

- At this point, the east wall carried about 5 percent more of the gravity loads, and the core carried about 2 percent less. The other three walls carried between 0 percent and 3 percent less.
- The long-span floors on the east side of the 79th to 83rd floors weakened with increasing temperatures and began to sag. About one-third of the remaining floor connections to the east perimeter wall on the 83rd floor failed.
- Those sagging floors whose seats were still intact pulled inward on the east perimeter columns, causing them to bow inward. The inward bowing increased with time.

Collapse Initiation

- As in WTC 1, the bowed columns buckled and became unable to carry the gravity loads. Those loads shifted to the adjacent columns via the spandrels, but those columns quickly became overloaded. In rapid sequence, this instability spread all across the east wall.
- Loads were transferred from the failing east wall to the weakened core through the hat truss and to the north and south walls through the spandrels. The instability of the east face spread rapidly along the north and south walls.
- The building section above the impact zone (near the 82nd floor) tilted 7 degrees to 8 degrees to the east and 3 degrees to 4 degrees to the south prior to significant downward movement of the upper building section. The tilt to the south did not increase any further as the upper building section began to fall, but the tilt to the east was seen to increase to 20 degrees until dust clouds obscured the view.
- The downward movement of this structural block was more than the damaged structure could resist, and the global collapse began.

6.14.8 Accuracy of the Probable Collapse Sequences

Independent assessment of the validity of the key steps in the collapse of the towers was a challenging task. Some of the photographic information had been used to direct the simulations. For example, the timing of the appearance of broken windows was an input to the fire growth modeling. However, there were significant observables that were usable as corroborating evidence, as shown in Tables 6–10 and 6–11. Some of these were used to establish the quality of the individual simulations of the aircraft impact and the fire growth, as described in Sections 6.9 and 6.10. While the agreement between observations and simulation was not exact, the differences were within the uncertainties in the input information. The generally successful comparisons lent credibility to the overall reconstruction of the disaster.

There remained a small, but important number of observations against which the structural collapse sequences could be judged. The comparisons are for Cases B and D impact damage and temperature histories, for which the better agreement was obtained.