

East-west Motion of the Building as the East Penthouse Collapsed

As evidenced by the breaking glass in the upper stories (Figure 8–2 and Figure 8–4), collapse on the east side of the building was not limited to the roof and penthouse. Failures were likely occurring on many floors below with sufficient energy to cause the 47 story building to move laterally in its strong (east-west) direction (Figure 8–3). An analysis of one of the videos using frame subtraction to highlight differences between two video frames (Appendix C), revealed that the northwest edge of the building showed horizontal motion of around 15 in. peak-to-peak oscillation as the east penthouse collapsed (Figure 8–8). Measurable, though smaller, vibrations (about ± 2 in.) were detected at least 6 s before the east penthouse began to collapse. This suggested that a major disturbance occurred within the building prior to visible evidence of collapse (movement of the east penthouse) from available video recordings.

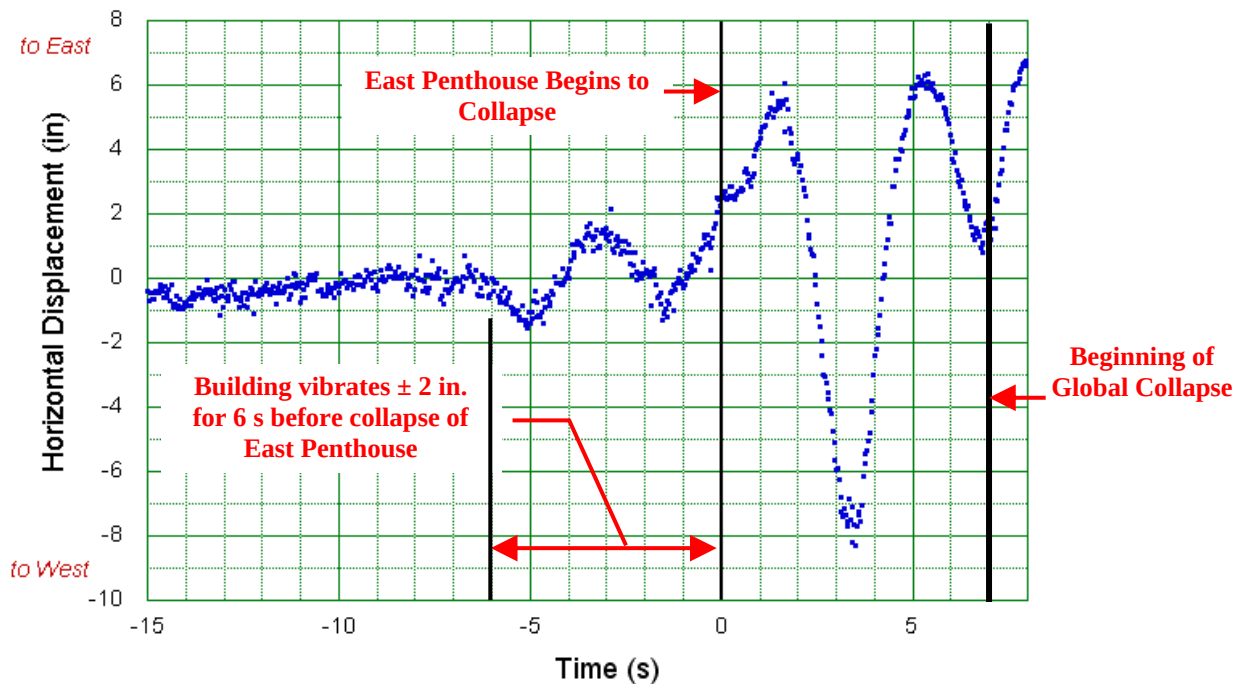


Figure C–8 (Appendix C) with annotations

Figure 8–8. Horizontal motion detected on the northwest edge of the building.

Collapse of the Entire Building

The global collapse of WTC 7 began approximately 7 s after the onset of downward movement of the east penthouse (Figure 8–5). At this time, the entire upper section of the building – all floors visible in the videos – moved downward together, suggesting widespread failure of the support structure (columns and/or transfer trusses) in the lower levels of the building (Figure 8–6).

8.4 BUILDING CONTENTS FIRES

If, as identified above, the failure of Column 79 were consistent with the observations and interpretations of the photographic and videographic evidence, then the possible causes of failure of Column 79 needed to be investigated.