

The rate of heat release shown in Figure 9–13 indicates only what the FDS analysis predicted to have burned. All the combustibles were not consumed in the simulations. Floors 7 and 8 had nominally the same fuel load, but the layout of furnishings was different, the window breakage history was different, and consequently the total amount of combustibles consumed was different. Floor 12 was assumed to have a higher combustible loading, and the layout of the floor was different from Floors 7 and 8. Also, the simulated fires spread along the south face of Floor 12, as well as along the east and north faces, whereas the simulated fires on Floors 7 and 8 spread along the west, then north, then east faces. There is no visual evidence to confirm that there was any substantial fire spread along the south face, but nothing was deliberately added to the model to spread or not spread fire along the south face.

9.5 SUMMARY OF THE SIMULATIONS OF FIRES IN WTC 7

The Investigation Team concluded that possible diesel fuel fires on the 5th or 6th floors were not likely to have been significant contributors to the eventual collapse of the building. The worst-case scenarios associated with ruptured fuel lines generated fires that could not be sustained long enough, or generated too little heat, to raise the temperatures of the steel and concrete structure to the point of significant loss of strength or stiffness, or these fires would have exhausted smoke from the exhaust louvers. No such emanation was observed.

Although the visual evidence for WTC 7 was not nearly as extensive as for WTC 1 and WTC 2, the fire simulations did exploit as much as possible the few photographs showing the location of severe fire activity in WTC 7 at various times during the afternoon of September 11, 2001. Compared to the actual fires, the simulated fires followed the same general paths and, as evidenced by the validation experiments reported in NIST NCSTAR 1-5E, generated comparable temperatures to those in the fire tests. The simulations of the 12th floor fires (and thus the derivative 11th and 13th floor fires) may have mildly overestimated the duration of the fires and the fraction of the burning near the north face windows, relative to the burning in the interior of the tenant space.

The output from the fire simulations of the 7th, 8th, and 12th floors, along with the time-shifted output for the 9th, 11th, and 13th floors, was used as the input for the building thermal response calculations presented in the next chapter.

9.6 REFERENCES

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