.43
92	558.32	139.83	36.65	14.98	1.19	13.80	94.78	76.05	56.57	17.57
93	558.38	141.35	36.40	15.23	1.19	14.04	95.87	77.16	56.89	17.63
94	558.48	142.50	36.17	15.47	1.22	14.25	97.09	78.38	57.30	17.72
95	558.57	144.46	35.92	15.72	1.22	14.50	98.08	79.43	57.55	17.76
96	558.63	146.13	35.68	15.97	1.24	14.73	99.22	80.59	57.87	17.82
97	558.71	147.69	35.44	16.22	1.24	14.97	100.31	81.72	58.16	17.88
98	558.74	149.26	35.16	16.49	1.24	15.25	101.44	82.93	58.42	17.91
99	558.75	150.88	34.93	16.74	1.25	15.49	102.66	84.17	58.77	17.98
100	558.82	152.53	34.66	17.01	1.29	15.72	102.96	84.69	58.55	17.87
101	558.87	154.12	34.40	17.28	1.28	16.00	103.96	85.79	58.73	17.88
102	558.97	155.65	34.13	17.55	1.28	16.27	104.28	86.32	58.51	17.77

COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

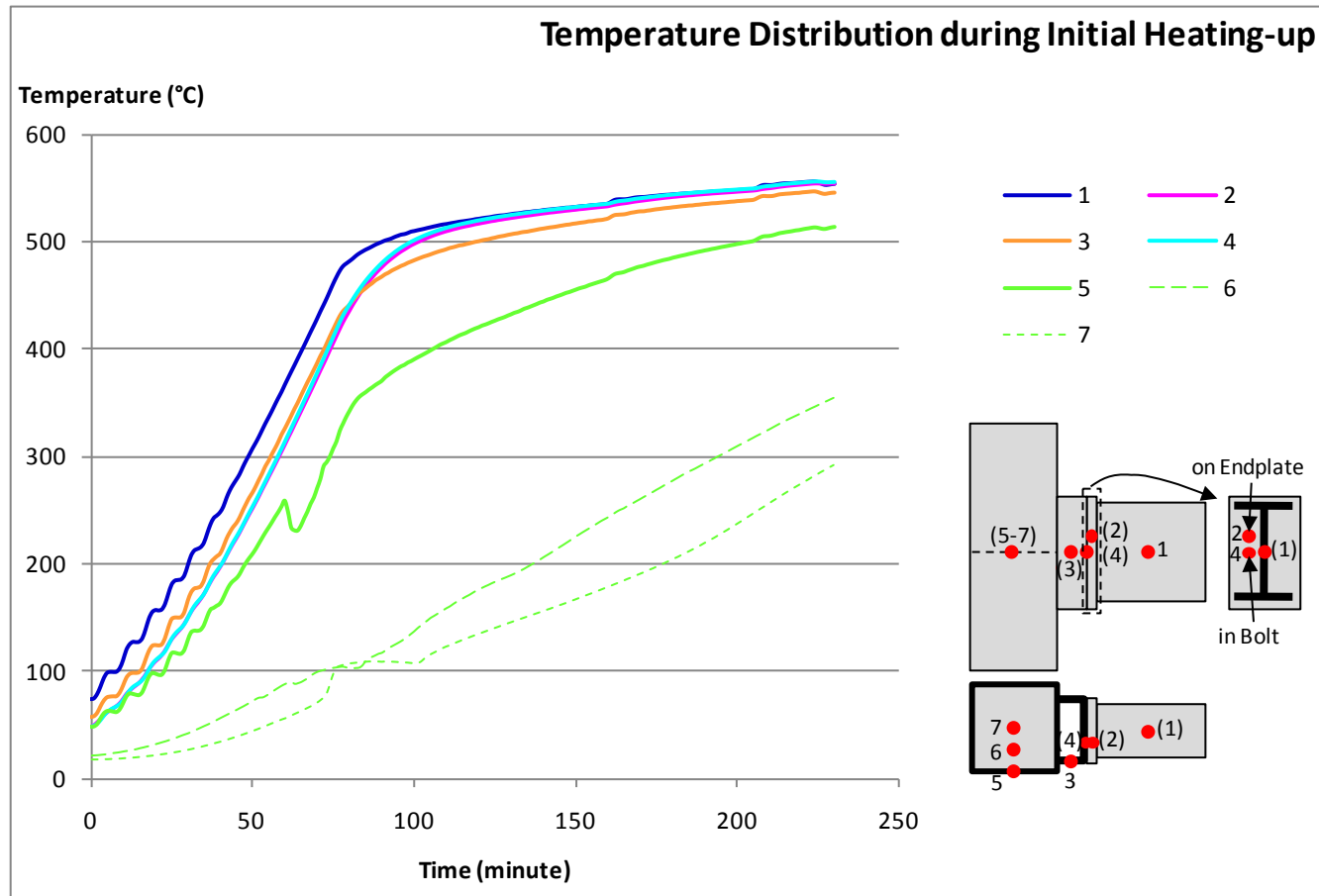
103	559.11	157.15	33.83	17.85	1.30	16.55	104.49	86.80	58.18	17.62
104	559.14	158.75	33.56	18.13	1.29	16.84	104.90	87.41	57.99	17.52
105	559.17	160.28	33.29	18.40	1.29	17.11	105.85	88.47	58.10	17.50
106	559.18	161.94	33.00	18.69	1.29	17.40	106.40	89.23	57.96	17.41
107	559.24	163.36	32.74	18.96	1.30	17.66	107.18	90.15	57.97	17.37
108	559.32	165.43	32.43	19.27	1.29	17.98	107.37	90.62	57.59	17.20
109	559.45	166.97	32.13	19.58	1.29	18.29	108.35	91.76	57.62	17.15
110	559.53	168.50	31.85	19.87	1.30	18.57	108.35	92.04	57.17	16.97
111	559.59	170.11	31.52	20.20	1.30	18.90	108.21	92.25	56.57	16.73
112	559.63	171.60	31.21	20.51	1.30	19.22	108.86	93.10	56.41	16.62
113	559.65	173.15	30.89	20.84	1.30	19.54	109.03	93.57	55.97	16.43
114	559.67	174.87	30.57	21.16	1.30	19.87	108.58	93.49	55.22	16.15
115	559.72	176.60	30.23	21.51	1.29	20.22	107.91	93.24	54.33	15.82
116	559.73	178.08	29.86	21.88	1.27	20.61	106.99	92.79	53.27	15.45
117	559.86	179.82	29.51	22.23	1.27	20.96	105.29	91.63	51.87	14.97
118	559.96	181.61	29.13	22.62	1.26	21.36	103.24	90.19	50.25	14.43
119	560.02	183.03	28.74	23.00	1.25	21.75	101.35	88.86	48.74	13.93
120	560.09	184.57	28.35	23.40	1.24	22.16	99.61	87.66	47.29	13.44
121	560.11	186.11	27.95	23.80	1.20	22.60	96.82	85.53	45.38	12.82
122	560.20	187.64	27.47	24.28	1.17	23.11	91.87	81.51	42.37	11.89
123	560.20	189.18	27.00	24.75	1.14	23.61	86.91	77.44	39.45	10.99

* Average temperature of the beam web, endplate, reverse channel and bolt

** Moment about Point A on the specimen drawing

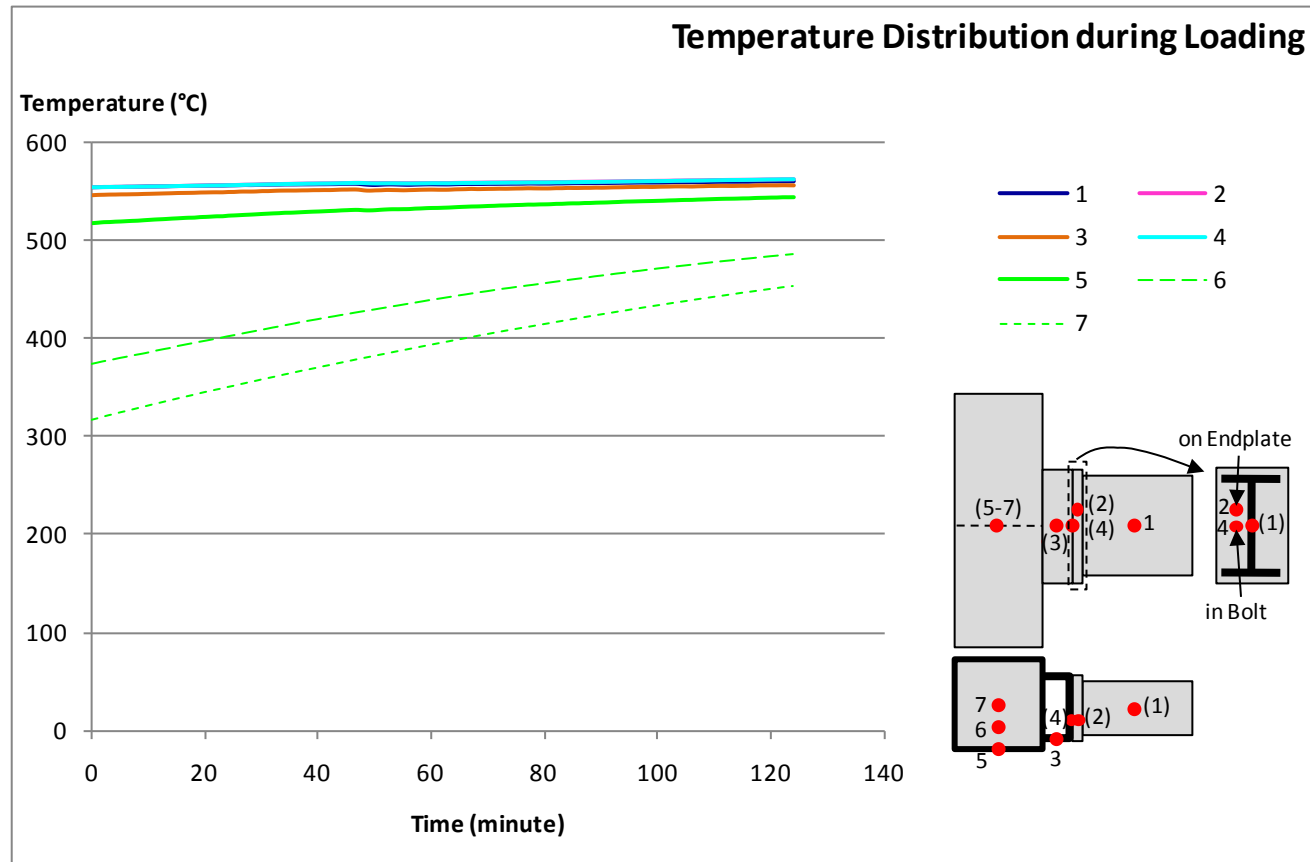
SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result



SCFT-RC200_550_55_04-01-2011

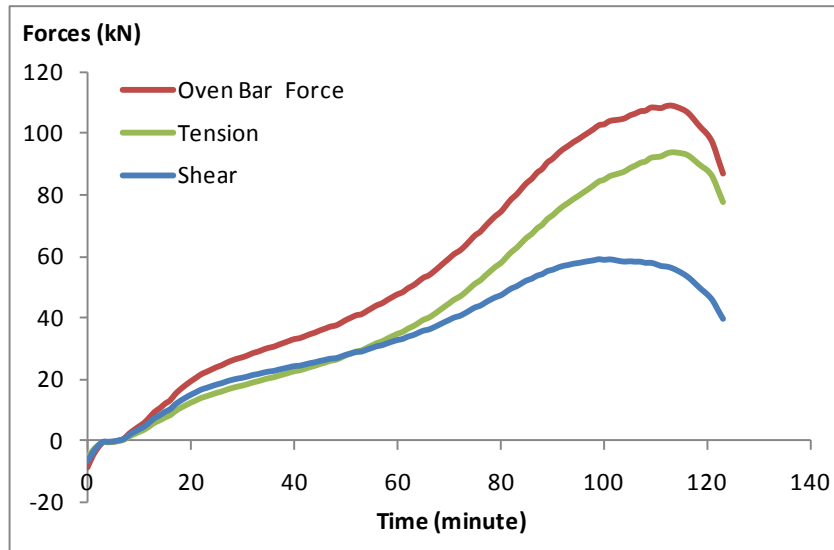
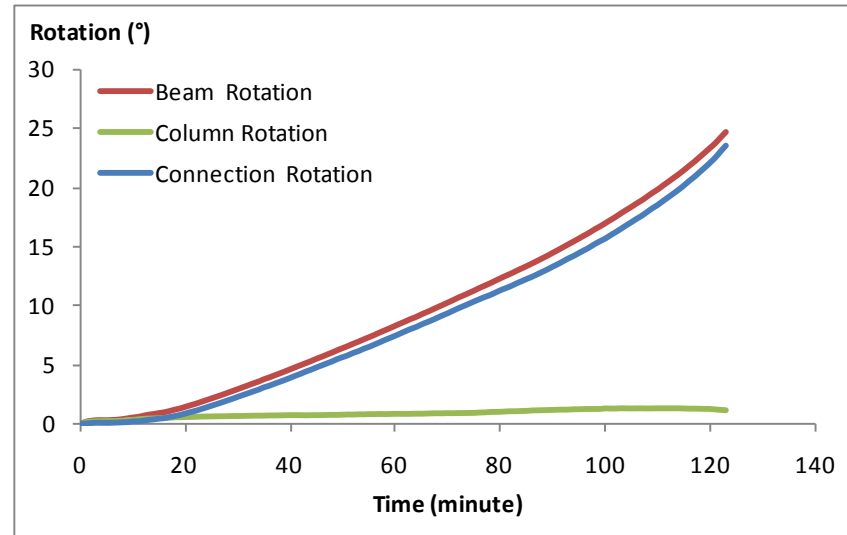
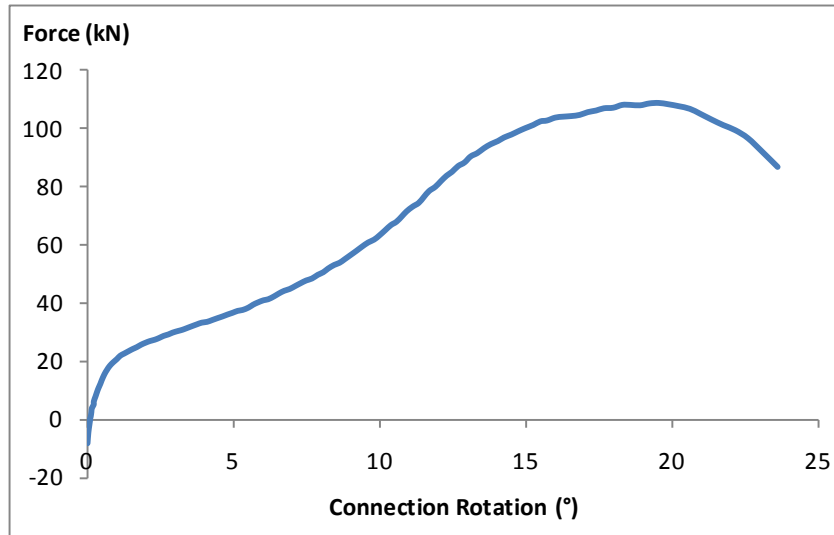
4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result



COMPFIRE

SCFT-RC200_550_55_04-01-2011

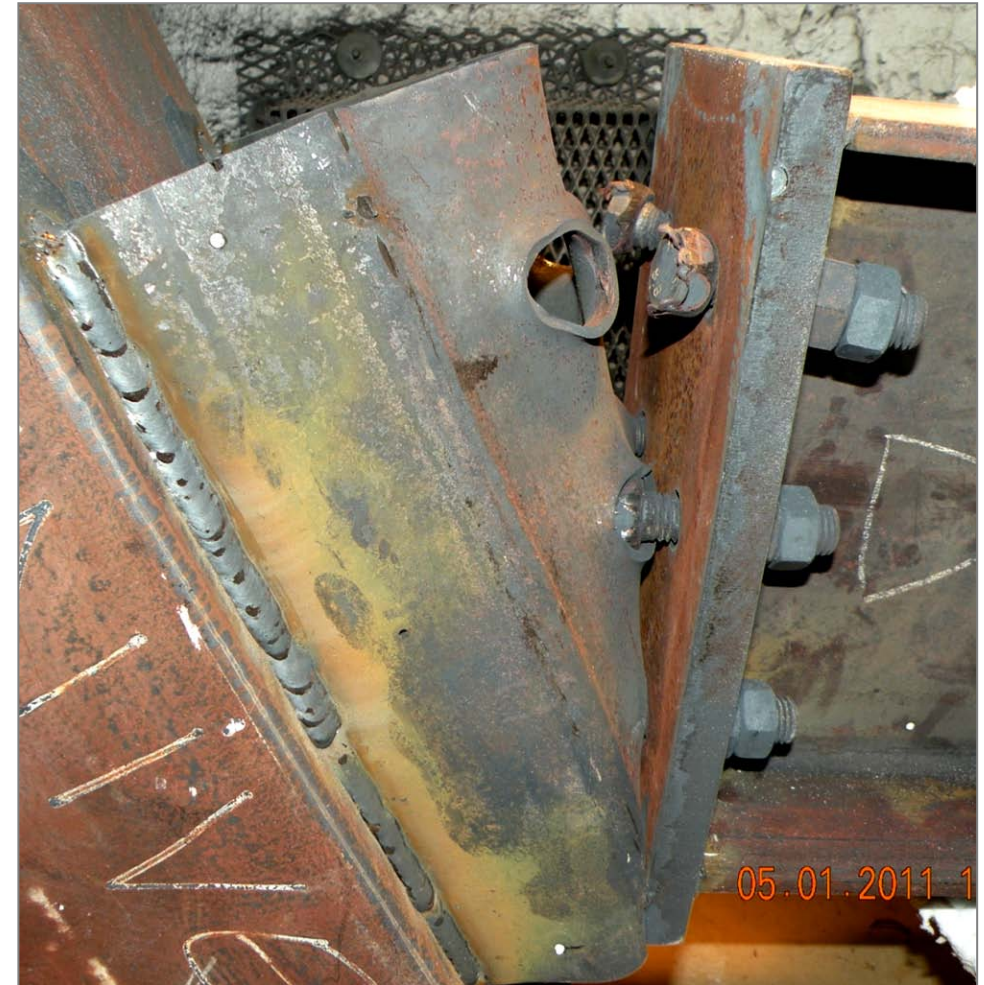
4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

RFSR-CT-2009-0021

Design of joints to composite columns for improved fire robustness

<ftp://openspace.dec.uc.pt/>

Photographs after Test



COMPFIRE

SCFT-RC200_550_55_04-01-2011

4 January 2011 Reverse Channel Connection (Cut from SHS200x6) to Square Concrete-Filled Tube Test Result

RFSR-CT-2009-0021

Design of joints to composite columns for improved fire robustness

<ftp://openspace.dec.uc.pt/>

