

Chapter 7

FINDINGS

7.1 CHARACTERISTICS OF THE BUILDINGS

- The floors which the aircraft impacted and on which the major fires occurred were mostly occupied by a single tenant. The floor plans were generally open, with few interior walls.
- The principal combustibles on the fire floors were workstations, each capable of generating a peak heat release rate of 7 MW and a total (integrated) heat release of 4 GJ. The total fuel load on the World Trade Center (WTC) floors was about 4 psf, 20 kg/m².
- The aircraft added significant combustible material to their paths (and the paths of their breakup fragments) through the buildings.
- The ceiling tile systems in the fire zones were heavily damaged by the shocks from the aircraft impacts and would have provided little, if any, barrier to fire exposure of the ceiling structure. This was consistent with multiple observations during the evacuation.

7.2 CHARACTERISTICS OF THE FIRES

- Upon aircraft impact, a significant fraction of 10,000 gal of jet fuel ignited within the building. The expansion of the hot combustion gases broke windows and blew some of the remaining fuel through them in large fireballs.
- The jet fuel fires consumed most of the oxygen within the fire floors, and the fires quickly died down. The fires grew as fresh air became available through broken windows and the primed solid combustibles reached their full burning rates.
- The jet fuel was the primer for near-simultaneous ignition of large fires on multiple floors.
- The dominant fuel for the fires in the towers was the office combustibles. On the floors where the aircraft fuselage impacted, there was a significant, but secondary contribution from the combustibles in the aircraft. Most of the jet fuel in the fire zones was consumed in the first few minutes after impact, although there may have been unburned pockets of jet fuel that led to flare-ups late in the morning.
- The major fires in World Trade Center (WTC) 1 were on the 93rd through 99th floors. The fires generally moved both clockwise and counterclockwise from the north to the south of the tenant spaces. The fires were generally ventilation limited, i.e., they burned and spread only as fast as fresh air became available, generally from additional window breakage.
- The major fires in WTC 2 were on the 79th through 83rd floors, with the most important fires being in the northeast corner of the 81st and 82nd floors. The fires moved far less than those in