Appendix

Fire Research #73

Proposal of new expressions for the calculation of section factor on structural steel columns in contact with walls

Table A1. Steel profiles used in the numerical simulation models.

Walls 7cm thick		Walls 15cm thick	
Web parallel to walls	Web perpendicular to walls	Web parallel to walls	Web perpendicular to walls
-	HD 320x127	HD 320x127	HD 320x127
HD 320x127	IPE 180	HE 450 AA	HE 450 AA
IPE 180	HE 160 A	HE 450 A	HE 450 A
HE 160 A	HE160 AA	HE 450 M	HE 450 M
HE160 AA	HE160 M	HP 260x52	HP 260x52
HE160 M	HE 450 M	HP 360x152	HP 360x152
HE 450 M	HP 360x174	HP 360x174	HP 360x174
HP 360x174	HP 250x62	HP 305x79	HP 305x79
HP 250x62	HP 360x152	HP 305x110	HP 305x110
HP 360x152	HP 305x79	HP 400x194	HP 400x194
HP 305x79	HP 400x194	HP 400x231	HP 400x231
HP 400x194	IPEO 180	IPEA 400	IPEA 400
IPEA 100	IPE 400	IPEA 270	IPEA 270
IPE 400	IPEA 180	IPE 400	IPE 400
IPEA 180	IPEO 270	IPEO 270	IPEO 270
IPEO 270	UBP 356x368x133	UBP 356x368x133	UBP 356x368x133
UBP 356x368x133	UB 254x102x28	UB 254x102x28	UB 254x102x28
UB 254x102x28	UB 406x178x54	UB 406x178x54	UB 406x178x54
UB 406x178x54	UC 254x254x107	UC 254x254x107	UC 254x254x107
UC 254x254x107	UC 356x406x551	UC 356x406x551	UC 356x406x551
UC 356x406x551	W 250x250x131	-	W 250x250x131
W 250x250x131	W 460x280x235	W 250x250x167	W 250x250x167
W 460x280x235	W 920x420x390	W 460x280x235	W 460x280x235
W 920x420x390	HD 320x127	W 920x420x344	W 920x420x344

Table A2. Temperatures obtained by Eurocode and ABAQUS, and their quotient - Case 1.

Time (min)	Eurocode	ABAQUS			ABAQUS/EUROCODE		
		HF	WEB	UF	HF	WEB	UF
15	549	484.450	271.399	50.240	0.882	0.494	0.530
60	938	912.660	626.422	250.370	0.973	0.668	0.696
120	1046	1030.800	744.852	372.990	0.985	0.712	0.710
AVERAGE					0.947	0.625	0.691

HF, Heated Flange; UF, Unheated Flange.

Table A3. Temperatures obtained by Eurocode and ABAQUS, and their quotient - Case 2.

Time (min)	Eurocode	ABAQUS			ABAQUS/EUROCODE		
		HF	WEB	UF	HF	WEB	UF
15	328	484.450	271.399	50.240	1.477	0.827	0.153
60	901	912.660	626.422	250.370	1.013	0.695	0.278
120	1042	1030.800	744.852	372.990	0.989	0.715	0.315
AVERAGE					1.160	0.746	0.249

HF, Heated Flange; UF, Unheated Flange.

Table A4. Temperatures obtained by Eurocode and ABAQUS, and their quotient - Case 3.

Time (min)	Eurocode	ABAQUS			ABAQUS/EUROCODE		
		HF	WEB	UF	HF	WEB	UF
15	432	484.450	271.399	50.240	1.121	0.628	0.116
60	926	912.660	626.422	250.370	0.986	0.676	0.270
120	1045	1030.800	744.852	372.990	0.986	0.713	0.314
AVERAGE					1.031	0.672	0.234

HF, Heated Flange; UF, Unheated Flange.

Table A5. Temperatures obtained by Eurocode and ABAQUS, and their quotient - Case 4.

Time (min)	Eurocode	ABAQUS			ABAQUS/EUROCODE		
		HF	WEB	UF	HF	WEB	UF
15	236	484.450	271.399	50.240	2.053	1.150	0.213
60	843	912.660	626.422	250.370	1.083	0.743	0.297
120	1038	1030.800	744.852	372.990	0.993	0.718	0.316
AVERAGE					1.376	0.870	0.275

HF, Heated Flange; UF, Unheated Flange.

Table A6. Reduction coefficients - Case 2.

Time (min)	k_1	k_2	k_3
15	0.901	0.905	0.507
60	0.865	0.778	0.610
120	0.885	0.793	0.633

Table A7. Reduction coefficients - Case 4.

Time (min)	k_1	k_2	k_3
15	1.116	1.117	0.635
60	0.878	0.787	0.619
120	0.886	0.792	0.634

Table A8. Reduction coefficients - case 2.

Time (min)	k_1	k_2	k_3
15	1.122	0.959	0.635
60	0.965	0.828	0.699
120	0.945	0.813	0.707

Table A9. Reduction coefficients - case 4.

Time (min)	k_1	k_2	k_3
15	1.376	1.177	0.779
60	0.967	0.830	0.702
120	0.946	0.814	0.713

Table A10. Reduction coefficients - case 2.

Time (min)	k_1	k_2	k_3
15	1.297	0.637	0.081
60	1.012	0.621	0.155
120	0.999	0.668	0.207

Table A11. Reduction coefficients - case 4.

Time (min)	k_1	k_2	k_3
15	1.526	0.804	0.102
60	1.061	0.675	0.180
120	1.000	0.685	0.219

Table A12. Reduction coefficients - case II.

Time (min)	k_1	k_2	k_3
15	1.289	0.929	0.093
60	1.011	0.781	0.179
120	1.001	0.806	0.226

Table A13. Reduction coefficients - case IV.

Time (min)	k_1	k_2	k_3
15	1.508	1.091	0.100
60	1.026	0.788	0.167
120	1.003	0.804	0.212