ENGINE COMPANY OPERATIONS

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INDEX

ENGINE OPERATIONS OVERVIEW

1. OVERVIEW

1.1 Engine Company Operations are the foundation of all firefighting efforts in the FDNY. A full understanding of these operations is essential to the continued success of the Department and the preservation of life and property in the City of New York.

1.2 This manual is designed to provide a comprehensive description of Engine Company operations in the FDNY. This includes proper operating procedures, as well as a description of all related equipment.

ENGINE COMPANY OPERATIONS
CHAPTER 2
August 5, 2021

APPARATUS

1. ENGINE APPARATUS OVERVIEW

1.1 The engine company apparatus is a complex piece of equipment that serves both as a vehicle and as a high capacity water pump.

1.2 There are two primary functions of an engine apparatus in the FDNY:

1.2.1 Transport members and equipment to the scene of a fire or emergency.

1.2.2 Deliver water with sufficient pressure to the fire area for firefighting operations.

1.3 In order to properly use the engine apparatus effectively, it is necessary for all members to be knowledgeable about the critical components of the apparatus.

1.4 This chapter will describe the critical components of the engine apparatus as it exists in the FDNY. This includes the components listed below, which are described in the following sections:

- Apparatus Pump
- Booster Tank
- Inlets and Outlets
- Drain Valves
- Pump Panel
- Deck Gun
- Hose Beds
- Standpipe Hose
- Hydrant Connections
- Drafting Connections
- Additional Hose and Equipment

1.5 Components of the apparatus itself are described in this chapter. For further information on a specific apparatus, refer to the manufacturer's manual. For a full description of the equipment mentioned above that is carried on the apparatus, see *Chapter 3: Engine Company Equipment*.

2. APPARATUS PUMP

2.1 Conventional engine apparatus in the FDNY are equipped with a two-stage centrifugal pump. These apparatus' have a total rated capacity of 2,000 GPM and a maximum pressure rating of 600 psi.

2.1.1 Select engine companies with the two-stage 2,000 GPM pump are designated as "High Pressure Engines" as they have been fitted with a high-pressure discharge elbow, and issued specialized high-pressure equipment (hose, fittings, etc.). This special equipment allows them to safely perform "High-Pressure Pumping" operations up to 600 psi.

2.1.2 A "stage" is the portion of the centrifugal pump that consists of one impeller and generates the force required to discharge water.

2.1.3 The FDNY also has a number of engine apparatus that have a 3rd stage, designated as "3rd Stage Engines", which have a total rated capacity of 2,000 GPM and have a maximum pressure rating of 700 psi. 3rd Stage Engines have been fitted with two special high-pressure discharge elbows and issued high-pressure equipment. This special equipment allows them to safely perform High-Pressure Pumping operations up to 700 psi.

2.1.4 Squad Company apparatus are conventional engine apparatus equipped with a two-stage centrifugal pump. They have a total rated capacity of 1,000 GPM and a maximum pressure rating of 600 psi.

2.2 Conventional Engine apparatus have the capability to operate their two stages in two different fashions:

2.2.1 Volume Operation

A. When in Volume Operation, the two stages of the pump are operated in parallel, in which water passes through both stages at the same time before it is discharged.

B. Volume Operation enables the pump to discharge up to its maximum rated flow capacity.

C. The idle pressure of an apparatus in Volume Operation is roughly 55 psi.

D. Volume Operation is the default setting for FDNY engine apparatus and is used for the vast majority of engine operations.

2.2.2 Pressure Operation

A. When in Pressure Operation, the two stages of the pump are operated in series, in which water passes through the first stage, and then passes through the second stage afterwards.

B. Pressure Operation enables the pump to reach its highest rated discharge pressure, but only half of its maximum rated flow capacity.

C. The idle pressure of an apparatus in Pressure Operation is roughly 110 psi.

D. Pressure Operation should only be used when head pressure must be overcome, such as when supplying a Fire Department Connection (FDC) for a standpipe system.

Note: Head pressure is the static pressure (the pressure when water is not flowing) caused by the weight of water solely due to its height above the measuring point.

2.3 Engine apparatus should be maintained in "Volume Operation" unless the pumping operation needs to overcome head pressure (such as when supplying a standpipe system in a high-rise building). When overcoming head pressure is required, the pump should be switched to "Pressure Operation".

2.4 Switching the pump from Volume Operation to Pressure Operation is done using the transfer valve, which is switched using an operating handle located at the pump panel. Prior to using the transfer valve, the engine RPM should be returned to idle pressure.

3. BOOSTER TANK

3.1 The booster tank is a 500-gallon water tank carried by all FDNY Engine apparatus. It is capable of quickly supplying water to a hoseline or deck pipe for a limited period of time.

3.2 The operation of the booster tank is controlled by operating handles on the pump panel.

3.2.1 One handle allows the booster tank to supply water to the pump.

3.2.2 One handle allows the booster tank to be filled from the apparatus' water supply.

3.3 A Tank Vision Gauge is a lighted, multi-color booster tank water level indicator. There are two on the apparatus, which are located on the pump panel and the panel on the opposite side of the apparatus. (Figure 1)

Figure 1

4. INLETS AND OUTLETS

4.1 The apparatus is equipped with a number of connections by which water can be either taken into the apparatus (inlets) or discharged from the apparatus (outlets).

4.1.1 Inlets (Figure 2) are connections by which water can be supplied to the apparatus.

A. Inlets are also called “suctions”.

B. Inlets exist in a number of sizes, including 3”, 4 ½”, and 6”.

C. Inlets may be gated or non-gated. Gated inlets are controlled by an operating handle, which may be located adjacent to the inlet, or at the pump panel.

D. Gated inlets should always be used in the fully opened position.

Figure 2

4.1.2 Outlets (Figure 3) are connections by which water can be discharged from the apparatus.

A. Outlets are also called “discharges”.

B. Outlets come in a number of sizes, including 2 ½”, 3”, and 4 ½”. A reducer is placed on 2 ½” outlets for hose stretches utilizing 1 ¾” hose.

C. All outlets are gated and are controlled by an operating handle located at the pump panel. Outlets are often operated in a partially open position to regulate pressure.

Figure 3

4.2 Inlets and outlets may be color coded to match their corresponding operating handle and bleeder valves.

5. DRAIN AND BLEEDER VALVES

5.1 Drain and bleeder valves are located at a number of points around the bottom of the apparatus and serve the purpose of bleeding air and draining water from the pipes that supply and discharge water from the apparatus. These valves may be manually operated, or some may be automatic.

5.2 There is at least one bleeder valve for each inlet, and one drain valve for each discharge. Both drain and bleeder valves are the same design and located between a gate and the opening associated with it.

5.2.1 Drain valves can be opened to drain water from a discharge pipe, which can facilitate breaking down hoselines after an operation, as well as prevent freezing in cold weather. (Figure 4)

Figure 4

5.2.2 For inlets, the bleeder valve is also used to bleed air coming from an intake hose in order to reduce the introduction of air into the pump, which may cause a loss of prime during pumping operations.

5.3 The apparatus pump itself is also equipped with a designated drain valve. (Figure 5)

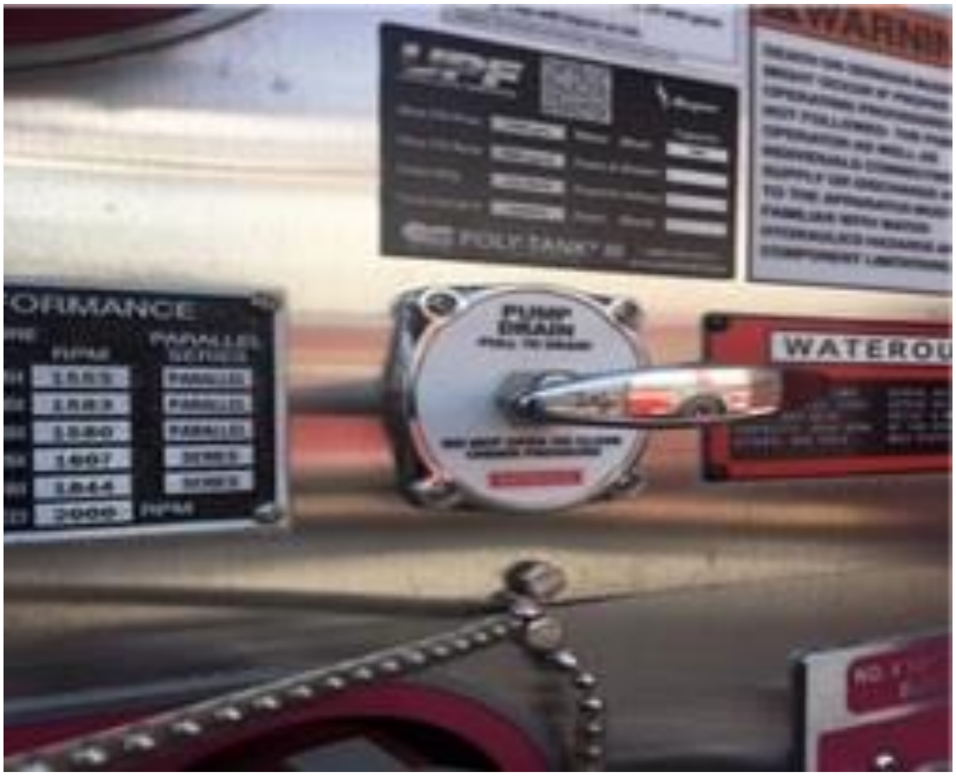

Figure 5

6. THE PUMP PANEL

6.1 The pump panel (Figure 6) is the area on the Chauffeur's side of the apparatus that provides controls and gauges for managing water flow and monitoring the status of the apparatus pump. Discussed below are the key components of the pump panel and their primary functions.

Figure 6

6.1.1 Operating handles for gated inlets (Figure 7) and outlets (Figure 8)

A. The flow of water via the various gated inlets and outlets are controlled by operating handles. All operating handles for outlets are at the pump panel, and the operating handles for gated inlets can either be at the pump panel, or adjacent to the inlet.

Figure 7

Figure 8

6.1.2 Discharge Outlet Gauges

A. Adjacent to the operating handle for each discharge outlet, there is a pressure gauge that provides a reading of the pressure being supplied to that outlet.

B. There is also a flowmeter for each discharge outlet that provides a reading of the amount of water currently flowing via the discharge outlet.

6.1.3 Booster Tank operating handles

A. At the pump panel, there is an operating handle to control the supply of water to the booster tank (Figure 9), as well as an operating handle to control the supply of water from the booster tank to the pump.

Figure 9

6.1.4 Master Inlet Pressure Gauge (Figure 10A)

A. This is also called the "Intake Pressure Gauge". It is a compound gauge capable of measuring negative pressure.

B. This gauge provides a reading of the intake pressure of the apparatus. This is the pressure with which the apparatus is being supplied. For example, this gauge will show the pressure a hydrant is supplying to the apparatus.

6.1.5 Master Pressure Gauge (Figure 10B)

A. This gauge provides a reading of the total amount of pressure currently being generated by the apparatus pump and available for supply to discharge outlets.

B. When properly primed, this will be equal to the sum of the pressure with which the Engine is being supplied (from a hydrant and/or from another pumper relaying water) and the additional pressure being generated by the pump.

Figure 10A Figure 10B

6.1.6 Transfer Valve (Figure 11)

A. The Transfer Valve is the handle that switches the operation of the apparatus pump from “Volume Operation” to “Pressure Operation”.

Figure 11

6.1.7 Pro Pressure Governor (Figure 12)

A. The Pro Pressure Governor (PPG) is a computer that controls engine throttle which ultimately adjusts the pump speed. Its purpose is to automatically maintain the uninterrupted supply of proper operating pressure to all hoselines supplied by an apparatus.

B. Refer to *Chapter2, Addendum 1: Pro Pressure Governor* for a discussion on the basic operation of the PPG.

Figure 12

6.1.8 Primer Button (Figure 13)

A. Adjacent to the PPG, there is a button labelled “Push to Prime”. Pushing and holding this button will “prime” the pump, which has the effect of ejecting air from the pump as water is supplied. This prevents air from entering the hoselines that are being supplied.

Figure 13

7. DECK PIPE

7.1 The apparatus deckpipe (Figure 13) is permanently affixed to the engine apparatus and supplied directly by a 3-inch pipe from the pump.

Figure 13

7.2 The deckpipe has 4 stacked tips (2 ½", 2 ¼", 2", 1 ½").

7.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

7.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

7.2.3 The maximum rated flow of 2,000 GPM is reached when the 2 ½" tip is supplied with 116 psi.

7.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.

7.4 For a full discussion of deck pipe operations, see *Chapter 9: Large Caliber Streams*.

8. HOSEBED

8.1 Conventional Engine apparatus in the FDNY are equipped with 4 hosebeds in the rear of the apparatus.

8.2 While the specific organization of the hosebeds may vary among companies based on their response area and response patterns, the following guidelines must be adhered to:

8.2.1 At least one bed must contain 6 lead lengths of 1 ¾" hose.

8.2.2 At least one bed must contain only 2 ½" hose

8.2.3 At least one bed must contain only 3 ½" hose

8.3 The lead length of all hosebeds with either 1 ¾" hose or 2 ½" hose must be maintained with a straight-stream nozzle attached. These hosebeds are intended for fire attack.

8.4 The 3 ½" hosebed is intended to be used as a supply line. It can be oriented with either the male or female coupling leading away from the apparatus and may be maintained with necessary fittings attached to the coupling.

8.5 When a hosebed contains 1 ¾" hose, the first 6 lengths of this hosebed must be 1 ¾" hose. No more (and no fewer) than 6 lengths are permissible. This limitation is due to the high pressures required to overcome the friction loss of more than 6 lengths of 1 ¾" hose.

8.6 The proper loading of hose in a traditional hosebed arrangement will allow the hose to play out smoothly when stretched. When properly loaded, 4 folds of hose in the hosebed is roughly one 50' length of hose. The procedure of packing hose in a traditional hosebed arrangement is fully described in *Chapter 3, Addendum 3: Hose Maintenance.*

8.7 To facilitate stretching hose, the lead lengths of hose in a hosebed may be maintained in a horseshoe arrangement (Figure 14). The procedure of packing hose in a horseshoe arrangement is fully described in *Chapter 3, Addendum 3: Hose Maintenance*.

8.7.1 Both 1 ¾" hose and 2 ½" hose can be arranged in a horseshoe.

8.7.2 Each horseshoe should be comprised of at least one 50' length of hose.

8.7.3 A hose bed can have multiple horseshoes. Horseshoes can be stacked on top of each other on the hosebed, with the lead length on top.

Figure 14

9. STANDPIPE HOSE

9.1 All Engine apparatus must carry a number of lengths of hose arranged into a “roll-up”, intended for use when stretching from a standpipe system. The roll-up is more fully described in *Chapter 3, Addendum 3: Hose Maintenance*

9.2 This hose may be carried on the side board of the apparatus, and is secured using straps and buckles. They may also be carried inside apparatus compartments.

9.3 The following is required to be carried on all engine apparatus:

9.3.1 1 length of 2” lightweight hose, maintained as a roll-up and kept with the 2” nozzle and 1” MST attached. This hose is colored green with a red stripe.

9.3.2 3 lengths of 2 ½” lightweight hose, maintained as roll-ups. One of these lengths must be kept with the 2 ½” nozzle and 1 1/8” MST attached. This hose is white with a red stripe.

9.3.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½” lightweight hose must be carried, maintained as a roll-up.

9.4 Refer to *Chapter 3: Engine Company Equipment* for a complete description of the capabilities of all hoses and nozzles.

10. HYDRANT CONNECTIONS

10.1 All Engine companies must carry a number of hydrant connections, as follows:

10.1.1 3 ½" hose to be used for hydrant connection

A. 3 ½" hose may be carried in the side trays located on each side of the apparatus. This is in addition to the 3 ½" hose on the rear hosebed.

10.1.2 5" yellow hose to be used for hydrant connection

A. A 35-foot length of 5" yellow synthetic hose (soft hydrant connection) is carried on the apparatus to be used exclusively as a hydrant connection.

B. It is carried on the front of the apparatus but may be used to supply inlets on both the front and side of the apparatus.

10.1.3 4 ½" semi-rigid suction and/or 3 ½" soft suction hydrant connection

A. These are used exclusively for hydrant connection.

B. Carried on a designated tray on the Chauffeur's side of the apparatus.

10.2 *Chapter 3: Engine Company Equipment* has a complete description of all hydrant connections

11. DRAFTING CONNECTIONS

11.1 All Engine companies must carry a number of connections designated to be used for drafting water. FDNY engine apparatus are equipped with the following 3 drafting connections:

11.1.1 10-foot hard connection.

11.1.2 10-foot ribbed drafting connection – with a strainer.

11.1.3 10-foot ribbed drafting connection – without a strainer.

11.2 All 3 connections are carried on designated trays on the Chauffeur's side of the apparatus (Figure 15). Drafting operations are further discussed in *Chapter 5: The Engine Company Chauffeur*.

Figure 15

12. ADDITIONAL HOSE

12.1 In addition to the standpipe hose maintained in roll-ups and hose carried in the hosebeds, additional hose is required to be carried on the apparatus as follows:

12.1.1 At least 4 lengths of 1 ¾" hose shall be carried, rolled or arranged in a roll-up, for use as an additional length in a hose stretch as described in *Chapter 10: Engine Company Emergencies.* One of these 1 ¾" hose lengths should be maintained with a nozzle attached.

12.1.2 Two lengths of 1 ¾" hose to be used as a "booster line". This hose should be maintained with a fog nozzle attached to one length (Figure 16).

A. This hose is intended to be used on outside fires, such as rubbish fires or car fires. In an emergency, it can also be used to apply water from the exterior of the fire building.

B. It should be maintained pre-connected to a discharge outlet. It may also be maintained pre-connected to a gated wye attached to a discharge outlet.

C. This hose may be maintained either rolled or folded. Generally, it is stored on the front bumper of the apparatus.

Figure 16

13. ADDITIONAL TOOLS AND EQUIPMENT

13.1 A wide range of additional tools and equipment are also carried on all engine apparatus. For a full description of the primary functions and capabilities of all equipment carried by conventional engine companies in the FDNY, refer to *Chapter 3: Engine Company Equipment*.

PRO-PRESSURE GOVERNOR

1. OVERVIEW OF THE PRO-PRESSURE GOVERNOR

1.1 The Pro-Pressure Governor (PPG) is a computer located on the pump panel of the engine apparatus that controls the operating pressure of the apparatus pump. (Figure 1)

1.2 Its central purpose is to maintain constant pump discharge pressure at each operating outlet throughout the operation, regardless of the opening or closing of other discharge outlets on the apparatus.

1.3 When effectively engaged, the PPG will maintain the selected pressure setting in the LED display regardless of the number of discharges that are opened or closed, as long as the water supply is capable of supplying the amount of water required.

1.4 This is especially important for operations at which a single apparatus is supplying multiple hoselines. In these situations, the PPG will adjust the engine revolutions per minute (RPMs) whenever a hoseline is opened or closed, in order to maintain the desired pump pressure for each hoseline.

1.5 If the PPG is malfunctioning on an apparatus, the apparatus must be placed out-of-service and the Fleet Maintenance Division must be notified.

Figure 1

2. FEATURES OF THE PPG

2.1 PPG Operating Modes

2.1.1 The PPG can be operated in two different modes, as described below:

A. **PSI Mode** – In the PSI (pounds per square inch) mode, the PPG will automatically maintain the discharge pressure set in the LED display. This is the setting used by all apparatus in the FDNY.

B. **RPM Mode** – In the RPM (revolutions per minute) mode, the PPG will maintain engine RPMs set in the LED display. In this mode, it will not automatically compensate for any changes in discharge pressure. For this reason, apparatus in the FDNY do not normally use the RPM mode.

2.1.2 RPM mode is used only in the following two situations:

A. To initially gain a water supply in a drafting evolution.

B. If the PSI mode malfunctions, the PPG could be switched to RPM mode.

2.2 PPG Digital Displays

2.2.1 The PPG has several digital displays, each of which is described below:

A. **SETTING** – This display is located in the center of the PPG and displays the pressure level at which the PPG is currently set.

B. **PUMP DISCHARGE** – This displays the total amount of pressure currently being generated by the apparatus pump and available for supply to discharge outlets. This value will match the "Master Pressure" gauge on the pump panel.

C. **PUMP INTAKE** – This displays the pressure with which the apparatus pump is supplied. This value will match the "Master Inlet Pressure" gauge on the pump panel.

D. **RPM** – This displays the current speed of the engine.

2.3 PPG Buttons

2.3.1 The PPG is equipped with 6 buttons, each of which is described below:

A. **IDLE** - The "Idle" button will bring the engine to idle. This has the effect of deactivating the PPG.

B. **INCREASE** - The "Increase" button will increase the pressure setting on the PPG. When pressed momentarily, the pressure increases by 1 psi. When the button is held down, the pressure increases in increments of 5 psi and 10 psi.

C. **DECREASE** - The "Decrease" button will decrease the pressure setting on the PPG. When pressed momentarily, the pressure decreases by 1 psi. When the button is held down, the pressure decreases in increments of 5 psi and 10 psi.

D. **PSI** - The "PSI" button will change the PPG operation to the PSI mode (as previously described). This is the standard setting for all FDNY apparatus.

E. **RPM** - The "RPM" button will change the PPG to the RPM mode (as previously described). The RPM mode is only used if the PSI mode malfunctions or to initially gain a water supply in a drafting evolution.

F. **PRESET** - The "Preset" button brings the pump pressure quickly to a pre-determined setting. This setting is further described below.

2.4 PPG Preset Value

2.4.1 A key feature of the PPG is the "Preset", which is a pre-determined pressure value that is uniquely set for each engine apparatus. The purpose of this feature is to quickly set the PPG to a level which will most commonly effectively engage the PPG. This value is the sum of the apparatus idle pressure and the pressure of the water supplied to the apparatus in Volume Operation.

A. This feature is critical because the PPG will not activate unless the setting on the PPG is at least as high as the actual pressure being generated by the apparatus pump. If the PPG setting is lower than the actual pressure generated, the PPG will not be effectively engaged.

B. To ensure the activation of the PPG, the "Preset" is set to the minimum pressure generated by the apparatus, which is equivalent to the total combination of the apparatus idle pressure and the pressure of the water supplied to the apparatus.

C. In various parts of NYC, hydrant pressures can vary significantly, ranging from 40 psi to 100 psi. Due to this variation, the preset value should be set for each apparatus using the procedure described below.

2.4.2 Setting the Preset Value

A. The preset value on each apparatus should be set to the sum of the engine idle pressure in Volume Operation and the local expected hydrant pressure.

B. To set the preset value, the apparatus should be hooked up to a hydrant in their response area. The hydrant should be fully turned on, the apparatus should be placed in pump mode, and the pump should be primed.

C. Ensure the PPG is at “Idle” and make note of the pressure on the pump pressure gauge. This reading should be the pump idle pressure in Volume Operation (roughly 55 psi) plus the hydrant pressure.

D. Press and hold the Preset button until the LED display is flashing. While depressing the Preset button, press and hold the “Increase” or “Decrease” buttons until the number in the LED display matches the pressure shown on the pump pressure gauge.

E. When the pressure indicated in the LED display matches the Indicated Pump Pressure on the pump pressure gauge, release both buttons.

F. This pressure value is now stored as the “Preset” pressure. Whenever the Preset button is depressed, the PPG will automatically bring the pump to that pressure.

3. PUMP OPERATIONS WITH PPG

3.1 Single Line Operation

3.1.1 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps:

A. Place the apparatus transmission in “neutral”.

B. Engage the apparatus maxi-brake.

C. Move the “pump shift control” to the pump position (located in the cab).

D. Place the apparatus transmission in “drive”.

3.1.2 Once the apparatus pump is engaged, water can be supplied to a hoseline using following steps:

A. Introduce water to the apparatus.

B. Press and hold the “Push to Prime” button on the pump panel.
(this expels air from the pump system).

C. Press the preset button on the Pro-Pressure Governor.

D. Open the desired discharge gate to charge a hoseline.

3.1.3 Slowly open the discharge outlet until the desired line pressure is reached. If the discharge gate is fully opened and more pressure is required, depress the Increase Button until the desired pressure is reached.

3.1.4 The Pressure Governor will adjust engine speed to maintain indicated pump pressure as the hoseline's nozzle is opened or closed.

3.2 Multi-Line Operations

3.2.1 Charge the first line as described above.

3.2.2 Slowly charge the second line. The PPG will increase pump pressure to maintain the first line.

3.2.3 If the discharge gate is fully opened and more pressure is required in the second line, press the "INCREASE" button while adjusting the discharge gate of the first line to maintain its pressure. Adjusting the discharge gate of the first line in this manner is commonly called "gating down".

3.2.4 When charging a third line, slowly open discharge gate until desired pressure is reached. The pressure governor will increase pump pressure to maintain the first two lines. If the discharge gate for the third line is fully opened and more pressure is required in that line, depress the INCREASE button while adjusting the gates for the other two lines to maintain their pressure.

3.2.5 When ordered to shut down a handline, slowly close the respective discharge gate. The PPG will maintain any lines continuing to operate. This process is continued until all lines are shut down. When shutting down the last line, depress the idle button to return the pump to IDLE.

4. RELAY OPERATIONS WITH PPG

4.1 At a relay operation, the pumper supplying the water is called the "supply pumper" and the pumper receiving water is called the "operating pumper".

4.2 A concern at a relay operation is ensuring the activation of operating pumper's PPG.

4.2.1 This can be a problem because the operating pumper is receiving water from the supply pumper at a pressure greater than hydrant pressure. The operating pumper is receiving the discharge pressure of the supply pumper, which is hydrant pressure, plus the idle pressure of the supply pumper. This number will be roughly 55 psi higher than regular hydrant pressure. Based on local hydrant pressure, this number can range from 95 psi to 155 psi.

4.2.2 Since the operating pumper's PPG will only effectively engage if the setting on the PPG is higher than their actual pump pressure, the PPG will not activate at their normal Preset value.

4.3 The ECC of the operating pumper must be aware of this difference and set their PPG to match the "Master Pressure Gauge" of the apparatus. This will be equal to the idle pressure of the operating pumper, plus the pressure supplied by the supply pumper (which is equal to their apparatus idle pressure, plus hydrant pressure). Based on local hydrant pressure, this number will range from 150 psi to 210 psi.

4.4 To minimize the difference in supply pressures, the ECC of the supply pumper should supply water at their preset value (which is their idle pressure, plus hydrant pressure).

4.5 The operating ECC will coordinate with the supply ECC to ensure enough water is supplied to meet pressure demands of the operating pumper.

ENGINE COMPANY EQUIPMENT

1. OVERVIEW

1.1 This chapter will describe the various equipment used by engine companies in the FDNY. The aim of the chapter is to describe key physical attributes of each piece of equipment, as well as its pertinent operating capabilities and capacity.

1.1.1 For information on the inspection requirements and out-of-service procedures of standard engine equipment, refer to *Chapter 3, Addendum 1: Engine Equipment Inspection and OOS Procedures*.

1.1.2 For information on the maintenance and routine inspections of hydrants, refer to *Chapter 3, Addendum 2: Hydrant Maintenance*.

1.1.3 For information on the maintenance and annual testing of hose, refer to *Chapter 3, Addendum 3: Hose Maintenance.*

1.1.4 For information on the equipment that exists as part of the water supply infrastructure in NYC that is used by engine companies, specifically, this includes hydrants, sprinkler systems, and standpipe systems, refer to *Chapter 3, Addendum 4: Water Supply Infrastructure Equipment.*

2. HOSE

2.1 Hose is the primary tool for the application and transfer of water in the FDNY. A variety of different size and types of hose are used by units in the Department. This section will describe key characteristics of each type of hose used in the FDNY.

2.2 1 ¾" rubber-lined hose (Figure 1)

Figure 1

2.2.1 1 ¾" hose is the primary attack hose for firefighting operations in the FDNY. Its smaller size and reduced weight provide the benefits of increased speed and mobility while operating.

2.2.2 1 ¾" hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.

2.2.3 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 1 ½".

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each 50-foot length of 1 ¾" hose is 20 psi.

2.3 2 ½” rubber-lined hose (Figure 2)

Figure 2

2.3.1 2 ½” hose is the most versatile type of hose in the FDNY. It can be used as an attack line at a fire or emergency. Additionally, it can be used as a supply line in a number of situations.

2.3.2 2 ½” hose is carried on the hosebeds of all engine and squad companies for rapid deployment at a fire or emergency operation.

2.3.3 When used as an attack line, 2 ½” hose provides increased water flow, but is heavier and more difficult to maneuver than the 1 ¾” line.

2.3.4 Operational specifications:

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½”.

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each 50-foot length of 2 ½” hose is 5 psi.

2.4 2" polyurethane-lined lightweight hose (Figure 3)

Figure 3

2.4.1 2" lightweight hose is colored green with red stripes.

2.4.2 2" lightweight hose is carried by all engine and squad companies.

2.4.3 It is only used as the lead (nozzle) length on the attack line when using a standpipe system in residential buildings.

2.4.4 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½".

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each length of lightweight 2" hose is 10 psi.

E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the "A-fold".

F. There are reflective arrows on each female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.5 2 ½" polyurethane-lined lightweight hose (Figure 4)

Figure 4

2.5.1 2 ½" lightweight hose is colored white with red stripes.

2.5.2 2 ½" lightweight hose is carried by all engine and squad companies.

2.5.3 It is used as an attack line when using a standpipe system.

2.5.4 Operational specifications

A. Each length of hose is 50 feet long.

B. The coupling size is 2 ½".

C. Operating pressure is normally limited to 250 psi.

D. The friction loss in each length of lightweight 2 ½" hose is 5 psi.

E. The midpoint of the hose is painted red. This marking can facilitate a smooth deployment of the hose and is called the "A-fold".

F. There are reflective arrows on each the female coupling that serve as a directional indicator. The arrows point in the direction of the water source.

2.6 3 ½" rubber-lined hose (Figure 5)

Figure 5

2.6.1 3 ½" hose is carried by all engine and squad companies.

2.6.2 3 ½" hose is only used as a supply line.

2.6.3 Operational specifications

1. Each length of hose is 50 feet long.
2. The coupling size is 3".
3. Operating pressure is normally limited to 250 psi.
4. The friction loss in each 50-foot length of 3 ½" hose is approximately 3 psi. This number depends upon several factors including the length of the stretch and the amount of water flowing.

3. NOZZLES

3.1 A nozzle is a hose line appliance that is used to direct the flow of water, increase the velocity of flow, or disperse water in various patterns. Nozzles are identified by the type of water pattern created and size of the tip used.

3.2 A nozzle is typically comprised of two components: a shut-off and a tip.

3.3 A shut-off is the portion of the nozzle that contains a handle which controls the opening and closing of the nozzle. Shut-offs may sometimes be equipped with a "pistol grip" handle.

3.4 A tip is an attachable component that shapes the stream of water as it leaves the nozzle.

3.4.1 Tips can either be solid stream or fog stream and exist in a variety of different sizes.

3.4.2 Tips are also classified as Main Stream Tip (MST) or Outer Stream Tip (OST).

A. MST's attach directly to the shut-off and have a threaded outlet orifice. In the FDNY, nozzles to be used for fire attack are equipped with MST's.

B. OST's are smaller and can attach to the threaded outlet orifice of the MST. The only OST used in the FDNY is the ½" tip. The OST should only be attached to the MST for overhaul operations, if deemed necessary.

3.5 There are three basic metrics used to describe the performance of a nozzle:

3.5.1 ***Nozzle pressure*** - In order to create the desired stream, nozzles must be supplied with sufficient pressure "at the tip". This pressure is called nozzle pressure. It is generally measured in psi (pounds per square inch).

3.5.2 ***Nozzle reaction*** - This is a metric that measures the reaction force of water flowing through an open nozzle. It is a mathematically derived metric that is based on the size of the tip and the supplied nozzle pressure. Nozzle reaction provides a standard measure of how strong the force of the nozzle "feels", which allows for comparison between nozzles of different sizes. It is generally measured in pounds.

3.5.3 ***Flowrate*** - This is a measurement of how much water is discharged by the nozzle. It is generally measured in gallons per minute.

3.6 Solid Stream Nozzles

3.6.1 Solid Stream nozzles (also called "Smooth Bore" nozzles) create a solid, straight stream of water when used (Figures 6, 7 & 8). They provide high volume flows at low pressure and have long stream reach, superior penetration, and manageable nozzle reaction.

3.6.2 1 ¾" Nozzle

Figure 6

A. The 1 ¾" nozzle is used with the 1 ¾" hose.
B. It has a 1 ½" coupling and a 15/16" MST that is used for attack.
C. The required nozzle pressure is 50 psi at the tip.
D. At 50 psi nozzle pressure, the flowrate is 180 GPM.
E. The nozzle reaction at 50 psi nozzle pressure is 68 lbs.
F. A ½" OST can be attached to the MST for overhaul purposes.

3.6.3 2 ½” Nozzle

Figure 7

A. The 2 ½” nozzle is used with the 2 ½” hose.
B. It has a 2 ½” coupling and a 1 1/8” MST that is used for attack.
C. The required nozzle pressure is 40 psi at the tip.
D. At 40 psi nozzle pressure, the flowrate is 235 GPM.
E. The nozzle reaction at 40 psi nozzle pressure is 78 lbs.
F. At 50 psi nozzle pressure, the flowrate is 265 GPM.
G. The nozzle reaction at 50 psi nozzle pressure is 98 lbs.
H. A ½” OST can be attached to the MST for overhaul purposes.
I. The 2 ½” nozzle should be marked with a white stripe around the MST.

3.6.4 2” Nozzle

Figure 8

A. The 2” nozzle is used with the 2” lightweight hose.
B. It has a 2 ½” coupling and a 1” MST that is used for attack.
C. The required nozzle pressure is 50 psi at the tip.
D. At 50 psi, the flowrate is 210 GPM.
E. The nozzle reaction at 50 psi nozzle pressure is 77 lbs.
F. At 55 psi nozzle pressure, the flowrate is 220 GPM.
G. The nozzle reaction at 55 psi nozzle pressure is 85 lbs.
H. A ½” OST can be attached to the MST for overhaul purposes.

3.7 Fog Nozzles

3.7.1 Fog nozzles can produce either a straight stream or a fog pattern (Figures 9, 10, 11 & 12). The straight stream is hollow. The fog pattern is adjusted by rotating the outer barrel and the reach of the stream depends on the width of the pattern: when the fog pattern is wider, the reach of the pattern will become shorter.

3.7.2 Removable fog tips may have a fixed fog pattern without the option of a straight stream. These can be attached directly to a shut-off.

3.7.3 Fog patterns are effective for maximizing hydraulic ventilation, dispersing gas vapors, and extinguishing fire near electrical equipment. However, fog patterns can have limited stream reach and can entrain air as they operate.

3.7.4 Fog nozzles used in the FDNY are classified in the following two ways:

A. *Variable flow* fog nozzles provide a different flowrate depending on the fog pattern selected. All fog nozzles in the FDNY are variable flow.

B. V*ariable pressure* (also called non-automatic) fog nozzles will allow their nozzle pressure to change as the fog pattern is adjusted. All fog nozzles in the FDNY are variable pressure.

3.7.5 1 ¾" Fog Nozzle

Figure 9

A. The 1 ¾" fog nozzle is used with the 1 ¾" hose.
B. It has a 1 ½" coupling and a fog tip.
C. The required nozzle pressure is 100 psi at the tip.
D. At 100 psi nozzle pressure, the flowrate can reach 200 GPM.
E. At 200 GPM, the nozzle reaction is 101 lbs.
F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
G. To operate as a straight stream, the tip is rotated to the right.
H. To operate as a fog pattern, the tip is rotated to the left.
I. The further to the left the tip is rotated, the wider the fog pattern will be.

3.7.6 2 ½" Fog Nozzle

Figure 10

A. The 2 ½" fog nozzle is used with the 2 ½" hose.
B. It has a 2 ½" coupling and a fog tip.
C. The required nozzle pressure is 100 psi at the tip.
D. At 100 psi nozzle pressure, the flowrate can reach 250 GPM.
E. At 250 GPM, the nozzle reaction is 121 lbs.
F. This fog nozzle can be adjusted from a straight stream to a fog pattern.
G. To operate as a straight stream, the tip is rotated to the right.
H. To operate as a fog pattern, the tip is rotated to the left.
I. The further to the left the tip is rotated, the wider the fog pattern will be.

3.7.7 2 ½” fog tip

Figure 11

A. Also called the “Aquastream”.
B. It is used to produce a fog spray for a mass decontamination procedure.
C. It has a 2 ½” coupling and a non-adjustable fog pattern.
D. The required nozzle pressure is 100 psi at the tip.
E. At 100 psi nozzle pressure, the flowrate is 750 GPM at full fog.
F. It may be connected directly to an apparatus outlet or ladder pipe. It may also be used on a 2 ½” hoseline in conjunction with a shut-off for decontamination.

3.7.8 Akron Turbomaster Fog Tip

Figure 12

A. The Turbomaster is connected directly to a Tower Ladder basket waterway.
B. It is used to produce a fog spray for a mass decontamination procedure.
C. It has a 2 ½” coupling and an adjustable fog pattern.
D. The required nozzle pressure is 100 psi at the tip.
E. It has 4 settings, capable of producing flows of 500, 750, 1000, or 1250 GPM.

3.7.9 High-Rise Nozzle

Figure 13

A. The High-Rise Nozzle (Figure 13) is designed to be used from the floor below the fire when standard interior handline attack methods are not possible, such as conditions caused by wind-driven fires. Refer to *Chapter 8 Addendum 3* for a full discussion of High-Rise Nozzle operations.

3.7.10 Cockloft Nozzle

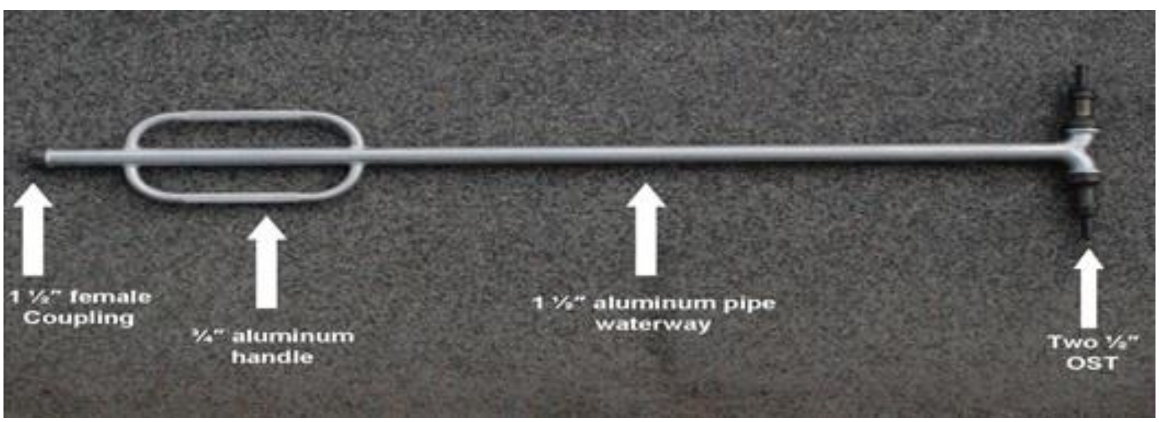

Figure 14

A. The cockloft nozzle (Figure 14) is primarily designed for use at cockloft fires but may also be used in other situations such as in a vertical application to extinguish fire on the outside of a building from a window on the floor below. When the cockloft nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building. For more information on cockloft nozzle operations see Chapter 7, Addendum 1.

3.7.11 The Combination Nozzle is a two-piece system that allows for the use of either a High-Rise Nozzle attachment or a Cockloft Nozzle attachment to a single base pipe section.

A. It is comprised of 3 different components, as follows:

1. *Base Pipe* – a 48” long aluminum alloy pipe with a 1 ½” diameter. It is equipped with a permanently attached 2 ½” shutoff and has a 1 ½” quick connect for attaching one of the two different nozzles (Figure 15). Attached to the aluminum pipe is a support rod with a quick connect at the top and a T-handle at the bottom. The Base pipe should be stored with the 1 ½” x 2 ½” increaser attached to the 2 ½” shut off.

Figure 15

B. *High Rise Nozzle (HRN) Tip* - a 44” long aluminum pipe with a 68 degree, 2-foot bend to provide the proper angle for the water stream (Figure 16). It has a 1 1/8” tip attached to its outlet and a 1 ½” quick connect at the bottom. The HRN tip has a support rod attached with a quick connect.

Figure 16

Figure 17

C. *Cockloft Nozzle Tip* - a 32” long aluminum pipe divided at the tip into two ninety-degree bends to provide the proper angle for the water stream (Figure 17). Each bend terminates with a 15/16” MST and a ½” OST. The two ½" OSTs are NOT to be removed; these tips increase the reach of the stream in excess of 60 feet. They also facilitate the generation of steam that enables a more rapid extinguishment of fire in the confined spaces of a cockloft. The Cockloft Nozzle tip has a support rod attached with a quick connect.

D. The Combination Nozzle has been issued to a number of companies in the field. It is carried in a kit mounted above the portable ladder rack on the apparatus.

Note: The original one-piece HRN has not been removed from Companies equipped with the Combination Nozzle. These Companies carry both so that non-trained members can use the one-piece HRN. Engine Companies not trained in the use of the Combination Nozzle System should continue to use the conventional High-Rise Nozzle or Cockloft Nozzle as required.

E. The Combination Nozzle System shall be visually inspected weekly. If repairs are deemed necessary, contact Research and Development (718) 281-8490. The out of service equipment shall be tagged with an RT-2 documenting the nature of the defect.

4. FITTINGS

4.1 A fitting is a hose connection which allows dissimilar couplings to become coupled. Specifically, fittings allow for different size couplings to be connected and for couplings of the same sex to be connected.

4.2 There are four categories of fittings:

4.2.1 *Reducers* – allow for larger male couplings to connect to smaller female couplings. The male threaded orifice on a reducer is smaller than the female threaded orifice. These are typically used for water to flow from a larger hose to a smaller hose. (Figure 16A)

4.2.2 *Increasers* – allow for smaller male couplings to connect to larger female couplings. The male threaded orifice on an increaser is larger than the female threaded orifice. These are typically used for water to flow from a smaller hose to a larger hose. (Figure 16B)

Figure 16A Figure 16B

4.2.3 *Double males* – allow for two female couplings of the same size to be connected. (Figure 17)

Figure 17

4.2.4 *Double females* – allow for two male couplings of the same size to be connected. (Figure 18)

Figure 18

4.3 Fittings are available in all necessary sizes in each of the four categories above.

4.4 There also exists a fitting specially designed as a hydrant connection, which is a double female with different sized couplings. One side has 4 ½" threads (for hydrant connection) and the other side has 3" threads (for connection to a 3 ½" hose).

Figure 19

4.5 By using the proper fittings, any hose in the FDNY can be connected to any other hose. Be aware that multiple fittings may have to be used to make coupling possible.

5. ADAPTERS

5.1 An adapter is a fitting that allows connection between a coupling with FDNY threads and National Standard threads or between FDNY threads and National Pipe threads.

5.2 The following different types of adapters exist:

5.2.1 Adapter with a male FDNY coupling and female National Standard (or National Pipe) coupling.

5.2.2 Adapter with a female FDNY coupling and male National Standard (or National Pipe) coupling.

5.2.3 Double male adapter, with a male FDNY coupling and male National Standard (or National Pipe) coupling.

5.2.4 Double female adapter, with a female FDNY coupling and female National Standard (or National Pipe) coupling

5.3 National Pipe threads (NPT) adapter can be differentiated by the length of the threaded coupling; National Pipe threads (Figure 20) are longer (deeper) than FDNY or National Standard (NST) threads (Figure 21).

Figure 20

Figure 21

6. IN-LINE PRESSURE GAUGE

6.1 Digital In-Line Gauge

6.1.1 The Digital In-Line Pressure/Flow metering device (Digital In-line Gauge) is used to monitor the pressure and flow being delivered from the standpipe outlet. It does not regulate water flow; it simply monitors the pressure and flow of the water supplied (Figure 22)


Figure 22

6.1.2 The Digital In-line Gauge has 2 ½” couplings and has a built-in 45-degree elbow.

6.1.3 To turn the gauge on, press and hold the green ON/OFF button. The digital display will show “- - - -” under PRESSURE and "r3.00" above FLOW. When the button is released, the digital display will show “0” PRESSURE and “0” FLOW. The gauge is now ready to be used. (Figure 23)

Figure 23

6.1.4 The red digital display shows the pressure at the gauge in psi.

A. *High Pressure Warning*: red display flashes “HI-P” when pressure exceeds 200 psi.

6.1.5 The blue digital display shows water flow at the gauge in GPM.

A. *High Flow Warning*: blue display flashes “HI-F” when flow exceeds 250 GPM.

B. *Low Flow Warning*: blue display flashes “LO-F” when flow is less than 80 GPM.

6.1.6 If there is no water flow for 15 minutes, the display goes into “sleep” mode and will not display any readings. Resumed water flow automatically re-activates the display. If there is no water flow for 30 minutes, the display will power off automatically. To resume operations, the gauge has to be re-started manually.

6.1.7 The Digital In-line Gauge is powered by special 9v rechargeable lithium ion batteries.

A. **Only the supplied batteries may be used**.

B. A fully charged battery will supply approximately 5 hours of continuous operation.

C. After 3½ hours of usage, the digital display will slowly flash "LO batt".

D. When 10 minutes of battery life remains, "LO batt" will flash rapidly. Immediately replace the battery if this occurs.

E. To test the battery, press the "Battery" button. A battery in serviceable condition will display as "Batt Good".

F. Units are issued 4 batteries. One is used in the gauge, one is carried in the clear battery pouch of the carrying case, and 2 are placed in the charging unit at quarters.

G. Batteries on the charger should be rotated weekly and switched with the batteries in the gauge and the carrying case.

H. The battery charger indicators are as follows:

1. Indicator is steady red color = the battery is charging.
2. Indicator is slowly blinking red color = defective battery must be replaced.
3. Indicator is steady green.

6.2 Analog In-Line Pressure Gauge (Figure 24)

Figure 24

6.2.1 The analog in-line pressure gauge is used to monitor the pressure being delivered from the standpipe outlet.

A. Like the digital in-line gauge, it does not regulate water flow; it simply monitors the pressure of the water supplied.

B. Unlike the digital in-line gauge, the analog gauge does not measure water flow.

6.2.2 It has 2 ½" couplings and an analog dial to measure the supply pressure.

6.2.3 The analog in-line gauge is not battery powered.

7. FOAM EDUCTOR AND NOZZLE

7.1 All Engine and Squad companies carry a foam eductor and nozzle, capable of producing finished firefighting foam.

7.2 The eductor and nozzle are carried together in a black pelican case. The foam nozzle can be identified by white markings on the tip, handle, and pistol grip.

7.3 When supplied with 200 psi, it has a flow of 125 GPM.

7.4 Refer to *Training Bulletin: Foam* for a full discussion of foam operations.

8. NEW YORKER MULTIVERSAL (FIGURE 25)

Figure 25

8.1 The New Yorker Multiversal is carried by all engine companies.

8.2 The multiversal has three stacked tips (2”, 1 ½”, 1 ¼”).

8.2.1 When the 1 ¼” tip is used, it will flow roughly 465 GPM with 100 psi at the tip.

8.2.2 When the 1 ½” tip is used, it will flow roughly 560 GPM with 70 psi at the tip. When supplied with 100 psi at the 1 ½” tip, it will flow roughly 660 GPM.

8.2.3 When the 2” tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

8.3 The multiversal has two 3” inlets. The maximum pressure to be supplied to the appliance base is 200 psi.

8.4 For a full discussion of operations, refer to *Chapter 9: Large Caliber Streams*

9. Hose Roller

Figure 26

9.1 The hose roller (Figure 26) is used to facilitate the hoisting of a hoseline over a windowsill or parapet by eliminating the friction of the dry line being pulled over a window sill or roof parapet during an exterior hose stretch.

9.2 When properly used, the hose roller should be placed over the windowsill or roof parapet and secured to a substantial object using the attached rope.

10. Bresnan Distributor

Figure 27

10.1 The Bresnan Distributor (Figure 27) is an appliance carried by engine companies that attaches to a hoseline to distribute water in a 360-degree pattern. It is designed to be used remotely in a fire area that cannot be accessed by a hoseline. Generally, it is used for fires below grade, such as cellar fires.

10.2 It is comprised of 9 angled ports for water delivery. When in operation, the angled force of the water will cause the Bresnan distributor to spin, which maximizes the distribution of water.

10.3 When supplied at 50 psi nozzle pressure, it will deliver 250 GPM of water.

10.4 The Bresnan distributor is supplied with a 2 ½" hose. A shut-off should be placed one length from the distributor, allowing flow to the distributor to be controlled.

10.5 To properly use the Bresnan distributor, it should be lowered into the fire area via an opening and the shut-off should be opened to begin water flow. The distributor is lowered until it hits the floor, then raised several feet to position for optimal distribution.

11. SINGLE GATE

11.1 The primary function of a single gate (also called "one-way gate") is to enable firefighters to control the flow of water at a point other than the water source itself. By using a single gate, flow can be augmented, or even halted, without having to shut down the water source itself. (Figure 28)

Figure 28

11.2 Commonly, single gates are used on the 2 ½" outlet of a hydrant, but they are also often used to control flow from standpipe outlets, deck guns, or multiversals.

11.3 Single gates exist in a number of different sizes for use on hydrants, standpipe outlets, or other appliances (such as a deck pipe or multiversal).

11.4 To use a single gate, it must be attached before the water source is turned on. Once attached, the water source is opened and the flow can be controlled at the single gate.

12. GATED WYE

12.1 The primary function of a gated wye is to allow a single source of water to supply two separate hoselines. A gated wye has one inlet and two outlets. Each outlet is equipped with a gate that allows for the control of water flow. (Figure 29)

Figure 29

12.2 Commonly, gated wyes can be found attached to an outlet on fire apparatus, most often on the front pumper. Gated wyes can also be attached to a hydrant, or attached to a hoseline to facilitate the stretching and operation of multiple hoselines.

12.3 Gated wyes exist in all available sizes, from 4 ½" to 1 ½". The most common size has one 2 ½" inlet and two 1 ½" outlets and is often found on the front outlet of the apparatus.

12.4 To use a gated wye, it must be attached before the water source is turned on. Once attached, water flow can be controlled by the quarter-turn ball valve at each outlet. Units should be aware that when two hoselines are operating from a gated wye and one of those hoselines is shut down, backpressure may impact the other operating hoseline.

13. SIAMESE CONNECTION (WITH SINGLE GATE)

Figure 30

13.1 A Siamese connection performs the opposite function of the gated wye. Its primary function is to supply a single outlet by way of two separate hoselines. A Siamese connection has two inlets and one outlet. (Figure 30)

13.2 Siamese connections are not typically carried on engine apparatus in the FDNY, but they are carried by aerial ladder apparatus for use with their ladder pipe.

13.3 The Siamese used in the FDNY has two 3” inlets and one 3” outlet. It is used in conjunction with a single gate to supply the 3 ½” hose used when an aerial ladder pipe is placed in operation.

14. SPANNER WRENCH

14.1 The primary function of a spanner wrench (Figure 30) is to tighten and loosen hose couplings.

Figure 30

14.2 Every firefighter is issued a spanner wrench and is required to carry it with them at a fire operation.

14.3 Two basic types of spanner wrenches exist:

14.3.1 Flip-open spanner (often carried in a bunker coat pocket)

14.3.2 Straight spanner (often carried on the apparatus)

14.4 A spanner wrench is used by gripping the lugs to tighten or loosen the coupling. While a single spanner can be used, it is most effective to use two spanners together, facing opposite each other and pulled in opposite directions.

15 HOSE STRAP

Figure 31A

Figure 31B

15.1 The primary function of a hose strap is to secure a hoseline that has been stretched a distance vertically, with the purpose of preventing the hose from falling back down the vertical space through which it was stretched.

15.2 Hose straps are commonly used when performing a well-hole stretch, fire escape stretch, or a rope stretch.

15.3 Every firefighter is issued a hose strap and is required to carry it with them at a fire operation. Two basic types of hose strap exist:

15.3.1 ***Rope hose strap with hook*** - One end has a metal hook and the opposite end has a loop in the rope (Figure 31A)

15.3.2 ***Nylon hose strap with carabiner*** - One end has a carabiner and the opposite end has a loop in the nylon strap. There are a number of small metal loops on the strap, which are not normally used when securing a hose (Figure 31B)

15.4 When used properly, the looped end of the hose strap secures the hose by using a girth hitch. This uses the weight of the hose to tighten the grip of the hose strap. The carabiner (or hook) end of the hose strap is used to attach to an anchor point. The hose strap is attached to the anchor point by passing over the anchor point and is attached back to the strap itself.

15.5 The ideal location on the hose to secure the hose strap is just below a coupling. This minimizes the likelihood of the hose slipping through the girth hitch, while also relieving pressure on the coupling.

16. HYDRANT WRENCH

Figure 32A

Figure 32B

16.1 There are two basic types of hydrant wrenches available, both of which are carried by all engine and squad companies:

16.1.1 ***Custodian Hydrant Wrench*** - equipped with a magnetic cup (Figure 32A) that allows the operation of hydrants equipped with a Custodian lock. It can also operate Hydra-Shield equipped hydrant caps and can operate the standard 5-sided hydrant operating nut. Hydrant is turned clockwise to open.

16.1.2 ***Standard Hydrant Wrench*** - Used to open the standard 5-sided hydrant operating nut (Figure 32B). Hydrant is turned clockwise to open.

17. CURB VALVE KEY (Figure 33)

Figure 33

17.1 Carried by all engine and squad companies and is used to operate the curb valve that controls water flow from the water main to a hydrant.

17.2 The wrench is placed over the operating nut and turned counterclockwise to close.

18. HYDRANT PLUG

Figure 34A

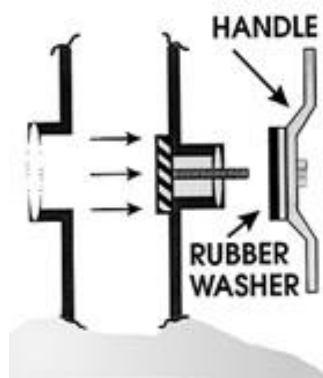

Figure 34B

18.1 Carried by all engine and squad companies. If the outlet threads of a hydrant are damaged or missing, a hydrant plug can be used to close the 2 ½” outlet before using the hydrant.

18.2 The hydrant plug (Figure 34A) consists of a T-bolt, (which has a threaded rod) and a handle with an attached rubber washer. The T-bolt may be equipped with a rope in case it falls into the barrel of the hydrant during operation.

18.3 To use the hydrant plug, maneuver the T-bolt through the 4 ½” outlet into the hydrant barrel (as pictured). Place the threaded rod out through the 2 ½” outlet, centering it in the middle of the opening. Hold the T-Bolt firmly against the inside of the hydrant barrel with one hand and turn the handle onto the threaded end of the T-Bolt with the other hand until handle is tight to the barrel. The washer must be on the outside of the hydrant Figure 34B).

19. Drafting Connections

Figure 35

19.1 There are 3 different drafting connections on the apparatus (Figure 35):

19.1.1 One ribbed 10-foot hard connection.

19.1.2 One ribbed 10-foot hard connection with strainer.

19.1.3 One smooth 10-foot hard connection.

19.2 Each of these connections is equipped with 6" couplings. The connection with a strainer has a strainer on one end and a female coupling on the other. The other two connections have one male and one female coupling.

19.3 When used for drafting, the connection with the strainer is lowered into the water and the smooth connection is used to connect to the ungated inlet on the apparatus. The 3rd connection is to be used between them if more length is needed. Please refer to *Chapter 5: Engine Company Chauffeur* for more information on drafting.

20. 10-FOOT SOFT SUCTION 3 ½" HYDRANT CONNECTION

Figure 36

20.1 The "soft suction" is a black, semi-rigid hose used exclusively as a hydrant connection.

20.2 It is 10 feet long, has a 3 ½" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant.

21. 10-FOOT SEMI-RIGID 4 ½" HYDRANT CONNECTION

Figure 37

21.1 The "semi-rigid connection" is a black, semi-rigid hose used exclusively as a hydrant connection.

21.2 It is 10 feet long, has a 4 ½" diameter, and is equipped with two 4 ½" female couplings for direct connection to a hydrant. It is similar to the older 3 ½" soft suction connection, but is more rigid and has a larger diameter.

22. 35-FOOT SOFT HYDRANT CONNECTION

Figure 38

22.1 The 35-foot soft connection is a yellow, synthetic hose that is used exclusively as a hydrant connection.

22.2 It is 35 feet long, has a 5” diameter, and is equipped with two 4 ½” female couplings for direct connection to a hydrant.

EQUIPMENT INSPECTIONS AND OUT OF SERVICE (OOS) PROCEDURES

1. ENGINE EQUIPMENT INSPECTION REQUIREMENTS AND OUT-OF-SERVICE (OOS) PROCEDURES

1.1 The following table lists each piece of engine company equipment, along with the following information:

1.1.1 The inspection requirement for the equipment.

1.1.2 The procedure to be followed to place the equipment OOS.

Equipment	Inspection	OOS
Hydrants	Spring and Fall	Hansen Hydrant System
Hose	Annual test, Spring and Fall repacking	RT-3
Nozzles	Annual test (in August), Each tour	RT-4
Digital In-line Gauge	Each tour	RT-2
Hose Strap	Each tour	RT-2
Hydrant Wrench	Each tour	RT-2
Spanner Wrench	Each tour	RT-2
10-foot Semi-rigid 4 ½” Connection	Each tour	RT-2
10-foot Soft 3 ½” Suction	Each tour	RT-2
35-foot Soft Hydrant Connection	Each tour	RT-2
Analog In-line Gauge	Weekly	RT-2
Adapters	Weekly	RT-2
Blitzfire	Weekly	RT-2
Bresnan Distributor	Weekly	RT-2
Cockloft Nozzle	Weekly	RT-2
Combination Nozzle	Weekly	RT-2
Curb Valve Wrench	Weekly	RT-2
Drafting Connections	Weekly	RT-2
Fittings	Weekly	RT-2
Foam Eductor and Nozzle	Weekly	RT-2
Gated Wye	Weekly	RT-2
High Rise Nozzle	Weekly	RT-2
Hose Roller	Weekly	RT-2
Hydrant Plug	Weekly	RT-2
New Yorker Multiversal	Weekly	RT-2
Single Gate	Weekly	RT-2

HYDRANT MAINTENANCE

1. HYDRANT MAINTENANCE

1.1 In order to ensure the reliable performance of the NYC hydrant system at fire and emergency operations, field units of the FDNY are responsible for the inspection and maintenance of hydrants in their administrative areas.

1.2 These responsibilities include semi-annual inspection of all hydrants, as well as the prompt reporting of defective hydrants discovered during any other activities.

1.3 Additionally, units will oversee the proper placement of hydrant caps, including spray caps as requested by the public.

1.4 Company commanders shall maintain a current map of all hydrants in the company's response area.

1.5 It is illegal for the public to open or use a fire hydrant without a permit issued by the Department of Environmental Protection (DEP). All units shall close down illegally opened hydrants whenever the officer in command determines that such action will not precipitate an incident. The Police Department shall be notified when necessary.

2. HYDRANT INSPECTION

2.1 Every hydrant shall be inspected twice per year. Inspections occur as follows:

2.1.1 Spring hydrant inspection period (March 1st – June 1st)

2.1.2 Fall hydrant inspection period (September 1st – December 1st)

2.1.3 Inspections shall be performed between the hours of 0930 and 1700.

2.2 Company Commanders are responsible for causing the inspection of all hydrants in their administrative area and shall schedule inspections as necessary to ensure units achieve their goals. Battalion Commanders may specify additional inspection periods when necessary to ensure units complete all semi-annual inspections.

2.2.1 When the company commander believes their company will not complete inspection by the end of the period, they should submit a letterhead report to the Borough Commander via the chain of command to request assistance.

2.3 During inspection, hydrants should be opened to ensure the hydrant is serviceable and can be used as a viable water source. The hydrant should be flushed thoroughly to allow any debris to be flushed out of the barrel.

2.3.1 If a hydrant fails to drain, the barrel must be pumped out. This is especially important during the fall inspection period, as the coming winter months will cause the undrained hydrant to freeze.

2.3.2 When there is no hydrant cap present, one should be placed on the hydrant, if available. Caps will be supplied to FDNY units by the DEP for installation during hydrant inspection. Units will obtain these caps through their Division.

2.4 FDNY field units will use the Hansen Hydrant application (accessed via the FDNY Intranet) to record semi-annual hydrant inspections.

2.4.1 Defective hydrants are reported to the DEP through the Hansen Hydrant System. Defective hydrants include unserviceable hydrants (e.g. broken spindle), hydrants that fail to drain, hydrants that require a cap, or hydrants with any other defect.

2.4.2 The Hansen Hydrant System is also used to record frozen hydrants for transmittal to the responsible FDNY Thawing Apparatus.

2.4.3 Hydrant Cards (BF-47A) shall be filed in company quarters until further notice.

2.5 When a hydrant is found to be defective during emergency response activity, the Hansen Hydrant system is used to report the defect.

2.5.1 When the hydrant is not in the company's administrative area, the officer should ensure the administrative company is notified of the defect and cause a white disc to be placed on the hydrant only if it is unserviceable.

2.6 Hydrant discs should be painted with the company number and should be placed on hydrants as follows:

2.6.1 White discs shall be placed on unserviceable hydrants (comes in 4 ½" and 2 ½" sizes).

2.6.2 Yellow discs shall be placed on frozen hydrants (comes in 4 ½" and 2 ½" sizes).

Note: Blue discs are not used on hydrants; they are used on sprinkler and standpipe systems.

2.7 Completed DEP repair tickets will be emailed to the appropriate administrative company and will indicate the date and nature of the repair work performed.

2.7.1 Upon receipt of a DEP repair ticket, the officer shall cause an inspection to be made. If the hydrant is found satisfactory, the hydrant disc shall be removed.

2.7.2 If the hydrant is still found to be defective or repair work is unsatisfactory, utilize the Hansen Hydrant application to report the defect, giving specific instructions in the "Comments" section.

2.8 Priority Repairs

2.8.1 When a hydrant repair is a "Priority Repair", it should be indicated as such when the work order is created in the Hansen Hydrant System. Out-of-service hydrants that fit the following criteria shall be indicated as a "Priority Repair" to the DEP:

A. A hydrant that is out of service and is the only hydrant in a block.

B. A hydrant that is out of service, which is vital to the protection of high-profile locations or critical infrastructure locations (bridges, tunnels, transit systems, etc.)

C. If two adjacent hydrants in a block are both out-of-service, they are both priority repairs.

3. HYDRANT SPRAY CAP PROGRAM

3.1 The Fire Department has been charged with distributing spray caps to the public during the summer months in order to provide heat relief to the public while reducing water consumption.

3.2 DEP will deliver hydrant caps and spray caps to Divisions. Units can request caps through the chain of command.

3.3 When a member of the public requests a spray cap, the following steps should be taken:

3.3.1 Ensure that the requesting party is at least 18 years old.

3.3.2 Require that a "Request for Spray Caps" form be completed.

3.3.3 Provide a copy of the "Spray Cap Permit/Instructions" sheet.

3.3.4 Officer on duty reviews documents and notifies the applicant of approximately when the company will be able to turn on the hydrant.

3.3.5 The officer on duty should schedule the unit to turn off the hydrant during the 6 x 9 tour and remove the spray cap.

3.3.6 Spray caps shall not be placed on hydrants that: have mains larger than 20 inches, are red or yellow, are on two-way streets, near intersections, on bus routes, or on access routes to main traffic arteries.

3.3.7 Spray caps may only be used from 1000 hours until 2100 hours.

3.4 Units shall carry spray caps on the apparatus. When shutting down open fire hydrants being used for heat relief by the public, the officer should consider having a member place a spray cap on the hydrant, if needed. Units shall fill out a Request for Spray Caps Form for recordkeeping purposes.

4. ANNUAL HYDRANT PRESSURE READING

4.1 During the first full week in May each year, all engine and squad companies will take pressure readings on the hydrants nearest their quarters. Readings for each calendar day, Sunday to Saturday inclusive, will be taken at approximately 1000 hours, 1300 hours, 1600 hours, 1900 hours and 2200 hours, and shall be recorded on the "Hydrant Pressure Chart" (form CD-65). This chart should be posted at the housewatch area.

5. LOW WATER PRESSURE PROCEDURES

5.1 The Low Water Pressure procedures described below will be implemented upon transmission of a 65-2. Borough Commanders have the authority to implement these procedures within their Borough from 0800 - 1600 hours on weekdays. The Command Chief has the authority to implement these procedures at all other times.

5.2 Phase I - "Water Pressure Alert" Procedures

5.2.1 Starting at 1000 hours each unit shall take and record the pressure on the hydrant nearest to quarters, every hour until 2200 hours.

5.2.2 Within one hour of a Phase I announcement, Battalion Chiefs shall leave quarters and physically survey their districts to observe and note the number and location of illegally opened hydrants. BC’s may schedule units to assist in this survey.

5.2.3 Battalion Chiefs shall notify the Deputy Chief of their division of the pressure on hydrants recorded by their units. If warranted, they may recommend a Phase II be implemented or any other actions that may be required.

5.2.4 Deputy Chiefs shall notify the Borough Commander or Command Chief of the results of hydrant pressure readings and of the reported number of illegally opened hydrants.

5.2.5 The Borough Commander or Command Chief shall evaluate these reports and take any needed action. This may include the institution of a Phase II citywide, borough-wide, division-wide, or in specified battalion areas. They may also schedule specific units to go on patrol to shut down hydrants.

5.3 Phase II - "Water Pressure Emergency" Procedures

5.3.1 Starting at 1000 hours each unit shall take and record pressure readings on the hydrant nearest to their quarters, every hour until 2200 hours.

5.3.2 Units shall patrol in their district as per schedules established by Deputy Chiefs. Every effort shall be made to shut down hydrants and/or place spray caps unless a serious confrontation may result. The Police Department should be called when necessary.

5.3.3 Whenever a hydrant is shut down, the location and condition of the hydrant shall be recorded by completing a "Water Pressure Emergency/Hydrant Shutoff Report" (form CD-64). Upon completion of the assigned patrol duty the officer shall forward this form to DEP.

5.3.4 Officers on duty upon completing their assigned patrol duties, shall notify the Battalion of the following information:

A. the number of illegally opened hydrants

B. the number of hydrants shut down

C. the number of spray caps placed

D. any areas experiencing dangerously low water pressures

5.3.5 Every 2 hours during a Phase II emergency, the Battalion Chief shall provide the administrative Deputy Chief with the above information received from units.

5.3.6 Every 2 hours, Deputy Chiefs shall apprise the Borough Commander or Command Chief of all information received from Battalion Chiefs, the number of units on patrol, and any incidents where problems were encountered at fires due to water shortages or loss of water pressure.

HOSE MAINTENANCE

1. HOSE MAINTENANCE

1.1 This bulletin will outline the basic requirements of hose maintenance for all engine companies in the FDNY. This includes the following:

1.1.1 Hose requirements.

1.1.2 Hose packing.

1.1.3 Hose removal and repacking.

1.1.4 Hose testing.

1.1.5 Hose out-of-service.

2. HOSE REQUIREMENTS

2.1 Engine companies are required to maintain the amount of hose listed below. This amount includes hose kept on the apparatus and hose maintained in quarters. Minimum requirements are as follows:

2.1.1 1 length of 2” lightweight hose shall be arranged in a roll-up and maintained with a 2” nozzle and 1” MST attached. This hose is colored green with a red stripe.

2.1.2 3 lengths of 2 ½” lightweight hose shall be arranged in a roll-up. One of these lengths shall be maintained with a 2 1/2” nozzle and 1 1/8” MST attached. This hose is colored white with a red stripe.

2.1.3 3 lengths of 2 ½” lightweight hose
(Engines normally staffed with 5 FF’s should carry 4 lengths)

2.1.4 30 lengths of 2 ½” hose.

2.1.5 10 lengths of 3 ½” hose.

2.2 Additionally, hose is required to be carried on the apparatus in the following fashion:

2.2.1 1 length of 2” lightweight hose shall be arranged in a roll-up and maintained with a 2” nozzle attached.

2.2.2 3 lengths of 2 ½” lightweight hose shall be arranged in a roll-up. One of these lengths shall be maintained with a 2 ½” nozzle attached.

2.2.3 For companies staffed with 5 firefighters, 1 additional length of 2 ½" lightweight hose must be carried, maintained as a roll-up.

2.2.4 At least 4 lengths of 1 ¾" hose shall be carried, either rolled or arranged in a roll-up. One of these lengths shall be maintained with a 1 ¾" nozzle attached (to be used to replace a burst length or to add to a short stretch).

3. HOSE PACKING

3.1 When carried on the apparatus or stored in quarters, hose can be maintained in several different arrangements, as described in the following sections.

3.2 Traditional hose bed arrangement. (Figure 1)

3.2.1 Hose is carried in the hosebeds of all engine apparatus in a traditional hosebed arrangement. This is created as follows:

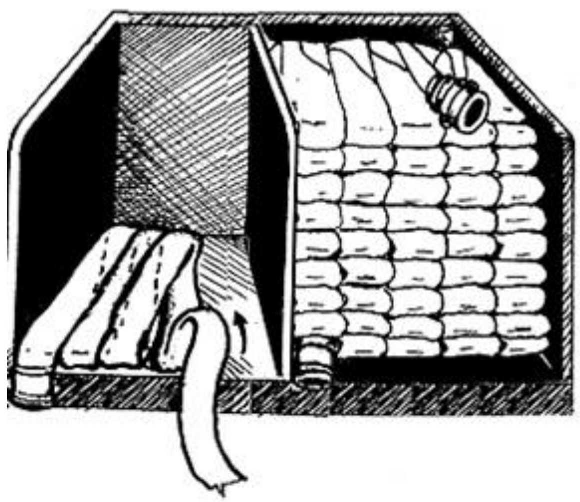

Figure 1

A. Load hose from left to right in the hosebed compartment.
B. Begin on the left side with the coupling extended beyond the hosebed.
C. Lay the hose straight back to the left rear of the compartment.
D. Fold hose at the rear and bring back forward, veering slightly to the right.
E. When at the front of the compartment, the hose should lie alongside the coupling.
F. Fold the hose at the front and repeat the movement until the layer is complete.
G. When a layer is finished, fold the hose at the right rear of the compartment and bring forward diagonally to the front left to begin the next layer.

3.3 Horseshoe Arrangement

Figure 2

3.3.1 The lead lengths of hose in a hosebed can be maintained in a horseshoe arrangement to facilitate the hose stretch. (Figure 2) This arrangement is created as follows:

A. Each horseshoe is comprised of exactly 1 length of hose.

B. Place the hose on its edge on top of the hosebed.

C. Fold the hose back and forth in the shape of a horseshoe.

D. Completed horseshoes should be roughly 4 feet long.

3.3.2 The horseshoe arrangement makes the hose easier to carry and ensures exactly 1 length of hose is carried.

3.3.3 The midpoint of the horseshoe can be located by grabbing the middle ring of the horseshoe. (Figure 3)

Figure 3

3.4 Roll-ups

Figure 4

3.4.1 In order to facilitate the efficient deployment of hose when stretching from a standpipe outlet, dedicated lengths of hose should be folded in a specific arrangement, referred to as a "roll-up". (Figure 4)

3.4.2 The roll-up is created as follows:

A. Lay one length of hose folded halfway with the couplings side by side. Facing couplings (while standing away from the hose, as pictured), the male coupling is on the left.

Figure 5

B. For the lead length, attach the nozzle and fold hose in half so that the nozzle tip is even with the female coupling. (Figure 5)

C. Bring the midpoint fold to the couplings. (Figures 6A with nozzle and 6B)

Figure 6A

Figure 6B

D. Bring the next fold up to the couplings over the midpoint fold. (Figure 7

Figure 7

E. Lift the couplings (and the two folds of hose on top of them) and fold them over on top of the remaining fold of hose.

F. The folded hose should now be arranged with the couplings on top of the hose. Facing couplings (while standing away from the hose, as pictured), the male coupling is now on the right. (Figure 8)

Figure 8

G. Secure completed folds with a strap connector on top.

Figure 9

3.4.3 The roll-up makes the hose easy to carry, allows lengths to be easily connected to each other, and facilitates a smooth deployment when stretched.

3.4.4 The midpoint of the hose can be identified by grabbing the hose fold located directly beneath the couplings. (Figure 10) This point is called the “A-fold” and is painted red on all lightweight hose. Using this A-fold, the hose should be deployed as discussed in *Chapter 8: Standpipe Operations*.

Figure 10

3.5 Rolled hose (Figure 11)

3.5.1 Spare serviceable hose may be maintained in a rolled length when carried on the apparatus or stored in quarters. This arrangement is created as follows:

A. Lay the hose out and fold the hose back on itself.

B. Lay the male coupling on top, roughly 3 feet from the female coupling.

C. Beginning at the folded end, roll the doubled hose towards the couplings.

D. Rolled hose may be secured with a short piece of rope.

Figure 11

3.5.2 When hose is being placed out-of-service, it is arranged in a single roll. (Figure 12) The male coupling should be placed on the inside when single rolled.

Figure 12

4. HOSE REMOVAL AND REPACKNG

4.1 Hose should be removed and repacked in the spring and fall of each year, in accordance with schedules issued by Division Commanders. Spare hose shall be used to replace hose on the apparatus, when available.

4.2 Any hose 10 years old or older should be placed out-of-service. The first two digits of the serial number stamped on the female coupling will indicate the year of manufacture.

4.3 Hose should be inspected before being placed on the apparatus.

4.3.1 Any hose of doubtful strength should be placed out-of-service. This may be due to cuts, abrasions, wear, or burns to the hose jacket.

4.3.2 Couplings should not be cracked or out-of-round and there should be no burred threads

4.3.3 All female couplings should have a rubber washer. Washers that are dried out or cracked shall be replaced.

5. ANNUAL HOSE TEST

5.1 All hose must be tested for serviceability each year as follows:

5.1.1 The hose must be tested to its maximum operating pressure of 250 psi.

5.1.2 The hose must not have any obvious defects.

5.1.3 The hose must be less than 10 years old.

5.2 Hose test equipment

5.2.1 The annual hose test shall be completed only through the use of the hose test kit, which is specially designated for this purpose. The kit contains the following:

A. Hose test manifold.

B. Hose caps with relief valves (drain valve caps).

C. Fittings.

D. In-line pressure gauge.

E. 2 ½" single gate.

5.2.2 The hose test kit is maintained by the administrative division and will be provided to engine companies as per a schedule determined by the Deputy Chief.

5.3 Setting Up

5.3.1 The company will be placed out-of-service for the duration of the hose test.

5.3.2 Before the hose is tested, it should be visibly inspected for obvious defects. This includes damaged couplings, as well as abrasions, burns, or rot to the hose jacket. If defects are noted, the hose should not be tested and should be placed OOS.

5.3.3 The hose test should be conducted in a safe area that allows for the stretching of a large amount of hose. The hose manifold is capable of testing 6 lines of 6 lengths each, for a total of 36 lengths stretched from the manifold.

5.3.4 All hose couplings must be tightened with a spanner wrench.

5.3.5 The apparatus is hooked up to a hydrant using the inlet opposite the pump panel.

5.3.6 Attach a single gate to the pumper outlet, also on the side opposite the pump panel.

5.3.7 Ensure the manifold is equipped with the 4 ½" to 2 ½" fitting with the in-line gauge attached to the 2 ½" coupling.

5.3.8 Stretch 1 or 2 lengths of 2 ½” hose from the single gate on the pumper to the in-line gauge attached to the hose manifold. Only 2 ½” hose may be used to supply manifold. This hose will supply the manifold, but is also being tested.

5.3.9 Attach hose to be tested to manifold outlets. Up to 6 lengths may be stretched from each outlet. All outlets are 2 ½”, so provided fittings should be used as necessary.

5.3.10 Attach a drain valve cap to male coupling of last length being tested from each outlet.

Figure 13

5.4 Conducting the Hose Test (Figure 13)

5.4.1 Close the 6 outlets and 6 drain valves on the manifold.

5.4.2 Fully open the single gate at the pumper outlet.

5.4.3 Charge the manifold with idle pressure.

5.4.4 Charge the hoselines by opening the 6 outlets on the manifold.

5.4.5 Open the spigot on the drain cap on the end of each hose to bleed air from the hose.

5.4.6 Once water flows from the open drain valve cap, close the spigot and the single gate. There is a small opening in the single gate that will allow pressure to build while using minimal water.

5.4.7 This will also minimize the reaction if a length bursts.

5.4.8 Officer ensures all members are positioned a safe distance from the hose before charging the system to the test pressure.

5.4.9 Once safety of members is assured, the ECC will gradually increase pressure to 250 psi.

5.4.10 The inline gauge attached to the manifold should be used to monitor pressure.

5.4.11 The test pressure of 250 psi is maintained for 5 minutes. The ECC should be mindful that there is no movement of water during the test and the pump may build up heat. If heat is noted, a valve on an unused gate may be partially opened to allow water movement.

5.4.12 After 5 minutes, the test pressure is gradually reduced to idle pressure.

5.4.13 Close the pumper outlet and open the drains to relieve pressure.

5.5 Hose Test Results

5.5.1 After the hose is tested, it is inspected for damage to the hose jacket or couplings.

5.5.2 There is a black marker circle around each male coupling called the “creep line”. This is provided by the manufacturer and is inspected to see if the coupling is separating from the hose. This would be indicated by a movement of the line 1/8” away from the coupling.

5.5.3 Any hose found to be defective must be placed out-of-service. This also includes any hose found to be 10 years old or greater.

6. HOSE OUT-OF-SERVICE

6.1 To place hose out of service, complete form RT-3 and attach it to the OOS hose.

6.2 Replacement hose is requisitioned from Fire Tools and Equipment (718) 391-9405.

WATER SUPPLY INFRASTRUCTURE

1. WATER SUPPLY INFRASTRUCTURE

1.1 This section will discuss critical equipment that is regularly used by Engine Companies but is not carried on the engine apparatus. This equipment exists as part of the water supply infrastructure of New York City and plays a vital role in Engine Company Operations.

1.2 This section will provide a brief discussion of the physical specifications and key equipment as it exists in the field. It is not intended to provide a comprehensive description of the capabilities of the systems discussed, but rather a general overview of key components.

1.3 Specifically, the infrastructure discussed will concern the following:

1.3.1 Hydrants

1.3.2 Sprinkler systems

1.3.3 Standpipe systems

2. HYDRANTS

2.1 Hydrants are the primary source of water for firefighting operations. There are several types of hydrants available in NYC, which may be equipped with a variety of features, as described below.

2.2 Hydrant pressure varies significantly based on local geography.

2.3 Types of Hydrants

2.3.1 ***Smith Hydrant*** - Has two outlets, one 2 ½” and one 4 ½”. Some Smith hydrants have a breakaway feature, but not all. (Figure 1)

Figure 1

2.3.2 ***Dresser Hydrant*** – Has two outlets, one 2 ½” and one 4 ½”. All Dresser hydrants have a breakaway feature. (Figure 2)

Figure 2

2.3.3 ***Yellow Hydrants on Parkways and Expressways*** - Some hydrants on parkways and expressways are maintained shut at the curb valve. These hydrants are painted yellow. They must be turned on fully at the curb valve, approximately 18 turns clockwise using a curb valve key, in order to be used.

2.3.4 ***Red Air Cock Hydrants*** **-** Hydrants on 30” diameter or greater mains in strategic locations (high and low points on the water main). These hydrants are painted red and are excellent sources of water for fire department use.

2.3.5 ***Red Satellite Water System Hydrants*** **-** Twin hydrant arrangement on large mains for a rapid and adequate source of water for Satellite Units. The hydrants are painted red and may have two 4 ½” outlets. (Figure 3)

Figure 3

Figure 4

2.3.6 ***Wall Hydrants*** – Hydrants that are embedded in the wall of a building (Figure 4). They closely resemble a Fire Department Connection (FDC) but should be labeled as a hydrant. They are operated by turning an operating nut (often located above the outlets).

2.4 Hydrant features

2.4.1 ***Hydrant Markings* -** Some hydrants may be marked with a white number on the barrel, which indicates the size of the main supplying the hydrant (in inches). A white line under the number on the barrel indicates the hydrant is on a dead end main and is only supplied from one direction, which may limit water flow.

2.4.2 ***Breakaway Feature* -** Some hydrants have a "breakaway" feature, which was designed as a safety feature to minimize damage to the hydrant system if a hydrant is struck by a vehicle. These hydrants will have a "collar" fitted on the lower portion of the barrel which, when broken, will cause the water supply to the hydrant to be shut down. It is sometimes possible to find this collar buried beneath concrete surrounding a hydrant.

2.4.3 ***Curb Valve -*** Hydrants are equipped with a curb valve, which provides a means to shut the water supply to a hydrant from the water main. These valves are generally located in the street, near the hydrant and require a special curb valve key to shut down. The curb valve key is turned counterclockwise 17 full turns to shut the valve. There will not be a noticeable decrease in water flow until about 12 full turns are made.

2.4.4 ***Hydra-Shield -*** This is a threaded hydrant cap with three indentations on its surface. Except for the three tapered indentations, the cap has a smooth rounded surface which prevents removal using conventional tools. The hydrant wrench matches the indentations on both the 2 1/2 inch and 4 1/2 inch caps.

2.4.5 ***Custodian Hydrant Guard -*** This is a free spinning cap which completely covers the hydrant operating nut to prevent it from being turned on by unauthorized users. The Custodian hydrant wrench, which is equipped with an internal magnet, is needed to open the hydrant.

2.4.6 ***Hydrant Drain -*** After the hydrant is shut, the residual water in the barrel will drain out into the ground by way of a small hole in the bottom of the barrel. This hole is the hydrant drain and, if blocked, it may not completely drain.

2.4.7 ***Hydrant Discs -*** If a hydrant is found to be unserviceable, it should have a white disc attached to one of the outlets. A frozen hydrant should have a yellow disc attached. Blue discs are reserved for use on partially OOS auxiliary fire protection systems (standpipe and sprinkler systems).

2.4.8 ***Hydrant Caps*** - All hydrants should be equipped with caps on both the 2 ½” and 4 ½” outlets. This minimizes damage to the hydrant and limits possible obstructions inside the barrel.

3. SPRINKLER SYSTEMS

3.1 Sprinkler systems are found in a wide range of buildings and occupancies in NYC. Depending on the occupancy, the system may be either automatic or non-automatic.

3.1.1 ***Automatic sprinkler systems*** are capable of being activated and issuing water without fire department assistance. They are typically supplied by a city water main and at least one other source. Most common among these other sources are gravity tanks, pressure tanks, suction tanks, or cisterns. Types of automatic sprinkler systems include the following:

3.1.2 ***Wet pipe*** - Wet pipe sprinkler systems contain water in the riser and piping at all times. When a sprinkler head activates, water is immediately discharged.

3.1.3 ***Dry pipe -*** Dry pipe systems are installed where there is a danger of freezing and contain air (or sometimes nitrogen) in the riser and piping. When a sprinkler head activates, the air is exhausted through the open head, allowing water to be admitted to the riser and piping.

3.1.4 ***Deluge -*** Deluge systems are often found in aircraft hangars or where large quantities of flammable liquids are used in industrial processes. A "deluge" valve opens upon an electrical signal received from a detector. In a deluge system, all sprinkler heads (or nozzles) are open and will flow water simultaneously.

3.1.5 ***Pre-action -*** Pre-action systems are most often found in computer rooms or where other sensitive electronic equipment is used. A pre-action type of sprinkler system consists of fusible sprinkler heads, dry piping, and a valve which is opened upon an electrical signal from a detector.

3.1.6 ***Combination -*** A combination sprinkler system or combination sprinkler-standpipe consists of sprinkler heads and standpipe hose outlets attached to a common riser. Combination systems may be either "wet" or "dry."

3.1.7 ***Non-automatic sprinkler systems*** depend solely upon the fire department to supply water for firefighting. They are commonly found in cellars and sub-cellars of older commercial buildings. These systems may contain fusible sprinkler heads, open sprinkler heads, or even perforated pipes.

3.2 While many sprinkler systems will have a fire department connection (FDC) for FDNY units to supply water, it is common to find a sprinkler system with no FDC. These systems cannot be augmented by FDNY units.

3.3 Automatic sprinkler systems are identified by FDC or caps that are painted green. Non-automatic sprinkler systems will have FDC or caps that are aluminum colored. Sprinkler systems that are part of a combination system will have FDC or caps painted yellow.

3.4 While the flowrate provided by sprinkler heads will vary, a standard sprinkler head can be expected to provide a flowrate of 13 – 18 GPM.

4. STANDPIPE SYSTEMS

4.1 A standpipe system is a system of piping installed in a building or other structure that serves to transfer water to hose connections located throughout the structure for firefighting purposes.

4.2 In NYC, the requirements for the presence of a standpipe system are described in the NYC Building Code and are based on several criteria, primarily the height and area of the structure.

4.3 Standpipe Classifications

4.3.1 According to national standards, standpipes are formally classified into 3 distinct classes as follows:

A. ***Class I -*** Designed to be used by the fire department only. Equipped with 2 ½" outlets only.

B. ***Class II*** - Designed to be used by trained, non-fire department personnel. Equipped with 1 ½" outlets only.

C. ***Class III*** - Designed to be used by both the fire department and by trained, non-fire department personnel. Equipped with both 2 ½" and 1 ½" outlets.

4.3.2 In NYC, nearly all standpipe systems are Class I systems. In several older occupancies (such as theaters), Class III systems may still exist. Class II systems are not compliant with NYC building code and should not exist in NYC.

4.4 Types of Standpipe Systems

4.4.1 Standpipe systems can be categorized as either "wet" or "dry". Wet systems contain water in the piping at all times. Dry systems do not contain water in the system under normal conditions.

4.4.2 Standpipe systems can also be considered either "automatic" or "manual". The description of each type will depend on whether the system is wet or dry, as follows:

A. ***Automatic wet systems*** - capable of providing water under pressure at the standpipe outlets, possibly with the assistance of a fire pump or a gravity tank.

B. ***Manual wet systems*** - connected to a small water supply that will maintain water in the system but is not capable of providing necessary operating pressure to the system.

C. ***Automatic dry systems*** - usually supplied by a public water main but are maintained with pressurized air in the standpipe piping. When a decrease in air pressure is detected in the system, water will automatically be supplied to the system.

D. ***Manual dry systems*** - may or may not be connected to a water supply. If it is connected to a water supply, the provided water supply will only enter the system when a control valve is manually opened. If there is no water supply, the system will remain dry until water is supplied by FDNY units via FDC.

4.4.3 ***Air Pressurized Systems*** - a specific type of manual dry systems that are maintained pressurized by a dedicated air compressor. These systems are required in buildings under construction that are taller than 75 feet. When there is a change in air pressure that exceeds a pre-determined threshold, an alarm will sound on site.

4.4.4 ***Combination systems*** - systems that supply both the standpipe system and an automatic sprinkler system. The FDC or caps for combination systems are painted yellow.

4.4.5 ***Multi-zone systems*** - standpipe systems that are vertically subdivided into zones to limit the maximum operating pressure in the system. Each zone may have its own FDC, or the entire system may be supplied from a single FDC.

4.4.6 ***Express Piping Systems*** - Some taller high-rise buildings may have separate “Low Zone” and “High Zone” standpipe systems (Figure 5). These separate risers are not interconnected and may have separate FDC. The FDC 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”.

Figure 5

4.4.7 ***Interconnected Building Systems*** - systems in which the standpipes of multiple buildings are interconnected to each other via underground piping. This is common in residential housing complexes, especially those owned by the NYC Housing Authority (NYCHA).

A. Generally, the water supply to the entire interconnected system is by way of a single gravity tank located on one of the buildings.

B. Each building will have a Post Indicator Valve (PIV) that can be used to isolate that building from the rest of the system. When the PIV is closed, the building will be disconnected from all other buildings, including the gravity tank, and will not be connected to any additional water supply.

C. When the PIV is open, the building will be connected to the rest of the complex. When all PIV's are open, all standpipes in the system can be supplied by way of any building.

D. The PIV will generally be located outside and in close proximity to the building and is often found in the direction of the building that contains the gravity tank for the system.

4.5 Components of Standpipe Systems

4.5.1 Standpipe systems include a variety of different components. The most significant of these are described below. This list is not exhaustive and additional components may exist.

4.5.2 ***Fire Department Connections (FDC)*** - Formerly known as "Siamese connections", FDC are the 3" connections by which the Fire Department can supply water to the standpipe system. (Figure 6)

A. The FDC (or FDC caps) of a standpipe system should be painted red.

B. For a combination system, the FDC (or FDC caps) should be painted yellow.

C. If the system is out-of-service, a white disc should be affixed to the FDC.

D. If the system is partially out-of-service, a blue disc should be affixed to the FDC. Yellow discs should not be used on FDC.

Figure 6

4.5.3 ***Section valves* -** can be used to shut down water supply to a section of the standpipe system (Figure 7). These are OS&Y type valves (Outside Stem & Yoke) and can be located at various points in the system. Often, they can be located in a cabinet below the standpipe outlet. If the valve is open, the stem will be visible outside the attached wheel. If closed, the stem is not visible. These valves may also be called a Riser Control Valve or an Isolation Valve.

Figure 7

4.5.4 ***Post Indicator Valves*** - exist in Interconnected Building Systems and are used to isolate a building from the rest of the system. They are painted red and are generally located outside and in close proximity to the building (Figure 8). If the valve is open, the word "OPEN" should be visible on the face of the valve. If closed, the word "CLOSED" should be visible.

Figure 8

4.5.5 ***Gravity Tank*** **-** a large container that uses the force of gravity to supply water pressure to a standpipe system. To work properly, the gravity tank needs to be located a distance above the highest outlet, so they are commonly located above roof level. For standpipe systems in an interconnected building complex, a single gravity tank may supply the system for the entire complex (Figure 9 and Figure 10). In larger high-rise buildings with low-zone and high-zone systems (such as mega-high-rises), it is possible for additional gravity tanks to be found inside the building.

Figure 9

Figure 10

4.5.6 ***Roof Manifold*** **-** the top of the standpipe riser, where the piping extends to the roof level (Figure 11). It is terminated with three outlet connections, which are used when testing water flow in the standpipe. It may be used by fire companies to supply a hoseline at the roof level.

Figure 11

4.5.7 ***Pressure Reducing Device (PRD)*** **-** a device installed at the standpipe outlet for the purpose of reducing the water pressure (Figure 12 and Figure 13) flowing from the outlet. PRD's are removable and are adjustable.

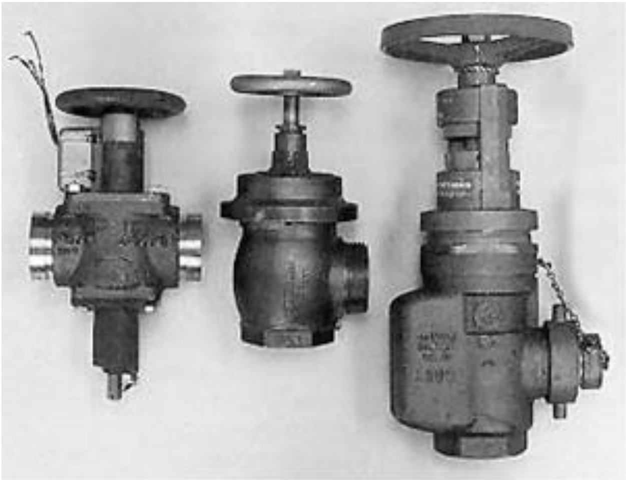

Figure 12

Figure 13

4.5.8 ***Pressure Reducing Valve (PRV)*** **-** a valve (Figure 14) that is permanently attached to a standpipe outlet for the purpose of reducing the water pressure flowing from the outlet. PRV's are not removable and cannot be adjusted.

Figure 14

ENGINE COMPANY OFFICER

1. OVERVIEW OF THE ENGINE OFFICER

1.1 The primary function of the engine company officer is to facilitate fire extinguishment by overseeing the placement of a hoseline to the fire area and directly supervising its operation to extinguish the fire.

1.2 In the fulfillment of this primary function, the engine officer is responsible to make a number of critical decisions and take decisive action. While the decisions to be made will differ depending on the specific operation, the following is an outline of the actions the engine officer should expect to make at a fire operation. They are listed here and will be further discussed in the sections to follow.

1.2.1 Determine if a hoseline needs to be stretched.

1.2.2 Determine the size of the hoseline to be used.

1.2.3 Determine the placement of the hoseline.

1.2.4 Determine the path by which the line will be stretched.

1.2.5 Call for the hoseline to be charged.

1.2.6 Begin fire attack.

1.2.7 Supervise fire extinguishment.

1.2.8 Ensure relief of operating members.

2. CALLING FOR A HOSELINE

2.1 As soon as the Engine Officer has determined a hoseline is needed, they should contact the nozzle firefighter via the handie-talkie and order a hoseline to be stretched. With this transmission, the Engine Officer should include the following information:

2.1.1 The location to which the line is to be stretched.

2.1.2 The size of the line to be stretched.

2.1.3 The route and method by which the line should be stretched (if not obvious).

2.2 If possible, this information should be communicated by handie talkie, even if the nozzle firefighter is within voice contact. This ensures all units on the fireground are aware a line is being stretched and where it will be located.

2.3 If the need for a hoseline is evident before the exact location of the fire is confirmed, the engine officer may elect to call for a line to be initially stretched to the front of the fire building. This can save time, as the line will be readily available to be advanced to the fire area as soon as it is located.

2.4 Before the engine officer can direct the hoseline to the fire area, they must know where the fire area is. While a line may be called for before the exact location of the fire is discovered, the officer must identify the location as soon as possible, so as to ensure the hoseline is stretched to the correct location.

2.5 As searching for the fire location is a primary function of the ladder company, the engine officer will work in close coordination with the ladder company and will often rely on information from them to effectively lead the hoseline to the fire.

2.6 If the apparatus will be performing a back stretch and will proceed to a position at a hydrant more distant from the fire building, the Engine Officer can consider calling for a 2nd hoseline to be placed in the street as the first line is being stretched.

3. LINE PLACEMENT

3.1 The engine officer must determine the proper placement of their hoseline. The location to which the line is stretched must be clearly communicated to their nozzle firefighter, as well as the engine company that will be assisting them in stretching the line.

3.2 1st Hoseline Placement

3.2.1 Generally, the purpose of the first hoseline is to extinguish the main body of fire. This line should be placed to attack the main body of fire while also protecting the primary egress of the building. This position will allow the hoseline to extinguish the fire while enabling civilians and firefighters to safely use the primary egress.

3.2.2 One exception to this may be a situation in which fire is actively endangering civilians that are evacuating the building via windows or fire escapes and the immediate application of water from the exterior is needed to protect them. In this case, the first line may be operated from the street to partially extinguish or knockdown fire and protect the fleeing civilians (this is further discussed in a later section).

3.3 2nd Hoseline Placement

3.3.1 The placement of the 2nd hoseline will depend on the purpose of the line. Generally, the 2nd hoseline will be stretched for one of the following purposes:

A. Back-up the 1st hoseline.

B. Address extending fire.

C. Attack the main body of fire from an alternate access point.

D. Protect a life hazard from fire.

3.3.2 ***Back-Up the 1st Hoseline*** - At most fires, the primary purpose for the 2nd hoseline will be to back up the 1st line.

A. This line will protect the 1st line in case of a burst length or other water loss.

B. This line can also be used simultaneously with the 1st line if warranted by advanced fire conditions.

C. When the 2nd hoseline is stretched to back up the 1st line, it should be stretched to the same location as the 1st line and use the same path to get there.

D. If the 2nd hoseline is not needed to back up the 1st line, it can be advanced to address possible fire extension. Most commonly, this will be on the floor above the fire.

3.3.3 ***Address extending fire*** - The 2nd hoseline may be stretched to address extending fire when it is not needed to back up the 1st line, or when the need to address extending fire demands the immediate placement of a hoseline.

A. When stretched to address extending fire, the 2nd hoseline will be stretched to a different location than the 1st line.

B. If the 2nd hoseline is stretched to address vertical fire extension, the likely location will be the floor above the fire. This occurs often at multiple dwelling fires (tenements, brownstones, row frames, etc.) when heavy fire has extended above the fire floor due to internal voids or auto exposure. If this line is to be stretched above the fire, the officer must confirm the existence of a safe area to flake and charge the line.

C. If the 2nd hoseline is stretched to address horizontal fire extension, it may be stretched to a different building than the 1st line. This occurs often in structures (private dwellings, row frames, etc.) in which horizontal fire extension is an immediate concern due to heavy fire extending laterally via windows, combustible exteriors, or shafts.

3.3.4 ***Attack from alternate access point*** - The 2nd hoseline may be stretched to attack the main body of fire from a different access point if the fire can be more readily accessed from a different location than the position of the 1st line, or if the 1st line is having difficulty advancing to the seat of the fire.

A. If a second access point is identified as providing a more effective attack on the fire, the 2nd hoseline can be stretched to this point. This may be common at a cellar fire (private dwellings, tenements, places of worship, etc.), where multiple access points to the fire area might exist.

B. If the 1st hoseline has difficulty gaining access to the fire area due to heavy fire conditions, obstructions, or other delays, an alternative access point may allow the 2nd hoseline to reach the fire. This may be the case at an advanced cellar fire, when fire conditions prevent the advancement of the hoseline down the interior stairs. It may also be the case when a fire escape or balcony provides access to the fire area, or if stretching the 2nd line by way of a ladder is possible.

C. If the fire is on the building exterior in the rear (deck or patio fire, etc.), the fire might be more effectively attacked with a 2nd hoseline stretched to an access point in the rear of the building.

D. When stretched to attack the main body of fire from a different access point, the operation of the 2nd hoseline must be closely coordinated with the operation of the 1st line.

3.3.5 ***Protect life hazard from fire*** - This may be done if a person is at a window, fire escape, or other exposed position and the immediate application of water from the exterior is needed to protect them while the 1st hoseline is being put into operation.

A. If the 1st hoseline is already committed to extinguish the fire, an immediate life threat to a person seriously exposed at a window or other location may require the 2nd hoseline to be operated as an exterior hoseline from the street level.

B. In this situation, the 2nd hoseline should be operated so as not to drive heat, smoke, or fire into the building. This is accomplished by operating the hoseline into the window at a steep angle, directing the stream at the ceiling. The stream should be kept stationary; it should not be moved in the circular motion that is used to advance an interior hoseline. This circular motion can create an air current into the fire area and negatively affect conditions opposite the stream.

3.4 Additional Hoseline Placement

3.4.1 At larger operations, additional hoselines may be stretched to meet a variety of different needs. Generally, the placement of a 3rd hoseline (and above) will be done as determined by the Incident Commander. The following sections discuss situations that may require the placement of an additional hoseline.

3.4.2 ***Cellar fires*** – If a hoseline is operating in a cellar or similar area below grade, an additional charged hoseline must be positioned at the top of the cellar stairs.

A. This position may be covered by the 2nd hoseline, but if the 2nd hoseline is stretched elsewhere, an additional hoseline must be stretched to this location.

B. This hoseline is critically important because it is protecting potentially the only egress for the members operating in the cellar. In this case, all members operating in the cellar may need to pass through the floor above the fire to get to safety.

3.4.3 ***Additional exposure protection*** – If fire is extending to more than one location, additional lines will be required at each location of extension.

A. These additional locations may be located in different buildings, as in the case of fire extension horizontally into exposures 2 and 4, in one or both directions (private dwellings, row frames, old law tenements, etc.)

B. These additional locations may also be in the original fire building, as in the case of fire extension horizontally within larger buildings via voids or the cockloft (new law tenements, H-types, or taxpayers etc.). In this case, the engine officer should be sure that no more than two hoselines are stretched in a stairway. If there are no additional stairways available, an alternative hose stretch may be required (rope stretch, fire escape stretch, etc.).

3.5 Typically, the 2nd arriving engine company will team up with the 1st arriving engine to operate the 1st hoseline. However, there are situations in which the 2nd arriving engine company may stretch and operate a 2nd hoseline. This should only be done when all of the following conditions exist:

3.5.1 The 1st arriving engine company must have secured a positive water source. The 2nd arriving engine officer can communicate with the 1st arriving chauffeur to confirm this.

3.5.2 The 1st arriving engine company does not require the help of the 2nd arriving engine to get the 1st line in operation. The 2nd arriving engine officer must communicate with the 1st arriving engine officer to confirm this.

3.5.3 The hose stretches are sufficiently short, so the 1st arriving company will not require immediate assistance in operating the line once it is charged.

3.5.4 There is an immediate need for a 2nd hoseline to address fire extension or a life hazard.

Note: The Incident Commander (Chief Officer or Acting Chief Officer) may order the second engine in any situation to immediately stretch a second line for any purpose including the need for a backup line or exposure protection.

3.5.5 Generally, this situation will only occur in 1 or 2 story structures where the length of the stretch is manageable. The decision by the second engine officer to immediately stretch a 2nd line, even in these buildings, must be weighed against the need to assist the 1st arriving engine in quickly getting the 1st hoseline in operation. Getting the first line into operation is the primary tactical concern.

3.6 Typically, the 3rd arriving engine company will team up with the 4th arriving engine to stretch and operate the 2nd hoseline at an operation. However, if the 2nd arriving engine has already begun stretching a 2nd hoseline (as described above), the 3rd arriving engine should team up with the 1st arriving engine and assist in the operation of the 1st hoseline.

3.6.1 There may be situations in which the 3rd arriving engine may need to assist the 1st and 2nd arriving companies in getting the 1st hoseline in operation. This may be the case if there is an excessively long or difficult stretch, or if there was a problem with the stretch. The 3rd arriving engine officer should make sure their assistance is not required with the 1st line before ordering a 2nd line stretched.

3.6.2 In extreme situations where fire extension in multiple occupancies is an immediate threat, there may be a need to quickly stretch a 3rd hoseline to address extension. If both the 1st and 2nd arriving engine companies are able to stretch and operate their own hoselines and do not require assistance, it may be necessary for the 3rd arriving engine to stretch and operate a 3rd hoseline.

3.6.3 The 3rd arriving engine should only stretch a 3rd hoseline when ordered by the Incident Commander.

4. DETERMINING THE SIZE OF THE HOSELINE

4.1 Determining the size of the hoseline to be stretched is a critical decision to be made by the engine officer.

4.1.1 When making this decision, the advantages of the speed and mobility of the smaller 1 ¾" hoseline need to be weighed against the limitations of the flowrate provided.

4.1.2 Similarly, the advantages of the increased flowrate of the larger 2 ½" hoseline need to be weighed against the limitations of the heavier weight and decreased maneuverability of the hoseline.

4.2 The engine officer should determine the size of the hoseline stretched based on the conditions faced and the specific purpose of their hoseline.

4.2.1 All hoselines stretched at an operation do not need to be the same size; if the initial hoseline stretched is a 2 ½" line, subsequent hoselines are not required to also be 2 ½" hose. If the engine officer determines the use of a smaller hoseline would be appropriate, subsequent hoselines may be 1 ¾" hose.

4.3 To aid the engine officer in making this decision, the following sections discuss the capabilities of both the 1 ¾" and 2 ½" hoselines, as well as their applicability to various situations. These guidelines are intended to assist the engine officer in making a difficult and important decision.

4.4 1 ¾" hoseline is the primary attack line in the FDNY.

4.4.1 The 180 GPM flowrate provided by the 1 ¾" hoseline is sufficient to extinguish the majority of fires encountered.

4.4.2 When the 1 ¾" hoseline is supplied with 50 psi at the 15/16" tip, the nozzle reaction is 68 lbs. This is the force felt by the nozzle firefighter.

4.4.3 The increased speed and mobility of the 1 ¾" hoseline enables the nozzle firefighter to more effectively operate the hoseline and direct the water stream as needed.

4.5 There exist situations where the flowrate provided by the 1 ¾" hoseline may not be sufficient and the larger flowrate provided by the 2 ½" hoseline is needed.

4.5.1 When supplied with a nozzle pressure of 40 psi, the 2 ½" hoseline will provide a flowrate of 235 GPM and a nozzle reaction of 78 lbs. This is the force felt by the nozzle firefighter.

4.5.2 If this flowrate proves inadequate, the engine officer can request an additional 10 psi be supplied to the 2 ½" hoseline. This will provide a nozzle pressure of 50 psi and a flowrate of 265 GPM. The nozzle reaction will be 98 lbs., which is nearly 50% greater than the nozzle reaction of the 1 ¾" hoseline.

4.6 While the elevated flowrates of the 2 ½" hoseline provide increased extinguishment power, the resultant nozzle reactions reduce the maneuverability of the hoseline. The advance of the line will be slower, and it may be more difficult for the nozzle firefighter to maneuver the stream as needed.

4.7 There are five situations in which the use of the 1 ¾" hoseline would not be appropriate and a larger hoseline should be used:

4.7.1 ***Purely Defensive position***

4.7.2 ***Unknown size or extent of the fire area***

4.7.3 ***Advanced fire conditions***

4.7.4 ***Large, uncompartmented fire area***

4.7.5 ***Standpipe operations***

4.8 Each of these situations is further described below:

4.8.1 ***Defensive position*** – If a hoseline is to be used from a purely defensive position, a 2 ½" hoseline should be used. This includes hoselines stretched at an exterior operation, when the line will be operated exclusively from outside the building, such as from an adjoining rooftop, or from street level.

4.8.2 ***Unknown size or extent of the fire area*** – If the size of the fire area cannot be determined by the engine officer, a 2 ½" hoseline should be used. This situation could be encountered in larger, non-typical buildings, where the size or extent of the fire area cannot be readily determined at the outset of the operation.

4.8.3 ***Advanced fire conditions*** – If the fire conditions on arrival are advanced to such a degree that the officer feels the flow provided by the 1 ¾" line would not be sufficient, the 2 ½" hose may be used. The reduced maneuverability of the 2 ½" line should be considered in this case, especially if the fire is above the first floor or the fire is in a smaller, compartmented building like a Brownstone or Row Frame.

4.8.4 ***Large, uncompartmented fire area*** – If the fire area is large and is uncompartmented, a 2 ½" hoseline should be used. While the officer should use their discretion in assessing the size of the fire area, a general guideline is that a fire area over 50 feet wide can be considered "large". The area should also be "uncompartmented", which means that it largely consists of open areas and floor space. An uncompartmented fire area may also have high ceilings, or directly access a potential roof vent. This may include large industrial or commercial occupancies, such as warehouses, places of worship, large stores, or one-story taxpayers. In such cases, the large, uncompartmented area will allow the reach of the stream to be unimpeded and hit the seat of fire from a distance.

4.8.5 ***Standpipe operations*** – When a hoseline is stretched from a standpipe system, the 1 ¾" hose must not be used due to its high friction loss. In order to achieve a reliable and effective firefighting stream, larger hose with less friction loss must be used from a standpipe system. For residential occupancies, the lead length of the stretch from the standpipe outlet should be 2" lightweight hose, as the relative speed and mobility is more appropriate for the compartmented conditions encountered in these occupancies. In all other situations (commercial, subways, etc.), all lengths stretched should be 2 ½" lightweight hose.

4.9 Considering the above guidelines, further clarification may be required for specific situations, as follows:

4.9.1 Commercial occupancies

A. The presence of a commercial occupancy (OLT with a store, etc.) does not mandate the use of a 2 ½" hoseline. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate. If any of the above described conditions exist, a 2 ½" hoseline is required.

B. For fires in a 1 or 2 story taxpayer, the large fire area and large amount of combustible contents will require the use of a 2 ½" hoseline. Also, the high ceilings and availability of a roof vent directly over the fire area constitute an uncompartmented fire area.

C. For fires in a commercial portion of a mixed occupancy building (two or three story building with a store on the first floor and one or two apartments above), the use of 2 ½" hose may not be necessary. These commercial occupancies are not a taxpayer, and they generally do not have a large fire area. Such commercial occupancies are commonly less than 50 feet wide, do not have a direct opening to a roof vent, and may have narrow aisle space with limited open area. This situation may not fit the above described criteria of a "large, uncompartmented fire area". Unless the fire area is sufficiently large, or one of the other described conditions is present, the use of 1 ¾" hose may be appropriate in these occupancies.

4.9.2 Standpipe-equipped buildings

A. When a hoseline is hand stretched from the apparatus into a building with a standpipe system, the use of 2 ½" hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate.

B. Larger diameter hose (2" and 2 ½") is used from standpipe systems in order to achieve a firefighting stream from the limited pressure available at the standpipe outlet.

C. 1 ¾" hose is not used from a standpipe because of its high friction loss, not because of its inability to address fire conditions.

D. If the standpipe system is not used, and none of the other above conditions is met, 1 ¾" hose may be appropriate in these buildings.

4.9.3 Fireproof multiple dwellings

A. Similar to other standpipe equipped buildings, when a hoseline is hand stretched from the apparatus into a fireproof multiple dwelling, the use of 2 ½" hose is not mandated. Unless one of the conditions described above is met, the use of 1 ¾" hose may be appropriate. This is true for high rise and low rise fireproof multiple dwellings alike.

B. The flowrate provided by 1 ¾" hose is sufficient to extinguish the majority of fires in fireproof multiple dwellings. Due to the fireproof construction, these fires will involve the contents only. Considering the compartmented layout common in multiple dwellings, the speed and mobility of 1 ¾" hose may be most effective in these buildings when hand stretched from the apparatus.

C. In the event of wind-impacted conditions, in which fire or high heat is driven down the hallway, even the increased flow of a 2 ½" line has proven ineffective. Consequently, alternative fire attack procedures will be implemented (such as the KO curtain, or the high-rise nozzle). The practice of combating wind-impacted conditions with one or more hoselines operating down a hallway is not a primary tactic, regardless of the size of the hoseline.

5. DETERMINING THE PATH OF THE HOSELINE

5.1 When ordering a hoseline stretched, the engine officer is responsible for determining the path by which the hoseline is stretched. If the path is not obvious, it will need to be clearly communicated to the nozzle firefighter when the line is called for.

5.2 When stretching the first hoseline, the hoseline should be stretched in such a way to protect the primary egress of the building while accessing the fire area. Generally, this will require the path of the hoseline to be via the stairway.

5.2.1 In rare situations, unique building characteristics may necessitate the first hoseline to be stretched via an alternative method (such as a rope stretch). In these cases, the path of attack should protect the primary egress as best as possible. These situations should be noted in CIDS.

5.3 If multiple stairways are available, the engine officer should choose the stairway that will provide the most efficient stretch and attack possible. Most commonly, this will be the stairway that provides the shortest path to the fire area.

5.3.1 Consideration should be given to using the stairway that provides the shortest stretch on the fire floor. This is particularly relevant when scissor stairs are used.

5.3.2 If a more remote stairway would provide an easier stretch, consideration should be given to using that stairway instead. This is relevant if the closer stairway provides a difficult stretch (such as a wrap-around stretch), or if a more distant stairway provides a much easier stretch (such as a well-hole stretch).

5.3.3 Consideration should also be given to reserving an evacuation stairway for building occupants. This is relevant if there are multiple stairways, but only one is enclosed, in which case it should be used as an evacuation stairway and not for fire attack. The hoseline will have to be stretched via a different stairway.

5.4 The engine officer determines when a well-hole stretch is to be executed. The presence of a well-hole and the intention to use it should be clearly communicated to the nozzle firefighter. This information is also critical to the control firefighter for estimating the stretch.

5.4.1 The presence of a well-hole does not mean it must be used.

5.4.2 The engine officer will need to determine the location at which the hoseline will be taken out of the well hole and secured with a hose strap. The following locations should be considered:

A. ***On the floor below*** – Hose can be secured on the floor below the fire if conditions or limited space on the fire floor prevent it from being secured on the fire floor. This will provide a safe area to flake out hose. From this location, the hose will be stretched via the stairway to the fire floor, providing an element of protection to the primary egress.

B. ***On the half landing*** – If there is a half-landing present in the stairway (which is common when a well-hole is present), the hose may be secured at this point. This will provide a safe area to stage the hose but may provide limited space to flake the hose out.

5.5 Path of the 2nd hoseline

5.5.1 If the 2nd hoseline is stretched to the same location as the 1st line, it should be stretched using the same path as the 1st hoseline and access the fire floor using the same attack stairway. A second dry hoseline should not be stretched into a building until the first hoseline has been charged with water. This is because this practice may cause confusion at operations as to which line is being referred to. Additionally, it may cause the two lines to get tangled with each other.

5.5.2 If the second hoseline is stretched to a different location (to address extending fire, to attack the main body of fire from an alternate access point, or to protect life), it will be stretched via the most effective path for that destination, as determined by the engine officer.

5.6 Path of additional hoselines

5.6.1 At a fire operation, only 2 hoselines should be stretched on a stairway. If a 3rd line is to be stretched, it will need to be stretched by an alternative means.

5.6.2 If additional lines are to be stretched in the fire building, the engine officer should consider other options available, which may include using a different stairway, or possibly an exterior stretch.

5.6.3 For exterior stretches (such as a rope stretch, fire escape stretch, or stretch via aerial or portable ladder), the engine officer will have to determine the location at which the line will be brought into the building.

A. In most situations, the line will be brought in the building on the floor below the fire. This ensures the hoseline is flaked out in a safe area below the fire. The hoseline will then be advanced to the point of operation via the interior stairs.

B. Depending on the situation and building characteristics, it may be possible to bring the line in the building on the floor on which it will be operated. This should only be done if the hose can be flaked out and charged in a safe area before being advanced to the point of operation.

C. In the case of a fire escape stretch or a stretch via a ladder, it may be possible to charge the hoseline outside the building and advance it directly into the building on the fire floor while charged. This operation must be closely coordinated with all other units operating on the fire floor.

5.7 Priority order of stretching hoselines

5.7.1 Depending on the situation, the engine officer may have several options available for stretching hoseline. In the event that multiple methods are available, the following is the priority order of methods for stretching hoselines:

A. Interior stairs

B. Rope

C. Fire escape

D. Portable ladder

E. Aerial ladder

6. CHARGING THE HOSELINE

6.1 As the hoseline is being stretched, the engine officer must determine the point at which the hoseline will be flaked out and charged. This point should be in a safe area, as close to the fire area as possible.

6.2 In some occupancies and building types there are no public hallways to flake out and charge the hoseline before entering the fire area, thus the hoseline will be charged outside the fire building. In these cases, the hoseline should be flaked out and charged as close to the building entrance as possible. This includes hoselines stretched at private dwelling fires, place of worship fires, and taxpayer fires (among others), where hoselines are flaked out and charged outside the fire building.

6.3 If the hoseline is to be stretched dry into the building, it should be flaked out and charged in a safe area as close to the fire area as possible. This includes fires in all types of multiple dwellings, as well as fires in lofts, and other large commercial or industrial spaces.

6.4 If the door to the fire apartment (or fire area) is controlled and conditions in the public hallway are tenable, the hose should be flaked out and charged at the apartment door.

6.5 If the door is not controlled and conditions in the public hallway are not tenable, the hoseline may have to be flaked out and charged before entering the hallway. If the stairway is a safe area, the hoseline may be flaked out and charged in the stairway. If the stairway is not a safe area, or there is no space to flake out the hose, it may be necessary to charge the hoseline in a safe area on the floor below the fire.

7. EXTERIOR WATER APPLICATION

7.1 The application of exterior water into an occupied structure is a valuable tactic under the right set of circumstances.

7.2 In the FDNY, the first hoseline is normally stretched at fires to the interior of the structure to protect the primary egress route, and to confine and extinguish the fire. The NFPA compliant staffing of FDNY Engine Companies greatly contributes to the FDNY's ability to quickly and efficiently stretch and operate handlines to protect life and property with little delay.

7.3 On occasion, when heavy fire is venting out a front window or door on arrival, the first hoseline may be used to momentarily extinguish venting fire. This is tactic of opportunity which does not unnecessarily delay interior operations.

7.4 There are situations where the standard approach of interior attack may not lead to a quick extinguishment of the fire enabling the fire to grow larger. In these situations, the proper application of water from an exterior stream may facilitate the rapid advance of interior attack hoselines by partially extinguishing the fire.

7.5 Exterior stream application may significantly improve interior conditions that may have otherwise been untenable. It may also provide a limited amount of additional time for the interior attack team to overcome obstacles and facilitate advance for final extinguishment.

7.6 The single best way to always improve conditions at any fire is to apply water on the fire. In structures that are not built with fireproof construction, the failure to rapidly apply water on the fire allows a contents fire to extend to the structure. This creates a greater fire problem because the structure is weakening, fire is extending, and heat and smoke conditions are becoming worse.

7.7 In these situations, the application of an exterior stream must be carefully coordinated between all units operating on the fireground. Such situations are as follows:

7.7.1 ***Fire blocks building entry*** - If fire meets the hoseline at the front door to the fire building, the 1st hoseline will need to be charged outside the building and operated into the building in order to advance the line.

7.7.2 ***Delayed forcible entry to building*** - If there is a severe delay in gaining forcible entry to the fire building and the fire is blowing out a front window, the 1st hoseline may be charged outside the building and operated in the window while entry is gained.

7.7.3 ***Delayed forcible entry to fire area*** - If there is a severe delay in gaining forcible entry to the fire area after the 1st hoseline enters the building, the 2nd hoseline may be charged outside the building and operated in an open window. This may be done from the street, fire escape, or other exterior location.

7.7.4 ***No progress by interior hoselines*** - If the interior handline is in the fire area, but unable to make progress for an extended period of time, due to a clutter condition, other obstruction, problem with the hoseline, or any other obstacle that prevents the hoseline from reaching the main body of fire, an additional hoseline can be charged outside the building and operated in an open window. This may be done from the street, fire escape, or other exterior location.

7.7.5 ***Wind-impacted conditions*** - If a wind-impacted fire condition prevents the interior hoseline from advancing to the fire area, an additional hoseline can be charged outside the building and operated in an open window. This may be done from the street, fire escape, or other exterior location.

7.7.6 ***Advanced cellar fire*** - If there is an advanced fire condition or high heat at a cellar fire that prevents the interior hoseline from advancing into the cellar, an additional hoseline may be operated in a window from the exterior.

7.7.7 ***Trapped occupant or member*** - If there is a trapped occupant or member at a window (or other exposed location) in immediate danger from active fire, a hoseline may be charged and operated from the exterior to protect the occupant or member. This should be done in coordination with an interior attack.

7.7.8 ***Exterior fire between buildings*** - If fire is showing on the exterior between two buildings and it is unclear which of the two is the original fire building, the first hoseline may need to be charged and operated from the exterior of the building, hitting the highest point of fire first and moving the stream down to the fire's base to determine from which building (if any) the fire is extending. If this first hoseline is repositioned, a subsequent hoseline should be placed to ensure the exterior fire does not reignite.

7.8 If one of the above conditions (or a similar condition) is present AND there is a window or other opening accessing the fire area readily available, a hoseline may be charged outside the building and operated into the fire area from the exterior, as follows:

7.8.1 Members inside the building should be notified that an exterior stream will be utilized and positioned to a safe area prior to water application.

7.8.2 For optimal fire extinguishment, the stream should be operated at a steep angle by placing members as close to the structure as possible.

7.8.3 The stream should aim the water towards the ceiling.

7.8.4 The nozzle should be fully opened as a fully opened smooth bore nozzle creates a tight stream which minimizes air entrainment. When a hose line is moved in a circular or whipping motion, air is introduced and can have negative consequences. This may occlude or block the opening and prevent gasses from exiting.

7.8.5 After applying water as described above, the stream should be moved upward towards the top of the window opening (the lintel) and operated for a few seconds off of the lintel. This will provide the most effective water application as it ensures greater coverage of water into the room, especially if the ceiling has failed.

7.8.6 Exterior handlines should only be used as long as necessary to visually see improvement in the fire conditions. Normally, this is approximately 10 seconds.

7.9 The acronym to allow for easy mental recall of the manual technique of applying water correctly from an exterior handline to the interior of a building is **"S.S.S.S"**

7.9.1 **Solid** (bore) stream – fully open, do not partially open, do not use a fog tip (occlusion)

7.9.2 **Steep** Angle – will assist with breaking up and cooling the hot gases at the upper levels of the room as it strikes the ceiling.

7.9.3 **Steady** – no circular or whipping motion (occlusion/entrainment) to allow hot gases and smoke to exit as well as preventing less air being drawn inward to fuel (feed) the fire.

7.9.4 **Sprinkler** –a solid stream held steady and positioned at a steep angle will create a "sprinkler effect" to cool the hot gases and knock back the fire.

7.10 The application of an exterior stream can only be accomplished if there is an open window or other access point readily available.

7.11 The operation of an exterior stream must be coordinated with the placement and advance of interior attack lines. A hoseline applied from the exterior will not fully extinguish the fire. The interior attack lines must be ready to rapidly advance after the exterior stream has knocked down fire, so that the fire does regain full intensity.

7.12 If another hoseline is available, it should be simultaneously stretched and positioned for an interior attack in coordination with the exterior stream. If hoselines are already in the building when the exterior stream is deployed, the continuation of their attack should be coordinated with the exterior stream.

7.13 If another hoseline is not available, the hoseline operating from the exterior must be repositioned to the interior as soon as the fire is sufficiently knocked down. This repositioning must be done as quickly as possible, as the fire conditions can rapidly rebound to full intensity once water is shut down.

7.14 In all cases, exterior hose line operations need to be communicated to and coordinated by the IC, especially when there are members operating inside the fire building. In some situations, the IC may be the first arriving Engine Officer.

8. BEGIN THE FIRE ATTACK

8.1 Once the hoseline is properly flaked out and in position, the engine officer will call for the line to be charged.

8.1.1 Before calling for water, the engine officer should confirm that sufficient hose has been stretched and flaked out to allow for a smooth advance into the fire area.

8.1.2 The engine officer should also confirm with the nozzle and back-up firefighters that they are ready for the line to be charged. The officer should ensure each firefighter is properly equipped with all required PPE and that their SCBA is donned and in use.

8.2 Once the line is charged, the engine officer should ensure the line is properly bled before the attack begins. This is to confirm water at the nozzle, allow air to escape the hoseline, and to allow for the proper setting of the operating pressure.

8.2.1 At standpipe operations, a long bleed will be necessary to allow the control firefighter to properly set the operating pressure at the standpipe outlet.

8.2.2 The long bleed will also be necessary when a 2 ½” hoseline is stretched from the apparatus. In this case, the low operating pressure may be below the preset of the Pro-Pressure Governor. This will require the ECC to set the pressure manually and necessitate a long bleed by the nozzle firefighter to allow the pressure to be properly set.

8.3 Prior to opening the door to the fire area for advancement of the hoseline, the engine officer must assure that no firefighters will be exposed in the hallway or on the stairs above as the fire attack is initiated. This can be done via handie-talkie or in person.

8.4 Immediately before moving into the fire area with the hoseline, the engine officer should ensure the nozzle team is crouched low, on the same side of the door and relay to the nozzle team information gathered while the line was being stretched. This may include directions to the location of the fire, or any hazards found in the fire area. At this point, the officer should ensure the nozzle team is ready both physically and mentally. If needed, this is the time for the nozzle team to take a deep breath to reset themselves for the fire attack.

8.5 The nozzle team must begin every interior fire attack through the door to the fire area crouched low, near the floor, regardless of conditions. A sudden ceiling collapse, rapid self-venting, or a fire driven by wind could create a blowtorch effect at the entrance door and seriously injure any firefighter in its path. After entry is made into the fire area, the engine officer can evaluate conditions and adjust or modify the method of advance used.

8.6 The decision to open the nozzle is made by the engine officer. Based on the conditions encountered, the officer may decide to open on smoke. Smoke is to be considered fuel and flowing water on the approach to the fire can cool the area, preventing flashover and rapid fire development. The overhead temperatures within the smoke layer are often unknown and "conditioning the area" with the hoseline may be beneficial.

8.6.1 If there is a smoke condition with high heat, the nozzle should be opened on the smoke and operated as necessary to cool the area and then advance toward the fire. If turbulent smoke is encountered at the entry point the nozzle should be opened and operated at this location until it is able to advance.

8.6.2 When an area is heavily involved in fire, the area adjacent to the fire room may also be at extreme temperatures. In this case, the officer should order the nozzle opened as the team approaches the area. This will cool the area and allow the nozzle team to make entry for extinguishment.

8.6.3 When opening the nozzle on smoke, the officer may either order the nozzle opened intermittently or have the nozzle opened for constant flow during the advance.

8.6.4 The officer needs to decide if opening the nozzle can wait until they see visible fire, or the team is just outside the fire room. In the absence of high heat and turbulence in the smoke, conditions may be such that advancing the charged line in the smoke condition without opening the nozzle would be more effective. In this case, the line can be advanced with the nozzle closed until the fire can be hit directly with the stream.

8.6.5 Once the hoseline arrives at the fire area, the line should be operated into the overhead area initially to wet the ceiling and adjacent walls then lowered to hit burning objects in the room. Sweep the floor and enter for final extinguishment.

9. SUPERVISE THE FIRE ATTACK

9.1 Once the nozzle is opened and the fire attack begins, the engine officer will operate from a position that allows them to effectively supervise the operation of the hoseline. To do this, the officer needs to be able to communicate with the nozzle firefighter but should not be positioned so as to hinder the progress of the nozzle team.

9.2 The engine officer should advise the Incident Commander that the fire attack is beginning and update the IC as to the progress that is being made.

9.3 The engine officer should be positioned as close as possible to the nozzle firefighter but needs to avoid coming between the nozzle and back-up firefighters. The back-up firefighter needs to maintain contact with the nozzle firefighter in order to support them as they operate the hoseline.

9.4 In open spaces or wide hallways, an ideal position for the engine officer would be directly alongside the nozzle firefighter. From this position, they can communicate with the nozzle firefighter without getting in the way.

9.5 In narrow hallways, cluttered or crowded spaces, and smaller areas, this position may not be possible. In this case, the officer will have to be positioned either behind the back-up firefighter, or in front of the nozzle itself (if fire conditions allow).

9.5.1 The preferred position in this situation is behind the back-up firefighter. If positioned behind the back-up firefighter, the officer should work to maintain communication with the nozzle firefighter as much as possible. Communication may need to be done via the back-up firefighter. The engine officer should strive to maintain some physical contact with the nozzle firefighter and must maintain the ability to immediately stop the progress of the hoseline if needed.

9.5.2 If the officer is operating in front of the nozzle, they will be able to guide the advance of the hoseline, but they need to avoid the path of the stream and be sure not to impede the nozzle firefighter's operation. From this position, the officer will not be able to monitor conditions behind the nozzle team as they advance and it may also be difficult to hear handie-talkie transmissions, as the line will be operating directly overhead.

9.6 The engine officer should maintain a fluid position throughout the operation and should switch their positioning as the operating environment changes.

9.7 Engine company officers should develop a physical communication system with the nozzle firefighter for use when voice communications cannot be heard. The following system of touch signals can be used in conjunction with verbal commands to relay orders:

9.7.1 ***open or close the nozzle*** – one or two slaps on the back or shoulder.

9.7.2 ***direction of stream*** – tug on the arm or nozzle, either left or right.

9.7.3 ***advance hoseline*** – steady push on back or SCBA.

9.7.4 ***stop line advance*** – pull back on shoulder, bunker coat, or SCBA.

9.7.5 ***emergency withdrawal*** – 4 slaps on the shoulder and pull in direction of retreat.

9.8 During the advance of the hoseline, the engine officer must maintain 360-degree awareness and avoid “tunnel vision”. The engine officer must constantly monitor the nozzle team’s progress, the conditions above and around them, and handie-talkie transmissions.

9.9 As the hoseline is advanced into the fire area, the engine officer should communicate orders, encouragement, and directions to the nozzle team. The nozzle team should be advised of their progress and given estimates of how much fire remains to be extinguished.

9.10 In the case of a cellar fire, in which the hoseline is being advanced down a flight of stairs, the engine officer must ensure the line is advanced to the bottom of the stairs without delay on the staircase. This requires sufficient hose at the top of the stairs so that the nozzle team will not get caught up in an exposed position on the stairs. If flames are visible from the top of the stairs, the line should be opened to knock down the fire from this position and quickly advanced to the bottom of the stairs.

Note: At an advanced cellar fire in a non-fireproof structure (OLT, taxpayer, row frame, etc.) it is frequently safer and more efficient to initially attack the fire using an exterior entrance if such access exists. Members must be mindful of the fact that operating directly above an uncontrolled cellar fire is an extremely hazardous operation as the possibility of floor collapse is greatly increased in these situations.

9.11 After all visible fire has been knocked down, the engine officer should order the nozzle shut down. Only the engine officer may order the nozzle shut down. This action allows any remaining fire to “light up” indicating those areas requiring follow up extinguishment.

9.12 After final extinguishment, the engine officer may order a fog or broken stream directed out a window in the fire area to assist in removal of heat and smoke conditions. A broken stream can be produced for venting purposes by removing the MST and partially shutting down the control handle.

10. ENSURE RELIEF OF OPERATING MEMBERS

10.1 As the operation progresses, the engine officer must ensure the timely relief of members operating under their supervision as it becomes necessary. It is critical that the engine officer is mindful of the need to relieve members of their unit throughout the operation.

10.2 To anticipate the need for relief, the officer must remain aware of the amount of air each member of their unit has remaining. It is essential that the officer communicate with members in order to monitor their air levels, as well as their degree of fatigue.

10.3 In the event a member's SCBA vibralert activates (or if a member's HUD shows a rapidly flashing red light), the officer must immediately have that member relieved and ensure their safe exit of the IDLH, as described in *Training Bulletin: SCBA.*

10.4 When communicating the need for the company to be relieved, the officer should be sure to find out which unit will be providing the relief.

11. 2ND ARRIVING ENGINE OFFICER RESPONSIBILITIES

11.1 Generally, the 2nd arriving engine will team up with the 1st arriving engine to stretch and operate the 1st hoseline.

11.2 Upon arrival, the 2nd arriving engine officer must ensure the 1st arriving engine has a positive water source. If they do not have a positive water source, the 2nd arriving engine officer is responsible to see that a water source is secured. In the event a 10-70 is transmitted, the 2nd arriving engine officer will be designated the water resource officer.

11.3 When assisting the 1st arriving engine with the first line, the 2nd arriving engine officer should ensure their members are spread out on the line and position themselves out of the IDLH if possible. This will afford members the opportunity to conserve air in the event that relief of the 1st arriving engine is needed.

11.4 When assisting with the 1st hoseline, the 2nd arriving engine officer should monitor the progress of the line and keep track of members going above the fire.

12. 3RD ARRIVING ENGINE OFFICER RESPONSIBILITIES

12.1 Generally, the 3rd arriving engine will stretch the 2nd hoseline at an operation.

13. LATER ARRIVING ENGINE OFFICER RESPONSIBILITIES

13.1 When arriving as a later assigned engine company at a multiple alarm, the engine officer should anticipate the possibility of stretching a line into the building by an alternate means (rope stretch, fire escape stretch, etc.) With this in mind, the engine officer should report in with the necessary tools (rope, hose roller, etc.).

13.2 When reporting into the command post, the engine officer should survey the scene to determine which engine can be used to stretch a line. This includes noting where the apparatus is placed, whether they are connected to a positive water source, and how many hoselines they are supplying.

13.3 Additional lines will be stretched as ordered by the IC. Before stretching a hoseline from an apparatus, the officer should confirm with the ECC of that pumper that the apparatus has enough water capacity to supply their hoseline.

ENGINE COMPANY CHAUFFEUR

1. ENGINE COMPANY CHAUFFEUR OVERVIEW

1.1 The primary responsibilities of the Engine Company Chauffeur (ECC) involve three general areas:

1.1.1 The safe delivery of the members and apparatus to the scene of a fire or emergency.

1.1.2 Locating and establishing a positive water source.

1.1.3 Delivering and maintaining a water supply to the firefighting force throughout the operation.

1.2 To effectively fulfill these responsibilities, the ECC must be thoroughly familiar with the engine apparatus, all the tools and equipment carried on board, and the layout of the hose beds.

1.3 The ECC must also be familiar with the various methods of establishing a positive water source, as well as the procedures and requirements for properly supplying water to a firefighting operation.

2. RESPONDING TO A FIRE

2.1 Upon receiving a call for report of a fire, the ECC is to determine the best route to the reported site of the fire. Consideration should be given to the response patterns of other incoming units. If other units are already 10-84, this may require coordination with the officer, as well as with the other units on scene.

2.2 When entering the block of the reported fire, the ECC should immediately check the building addresses, so as not to pass the building by too great a distance. Once on the block, the ECC should coordinate with the officer to locate hydrants to be used.

2.3 The first due engine company should strive to enter the block ahead of the first ladder company and from the same direction. This will allow for optimal apparatus positioning.

2.4 Apparatus positioning

2.4.1 Proper apparatus positioning is a critical component of an effective response and requires a coordinated effort between the ECC, Engine Officer, and first arriving ladder company to ensure optimal apparatus placement.

2.4.2 The engine apparatus should be positioned as close to the fire building as possible to reduce the time, effort and number of lengths needed for the stretch. However, consideration must be given to ladder company response and the engine apparatus should be positioned so that it will not interfere with ladder company positioning.

2.4.3 The engine apparatus can be positioned to hook up to a hydrant either past the fire building, or before reaching the fire building. A hydrant in the immediate vicinity of the fire building may also be used if it will not interfere with ladder company positioning.

2.5 Hydrant past the fire building

2.5.1 The ECC should position the apparatus to hook up to a hydrant past the fire building whenever possible. This allows for an efficient hose stretch, while providing engine company members with a view of the entire frontage of the fire building before they stretch their line.

2.5.2 When the hydrant is in close proximity to the fire building, the ECC may elect to initially position the apparatus directly at the hydrant itself. An initial position at the hydrant will facilitate hooking up to the hydrant but may result in a longer hose stretch from the apparatus to the fire building.

2.5.3 When the ECC plans to use a hydrant more distant from the fire building, they may elect to initially position the apparatus in the immediate vicinity of the fire building, so as to facilitate the stretch of the attack line. In this case, the hose stretch will begin at this initial position and the ECC will reposition the apparatus to the hydrant while the stretch is in progress. This evolution is called a "backstretch" (Figure 1).

2.5.4 When executing a backstretch, the ECC will initially position the apparatus in the vicinity of the fire building, but so as not to impede ladder company positioning. In most cases, this will be a proper distance past the front entrance and is normally based on the type of ladder apparatus responding directly from behind. At most structural fires, the location of the ladder apparatus turntable normally dictates how far past the front entrance of the building the engine backstep should initially be placed on arrival. For longer stretches in larger buildings (such as H-types), an initial position just opposite the front entrance may significantly facilitate a more efficient stretch.

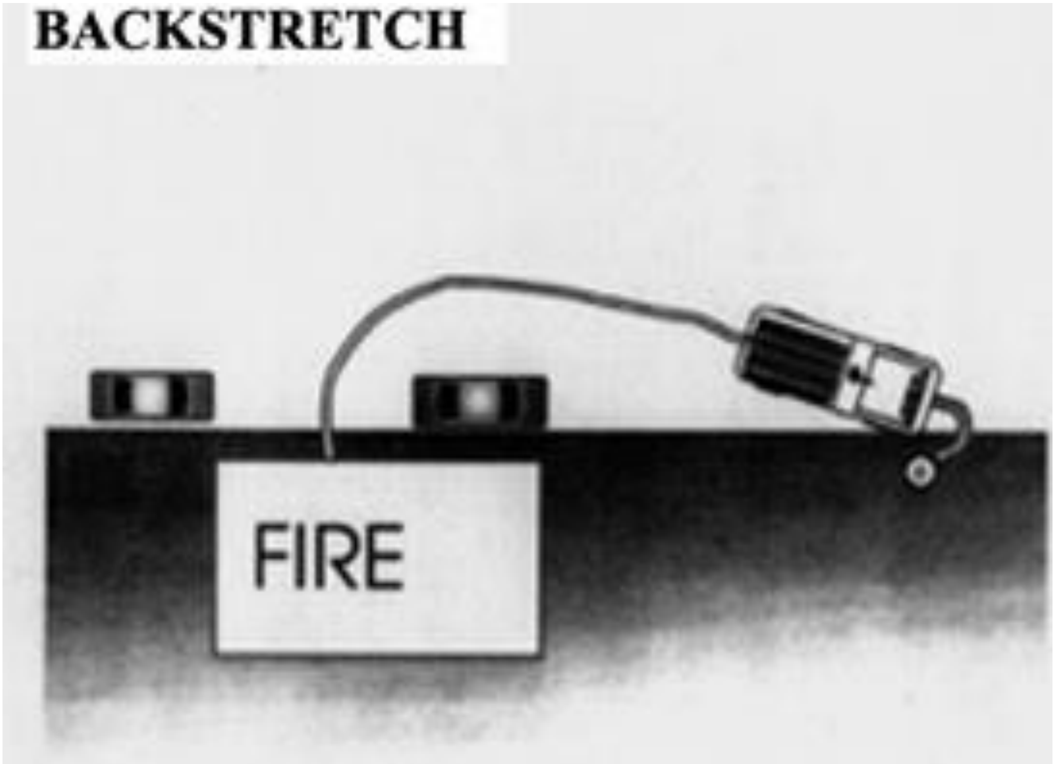

Figure 1

2.5.5 After firefighters remove sufficient hose to reach and cover the fire area, the ECC proceeds with the Engine to the hydrant to be used, playing out hose as the apparatus moves. If deemed advantageous, a 2nd hoseline may also be removed before the engine repositions to the hydrant.

2.5.6 When positioned for a backstretch, the ECC should be mindful of any company approaching from the opposite direction that might prevent the engine from reaching their desired hydrant and should be prepared to contact them via handie-talkie to coordinate their response, if necessary. Similarly, if engine company positioning prevents access for a ladder company responding from the opposite direction, the ECC should inform them either via handie-talkie, or through the dispatcher.

2.5.7 Another benefit of positioning for a backstretch is that the apparatus will be positioned in close proximity to the fire building at the outset. This initial positioning allows for the use of the deck gun, when needed. This is important when the immediate application of exterior water could facilitate life-saving operations due to extreme fire conditions.

2.6 Hydrant before the building

2.6.1 When the ECC elects to use a hydrant located before the fire building, a more challenging stretch will result, as members will be forced to stretch the line around the apparatus. This forces the hoseline to make an extra turn and commonly requires a member to remain at the backstep until sufficient hose has been stretched to reach and cover the fire area.

2.6.2 When the hydrant is in reasonable proximity to the fire building, the hose stretch may be initiated from a position directly at the hydrant. This also may be required if ladder apparatus positioning prevents the engine from moving closer to the fire building.

2.6.3 When there is room to reposition the apparatus closer to the fire building without blocking out ladder apparatus, in-line pumping may be used to facilitate a shorter and more rapid hose stretch. This is executed by stretching 3 ½" hose to the hydrant to be used. This can either be hand stretched back to the hydrant or stretched using the apparatus.

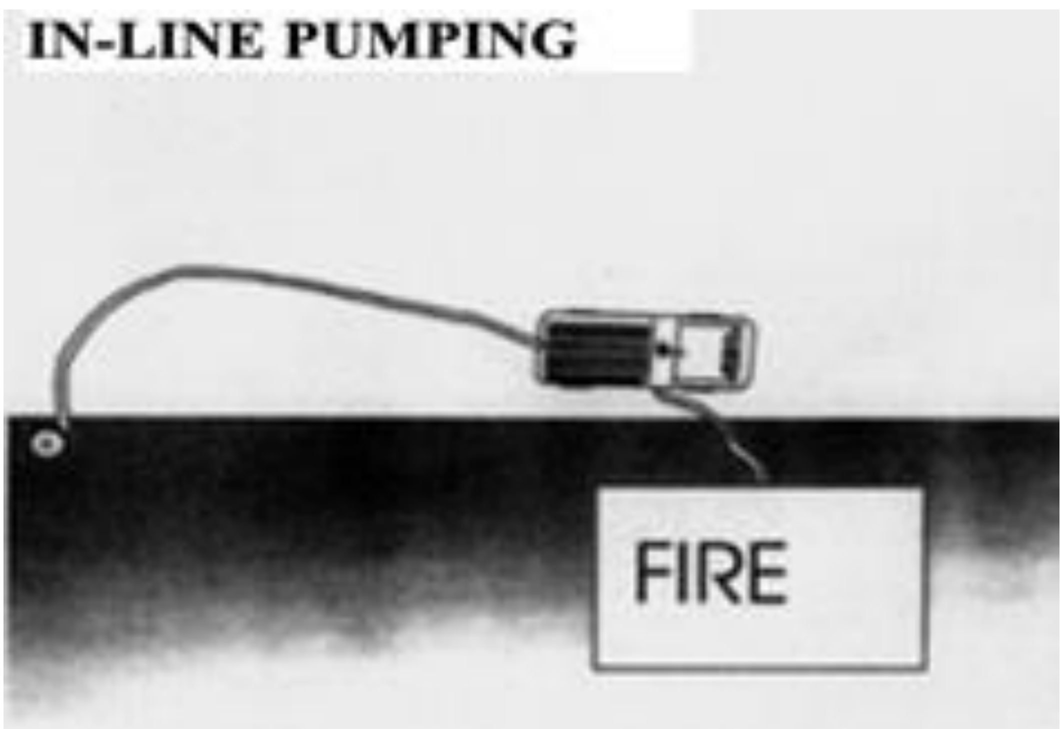

Figure 2

2.6.4 When the apparatus is used to stretch the 3 ½" hose, the Control firefighter will first "key" the hydrant with the 3 ½" hose, wrapping it around the hydrant to anchor it in place. The apparatus will then proceed to a more advantageous position closer to the fire building. The 3 ½" hose will play out as the apparatus is repositioned. If time permits, the Control firefighter should connect a 2 ½" gate to the hydrant's 2 ½" outlet for possible augmentation.

2.6.5 When the apparatus is repositioned, in-line pumping can result in shorter hose stretches to the fire area, but longer stretches from the apparatus to the hydrant. This also necessitates the use of the smaller 3 ½" hose as a hydrant connection, which may limit water supply.

2.7 In-line pumping

2.7.1 The term "in-line pumping" refers to any situation in which 3 ½" hose is used to connect to a hydrant (Figure 2). In these situations, the apparatus will be more distant from the hydrant and will be pumping "in-line" between the hydrant and the fire building.

2.7.2 In-line pumping is not exclusive to a situation with a hydrant before the fire building and can be used regardless of the position of the hydrant or apparatus. In-line pumping can be used if the hydrant and apparatus are positioned past the fire building as well.

2.7.3 It is important to specifically identify "in-line pumping" because the smaller size of the 3 ½" supply hose may limit the available water supply. Whenever in-line pumping is used, the ECC should be mindful of the possible need to augment their water supply. If intake pressure drops below 15 psi, the ECC must have their water supply augmented.

2.8 Later arriving units

2.8.1 All responding engine companies should be positioned so as to secure a positive water source. This is most commonly a hydrant, but on rare occasions, drafting or other water supply options may influence apparatus positioning.

2.8.2 Later arriving engine companies should ensure two ladder companies are on the block before entering narrow streets that could possibly leave ladder apparatus blocked out from the fire building.

2.8.3 Later arriving engine companies should attempt to position their apparatus so the backstep is facing the direction of the operation. It may be necessary to back into the block to achieve this. This positioning will allow these engine companies to quickly assist the first due engine in the event of a 10-70.

3. LOCATING A WATER SOURCE

3.1 Hydrants are the primary source of water in the FDNY. Before connecting to a hydrant, it must be visually inspected for obvious defects, properly flushed, and tested to ensure sufficient water supply.

3.1.1 Flushing a hydrant allows for any debris inside the barrel to be removed. The hydrant should be opened slowly to allow water to flow from the outlets without having the outlets completely filled with water. This will permit debris trapped inside the barrel to flow out with the water. If large debris is noted inside the barrel, all efforts must be made to remove it.

3.1.2 After the hydrant is properly flushed out, it must be flow tested for proper pressure. This is done by opening the hydrant until sufficient water flow under pressure is observed, indicating there is appropriate water volume available for supply. Once sufficient flow is noted, the hydrant is shut down. The hydrant is now ready for connection

3.2 To connect to a hydrant, the ECC has four options available:

3.2.1 ***10-foot soft suction*** – This 3 ½" soft suction has 4 ½" couplings, so it can be connected directly to a hydrant. It can be bent but will straighten when charged with water and is very difficult to kink. At 10 feet long, it is the shortest hydrant connection and requires accurate positioning close to the hydrant.

3.2.2 ***10-foot semi-rigid suction*** – This 4 ½" semi-rigid hose has 4 ½" couplings, so it can be connected directly to a hydrant. It can be bent and will straighten when charged.

3.2.3 ***35-foot soft connection*** – This 5" synthetic hose is yellow and has 4 ½" couplings for direct connection to a hydrant. It is 35 feet long, so it allows for some distance from the hydrant and provides the ability to maneuver around obstructions. It provides the largest flow of any hydrant connection, but has the potential to kink, so it needs to be properly flaked out.

3.2.4 ***3 ½" hose*** – Standard 50-foot lengths of 3 ½" hose can be used to hook up to a hydrant through the use of a specialized hydrant connection fitting (4 ½" to 3" double female). There is no limit on the number of lengths that can be used, so this option allows for the greatest flexibility, but provides the least water flow.

3.3 Hydrants are operated using a hydrant wrench. It is placed over the five-sided operating nut on the top of the hydrant and turned clockwise to open. If the hydrant is equipped with a Custodian Lock, the magnetic cup feature of the Custodian hydrant wrench is placed over the Custodian lock and turned clockwise to open.

3.4 White hydrant discs are used to identify inoperable hydrants. If the ECC encounters a hydrant with a white disc, it should be considered unserviceable. Yellow hydrant discs are used to identify frozen hydrants. If a hydrant is discovered to be inoperable or frozen, the ECC should use the proper disc to identify it.

3.5 If increased water supply is anticipated, the ECC may consider attaching a 2 ½” single gate to the 2 ½” outlet of the hydrant before the hydrant is initially opened for water supply. This will make it possible to later self-augment if the need for elevated water flow arises. If needed, a second supply hose can be connected to this single gate, which can be opened to further supply the engine apparatus. This maximizes the water supply from a single hydrant.

3.5.1 Self-augmentation by way of a 2 ½” single gate can also be used to bypass the initial supply line in the event an obstruction in the supply line interrupts water flow to the apparatus. In this case, a second supply line from the 2 ½” single gate can ensure continued water supply.

3.6 Signal 10-70: no positive water source

3.6.1 In the event an ECC cannot hook up to a positive water source, the ECC should transmit a signal 10-70 via handie talkie. The EAB should be used and the signal transmitted as per *Communications Manual Chapter 9: Company Unit Communications*. This will alert all on-scene units that the 1st due engine does not have a positive water supply and they require assistance in obtaining one.

3.6.2 It’s important to also transmit the 10-70 on the department radio, which informs incoming units of the situation and allows dispatch to assign a water resource unit. The second arriving engine will be the water resource unit when a 10-70 is transmitted by the first arriving engine.

3.6.3 Once the 10-70 is transmitted, the ECC should coordinate with assisting units, including the water resource unit, and make clear what assistance is needed.

3.7 Receiving a Relay

3.7.1 In a variety of situations, an engine apparatus may not be able to hook up to a positive water source and may have to receive water from another engine company. This could happen when there are no hydrants available in the area, if access is blocked to a hydrant, or if a hydrant is found to be inoperable. There are also times when an engine may have a water source but needs to be augmented via a relay.

3.7.2 When receiving water via a relay, the engine apparatus delivering the water is called the “supply pumper” and the engine apparatus receiving water is called the “operating pumper”. The supply pumper and operating pumper should both remain in the “Volume” position. However, at standpipe operations where head pressure needs to be overcome, the supply pumper remains in volume while the operating pumper switches to the pressure position.

Note: Head pressure is the static pressure (the pressure when water is not flowing) caused by the weight of water solely due to its height above the measuring point.

3.7.3 The ECC of the operating pumper opens the inlet gate and should verify incoming water with the ECC of the supply pumper. The ECC of the operating pumper must also open the air bleeder valves to the inlet being used, so as to prevent air from the supply hose from entering the pump.

3.7.4 The ECC of the operating pumper then sets the reading on the Pro Pressure Governor (PPG) to match the idle pressure on the pump pressure gauge. The operating ECC will coordinate with the supply ECC to ensure enough water is supplied to meet pressure demands of the operating pumper.

3.8 Drafting

3.8.1 Engine companies can also use a standing body of water as a positive water source. This can be used when there are no hydrants available, or in situations where more water is required than can be supplied by the hydrant system.

3.8.2 When drafting water, the apparatus should be operated in Volume Operation and the PPG should be switched to "Revolutions Per Minute (RPM) Mode". Once switched to RPM Mode, the PPG throttle should be increased to 1,000 RPM.

3.8.3 To draft water, the apparatus priming pump is used to remove air from the drafting hose, which creates a vacuum in the pump chamber and pulls water into the system. The prime should last for at least 45 seconds. To make this possible, all inlets and outlets not used must be capped and spanner tightened. All gates and drains must be closed.

3.8.4 A positive and steady Master Pressure Gauge reading will indicate a successful draft. A negative reading on the Master Inlet Pressure Gauge is normal.

3.8.5 Once a successful draft is achieved, the PPG is returned to PSI (Pounds per square inch) Mode for pumping operations.

3.8.6 FDNY apparatus carry 3 connections intended exclusively for use in the drafting evolution. Each of the connections is 10 feet long and one is a smooth connection, while the other 2 are rigid connections.

A. The 10-foot smooth connection is hooked up to the 6" ungated inlet on the Engine.

B. The rigid connection equipped with a strainer is lowered into the water.

C. The 2^{nd} rigid connection is connected between the other two connections.

3.8.7 The connection equipped with the strainer is secured in the water with a rope. The rope is tied to the connection just above the strainer using a clove hitch and binder and lowered until the strainer is at least 2 feet under the water's surface. The other end of the rope is secured to a substantial object, using the substantial object knot.

3.8.8 A limiting factor on the apparatus' ability to draft water is the vertical distance water needs to travel from the water's surface to the apparatus. In practice, a pumper can draft water a maximum distance of roughly 22 feet, though lifting water vertically beyond 10 feet reduces the Gallons Per Minute (GPM) capability of the pumper.

4. SUPPLYING WATER

4.1 The ECC is responsible for supplying water to firefighting forces via hoselines and maintaining the provision of sufficient operating pressure throughout the operation. This occurs in a number of different ways:

4.1.1 Supplying water to handlines.

4.1.2 Supplying water to a standpipe system.

4.1.3 Supplying water to a sprinkler system.

4.1.4 Supplying water to a large caliber stream (LCS).

4.1.5 Supplying water to another pumper via a relay.

4.2 Supplying handlines

4.2.1 In order to properly supply a hoseline, the ECC must know the number of lengths stretched, the size of the hose stretched, and the elevation to which the line is being stretched. Generally, this information is confirmed by communicating directly with the control firefighter.

4.2.2 Supplying water to a hoseline is the responsibility of the ECC, however, all members should be capable of placing the apparatus in pump and supplying a hoseline, in case of an emergency. To accomplish this, the following steps should be taken:

4.2.3 Before pressure can be supplied to a hoseline, the apparatus pump must be engaged using the following steps:

A. Place the apparatus transmission in "neutral".

B. Engage the apparatus maxi-brake.

C. Move the "pump shift control" to the pump position (located in the cab).

D. Place the apparatus transmission in "drive".

4.2.4 Once the apparatus pump is engaged, water can be supplied to a hoseline using the following steps:

A. Press the "Push to Prime" button (Figure 3) on the pump panel (this expels air from the pump system)

Figure 3

B. Press the preset button on the Pro-Pressure Governor (Figure 4) (this engages the PPG)

Figure 4

C. Open the desired discharge gate to charge (Figure 5) a hoseline.

Figure 5

4.2.5 The maxi-brake on the apparatus must be set for the apparatus pump to be engaged. The pump will not engage if the maxi-break is not set.

4.2.6 The ECC ensures proper pressure is supplied to the handline by calculating the pressure needed to overcome the friction loss in each length of hose and the pressure loss due to the elevation of the hoseline, while still providing the correct nozzle pressure "at the tip". This practice is known as "street hydraulics".

4.2.7 The following are the rules of thumb that govern the quick calculations involved in street hydraulics:

A. add 20 psi friction loss per length of 1 ¾" hose.

B. add 5 psi friction loss per length of 2 ½" hose.

C. add 5 psi per floor of elevation (one floor is roughly 10 feet).

D. subtract 5 psi per floor of elevation loss below grade (one floor is roughly 10 feet).

E. 1 ¾" hoseline nozzle (15/16" tip) requires 50 psi at the tip.

F. 2 ½" hoseline nozzle (1 1/8" tip) requires 40 psi at the tip.

G. Fog nozzle requires 100 psi at the tip.

4.2.8 For a more complete discussion of the operations of the Pro Pressure Governor, refer to *Chapter 2, Addendum 1: Pro Pressure Governor*.

4.2.9 The ECC should inform the engine officer via handie-talkie when water is being supplied. In this transmission, the ECC should also inform the officer whether they are being supplied by a hydrant or if they are only supplied by the booster tank (for example: "255 Chauffeur to 255, Here comes your water…you're on hydrant water").

4.2.10 In a situation where there is delay in hooking up to a hydrant and the officer calls for the hoseline to be charged, it may be necessary for the ECC to supply the line with the booster tank. This may also occur if the officer calls for quick water in an attempt to immediately protect life. When the officer calls for water, the ECC must supply water as soon as possible. Supplying water to a hoseline from the booster tank should not be delayed by the ECC continuing to hook up to a hydrant after the officer has called for booster water.

4.2.11 Whenever a line is supplied with the booster tank, the ECC must communicate to the Engine Officer that they are on booster water. The Engine Officer should also be notified when the water level in the booster tank is half empty. Once they are hooked up to a hydrant, the "tank to pump" valve is closed, and there is sufficient intake static pressure (pressure when water is not flowing) and residual pressure (pressure remaining after a line is charged), the ECC must notify the officer that they are now on hydrant water.

4.3 Supplying a standpipe system

4.3.1 When a hoseline is to be operated from a standpipe outlet, the ECC must hook up to the standpipe system and augment the system. This supply line should be the first line stretched from the apparatus.

4.3.2 Exception: Most modern and some older high-rise buildings may have unique standpipe system considerations that first alarm units have become aware of. The reliability, or unreliability of such systems may be knowledge that local units are cognizant of. These buildings may require Pre-Incident Guidelines, Familiarization Drills and identification in CIDS with specific instructions regarding standpipe supply tactics for such buildings. Division Commanders are authorized to approve CIDS and Pre-Incident Guidelines for those buildings that have unique standpipe systems requiring adjustments to the standard FDNY policy.

4.3.3 When supplying water to a standpipe system, the ECC should use 3 ½" hose (or 3" hose if high-pressure pumping) to supply the appropriate Fire Department Connection (FDC, formerly known as Siamese connections). The standpipe FDC is entirely painted red or may just have red caps (Figure 6A). If part of a combination system (Figure 6B), the FDC is entirely painted yellow or may just have yellow caps.

Figure 6A

Figure 6B

4.3.4 ECC's can encounter a wide range of difficulties when connecting hose to a FDC. This can include defective or damaged threads, frozen female swivels or swivel that will not turn, caps that cannot be removed, broken clapper valves, or outlets stuffed with debris. In these situations, there are various possible solutions to this problem:

A. Tapping the swivel(s) on the FDC with a tool (spanner) may loosen paint, dirt, etc., and allow the swivel to operate.

B. Twist the supply hose 4-5 turns to the left, insert the male end, then twist the male end to the right (clockwise) into one of the female swivels of the FDC.

C. Insert a 3" x 3" x 3" Siamese into one of the female swivels of the FDC, this provides a female coupling for the male coupling of the 3 ½" supply hose to attach to.

D. Using a 3" double male fitting and a 3" double female fitting. The double male fitting is attached to the malfunctioning female coupling of the FDC (the fitting will be turned, not the broken swivel). The double female fitting is then coupled to the double male, which provides a female coupling for the male coupling of the 3 ½" supply hose to attach to.

4.3.5 If the FDC is found to be inoperable, or if the position of the FDC in relation to the hydrant makes connection to the FDC impractical, the standpipe system can be supplied by way of the first-floor standpipe outlet as an alternative.

4.3.6 The ECC must provide for sufficient pressure available at the standpipe outlet but should also strive to minimize the amount of excess pressure supplied to the system. When the standpipe system is charged with excessive pressure, it can become more difficult for the control firefighter to set the proper pressure in the handline at the standpipe outlet.

4.3.7 With this in mind, the ECC should generally supply the standpipe system with a pressure of 100 psi, plus an additional 5 psi per floor of elevation. This is measured to the floor on which the hoseline will be operating.

A. Example—If fire is on the 26th floor of a HRFPMD, the ECC should supply 225 psi to the standpipe system (100 psi-baseline + 125 psi for 25 floors of elevation)

4.3.8 The guideline of supplying standpipe systems with 100 psi, plus an additional 5 psi per floor of elevation should be used as the primary guide at most operations in buildings that are known to be older, traditional construction.

Note: Chapter 8, Addendum 2 provides two standpipe supply charts:

4.3.9 It is important to note that these supply charts are approximations and adjustments must be considered as the height of the fire floor increases. This is particularly pertinent in modern high-rise construction located mostly in the Borough of Manhattan, but now starting to be seen in the outer boroughs.

4.3.10 It is critical that units with unique high-rise construction familiarize themselves with the standpipe systems provided, and develop appropriate Pre-Incident Guidelines, Familiarization Drills and CIDS messages so that appropriate standpipe supply decisions can be made at operations.

4.3.11 For a full discussion of ECC operations at a standpipe operation, see *Chapter 8: Standpipe Operations*.

4.4 Supplying a sprinkler system

4.4.1 Upon being ordered to supply a sprinkler system, the ECC should supply the system with a 3 ½" hoseline to the FDC. Not all sprinkler systems have a FDC, so only those with an available connection need to be supplied.

4.4.2 Automatic sprinkler system FDC's are painted green (Figure 7) or are equipped with green caps. If part of a combination system, either the FDC or the caps are painted yellow. If the FDC is aluminum or has aluminum caps, it indicates a non-automatic sprinkler, or a system of perforated pipe.

Figure 7

4.4.3 The ECC should supply the sprinkler system with 150 psi, but should be prepared to increase pressure upon any indication that the system requires more water. This can be based on reports of system performance from operating members.

4.4.4 While the flowrate provided by sprinkler heads will vary, a standard sprinkler head can be expected to provide a flowrate of 13 – 18 GPM.

4.4.5 When the building is equipped with both a standpipe and a sprinkler system, the first supply line stretched should be to supply the standpipe FDC. Once the standpipe FDC is supplied, a second line should be stretched to supply the sprinkler FDC.

4.4.6 When the first due engine is supplying both the standpipe and sprinkler systems, both systems should be augmented by later arriving units. If a sprinkler/standpipe combination system is being used, it should similarly be augmented by later arriving units. The water demanded by this system will be much higher, as it supplies both the standpipe and the sprinkler systems.

4.5 Supplying a Large Caliber Stream (LCS)

4.5.1 LCS are streams that deliver at least 350 GPM of water. Streams of this size are delivered through several different appliances, including tower ladder monitors, aerial ladder pipes, engine apparatus deck pipes, Blitzfire Oscillating Monitors, and the New Yorker Multiversals.

4.5.2 ECC's should supply LCS with 3 ½" hose. When their use is anticipated, or if the LCS apparatus is not yet in position, the ECC may stretch 3 ½" hose to the location.

4.5.3 During LCS operations, all valves and gates should be opened slowly to avoid a "water hammer". This sudden force that results when a water supply is quickly shut down can result in damage to pump, appliances, and hose.

4.5.4 Whenever possible, an engine company supplying a LCS should be dedicated exclusively to that task to ensure LCS flow demands are met. Engine companies supplying LCS may require augmentation to achieve required flows for the LCS stream. Specific information regarding pressure requirements and flowrates achieved can be found in *Chapter 9: Large Caliber Streams*.

4.6 Supplying a relay operation

4.6.1 When performing a relay operation, the pumper that is hooked up to a water source and supplying water to the operating pumper is called the "supply pumper".

4.6.2 The ECC of the supply pumper supplies the operating pumper using 3 ½" hose and should maintain the supply pumper in the "volume" setting. This will ensure the operating pumper can properly receive the relay and supply the required water flow.

4.6.3 The supply ECC should set their Pro Pressure Governor to idle pressure and inform the operating ECC of the pressure that is being sent (this should be roughly 55 psi plus hydrant pressure).

4.6.4 The operating ECC will tell the supply ECC if more pressure is required. The supply ECC should increase the relay pressure in increments of 10 psi until sufficient pressure is achieved, or until the incoming pressure on the supply pumper drops to 15 psi.

5. TROUBLESHOOTING

5.1 A critical component of the ECC's job is the ability to quickly recognize and address problems that could jeopardize the supply of water to firefighting units. The following section will highlight common issues ECC's can expect to encounter at an operation.

5.2 Once the ECC has properly charged a hoseline, they must continually monitor the status of the line. This includes monitoring of intake pressure, as well as the pressure and flow of each line supplied. The ECC must be able to identify a problem from the pump panel that could compromise the maintenance of water in the hoseline. Some indications of loss of pressure can include:

5.2.1 Intake pressure decreases = possible blockage, or insufficient water supply.

5.2.2 Flow on flowmeter decreases, Engine RPM decreases = possible kink in the hoseline.

5.2.3 Flow on flowmeter increases, Engine RPM increases = possible burst length.

5.3 The ECC needs to ensure the rig is receiving enough water to meet the demands of the hoselines it is supplying. The Engine will "run away from water" if it attempts to pump out more water than it is taking in. To prevent this from happening, the ECC should not allow the intake pressure to drop below 15 psi. Once 15 psi intake pressure is reached, the apparatus should be augmented with an additional water supply.

5.4 One option for augmentation is to “self-augment”, which is accomplished when an engine hooks up to both the 4 ½” and 2 ½” outlets of a single hydrant. To do this, a 2 ½” single gate needs to be attached to the 2 ½” hydrant outlet before the hydrant is opened. Then, when augmentation is needed, a 3 ½” hose (with an increaser) can be used to further supply the rig using the single gate on the hydrant.

5.5 Often times, a hydrant can be especially difficult to open with a standard custodian wrench. To overcome this, a “breaker bar” can be used to generate additional torque when using the wrench. A breaker bar is a section of pipe that fits over the handle of the wrench and acts as an extension of the handle, creating more force when opening a hydrant.

5.6 For further discussion on troubleshooting in emergency situations, refer to *Chapter 10: Engine Company Emergencies*.

THE BACKSTEP

1. OVERVIEW

1.1 "The Backstep" is a term used to describe the team of firefighters in an engine company whose primary purpose is to stretch and operate hoselines to extinguish fire.

1.1.1 The Backstep is comprised of the following 4 firefighters and does not include the Engine Company Chauffeur (ECC):

A. Nozzle firefighter

B. Back-up firefighter

C. Door firefighter

D. Control firefighter

1.2 The duties of each of these positions is described in the sections below. Additionally, all firefighters should be able to perform the following basic operations (which are fully discussed in *Chapter 5: The Engine Company Chauffeur*):

1.2.1 Properly operate and connect to a hydrant.

1.2.2 Engage apparatus pump and properly supply a hoseline.

1.2.3 Supply and operate the apparatus deck pipe.

1.3 All firefighters should be familiar with buildings within their districts which pose extreme difficulties when stretching hoselines (interconnected buildings, wrap-around stretches, etc.)

1.4 All firefighters must be proficient in executing all types of hose stretches and must be familiar with the proper usage of all related tools and equipment.

1.5 All firefighters must be proficient in forcible entry and must be familiar with the proper usage of the halligan, axe, and all related forcible entry equipment.

1.6 All firefighters must conduct many individual size-ups during any incident, each of which may have a direct impact on the success or failure of the operation. This includes reading the response ticket for all relevant information, including CIDS, as well as a thorough size-up of the fire building itself.

1.7 The following sections will describe the general responsibilities and techniques relevant for the positions of the Backstep. The techniques specific to the various types of hose stretches will be discussed in *Chapter 7: Stretching Hoselines*.

2. THE NOZZLE FIREFIGHTER

2.1 The firefighter assigned the nozzle occupies one of the most challenging and dangerous positions on the fireground. The duties associated with the nozzle position routinely take this firefighter in close proximity to the fire and require a determined and experienced member.

2.2 This position is assigned by the officer at the start of each tour, but can be flexible throughout the tour, allowing a less experienced firefighter to move up to the nozzle position at a minor fire to gain valuable "on the job" experience.

2.3 In addition to their standard size-up, the nozzle firefighter should pay particular attention to the various factors that influence the hoseline stretch and operation. This includes the location of the fire apartment within the building, the type of stretch to be executed, the type of stairway present, and the size of public hallways and stairway landings.

2.4 Stretching the line

2.4.1 The Nozzle firefighter stretches the first length of hose with the nozzle attached via the route and to the location determined by the officer (Figure 1). If the hosebed is maintained using a horseshoe arrangement, the nozzle firefighter takes their length by carrying the first horseshoe. If horseshoes are not used, the nozzle firefighter takes their first length by grabbing the top 3 folds of the hosebed.

Figure 1

2.4.2 The hose should be stretched to a safe location in proximity to the fire area. If the line is to be charged inside the building, such an area could be a stairway landing, hallway, or adjoining area. From this point, it is the nozzle firefighter's responsibility to flake out the lead length of hose.

2.4.3 The techniques specific to the various types of hose stretches are discussed in *Chapter 7: Stretching Hoselines.*

2.5 Flaking out hose

2.5.1 The nozzle firefighter is responsible for flaking out the lead length of the hose stretch. A determining factor in the technique used to flake out the lead length will be whether the hose is to be charged inside the structure (as in multiple dwellings, etc.), or outside the structure (as in private dwellings, taxpayers, etc.).

2.5.2 In either scenario, the nozzle firefighter should carry the entire lead length intact to the entrance to the fire area and flake out the hose from that location. This should be in a safe area, but as close to the fire area as possible.

A. If the line is being charged inside the building, this point may be the door to the fire apartment.

B. If the line is charged outside the building, this point will be the entrance to the building.

2.5.3 When stretching hose carried in a horseshoe, an effective technique is to use the midpoint of the length to efficiently flake the hose out. This is accomplished by laying the horseshoe down at the point of deployment and pulling the hose from the middle "ring" of the horseshoe (which is approximately the midpoint of the length). The midpoint can then be walked or tossed away from the point of deployment for a smooth flake out (Figure 2).

Figure 2

2.5.4 When properly flaked out, the nozzle and first coupling should be side by side at the entrance to the fire area, ensuring an entire 50-foot length of hose is available for the interior of the fire area.

A. This "U-shaped" orientation will facilitate a smooth advance into the fire building by allowing the lead length to pivot at the first coupling. This allows the lead length to advance without having to pull the weight of the entire line. In effect, the nozzle team only has to advance the weight of one length of hose, rather than the weight of the entire stretch.

2.5.5 When flaking out hose outside the structure (private dwellings, taxpayers, etc.), consider the following:

A. The availability of space to flake the hose is not usually a problem when flaking out outside the structure.

B. If possible, hose should be flaked out in line with the entrance to be used. This is especially important when stretching 2 ½" hose, which is heavier and more difficult to maneuver.

C. Avoid areas where the hoseline could be damaged by falling glass, heat, or fire.

2.5.6 When flaking out hose inside the structure (multiple dwellings, etc.), consider the following:

A. The availability of space to flake out hose is a central concern when flaking out inside a structure.

B. The condition of the public hall is also a critical concern. If conditions in the hall allow, the nozzle length should be carried to the door to the fire area and flaked out from there. If the public hall is untenable, the lead length will need to be flaked out elsewhere (Figure 3).

C. If conditions allow, hose should be flaked out in the hallway on the fire floor. If necessary, other apartments on the fire floor, on the same side of the public hallway as the fire apartment, can be used for additional space.

D. If more space is needed, hose can be flaked up the interior stairway to the half landing or the floor above, which allows gravity to assist with the advance of the hose line into the fire apartment. Hose can also be flaked down the interior stairway to the half landing or to the floor below the fire. When flaking out on the floor above the fire, be mindful to allow space for the possibility that an additional hoseline may be stretched to that area. When flaking hose out above the fire floor, the nozzle firefighter should ensure the door to the fire area is being controlled.

E. When hallways and landings are extremely small, hose can be flaked out on the floor below the fire and advanced to the fire area.

Figure 3

F. The hose needed to reach the fire area should be supplied by the length carried by the back-up firefighter. This ensures the nozzle firefighter's length is reserved for the fire area itself. Additional hose from the back-up firefighter's length will be used to make sure there is enough extra hose available and flaked out to facilitate a smooth advance into the fire area.

G. While most apartments require one length of hose, it is possible for larger apartments or duplexes to require additional hose for the fire area. With this in mind, the nozzle firefighter should estimate the amount of line needed to cover the entire fire area and communicate this need to the back-up firefighter, who may have to adjust the location of their drop point to accommodate the additional hose required for the fire area.

H. When the public hall on the fire floor is untenable, the lead length will have to be flaked out in a safe area elsewhere. This may be on the floor below, or possibly inside the stairway (if the stairway is enclosed). Ideally, the lead length should be flaked out in the same manner at the point of deployment, with the nozzle and first coupling next to each other as close the fire area as practical.

2.5.7 When flaking out the lead length, the hose should be laid out as neatly as possible to reduce the chances of kinking or snagging the line once the line is charged.

2.6 Charging the line

2.6.1 After flaking out the line in preparation for its advance, the nozzle firefighter should keep a knee on the nozzle to protect it from being kicked or moved while they don their SCBA facepiece.

2.6.2 Once their protective equipment is donned and the line is flaked out, the nozzle firefighter should signal the engine officer that they are ready for water. The decision to charge the line is ultimately made by the engine officer.

2.6.3 When the engine officer calls for water the nozzle firefighter must prepare for a "long bleed" of the hose line. This allows for the release of air trapped in the hose, confirms serviceability of the nozzle, and allows the operating pressure to be accurately set.

A. To bleed the line, the nozzle is fully opened after water reaches nozzle, allowing water to flow. While waiting for the line to be charged, the nozzle can either be kept closed or cracked slightly open, allowing air to escape.

B. When bleeding the line, it should be directed towards the fire area, if possible. In buildings with elevators, an attempt should be made to direct the bleed away from elevator shafts. This can help keep elevators serviceable for firefighting operations.

C. The long bleed is especially important at standpipe operations, as it allows the control firefighter to accurately set the operating pressure at the standpipe outlet while water is flowing.

D. The long bleed is also particularly important when a 2 ½" hoseline is stretched from the apparatus. At these operations, the lower friction loss of the 2 ½" hose will require lower discharge pressures and the operating pressure may be below the preset on the Pro Pressure Governor. In such cases, the ECC will need to manually set the operating pressure at the discharge gate while water is flowing. Without a long bleed, the ECC may not have the opportunity to set the pressure properly.

2.6.4 The nozzle firefighter must be at a position at the door to the fire area crouched low and out of the doorway opening itself, regardless of conditions. A sudden ceiling collapse, rapid self-venting or a fire driven by wind could create a blowtorch effect at the entrance door and seriously injure any firefighter in its path.

A. This position also allows unobstructed access and egress for the ladder company operating in the fire apartment prior to the line being charged. After entry is made into the fire area, the advancement technique may be adjusted based on conditions encountered.

2.6.5 The nozzle firefighter should never enter the fire area without a charged hoseline. To do so could allow the fire to rapidly extend and overtake the nozzle team causing burns to them and any firefighters operating behind or above them.

2.7 Operating the hoseline

2.7.1 There are a number of decisions the nozzle firefighter is empowered to make while operating a hoseline. They are as follows:

A. Direction of the stream.

B. Rate of advancement.

C. Sweeping the floor with the stream.

D. Calling for more line.

E. Partially closing the nozzle to reduce nozzle reaction and regain control.

F. Opening the nozzle in an emergency.

G. Communicating the need to be relieved on the nozzle.

2.7.2 The nozzle firefighter must understand that the decision to open or close the nozzle is made by the engine officer. Based on the conditions encountered, the officer may decide to have the nozzle opened on smoke and high heat, or they may decide to advance the line until the nozzle can be opened on visible fire.

2.7.3 Opening the nozzle on smoke is a preventive measure taken so that hidden fire can be extinguished while reducing the chance of flashover. If there is a smoke condition with high heat, the nozzle should be opened on the smoke and operated as necessary to cool the area and advance toward the fire. This is done only at the direction of the engine officer.

2.7.4 Advancing a hoseline under a smoke layer without opening the nozzle is not unusual at fires. In the absence of high heat and turbulence in the smoke, conditions may be such that advancing the charged line in the smoke condition without opening the nozzle would be more effective. The line can be advanced with the nozzle closed until the fire can be hit directly with the stream.

2.7.5 Once fire is visible, the nozzle should be opened and the fire extinguished, as ordered by the engine officer. Never pass fire; extinguish it and continue to advance the line. This includes fire visible in the upper levels of a smoke condition, which should be extinguished to prevent a pre-flashover condition from reaching flashover.

2.7.6 Operating the 1 ¾" hoseline

A. When operating the 1 ¾" line (Figure 4), the nozzle firefighter should keep one hand firmly holding the hoseline just behind the nozzle coupling and the hoseline itself should be held tight under the opposite side armpit.

Figure 4

B. The nozzle firefighter should keep the nozzle out ahead of their body at a distance such that they can comfortably operate the nozzle handle with their arm extended (Figure 5). This distance allows them to manage the movements of the nozzle, giving them the ability to achieve complete coverage of the fire area from ceiling to floor.

Figure 5

C. When using the 1 ¾" hose, most movements of the nozzle are made by the nozzle firefighter simply turning the nozzle itself. The bend in the hoseline will occur in the distance of line between the nozzle itself and the nozzle firefighter's body.

D. Using the pistol grip while operating the hoseline is not recommended, as it will limit the nozzle firefighter's effective maneuverability.

2.7.7 Operating the 2 ½" hoseline

A. When operating the 2 ½" hoseline, the nozzle firefighter's hand position will be the same as with the 1 ¾" line. The nozzle should be out ahead of their body, with one hand firmly behind the nozzle coupling and the hoseline held tight under the opposite side armpit.

B. When turning the 2 ½" hoseline, the nozzle firefighter will have to make the turn by using their body, not just by moving the nozzle itself (as is done with the 1¾"). As the nozzle firefighter turns, the back-up firefighter must quickly move in the opposite direction into a position behind the nozzle firefighter, keeping the line as straight as possible.

C. By keeping the line as straight as possible (Figure 6), the hoseline itself will help overcome nozzle reaction. This will also decrease the chance of a kink developing behind the nozzle firefighter.

Figure 6

2.7.8 In the FDNY, there are two basic nozzle advancement techniques used: “Flow and Move” and “Stop and Flow”. Both of these techniques are effective with both the 1 ¾” hose and the 2 ½” hose.

2.7.9 ***“Flow and move”*** is a technique that involves opening the nozzle and advancing the line with the nozzle open and water flowing until extinguishment is reached. This is the standard technique taught in the FDNY Fire Academy and is effective in nearly all fire situations.

A. This technique makes for a rapid advance on the fire while providing a reduced temperature environment in which to travel. Additionally, temperature rebound does not occur, as the line will not be shut down and the fire will not have a chance to regain strength.

B. This technique provides for increased nozzle team safety by enabling the nozzle team to direct a flowing nozzle as the need arises, as in the situation of the discovery of an additional room of fire. It also allows the nozzle team to pace their rate of advancement to meet conditions encountered; once an area is cool enough to enter, the line can be quickly advanced.

C. By flowing water as the nozzle team advances down the hallway towards the fire area, the reach of the stream is being used to facilitate extinguishment. Additionally, surface cooling and gas contraction will be maximized, both of which contribute to effective extinguishment.

2.7.10 ***“Stop and Flow”*** is a technique that involves opening the nozzle and operating from a stationary position while extinguishing fire. The nozzle is then partially closed as the line is advanced further without water flowing. Upon reaching the next point of operation, the advance is stopped and the nozzle is re-opened for extinguishment.

A. This is the primary technique to be used when advancing a 2 ½” hoseline.

B. This technique is useful in situations where obstructions or other physical obstacles create a difficult path of advancement for the line, such as heavy clutter conditions. It is also useful when faced with fire in multiple, separate locations.

C. “Stop and Flow” has the effect of cooling an area so the nozzle can be further advanced to a position from which the main body of fire can be extinguished.

D. “Stop and Flow” should not be used when faced with heavy fire conditions or high heat. It requires sufficient knockdown of the fire to allow for the advancement of the line before the fire can regain strength.

2.7.11 The nozzle firefighter must constantly be aware of the need to sweep the floor ahead of the advancing nozzle team. This is true when using either nozzle advancement technique.

A. This should be a quick and deliberate side to side motion to achieve good coverage of the floor area ahead of the nozzle team.

B. Sweeping the floor will clear the path of debris, burning embers, and hot water. It also allows the nozzle firefighter to detect a change in the impact noise of the stream, which could indicate an obstacle or the lack of a solid floor ahead of the nozzle team.

C. The nozzle firefighter should sweep the floor (Figure 7) each time the nozzle team makes another forward push, and not just a single sweep when entering the fire area.

Figure 7

2.7.12 While operating, the nozzle firefighter can use the stream impact noise as a guide to which direction to advance or direct the hoseline.

A. The lack of impact noise, while operating the nozzle above the floor level, could indicate an opening such as a doorway or a window. Conversely, an increase in impact noise could indicate an obstruction and the need for the nozzle to be operated in a different direction. The nozzle firefighter should have the ability to ‘see what they hear’ when deciding on direction of the stream.

2.7.13 When advancing the hoseline, the nozzle firefighter should normally operate from a “knee-up” position, with one knee up in front of them and one knee down.

A. This position provides a stable platform that allows the nozzle firefighter to keep the hoseline in tight and close to their body as they operate. This is especially important in cluttered areas where unsure footing could cause the nozzle firefighter to lose balance.

B. This position also naturally forces the nozzle to be directed upward toward the ceiling, which causes the line behind them to be directed downward toward the floor. This can assist the nozzle firefighter in handling the nozzle reaction.

2.7.14 When using this “knee-up” position, the hoseline can be advanced using two methods:

A. ***Step forward*** - The nozzle firefighter can use the forward leg, which has the knee up, to step forward while lifting and dragging the other knee.

B. ***Alternating knees*** - The nozzle firefighter can roll one knee forward and down, while raising the other knee, thereby alternating knees which have contact with the hot floor surface.

2.7.15 As an alternative to the knee-up position, the nozzle firefighter can also operate with their front leg outstretched, while their other knee is down.

A. This method gives the nozzle firefighter a lower profile, which can provide more control of nozzle and direction of the stream. It also allows them to check the integrity of the floor surface ahead of the advancing hoseline.

B. However, the outstretched leg method can make it more difficult to continually advance the line, especially in clutter conditions.

2.7.16 While it is possible to operate the hoseline with both knees off the ground in a “duckwalk” technique, this can be difficult to execute while wearing bunker pants. The duckwalk was primarily used before the development of bunker pants, which provide the knees with a degree of protection that makes it possible for them to stay in contact with the floor.

2.7.17 Advancing a hoseline down a flight of stairs can be an especially challenging operation for the nozzle firefighter. While descending stairs with a hoseline, the following techniques should be considered:

A. Before advancing down the stairs, the nozzle firefighter should communicate with the back-up firefighter to ensure enough hose is available to reach the bottom of the stairs without delay.

B. Do not delay the descent once initiated, as a position on the stairway places the nozzle team in an exposed and dangerous area.

C. Keep one leg out in front to check for the presence and integrity of each step as you descend. Leaning back against a wall can help guide the descent.

D. If high heat is present, the nozzle should be kept open during the descent and lifted upwards to cool the stairway while descending.

2.7.18 If fire appears behind the nozzle team as it is advancing the hoseline, it must be immediately addressed. Fire behind the nozzle is a serious threat, as it blocks the egress of the nozzle team and any other members operating ahead of the nozzle.

A. This problem can be complicated if the nozzle team is operating in a narrow area that would prevent the nozzle firefighter from simply turning around to extinguish the fire behind them.

B. In this case, the nozzle firefighter should bend the hoseline back on itself and pass the line to the back-up firefighter, who is better positioned to extinguish the fire behind them. The nozzle firefighter will act as their back-up while they operate the hoseline.

C. When passing the nozzle back, the nozzle firefighter should be sure to turn towards the hoseline to avoid getting tangled in the line. The nozzle will pass overhead as it is bent back and should be maintained open, if possible.

D. Once the fire behind the nozzle team is extinguished, the back-up firefighter will similarly bend the line back in the original direction and pass the nozzle back to the nozzle firefighter to continue advancing the line.

E. It should be noted that the nozzle firefighter is not “giving up the line” in this case; they are simply working together with the other half of their nozzle team to temporarily address an immediately dangerous situation.

3. THE BACK-UP FIREFIGHTER

3.1 The back-up firefighter works together with the nozzle firefighter to form the "nozzle team" and is responsible for providing the nozzle firefighter with physical and moral support as the hoseline is advanced.

3.2 In addition to their standard size-up, the back-up firefighter should pay particular attention to the various factors that influence their ability to properly execute the stretch and flake out the hoseline. This includes sizing up the specific route of the stretch, as well as the size and location of public hallways and stairway landings.

3.3 Stretching the hoseline

3.3.1 The member assigned the back-up position is the second firefighter on the hoseline. This firefighter is responsible for removing the second length of hose from the hosebed and then proceeds, in unison with the nozzle firefighter, to the fire area. If the hosebed is maintained with the 2^{nd} length in a horseshoe, the back-up firefighter carries the second horseshoe. If there is no horseshoe, the back-up firefighter takes their length by grabbing the next 3 folds of the hosebed.

3.3.2 The back-up firefighter will drop and flake out their length of hose in coordination with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter's horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.

3.3.3 Once their length is properly deployed and flaked out, the back-up firefighter should also help flake out hose from the nozzle firefighter's length.

3.4 Charging the hoseline

3.4.1 Before the hoseline is charged the back-up firefighter should ensure the hoseline near the fire area is properly flaked out and that the nozzle firefighter has enough hose available to make an advance on the fire.

3.4.2 When the line is charged, the back-up firefighter should make a quick check for kinks and take a position behind the nozzle firefighter providing physical as well as moral support as the fire attack is commenced.

3.5 Operating the hoseline

3.5.1 It is the back-up firefighter's responsibility to absorb as much nozzle reaction as possible. This enables the nozzle firefighter to more effectively handle the nozzle and advance the line.

3.5.2 The back-up firefighter should avoid pushing the nozzle firefighter forward as they operate the line. Instead, they should work to absorb the backwards thrust of the nozzle reaction and advance at the pace set by the nozzle firefighter.

3.5.3 In order to achieve this, the back-up should be on the same side of the hose as the nozzle firefighter and as close as physically possible behind them (Figure 8).

Figure 8

3.5.4 In a situation in which the line is flowing but not advancing, the back-up firefighter can pin the line to the floor and achieve the same desired results (Figure9).

Figure 9

3.6 The back-up firefighter should be positioned so they can look forward as they advance. This allows the back-up firefighter to see what the nozzle firefighter sees and enables them to anticipate the nozzle firefighter's movements.

3.7 The back-up firefighter should maintain a firm grip of the advancing hoseline at all times. If this member was to lose control of the line, the reaction of the opened nozzle could pull it through the grasp of the nozzle firefighter and leave the nozzle team unprotected from the fire.

3.8 When the nozzle firefighter wants to change the direction or elevation of the stream, the back-up member should maneuver the section of hose behind the nozzle firefighter in the opposite direction. This is especially true when operating a 2 ½" handline, in which the back-up firefighter can hinder the operation if they do not coordinate their movements with the nozzle firefighter.

3.9 During the initial hoseline advance, the back-up firefighter should maintain the hoseline below the level of the operating nozzle and keep the line as straight as possible. Any change in direction could lead to a severe kink between the back-up firefighter and the nozzle.

3.10 In the event the advance of the hoseline is stalled due to insufficient available hose, the back-up firefighter may need to momentarily leave the nozzle firefighter to retrieve the hose necessary to continue the fire attack. This must be coordinated with the officer and nozzle firefighter.

4. THE DOOR FIREFIGHTER

4.1 The door firefighter is responsible for supplying the nozzle team with sufficient hose to make the fire attack and ensures the proper flaking out of the hoseline.

4.2 In addition to their standard size-up, the door firefighter should pay special attention to the particular route of the stretch and the size and location of areas to flake out excess hose.

4.3 Stretching the hoseline

4.3.1 The member assigned the door position is the third firefighter on the hoseline. This firefighter is responsible for removing the third length of hose from the hosebed and carrying it to an appropriate drop point in the hose stretch. If the hosebed is maintained with the 3rd length in a horseshoe, the door firefighter carries the third horseshoe. If there is no horseshoe, the door firefighter takes their length by grabbing the next 3 folds of the hosebed.

4.3.2 After dropping their hose, the door firefighter assists with flaking out the hoseline in preparation for it being charged. The door firefighter is also responsible to check the stretch for kinks while proceeding to the entrance of the fire area.

4.4 Charging the hoseline

4.4.1 The door firefighter should also identify any potential pinch points the hoseline will encounter. Any potential pinch point should be dealt with by placing extra hose in the area of the pinch point itself, prior to advancing to the entrance of the fire area. Such pinch points can include a stairway newel post, a doorway, or any abrupt turn.

4.5 Operating the hoseline

4.5.1 After the nozzle team enters the fire area with the charged line, the door firefighter takes a position at the entrance of the fire area and slowly feeds line into the advancing nozzle team. The door firefighter must not push the hoseline to the nozzle team, but instead provide enough slack in the line so that they can advance easily.

4.5.2 The door firefighter should maintain a bow in the section of hoseline between the door and the nozzle team. This tactic will allow the door firefighter to monitor the advance of the nozzle team by observing the straightening of the hoseline. As the hose straightens the member restores the bow in the line (Figure 10).

4.5.3 When maintaining bow in the line, avoid placing the hose high up against a wall where it will be subjected to high heat levels and possible burn through. Additionally, a firefighter attempting to exit the area by following the hoseline may lose contact with the hoseline if the bow is maintained high against the wall.

Figure 10

4.5.4 In large rooms or open areas, it may be possible to maintain a horizontal bow in the line, rather than a vertical bow. This will look like a large loop in the line, laid horizontally on the floor. As the line is advanced, the door firefighter can feed hose to the nozzle team the same way as with a vertical bow (Figure 11).

Figure 11

4.5.5 In larger apartments or private homes the door firefighter may be forced to move into the fire area to keep line of sight with the nozzle team. Maintaining visual contact with the nozzle team is necessary to ensure they are supplied with enough line as they advance.

4.5.6 If either member of the nozzle team requires relief or is injured, the door firefighter can quickly move into position and the attack on the fire can continue. The door firefighter should consider leaving their flashlight on which would serve as a guide for members exiting the fire area.

4.5.7 An important task of the door position is to monitor and observe heat, smoke and fire conditions at the entrance doorway. Undetected or extending fire could suddenly erupt or appear between the entrance and the nozzle team. The door firefighter is in a prime location to detect this situation and warn the nozzle team. This position at the entrance to the fire area also gives the door firefighter the ability to monitor and warn the firefighters going above the fire in the case of a sudden change in conditions or water loss.

5. THE CONTROL FIREFIGHTER

5.1 The member assigned the control position is the last firefighter on the hoseline. The control firefighter's primary function is to ensure the correct amount of hose is stretched to enable the nozzle team to advance to the seat of the fire.

5.2 The success of an engine company hoseline operation relies greatly upon the actions of the control firefighter. Where possible, only experienced and knowledgeable firefighters should be assigned the control position. This will assure a more accurate hose estimate and removal from the apparatus.

5.3 In addition to their standard size-up, the control firefighter should pay special attention to the route of the stretch and the various factors that influence the number of lengths of hose required to reach the fire area. This includes sizing up the location of the fire apartment, type of stairway present, and any possible obstacles in the stretch.

5.4 Estimating the stretch

5.4.1 The control firefighter is responsible for the accurate estimation of the amount of hose to be stretched. Their objective is to ensure enough hose is stretched to reach the seat of the fire, while minimizing the number of excess lengths used. Excessive hose increases both friction loss and the potential for kinks, which can cause a considerable reduction in both flow and stream quality at the nozzle.

5.4.2 The control firefighter must pay close attention to the particular route of the stretch in order to accurately estimate the amount of hose to be used. This includes consideration of the following:

A. Distance from apparatus to building entrance.

B. Distance from building entrance to foot of stairs.

C. Type of stairs to be used.

D. Number of floors to ascend or descend.

E. Distance to fire area from stairs or building entrance.

F. Size of fire area.

5.4.3 When estimating the amount of hose to be used, the distance involved in each of the building features listed above needs to be accounted for. The following are guidelines to be considered:

A. At least 1 full length of hose is needed to cover the fire area. Larger apartments or fire areas may require 1 ½ lengths.

B. Roughly 1 length is needed to travel up (or down) 1 floor.

C. For a wrap-around stretch, roughly 1 ½ lengths are needed to travel 1 floor.

D. For a well hole or rope stretch, 1 length of hose stretched vertically can travel roughly 5 floors.

E. Generally, return type stairs may require more hose than straight run stairs.

5.5 Controlling the stretch

5.5.1 To effectively control the hose stretch, the control firefighter must remain last in the stretch. This is true even when they are assisted by another unit in the stretch. When the 2nd engine arrives to assist the stretch, the 1st control firefighter should not delegate or transfer the control position to the 2nd control firefighter. Instead, they should maintain a position at the hose bed and complete the hose estimate and removal.

5.5.2 The control firefighter's position at the hosebed is especially critical when performing a backstretch, as the ECC may be waiting for the necessary hose to be removed prior to proceeding to a hydrant.

A. If the control firefighter was to abandon this position, it may delay the ECC in securing a water source. It may also give the ECC the false impression that sufficient hose has already been stretched, which could lead to the apparatus being prematurely repositioned to a hydrant. If this occurs before enough hose is removed, a short stretch could result.

B. To avoid the above mistakes, direct face to face communication between the control firefighter and ECC regarding the number of lengths removed should take place prior to moving onto the hydrant.

5.5.3 The control firefighter shall remove hose from the hosebed in a manner that allows for later arriving firefighters to easily pick up their length of hose in the street.

A. After the nozzle, back-up, and door firefighter take their lengths from the hosebed, the control firefighter shall remove additional required lengths of hose individually and place them on the ground in the direction of the stretch. Later arriving firefighters can more readily stretch these lengths, as needed.

B. The control firefighter should avoid simply pulling hose off the hosebed and piling it on the ground. This complicates the stretch and delays the positioning of the line.

5.5.4 After sufficient hose is removed from the hose bed, the line must be broken and connected to a pump discharge outlet. The control firefighter must inform the ECC of the size of hose, total number of lengths stretched, and which floor the hose is stretched to.

A. If a backstretch is performed, once sufficient hose has been stretched, the control firefighter will signal the ECC to proceed to the hydrant to be used. At this point, the line will be broken and connected to a discharge outlet.

B. When a second hoseline is dropped at the same time as the first hoseline, the control firefighter must be sure to correctly identify to the ECC which hoseline each unit is operating.

5.5.5 If the hydrant used is in close proximity to the fire building, the control firefighter may assist the ECC with hydrant connection after controlling the hose stretch. This should only occur after the hose stretch has been completed.

A. If in-line pumping is used, the control firefighter may similarly assist the ECC with connections as necessary after the stretch is completed.

5.6 Charging the hoseline

5.6.1 After sufficient hose has been stretched and the ECC does not require their assistance, the control firefighter should assist in flaking out hose between the apparatus and the building entrance door, in addition to feeding slack toward firefighters ahead on the line. In doing this, they should remain mindful of the following:

A. Minimize the number of turns made by the hoseline outside the building.

B. Hose should not be stretched or flaked out in the middle of the street.

C. If apparatus positioning or the presence of cars makes stretching in the street difficult, bring the hoseline onto the sidewalk close to the apparatus and stretch by way of the sidewalk.

D. If the hoseline needs to cross the street, cross over as close to the fire building as possible, while remaining mindful of ladder company positioning.

E. Leave room for the hoseline to move around any obstructions or pinch points, such as parked cars, trees, fences, or doorways. Be especially mindful of car tires, which can easily snag the hoseline.

5.6.2 Once the line is charged, the control firefighter will eliminate kinks in the hoseline as they move along the line toward the fire area. This may require repositioning of hose in halls and stairways and straightening any bends that are restricting the water flow.

5.7 Operating the hoseline

5.7.1 Once the line is charged and the stretch is checked for kinks the control firefighter should take a position at the entrance to the fire area, this allows the door firefighter to move into the fire area allowing them to better supply the nozzle team with line.

5.7.2 When an engine is staffed with four firefighters the control firefighter will also assume the responsibilities of the door firefighter.

5.8 Standpipe operations

5.8.1 The responsibilities of the control firefighter differ significantly when the hoseline is stretched from a standpipe outlet. In this case, the control firefighter is responsible for supplying the proper pressure to the hoseline from the outlet.

5.8.2 The control firefighter's responsibilities at a standpipe operation are fully discussed in *Chapter 8: Standpipe Operations*.

6. 2ND ARRIVING ENGINE

6.1 Generally, the backstep of the 2nd arriving engine will assist the 1st arriving engine in stretching and operating the 1st hoseline. Members should maintain their assigned order as they assist in the stretch, with the nozzle firefighter closest to the 1st arriving company, followed by the back-up, door, and control firefighters

6.2 If the 2nd engine arrives on scene before the 1st engine begins the stretch, they should join the 1st arriving engine at the back of the apparatus and assist in the stretch. If necessary, members of the 2nd arriving engine should carry a full length each by grabbing 3 folds of hose from the hosebed. This may be needed for a long stretch.

6.3 If the 2nd engine arrives after the 1st engine has begun stretching, the 2nd arriving members should begin assisting with the stretch only after they have confirmed the position of the 1st arriving engine and the progress of the stretch. This may require the 2nd arriving members to enter the building and follow the line to determine the progress made by the stretching members.

6.4 When backing up a hoseline in operation, the members of the 2nd arriving engine should ensure the smooth advance of the hoseline. This will require the members be positioned in proximity to the 1st arriving company, while remaining adequately spaced out on the hoseline.

6.5 However, members of the 2nd arriving engine should also strive to conserve air and remain outside of an IDLH atmosphere as much as possible, as they may be assigned to relieve the 1st arriving engine on the nozzle at a prolonged operation. Their position should consider both the need to advance the charged line and the need to conserve air for possible relief.

7. LATER ARRIVING ENGINES

7.1 For later arriving engine companies at a fire operation, the hoseline operations of the members of the backstep will be determined by whether the company is stretching and operating their own hoseline, or whether they are the company backing the hoseline up.

7.2 Engine companies that are stretching and operating their own hoselines should operate similar to the 1st arriving engine company, as described above.

7.3. Generally, this will include the 3rd arriving engine, who is usually responsible for stretching and operating the 2nd hoseline at a fire operation.

7.4. Any company stretching their own hoseline must determine the destination of their hoseline and the location of the apparatus from which they will stretch the hoseline. Depending on the location and availability of engine apparatus, this may not necessarily be the same apparatus from which the 1st hoseline was stretched.

7.5 Engine companies that are backing up additional hoselines should operate similar to the 2nd arriving engine company, as described above. They must confirm the identity of the unit who is stretching the hoseline they will be backing up.

STRETCHING HOSELINES

1. STRETCHING HOSELINES

1.1 In the FDNY, the primary method of fire extinguishment is by way of a hoseline hand-stretched from the engine apparatus. The method used to stretch the hoseline depends on a variety of factors, including the fire situation encountered, building construction, and stairway type.

1.2 When stretching hoselines from an apparatus, the FDNY stretches either 1 ¾" hose or 2 ½" hose to extinguish fires. The decision of which line to stretch is made by the engine officer and is further discussed in *Chapter 4: The Engine Company Officer*. All of the hose stretching techniques discussed in this chapter are effective for stretching either size hoseline.

1.3 The placement of the hoseline and the path of travel are also determined by the Engine Officer and are also discussed in *Chapter 4: The Engine Company Officer*. However, the 1st and 2nd hoselines are generally stretched to the fire area by way of the building's primary means of egress.

1.4 The interior placement of the first hoseline by way of the primary means of egress provides protection for evacuating occupants and firefighters alike, while allowing direct fire extinguishment. However, in some situations (cellar fire in a private dwelling, fire in a place of worship, etc.), hoselines are stretched by way of the entrance which provides the quickest access to the fire.

Note: At an advanced cellar fire in a non-fireproof structure (OLT, taxpayer, row frame, etc.) it is frequently safer and more efficient to initially attack the fire using an exterior entrance if such access exists. Members must be mindful of the fact that operating directly above an uncontrolled cellar fire is an extremely hazardous operation as the possibility of floor collapse is greatly increased in these situations.

1.5 Depending on the occupancy and conditions encountered, the first hoseline may either be flaked out and charged outside the fire building, or it may be stretched into the fire building and flaked out in a safe area in proximity to the fire area before it is charged.

1.5.1 Generally, the hoseline is charged outside the fire building for fires in buildings that do not contain public hallways or stairs which are separated from the occupancy areas. This includes private dwellings, places of worship, taxpayers, and similar occupancies. This tactic may also be necessary if units are met with fire at the main building entrance of any occupancy type.

1.5.2 For fires in buildings that contain public hallways or stairs which are separated from the occupancy areas, like multiple dwellings, lofts, and similar occupancies, primary hoselines will be stretched dry inside the fire building and will be flaked out and charged in a safe area as close to the fire area as practical.

1.6 When stretching hoselines inside the fire building, the most critical factor in determining the manner in which the first and second hoselines are stretched is the type of interior stairs to be used. The concerns that are of the greatest consequence for stretching hoselines are the following (which will be further described in the sections below):

1.6.1 Does the stairway provide a safe area to operate from?
(*Is the stairway open, or enclosed?)*

1.6.2 What portion of the building does the stairway access?
(*Is the stairway transverse, wing, or isolated?)*

1.6.3 Is the layout on each floor identical in relation to the stairway?
(*Are return stairs present? Scissor stairs?)*

1.6.4 Does the layout of the stairway complicate the stretch, or can it make it easier?
(*Is there a well hole? Does it wrap around an elevator shaft?)*

2. TYPES OF STAIRWAYS

2.1 Each of the concerns listed above should be determined when a stairway is to be used to stretch a line. This is accomplished by categorizing the stairway based on the following questions:

2.1.1 Is the stairway open, or enclosed?

2.1.2 Is the stairway straight run, return, or scissor stairs?

2.1.3 Is the stairway transverse, wing, or isolated?

2.1.4 Does the stairway have a well hole?

2.1.5 Does the stairway wrap around an elevator shaft?

2.2 Each stairway type is further described in the sections below.

2.3 Open Stairways (Figure 1)

2.3.1 Open stairways are directly exposed to the public hallway and generally extend from the ground floor to the roof. They do not have doors separating them from the public hallway and cannot be isolated to provide a safe area on the fire floor.

2.3.2 It is common to have a roof vent at the top of an open stairway (skylight, bulkhead, scuttle, etc.), which can be used to relieve the early upper level smoke travel that is common in an open stairway.

2.3.3 The floors above the fire will become quickly filled with smoke, which can complicate stretching and operating additional hoselines on upper floors.

Figure 1

2.4 Enclosed stairways (Figure 2)

2.4.1 Enclosed stairways are separated from the public hallway on each floor by a door (Figure 3). If conditions in the public hallway are untenable, this stairway door can be controlled to provide a safe area from which to operate on the fire floor.

2.4.2 This stairway provides a barrier to smoke travel and allows safe passage for egress on all floors (in stairways other than the attack stair).

2.4.3 Smoke conditions on floors above the fire can be less severe in the case of an enclosed stairway, as each floor will be isolated from the path of smoke travel.

Figure 2

Figure 3

2.5 Straight run stairways

2.5.1 Straight run stairways are stairs that run in a single direction from floor to floor (Figure 4). As a result, the entrance to the stair at the bottom of the stairway will not be directly beneath the exit from the stairway on the floor above.

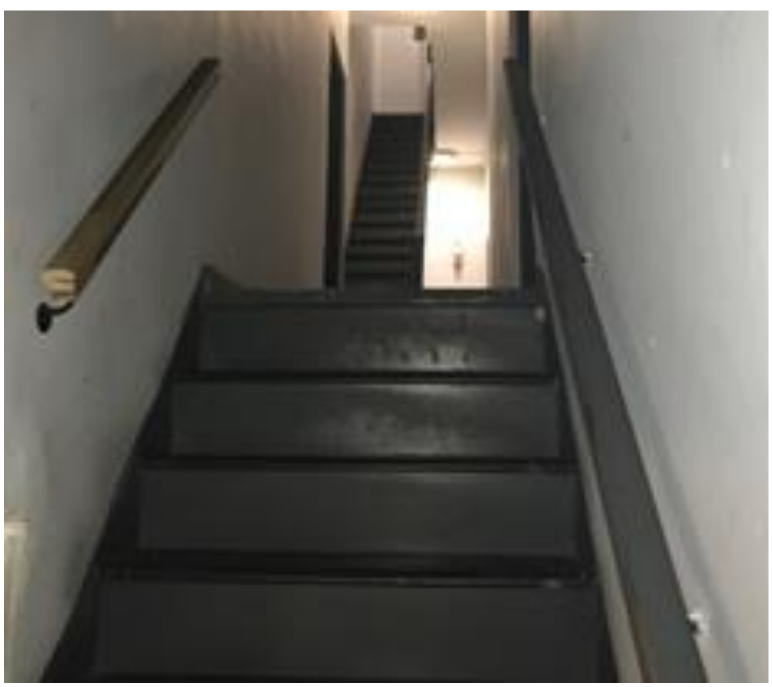

Figure 4

2.5.2 Typically, these stairs are stacked over each other in most buildings. Sometimes, the straight run stairs are oriented so the stairway is a continuously straight run for a number of floors. While climbing a continuous straight run staircase, the access point on each floor will be increasingly further away from the original stairway entrance. This type of stairway can be found in loft buildings and other large occupancies (such as theaters).

2.6 Return stairways

2.6.1 The defining characteristic of a return stairway is that the stairway's access point is located at the same place on each floor. When using this stairway, you will "return" to the same spot when you enter each floor.

2.6.2 Return stairs generally exist in one of three possible orientations: straight run stacked stairs, half-landing return stairs, or wrap-around stairs.

2.6.3 Straight run stacked stairs involve a straight run stairway connecting each floor. However, the stairway is not continuous; to continue up the stairway, you will have to walk down a hallway on each floor to return to the bottom of the next flight. The result is a series of straight run stairs oriented in the same direction and stacked on top of each other.

2.6.4 Straight run stacked stairs (figure 5) can be found in a variety of occupancies, but are common in brownstones, old law tenements, and some styles of private dwellings.

Figure 5

2.6.5 Half-landing return stairs have a platform (half-landing) between floors, which allows the stairway to change direction and return to the same access point location on each floor. In effect, there are two sets of stairs between each floor: one going from the floor to a half-landing, and another going from the half-landing to the next floor (facing the opposite direction).

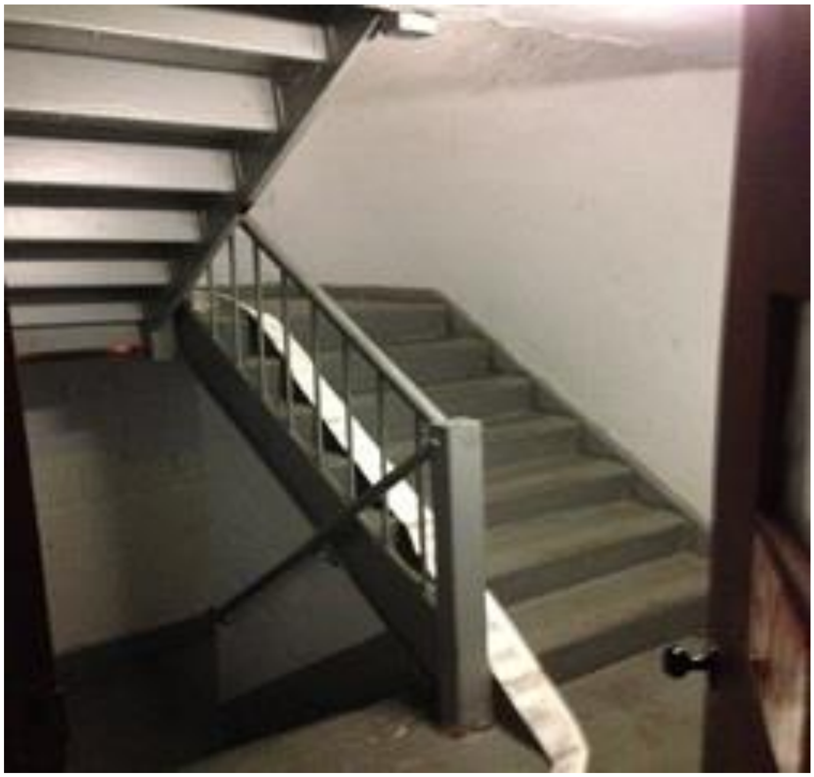

Figure 6

2.6.6 Half landing return stairs (Figure 6) can be found in a variety of occupancies, but are commonly found in new law tenements, larger apartment houses, and high-rise multiple dwellings (including Class 2 buildings).

2.6.7 It is possible for a half landing return stair to have more than one platform (half-landing) between floors. If there is more than one change-of-direction platform, the result will be a "wrap-around" staircase that wraps around between floors as it returns to the same access point on each floor.

2.6.8 These "wrap-around" stairs can exist in larger buildings of various occupancies, including new law tenements and larger apartment houses. The stairway may wrap around an elevator shaft, or it may have a large well-hole.

2.6.9 Wrap-around staircases (Figure 7) can have one or more half-landings between floors. In either case, it will also be necessary to walk around the remaining turns on each floor to access the next flight of stairs. In essence, these wrap-around stairs combine the elements of straight run stacked stairs and half-landing return stairs. When wrapped around an elevator shaft (or other obstruction), wrap-around stairs present a challenging stretch.

Figure 7

2.7 Scissor stairs

2.7.1 Scissor stairs are a series of continuous stairs (Figure 8) that change direction at each floor. A flight of stairs will run in one direction up to the next floor where a landing is found, allowing the stairway to change direction. The direction of the stairway changes at the landing and the next flight of stairs will be oriented in the opposite direction. These stairs are continuous in the sense that you don’t have to leave the stairway to continue to the next floor.

2.7.2 The result is that the stairway access point in the public hallways will not be the same on each floor. Rather, the location of the access point will alternate from floor to floor. However, the access point on alternating floors will be in the same location (if you climb two flights up, the stairway exit will be in the same location). This can be a source of confusion at a fire operation.

Figure 8

2.7.3 Typically, scissor stairs exist in pairs; there will be two stairways that mirror each other as they continue from floor to floor. The staircases will crisscross as they go between floors and their access points will be at opposite (Figure 9) and alternating locations on each floor.

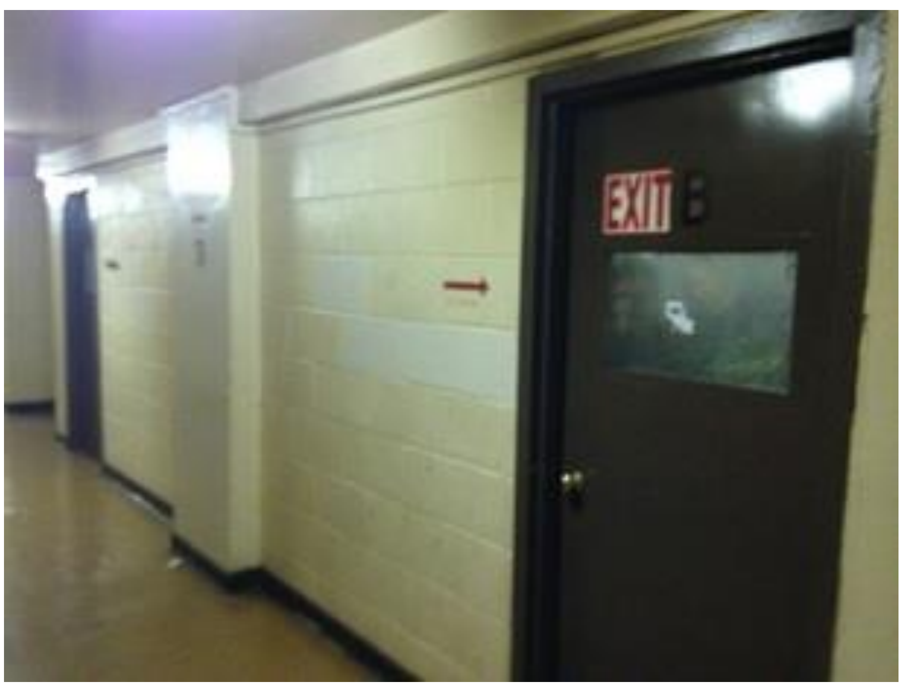

Figure 9

2.7.4 Scissor stairs must be properly labelled. Mislabeled scissor stairs can cause great confusion at an operation. Each stairway should have the same letter designation throughout its span; it does not alternate as you climb from floor to floor. Instead, the orientation of the lettered staircases in relation to each other on each floor will alternate. The Incident Commander must be notified immediately when members find stairs mislabeled at an operation so that all units can be made aware of this matter.

2.7.5 Scissor stairs are most commonly found in high-rise multiple dwellings, high-rise commercial buildings, and other large occupancies. They can also be encountered in various styles of newly constructed low-rise multiple dwellings.

2.8 Transverse stairs

2.8.1 Transverse stairs are stairways that provide access to all apartments on a floor. By using a transverse stairway, access is possible to all apartments.

2.8.2 Transverse stairs are a key concern in buildings with multiple stairways, such as new law tenements or larger apartment houses. Typically connected by a "transverse hallway", these stairs are often located at the ends of the hall. The hallway allows members to transverse to all apartments and all stairways.

2.9 Wing stairs

2.9.1 Wing stairs are stairways that provide access to only the apartments found in a specific section (or "wing") of a building. By using wing stairs, there will be apartments in the building that cannot be accessed.

2.9.2 Wing stairs can access a "wing hallway", which only provides access to apartments in that specific section (wing) of the building. While smaller than transverse hallways, these wing hallways are often large enough to accommodate flaking out hose.

2.9.3 Wing stairs are often found in new law tenements and larger apartment houses and are a key concern when stretching hose. Care must be taken to ensure the correct stairway is used to access the fire apartment.

2.10 Isolated stairs

2.10.1 Isolated stairs are stairways that access only a small number of apartments and are isolated from other areas of the building. By using isolated stairs, there will only be access to the apartments immediately accessed by the stairs.

2.10.2 There is typically no hallway associated with isolated stairs. Rather, these stairs open onto a landing on each floor, from which the apartments are accessed. This landing area can be small and may present difficulty in flaking out hose.

2.10.3 Isolated stairs can be found in a number of building types, including new law tenements, apartment houses, and other newly constructed multiple dwellings. When faced with isolated stairs, care must be taken to ensure the correct stairway is used to access the fire apartment.

2.11 Well hole stairway

2.11.1 While a "well hole stairway" is not a specific type of stairway in a strict sense, the presence of a well hole is a critical concern when stretching hose. A well hole stretch can save time, energy, and minimize the amount of hose needed.

2.11.2 A well hole is the empty area in the center of the stairway that serves as a vertical void spanning the length of the stairs. If the space is large enough, this area can be used to aid in the hose stretch.

2.11.3 Well holes can exist in all three types of return stairways (straight run stacked stairs, half-landing return stairs, or wrap-around stairs) and may also exist in some scissor stairways.

3. TYPES OF STRETCHES

3.1 Typically, at fires above the first floor, the first hoseline at a fire operation is stretched by way of the main building entrance and the interior stairs. This is done to protect the primary means of egress.

3.2 However, there may exist specific building characteristics or situational considerations may necessitate a variation from stretching via the primary means of egress and an alternative method may be appropriate (such as a rope stretch or fire escape stretch). Buildings where these alternative methods may need to be employed should be identified in CIDS.

3.3 The following sections describe various techniques to stretch hoselines using different types of interior stairways and various techniques of exterior stretches.

4. TRADITIONAL STAIRWAY STRETCH

4.1 In a traditional stairway stretch, the hoseline is stretched by carrying the hose up the interior stairway and to the fire area (Figure 10). As the hose is stretched, each member carries their length (in folds or a horseshoe) and the hose plays out on the stairway behind them.

Figure 10

4.2 In this type of stretch, two critical concerns are managing the turns on the staircase and determining the proper drop point for the length of hose carried by each member.

4.3 To properly manage the turns on the stairway, the hose should be carried in the outside arm of the stretching members. This will help the members make wide turns with the hose as they climb the stairs. This is important because, if stairway turns are taken too tight, the hose can get caught on the turns as the members climb. If this happens, the back-up firefighter or other members may have to go back to loosen the hose around the caught turn.

4.4 The nozzle firefighter will carry their length (folds or horseshoe) intact to the point of deployment, which will be as close to the fire area as possible. They should keep their length intact to be used in the fire area itself. If the hallway is tenable and if there is enough room, the hose should be flaked out in the hall.

4.5 If there is not enough room in the hallway on the fire floor, the length can be flaked up to the half-landing (if present) or all the way up to the next landing. Hoselines can also be laid out in adjoining apartments (on the same side as the fire apartment) on the fire floor if additional space is needed. Alternatively, the hose can be flaked out on the floor below the fire and advanced up to the fire floor.

4.6 If the public hallway on the fire floor is untenable the hoseline may need to be flaked out and charged on the floor below the fire.

4.7 The back-up firefighter carries their length (in folds or a horseshoe) and must determine the proper drop point at which to deploy their length. This should be coordinated with the nozzle firefighter. The proper deployment of the length of hose contained in the back-up firefighter's folds or horseshoe is essential, as it is the hose the nozzle firefighter will need to reach the fire area with their full length intact.

4.7.1 The location of the back-up firefighter's drop point will depend on the distance of the fire area from the stairway. If the hallways are long, this may be on the fire floor. If the hallways are small, or if the fire area is close to the stairway, the back-up firefighter may need to drop their length on the floor below the fire.

4.8 Similarly, the hose carried by the next firefighter in the stretch should be deployed at the proper drop point. This will depend on the type of stairway present, as some stairways can require more hose than others. Generally, the next length of hose should be dropped on a floor below the fire.

5. WELL HOLE STRETCH

5.1 The presence of a well hole in the stairway makes it possible to execute a well hole stretch as an alternative to a traditional stairway stretch. This type of stretch will use significantly less hose, will take less time, and will be less physically demanding, while still protecting the primary egress of the building.

5.2 In order for the well hole to be used, it must be large enough to accommodate the hose. An effective test for size is a closed hand (Figure 11); if you can fit your gloved fist inside a well hole, it should be large enough to execute a well hole stretch.

Figure 11

5.3 The presence of a well hole does not require the execution of a well hole stretch. The decision to use the well hole is made by the engine officer and should be clearly communicated to the members executing the stretch.

5.4 Before the decision is made to use the well hole, be sure the path of the well itself is clear. This is accomplished by looking up from the bottom of the well. Obstructions in the well hole (such as metal bars) can complicate the stretch. Also, be sure the well continues above the first floor, as variations in layout may impact the well hole. Conversely, be mindful that variations in layout may create a well hole that begins on the 2^{nd} floor. If desired, the well hole stretch can begin from that point.

5.5 The engine officer should also determine the point at which the hose will be pulled out of the well and flaked out for fire attack. This point should be in a safe area as close to the fire apartment as practical. Most commonly, this will be on the floor below the fire (or half landing) and stretched to the fire apartment by way of the stairs. In larger buildings, it may be possible to pull the hose out of the well hole and secure it on the fire floor, if the stairs are sufficiently remote from the fire apartment to allow for members to flake out the required lengths and secure the hose.

5.6 Before the hose is secured, the engine officer must confirm that enough hose is available on the fire floor to reach the fire area.

5.7 ***Well hole technique 1: Nozzle firefighter carries their length***

5.7.1 The nozzle firefighter will carry their entire length intact to the fire apartment, where it will be flaked out for fire attack. Only the "tail" of the hose that leads from the nozzle length towards the back-up firefighter should be placed inside the well. There is no need to carry the folds or horseshoe in the well hole itself.

Figure 12

5.7.2 This is best accomplished by carrying the length in their outside arm as they walk up the stairs. This allows the nozzle firefighter to use their inside hand to guide the "tail" of the hose into the well and avoid obstructions (such as newel posts).

5.7.3 By using this technique, the entire lead length can be carried up to the fire floor intact, regardless of the size of the well. The "tail" hose of the nozzle firefighter's length can easily fit in a narrow well. This ensures an entire lead length of hose is readily available to cover the fire apartment and eliminates the need for the nozzle firefighter to hoist an entire length of hose up the well.

5.7.4 Before the nozzle firefighter can begin climbing the stairs, there needs to be a length of hose available at the bottom of the well. This is the hose that will be hanging in the well hole. This hose will be provided by the back-up firefighter, who will drop their length at the base of the well. As the nozzle firefighter begins to climb the stairs, the back-up firefighter should ensure the smooth advance of hose up the well hole.

5.7.5 Upon arrival at the fire floor, the nozzle firefighter will set their length aside (keeping it intact), step on the hose to prevent it from falling down the well, and pull up any additional hose needed on the fire floor, being mindful that their entire lead length should be reserved for advance into the fire apartment. If there is enough room in the hallway, line can be more easily pulled up by simply walking with the hose away from the well hole.

5.7.6 Once enough hose is on the fire floor, the hose hanging in the well hole needs to be properly secured using a hose strap. A girth hitch is placed around the hose, and the hook/carabiner is used to secure it to the stairway railing. Allow the weight of the hose to hang freely on the hose strap to ensure it is properly secured. Ideally, the hose strap should be placed just below a hose coupling, but this exact placement is not necessary.

Figure 13A

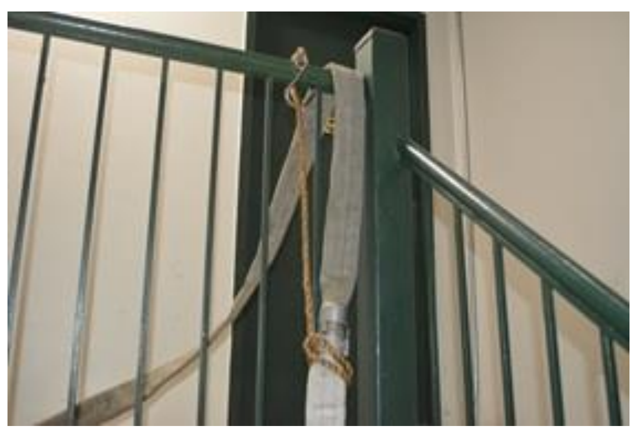

Figure 13B

5.7.7 Once the hose is secure, the nozzle firefighter should pick up their length, carry it intact to the fire apartment, flake it out, and prepare to advance, as described in *Chapter 6: The Backstep*.

5.7.8 As the stretch is being executed, the back-up firefighter should ensure the smooth deployment of hose up the well hole and make their way up to the fire floor as soon as practical. Once there, assist the nozzle firefighter in pulling up the necessary hose, securing the hose strap, and flaking out the hose before preparing to advance as in *Chapter 6: The Backstep*.

5.8 ***Well hole technique 2: Nozzle and back-up firefighters both carry their lengths***

5.8.1 When conditions allow, a more efficient alternative to the above evolution would allow both the nozzle and back-up firefighters to carry their lengths up the stairs (Figure 14). This technique should be considered when the floors are larger and more hose is required on the fire floor.

Figure 14

5.8.2 To do this, the control (or door) firefighter would supply the length of hose at the bottom of the well hole and guide the hose up the well. This is the 3rd length in the stretch and the control (or door) firefighter would stretch it to the base of the well hole behind the nozzle and back-up firefighters.

5.8.3 With the 3rd length on the floor at the bottom of the well, both the nozzle and back-up firefighters will carry their lengths up the stairs (in their outside arms) and the "tail" of the back-up firefighter's hose would be placed inside the well, as described above. The "tail" of the nozzle length will hang between the nozzle and back-up firefighters on the stairway as they climb. Working together, the nozzle and back-up firefighters would then carry two entire lengths up to the fire floor, being careful not to entangle the hose hanging between them.

5.8.4 Upon reaching the fire floor, two lengths will already be present, so it is likely that no additional lengths will need to be pulled up. The hose can be secured using the hose strap and the line stretched to the fire apartment as described above.

5.9 *Well hole technique 3: Nozzle firefighter carries nozzle only*

5.9.1 When there is an obstruction in the well hole, the line will need to be passed around the obstruction at every turn. Such an obstruction may be a pole or other construction feature. If there is a hoseline already stretched in the well hole, it will also be an obstruction. For this reason, a second hoseline stretched in a well hole should be executed as described below.

Figure 15

Figure 16

5.9.2 Even if it is possible to pass an entire length around an obstruction, it is not easily accomplished and greatly complicates the stretch. To avoid this, the nozzle firefighter should drop their length at the base of the well hole and carry only the nozzle itself up the well, passing it around the hanging hose (or other obstruction) as necessary.

5.9.3 Upon arrival on the fire floor, all hose required for operation will need to be hoisted up and properly secured. This is likely at least 2 lengths, as at least one length will be needed to reach the fire area and another entire length will be needed to cover the fire area itself.

5.9.4 The hose can be secured using the hose strap and the line stretched to the fire apartment as described above.

6. ROPE STRETCH

6.1 If the stairway is not to be used to stretch the hoseline, an alternative method is to use a rope to hoist the hoseline into position. This can commonly occur when two lines have already been stretched on a single stairway, or when a hoseline is stretched to a roof.

6.2 The decision to execute a rope stretch is made by the engine officer and should be clearly communicated to the members executing the stretch.

6.3 In some cases, the first hoseline may be stretched using a rope stretch. This may be appropriate when a rope stretch would greatly facilitate line placement due to unique building characteristics or other similar circumstances. In this case, the engine officer should be aware that the primary egress to the building will not be fully protected. Buildings where these alternative stretches may need to be employed should be identified in CIDS.

6.4 To execute a rope stretch, the engine officer carries the rope to the drop location to which the hose will be hoisted. This will be a window (or similar opening), balcony, or roof parapet. The officer must ensure windows are sufficiently opened, which may involve removing child gates or other obstructions.

6.5 The rope is carried in a bag or a similar container. Commonly, a modified bleach bottle may be used (this evolution is sometimes called a "bottle stretch").

6.6 The hoseline will be stretched to a point directly below the drop location and the nozzle and back-up firefighters will arrange their lengths neatly on the ground (Figure 17). The back-up should be careful not to place their hose on top of the nozzle firefighter's hose.

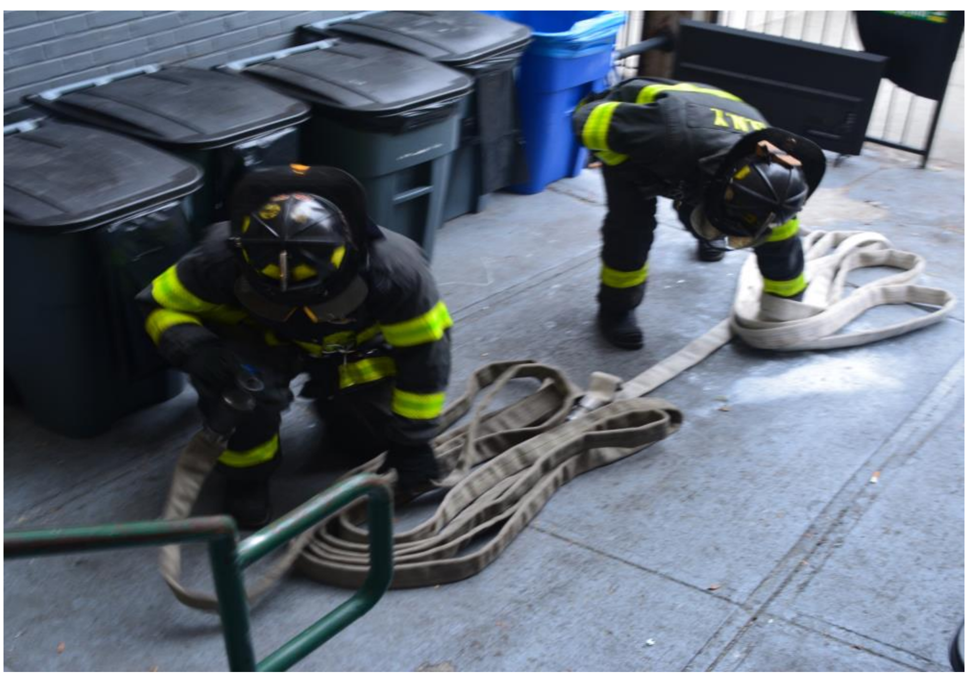

Figure 17

6.7 If the hose is going to be stretched from outside the building, the nozzle and back-up firefighters will drop their lengths on the ground outside the building, directly underneath the drop point.

6.8 A rope stretch may also be executed from inside the building. This can be beneficial in cases of long and difficult stretches (such as a wrap-around stretch) and would require a window available on the ground floor, in addition to another window available directly above this window to serve as the drop point.

6.8.1 If the hose is going to be stretched from inside the building, the nozzle and back-up firefighters will carry their lengths inside the building and neatly drop them next to the window to be used on the ground floor.

6.8.2 The rope will be lowered to this window from the drop point above and the nozzle firefighter will pull the rope into the window on the ground floor and secure their length of hose (as described below).

6.8.3 The rope will then be lifted out of the window on the ground floor and hoisted up to the deployment point above. On the ground floor, the hose should pass through the upper pane of the window, while the hose should pass through the lower pane on the upper floor.

6.9 The engine officer will send the rope to the members below. This can be accomplished two different ways:

6.9.1 ***Toss the rope -*** The officer can hold the working end of the rope and toss the rope container itself to the members below. This may be necessary if the rope needs to be thrown a distance away from the building, but it introduces the possibility of the rope becoming caught in an obstruction, or not reaching the ground if it does not play out of the container properly. It also requires the members in the street to make a more complex knot to secure the hose.

6.9.2 ***Lower the rope -*** The officer can lower the working end of the rope to the members below, keeping the container upstairs with him. This ensures a smooth play-out of the rope as it is lowered and allows the members below to use a carabiner or clip on the working end of the rope to secure the hose.

6.10 Once the rope reaches the ground, the nozzle firefighter secures it to the hose. If the working end of the rope is lowered, this can be done using a carabiner or clip, if present. If there is no carabiner or clip, a clove hitch or slipknot can be tied to secure the hose. If the working end is not lowered, the hose will need to be secured in the middle of the rope. To do this, either a slip-over clove hitch or a slipknot can be used (Figure 18 and Figure 19).

Figure 18

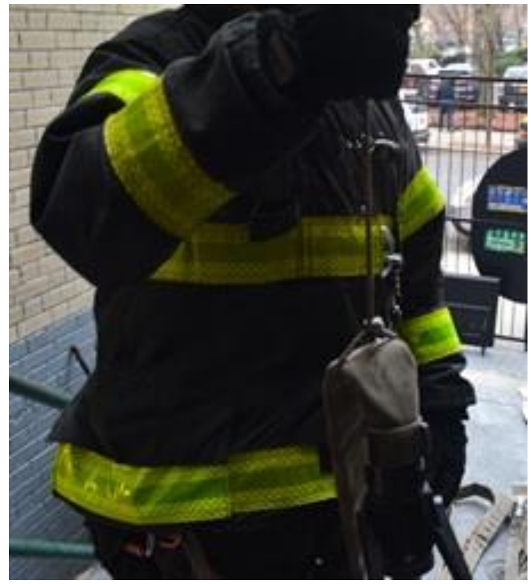

Figure 19

6.11 When the hose is secured, the rope is hoisted up. The engine officer may start this process, but either the nozzle or back-up firefighter should make their way to the drop point as soon as possible to hoist the hose up. Enough hose will need to be hoisted to reach and cover the fire area.

6.12 When available, a hose roller can be used to help hoist the hose. This will remove the friction of pulling the hose over the window or roof edge. The hose roller is placed over the window sill (or roof edge) and serves as a channel through which hose is pulled, allowing it to roll smoothly over the edge. When the hose roller is used, the attached rope should be properly secured with a substantial object knot.

6.13 One member should stay at ground level to ensure enough hose is available below the drop point to allow for a smooth and complete stretch (Figure 20).

Figure 20

6.14 Once sufficient hose has been hoisted into the window (or onto the roof), the hose must be properly secured. This should be done directly below a hose coupling. Generally, a hose strap secured to a substantial object inside the building will effectively secure the hose.

6.15 At higher elevations, the increased weight of the hose may make it necessary to use a rolling hitch to secure the hose. The rolling hitch is used when the weight of the line hanging vertically is heavy enough to cause the hose to kink when a hose strap is used. The width of the rolling hitch (wrapped 4 times around the hose) prevents such kinking. When used, the rolling hitch must be properly tied directly below a hose coupling and properly placed in a vertical position outside the window. It is anchored with a substantial object knot inside the building.

6.16 Once the line is secured, the nozzle and back-up firefighters will stretch and flake out their hose for fire attack, as described in *Chapter 6: The Backstep*.

7. WRAP-AROUND STRETCH

7.1 When stretching up a wrap-around stairway, the technique used needs to be modified somewhat from the traditional stairway stretch. Due to the additional turns in the stairway and limited visibility, these stretches are more time consuming, demand greater coordination, and require additional hose.

7.2 These stairways require 4 turns to be made for each floor, which is twice as many as typical return stairways. In addition to being obstacles themselves, the added turns demand more hose per floor. Instead of a single length per floor, a more accurate estimate would be 1 ½ lengths per floor for a wrap-around stretch.

7.3 Commonly, wrap-around stairways are located around an elevator shaft. This further complicates the stretch by hampering communication between members on the line. The solid walls of the elevator shaft eliminate visibility between members on different floors and make verbal communication difficult.

7.4 The keys to this stretch are adopting a methodical pace and keeping the lead lengths intact for deployment on the fire floor. The numerous turns on the staircase will invariably catch on the hose and stop forward progress. When this happens, stretching members may need to put down their length (without deploying it) and go back down the stairs to help move the line forward. This is especially true for the back-up firefighter, but it may be necessary for the nozzle firefighter as well.

7.5 After the line has been advanced on the floors below, the back-up (and possibly the nozzle) firefighter should return to their folds, pick them back up, and continue the stretch without prematurely deploying their lengths.

7.6 To minimize the incidence of the hoseline being caught on the wrap-around turns, both the nozzle and back-up firefighters should carry their lengths in their outside arms and make their turns around the elevator shaft as wide as possible. This will allow the stretch to progress as far as possible before the hose becomes caught up on the turns of the staircase.

7.7 A technique that is effective in maintaining the methodical pace necessary to minimize hose being caught up is to use visual contact between members to execute the stretch one turn at a time. This is accomplished as follows:

7.7.1 The nozzle firefighter climbs the stairs to the first turn, at which point they turn back to make visual contact with the back-up firefighter (Figure 21).

Figure 21

7.7.2 Once they make visual contact, the nozzle firefighter proceeds to the next turn and waits there until they can make visual contact with the back-up firefighter again (Figure 22).


Figure 22

7.7.3 The back-up firefighter does the same (Figure 23); they await visual contact from the next member in the stretch below them (this may be the door firefighter, control firefighter, or the 2nd due nozzle firefighter).

Figure 23

7.7.4 If there is no one there, they may have to go back and lighten up on the line themselves (if necessary). If another member is in the stretch, the back-up only moves forward when they have visual contact with them.

7.8 By using this technique, the pace of advancement is driven by the back of the hoseline, which ensures methodical, but steady progress as hose becomes available and prevents the nozzle and back-up firefighters from prematurely deploying their lengths.

7.9 Once the fire floor is reached, the nozzle and back-up firefighters will flake out their line and prepare for fire attack as described in *Chapter 6: The Backstep*.

8. FIRE ESCAPE STRETCH

8.1 When stretching a hoseline up a fire escape, the hose is not stretched up the fire escape in the same manner as a stairway; rather the line is stretched vertically, brought in over the side, and secured with a hose strap.

8.2 To execute this stretch, members can use a six-foot hook to pass the hoseline up the exterior of the fire escape. As an alternative, a rope stretch may be executed, as described in the previous section.

8.3 Initially, the hose is stretched to an area near the fire escape drop ladder. Once the hose is available below the fire escape, one member will climb to the second floor of the fire escape and wait for the line to be passed to them.

8.4 Using an inverted six-foot hook to hold the shut-off handle of the nozzle (Figure 24), the line will be passed up to the member on the fire escape. As this is happening, another member will climb to the 3rd floor of the fire escape. Once there, the hook will be used to pass the line up to them (Figure 25). This procedure will continue until the floor below the fire is reached.

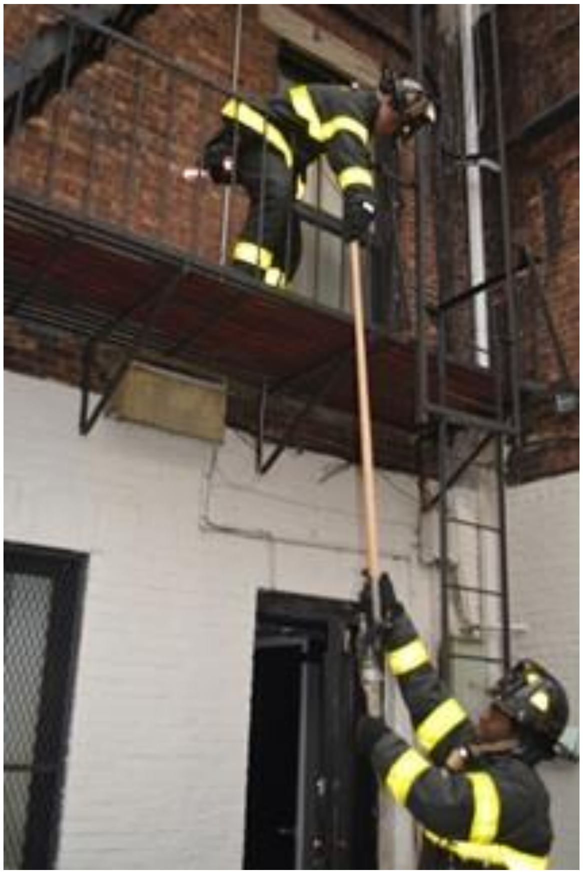

Figure 24

Figure 25

8.5 On the floor below the fire, the member receiving the hoseline will pull up sufficient hose to reach and cover the fire area. The hose will then be secured with a hose strap to the fire escape railing. This one hose strap will effectively secure the hose; additional hose straps are not necessary.

8.6 If the hoseline is to be stretched directly to the fire floor by way of the fire escape, the necessary hose needs to be flaked out on the fire escape balcony on the floor below. This would occur if the line was to be charged outside the building (on the fire escape) and the fire attack made via the window.

8.7 If the hoseline is to be stretched to the fire floor by way of the interior stairs from the floor below the fire, then the line will be brought in the window on the floor below and stretched to the fire area via the stairs.

9. AERIAL LADDER STRETCH

9.1 Using an aerial ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position. The hoseline may be stretched to the desired location via the aerial ladder or the hoseline may be operated from the aerial ladder itself.

9.2 Stretching a handline up an aerial ladder requires that the aerial not move during the stretch or throughout the operation of the hoseline.

9.3 The engine officer should proceed to the elevated location via the aerial ladder.

9.4 The hoseline is stretched to the area near the turntable of the aerial apparatus and is placed neatly on the ground. The back-up firefighter should be sure not to place their hose on top of the nozzle firefighter's hose. Enough hose to complete the stretch should be brought to this point.

9.5 The nozzle firefighter will leave their length on the ground and carry the nozzle with them as they climb the aerial with the hose playing out behind them. The hose is carried under the left arm (Figure 26) and the nozzle is draped upward across the front of their torso and back over their right shoulder (Figure 27). This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder.

Figure 26

Figure 27

9.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the aerial. Once off the aerial ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building).

9.7 As the nozzle firefighter climbs the aerial, the back-up firefighter climbs the ladder behind them, advancing hose as they climb. The hose should be maintained on the left side of the aerial ladder.

9.8 Initially, the control firefighter should guide hose onto the aerial from the position on the ground. When there is a member available to guide hose (possibly the 2nd due nozzle firefighter), the control firefighter should climb the aerial and advance hose behind the back-up firefighter.

9.9 Once the nozzle firefighter has dismounted the aerial and begins to pull hose into the building or onto the roof, the members on the aerial will advance hose from a stationary position on the ladder, keeping the hose on the left side of the ladder. Before doing this, members on the aerial must clip the hook of their personal harness to the rungs of the aerial ladder.

9.10 When sufficient hose has been stretched, a hose strap is used to secure the hoseline to a rung of the aerial ladder at the window or roof level. Once secured, all members on the aerial will complete the ascent up the ladder and proceed to the point of operation.

9.11 The engine officer will wait until all of the firefighters are off the aerial before calling for water in the line. The line should be charged gradually.

9.12 When firefighters are going to operate the hoseline from a position on the aerial ladder, all members must have the hooks of their personal harness clipped to the rungs of the ladder. A hose strap must be used to secure the line in the vicinity of the nozzle firefighter.

10. PORTABLE LADDER STRETCH

10.1 A portable ladder is an additional option for stretching hose to a roof, upper floor window, or other elevated position.

10.2 Hose may also be advanced up portable ladders to access difficult-to-reach places to extinguish fire (such as attic fires or mezzanine areas fires).

10.3 When using a portable ladder, the hoseline may be either stretched dry and charged once in position, or it may be advanced up the ladder while charged.

10.4 When the line is to be stretched dry up the portable ladder, the technique will be similar to the aerial ladder evolution. The engine officer should proceed to the location to which the hoseline will be stretched. This may be by way of the portable ladder, or other route, if more practical.

10.5 Enough hose to complete the stretch should be stretched to the base of the portable ladder. The nozzle firefighter will climb the ladder with the hose under the left arm and the nozzle is draped upward across the front of their torso and back over their right shoulder. This technique will allow the hose to advance smoothly and prevents the nozzle from being caught in the rungs as the nozzle firefighter keeps both hands on the rails of the ladder. The hose is maintained on the left side of the ladder to facilitate a smooth advance.

10.6 Once the nozzle firefighter has reached the destination, they should momentarily pass the nozzle to the engine officer, allowing them to safely dismount the portable ladder. Once off the ladder, the nozzle firefighter pulls sufficient hose onto the roof (or into the building). When sufficient hose is stretched, the hose is secured to a substantial object using a hose strap.

10.7 The back-up firefighter will feed hoseline to the nozzle firefighter from a position on the ground at the base of the ladder. Once sufficient hose has been advanced, the back-up will climb the ladder and assist the nozzle firefighter in flaking out the line.

10.8 When a charged hoseline is advanced up a portable ladder, the nozzle firefighter should carry the hose in their left hand and the hose should be maintained on the left side of the ladder.

10.9 When the nozzle firefighter is to operate the hoseline from a position on the portable ladder, they should clip the hook of their personal harness to a rung of the ladder and the base of the ladder must be secured.

11. Cockloft Nozzle Stretch—see Chapter 7 Addendum 1 for a complete discussion.

COCKLOFT NOZZLE

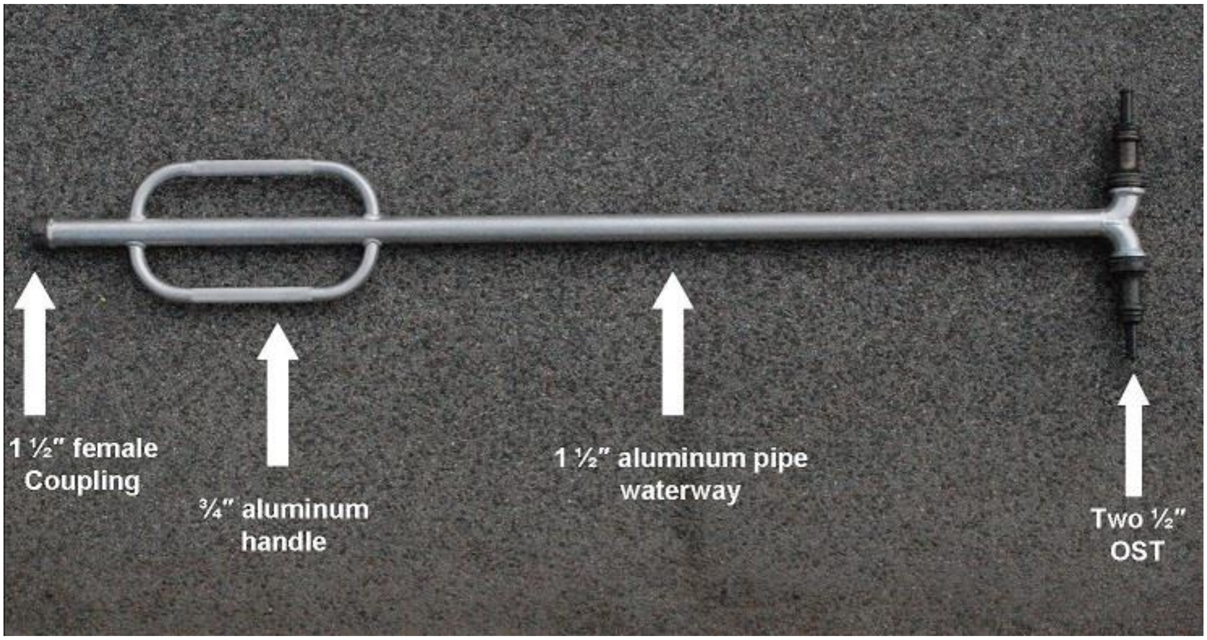

Figure 1

1. DESCRIPTION

FDNY Designation:	Cockloft Nozzle (Figure 1)
Material:	Waterway—1 ½" Diameter Aluminum Pipe
Length:	6' 3" (overall)
Width:	10"
Weight:	Approx 10 lbs.
Misc:	1 ½" male threaded ends receive $^{15}/_{16}$" Main Stream Tips (MST) to which ½" Outer Stream Tips (OST) are connect.

1.1 The cockloft nozzle is a 6' 3" aluminum pipe with two ½" OSTs. Attached to the body is a ¾ " aluminum handle allowing members control during operation.

1.2 The cockloft nozzle has a 1 ½" female coupling at one end which connects directly to any controlling nozzle shut-off. After removing the MST from the shut-off, members then connect the 1 ½" female coupling of the cockloft nozzle to the shut-off.

1.3 The other end has two ½" OST's. The configuration of these two ½" OST's eliminates backpressure. These two OST's should not be removed when the nozzle is being used to extinguish fire in a horizontal area like a cockloft. The design of the OST's enables the stream to reach in excess of 60 feet. (Figure 1)

Figure 2

2. INTRODUCTION

2.1 The cockloft nozzle (Figure 2) is a versatile tool that has proven extremely effective in applying water into a narrow, confined area (such as a cockloft). It is primarily designed for use at cockloft fires but may be used in other situations. It is carried by all Divisions and Squad companies, as well as select engines that carry a combination nozzle. Any Engine company can be tasked with placing it into operation.

2.2 When the cockloft nozzle is being used to extinguish fire in a cockloft, the nozzle may be placed above the ceiling on the top floor of a building or inverted and lowered into the cockloft area from the roof of the building.

2.3 The cockloft nozzle may also be used to extinguish fire vertically inside of a building (in a vertical shaft) or vertically on the outside of a building (for an EFIS fire) by placing the nozzle so that the OST's are in a vertical position. When used in a vertical application to extinguish fire above, the ½" OST facing downward may be removed and capped with a shut-off, if deemed necessary. This is the only time the ½" OST may be removed.

2.4 The design of the cockloft nozzle greatly minimizes the introduction of air into the confined area of the cockloft, often maintaining the fire in a ventilation limited state.

3. COCKLOFT NOZZLE USE

3.1 To place the cockloft nozzle into operation, a hoseline is needed at the point of operation. This may be an existing handline already in place that is converted to a cockloft nozzle operation, or an additional handline that is stretched and dedicated to operate the nozzle.

3.2 Members should be mindful that only two hoselines may be stretched up an interior stairway, so an alternative means of stretching may be necessary.

3.3 An 1 ¾" or 2 ½" hoseline can be utilized to supply the cockloft nozzle. It should be supplied with a nozzle pressure of 50 psi and is capable of delivering 100 GPM.

3.4 The cockloft nozzle should be inserted into the cockloft between the joists (Figure 3 and Figure 4). Operating members shall alternate the direction of the stream by rotating the nozzle 90 degrees and returning the nozzle to its original position to provide maximum coverage. Do not rotate the cockloft nozzle in a continuous counter-clockwise direction; this action may cause the nozzle to become unscrewed from the shut-off.

Figure 3

Figure 4

3.5 The cockloft nozzle may be placed into operation for fires in the cockloft areas of taxpayers, row frames, and NFP multiple dwellings like H-types. When deemed necessary, a separate, conventional protection line should be stretched, charged, and in the area of operation before the cockloft nozzle is used on a separate handline.

3.6 This is especially important when members are operating the cockloft nozzle in an area where ceilings may blow down or fire extension may trap members. These events have greater potential at top floor operations in H-type or similar buildings, even when members are operating in another wing.

3.7 There are times when the cockloft nozzle may be needed in an exposure, like a Row Frame building, as a precaution or to prevent extension, and the conditions are such that a protection line is not initially necessary during its operation.

3.8 Only the IC (or Sector Chief), should determine when to place the cockloft nozzle into operation, and when to shut it down. The IC and / or Sector Supervisors must use judgment based on existing conditions to determine when it is safe to operate without a protection line, bearing in mind that conditions may change.

3.9 The operation of the cockloft nozzle should be supervised by a Chief Officer.

3.10 The cockloft nozzle is generally placed into operation on the top floor of a building for use in the cockloft area above the ceiling. It may also be lowered into the cockloft from the roof of the building, when the roof is deemed safe to operate on. The Incident Commander and/or Sector Supervisors must determine which is the best location (top floor or the roof) to operate from.

3.11 Operating from the roof is a particularly useful tactic when there are high ceilings or difficult ceilings to pull, which often occurs at taxpayer fires. Operating from the roof may sometimes provide the opportunity for a quicker stretch and safer operation at residential building fires, depending on the existing conditions.

3.12 Ideally, when operating from the roof, members should begin nozzle operation from an inspection hole where fire is not venting and move toward the area of origin as conditions permit.

3.13 If members are operating without a separate, additional protection line, they should operate as follows:

3.13.1 A hoseline with a conventional nozzle should be stretched and charged in case it is needed while members are opening up the ceiling area where the cockloft nozzle will operate.

3.13.2 In non-fireproof multiple dwellings, the area immediately inside the apartment door offers an extra degree of protection provided by the public hallway. This option should be employed when fire conditions dictate.

3.13.3 Members should then open up an area in the ceiling into which the cockloft nozzle will be placed for operation. The hole should initially be limited in size, but large enough for the cockloft nozzle to fit into. Additional holes may need to be made to use the nozzle at different locations.

3.13.4 If fire shows while opening up the ceiling, the fire should be knocked down by the hose line with the conventional nozzle. The MST should then be removed from the hose line and the female coupling of the cockloft nozzle connected directly to the shut-off of the charged line.

3.13.5 The cockloft nozzle should then be placed into the opening, the shut-off handle opened, and the nozzle operated to extinguish fire in the cockloft.

3.13.6 The nozzle should be maintained upright and alternately rotated 90 degrees and then back to its original position, allowing water to be distributed in all directions in the cockloft.

3.14 The use of the cockloft nozzle does NOT eliminate the need of pulling ceilings for final extinguishment and washdown.

3.15 Firewalls, division walls, nogging and other impediments may require the repositioning of the cockloft nozzle into several different areas to obtain final extinguishment.

4. COMMAND CONSIDERATIONS

4.1 The cockloft nozzle shall only be placed into operation at the direction of a Chief Officer.

4.2 To be most effective, the cockloft nozzle must be considered an offensive tactic and employed early into the operation.

4.3 The cockloft nozzle can be used in any building with a cockloft, large confined space or void.

4.4 The cockloft nozzle can be operated from the interior of the building or from the roof of the building.

4.5 At top floor fires, consideration should be given to pre-emptively using the cockloft nozzle from the roof or the interior whenever fire is suspected of entry into the cockloft.

4.6 The Chief Officer must consider the following when placing the cockloft nozzle into operation:

4.6.1 Dimension of the cockloft.

4.6.2 Volume of fire.

4.6.3 Type of roof support.

4.6.4 Type and weight of suspended ceilings.

4.6.5 Potential for roof/ceiling collapse.

5. REPAIR AND REPLACEMENT

5.1 The cockloft nozzle shall be visually inspected weekly. If repairs are deemed necessary, the Division shall contact the Technical Services Division via phone and request a replacement. The out of service cockloft nozzle shall be tagged with an RT-2 documenting the nature of the defect.

STANDPIPE OPERATIONS

1. OVERVIEW OF STANDPIPE SYSTEMS

1.1 In New York City, standpipes can be found in a wide range of buildings containing various occupancies. Standpipe systems can be found in the following locations:

1.1.1 High Rise Buildings (over 75 feet)

1.1.2 Hospitals, Warehouses, and Industrial Buildings

1.1.3 Enclosed Shopping Malls

1.1.4 Parking Garages

1.1.5 Theaters, Stadiums, and Arenas

1.1.6 Bridges and Limited Access Highways

1.1.7 Subway Stations and Tunnels

1.1.8 Piers and Wharves

1.2 All required standpipes in NYC are compatible with FDNY equipment and can be used to provide FDNY hoselines with adequate water supply. Fire companies will use standard FDNY hose and other equipment when using any standpipe system.

1.3 Existing 1 ½" diameter occupant-use hose should not be used, except in rare cases where life is in immediate peril and a FDNY hoseline is unavailable. This situation would most likely occur when a ladder company or rescue company is operating without an engine company.

2. KEY CHARACTERISTICS OF STANDPIPE SYSTEMS

2.1 A more complete discussion of the types of standpipe systems that exist in NYC and their various features and components can be found in *Chapter 3: Engine Company Equipment*. This section will focus on several key practical characteristics of standpipe systems.

2.2 The primary practical concern for a standpipe system is the presence of water.

2.2.1 A wet system is maintained with water in the system at all times. A dry system is maintained without any water under normal circumstances. Both wet and dry systems are supplied and used by the same procedure.

2.3 The presence of a fire pump is also an operational concern.

2.3.1 While many standpipe systems are equipped with a fire pump, it is common to find a building with a standpipe system, but no fire pump.

2.3.2 Fire pumps are designed to supply the standpipe system with sufficient pressure to operate as needed. Some fire pumps are manually operated, some operate automatically. Units must be aware of the buildings in their response area and what types of fire pump systems exist. Firefighting Procedures High-Rise Office Buildings provides detailed information regarding fire pump operations.

2.4 The location of floor outlets within the system impacts firefighting operations.

2.4.1 Regardless of the type of standpipe system encountered, floor outlets can be found in a variety of locations within the area protected and there are important operational considerations unique to each location that could provide advantages or disadvantages in the execution of the stretch.

2.4.2 Floor outlets inside a stairway (Figure 1) provide direct access to that stairway, but can create a more complex stretch in the event a different stairway is selected for the fire attack.

2.4.3 Floor outlets in a public hallway (Figure 2) can provide more space in the proximity of the outlet to hook up and arrange the lengths of hose, though the floor outlet will not provide direct access to a stairway. However, floor outlets in the hallway can provide easier access to alternative stairways, which would simplify the stretch if a different stairway was used for attack.

Figure1

Figure 2

2.4.4 Standpipe outlets in open areas can present a challenging situation, especially when located in non-residential occupancies, such as subway stations and parking garages. In these cases, the outlet may be located remote from the attack stairs.

3. SUPPLYING STANDPIPE SYSTEMS

3.1 Standpipe systems are supplied with 3 ½" hose. The only exception to this is when 3" high pressure hose is used to supply a standpipe system as part of the High-Pressure Pumping evolution. This is discussed in Chapter 8, *Addendum 1: High Pressure Operations.*

3.2 Standpipe systems may be supplied through Fire Department Connections (FDC) and/or floor outlets. While the FDC is the primary consideration, the standpipe system can be supplied by way of a floor outlet as an alternative. This should be considered in the following situations:

3.2.1 FDC is inoperable (due to vandalism, disrepair, or other damage)

3.2.2 FDC is located remote from the hydrant to be used to supply the system and the floor outlets are more readily accessed from the apparatus.

3.2.3 It is necessary to augment the system and there is no available FDC (all FDC are already being supplied)

3.3 When a building is equipped with both a standpipe system and automatic sprinklers, the first supply line should supply the standpipe system. If the first arriving engine is supplying both the standpipe and sprinkler systems, later arriving engine companies should stretch additional lines to augment both systems.

3.4 When the building being supplied is part of an interconnected building system, one building will have a gravity tank on the roof which supplies water to that building and the other interconnected buildings. These interconnected buildings have a Post Indicator Valve which is normally open to allow water supply into that building. The ECC should be aware of the possibility of a Post Indicator Valve (PIV) being closed to one of the other interconnected buildings. If the PIV is found closed, the ECC should notify the Engine Officer. A closed PIV in one of the interconnected building means that this structure is now isolated from the water supply coming from the building with the gravity tank. The standpipe in that interconnected building will have no access to a water source until the ECC supplies the building system. Until supplied by the ECC, the only water available will be the residual water in the standpipe riser itself. This water can quickly run out, which could place operating units in danger if the Engine Officer is unaware of the PIV closure.

3.5 Due to the possibility of a Post Indicator Valve (PIV) being closed, it is preferred that ECC's supply the FDC on the fire building when it will not result in any delay of water supply to the standpipe system.

3.6 When the building is equipped with an air pressurized standpipe, the pressurized air must be bled from the system before the system can be supplied with water. These systems are maintained dry and are used in buildings that are being demolished and in buildings under construction upon reaching a height of 75 feet. See Chapter 8, Addendum 4 for a complete description on the operations at buildings with Air-Pressurized Standpipe Systems.

3.7 Supply via Fire Department Connection (FDC)

3.7.1 To supply the standpipe system via the FDC, the male end of a 3 ½" hoseline should be stretched to the FDC and connected. Depending on the orientation of the 3 ½" hose on the apparatus, a double male fitting may be needed.

3.7.2 FDC are color coded for ease of identification (Figure 3). Either the caps or the entire FDC may be painted. The color of the connections are as follows:

A. Red = standpipe system

B. Yellow = combination system (sprinkler/standpipe)

C. Green = automatic sprinkler system

D. Aluminum = non-automatic sprinkler system or perforated pipe

Figure 3

3.7.3 When any part of the system is out of service (OOS), the FDC will have a colored disc attached to indicate the serviceability of the system. The color coding is as follows:

A. White disc = system fully OOS

B. Blue disc = system partially OOS

3.7.4 Whenever possible, a second apparatus should hook up to an available FDC and be prepared to augment water supply, if needed.

3.8 Supply via a floor outlet

3.8.1 If a standpipe system is to be supplied via a floor outlet, proper fittings must be employed to attach the 3 ½" supply hose to the 2 ½" outlet threads.

3.8.2 If a pressure reducing/restricting device (PRD) is found on a floor outlet, it should be removed, if possible. If the PRD cannot be removed, the outlet may still be used, so long as sufficient water can be supplied. The ECC should notify the Engine Officer if an outlet with a PRD is being supplied.

3.8.3 When supplying water to a floor outlet, it is important to keep the outlet valve closed until water is supplied to the outlet via the supply hose. If the outlet is opened prematurely, the water supply on the fire floor may be severely impacted.

3.8.4 To facilitate this operation, the company commander may consider carrying a designated "ECC standpipe kit" on the apparatus. Such a kit should include:

A. Necessary fittings (i.e. double female, 3 ½" to 2 ½" reducer)

B. Pipe wrench

C. Spanners

D. Chocks

E. Adapter

3.9 Apparatus Pump Operation

3.9.1 When a hoseline is to be operated from a standpipe outlet, the ECC must hook up to the standpipe system and augment the system. This supply line should be the first line stretched from the apparatus.

3.9.2 Exception: Most modern and some older high-rise buildings may have unique standpipe system considerations that first alarm units have become aware of. The reliability, or unreliability of such systems may be knowledge that local units are cognizant of. These buildings may require Pre-Incident Guidelines, Familiarization Drills and identification in CIDS with specific instructions regarding standpipe supply tactics for such buildings. Division Commanders are authorized to approve CIDS and Pre-Incident Guidelines for those buildings that have unique standpipe systems requiring adjustments to the standard FDNY policy.

3.9.3 When supplying water to a standpipe system, the ECC should use 3 ½" hose (or 3" hose if high-pressure pumping) to supply the appropriate Fire Department Connection (FDC, formerly known as Siamese connections). The standpipe FDC is entirely painted red or may just have red caps. If part of a combination system, the FDC is entirely painted yellow or may just have yellow caps.

3.9.4 Members should be aware that when the fire floor is on the upper 20 floors of a building, until the standpipe system is supplied by a Fire Department pumper, there may be insufficient head pressure available at the floor outlet to supply a hoseline from a gravity tank. Units must be aware of the possibility of insufficient pressure during initial operations.

3.9.5 In buildings with an interconnected standpipe system, a single gravity tank may supply multiple buildings. This means that in some buildings, water is supplied to the standpipe via underground piping from a gravity tank on a different building. There will be limited head pressure available at the floor outlet and additional pressure will be needed.

3.9.6 The presence of a fire pump is another factor. Some fire pumps are manually operated, some operate automatically. Units must be aware of the buildings in their response area and what types of fire pump systems exist. Control firefighters must be aware that fire pumps may automatically activate or be manually activated after the Control FF has supplied the correct pressure to a handline. This action may require the Control FF to adjust the pressure being supplied at the floor outlet.

3.9.7 When supplying a standpipe system, the apparatus should be switched to "Pressure Operation". This will provide the ability to maximize the pressure supplied by the apparatus. Only the apparatus actually supplying the standpipe system should be switched to "Pressure Operation" (any apparatus relaying water to another apparatus should remain in "Volume Operation"). Prior to using the transfer valve, the engine revolutions per minute (RPM) should be returned to idle pressure.

3.9.8 The ECC must provide for sufficient pressure available at the standpipe outlet, but should also strive to minimize the amount of excess pressure supplied to the system. When the standpipe system is charged with excessive pressure, it can become more difficult for the control firefighter to set the proper pressure in the handline at the standpipe outlet.

3.9.9 With this in mind, the ECC should generally supply the standpipe system with a pressure of 100 psi, plus an additional 5 psi per floor of elevation. This is measured to the floor on which the hoseline will be operating.

3.9.10 Example—If fire is on the 26th floor of a HRFPMD, the ECC should supply 225 psi to the standpipe system (100 psi-baseline + 125 psi for 25 floors of elevation)

3.9.11 The guideline of supplying standpipe systems with 100 psi, plus an additional 5 psi per floor of elevation should be used as the primary guide at most operations in buildings that are known to be older, traditional construction.

Note: Chapter 8, Addendum 2 provides two standpipe supply charts:

3.9.12 It is important to note that these supply charts are approximations and adjustments must be considered as the height of the fire floor increases. This is particularly pertinent in modern high-rise construction located mostly in the Borough of Manhattan, but now starting to be seen in the outer boroughs.

3.9.13 It is critical that units with unique high-rise construction familiarize themselves with the standpipe systems provided, and develop appropriate Pre-Incident Guidelines, Familiarization Drills and CIDS messages so that appropriate standpipe supply decisions can be made at operations.

3.9.14 This guideline is based on a number of factors and makes several assumptions. In order to effectively overcome obstacles, it is important to understand what these numbers mean and how they are derived.

A. 5 psi is provided for each floor

1. It requires 0.434 psi to push water up vertically 1 foot.
2. 1 floor is assumed to be 12 feet high.

B. 100 psi is provided as a baseline for the building

1. 80 psi provided at the outlet being used.
2. 20 psi friction loss in the standpipe system supply (FDC, supply hose, etc.)

3.9.15 It's important for the ECC to be aware of the difference between height (measured in feet) and the number of floors above street level. In the above assumptions, each floor is assumed to be 12 feet high. This assumption provides us with the standard of 5 psi for each floor of elevation. In reality, this assumption may not be accurate and floor heights may be different. This difference can become significant on upper floors of large buildings (such as mega high-rises).

3.9.16 In some cases, floor numbers may not accurately describe the actual height of the floor above ground. This can occur in buildings with occupancies with high ceilings on lower floors (shopping malls, theaters, etc.). It can also occur in buildings with inconsistent floor numbering (skipped floors, etc.). Skipped floors, also known as "Marketing Floors" are common in newer, mixed-occupancy high rise construction. The number of floors skipped in these buildings may be substantial. In these cases, the actual height (in feet) should be considered, if known.

3.9.17 In these situations, when the height (in feet) is known, the proper supply pressure can be calculated by providing 100 psi, plus .434 x height of outlet (in feet). (See addendum for chart)

3.9.18 To make computation easier, it is often common practice to assume each floor is 10 feet high (instead of 12 feet). While the difference between these values is negligible for smaller buildings, it can create a larger discrepancy when considering an upper floor in a large building. ECC's should be aware of this difference.

3.9.19 The ECC should supply standpipe systems gradually to avoid damaging the system by introducing a sudden surge of water into the pipes. This is especially important when supplying a dry standpipe system, as the integrity of the pipes and their ability to hold water is not immediately evident. The rapid introduction of water could lead to a failure of the pipes or fittings throughout the system. For this reason, dry standpipes should initially be supplied at idle.

3.9.21 When the ECC supplies the system with water, there will be a surge in pressure in the system. This will increase pressure to the operating hoseline and will affect the reading on the pressure gauge at the standpipe outlet. The ECC should communicate with the Control firefighter and/or the Engine Officer when the system is supplied, allowing them to anticipate the pressure increase and make the necessary adjustments.

3.9.22 In all situations, the ECC must remain alert for any indication of insufficient pressure in the system and be prepared to augment the system with additional water supply, if needed.

4. SELECTING THE STANDPIPE OUTLET

4.1 It is the responsibility of the Engine Officer to select the floor outlet to be used. This decision should be based on the consideration of a number of criteria, including:

4.1.1 Proximity to fire area.

4.1.2 Proximity to attack stairs.

4.1.3 Operability of outlet.

4.1.4 Outlet is located in a protected area.

4.2 The selected floor outlet should be located on a floor below the fire. This will ensure the outlet is in a protected, smoke-free area. Primary consideration should be given to using an outlet on the floor immediately below the fire. This will minimize the length of the stretch and facilitate verbal communication between the fire floor and the floor outlet.

4.3 The selected floor outlet can be located on any floor below the fire. Generally, the outlet on the floor below the fire will be used, but it may be necessary to use a more distant floor due to an unserviceable outlet on the floor below the fire in a building with a single standpipe riser. A more distant outlet may also be used if it will facilitate an easier stretch due to unique building characteristics (e.g. unusual stairway layout, duplex apartments, etc.)

4.4 In rare cases, using the floor outlet on the same floor as the fire may be permissible due to unusual building characteristics. This would require approval from the Division Commander. A CIDS entry is mandated in these situations. An example of this is where the stretch of the handline from the floor outlet to the fire apartment entrance is via an exterior, open air balcony, and stretching from the fire floor allows the fire apartment to be reached with 3 lengths of hose.

4.5 Selecting a floor outlet on the same level of the fire may also be necessary in non-residential structures with standpipe systems, such as parking garages, subway stations, or large industrial occupancies. This would require approval from the Division Commander. A CIDS entry is mandated in these situations.

4.6 Once selected, the engine officer should clearly communicate the floor outlet to be used to the members of their company. This can be visually communicated, or may be communicated verbally, either by handie-talkie transmission or face-to-face.

4.7 If the control firefighter finds a problem with the selected floor outlet and needs to move to a different outlet, the engine officer should be immediately informed. The engine officer should also ensure the 2nd due engine is aware of the new outlet, so they can assist with the stretch. If scissor stairs are used, it may be easier to move to an outlet two floors away, as this would likely be shorter than having to stretch from the opposite staircase if the immediate floor below is used.

4.8 If a floor outlet has a Pressure Reducing Device (PRD) attached, it should be removed, if possible. If it cannot be removed, the outlet can still be used to supply the hoseline, so long as sufficient pressure can be achieved. The Engine Officer should be notified that the outlet being used has a PRD attached.

4.9 If a floor outlet has a Pressure Reducing Valve (PRV) attached, it will not be removable. As long as sufficient pressure can be achieved, the outlet can still be used to supply the hoseline. The purpose of a PRV is to supply the appropriate pressure to the floor on which it is located under the operation of the building fire pump, so sufficient pressure at the outlet can be expected. The Engine Officer should be notified that the outlet being used has a PRV attached.

5. SUPPLYING THE HOSELINE

5.1 The 1st due control firefighter is responsible for supplying water to the first hoseline from the selected floor outlet. They shall remain at the floor outlet throughout the operation and communicate with the Engine Officer to ensure that adequate pressure is supplied to the nozzle.

5.2 Upon arriving at the selected outlet, the control firefighter should open the outlet and flush it thoroughly. This is to confirm a water supply is available and to clear the outlet of any possible obstructions to water flow. After confirming the availability of water, the control firefighter should connect the in-line pressure gauge and the hoseline to be supplied. The in-line pressure gauge is used to ensure the correct pressure is supplied to the hoseline.

5.3 For the most common standpipe hose stretches, the control firefighter should supply hoselines supplied from an outlet on the floor below the fire as follows:

5.3.1 Residential 3 length stretch (2" lead length) = 80 psi
(two lengths 2 ½" hose, one length 2" hose, nozzle with 1" tip)

5.3.2 Commercial or residential 3 length stretch (2 ½" lead length) = 70 psi
(three lengths 2 ½" hose, nozzle with 1 1/8" tip)

5.4 These standard pressures are calculated based on the guidelines of "street hydraulics" and are explained as follows:

5.4.1 A residential 3 length stretch from the floor below the fire has 2 lengths of 2 ½" lightweight hose (5 psi each = 10 psi total), 1 length of 2" lightweight hose (10 psi), 1 floor of elevation (5 psi) and 55 psi at the 1" tip of the nozzle. This adds up to the target outlet pressure of 80 psi and provides 220 GPM.

5.4.2 The 1" tip of the nozzle is supplied with 55 psi, which is above the minimum recommended nozzle pressure of 50 psi. This additional pressure is added to minimize the likelihood of kinking in the hose.

5.4.3 A commercial 3 length stretch from the floor below the fire has 3 lengths of lightweight 2 ½" hose (5 psi each = 15 psi total), 1 floor of elevation (5 psi) and 50 psi at the 1 1/8" tip of the nozzle. This adds up to the target outlet pressure of 70 psi and provides 265 GPM.

5.4.4 Since the 2 ½" lead length will be stretched primarily for commercial occupancies, which may involve a large, open floor space with a potential for a heavy fire load, the 2 ½" nozzle should be supplied with 50 psi at the tip. This is to enable the full reach of the stream to be used and to achieve the maximum available flow from the standpipe system.

5.4.5 If additional lengths of hose are required for a standpipe stretch, the control firefighter should supply an additional 5 psi for every length of 2 ½” hose added.

5.4.6 If the hoseline will be stretched from further than 1 floor away, the control firefighter should supply an additional 5 psi for every additional floor of elevation needed.

5.5 Pressures at the outlet should be set while water is flowing at the nozzle. When the nozzle is shut, the gauge will read the static pressure (the pressure when water is not flowing) in the hoseline, which will be higher than the actual operating pressure. In order to properly set the operating pressure, the nozzle firefighter must use a “long bleed” and bleed the line for long enough to allow the control firefighter to adjust the pressure accordingly. The long bleed is essential to ensure the proper pressure is set.

5.6 Operating pressure is adjusted by use of the operating wheel at the floor outlet and by observing the in-line pressure gauge. If there is no valve wheel attached to the standpipe outlet, a substitute tool can be used. Such options include a pipe wrench, vise grips, or a removable operating wheel carried in the standpipe kit.

5.7 The Control firefighter should be aware that a properly supplied hoseline may exceed the Hi-Flow alarm of the digital pressure gauge (which alarms when flow exceeds 250 GPM). This activation does not necessary indicate a problem with water supply. If doubt exists as to the accuracy of the supply pressure reading, the Control Firefighter can communicate directly with the Engine Officer to confirm that sufficient pressure is supplied to the hoseline.

6. STANDPIPE KIT

6.1 The control firefighter carries the standpipe kit. This ensures the control firefighter is in possession of all the equipment necessary to secure a water source at the standpipe outlet.

6.2 The standpipe kit is required to include the following equipment (Figure 4):

6.2.1 2 ½” in-line pressure gauge

6.2.2 Pipe wrench (18 inch)

6.2.3 Spanner wrenches

6.2.4 Chocks

6.2.5 2 ½” nozzle with 1 1/8” MST

6.2.6 1 ½” to 2 ½” increaser

6.2.7 Adapters (National Standard thread and/or National Pipe thread to FDNY thread)

Figure 4

6.3 The following equipment may be included in the standpipe kit as deemed beneficial by the Company Commander, but are not required, as some are not provided by the FDNY:

6.3.1 Spare operating wheels (to be used if wheel is missing)

6.3.2 Mallet (to help remove tightened caps)

6.3.3 Vise grips (to be used as an alternative to the pipe wrench)

6.3.4 Wire brush (to be used to remove paint or debris from outlet threads)

6.3.5 Fog tip (to be used to vent the fire area during overhaul)

6.3.6 Single gate (to ease operation of difficult to operate outlets)

7. STRETCHING HOSELINES FROM THE APPARATUS

7.1 The presence of a standpipe system does not mandate engine companies to use the standpipe to supply their hoselines. The Engine Officer may elect to stretch their hoseline from the apparatus as an alternative to using the standpipe system. When making this decision, the Engine Officer should consider a number of factors, including:

7.1.1 condition of the standpipe system.

7.1.2 proximity of the apparatus to the building.

7.1.3 location and type of stairway to be used for the attack.

7.1.4 length and ease of the stretch.

7.2 The 1st due Engine Officer must ensure the 2nd arriving engine company is aware of their decision to stretch from the apparatus, as they will need to assist the 1st arriving company with the stretch and will not require their standpipe equipment.

7.3 Additional hoselines may be similarly stretched from the apparatus, as determined by the Engine Officer of the unit stretching the hoseline and are not required to be stretched in the same fashion as the first line. For example, if the first line uses the standpipe, the second line may be stretched from the apparatus, as determined by the Engine Officer of the company stretching the line.

7.4 Selecting attack stairway

7.4.1 All hoselines should be stretched from the attack stairway and all access to the fire floor should be made by way of the attack stairway. This is in an attempt to keep all other stairways free of smoke. All stairways, other than the attack stairway, can be considered evacuation stairways.

7.4.2 The attack stairway does not need to be the stairway closest to the floor outlet. The stairway selected should allow for the most efficient stretch possible, with the goal of minimizing the length of the stretch, while allowing for an efficient advance on the fire floor. The selection should be made by the Engine Officer, in consideration of the following criteria:

A. Proximity of the stairway to the fire area on the fire floor.

B. Proximity of the stairway to the floor outlet on the floor from which the hoseline is being supplied.

C. Type of stairway used.

D. Conditions on the fire floor.

7.4.3 The Engine Officer is responsible for selecting the attack stairway. Once selected, the IC must be informed of the identity of the attack stairway and operations should be coordinated with the ladder companies operating on the fire floor.

7.4.4 The Engine Officer should be sure of the location of the fire before committing to an attack stairway. This is especially important in situations involving a large area and multiple stairway options, such as in commercial high-rise buildings or open areas, such as parking garages. In these situations, a stretch of at least 4 lengths should be anticipated, which may require hose from the 2nd due engine company.

7.4.5 The type of stairway used should be a key consideration when selecting the attack stairway. Certain characteristics of various stairway types may allow for a more efficient stretch, as follows:

A. If available, an enclosed stairway should be used. Open stairways are more readily contaminated and should be avoided, if possible. However, if the building only has one enclosed stairway, the priority will be for the enclosed stairs to be used as an evacuation stairway and an open stairway would need to be used for the attack.

B. Return-type stairs offer several advantages as an attack stairway. The stairway door will be at the same location on each floor, which makes it possible to visualize the path of line advancement on the fire floor by using the layout of the floor below the fire. Also, return-type stairs often have half-landings, which can provide an ideal location to flake out the hoseline. This can be helpful when the public hallway is contaminated and the hoseline needs to be charged inside the stairway.

C. Scissor stairs are effective as an attack stairway, but may introduce an element of complication, as their orientation will vary from floor to floor. It is important to remain aware that the orientation of the attack stairway door on the fire floor will be on the "opposite side" of the scissor stairs on the floor below the fire.

D. When using scissor stairs, consider using the stairway that provides the best access to the fire area on the fire floor, even if it is further from the standpipe outlet on the floor below the fire. This would require stretching from the floor outlet to the selected attack stairway on the floor below the fire.

E. If the floor outlet is located inside a scissor stairway, stretching to the opposite stairway on the floor below the fire will involve additional turns and potential pinch points, as the line will have to be stretched out of the stairway, down the hall, and back into the opposite stairway. As a result, the hoseline will go through at least three stairway doors when using the opposite stairway, instead of just one.

F. In this situation, another method to stretch the line via the opposite stairway is to hook up to the floor outlet 2 floors below the fire. By doing this, the outlet will be located inside the desired attack stairway and the hose need not be stretched around on the floor below. Instead, the hose will remain inside the stairway and be stretched straight up two floors. While the outlet is a floor further away, the total amount of hose used may actually be less and the additional turns and pinch points will be eliminated.

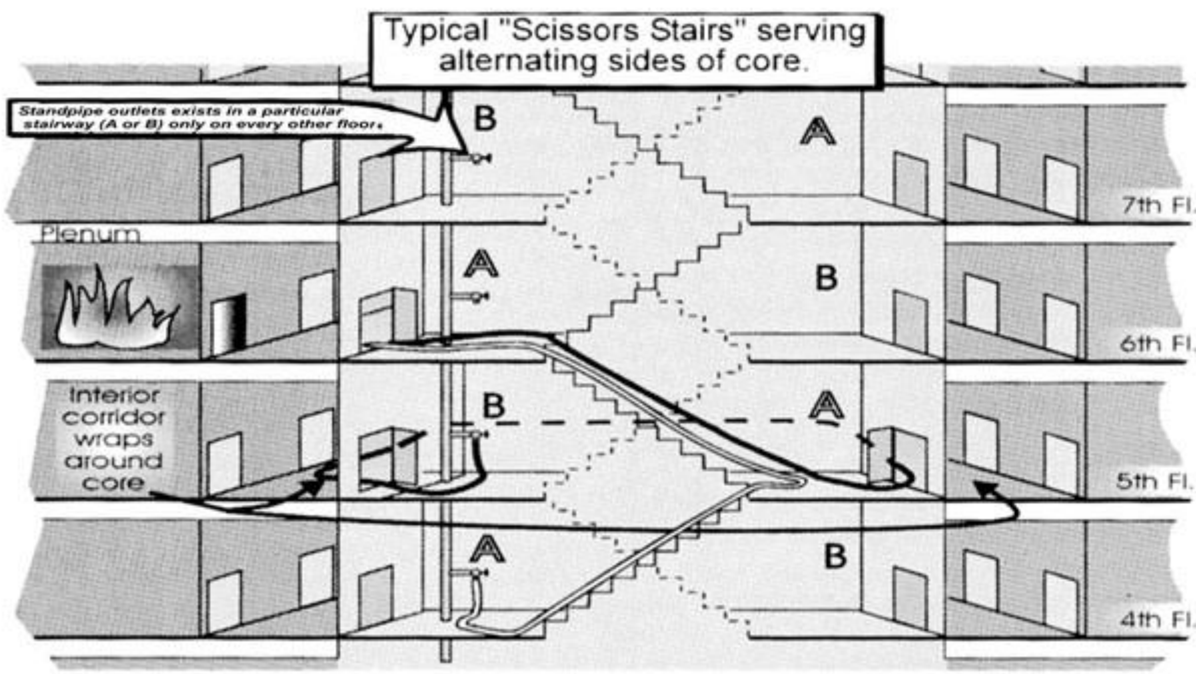

Figure 5

7.5 Estimating the stretch (Figure 5)

7.5.1 In a standpipe stretch, the engine officer needs to estimate the length from the standpipe outlet to the fire area in order to determine if a standard 3-length stretch will be long enough to reach the fire area.

7.5.2 When estimating the length of the stretch, the officer must remember that the nozzle firefighter's length is designated to be used inside the fire apartment itself and should not be included in the estimation. Consequently, the distance between the standpipe outlet and the fire area must be covered using only two lengths. This means that if the fire area is more than 100 feet away from the standpipe outlet, a 4th length will need to be added to the stretch.

7.5.3 The officer must be sure to estimate using the actual path the hoseline will travel. This includes ensuring the right attack stair is considered. Also, the officer must be sure to consider the vertical distance travelled, especially if a floor outlet is used on a more distant floor.

7.5.4 If the officer finds that a 4th length will be needed, they must notify the control firefighter and second engine that an extra length of hose will be needed for the stretch.

7.6 Stretching the 1st hoseline

7.6.1 The 1st due engine and the 2nd due engine will work together to stretch the first hoseline from the selected standpipe outlet to the fire area by way of the designated attack stairway.

7.6.2 When using the standpipe system in a commercial occupancy, all hoselines stretched from the outlet will be 2 ½". In a residential occupancy, hoselines stretched from the outlet may have a lead length of 2" hose. 1 ¾" hose must not be stretched from a standpipe outlet. The larger diameter hose is required for the purpose of minimizing friction loss in the hose and maximizing water flow from the standpipe system.

7.6.3 In residential occupancies, the lead length will typically be 2" hose. However, a lead length of 2 ½" hose should be considered instead in situations in which adequate pressure may not be immediately available from the standpipe outlet. Such situations may include an outlet with a PRV or a building in which the ECC will be delayed in supplying the FDC due to difficulties accessing the FDC or securing a hydrant. In these situations, the larger diameter of the 2 ½" hose will allow for better performance at lower supply pressures.

7.6.4 Each firefighter will bring one length of lightweight hose, folded into a roll-up. The nozzle firefighter will have a nozzle attached to their length. The roll-up is oriented such that the midpoint of the length is located directly beneath the hose couplings. This will ensure the hose is easily deployed. The midpoint is indicated with a red marking.

7.6.5 For most residential occupancies, lightweight hose will be used as follows:

A. The nozzle firefighter will bring one length of 2" lightweight hose with a nozzle that has a 1" tip attached. This hose has a friction loss of 10 psi per length. The midpoint of this length is indicated with red paint. This point is called the A-fold.

B. This nozzle should be supplied with 55 psi nozzle pressure, which will provide a flowrate of 220 GPM and a nozzle reaction of 85 lbs.

C. The Back-up and Control firefighters will each bring one length of 2 ½" lightweight hose, each of which will have a friction loss of 5 psi per length.

7.6.6 For commercial occupancies (and some residential occupancies), lightweight hose will be used as follows:

A. The nozzle firefighter will bring one length of 2 ½" lightweight hose with a nozzle that has a 1 1/8" tip attached. The midpoint of this length is indicated with red paint.

B. This nozzle should be supplied with 50 psi nozzle pressure, which will provide a flowrate of 265 GPM and a nozzle reaction of 98 lbs.

C. The Back-up and Control firefighters will each bring one length of 2 ½" lightweight hose. All 2 ½" hose has a friction loss of 5 psi per length

7.6.7 If the door to the fire area can be controlled, the 1st hoseline should be stretched to the door to the fire area, flaked out, and charged at that location. If the door to the fire area cannot be controlled and the public hall has become part of the fire area, the hoseline should be stretched to the stairway door, flaked out, and charged inside the stairway and public hallway on the floor below.

7.6.8 Flaking out and charging hose in the stairwell below the floor outlet would require the weight of the charged hose to be pulled back up the stairs in a stairwell. Additionally, the turns in the staircase create a greater opportunity for a kink to occur. In these situations, these stairway areas may also become very congested.

7.6.9 When charging a hoseline in the stairwell at the stairway door, the public hallway on the floor below the fire near the floor outlet provides an area where the hose may be more easily flaked out, and more easily advanced under these conditions.

7.6.10 All three roll-ups should be connected to each other (Figure 6) in close proximity to the standpipe outlet (in the stairway, or public hallway) and the control firefighter's length should be connected to the outlet. This will provide visual confirmation that the line is intact and connected to the outlet. The roll-ups should be arranged with the nozzle length closest to the direction of the stretch.

Figure 6

7.6.11 The nozzle firefighter should keep their length intact in a roll-up as they carry it to the point of operation. This will ensure the entire lead length of hose is available to be used inside fire apartment and will aid in flaking out the hose.

7.6.12 To facilitate the efficient stretching and flaking out of the hoseline, consider "splitting" the backup firefighter's roll-up, as follows:

A. The backup firefighter's roll-up can be split into a "male" section and "female" section. The nozzle firefighter can then carry the male section of the backup roll-up in addition to their own roll-up (Figure 7). The nozzle firefighter would then be carrying roughly 75 feet of hose.

Figure 7

B. As the nozzle firefighter approaches the fire area, they can drop the portion of the roll-up at an appropriate drop point (Figure 8 and Figure 9), while keeping the lead length intact in a roll-up, to be used in the fire area itself.

Figure 8

Figure 9

C. The female section of the backup roll-up can be carried and flaked out by the backup firefighter, who is responsible for ensuring both the backup and control roll-ups are properly stretched and flaked out. The female section of the backup hose back can be similarly carried as necessary.

D. If practical, the control roll-up can be similarly separated (Figure 10). The female section of the roll-up would connect to the outlet, while the male end could be carried by the backup firefighter to a drop point and flaked out.

Figure 10

E. This technique allows the nozzle and backup firefighter to both carry sections of hose without being too close to each other, as their roll-ups will be coupled together and it would be impossible to carry both roll-ups intact while coupled.

7.6.13 The nozzle firefighter should carry their entire roll-up to the point of operation and flake out the line from that point. It is preferred that seat-belt buckles be removed from the roll-ups before leaving the protection of the stairway.

A. The first fold of hose beneath the couplings is the midpoint of the length and can be used to flake out the line. This midpoint will be indicated with red paint. (Figure 11 and Figure 12) To flake out, grab the midpoint fold and walk or toss it away from the point of operation. This creates a large "U", leaving the nozzle and first hose coupling at the point of operation.

Figure 11

Figure 12

B. Depending on the length and complexity of the stretch, the back-up firefighter may be quickly available to help the nozzle firefighter flake their hose out (Figure 13 and Figure 14). In this case, the back-up firefighter can grab the midpoint of the nozzle length and flake it out by walking it away from the point of operation, allowing the nozzle firefighter to prepare for the attack.

Figure 13

Figure 14

C. This “U” shaped configuration makes for a smooth advance into the fire area (Figure 15), as the nozzle team will only be pulling the weight of the first length as it pivots at the first coupling, instead of the weight of the entire charged hoseline.

Figure 15

7.6.14 If the hallway is part of the fire area, the line will need to be charged at the stairway door and the hose flaked out inside the stairway and the hallway on the floor below.

A. Standing inside the midpoint fold and walking it up the stairs (Figure 16) can effectively flake out the line. If possible, flake the line out up the stairs, so line advancement will be aided by gravity once the line is charged. The presence of a half-landing will be helpful and the line should be flaked out on the half-landing platform.

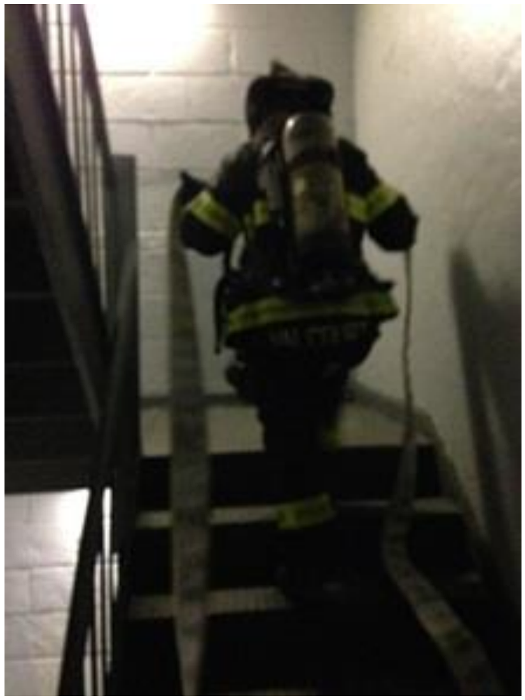

Figure 16

B. If using a scissor staircase, the straight-run configuration of scissor stairs may prove more difficult, but the hose should be similarly stretched up to the next floor and flaked out on the landing (Figure 17). This may require more than one length of hose to be used on the stairway.

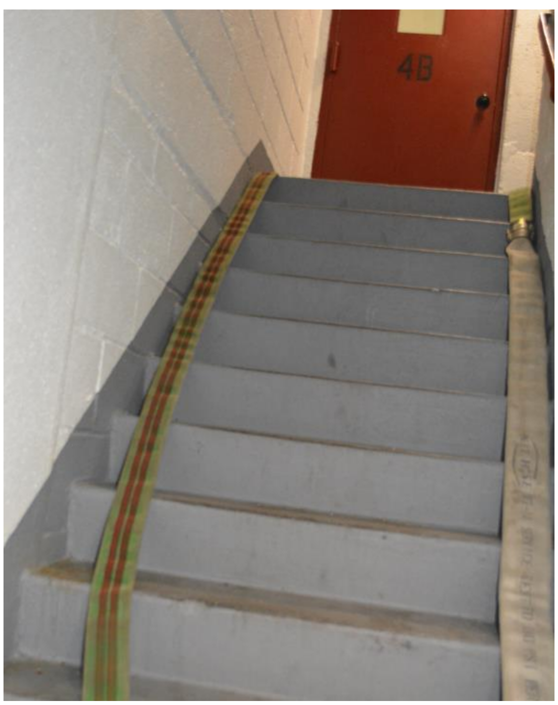

Figure 17

Figure 18

C. When the line is charged at the stairway door, the nozzle side of the hoseline should be oriented on the outside wall of the stairway on the fire floor (Figure 18). This will reduce kinking and ease the advance of the charged hoseline.

Figure 19

D. If more room is needed to flake out hose inside the stairway (Figure 19), it is preferred to use the hallway on the floor below rather than flaking hose down the stairs below the floor outlet.

7.6.15 As the nozzle firefighter is carrying their roll-up to the fire floor, the backup firefighter will flake out the 2nd and 3rd lengths of hose, allowing the nozzle firefighter to bring their entire length to the point of operation. When compatible with the building layout, the backup firefighter may carry a portion of their hose to a drop point closer to the fire area and flake their line out in a similar fashion to the nozzle firefighter. All doors should be chocked.

7.6.16 Once the hoseline is in position, the Engine Officer will communicate with the control firefighter to charge the line. The control firefighter will supply water and maintain adequate pressure in the line from the floor outlet.

7.6.17 As the line is being charged, the nozzle firefighter must "bleed the line" until the operating pressure is set.

A. This allows air in the hoseline to escape and allows the control firefighter to set the proper operating pressure.

B. Allow the water entering the hoseline to reach the nozzle. The nozzle must be opened fully and carefully to ensure an accurate reading at the floor outlet while maintaining control of the line.

C. A "long bleed" may be necessary to allow the Control firefighter to set the proper operating pressure with water flowing. Keep the nozzle open until the Control firefighter has set the correct pressure.

D. If possible, avoid bleeding the line in the direction of the elevators and attempt to use the stairway or compactor chute. This will help prevent flooding in the elevator shafts in an attempt to keep all elevator cars in operation for firefighter use.

7.6.18 As the line is being charged, the backup firefighter should consider taking a temporary position at the stairway door on the fire floor. From this position, they can make sure the line does not become trapped beneath the stairway door as it is charged. As soon as the line is charged, the backup firefighter makes their way to the nozzle, removing any kinks or obstructions they encounter in the hoseline. By the time the nozzle firefighter finishes "bleeding" the nozzle, the backup firefighter should be in position behind them and ready to advance.

7.6.19 The Engine Officer must ensure sufficient pressure is available in the hoseline before committing to the fire area. Once the hoseline is properly charged and in position, the fire attack can begin.

7.6.20 The 2nd engine company will assist with stretching and operating the first hoseline. The 2nd Engine Officer should consider the type and length of stretch when deploying members to properly assist the first engine company.

A. Since the 1st engine's Control firefighter will remain positioned at the standpipe outlet, members of the 2nd engine will need to be properly positioned to assist the 1st engine's nozzle team with their advance into the fire area.

B. The second engine officer must exercise proper judgment when deploying members to assist. The factors that must be considered include the status of water supply, the length of the stretch from the fire floor stairway door to the fire occupancy door, size of the fire occupancy, are there any turns in the hallway between the fire floor stairway door and the fire occupancy door, and is the first engine a four or five firefighter unit.

C. The second control firefighter should be positioned at the stairway door on the fire floor to ensure the hoseline does not become kinked or otherwise impeded. This also keeps them in the vicinity of the first control firefighter should water supply issues occur.

D. The second engine officer should then deploy other members in the public hallway as necessary to assist with line advance.

E. When there is a turn in the hallway, such as in a T-shaped hallway, another member should be positioned at that turn to ensure the hoseline does not become kinked or otherwise impeded.

F. The second engine officer should ensure the position at the fire occupancy door is covered to insure a proper advance into the fire area.

G. If the stretch from the fire floor stairway door to the fire occupancy door is long, members may need to be spaced along that path to ensure the line is properly advanced. This may also require the assistance of a third engine company.

H. If the 1st hoseline is charged inside the attack stairway, members of the 2nd engine will be needed to assist with the more arduous task of advancing the charged hoseline up the stairs and then down the hallway to the fire area.

7.7 Stretching additional hoselines

7.7.1 Floor outlet selection can be a challenge when multiple lines are stretched at an operation. Depending on the number of standpipe risers in the building, it may be necessary to stretch additional lines from several floors below the fire. This will result in longer stretches, requiring the assistance of additional engine companies and their hose.

7.7.2 If the first line is stretched from an outlet on the floor below the fire, the second line may have to be stretched from 2 floors below the fire when using the same standpipe riser. If this second line is being stretched as a back-up line on the fire floor, this stretch will be at least 4 lengths long. If the second line is being stretched to the floor above the fire, the stretch will be even longer.

7.7.3 In the extreme case of a third line being stretched to the floor above the fire, and if the floor outlet is located in an enclosed stairway, consideration may be given to hooking up the 3rd line to the outlet on the original fire floor. This outlet will be protected by charged hoselines and the door to the stairway will be controlled, providing the control firefighter of the 3rd line with a protected environment to hook up to the standpipe. Approval by the IC or Fire Sector Supervisor is needed to hook up to an additional line to an outlet on the original fire floor.

7.7.4 The proper operating pressure for additional hoselines should be calculated using "street hydraulics". The Engine Officer should communicate with the Control firefighter to ensure the hoseline is supplied with sufficient pressure.

8. OPERATING THE HOSELINE

8.1 While the line is operating, the control firefighter must remain at the standpipe outlet to ensure proper pressure is maintained in the line throughout the operation. It is important to recognize the difference between the higher static pressure that will exist when the nozzle is closed and the pressure reading when the nozzle is flowing water, which is the true pressure reading in the hoseline.

8.2 If there is inadequate pressure in the line, the Engine officer should communicate with the control firefighter to rectify the problem.

8.3 After the proper operating pressure has been established, if the pressure reading at the outlet is adequate, or even too high, and there is inadequate pressure at the nozzle, this is an indication of kinking in the line. Kinks should be removed manually, not by supplying more pressure.

8.4 After the fire is extinguished, ventilation of the fire area can be difficult. To facilitate ventilation, consideration can be given to using a fog tip on the hoseline. A small, removable tip may be carried in the standpipe kit and can replace the existing tip. The fog tip can be used to move smoke and heat out an open window in the fire area. This can also be accomplished by removing the MST from the nozzle and partially opening the shut-off handle. This should only be considered in the overhaul phase of the operation, well after the fire has been fully extinguished.

9. HIGH RISE NOZZLE

9.1 The 5th due engine on a 10-77 assignment is responsible to bring the High-Rise Nozzle (HRN) to the Incident Command Post (ICP) and when ordered, put the High-Rise Nozzle into operation. If they are not equipped with a HRN, they will obtain it from another unit on scene. If necessary, they should contact the dispatcher to determine which responding unit(s) are equipped with a HRN. See Chapter 8, Addendum 3 for a complete description on the use of the High-Rise Nozzle.

Figure 20

10. ADDITIONAL INFORMATION

10.1 The NFPA provides national standards regarding the installation and maintenance of standpipe systems. NFPA 14 outlines standards for the installation of standpipe systems and NFPA 25 outlines standards for the maintenance of standpipe systems.

10.2 The New York City Building Code describes the legal standpipe requirements in NYC. Standpipe systems are described in the chapter dedicated to Fire Protection Systems.

10.3 The New York City Fire Code describes maintenance requirements for standpipe systems in NYC. Standpipe systems are discussed in the chapter dedicated to Fire Protection Systems.

HIGH-PRESSURE PUMPING OPERATIONS

1. HIGH-PRESSURE AND 3RD STAGE ENGINES

1.1 *High-Pressure Engines* are engine apparatus with a two-stage pump and a total rated capacity of 2,000 GPM. They are conventional engines that have been fitted with a special high-pressure discharge elbow and issued specialized high-pressure equipment to pump at discharge pressures up to 600 psi.

1.2 *3rd Stage Engines* are engine apparatus that have a 3rd stage and a total rated capacity of 2,000 GPM. They are fitted with two special high-pressure discharge elbows and issued specialized high-pressure equipment. Using the 3rd stage, the apparatus can supply a maximum pressure of 700 psi.

1.3 High-Pressure and 3rd Stage Engines both have the following specialized equipment;

1.3.1 3" High-Pressure supply hose (50' per length; red hose with white fittings)

1.3.2 High-Pressure fittings.

A. Painted white and noticeably heavier than conventional fittings.

1.3.3 High-Pressure outlets.

A. High-Pressure Engines have 1 High-Pressure outlet.

B. 3rd Stage Engines have 2 High-Pressure outlets.

1.3.4 Tether straps with gated hooks.

A. The tether strap contains velcro bands that allow the straps to be attached to the High-Pressure supply hose.

B. It is recommended that units pre-attach the tether strap to the High-Pressure supply hose and store them together as a unit. (See Figure 1)

Figure 1

1.4 "High-Pressure Pumping" is defined as operating at discharge pressures over 300 psi. The IC (Battalion Chief or higher) shall be notified when High-Pressure pumping is necessary. ECCs intending to pump using High Pressure Pumping must notify and get approval from the IC. Only an IC at the rank of Battalion Chief or higher may order the use of the High-Pressure Pumping.

Note: Members should be aware that the recommended discharge pressure for standpipe operations will be over 300 psi when the fire floor is the 41st floor or above; or the building elevation in feet is 475 feet or higher.

1.5 All engine apparatus in the FDNY are capable of providing pressures over 300 psi. However, unless they are ordered to do so by the IC, conventional engines not equipped with high-pressure equipment should not operate in pressures exceeding 300 psi.

2. HIGH-PRESSURE PUMPING OPERATIONS

2.1 When High-Pressure Pumping operations are in use, the following precautions are to be followed:

2.1.1 Specially trained and equipped "High-Pressure" or "3rd Stage" Engines must use their High-Pressure supply hose, High-Pressure fittings, and tether strap.

2.1.2 Whenever possible, an engine supplying High-Pressure should be positioned within 1 hose length of the Fire Department Connection (FDC) being supplied. No more than 2 connected lengths of High-Pressure supply hose should be stretched to the Fire Department Connection.

2.1.3 Prior to initiating high-pressure pumping, a Safety Zone of at least 50 feet must be established on each side of the engine and the High-Pressure supply hose in all directions. Warning tape, rope, or other barriers can be used to designate this zone. If two connected lengths of High-Pressure supply hose are in use, the Safety Zone may need to be expanded.

2.1.4 Supply lines should be connected to the designated High-Pressure outlets of an engine when operating in High-Pressure.

2.1.5 Supply lines must be secured using the tether strap. The tether strap shall be secured to both the engine and the building FDC (Figures 2 & 3). When more than one length of hose is required, each length must be tethered and secured to each other by the tether gated hook (Figure 4). When ordered to pump in High-Pressure, engines without tethering straps should secure the supply line to the building FDC and the apparatus using a utility rope.

Figure 2

Figure 3

Figure 4

2.1.6 All unused gates and outlets on the apparatus must be closed and capped. All caps must be secured tightly.

2.1.7 Each engine operating at High-Pressure must be controlled by the ECC who is assisted by an ECC from a non-pumping engine. One ECC shall operate the pump and one ECC shall monitor radio communications. Other ECCs of non-pumping engines shall assist in keeping persons out of the safety zone.

2.1.8 A Battalion Chief should be designated as the High-Pressure Pumping Group Supervisor to control this pumping operation. The operation may be implemented pending their arrival.

2.1.9 The IC should ensure building occupants avoid stairwells containing standpipes when possible. Public address and building communication systems should be used if needed.

2.1.10 Stairwells served by standpipes must not be used as staging or rest areas during high pressure pumping operations. Use a minimum amount of operating personnel in these stairways.

2.1.11 When more than one engine supplies the standpipe system, ECCs shall communicate and coordinate to ensure that they operate at the same discharge pressure.

2.2 Officers must be aware of the potential need for High-Pressure Pumping operations and the pumping capabilities of responding engines. When other than first due to a fire in a high-rise building, Officers of High-Pressure Engines and 3rd Stage Engines shall direct their ECCs to position the apparatus at a hydrant in proximity to the standpipe Fire Department Connection. It is important for Officers and ECC's of High-Pressure Engines and 3rd Stage Engines to communicate with on-scene units to coordinate proper positioning.

2.3 The standpipe system should be supplied by two engines. This will require more than one High-Pressure or 3rd Stage Engine to be assigned or special called to the incident if pressures higher than 300 psi are required. When only one building FDC is available, stretch the second supply line to the 1st floor outlet. Do not connect two high-pressure supply lines to a single FDC.

3. 3RD STAGE PUMPING OPERATIONS

3.1 Pressures exceeding 600 psi will require a 3rd Stage Engine. When 3rd Stage Pumping is implemented, the IC shall ensure an additional 3rd Stage Engine is assigned to the incident. ECCs intending to pump using the 3rd stage must notify and get approval from the IC. Only an IC at the rank of Battalion Chief (including Acting Battalion Chiefs) or higher may order the use of the 3rd stage.

Note: The recommended discharge pressure for standpipe operations exceeds 600 psi when the fire floor is the 101st floor or above; or the building elevation in feet is 1175 feet or higher.

3.2 As compared to two-stage engines, three-stage engines (with the third stage engaged) can pump higher volumes at pressures over 500 psi and will do so at lower pump RPM's. This increased efficiency makes the 3rd Stage Engines the preferred choice for pumping operations requiring discharge pressures over 500 psi.

Note: The recommended discharge pressure for standpipe operations exceeds 500 psi when the fire floor is the 81st floor or above; or the building elevation in feet is 925 feet or higher.

4. COMPANY DESIGNATIONS

4.1 The following Engines are designated as High-Pressure Engines:

E-1, E-4, E-7, E-9, E-21, E-22, E-23, E-24, E-40, E-66, E-67, E-76, E-79, E-93, E-205, E-207, E-210, E-211, E-216, E-219, E-221, E-224, E-226, E-229, E-238, E-259, E-260, E-262, E-325.

4.2 The following Engines are designated as 3^{rd} Stage Engines:

E-6, E-8, E-10, E-26, E-34, E-54, E-65, E-258.

STANDPIPE SUPPLY CHARTS

Standpipe Suppy Pressures
(by floor number)

Floor number	Pressure (in psi)	Floor number	Pressure (in psi)
10	150	56	380
12	160	58	390
14	170	60	400
16	180	62	410
18	190	64	420
20	200	66	430
22	210	68	440
24	220	70	450
26	230	72	460
28	240	74	470
30	250	76	480
32	260	78	490
34	270	80	500
36	280	82	510
38	290	84	520
40	300	86	530
42	310	88	540
44	320	90	550
46	330	92	560
48	340	94	570
50	350	96	580
52	360	98	590
54	370	100	600

Standpipe Suppy Pressures (by elevation)

Elevation (in feet)	Pressure (in psi)	Elevation (in feet)	Pressure (in psi)
100	143	750	426
125	154	775	436
150	165	800	447
175	176	825	458
200	187	850	469
225	198	875	480
250	209	900	491
275	219	925	501
300	230	950	512
325	241	975	523
350	252	1000	534
375	263	1025	545
400	274	1050	556
425	284	1075	567
450	295	1100	577
475	306	1125	588
500	317	1150	599
525	328	1175	610
550	339	1200	621
575	350	1225	632
600	360	1250	643
625	371	1275	653
650	382	1300	664
675	393	1325	675
700	404	1350	686
725	415	1375	697
		1400	708

HIGH RISE NOZZLE

1. DESCRIPTION

FDNY Designation	High Rise Nozzle (HRN)
Material	1½" Diameter Aluminum Pipe
Weight	Approx 10 lbs.
Misc.	Standard 2 1/2" shut-off with 1 1/8" MST
	T-handle allows members control of the nozzle.

2. INTRODUCTION

2.1 Experience has shown that members have become caught in wind-driven fires often with minimal or no warning. Members must remain alert and knowledgeable of the conditions which may cause a wind-driven fire, some examples include: a wind condition blowing toward a fire apartment window, an open window, an open fire apartment door with a high heat and smoke condition on the fire floor. If the equipment and resources are available and wind conditions exist, the high-rise nozzle should be placed in position as a precaution even if the need is not immediately evident. Depending upon the fire conditions encountered, if the decision is made to place the High Rise Nozzle in position, additional resources may need to be called to the incident.

2.2 Dispatch policy dictates that every 10-77 will have at least one HRN equipped engine company assigned. It is the responsibility of the 5th due engine to bring the HRN to the Incident Command Post. If the 5th engine is not equipped with a HRN, they will obtain it from another unit on the scene. If necessary, the officer should contact the dispatcher for the identity of the assigned engine company equipped with a HRN. Upon arrival the officer will have the unit bring the HRN, roll-ups and a standpipe kit to the ICP.

3. HIGH RISE NOZZLE USE

3.1 The HRN may be used as an alternate attack strategy at high rise multiple dwelling fires in the following situations:

3.1.1 IC has determined that a direct interior attack with a handline is not possible, such as conditions caused by wind-impacted fires.

3.1.2 The fire apartment is inaccessible to traditional exterior streams (TL, handlines, etc.)

3.1.3 Any situation where the IC determines the HRN will be beneficial.

4. DESCRIPTION

4.1 The High Rise Nozzle is an eight-foot long aluminum pipe with a 68 degree two-foot bend to provide the proper angle for the water stream. It is attached to a standard 2 1/2” FDNY shut-off that is permanently attached to the nozzle. There is a T-shaped handle that allows members operating the nozzle to control the direction of the stream and maintain control of the nozzle. (Figure 1)

Figure 1

4.2 A 1 1/8” MST is attached to the outlet of the HRN. The tip is removable and should be checked weekly during MUD and before use. (Figure 2)

Figure 2

4.3 The HRN may be supplied by a 2” or 2 1/2” hoseline. The HRN requires a pressure of 50 psi at the tip with water flowing to produce a flow rate of 225 GPM. A stretch of longer than 3 lengths should be anticipated and thus the floor outlet pressure will need to be adjusted accordingly. A properly positioned high rise nozzle in operation is shown in Figure 3.

Figure 3

5. PROCEDURE

5.1 The High Rise Nozzle (HRN) will only be placed into operation at the direction of the IC, who must be a Chief Officer.

5.2 The IC must consider the following when placing the HRN into operation:

5.2.1 Life hazard.

5.2.2 Is the fire inaccessible to outside streams?

5.2.3 Intensity and stage of the fire: Wind driven fire creating supercharged fire conditions in the fire apartment and/or the public hallway.

5.2.4 Potential for fire spread via auto exposure.

5.2.5 Availability of a Wind Control Device.

5.2.6 Sufficient units on scene to deploy the High Rise Nozzle.

5.3 The IC shall announce over all radio frequencies that the HRN will be placed into operation, and ensure members are safely positioned before the stream is operated. By design, the high rise nozzle provides effective water application based on the principles of exterior water application (discussed further in Chapter 4). Namely the acronym S.S.S.S. of solid bore stream, steep angle, steady stream without circular motion and a steep angle providing a sprinkler effect.

5.4 The IC should ensure a spotter, equipped with a handie-talkie and a pair of binoculars, is in place to clearly observe the operation from the exterior. This member must monitor the conditions in the fire apartment before, during and after HRN deployment. The spotter will provide direction and progress reports to the IC and members operating.

5.5 The officer supervising HRN use will initiate and maintain HT contact with the spotter to ensure the nozzle is being operated effectively and the stream is knocking down the fire.

5.6 The IC should be aware that putting the HRN into operation will generally require additional units to assist the 5th Engine. These units should bring roll-ups, standpipe kits, and/or forcible entry tools to assist with deployment of the nozzle and forcible entry.

5.7 Units will need to gain access to the apartment below the fire apartment and determine which window the HRN will be operated from. Depending on the situation, the hoseline supplying the HRN may have to be stretched from an outlet two or three floors below the fire floor. Officers must size up the number of roll-ups required to reach the area of deployment, if assistance is needed with forcible entry and inform the IC of the conditions, the actions being taken and any needs that they have.

5.8 Once the proper window is chosen and opened, impediments such as window bars, child gates, will have to be removed. In most cases it is **not necessary** to remove the window to operate the nozzle. Some windows are easily removed via clips on the top of the sash.

5.9 The supply line must be attached to the HRN before the nozzle is slid out on the window sill for use. Firefighters operating the HRN will use the T-handle to properly position the nozzle for optimum stream placement. The T-handle will allow the firefighters to move the nozzle along the window sill and maintain control.

5.10 The key to the rapid extinguishment of a wind-driven fire is putting water directly on the seat of the fire. If multiple rooms are involved, it will be necessary to reposition the nozzle to ensure complete knockdown of the fire. If this is the situation, start with the window that the wind is blowing into and extinguish the fire in this room first. Then move to the other windows downwind of the original fire room and complete knockdown of the fire.

5.11 If a wind-driven fire has control of several rooms, it will be necessary to move the HRN from a window in one room to another window in a separate room to achieve knock down of the fire. If this is the situation, company officers must anticipate and make sure the next window(s) that will be used for operation of the nozzle is cleared of window gates, bars etc., this will speed up the repositioning.

5.12 A shut-off shall be placed in line one length back from the nozzle. When repositioning of the HRN is required, the supply line should be shut down at the shut-off located one length back and the nozzle opened to bleed the line. This will make it easier to move the nozzle and supply line while repositioning. Once in position, the officer supervising nozzle operations will order water started. This officer will then notify the IC that the nozzle is in position and ready to operate. The nozzle will not be operated until the IC has given approval.

6. REPAIRS AND REPLACEMENT

6.1 If repairs to the High Rise Nozzle are required, the company officer shall contact the Technical Services Division via phone and request a replacement. The out of service HRN shall be tagged with an RT-2 documenting the nature of the defect.

AIR PRESSURIZED STANDPIPE

1. PURPOSE

1.1 An air pressurized manual dry standpipe system is required at buildings under construction upon reaching a height greater than 75 feet or buildings undergoing demolition with an existing standpipe (2014 NYC Building Code and Local Law 64 of 2009). The entire standpipe system including the riser, cross connections, and Fire Department Connections (FDC) are pressurized by a dedicated air compressor. This air pressurized standpipe system is designed to alert workers on site when the standpipe has been compromised.

1.2 When the air pressure drops below a predetermined (supervisory) pressure due to an open valve or broken pipe in the system or pressure rises above 25 psi an audible alarm will sound only at the site. The supervisory pressure will vary for each site but will always be below a maximum of 25 psi. The alarm will continue until the opening in the system is closed allowing the compressor to slowly bring air pressure back into the supervisory range or excessive pressure is reduced below 25 psi.

1.3 When an alarm sounds, work at the site must cease, and construction personnel are to notify the FDNY. Concrete pouring operations in progress shall be permitted until an orderly termination of such operation can take place. No construction or demolition work shall resume except repairs needed to restore air pressure to the standpipe.

Note: Any portion of the standpipe compromised above a closed section valve will not cause activation of the alarm due to air pressure being maintained constant in the lower portions of the standpipe.

2. OPERATION

2.1 To use an air pressurized standpipe system at a fire operation the air pressure must be released from the system prior to uncapping the FDC and supplying it with water. Attempting to remove the FDC caps prior to expelling the air from the system may cause the cap to become a projectile causing serious injury. After the air pressure is discharged, units can supply the system with water as they would at a standard dry standpipe operation.

2.2 A 2 ½" manual air release / drain valve (usually a standard standpipe outlet) is required to be installed immediately adjacent to the FDC. (See Figures 1) Remove the manual air release valve cap and open the valve fully. Air will be heard escaping from the manual air release valve. The ECC shall not remove the FDC cap(s) until air pressure has been expelled from the system. Air will be heard escaping from the open manual air release. The number of air release valves is required to be such that air pressure shall be released in no more than 3 minutes. When encountering systems with more than one manual air release valve, all manual air release valves should be opened. (See Figure 3)

Figure 1

2.3 Once air pressure is expelled, FDC cap(s) may now safely be removed. Connect the supply line, close the manual air release valve, and supply the standpipe with water.

2.4 It is not necessary to deactivate the air compressor as it will shut off when the standpipe is supplied with water.

2.5 The location of the FDC is required to be marked by a sign and lit by a red light at night. Signs are also required indicating that the standpipe is pressurized with air as well as the location of the manual air release valve. (See Figures 1, 2 & 3)

2.6 If air is noticed escaping under pressure from a FDC cap while being loosened, and no sign is present, member should stop cap removal immediately and notify the IC that the standpipe is pressurized with air. Steps shall be taken to bleed the air from a manual air release valve and/or standpipe outlet inside the building prior to removing the FDC cap(s).

Figure 2

2.7 Screw in type FDC caps are required in order to provide the air tight seal necessary for an air pressurized standpipe system. Breakaway caps or other non-screw in type caps on the FDC are indicative of a standpipe that is not pressurized with air.

Figure 3

2.8 The control firefighter, after reaching the floor outlet where the hoseline connection will be made, should remove the cap, open the standpipe outlet control valve, and wait for water to reach this point. This will expedite air removal from the system. Once water is present at the outlet, close it, and make necessary connections. The standpipe system will now function as a standard manual wet standpipe.

2.9 An occupied building with a wet standpipe system will have a check valve installed inside the exterior building wall providing freeze protection for the piping and FDC connection. During the construction or demolition phase with the standpipe pressurized with air, this check valve will be bypassed allowing air pressure to reach the FDC connection. At a fire operation, once the system has been drained of air and charged with water, water will flow past the bypassed check valve(s) out to all FDC connections. If FDC clapper valves are defective or tampered with in the second FDC, its caps may be under pressure.

2.10 The manual air release valve does not need to be opened when augmenting the standpipe with a second pumper. However, when loosening the FDC cap(s) at this second FDC, if water begins spraying out under pressure consider the clapper valves inside this FDC defective. Immediately stop cap removal, and use another option for augmenting the system e.g. supply the drain valve next to the FDC, use another FDC, or supply the first floor or another floor outlet. The manual air release valve can be supplied in the same manner as you would supply the first floor standpipe outlet.

LARGE CALIBER STREAMS

1. LARGE CALIBER STREAM OVERVIEW

1.1 A Large Caliber Stream (LCS) is a fire stream that delivers 350 gpm of water flow or more. They can be ground based (New Yorker multiversal), engine apparatus based (deckpipe), or applied through an elevated position (tower ladder or aerial ladder pipe).

1.2 The versatility and increased flow rates of LCS can dramatically impact operations. At fast-moving fires, early use of LCS can limit fire growth and spread.

1.3 Only the Incident Commander may order the use of LCS, which may be the first arriving officer. This includes the first arriving engine using its apparatus deckpipe.

2. SUPPLYING LCS

2.1 Whenever possible, an engine company supplying LCS should be dedicated to that task and not engaged in supplying handlines.

2.2 LCS should be supplied with the largest available hoselines. Most commonly, this will be 3 ½" hose.

2.3 Engine companies supplying a LCS may require additional augmentation, especially when in-line pumping is used. This can be accomplished through the use of a 2 ½" single gate attached to a hydrant for the purpose of possible self-augmentation.

3. LCS OPERATIONS

3.1 If LCS use is ordered after units are operating within a building, all operating forces must be notified, and time permitted for their safe withdrawal to unexposed positions. Confirmation of their safe withdrawal will be verified by way of a Roll Call and all officers should be prepared to account for the members of their company.

3.2 As an additional safety measure, the LCS should be quickly swept through the building without stopping at any window or other opening to serve as a warning to any members left in the area of operation.

3.3 LCS use requires strict adherence to operating procedures to avoid serious injury or unnecessary property damage. LCS can cause structural stress when driven into building components and may dislodge building materials, turning them into dangerous projectiles. Additionally, water accumulation can add significant weight to a building and can precipitate structural collapse.

3.4 LCS can entrain large amounts of air into a structure with stream application. The effect of air movement resulting from LCS use must be considered by the IC and operating members as conditions may deteriorate in remote areas of the building.

4. NEW YORKER MULTIVERSAL

Figure 1

4.1 The New Yorker Multiversal (Figure 1) is carried by all engine companies and has a two-piece design:

4.1.1 The top section contains the tips, stream shaper, lock, and wheel.

4.1.2 The base section contains the folding legs, attachment points, pins, and supply connections.

4.2 The multiversal is equipped with three stacked tips (1 ¼”, 1 ½” and 2”)

4.2.1 When the 1 ¼” tip is used, it will flow roughly 465 GPM with 100 psi at the tip.

4.2.2 When the 1 ½” tip is used, it will flow roughly 560 GPM with 70 psi at the tip. When supplied with 100 psi at the tip, it will flow roughly 660 GPM.

4.2.3 When the 2” tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

4.3 Assembling the Multiversal

4.3.1 Extend the three leg supports and the place the base section on the ground. The front leg (with safety chain attached) points in the direction of operation.

4.3.2 Attach the top section to the base section by placing the top section on top and inserting the two locking plungers fully, one on either side of the appliance.

4.4 Securing the Multiversal

4.4.1 Due to the significant back pressures caused by the nozzle reaction, the multiversal must be secured to ensure a safe operation.

4.4.2 The primary means of securing the multiversal is the proper placement of the supply hose. All hose supplying the multiversal should be brought straight back from the appliance for 15 feet. This configuration of hose will effectively absorb the nozzle reaction and prevent lateral movement of the multiversal.

4.4.3 An additional measure to prevent backward movement of the multiversal is to secure it in position with a utility rope. The following procedure should be used before the supply hose is attached:

A. Before attaching the supply hose, place the middle of the rope on top of the supply connection (Figure 2).

B. Bring the two sides of the rope around the supply connection and up between the two inlets.

C. Bring the two sides of the rope up over the connection and bring each side forward to the large leg of the ground base on each side of the front leg. Make a half hitch on each of these two legs (Figure 3).

D. Bring the rest of each end of the rope forward and secure each end to a substantial object which is forward and at an angle to the multiversal, using a clove hitch and binder on the taut part of the rope.

Figure 2

Figure 3

4.4.4 If there is no substantial object readily available in the area, the supply hose itself can be used as a substantial object. This is done by looping the supply hose in front of the multiversal and tying the rope to it. The supply hose should be laid straight back for 15 feet before it is looped in front of the multiversal.

4.4.5 Additionally, the safety chain can be secured to a substantial object, if one is close enough. The safety chain alone should never be relied on to secure this appliance.

4.5 Supplying the Multiversal

4.5.1 The multiversal is equipped with two 3” female connections.

4.5.2 The multiversal should be supplied with two supply lines whenever possible, though it can be operated when supplied with only one line.

4.5.3 The multiversal should be supplied with the largest size hose available. Generally, this is 3 ½” hose, though it is possible to supply it with 2 ½” hose.

4.5.4 The maximum allowable pressure supplied to the appliance base is 200 psi.

4.6 Operating the Multiversal

4.6.1 Do not move the multiversal or the 15 feet of supply hose while it is in operation.

4.6.2 The multiversal can rotate horizontally 90 degrees in each direction.

4.6.3 The vertical range of the nozzle is from 15 degrees below the horizontal to 90 degrees above the horizontal. The elevation is adjusted by the operating wheel.

4.6.4 There is a safety stop at 35 degrees above the horizontal. To operate below 35 degrees, release the safety stop by pulling up the release pin**.**

5. APPARATUS DECKPIPE

Figure 4

5.1 The apparatus deckpipe is permanently affixed to engine apparatus and supplied directly by a 3-inch pipe from the pump (Figure 4).

5.2 The deckpipe has 4 stacked tips (2 ½", 2 ¼", 2", 1 ½").

5.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

5.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

5.2.3 The maximum flow of 2,000 GPM is reached when the 2 ½" tip is supplied with 116 psi.

5.3 The deckpipe should be maintained with a single gate connected. The single gate allows the ECC to supply the deckpipe with water prior to operating the stream.

5.4 Deckpipe Operations

5.4.1 In situations where fast water on a rapidly expanding fire is required, the IC may consider using the engine deckpipe for a quick knock-down. This may be the first arriving officer.

5.4.2 Prolonged usage of the deckpipe LCS may necessitate augmentation, especially when in-line pumping. An engine company using a LCS should attach 2 ½ gate to the hydrant for possible self-augmentation.

6. AERIAL LADDER PIPE

Figure 5

6.1 The Aerial Ladder Pipe (Figure 5) is carried by all aerial ladder apparatus. It is comprised of a nozzle attachment, two halyards to control the direction of the stream, and a Siamese connection used to supply the appliance.

6.2 The ladder pipe has a 1 ½” tip that will flow roughly 660 GPM with 100 psi at the tip.

6.3 The nozzle attachment is equipped with a movable tip section and has a 3” female coupling. It is manually attached to the top two rungs of aerial ladder fly section.

6.4 The direction of the stream is controlled by the halyard attachments, which connect to the moveable portion of the nozzle attachment and are operated by a member standing at ground level.

6.5 Aerial ladder companies carry two lengths (100 feet) of 3 ½ hose (Figure 6) that are maintained connected to each other. The male coupling is maintained connected to the ladder pipe (Figure 7) and the female coupling is maintained connected to the outlet of a 3-inch gated Siamese connection. Also carried are two halyards and reels, which are kept in a designated area on the apparatus.

Figure 6

Figure 7

6.6 Aerial Ladder Pipe Operations

6.6.1 To put the ladder pipe in operation, members of the ladder company will attach the ladder pipe (with 3 ½" hose connected) to the first two rungs of the aerial ladder. The 3 ½" hose is secured with a hose strap just below the ladder pipe coupling. The hose strap should be attached to the first rung of the top sliding section of the ladder.

6.6.2 Once the ladder pipe is attached to the ladder (Figure 8), the two halyards are connected to the ladder pipe as follows:

A. One halyard clip is attached to the ladder pipe handle.

B. One halyard clip is attached to the collar of the ladder pipe (Figure 9).

Figure 8

Figure 9

6.6.3 The halyard reels are placed on the ground (Figure 10) near the tip of the aerial. One ladder company member holds the ends of both halyards, using them to control the vertical movement of the ladder pipe stream. This member should stand on the same side of the aerial ladder as the ladder pipe handle (which is to the right of the ladder, when facing the tip from the turntable) (Figure 11). This will allow for smooth operation of the halyard. If operating the halyard near the aerial tip is not possible (or is a safety hazard), the halyard can also be operated from the area of the turntable.

Figure 10

Figure 11

6.6.4 After the ladder pipe is attached to the ladder, the Siamese connection is placed near the rear of the apparatus. Water supply to the ladder pipe is controlled using the single gate attached to the Siamese connection.

6.6.5 The Siamese connection is supplied with 3 ½" hose, which is stretched from an engine apparatus and connected near the rear of the aerial ladder. Two supply sources are recommended to prevent undue stress on the aerial ladder in the event a sudden loss of water occurs.

6.6.6 The ladder pipe should be supplied with roughly 110 psi, plus 5 psi for every 10 feet in elevation. When operating at the maximum elevation of 80 feet, the Siamese should be supplied with roughly 150 psi.

6.6.7 When in operation, the angle of the aerial ladder should not exceed 70 degrees. At the maximum operating angle of 70 degrees, the maximum elevation of the ladder pipe will be 80 feet.

6.6.8 While the ladder pipe is in operation, the vertical movement of the stream is controlled using the halyard. The horizontal movement is controlled by moving the turntable. The halyard is most easily operated from a position near the tip of the aerial. However, depending on the position of the ladder, it may be necessary to operate from near the turntable to ensure a position of safety.

7. TOWER LADDERS

Figure 12

7.1 All tower ladder apparatus in the FDNY are equipped with a basket-based monitor capable of delivering a large caliber stream when supplied by an engine company (Figure 12).

7.2 The tower ladder monitor has 2 stacked tips (2", 1 ½"). A fog tip may also be attached to the monitor.

7.2.1 When the 1 ½" tip is used, it will flow roughly 660 GPM with 100 psi at the tip.

7.2.2 When the 2" tip is used, it will flow roughly 840 GPM with 50 psi at the tip.

7.2.3 The maximum solid stream flow of roughly 1,200 GPM is reached when the 2" tip is supplied with 100 psi**.**

7.2.4 When the Akron Turbomaster fog tip is used, the flow can be up to 1,250 GPM.

7.3 Suppling the Tower Ladder

7.3.1 Generally, only one source at the base of the tower ladder should be used.

A. A Satellite Water Unit is the best source of supply if available.

B. When supplied with 3 ½" hose, ensure the male end is stretched to the gated inlet.

C. 200 – 250 psi is the recommended pressure at the gated inlet.

7.3.2 Water flow is controlled by the supply pumper

A. The gated inlet at the TL should not be used to control water flow.

B. Water should always be shut down at the supply pumper.

7.3.3 Refer to *Tower Ladder Operations* for more information.

8. BLITZFIRE OSCILLATING MONITOR

Figure 13

8.1 The Blitzfire Oscillating Monitor is a compact portable monitor that is carried only by the following specialized units:

8.1.1 Satellite Engine Companies

8.1.2 Foam Tanker Engine Companies

8.1.3 Haz-Mat Technician Engine Companies

8.1.4 Haz-Mat Company 1

8.2 The inlet and the outlet of the Blitzfire are both equipped with 2 ½" threads. There is one 2 ½" supply inlet which should be supplied with only one 2 ½" hoseline.

8.3 The maximum pressure to be supplied to the Blitzfire is 175 psi.

8.4 The Blitzfire comes supplied with its own Max-Force Dual Pressure fog tip. This is the only tip that may be used on the Blitzfire for exterior water stream application.

8.5 The fog tip can flow approximately 500 GPM at its maximum pressure of 175 psi.

8.5.1 The fog pattern ranges from straight stream to a 120-degree fog pattern.

8.5.2 The fog tip may be switched from a standard mode of 100 psi to a low-pressure mode of 55 psi.

8.5.3 The fog tip may also be used to apply finished firefighting foam.

8.6 The Akron 500 GPM foam nozzle may also be used with the Blitzfire to apply foam.

8.7 The Blitzfire has the following range of motion:

8.7.1 The vertical range is approximately from 10 degrees to 45 degrees.

8.7.2 The horizontal range is 20 degrees from center in either direction.

8.7.3 It also has an oscillation feature providing an automatic horizontal sweep of either 20, 30, or 40 degrees.

8.7.4 A minimum flow of 175 gpm is required for proper oscillation.

8.7.5 The speed of oscillation is a function of the flow rate.

8.8 The Blitzfire has a flow control handle that can be used to control water flow and act as a safety shut-off feature. The handle is closed when pushed fully forward and open when pulled back. The flow control handle also has 6 flow positions, allowing the water flow (gpm) to be regulated at different positions.

8.9 The flow control handle also has a safety shut-off valve. The safety shut-off valve will automatically shut off the monitor's water flow if the monitor starts to move sideways. Once the safety shut-off is tripped, the flow control handle will automatically move to the fully closed position. To resume operations, push the handle fully forward to ensure the safety shut-off valve has been reset.

8.10 If the monitor is positioned on a sloped surface, the safety mechanism may activate preventing the flow control handle from remaining open. This can happen because it appears the monitoring is moving. If this occurs, the flow control handle will have to be manually held open by a firefighter. In these situations, it is dangerous to attempt to utilize utility rope, webbing or any other device to hold the flow control handle open.

8.11 When in operation, the Blitzfire should only be secured using the tie down strap. The loop end of the strap will be secured to an anchor point and the hook will be snapped into the hole at the front of the Blitzfire. This is the safest method to secure the monitor because if the monitor slides, its travel is limited by the length of the strap.

ENGINE COMPANY EMERGENCIES

1. ENGINE COMPANY EMERGENCIES

1.1 Engine companies can encounter a number of unique emergency situations on the fireground. Each presents a serious safety hazard and need to be decisively addressed to avoid catastrophic consequences.

1.2 Engine emergencies can be classified into three broad categories, based on the underlying threat presented by each specific situation:

1.2.1 Inability to secure a water source.

1.2.2 Loss of water in an operating hoseline.

1.2.3 Inability of hoseline to reach the seat of the fire.

1.3 The following sections will describe a number of emergency situations that engine companies may encounter at a fire operation. These sections will also discuss the proper reaction by engine company personnel, as well as potential solutions to the problems faced.

2. INABILITY TO SECURE A WATER SOURCE

2.1 The inability of the 1st due engine company to secure a positive water source is a serious situation that affects everyone on the fireground.

2.2 Anytime an engine company is unable to secure a positive water source, a signal 10-70 should be transmitted. This should be given by an URGENT handie-talkie transmission in accordance with *Communications Manual Chapter 9: Company Unit Communications*. The signal 10-70 should also be transmitted over the department radio, which will alert incoming units of the situation. The second due engine company will be designated the "Water Resource Unit" and will be responsible for ensuring a water source is secured.

2.3 Inoperative hydrant

2.3.1 If the 1st due engine finds their hydrant to be inoperative (or frozen), the ECC should immediately notify their officer that their primary hydrant is inoperative and attempt to find a nearby operable hydrant that can supply water. If there are no nearby hydrants, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.

2.3.2 If there is another hydrant in the immediate area, the ECC should test it for operability. If the second nearby hydrant is inoperative or frozen, and the second due engine is not on scene, the 1st ECC should transmit a 10-70, as described above.

2.3.3 If there is no alternative hydrant in the immediate area and the 2nd due engine is on scene, the 1st ECC should contact the 2nd ECC to see if they have a working hydrant.

2.3.4 If the 2nd due company has a working hydrant, the 1st ECC must determine if they can hook up to that hydrant directly, either by repositioning their rig, or by stretching 3 ½" hose. If either option is available, the 10-70 signal is not required.

2.3.5 If the 1st ECC determines that they cannot directly hook up to the working hydrant, they will need to be supplied via a relay operation. If this is required, the 1st ECC should transmit a 10-70, as described above.

2.3.6 If the 2nd due engine does not have a working hydrant, both ECC's must continue searching for a working hydrant until a water source is obtained. In this situation, a 10-70 should be transmitted as described above.

2.4 Inoperative standpipe system

2.4.1 If the standpipe system fails to provide water at the floor outlet of a high-rise building, engine company members will not be able to stretch and operate a hoseline from the standpipe outlet, creating an emergency situation for operating units.

2.4.2 This will likely be discovered by the control firefighter at the standpipe outlet. If they are unable to use the standpipe system to supply the hoseline, they should transmit a signal 10-70 via an URGENT handie-talkie transmission as described above and inform the Incident Commander and engine officer of the situation.

2.4.3 Before initiating an emergency solution, it should be determined whether the standpipe system is completely inoperative. It may be possible to rectify the issue of inadequate water at the outlet by correcting a minor problem in the system, effectively making the system fully operational. As a first step, members should troubleshoot possible problems in the standpipe system by considering the following:

A. Confer with the supplying ECC to determine if they are flowing water as indicated on their flowmeter.

B. If they are flowing water, this indicates an opening (open floor outlet, ruptured piping, etc.) in the standpipe system.

C. In this case, members should attempt to find and close the opening.

D. Depending on the height of the building and the fire floor, the Incident Commander may have to assign several units to assist in this search.

E. The search for the opening should begin in the lowest level of the building and work towards the fire floor.

F. However, units already in place on upper floors may be assigned by the Incident Commander to assist in the search by working downwards from the upper floors.

G. If the ECC is not flowing any water as indicated on the flowmeter, this may indicate a blockage in the system.

H. This may be a closed riser or section valve or other obstruction. In this case, members should attempt to find the closed valve.

I. The search for the closed valve should begin in the lowest level of the building and work towards the fire floor.

J. In either case, the system should be augmented by a 2nd apparatus. This may be via a 2nd FDC or the 1st floor outlet.

2.4.4 If the standpipe system proves to be fully inoperative, engine companies must seek out an alternative method of supplying water to the fire floor. By the time the failure of the standpipe system is discovered, the 1st arriving engine will likely be positioned at the floor outlet on the floor below the fire, equipped with their standard complement of equipment, which includes 3 lengths of hose and a standpipe kit. Using this equipment, this emergency can be solved by performing either a “reverse stairway stretch” or an “exterior hose drop”.

2.4.5 A “reverse stairway stretch” involves members carrying 2 ½” roll-ups into the building and stretching down the stairway to the apparatus. Rather than beginning the stretch on the street level, the stretch begins on the floor below the fire and additional lengths are added as it continues down the designated stairway. This method will use gravity to facilitate a long and difficult stretch.

2.4.6 An "exterior hose drop" is similar to a rope stretch, but instead of using a rope to hoist hose up to a window, members will lower connected lengths of hose down from a window to the street below. While completing a rope stretch from a window on an upper floor might be possible, the extreme weight of the hose will make hoisting the required number of lengths prohibitively difficult.

2.4.7 In both scenarios, the key point is that 2 ½" roll-ups are carried to the fire area and stretched down to the apparatus.

2.5 Reverse Stairway Stretch

2.5.1 The execution of a reverse stairway stretch must be approved by the IC and communicated to all units.

2.5.2 The engine officer will communicate with the Incident Commander and the ECC to identify the stairway to be used for the stretch. On the ground, the ECC (assisted by additional engine companies) will begin stretching 2 ½" hose up the designated stairway.

2.5.3 Beginning on the floor below the fire, members will connect their lengths of 2 ½" hose (roll-ups) and begin stretching down the designated stairway. As additional engine companies arrive, they will add their roll-ups to the stretch as it descends the stairway. Members should ensure the female end of the hose is being stretched downwards towards the street.

2.5.4 Depending on the length of the stretch, additional engine companies may be directed to report to a lower floor (equipped with their roll-ups) to meet the stretch as it descends the stairway. This operation will require significant coordination and clear communication to ensure sufficient hose is brought to the correct locations.

2.5.5 The stretch will continue down the designated stairway until it meets the hoseline being stretched up the stairway. At this point, the hoselines will be coupled and the stretch will be complete.

2.5.6 Once the stretch is complete, the engine officer in command of the nozzle team must be notified. Only the officer in command of the nozzle team can call for the hoseline to be charged.

2.5.7 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a 2 ½" hoseline. The ECC must remain aware of any indication of insufficient pressure in the hoseline and be prepared to supply additional pressure if necessary.

2.6 Exterior Hose Drop (Figure 1)

Figure 1

2.6.1 The execution of an exterior hose drop must be approved by the IC and communicated to all units.

2.6.2 The engine officer will communicate with the Incident Commander and the ECC to coordinate the location from which the hoseline will be lowered. On the ground, the ECC will stretch a 2 ½" line to the point at which the lowered line will reach the ground.

2.6.3 On the floor below the fire, members of the first due engine will connect their lengths of hose and begin to lower it out the window. If there is a rope available, it can be tied as a safety precaution to the lead coupling being lowered, so as to allow the members waiting on the ground below to guide the hose as it's being lowered. Once the lead coupling reaches the ground, the ECC will couple it to the supply line stretched to that location.

2.6.4 After the hose has been lowered, members of the first due engine company must properly secure the hose. This is the most critical point of the evolution. If the hose is not properly secured, the weight of the charged hoseline will cause such severe kinking in the line such that sufficient water will not reach the fire floor. Once charged, the line will be too heavy to move and adjustments to eliminate the kinks will not be possible.

2.6.5 To properly secure the hoseline with the equipment available, a rolling hitch must be tied and secured directly below the first hose coupling that will be located outside the window (Figure 2). The knot must be tied and secured before the line is charged. If a different knot, such as a standard clove hitch, is used, the line will likely kink around the rope and severely limit water flow. The wide surface area of the rolling hitch (4 turns around the rope) will minimize this kinking effect. If the knot is tied away from the coupling, it will likely also kink severely; it requires the stability of the coupling to prevent kinking.

2.6.6 Once the rolling hitch is tied at the coupling, the knot must be lowered outside the window so the hose is oriented vertically (Figure 3). If the knot is kept inside the window when it is secured, the weight of the water will severely kink the line as it comes over the window sill. (*photos show hose lowered from a roof, but the evolution is the same from a window*)

Figure 2

Figure 3

2.6.7 After the knot is lowered into place, the rope must be secured inside the window using a substantial object knot. The location of the substantial object knot will depend on the length of the rope being used. Any available rope may be used for this purpose.

2.6.8 When the rolling hitch is in position, the substantial object knot has been secured, and the nozzle is attached, the line is ready to be charged (Figure 4). When the officer calls for water, the ECC should charge the line slowly to minimize movement in the hose as the water fills the line.

2.6.9 Once the line is charged, there will likely be a significant kink at the window sill. This can be eliminated by lifting the line to create a bow, effectively "loading" the line onto the rolling hitch (Figure 5), which is supporting the hose at the first coupling located outside the window.

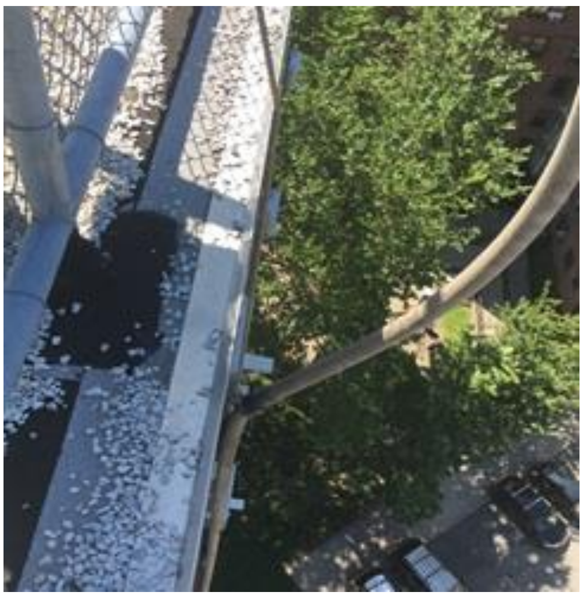

Figure 4

Figure 5

2.6.10 The ECC should supply the line with pressures consistent with the street hydraulics calculations for a standard 2 ½" line stretched. This calculation should include the lengths to be stretched inside the building from the floor below the fire to reach the fire area.

3. LOSS OF WATER IN AN OPERATING HOSELINE

3.1 When an engine company loses water in their hoseline while operating, the Engine Officer should transmit an URGENT message via handie-talkie, as outlined in Communications Chapter 9. This will alert the entire fireground of the emergency. In addition to this transmission, the Engine Officer must initiate action to remedy the situation.

3.2 It is important for the engine officer to coordinate with the ECC to identify the problem and correct it as soon as possible. Once the problem is accurately identified, there may be corrective action that can be taken that would not require the water supply to the hoseline to be shut down. Shutting the water supply to the hoseline should be avoided, if possible.

3.3 Burst length

3.3.1 When a burst length is severe enough to critically reduce the extinguishment capabilities of the hoseline, it should be treated as a loss of water in the hoseline and it must be addressed. An URGENT handie-talkie transmission must be made and the hoseline should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.3.2 It is important to note that a leak in the hoseline does not necessarily constitute a burst length. If adequate water flow is still present at the nozzle, it is not a "water loss" emergency, even if water is leaking from the hoseline. If a significant leak is found in the hoseline, the engine officer should be notified, but the determination of a water loss should be made by the engine officer in charge of the hoseline.

3.3.3 The indications of a burst length include water loss at the nozzle, pressure loss in the lead length, an elevated water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter) and the apparatus pump RPM increasing automatically. This indicates that water is leaving the pumper, but not reaching the nozzle. This diagnosis from the pump panel must be followed up with the confirmation of the location of the burst length itself.

3.3.4 This problem can be solved by locating and replacing the burst length. To do this, water to the hoseline will need to be shut down at the pumper (or standpipe outlet) and a replacement length of the same size hose will be brought to the location of the burst length. Once water is shut, the burst length is disconnected and replaced with the new length. Only the engine officer can order the hoseline shut down.

3.3.5 In certain situations, if enough hose is available and it is determined that the hoseline can safely operate with one less length, the burst length can simply be removed, and the couplings reattached from existing hose lengths.

3.3.6 Once the replacement length of hose is connected, the engine officer in command of the hoseline must be notified. The engine officer will then call for the line to be recharged.

3.4 Clogged nozzle

3.4.1 If there is a water loss at the nozzle, but no pressure loss in the lead length of hose, there may be an obstruction at the nozzle itself. In this case, the pump panel will indicate normal pressure, but no water flow.

3.4.2 To check for an obstruction at the nozzle, the shut-off handle to the nozzle should be closed and the MST is removed, allowing any obstruction to be removed. Water may not need to be shut down at the pumper.

3.4.3 Once the obstruction is removed, reattach the MST and open the nozzle to continue operations.

3.4.4 If the clog is suspected to be related to ice or slush in the hoseline, a possible solution may be to rapidly open and close the nozzle repeatedly. This may help break up the ice or slush in the line.

3.5 Kinks

3.5.1 Kinks are a common problem on the fireground, but they can escalate to an emergency situation if the kinking is severe enough to critically reduce the extinguishment capabilities of the hoseline. This would be the case if water flow is reduced at the nozzle to the degree that the engine officer determines that the hoseline cannot continue to advance.

3.5.2 If kinks are severe enough to critically reduce the extinguishment capabilities of the hoseline, they should be treated as a loss of water in the hoseline and they must be addressed. An URGENT handie-talkie transmission must be made. When deemed necessary, the hoseline may be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.5.3 In the case of kinking, the pump panel would indicate normal pressure, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter). There will also be a decrease in the engine RPM.

3.5.4 The problem can be solved by dispatching members to survey the path of the hoseline and manually remove any kinks in the line. Kinking should not be corrected by increasing the pressure in the hoseline.

3.5.5 Once the kinks are removed, full water flow should return to the nozzle. The engine officer should communicate the return of water to the line.

3.6 Hoseline charged under a door

3.6.1 If a hoseline becomes charged while it is under a door (or similar narrow opening), water flow and pressure at the nozzle may be completely lost. Additionally, the hoseline may not be able to advance as it is physically stuck in place under the door. This is a more serious situation than kinking and is not as easily resolved.

3.6.2 In this situation, the pressure reading at the pump panel will be normal, but there will be a reduced water flow reading at the pump panel flowmeter (or standpipe outlet flowmeter).

3.6.3 Upon the discovery of the charged hose under a door, the engine officer must be notified, and steps must be taken to remove the hose from the pinch point. The engine officer should transmit an URGENT handie-talkie message and withdraw the nozzle team to an area of safety.

3.6.4 If a charged hoseline is found under a door and critically reducing the extinguishment capabilities of the hoseline, this situation should be treated as a loss of water in the hoseline and must be addressed. An URGENT handie-talkie transmission must be made and the nozzle team should be withdrawn to a safe location. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.6.5 The member that discovered the pinch point must work to remove the hose from the obstruction. This will likely require a halligan, hydra ram, or other hand tools. In the case of a hose stuck under a door, the quickest solution may be to remove the door from the hinge (if the door removal will not adversely impact fire conditions).

3.6.6 If the charged hose cannot be removed from the obstruction, it may become necessary to momentarily shut the water supply to the hoseline to allow members to free the hose. Once the water supply is shut, the ECC will need to relieve the pressure in the line by opening the appropriate drain valve on the apparatus. This order must be given by the engine officer and would have to be closely coordinated between the engine officer, ECC, and member removing the hose from the pinch point. Once removed, the engine officer will order the line recharged as soon as possible.

3.6.7 If this scenario occurs when a line is stretched from a standpipe outlet, there will not be an option to relieve the pressure in the hoseline by opening a drain valve on the apparatus. This is a more serious situation, as there will be no way to relieve the pressure in the line once it is charged from the standpipe outlet. The obstruction will need to be removed.

3.7 Failure of Apparatus pump

3.7.1 A serious emergency situation would be the failure of the apparatus pump while supplying a hoseline. This could cause the immediate loss of water in all hoselines supplied by that apparatus.

3.7.2 If the issue is first noticed at the nozzle, the engine officer would experience a loss of water and pressure in the line. An URGENT handie-talkie message should be given indicating the problem.

3.7.3 If the problem is first noticed by the ECC, they should transmit an URGENT handie-talkie message for a water loss. Since the problem is with the apparatus and not the water source, a signal 10-70 should not be transmitted. When a 10-70 is transmitted, resources are focused on securing a water source for the 1st due apparatus. In this case, the apparatus itself is not operational, so an URGENT transmission for water loss is more effective.

3.7.4 Following this transmission, the engine officer should withdraw the nozzle team to an area of safety and members in the street should provide whatever assistance necessary to solve the problem. The Incident Commander must ensure that all members that may be endangered on the fire floor or floors above are notified, and when necessary repositioned.

3.7.5 If the problem with the apparatus cannot be quickly solved, water supply can be restored to the hoseline by stretching 2 ½" hose from a nearby apparatus (that is connected to a hydrant) to the 1st due pumper. The hoseline is then disconnected from the 1st due apparatus outlet and connected to the new 2 ½" line. The hoseline can now be supplied by the new pumper.

3.7.6 An alternative solution may be to supply water from a 2nd apparatus to the apparatus with the failed pump. The pumping operation can then be controlled from the 2nd pumper, with the original apparatus essentially functioning as a large manifold. In this scenario, the pressure supply to the original apparatus will be limited to 150 psi, as the relief valve will dispel any additional pressure.

3.8 Failure of Pro Pressure Governor

3.8.1 If the PPG of the apparatus fails to operate properly, the ECC may not be able to supply sufficient pressure to operating hoselines.

3.8.2 As a solution, the ECC may be able to boost available pressure by switching the apparatus to Pressure Mode by using the apparatus transfer valve. An additional solution may be to receive a relay from another pumper.

4. INABILITY OF HOSELINE TO REACH FIRE AREA

4.1 At a fire operation, there are a number of reasons that a hoseline would not be able to access the fire area. While such a situation may not require an URGENT transmission, it should be treated as an emergency and all available resources should be used to facilitate the advance of the hoseline to the fire area.

4.2 If the hoseline is unable to reach the fire area, the engine officer must clearly communicate the situation to the IC and ensure all members operating in exposed positions (such as the floor above) are aware that extinguishment will be delayed. Depending on the situation, corrective action may be taken.

4.3 Short stretch

4.3.1 If there is not enough hose in the hoseline to reach the fire area, it is called a "short stretch". This problem can be prevented by ensuring an accurate estimation of the amount of hose needed in the stretch to reach the fire area.

4.3.2 The problem of a short stretch can be fixed by adding a length of hose to the stretch. Rolled up lengths of 1 ¾" hose (one with a nozzle attached) should be maintained in readiness on all engine apparatus for this purpose. If 2 ½" hose is needed, a length maintained as a roll-up can be used.

4.3.3 If the short stretch is recognized after the line is operating inside the fire area, the line will need to be withdrawn to a safe area in order to add the additional hose. This may occur when the hoseline cannot reach the fire room itself. In this case, the IC must be informed when the line is repositioned to a safe area.

4.3.4 The engine officer must decide where to add the additional length to the stretch. There are two options: the length can either be added to the front of the stretch at the nozzle, or it can be inserted at any point in the stretch itself.

4.3.5 When adding an extra length in the stretch behind the nozzle, the water supply to the hoseline will need to be shut. To minimize the amount of time without water, the extra length should be flaked and ready to be coupled at the desired location before the engine officer orders the water supply shut to the line. Once the new length is connected, the officer will order the line recharged.

4.3.6 To avoid shutting the water supply to the hoseline, the length can be added to the front of the stretch at the nozzle. To do this, the added length (with an additional nozzle attached) will be brought to the nozzle. With the hoseline remaining charged, the nozzle is closed and the MST is removed. The added hose is coupled directly to the shut-off of the nozzle. If the added length is 1 ¾" hose, no additional fittings are required and it is connected directly to the existing shut-off. If the added length is 2 ½" hose, an increaser will be needed to make this connection. The added length will now become the new lead length.

4.3.7 Once the new lead length is flaked out, the original shut-off will be opened and the lead length will be charged. The shut off must be maintained in an open position, which can be achieved by securing it with a hose strap. The hose strap is looped around the hose several feet behind the original shut-off and the clip of the hose strap is attached to the handle of the shut-off to maintain it in an open position. A member must also be positioned at the shut-off to ensure the shut-off remains open and the water supply is not interrupted.

4.3.8 If conditions prevent the new length from being added to the front of the stretch, it should be added as close to the front of the stretch as possible. This will minimize the hose that will need to be advanced after the addition of the extra length.

4.3.9 If six lengths of 1 ¾" hose have already been stretched, it is permissible to add one extra length of 1 ¾" hose to the stretch in the emergency situation of a short stretch.

4.3.10 If the hoseline is stretched from a standpipe, it may have a lead length of 2" hose. In this case, the procedure is the same and the 1" MST can be removed to allow the connection of an additional length. The additional length can be either 2" hose or 2 ½" hose, so an increaser will be needed to make the connection. In this emergency situation, it is permissible to add a 2nd length of 2" hose (with 1" tip) to remedy a short stretch. It is also permissible to add a length of 2 ½" hose (with 1 1/8" tip) to a lead length of 2" hose.

4.4 Hose strap failure

4.4.1 When a hose strap is used in a well hole stretch, rope stretch, or fire escape stretch, it is supporting the weight of the charged hose that is hanging vertically. If the hose strap fails (either the strap breaks or the securing knot is ineffective), this hanging hose will begin to fall away from the fire floor.

4.4.2 Such a failure will have the effect of halting the forward progress of the hoseline and may even pull the operating hoseline out of the fire area. If this happens, the engine officer must be made aware of the situation and coordinate the restoration of the hoseline to the proper position.

4.4.3 The problem can be solved through a coordinated effort of members lifting the hose back to the fire area and properly securing it with another hose strap.

4.5 Blocked access to fire area

4.5.1 In a situation in which the 1st hoseline cannot gain access to the fire area, the engine officer must clearly communicate the problem and work to find a solution.

4.5.2 A common obstruction to a fire area can be the door to the fire area itself. If the door opens inward into the fire area, it can often block access for the hoseline when the door is chocked in the open position (Figure 6). This is especially difficult if the open door blocks the entire hallway behind it, as is common in a variety of multiple dwellings. In these situations, the presence of a hallway behind the door can be difficult to detect and units may have difficulty finding the fire.

Figure 6

4.5.3 To resolve this, the engine needs to advance a sufficient amount of the charged lead length into the apartment and stage it in an area opposite the door. Once in position, the door needs to be closed (at least partially) to allow the engine to advance the hoseline and access the fire. Once water is on the fire, consideration can be given to removing the door from its hinges, if it will not negatively impact fire conditions. This will allow for unimpeded egress from the fire area.

4.5.4 In the case of a more significant obstruction that cannot be removed and hoseline access will be impossible or severely delayed, the engine officer must notify the IC and consideration should be given to finding alternative access with a 2nd hoseline. The 1st hoseline should remain in position to protect operating members and the building egress, but the operation of the two hoselines must be closely coordinated.