

B *Structural Steel and Steel Connections*

B.1 Structural Steel

This appendix focuses mainly on the structural steel and connections in the WTC towers (WTC 1 and WTC 2), but column-tree connections in WTC 5 are also considered. Other WTC structures were fabricated from ASTM A36 and A572 grade steels, and their structural framing and connections are discussed in prior chapters.

The structural steel used in the exterior 14-inch by 14-inch columns that were spaced at 3 feet 4 inches on center around the entire periphery of each of the WTC towers was fabricated from various grades of high-strength steel with minimum specified yield stress between 36 kips per square inch (ksi) and 100 ksi (PATH-NYNJ 1976). Column plate thickness varied from 1/4 inch to 5/8 inch in the impact zone of WTC 1 for floors 89-101, and from 1/4 inch to 13/16 inch in the impact zone of WTC 2 for floors 77-87. Spandrel beams at each floor level were fabricated of matching steel and integrated into the columns as the columns and spandrel sections were prefabricated into trees. These trees were three columns wide and one to three stories

high. The cross-sectional shape of the columns can be seen in Figure B-1. These varied in length from 12 feet 6 inches to 38 feet, depending on the plate thickness and location.

The three columns in a panel were generally fabricated from the same grade of steel. The yield stress varied from 50 ksi to 100 ksi in increments of 5 ksi up to 90 ksi. Although most of the time the same grade of steel was used in all three columns, sometimes a column was fabricated from different grades. The difference was up to 15 ksi (i.e., 75 ksi, 85 ksi, and 90 ksi). The core columns were box sections fabricated



Figure B-1 Exterior column end plates.