



**National Fire Protection Association**

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**MEMORANDUM**

**TO:** NFPA Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems

**FROM:** Elena Carroll, Administrator, Technical Projects

**DATE:** October 14, 2011

**SUBJECT:** NFPA 13 ROC TC Letter Ballot (A2012)

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The ROC letter ballot for NFPA 13 is attached. The ballot is for formally voting on whether or not you concur with the committee's actions on the comments. Reasons must accompany all negative and abstention ballots.

**Please do not vote negatively because of editorial errors. However, please bring such errors to my attention for action.**

Please complete and return your ballot as soon as possible but no later than **Friday, October 28, 2011**. As noted on the ballot form, please return the ballot to Elena Carroll either via e-mail to [ecarroll@nfpa.org](mailto:ecarroll@nfpa.org) or via fax to 617-984-7110. You may also mail your ballot to the attention of Elena Carroll at NFPA, 1 Batterymarch Park, Quincy, MA 02169.

The return of ballots is required by the Regulations Governing Committee Projects.

Attachments:

Comments  
Letter Ballot

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13-37 Log #106 AUT-HBS Final Action: Accept  
(3.5 Various Definitions, 9.3.3, and A.9.3.3 (New) )

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**Submitter:** Technical Correlating Committee on Automatic Sprinkler Systems,

**Comment on Proposal No:** 13-39

**Recommendation:** The TCC Rejects this proposal

Current products marketed as "seismic loops" are not evaluated for their ability to accommodate seismic movement, this action could have the unforeseen consequence of not allowing current products to use the term. The HBS TC should evaluate whether such products require listing and whether, independent of listing requirements, the term "seismic loop" is desirable to differentiate from a seismic separation assembly comprised of traditional fittings.

This proposal will be reviewed by the HBS TC at the ROC meeting.

**Substantiation:** This is a direction from the Technical Correlating Committee on Automatic Sprinkler Systems in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

**Committee Meeting Action:** Accept

**Committee Statement:** Also see proposal 13-39.

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13-38 Log #79 AUT-HBS Final Action: Reject  
(3.5.9 Risers, 3.5.x Branch Line Riser (New), and 9.3.2.3(2)(b))

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**Submitter:** Larry Keeping, Vipond Fire Protection

**Comment on Proposal No:** 13-42

**Recommendation:** Revise the definition of a Riser in 3.5.9 to read:

**3.5.9 Risers.** The vertical ~~supply pipes~~ portions of cross main, feed man or system risers in a sprinkler system.

Add a new definition 3.5.X for a Branch Line Riser to read:

**3.5.X Branch Line Riser.** A vertical portion of a branch line.

Revise 9.3.2.3(2)(b) to read:

(b)\* On the vertical portion of the tie-in where the tie-in incorporates a riser or a branch line riser

**Substantiation:** The current definition for a riser in 3.5.9 incorporates any and all vertical piping in a sprinkler system. However, for clarity, there is a need to differentiate between the risers on a main and those on a branch line. This is particularly so with regard to 9.3.5.5, where it says that risers need to be fitted with four-way braces. With the definition as is, that would include risers on branch lines, which is contrary to 9.3.6, which (generally) only requires branch line piping to be restrained.

The term "branch line riser" is used in Figure A.9.3.2.3 (2) (b), which illustrates the location of flexible couplings in a main riser and a branch line riser. Therefore, again for clarity, it is suggested to revise 9.3.2.3 (2) (b) to have matching text.

**Committee Meeting Action:** Reject

**Committee Statement:** The current definition satisfactorily addresses vertical piping. Separating branch line risers from risers also impacts how flexible couplings and four-way bracing are applied. Branch lines don't have to be braced unless they are larger than 2" pipe. Those branch lines must however be restrained.

13-43 Log #CC33 AUT-HBS  
(3.11.x)

Final Action: Accept

**Submitter:** Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,

**Comment on Proposal No:** 13-39

**Recommendation:** Delete the first sentence of second paragraph of A.9.3.3.

Add new definition under Section 3.11:

**3.11.X Seismic Separation Assembly.** An assembly of fittings, pipe, flexible pipe and/or couplings that permits movement in all directions to accommodate seismic differential movement across building seismic separation joints.

New Annex to the above language:

**A.3.11.X Seismic separation assemblies** include traditional assemblies as shown in Figure A.9.3.3(a) and seismic loops as in Figure A.9.3.3(b).

**Substantiation:** The term "seismic loop" is being used regularly in the field. There is concern that all authorities are not permitting use of these loops as they are not referenced with that terminology in NFPA 13. The solution was to develop a definition for seismic separation assembly as the "loop" is just an option for that assembly. Annex language indicates directly that seismic loops are included.

**Committee Meeting Action:** Accept

13-44 Log #54 AUT-HBS  
(3.11.1 Hanger)

Final Action: Accept in Principle

**Submitter:** Kraig Kirschner, AFCON

**Comment on Proposal No:** 13-51

**Recommendation:** Revise text to read as follows:

3.11.1 Hanger. An assembly including its fastener intended to be attached to the system piping to provide support.

**Substantiation:** Add text to enhance clarity.

A hanger is an assembly if you include its fastener.

**Committee Meeting Action:** Accept in Principle

**Committee Statement:** See TC Action on 13-46 (Log #350).

13-45 Log #335 AUT-HBS  
(3.11.3)

Final Action: Accept in Principle

**Submitter:** Victoria B. Valentine, National Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-53

**Recommendation:** Modify the definition for  $F_v$  as follows:

3.11 .3 Net Vertical Force  $F_v$ . ~~The net vertical force is a reaction~~ due to the angle of installation of sway braces on system piping due to earthquake motion. ~~vertical seismic force acting on a vertical sway brace at working stress levels. that is generates due to the angularity of a lateral sway brace.~~

**Substantiation:** The definition is aimed at explaining the net vertical force . "F," is not a term used by NFPA 13. In addition, F, is the long period site coefficient used in seismic calculations (defined in ASCE 7-10) and should not be defined as the net vertical reaction force. The vertical uplift could be caused from a lateral or longitudinal sway brace and should be a more generic reference.

**Committee Meeting Action:** Accept in Principle

Add the word "due" following the word "reaction".

Revise "due to" at the end of the definition to "resulting from".

Definition should read as follows:

3.11 .3 Net Vertical Force  $F_v$ . ~~The net vertical force is a reaction~~ due to the angle of installation of sway braces on system piping due to resulting from earthquake motion. ~~vertical seismic force acting on a vertical sway brace at working stress levels. that is generates due to the angularity of a lateral sway brace.~~

**Committee Statement:** Revisions were added to the submitters definition to provide clarity(editorial).

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13-46 Log #350 AUT-HBS  
(3.11.5)

Final Action: Accept in Principle

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Submitter: Victoria B. Valentine, National Fire Sprinkler Association, Inc.

Comment on Proposal No: 13-51

Recommendation: Modify the definition as follows:

3.11 .5 Hanger. A device ~~used as part of an An or assembly used~~ intended to be attached to support the gravity the gravity load of the system piping and appurtenances ~~intended to provide gravitational support.~~

Substantiation: The main purpose of a hanger is to resist the gravitational load of the system piping and appurtenances. This clarifies the definition. It also indicates that hangers come in many styles and may be a single device or a combination of components, which creates a support assembly.

[It should be noted that the text in the pre-print does not match that of ROP 13-51]

Committee Meeting Action: Accept in Principle

Revise the definition of Hanger to read as follows:

3.11.X Hanger. A device or assembly used to support the gravity load of the system piping.

Committee Statement: Delete the redundant words "the gravity" and delete "and appurtenances", since appurtenances is not a term used in Chapter 9 and the test loads for hangers are based on the weight of water filled piping over a distance and not the load from other devices.

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13-92 Log #CC31 AUT-HBS  
(7.2.3.9.1)

Final Action: Accept

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Submitter: Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,

Comment on Proposal No: 13-113

Recommendation: Revise  $F_y$  value in title to 30 ksi

Add (with soldered joints) after Type M Copper Tube in Figure Title

Revise values in table as outlined in the table

\*\*\*\*\*13- (Log #CC2) (HBS) Copper Values Table\*\*\*\*\*

The remainder of table and notes should not be changed (See ROP)

Substantiation: The copper yield strength was reevaluated by the TC and determined to be 30 ksi. When recalculated the values have been adapted for soldered joint which are the most common installation. Brazed joints have not been evaluated in a table but can be calculated using annex E.

Committee Meeting Action: Accept

Fy = 30 ksi

Permissible Bending Stress =  $0.65F_y =$

19.5 ksi

Diameter	Lateral Sway Spacing (ft)				
	20	25	30	35	40
3/4	16	13	10	9	8
1	29	24	19	16	14
1 1/4	53	42	35	28	25
1 1/2	86	69	56	46	41
2	180	144	118	97	85

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13-229 Log #319 AUT-HBS

Final Action: Accept in Principle

(9.1.1.2(6), 9.3.5.1.4, 9.3.5.1.5, A.9.1.1.2(6), A.9.3.5.1.4, and A.9.3.5.1.5)

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Submitter: John Deutsch, City of Brea Fire Department

Comment on Proposal No: 13-313

Recommendation: Add text to read as follows:

9.1.1.2.(6)\* Sprinkler pipe and other equipment shall be permitted to be supported from a shared support structure provided it is engineered in accordance with section 9.1.1.2 and all pipe and equipment is included when applying the requirements of section 9.1.1.2 (1). The design forces for shared components shall be determined in accordance with ASCE 7 using an Importance Factor  $I_p = 1.5$ .

A.9.1.1.2.(6) A shared support structure may be in the form of a rack structure or a trapeze assembly or pipe stand or other similar assembly. It is not the intent of this section for a building to be considered a shared support structure. It is the intent of this section to require that a shared support structure be engineered to support the added load of five times the water filled pipe plus a minimum of 250 lb (114 kg) applied at the point of hanging of the sprinkler system. Supports for all other equipment shall be designed with an importance factor of 1.5. Consideration shall be given to not support multiple systems on a shared support structure in which the systems are incompatible with the fire sprinkler system based on vibration, thermal expansion and contraction or other factors.

9.3.5.1.4\* A shared support structure shall be permitted to support both the dead loads addressed in 9.1.1.2.(6) and the seismic loads addressed in 9.3.5.6. When a shared support structure is used to support dead and seismic loads, the structure shall be designed to support the dead and seismic loads for all pipe and equipment on the structure.

A.9.3.5.1.4 A shared support structure may be used to provide both support as defined in section 9.1.1.2.(6) and provide resistance to seismic forces. When a structure is used for both support and seismic forces the structure must be engineered to resist the seismic force for all of the equipment on the structure. The shared support structure must be engineered for a load in which the zone of influence includes the water filled sprinkler pipe and all of the other fluid filled mechanical equipment attached to the shared structure.

9.3.5.1.5\* If a shared support structure is used to support sprinkler pipe and other mechanical equipment as per 9.1.1.2.(6) but that same structure does not provide seismic resistance as described in 9.3.5.1.4 then the following must be met. The sprinkler pipe shall be braced using the method in section 9.3.5.6 with the zone of influence including the water filled sprinkler pipe and all of the other fluid filled mechanical equipment attached to the shared support structure. The sprinkler bracing shall be designed for seismic load of everything attached to the shared support structure and not just the sprinkler pipe. The sprinkler sway bracing attachment shall be connected to the same building element as the common support structure is attached to.

A.9.3.5.1.5 Where a shared support structure is used to support sprinkler system pipe and all other mechanical equipment as per 9.1.1.2.(6) but that same structure does not provide seismic resistance as described in 9.3.5.1.4 then the sprinkler system pipe would be braced using the method in section 9.3.5 with the zone of influence including the water filled sprinkler system pipe and all of the other equipment supported by the structure. The seismic load applied to the brace includes all equipment attached to the shared support structure and not just the sprinkler pipe. It is the intent of this section to avoid any incompatibility of displacements between the shared support structure and the sprinkler seismic bracing.

**Substantiation:** I am submitting these comments on behalf of a NFPA 13 AUT-HBS task group consisting of Robert Bachman, Kraig Kirschner, Janak Patel, John Gillengerten, J. Scott Mitchell, Zeljko Sucevic and myself. The initial proposal was helpful in bringing light to the fact that the concept of a shared support structure was not adequately address in NFPA 13. The task group was established to address the concept of a shared support structure. These 6 new sections are the result of the work of the task group.

**Committee Meeting Action:** Accept in Principle

DELETE 9.1.1.2(6)

Add a new 9.1.1.3 and renumber accordingly. (EDITORIAL NOTE....the references within the new 9.1.1.3 may require updating based on renumbering)

9.1.1.3 – Shared support structures shall be certified by a registered professional engineer in accordance with 9.1.1.2 and 9.1.1.3.

9.1.1.3.1\* The design of a shared support structure shall be based on either section 9.1.1.3.1.1 or 9.1.1.3.1.2:

9.1.1.3.1.1 Sprinkler pipe and other distribution systems shall be permitted to be supported from a shared support structure designed to support 5 times the weight of water-filled sprinkler pipe and other supported distribution systems plus 250 lbs., based on the allowable ultimate stress.

9.1.1.3.1.2 Sprinkler pipe and other distribution systems shall be permitted to be supported from a shared support structure designed to support 5 times the weight of the water filled sprinkler pipe plus 250 lbs., and 1.5 times the weight of all other supported distribution systems.

9.1.1.3.1.3 The building structure shall not be considered a shared support structure.

9.1.1.3.1.4\* The requirements of section 9.1.1.3.1 shall not apply to section 9.2.1.3.3.

9.1.1.3.1.5 Systems that are incompatible with the fire sprinkler systems based on vibration, thermal expansion and contraction or other factors shall not share support structures.

A.9.1.1.3.1.4 It is not the intent of section 9.1.1.3.1 to apply to flexible sprinkler hose fittings or ceiling systems.

A.9.1.1.3.1 A shared support structure may be in the form of a pipe rack structure, a trapeze assembly, pipe stand, or other similar assembly. It is not the intent of this section for a building structure to be considered a shared support structure. Storage racks are not intended to be considered a shared support structure.

Revise the following portions of 9.3.5:

9.3.5.1.4\* A shared support structure shall be permitted to support both the gravity loads addressed in 9.1.1.3.1 and the seismic loads addressed in 9.3.5.6.

9.3.5.1.4.1 When a shared support structure is used to support gravity and seismic loads, the structure shall be designed to support these loads for all pipe and distribution systems on the structure using either section 9.3.5.6.2 or section 9.3.5.6.2.1 with an Importance Factor  $I_p = 1.5$  being applied to all of the distribution systems.

A.9.3.5.1.4 A shared support structure may be used to provide both support as defined in section 9.1.1.3.1 and provide resistance to seismic forces. When a shared support structure is used for both support and seismic forces the shared support structure should be designed to resist the seismic force for all of the distribution system. The shared support structure should be designed for a load in which the zone of influence includes the water filled sprinkler pipe and all other distribution systems attached to the shared support structure.

9.3.5.1.5\* If a shared support structure is used to support sprinkler pipe and other distribution systems as per 9.1.1.3.1 and that structure does not provide seismic resistance as required in 9.3.5.1.4 the following shall be met:

1) The sprinkler pipe shall be braced using the method in section 9.3.5.6 with the zone of influence including the water filled sprinkler pipe and all other distribution systems which are not independently equipped with seismic protection and attached to the shared support structure.

2) The sprinkler sway bracing attachment shall be connected to the same building or structure as the shared support structure.

A.9.3.5.1.5 It is the intent of this section to avoid any incompatibility of displacements between the shared support structure and the sprinkler seismic bracing, as might occur if the supports are located on separate adjacent structures.

Revise 9.1.1.7 as follows:

9.1.1.7 Support of Non-System Components.

9.1.1.7.1 \*- Sprinkler piping or hangers shall not be used to support non-system components.

9.1.1.7.2- Sprinkler piping shall be permitted to utilize share support structures in accordance with 9.1.1.3.

Move existing A.9.1.1.7 annex text to A.9.1.1.7.1

**Committee Statement:** The revisions to the original comment were editorial in nature to coincide with the manual of

style.

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13-230 Log #351 AUT-HBS  
(Table 9.1.1.6.1(a))

**Final Action: Accept in Principle**

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**Submitter:** Victoria B. Valentine, National Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-319

**Recommendation:** Modify Table 9.1.1.6.1(a):

\*\*\*INSERT TABLE 9.1.1.6.1(A) HERE\*\*\*

**Substantiation:** The expansion of this table was requested by the Committee during the ROP meetings. The supported pipe has been : increased to nominal 12-inch diameter. The spans have been increased up to 20 feet using 0.5-foot increments. This is more than the standard hanger spacings allowed by the standard, but the stresses and deflections remain low with the anticipated load of the system piping. For spans more than 20 feet. the trapeze should be looked at further by an expert as many scenarios would then involve a joint in the trapeze which could create the need for additional analysis.

**Committee Meeting Action: Accept in Principle**

1) Accept the tables as proposed with the following modification:

a) Eliminate the 12" COLUMN from both of the tables.

b) Eliminate the ROWS for 16.5 FT spans through 20 FT spans in both tables.

2) ADD ANNEX material for the table read as follows:

A.9.1.1.6.1(a) The table values are based on the trapeze being a single continuous member.

**Committee Statement:** Annex material is needed to clarify the allowances for long spans. The values are based on single continons members. The TC feels that for spans in excess of 16 feet, the values should be reviewed on a case by case basis.

Nominal Diameter of Pipe Being Supported - Schedule 10 Steel

Span (ft)	1	1.25	1.5	2	2.5	3	3.5	4	5	6	8	10	12
1.5	0.08	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.15	0.18	0.26	0.34	0.50
2.0	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.20	0.24	0.34	0.45	0.66
2.5	0.14	0.14	0.15	0.16	0.17	0.18	0.20	0.21	0.25	0.30	0.43	0.56	0.83
3.0	0.16	0.17	0.18	0.19	0.20	0.22	0.24	0.26	0.31	0.36	0.51	0.67	0.99
3.5	0.19	0.20	0.21	0.22	0.24	0.26	0.28	0.30	0.36	0.42	0.60	0.78	1.16
4.0	0.22	0.22	0.24	0.25	0.27	0.30	0.32	0.34	0.41	0.48	0.68	0.89	1.32
4.5	0.24	0.25	0.27	0.28	0.30	0.33	0.36	0.38	0.46	0.54	0.77	1.01	1.49
5.0	0.27	0.28	0.30	0.31	0.34	0.37	0.40	0.43	0.51	0.60	0.85	1.12	1.65
5.5	0.30	0.31	0.33	0.34	0.37	0.41	0.44	0.47	0.56	0.66	0.94	1.23	1.82
6.0	0.33	0.34	0.35	0.38	0.41	0.44	0.48	0.51	0.61	0.71	1.02	1.34	1.98
6.5	0.35	0.36	0.38	0.41	0.44	0.48	0.52	0.56	0.66	0.77	1.11	1.45	2.15
7.0	0.38	0.39	0.41	0.44	0.47	0.52	0.56	0.60	0.71	0.83	1.19	1.56	2.31
7.5	0.41	0.42	0.44	0.47	0.51	0.55	0.60	0.64	0.76	0.89	1.28	1.68	2.48
8.0	0.43	0.45	0.47	0.50	0.54	0.59	0.63	0.68	0.82	0.95	1.36	1.79	2.65
8.5	0.46	0.48	0.50	0.53	0.58	0.63	0.67	0.73	0.87	1.01	1.45	1.90	2.81
9.0	0.49	0.50	0.53	0.56	0.61	0.66	0.71	0.77	0.92	1.07	1.53	2.01	2.98
9.5	0.52	0.53	0.56	0.60	0.64	0.70	0.75	0.81	0.97	1.13	1.62	2.12	3.14
10.0	0.54	0.56	0.59	0.63	0.68	0.74	0.79	0.85	1.02	1.19	1.70	2.23	3.31
10.5	0.57	0.59	0.62	0.66	0.71	0.78	0.83	0.90	1.07	1.25	1.79	2.35	3.47
11.0	0.60	0.62	0.65	0.69	0.74	0.81	0.87	0.94	1.12	1.31	1.87	2.46	3.64
11.5	0.63	0.64	0.68	0.72	0.78	0.85	0.91	0.98	1.17	1.37	1.96	2.57	3.80
12.0	0.65	0.67	0.71	0.75	0.81	0.89	0.95	1.02	1.22	1.43	2.04	2.68	3.97
12.5	0.68	0.70	0.74	0.78	0.85	0.92	0.99	1.07	1.27	1.49	2.13	2.79	4.13
13.0	0.71	0.73	0.77	0.81	0.88	0.96	1.03	1.11	1.33	1.55	2.21	2.90	4.30
13.5	0.73	0.76	0.80	0.85	0.91	1.00	1.07	1.15	1.38	1.61	2.30	3.02	4.46
14.0	0.76	0.78	0.83	0.88	0.95	1.03	1.11	1.20	1.43	1.67	2.38	3.13	4.63
14.5	0.79	0.81	0.86	0.91	0.98	1.07	1.15	1.24	1.48	1.73	2.47	3.24	4.79
15.0	0.82	0.84	0.89	0.94	1.02	1.11	1.19	1.28	1.53	1.79	2.56	3.35	4.96
15.5	0.84	0.87	0.92	0.97	1.05	1.14	1.23	1.32	1.58	1.85	2.64	3.46	5.13
16.0	0.87	0.90	0.95	1.00	1.08	1.18	1.27	1.37	1.63	1.91	2.73	3.58	5.29
16.5	0.90	0.92	0.98	1.03	1.12	1.22	1.31	1.41	1.68	1.97	2.81	3.69	5.46
17.0	0.92	0.95	1.01	1.07	1.15	1.26	1.35	1.45	1.73	2.03	2.90	3.80	5.62
17.5	0.95	0.98	1.04	1.10	1.18	1.29	1.39	1.49	1.78	2.09	2.98	3.91	5.79
18.0	0.98	1.01	1.06	1.13	1.22	1.33	1.43	1.54	1.84	2.14	3.07	4.02	5.95
18.5	1.01	1.04	1.09	1.16	1.25	1.37	1.47	1.58	1.89	2.20	3.15	4.13	6.12
19.0	1.03	1.06	1.09	1.19	1.29	1.40	1.51	1.62	1.94	2.26	3.24	4.25	6.28
19.5	1.06	1.09	1.12	1.22	1.32	1.44	1.55	1.67	1.99	2.32	3.32	4.36	6.45
20.0	1.09	1.12	1.18	1.25	1.35	1.48	1.59	1.71	2.04	2.38	3.41	4.47	6.61

13-L351 - E - A202 / eoc

pet

Nominal Diameter of Pipe Being Supported - Schedule 40 Steel

Span (ft)	1	1.25	1.5	2	2.5	3	3.5	4	5	6	8	10	12
1.5	0.08	0.09	0.09	0.10	0.11	0.12	0.14	0.15	0.18	0.22	0.30	0.41	0.53
2.0	0.11	0.11	0.12	0.13	0.15	0.16	0.18	0.20	0.24	0.29	0.40	0.55	0.71
2.5	0.14	0.14	0.15	0.16	0.18	0.21	0.23	0.25	0.30	0.36	0.50	0.69	0.89
3.0	0.16	0.17	0.18	0.20	0.22	0.25	0.27	0.30	0.36	0.43	0.60	0.82	1.07
3.5	0.19	0.20	0.21	0.23	0.26	0.29	0.32	0.35	0.42	0.51	0.70	0.96	1.25
4.0	0.22	0.23	0.24	0.26	0.29	0.33	0.36	0.40	0.48	0.58	0.80	1.10	1.42
4.5	0.25	0.26	0.27	0.29	0.33	0.37	0.41	0.45	0.54	0.65	0.90	1.23	1.60
5.0	0.27	0.29	0.30	0.33	0.37	0.41	0.45	0.49	0.60	0.72	1.00	1.37	1.78
5.5	0.30	0.31	0.33	0.36	0.40	0.45	0.50	0.54	0.66	0.79	1.10	1.51	1.96
6.0	0.33	0.34	0.36	0.39	0.44	0.49	0.54	0.59	0.72	0.87	1.20	1.64	2.14
6.5	0.36	0.37	0.40	0.42	0.48	0.54	0.59	0.64	0.78	0.94	1.31	1.78	2.32
7.0	0.38	0.40	0.43	0.46	0.52	0.58	0.63	0.69	0.84	1.01	1.41	1.92	2.49
7.5	0.41	0.43	0.46	0.49	0.55	0.62	0.68	0.74	0.90	1.08	1.51	2.06	2.67
8.0	0.44	0.46	0.49	0.52	0.59	0.66	0.72	0.79	0.96	1.16	1.61	2.19	2.85
8.5	0.47	0.48	0.52	0.56	0.63	0.70	0.77	0.84	1.02	1.23	1.71	2.33	3.03
9.0	0.49	0.51	0.55	0.59	0.66	0.74	0.81	0.89	1.08	1.30	1.81	2.47	3.21
9.5	0.52	0.54	0.58	0.62	0.70	0.78	0.86	0.94	1.14	1.37	1.91	2.60	3.38
10.0	0.55	0.57	0.61	0.65	0.74	0.82	0.90	0.99	1.20	1.45	2.01	2.74	3.56
10.5	0.58	0.60	0.64	0.69	0.77	0.86	0.95	1.04	1.26	1.52	2.11	2.88	3.74
11.0	0.60	0.63	0.67	0.72	0.81	0.91	0.99	1.09	1.32	1.59	2.21	3.01	3.92
11.5	0.63	0.66	0.70	0.75	0.85	0.95	1.04	1.14	1.38	1.66	2.31	3.15	4.10
12.0	0.66	0.68	0.73	0.78	0.88	0.99	1.08	1.19	1.44	1.73	2.41	3.29	4.27
12.5	0.69	0.71	0.76	0.82	0.92	1.03	1.13	1.24	1.50	1.81	2.51	3.43	4.45
13.0	0.71	0.74	0.79	0.85	0.96	1.07	1.17	1.29	1.56	1.88	2.61	3.56	4.63
13.5	0.74	0.77	0.82	0.88	0.99	1.11	1.22	1.34	1.62	1.95	2.71	3.70	4.81
14.0	0.77	0.80	0.85	0.91	1.03	1.15	1.26	1.39	1.68	2.02	2.81	3.84	4.99
14.5	0.80	0.83	0.88	0.95	1.07	1.19	1.31	1.43	1.74	2.10	2.91	3.97	5.17
15.0	0.82	0.86	0.91	0.98	1.10	1.24	1.35	1.48	1.80	2.17	3.01	4.11	5.34
15.5	0.85	0.88	0.94	1.01	1.14	1.28	1.40	1.53	1.86	2.24	3.11	4.25	5.52
16.0	0.88	0.91	0.97	1.05	1.18	1.32	1.44	1.58	1.92	2.31	3.21	4.39	5.70
16.5	0.91	0.94	1.00	1.08	1.21	1.36	1.49	1.63	1.98	2.38	3.31	4.52	5.88
17.0	0.93	0.97	1.03	1.11	1.25	1.40	1.53	1.68	2.04	2.46	3.41	4.66	6.06
17.5	0.96	1.00	1.06	1.14	1.29	1.44	1.58	1.73	2.10	2.53	3.51	4.80	6.23
18.0	0.99	1.03	1.09	1.18	1.33	1.48	1.62	1.78	2.16	2.60	3.61	4.93	6.41
18.5	1.02	1.05	1.12	1.21	1.36	1.52	1.67	1.83	2.22	2.67	3.71	5.07	6.59
19.0	1.04	1.08	1.16	1.24	1.40	1.56	1.71	1.88	2.28	2.75	3.81	5.21	6.77
19.5	1.07	1.11	1.19	1.27	1.44	1.61	1.76	1.93	2.34	2.82	3.92	5.34	6.95
20.0	1.10	1.14	1.22	1.31	1.47	1.65	1.80	1.98	2.40	2.89	4.02	5.48	7.12

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13 - U351

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13-231 Log #48 AUT-HBS  
(9.1.1.6.7 and 9.1.1.6.8)

Final Action: Reject

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**Submitter:** Thomas G. Wellen, American Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-322

**Recommendation:** Revise text to read as follows:

Accept proposal 13-322.

9.1.1.6.7 Holes for bolts or rods shall not exceed 1/16 in. (1.6 mm) greater than the diameter of the bolt.

9.1.1.6.8 Bolts or rods shall be provided with a flat washer and nut.

**Substantiation:** The committee statement is flawed. "1/16 in. is too restrictive for rods based on actual field variations. It is common practice to use slotted holes for connecting rods to the trapeze member." The standard has referenced drilling holes for bolting for some time and provided the 1/16 in. larger dimension for the hole. It is not common practice to use slotted holes for connecting rods to the trapeze member. Contractors drill holes, but they do not machine slots into structural members. Machining holes is outside the scope of this standard. There are many factors to take into consideration such as the placement of the slot and the length of the slot. The slot could be placed too close to the edge of the structural member and the slot could be made too long. Each of those factors would affect the ability of that structural member to support a load. These tasks should be evaluated and stamped by a structural engineer since it would no longer fall under a generic structural member. The section modulus numbers from the standard should not be applied to the modified member. The statement by the committee in proposal 13-322 conflicts with a statement made in Proposal 13-318 Log #17 that stated, "The section modulus for strut can vary from one manufacturer to the next. It is proprietary information and should be provided from the manufacturer to the user." As such, slots can vary from one fabricator to the next and this means contractors are buying a specialty product to where appropriate documentation should be provided.

**Committee Meeting Action:** Reject

**Committee Statement:** The tolerance established in this section is intended to only apply to bolts, other connections may have additional considerations. There are other applications for studs where the 1/16 in. is too restrictive for rods based on actual field variations. It is common practice to use slotted holes for connecting rods to the trapeze member.

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13-232 Log #53 AUT-HBS  
(9.1.1.6.7 and 9.1.1.6.8)

Final Action: Reject

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**Submitter:** Kraig Kirschner, AFCON

**Comment on Proposal No:** 13-322

**Recommendation:** Revise text to read as follows:

9.1.1.6.7 Holes for bolts or studs shall...".

9.1.1.6.8 Bolts or studs shall...".

**Substantiation:** I don't agree with the committee statement to reject.

Bolting is a method of attachment accomplished by fasteners commonly known as bolt, stud, MSR and ATR etc.

I don't not agree with the committee statement... 1/16<sup>th</sup> inch is not restrictive... bolt, studs and ATR are ASTM compliant including the nuts that are commonly installed on all of them.

Additionally contractors drill holes, they do not machine slotted holes typical to specialty construction materials WHICH PURPOSELY ARE BEYOND THE SCOPE OF THIS STANDARD. Proprietary structural information regarding the installation of specialty construction materials including slotted, angle or strut should be provided by the manufacturer of the product.

Additionally this committee statement conflicts with the committee statement on proposal 3-318.

**Committee Meeting Action:** Reject

**Committee Statement:** The tolerance established in this section is intended to only apply to bolts, other connections may have additional considerations. There are other applications for studs where the 1/16th tolerance is not acceptable. The term stud is used elsewhere where its inclusion in this section may cause confusion.

13-233 Log #352 AUT-HBS  
(9.2.3.2.1)

**Final Action: Accept**

**Submitter:** Victoria B. Valentine, National Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-327

**Recommendation:** Modify the text to account for the new section added as follows:

Unless the requirements of 9.2.3.2.2 or through 9.2.3.2.45 are met.

**Substantiation:** A new section was during the ROP that needs to be included. In addition, Section 9.2.3.2.3 is also a variation from the base paragraph and should be included with the exceptions.

**Committee Meeting Action:** Accept

EDITORIAL CHANGE:

The "4" is intended to be removed.

The term "or" is intended to be removed

Unless the requirements of 9.2.3.2.2 ~~or~~ through 9.2.3.2.45 are met.

13-234 Log #49 AUT-HBS  
(9.2.4.1)

**Final Action: Accept**

**Submitter:** Thomas G. Wellen, American Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-329

**Recommendation:** Revise text to read as follows:

9.2.4.1 Unless the requirements of 9.2.4.2, 9.2.4.3, 9.2.4.4, 9.2.4.5, or 9.2.4.6 are met, hangers for mains shall be in accordance with 9.2.2, between each branch line, or on each section of pipe, whichever is the lesser dimension.

9.2.4.2 For welded or mechanical outlets on a continuous section of pipe, hanger spacing shall be according to Table 9.2.2.1(a) or Table 9.2.2.1(b).

**Substantiation:** A reference to 9.2.4.2 in 9.2.4.1 is needed to avoid a conflict between the two sections.

**Committee Meeting Action:** Accept

13-235 Log #55 AUT-HBS  
(9.2.4.1)

**Final Action: Accept**

**Submitter:** Kenneth W. Wagoner, Parsley Consulting Engineers

**Comment on Proposal No:** 13-329

**Recommendation:** Revise text to read as follows:

9.2.4.1 Unless the requirements of 9.2.4.2, 9.2.4.3, 9.2.4.4, 9.2.4.5, or 9.2.4.6 are met, hangers for mains shall be in accordance with 9.2.2, between each branch line, or on each section of pipe, whichever is the lesser dimension.

**Substantiation:** Section 9.2.4.1 should reference the revised 9.2.4.2, as well as 9.2.4.3-9.2.4.6, as it also covers hanger spacing on pipe with welded and mechanical outlets.

**Committee Meeting Action:** Accept

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13-236 Log #223 AUT-HBS  
(9.3.4.9 and 9.3.4.9.1 (New) )

Final Action: Reject

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Submitter: Robert E. Bachman, Robert E. Bachman, Consulting Structural Engineer

Comment on Proposal No: 13-337

Recommendation: Add text to read as follows:

9.3.4.9 Clearance from structural members not penetrated or used, collectively or independently, to support the piping shall be at least 2 in. (50 mm).

9.3.4.9.1 A clearance of at least 2 in. (50 mm) in any direction shall be provided between structural members and sprinkler risers, drops and heads.

Substantiation: Interaction between sprinkler risers, drops and heads and structural members is a major source of sprinkler failure during earthquakes. While Section 9.3.4.9 requires a clearance between sprinkler piping and structural members, it is unclear whether this would apply to sprinkler drops, risers and heads. This additional text provides needed clarification language that makes the clearance requirement for these items abundantly clear.

Committee Meeting Action: Reject

Committee Statement: This is subject that needs further exploration by the technical committee. The TC will form a task group off cycle to review this and address it in the A2015 cycle.

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13-237 Log #1 AUT-HBS  
(9.3.5.2.2)

Final Action: Reject

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Submitter: Kraig Kirschner, AFCON

Comment on Proposal No: 13-340

Recommendation: Additional documentation regarding existing proposed text at 9.3.5.2.2.

"...tested for listing at maximum eccentricity."

Substantiation: See two additional figures below.

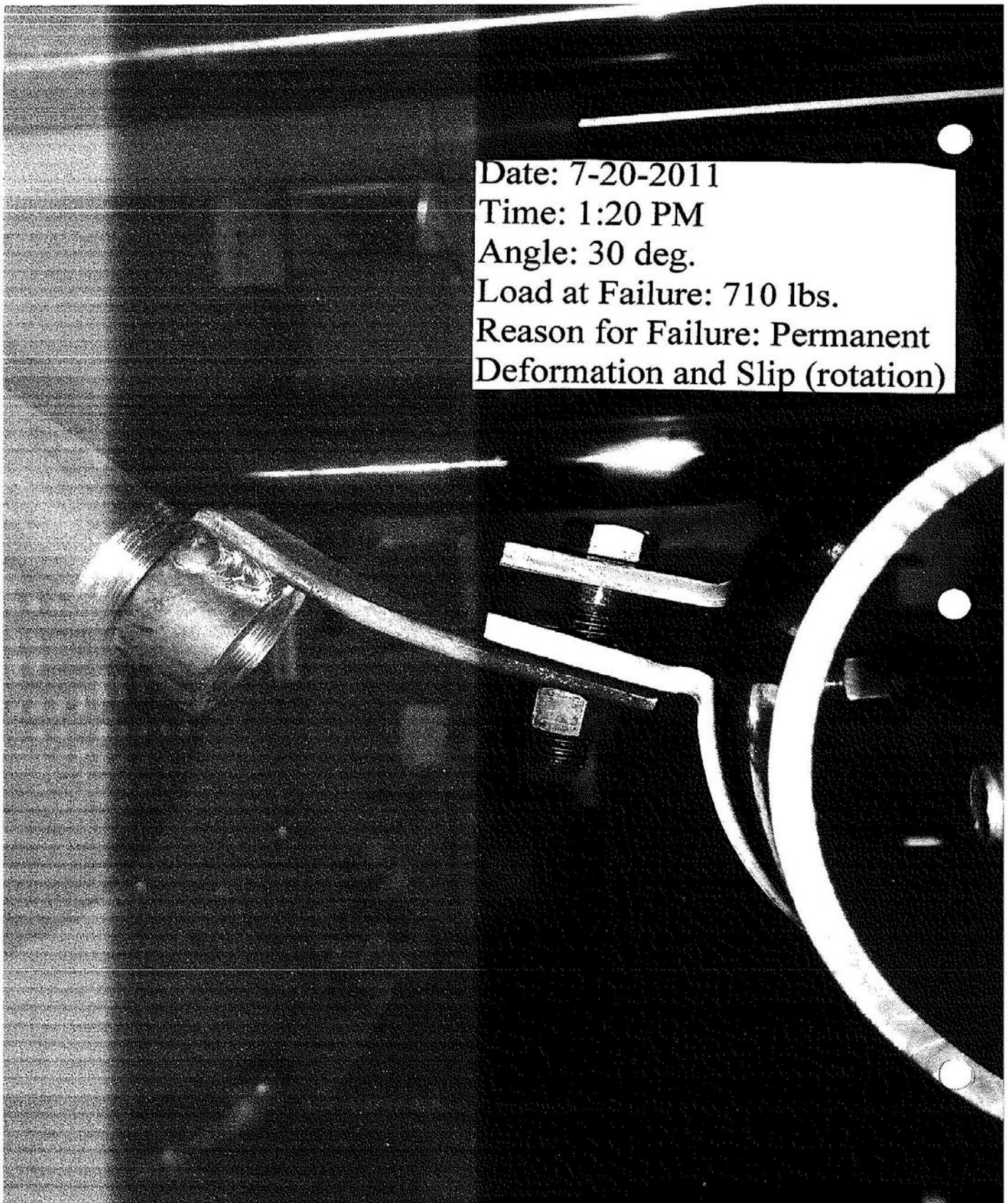
\*\*\*\*\*Insert Figure #1 Here\*\*\*\*\*

\*\*\*\*\*Insert Figure #2 Here\*\*\*\*\*

Committee Meeting Action: Reject

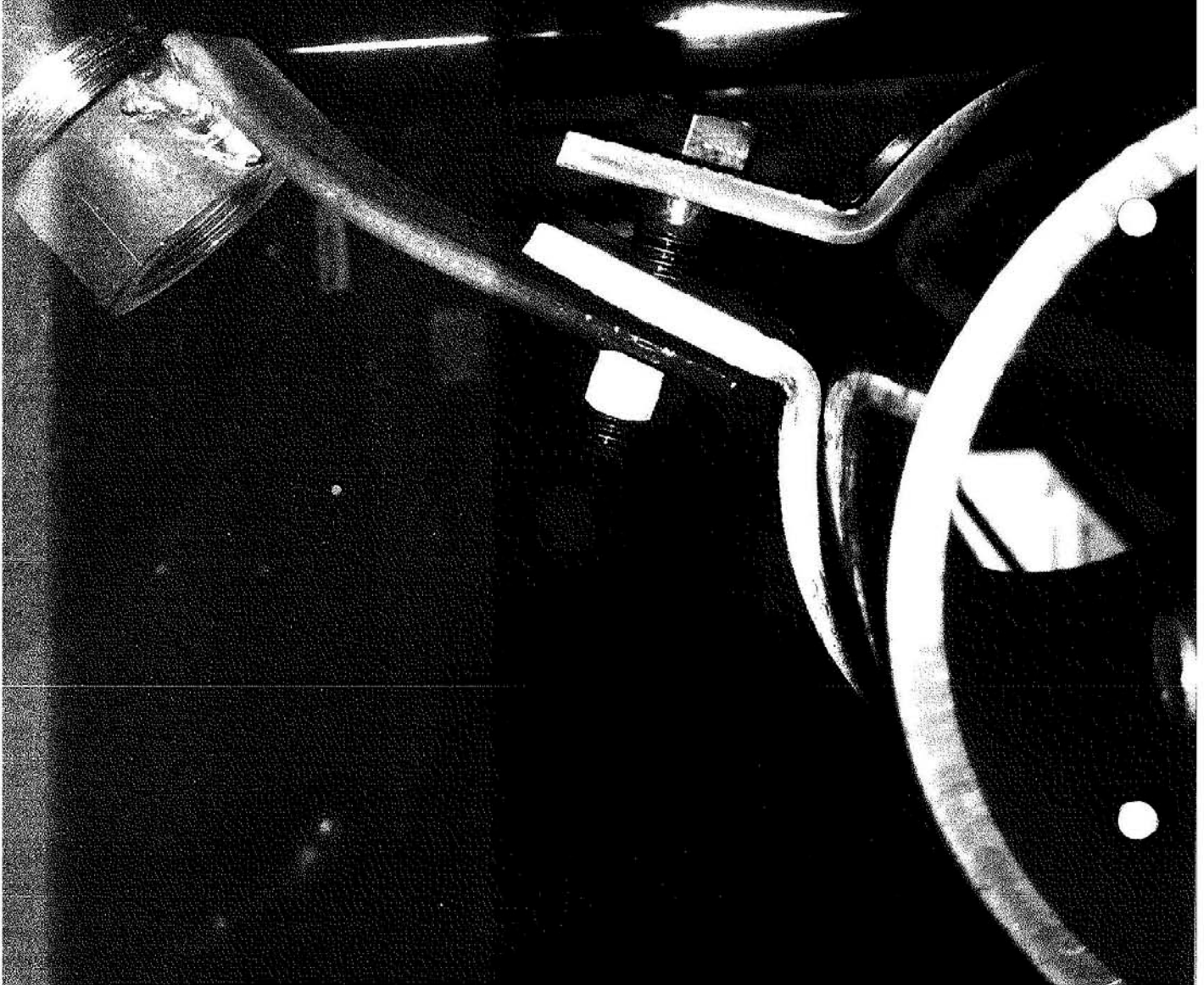
Committee Statement: The submitter did not request a specific action of the TC to include language.

Date: 7-20-2011  
Time: 1:20 PM  
Angle: 30 deg.  
Load at Failure: 710 lbs.  
Reason for Failure: Permanent  
Deformation and Slip (rotation)



13\_L1\_Figure #1\_S

Date: 7-21-2011  
Time: 2.00 PM  
Angle: 45 deg.  
Load at Failure: 980 lbs.  
Reason for Failure: Permanent  
Deformation and Slip (Rotation)



13\_L1\_Figure #2\_S

13-238 Log #135 AUT-HBS  
(Table 9.3.5.3.2(d))

**Final Action: Reject**

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**Submitter:** David W. Ash, Lubrizol Advanced Materials, Inc.

**Comment on Proposal No:** 13-344

**Recommendation:** None given.

**Substantiation:** The committee acted appropriately on the submitted proposal 13-344. The submitter of the proposal has misinterpreted the burst pressure values for CPVC as yield stress numbers. During the standard development cycle for NFPA 13-2010, test data was presented to validate the elongation at rupture (deformability) of CPVC pipe and fittings. That same set of test data shows that the CPVC compounds used to manufacture fire sprinkler pipe and fittings have a yield stress value of over 8000 psi (comment 13-174 and supporting data).

ASTM D1784 is the standard which specifies how to classify CPVC compounds. It does not specify a minimum acceptable value for yield strength.

**Committee Meeting Action:** Reject

**Committee Statement:** There is no modification to the code language. The submitter has not requested any specific action of the TC.

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13-239 Log #56 AUT-HBS  
(9.3.5.3.6)

**Final Action: Accept**

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**Submitter:** Kenneth W. Wagoner, Parsley Consulting Engineers

**Comment on Proposal No:** 13-341

**Recommendation:** Revise text to read as follows:

9.3.5.3.6 Where there is a change in direction of the piping, the cumulative distance between consecutive lateral sway braces shall not exceed the maximum permitted distance in accordance with 9.3.5.3.2.2.

**Substantiation:** The correct reference for maximum distance allowed between lateral braces is 9.3.5.3.2.2, which note that lateral braces may not be spaced greater than 40'

**Committee Meeting Action:** Accept

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13-240 Log #109 AUT-HBS  
(9.3.5.3.9)

Final Action: Reject

Submitter: Kraig Kirschner, AFCON

Comment on Proposal No: 13-346

Recommendation: Delete paragraph 9.3.5.3.9 ENTIRELY

Substantiation: Eliminate inconsistency in NFPA 13 standard.

Ch. 9 Sway bracing protocol has strict tenets/methodology

Why Sway Brace.....When Sway Brace .... How Sway Brace....Sway Brace Mechanics

Therefore, purposeful omission of sway braces violates this protocol and is arbitrary and inconsistent.

THE HANGER EXCEPTIONS described in paragraphs 9.3.5.3.9 and 9.3.5.3.10 should be eliminated from Chapter 9 because they are intellectually inconsistent with the conservative tenets of the NFPA 13 emergency system. They are dismissive of all the Chapter 9 sway brace protocols including requiring sway braces to limit stress on system piping and limit additional non-axial load on hangers. The potential additional seismic load on the hanger is not defined, unknown and absolutely contrary to the precise structural definition of a sway braces performance and function. The conservatively defined mechanics of the pipe hanger may be breached.

Since 2007, NFPA 13 sway bracing is relative to the structural characteristics of the system piping as respects seismic force per SEI/ASCE 7 and specific to the USGS.

THE HANGER EXCEPTIONS do not comport to the above tenets of restraining the force on system pipe in relation to the zone of influence, Ss, Cp, pipe material and pipe size.

I believe co-mingling of the vertical performance of hangers with the horizontal performance of sway braces is not prudent and invites interpretation over clarity.

THE HANGER EXCEPTIONS are arbitrary by assuming a defined benefit of uniform predictability regardless of many Chapter 9 variables.

Since THE HANGER EXCEPTIONS still omit quantifying the seismic force and analyzing its effects on the system piping material, shouldn't we remedy this situation now? This is exactly the problem that the I-Codes had with all of Chapter 9 prior to 2007 NFPA 13.

The hanger exceptions directly conflict with the required sway brace features specified in the following Chapter 9 paragraphs:

9.3.5.2.3 "...weakest component ... with safety factors."

9.3.5.3.2 "... based on the piping material of the sprinkler system."

9.3.5.3.2.3 "The maximum permissible load... of a sway brace ..."

9.3.5.6 Horizontal Seismic Loads

9.3.5.7 "...arranged to resist..."

9.3.5.8.1 "Sway bracing shall be tight"

9.3.5.8.4 "...avoid eccentric loading on fittings and fasteners."

9.3.5.9.2 "The type of fasteners ... shall be limited..."

9.3.5.9.7.1 "Concrete anchors shall be prequalified for seismic applications..."

9.3.5.10.1 "...listed for maximum load rating..."

9.3.5.10.2.1 "... shall be listed."

9.3.5.11.1 "...directly attached..."

A.9.1.2.3 "Limit horizontal loads on hanger rod"

In view of the above, I believe it is prudent to remove Paragraphs 9.3.5.3.9 and 9.3.5.3.10 from the 2013 NFPA 13 Chapter 9 text.

Committee Meeting Action: Reject

Committee Statement: The submitter is requested to submit test data on this issue. There is not sufficient loss history using the 6" rule. The submitter is encouraged to submit loss history data on this issue for future code cycles. The TC may choose to pursue this with the FPRF.

13-241 Log #77 AUT-HBS  
(9.3.5.3.9 and A.9.3.5.9 (New) )

**Final Action: Accept**

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**Submitter:** John Deutsch, City of Brea Fire Department

**Comment on Proposal No:** 13-346

**Recommendation:** Add text to read as follows:

9.3.5.3.9 The requirements of 9.3.5.3 shall not apply to pipes branch lines or feed mains individually supported by rods less than 6 in. (152 mm) long measured between the top of the pipe and the point of attachment to the building structure. The exception to the requirements of 9.3.5.3 shall not apply to cross mains.

A.9.3.5.9 The 6" hanger rods exception to the requirements of 9.3.5.3 shall only be used for the pipe or portion of pipe being hung directly from the hanger as limited by hanger spacing rules in section 9.2.2. The exception to the requirements of 9.3.5.3 shall not be permitted to include any tributary loads from other pipes with separate hangers such as the added longitudinal forces from branch lines.

**Substantiation:** The requirements of section 9.3.5.1.1 can not be met by allowing the omission of sway bracing in lieu of short rods. The ZOI method uses the sway brace or attachment load capacity limits to control lateral loads on cross mains sway brace. The short rod rule does not have any load capacity limit. Therefore as 9.3.5.3.9 is currently written an unlimited amount of longitudinal seismic force from branch lines can be added to a cross mains lateral seismic force and be controlled by the 6" rod.

**Committee Meeting Action:** Accept

13-242 Log #108 AUT-HBS  
(9.3.5.3.10)

Final Action: Reject

Submitter: Kraig Kirschner, AFCON

Comment on Proposal No: 13-347

Recommendation: Delete paragraph 9.3.5.3.10 Entirely.

Substantiation: Eliminate inconsistency in NFPA 13 standard.

Ch. 9 Sway bracing protocol has strict tenets/methodology

Why Sway Brace.....When Sway Brace .... How Sway Brace....Sway Brace Mechanics

Therefore, purposeful omission of sway braces violates this protocol and is arbitrary and inconsistent.

THE HANGER EXCEPTIONS described in paragraphs 9.3.5.3.9 and 9.3.5.3.10 should be eliminated from Chapter 9 because they are intellectually inconsistent with the conservative tenets of the NFPA 13 emergency system. They are dismissive of all the Chapter 9 sway brace protocols including requiring sway braces to limit stress on system piping and limit additional non-axial load on hangers. The potential additional seismic load on the hanger is not defined, unknown and absolutely contrary to the precise structural definition of a sway braces performance and function. The conservatively defined mechanics of the pipe hanger may be breached.

Since 2007, NFPA 13 sway bracing is relative to the structural characteristics of the system piping as respects seismic force per SEI/ASCE 7 and specific to the USGS.

THE HANGER EXCEPTIONS do not comport to the above tenets of restraining the force on system pipe in relation to the zone of influence, Ss, Cp, pipe material and pipe size.

I believe co-mingling of the vertical performance of hangers with the horizontal performance of sway braces is not prudent and invites interpretation over clarity.

THE HANGER EXCEPTIONS are arbitrary by assuming a defined benefit of uniform predictability regardless of many Chapter 9 variables.

Since THE HANGER EXCEPTIONS still omit quantifying the seismic force and analyzing its effects on the system piping material, shouldn't we remedy this situation now? This is exactly the problem that the I-Codes had with all of Chapter 9 prior to 2007 NFPA 13.

The hanger exceptions directly conflict with the required sway brace features specified in the following Chapter 9 paragraphs:

9.3.5.2.3 "...weakest component ... with safety factors."

9.3.5.3.2 "... based on the piping material of the sprinkler system."

9.3.5.3.2.3 "The maximum permissible load... of a sway brace ..."

9.3.5.6 Horizontal Seismic Loads

9.3.5.7 "...arranged to resist..."

9.3.5.8.1 "Sway bracing shall be tight"

9.3.5.8.4 "...avoid eccentric loading on fittings and fasteners."

9.3.5.9.2 "The type of fasteners ... shall be limited..."

9.3.5.9.7.1 "Concrete anchors shall be prequalified for seismic applications..."

9.3.5.10.1 "...listed for maximum load rating..."

9.3.5.10.2.1 "... shall be listed."

9.3.5.11.1 "...directly attached..."

A.9.1.2.3 "Limit horizontal loads on hanger rod"

In view of the above, I believe it is prudent to remove Paragraphs 9.3.5.3.9 and 9.3.5.3.10 from the 2013 NFPA 13 Chapter 9 text.

Committee Meeting Action: Reject

Committee Statement: The submitter is requested to submit test data on this issue. There is not sufficient loss history using the 6" rule. The submitter is encouraged to submit loss history data on this issue for future code cycles. The TC may choose to pursue this with the FPRF.

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13-243 Log #204 AUT-HBS  
(9.3.5.5.1)

**Final Action: Accept in Principle**

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**Submitter:** John Silva, Hilti North America

**Comment on Proposal No:** 13-339

**Recommendation:** Add new Section 9.3.5.5.1.1

9.3.5.5 Lateral Sway Bracing.

9.3.5.5.1\* Lateral sway bracing shall be provided on all feed and cross mains regardless of size and all branch lines and other piping with a diameter of 2-1/2 in. (65 mm) and larger.

9.3.5.5.1.1 Where not provided with sway bracing, branch lines shall be provided with restraint in accordance with 9.3.6.

**Substantiation:** The requirement for restraint of small diameter branch lines is often missed in practice. This pointer ensures that lateral bracing or restraint is provided on all branch lines.

**Committee Meeting Action:** **Accept in Principle**

Submitter intended to submit the comment to 13-349 which discusses braces.

9.3.5.5.1.1 Where branch lines are not provided with lateral sway bracing, they shall be provided with restraint in accordance with 9.3.6.

**Committee Statement:** Modifications to the proposed language were editorial in nature. The concept of restraining branch lines is not new to chapter 9 as it is addressed in 9.3.6. This language is being added to 9.3.5.5.1 for clarity.

13-244 Log #71 AUT-HBS  
(9.3.5.6.4 and 9.3.5.6.4.1)

Final Action: Accept in Principle

Submitter: John Deutsch, City of Brea Fire Department

Comment on Proposal No: 13-351

Recommendation: 9.3.5.6.4.1\* When riser nipples are provided in systems requiring seismic protection, the weight of the water filled branch line pipe in the zone of influence ( $W_p$ ) as defined by 9.3.5.6.1, including the length of the riser nipple, multiplied by the seismic coefficient ( $C_p$ ), and by the height of the riser nipple ( $H_r$ ), divided by the section modulus ( $S$ ) of the riser nipple piping shall not meet or exceed the yield strength ( $F_y$ ) of the riser nipple piping. If the calculated value is equal to or greater than the yield strength or the riser nipple, the longitudinal seismic load of each line shall be evaluated individually and branch lines shall be provided with longitudinal sway bracing per 9.3.5.4.

Formula:  $(H_r * W_p * C_p) / S \geq F_y$

Where:

$H_r$  = Height of RN (in inches)

$W_p$  = Tributary weight in pounds for the branch line or portion of branch line within the ZOI including the riser nipple

$C_p$  = Seismic coefficient

$S$  = Sectional modulus of the riser nipple pipe

$F_y$  = Allowable yield strength

30,000 for Steel

11,000 for Copper

2,000 for CPVC

A.9.3.5.6.4.1 When steel schedule 10 and schedule 40 pipe are used, the section modulus can be found in Table 9.1.1.6.1(b).

Substantiation: This is a revision / correction to the committee accepted in principal proposal. The sign to greater than or equal to has been corrected, values for copper and CPVC have been added and the text has had some word smithing applied.

Committee Meeting Action: Accept in Principle

Accept the proposed language with the following modifications:

Add the phrase "and longer than four feet" as follows:

9.3.5.6.4.1\* When riser nipples are provided in systems requiring seismic protection and are longer than four feet ....

Modify the "where list":

Where:

$H_r$  = Length of RN Piping (in inches)

$W_p$  = Tributary weight in pounds for the branch line or portion of branch line within the ZOI including the riser nipple

$C_p$  = Seismic coefficient

$S$  = Sectional modulus of the riser nipple pipe

$F_y$  = Allowable yield strength

30,000 for Steel

30,000 for Copper (Soldered)

8,000 for CPVC

Committee Statement: Modifications were made to the values for yield strength of copper and CPVC based on discussion during the ROC meeting that the values as submitted were inaccurate. The reference to 4 foot risers nipples was included in the original proposal from the ROP meeting.

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13-245 Log #146 AUT-HBS  
(9.3.6.3)

Final Action: Accept

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Submitter: Kenneth E. Isman, National Fire Sprinkler Association, Inc.

Comment on Proposal No: 13-359

Recommendation: Modify Section 9.3.6.3 and add annex language as follows:

9.3.6.3 The end sprinkler on a branch line shall be restrained ~~against excessive vertical and lateral movement.~~

Substantiation: The proposed language is mostly an editorial change. The concept has been to locate restraint at the ends of branch lines for many editions. However, there is confusion in the field as to how to determine the vertical and lateral movement as well as what values would then be deemed "excessive."

Committee Meeting Action: Accept

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13-246 Log #336 AUT-HBS  
(9.3.7.8 and A.9.1.3)

Final Action: Accept

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Submitter: Victoria B. Valentine, National Fire Sprinkler Association, Inc.

Comment on Proposal No: 13-360

Recommendation: Add new language as follows:

9.3.7.8 Where seismic protection is provided , concrete anchors used to secure hangers to the building structure shall be in accordance with ACI 355.2, *Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary*, and installed in accordance with manufacturer's instructions.

A.9.1.3 In areas that are subject to provisions for earthquake protection, the fasteners in concrete will need to be prequalified. See Section 9.3.7.8 for information.

Substantiation: The language from the proposal was editorially modified by the task group. After task group discussions it was decided the language should be added to NFPA 13. There is an attached report of the task group that provides additional background information and some product information.

Note: Supporting material is available for review at NFPA Headquarters.

Committee Meeting Action: Accept

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13-247 Log #113 AUT-HBS  
(9.3.11)

Final Action: Accept

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Submitter: Technical Correlating Committee on Automatic Sprinkler Systems,

Comment on Proposal No: 13-361a

Recommendation: Where and when the TC's use the term "Readily Accessible", the TC's are directed to better define their intent on a case by case basis.

Substantiation: This is a direction from the Technical Correlating Committee on Automatic Sprinkler Systems in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Committee Meeting Action: Accept

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13-358 Log #250 AUT-HBS  
(A.9.1.1.7)

Final Action: Reject

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**Submitter:** Joshua Elvove, U.S. General Services Administration

**Comment on Proposal No:** 13-550

**Recommendation:** Accept original proposal add add new text to read as follows:

A.9.1.1.7 The rules covering the hanging of sprinkler piping take into consideration the weight of water-filled pipe plus a safety factor. No allowance has been made for the hanging of nonsystem components from sprinkler piping. NFPA 13 provides the option to support sprinkler piping from other sprinkler piping where the requirements of Section 9.1.1.2 are met. It is not the intent to prohibit materials that have no impact on the external load bearing capability of the sprinkler pipe such as decorations, unless these materials obstruct the sprinkler discharge.

**Substantiation:** My original proposal would not permit items that obstruct sprinkler discharge to be hung from sprinkler pipe. If sprinkler discharge is the real issue, what's the problem with running wire along sprinkler piping (especially if piping is concealed), since the weight is inconsequential. This is a turf issue that really has no merit, in every circumstance, and frankly gives enforcers and sprinkler inspectors needless fodder for citations. Give users of the standard some true rationale as to why NOTHING can be hung from sprinkler pipe. Otherwise, give them the needed relief as proposed. Then, NFPA 25 can follow suit.

**Committee Meeting Action:** Reject

**Committee Statement:** Once you permit non-system components to be attached to the sprinkler system the interaction between the attached item and the system piping or the sprinklers cannot be predicted.

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13-359 Log #CC34 AUT-HBS  
(A.9.1.2.3)

Final Action: Accept

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**Submitter:** Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,

**Comment on Proposal No:** 13-325

**Recommendation:** Revise the word "eliminate" to "minimize" in Figure A.9.1.2.3(1) and A.9.1.2.3(1).

**Substantiation:** This is a correction to the annex language to better correlate with the language in the body.

**Committee Meeting Action:** Accept

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13-360 Log #CC32 AUT-HBS  
(A.9.2.6)

Final Action: Accept

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**Submitter:** Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,

**Comment on Proposal No:** 13-330

**Recommendation:** Add to current A.9.2.6 as new paragraph:

Where applicable, the design of pipe stands should consider additional loading from other sources. Environmental impacts, including water accumulation at the base, corrosion, and wind should also be taken into account as appropriate.

Add new 9.2.6.2 and renumber:

The pipe stand base shall be secured by an approved method.

**Substantiation:** This task group was charged with reviewing the current pipe stand criteria in relation to proposals 13-330, 13-331, and 13-332. It was determined that the user needs to be made aware that any horizontal loading or environmental conditions need to be evaluated in conjunction with the support method for the piping system. In addition, pipe stands need to be secured to the floor. There is no current language that specifies that and instances of movement after installation have been noted in the field. The method used to secure the plate has to be approved as the flooring material could differ from one scenario to the next as well as additional site specific loads such as possible vibration.

**Committee Meeting Action:** Accept

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13-361 Log #CC30 AUT-HBS  
(A.9.3.2.3(2)(b))

**Final Action: Accept**

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**Submitter:** Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,  
**Comment on Proposal No:** 13-79

**Recommendation:** Change the title of A.9.3.2.3.(2)(b) to read as follows:  
Flexible Coupling on Vertical Portion of Tie-in

**Substantiation:** This change is being made to make the figure title consistent with Figure A.9.3.2.3(2)(a).  
**Committee Meeting Action:** Accept

13-362 Log #73 AUT-HBS  
(A.9.3.2.4)

Final Action: Accept in Principle

Submitter: John Deutsch, City of Brea Fire Department  
 Comment on Proposal No: 13-554  
 Recommendation: Comment:  
 Proposed Code

**A.9.3.2.4** See Figure A.9.3.2.4. Drops that extend into freestanding storage racks or other similar structures should be designed to accommodate a horizontal relative displacement between the storage rack and the overhead supply piping. The horizontal relative displacement should be determined using the least value from one of the following formulas and shall be taken as the height of the top point of attachment to the storage rack above its base or the highest point of potential contact between the rack structure and the piping above its base, whichever is higher, ~~multiplied by ±0.05~~ unless a smaller value is justified by test data or analysis. ~~The horizontal relative displacement should be accommodated by two or more flexible couplings, swing joints, or other approved means. The designer shall only be required to account for the differential movement value as determined from one of the two formulas, not both and the lesser of the two value shall be acceptable. It shall be the responsibility of the sprinkler designer to determine how to account for the determined differential movement using flexible couplings or other approved means.~~

$$D = H * 0.06 * S_1 * F_v$$

Or

$$D = H * 0.05$$

Where:

- D = Differential movement between the rack and the roof (feet or meters)
- H = Height of the top point of attachment to the rack (feet or meters)
- S<sub>1</sub> = One second period spectral acceleration per USGS 2010 Seismic Design Maps (see ASCE 7-10).
- F<sub>v</sub> = One second period Site Coefficient (Site Class D)

F<sub>v</sub> is a function of S<sub>1</sub> and shall be determined as follows:

\*\*\*Insert Table 13\_L73\_R here\*\*\*

Note: Use straight-line interpolation for intermediate values of S<sub>1</sub>

**Substantiation:** Rack storage systems in all areas should not be subjected to worst case potential displacement as would be required in seismic zones, just as NFPA 13 does not require the same C<sub>p</sub> value for all brace calculations for all sprinkler systems. The original text allows for smaller displacement values; however it does not provide any procedure to determine such values. Further, the original text suggests the use of flexible couplings to account for displacement; however, 5 percent rack displacement is well beyond the capabilities of 2 flexible couplings, which makes the original text misleading. The storage rack potential displacement should be determined using site specific information, rather than an arbitrarily applied value of 5% for all buildings without regard to their potential seismic activity. This can be accomplished using the same resources as are used to determine S<sub>s</sub>.

The potential rack displacement is a function of the ASCE 7-10 variable S<sub>1</sub> (rather than the S<sub>s</sub> which is more appropriate for buildings) which is the mapped MCE spectral response acceleration at a period of one second, as defined in section 11.3 of ASCE 7-10. The use of the variable S<sub>1</sub> to determine rack displacement would not require a worst case scenario to be applied to all buildings without regard to their location in a seismic zone. As a result, racks installed in areas which are not subject to potentially large seismic events will not be required to provide for the same

potential displacement as are those in areas where the potential is much more severe.

**Committee Meeting Action: Accept in Principle**

Accept the proposed language, table, note and formula to read as follows;

**A.9.3.2.4** See Figure A.9.3.2.4. Drops that extend into freestanding storage racks or other similar structures should be designed to accommodate a horizontal relative displacement between the storage rack and the overhead supply piping. The horizontal relative displacement should be determined using the least value from one of the following formulas and shall be taken as the height of the top point of attachment to the storage rack above its base or the highest point of potential contact between the rack structure and the piping above its base, whichever is higher, ~~multiplied by ±0.05 unless a smaller value is justified by test data or analysis. The horizontal relative displacement should be accommodated by two or more flexible couplings, swing joints, or other approved means. The designer shall should only be required to account for the differential movement value as determined from one of the two formulas, not both and the lesser of the two values shall is acceptable. It shall be the responsibility of the sprinkler designer should be to determined how to account for the determined differential movement using flexible couplings or other approved means.~~

$$D = H * 0.06 * S_1 * F_v$$

Or

$$D = H * 0.05$$

Where:

D = Differential movement between the rack and the roof (feet or meters)

H = Height of the top point of attachment to the rack (feet or meters)

S<sub>1</sub> = One second period spectral acceleration per USGS 2010 Seismic Design Maps (see ASCE 7-10).

F<sub>v</sub> = One second period Site Coefficient (Site Class D)

F<sub>v</sub> is a function of S<sub>1</sub> and shall be is determined as follows:

\*\*\*Insert Table 13\_L73\_R here\*\*\*

Note: Use straight-line interpolation for intermediate values of S<sub>1</sub>

**Committee Statement:** The word "designer" was removed from the proposed language to avoid any confusion that a registered design professional is required to perform this work. The word "shall" is not permitted to be used in the annex and was replaced throughout the proposed text.

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13-363 Log #CC35 AUT-HBS  
(A.9.3.4)

**Final Action: Accept**

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**Submitter:** Technical Committee on Hanging and Bracing of Water-Based Fire Protection Systems,

**Comment on Proposal No:** 13-556

**Recommendation:** Replace "listed flexible connections" with "Flexible Sprinkler Hose Fitting".

**Substantiation:** This is consistent with the wording previously used in the standard.

**Committee Meeting Action:** Accept

$S_1$	Fv
$\leq 0.1$	2.4
$= 0.2$	2.0
$= 0.3$	1.8
$= 0.4$	1.6
$\geq 0.5$	1.5

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13-364 Log #52 AUT-HBS  
(A.9.3.5)

**Final Action: Accept**

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**Submitter:** Kraig Kirschner, AFCON

**Comment on Proposal No:** 13-557

**Recommendation:** Revise text to read as follows:

Proper...good craftsmanship with appropriate brace angle corresponding to correct....plans and drawings.

**Substantiation:** I do not agree with the committee statement to reject.

Suggest adding the above wording to the proposal to enhance clarity.

Documentation provided with proposal 13-340 should be used to justify the need for and support the addition of this QC statement that corresponds to the hanger QC statement in A.9.2.

**Committee Meeting Action:** Accept

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13-365 Log #353 AUT-HBS  
(Figure A.9.3.5(a) and (b))

**Final Action: Accept in Principle**

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**Submitter:** Victoria B. Valentine, National Fire Sprinkler Association, Inc.

**Comment on Proposal No:** 13-575

**Recommendation:** Modify Figure A.9.3.5 (a), and Figure A9.3.5 (b) will also need to be correlated.

\*\*\*INSERT FIGURE HERE\*\*\*

**Substantiation:** The section numbers for the adjusted load rating under "Seismic Brace Attachments" were updated to reflect the pre-print document and where the table is currently located. The load calculation portion was also modified for clarity. The "default" language has been removed as it is rarely used. In addition, a line for transition attachments has been added as some structural connections require this additional component.

**Committee Meeting Action:** Accept in Principle

Add a new row at the bottom of the table.

Add the following language in the new row underneath "Total  $F_{pw}$ "

"Maximum  $F_{pw}$  per 9.3.5.5.2" underneath

**Committee Statement:** Editorial: Align text at the bottom of the form in the 5th column

# Seismic Bracing Calculations

Sheet \_\_\_ of \_\_\_

Project: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_

Contractor: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Telephone: \_\_\_\_\_  
 Fax: \_\_\_\_\_

## Brace Information

Length of brace: \_\_\_\_\_  
 Diameter of brace: \_\_\_\_\_  
 Type of brace: \_\_\_\_\_  
 Angle of brace: \_\_\_\_\_  
 Least radius of gyration:\* \_\_\_\_\_  
 r/r value:\* \_\_\_\_\_  
 Maximum horizontal load: \_\_\_\_\_

## Seismic Brace Attachments

Structure attachment fitting or tension-only bracing system:  
 Make: \_\_\_\_\_ Model: \_\_\_\_\_  
 Transition attachment fitting (where applicable):  
 Make: \_\_\_\_\_ Model: \_\_\_\_\_  
 Listed load rating: \_\_\_\_\_ Adjusted load rating per 9.3.5.2.4: \_\_\_\_\_  
 Sway brace (pipe attachment) fitting:  
 Make: \_\_\_\_\_ Model: \_\_\_\_\_  
 Listed load rating: \_\_\_\_\_ Adjusted load rating per 9.3.5.2.4: \_\_\_\_\_

## Fastener Information

Orientation of connecting surface: \_\_\_\_\_  
 Fastener:  
 Type: \_\_\_\_\_  
 Diameter: \_\_\_\_\_  
 Length (in wood): \_\_\_\_\_  
 Maximum load: \_\_\_\_\_

## Seismic Brace Assembly Detail

(Provide detail on plans)

Brace identification no. \_\_\_\_\_ (to be used on plans): \_\_\_\_\_

Lateral brace       Longitudinal brace       4-way brace

## Sprinkler System Load Calculation [ $F_{pw} = C_p W_p$ ]

$C_p =$  \_\_\_\_\_

Diameter	Type	Length (ft)	Total (ft)	Weight per ft	Weight
				lb/ft	lb
				lb/ft	lb
				lb/ft	lb
				lb/ft	lb
				lb/ft	lb
				lb/ft	lb
<b>Subtotal Weight</b>					lb
<b>W<sub>p</sub> (incl. 15%)</b>					lb
<b>Total (F<sub>pw</sub>)</b>					lb

\* Excludes tension-only bracing systems

13-Log 353 - ROC - Figure A.9.3.5(a)