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Changes in the 2016 Edition of NFPA 13 Hanging and Bracing

The 2016 edition of NFPA 13 has just been published by the NFPA. This new edition of the standard contains a number of new requirements that are important to everyone in the fire sprinkler industry. The list is quite long, so it has been broken into a four-part series of special editions for TechNotes. These summaries will explain the changes that are most important in the opinion of the editor. This will not be a list of every change to the standard, but is intended to help everyone understand the big items with respect to installation, hanging and bracing, discharge, and residential.

This issue is Part 2. It will focus on the changes to the hanging and bracing rules of NFPA 13. The following items are highlighted from the revisions made in preparation of the 2016 edition:

Trapeze Hangers with Slotted Holes (9.1.1.7.9)
Although it has been common practice to use slots on an angle iron to simplify the installation of a trapeze hanger, NFPA 13 has not previously discussed slots. There are now specifications to make sure that the angle still has sufficient strength to support the intended load when these slots are used.

Screws in the Side of Joists (9.1.5.6.1)
The 2016 language will reflect the support requirements based on the diameter of the pipe instead of referencing branch line or main piping. This modification confirms that the minimum edge distance is related to the load the joist has to carry.

Flexible Sprinkler Hose and Vertical Upward Movement (9.2.3.4.4.4)
It will now be reflected that additional action is not needed to address vertical upward movement when a flexible sprinkler hose is used. This is due to the bracket that ties the hose to the ceiling grid. It is tested during the listing process to ensure it will stay in place upon sprinkler activation.

Pipe Stands (9.2.6 & 9.3.8)
Pipe stands now have more guidelines in NFPA 13. Many of these requirements are familiar to those who have used the information in NFPA 15. However, there are some differences. There is an allowance for short pipe stands (those 4 ft or shorter) that are axially loaded to accommodate common uses such as headers and pipe that is entering or exiting a fire pump. The heights found in Table 9.2.6.3.1 are relatively low, however these are for pipe stands that are run in a straight line. If system piping is arranged in a loop, it can offer additional support that can utilize taller pipe stands. Another important note is that a cantilever support is not permitted to be more than 1 foot horizontal from the pipe stand.

In situations where the seismic coefficient is more than 0.5 and the pipe stand is more than 4 ft tall, a registered professional engineer will have to certify the pipe stand(s). This will ensure that site specifics have been considered and that the pipe stand will keep the system in place following an earthquake.

Clearance from Structural Members (9.3.4.11)
Should a sprinkler get impacted during a seismic event, it could lead to not activating properly if needed or operation without a fire event. This language has been modified to require 3 inches between the sprinkler and structural members that are nearby but not being used to support the system. In other words the pipe may not move with those structural members and impact could occur.

Testing Brace Angles (9.3.5.2.3.1)
There are many variables in the geometry of sway brace attachments. A change has been made that manufacturers will have to test the attachments positioned at 30, 45, 60 and 90 degrees. This will confirm that the attachments meet the allowable loads per Section 9.3.5.2.3.

Zone of Influence Maximum Load Tables (9.3.5.5.2 & 9.3.5.5.2.4)
Minor updates were made to the tables. However, an additional table was added for Red Brass pipe. This is just another option contained in the standard for use where applicable.

In addition, pipe has been addressed where the diameter varies within the zone of influence. The smallest diameter pipe of the main within the zone of influence has to be used for comparison with the maximum load.

Lateral Sway Brace Omission for Short Hanger Rods (9.3.5.5.10)
This allowance for omitting lateral sway bracing has been revised for the 2016 edition so that the bracing is permitted to be omitted depending on the severity of the loads expected. In order to omit the sway bracing from branch lines the pipe has to be supported within 6 inches of the structure measured from the top of pipe to the point of attachment to the structure. There is an allowance for an occasional hanger to be longer than 6 inches, but the longer ones cannot be consecutive on the line and at least 75 percent have to comply with the 6-inch maximum.

For main piping, the base requirement of being supported within 6 inches measured from the top of pipe to the point of attachment to the structure is the same. Also, just like branch line piping, the hangers that are longer cannot be consecutive and those meeting the requirement must be at least 75 percent of all the hangers for that pipe. In addition to those requirements, the seismic coefficient (C_p) must not exceed 0.5 in order to use this omission. There are also now limits on nominal pipe diameter – 6-inch for feed mains and 4-inch for cross mains. Finally, if intermediate hangers are omitted in accordance with Sections 9.2.4.3, 9.2.4.4 or 9.2.4.5, the omission is not allowed.

Figures have been added to Annex A to depict where the 6-inch measurement is taken for a couple of common scenarios.

Seismic Coefficient Table (9.3.5.9.3)
The table has been expanded for the 2016 edition. Values can now be found in the table for S_S up to 4.0.

Load Transfer through Riser Nipples (9.3.5.9.6.1)

Long branch lines add significant load to sway braces on the mains. However, if the riser nipples are long it is challenging to transfer that load to the bracing on the main piping. "Long" can vary with the seismic coefficient for the system. The new language has 3 scenarios where the calculation does not have to be done: (1) the riser nipple is a maximum 4 ft and the C_p is a maximum of 0.5, (2) the riser nipple is a maximum 3 ft and the C_p is a maximum of 0.67, and (3) the riser nipple is a maximum 2 ft and the C_p is a maximum of 1.0. If these conditions are not met, then the calculations need to be done.

Concrete Anchors (9.3.5.12.8)

The information for the 2016 edition has been correlated with ASCE/SEI 7-16 (which is close to publication at this time). There have been adjustments to the load values from the previous edition for prying factors, overstrength (Ω), and ASD calculation methods. This means that when using post-installed anchors, the prying factor, which is based on the geometry of the attachment, will have to be acquired from the manufacturer. Then the tables can be used. It is also possible to calculate the loads following the information laid out in Section 9.3.5.12.8.3. For further details on the supporting information for the revisions related to concrete anchors, it can be found in TIA 16-2 on NFPA's website (www.nfpa.org/13).

Seismic Restraint (9.3.6.4)

The tables for seismic restraint have been expanded. There are now smaller diameter pipes included since other standards, such as water mist systems, also reference the criteria and use smaller piping. The inclusion of these smaller diameters does not mean that trim piping needs to be restrained. The seismic coefficient has also been broken into four ranges instead of three.