

girders supporting more than one floor and a 2 hour rating for floors including beams. There were no height or area requirements that differentiated between Class 1A and Class 1B, and the towers could have been classified as either one. The Port Authority elected to provide the fire protection in the WTC towers with Class 1B standards.

Achieving a specified rating for a truss-supported floor using a sprayed fire-resistive material (SFRM) was an innovation at the time of the WTC design and construction. NIST was not able to find any evidence that there was a technical basis to relate SFRM thickness to a fire resistance rating, nor was there sufficient prior experience to establish such thickness requirements by analogy. NIST did find documentation that the Architect of Record and the Structural Engineer of Record had each written to The Port Authority, stating that the fire rating of the WTC floor system could not be determined without testing. NIST was unable to find any indication that such tests were performed nor any technical basis for the specification of the particular SFRM product selected or its application thickness.

The NYC Building Code required inspection at the time of application of the SFRM, to be conducted under the supervision of a building inspector or a licensed design professional who assumed responsibility for compliance. This inspection included verification of the thickness of the material, its density, and its adhesion, each using a specific ASTM test method. The Code contained a requirement that SFRM installed in areas where it was subject to mechanical damage be protected and maintained in a serviceable condition.

There were no code requirements nor general practice by which sprayed fire-resistive material was to be inspected over the life of the building.

### 5.3.4 Compartmentation

Both the 1968 NYC Building Code and The Port Authority practice required partitions to separate tenant spaces from each other and from common spaces, such as the corridors that served the elevators, stairs, and other common spaces in the building core. These were intended to limit fire spread on a floor and to prevent the spread of a fire from one tenant space to that of another.

- The Port Authority specified partitions separating tenant spaces from exit access corridors to have a 2 hour rating. This allowed dead end hallways to extend to 100 ft (rather than 50 ft with 1 hour partitions), which permitted more flexibility in tenant layouts. Above the ceiling, penetrations for ducts or to allow for return airflow were fitted with rated fire dampers to preserve the fire rating. This 2 hour rated construction was not used in the original design, but was specified later by The Port Authority as tenant spaces were altered.
- For walls separating tenant spaces to achieve a 1 hour rating, they needed to continue through any concealed spaces below the floor and above the ceiling. The Port Authority chose to stop these demising walls at the bottom of the suspended ceiling and use 10 ft strips of 1 hour rated ceiling on either side of the partition. There was no precedent for this approach and, after a warning from the general contractor, the tenant alteration guidelines required that tenant partitions have a continuous fire barrier from top of floor to bottom of slab.
- There were no requirements in the 1968 NYC Building Code or in The Port Authority guidelines for partitions wholly within tenant spaces. As mentioned in Section 1.2.2, these