



Figure 4-11 WTC 5 façade damage.

complete destruction. Even the mid-height partitions were destroyed and had collapsed throughout much of the 6th floor. This level of damage was not evident on the other floors.

The sprinkler system appears not to have operated at all. This was evident due to the lack of water damage throughout, but especially in the lower level bookstore shown in Figure 4-15. Many sprinkler heads were damaged; some even melted and fell off the sprinkler piping in the fire areas.

As illustrated in Figure 4-16, the interior of the exit stair tower at the southwest corner was practically untouched by the fire. There were no burn marks or smoke damage in this exit tower, or on the “safe” or stairwell side of the fire door. At one location, a piece of paper was found taped to the exit stairwall just inside the fire door with no evidence of smoke or charring from fire.

4.3 Analysis of Building Performance

4.3.1 Steel and Frame Behavior

The punctures in the building envelope of WTC 5, caused by falling debris from the WTC towers, are a result that would be expected from large debris falling over a great distance. Generally, the debris punched through the roof and floor slabs and severed or otherwise damaged framing until sufficient energy had dissipated to arrest the collapse.

The debris from the towers caused damage to the outside wall steel framing of WTC 5, but this damage did not cause any additional collapse of the floors. In fact, the steel pipe façade supports (mullions) provided structural redundancy to the floor framing and redistributed some portion of the cantilevered floors to other levels.