9. STANDPIPE OPERATIONS

9.1 The City of New York is the Nation's foremost "vertical" city with thousands of high rise buildings. Firefighting in these buildings is challenging and success depends upon both the condition of the standpipe system and our skill and efficiency in using it. High rise buildings, however, are not the only structures equipped with standpipes. Requirements for the installation of standpipe systems are predicated on several factors. The primary factors are the height and area of the structure. Standpipe systems are also installed in locations with no access for fire department vehicles (such as parking garages) or where excessive distance precludes the stretching of hoselines directly from engine apparatus (such as on bridges). As such, standpipes may be found in any of the following places:

- High Rise Residential and Office Buildings
- Large Area Buildings such as Hospitals, Terminals, Warehouses, and Industrial Buildings
- Enclosed Shopping Malls
- Theaters, Stadiums, and Arenas
- Parking Garages
- Limited Access Highways
- Bridges and Tunnels
- Piers and Wharves

9.1.1 Pre-incident Planning

Engine and ladder companies should be familiar with the standpipe systems found in their response areas and any special characteristics or problems with these systems. Many buildings and other structures equipped with standpipes should already be included in our CIDS program, but information related to the standpipe system itself may not be available. Buildings that require a stretch of more than three lengths of hose should be included in CIDS for this specific reason. Engine company chauffeurs should pay particular attention to the location and condition of siamese connections and nearby hydrants.
9.2 TYPES OF STANDPIPE SYSTEMS

9.2.1 Standpipes are categorized as either wet or dry systems

- Wet systems contain water in the riser at all times supplied by city main, gravity tank, pressure tank, and/or fire pump (see Fig. 9-1). Combination systems consist of piping that supplies both hose connections and sprinklers. Most of these systems are "wet" and are of special concern because the water flow demands of both sprinkler heads and hoselines attached to the standpipe system require prompt augmentation by fire department pumpers.

- Dry systems may be equipped with an automatic source of supply, but many contain no water and the only supply is from fire department pumpers. This latter type is called a "manual dry" standpipe system.
9.2.2 Engine companies shall utilize only Department issued hose for standpipe firefighting. Engine companies shall not attempt to use the “occupant use” hose sometimes provided with these systems, even in those instances when the hose is 2 ½" in diameter. Occupant use hose may not be maintained properly, is often old, and may fail under fire department operating pressures. If a reducer is encountered, it must be removed to permit attachment of FDNY hose to the standpipe outlet. The stretching of occupant use hose by ladder and rescue companies operating remotely from an engine company, while performing searches, may be justified in an attempt to save lives.

9.3 SUPPLYING STANDPIPE SYSTEMS

9.3.1 Standpipe systems may be supplied through siamese connections and/or floor outlets. Floor outlets are often used when siamese connections are vandalized or to reinforce augmentation with additional supply lines.

9.3.2 Siamese connections are color coded for ease of identification. Either the caps or the entire siamese connection may be painted. Standpipe siamese connection colors used and what they indicate are as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Standpipe</td>
</tr>
<tr>
<td>Green</td>
<td>Automatic Sprinkler System</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Non-automatic Sprinkler or Perforated Pipe</td>
</tr>
<tr>
<td>Yellow</td>
<td>Combination Sprinkler/Standpipe</td>
</tr>
</tbody>
</table>

If no color coding is present, each siamese connection should be identifiable as to the type of system it supplies. This information is usually embossed or stamped on a plate or on the siamese connection itself.

9.3.3 Standpipe systems should **always** be supplied with 3 ½" hose.

9.3.4 Whenever possible, standpipe systems should be supplied by at least two different pumpers.

9.3.5 Whenever possible, standpipe systems should be supplied through at least two independent siamese connections. If there is only a single siamese connection, a second supply line can be attached to the first floor outlet. Additional floor outlets can be supplied if required.

9.3.6 If a standpipe system is to be supplied via a floor outlet, proper fittings must be employed to attach the 3 ½" hose to the 2 ½" outlet threads. In addition, if a pressure reducing/restricting device (PRD) is found on the standpipe outlet, it **should** be removed. If the PRD cannot be removed, and there is no other outlet available without a PRD, then it is permissible to use an outlet with a PRD. Standpipe systems may contain only 2 ½" outlets, both 2 ½" and 1 ½" outlets, or 2 ½" outlets reduced to 1 ½" with a removable fitting.
9.3.7 As a general rule there should be a separate engine company supplying the standpipe system for each hoseline placed in service. All pumper should be supplying the standpipe at the same pressure for maximum efficiency. For example, if the recommended pressure (according to the chart in section 9.3.12) is 200 psi, each pumper should be supplying the siamese with 200 psi.

9.3.8 If a building is equipped with both a standpipe system and automatic sprinklers, the first supply line must be attached to the standpipe siamese. The ECC supplying the system must verify that it is attached to the correct siamese connection. If the first arriving engine is supplying both the standpipe and sprinkler systems, the second and third arriving engine companies must stretch additional lines to augment both systems.

9.3.9 When supplying a manual dry standpipe system with water, the engine’s pump is more likely to “run away” from water. Initially, the standpipe should be supplied at idle and as the piping is filled with water, pressure can be increased to proper levels. It is recommended engine companies use the 35’ soft connection for hydrant hookup and avoid in line pumping when supplying manual dry systems.

9.3.10 Difficulties may be encountered with siamese connections. These difficulties include missing caps, defective threads, debris stuffed into the connection, tight caps, female swivels out-of-round, frozen female swivels, and clappers either broken or jammed open. Never insert any part of your hand inside the connection to clear debris. In addition to broken glass and sharp metal edges, hypodermic needles have been found inside siamese connections. A spare 3” male cap should be carried by all engine companies in the event it becomes necessary to cap one side of the siamese connection to prevent an outflow of water due to a malfunctioning clapper valve. Immediately stretching and connecting a second 3 ½” line is another remedy for this problem. Figs. 9-2A to 9-2D illustrates various solutions to the problem of caps stuck in place, defective threads, and frozen female swivels.
Figs. 9-2A to 9-2D illustrates various solutions to the problem of caps stuck in place, defective threads, and frozen female swivels.

**Fig. 9-2A**
Tap swivels to loosen paint, polish, dirt etc.

**Fig. 9-2B**
Twist hose 4-5 left turns, insert, and turn to the right

**Fig. 9-2C**
Insert siamese 3"x3"x3", insert

**Fig. 9-2D**
Insert double 3" male, attach 3" double female swivel, and insert.
9.3.11 Many siam connections are equipped with either metallic or plastic vandal-proof caps. These caps are usually attached with screw eyes placed over the pin lugs on the female swivel (see Fig. 9-3). Both metal and plastic caps are removed by striking the center of the cap with a tool. Caps can also be removed by prying one of the screw eyes off the pin lug.

9.3.12 To simplify computing pump discharge pressure when supplying a standpipe system, a street hydraulics chart has been formulated. These calculations are based on nozzle pressure, friction loss of three lengths of 2 ½" hose, head loss, system friction loss, and friction loss of two lengths of 3 ½" hose supplying the fire department connection.

### Recommended Pump Discharge Pressures for Standpipe Operations

<table>
<thead>
<tr>
<th>Fire Floor</th>
<th>Recommended Pump Discharge Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 10</td>
<td>150 psi</td>
</tr>
<tr>
<td>11 – 20</td>
<td>200 psi</td>
</tr>
<tr>
<td>21 – 30</td>
<td>250 psi</td>
</tr>
<tr>
<td>31 – 40</td>
<td>300 psi</td>
</tr>
<tr>
<td>41 – 50</td>
<td>350 psi</td>
</tr>
<tr>
<td>51 – 60</td>
<td>400 psi</td>
</tr>
<tr>
<td>61 – 70</td>
<td>450 psi</td>
</tr>
<tr>
<td>71 – 80</td>
<td>500 psi</td>
</tr>
<tr>
<td>81 – 90</td>
<td>550 psi</td>
</tr>
<tr>
<td>91 – 100</td>
<td>600 psi</td>
</tr>
<tr>
<td>101 – 110</td>
<td>650 psi</td>
</tr>
</tbody>
</table>

Variations in building and standpipe system layout, length of supply lines, etc. will impact pressure loss throughout the system. All members, particularly ECC’s, should monitor the handie-talkie for indications that the pressure to the standpipe system needs to be increased.

9.3.13 Buildings constructed under the 2008 building code having a standpipe riser over 600 feet in height shall have separate “Low Zone” and “High Zone” siam connections (See Fig. 9-4). These separate risers are **not** interconnected, so supplying the High Zone riser will not charge the Low Zone riser and vice versa. The connections shall be identified with signage stating either “Low Zone” or “High Zone” and indicate the floors they serve. The High Zone riser is also known as “Express Piping” since it bypasses lower floors.
9.3.14 It is imperative that once the fire floor is confirmed, the ECC supplies the correct riser that is feeding the floor outlet the attack hoseline is connected to. Operations shall be in accordance with High Pressure Pumping (Addendum 1). Buildings with Express Piping should be the subject of familiarization drills and included in the CIDS program.

9.4 OPERATING FROM STANDPIPE SYSTEMS

9.4.1 Required Equipment

A. Standpipe Kit. Each engine company shall carry a "standpipe kit" with the following minimum basic complement of tools:

- 2 ½" controlling nozzle with 1 ⅛" main stream tip and 1 ½" x 2 ½" increaser.
- Hand control wheel(s) for outlet valve. (Note: Hand control wheels are optional and not supplied by the Department.)
- 2 ½" x 2 ½" in-line pressure gauge.
- Pipe wrench (minimum 18” in length).
- Spanner wrenches.
- Door chocks.
- Special adapters as required. For example, some buildings may contain floor outlet valves with non-New York City threads. Adapters for connecting FDNY 2 ½" hose to National Standard Thread or National Pipe Thread may be required.

B. Four lengths of folded 2 ½" hose. In most instances, three lengths will be brought into the building by each engine company. 2 ½" controlling nozzle with 1 ⅛" MST must be pre-connected to one of the lengths brought into the building.

9.4.2 The use of a 2 ½" diameter hoseline with controlling nozzle and 1 ⅛" MST at standpipe operations is required due to the large volume of water it can deliver with lower friction loss per length. All hoselines stretched from standpipes shall be connected to outlets on floors below the fire floor. (See Fig. 9-5)
**Note:** Variations from stretching initial hoselines from standpipe outlets on a floor below the fire due to building configurations shall be approved by Division Commanders and entered into the CIDS program.

9.4.3 Due to the complexity of supplying and stretching from standpipe systems, the first and second arriving engine companies shall **always** operate together in order to ensure prompt and efficient placement of the first hoseline. The third and fourth engines shall operate similarly when operating the second hoseline.

9.4.4 PRD’s (Pressure Restricting Devices) may be found in hi-rise buildings and are designed to reduce, restrict, or otherwise control the pressure available at the standpipe hose outlet. Several types of PRDs, produced by various manufacturers, may be encountered in the field. See Figs. 9-6A to 9-6C for several illustrations of PRDs in use within the City of New York. At fire operations, whether supplying or operating from a standpipe outlet, the PRD **should** be removed because of the reduced water flow. If the PRD cannot be removed, and there is no other outlet available without a PRD, then it is permissible to use an outlet with a PRD.
Three types of PRDs

Vane type PRD

Inside of vane type Pressure Restricting Device
9.4.5 Prior to attaching the in-line pressure gauge, flush the standpipe system thoroughly through the floor outlet. Rubber balls and soda cans lodged within a standpipe riser or piping can restrict water flow to the controlling nozzle.

9.4.6 The first arriving control firefighter shall remain at the standpipe outlet throughout the operation and communicate with the first arriving engine officer to ensure that adequate pressure is supplied to the nozzle. He/she shall ensure a proper hook-up to the standpipe outlet, including connection of any necessary fittings and adapters, as well as removal of the PRD. The first arriving control firefighter should remain in close proximity to the standpipe outlet throughout the operation in case adjustments are needed. The in-line pressure gauge should always be used to ensure correct nozzle pressure and a good fire stream (see Fig. 9-7).

9.4.7 If a second hoseline is required, it may have to be stretched from a hose outlet two (2) floors below the fire or from another standpipe riser. Both of these situations often require at least four lengths of hose.

9.4.8 Nozzle pressure is to be adjusted by use of the valve wheel at the hose outlet valve and by observing the in-line pressure gauge. Ensure the hoseline is charged and bled by opening the nozzle fully, and checking for an adequate firefighting stream before entering the fire area. Sometimes this may require charging and bleeding the line in the stairway, such as when an apartment door is left open and high heat conditions exist in the hallway, or at commercial building fires with large, open floor areas. Other times, a dry hoseline can be stretched to the apartment door and charged and bled in the public hallway. Once operating, if the nozzle is shut down the reading on the in-line pressure gauge will increase due to the back pressure and should not be adjusted at this time. Once the nozzle is re-opened to extinguish the fire, the reading on the in-line pressure gauge should return to the set pressure. It is important to continuously monitor the in-line pressure gauge closely once the attack is started and adjust the valve wheel as necessary to maintain the proper pressure. The control firefighter should be aware that kinks, cracking or shutting down the nozzle, etc. during the operation will also cause the pressure displayed on the in-line pressure gauge to increase, and should refrain from adjusting the valve.
9.4.9 As a general rule, **WITH WATER FLOWING:**

- At standpipe operations with a 2 ½" lead length with 1 ⅛" MST, the outlet pressure is 70 psi for three lengths and 80 psi for four lengths.
- At below grade operations, head pressures will **increase** 5 psi for every 10 feet below grade. The pressure at the standpipe outlet may have to be reduced accordingly.

9.4.10 When attaching lengths of hose, especially in a smoke condition, be careful not to connect the hose in a loop or to create excessive knots or twists in the line.

9.4.11 As the first arriving engine company begins its advance on the fire, the second arriving engine must assist with line movement and be prepared at any moment to relieve the first engine company. Air conservation is an important consideration for the second arriving engine. If it is not possible to conserve air due to products of combustion the IC must be notified so that additional engine companies can be utilized to reinforce the critical position of the first hoseline.

9.4.12 Scissor stairs create additional complexities and usually require stretching four or more hose lengths (see Fig. 9-8). This information should be included in CIDS.