

5.7.3 Distortion of the North Façade

After the east penthouse and a small section of the north screenwall disappeared, there was a short period during which structural changes were not apparent in the videos. Figure 5–197 shows two views of the north face of the building 3.5 s after the east penthouse began to move downward and 1.5 s later than Figure 5–196. In the close view, a number of windows have opened on the 40th through 45th floors between Columns 43 and 45. A bright area is evident in the windows on the 46th and 47th floors. This bright area appeared as the east penthouse disappeared into the building, likely due to sunlight shining onto the windows through the opening created in the roof of WTC 7 by the collapsing penthouse. The same bright area near the top of WTC 7 is evident in the long distance view in Figure 5–197.

In this same frame, a faint tear-drop-shaped brighter area is also apparent, spread over multiple floors on the eastern side of the north face. This area extends downward to near the 33rd floor. When this video clip was scrubbed (played back and forth at varying rates), it was possible to observe this lighter area moving downward on the face following the penthouse descent. It appeared near the top of the building at the same time the east penthouse disappeared into the building (Figure 5–194 through Figure 5–196) and moved downward in a single continuous motion, disappearing from view behind the building in the foreground, roughly 5 s after the penthouse began to descend. The same motion could be seen in the Camera 1 video clip from which the more distant view shown in Figure 5–184 was taken.

Since the majority of the window glass in the area of the movement was still intact, it is probable that the lighter area was the result of changing light reflections due to distortions of the façade, similar to those discussed earlier. Such distortions could be due to physical movement of the face or perhaps to pressure changes within the building. Whatever the cause, it seems clear that some type of disturbance began to move downward in the building at the same time as the east penthouse started descending.

Just prior to the time that Figure 5–196 was taken (at $3.5 \text{ s} \pm 0.1 \text{ s}$), an additional failure was observed on the roof of WTC 7 in the Camera 2 video clip. A relatively small piece of screenwall or mechanical equipment in the vicinity of the east end of the screenwalls began to move and appeared to rotate downward toward the south or west. It disappeared from view in about 2 s.

When the Camera 3 video clip was scrubbed, it could be seen that the entire building moved as the east penthouse began to sink into WTC 7. This motion was most evident along the northwest corner. At first, there was a relatively small motion toward the west, followed by a larger movement toward the east. These motions were more easily identified by creating difference frames in which a single frame recorded prior to the start of the east penthouse movement was subtracted from each frame in the clip. Figure 5–198 includes three frames taken from such a difference video, with times following the start of downward motion for the east penthouse indicated. The variations in the brightness of the line along the northwest corner reveal that lateral motions were taking place. Details concerning these motions are provided in Appendix C, where a more sophisticated analysis is used to quantify the building movements. Note that other observations discussed previously, such as the appearance of broken windows and light coming through the upper windows at the top of the building, can be discerned in the difference frames.

Figure 5–187 was recorded 0.2 s after the images shown in Figure 5–197 and 3.7 s after the east penthouse began to move downward, looking down West Broadway. Much of the north face is visible for the 25th floor and higher. Roughly seven additional lower floors are visible at the northeast corner. Some