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NFPA 13E Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems 1989 Edition

National Fire Protection Association 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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MGR AM-90

Errata

NFPA 13E

Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems

1989 Edition

Reference: 1-3.6

The Fire Service Training Committee notes the following error in the 1989 edition of *Recommendations for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems*, NFPA 13E:

1. In 1-3.6, on lines 2 and 5, delete the word "outside".

Issue Date: January 1991

NFPA 13E

Recommendations for

Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems

1989 Edition

This edition of NFPA 13E, *Recommendations for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems*, was prepared by the Technical Committee on Fire Service Training and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 15-18, 1989 in Washington, DC. It was issued by the Standards Council on July 14, 1989, with an effective date of August 7, 1989, and supersedes all previous editions.

The 1989 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Origin and Development of NFPA 13E

The NFPA adopted in 1933 an informative brochure, prepared by the Committee on Field Practice, "Use of Automatic Sprinklers by Fire Departments." This was published as a separate pamphlet and reprinted in 1936. The work formerly carried on by the Committee on Field Practice was distributed to a number of new committees in 1953 and at that time the Committee on Standpipes and Outside Protection was given responsibility for this brochure. A subcommittee of the Committees on Standpipes and Outside Protection, Automatic Sprinklers, Fire Department Equipment, and Fire Service Training prepared a revision, Fire Department Operations in Protected Properties, which, on recommendation of the four committees, was adopted as an informative report at the NFPA Annual Meeting, Detroit, May 16, 1961. The informative report was published and circulated as a separate pamphlet No. SPI-1961, but was not included in the annual volumes of the *National Fire Codes®*.

Recommendations for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems, NFPA 13E, was adopted with minor revisions by the NFPA at its 1966 Annual Meeting on recommendation of the Committee on Standpipes and Outside Protection. It was amended in 1973, 1978, 1983, and 1989.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

Contents

NFPA 13E

Recommendations for

Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems

1989 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Chapter 1 Properties Protected by Automatic Sprinkler Systems

1-1 General.

1-1.1 Records of the National Fire Protection Association clearly indicate the highly effective performance of automatic sprinkler systems. The actual performance is likely even better than the greater than 95 percent statistics available, since many small fires involving only one or two sprinklers are probably not reported.

There are two principal causes of unsatisfactory sprinkler performance: a closed valve in the water supply line and inadequate water delivered to the sprinkler system. Both of these situations can be reduced by effective fire department prefire planning and appropriate actions at the time the fire department is called. If the sprinkler system was initially designed for a low heat release product or only intended to accommodate low storage, a change to a high heat commodity, or significant increase in storage height may result in unsuccessful sprinkler performance. Knowledge of sprinklered buildings within the response area will enable companies to be alert for these types of changes and refer these changes to the authority having jurisdiction for determination if sprinkler system upgrading is needed.

Wherever automatic sprinklers are installed, the fire department training program should include a course on the fundamentals of automatic sprinkler systems. Where automatic sprinklers are in use, the fire department should recognize that:

(a) Where properly designed, installed, and maintained, the sprinkler system can put water directly on the fire in a more effective manner than the fire department can do using manual methods.

(b) Not all sprinkler systems are equally effective in their performance. Systems installed many years ago may not have been properly maintained or may not be fully effective for the occupancy now in the building.

(c) Changing water supply conditions may have reduced the water supply for sprinklers initially contemplated by the system designer.

(d) Newer occupancies and commodity storage methods may rely heavily on fire department support for the sprinkler system as compared to past sprinkler system performance and conventional storage methods.

(e) Sprinkler systems are being installed in single family and multiple family dwellings as well as other types of residential occupancies. Some of these systems may not have the traditional fire department connection and other traditional exterior building fittings or dedicated separate water supplies.

1-2 Inspection and Pre-Fire Planning. (*See Figure 1-2.*)

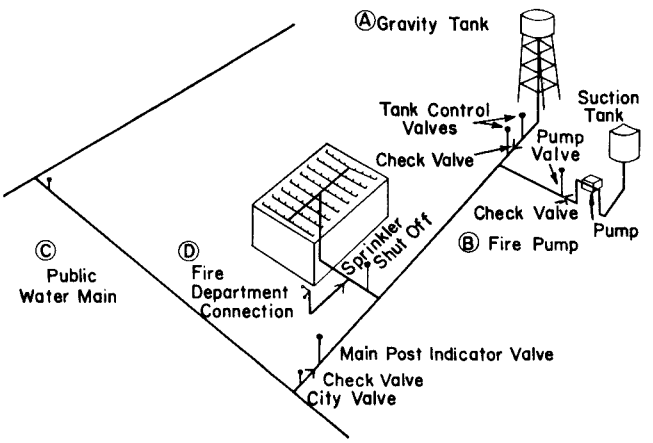

Figure 1-2 A typical layout.

1-2.1 In properties protected by automatic sprinklers, fire officers, including the chief of the battalion and/or district and officers assigned to first due companies, should know:

(a) The buildings and nature of occupancies protected by automatic sprinklers, the extent of this protection, and the type of sprinkler systems.

(b) The water supply to the sprinklers, including the source and type of supply, the flow and pressure normally available, and the anticipated duration of the supply available.

(c) The location of all sprinkler control valves, what each valve controls, and the consequence of shutting off any valve.

(d) The location of fire department connections to sprinkler systems, the specific area each connection serves, and the water supply, hose, and pumper layout that will be used to feed the sprinkler connections. [*See Figure 1-2.1(d)*].

(e) The specific company assignment having the primary responsibility for charging the sprinkler connection.

(f) The location of water supplies for hand lines without jeopardizing the water supply to operating sprinklers.

(g) An alternate means for supplying water to the system in case of damage to the fire department connection.

(h) The location of spare or replacement sprinkler heads.

(i) Location of waterflow indicators and annunciator panels associated with the systems.

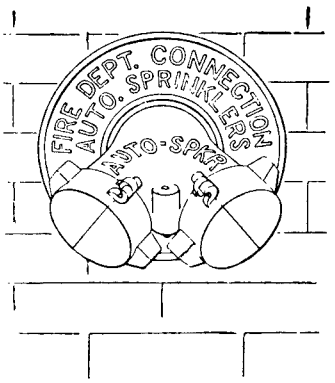

Figure 1-2.1(d) Fire department connection.

(j) Names of building owner or tenant for contact in emergency.

1-2.2 During the periodic inspections by fire code officials, the location and accessibility of fire department connections and connections to the water source as well as the availability of an adequate water supply should be ascertained.

1-2.3 Arrangements should be made with the property owner for entering the building as quickly as possible when the building is unattended. If such arrangements are made, the necessity for using forcible entry equipment may be reduced and damage from the use of such equipment avoided.

1-3 Fireground Operations in Sprinklered Properties.

1-3.1 It is most important that each fire department responding to properties protected by automatic sprinkler systems have standard operating procedures developed for handling fires in sprinklered buildings. It is the duty of the officer in charge at the fire to see that these procedures are carried out as promptly and efficiently as possible.

1-3.2 When responding to a fire in properties protected by automatic sprinkler systems it is important that fire fighting operations be based upon a thorough knowledge of the property resulting from prior inspection and "prefire planning."

1-3.3 Accurate size-up may be hindered by low visibility from smoke resulting from downward air currents due to operating sprinkler heads.

NOTE: Experience shows that shutting down a sprinkler system to improve visibility could prove disastrous.

1-3.4 A fire fighter familiar with the building and the system, and preferably with a portable radio, should be sent immediately to see that control valves are fully opened and so advise the officer in charge. Where ample personnel are available and communications can be maintained, it is desirable to remain at the control valve area to ensure that no one closes the valve(s) until so ordered by the officer in charge.

If the valve is found to be closed, the officer in charge should be promptly notified and the valve should be fully opened at his direction unless valve is tagged "Closed for Repairs." Valves found closed for no apparent reason should be reported to the fire investigator as soon as possible.

NOTE: If the system is supplied or augmented by a fire pump, a fire fighter should also be assigned to verify that the pump is in operation.

1-3.5 When arriving at a property protected by an automatic sprinkler system, prompt action should be taken to supply the system. [*See Figures 1-3.5(a) and 1-3.5(b).*]

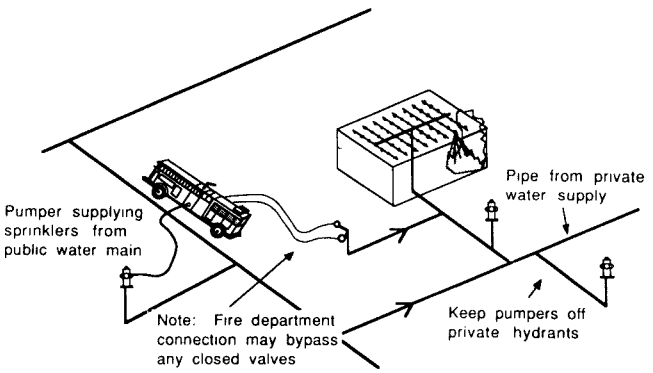

Figure 1-3.5(a) Supplying the system.

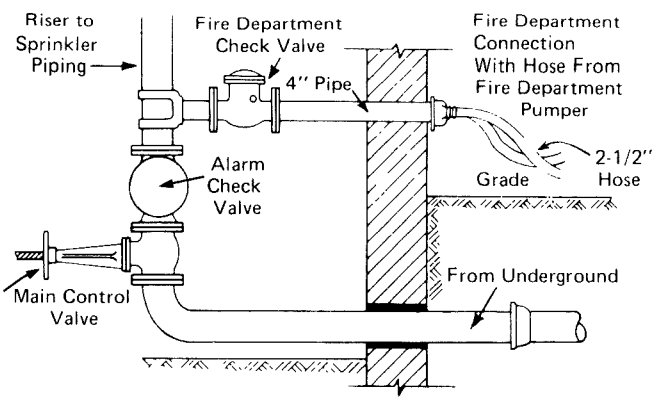

Figure 1-3.5(b) Supplying the fire department connection.

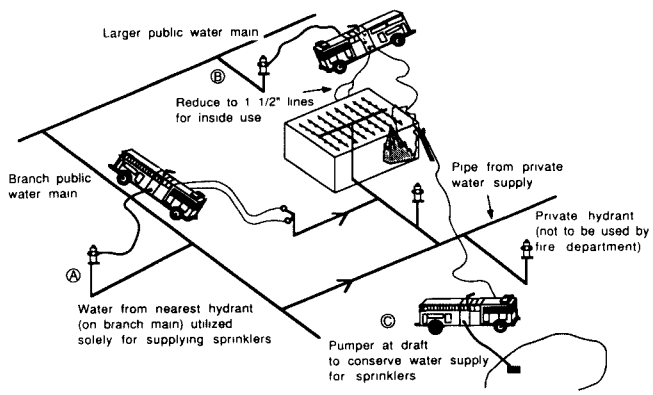

Figure 1-3.5(c) Where hose streams must be used, water must be taken from sources that do not reduce the sprinklered protection. Pumpers should be supplied by either:

(A) Connecting to large mains which flow tests have indicated may be adequate to supply both sprinklers and the required hose streams; (B) Connecting to water mains not needed for sprinkler supply; (C) Drafting from static sources.

A minimum of one pumper supply line should be connected to the fire department connection and should be supplemented according to fire conditions. The supply line should be charged to a pressure of 150 psi (10.3 bars). Where fire conditions dictate multiple lines into the system, a somewhat higher pressure may be needed.

Additional hose lines should be stretched to the fire area as directed by the officer in charge. [*See Figure 1-3.5(c).*]

1-3.6* Fire departments should avoid pumping out of open water sources and into outside sprinkler systems when such systems are connected to potable water supplies unless appropriate backflow protection equipment is installed on the supply line from the public water system to the outside sprinkler system.

1-3.7 The unit performing "truck" duties should provide ventilation and salvage as needed in order that there be no delay in advancing hose lines to complete extinguishment. Refer to Section 1-6 for exceptions to ventilation procedures.

Salvage covers should be spread over those items/areas likely to be affected by operating sprinklers or hose lines, or both. Special attention should be given to those areas on levels below the area of sprinkler operation.

1-4 Post-Fire Operations.

1-4.1 AUTOMATIC SPRINKLERS SHOULD NOT BE SHUT OFF UNTIL AFTER THE FIRE HAS BEEN EXTINGUISHED. If there is a sectional or floor valve, this should be closed in lieu of the main valve. Assign a fire fighter, preferably with a portable radio, to remain at the valve until overhaul is completed. Orders should also be given to the pump operator to shut down the lines connected to the fire department connection as these by-pass the main valve, and in the absence of a floor valve, water will flow until the pump discharge gates are closed.

Where a combined sprinkler-standpipe system is installed it may be necessary to maintain the hose lines charged until overhaul is completed.

NOTE: Where only a few sprinkler heads are operating, sprinkler tongs, tapered wooden wedges, or dowels can be used to immediately stop the flow from the opened heads without shutting off the entire system. (*See Figure 1-4.1.*)

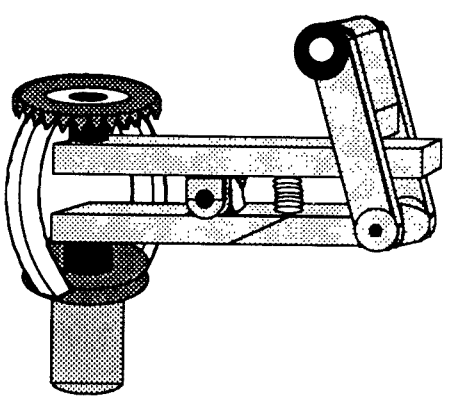

Figure 1-4.1 Sprinkler head with sprinkler wedge installed.

1-4.2 Provide routine overhaul and initiate cause and origin investigation.

1-4.3 When overhauling is completed the lines from the pumper to the sprinkler system fire department connection may be ordered disconnected.

1-4.4 Where appropriate, the fire department may assist in restoring the sprinkler system. This may include replacing fused heads surrounding the operating sprinkler, resetting dry valves, turning on water, etc. Unfused heads surrounding the operating sprinkler heads subjected to elevated temperatures should be replaced to avoid potential fusing under nonfire conditions.

NOTE: Work on restoring a sprinkler system may present potential consequences for improper or negligent actions. Each fire department should review its position on this matter.

1-4.5 Notify code enforcement authorities where the automatic sprinklers are part of a "code" required system. If the sprinkler system cannot be restored to operating condition by the time the fire department leaves the premises, the code enforcement agency should be promptly notified of the noncompliance status of the structure. The building owner or representative should also be notified.

1-4.6 Notify the Fire Prevention Bureau of any fire involving a building with automatic sprinklers.

1-5 Reports.

1-5.1 It is very important that the officer in charge include with the fire report essential data regarding the operation of the sprinkler system.

1-5.2 A fire department report of fire in a property protected by an automatic sprinkler system should include pertinent additional information regarding automatic sprinkler operation such as:

Location of heads operating.

Number of sprinkler heads operating.

Result of sprinkler operation.

Reason for any unsatisfactory operation.

What member of department was assigned to check control valve?

Did fire department connect to sprinkler system?

If not, why not?

Company connected to sprinkler system: Engine number.

Number of hose lines used.

Was water pumped into system?

Was valve closed after fire? Who ordered valve closed?

Number of sprinkler heads replaced by fire department.

Type of heads installed.

Is sprinkler protection fully restored?

By whom?

Did the private water supply to sprinklers operate satisfactorily?

Was representative of management notified? Who?

1-5.3 A thorough critique of the fire department operations and the performance of the automatic sprinkler system should be completed to improve future operations at sprinklered properties.

1-6 Storage Occupancies.

1-6.1 Occupancies with a wide variety of configurations and a wide range of storage commodities may need special procedures, particularly where storage heights are in excess of 15 ft (4.57 m). In some cases, routine ventilation procedures in the early stages of a fire may hinder effective sprinkler operations. It is desirable for the fire department to discuss its pre-fire plan for warehouse occupancies with the occupant, sprinkler designer, and insurance carrier to determine if a modification in procedures is appropriate.

1-6.2 For those cases where search and rescue operations have been completed prior to ventilation work being performed by the fire department, it may be appropriate to allow the automatic sprinklers to continue to operate without further ventilation to enable them to achieve full control of the fire. This may take 20 to 30 minutes or more.

Chapter 2 Properties Protected by Outside Sprinklers for Protection Against Exposure Fires

2-1 General.

2-1.1 Many buildings or properties having a severe exposure problem are equipped with outside or external sprinkler systems designed to provide a water curtain capable of shielding the property from fires in other buildings or in storage areas. Most of these systems are designed for manual operation. Some are thermostatically operated, open-head systems. Some are specially designed sprinkler heads on pipes extending from a wet- or dry-pipe sprinkler system inside the building and so placed as to protect window openings.

2-1.2 Sprinkler heads for outside protection are specially designed for water curtain effect and when properly used should prevent an exposure fire from entering the building.

2-2 Pre-Fire Planning. In properties having outside sprinkler protection, fire officers, including the chief of the battalion and/or district and officers assigned to first due companies, should know:

(a) The building and nature of the occupancy protected by the outside sprinkler, the extent of the protection, and the type and operation (automatic or manual) of the system.

(b) The water supply to the sprinklers, including the source and type of supply, the flow and pressure normally available, and the anticipated duration of the supply available.

(c) The location of all sprinkler control valves, what each valve controls, and the consequence of shutting off any valve.

(d) The location of fire department connections to the system, the specific area each connection serves, and the water supply, hose, and pumper layout that will be used to feed the sprinkler connections.

(e) The specific company assignment having the primary responsibility for charging the sprinkler connection.

(f) The location of water supplies for hand lines without jeopardizing the water supply to operating sprinklers.

(g) An alternate means for supplying water to the system in case of damage to the fire department connection.

(h) The location of spare or replacement heads.

(i) Names of building owner or tenant for contact in case of emergency.

2-3 Water Supply for Fire Fighting.

2-3.1 A sketch should be prepared showing the location of the control valves, the fire department supply connections, and the hydrants to be used for pumping into the system. Where there is an exposure fire problem it must be assumed that there may be a major fire which will also require a number of hose streams for manual fire fighting. There may also be standard automatic sprinkler systems in the fire area which must also be supplied with lines from pumpers.

2-3.2 Fire departments should avoid pumping out of open water sources and into outside sprinkler systems when such systems are connected to potable water supplies unless appropriate backflow protection equipment is installed on the supply line from the public water system to the outside sprinkler system.

2-4 Fireground Operations Involving Outside Sprinklers.

2-4.1 The purpose of outside sprinkler systems is to prevent extension of fires to exposed properties. It is the duty of the officer in charge of the fire to see that these systems are used to fulfill their intended purpose. To do this it is necessary that the officer in charge know of the existence of the system and how it is supplied with water.

2-4.2 The officer in charge should ascertain as quickly as possible whether outside sprinklers are operating. If the system is manually operated, a fire fighter preferably with a portable radio should be sent to the valve to open the valve immediately in the event the outside sprinklers are needed. In some cases there will be several valves controlling different exposed parts of the protected building and it is important to open the correct valve. Care must be taken to conserve water supply and minimize potential water damage by shutting off the outside sprinklers when they are no longer needed.

2-4.3 Where a fire department connection is provided, an engine company should pump into the fire department connection supplying the outside sprinklers.

2-4.4 The officer in charge should:

(a) Order fire fighters into the exposed buildings on each side to see that all windows are closed and that fire has not extended into the buildings concerned.

(b) If the exposure is severe, set up fire department lines in the exposed buildings using standpipe facilities if available.

(c) Send fire fighters to the roof to make certain that no part of the roof structure has ignited.

(d) Order the start of salvage operations in exposed buildings.

(e) Order outside sprinklers shut off and drained when no longer needed.

(f) Order the system restored. (*Refer to 1-4.4.*)

Chapter 3 Properties Protected by Standpipe Systems

3-1 General. Many properties have standpipe systems serving fire hose outlets in various parts of one or more buildings. Standpipe systems of various types may be used by the fire department to place streams in service quickly in areas that cannot be reached conveniently with hose lines directly connected to pumpers or hydrants outside of buildings.

3-2 Inspection and Pre-Fire Planning.

3-2.1 The procedure for fire department pre-fire planning for properties protected by standpipe systems is in many ways similar to that for automatic sprinkler systems. The inspector must determine the source and reliability of water supply and follow the piping, noting the control valves.

3-2.2 Where the fire department is required to supply hose outlets several hundred feet from the fire department connection, plans must be made in advance to provide the required pressure and fire flow based upon the size, length of pipe, the maximum height of standpipe outlets and the number of streams that are to be supplied.

3-3 Water Supply for Fire Fighting.

3-3.1 Standpipe systems will likely have water supplied by city water mains. They may also be connected to fire pumps, gravity tanks, pressure tanks, fire department connections, or combinations of these to provide water at adequate pressure and quantity at the outlets.

3-3.2 The fire department should determine the available pressure and quantity of water at the highest outlets, and develop procedures to provide appropriate amounts of water for fire fighting when using the system.

3-3.3 Alternate means of supplying water to the fire area should be identified in case the system is unusable at the time of a fire.

3-3.4 Fire departments should avoid pumping out of open water sources and into standpipe systems when such systems are connected to potable water supplies unless appropriate backflow protection equipment is installed on the supply line from the public water system to the standpipe system.

3-4 Fireground Operations Involving Properties Protected by Standpipe Systems.

3-4.1 Fire department operations in properties protected by standpipe systems designed to supply fire department hose streams require carefully planned operating procedures as do operations in buildings protected by automatic sprinklers. Many buildings will have sprinkler systems, standpipe systems, or a combination.

3-4.2 Where fires occur on floors above the reach of ground or aerial ladders and where valuable time will be lost in stretching lines up stairways, standpipes should be utilized, and careful planning is necessary for successful operations.

3-4.3 Where standpipe systems are provided having fire department connections, it is important that lines from a pumper supplied by a public main be connected and charged to the pressure required to give the desired working pressure on the standpipe outlets to be used. Where there are several independent standpipes for fire department use in the fire area, each standpipe should be charged. (*See Figure 3-4.3.*)

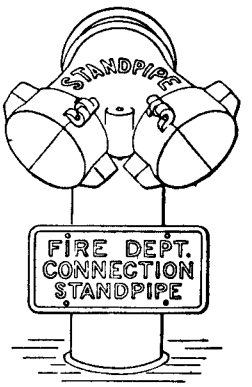

Figure 3-4.3 Standpipe connection.

3-4.4 Entrance pressure at the standpipe fire department connection should start at approximately 100 psi (6.9 bars) to supply solid stream nozzles at elevations up to 100 ft (30.4 m) and 150 psi (10.3 bars) to supply fire department spray nozzles requiring 100 psi (6.9 bars) nozzle pressure. For elevations above 100 ft (30.4 m), 5 psi (0.3 bars) should be added for each additional floor. The water head to be overcome in pumping vertically, termed "back pressure," is 43.4 psi per 100 ft (3 bars/30.4 m).

Fire department standpipe outlets are usually located in stair towers so that fire fighters can work from the stairway into the fire area. However, in some cases the standpipe may be located on the exterior of the building, frequently adjacent to outside stairs or fire escapes. Accepted practice in standpipe operations is to connect the fire department hose to an outlet a floor below the fire and advance the line up one flight of stairs. This is done so that an intense fire on the "fire floor" will not drive fire fighters away from the standpipe connection. Where additional lines are needed, connections can be made to other outlets.

3-4.5 Private hose or "house lines" attached to standpipe outlets should not be used except in the case of extreme emergency. The fire department should provide its own hose and nozzle of appropriate size and length for the fire condition involved.

3-4.6 The ability to maintain communications between the incident command post and officers on the upper floors is essential. In many cases portable radios can be used effectively. However, their limitations must be identified during pre-fire planning.

3-4.7 Where private water supplies serve the standpipe system, make certain that supply valves are open and private fire pumps, if any, are operating properly.

3-4.8 Fire fighters proceeding up stairs should observe all hose outlet valves on lower floors to see that these are closed so that pressure will not be diverted from the fire area.

Appendix A

A-1-3.6 River water pumped into a fire department sprinkler connection resulted in the city water system being shut off for two days until proper water quality could be restored.

Index

SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

7. Type or print legibly in black ink.

NOTE. The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council
National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101

Note: All proposals must be received by 5:00 p.m. E.S.T./E.S.D.T. on the published proposal closing date.

Date 5/18/85 Name John B. Smith Tel. No. 617-555-1212

Address 9 Seattle St.. Seattle, WA 02255

Representing (Please indicate organization, company or self) Fire Marshals Assn. of North America

1. a) Document Title: Protective Signaling Systems NFPA No. & Year NFPA 72D

   b) Section/Paragraph: 2-7.1 (Exception)

FOR OFFICE USE ONLY
Log #:
Date Rec'd:
Proposal #:

2. Proposal recommends: (Check one)
   - ☐ new text
   - ☐ revised text
   - ☒ deleted text.

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

   Delete exception.

4. Statement of Problem and Substantiation for Proposal:

   A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ This Proposal is original material.
   ☐ This Proposal is not original material; its source (if known) is as follows: _____

(Note: Original material is considered to be the submitter's own idea based on or as a result of his own experience, thought or research and, to the best of his knowledge is not copied from another source.)

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