

The interiors of the towers had been heavily modified over the years due to tenant turnover, same-tenant space usage changes, the addition of sprinklers, and asbestos abatement.

5.3 BUILDING DESIGN

5.3.1 Loads

The NYC Building Code specified minimum design values for both dead and live gravity loads and for lateral (wind) loads.

- Each tower was designed to support dead loads (its own weight) consistent with the provisions in the 1968 NYC Building Code. The dead loads included the weight of the structural system and loads associated with architectural, mechanical, plumbing, and electrical systems.
- Each tower was designed to support live loads (the combined weights of the people and the building contents) exceeding those specified in the 1968 NYC Building Code.
- The design wind loads used in the towers were higher than those required by the 1968 NYC Building Code and the three other codes identified earlier.

5.3.2 Aircraft Impact

The accidental 1945 collision of a B-25 aircraft with the Empire State Building sensitized designers of high-rise buildings to the potential hazards of such an event. However, building codes did not then, and do not currently, require that a building withstand the impact of a fuel-laden commercial jetliner. A Port Authority document indicated that the impact of a Boeing 707 aircraft flying at 600 mph was analyzed during the design stage of the WTC towers. However, the investigators were unable to locate any documentation of the criteria and method used in the impact analysis and were thus unable to verify the assertion that "...such collision would result in only local damage which could not cause collapse or substantial damage to the building and would not endanger the lives and safety of occupants not in the immediate area of impact."⁸ Since the ability for rigorous simulation of the aircraft impact and of the ensuing fires are recent developments and since the approach to structural modeling was developed for this investigation, the technical capability available to The Port Authority and its consultants and contractors to perform such an analysis in the 1960s would have been quite limited.

5.3.3 Construction Classification and Fire Resistance Rating

Building codes classify building constructions into different "Types" or "Classes." The Class pertinent to the WTC towers was Class 1 (fire resistive). The 1938 NYC Building Code had no subdivisions of Class 1 construction, which required a 4 hour fire resistance rating for columns and a 3 hour rating for floors. The 1968 version of the Code subdivided Class 1 for office occupancies into 1A, with requirements identical to the 1938 Class 1, and 1B. Class 1B specified a 3 hour rating for columns and

⁸ Letter with an attachment dated November 13, 2003, from John R. Dragonette (Retired Project Administrator, Physical Facilities Division, World Trade Department) to Saroj Bhol (Engineering Department, PANYNJ).