

THE NIST SOFA SUPER STORE DRAFT INVESTIGATION REPORT-PART 5 (ANALYSIS: TERMINOLOGY)

By Richard Schulte

NIST released a draft report on its investigation into the fire at the Sofa Super Store on October 28, 2010. Commentary on the technical aspects of the report have been included in Parts 1 through 4 of the series of articles on the draft report. Part 5 of this series of articles will offer commentary on the terminology utilized in the report.

- **“High Bay Storage”**. The NIST draft report refers to the warehouse portion of the Sofa Super Store building as “high bay” storage. According to the report, the ceiling height of the warehouse was roughly 29 feet. Typically, the term “high bay” storage is a storage configuration which is too high for the use of conventional warehousing methods (fork-lift trucks) and where automated warehousing equipment is utilized. Given that the report does not discuss the use of automated warehousing equipment, it is assumed that fork-lift trucks were utilized as the means of moving pallet-loads in the warehouse. Hence, the warehouse at the Sofa Super Store would not be considered to be “high bay storage” building.
- **“Dropped Ceiling”**. The NIST draft report refers to ceiling construction in the showrooms of the Sofa Super Stores as a “dropped ceiling” throughout the report. Ceilings constructed with ceiling tiles and a grid system are typically referred to as suspended ceilings since the grid which supports the ceiling tiles is suspended from the floor construction above. The term “dropped ceiling” is a slang term.
- **“Water Sprinklers”**. The NIST draft report refers to sprinklers as “water sprinklers”. The term “water sprinklers” is a term which is not used in the fire protection field. Typically, the term “sprinklers” is used in reports dealing with building fire protection. In the last decade or so, the use of the term “fire sprinklers” has been used to differentiate sprinklers utilized for fire protection purposes from sprinkler systems used for lawn watering purposes (*i.e.*, lawn sprinklers).

- **“Pendant Sprinklers”**. The draft report refers to “pendant” sprinklers. Perhaps “pendant” sprinklers are used in lawn sprinkler systems, but there are only three types of sprinklers utilized in fire protection systems, upright, pendent and sidewall sprinklers. (Table K.7, page K-45, Volume II)
- **“Sprinkler Heads”**. In at least one instance, the draft report uses the term “sprinkler head”. The term “sprinkler head” is a slang term for “sprinkler”.
- **“Dry Powder Fire Extinguisher”**. The “dry powder” contained in a multi-purpose portable fire extinguisher is referred to as “dry chemical” and multi-purpose portable fire extinguishers are referred to as “dry chemical fire extinguishers”. The term “dry powder” is slang terminology. The term may also be used by skiers to refer to the type of snow on a mountain.
- **Joists vs. Beams**. Page F-21 (Appendix F) in Volume II of the draft report includes a photograph of a steel beam, but refers to the beam as a steel joist.
- **Light Hazard vs. Ordinary Hazard Classifications**. Page 4-29 in the draft report discusses providing sprinkler protection for the Loading Dock space in the Sofa Super Store and indicates that the sprinkler spacing assumed for the Loading Dock will be per the spacing limitations applicable to light hazard occupancies contained in NFPA 13. The drawing of the sprinkler layout assumed indicates that the sprinkler spacing for the Loading Dock will be 3.5 meters by 3.27 meters. When this sprinkler spacing is converted to English units, the sprinkler spacing is 123.3 square feet.

The Loading Dock would properly be classified as an ordinary hazard, or perhaps an extra hazard (due to the flammable/combustible liquid storage), with spacing limited to a maximum of 130 square feet per sprinkler (or 100 square feet per sprinkler if the Loading Dock is classified as an extra hazard).

The draft report includes the following explanation as to why the Loading Dock was assumed to be a light hazard:

"The sprinkler system layout was designed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems [17]. The system was designed as a light hazard wet pipe system, assuming that the enclosed loading dock area was heated. A light hazard sprinkler system was utilized in order to provide a conservative estimate for the area/water density for the simulations. The locations of the sprinklers within the enclosed loading dock are shown in Figure 4-35." (Page 4-29, Volume I)

Further contradictory information is provided in Appendix K of the report. Table K.7 on page K-45 indicates that the “k” factor assumed in the computer simulation was 5.5 and that the pressure of the operating sprinklers was 25 psi. Based upon these two assumptions, the flow from the operating sprinklers should be 27.5 gpm. With a sprinkler spacing of 123.3 square feet per sprinkler, the density achieved at each operating sprinkler would be 0.22 gpm/SF. A density of 0.22 gpm/SF would comply with the density requirements for an ordinary group 2 hazard, rather than a light hazard.

Analysis

The fire at the Sofa Super Store occurred in the evening of June 18, 2007. Almost three and one-half years later, NIST released a draft report on its investigation of the fire. Given the length of time between the event and the issuance of the report, it is not unreasonable to expect a report “with all of the *i*’s dotted and the *t*’s crossed”, but instead it would appear that NIST issued a report “with all of the *t*’s dotted and the *i*’s crossed”.

Misuse of terminology used in the fire protection field in a report on a fire by “experts” in the field does not give one confidence in the investigation into this fire, but rather might cause one to question the expertise of the investigators. This, combined with the fact that the report failed to discuss a key fact in the fire, the contribution of the insulated metal deck to the fire, gives the appearance that the entire investigation into the fire at the Sofa Super Store was botched by NIST.

Given the sloppy use of terminology, it seems reasonable to ask whether or not NIST’s analytical work included in the investigation was also sloppy. It would seem that the focus of NIST’s work in this investigation was the fire modeling aspects of the analysis. Perhaps NIST should have spent less time on the “cutting edge” work and paid more attention to the basics. Without a basic knowledge of fire protection, the “cutting edge” work is pretty much “worthless”.

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