

In light of the lack of visual evidence with which to validate the highly complex coupling of the fire and thermostructural models, the Investigation Team did not pursue simulating the modest effect of these late floor failures on the progress of the fires.

The Investigation Team was able to develop a qualitative estimate of the effect of not including floor-to-floor fire spread through possible gaps in the firestopping on the accuracy of the thermal environment in the fire simulations. The estimates were for fire spread from Floor 7 to Floor 8, Floor 8 to Floor 9, Floor 11 to Floor 12, and Floor 12 to Floor 13. No sustained fires were observed on any other pairs of floors (Section 5.6).

At about 3:40 p.m. there were fires above each other on the 7th and 8th floors. No fire had been observed on the 8th floor prior to 3:22 p.m. The 8th floor fire simulation assumed that the fire had begun in the southwest corner and calculated that it moved northward on the west side of the building. If the fire had actually started on the 8th floor by spreading from the 7th floor around 3:30 p.m., the simulation of the fire on the 8th floor would have overestimated the thermal environment in the southwest region of this floor. However, Figure 9-10 shows that the calculated air temperatures at the southwest region of the 8th floor were below about 300 °C after about 3 h of simulation time; and the ANSYS simulations (Chapter 11), which included this potential overheating, indicated minor fire-induced structural damage in this region. The LS-DYNA simulations (Chapter 12) indicated that complete removal of the more serious, debris-induced structural damage still resulted in the collapse of WTC 7. Thus, it appeared that any overestimation of the thermal environment due to the assumption of no floor-to-floor fire spread was not consequential.

The fire on the 9th floor, which was not observed in the imagery until about 4:00 p.m., was simulated by displacing the 8th floor fire one hour later. The effect of overestimation of the temperatures in the fire simulation would have been similar to that for the hypothetical spread from the 7th floor to the 8th floor.

The fires on the 11th, 12th, and 13th floors were all first observed between 2:08 p.m. and 2:30 p.m. near the southeast corner of WTC 7. Thus, it is conceivable that a single fire started on the 11th floor following the collapse of WTC 1 and that the fire had spread to the 12th and 13th floors by the time the fires emerged from the dust-blocked south side of the building. The fires on the 11th and 13th floors were simulated as delayed equivalents of the 12th floor fire. As shown in Figure 9-13, nearly all of the heat released in these simulated fires occurred after these initial observation times (i.e., after about 2:00 p.m.), even though the simulations had been started over 2 h earlier. Thus, any overestimation of structural heating (from assuming three fires burning in the late morning rather than just one) would have been small compared to the effects of the far larger fires in the northeast region of the floors later in the afternoon..

The Investigation Team concluded that it was unlikely that hypothetical spread of fire through gaps in the firestopping would have changed the simulated thermal environment substantially.