

Fire Hose

Fire hose is the backbone of the fire service. From the days of our bucket brigades to current engine companies, the process of moving water to the fire is still the foundation of all fire operations. This chapter will identify common hose terms, types of hose used at Pendleton Fire, care and maintenance of fire hose, handling of fire hose, hose loads, and taking a hydrant/anchoring hose lines.

This chapter will be broken down into the following sections:

- 6.1** Common Terms
- 6.2** Types of Fire Hose
- 6.3** Care and Maintenance of Fire Hose
- 6.4** Couplings and Gaskets
- 6.5** Handling of Fire Hose
- 6.6** Taking the Hydrant/ Anchoring hose
- 6.7** Calling for Water



Section 6.1

Common Terms

BIGHT OF HOSE- This the part of a line leading to and forming a fold in the line. (1) Fold of hose.

CHARGED LINE- A hose line filled with water under pressure.

COUPLING- As a noun, it is the connecting device attached to the end of a length of hose having either male or female threads. When used as a verb, it is the act of connecting hose. Storz couplings are sexless.

CROSS-LAY- A pre-connected hose bed/tray that is loaded horizontally across the width of an apparatus.

INTAKE- An intake is a port on an apparatus for the intake of water from another source either pressurized or static.

DISCHARGE- A discharge is a port on an apparatus that pumps water out/ discharges water.

DRAFTING- A means of supplying a pump with water from a body of water, by creating a partial vacuum within the pump and permitting atmospheric pressure to force water into the pump.

DRAG LOAD- Hose that is dragged by a firefighter in the performance of a stretch.

DUTCHMAN-A short fold or reverse bend used to allow couplings to pay out without them turning over.

EVOLUTION- An established operational sequence for performing various firefighting tasks requiring teamwork.

EXPANSION RING- The metal ring that holds fire hose securely to the inside of a coupling.

FLAKE (FLAKING) - removing hose from a shoulder load one bight at a time.

GASKET- This is the interior rubber ring in a coupling that creates a tight seal when coupled with another section of hose or an appliance.

GPM- Gallons per minute

HANDJACK- *Handjack* specifically refers to a supply line or LDH. When the scene is close enough to the hydrant to allow a firefighter or engineer to pull/"Handjack" the supply line back to the hydrant by hand rather than laying down the street in the case of longer supply lays.

HAND LINES- Hose lines of 1¾" or 2½" diameter, handled manually.

HARD SUCTION- A hard rubber hose with a plastic or wire helix, usually 10' long, used for drafting operations. Hose can be 3" or 6" in diameter.

HOSE BED- The areas of an engine or truck that hold loaded hose such as the pre-connect bed or supply bed

LARGE DIAMETER HOSE (LDH) - 5" hose used for supplying water to an apparatus or to a manifold/portable monitor. LDH is stored in the Supply Bed.

LAY IN- The act of an engine paying out supply hose either to or from a water source. Also a verbal command yelled loudly by the firefighter taking the hydrant that signifies the engineer can proceed toward the scene/ water source.

OVERHAUL- A late stage of firefighting in which remaining hot spots are extinguished and fire debris is removed from the structure.

PONY ROLL- A short section of hose usually 5" or 2.5" used for taking hydrant/water supply when distance is not a factor (pony roll ~ 25').

PRE-CONNECT- a pre-connected hose line that is stored in a pre-connect hose bed (or bumper load). The pre-connect hose is attached to a discharge prior to operation and are usually 200 feet in length.

SHOULDER LOAD- A shoulder load usually consists of 50-100 feet of hose and is placed on the shoulder from a hose bed in several bights or folds. Coming from the stretch bed the shoulder load must be flipped in order to be flaked or pay out as the hose is advanced.

STRETCH BED- The stretch bed consists of 2 ½" hose and is primarily used to advance or "stretch" a longer section of hose to a location on the fire ground that a pre-connect may not reach. The stretch bed on the engines consists of 600' and on the truck consists of 400'. The stretch bed can also be used to supply water from a source such as a hydrant or other apparatus if necessary (i.e. supply an engine from water tender).

SUPPLY BED (LDH)- The supply bed is where the LDH is loaded in a flat load and is primarily intended to be used for supplying water from a hydrant or other pressurized source (i.e. water tender or engine) to an engine. Be sure that when loading the supply beds that Storz couplings are positioned so that a coupling does not have to flip over to be paid out. Supply hose may also be used in a reverse lay and attached to a manifold.

SUPPLY LINE- Most often a supply line refers to a line that is supplying and apparatus with water such as LDH from a hydrant to an engine.

TRUNK LINE- This is a hose that is to be split into 2 or more separate and small diameter lines. Commonly used with progressive hose lays in wildland operations (refer to Wildland Chapter) and when a 2 ½" hose is attached to house bundles.

WATER HAMMER - The force created when the flow of water is abruptly halted.



Section 6.2

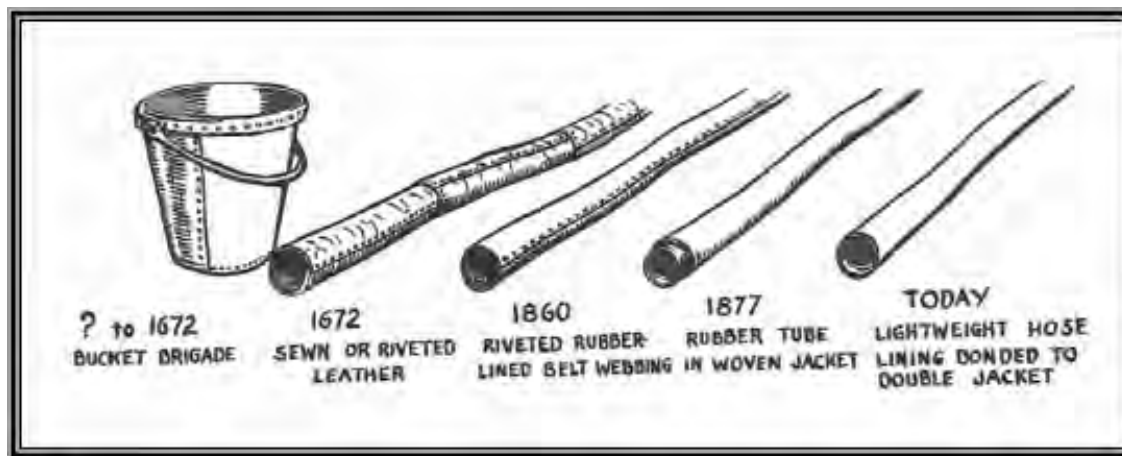
Types of Fire Hose

There are three main types of hose that are carried at Pendleton Fire. These three types of hose consist of woven jacket hose, braided booster hose, and hard suction hose. Of these three types, the most commonly used hose in structure firefighting operations is the woven jacket hose. This section will describe each hoses characteristics and uses.

Woven-Jacket- There are two types of woven-jacket fire hose: lined and unlined. The standard fire department hose consists of one, two or three woven jackets with an inner lining. They are supplied in fifty foot lengths, with diameters of 1¼", 2½". LDH is also a lined woven jacket hose, and is most commonly supplied in 100' lengths with the exception of pony rolls. Unlined hose consists of a single thickness of woven linen and depends upon the tightness of the weave to hold water. It is widely used inside standpipes and in wildland firefighting because of its lightweight and flexibility. Forestry hose with a 1" or 1 ½ " diameter is usually found in 100' lengths, but can also be found in 50' lengths.

Braided (Booster Hose) - This type of hose is a rigid, noncollapsible hose made of several layers of rubber and braided material. This ¾" or 1" hose is used on booster reels. This hose is commonly used in wildland operations when performing suppression near an apparatus due to the easy of retrieval and storage.

Plastic covered suction hose- This type has a plastic helix to provide support. This type of construction results in a hard, stiff hose that will resist the vacuum developed in the hose during drafting operations. The standard length for hard suction hose is 10' with a 6" diameter. It is supplied in smaller and more storable sizes for wildland applications.



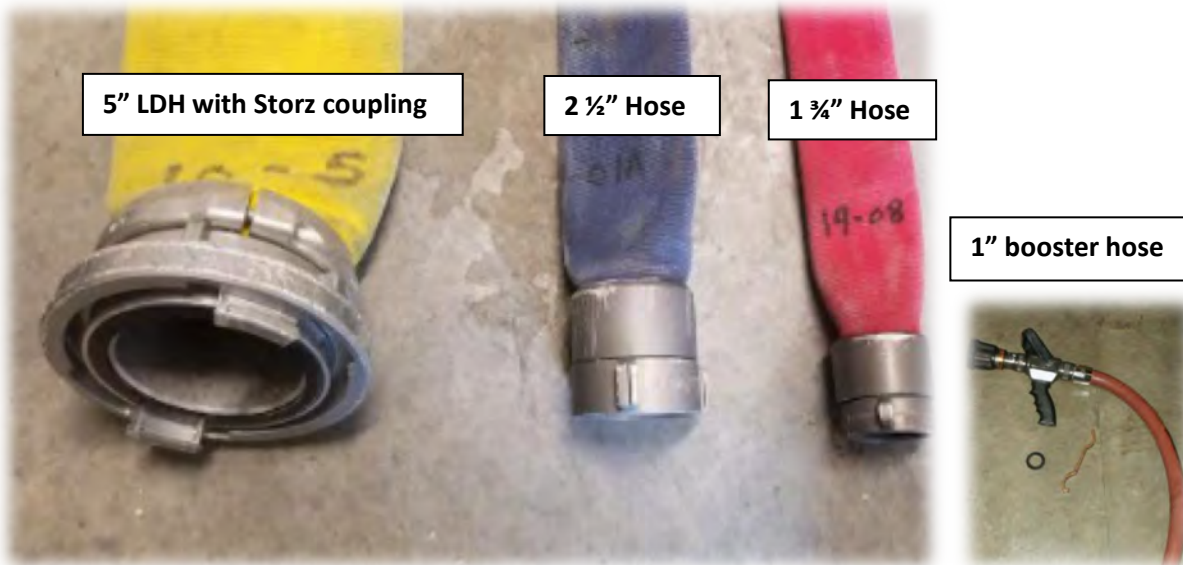
Sizes of Fire Hose

The sizes of hose found on apparatus at Pendleton Fire are 1", 1 1/2", 1 3/4", 2 1/2", and 5". Although the structure engines do carry wildland hose in *progressive hose packs* (refer to Wildland Chapter), the main hose found on the structure engines are the latter 3 sizes listed above.

1 3/4" Hose- This hose is the most commonly used hand line used in structure firefighting operations. This hose can be manipulated by 1 firefighter and provides around 150 GPM of water. 200' of 1 3/4" hose is stored in pre-connect beds usually for rapid deployment. (2) 100' "Cleveland" loads of 1 3/4" hose are stored on the engines and ladder truck and are referred to as *house bundles*. One of the two house bundles has a 2 1/2" to 1 1/2" gated wye attached for splitting a 2 1/2" trunk line into (2) 1 3/4" hand lines.

2 1/2" Hose- This hose serves multiple purposes. Its primary function is as a large hand line which may be used for defensive tactics or offensive tactics when the fire load necessitates a larger volume of water. This hose can be manipulated by 1 firefighter with proper techniques, but in offensive strategies will usually need 2 or more firefighters to efficiently operate and advance the hose line. The 2 1/2" provides between 250-350 GPM depending on the nozzle or appliance being used. 2 1/2" hose may also be used for water supply from a hydrant, reverse lay operations, or supplying water from one apparatus to another when 5" hose is not suitable. 2 1/2" hose is stored in 200' length in pre-connect beds as well as 400-600' in the stretch bed (400' on Ladder Truck). A 25' pony roll of 2 1/2" hose is found in the engineer compartment on the structure engines and Ladder Truck.

5" Hose – This hose is primarily used for water supply from a hydrant to the fire pump. 5" hose is stored in the supply bed on the engines and ladder truck. 5" hose can also be used to supply water from one apparatus to another, or in reverse lay operations for supplying to a manifold or a portable monitor. The 5" hose at Pendleton Fire is rated as an attack line due to the high pressures it may be pumped to in some operations. 5" hose has sexless *Storz* couplings.



Section 6.3

Care and Maintenance of Fire Hose

Care and maintenance of fire hose is crucial not only to the life of the fire hose, but also to the safety of the crews working with and around fire hose. Fire hose provides one of the most valuable means of extinguishing fire. As with all fire extinguishing equipment, to be reliable it should always be in good working order and cared for properly. It should not be used, except in extreme emergencies, for other than firefighting purposes.

The importance of reliable hose and the ability to put hose streams into action without delay is often not fully appreciated until fire occurs and a pressing need for action arises. When neglect of hose is discovered because it fails when called upon for service, it may be too late. Time will be lost when attacking a fire if a hose fails and must be replaced. A hose line that fails may also be responsible for serious injury to firefighters and other persons. **Fire hose is tested annually at Pendleton Fire.**

Dirty hose should be washed and thoroughly rinsed with clear water, if possible using the hose washing appliance at Station #1. Use a stiff brush or broom to remove small particles lodged in the weave of the jacket if necessary. Do not use any type of solvent to remove grease or stains. A strong soap or a mild detergent may be used in extreme cases where stains are the result of oil or acid exposure. Couplings should be cleaned and a visual inspection should be made of its overall condition and any necessary repairs attended to such as rough threads needing filed (use a triangle file/ 3 sided file).



Storage of Fire Hose

Hose should be dried before placing in storage. All polyester, nylon, or rubber-covered hose may be reloaded while still wet but only after proper cleaning. After hose is cleaned it is either placed back on the apparatus or rolled and stored in the Hose Room on the Hose Rack (Station #1). Hose at station 2 is usually limited to that hose that is on the apparatus and potentially a small amount of extra hose rolled and stored.

Hose Rack in Hose Room



Below, a 50' section of hose rolled and ready for storage (notice the male threads in the inside of the roll. This is to protect the male threads from damage. When a section of hose is rolled and stored with the male coupling out as noticed in the picture above with the red tag, it is considered out of service (OOS). This hose should be tagged out and removed from the middle of the rack.



Damage to Fire Hose

The sources of damage to fire hose are as follows:

- Mechanical Injury
- Heat Injury
- Mold and Mildew
- Freezing
- Chemicals

Mechanical Injury- Cuts, snags, abrasions and damaged couplings result from dragging hose over rough ground or pavement or around sharp corners.

Heavy vehicles being driven over hose lines may cause severe mechanical injury. Do not allow any vehicle to run over fire hose during firefighting operations unless absolutely necessary. It is not permissible to run over any part of fire hose during “picking-up” operations. Never under any circumstances should the hose be run over near a coupling since this might distort the expansion ring and pull the hose loose from the coupling.

A “water hammer” can injure not only hose lines in use but also plumbing on the apparatus. To avoid a “water hammer,” shut off the water flow slowly.

Hose can also be mechanically damaged by the sharp bends that occur when it is loaded into the hose bed. Frequent hose changes helps to avoid the strain that causes permanent kinks. It is good practice and preventative maintenance to pull and reload hose beds often.

Heat Injury- The higher the temperature to which hose is exposed, the more rapidly the lining hardens. At very high temperatures vulcanization takes place so rapidly that the hose is readily put out of commission by the lining hardening and cracking the first time the hose is bent. The fiber in hose loses its strength when scorched. Take precautions to see that the hose is not buried by, dragged over, or allowed to rest on hot cinders.

Mold and Mildew Injury- All cotton-polyester hose should be thoroughly dry before loading or storing. Improper cleaning and drying of hose causes mildew, mold and other forms of fungus growth appearing on the hose. Mold and mildew are likely to occur in the lower layers of the hose load where there is a lack of air circulation. This problem may be more commonly encountered with some types of wildland hose.

In the event that mold or mildew should form on the surface of any all-polyester hose it should be cleaned by brushing with a solution of soap and water, and thoroughly rinsing with water. In persistent or severe cases use a solution of 1 cup bleach in 5 gallons of water, brushing and thoroughly rinsing with water. Even though mold or mildew may leave stains, it will not damage all polyester hose jacket material. ,

Injury by Freezing- A common cause of hose injury during the winter months is improper handling when it is frozen. When in this condition it should be picked up with great care, as the frozen fibers are weakened and apt to break. When necessary, chop it clear by using an axe to free the ice beneath it. Any ice attached to the hose should be permitted to remain and the hose loaded with as few bends as possible. Never attempt to roll or fold frozen hose. Transport frozen hose to a warm place. After thawing, give it regular care.

Chemical Injury- Many liquids and gases contain chemical ingredients that can harm fire hose. Strong acids and alkaloids will attack hose jackets and the more volatile petroleum products such as gasoline penetrate the jacket and act to dissolve the rubber lining. Where there is likelihood that hose has been in contact with chemicals it should be thoroughly washed and scrubbed as soon as possible.

Hose lines laid parallel to the curb should be kept far enough away that water in the gutter will flow between the hose and the curb. The dirt, grease, chemicals and gasoline which are picked up and carried in the gutter by water flowing from the fire ground are apt to damage the hose if it is laid in the gutter.



INSPECTION OF HOSE

A visual inspection of all hose should be conducted to discover chafing, checking, cuts in the hose outer covering and displacement or damage to the couplings. This inspection is made after each use, when reloading, and at the annual service test.

Booster hose should not be kinked, and care should be taken when rolling this hose onto the reel so that no undue twist is put into the hose. When hose is rolled back onto the reel it should be wiped clean and inspected for damage. Hose should not be jammed between the side of the reel and the frame.

Lockout/Tag out

As with any tool on the job, faulty or damaged fire hose should be tagged out of service with an “Out of Service” tag and rolled with the female coupling on the inside (with the exception of Storz couplings). Sometimes the couplings will also be cut off.



Hose Weight and Capacity

1¾” Hose: • 50’ weighs approx. 10-15lbs. • Will hold ~ 6.23 gallons of water. • Weight of hose and water is approx. 65lbs.

2½” Hose: • 50’ weighs approx. 45lbs. • Will hold ~ 12.75 gallons of water. • Weight of hose and water is approx. 151lbs

5” Hose: • 100’ weighs approx. 110lbs. • Will hold ~ 102 gallons of water. • Weight of hose and water is approx. 956lbs.

Section 6.4

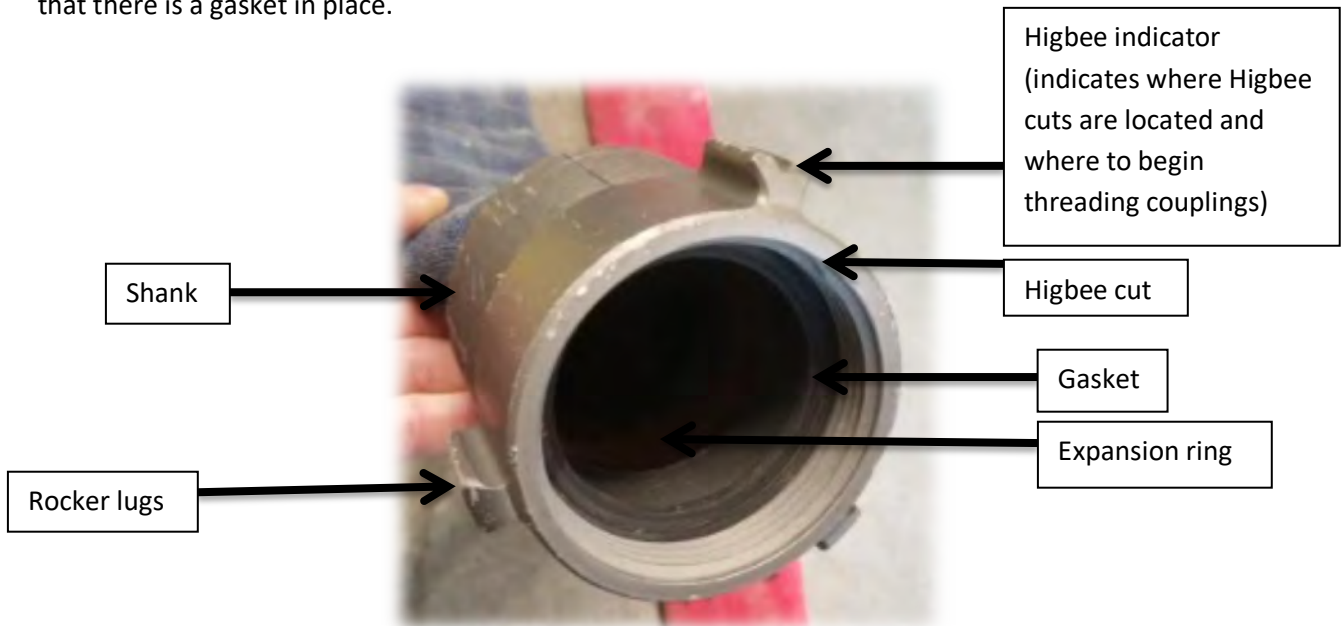
Couplings and Gaskets

A coupling is a simple connecting device attached to the end of hose. When properly maintained it will provide years of service. The coupling consists of the shank that houses an expansion ring that holds the fire hose securely inside it. The female end will have a swivel with a rubber gasket. The female coupling does not have rockers on the shank like the male coupling, but rather has them on the swivel. Rockers are found on both male and female couplings and are used for gripping the coupling with either your hand or a spanner.

Care should be taken when handling hose to prevent dropping couplings. Impact can cause damage to the swivel and male threads or even make the couplings out of round. Hose should be rolled with the male threads in the center of the roll to protect from injury. Rough threads or burrs should be filed with a triangle/ 3 sided file by running between threads in a forward motion.

Couplings should be cleaned, washed out and thoroughly checked for defects before the hose is placed back in service. Sticky swivels can ordinarily be freed by washing in a warm solution of soap and water. Submerge the swivel and turn it until a free movement is obtained and the swivel spins easily. Rinse in clear water and lubricate the swivel joint both externally and internally with an approved lubricant. Do not use grease or oil!

When couplings are examined, check gaskets for fit and condition. Rubber gaskets deteriorate from age and mechanical injury. Gaskets should be replaced if they show hardness, checking or cutting. A gasket should not protrude into the waterway of the coupling and should have an outside diameter large enough to fit the gasket recess. Before making any hose connection, the firefighter should check to see that there is a gasket in place.



Section 6.5

Handling of Fire Hose

The handling of fire hose is crucial to the success of all firefighting operations. As stated at the beginning of the chapter, fire hose and hose company operations is the backbone of firefighting. The majority of tools used in firefighting are to support the hose company and their operations, such as ventilating a building so a hose company can advance a hose line or pulling ceiling to expose hidden fire for the hose company to extinguish. Every member of Pendleton Fire should have the same basic hose handling practices which will allow them to work effectively as part of a team.

Basic hose practices must be mastered by the individual before the individual can effectively function and participate in company operations. Some of the basic hose company operations include:

- Making and breaking connections
- Loading/Deploying Hose Beds
- Shouldering/carrying fire hose
- Controlling nozzles on hand lines
- Picking up hose
- Taking a hydrant

Making and Breaking Connections**One Firefighter**

There are four methods for making and breaking connections for a firefighter working alone. These methods can be used for connecting (2) sections of hose, as well as attaching a nozzle or appliance to a hose. The four methods are:

Above the waist- The firefighter grasps the male coupling in the non-dominant hand and the female coupling/nozzle in the dominant hand and makes the connection in the hands above the waist.



Over the knee-Position feet apart, with your knees bent. Have the hose thrown well behind your body with female end of hose lying across upper part of your leg. Cup the male coupling in the non-dominant hand and grasp the female coupling in the other hand. With your thumb behind the lug, bring the couplings together and turn the swivel to the right until the connection is tight.



Straddling the Hose- Place hose between the knees just back of the male coupling and grasp the female coupling in the other hand. Place the female coupling over the male coupling and turn the swivel until the connection is tight. You can alternate the couplings if desired.



Stepping on the Hose- Spread your feet well apart. Place foot close to male coupling to tilt coupling off ground. Turn female coupling swivel onto male coupling until connection is tight. Be sure to step as close to the male coupling as possible.



Two Firefighters

When making and breaking a connection with two firefighters the process is simple. One firefighter will hold the male coupling steady while looking away while the other firefighter with the female coupling aligns the threads using the Higbee indicators (to reduce the chance of cross-threading) and turns the swivel over the male coupling to make the connection.

Storz connections

When making connections with Storz couplings, it is good practice to align the tabs on the top side of the couplings. This way, the Storz spanners can be used from the same side of the hose, which will provide for much easier breaking of connections especially if there is still water in the LDH.



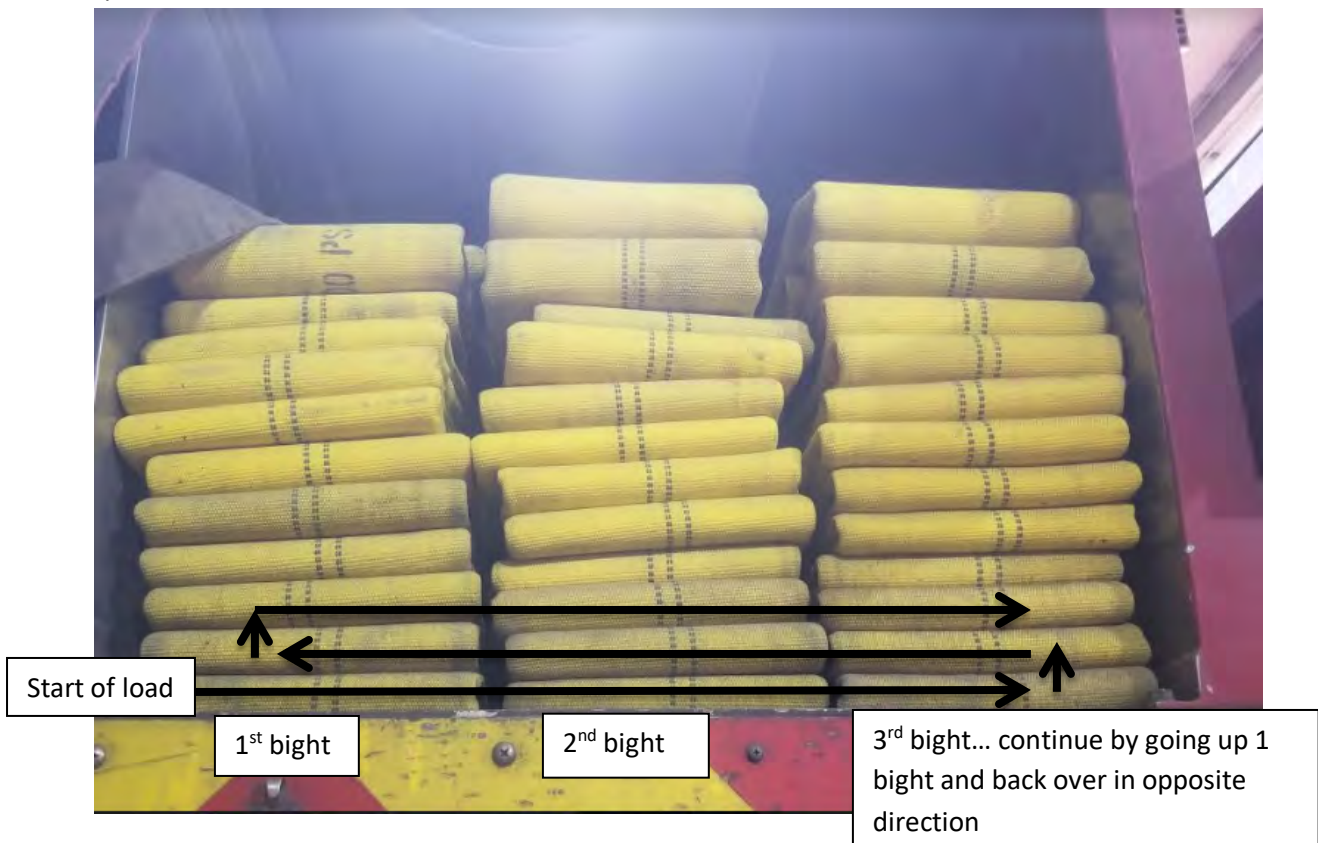
*Not as much emphasis is needed on importance of breaking the connection in contrast to making the connection due to the lack of problems that may arise such as cross threading the couplings when making connections.

Loading Hose Beds

Loading hose beds is not an emergency operation, but is vital to the efficiency of company operations at the time of an emergency. Hose should be loaded snugly enough to prevent it from shifting or sliding when the engine is driven over rough terrain, but not tight enough to bind when laying-in or pulling hose out for a stretch. There are (3) different types of hose beds; the supply bed, the stretch bed, and pre-connect beds. The supply bed consists of 5" LDH. The Stretch Bed consists of 2 1/2" hose. The pre-connect beds consist of either 1 3/4" hose or 2 1/2" hose.

Loading the Supply Bed:

The load is started from either side with a coupling even with the rear (cab side) of the bed. Lay the hose to the front of the bed and fold it back onto itself to the rear of the bed. At the rear of the bed, fold the hose and lay it at an angle back to the front of the bed forming a new bight. Continue across the bed to complete the layer. When the opposite partition is reached, a double layer is formed as at the start. Continue forming layers in the same manner. Try to stagger layers/folds in length at the front of the bed in order to prevent excessive height of hose towards the front of the bed. Be sure to stagger the couplings in order to reduce height of couplings at the rear of the hose bed. Also, use a Dutchman if necessary to ensure all Storz couplings can pay out of the hose bed without needing to turn/flip over. See pictures below.





With taller hose beds, there may be a strap attached to a short bight at the end of the hose load to facilitate in grabbing the end of the hose for removal from the bed. On shorter hose beds, the coupling at the end of the hose may by itself be what is grabbed for removing hose from the bed. With the ladder truck, the supply hose is accessed via a small door at the rear officer side of the truck and comes out via a small chute. Proper loading of couplings in the truck's supply bed is crucial for minimizing hang ups of hose couplings with LDH. Typically an Engine at Pendleton Fire will have 1000' of 5" LDH and the Truck will have 600' of 5" LDH, however the hose load is the same for all supply beds.

Loading the Stretch Bed- The stretch bed at Pendleton is loaded from Left to Right beginning with the female coupling at the front of the hose bed (see picture below). 50' of 2 ½" hose is loaded to begin the hose on the bottom left of the hose bed, followed by 50' to the right of the initial stack and so on. Each stack (with the exception of the first where the female coupling starts the load at the front left of the bed) starts with a small loop just big enough to fit a gloved hand inside. Depending on if the engine has a **2 column** stretch bed or a **3 column** stretch bed will dictate how the load is created. See below...

2 Column Stretch Bed Load:

Drag Load Side

Shoulder Load side

11.) Small fold and 50'	12.) Small fold and 50' FINISH with the male coupling on the top right. A hose strap may be girth hitched to this section of 50' for easier deployment.
9.) Small fold and 50'	10.) Small fold and 50'
7.) Small fold and 50'	8.) Small fold and 50'
5.) Small fold and 50'	6.) Small fold and 50'
3.) Small fold and 50'	4.) Small fold and 50'
1.) [female coupling to START] 50'	2.) Small fold and 50'

This is how the stretch bed is loaded if looking at the rear of the engine with a **2 column** stretch bed. The small fold should be just enough to fit a gloved hand inside. The stack on the right (if facing the rear of the engine), is the side that should be shouldered. The stack on the Left (if facing the rear of the engine) is the stack that should be dragged. Hose is loaded from Left to Right and hose is pulled from Right to Left. *Flip the shoulder load to flake hose*



3 Column Stretch Bed Load:

10.) Small fold and 50'	11.) Small fold and 50'	12.) Small fold and 50' [Finish with male coupling on top right. A hose strap may be girth hitched to this section of 50' for easier deployment.]
7.) Small fold and 50'	8.) Small fold and 50'	9.) Small fold and 50'
4.) Small fold and 50'	5.) Small fold and 50'	6.) Small fold and 50'
1.) [Female Coupling to Start] 50'	2.) Small fold and 50'	3.) Small fold and 50'

This is how the stretch bed is loaded if looking at the rear of the engine with a **3 stack** stretch bed. The small folds should be just enough to fit a gloved hand inside. The last 50 feet should be girth hitched with a hose strap for easy deployment and should be shouldered. If it is to be flaked it should be flipped over before shouldering so that it will pay out off of the top of the shoulder load. The subsequent column is to be dragged by inserting a gloved hand into the small fold. This allows the firefighter to easily move 100' of 2 ½" hose. The sequence continues on by shouldering a column and dragging a column. Hose is loaded from Left to Right and hose is pulled from Right to Left. When hose is loaded on either the 2 column or 3 column stretch bed hose is ALWAYS loaded from Left to Right. After the layer is created on either the 2 or 3 column stretch bed, you will take the following 50' diagonally back to the Rear Left of the hose bed and begin the process again. This is what makes the difference between the stretch bed load and the supply bed load.

Completed 3 column stretch bed load



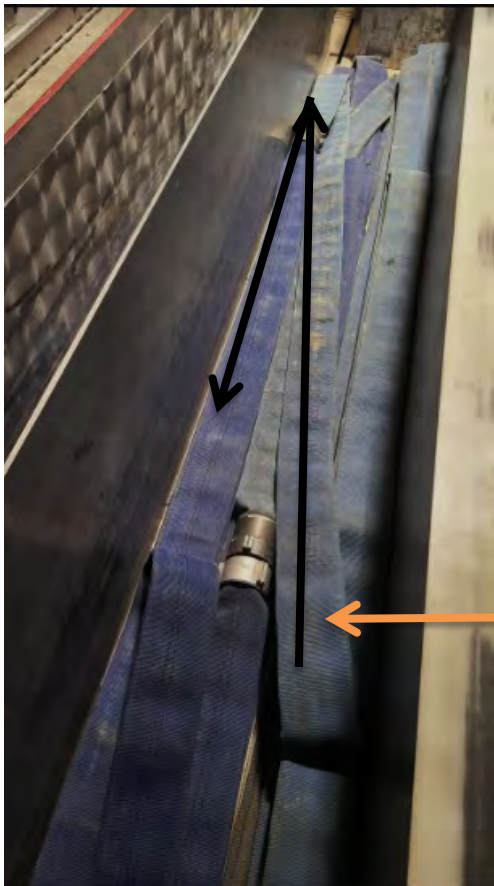
End of load on top right with male coupling (notice the last 50' section is girth hitched with hose/utility strap for easier deployment).

Small fold signifying the start of a 50' section of hose

Start of load on Bottom left with female coupling



Small loops signifying the start of a 50' section of hose. Notice the bights beneath are even with the edge of the hose bed.

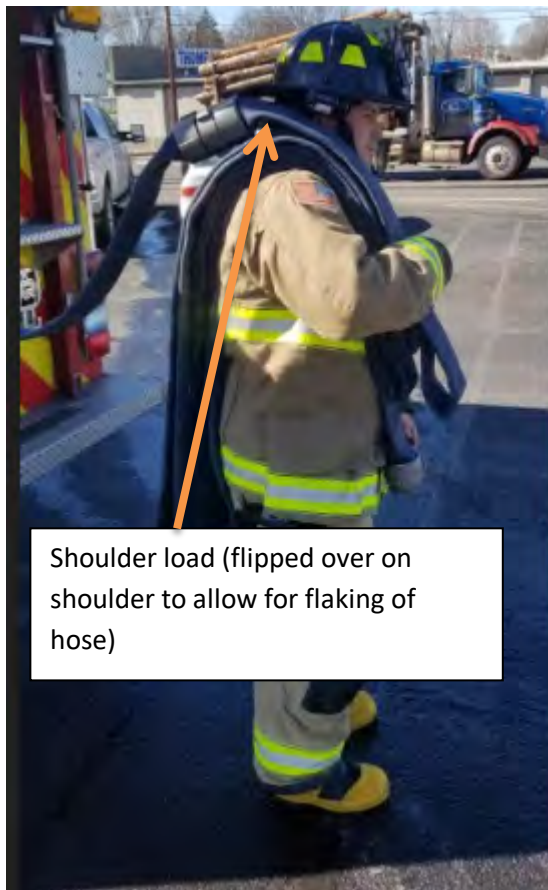


After the layer is completed from Left to Right on either the 2 or 3 column stretch bed the hose is to be brought to the Left rear of the hose bed and a new layer will be started again at the Left side of the hose bed. Again, a small loop will indicate the beginning of a 50' section of hose.

Deploying the Stretch Bed:

Pulling hose from the stretch bed should be done in the opposite order as loading the stretch bed. The stretch bed is always loaded from the bottom of the hose bed to the top and from Left to Right. Thus, the stretch bed is to be pulled from the top of the hose bed starting on the Right and moving towards the Left. The male coupling will always end on the top Right of the hose bed when facing the stretch bed. To initiate pulling the stretch bed, the firefighter shall place the first 50' section of the stretch bed onto his/her Right shoulder (male coupling). While placing the first 50' section of hose onto the right shoulder, the firefighter shall turn the section of hose over (flip the section) so that the bight leading back to the hose bed is on top of the shoulder load (this allows the hose to be flaked out).

After shouldering the 50' section, the firefighter can then turn back to the stretch bed and proceed to take a drag load by taking their gloved Left hand and placing it through the small loop at the base of the next 50' section of hose. This sequence of events should be continued until the desired amount of hose is cleared from the stretch bed. In instances when manpower is limited, the drag load may be increased by as many feet as needed, and should be tended to by the engineer of the apparatus if at all possible.



Shoulder load (flipped over on shoulder to allow for flaking of hose)



Drag load being pulled behind firefighter after taking shoulder load from stretch bed

*Depending on the use of the stretch, the firefighter will either prepare hose for the use of a nozzle, attachment of house bundles, or to supply water to an FDC, apparatus, or other appliance.

Loading the Pre-connected Hose Beds:

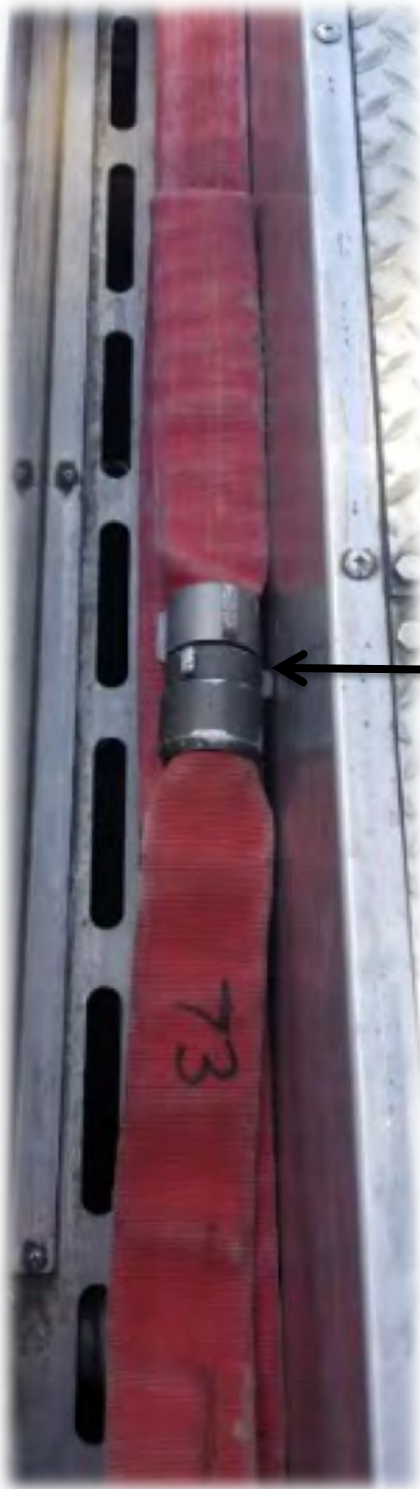
Loading of the pre-connected hose beds shall be the same for all pre-connects with the exception of a single column pre-connect (see notes below). All pre-connect hose beds (1 ¾" and 2 ½") are to be loaded with a 100' drag load and a 100' shoulder load. To load the pre-connected hose bed, the hose shall first be connected to the pre-connected discharge. Some of the pre-connected hose beds have a 10' section of hose that shall always be attached to the discharge. The hose is then loaded starting on the Right side of the hose bed if looking at the hose bed/tray. The hose is loaded as a flat accordion. On the 3rd bight or fold, the hose shall have a loop placed in the hose load on the side that hose will be pulled from (if on a cross-lay). The first loop shall be large enough to easily place a gloved hand inside. The hose load shall be continued on until reaching the 6th bight or fold, in which another loop will be created almost double the size of the first loop. Continue the accordion load until 100' has been loaded in the hose bed. When you have finished the first column of 100' of hose, place the male coupling off to the side of the hose bed.



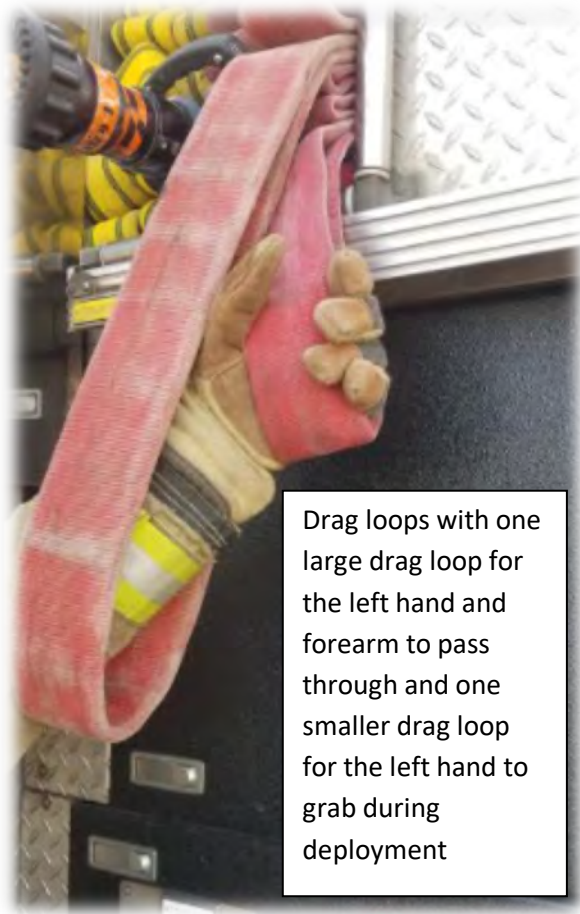
The next 100' of hose shall begin with the nozzle at the base of the hose bed on the Left side if facing the hose bed. Simply place the nozzle at the edge of the hose bed and create a flat accordion load on top of the nozzle until 100' of hose has been loaded. When finished, connect the female coupling from the nozzle side to the male coupling on the opposite column. Be aware of the position of the nozzle and bale of the nozzle so that it is not wedged in to the hose bed too tightly.



*When loading pre-connected hose beds be sure to use a Dutchman where necessary to avoid having couplings turned over.



Dutchman placed in hose load to keep couplings placed conveniently and to prevent them from turning/flipping over upon deployment



NOTES

*The single column pre-connect shall be loaded with a short loop on the 3rd bight that will allow a gloved hand to fit inside followed by a larger loop (approximately double the size) on the 6th bight. End with the nozzle/appliance on top or in mounted position.

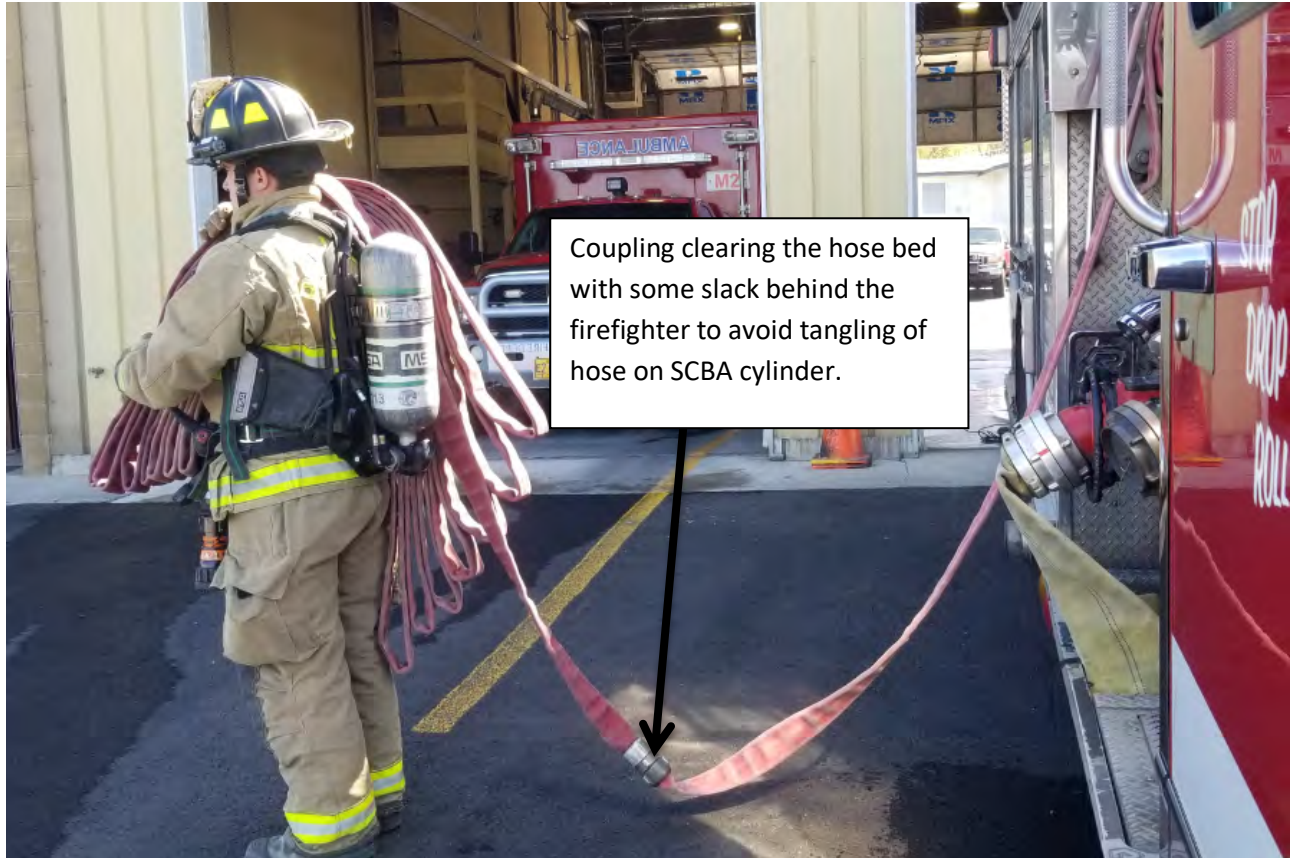
* If loading a pre-connect hose bed that is longer than a standard cross-lay hose bed, be aware of the length of the shoulder load when loading so that it is not too long to be shouldered appropriately.

Deploying the Pre-connected Hose Bed:

To deploy a pre-connected hose bed, the firefighter shall first approach the hose bed/cross-lay bed on the side from which the hose will be pulled out (nozzle side on a cross-lay). The firefighter shall then proceed to grasp the nozzle and in a controlled manner pull the 100' shoulder load from the hose bed. The firefighter should squeeze the shoulder load together as he/she proceeds to place the 100' shoulder load onto the **Right** shoulder.



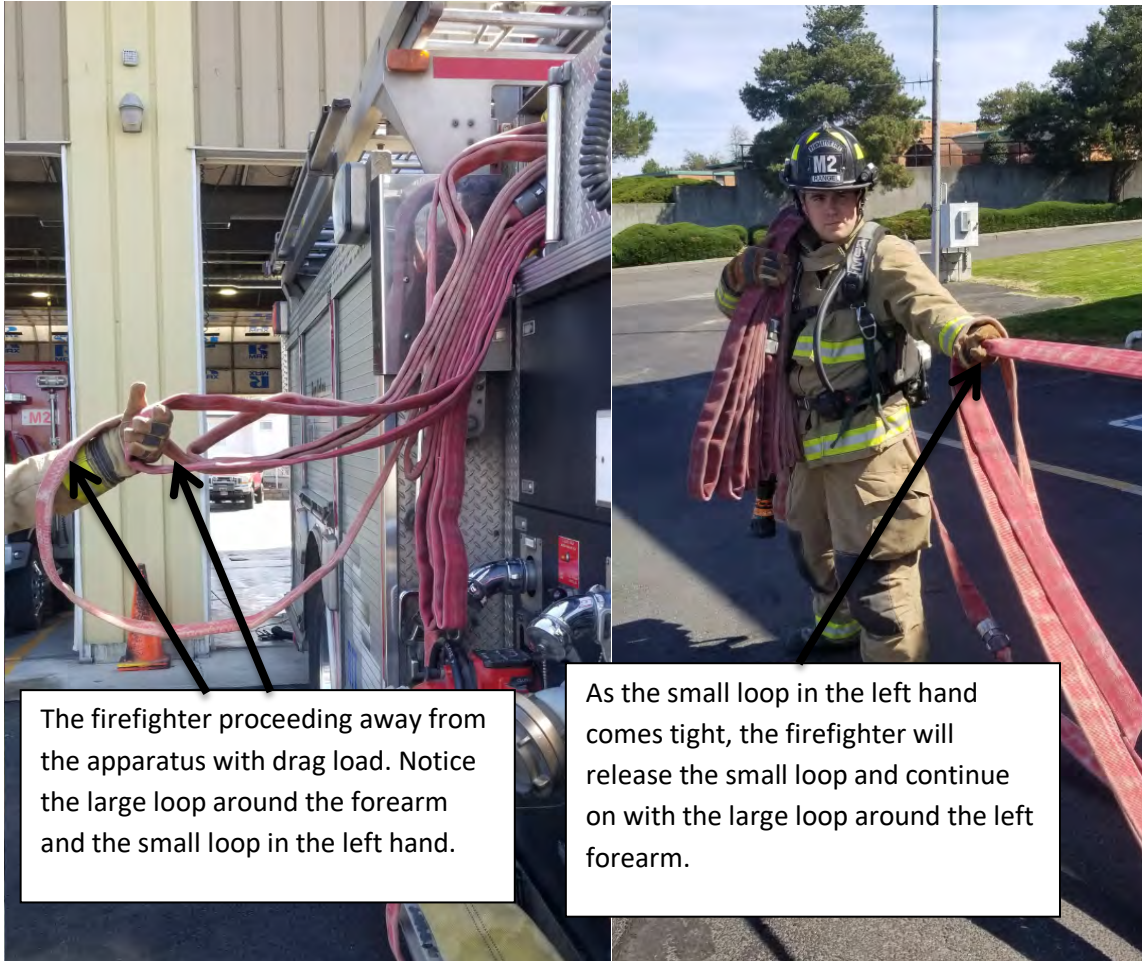
After placing the 100' shoulder load on the **Right** shoulder, the firefighter shall proceed forward and away from the apparatus far enough to clear the coupling from the hose bed (the firefighter may walk forward with the body angled slightly to the right to avoid having the hose hang up on the SCBA cylinder).



The firefighter shall next proceed back to the hose tray with a ~90° turn towards the drag load loops. The firefighter will then place his/her left hand and forearm through the large loop and grasp the small loop with the left hand.



With the left hand and forearm placed through the large loop and the left hand firmly grasping the small loop, the firefighter will proceed toward the scene/objective. As the firefighter proceeds forward, the small loop in the hand will tighten first, at which point the firefighter shall release that loop from the left hand.



The firefighter will proceed on with the large loop around the forearm until the loop comes tight. In some instances the firefighter will have to drop the loop(s) prior to pulling them tight due to space and/or obstacles on scene. Regardless of whether the hose can be pulled tight or not, the hose should always be dressed and prepared for water without excessive bends or kinks.

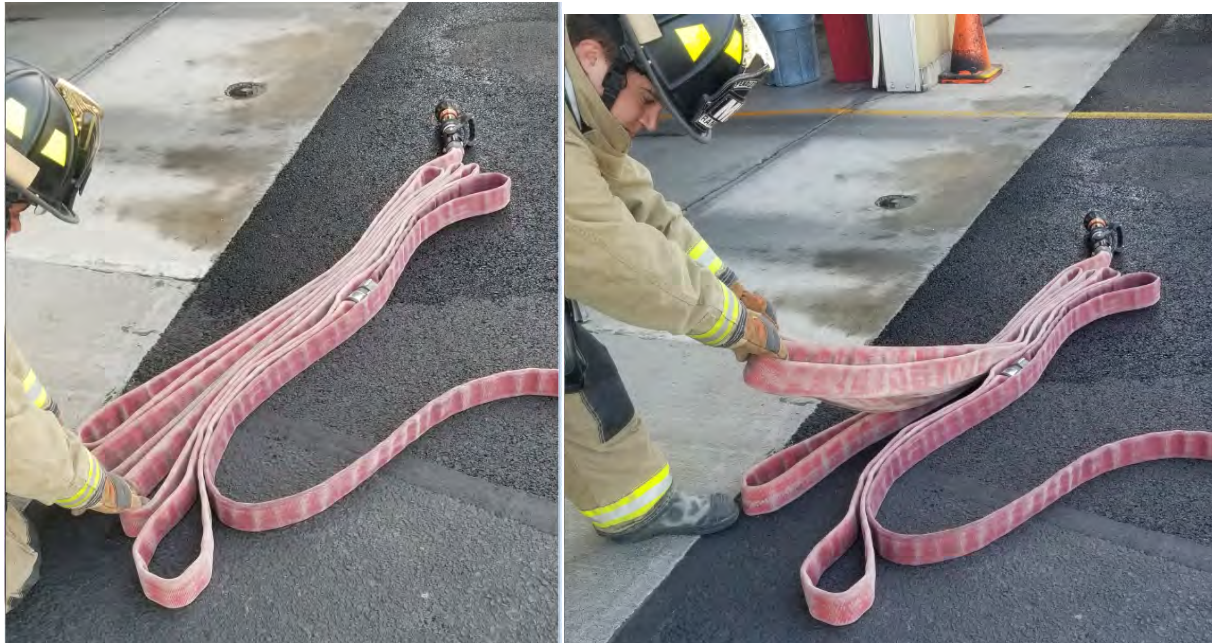


With the drag load deployed the firefighter has the ability to either flake hose on the way to the objective, or lay the shoulder load down and prepare for deployment.



Preparing the Shoulder Load:

When laying down the shoulder load for further deployment, the firefighter should do so in a controlled manner if possible so that the shoulder load stays intact and organized. After laying the shoulder load down, the firefighter can simply pull two of the middle bights/folds back away from the nozzle to dress the shoulder load and prepare for a more efficient entry or advancement (as seen below). This deployment can be utilized in almost any situation and can be prepared in any direction.



Coil or “Cleveland” Deployment

Another option for deployment of the shoulder load after laying the shoulder load down is the coil deployment. This deployment method may be useful in confined areas such as stairwells, small landings, etc. In order to deploy the hose as a coil, the firefighter shall first move to the nozzle side of the shoulder load. The firefighter will then begin to put each bight of hose over his/her left arm starting with the bight nearest the nozzle. The firefighter will continue to place each bight over the arm in sequence from the bight nearest the nozzle to the bight furthest away.



After all of the bights of the shoulder load have been placed in sequence over the arm, the firefighter will proceed to put both arms through the bights (as seen below) and can then either stand the coil up against a wall or substantial object and have the line charged. The hose will remain charged on its side in the coil while standing, which can be beneficial in a stairway or landing. This hose load can also be used horizontally on the ground by creating the coil and stepping through it (as seen in the pictures below). With this deployment one must be even more mindful of kinks and bends in the line.





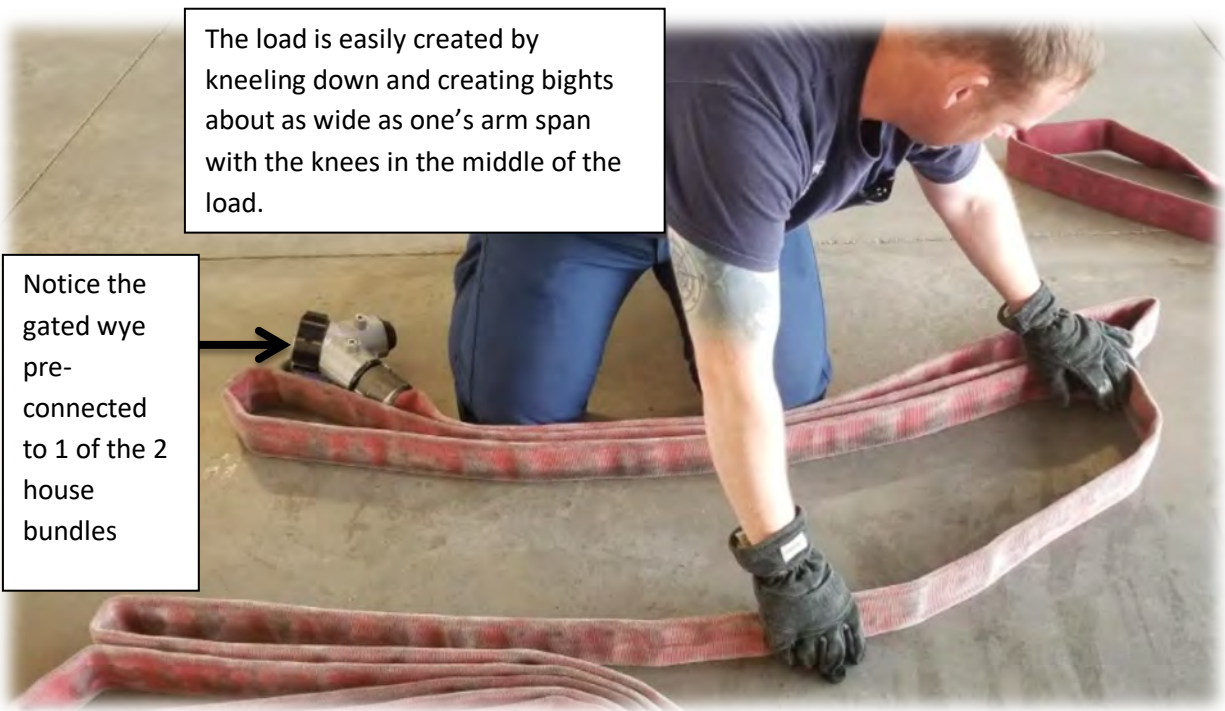
Bumper Load:

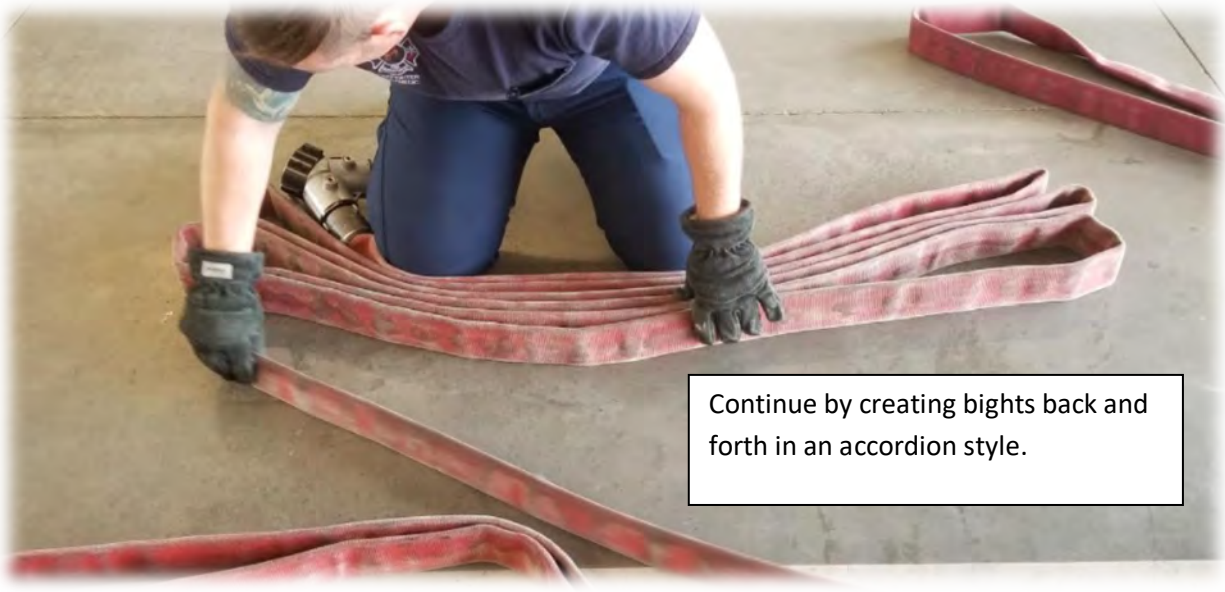
The bumper load, also known as the “Scorpion Load”, is a short 100’ section of pre-connected 1 ¾” hose. This hose line is also sometimes referred to as a “Trash Line” for use on such things as dumpster or car fires, etc. The bumper load is loaded by first creating a bight in the back (nearest the cab) of the hose tray. The hose is then loaded in one bight at a time in sequence moving forward just as you would load a supply bed. The first layer is loaded from back to front; the second layer is loaded from front to back, and then repeat. When loading in the second 50’ section of 1 ¾” hose, make a tail with the couplings and leave them on the outside of the hose tray, as shown below. After finishing the load and attaching the nozzle, place the tail and connected couplings next to the nozzle as shown below. To deploy the hose, simply grab the nozzle with one hand and the couplings with the other. When resistance is met, look back to ensure all of the hose has come out of the tray, lay down the couplings, and call for water. This load will allow one firefighter to deploy the 100’ hose line in 50’.



Loading the House Bundles:

House bundles (also known as high-rise packs) are 100' of 1 ¾" hose that are loaded into a pre-packaged shoulder load and are often used when a 200' pre-connected hose line is not adequate in length or application for a particular incident (such as a fire on an upper level of a multi-story building, etc.). The house bundle is loaded as a simple accordion load. This allows the house bundle to be deployed as either an accordion by dressing the shoulder load as one would with the pre-connected shoulder load, or as a coil, also as one could deploy the pre-connected shoulder load. When finished creating the house bundle it should be roughly as long as one's arm span (around 5-6 feet in length) and is contained with the use of (3) Velcro straps. There are (2) house bundles carried on each engine as well as on the truck. One of the house bundles has a gated wye attached, and is meant to be attached to a 2 ½" trunk line for supply. The other house bundle's female coupling is left as is, and can be used by attaching to the other discharge of the gated wye, or when extending a line such as adding the house bundle to the 1 ½" male threads on the breakaway nozzle's that are found on the 2 ½" pre-connect(s). The diagrams below show how one should load the house bundles.





Continue by creating bights back and forth in an accordion style.

The coupling between the (2) 50' sections of 1 3/4" hose should be placed in an appropriate location in the load to allow for the load to be folded for storage (slightly off-center).



The completed house bundle prior to fastening with Velcro straps. The load can either begin or end with the nozzle/female coupling/wye.



Securing the bights of the house bundle with Velcro straps. Straps are placed as shown.



A finished 100' house bundle



Deploying the House Bundle(s):

Deploying the house bundle(s) is done in a similar manner to the shoulder load of a pre-connected hose line. The Velcro straps that secured the bights of the load together allow it to be shouldered, moved, and placed with ease and efficiency. The house bundle can also easily be hoisted with utility rope due to the fact that it is secured with straps. When the decision is made to deploy house bundles, the firefighter will either be connecting to a dry (uncharged) 2 ½" trunk line to supply the house bundle(s), or will be attaching the house bundle without a gated wye to the threaded end of a 2 ½" breakaway smooth bore nozzle (found on pre-connected 2 ½" lines. Whether connecting the house bundle to a trunk line with a gated wye or connecting to a pre-connected 2 ½" line via threaded smoothbore nozzle, the firefighter must ensure the gated wye and/or bale of the nozzle is secured open/closed with a hose strap (webbing) and a clove hitch. By securing the gated wye open/closed the firefighter ensures that the valves of the gated wye cannot be kicked or dragged open or closed during firefighting operations. The same principle goes for extending a 2 ½" line via a house bundle. The bale of the nozzle must be secured open after extending the line to ensure that the flow of water is not decreased or completely stopped via the bale being accidentally closed by dragging over obstacles or being kicked shut by a firefighter.

When placing the house bundle in a confined hallway or stairwell, the firefighter has the option of deploying the accordion by stretching two of the middle bights of the house bundle in a linear fashion either to the front or rear of the nozzle. Be sure to dress the line appropriately to minimize and kinks. The other option is to create a coil of hose by placing the bights of the accordion over the arm in sequence starting from the nozzle side of the accordion load. The coil deployment may allow for a deployment of hose in a more confined space. **These deployments and dressing of hose must be done prior to charging the line(s).**

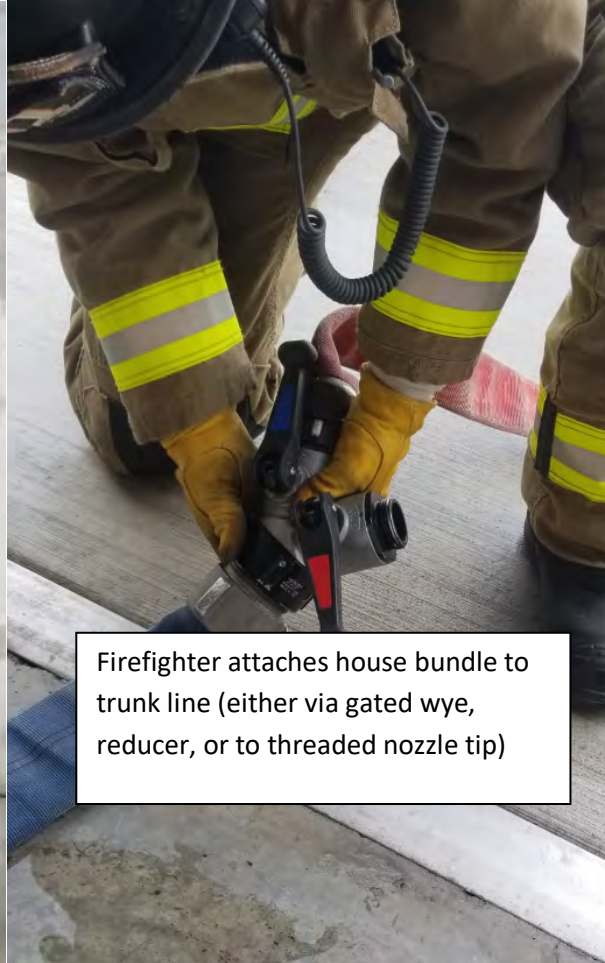


Firefighter with shouldered 100' house bundle

House bundle on ground ready for deployment



Firefighter removing straps before deployment



Firefighter attaches house bundle to trunk line (either via gated wye, reducer, or to threaded nozzle tip)



Once the house bundle is completely dressed, the line is to be charged. Always be sure to tie off any open/shut valves on gated wyes or nozzle bales with a hose strap and clove hitch as shown in pictures below and in *“Extending a Hose Line”* section below.



Dressed house bundle ready to be charged





Charged house bundle

Gated wye valve tied open with hose strap and clove hitch



If a gated wye only has one hose operation off of it, the unused valve should be tied shut with a hose strap and clove hitch.

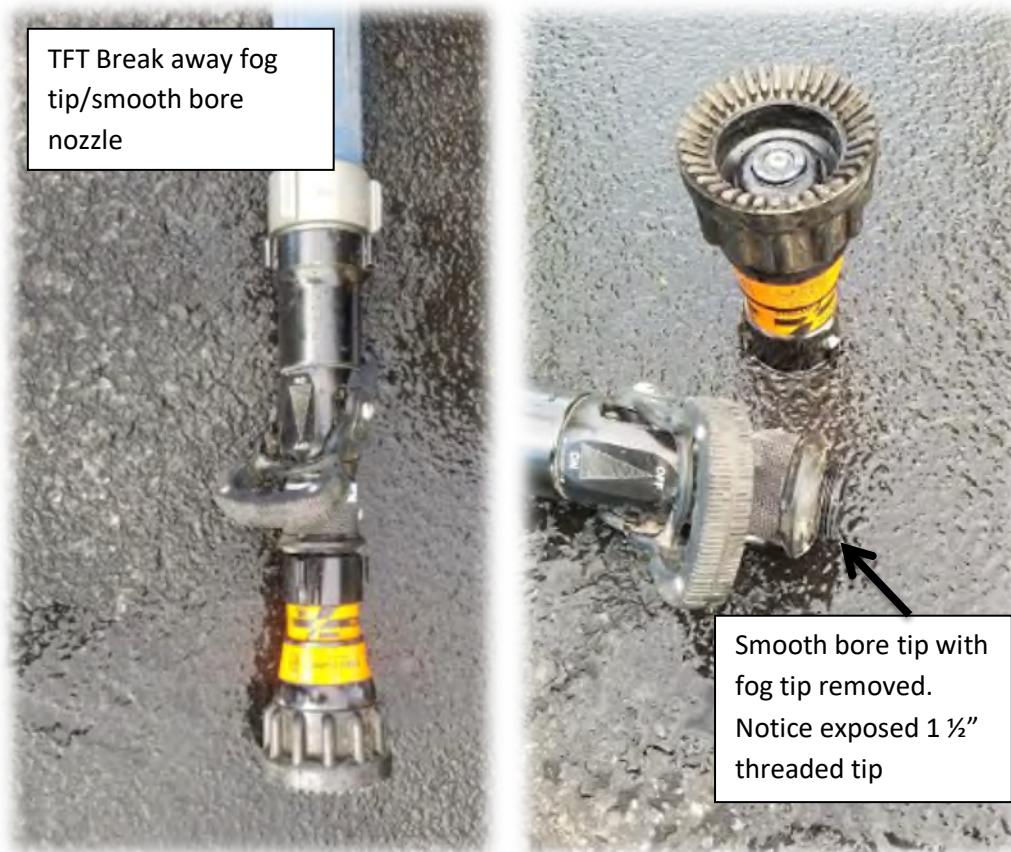
Coil Deployment of house bundle- The coil deployment (done the same as shown on the pre-connect section) can be placed either horizontal or vertical depending on the situation.



Extending a Hose Line:

There are times when the need will arise to extend a hose line due to several factors, the most common being an insufficient length of hose in use needs to be extended for further use on the fire scene. There are (2) primary methods for extending a hose line:

1. The first method to extend a hose line is to simply shut the hose line down at the apparatus pump, remove the nozzle, add section(s) of hose (either of like size or reduced size), reattach the nozzle, and charge the line for continued use. The use of a reducer is necessary if extending from a larger hose (2 ½") to a smaller hose line (1 ¾").
2. The second method for extending a hose line requires a threaded end on the nozzle in use (such as those nozzles found with breakaway fog tips on 2 ½" and 1 ¾" pre-connects). The hose line is to be shut down at the nozzle/bale while the hose is still charged. The breakaway fog tip is to be removed exposing the 1 ½" male threads. A house bundle or other section of hose may then be added with an additional nozzle at the end. The bale is to then be re-opened at the point where the extension was made and should always be secured open via a hose strap and clove hitch. This method works mainly for 2 ½" and 1 ¾" pre-connected hose lines and are extended primarily with the 1 ¾" house bundle (without the gated wye). This will extend a 200' 2 ½" or 1 ¾" pre-connected hose line from 200' to 300'. This method may be useful when transitioning from a large diameter hose for defensive operations into a smaller diameter hose for interior or overhaul work.



The picture below shows a 1 ¾" hose line attached directly to the threaded end of the breakaway fog/smoothbore nozzle. Notice the trunk line (blue) is still charged and the bale is in the "off" position.



After opening the bale and charging the 1 ¾" hose line, the bale should always be tied in the open position as shown below with a hose strap girth hitched around the bale handle, and then clove hitched tightly just behind the shank of the coupling in order to prevent slipping. Add an additional half hitch or safety knot if possible after finishing the clove hitch.



Hose handling techniques:

Hose lines are often operated and handled by (2) firefighters, however at times due to limited manpower or the need for multiple lines in operation, (1) firefighter may be have to man a hose line without assistance.



Heal clamp- This can be used for stationary operation as well as for advancing hose. To advance, kick the front (left leg) forward, and then pull the hose forward with the rear leg (right leg) that is over straddling the hose. Keep the bale at an arm's length during operation.



Standing- with hose pinned against hip. It is helpful to have a backup firefighter behind you on the hose line to assist in feeding hose and absorbing nozzle reaction. Keep the bale at an arm's length during operation.



High-knee position- It is helpful to have a backup firefighter behind you on the hose line to assist in feeding hose and absorbing nozzle reaction. Keep the bale at an arm's length during operation. Be sure to maintain an aggressive stance with



Operating hose with a hose strap- girth hitched around hose. Notice that the firefighter places the hose strap around the opposite shoulder.

2 person “push” Notice the nozzle firefighter has the front (left) leg out and back (right) leg on a knee. The backup firefighter creates a tripod with his/her Right hand on the hose line and left hand on the ground. He/she also will have the right leg by the right hand in a position allowing to “push” against the ground. The left leg will remain on a knee. The nozzle firefighter shall lean solidly back into the backup firefighter and when ready to move say “push”. The nozzle firefighter shall wait for the backup firefighter to initiate the push, and then proceed to lift the front left leg while moving with the back knee. This can be done while flowing water or with the hose line turned off, and with or without SCBA.



Notice the back-up firefighter with the left hand on the ground and the right hand on the hose line.

Picking up hose:

Hose is usually picked up from a scene or training in (2) different ways. When time allows, hose should be rolled with the male coupling on the inside of the roll in order to protect the exposed threads of the male coupling. Rolling hose also removes the maximum amount of water and air from the hose line prior to being re-loaded into a hose bed. Hose can also be flaked over the shoulder for quick pick up if it is dirty or needing to be moved rapidly from the scene.



This picture shows a firefighter rolling hose. Hose should be rolled tight and can be laid down on its side after and stepped on to make the roll neat.



The firefighter flaking hose over the shoulder for quick pick up from a scene.

Section 6.6

Taking a Hydrant/ Anchoring Hose:

Water supply is a necessity during all firefighting operations. In structure firefighting, water supply most often comes from a pressurized source. The most common source of water in structure firefighting operations is the fire hydrant. It is the responsibility of every member of the fire department to not only understand the process for “taking a hydrant” (connecting supply hose to a hydrant), but also to be proficient in one’s skills and abilities to take a hydrant.

The hydrant is most commonly taken utilizing the 5” supply LDH. If the hydrant is being taken using 2 ½” hose for supply it should be done with the same principles as the 5” LDH. Although a hydrant may be taken with a *reverse lay* (when the engine comes to the hydrant from the fire scene or from another engine), the *forward lay* is the most commonly used and requires a firefighter to work in the “hydrant” position. The firefighter taking the hydrant in such circumstances will be left at the hydrant while the engine proceeds to the scene. The subsequent steps are the same for any situation when a firefighter or engineer needs to take a hydrant for water supply.

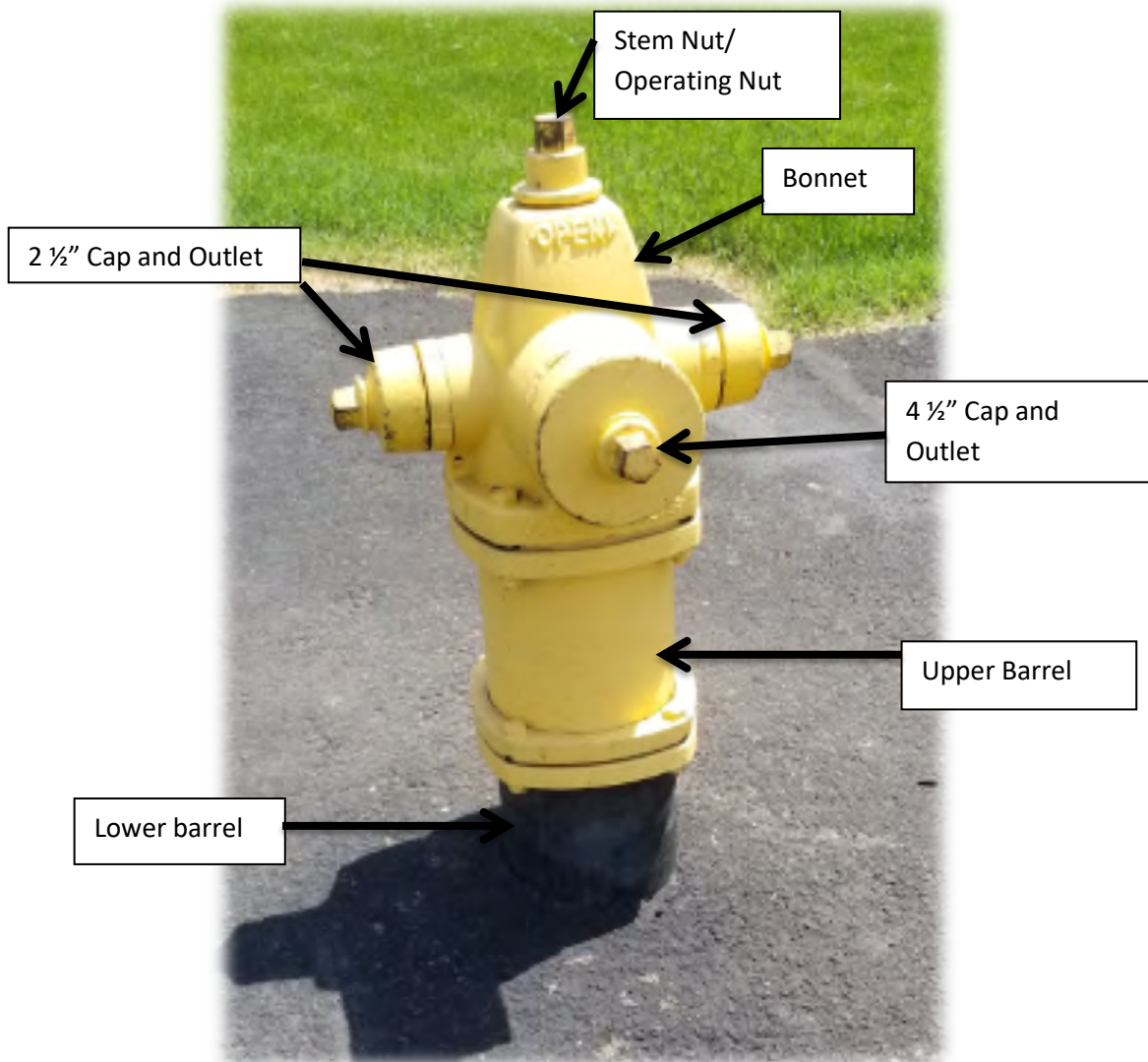
The following picture(s) show how a firefighter in the hydrant position will wrap the hose around the hydrant to secure for a forward lay. The firefighter will exit the apparatus after coming to a complete stop, grab the hydrant bag containing the tools and fittings necessary for taking a hydrant, and remove the 5” LDH from the supply bed. The firefighter will then wrap the hose around the hydrant with the hose going to the far side of the hydrant opposite the rear of the apparatus. Wrapping the hose in this manner will cause the hose to swing into the street if it were to be come tight and break loose from the hydrant.

After the firefighter has wrapped the hose he will signal with his arm(s) and verbally yell “Lay In!” making sure to create good line of sight with the engineer if at all possible. The firefighter should stand behind the hydrant and be aware of the hose and its position as well as the apparatus.

In the instances where a Forward Lay is used, the firefighter shall wait until the supply hose has created sufficient friction on the ground (+/- 100’), and will then un-wrap the hose and begin removing the caps and making the connections necessary for attaching the supply hose and 2 ½” gate valve.

ALWAYS HAVE AN ALTERNATIVE HYDRANT/WATER SUPPLY LOCATION!

Parts of a Hydrant



Taking a hydrant "Laying in"



Hydrant bag with fittings and tools located near the hydrant but not to interfere with initial lay in.

Supply hose wrapped from the far side of the hydrant around the side nearest the engine/apparatus

Firefighter standing behind the hydrant, securing the hose with a boot, and maintaining visibility of hose and apparatus as he/she signals and verbalizes to the driver engineer to "Lay in!"



The tools necessary for taking hydrant include the **hydrant wrench** for removing caps (*if caps are seized try tapping on them with outside of wrench or use a 2.5"-5" Storz adapter off of a 2.5" port*), turning the stem, and tightening couplings, **The 5" Storz adapter** to allow for hooking 5" hose to the 4.5" threaded outlet on the front of the hydrant, and **The 2 1/2" ball valve/gate** to be attached to the 2 1/2" threaded outlet facing towards the apparatus.



Hydrant with 5" Storz adapter and 2 1/2" gate attached.

*When the hydrant wrench is not being used to remove caps or fasten adapters/gates, it should always go back on the hydrant stem nut.



5" LDH attached to hydrant and firefighter opening hydrant with gate valve open to flush hydrant and slowly fill supply hose.



Gate valve shut with hydrant fully opened and supply line fully charged. Be sure to fully open hydrant.

*Be careful not to send water too fast causing a water hammer.



Firefighter anchoring a supply line (*dry tail*) for lay in without a substantial object to wrap with hose. Be sure to make a safe length bight of hose with the coupling on top to avoid any injury if the hose were to be pulled away by the engine laying in. This is necessary for **reverse lay**, **dry tail supply lay**, etc. Be sure to signal to lay in with a raised hand and loudly yell “**LAY IN!**”

Handjack LDH/Supply Line:

There may be instances when it is necessary for the engineer or firefighter to take a hydrant by pulling (hand jacking) LDH from the apparatus to the hydrant. This method is dependent upon distance to the hydrant and the physical capabilities of the firefighter(s) who may be pulling the line to the hydrant.

Section 6.7

Calling for Water

Calling for water can be done either verbally, with hand signals, or via an engines horn blast. When calling for water on a hand line, be sure to have line of sight with the pumper operator who will be sending you water. Use a loud "**WATER!**" combined with a raised hand that is moved in a circular motion. If you cannot see the pumper operator due to terrain, distance, etc. be sure to utilize your radio for clear communication to the pumper operator that you are ready for water.

When the firefighter taking the hydrant is responsible for sending water to the pumper/apparatus, the pumper operator often times is at a distance where verbal commands will not suffice. In this situation, the firefighter should look for the same raised hand moving in circular motion to indicate that the pumper operator is ready for water to be sent. If the hose lay is very long and the pumper operator is out of sight, he/she may utilize radio communications to call for water, or (3) sequential air horn blasts from the pumper to signify the need and readiness for water to be sent.

