

## Ladders

The use of ladders is a necessity in the fire service. Ladders are carried on almost all structure apparatus and can be found in different lengths and configurations. One must possess the knowledge of the ladder(s) including construction and maintenance, how to climb ladders, and how to handle ladders.

This chapter will be broken down into the following sections:

### **8.1 Types of Ladders**

### **8.2 Parts, Construction, and Care of Ladders**

### **8.3 Climbing Ladders**

### **8.4 Handling Ladders**



**Section 8.1****Types of Ladders**

Pendleton Fire employs several different types of ladders for use on emergency operations. Each ladder has its own capabilities and areas of use for different scenarios and situations on the emergency scene. Understanding the different types of ladders carried by Pendleton Fire Department can aid the firefighter in selecting the appropriate ladder(s) for the situation at hand, thus making operations more timely and efficient.

**Ladder Uses**

**RESCUE** - The principle use of fire service ladders is for rescue work. .

**ACCESS** - Fire service ladders are used to gain access to attics, upper floors, or to the roof of a structure as well as spaces that may be difficult to access otherwise.

**VENTILATION** – Windows may be vented from the exterior using ground ladders.

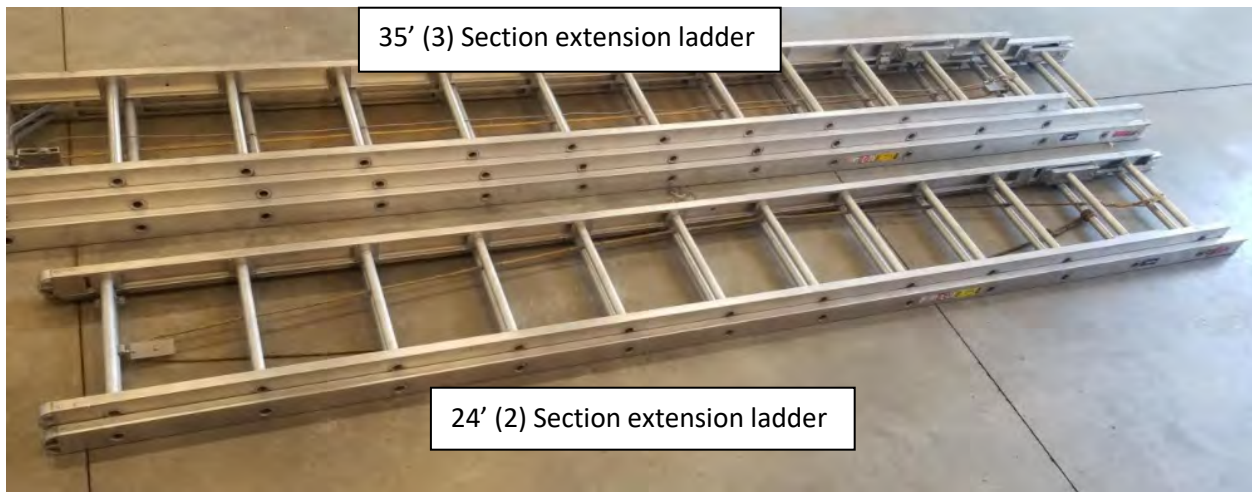
**FIRE STREAMS** - Ladders provide a means of access for hose lines from the ground level. Fire streams can be operated directly off of properly supported ladders.

**BRACING** - Ladders can be used as braces and as shoring in many applications.

**SALVAGE** - Ladders can be used to effect efficient salvage operations; forming catch-all basins, providing a means of attaching tarps, etc.

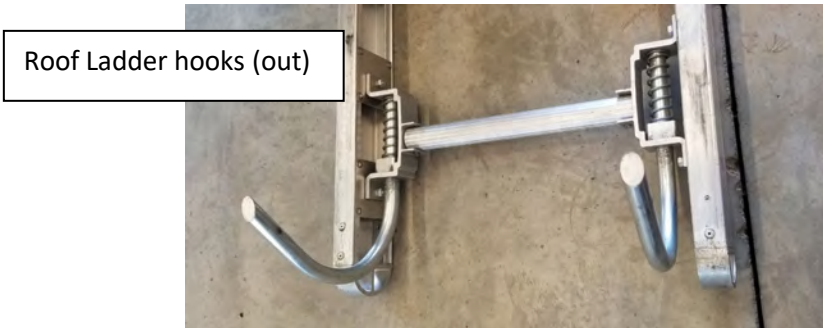
**Extension Ladders:**

An extension ladder consists of two or more sections nested together to provide a longer ladder, which still permits ease of handling and convenience in mounting on fire apparatus. The extension ladder is one of the most versatile ladders and is often the first choice when placing a ground ladder during emergency operations due to the ability to easily adjust for height. Pendleton Fire carries (2) lengths of extension ladders. The most commonly used is the 24' 2 section extension ladder. This ladder is often used in emergency operations involving residential structures when accessing the roof, providing points of egress, rescue situations, etc. The 24' extension ladder is light enough to be handled and raised by the individual firefighter. The 24' extension ladder is carried on structure engines and on the ladder truck. The other extension ladder carried at Pendleton Fire is the 35' 3 section extension ladder. These ladders (2 of them) are carried only on the ladder truck. These ladders provide means of accessing roofs, windows, etc. on taller buildings where the 24' extension ladder will not. The 35' extension ladder is heavier and more cumbersome than the 24' extension ladder, making it necessary to carry and raise with a minimum of (2) firefighters, but preferably (3) firefighters.



**Roof Ladders:**

Roof ladders are straight ladders, equipped with spring-loaded collapsible hooks at one end. They are used when working on roofs to distribute weight and avoid slipping. They may also be used whenever it is necessary to suspend a ladder from the top instead of supporting it from the bottom. The most commonly carried length of roof ladder at Pendleton Fire is 14' and 16'. The roof ladder is also an optimal choice for accessing a roof or lower window when height allows due to its light weight and ease of maneuverability (as a straight ladder with hooks folded in). An individual firefighter can easily move and place a roof ladder without assistance.



**Attic Ladders:**

Attic ladders are small and vary in type and design. Pendleton Fire carries attic ladders on all engines and the ladder truck. The attic ladder folds to a width of four inches. They are usually used in confined areas to gain access to attics or other hard to reach places. Remember to carry attic ladders into residential structures tip first for ease of placement.



**Aerial Ladder:**

Aerial ladders are power operated extension ladders with the base permanently mounted to a platform on the apparatus. They are multiple section ladders ranging in length from 65 feet to 100 feet. Speed, stability, and range make them useful for most types of ladder work, especially for rescue and elevated fire streams. Pendleton Fire currently employs a 104' rear mounted aerial ladder tower that. Always use a ladder belt when working on/from the aerial platform/ladder.



**Misc. Ladders:**

Other ladders such as folding fiberglass ladders and folding A-frame ladders may be used around the station as well. These ladders are not commonly used on emergency operations, but do play a role in facility maintenance. The ladder truck does carry a small fire rated Folding A- frame ladder.



A-Frame Ladder in its folded, A-frame, and straight positions.

## Section 8.2

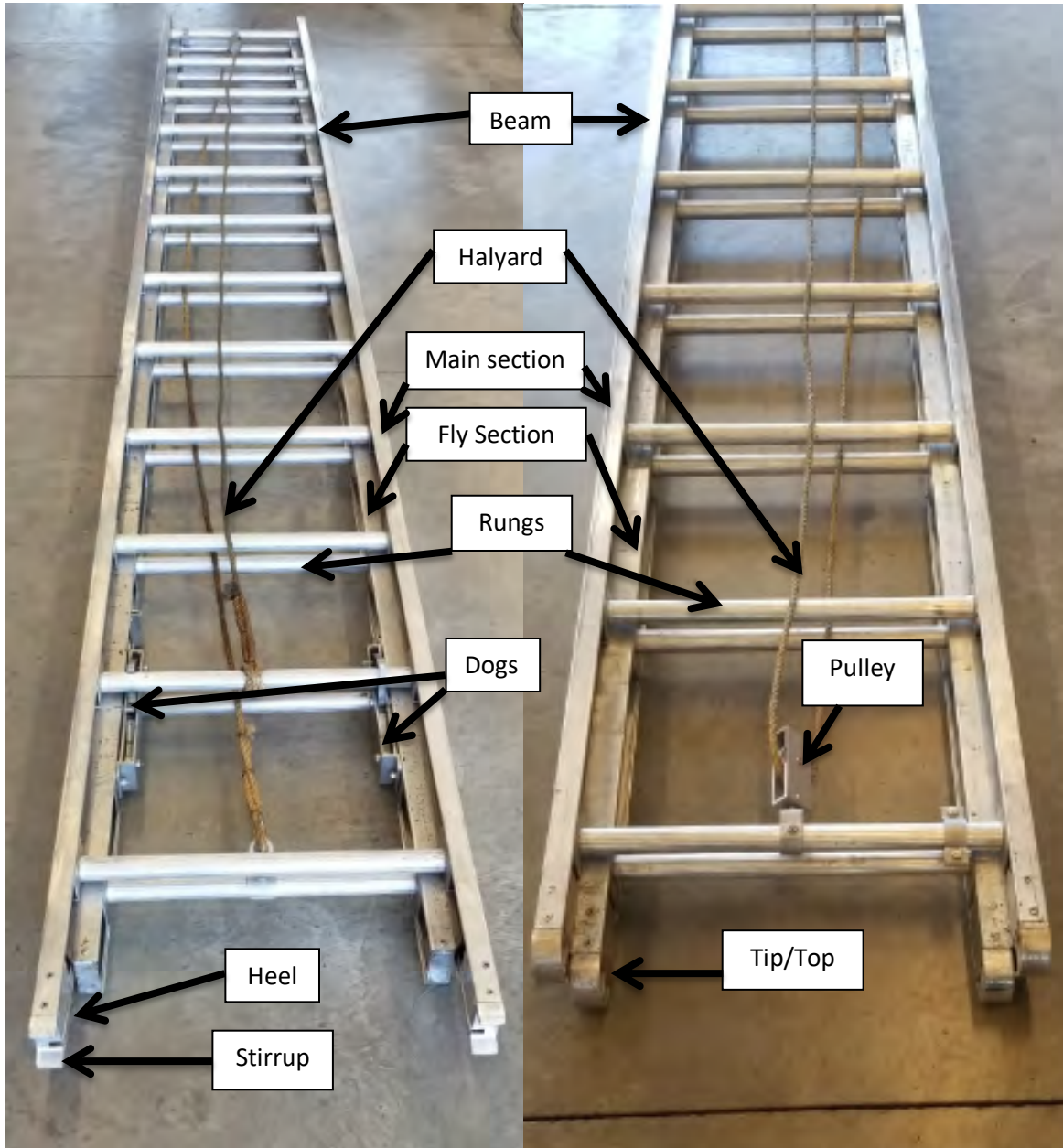
Parts, Construction, and Care of Ladders

The following terms are commonly used and recognized with fire service ladders and should be utilized by Pendleton Fire Department.

Parts of the Ladder:

- **BEAM**- The sidepieces of a ladder which support the rungs and which may be either solid or trussed.
- **DOGS**- Devices that hold and lock the fly section in position when it is extended, sometimes referred to as *pawls or locks*.
- **FLY**- A section of an extension or aerial ladder, which may be elevated by extending it out of the main or bed section. There may be several fly sections in one ladder.
- **GUIDES**- Metal strips on an extension ladder which guides the fly section while it is being elevated.
- **HALYARD**- The rope or cable used to elevate the fly sections of an extension ladder.
- **HEAT SENSOR LABEL**- A label affixed to the ladder beam near the top and heel to provide a warning that the ladder has been subjected to excessive heat.
- **HEEL**- The end of a ladder that rests on the ground.
- **HOOKS**- Spring-loaded swivel hooks mounted on the top ends of roof ladders for hooking over the peak of a gable roof.
- **MAIN SECTION**- The bottom section of an extension or aerial ladder, also referred to as the *bed section*.
- **PULLEY**- A small grooved wheel used to guide the halyard when raising or lowering a fly.
- **RUBBER PADS**- Found on collapsible attic ladders that have a swivel-type foot. It is designed to lay flat to help prevent slippage on smooth surfaces.
- **RUNGS**- Round crosspieces between the beams.
- **STIRRUP**- A formed metal strap, covering the heel of a beam, which helps prevent the base of the ladder from slipping when raised.
- **STOPS**- Limiting devices that prevent the fly section from being overextended when raised or retracted.
- **TIP/TOP**- The end of the ladder opposite the heel.

Parts of the Ladder





### Construction of Ladders

Fire service ladders of the past were most often made of wood. Due to more available and lighter materials such as aluminum alloys and fiberglass, wood ladders have nearly become obsolete. Pendleton fire utilizes aluminum fire service ladders. Fire service ladders are quite different from the ordinary household ladder. Demands of emergency service have developed material and construction standards, which produce equipment that is strong and reliable. Although fire service ladders are often of greater strength and durability than their household counterparts, they still require inspection and maintenance for safe operations.

### Care and Maintenance of Ladders

Although annual service testing is done on Pendleton Fire Department ladders, the firefighter should always be aware of defects and able to perform preventative maintenances on ground ladders when needed.

Ladders should be examined after each use for damage they may have received. Any repairs that are needed should be made immediately. A thorough regular inspection should be made to determine their overall condition. During this inspection, ladders should be removed from the apparatus for better observation. Some of the things to look for, and the proper remedial actions, are listed below.

- **Burring** - File burrs on metal ladders smooth with a mill bastard file and polish with steel wool.
- **Corrosion** - Wash with soap and water, then clean with steel wool.
- **Foreign Material** - Cut, scrape, or file away foreign material (melted tar, sulfur, or light metals) or remove with proper solvent.
- **Loose Rungs** - This defect is beyond company repair. Notify proper authority.
- **Worn Halyard** - This defect is beyond company repair. Notify proper authority.
- **Ladder Dogs** - Keep dogs clean. Check spring action periodically. If sticking occurs, clean and lubricate accordingly.

Care should be exercised in placing all ladders on the apparatus. Each ladder has a proper location and should be carefully replaced after use. Do not attempt to force ladders into brackets or slides. Ladders can be damaged during removal from the apparatus, as well as during replacement.

Use care in removing ladders, placing those not needed immediately in a safe position where they cannot be damaged. Usually, these ladders can be placed under the truck and out of the way or back on/in ladder racks.

**Cleaning Aluminum Ladders:**

- A.** Mild soap and water works well. Be sure to flush inside the rails and rungs to clear them of road salts, dirt, etc.
- B.** If the ladder is greasy or oily, use a solvent cleaner to remove the oil.
- C.** If brightening is required, use a double -00- steel wool or a plastic scrub pad on aluminum surfaces and rinse thoroughly to remove residue.

**Visual Inspection of Ground Ladders:**

After each use, ladders should be inspected as follows:

- A.** Make certain that all rungs are snug and tight. Test by attempting to twist by hand. If any rung shows evidence of being loose, arrange to have the ladder repaired.
- B.** Check all bolts and rivets for tightness. Rivets on metal ladders should show no indication of looseness.
- C.** Visually check any welds for apparent defects.
- D.** Inspect rails for cracks, splintering, breaks, gouges; check for any evidence of failure.
- E.** If a discoloration or a slight deformation in the ladder is noted, it is not necessarily an indication that the ladder is unsafe.
- F.** Check the heat sensor label for discoloration. If discoloration is noted have the ladder tested. Note: Use of harsh soaps and chemicals can sometimes turn heat sensor labels dark, which is why a mild soap is recommended for cleaning.
- G.** Any deficiencies noted in "A" through "F" above should be corrected. After major repairs have been made (by proper authority), the ladder shall be tested before placing it back in service.

## Section 8.3

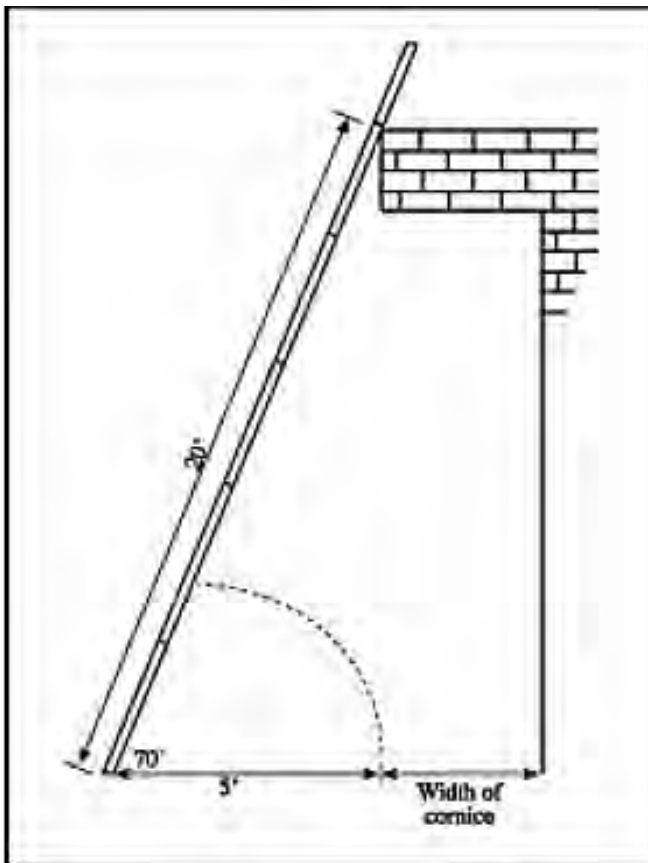
**Climbing Ladders**

Climbing ladders is common place for a firefighter. However, in order to do so safely and effectively, one must pay attention to several aspects. The safety of the firefighters depends on the angle of inclination, observance of ladder load capacities, correct climbing methods, and utilization of the proper safety holds.

**ANGLE OF INCLINATION:**

The angle of inclination providing both strength and easy climbing is about 70 degrees from the horizontal. By increasing the angle of the ladder, the result is decreased stability of the ladder. A flatter angle lessens the ability of the ladder to withstand loading. It is therefore important for a firefighter to be able to set a ladder at the proper climbing angle.

The heel of the ladder should be out from the building a distance equal to one-fourth the distance from the heel to the point where the ladder touches the building. If the top of the ladder rests on a cornice, shelf, or other projection from the building, the width of the projection must be added to the heel distance.



**Checking Angle of Inclination:**

Stand straight up with the toes of your boots against the ladder stirrups. Then extend your arms straight out from your shoulders creating a 90 degree angle and reach toward the ladder rung nearest shoulder height. If your hands fall on the rung in a comfortable grasping position, the ladder will be near the proper angle of inclination.



**Loading of Ground Ladders:**

The list below shows the capabilities of each ladder in regards to loading by climbing firefighters:

- **Roof ladder (vertical)** – 1 Firefighter
- **24' Extension Ladder** - 2 Firefighters
- **35' Extension Ladder**- 3 Firefighters

The maximum number of people listed above includes anyone being rescued or carried down the ladder and should not be exceeded.

**Loading of Ladder Resting on Roof:**

As a rule of thumb, the maximum load for any ladder on a roof is: ***one firefighter for every five feet of roof ladder.*** The load bearing capability of the roof is, of course, the final determining factor and may further limit the load that may be placed on a roof ladder in a given emergency situation.

**CLIMBING METHODS**

Proper climbing methods should always be employed in ascending and descending ladders. When ascending a ladder, the firefighter should climb with hands on the rungs. Be sure to use each rung as the ladder is climbed, never skipping a rung. With your body erect and your arms straight, move your hands up the ladder between your waist and your head. Keep the weight of the body on your legs, straightening them as each step is made. Keep your feet near the center of the ladder and use your hands to help maintain balance. The firefighter should always maintain (3) points of contact while working on a ladder, unless locked in.



A firefighter climbing with both hands on the rungs and ascending one rung at a time.

### Climbing with Tools

Every attempt should be made to avoid having to climb with a tool either by hoisting tools or by securing to the body with a tether or strap. However, if the need arises to climb with a tool or power tool, use the **beam(s)** to ascend the ladder while holding the tool against the ladder for additional support. If climbing with two tools, try to place one of the tools up on the rungs as high as possible before climbing with the other tool in the hand. Proceed to move to tool up the rungs as you ascend.



Climbing with one tool. Notice the tool held against the beam.



When climbing with two tools, try to place one tool up on the ladder and move it up the rungs as your ascend with the other tool on carried against the beam.

### **Climbing with Hose**

There are times when it is necessary to carry hose up the ladder. These instances may include, but are not limited to, carrying a section of hose, carrying a hose and nozzle for deployment, and carrying hose in line with other firefighters for hose operations. If possible, hose should be hoisted with a utility rope from the level or story needing hose.

When carrying a section of hose up a ladder, double the hose back on its self and carry the section of hose over the shoulder as shown below. Be sure to let the hose hang off the side of the ladder.



When carrying hose up the ladder with a nozzle, the nozzle is carried on the shoulder on the same side as where the hose will lead off from the ladder. Bring the nozzle end up under the arm and back over the shoulder. Be careful to step around hose as you climb the ladder.



When climbing with hose in line with other firefighters, create a bight over the shoulder with slack in front. The firefighters are spaced two to a length of hose; they follow each other at close intervals on the ladder. This can also be done with a hose strap and girth hitch around the hose with the hose strap over the shoulder.





**Climbing with Roof Ladder**

Position the roof ladder next to/against the ladder that will be ascended (with the hooks locked out). You can also hook the roof ladder onto the ladder that will be climbed. Once on the ladder and at a level parallel with the tip end of the roof ladder, place an arm through one of the last rungs of the roof ladder, positioning the weight of the roof ladder on the shoulder. Proceed to bring the arm back around the beam of the roof ladder and continue climbing while maintaining (3) points of contact. When moving the roof ladder from the shoulder to the roof, tie-in to the ladder with a leg lock if possible and move the roof ladder to the roof with the hooks facing up. When the roof ladder crests the peak of the roof, flip it over to secure the ladder with the hooks facing down. If more personnel are available, the heel end of the ladder may be tended by another firefighter while climbing.





**Climbing/Descending with Victim(s)**

When descending with an unconscious victim, you can use several methods. However, the simplest methods for the individual firefighter are to either descend with the victim facing away from the ladder and the legs over the firefighters shoulders, or with the victim's legs straddling the knee. With either, grasp the beams and lean into the victim to keep them pressed against the ladder.





\*With a conscious victim, assist them in climbing down the ladder and implement a body hold while descending one rung at a time. If the victim slips you can press them against the ladder with your body.

## **SAFETY HOLDS**

It is necessary at times to perform work from a ladder that requires the use of both hands. Two holds that allow free use of hands are described below. They are referred to as the leg-lock and the body hold. Their application is often referred to as “tying-in.” Because there are several types of ladders and physical differences between individuals, it will occasionally be necessary to vary from the directions given in order to assume a comfortable and safe working position.

**Never lock in on an unsecured ladder.**

**Never lock in on an aerial ladder.**

### **Leg-Locks**

The leg-lock is used by a firefighter working alone. Two different variations can be used depending if work is to be done facing the ladder or to the side, or facing away. If working to one side of the ladder, the leg opposite to the side that work is to be done should be used to tie-in. The foot on the tie-in leg should be placed on the outside of the beam for additional leverage. This safety hold is not recommended if work is to be done for an extended period of time without the ladder being secured.





### **Body Hold**

The body hold provides more freedom to the firefighter being secured and is particularly useful in holding a firefighter who is operating a nozzle from a ladder. Stand a rung or two below the firefighter to be held. Place your arms around their sides and grasp the beams or a convenient rung.



**Section 8.4****Handling Ladders**

The proper handling of ladders is of prime importance and cannot be overemphasized. Proper handling not only prevents damage to ladders and property, but also results in speed and effectiveness in placement. In addition to lower property damage, the chance of injury to firefighters, bystanders, and victims being rescued is greatly reduced.

The ability to handle ladders properly can be acquired by learning and practicing the fundamental individual skills that are presented in this manual. They are presented by detailing the actions of an individual firefighter. In several of the ladder carries, the actions of the individual remain the same, but the positions taken along the ladder will vary according to the number of firefighters available and the length of the ladder.

**SAFETY PRECAUTIONS**

- Use extreme caution when reaching arms through the rungs of extended ladders, making sure that all dogs are locked and that the halyard is secured.
- Do not adjust the butt of an extended ladder until the tip is against the building and the fly is properly secured with dogs locked.
- Keep hands, fingers, and feet clear of the fly sections and rungs of extension ladders when extending or retracting the fly.
- Use approved safety gear while manipulating ladders. At a minimum, wear gloves, helmets, and steel toed shoes.
- Avoid walking backward while carrying ladders.
- Attempt to maintain as many points of contact with the ladder to safely complete the required task, unless you are locked in on the ladder.
- Never lock in on an unsecured ladder.
- Never lock in on an aerial ladder.
- Check overhead for wires or obstructions prior to raising and lowering ladders.
- Always watch the tip of the ladder whenever it is in the vertical position, when lowering the ladder into the building, and when pivoting.
- Do not step over ladders lying on the ground, walk around instead.

### **PICKING UP A LADDER**

A firefighter should develop the habit early of using the powerful muscles of the legs when picking up ladders, rather than risking a strained back. Whenever it is necessary to stoop down to pick up a ladder, lifting should be done by bending the knees and keeping the back straight. This same procedure should be followed in reverse whenever laying a ladder on the ground.

### **Flat Carry from the Ground**

Take a position alongside the ladder facing the direction opposite to that in which the ladder is to be carried. Squatting, take hold of the second to the last rung or the last rung with the hand nearest the ladder with the palm of your hand facing the rear. The ladder is lifted with one hand until it is high enough to permit placing the other hand under the beam, at which time an about-face(180 degree turn) is executed toward the ladder. This places the ladder on the shoulder. The flat carry can be done with (3) or (4) firefighters and is usually used for 35' extension ladders.





### Flat Carry from Ladder Truck

The flat carry from the ladder truck is done in the same fashion as from the ground, except that the firefighters take position as the ladder is being pulled from the ladder bed, as shown in the pictures below. The first firefighter begins by pulling the heel of the ladder from the ladder bed by grabbing the bottom rung on the bed section. The other 2 firefighters take position at the middle of the beams and the tip of the ladder as it is pulled free.





This same technique can be utilized when removed ladders from a ladder bed on the beam (such as an extension or roof ladder from an engine). Subsequently, they can also be removed by the individual firefighter on the beam with a high shoulder or low shoulder carry (24' extension ladder and shorter).

**Low Shoulder Carry (1) Firefighter (24' extension ladder and shorter)**

Identify the center of the ladder. Position yourself at the center of the ladder and face it. Place on the ladder on its beam with bed section facing toward you. Place your body in a semi-squat position. The tip of the ladder is picked up and the ladder is placed on the thigh. Place the inside arm between the rungs, by or at the center (balance point), and grasp the upper beam of the ladder in front of the rung so the rung will rest against the arm to keep it from twisting. Rise to a standing position with the ladder resting on the shoulder. The outside hand takes hold of the most comfortable rung in front of the chest for stabilization and balance. The butt end of the ladder should be tilted slightly downward to allow for clear forward vision.

\*The low shoulder carry from an engine should be used when it is possible to position yourself along the beam as the ladder exits the ladder bed or ladder rack. If the ladder is on a rack that is too tall to position for a low shoulder, the ladder should be brought to the ground in a controlled manner before shouldering. Be sure to unlock the ladder from a rack when removing it.





**Removing from Ladder Rack**



When removing the ladder from the ladder rack, it may be easier for some to set on end of the ladder down on the ground prior to removal. If necessary, set the heel end of the ladder down prior to shouldering/removing.



You can also find the midpoint of the ladder and remove the ladder directly from the rack as shown below.



Once the ladder is off of the rack, set the ladder on the thigh and transition to a low shoulder carry. You can also set the heel on the ground and walk under the bottom beam until you find the balance point, and then proceed with a high shoulder carry.



**Low Shoulder Carry (2) Firefighters (35' extension ladder and shorter)**

The low shoulder carry with (2) firefighters is performed the same way as with (1) firefighter, with the exception that one firefighter is at the tip and one at the heel end. This carry is useful with larger ladders such as the 35' extension ladder. The firefighter on the heel end is in control of direction and commands while moving the ladder.





**High Shoulder Carry (1) Firefighter (24' extension ladder and shorter)**

Identify the center of the ladder. Position yourself at the top 1/3 of the ladder and face it. Squat down and grasp hold of the closest beam with both hands. Lift the beam from the ground and step in toward the ladder allowing it to rest on its outside beam so the bed of the ladder is now next to you. Lift the tip of the ladder leaving the heel on the ground as you come to a standing position. Move toward the heel raising the tip until you can step under the lower beam with your shoulder at the center of the ladder. Lift the butt end off the ground. One hand takes hold of the bottom beam to secure the ladder to the shoulder. The other hand grasps the upper beam for stabilization and balance.



## Ladder Raises

### Beam Raise (1) Firefighter (Ladder Throw)

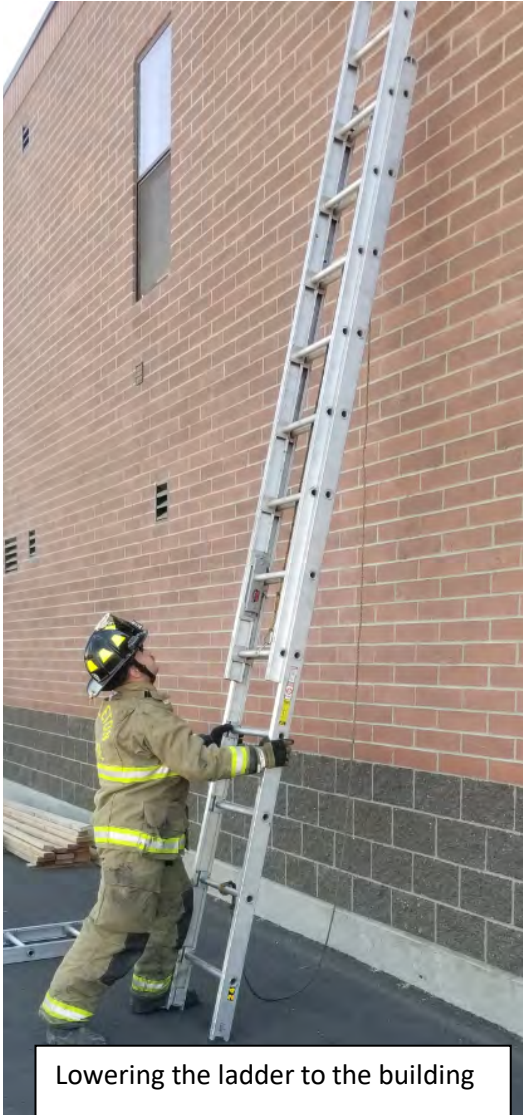
Starting with the ladder in the high shoulder position, walk forward towards the objective and begin to point the heel of the ladder downwards. In a continuous motion and with some upward lift from the shoulder, plant the bottom stirrup into the ground and use the forward momentum to bring the ladder to an upright position. After the ladder is upright, move to the bed section side of the ladder and heel the ladder with your right foot and knee, keeping the left foot back for stability. Place your elbows on the beams and use the halyard for tension to keep the ladder from falling away. Extend the fly section and lock the dogs. Pivot and lower the ladder on the flat to the building and roll the ladder so that the fly section is facing out. Adjust the heel of the ladder for proper angle and tie the ladder off with a clove hitch or half hitch. If there is enough length in the halyard, tie an additional half hitch around the running part of the halyard.





Firefighter  
"throwing" the  
ladder with forward  
momentum.

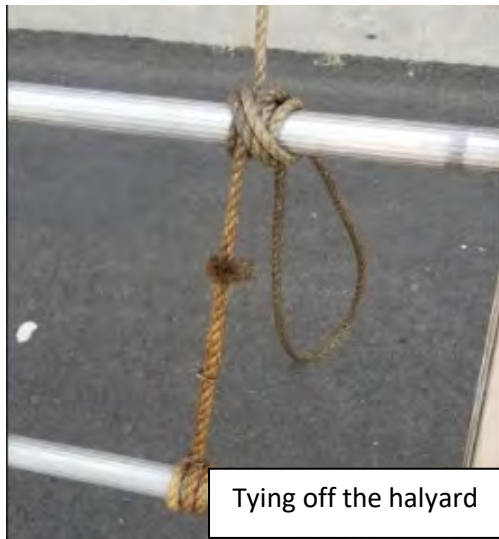




Lowering the ladder to the building



Ladder with fly facing out and adjusting the heel of the ladder for proper angle



Tying off the halyard

**Beam Raise (2) Firefighters**

With the ladder on its beam, heel the ladder with foot and hands and assist the ladder up as the other firefighter raises the ladder hand over hand on the beam. When the ladder is coming to its upright position, the firefighter heeling the ladder will move to the main section side and prepare to raise the fly. Raise the fly to the desired height and make sure the dogs are locked. The ladder can either be lowered on the beam or pivoted and lowered on the flat. When taking the ladder down on the beam, perform the same procedures in the opposite sequence.





**Flat Raise (1) Firefighter**

When raising a ladder on the flat with (1) firefighter, place the heel of the ladder against the apex of the building the ladder will be raised to. Squat down at the tip of the ladder and lift the tip of the ladder with the legs and straight back. When the ladder is at an appropriate height (eye level) the firefighter can transition to underneath the ladder. Raise the ladder rung by rung until the ladder is flat against the building. If raising an extension ladder, start with the fly section facing up. Heel the ladder against the building. Adjust the heel of the ladder for proper angle. When taking the ladder down, perform the same procedures in opposite sequence.









**Flat Raise (2) Firefighters**

When raising the ladder on the flat with (2) firefighters, one firefighter should heel the ladder by standing on the bottom rung of the bed section with both feet and placing the hands on the next rung with both hands close to the beams. Always place the ladder with the fly section to the ground when rising on the flat. The firefighter at the tip will then lift the tip of the ladder in a squatting position by using the leg and straight back to lift. As the ladder is lifted to eye level, the firefighter will come underneath the ladder and begin to raise the ladder rung by rung. As the ladder is raised the firefighter at the heel will move his hands up a rung to compensate for the increase in angle. When the ladder comes near being completely raised, the firefighter at the heel will remove one of his feet from the rung for stability. Continue by bringing the ladder to the raised position. The firefighter at the heel will raise the fly while when the ladder is finished being raised. The firefighter on the fly side must keep hands on the beams and free of the fly sections and rungs to prevent serious injury.

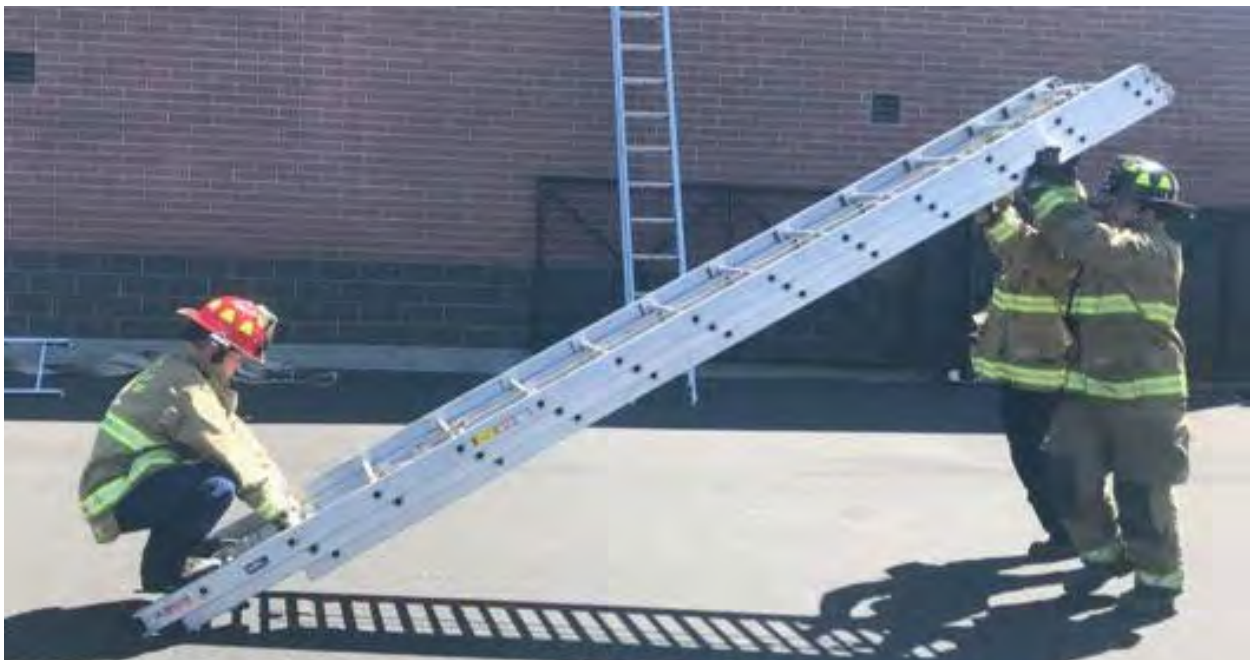






**Flat Raise (3 OR 4) Firefighters (35' extension ladder)**

When raising a ladder with (3) or (4) firefighters on the flat, follow the same procedures as raising a ladder on the flat with (2) firefighters, with the exception the positioning of the firefighters on the heel and the tip of the ladder. The firefighters on the tip of the ladder will raise the ladder in unison with the outside hand on the beam and the inside hands on the rungs. If one firefighter is on the heel (as shown) the procedure is the same as with a (2) person flat raise. When (2) firefighters are used to heel a ladder, each firefighter places one foot on the bottom rung and the other on the stirrup. Also, the hand next to the beam may be placed on the beam. Start with the fly sections on the ground.





When extending the fly, the firefighters on the fly side should keep the outside hand on the beam, and place their inside hand on the back of their partner. This helps keep the inside hand(s) free of the fly section and helps by interlocking the firefighters for added stability while the firefighter opposite of them raises the fly. This is displayed below.



### **Heeling Ladders (raised)**

If (2) firefighters are present, the ladder can be heeled in both positions simultaneously. However, most often the ladder will be heeled by one firefighter. The advantage to heeling a ladder while facing the building, as shown on the left, is the ability to maintain situational awareness of the ladder and those above you. Heeling the ladder as shown the right allows for some more tension to be pulled into the ladder, but decreases situational awareness.





**Heeling Ladders (while raising)**



When heeling a ladder being raised on the flat the firefighter will stand on the bottom rung and put both hands on the second rung with hands against the beams. Adjust hands up a rung as the ladder is brought to the upright position. Heel the ladder on the main section of the ladder with the fly section against the ground.



When heeling a ladder being raised on the beam, stand with one foot against the bottom stirrup, and press down on the top stirrup. Stand slightly off to one side and maintain focus on the tip of the ladder. As the ladder is brought to the upright position, help the ladder rise by pulling on the top beam. If two firefighters are to heel the ladder, the second firefighter takes a similar position on the opposite side of the ladder with a foot placed on the beam forward of the bottom rung.

### **Pivoting Ladders**

Turning of a ladder on one of its beams when the ladder is in near vertical position is also known as pivoting. Pivoting should be done on the inside beam (beam nearest to object or structure against which the ladder is to rest). The person(s) footing the inside beam keeps the beam securely footed during the pivoting. One firefighter can individually pivot a ladder if raising the ladder alone and should heel the ladder on the inside beam during the pivot.

### **Lowering a Ladder to a Building**

Lowering a ladder to a building after it has been raised is not difficult. Care must be exercised to avoid damage to the ladder or the building. Lowering should not be done individually unless you have raised the ladder by yourself.

- **Flat Side toward Building**

If lowering a ladder individually, the firefighter should first pivot the ladder to lower in the flat position, and then lower the ladder while facing the building and heeling the ladder, allowing for good visualization of the tip of the ladder. If two firefighters are doing the raise, the second firefighter takes a position between the ladder and the building. By grasping both beams shoulder high, and facing the ladder, the second firefighter assists by pulling the ladder to the building. The firefighter in the heel position maintains a hand position about shoulder height on the beams. The heel position then assists in lowering the ladder to the building. If two firefighters are between the ladder and the building, they each grasp a beam with hands well apart and pull the ladder to the building. If two firefighters are used to heel the ladder, each grasps one beam while heeling the ladder.

- **Ladder Edge toward Building**

This operation requires a minimum of two firefighters. One firefighter assumes a position between the ladder and the building. Grasping the beam with hands just above and below shoulder level, you pull the ladder carefully toward yourself and to the building. The other firefighter faces the climbing side of the ladder and places the foot nearest the building against the inside heel/stirrup. Placing hands on the beams about shoulder height, the ladder is steadied as it is eased into the building on the beam. Both firefighters should be watching the top of the ladder. As soon as the top of the ladder rests against the building, the firefighter heeling the ladder turns the ladder down flat.

### **Positioning of Ladders**

Positioning of the tip of the ladder can change depending on the objective. There are times when ladders will need to be placed for roof access, window access, ventilation, and various other forms of work from a ladder.

### **Roof Access/ Vertical Ventilation**



For roof access, place the ladder at least 3 rungs above the edge of the roof, with 5 rungs above being preferable. This allows for more ease of getting on and off the ladder, and it also makes finding the ladder easier for egress when in low visibility conditions.

**Rescue**



When positioning the ladder for rescue or search operations, place the tip of the ladder just to the base of the window sill as shown. Be sure to enter the room feet first while trying to keep your head protected from hot gases and smoke by the side of the building. Entering head first can cause an immediate impact load on a potentially unstable floor. Be sure to sound the floor before entering and sweep for victims. Maintain firm contact with the ladder until you are ready to search a room.

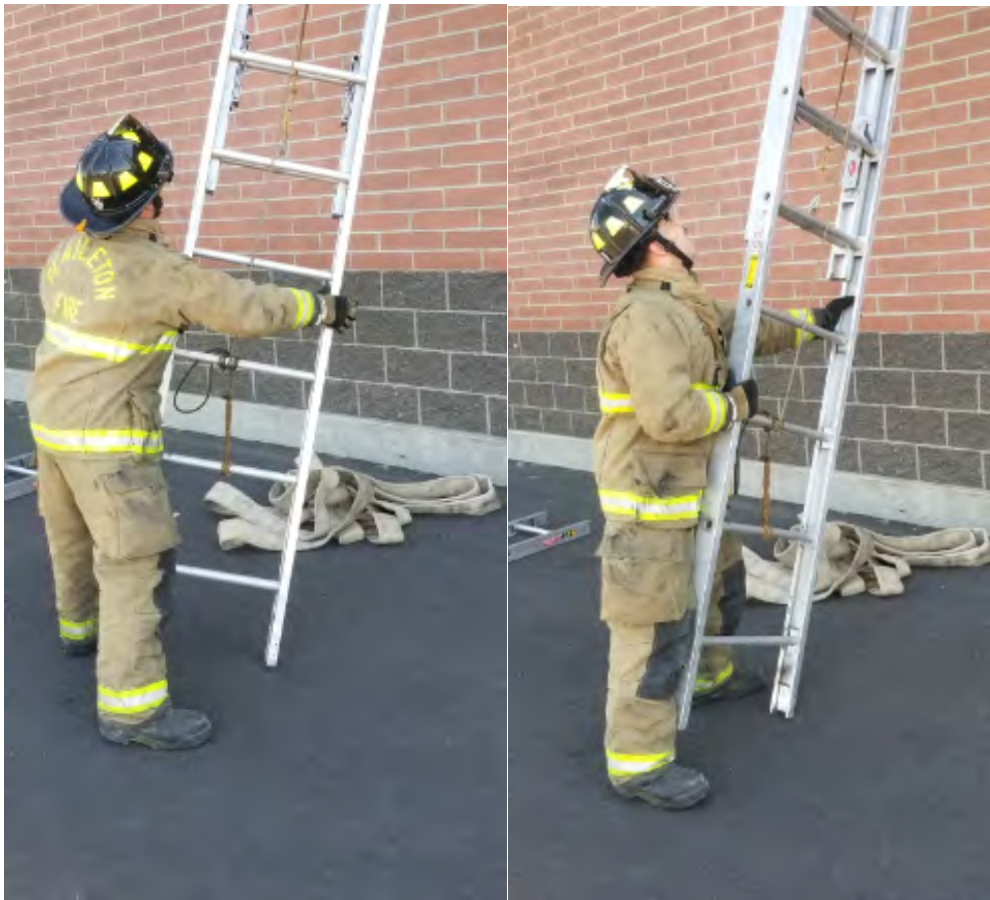
**Ventilation (horizontal)**



When positioning a ladder for horizontal ventilation, place the ladder to the windward side of the window/opening with the tip of the ladder even with the top of the opening. This will allow for protection from hot gases and smoke while working from the ladder.

### Repositioning/Rolling Ladders

When a ladder resting against a building is to be rolled or turned, your body and foot should be in front of the ladder and the heel. Hands should be placed on the beams about shoulder high as shown below. The ladder is then turned until the edge of the ladder is toward the building. You can keep pressure on the ladder with your upper body to help maintain control of the ladder. Moving your body and foot from the heel and allowing the ladder to pass in front of you completes the rolling process. As the ladder is about to reach a flat position against the building, your foot should be placed back on the heel/stirrup. This procedure can be repeated multiple times to reach a designated objective. Place your foot on the bottom rung for extra stability if necessary, and move it off the rung with each roll to let the ladder pass in front of you.



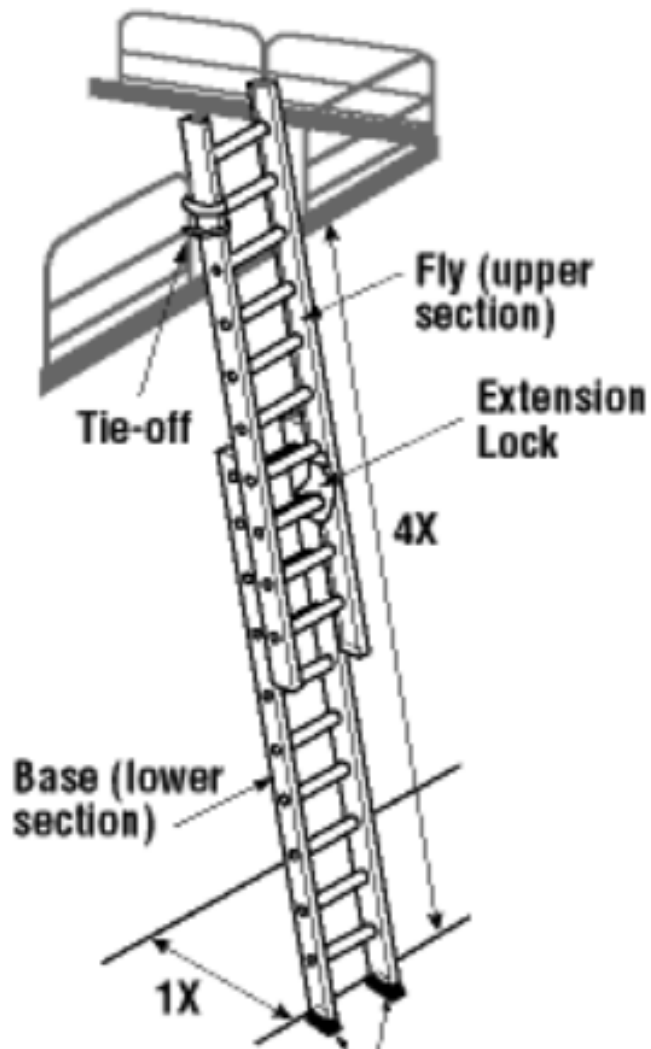
### **Adjusting the Heel/Bed Section of the Ladder**

After a ladder has been raised and placed against the building it may be necessary to move the heel of the ladder closer to, or farther away from the building, to get the proper angle for climbing. This may also be necessary when preparing to lower a long ladder. Take a position alongside one of the beams and grasp the second or third rung from the bottom with one hand and the beam or rung about shoulder height with the other. Then lift the ladder slightly and move the heel to the proper distance from the building. Two firefighters would take opposing positions, one alongside each beam. Be sure the dogs are locked.



### Tying off Ladders

When possible, tie off the tip of the ladder to a secure object with rope or webbing. The bottom rung of the ladder can also be tied off to a secure object between the ladder and the side of the building to prevent slipping. The ladder may be girth hitched and tied off to an object with a clove hitch or clove hitch on each.



### Tying off Hose/Nozzle on Ladders

Attach your hose strap to the hose line using a girth hitch about six inches behind the nozzle before ascending the ladder. Then place the nozzle and strap over the shoulder. When you reach the position on the ladder from which the nozzle is to be operated, pass the nozzle and strap through the ladder about waist high. The nozzle is secured on the rung below where you have passed it through. Make several wraps with the utility strap and either secure with a hitch, or snap the utility strap back onto itself with a carabiner. When fastened in this manner and properly adjusted, the utility strap takes all the back thrust of the nozzle while it is being operated, leaving the firefighter free to direct the hose stream.

