

First Interstate Bank and One Meridian Plaza, both commercial office buildings, had fires that fully involved entire floors. In both buildings, vertical spread of fire was by external flame exposure, breaking glass windows from the outside and igniting office furnishings in the floor above. By contrast, the fires in WTC 7 spread across several floors, but did not involve an entire floor at any given time. Additionally, in WTC 7 there was no evidence of floor-to-floor fire spread in the photographic and videographic records. Finally, the combustible load was likely similar in First Interstate Bank, One Meridian Plaza, and WTC 7, with the combustible load in One Meridian Plaza perhaps even greater as it was described subjectively as “heavy.” NIST therefore concluded that the fires in First Interstate Bank and One Meridian Plaza were at least as severe, and probably more severe, than the fires in WTC 7.

The maximum gas temperature for large, open-floor plan burning of office furnishings is approximately 1200 °C (2200 °F), as measured in Cardington Test No. 6. Note that Cardington Test No. 3, which was also characterized as a severe fire, produced maximum gas temperatures of approximately 1000 °C (1800 °F). These maximum temperatures were consistent with the maximum gas temperatures of 1100 °C (2000 °F) determined by fire simulations and measured experimentally for fires of workstations similar to those in WTC 7 (NIST NCSTAR 1-5E).

If the fires in First Interstate Bank, One Meridian Plaza, the Cardington Test Building and WTC 7 generated comparable gas temperatures, and of the four buildings cited only the WTC 7 building collapsed, the reason for the different outcomes likely lay in differences in the structural systems and the details of how the steel frames were constructed.¹ Although all four buildings have been described as “steel frame structures,” comparison of construction features between the three buildings that did not collapse in an uncontrolled fire and WTC 7 revealed the following differences:

- Simple framing connections for girders in WTC 7 vs. fully restrained moment connections of girders-to-columns in the One Meridian Plaza and First Interstate Bank buildings;
- Floor beam spans up to 16 m (52 ft) in WTC 7, rather than a maximum of 9 m (30 ft) in the other structures;
- Asymmetric framing in WTC 7 (providing one-sided lateral support to girders) rather than regular floor framing (providing two-sided lateral support to girders) in the other three structures (Section 8.6);
- Non-composite girders in WTC 7 rather than composite girders (presence or absence of shear studs) in two of the other three structures; and
- Seated connections used for girder-to-column connections in WTC 7; NIST found no evidence that such connections were used in the First Interstate Bank and Cardington buildings.

The implications of these differences are discussed in the following section.

¹ WTC 7 sustained damage to its exterior as a result of falling debris from the collapse of WTC 1, but this damage was found to have no effect on the collapse initiating event.