

2.10 THE OUTCOME

Seven major factors led to the collapse of WTC 1:

- Structural damage from the aircraft impact;
- Large amount of jet fuel sprayed into the building interior, that ignited widespread fires over several floors;
- Dislodging of SFRM from structural members due to the aircraft impact, that enabled rapid heating of the unprotected structural steel;
- Open paths for fire spread resulting from the open plan of the impact floors and the breaking of partition walls by the impact debris;
- Weakened core columns that increased the load on the perimeter walls;
- Sagging of the south floors, that led to pull-in forces on the perimeter columns; and
- Bowed south perimeter columns that had a reduced capacity to carry loads.

After the building withstood the initial aircraft damage, the timing of the collapse was largely determined by the time it took for the fires to weaken the core and to reach the south side of the building and weaken the columns and floor assemblies there.

There were no survivors among the 1,355 people who were on or above the 92nd floor. The aircraft had destroyed all egress paths downward, and roof rescue was impossible.

Of the roughly 7,545 building occupants who started that morning below the 92nd floor, all but 107 escaped the building. Those left behind were trapped by debris, awaiting assistance, helping others, or were just too late in starting their egress. For the most part, the evacuation was steady and orderly.

Six percent (almost 500) of the survivors from WTC 1 had a limitation that impaired their ability to evacuate. Many of these were able to evacuate, often with assistance; others were less fortunate. About 40 to 60 mobility-impaired occupants were found on the 12th floor, where they had been placed in an attempt to clear the stairways. Just before the collapse of WTC 1, emergency responders were assisting about 20 of these people down the stairwell. It remains unclear how many of these people survived.

Had the building been significantly more than one-third to one-half occupied, the casualties would likely have been far higher, since the exiting population would have exceeded the capacity of the stairwells to evacuate them in the time available.

Those emergency responders who entered the building and the emergency personnel who were already in the building were helpful in assisting the evacuation of those below the impact floors. However, there was insufficient time and no path to reach any survivors on the impact floors and above. Any attempts to mitigate the fires would have been fruitless due to the lack of water supply and the difficulty in reaching the fire floors within the time interval before the building collapse. It is not known precisely how many