

6.12.6 Characterization of the Thermal Profiles

Tables 6–8 and 6–9 summarize the regions of the floors in which the structural steel reached temperatures at which their yield strengths would have been significantly diminished. Instances of brief heating of one or two columns early in the fires were not included.

Even in the vicinity of the fires, the columns and trusses for which the insulation was intact did not heat to temperatures where significant loss of strength occurred.

Unlike the simulations of the aircraft impact and the fires, there was no evidence, photographic or other, for direct comparison with the FSI results.

Table 6–8. Regions in WTC 1 in which temperatures of structural steel exceeded 600 °C.

Floor Number	Trusses		Perimeter Columns		Core Columns	
	Case A	Case B	Case A	Case B	Case A	Case B
93	–	–	–	–	–	–
94	–	–	–	–	N, S	NE, S
95	N	N, S	–	–	S	NW, S
96	N	N, S	–	S	S	W, S
97	N, S	N, S	–	S	N	W, S
98	N	N, S	–	–	–	–
99	–	–	–	–	–	–

Key: N, north; NE, northeast; NW, northwest; S, south; W, west.

Table 6–9. Regions in WTC 2 in which temperatures of structural steel exceeded 600 °C.

Floor Number	Trusses		Perimeter Columns		Core Columns	
	Case C	Case D	Case C	Case D	Case C	Case D
79	–	–	–	–	–	–
80	–	–	–	–	–	–
81	NE	NE	NE	NE	–	NE
82	E	E	E	E	E	E
83	E	E	–	E	–	E

Key: E, east; NE, northeast.

6.13 MEASUREMENT OF THE FIRE RESISTANCE OF THE FLOOR SYSTEM

As described in Section 5.4.7, the composite floor system, composed of open-web, lightweight steel trusses topped with a slab of lightweight concrete, was an innovative feature. As further noted in Section 5.6.2, the approach to achieving the specified fire resistance for these floors was the use of a SFRM. Documents indicated that the fire performance of the composite floor system of the WTC towers was an issue of concern to the building owners and designers. However, NIST found no evidence regarding the technical basis for the selection of insulation material for the floor trusses or for the insulation thickness to achieve a 2 hour rating. Further, NIST has found no evidence that fire resistance tests of the WTC floor system were conducted.