

6.3 Structural Damage Description

Debris from WTC 2 fell along the north side of the building. This debris completely crushed the single-story extension of the building, north of line 8, and collapsed it into the basement in this area. A column section from WTC 2 was embedded in the north edge of the floor slab of the 29th floor. It also appears that one section, or perhaps several sections, of exterior column trees from the south wall of WTC 2 plunged through the north wall of the building just above the 23rd floor. This impact area is illustrated in Figure 6-4. The zone of structural damage remained confined to one structural bay for several floors immediately below the point of impact before spreading to two and sometimes three bays in the floors below. However, although the pattern of damage was influenced by the structural response, most of the damage can be attributed to the path of the impact debris and not to progressive collapse.

It appears that the direction of motion of the falling debris from WTC 2 was steeply angled down and to the east-southeast. As the falling debris smashed through the 23rd floor spandrel between column lines C and D, it and the debris it created at each floor continued to dive deeper into the building, causing more structural damage. Between the 19th and 22nd floors, the floor areas between column lines 7 and 8, and C and D were damaged or destroyed (Figure 6-5). The damage zone increased to include portions of the area between column lines D and E from the 18th floor down to the 9th floor (Figure 6-5).

Column splices are typically located at every second floor and are composed of thin splice plates bolted to the column flanges. Large axial tension loads were probably not a design condition for the column splices, and the splice plates appear to be minimal in thickness, offering little resistance to separation. The D-8 column splices at the 18th and 16th floors appear to have been overloaded, leaving a section of column suspended from the spandrels at floors 16 through 18. The column below this level and down to the 8th

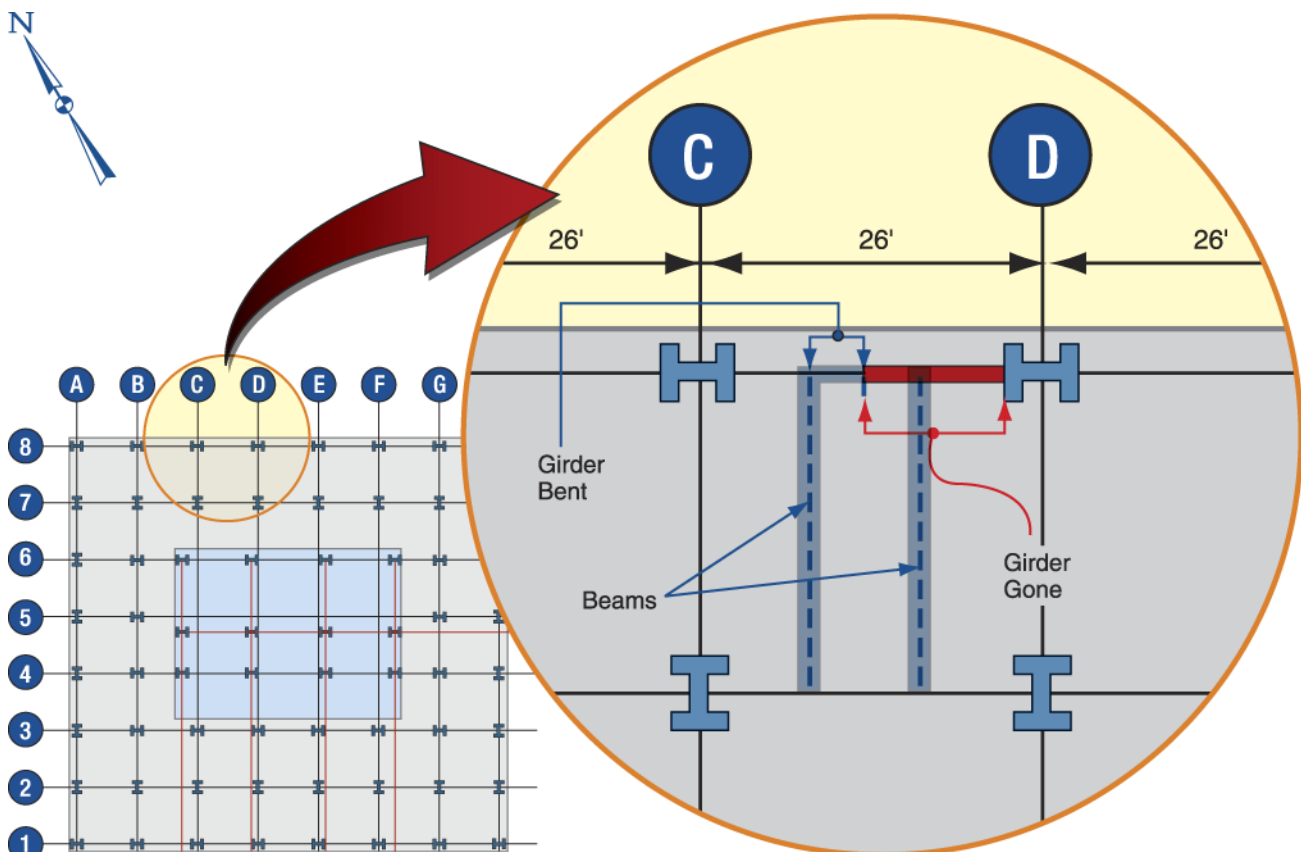


Figure 6-4 Area of initial impact of debris at the 23rd floor.