

Horizontal Progression of Failure

Triggered by damage due to the vertical failure below the east penthouse, the failure progressed horizontally across the lower floors (in the region of Floors 5 and 7 that were much thicker and more heavily reinforced than the rest of the floors), resulting in a progressive collapse of the entire structure.

Other Collapse-Related Possibilities

The leading hypothesis was based on an initial local failure caused by ordinary building contents fires, not fires from leaking pressurized fuel lines or fuel from day tanks. These other factors were considered as possible collapse hypotheses, but were ruled out, as discussed subsequently in Section 8.9.1.

While NIST found no evidence of a blast or controlled demolition event, it evaluated the consequences of hypothetical blast scenarios that could have led to the structural failure of one or more critical elements (Section 8.9.2).

The Con Edison substation was also found to have had no role in the collapse of WTC 7 (Section 8.9.3).

8.3 WTC 7 COLLAPSE OBSERVATIONS

8.3.1 Visual Images

The collapse of WTC 7 was recorded on several videos taken from various locations, and the study of these videos was reported in Section 5.7. Table 5–3 shows the timeline for major WTC 7 collapse observations. Several of the collapse observations are repeated here with specific reference to annotated figures, which also appear in Section 5.7.

- East edge of the east penthouse started to move downward, roofline quickly “kinked” roughly 40 percent of the way from the east side of the penthouse (Figure 8–1).
- Two sections of the east penthouse rotated inward as the roof below gave way and the east section disappeared below the roof parapet wall (Figure 8–2). Window breakage occurred on the north face of the building near Columns 43 and 45 as the penthouse collapsed.
- Horizontal motion of the northwest corner of the building was detected during the collapse of the east penthouse and vertical progression of failure, as evidenced by video frame subtraction, as explained in Section 5.7 (Figure 8–3).
- Daylight was visible through the windows on the 47th floor after the entire east side of roof collapsed (Figure 8–4).
- Beginning of global collapse of WTC 7 was detected as the building roofline below the east penthouse location and the eastern end of the screenwall started dropping simultaneously, and the east edge of the north wall rotated northward and developed a kink near Column 47 (Figure 8–5).
- The entire upper portion of the building, i.e., all floors visible in the videos, began to move downward, and window breakage occurred on the west side of the north face between Columns