

Portland Fire & Rescue's 2011 Firefighter exam



Important Dates;

April 18, 2011 – Study materials available via the website

June 20, 2011 – Two-week open enrollment begins

August 1, 2011 – Written exam at the Oregon Convention Center

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Portland Fire & Rescue Training Manual



2007



Tools and Equipment

This section is intended to give assistance in recognizing or identifying tools and equipment used in the fire service and to denote the proper nomenclature of such tools and equipment. In addition to being well versed in the **Tool, Use, Maintenance and Safety**, firefighters shall know the location of all tools and equipment carried on the apparatus or in the station to which they are assigned.

The care and maintenance of tools is important. Metal tools should be kept free of rust and may be lightly oiled or painted, depending on the finish of the metal and use of the tool. Cutting edges of tools should be kept sharpened and lightly oiled. Those implements with working parts should be clean and well lubricated to allow free movement. Wooden handled tools must be sanded smooth to eliminate splinters, and finished with an approved coating. Wooden handled tools may be finished with boiled linseed oil or given two coats of a water-resistant varnish.

This section is separated into the following categories with a brief description of the tool and its use. Following these sections is a list of tool talks in alphabetical order.

- ◆ Sundry Supplies
- ◆ Hand Tools
- ◆ Hose Connections
- ◆ Portable Extinguishers
- ◆ Power Tools
- ◆ Miscellaneous Tools & Equipment
- ◆ Tool Talks



Sundry Supplies

There are numerous items carried on most fire apparatus, which are by their nature and use, considered as expendable. These supplies are largely common commercial commodities. They are obtainable from Portland Fire & Rescue's Logistics section through a system of requisitioning or are purchased on the open market. The expendable nature of such supplies requires each station to stock an adequate amount for its day to day use.

The supplies involved are so common to everyday use that recognition is assumed. Consequently, illustrations and tool talks of some of these items will not be presented.

BROOMS Brooms are utilized in salvage and overhaul work. Those that are best for this work are the warehouse type corn brooms. Although they are expendable, rinsing with water after each use will prolong their usefulness. Cleaning and drying is necessary before replacing them on the apparatus.

CHAMOIS Chamois skins are used in salvage work for wiping moisture from finished woods of furniture, counter tops and similar surfaces. They are also used to wipe down apparatus after they have been washed. Proper cleaning involves washing with soap and lukewarm water. Wring it out and stretch it to be dried at normal room temperature.

CHEMICAL LIGHT STICK Chemical lights may be used to draw attention to such things as ladder tips, standpipes, hydrants, doorways, marking equipment, a hazardous condition, etc. They are a tool to use in places where a Fusee would not be practical.

DUCT TAPE Duct tape has many uses. It has very good adhesive qualities that can aid in temporary repairs, salvage practices, etc.

FILES The need for files is understandable as an aid to maintain equipment in good repair. It is recommended that a double tapered, 7 inch, 3 corner file for filing fire hose coupling threads, and a mill bastard file to be used for tool and equipment maintenance, be carried on the apparatus.

FLARE/FUSEE These attention-getting devices, not attached to the

TOOLS AND EQUIPMENT SECTION 1

apparatus, may be classified as accident prevention items. They should be utilized when there is a need for additional warning signals, such as during a highway emergency or marking a landing zone. The most common Fusee lasts about 30 minutes.

LATH During salvage operations, lath may be utilized in the temporary repair of openings in order to protect them from the elements. Visqueen can be held in place over an opening by utilizing lath nailed over the edges of the Visqueen.

MOPS The principal use of mops is the picking up of water from floors during salvage operations. Timely and appropriate use of the mop can be a strong factor in good public relations. After their use, mops should be cleaned with soap and water, bleached, and dried before replacing on the apparatus.

NAILS Nails are useful in the various salvage tasks such as fastening lath and Visqueen around an opening. They come in various sizes and are carried in the salvage belt.

SEALANTS When the need arises to stop a leak where a wood plug would not do the job, sealants are used. Two such sealants are "Dux Seal and "Plug N Dike". Both sealants are multi-purpose sealing and caulking compounds with adhesion and shape retention. These products will seal water, air, liquid fuels, fumes and some chemicals. Depending on the circumstances one product may work better than the other.

VISQUEEN Visqueen (polyethylene sheeting) has many uses in salvage work. It is used to cover openings, divert or contain water, protect items from damage caused by fire or firefighters in the performance of their duties. It has taken the place of salvage covers in cases where an inexpensive covering can be left at the scene.

WEDGES Wooden door wedges are carried by all firefighters in their turnout gear. They are used to block doors open during firefighting operations.

WOOD PLUGS Wood plugs are normally used for plugging ruptured pipes. Plugs are constructed from softwood, and come in various lengths and diameters.

NOTES



Hand Tools

The following listing of hand tools involves those implements and devices of a more permanent nature. Care will be taken to maintain these items in proper working order.

AXES The pickhead axe was developed and is manufactured exclusively for fire fighting. It is used for forcible entry, ventilation, and overhaul work. The head of the pickhead axe has a blade, a peen, and a flat surface. Two sizes are preferred; the 4½ lb. head, which is usually carried in an axe belt, and the 6 lb. head, which is usually mounted on the apparatus. Fiberglass axe handles come in various lengths. The 4½ lb. head can have a handle length of 26" to 30". The 6 lb. head usually has a 36" handle. Flathead axes are also carried on apparatus. The flat side is used like a sledgehammer to strike other tools, such as the Halligan tool or the flat surface of another axe.

BAR, CROW This tool resembles a straight bar at one end and has a hook-like end on the other. It comes in various lengths and is used in similar applications as the wrecking bar.

BAR, HUX The Hux bar is utilized in situations requiring a prying or leverage action. However, its design makes it a more versatile tool than the crow bar.

BAR, WRECKING This straight bar has a point on one end and a flattened end on the other. The principle application of this bar is in situations requiring a prying or leverage action. Forcible entry and rescue work are the most common practical applications.

BELT, SALVAGE The salvage belt, as the name implies, is used for salvage work, most generally to secure cover protection over roof or window openings. It is provided with a shingling hatchet, hammer-stapler, a knife, and two pouches containing nails.

CUTTER, BOLT The bolt cutter is a scissors-like tool with hardened steel jaws; the leverage being provided by the handles. Bolt cutters are useful in forcible entry work. Padlocks, metal fencing, heavy wire screen, and small bars of metal gratings are typical items that bolt cutters may be used on.

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CUTTER, WIRE The wire cutter is designed for the cutting of non-energized electrical lines. The hooks on the end of the cutter provide a means of grasping the wire to control it. The handles must be properly insulated and kept clean.

DOOR OPENER, PORTLAND This tool is an adz-type tool, having a blade set at a right angle to the handle and opposite this blade, a flat end that may be struck to drive the blade. The handle end is also in the form of a blade. The principle use of this tool is in forcible entry. It is used by driving the blade into the object and then pull or push with the tool in a prying action.

HALLIGAN TOOL (with axe) This tool, like the Portland Door Opener, is a multi-purpose forcible entry tool. The halligan tool is carried with a flathead axe and together is referred to as the "Entry Set".

HOOK, CARGO Cargo hooks, or hay hooks, are useful in handling baled goods and wooden crates which must be removed from a fire or for salvage purposes. These hooks are also of great use in tearing open burned mattresses and overstuffed furniture for overhaul. The lifting of sewer inspection covers or metal covers over various types of valves located in streets are another use.

HOOK, RUBBISH The rubbish hook has a 'D' handle, fiberglass pole and a heavy metal fork on the end. It comes in various lengths and is used for overhaul work. It can also be used for "sounding" roof integrity.

PICKAROON This tool has a lightweight curved pick head about 7" in overall length with an axe type handle. It has been adopted because of its value in overhauling lumber pile fires and in removing some types of roofing.

PIKE POLE This tool has a wooden or fiberglass pole, some with a "D" handle, and a metal head having a strong spike and hook combination. The length of pike poles may vary from 3' to 16'. Pike poles have many uses but generally are utilized in ventilation and overhaul work.

SHOVELS These hand tools come in various sizes and configurations. More common configurations are the round point, square point and scoop. Handles may be long or short and made from wood or fiberglass. Short handled shovels may be equipped with a "D" handle.

SPANNERS This wrench has a jaw or socket to fit a nut, the head of a bolt, a pipe, a cap or hose coupling. It may also have a pin in its jaw to fit a hole or slot in an object. It is mainly used by firefighters on fire hydrants, fire hose couplings and fire department connections to fire protection systems. This tool is manufactured in a variety of shapes and sizes. Spanners currently used are the pocket, booster, hydrant, adjustable and foam bucket.

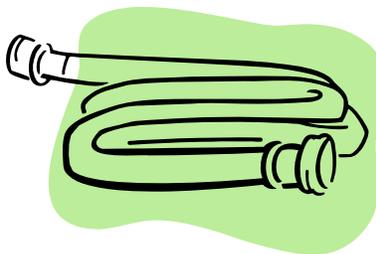
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SQUEEGEE A blade of rubber on a metal backing to which a handle is attached. It is used to push water on floors as a part of a salvage operation. A smaller version is also used to remove water from windows after being cleaned.

TUBS This two handled, galvanized tub is used primarily for removing debris during overhaul operation. It can also be used to contain water from broken pipes or after fire suppression operations.

WATER SCOOP The water scoop is a modified scoop shovel having about half of its top area covered by a metal hood. Such modification makes the scoop shovel more efficient for picking up or moving water during salvage operations.

NOTES



Hose & Hose Connections

Hose Connections include those devices that are used in conjunction with hose layouts and in the production of hose streams. The devices presented are Connections, Master Stream Devices, and Nozzles.

CONNECTIONS

It is necessary to have the means to connect hose lines, connect nozzles, or control the flow of water in hose lines regardless of how the couplings come together. This is accomplished by one of the following connections.

ADAPTERS At times, adapters may be necessary to couple our fire hose to various non-standard outlets or hydrants. The adapters normally carried are for 1½” connections and hydrant steamer ports.

DOUBLE CONNECTIONS These are used whenever it becomes necessary to connect two female or two male couplings together. All of our engines carry double male and double female connections in both 1½” and 2½” sizes.

EDUCTOR, FOAM Foam eductors are used in conjunction with a foam nozzle or fog nozzle. The foam eductor extracts foam concentrate from 5 gallon buckets to the nozzle, at a desired percentage. The foam eductor has 1½” connections and must be thoroughly cleaned after each use.

FIVE INCH HOSE CONNECTIONS Five inch hose and specific connections are generally carried by outlying engine companies.

GATE, CHAPMAN The Chapman gate takes several turns of the handle to operate. This is an advantage when precise control of water flow is important. The primary use of these gates is during the annual hose test.

GATE, MORSE The Morse (ball-type valve) gate is the most prevalent gate used in the Fire Bureau. It needs only a quarter turn to open and close.

GATED WYE This device is used to divide a single line into two or more lines. The most common wye is used to reduce a large line, usually a 2½”, into two smaller 1¾” lines. The outlets on wyes are normally equipped with ball valve gates.

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REDUCERS These connections are used to connect two different sizes of hose or fittings. The most common is the bell reducer that has 2½" female threads and 1½" male threads. Another common reducer is used to connect a hydrant steamer port to 2½" hose. Reducers can also be reversed to increase the size from 1½" to 2½".

SIAMESE Siamese are used to supply one large line by two or more smaller lines. These connections are usually equipped with clapper valves to prevent loss of water from a disconnected line. One use of siamese connections is in supplying lines to ladder pipes.

MASTER STREAM DEVICES

Master stream devices are nozzles capable of delivering water in quantities greater than what could be controlled by firefighters without mechanical aid. The two basic categories of master stream devices are portable and permanently mounted. The method used to supply these devices usually depends upon how they are mounted. Portable devices can be supplied by hose lines or preplumbed from the pump, while those that are permanently mounted are connected to built-in piping systems.

LADDER PIPE Ladder pipes are intended to be clamped to the top rungs of an aerial ladder for use any time that an elevated stream is desired. A 3" line laid up the center of the aerial ladder supplies them.

MONITOR Monitors are sometimes referred to as Deck Pipes. They are permanently mounted turrets, usually with gear operation for horizontal and vertical motion. Monitors are mounted on the fireboats.

TURRET, PORTABLE These devices are intended for producing large streams from any point on the fireground. Portable turrets may also be operated from their deck-mounted position on the apparatus in order to be quickly placed in service or to gain some height advantage. When operated from the ground they usually require at least two 3" supply lines.

NOZZLES

There is considerable history behind the development of modern fire service nozzles. Research and experimentation continually brings improvement to the production of hose streams. Nozzles currently in service vary in size and design.

APPLICATOR The term applicator refers to a device that is attachable to 1¾" nozzles or a booster hose for the purpose of applying hose streams beyond the accessibility of the firefighter. Applicators are constructed of metal tubing and vary in size and length. The ends are tooled to accommodate being connected to a nozzle, and a tip (spud) which is pierced with a number of holes to provide a spray stream.

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DISTRIBUTOR, ACKWOOD The Ackwood distributor is constructed of 1½” brass tubing approximately 3 feet in length and is equipped with an 1½” female connection. When properly supplied from a 2½” line, it will deliver approximately 460 GPM at 100 PSI nozzle pressure. This distributor requires a two inch hole for insertion and will cover an area of approximately thirty feet.

DISTRIBUTOR, BRESNAN The Bresnan distributor is a circulating nozzle equipped with a 2½” female connection. It can be lowered through an eight inch hole, and with 80 PSI nozzle pressure will produce approximately 250 GPM. It will also cover an area of approximately thirty feet in diameter.

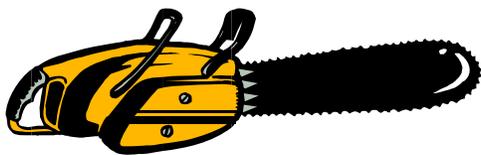
FOAM NOZZLE A nozzle specifically designed to generate foam. This nozzle is used in conjunction with a foam eductor to produce the desired percentage of foam. Although fog nozzles can be used to generate foam, foam nozzles, when used properly, will produce a much better product.

FOG NOZZLE Fog nozzles are available in a variety of sizes, shapes and types. Fog nozzles can be adjusted from a wide fog pattern to a straight stream. In addition, fog tips are available for operation on ladder pipes, portable turrets and monitors.

PIERCING NOZZLE This nozzle is designed to be driven through walls by striking the blunt end. The tip is in the shape of a wedge and can be driven through ordinary constructed walls, cinder block walls, and roofing. It has a 1½” female connection. The water discharges from holes drilled in the tube just behind the wedge-like tip.

STRAIGHT TIP NOZZLE Straight tip nozzles produce streams that are powerful and have a long reach. These nozzles are normally carried in 1½” and 2½” sizes. Straight tips are available for use on ladder pipes, turrets, and monitors. Straight tip nozzles all have removable tips to allow for varying the size of the tip or to extend a hose line from the nozzle shut-off.

NOTES



Power Tools

There are many occasions when firefighters benefit by utilizing power driven equipment. The power furnished for this equipment is from electric motors, compressed air, or internal combustion engines. For these units to be capable of providing their intended function, it is necessary to provide proper care, maintenance and to be knowledgeable in their use.

It is recommended that during the weekly check, internal combustion engines be run for a short period of time, and then checked for fuel, oil level and any malfunction.

AIR HAMMER This tool is also referred to as the Air Chisel. It is most often used for vehicle extrication when sheet metal needs to be removed for access to patients inside a vehicle. The Air Hammer's regulator is attached to a common S.C.B.A. bottle and the pressure set according to the type of bit used.

CHAIN SAW The chain saw is primarily used for ventilation and wildland fire operations. It consists of a 20" cutting bar, carbide tipped cutting chain, and is powered by a two (2) stroke engine that runs on mixed fuel.

ELECTRIC FAN The standard electric fan is used for ventilation operations either in a negative or positive pressure mode. The fan is equipped with hooks for hanging the unit above ground, an extension cord and a 1/3 horsepower motor that can be operated from any 110-volt power source. The SuperVac P-164SE used by PF&R moves approximately 3200 to 5200 cfm depending upon placement. Some larger fans will typically move up to 9500 cubic feet of air a minute.

FLOATING PUMP The floating pump is used to supply water from ponds, rivers, swimming pools, etc., when normal hydrant supplies are inaccessible or not available. It is powered by an eight (8) horsepower, two (2) cycle engine and will supply one 1 $\frac{3}{4}$ " line with sufficient pressure for fire fighting.

GAS FAN The gas fan is used for positive pressure ventilation operations. It is powered by a 5.5 horsepower, four stroke engine that runs on unleaded gas. This fan can be expected to move up to 8,500 cubic feet of air each minute (CFM).

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GENERATOR The electrical generators used in the fire service are capable of supplying emergency electrical energy. These units are often used in firefighting activities to provide electrical energy where none is available. They are driven by air-cooled, governor throttled engines, generally of the four (4) cycle variety, either gas or diesel. Power output of most of our generators is 110-volt, A-C with a power range of 1,500 to 7,500 watts.

HURST TOOL The Hurst Tool, also known as the "Jaws of Life", is primarily used in extrication operations. The name refers to one general application although there are several devices involved including the "spreader", the "cutter", and the "ram". The Hurst Tool can be powered either by a gasoline engine or in some cases by 110-volt electrical energy supply.

ROTARY SAW The rotary saw is a circular cutting device. It is used for forcible entry and ventilation operations when it is necessary to cut through metal or other hard materials. It consists of an extension frame, spindle and pulley, vee-belt, centrifugal clutch and drive pulley that are powered by an air-cooled, hand-throttled engine of approximately six (6) horsepower. An assortment of twelve (12) inch cutting blades is available for cutting through wood, masonry, and/or metal.

SAWZALL The Sawzall is a reciprocating saw used for extrication, ventilation, and other cutting operations. It operates off of a 110-volt power supply and comes with a variety of blades for cutting through different materials.

WATER VACUUM A device used to remove water during salvage operations. It consists of a backpack type harness, 110-volt electric motor, and a holding tank with a capacity of approximately five to six gallons.

NOTES



Portable Extinguishers

All Portland Fire & Rescue apparatus carry portable fire extinguishers. The appropriate choice of portable fire extinguisher used for a fire attack depends upon the type and quantity of material that needs to be extinguished. It is important that all firefighters be knowledgeable in the different types, classes, correct usage, maintenance, and safety of these extinguishers.

Fires are classified into five (5) classes. They are described below:



Class A – Ordinary Combustibles – Green Triangle
Class A fires are fires that involve ordinary combustible materials such as cloth, wood, paper, rubber, and many plastics.



Class B – Flammable Liquids – Red Square
Class B fires are fires that involve flammable and combustible liquids such as gasoline, alcohol, diesel oil, oil-based paints, lacquers, etc., and flammable gases.



Class C – Electrical Equipment – Blue Circle
Class C fires are fires that involve energized electrical equipment.



Class D – Combustible Metals – Yellow Star
Class D fires are fires that involve combustible metals such as magnesium, titanium and sodium.



Class K
Class K fires are fires that involve vegetable oils, animal oils, or fats in cooking appliances. This is for commercial kitchens, including those found in restaurants, cafeterias, and caterers.



PASS is an acronym that is used for the proper operation of an extinguisher. The four steps are; **P**ull the pin, **A**im the nozzle, **S**queeze the handle, **S**weep the base of the fire.

WATER EXTINGUISHER

Tool:

- Components:
 - Cylinder
 - Secured safety pin
 - Hose with nozzle
 - Handle with squeeze trigger
 - Pressure gauge
- Pressurized with compressed air
- 2 ½ gallon @ 100 psi

Use:

- Extinguishes Class A fires only
- Extinguishes by cooling
- Reach of 30 to 40 feet
- Check label on extinguisher to verify rating
- Use “PASS” acronym to discharge
- Pressurized water extinguishers are referred to as “pump cans”, are 2½ gallons in size and are pressurized to 100 psi. They have a rating of 2A. The water can be discharged in a straight stream or by placing a finger partially over the discharge outlet to achieve a semi-fog pattern.



Maintenance:

- Check cylinder for external damage or corrosion
 - Check condition of hose and nozzle
 - Check to ensure safety pin is intact
 - Check condition of squeeze trigger
 - Mark with Company number or apparatus number if on reserve apparatus
 - Hydrostatic test every 5 years (by certified extinguisher technician)
 - Add 2 tablespoons Silv-Ex when refilling. When filling, fill 90% with water, add Silv-Ex, replace top hand tight, pressurize to 100 psi
- (Note: 3 teaspoons = 1 tablespoon, 2 tablespoons = 1 oz)

Safety:

- Full PPE
- Use the buddy system.
- Never turn your back on the fire in case of re-ignition.
- Approach uphill/upwind if possible.
- Use appropriate extinguisher for the job.

DRY CHEMICAL EXTINGUISHER

Tool:

- Two types: B:C and multipurpose A:B:C
- Pressurized with nitrogen or CO₂
- Components:
 - Cylinder
 - Gauge
 - Hose with nozzle
 - Safety seal & safety pin
 - Handle with squeeze trigger
 - Maintenance tag



Use:

- Can extinguish A:B:C fires (if so rated)
- Reach of 5 to 20 feet
- Size and rating varies, check the label
- Extinguishes by interrupting chemical chain reaction
- Pressurized with nitrogen or CO₂. The pressure gauge only indicates the pressure inside the extinguisher.
- Application should start at the near edge and with a rapid sweeping motion progress forward.

Maintenance:

- Check cylinder for external damage or corrosion
- Check gauge; should be in "green". High or low pressure indicates service is needed.
- Check condition of nozzle and hose
- Check working condition of squeeze trigger and that safety pin & safety seal are intact
- Visually inspected yearly by certified extinguisher technician and recorded on the red inspection tag
- Serviced every 6 years by certified extinguisher technician
- Hydrostatic test every 12 years by certified extinguisher technician
- Invert and shake extinguisher once a month to prevent caking
- Insure 'PFB' marking is clearly visible

Safety:

- Wear full PPE and use the buddy system
- Never turn your back on the fire in case of re-ignition
- Approach uphill/upwind if possible
- Use appropriate extinguisher for the job

CARBON DIOXIDE EXTINGUISHER

Tool:

- Seamless steel cylinder
- Hose with nozzle and fog horn
- Handle with squeeze trigger
- Safety pin & safety seal
- Maintenance tag
- CO₂ stored as a compressed gas in liquid form

Use:

- Extinguishes B:C fires
- Extinguishes by displacing oxygen and smothering the fire
- Has a reach of approximately 3 to 8 feet
- Size and rating varies.
- Use “PASS” acronym to discharge
- Application of this product should start at the near corner and with a slow sweeping motion progress forward. Discharge is in the form of a gas with a limited reach.

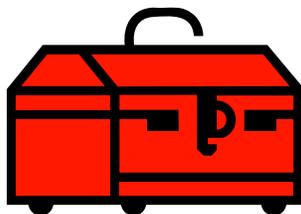


Maintenance:

- Check cylinder for external damage or corrosion
- Check condition of hose and nozzle
- Weigh the extinguisher monthly. If the weight of the extinguisher does not equal the full weight, send extinguisher in for service.
- Check safety pin & seal to insure they are intact. If not, weigh extinguisher. If the weight of the extinguisher does not equal the full weight, send extinguisher in for service.
- If the seal is intact and the red service tag indicates the need for annual service, send it in to a certified extinguisher technician.
- Hydrostatic test every 5 years by certified extinguisher technician. Date for hydrostatic testing will be determined by the extinguisher technician during annual service.
- Insure 'PFB' marking is clearly visible

Safety:

- Full PPE
- Use the buddy system.
- Never turn your back on the fire in case of re-ignition.
- Approach uphill/upwind if possible.
- During discharge, the horn gets cold – wear gloves to prevent frostbite
- Use appropriate extinguisher for the job.



Miscellaneous Tools & Equipment

Listed below are a few of the many tools and equipment that Portland Fire & Rescue apparatus carry that are not listed in the previous categories.

BACKBOARD A specially built wooden or molded plastic board with cut out handholds and straps attached. Used for assistance in first aid procedures and rescue operations.

BLANKET, FIBERGLASS A fire containment blanket that is used to remove burning mattresses, bedding, upholstered furniture, etc., from a building without spreading smoldering debris. It is 9' X 12' in size and has handles and strapping sewn into it. Care of this blanket can be summed up in one word, GENTLE! It should be swept gently to remove particles.

CLAMSHELL A backboard that is built to break down into two parts when it becomes necessary to place a patient on a board with the least amount of movement. The clamshell can be adjusted for length and comes with straps.

CHAFING PADS A pad that is utilized to prevent damage to vibrating fire hose at points where it touches the ground near the pump. Chafing pads can be made from a section of tire equipped with strap and buckle to hold it to the hose.

EXTENSION CORDS Extension cords are used to bring electrical power from a remote source to the power tool. The most common extension cord is found on a reel, mounted on truck apparatus with 100' to 150' of cord.

FLOOR RUNNER A floor runner is a scrap piece of tarp that is used to cover and protect flooring during overhaul and salvage operations.

HOSE CLAMP Hose clamps are used in conjunction with many hose evolutions. The hose clamp resembles a large pipe vise. The jaws or compression pieces are straight bars and will accommodate 3" fire hose. The clamp is hinged and has a spring snap lock on the opposite side making it easy to open and close quickly.

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KEY, GAS AND WATER This combination key will fulfill the functions of a gas shutoff key and a water shutoff key. The key is constructed from heavy metal and has a "T" handle. It breaks down into two pieces, each piece having an end to either accommodate a gas or water shutoff valve, domestic or commercial fittings.

LADDER BLOCK Whenever ladders are placed on uneven ground, these wedge shaped blocks may be placed under a ladder stirrup for stabilization.

LIFE JACKET The life jacket is a flotation device worn when working around water. It is generally worn on the inside of the turnout coat.

LIGHT, PORTABLE Most fire apparatus carry an assortment of electrical adapters, extension cords and lights that are used in firefighting activities. This lighting equipment is dependent on electrical power from the fire building, from a portable generator or from the battery powered outlets mounted on the apparatus.

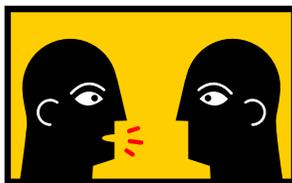
PIGTAIL A pigtail is a term used to describe a device that plugs into the end of an extension cord to provide two or more receptacles. This device is often found at the end of an extension cord on the cord reel mounted on trucks.

SALVAGE COVER Salvage covers carried on PF&R apparatus are 12' x 18' in size with grommets spaced every 16" around the edges. They are primarily used for salvage and overhaul work. Care should be taken to clean and refold the salvage cover after each use. Firefighters are encouraged to use Visqueen whenever possible due to the expense of replacing salvage covers.

SPRINKLER KIT The sprinkler kit is composed of an assortment of sprinkler heads, stops and wrenches which are utilized in salvage operations.

UTILITY STRAP The utility strap is carried as part of the turnout uniform. The utility strap, sometimes referred to as a hose strap, has many uses, one of which is in controlling handlines.

NOTES



Tool Talk Information

Tool Talk Organization

The following is an outline of commonly used tools, nozzles, and appliances. They are organized in the TUMS format. Listed below describes the TUMS format and outlines aspects that apply to nearly all of the various tools. Apply appropriately to the tool being considered. This list of tool talks is not a complete list of tools carried on apparatus. Each firefighter is responsible for knowing how to use and maintain every tool carried on the apparatus they are assigned.

Tool:

- ❖ A brief summarization of the tool and its components

Use:

- ❖ A summarization of the uses, advantages, disadvantages, utilization procedures, specifications, and suggestions for the tool

Maintenance:

- ❖ Check for damage
- ❖ Keep clean, in good condition, and free of debris
- ❖ Keep free of rust with -00- steel wool; apply a protective coating of oil or paint
- ❖ Polish if necessary
- ❖ Paint as needed
- ❖ Keep wood surfaces splinter free, sanded, and coated with boiled linseed oil
- ❖ Keep well marked with company or apparatus number
- ❖ For any repairs or replacement parts, initiate a form 500.36 to logistics

Safety:

- ❖ Wear full PPE, which may include SCBA, eye and ear protection, and BSI
- ❖ Work with a partner
- ❖ Use clear and concise communication
- ❖ Tool is in good working order
- ❖ Be aware of your immediate surroundings for hazards and people
- ❖ Use good lifting techniques
- ❖ Use caution when carrying the tool as to not hurt yourself or other

Helpful Hints:

1. Describe the tool
2. Some tools have common uses (i.e., ventilation, overhaul)
3. Explain daily, weekly and monthly checks and maintenance where applicable
4. Safety considerations will be the same in most cases (i.e., PPE, gloves)
5. Keep the tool talks short and to the point, but be thorough
6. Know the tools; you won't be able to slide something by your evaluator. They have heard it all before
7. Be able to answer questions about the tool

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INTRODUCTION TO ROPES AND KNOTS

The fire services, long ago, accepted rope as an important and necessary item of equipment carried on emergency apparatus. To utilize rope to maximum advantage it is essential that firefighters acquaint themselves with its construction, its care and maintenance, and knots suited to emergency operations. In conjunction with rope information, other rope rescue equipment such as webbing and hardware will be discussed in this section. Also, a simple lowering or raising system will be explained using the rope rescue equipment found in the rope bag carried on Portland Fire & Rescue engines.



CONSTRUCTION

While there are many terms used by the manufacturers of rope, familiarity with three of these terms should serve the purposes of this manual. These terms are fibers, yarns and strands. Rope is constructed by use of strands; strands are made up from yarns, and yarns are constructed from fibers.

Rope fibers come from many varied sources and have a bearing on the strength, weight, elasticity, life and buoyancy of the finished rope. Generally, rope-fibers can be classified into two categories, natural fibers and synthetic fibers. Typical natural fibers are manila, sisal, Italian hemp and cotton. Some synthetic fibers used are nylon, Orlon, polyester (Dacron), polyethylene and polypropylene.

Studies have found that when natural fiber rope, such as manila, gets wet, its tensile strength is reduced by 50%, no matter how well it is dried afterwards. Even when properly stored, manila rope will lose 10% of its strength per year.

Lab tests also have shown that manila starts to disintegrate at temperatures above 200°F. Nylon and polyester, on the other hand, show little effect until temperatures reach the range of 300 to 400 degrees Fahrenheit.

Some synthetic rope such as polyethylene and polypropylene, have the ability to float. This makes these kinds of rope excellent for water rescue emergencies.

ROPES AND KNOTS – SECTION 3

After the yarn is prepared it may then be processed into laid, braided or kernmantle rope. These types of rope construction are described below.

Laid Rope

Strands are formed from two or more yarns depending on the size of the finished rope, the number of yarns being the determining factor. A strand is usually one-third of a rope, although four strand ropes are also made.

The strands also have a permanent twist imparted in a direction that is opposite to that of the finished rope. This reversing of twists with each step in rope making is necessary to maintain the rope's structure.

The lay of rope is the direction in which the strands are twisted. Most rope is "right-laid". The strands spiral upward to the right when the rope is held vertical.

Braided Rope

Braided rope is constructed by braiding the strands together, usually around a central core. The purpose of a central core is to act as a "former" to keep the rope uniform in shape.

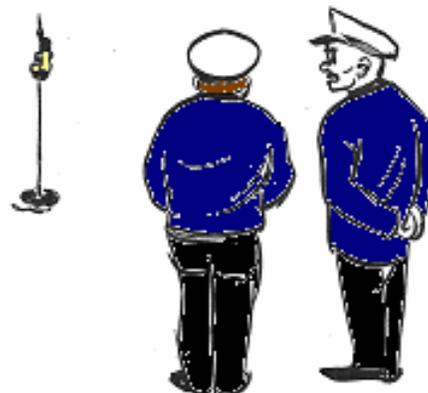
A central core constructed of short strands adds strength only in that undesirable stresses are avoided by maintaining rope uniformity.

The central core contributes to the strength of a braided rope in cases where the core is of the same construction as the outer portion, hence, braid on braid rope.

Kernmantle Rope

Kernmantle rope is constructed of an inner core or kern, covered by a woven outer sheath or mantle. The kern is made up of fibers running through the whole length of the rope. These fibers make up 70 to 90 percent of the ropes strength. The mantle is a woven outer sheath that surrounds the kern to protect it from abrasion and other injuries.

There are two types of kernmantle rope, "dynamic" and "static". Dynamic ropes are designed to stretch to reduce the impact load on a falling climber. Dynamic ropes stretch 40 to 60 percent at their breaking load. Static is the type of rope used for rescue. The stretch of most static ropes is around 2 percent at their working load and up to 20 percent at their breaking point.



"Aren't you carrying this rope practice a bit too far."

CARE AND MAINTENANCE OF ROPE

The best service from rope may be obtained by following the basic principles of care as outlined in this section. Since it is not feasible to test rope properly in the field, rope that has been in service for some time should be considered to be weaker than in its original condition. Constant inspection and good care will bring about the longest life and best service from rope.

Care of Synthetic Rope

Since all fibers of a rope contribute to its strength, try to avoid running rope around sharp corners or angular bends, and dragging it over rough, dirty, gritty or splintered surfaces. Pad these areas if they can't be avoided.

When bending a rope, the radius that the rope is bent around should be at least three or more times the diameter of the rope.

When pulling on a rope use a steady pull, not sudden jerks.

Do not walk on rope. The impact of a shoe grinding dirt particles into the rope can seriously damage its fibers.

Although synthetic rope is not subject to mildew, precautions are necessary to keep rope dry or if wet, to thoroughly dry it before storing.

Maintenance Of Synthetic Rope

If the rope is very dirty, it can be washed in a front loading, nonplexi-glassed windowed, washing machine (glass windowed is OK). Soap such as Ivory Snow can be added (not a detergent or

soap containing chlorine bleach). The rope should be placed in the washing machine in the same manner a roof rope is stored on the rig, chained.

Synthetic rope should be cut with a hot knife. If a hot knife is not available, melt the end together after the rope is cut making sure that the melted portion of the rope is shaped like a bullet, not like a mushroom.

Remove all kinks or knots and store in a dry, well ventilated room. Keep loose coils off the floor, preferably on a wooden peg.

Never treat a rope. A good rope is properly lubricated by the manufacturer for its useful life.

Do not store rope:

- with petroleum products, corrosives, acids, chemicals, or any equipment that may produce vapors of these products.
- with items that may cause mechanical damage.
- next to heat sources.
- with sharp bends in it.
- in direct sunlight.
- where it may contact concrete.

ROPES AND KNOTS – SECTION 3

Inspection of Synthetic Ropes

Rope should be inspected after every use and especially after it has been loaded.

Slide the rope through one's hands and feel for:

- any change in texture, stiffness or diameter such as an "hourglass" effect.
- abrasion of the sheath.
- hard spots.

Examine rope visually for:

- exposed core fibers (white in most static ropes) pulled through the sheath or exposed from abrasion or damage to the sheath.
- discoloration. An obvious change from the ropes original color, particularly brown, black, or green, could indicate chemical damage.
- glossy marks. These could indicate heat fusion damage.
- contamination with unknown substances.

Retiring Rope

When rope has reached the point that its useful life is over, or it has been loaded and the safety or strength of the rope is unsure, it needs to be replaced and the original should be retired.

A rope should be retired when:

- one or more defects are found when inspecting it.
- more than half of the outer sheath yarns are broken.
- the rope has been subjected to shock loading.
- the rope has been subjected to the kind of overload for which it was not designed, such as towing a vehicle.
- the ropes diameter and texture is not uniform throughout the length.
- the reliability of the rope is suspect because of the amount of use, age or suspected damage.



KNOTS

Emergency situations requiring the use of rope and securing knots occur with sufficient frequency as to warrant adopting a set of appropriate knots. The following knots have been selected as being of value to firefighters performing emergency and routine duties. It is strongly recommended that firefighters practice the listed knots often enough to

develop confidence, dexterity and speed. For the purpose of simplification, all bends, hitches, etc., will be referred to as "knots". The knots have been broken down as to when firefighter recruits are responsible for, and evaluated on them. All these knots are demonstrated on a DVD provided to each recruit and fire station.

ACADEMY MIDTERM

Girth Hitch
Simple Hitch
Half Hitch
Clove Hitch
Bowline
Quick Release Knot
Square Knot

ENGINE FINAL

Double Fisherman
Prussik Hitch
Muenter Hitch around object
Muenter Hitch with Carabiner
Water Knot
Webbing Harness or Hasty Harness
Daisy Chain for Webbing

ACADEMY FINAL

Half of a Double Fisherman
Figure 8
Follow Through Figure 8
Figure 8 on a Bight
Double Loop Figure 8
Inline Figure 8

TRUCK FINAL

Trucker's Knot
Becket Bend
Figure 8 Bend
Handcuff Knot
Daisy Chain around Coiled Rope

ADDITIONAL KNOTS ON DVD

Butterfly Knot
Taut Line Hitch
Electrician's Coil or Cable Coil

PROCEDURES ON DVD

Keenan's Hose Loop
35' Extension Ladder Knot
Tensioning Operations

THE SAFETY KNOT

Ropes made of synthetic fibers are more slippery than natural-fiber ropes making it necessary to back up some knots with a safety knot. The safety knot will prevent the "working end", or "bitter end", from backing or slipping out of the knot. When dressing the safety knot, draw it up against the main knot.

TERMS USED IN KNOTTING

Working end, or bitter end, is the end of the rope used in forming the knot.

The standing part is the inactive length of the rope between the working end and the running part.

Running part is the part of the rope that is used for work, such as pulling or hoisting.

A bend is a knot that joins two rope ends together.

A hitch is a knot that attaches a rope directly to an object. It has to be wrapped around something to keep its form.

The bight is formed by bending the rope back on itself but does not cross.

A loop is made by crossing the end over or under the standing part.

A turn is the same as a loop with the rope passing around an object.

A round turn is taken by looping the rope twice around an object.

Setting or drawing up a knot is tightening a knot slowly and evenly to make sure that the knot keeps its place and shape.

Dressing a knot is making sure that the rope is arranged in proper position, so as to maximize the strength of the knot. Dressing makes it easier to see that a knot is tied correctly and increases the strength of the knot.

Loading the rope is when pressure of a load is applied to a knot or the end of a rope or both. Improper loading could result in a knot failure. When loading the rope or knot, it should always tighten the knot, not pull it apart.

LOW ANGLE ROPE RESCUE

The purpose of low angle rope rescue is to provide training, equipment and procedures to assist first responding companies in a wide range of lowering, raising and rope tensioning systems to provide safety and recovery in support of the PFB mission.

Low angle is defined as any sloped surface a firefighter can travel up or down using the surface as primary means of support.

High angle is a surface or a slope that the firefighter's full weight will be borne by the rope at any time.

ROPES AND KNOTS – SECTION 3

Equipment

Each engine company has been issued a low angle rope bag. This kit contains the following equipment:

- 1 Rope 200'
- 1 Anchor Strap 12'
- 2 Red Webbing 15'
- 1 Yellow Webbing 15'
- 2 White Webbing 20'
- 2 Green Prusik Sling
- 2 Red Prusik Sling
- 1 Prusik minding pulley
- 5 Carabiners

Safety

Safety is the primary concern of rope rescue operations. The equipment and procedures provide a safety factor of 10 to 1. Safety is also provided by the use of the prusik minding pulley in conjunction with a prusik on the rope. This procedure is an automatic stop or "belay device". The green prusik is used with the prusik minding pulley (PMP).

Anchors

An anchor is any structurally sound object that will bear the load. Anchors are classified as NATURAL or VEHICULAR. Natural anchors are those that are already in place and not moveable. These include trees, utility poles, guardrails, etc. Vehicular anchors mostly refer to fire apparatus. Vehicles can provide a sound and convenient anchor because they can be parked and positioned to best suit extrication purposes. They must be parked with the brake set, wheels

blocked and insured that they are not driven away during the rescue operation. The primary places to attach an anchor strap to the rig include wheels, aerial ladders and towing hooks. Judgment, discretion and experience must be used when choosing places to anchor.

Lowering Operations

To maintain a high degree of control during lowering operations, a Munter hitch is used. The Munter hitch creates friction and can be used in a wide-range of applications. The Munter is usually attached to a carabiner or tied around an object. The Munter hitch only provides friction. Its only use is during lowering.

Raising Operations

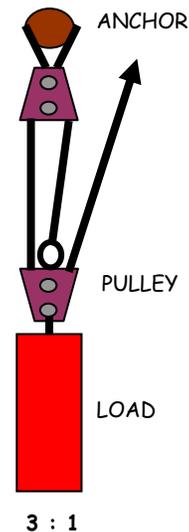
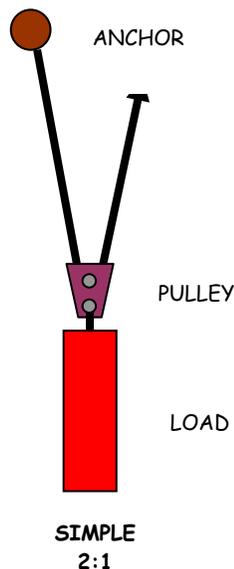
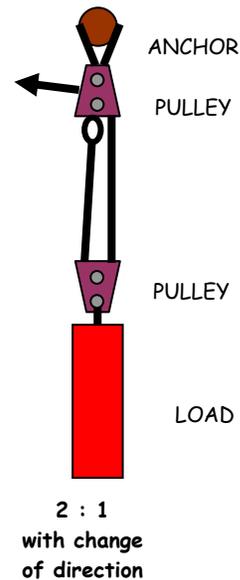
When raising loads, a simple 1 to 1 straight pull is usually sufficient due to manpower availability. The rope will still be routed through the prusik minding pulley, and the pulley will allow the pull to be in the most convenient direction. If the haul team needs to take another purchase of rope, the prusik will automatically grip and hold the load. If the haul team has difficulty raising the load, more personnel can be called or a 3 to 1 pulley system can be implemented. This will require additional equipment.

Tensioning Operations

Some operations will require the use of a non-moving tensioned rope. These include MPS, MCI on a low angle slope or as a personal restraint rope for edge

ROPES AND KNOTS – SECTION 3

people on an exposed area. Individuals wearing a sit harness are attached to the rope with a prusik. This allows movement along the rope by the individual while preventing an accidental fall. Tensioning systems are accomplished by securing one end of the rope to an anchor with a high strength tie off. A minimum of 3 wraps in generally sufficient; however, more wraps may be needed on smooth or small diameter objects. Wraps should spiral downward. The end of the rope has a “figure 8 on a bight” tied in the end, which is clipped onto the tensioned rope with a carabiner. The other end of the rope passes through the prusik minding pulley with a prusik that is attached to an anchor.



FINISHED KNOTS

Girth Hitch

The girth hitch is a standard knot used to attach a loop (sling or rope) to some anchor. Very easy to do, it can be done even if both ends are tied. Both ends should have the same load; otherwise it will not be reliable.



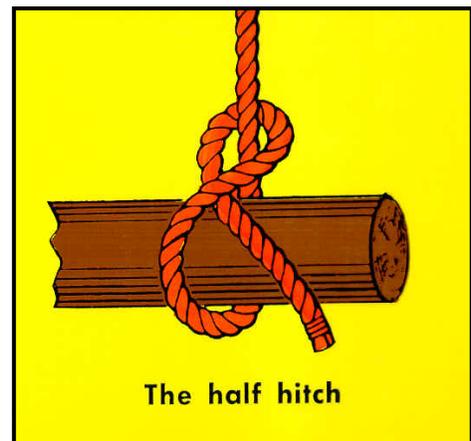
Simple Hitch (*not* Half Hitch)

AKA: Single Hitch. A simple hitch is used in between two knots to better secure the rope to an object.



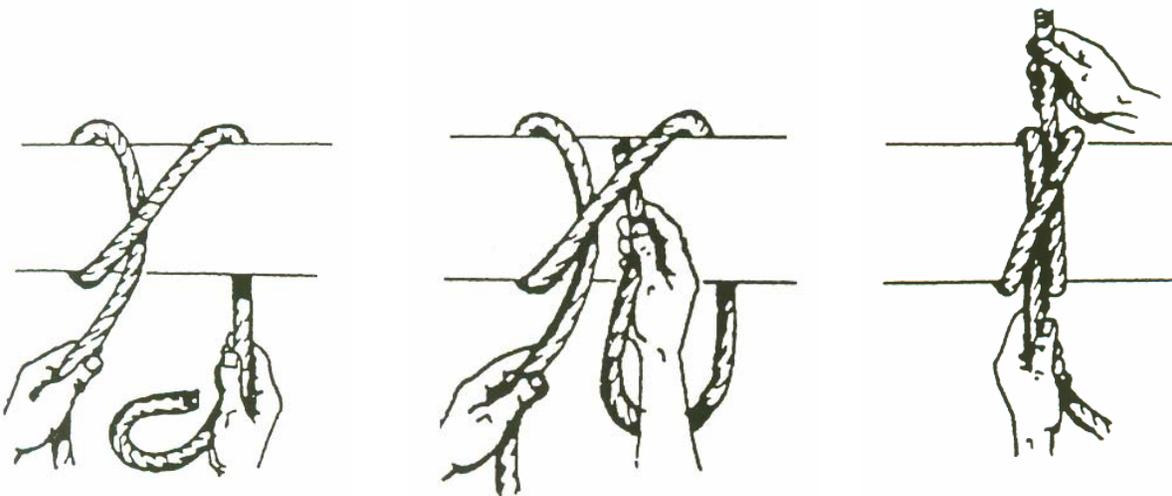
Half Hitch or Safety Knot

The half hitch is the start of a number of other hitches and is useful all by itself as a temporary attaching knot. Although this is probably the simplest knot of all, you have to be a skilled knot-tier to know how to tie and use it in a safe way. The loose end of the rope is nipped against the object and the standing part. The best nip is obtained against an edge or shoulder. If the load is released and the standing part shaken, the hitch is spilled instantly.

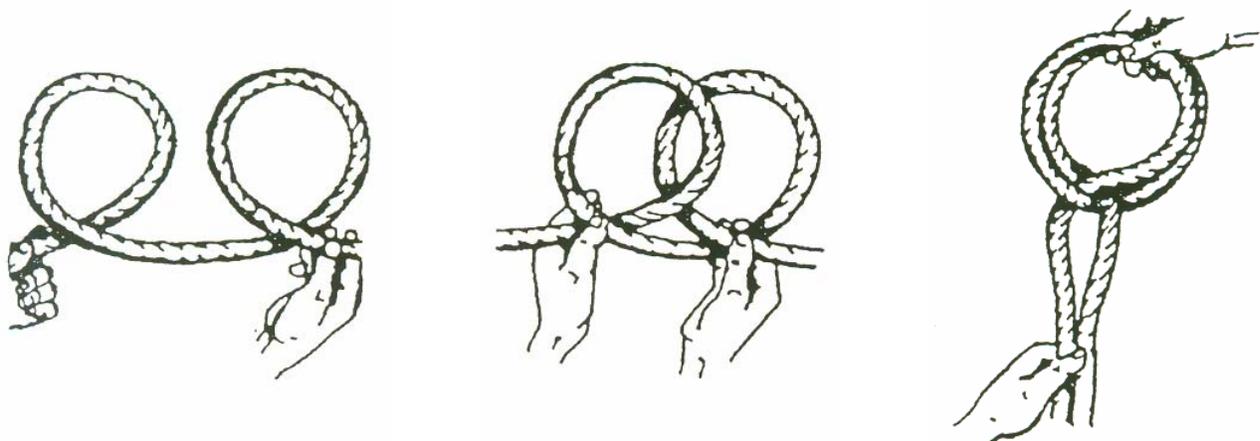


Clove Hitch

The Clove Hitch has many uses, including equalizing anchors. Without extra support, it is an untrustworthy knot in most situations. Back it up with a half-hitch for security if tied at the end of a rope.



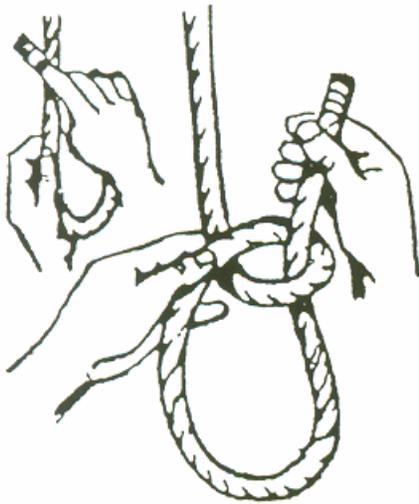
(Clove hitch on the end of a rope)



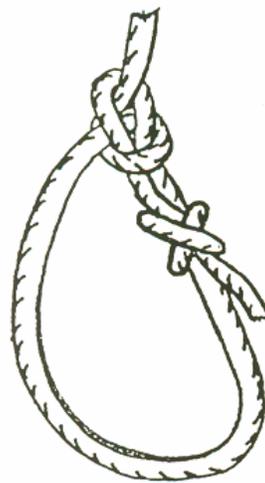
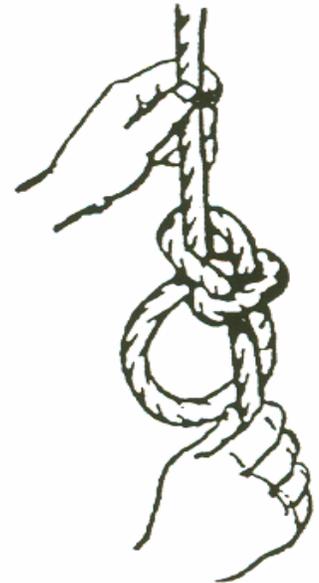
(Clove hitch in the middle of a rope)

Bowline

The Bowline Knot is one of the most used loop knots. It was once known as the king of knots because of simplicity, security, and its relationship with tensioning systems. The bowline is used to form a loop in a rope. It can be tied in the hand or tied to an object. This knot should be secured with a half of a double fisherman or safety knot.



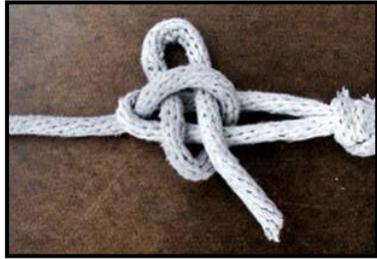
(Bowline)



(Bowline with a safety)

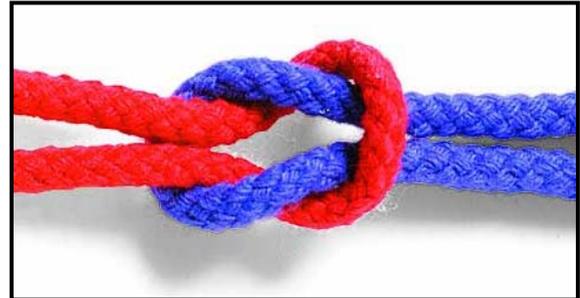
Quick Release Knot

The quick release knot is used to secure items for quick deployment such as the hotel bundle.



Square Knot

The square knot is only useful in simple applications. It is easily tied and will not jam, so it is always easy to untie. Sailors used it for binding rolled sails. When tied properly it will have a square look to it.



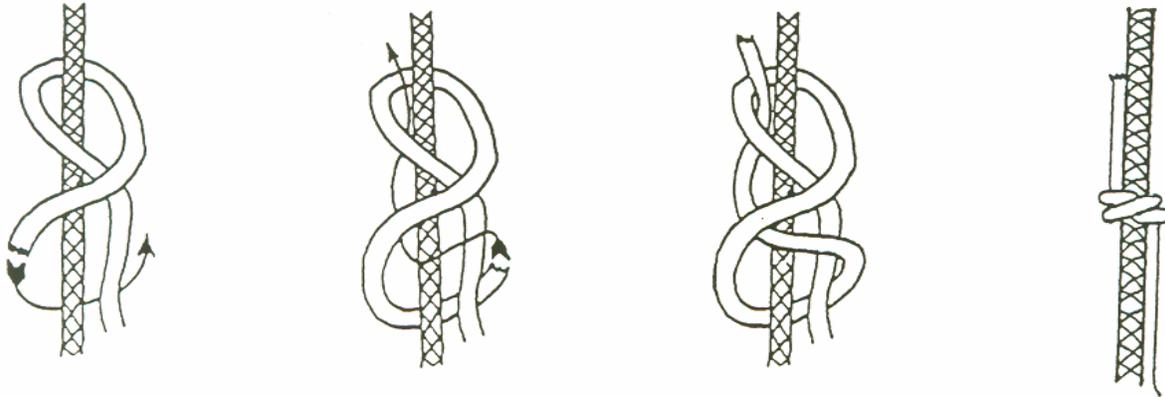
(Square knot tied on ends of rope or tying two similar size ropes together)



(Square knot tied around an object)

Half of a Double Fisherman

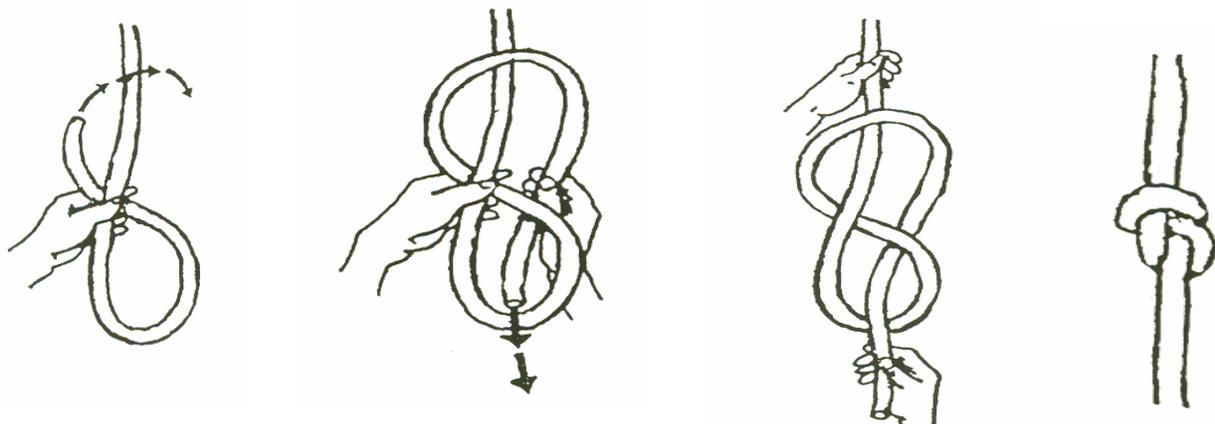
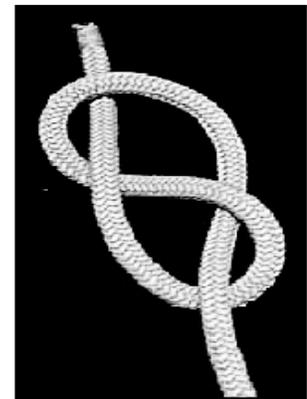
The half of a double fisherman knot is used to prevent a knot from slipping or coming apart. This safety knot is tied to the standing part then snugged up to the main knot.



(Half of a Double Fisherman)

Figure 8

The Figure 8 is the foundation knot for the family of figure 8 knots. When tied correctly, the Figure 8 tends to be more secure and less likely to come apart under loading. It is also easily identified when tied correctly. This type of knot is less detrimental to the strength of the rope than other knots that can be. The Figure 8 itself can be made in the start or end of a rope and used as a stopper knot.



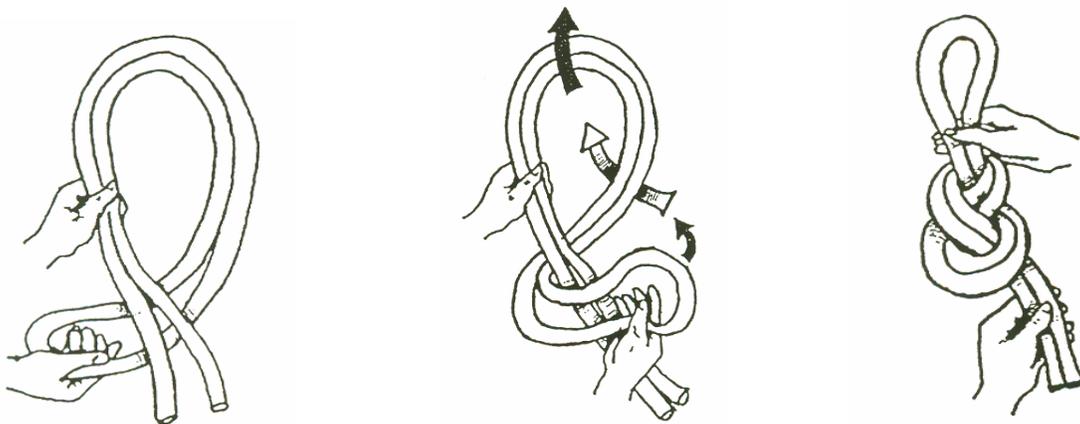
Follow Through Figure 8

The Figure 8 "follow through" is used to tie a loop into the end of a rope. It can be used as an anchor knot where the anchor is a tall object such as a tree. The loop is formed by going around the object. Do not confuse this knot with the Figure 8 Bend on page 19.



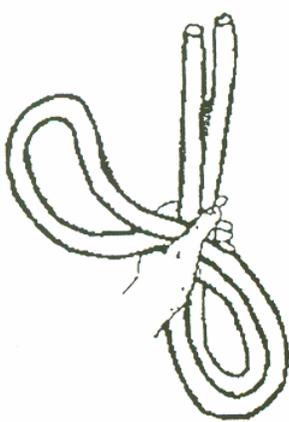
Figure 8 on a Bight

The Figure 8 on a Bight is used to make a loop in the rope. It can be tied in the middle or end of the rope. The loop formed can be clipped into for safety or anchor lines. This knot looks the same as a Follow through Figure 8 after it has been tied.

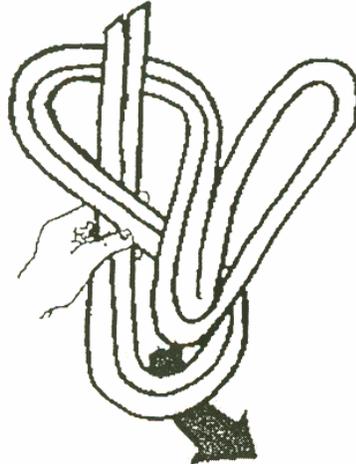


Double Loop Figure 8

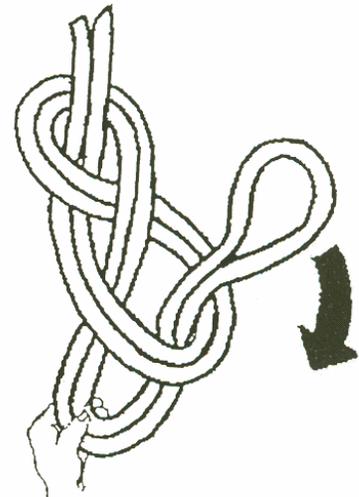
The Double Loop Figure-Eight is generally considered to be strong and secure. The Double Loop Figure 8 is a knot used by climbers. It is easy to tie and untie and safer than the bowline.



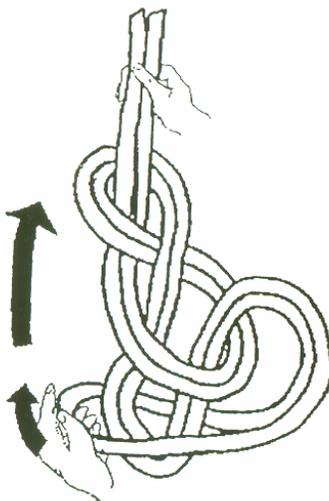
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(2)



(3)



(4)



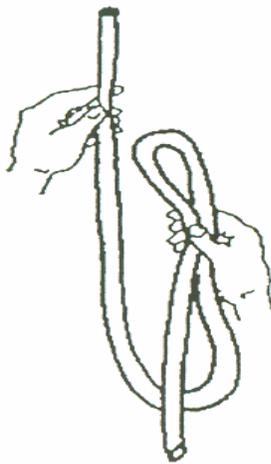
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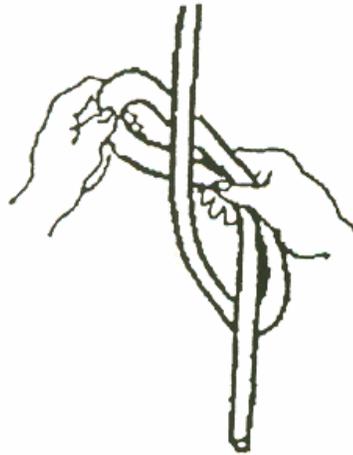
(6)

Inline Figure 8

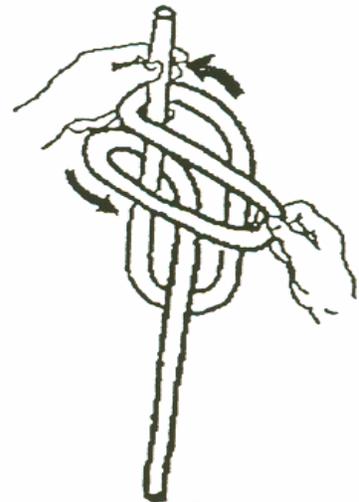
The Inline Figure-Eight Loop can be tied in the middle of a rope when you don't have access to the ends of the rope. The load can only be in the direction of the loop. Proper loading is necessary to ensure that the knot tightens and is not pulled loose.



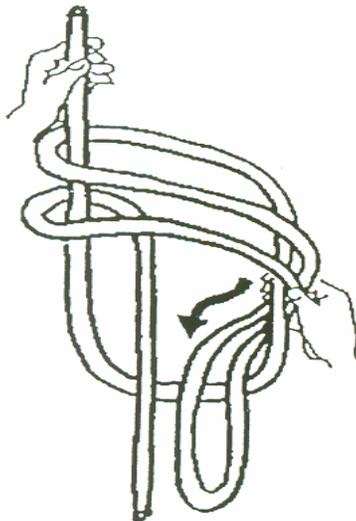
(1)



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(3)



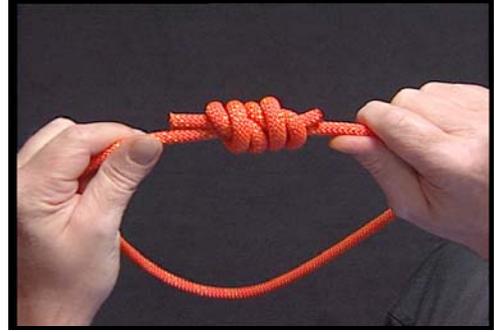
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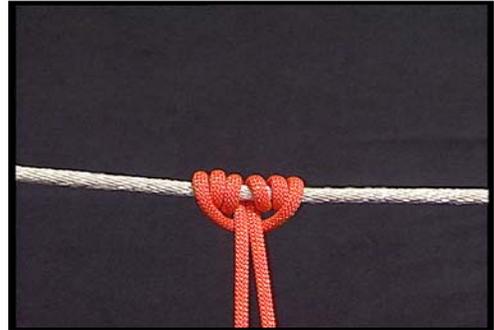
Double Fisherman's Knot

This knot is primarily used to form a Prussik Loop. It can be used to join only rope together, not webbing. Half of a Double Fisherman is used as a safety knot when tying a bowline.



Prusik Hitch

The Prusik is used as a safety knot during rappelling or a lowering operation. It is also used to ascend rope and in rescue work. It is tied very much like the girth hitch but with three wraps around it.



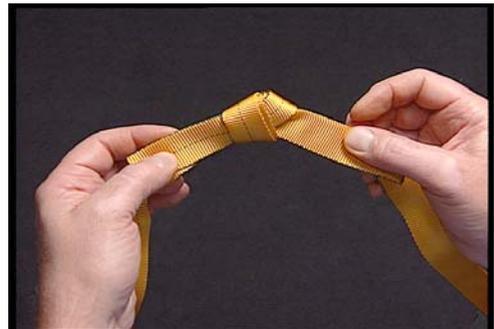
Munter Hitch on Carabiner

The Münter Hitch is commonly used to belay. This knot slips around a carabiner to create friction against itself. Always use a "pear-shaped" locking carabiner so the Münter Hitch does not jam.



Water Knot

The Water Knot is an overhand knot with a follow through. It is primarily used to tie two ends of webbing together.



Webbing Harness

AKA: Hasty Harness. A webbing harness can be tied quickly using a length of webbing and using a water knot to form a loop. A carabiner should be used to bring the loops together.



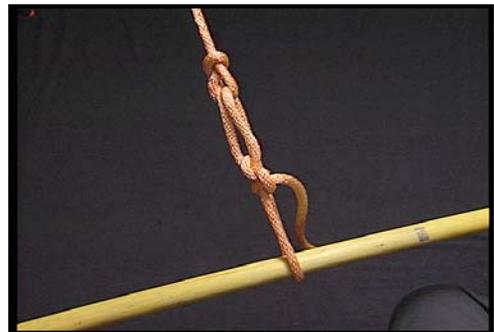
Daisy Chain for Webbing

This method of storing webbing insures that the webbing can be deployed without being tangled. It makes the webbing compact and it is easy to tie.



Trucker's Knot

The Trucker's Knot is used in a tensioning system or to secure a load. This knot is untied easily. After untying the half-hitch, the remaining bite loop unties with a pull.



Becket Bend

AKA: Sheet Bend. This knot is used to tie together two ropes of different thicknesses.



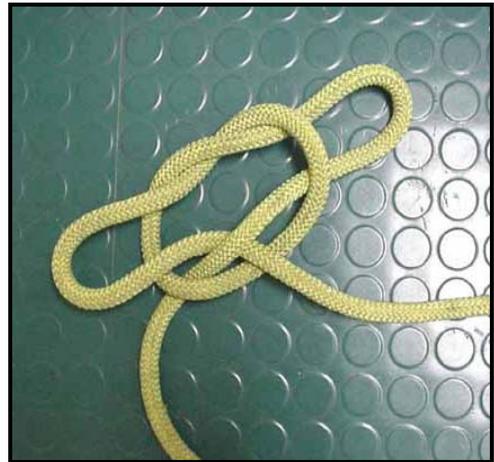
Figure 8 Bend

The Figure 8 Bend is used to tie two ropes together of equal size or form a loop by tying the ends of one rope together.



Handcuff Knot

This knot makes two loops which tighten around wrists or legs and can be used to rescue a person from a small or narrow space.



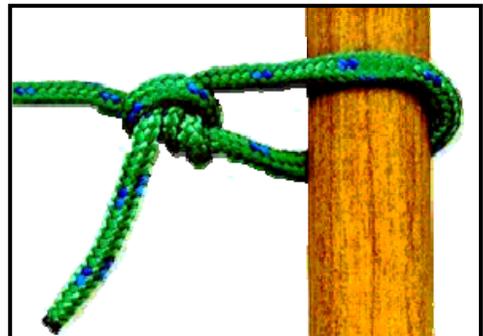
Butterfly Knot

This knot is used to put a loop in the middle of a rope. It does not decrease the linear strength of the rope nearly as much as other similar knots. It is secure even if the forces on both ends are stronger than the load in the loop.



Tautline Hitch

The Tautline Hitch is used for tensioning systems. It is adjustable and trustworthy. It is one of the better ways to adjust lines.

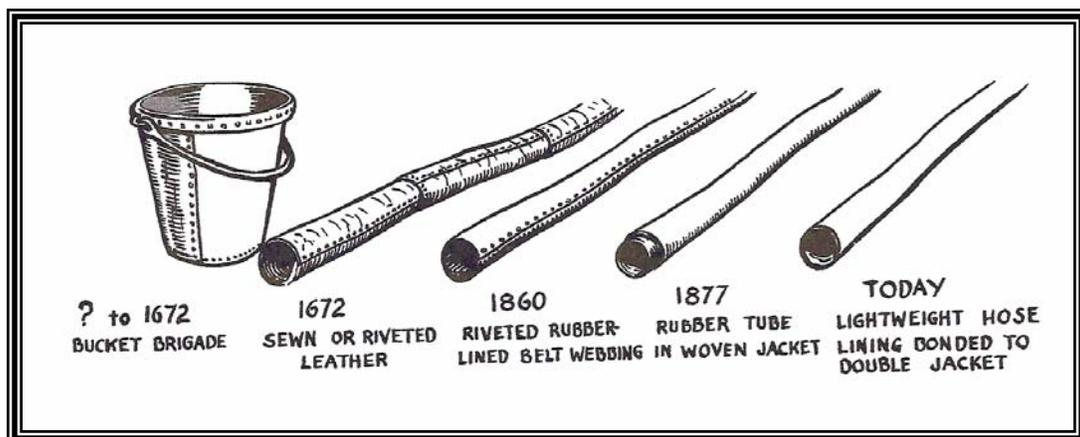


GLOSSARY

ACCORDION FOLD	Hose folded back and forth in the hose bed, having the appearance of pleats in an accordion.
BIGHT OF HOSE	That part of a line leading to and forming a fold in the line.
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.
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.
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 (See Figure 6).
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.
OVERHAUL	A late stage of firefighting in which remaining hot spots are extinguished and fire debris is removed from the structure.

HOSE PRACTICES – SECTION 5

- PORT** Any fixed intake or outlet where hose lines may be attached.
- SOFT SUCTION** An erroneous but commonly accepted term for a short length of 3" diameter hose used to connect a pump to a hydrant (no "suction" is involved because the hose is useful only when the engine receives water at pressures above atmospheric). Soft suction hose is used for incoming water only, not for lengthening a stretch line.
- "U" SHOULDER LOAD** The finish load in the stretch bed, which is carried to the fire to be used for firefighting.
- VULCANIZE** A process of treating crude or synthetic rubber chemically to give it useful properties such as strength and elasticity.
- WATER HAMMER** The force created when the flow of water is abruptly halted.



PART I TYPES OF FIRE HOSE

FOUR STANDARD TYPES OF FIRE HOSE IN USE TODAY:

- Woven-Jacket
- Rubber-Covered
- Braided (Booster)
- Wrapped (Hard Suction)

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 1¾", 2½", and 3".

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 with inside standpipes and in forest firefighting because of its lightweight and flexibility. Forest fire-fighting hose with a one-inch diameter is usually found in 100' lengths (See Figure 1).

Rubber-Covered

Rubber-covered is a general term used to describe this type of hose. The construction differs from woven jacket hose. The outer protective covering can be rubber or a synthetic type of material. It can either be extruded or vulcanized during the construction process. The diameter sizes used are 1¾", 2½", 3", and 5".

Generally, 5" hose comes in 100' lengths and has a unisex coupling called a Storz connection. Unlike a 3" hose

coupling, a Storz coupling has no male or female ends and only requires a ¼ turn to make and break connections. There are no threads but a silicone lubricant is required on the rubber seals between the couplings. A full 100 foot length of 5" hose weighs about 900 pounds, which makes it difficult to move once it has water in it. Because of the large diameter of the hose, it is not recommended that it be driven over. However, if it is necessary to drive over it, at least 8" of clearance is needed. Apparatus should approach the hose at a 30 to 45 degree angle to get over it. If not, the tire will most likely push the hose in front of it damaging the hose (See Figure 1).

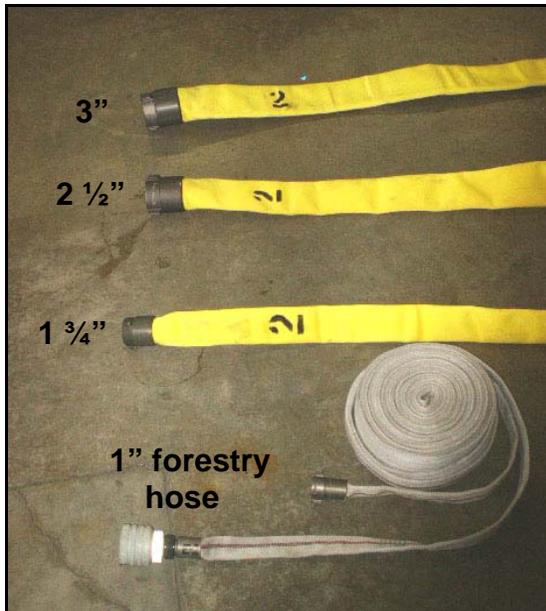
Braided (Booster Hose)

This type of hose is a rigid, non-collapsible hose made of several layers of rubber and braided material. This ¾" or 1" hose is used on booster reels (See Figure 1).

Wrapped (Hard Suction)

Wrapped hose is constructed by wrapping layers of material around an extruded rubber tube. Rubber covered suction hose has a rubber lining, plies of fabric reinforcement, a helix of wire set in rubber, additional plies of fabric reinforcement, and a rubber cover. Plastic covered suction hose has a plastic helix to provide support. Either 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' and is available in 3" or 6" diameter (See Figure 1).

HOSE PRACTICES – SECTION 5



Woven-Jacket



Braided (Booster)



Rubber-Covered



Wrapped (Hard Suction)

(Figure 1 - Four types of fire hose)

Specifications and Testing

N.F.P.A. publishes the minimum requirements of hose design and construction and the design verification testing done by the manufacturer of new fire hose. Portland Fire & Rescue purchases fire hose that meets or exceeds these specifications. General Order #16 "Care and Testing of Fire Hose", which mirrors the NFPA standards, establishes procedures to properly perform hose maintenance, testing, repair, marking and inventory.

PART II CARE OF 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.

The Chief Hose Officer has determined that fire hose be subjected to an annual service test. Specifications for the annual service test are found in General Order #16 "Care and Testing of Fire Hose."

Dirty hose should be washed and thoroughly rinsed with clear water. Use a stiff brush or broom to remove small particles lodged in the weave of the jacket. 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. Hose should be thoroughly

dried before placing in storage. All polyester, nylon, or rubber-covered hose may be reloaded while still wet but only after proper cleaning.

All hose issued to first line companies shall be marked with the number of the Engine Company in that station. Hose issued to reserve apparatus shall be marked with an "A" followed by the apparatus number in yellow. Marking of fire hose will follow the instructions contained within General Order #16 "Care and Testing of Fire Hose."

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. Care must be taken that vibration from the apparatus pump and motor does not cause chafing of the jacket on pavement, curbs, or other surfaces the hose may contact. Figure 2 illustrates the protection of hose using chafing pads.

HOSE PRACTICES – SECTION 5



(Figure 2 – Chafing pads on hose)

Heavy vehicles being driven over hose lines may cause severe mechanical injury. Where traffic detoured cannot be maintained and it becomes necessary to run over a hose line, hose bridges, or jumpers, should be improvised. 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. Do not allow vehicles equipped with studded tires or chains to run over fire hose unless the hose has been properly protected (See Figure 3).



(Figure 3 – Protecting hose from traffic)

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. First line and reserve companies shall reload hose every three (3) months. All hose shall be reloaded so the folds will occur in different locations on the hose.

Heat Injury

The higher the temperature to which hose is exposed, the more rapidly the lining hardens. At very high temperatures, such as are encountered adjacent to steam pipes, 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.

HOSE PRACTICES – SECTION 5

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.

When marking hose, use only materials specified in General Order #16 "Care and Testing of Fire Hose."

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

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.



(Figure 4 – Cleaning, Inspecting and Replacing Booster Hose)

HOSE PRACTICES – SECTION 5

Hard Suction Hose

Hard suction hose construction results in a hard, stiff hose that will resist the vacuum developed in the hose during drafting operations.

Because of the weight and stiffness of the hose, it will require at least two firefighters to lift and make connections. A rubber mallet can be used to strike the ears on the coupling to tighten the connection. Sharp bends should be avoided and the weight of the hose should not hang from the connection. If it is suspended when connected, some suitable support should be provided at the middle. Engines drafting, or connected to a hydrant by hard suction hose should not be moved unless the hose is disconnected.

Unlined Linen Hose

Unlined linen hose can be encountered inside buildings connected to standpipes. They are usually located in a hose cabinet with a non-closing nozzle attached. These hose lines are meant to be operated by untrained users.

This type of hose is being phased out as of 1976, because it is subject to rapid deterioration under moist or wet conditions. It will not withstand frequent service and is not suitable for use where fabric will be subjected to chafing on rough or sharp surfaces. For fire-fighting purposes, it is recommended that firefighters disconnect this type of hose from the standpipe and connect their own hose for use.

Hose Weight and Capacity

1 $\frac{3}{4}$ " Hose:

- 50' weighs approx. 13lbs.
- Will hold 6.23 gallons of water.
- Weight of hose and water is approx. 65lbs.

2 $\frac{1}{2}$ " Hose:

- 50' weighs approx. 45lbs.
- Will hold 12.75 gallons of water.
- Weight of hose and water is approx. 151lbs.

3" Hose:

- 50' weighs approx. 50lbs.
- Will hold 18.36 gallons of water.
- Weight of hose and water is approx. 203lbs.

5" Hose:

- 100' weighs approx. 107lbs.
- Will hold 102 gallons of water.
- Weight of hose and water is approx. 956lbs.



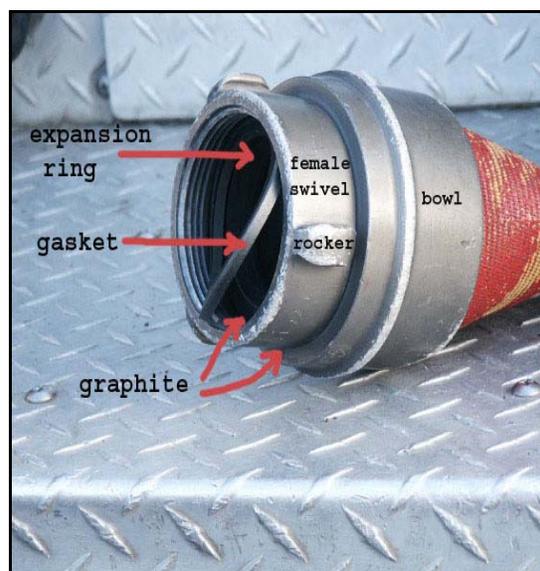
PART III COUPLINGS AND GASKETS

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 a bowl that houses an expansion ring that holds the fire hose securely inside it. The female end will have a swivel with a rubber gasket. Rockers are found on both male and female couplings and are used for gripping the coupling with either your hand or a spanner (see Figure 5).

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.

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.



(Figure 5 – Construction and lubrication of a hose coupling)



PART IV HANDLING FIRE HOSE

Firefighting requires a high degree of teamwork, proficiency, and timing. When hose is used in fire-fighting operations, each individual involved is called upon to perform basic hose practices. The skills exhibited in performing these basic hose practices determine the relative success of the hose operation. Should an individual fail in one minor practice, such as coupling a hose, the team will falter or fail.

All basic hose practices are important to the success of hose evolutions. They must be mastered by the individual firefighter before that firefighter can participate in company operations.

TEN BASIC HOSE PRACTICES

- Make and Break Connections
- Loading Hose Beds
- Pulling Hose From The Bed
- Shoulder Loading
- Carrying Fire Hose
- Carrying Nozzles
- Controlling Nozzles on Hand Lines
- Picking Up Hose
- Taking a Hydrant
- Clamping a Hose Line

MAKE AND BREAK CONNECTIONS

One Firefighter

There are three recognized methods that may be used by a firefighter in

making a connection while working alone.

Straddling the Hose

Place hose between the knees just back of the female coupling and grasp the male coupling in the other hand. Insert the male coupling into the female coupling swivel and turn the swivel to the right until the connection is tight (See Figure 6).

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 a 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 (See Figure 7).

Stepping on the Hose

Spread 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 (See Figure 8).

Greater latitude is allowed in breaking connections since there is no need to align threads to mesh and it is not considered essential to work from the male side of the connection in order to turn the swivel to the right when uncoupling. Any of the methods used in making connections may also be employed to break a connection by turning the female swivel to the left until the couplings are freed.



(Figure 6 – Straddling the hose)



(Figure 7 - Over the knee)



(Figure 8 - Stepping on the hose)

Attaching nozzles

When attaching a nozzle by stepping on the hose, hold the nozzle, coupling, and hose in the same manner as when making a connection in the hose line (Figure 9). When straddling the hose, hold the nozzle so that the tip is away from the body (Figure 10).



(Figure 9 – Attaching nozzle, stepping on hose)



(Figure 10 – Attaching nozzle, straddling hose)

HOSE PRACTICES – SECTION 5

Double Connection

The double connection is screwed into or onto the hose or appliance depending on the circumstances of the situation. There is less chance of dropping the double connection when using the method illustrated in Figure 11.



(Figure 11 - Attaching a double connection)

Two Firefighters

Two firefighters working together will make the connection as illustrated in Figure 12. The operation is made easier when the firefighter holding the male coupling holds it steady and looks away, allowing the firefighter with the female coupling to align the couplings while turning the swivel.



(Figure 12 – Making hose connections)

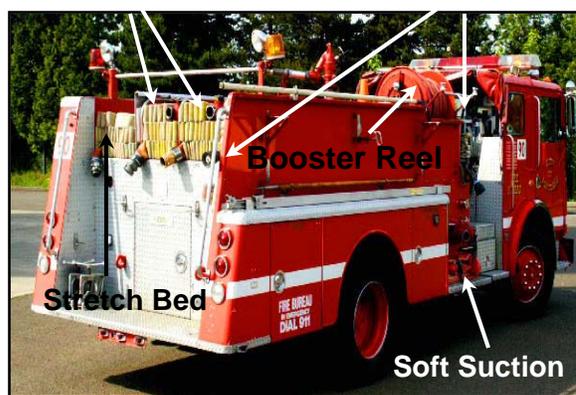
LOADING HOSE BEDS

The areas on engines where 2 ½” and 3” hose is carried are called the “hose beds.” On Portland Fire & Rescue engines they are divided into two hydrant beds and one stretch bed. Figure 13 shows the common arrangement of hose beds together with the terms used in referring to this part of the engine.

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. All couplings should be hand tight and the flat side of each length of hose kept in alignment to the flat side of the length to which it is coupled. Bends at the rear of the bed should be made carefully and kept even to facilitate pulling hose and estimating the amount of hose remaining in the bed. Hose carefully and evenly loaded presents a neat appearance, shows pride in apparatus and equipment and is indicative of company morale.

Hydrant Beds

Pre-connects



(Figure 13- Hose loads on triple bed engine)

HOSE PRACTICES – SECTION 5

5" Hose

5" hose can be encountered when working with Mutual Aid Companies and Portland Fire & Rescue's hose tender. Therefore it is important to know how to work with this type of hose. The flat load method is used for loading 5" hose (Figure 15). The hose is laid flat instead of on edge. The load is started from either side with a butt even with the rear 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. Each layer after the first should be an inch or two shorter than the previous one.

On engines that have grab bars on the rear of the bed, a "Dutchman" may be needed to prevent the couplings from rolling as you progress up the layers and get closer to the bar. Try not to stack the couplings on one another, as doing so can create loading problems.

To finish a 5" hose load a 5' bight is made behind the last coupling. A utility strap would then be used for securing the lay-in line to the hydrant. Place it behind the coupling and through the fold directly below it by slipping the strap through the fold and clipping it back on itself.



(Figure 15 – Loaded 5" hose)

HOSE PRACTICES – SECTION 5

Loading the Hydrant Bed

An “Accordion Load,” is used to load the hydrant bed. It is started in a rear corner of the hydrant bed with a double female attached to the end of the hose bearing the male coupling (Figure 16). Holding the hose close to the side of the bed, it is brought from the rear to the front of the bed where it is bent and led back to the rear. After the first full fold is in place it is flipped over so that the coupling is on the inside. This is done to protect the coupling and to pull it away from the side of the compartment so it is easier to remove the double connection if needed. It is then bent again and led back to the front of the bed. This folding is continued until a layer of hose has been formed in the bed. With the first layer of hose completed, the hose is gradually raised as it is brought from front to rear along the side of the bed. At the rear of the bed the hose is on top of the first layer and in position to start the second layer (See Figure 16).

The same back and forth folding process as the first layer forms the second and succeeding layers. As each fold, or bight, of hose is placed into the load, the remaining space in the bed

becomes increasingly narrower until the width is less than the length of a coupling. If a coupling is placed in the load at this point so that it must turn around when paying out, it will jam. To prevent this from happening, a short fold or reverse bend is made as shown in Figure 17. This procedure, known as a “Dutchman,” brings the coupling into place so it does not have to turn around when leaving the bed. It may also be used to keep a coupling out of the bend in the hose at either end of the bed.



(Figure 16 – Loading the hydrant bed)



WRONG –
Coupling must
turn to pay out.

RIGHT – Dutchman
formed. Coupling will
now pay out without
having to turn around.



(Figure 17 – Forming a “Dutchman”)

HOSE PRACTICES – SECTION 5

Loading the Stretch Bed

A Modified Accordion Load is used to load hose in the stretch bed (Figure 18). This load is started by placing the end of the hose bearing the female coupling in the left rear corner of the stretch bed. The first layer of hose is then folded into the bed as described for the accordion load in the hydrant bed.

When making the last bight in a layer, fold the bight towards the inside of the bed and bring the line a short distance toward the front of the bed. Then lift the hose up and lead it diagonally across the top of the first layer to the left front of the bed where it is bent back and a new layer is begun from the left side of the bed. When making the transition from right to left, the top edge of the hose on the right side should be on the top edge on the left side of the bed. Succeeding layers are made in the same manner.



(Figure 18 – Modified Accordion Load)

Load Finishes

The last length of hose is usually made up in a special manner designed to expedite placing the load in service. This special treatment is known as the load finish.

In the stretch bed the load finish is called the “U” shoulder load (Figure 19). A nozzle is attached to the last length of hose and the shoulder load is started with the nozzle and made up before the length is connected to the rest of the hose in the bed.

The nozzle is laid on the hose in the stretch bed. Starting with the first loop to the right, two loops approximately three to four feet long are made on each side of the nozzle. The balance of the hose is looped toward the front of the bed, then brought back and connected to the male coupling of the preceding length at the right rear corner of the stretch bed.



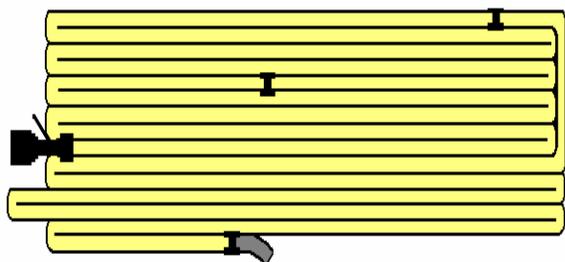
(Figure 19 – “U” Shoulder Load)

HOSE PRACTICES – SECTION 5

Loading the Preconnect Slots

The standard vertical accordion 1¾" hose load is started by first making a drag load of the first one or two lengths. Attach the female end of the first length to the supplied male connection in the slot. The hose is then folded into the slot. Leave a small drag loop on the second layer of hose to facilitate pulling the hose from the bed. Continue with as many folds as the hose and bed length allows. When the male coupling is reached it is laid up out of the way until the shoulder load has been finished.

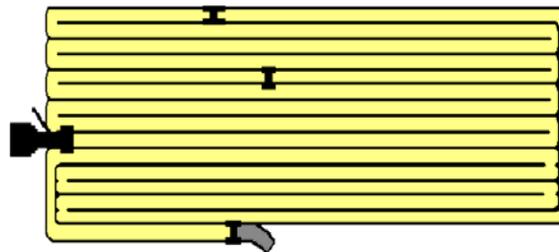
The shoulder load (one or two lengths) is started with an attached nozzle that is folded into the slot in a vertical accordion load. The nozzle is placed on top of the last fold of the drag load of hose. The nozzle tip should just protrude beyond the folded ends beneath it. Connecting the male coupling (which was laid up out of the way) to the female coupling on the end of the line bearing the nozzle completes the load. Due to variations in hose and bed lengths it may be necessary to make a short fold of hose on top of the load to take up slack (Figure 20a).



(Figure 20a – Standard Vertical Accordion Load)

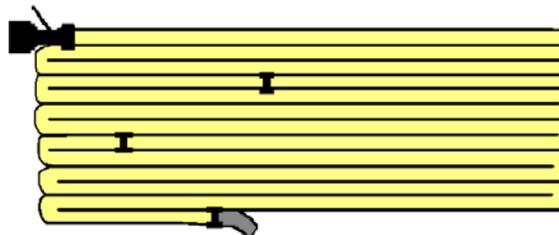
The modified accordion load version is very similar but eliminates the need to pull on the drag load loop. When the nozzle is pulled from the bed, it pulls on the entire hose load. The drag load will

drop to the ground right out of the slot (Figure 20b).



(Figure 20b –Modified Vertical Accordion Load)

The straight-pull accordion load has no drag load at all. The hose is folded back and forth with the nozzle ending on the top of the load (Figure 20c).



(Figure 20c –Straight-Pull Vertical Accordion Load)

PULLING HOSE FROM THE BED

When hose is pulled from the bed for a drag load, the pull load normally consists of the line coming out of the bed and two bights of hose.

Stand with the hose leading out of the bed on your right side. As you pull a load, lift it slightly to lessen friction and pull it straight back until the load drops free from the bed (Figure 21). Retain a grip on the hose. Back up and continue to pull until the line leading from the bed is taut. It will help to properly arrange the drag load on the ground if you bend over and hold your hands close to the ground while backing up after the load has dropped from the bed.

HOSE PRACTICES – SECTION 5

If the hose is being pulled from the bed, make a quarter turn, look to make sure the area behind you is clear, then back toward the left side of the engine until the load is at right angles to the hose remaining in the bed. The load is then released, laying the hose on the ground. The area directly behind the engine should remain clear to reduce the chance of tripping or hose becoming entangled.



(Figure 21 – Pulling hose from bed)

SHOULDER LOADING

Taking A Shoulder Load of Hose

Taking a shoulder load of hose starts as though pulling hose from the bed (Figure 21). The hose is grasped with the line leading from the bed and two bights of hose and pulled until the load is about three-quarters out of the bed. You then lay the ends down, move to the right side of the hose, and take hold of the middle of the load with both hands. Squeezing the layers of hose together, the load is then rolled onto the right shoulder so the line coming out of the bed will be on top of the shoulder load (Figure 22). With the load balanced on the right shoulder, move

away from the engine, watching over the left shoulder and stop when the line coming out of the bed is taut.

Taking A “U” Shoulder Load

To shoulder a “U” shoulder load, pull the load toward yourself until you can get your right arm under the center of the loops (Figure 23). Slipping the load onto your right shoulder, turn to the left and move directly away from the engine, watching back over the left shoulder until the hose coming out is taut.



(Figure 22 –A shoulder load of 2½” hose)



(Figure 23 – Taking a “U” Shoulder Load)

HOSE PRACTICES – SECTION 5

Pre-connect Line

When shoulder loading a pre-connect, the load consists of that part of the hose folded on top of and including the line with the nozzle attached.

A firefighter shoulder loading a pre-connect grasps the load, raises it up and pulls it out of the slot far enough to shoulder it. Laying the ends down, move to the right side of the load, squeeze the bights together, and place the load on your right shoulder.

CARRYING FIRE HOSE

Hose is usually carried in one of the following ways:

- While connected in a line
- While rolled
- As a shoulder load
- With utility straps
- For taking up a ladder

While Connected in a Line

When hose is connected in a line, it is carried by a firefighter at each coupling, with each firefighter carrying the hose on the same shoulder. The coupling is placed just behind the shoulder to avoid injury if the hose should become entangled and hang up while being carried, as shown in Figure 24.

The carrying of a charged hose line is not recommended. When possible, it is better to clamp or shut down and drain the line before moving. However, Figure 25 shows a method by which it is possible for even one firefighter to bring up the slack in a charged line in order to advance a line or increase the amount of working line.

While Rolled

Hose is sometimes carried rolled, especially when picking up lines after a large fire. Usually it is carried under the arm against the side of the body with the fingers thrust through the center of the roll. Safety and the protection of the couplings are the main considerations. It is not recommended to carry 5" hose! However, it can be carried by two firefighters placing a pike pole through the center of the roll and each lifting an end of the pike pole.



(Figure 24 – Carrying hose connected in a line)



(Figure 25 – Bringing up slack in a charged hose line)

HOSE PRACTICES – SECTION 5

As A Shoulder Load

A shoulder load of hose is carried as shown in Figure 26. This load is normally taken from the stretch bed; it should be carried so the female coupling or line coming out of the bed is on top of the load.

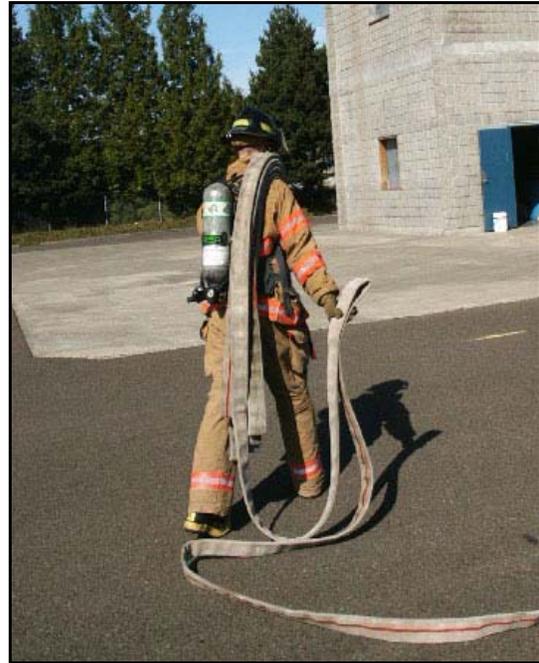


(Figure 26 – Carrying a shoulder load of hose)

The procedure of paying out hose from this load while walking along is known as “flaking.”

The top fold or bight of hose is grasped between the thumb and first two fingers. It is then taken off the shoulder and brought down at arm’s length near the knee, where it is released. Immediately the next bight of hose in the shoulder load is grasped and brought down to knee level in the same manner. It is released when the preceding bight has

been stretched out. This action continues until the shoulder load has been flaked (Figure 27).



(Figure 27 – Flaking hose from shoulder)

When flaking on stairways, the bight is brought down to knee level and released one layer at a time as the hose pays out (Figure 28).



(Figure 28 – Flaking on stairways)

HOSE PRACTICES – SECTION 5

With Utility Straps

To use a utility strap for carrying fire hose, place the strap around the hose and through the loop of the strap. This is called a “girth hitch.” Place the strap on your shoulder and start the carry. It is important not to place the utility strap across your body and over your neck. If the hose were to hang up while ascending a ladder it could cause the firefighter to fall, rather than the hose pulling off the shoulder.

An alternative to this method would be to place the strap around the hose and snap it to itself.

For Taking Up A Ladder

Hose connected in a line is carried up ladders by using utility straps over the same shoulder on which the hose will lead off the ladder (Figure 29). The hose is carried by a firefighter at each coupling and one in the middle of each length. The firefighter in the middle of the first length does not fasten the utility strap at the center of the length but rather about fifteen feet behind the firefighter with the nozzle to help distribute the weight more evenly.

As a safety precaution, a firefighter carrying hose on the ladder must always step around the hose when dismounting to a roof or fire escape balcony. Do not step between the hose and the ladder.

A length of hose is carried up a ladder by one firefighter as illustrated in Figure 30. The length is doubled back with the couplings almost together and laid over the shoulder so the couplings hang down about ten feet.

An emergency carry of hose can be conducted without utility straps. The

firefighters are spaced two to a length of hose; they follow each other at close intervals on the ladder (Figure 31).



(Figure 29 – Carrying hose connected in a line up a ladder)



(Figure 30 – One firefighter carrying a single length of hose up a ladder)



(Figure 31 - Emergency Hose Carry)

CARRYING NOZZLES

The chief considerations in establishing methods of carrying nozzles are the safety of the bearer, protection of the nozzle, and furtherance of fire-fighting operations.

To place a nozzle on your back, slip your arm and shoulder under it rather than throw it over the shoulder.

When picking up a nozzle, grasp it firmly with both hands, having your feet well set and your body prepared to assume the load. Always make certain that the shut-off is closed before carrying a nozzle connected to a line of hose.

With A “U” Shoulder Load

The normal method for the ground carry of a nozzle is in the “U” shoulder load (Figure 32), the standard finish load for the stretch bed. With this load, the

nozzle is in front on the chest where it may be grasped by the left hand to keep it from swinging or sliding down and can be controlled in the event of accidental charging of the line.



(Figure 32 – Carrying the nozzle in the “U” shoulder load)

Ground Carry w/out “U” Shoulder Load

When the “U” shoulder load is not available, and a line has already been taken from the stretch bed, the nozzle is carried over the right shoulder as shown in Figure 33. To place the nozzle on your back, form a bight in the hose at the nozzle coupling and slide it over the arm and onto your shoulder. Do not throw it over your shoulder! Turn to the right so the hose will lead across your chest and under your left arm.

Ground Carry With Shoulder Load

If a shoulder load of hose is to be carried that is not in a “U” shoulder load, it is carried on the right shoulder with the nozzle placed over the left shoulder as in Figure 34. Observe the same precautions when placing the nozzle on your back.



(Figure 33 – Ground carry with nozzle)



(Figure 34 – Ground carry with nozzle and shoulder loads)

On A Ladder

A nozzle on a hose line should be carried up a ladder as shown in Figure 35. The nozzle is carried on the shoulder on the same side as where the hose will lead off from the ladder. The same precautions should be observed in placing the nozzle over the shoulder as in a ground carry.



(Figure 35 – Carrying a nozzle on a ladder)

When entering a window from the ladder, the firefighter carrying the nozzle, before stepping off the ladder, places the nozzle through the window in the following manner. If the nozzle is on the right shoulder, reach down and back with your right hand and grasp the nozzle behind the tip. Then swing it forward between the hose and your right side and through the window while the hose is still on your shoulder (Figure 36). If the nozzle is on your left shoulder, you would use your left hand. With the nozzle through the window, shrug the hose off your shoulder and

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release the nozzle, allowing it to hang inside the window with the hose lying on the windowsill. Then step through the window, pick up the nozzle, and proceed, as the situation requires.



(Figure 36 – Placing a nozzle through a window)

CONTROLLING NOZZLES ON HAND LINES

A fire stream exerts back thrust. The greater the pressure and the larger the nozzle tip, the more severe the back thrust. The firefighter operating the nozzle must be prepared to control this back thrust before opening the nozzle and to brace for the reaction when changing direction of the fire stream.

The shut-off on a nozzle should always be carried in the closed position. When used, it should be opened and closed gradually to prevent surges of pressure in the hose (water hammer).

When lines are being employed in the testing of pumps or in pump operation drills, nozzles should be secure to a stationary object before opening the shut-offs. At other times, hand lines are usually controlled with the aid of utility straps.

Using Utility Straps

If you are working with another firefighter, take positions facing each other, one on each side of the hose line, and fasten a utility strap around the hose a short distance behind the nozzle. This distance will vary according to the type of nozzle. Place your utility strap over the shoulder closest to the nozzle so the strap will lead from this shoulder down across the front of your body. This position is illustrated in Figure 37.

Two firefighters with utility straps can handle all the ordinary nozzle pressures encountered in actual service. If more firefighters are to be used in working a line, they attach their utility straps and take similar positions far enough back on the hose so as not to impede directing the nozzle.

Without Utility Straps

When necessary to work a charged line without utility straps, the firefighter at the nozzle position holds the nozzle (at the shut off) with one hand and the hose just back of the nozzle with the other. Use the elbow to press the hose line firmly against your body above the hip at the waistline (Figure 38).

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As the back-up firefighter, take a position as illustrated, opposite and behind the firefighter operating the nozzle. Your position is the same except you have both hands on the hose line.

As the third firefighter, or “anchor,” you are behind the back-up firefighter but on the same side of the hose as the firefighter operating the nozzle. Anchor the hose line to the ground by kneeling on one knee on the hose and holding the hose with both hands near the other knee.



(Figure 37 - Controlling nozzle with utility straps)



(Figure 38 - Controlling nozzle without utility straps)

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Keenan's Hose Loop

Normally one firefighter should not attempt to control the nozzle on a 2½" hose line to direct a fire stream. However, a practice known as a Keenan's hose loop can be used by one firefighter to control and direct a 2½" hose line under normal pressures (Figure 39).

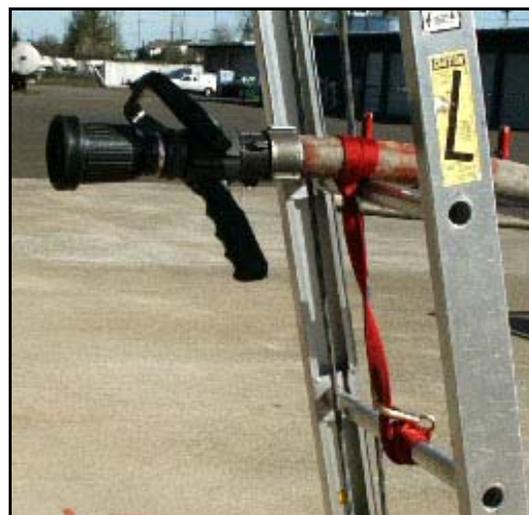
The loop is formed in a length of hose by bringing the nozzle end of the hose back in a circle and passing it far enough under the line near the center of the length so it is workable by a firefighter sitting at the crossover point. As a safety practice, the loop shall be secured at the crossover point. A utility strap may be used to tie the lines together at this point.



(Figure 39 – Keenan's hose loop, and close-up of tie off)

On A Ladder

Attach your utility 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 in the same manner as passing a nozzle into a window as shown in Figure 36. The nozzle is secured on the rung below where you have passed it through. Make several wraps with the utility strap and snap the utility strap back onto itself (Figure 40). 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.



(Figure 40 - Securing a nozzle for operation from a ladder)

1¾" Hand Lines

Frequently only one firefighter is available to handle a 1¾" hose line in the initial stages of firefighting and in mopping up. In this event, a 1¾" hose line is best controlled as shown in Figure 41. The hose should be straightened for some distance behind

HOSE PRACTICES – SECTION 5

the firefighter and anchored by placing a foot on the hose where it leaves the ground. The line is brought up and braced or held against the front of the body. When the hose is held in this manner, the back thrust of the fire stream may be met by leaning into the hose. The nozzle should be shut off before attempting to move the line.



(Figure 41 - One FF controlling a 1¾" line)

Two firefighters can work an 1¾" line as shown in Figure 42. This is preferable since it is safer and increases the mobility of the hose line, which is the chief advantage of this size of hose. One important function of the back-up firefighter in this method is to keep the hose straight behind the firefighter on the nozzle. Working together as a team with good communication will result in a safe and effective hose stream for fire attack.



(Figure 42 – Two FF controlling an 1¾")

PICKING UP HOSE

When hose is being picked up, it should not be dragged unnecessarily. Dragging causes wear to the jacket and increases the likelihood of damage to hose and couplings through snagging, pinching, hanging up and dropping. Recommended methods of picking up are rolling hose and loading hose on the shoulder or arm.

Rolling Hose

When rolling hose, the roll is started at the male coupling so it will be on the inside of the roll where the male threads will be partially protected. The roll should not be started too tight. When completed, the roll is laid down flat and the edges evened out by standing on the roll.

Loading on the Shoulder

To pick up a length of hose on the shoulder, you place the nozzle or coupling over your shoulder onto your back. Taking the hose leading down in front of you with both hands, form a loop extending from the ground up to your shoulder and back to the ground (Figure 43).



(Figure 43 – Picking up hose and loading on the shoulder)

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The loop thus formed is laid back across the shoulder and equalized. Each succeeding loop is made in the same manner and placed on the shoulder until the length of hose has been picked up.

Loading on the Arm

The firefighter “picking up” places the line over the right shoulder and faces the direction of travel. Walk along the line “picking up” the hose with the left hand each time the left foot is advanced. Place each bight of hose on the right forearm until you have an arm load (Figure 44).



(Figure 44 – Picking up hose on the arm)

TAKING A HYDRANT

The major water source for fire-fighting operations is the fire hydrant. To get water from the hydrant, the responsibility of one member of the engine crew is to connect the lay-in line(s) to the fire hydrant. That job is referred to as “taking the hydrant.”

In most of our fire-fighting efforts, the time required to get water on the fire is controlled by the firefighter taking the hydrant. For this reason the procedures for taking the hydrant are closely detailed, and little is left to discretion or personal preference.

Laying-In One Line (Single Header)

When the order to “take the hydrant” is given, the firefighter in the hydrant position takes the loose gate and spanner in the hand nearest the hydrant and the attached gate and hose in the other hand. The firefighter turns in the direction of the hydrant and pulls the line to the ground. Moving to the front of the hydrant, the firefighter pauses to pull on

the hose for slack and swings the hose in a loop around the hydrant, then the firefighter moves to the back of the hydrant.

Both of the gates are laid on the ground. Taking a stand close to the back of the hydrant, place a foot on the hose line to hold the hose line in place and call “Lay-in” to the driver (Figure 45).



(Figure 45 – Taking the Hydrant)

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Under no circumstances should you make a complete circuit around the hydrant. Always stay free of the hose wrapped around the hydrant so that if the hose hangs up in the bed and pulls tight around the hydrant, you will not be injured.

Remove the 2½” outlet caps with a spanner. Spin the outlet caps off rapidly, maintaining your hold on the wrench close to the hydrant cap. Make certain the steamer port cap is tight. When the caps are removed, place the spanner on the hydrant stem. Pick up the gate on the hose line and remove the loop of hose from around the hydrant. Step in front of the outlet in the direction of the lay-in and connect the gate. Attach the spare gate to the other hydrant port.

Gates are attached by tightening the gate swivel hand tight, while holding the gate in a position where the gate handle is backed off a quarter turn from being on top of the gate. When the swivel is hand tight, the swivel and valve together are turned a quarter turn to the right to further tighten the swivel and bring the handle on top of the gate (Figure 46).

During these operations the spanner should not be dropped to the ground. When the caps have been removed, the spanner should be placed in position on the hydrant stem. If an outlet cap does not yield when the spanner is first applied, the position of the spanner should be changed so it points downward and it should be given a sharp kick with the heel of the foot. This will generally loosen the cap. If the hydrant stem will not turn, and you have given a heavy lurch on the spanner in

the direction of opening, then the turn should be reversed and the operation repeated. If the valve stem turns just a little the hydrant may be opened.



(Figure 46 – Attaching hydrant gates)

Open the hydrant completely, letting water into the line. Check the gate on the lay-in line to be sure it is wide open. Remove any kinks in the line near the hydrant and proceed toward the nozzle, checking and straightening the lay-in line on the way.

Taking Hydrant for a Double Header

Occasionally two lines are laid from a hydrant and this operation is known as “laying-in a double header” (Figure 47).

When the order is given “take the hydrant double header,” the hydrant is three ported if possible, using the larger steamer port as the third one.

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The firefighter at the nozzle position takes the hydrant bed line closest to the hydrant and moves to the back of the hydrant, pauses and pulls on the hose to get slack. The firefighter continues around the hydrant, then places the coupling with gate attached on the ground about ten feet from the hydrant near the engine. The nozzle person also places the steamer connection with

gate attached near this line and gets back on the engine.

The firefighter taking the hydrant proceeds in the normal manner, except that the extra gate is left with the engine and the steamer port is connected before turning on the hydrant. The firefighter then proceeds toward the nozzle, straightening both lay-in lines.



(Figure 47 – Taking the hydrant double header)

Laying In From An Engine

When the lay-in to the fire is being made from an engine, the hydrant gate attached to the hose should be removed and both gates left with the engine. Snub the hose at a convenient place on the engine being laid from. Make sure there is sufficient slack hose to reach one of the pump outlets. The hose may

also be snubbed on the bumper or under a wheel, but should never be snubbed on any part of the pump. The firefighter at the hydrant position should assist the driver with connecting and getting water into the line after releasing the snubbed hose. Then proceed toward the nozzle as in taking a hydrant.

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Water Supply Operation 5" Hose

Placing a 5" supply line in service varies from a standard lay-in from a hydrant. When the order to "take the hydrant" is given, the nozzle position removes the fittings from the engine, places them near the hydrant and then remounts the engine. The fittings are usually stored in a bag or attached to a board.

The firefighter in the hydrant position takes the hose butt and hose strap and pulls or carries the line to the hydrant (Figure 48). Moving to the back of the hydrant, the firefighter pauses and loops the hose strap over the hydrant and

calls to the driver "Lay in." The gates are then applied in the normal manner and a 2½" to 5" adapter is added to one gate for the supply line. If the hydrant is a triple port hydrant the 5" line is applied to the steamer port without a hydrant gate (Figure 49).

Unlike 2½" or 3" hose, 5" supply lines are not charged until the firefighter at the hydrant receives a signal from the driver. This is due to the fact that 5" hose cannot be clamped and should not be charged until the driver has the hose completely attached.



(Figure 48 – Taking the hydrant, 5" hose)



(Figure 49 – Hydrant with 5" hose and Storz fittings attached)

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Anchoring Hose for Reverse-Lay

When making a reverse-lay (from fire to hydrant), snub the hose to a convenient post, under a tire, tree, bumper, etc. This ensures that it will pull free from the hose bed as the engine drives to the hydrant.

Occasionally there is no convenient object on which the hose may be fastened and a firefighter must “anchor” the line. To do this, the firefighter holds the hose line in both hands, feet well braced, and leans back against the pull of the hose (Figure 50). The firefighter stands behind the hose pulled from the bed so that it lies between the firefighter and the engine. It is important to maintain a position where entanglement with the line is not possible and the firefighter must be prepared to turn the line free in the event it hangs up in the bed.



(Figure 50 - Anchoring hose for reverse lay)

CLAMPING A HOSE LINE

At times, the flow of water must be controlled by the use of a hose clamp. In the event of a hose line failure it becomes necessary to stop the flow of water. Another instance would be while placing a hose line in operation and the

water must be held in the lay-in line until the driver is ready for water at the pump.

Applying the Hose Clamp

Before attaching the hose clamp the catch holding down the upper jaw of the clamp must be released and the clamp opened. The hose line should be positioned on the middle of the lower jaw and the pressure bar backed off into the upper jaw far enough to permit the clamp to be closed over the base. The clamp is then closed, the catch refastened, and the handle cranked clockwise until the pressure bar is tight enough against the hose and lower jaw to stop the water flow (Figure 51). To release the hose clamp, crank the handle rapidly counterclockwise until the pressure bar is raised off the hose. Never kick the release open!

Probably the most common use of the hose clamp is at the end of the lay-in line. When used for this purpose the clamp is placed (normally by the driver) on the lay-in line about twenty-five feet to the rear of the engine and behind a hose coupling if practical.



(Figure 51 – A clamped lay-in line)

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When placing the clamps for a “double header,” the release on each clamp is placed to the outside of the hose. This prevents a charged lay-in line from accidentally striking and releasing the other lines clamp.

Emergency Clamp

In an emergency, the flow of water in a line may be almost stopped by kinking the hose as shown in Figure 52. This operation requires at least two firefighters and it is recommended that the bights be about six feet in length.

If the hose is to be kinked near the end of the line, the first fold should not be

less than fifteen feet from the nozzle, and the nozzle should be partially opened after the first fold is made to relieve the pressure in the hose. With pump pressure in the hose line and the nozzle closed it is very difficult to keep the line kinked.

Emergency Hose Replacement

If a hose line should burst or a coupling fails during emergency operations, it should be replaced with two lengths of the same size hose. The hose should be clamped with a hose clamp or an emergency hose clamp can be performed if the driver cannot be told which line to shut down.



(Figure 52 – Making an emergency hose clamp)

GLOSSARY

- BACKLASH** The motion of the booster reel turning faster than the hose is played out, causing an entanglement.
- BLEEDER PLUG** A threaded metal stopper placed in the housing of a standpipe for the purpose of draining.
- CAP** A threaded metal cover placed on the male connections of standpipes, hydrants, pumps, etc.
- PLUG** A threaded metal stopper placed in the female connections of standpipes, appliances, etc.
- REMOTE PUMPING** An operation where an engine company lays-in to the fire from a hydrant and pumps into its stretch lines.
- STANDPIPE** A vertical water pipe riser used to supply fire hose outlets on buildings. Frequently found in inside stairwells and outside alongside fire escapes.



PART I GENERAL RULES AND PRECAUTIONS

Hose evolutions are team operations. It is essential that every firefighter be thoroughly trained in their proper performance. The evolutions presented are the basic outline to be followed when drilling. There may be, and usually are, variations of these evolutions performed at an emergency scene. At the emergency scene, protective clothing is required. Full protective clothing includes: helmet, PBI hood, turnout coat and pants, boots, gloves, and SCBA. When participating in company drills or evaluations, the officer in charge will determine when to wear the SCBA.

The laying-in and stretching of fire hose to the site of a fire or other emergency is a basic operation of firefighting. There are many factors that impact the performance of these operations.

Listed below are four factors that are common during firefighting operations:

- Fire location (below grade, ground level, upper floor, etc.)
- Number of firefighters
- Nature of area (topography)
- Type of apparatus and equipment

Hose evolutions are composed of two parts: the *lay-in* and the *stretch* (Figure 1). In the following discussion of these basic operations and the subsequent picking-up, certain points have been itemized for emphasis. Companies performing hose evolutions should bear these points in mind. Experience has shown them to be of value in achieving safety, smoothness, and effectiveness in the evolutions. Speed of the evolution, without compromising safety, will follow with practice.



(Figure 1 – The “Lay-in” and the “Stretch”)

LAYING-IN

The “lay-in” is the operation of placing a hose line between the water source and the fire location by letting hose pay out of the hose bed while the engine is moving. It usually presents little problem as long as the length of the lay-in does not exceed the amount of hose carried on the engine.

- When making a lay-in from a hydrant, the engine should come to a complete stop at the hydrant to let the hydrant person dismount safely.
- An engine laying-in should keep the lay-in line to the hydrant side of the street but out of the gutter. If it is necessary to cross the street, it should be done at the fire location.
- Standard procedure is after positioning the apparatus the driver clamps the lay-in line. The hydrant person charges the hose up to the clamp when laying-in. If water is needed at the fire it is available that much sooner and the hydrant person is free to rejoin the engine crew.
- When a hose line leading from the bed is disconnected behind the engine, the end of the hose coming from the bed should be placed back into the bed.
- All hose lines must be kept free of kinks and sharp bends to permit the unobstructed flow of water through the hose (Figure 2).
- When an engine is making a reverse lay, or being driven to a hydrant to pump, all equipment needed at the fire should be removed from the engine before it is driven away.

STRETCHING

The term “stretch” is either a manual operation of placing a hose line from the engine pump to the fire or a verbal signal used by firefighters when they are advancing hose. Judgment must be exercised when the stretch is made because difficulties can arise in an evolution. This is due to a number of things primarily because the stretch operation is performed by hand and fireground conditions and terrain vary widely.

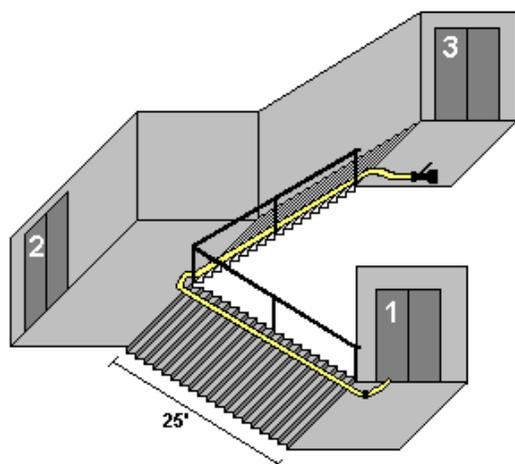
The amount of stretch line necessary after the engine spots at or near the fire location is enough hose to reach the fire plus sufficient hose to maneuver about or “work” the fire, usually fifty feet. When dealing with fires in warehouses and other large structures, the difficulty in estimating the amount of stretch line increases. During drills, estimates should be made of different stretches and these estimates checked by making the stretch. Also, as a means of becoming proficient in making stretches, it is good practice to estimate distances, especially distances over 100 feet. Check the estimates by actually pacing



(Figure 2 – Keep hose line free of kinks)

HOSE EVOLUTIONS – SECTION 6

the distance estimated. When stretching up a stairway, allow one length of hose for each two floors or twenty-five feet per floor (Figure 3).



(Figure 3 – Allow 25' per floor on stairways)

Measuring the amount of hose removed from the hose bed is greatly simplified by the use of the accordion method of loading hose, as the folds in a hose bed are of uniform length. Once the length of the hose bed is known, the length of a bight may be determined and it is comparatively simple to measure the amount of hose in the bed or as it is removed.

When a company is preparing to make a stretch, the position of the apparatus will affect the ease with which hose is stretched towards the objective. If the driver points the engine away from the direction of the stretch, the hose will lead out of the bed in a direct path toward the objective. However, if the drag load is properly cleared from the engine, the stretch can be made in any direction without difficulty.

The stretching of the shoulder load begins when the last firefighter in line has a shoulder load. After the last drag

load is pulled out, the driver will call out "Stretch." When the shoulder load of the last firefighter loaded has been stretched, "Stretch" is called out to the firefighter ahead. In this manner, stretching of shoulder loads progresses up the line toward the nozzle. Flaking hose normally stretches the shoulder load being carried. If the area is open and free of obstructions the load may be laid on the ground and the hose stretched.

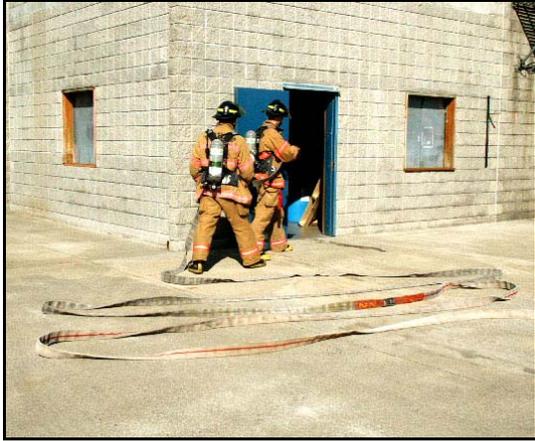
Listed next are rules to follow when stretching:

- When hose is taken from the hose bed for stretches, it should come from the stretch bed unless otherwise ordered by the company officer.
- Hose stretched up a stairway should be on the stairs, tight to the inside rail. Hose must not be allowed to hang over railings in the stairwell (Figure 3).
- It is permissible to stretch hose from a shoulder load by laying the load down and pulling the hose out when the area being traversed is open and free of obstructions.
- The nozzle should be advanced to the point of use at the fire before the stretch line is charged.
- When a company is positioning hose lines at a window or door with the intention of entering to fight fire, the stretch should provide enough hose to reach the objective at the point of entry.

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Unused or removed pieces of small equipment, such as replaced nozzle tips, should be placed in a pocket to prevent them from being lost.

- Upon reaching the objective, the nozzle person lays down the shoulder load, arranges the bights in loose folds and prepares for water (Figure 4).



(Figure 4—Shoulder Load Prepared for Water)

PICKING-UP

When hose is being picked up in a building, a coupling should be disconnected outside the building to allow the hose to drain. If a continuous line of hose (consisting of several lengths) is to be picked up, each firefighter loads about three loops of hose on the shoulder. Leave sufficient hose between each firefighter to allow freedom of movement, but without allowing hose to drag.

When hose being picked up is to be put back in the bed, the lengths in the line are disconnected and loaded on the shoulder. This drains the hose and makes it easier to transport to the engine or a loading point. Loading points should be established for long lay-ins by bringing hose to a central

location between the hydrant and the apparatus.

When rolling hose, the lengths are disconnected at each coupling and pulled out straight so they will drain. Hose is generally rolled if it has become too dirty to clean at the scene, or has been damaged. If it has been damaged, it should be marked, rolled and taken back to quarters for processing.

Sometimes it becomes necessary for a company to pick up and load enough hose to respond to an alarm as quickly as possible. For example, two greater alarms in sequence, a need to move to a new location because of fire spread, inadequate water supply, or other need. When such action is required, it is suggested that the companies drain the hose and load it flat in the bed in long folds. The fold should reach the cab in front and hang out of the bed at the rear. The line leading out of the bed must be on top of the load but under the handrail. This loading may be done at selected loading points, or the engine may be loaded as it is backed along the line of hose (Figure 5).



(Figure 5 – Emergency Hose Load)

HOSE EVOLUTIONS – SECTION 6

HAND SIGNALS

Difficulty in hearing oral communications on the fireground is commonly experienced by all firefighters. To overcome this problem, Portland Fire & Rescue uses visual signals for basic maneuvers. It is essential that these signals be made deliberately, with a sweeping motion, at right angles to the

line of sight of the recipient. The recipient should confirm each signal by returning the signal to show that it was understood. Signals made in a careless manner are likely to be misunderstood and may be worse than no signal at all. Figure 6 illustrates the two basic fireground hand signals.

CHARGE LINE OR RAISE PRESSURE

Hand or light, extended overhead and rotated in a circular motion.

CEASE OPERATIONS

Hand or light swinging in a wide arc, horizontally at shoulder level.



(Figure 6 – Fire Ground Hand Signals)

“FIREFIGHTER IN DISTRESS” (Emergency Signal)

The flashlight carried by firefighters at emergencies should be used to communicate the “Firefighter in Distress” signal. The firefighter transmitting the signal should aim a flashlight at other firefighters and turn the flashlight “on” and “off” in a blinking (strobe effect) manner. The flashlight may be turned “on” and “off” by the switch on the light, or left “on” and a hand placed over the lens, then removed, repeating this action until answered by the same signal.

WORKING POSITIONS

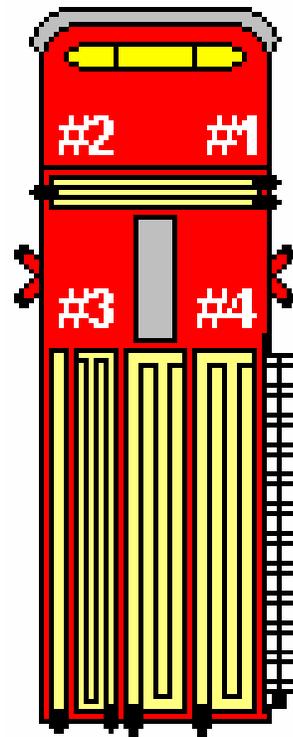
Individually assigned numbers refers to the working positions on apparatus. This is for convenience in training scenarios and to more clearly assign task responsibilities (Figure 7).

- #1 – Officer
- #2 – Driver
- #3 – Nozzle position
- #4 – Hydrant position

The company officer has overall responsibility for the safety and success of the company’s operation at an emergency, and must give immediate attention to sizing up the fire. The officer must decide whether to assist the company with the stretch or take

command of the incident. In cases where the company is short-handed or where unforeseen difficulties arise, the officer is expected to recognize and deal with these emergencies.

For ease of practice the officer has been assigned task-oriented functions in the following evolutions.



(Figure 7 – Working Positions)

PART II BOOSTER HOSE

Placing a booster line in use is a simple operation. It is carried connected on a reel. Small fires outside of buildings such as auto fires, trash fires, grass and brush fires may be initially attacked with booster hose lines. **DO NOT USE BOOSTER HOSE FOR INITIAL ATTACK ON RESIDENTIAL OR COMMERCIAL WORKING FIRES!** The following rules will provide effective advancement of booster lines.

- The hose should be unreeled by a steady pull, rather than a sudden strong tug, to prevent a “backlash” of hose on the reel.
- For a straight run, take the nozzle and advance to the fire, pulling the hose. When possible, a second firefighter pays-out the booster hose from the reel to the #3 position (Figure 8).



(Figure 8 – Straight Run)

- Advancing a booster line from the engine to the fire, the nozzle person should follow an open route. This

will permit moving the nozzle to a new point of attack without excessive delay. Take enough hose so that there is enough working line to control the fire or wash-down the product (Figure 9).



(Figure 9 – Advancing Booster Hose)

- When replacing the booster hose use a rag to clean the hose as it is reeled up, inspecting for deep cuts or abrasions, and taking care to wind the hose on the reel in an orderly fashion, and remember to refill the booster tank (Figure 10).



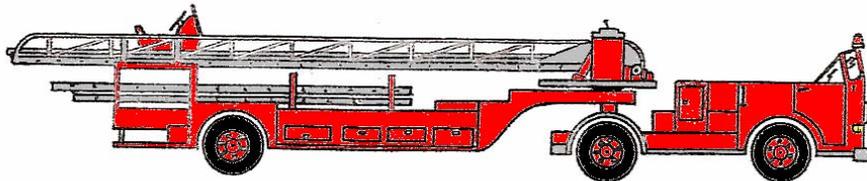
(Figure 10 – Replacing Booster Hose)

GLOSSARY

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.
POLES	Support poles attached with swivels to the main section of long extension ladders and used to help guide and steady the ladders during raising and lowering operations.

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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.
SPIKE	A pointed metal pin set into the end of a pole.
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 over-extended when raised or retracted.
TOP	The end of the ladder opposite the heel.



PART I TYPES OF LADDERS

The use of ladders is so essential to the operation of the fire service that they are carried to some extent on nearly all fire apparatus. To handle all the different situations that may be encountered, there are many different types of ladders employed by the fire service. Listed below are the types most commonly used.

- Straight
- Extension
- Roof Ladder
- Attic
- Aerial

Straight Ladder

Straight ladders are single section ladders that range from 10 to 25 feet in length. The fixed length of a straight ladder limits the places it can be used. Therefore, selection of the proper size of ladder for the job to be done is crucial (Figure 1).

Extension Ladder

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 40 foot and 50 foot extension ladders are equipped with poles to assist in raising and steadying them (Figure 2).

Roof Ladder

Roof ladders are straight ladders, equipped with spring-loaded collapsible hooks at one end and are up to twenty feet in length. They are used when

working on roofs to distribute weight and avoid slipping. They may also be used for descending into holes or whenever it is necessary to suspend a ladder from the top instead of supporting it from the bottom (Figure 3).

Attic Ladder

Attic ladders are small and vary in type and design, from small roof ladders to collapsible ladders, which fold to a width of four inches. They are usually used in confined areas to gain access to attics or other hard to reach places (Figure 4).

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 (Figure 5).



(Figure 1 – Straight Ladder)

LADDER PRACTICES – SECTION 7



(Figure 2 – Extension Ladder)



(Figure 4 – Attic Ladder)



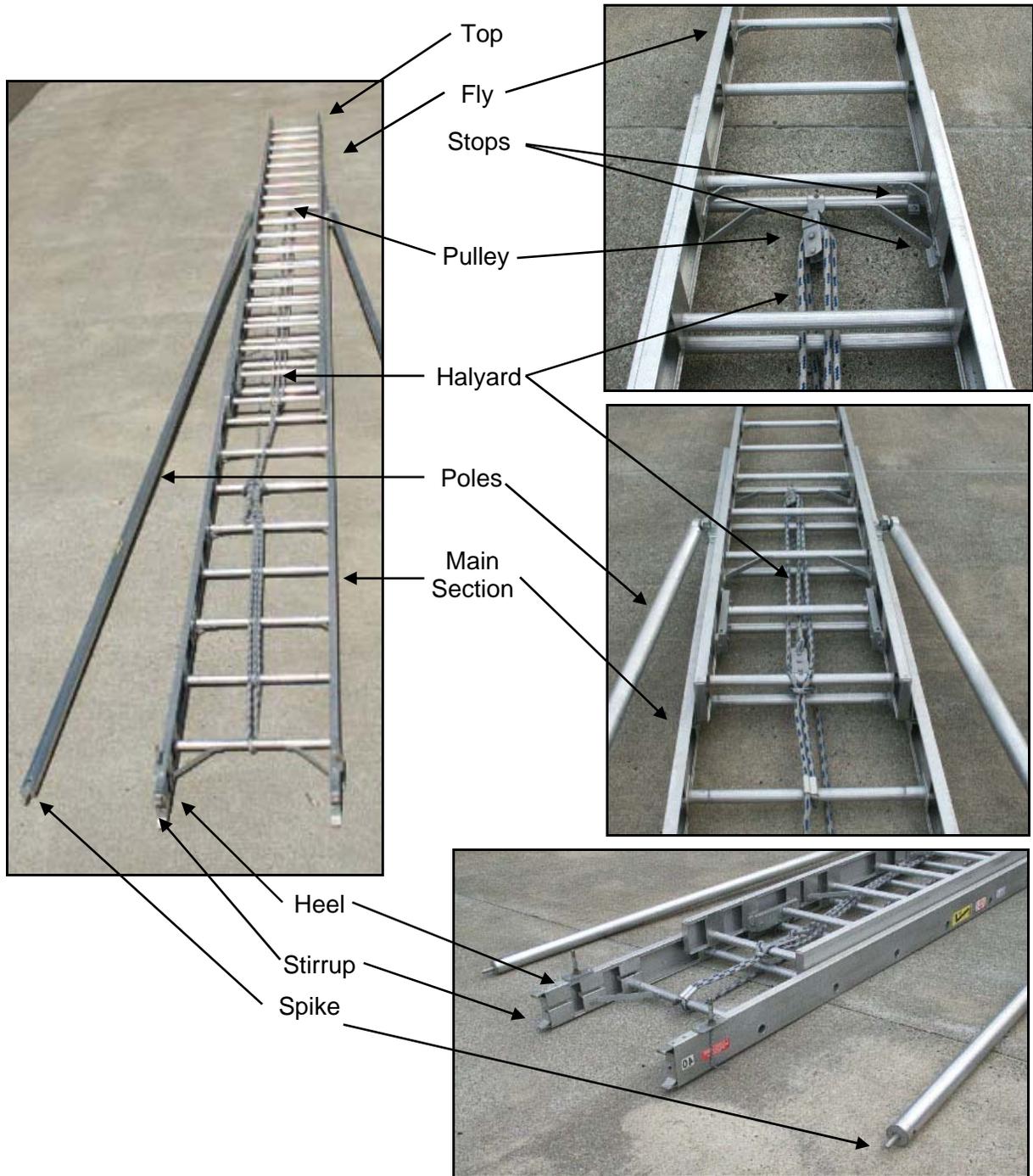
(Figure 3 – Roof Ladder)



(Figure 5 – Aerial Ladder)

PART II CONSTRUCTION, PARTS, AND CARE

The illustration below shows some of the common parts and terms used in reference to ladders.



(Figure 6 – Parts of a Ladder)

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CONSTRUCTION

A modern fire service ladder is 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. Portland Fire & Rescue has a rigid program of inspection and maintenance. The National Fire Protection Association and the National Board of Fire Underwriters publish the standards of material, construction and maintenance for fire service ladders. Until recently, ladders were made of wood. Due to the increasing shortage of prime ladder stock, a modern ladder is constructed of metal (aluminum alloy) or fiberglass type materials.

Parts

Firefighters use many terms and expressions to describe the parts of a ladder. Parts of the ladder are depicted in Figure 6, and definitions for the terms can be found in the glossary. The terms have been selected because of their wide usage and commonly accepted meaning. They will be used as standard nomenclature throughout this manual.

Ladder Care

All fire service ladders should be given an annual strength test supervised by proper authority. Also, fire service ladders must receive constant care and attention to keep them in dependable condition.

As part of this program of constant care and attention, ladders should be examined *after each use* for damage they may have received. Any repairs that are needed should be made immediately. A thorough weekly

inspection should be made to determine their overall condition. During this inspection, ladders should be removed from the apparatus and placed on ladder horses 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, coat with paraffin wax by rubbing it over and onto all of the contacting parts, as this reduces wear.

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. It is customary, on most ladder trucks, to nest some short, straight ladders in longer ladders, both straight and extension. Some trucks carry several ladders in a single "nest." In order to get at any of the longer

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ladders, it is necessary to remove the shorter ones first.

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.

Keep locks, bumpers, and brackets securely fastened.

It is not good practice to relocate a ladder more than a short distance by sliding it along a cornice or to roll it beam over beam.

Paint shall not be applied to aluminum parts of the ladder except for identifying the length and/or company number. It is not necessary to paint aluminum ladders, but some aluminum ladders have guides and miscellaneous parts that might require painting. Covering a damaged surface with paint without proper preparation and repair does not correct the problem.

Rust that has formed on steel parts of the ladder should be wire brushed clean to remove all loose scale and then repainted.

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.

- D. Use paraffin wax as a lubrication. This wax coats and works into the pores of the aluminum ladder and does not easily wash away with frequent water baths. Extend the ladder, and simply rub the wax over and onto all of the contacting parts. Do not forget to coat the lock parts (dogs) with wax as this reduces the wear on the rungs and these parts move over the rungs every time the ladder is used.
- E. A coating of paste wax to the unpainted aluminum surfaces will preserve the finish longer.

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.

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- 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, the ladder shall be tested before placing it back in service.



NOTE:

Any picture in the following sections which shows a firefighter not in full turnouts is included only for the purpose of clarity. When training, drilling, or at an actual emergency, appropriate PPE shall always be worn.

PART III CLIMBING LADDERS

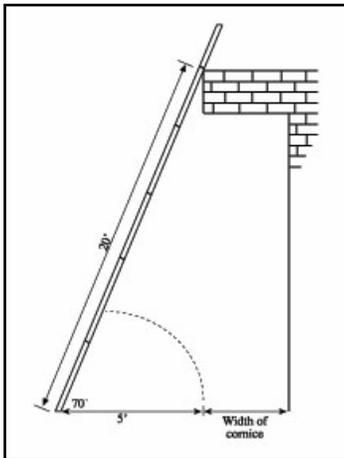
Whenever a firefighter climbs or works from a ladder, the safety of the firefighters depends on the angle of inclination, observance of ladder load capacities, correct climbing methods, and utilization of the proper safety holds.

ANGLE OF INCLINATION

The angle of inclination providing both strength and easy climbing is about 70 degrees from the horizontal. Increasing this angle results in decreased stability of the ladders. 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.

Proper Angle of Inclination

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 (Figure 7). 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.



(Figure 7 – Proper angle of inclination)

Checking Angle of Inclination

Stand erect with the toes of your boots against the ladder stirrups (Figure 8). Then extend your arms straight out from your shoulders 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.



(Figure 8 – Checking angle of inclination)

LADDER LOADING

The safe capacity or normal load limit of a ladder with the weight properly distributed and the ladder at the recommended angle of inclination will vary with the length of the ladder. National Standards for Ladder Capacities are set forth in Standard #1932 from NFPA. It is our belief that this standard should not be exceeded and that it should be curtailed to meet local practices. The following, more conservative table will be used with our ladders.

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Ground Ladders

0 to 19 feet.....	1 firefighter
20 to 29 feet.....	2 firefighters
30 to 39 feet.....	3 firefighters
40 to 49 feet.....	4 firefighters
50 feet and above.....	5 firefighters

Ladders Resting On A Roof

The capacity of a ladder resting on a roof will vary with the length of the ladder and the pitch of the roof. In addition, room must be allowed for firefighters on the ladder to work safely and effectively. 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. They have been developed as the safest, most efficient manner of climbing, and they will keep ladder bounce and sway to a minimum.

Portland Fire & Rescue Ladders

PF&R ladders are climbed with the hands on the rungs. While climbing the ladder, grasp the rungs with palms down and step on the rungs with the balls of your feet. 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 (Figure 9).

When climbing a ladder and carrying a piece of equipment, such as a roof ladder or power saw, it is important for a firefighter's hand to maintain contact with the ladder at all times. To do this, the firefighter must slide their free hand up the beam of the ladder. This will enable the firefighter to carry equipment in the other hand and still have a secure contact point with the ladder.



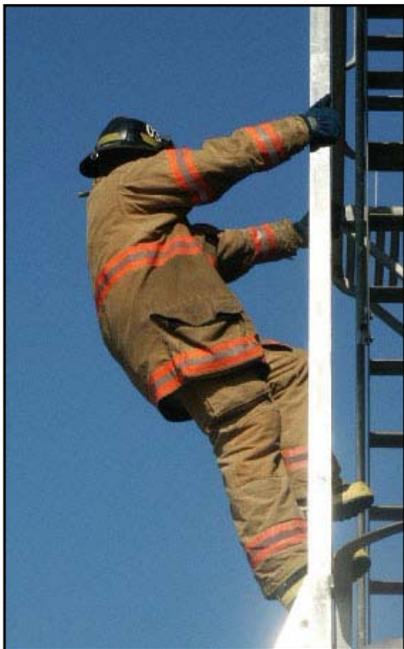
(Figure 9 – Climbing Fire Bureau ladders)

Fire Escape (Firefighter's) Ladder

The firefighter's ladder is climbed by sliding the hands up the beams rather than placing them on each rung. This is done so that if a rung were to give way, it would be underfoot and the firefighter climbing would be able to avoid a fall by holding onto the beams with both hands. Arms should travel between waist and shoulder level with thumbs wrapped to the inside of the beams. By keeping a slight bend in the arms, the legs do the

LADDER PRACTICES – SECTION 7

majority of the work. At all times, three points of contact with the fire escape shall always be maintained (Figure 10).



(Figure 10 – Climbing fire escape ladders)

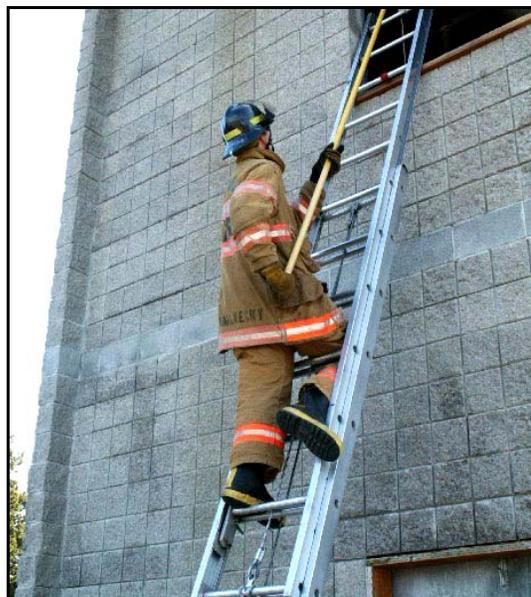
SAFETY HOLDS

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.

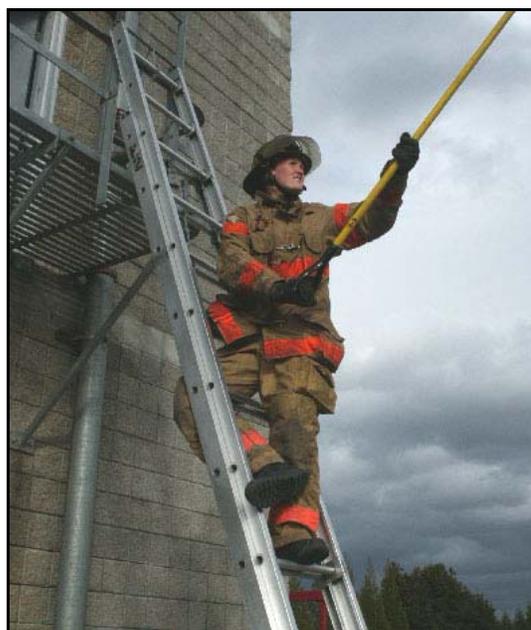
Leg-Locks

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 (Figure 11), or facing away (Figure 12). 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.



(Figure 11 – Leg-lock facing ladder)



(Figure 12 – Leg-lock facing away)

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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 (Figure 13).



(Figure 13 – Body Hold)



PART IV 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. These positions will be detailed in Section 8, "Ladder Evolutions."

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 as shown in Figure 14. This same procedure should be followed in reverse whenever laying a ladder on the ground.



(Figure 14 – Picking up for carry, ladder flat)

It is not advisable for one firefighter to carry a ladder in a horizontal position because the ends of the ladder cannot be properly safeguarded. When it is necessary, the ladder is picked up near the center and caution is taken not to strike anything or anybody with the ends of the ladder.

Flat Pickup for Carry

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 as in Figure 14.

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 is executed toward the ladder. This places the ladder on the shoulder as shown in Figure 15.

LADDER PRACTICES – SECTION 7



(Figure 15 – Ladder ready for carry)



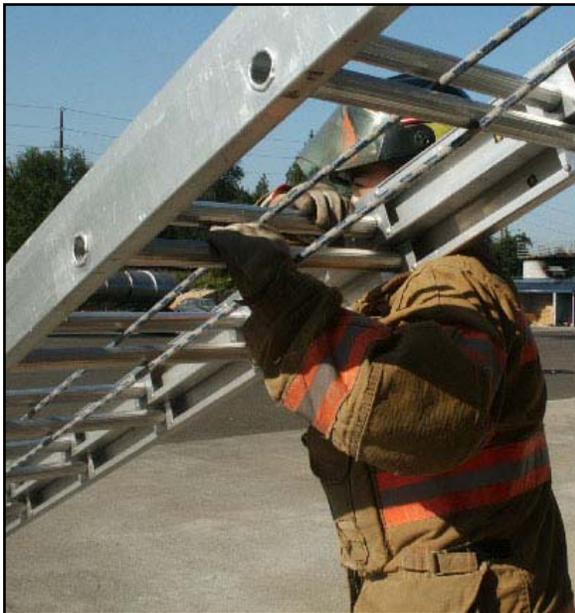
(Figure 17 – Ladder raised, on the flat)

Flat Pickup for Raise

When the ladder is to be raised, follow the same procedure as for flat pickup for carry. After executing the about-face, (Figure 16), push the ladder high above the head until the arms are straight as shown in Figure 17. By advancing the hands down the rungs (one firefighter), or the beam (two firefighters), the ladder is raised to the vertical.

Beam Pickup for Carry

Take a position alongside the ladder, facing the direction of carry or facing the ladder. You then squat and take hold of the center of a rung with one hand and the top beam with the other hand as shown in Figure 18. The ladder is lifted and an arm is passed between the rungs bringing the top beam to rest on the shoulder as shown in Figure 19.



(Figure 16 – Executing about-face)



(Figure 18 – Beam position, for carry)

LADDER PRACTICES – SECTION 7



(Figure 19 – Carrying a ladder on the beam)

Beam Pickup for Raise

Take a position alongside the ladder facing the direction opposite to that in which the ladder is to be raised. Take hold of the second to the last rung or the last rung, as shown in Figure 20, with the palm of your hand toward the heel of the ladder. As the ladder is lifted above your head, swing under the beam in an about face which leaves you facing the heel (Figure 21). By advancing your hands on the beam, the ladder is raised vertically.



(Figure 20 – Beam pickup for raise)



(Figure 21 – Swinging under the ladder, beam pickup for raise)

When there are two firefighters for the beam positions, the firefighter at the forward beam position advances with hands down the beam, keeping them near the shoulder with the head to one side of the beam as shown in Figure 22.



(Figure 22 – Ladder being raised on the beam, two firefighters)

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HEELING A LADDER

The heeling of a ladder means anchoring the heel so it will serve as a pivot for the ladder during the raise. This is accomplished by placing the heel against the side of a building or by positioning one or more firefighters at the heel or bottom of the ladder.

Depending on the position of the ladder at the start of a raise, there are two different ways of heeling a ladder. Either the ladder is on the flat, or on the beam.

Ladder Flat

Place both feet on the bottom rung of the ladder close to the beams. Grasping a rung above the feet with both hands, you lay back, using your body weight to assist in the raise as shown in Figures 23 and 24. As the ladder is raised, your hands are moved up one rung at a time.



(Figure 23 – One FF heeling, ladder flat)

When two 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.



(Figure 24 – Two FF's heeling, ladder flat)

Just before the ladder reaches the vertical, step back with one foot, leaving the other foot on the bottom rung. At the same time, place your hands on the beams about shoulder high as shown in Figures 25. All firefighters involved in the raise should be looking up at the top of the ladder. This will help the firefighter(s) at the heel position check the momentum and steady the ladder.



(Figure 25 – Stepping back as ladder reaches vertical)

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Ladder on the Beam

A position is taken alongside the base of the ladder facing the top. The foot next to the ladder is then placed on top of the ladder and spanning the heel, pushing the stirrup firmly to the ground. The other foot is placed one step forward. One hand is placed on the upper beam stirrup with the other grasping the upper beam directly above the forward foot (Figure 26).



(Figure 26 – One FF heeling, ladder on the beam)

As the ladder is raised by the firefighter at the beam position, the firefighter at the heel position pushes down with the hand on the upper stirrup and pulls up with the other hand. The forward foot is

moved back as the ladder comes up to maintain good body balance.

As the ladder reaches vertical, place your hands on the beams about shoulder height. Rest one foot on the bottom rung to steady the ladder. Eyes should be looking up at the top to assist with steadying the ladder (Figure 27).



(Figure 27 – One FF steadying ladder)

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 (Figure 28).



(Figure 28 – Two FF's heeling, ladder on the beam)

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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.

The operation as described here, begins with the ladder in a vertical position. At this time, either the flat side of the ladder or the one beam of the ladder will be toward the building.

Flat Side Toward Building

Take the position shown in Figure 27 and ease the ladder carefully to the building. 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 (see Figure 29).



(Figure 29 – Lowering the ladder to the building, flat side)

The firefighter in the heel position maintains a hand position about shoulder height on the beams. While keeping the heeling foot on the bottom

rung, 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 maintaining their heeling foot on the bottom rung as shown in Figure 30.



(Figure 30 – Two FF between ladder & bldg)

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 on the bottom rung, next to the beam nearest the building. Placing hands on the beams about shoulder height, the ladder is steadied as it is eased into the building on the beam (Figure 31). Both firefighters should be watching the top of the ladder. As soon as the top of the ladder rests against the building, the firefighter

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heeling the ladder turns the ladder down flat, which is also referred to as “closing the door.”



(Figure 31 – Lowering ladder, ladder edge toward building)

ADJUSTING A 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.

Side Position

Take a position alongside one of the beams and grasp the second or third rung from the bottom with one hand and the beam about shoulder height with the other. Then lift the ladder slightly and move the heel to the proper distance from the building (Figure 32). Two firefighters would take opposing positions, one alongside each beam.



(Figure 32 – Adjusting ladder, side position)

SHIFTING A LADDER

It is often necessary to move or shift a ladder that has been raised and positioned without lowering the ladder to the ground. When this situation is encountered, the ladder is shifted in one of three ways: by rolling the ladder, vertical carry in front of the body, or vertical carry on the shoulder.

Rolling a Ladder

When a ladder resting against a building is to be rolled or turned, your foot is placed on the bottom rung next to the beam that is in the direction of the roll or turn. Hands should be placed on the beams about shoulder high as shown in Figure 33. 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. Removing your foot from the rung and allowing the ladder to pass in front of

LADDER PRACTICES – SECTION 7

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 bottom rung. This procedure can be repeated multiple times to reach a designated objective.



(Figure 33 – Rolling or turning a ladder)

Vertical Carry, in Front of the Body

Depending on your height and the distance the rungs are apart, you will grasp either the second or the third rung from the bottom of the ladder with one hand and the beam overhead with the other hand as shown in Figure 34. The ladder is canted slightly back overhead, and is easier to balance and carry when held away from the body. The top of the ladder should be checked frequently to avoid collision with obstacles overhead.

Vertical Carry, on the Shoulder

An arm is placed through the ladder between the third and fourth rungs from the bottom and the second rung from the bottom is grasped with the hand,

bringing the fourth rung to rest on the shoulder. The other hand is raised high on the front beam to aid in balancing the ladder. This position is shown in Figure 35. With this method, the weight of the ladder is carried on the shoulder rather than by the arm.



(Figure 34 – Vertical carry in front of body)



(Figure 35 – Vertical carry, on the shoulder)

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LADDER POLES

The poles on poled ladders are used to assist with the following:

- Raising the ladder
- To steady the ladder while the fly is being extended
- To control the movement at the top of the extended ladder
- To help support the ladder load and check side sway when the ladder is in position

The following information is basic to the use of poles. Further information relative to specific operations will be given when these operations are described.

Holding a Ladder Pole

The firefighter in the pole position faces the pole and grasps the lower end in one hand and with the other hand grasps the pole higher up at a distance, which is comfortable (Figure 36).



(Figure 36 – Holding a ladder pole)

A firefighter in the pole position should maintain an upright position and watch the top of the ladder. There are times when a pole will be moved into positions which would require the firefighter holding the pole to stoop to maintain a hold on the end of the pole. At such times let the pole slide through your hands in order to stay erect. The sliding of the pole should be done by alternating through the upper and lower hands. As you move out of these positions you can regain your original hold on the pole.

Positioning With The Poles

Coordination of firefighter's efforts in positioning the poles is extremely important since the poles give them leverage on the ladder, which cannot be overcome by the firefighters at the beam position. For this reason, the two firefighters at the pole positions should face each other. This will allow them to coordinate their efforts to the observed progress of their partner and quickly communicate back and forth should it become necessary.

When the ladder is standing in a vertical position, as when the fly is to be extended, one firefighter handling the pole should always move to a position at ninety degrees from the other (Figure 37). This will ensure stability at the top of the ladder. Also, continue to watch the top of the ladder and direct each other as necessary to keep the ladder vertical.



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(Figure 37 – Poles at 90 degrees)

Walking With a Pole

When walking with a pole to assume a position at ninety degrees from the other pole, the firefighter walks forward. If the position is to the rear, move around the pole, change hands and walk forward to the new position. Arriving there you again move around the pole and change hands, so that you once again face the other pole.

Placing the Poles

When the ladder has been lowered to the building the pole ends are placed on the ground next to the building in a manner that keeps them out of the way and helps to support the load on the ladder (Figure 38). They must be checked frequently to see that they have not been moved by traffic on the ladder. Movement of the poles may cause the ladder to move or walk from its original position.



(Figure 38 – Poles in position)



RULES AND REGULATIONS

Governing the

PORTLAND BUREAU OF FIRE & RESCUE



**These Rules and Regulations supercede all
Rules and Regulations and other orders
conflicting herewith published prior to
July 1, 2008**

ARTICLE NUMBER 100

DEFINITIONS

100.1 ACTING OFFICER: An officer or other member designated and assigned by order of a superior to perform the duties of the next higher level of authority.

100.2 BATTALION HEADQUARTERS ADMINISTRATIVE CHIEF: A Deputy Chief, designated by the Division Chief of Emergency Operations, responsible for administering a Battalion Headquarters conforming with the rules, regulations and codes of the Bureau, and the policies and practices prescribed by the Chief of the Bureau.

100.3 BATTALION: A number of stations commanded and supervised by a Battalion Chief.

100.4 BATTALION CHIEF: A Chief assigned to manage the activities of a Battalion.

100.5 BUREAU: The City of Portland government is divided into five (5) executive departments, each headed by an elected official. A bureau is a primary subdivision of a department, and wherever used in these Rules and Regulations shall mean the Bureau of Fire & Rescue.

100.6 CHARTER: The Charter of the City of Portland, Oregon.

100.7 COMMISSIONER: The elected official charged with the administration of the executive department of city government to which the Bureau of Fire & Rescue is assigned.

100.8 COMPANY: A crew of sworn members assigned to perform duty under the immediate supervision of a company officer.

100.9 DEPARTMENT: A division of the city government.

100.10 DETAIL (Special): An assignment of one or more members by the Chief of the Bureau or designee to such special service and hours of work as may be deemed necessary.

100.11 DETAIL (Company): An assignment from one company to another for a limited period of time.

100.12 DIVISION: One of five functional areas of the Bureau: Chief's Office, Emergency Operations, Fire Prevention, Training & Safety, and Management Services.

100.13 FIRE MANAGEMENT AREA (FMA): The geographic area assigned to a fire station. The station is responsible for various administrative duties within the FMA.

100.14 GENERAL ORDERS: Orders, instructions, notices, directed procedures, and other information of a semi-permanent nature or of concurrent concern circulated and properly coded for disposition and filing purposes.

100.15 HEADQUARTERS: The office of the Chief and such other general offices as required for the operation and administration of the Bureau.

100.16 MEMBERS: All personnel actively employed in the Bureau.

100.17 NORMAL CHANNELS: The formal route for forwarding or transmitting official communications; runs from the point of origin through each ascending or descending level of authority.

100.18 OFFICER: A member of the uniformed force permanently appointed to the rank of Lieutenant or above.

100.19 SECTION: A unit of a Division.

100.20 SHIFT: The Operations Division is divided into three (3) shifts known as "A" Shift, "B" Shift and "C" Shift.

100.21 STATION: A building in which one or more companies of the Emergency Operations Division is quartered.

100.22 SWORN MEMBERS: Those members swearing the Oath of Office pertaining to their rank.

100.23 TOUR OF DUTY: A specified number of continuous hours on duty.

100.24 UNIFORMS: Includes all the various types of uniforms of the Bureau and all items of wearing apparel furnished by the City for on duty use by Bureau members.

100.25 UNIT: A general term referring to any one of the organized components of the Bureau.

ARTICLE NUMBER 400

FIRE FIGHTERS

400.1 Fire Fighter is the basic Civil Service classification in the fire service.

400.2 Fire Fighters shall perform their duties under the direct supervision of their company officer unless otherwise assigned.

400.3 They shall become familiar with the Rules & Regulations, General Orders, Operational Guidelines, Training Bulletins and other publications of the Bureau.

400.4 They shall promptly respond with their companies to all alarms or other emergencies assigned to them and shall assist one another when executing the orders of their superior officers.

400.5 When their company is not immediately ordered to work at fires or other emergencies they shall remain with their company.

400.6 They shall participate in company drills and other instructional training as directed.

400.7 In addition to emergency duty and as a condition of their employment, they shall perform fire prevention inspections, pre-fire inspections, hydrant surveys, equipment repair and maintenance, station maintenance and such other duties as may be directed by their company officers.

400.8 All newly appointed Fire Fighters shall be required to successfully complete a probationary training period of one year.

400.9 Whenever a dangerous or unsafe condition within the Bureau's jurisdiction is observed or called to their attention they shall promptly notify the responsible Officer, Manager or Supervisor who shall take appropriate action.

400.10 They shall perform such other duties as their superior officers may direct.

ARTICLE NUMBER 500

GENERAL RULES OF CONDUCT

500.1 In all matters of general conduct members shall be governed by the ordinary and reasonable rules of behavior observed by self respecting, law abiding citizens, and shall commit no act tending to bring reproach or discredit upon the Bureau or its members.

500.2 Members shall not conduct themselves in a manner, or be a party to any act, which would tend to impair the good order and discipline of the Bureau.

500.3 Members shall devote their time and effort to the welfare of the Bureau. They shall not be employed in or connected with any business or occupation which will in any way impair their health or their proficiency, or otherwise bring adverse criticism upon the Bureau.

500.4 Members shall not engage in any private enterprise for personal gain in any Bureau building.

500.5 In matters pertaining to the policy and practices of the Bureau, no member shall give utterance by public speech or publication, or take any similar action either directly or indirectly, without first obtaining the approval of the Chief of the Bureau.

500.6 No information relative to the business affairs of the Bureau shall be furnished persons not connected therewith, except as authorized by the Chief of the Bureau.

500.7 Members shall not lend their names, as members of the Bureau, to any commercial enterprise; nor shall they approve or allow the use of the name and prestige of the Bureau for any such purpose.

500.8 No member shall receive or accept a reward, fee or gift from any person for services performed in the line of duty, except as authorized by City Council.

500.9 No member shall contact the office of the Mayor or City Commissioner concerning any matter affecting the Bureau or any employee thereof, except through normal channels and in those cases where the routine business of the Bureau requires it.

500.10 No member shall use the uniform, badge or prestige of the Bureau to attempt to influence the vote of any person either for or against any candidate for elective office.

500.11 While on duty or representing the Bureau, no member shall display or distribute campaign literature, or solicit or speak for or against any ballot measure or candidate for elective office.

500.12 In all matters pertaining to the Bureau, members shall render prompt and unquestioned obedience to the orders of superiors.

500.13. Officers shall be addressed and referred to by their respective titles.

500.14 Members shall avoid political or religious arguments while on duty.

500.15 Members shall not report for duty or be on duty under the influence of any intoxicating liquor, illegal drug or compound.

500.16 No member shall bring or cause to be brought into quarters any controlled substance, intoxicating liquor, illegal drug or compound.

500.17 Members shall not have in their possession or partake of any intoxicating liquor, illegal drug or compound while on duty or in uniform.

500.18 No member shall use any prescription or non-prescription medications which may interfere with the safe and effective performance of duties or operation of City equipment without notifying their supervisor prior to beginning work.

500.19 No member shall be a party to any malicious gossip, report or activity which would tend to disrupt Bureau morale or bring discredit to the Bureau or any member.

500.20 Members shall not use obscene, uncivil or boisterous language at fires, in quarters, or while engaged in activities at which the Bureau is represented. Engagement in altercations under any circumstances is prohibited.

500.21 The falsification of records, the making of misleading entries or statements with intent to deceive, or the willful mutilation of any useful Bureau record, book, paper, computer entry or document will be considered cause for disciplinary action.

500.22 Smoking by members on fire apparatus or on duty at fires shall not be permitted. Reasonable exception may be made by the officer in charge when no emergency exists.

500.22 No member shall smoke in or on any oil or gas terminal, wharf, dock, pier, or waterfront in the Port of Portland.

500.23 Members shall not loan, sell, give away, or appropriate for their own use any public property or private property. A person found guilty of theft, pilferage or shoplifting at fires or elsewhere shall be subject to disciplinary action up to and including discharge.

500.24 Except in the event of an emergency, members shall not enter any Bureau property to remove or alter any piece of apparatus or equipment without clearance from the officer in charge.

500.25 No member shall go off duty unless properly relieved or authorized to by a superior officer.

500.26 Visitors shall not be permitted in stations from 2200 hours to 0800 hours, or during work or drill periods, unless authorized by the company officer.

500.27 Punctuality is required of all members. Failure to report for duty or to place of assignment at the time specified will be considered cause for disciplinary action.

500.28 All members shall forward all communications of an official nature through normal channels unless otherwise directed by a higher authority.

500.29 Inefficiency or indifference of members in the performance of their duties shall be sufficient cause for disciplinary action.

500.30 No member shall willfully disobey any lawful order issued by a superior officer. No member shall speak disrespectfully of or to any superior officer.

500.31 The wrongful or injurious exercise of authority on the part of any member may be cause for disciplinary action.

500.32 Members who become incapable of performing their duties because of unethical, immoral or unlawful acts will be subject to disciplinary action.

500.33 Members shall stay physically fit.

500.34 While in uniform, members shall refrain from visiting places of amusement unless they are on Bureau business. The soliciting of admission, tickets or passes is strictly prohibited.

500.35 Members shall promptly notify their immediate superiors of any changes in personal residence, telephone number, or other similar information.

500.36 Members shall be responsible for securing their lockers and assigned storage spaces, and for maintaining them in a clean and orderly condition.

500.37 Members shall reflect cleanliness about their persons and their uniforms and be exemplary in all other matters regarding personal appearance.

500.38 Members are forbidden to solicit or receive subscriptions or donations, or influence any person to purchase tickets, for any purpose in which the name of Portland Fire & Rescue is either used or implied, without the approval of the Chief of the Bureau.

500.39 Members shall not initiate arrangements to appear on, or use the name of Portland Fire & Rescue on, radio or television programs, nor shall they represent the Bureau on any broadcast or telecast, without the specific approval of the Chief of the Bureau or his/her designee. All scheduled public appearances to represent the Bureau shall first be authorized.

500.40 Members shall have a telephone at their place of residence in order to receive emergency calls.

500.41 Members off duty for any reason, such as sick leave, injury leave, or leave without pay, shall notify their immediate supervisor of their intention to return to duty, giving as much prior notice as possible. The Chief of the Bureau may require of all members a specified interval of time between notification of intention to return to duty and the actual reporting hour, such requirement being compatible with the City Code.

500.42 Members detailed to places of public assembly, fire duty, or fire watch shall not leave their posts without permission or otherwise being properly relieved.

500.43 False, fraudulent, or continued frivolous claims against sick time allowances, or disability or injury benefits, shall be considered cause for dismissal from the Bureau.

500.44 During or in the performance of inspections or emergency duties, members shall not physically examine or otherwise handle the personal property or merchandise of others, except as necessary for the protection of such property or merchandise.

500.45 Members in quarters or on Fire & Rescue property during their normal off-duty hours shall be subject to all the Rules & Regulations governing on-duty members, except for Rule 400.4.

500.46 The violation of any of the provisions of the Rules & Regulations, General Orders of the Bureau, or City Administrative Rules, and neglect or evasion of the prescribed duties, shall be cause for disciplinary action.

500.47 Members shall constantly be mindful that they are public employees in the uniformed service of the City, and as such their conduct on or off duty is subject to critical review by the general public. They shall conduct themselves as law abiding, self respecting citizens. They shall commit no act on or off duty tending to bring reproach or discredit upon the Bureau or its members.

500.48 All members must notify their immediate superior when charged with any felony or convicted of any crime. The immediate superior shall notify their Division Chief/Division Manager through channels as required by Rule 200.40. Conviction of any crime, on or off duty, subjects the member to the disciplinary process up to and including discharge. Any member on or off duty convicted of any crime involving bias, as defined in Oregon State law, or convicted of a felony, is subject to discharge.

500.49 No member shall use the uniform, badge or prestige of the Bureau to gain favorable or preferential treatment in any civil or legal matter; or attempt to avoid or influence the issuance of a citation or summons by any law enforcement official.

500.50 All members shall be truthful in all written and oral statements made to any superior officer who is investigating any matter that concerns the well being of the Bureau. Failure to do so shall be cause for discipline up to and including discharge.

500.51 Use of personal cell phones or electronic devices shall not interfere with a member's ability to respond or perform their duties.

500.52 Members driving or riding in any City vehicle, or driving or riding in their personal vehicle for City business, shall wear seat belts.

500.53 Sworn members shall maintain a valid State of Oregon Emergency Medical Technician certification.

ARTICLE NUMBER 625

BUREAU UNIFORMS

625.1 Uniform items furnished by the City shall remain the property of the City. The Chief of the Bureau shall establish regulations for uniform issuance and control.

625.2 Whenever an officer determines that any part of a member's uniform is in need of replacement or repair, the member shall be directed to initiate the repair or replacement of identified items. Officers shall ensure that all members under their command adhere to uniform regulations.

625.3 Members of the uniformed force shall not loan any portion of the prescribed uniform to persons outside the Bureau except by permission of the Chief of the Bureau.

625.4 All members shall be provided with the badge of their division and/or rank which shall be worn as prescribed by the Chief of the Bureau. Any member who loses the official Bureau badge shall report the matter through normal channels within five (5) days.

625.5 Violation of the Rules & Regulations and General Orders pertaining to the care and use of the Fire & Rescue uniform shall be a disciplinary offense.

PORTLAND FIRE & RESCUE
Portland, Oregon

October 7, 2008

GENERAL ORDER NO. 16

CARE AND TESTING OF FIRE HOSE

I. GENERAL

- A. This order supersedes and rescinds General Order No. 16, dated March 14, 2006.
- B. It is the purpose of this order to establish procedures for the general care and maintenance of Portland Fire & Rescue's (PF&R) fire hose.
- C. The Chief of PF&R has designated a B shift battalion chief as hose officer to administer PF&R's hose program.
- D. The engine officer on B shift shall be designated as the station hose officer. All hose matters should be processed through the station hose officer. It is not the purpose of this order to reduce or restrict the station captain's authority or responsibility for the hose assigned to the station.
- E. Reference is made throughout this general order to the hose inventory.

II. ORDINARY CARE OF WOVEN JACKETED FIRE HOSE

- A. When the woven jacket of a fire hose becomes dirty it shall be thoroughly washed with a brush and clean water to remove dirt. Do not use any type of solvent to remove grease or stains. A strong soap or mild detergent may be used in extreme cases where stains are the result of oil or acid exposure.
- B. 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 rinsed with water. In persistent or severe cases use a solution of one cup bleach in five gallons of water, brushing with the solution and thoroughly rinsing with water. Even though mold or mildew may leave stains, they will not damage all-polyester hose jacket material.
- C. Before hose is loaded, graphite the swivels and threads of the couplings as necessary. Inspect the gasket in the female coupling of each length. If the gasket is hardened, deteriorated, or projects appreciably into the waterway, replace it with a fresh, properly fitted gasket. Inspect for the burring of threads on the male coupling. If the threads of the male couplings need filing, use a 7" double tapered, extra slim, three-corner file. The file shall be carried on all first line and reserve engines. Spray cans of graphite are available from Logistics. All hose couplings should be checked for damage and a light film of petroleum jelly applied to the gasket before coupling as necessary.

- D. Never attempt to roll or fold frozen hose. Transport frozen hose to a warm place. After thawing, give it regular care.
- E. Do not allow any vehicle to run over fire hose during fire fighting operations unless absolutely necessary. Do not drive over the hose on or near the couplings. It is not permissible to run over any part of fire hose during picking-up operations. Do not allow vehicles equipped with studded tires or chains to run over fire hose unless the hose has been properly bridged with hose jumpers.
- F. Company officers shall record in the hose inventory software on the company computer all regular hose changes for both first-line and reserve apparatus.
- G. After a fire, companies shall reload their hose and return to in-service status as soon as possible. In exceptional cases of dirty or contaminated hose, the company officer may obtain permission from the incident commander to return to quarters out-of-service.
- H. Salvage hose is stored in the hose depot and is identified by S2, S3, and S4 respectively. Lengths of tested 1 3/4", 2 1/2" and 3" first-line hose are stored. After a fire has been controlled and it is apparent there will be a prolonged period of mop-up or stand-by (a day or more), the officer in charge of the fire shall arrange for hose replacement with salvage hose.

III. HOSE CHANGE SCHEDULE

- A. Companies shall reload first-line and reserve hose every three months. Hose changes shall occur in January, April, July and October.
- B. All hose shall be reloaded so the folds will occur in different locations on the hose.
- C. All hose changes are to be recorded on the hose inventory software on the station computer. Once entered these records will be available for review by PF&R's hose officer.

IV. MARKING OF FIRE HOSE

- A. All hose issued to first-line companies shall be marked with the number of the engine company in that station. Fireboat hose shall be marked with a "B" followed by the company number.
- B. All hose issued to reserve apparatus shall be marked with an "A" followed by the apparatus number.
- C. Wash down hose shall be marked with the engine company number, and to reduce the chance of being loaded on apparatus shall be further marked with three yellow bands not less than 1/2" wide at a point near the company number.
- D. Hose shall be marked with the regulation 3" stencil supplied by Logistics. Numbers shall be painted with black latex paint. The proper identifying number shall be centered 10" from the coupling on each end of the hose on both flat sides

of the hose. Stencils shall be cleaned immediately after use and stored for future use.

- E. Rubber covered hose and forest fire fighting unlined hose shall be marked with a black indelible felt tip marker.
- F. Hose which has been reassigned and needs new numbers shall be marked as follows:
 - 1. When remarking 1 $\frac{3}{4}$ " hose with black numbers and no painted background, use a 2 $\frac{1}{2}$ " x 7 $\frac{1}{2}$ " rectangular block stencil centered 10" from the coupling to cover the old numbers. If three numerals are needed, such as required by reserve apparatus, a 2 $\frac{1}{2}$ " x 10 $\frac{3}{4}$ " block stencil shall be used.
 - 2. When remarking 2 $\frac{1}{2}$ " and 3" hose with black numbers and no painted background, use a 4" x 5 $\frac{1}{2}$ " rectangular block stencil centered 10" from the coupling to cover the old numbers. If three numerals are needed, such as required by reserve apparatus, a 4" x 7 $\frac{3}{4}$ " block stencil shall be used.
 - 3. Old numbers shall be blocked out with yellow latex paint.
 - 4. Stencils for rectangular blocks are supplied by Logistics.
 - 5. New numbers shall be centered within the block using black latex paint and a regulation 3" stencil supplied by Logistics.
 - 6. When remarking hose with red background and yellow numbers, repaint the red background and paint new numbers in yellow.
 - 7. Black, yellow and red latex paint is available through company supplies.
 - 8. See Attachment #1 for example of hose markings.

V. DAMAGED FIRE HOSE

- A. When hose is damaged enter all pertinent data into the hose inventory software section under Damaged Hose and prepare the hose for transportation. Write the following on a wire tag and firmly attach it to the hose: the date, company number, size of hose, complete identification number and an accurate description of where the hose is damaged and what the damage is.
- B. To identify the damaged area of the hose, masking tape shall be wrapped completely around the hose on each side of and within two inches of the damaged area.
- C. For all first-line hose, a new length will be issued for each damaged length sent to the hose depot. Before placing the new length in service, the company officer shall subject it to the pressure indicated in Section VI of this general order, Testing of Fire Hose.

VI. TESTING OF FIRE HOSE

- A. All hose testing shall take place from April 1 to November 1. Record test results in the station hose inventory software.
- B. The station hose officer will assign company hose tests in an equitable manner to each shift.
- C. Station captains will email PF&R's hose officer by January 1st with notification of the following:
 - 1. Completion of annual hose testing.
 - 2. Completion of quarterly hose changes.
 - 3. Confirmation of accurate hose inventory.
- D. Test standards (NFPA 1962) for hose purchased after July 1, 1987 are:
 - 1. The hose is tested as per the stenciled information on the hose (e.g., "Service test to ___ psi") for five minutes (most hose will be 400 psi). Only use apparatus with two stage pumps in the pressure mode when testing to 400 psi. Do not relay pump with single stage pumps to reach 400 psi.
 - 2. The annual hose test will be conducted with the 12-port hose test manifold (blue chapman test gates are attached to the manifold). You must use a blue chapman test gate at the pump panel discharge port when using the hose test manifold. Use your blue chapman test gate to test all repaired or replaced hose.
 - 3. Attach all hose to the side of the pump panel opposite the operator for the safety of the operator (front mount pump operators should use caution due to the configuration of their apparatus pump panel). Only test a maximum 300 feet for each discharge port on the hose test manifold
 - 4. Secure hose to the apparatus with a utility strap for safety 10 to 15 inches from the coupling attached to the discharge port.
 - 5. To check for coupling slippage, all non-painted hose (without red background) will be marked at the back of each coupling with a black permanent marker prior to filling the hose with water. If a coupling slips during the test, remove the hose from service and document in the Damaged Hose Report section of the hose inventory software. Send damaged hose to the hose depot for replacement.
 - 6. Use a spanner to tighten all couplings before adding water to the hose. Fill hose with water and pressurize to 45 psi (+ or - 5 psi). Check for leaks before increasing test pressure. Inspect the hose during the test by standing 15 feet to the left side of the hose (facing away from the pump panel). Do not straddle the hose during the test. Do not walk in front of the free end (nozzle end) of the hose during the test. Helmets and gloves

will be worn during the test.

7. Record the hose test pressure used during the test in the appropriate columns of the hose inventory software.

VII. OBTAINING NEW HOSE

- A. There are two options for obtaining new hose.
 1. The officer can fill out PF&R form 500.36 requesting new lengths of hose. The form shall be forwarded to the apparatus maintenance supervisor at Logistics.
 2. The company may also pick up the hose directly from the hose depot. This should be done during normal business hours (0800 to 1600) with assistance from a member of Logistics or Station 23.
- B. Notify PF&R's hose officer with a copy of PF&R form 500.36 or via email when obtaining new hose from the hose depot.

VIII. HOSE REPORTS

- A. When a company officer becomes aware the station has lost assigned fire hose, the identification number of the hose and the probable cause of the loss shall be phoned to PF&R's hose officer.
- B. Requests for additional hose or replacement hose shall be made by the station hose officer through the captain using the hose inventory software.
- C. When the officer needs hose replaced or repaired, the Damaged Hose Report section of the hose inventory software shall be completed. This will automatically inform PF&R's hose officer. The hose should be properly cleaned and wire tagged before sending to the hose depot.

IX. ATTACHMENTS

- A. Marking of Fire Hose
- B. Hose Inventory Change – Status Form 200

John Klum
Fire Chief
Portland Fire & Rescue

PREPARED BY:	Duane Bray
REVISION DATE:	10/07/08
EFFECTIVE DATE:	10/07/08
REVIEWED BY:	Publications Committee
REVISED BY:	Lindsay Wochnick

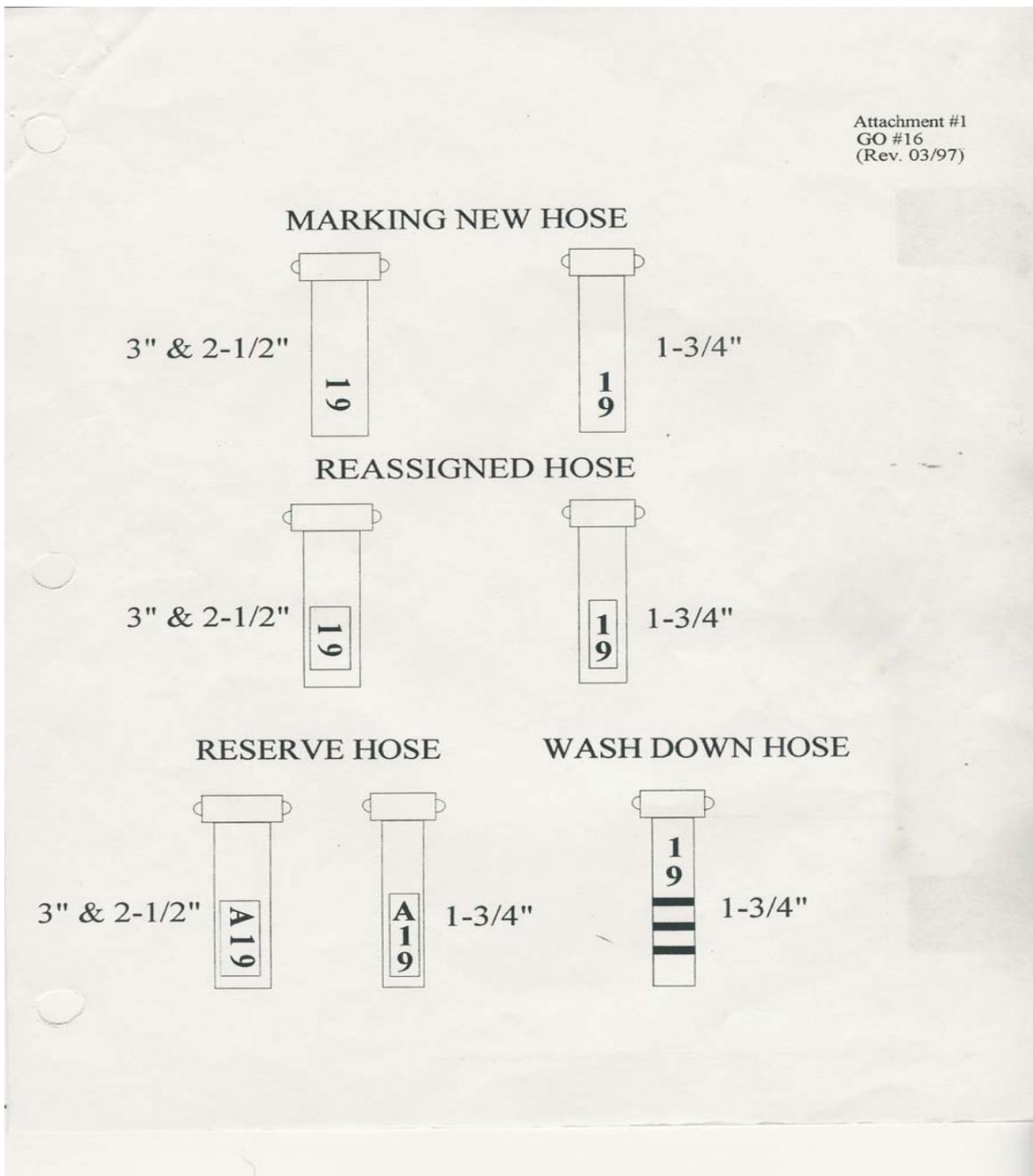
A _____
B _____
C _____

PORTLAND FIRE & RESCUE
Portland, Oregon

October 7, 2008

GENERAL ORDER NO. 16
ATTACHMENT #1

MARKING A NEW HOSE



PORTLAND FIRE & RESCUE

Portland, Oregon

A _____
B _____
C _____

March 30, 2005

GENERAL ORDER NO. 24

Traffic Regulations

*I. GENERAL

A. This order supersedes and rescinds General Order No. 24 dated May 9, 1990.

*B. This policy is instituted to provide compliance with State Emergency Vehicle operation statutes. Also, to provide a greater degree of safety en route to and on scene, and decrease apparatus maintenance cost and damage to Bureau equipment.

*II. DRIVING POLICY

A. When responding to alarms, all Fire Bureau drivers shall comply with Oregon's "Basic Rule". The Basic rule says you must always drive at a speed that is reasonable under existing conditions on all roadways at all times. To obey the basic rule, you need to be thinking about other traffic, the surface and width of the road, dangers at intersections, weather, visibility and any other conditions that could affect your safety and driving speed. If you drive at a speed that is unsafe for existing conditions in any area, even though you are driving slower than a designated or posted speed, you are violating the basic rule law." Notwithstanding the "Basic Rule" speed shall not exceed 10 miles per hour over the posted limits.

B. EMERGENCY SIGNALS (Visual and Audible)

1. Emergency lights will be in operation during emergency response. Emergency lights will include headlights day or night. Headlights used during day light hours will be on low beam only.

2. Emergency lights will always be on when the siren is being sounded.

3. Unneeded warning lights shall be turned off upon arrival at the emergency scene, except as necessary to mark apparatus in a hazardous situation or location.

*4. Four-way flashers and / or directional arrow lights will be used at the emergency scene to warn the public and mark location of Fire Bureau apparatus.

*5. The officer will see that the audible warning devices are utilized in a reasonable and prudent manner, consistent with safe operations and traffic conditions.

6. When approaching a nursing home, hospital, etc., the officer will be reasonable and prudent in the use of audible warning devices.

C. CROSSING CONTROLLED INTERSECTIONS DURING EMERGENCY RESPONSE

*1. Fire Bureau vehicles responding on emergency runs will stop at all red lights. Proceeding only when all traffic that is on the green light acknowledges and yields the right of way.

*2. Responding to an alarm through a signalized intersection with a green light, Fire Bureau vehicles will exercise caution and good judgment in the vicinity of the intersection. When the visibility of the cross street is limited to less than 400 feet in either direction, the emergency vehicle shall slow to a

maximum of 20 MPH or stop if necessary.

3. Extreme caution must be exercised when using the on coming traffic lane to circumvent a blocked intersection. Be certain you have the attention of and receive the right-of-way from every driver at that intersection before proceeding.
4. Fire Bureau vehicles will stop at all stop signs and only proceed when all other vehicles have yielded right of way.
5. Drivers shall not rely on a signal to proceed into or through a controlled intersection from anyone other than a recognized police officer or official.
6. Approaching an intersection that may be used by Fire Bureau vehicles coming from another direction, the officer shall use the radio to warn vehicles of their approach.

D. RIGHT-OF-WAY PRIVILEGE

- *1. Under no circumstances, including emergency response shall any member of the Bureau operating a vehicle attempt to exercise right-of-way privileges with reckless disregard for the safety of other persons or property.
2. The public is required to yield the right-of-way to responding emergency vehicles. This does not relieve the driver of an emergency vehicle from the duty to drive with due regard for the safety of all persons using the highway.

E. DRIVING OR TURNING AGAINST TRAFFIC

The driver of an emergency vehicle will drive in a manner so as to allow traffic ahead in the driving lane or lanes the opportunity to pull to the right. In the event it is impossible, Oregon Revised Statutes permit drivers of emergency vehicles responding Code 3 to disregard regulations governing direction of movement or turning in specified directions. This allows emergency vehicle drivers to briefly enter a lane or street allocated to traffic flowing in the opposite direction if the maneuver can be accomplished safely. **No law, affording privileges to the driver of an emergency vehicle responding Code 3, is a defense for negligence or reckless driving.**

*F. SCHOOL BUSES

Fire Bureau vehicles that meet a school bus with red lights flashing must come to a complete stop. This is on emergency and non-emergency responses alike. You must remain stopped until the flashing red lights are no longer operating. This law applies to streets or highways with two, three, four or more lanes of traffic. Only highways divided by an unpaved median strip or barrier are an exception to this law. You must only stop if you are on the same road as the bus.

*G. NON-EMERGENCY USE OF VEHICLES

When Fire Bureau vehicles are used in non-emergency situations, emergency signals will not be used and drivers will obey all applicable laws. Non-emergency vehicles will comply with all traffic laws at all times.

H. TURN SIGNALS

Turn signals will be used, 100 feet continuously, before lane changes or turns during emergency or non-emergency driving.

I. MOVE-UPS AND PUBLIC SERVICE RUNS

When making a move-up or public service response, emergency lights will not be used. Drivers will comply with designated and posted speed limits.

1. 20 mph - School zones whenever children are present on the school grounds or at a crosswalk.
2. 20 mph - Business district.
3. 25 mph - Residential district or public park.

III. OFFICER AND DRIVER RESPONSIBILITY

- A. Company Officers and drivers are jointly responsible for the safe operation of Fire Bureau vehicles.
- *B. The Fire Bureau Accident Review Board will review accidents involving Fire Bureau vehicles. The board may require the presence of the officer, driver or other personnel at the review hearing. G.O. 24 will be used as a guideline in the review process.
- *C. Officers shall be responsible for the assignment of drivers to all apparatus in their company. If for any reason these assignments cannot be accomplished, the officer shall notify Battalion Headquarters.
- D. Company Officers are responsible for providing training opportunities for personnel assigned as drivers. Prior to assigning a member to drive an apparatus, the officer shall certify that the member is qualified. The driver certification (Form 200.79) will be forwarded to the Training Section with one copy filed in the Station's Administrative House Policy Notebook.

Dave Sprando, Acting Fire Chief
Portland Fire & Rescue

PREPARED BY:	Safety Officer - BC Nohr
REVISION DATE:	03/30/05
EFFECTIVE DATE:	03/30/05
REVIEWED BY:	PC
REVISED BY:	Safety Officer
REVIEW DATE	10/01/05

PORTLAND FIRE & RESCUE
Portland, Oregon

July 25, 2008

GENERAL ORDER NO. 41

EQUAL EMPLOYMENT OPPORTUNITY (EE0) AFFIRMATIVE ACTION

I. PURPOSE

- A. This order supersedes and rescinds General Order No. 41, dated June 13, 2002.
- B. The City of Portland is an equal employment opportunity employer and is committed to an active affirmative action and diversity program. The City of Portland will continue to recruit, hire, train and promote into all job levels without regard to race, religion, color, gender, marital status, familial status, national origin, age, mental or physical disability, sexual orientation, gender identity, source of income, or Vietnam-era veterans status. The City of Portland will continue to administer all other personnel matters in accordance with this rule.
- C. Elected officials and all employees of the City of Portland, management and supervisory staff in particular, shall ensure that the intent and the stated requirements of this rule are implemented in all employee relations and personnel practices. It is the responsibility of every employee to ensure that the work environment is free of any practice of discrimination or harassment. The City of Portland Affirmative Action Officer is responsible for implementation of the affirmative action program.
- D. Additionally, contractors doing business with the City of Portland are required to assure that equal employment opportunity are offered by their organization(s), and that they comply with appropriate sections of this policy and with applicable state and federal regulations. The provisions for external Affirmative Action measures are contained in City of Portland Code Chapter 23.

II. ACCOMMODATIONS

- A. Any accommodation made in accordance with the American Disabilities Act must be in writing.

III. SPECIAL PROVISIONS RELATIVE TO AGE

- A. Equal employment opportunity as to age applies to persons who are age 18 or older. State law forbids employment discrimination on the basis of age. It is unlawful to fail or refuse to hire or to discharge an individual or otherwise

discriminate against any individual with respect to his/her compensation, terms, conditions, or privileges of employment, because of such individual's age.

IV. SPECIAL PROVISIONS RELATIVE TO DISABILITY

- A. Equal employment opportunity for persons with disabling conditions includes making a reasonable accommodation to known disabilities of a qualified disabled applicant or employee who would be able to perform the essential duties of the job if such accommodation is made.

V. BONA FIDE OCCUPATIONAL QUALIFICATIONS

- A. Age, gender or physical requirements may be considered if they constitute a bona fide occupational qualification necessary for performance of the essential duties of the job. Physical capacity requirements relating to minimum standards for employment may be a reasonable selection factor. However, such standards must be reasonably necessary for the specific work to be performed and are uniformly applied to all applicants for the particular job category, regardless of age or sex.

VI. COMPLAINT PROCEDURE

- A. The City of Portland has an internal complaint procedure designed to address and resolve complaints of discrimination, including retaliation and harassment. See the Administrative Rule on Workplace Harassment Prohibited. Individual bureaus may have work rules and complaint procedures specific to their work places. The City of Portland will take appropriate action to prevent discrimination, including retaliation and harassment, and to ensure that the rights of employees who file complaints are respected, whether the complaint is filed through the internal complaint procedure, a grievance, or with a local, state, or federal agency, or court.

VII. CONTACT INFORMATION

- A. Any person having questions about this rule or the City of Portland's Diversity Development/ Affirmative Action program should contact the City of Portland Diversity Development/ Affirmative Action Office at (503) 823-6959, or on-line at References 41 CFR § 60-1.4; §60-2.13(a); §60-2.20; City of Portland Code Chapter 23.

VIII. ADMINISTRATIVE RULE HISTORY

- A. Adopted by Council March 6, 2002
B. Effective April 5, 2002

IX. WORKPLACE HARASSMENT PROHIBITED

- A. The City of Portland is committed to a work environment that is free of illegal bias, prejudice and harassment and where all individuals are treated with respect and dignity. Every individual has the right to work in a professional atmosphere that promotes employment opportunities and prohibits discriminatory practices.
- B. Workplace harassment manifests itself in two primary ways:
 - 1. In forms of harassment that violate state and federal laws; and,
 - 2. In forms of harassment that may not violate law, but which violate this City of Portland rule because they are not conducive to creating a work environment for employees that is consistent with the intent of this rule.
- C. This rule covers both types of harassing behavior. Employees are expected to talk with their supervisors, other managers, or the City of Portland's Diversity Development/Affirmative Action Office, about harassment they experience regardless of its origin. Supervisors or managers receiving such complaints are expected to take appropriate corrective action to stop the harassment.
- D. It is the City of Portland's policy to prohibit workplace harassment and discrimination on the basis of race, religion, gender, sexual orientation, gender identity, age, physical or mental disability, marital status, familial status, national origin, source of income, or Vietnam-era veterans' status, or other protected status under applicable law in any personnel action.
- E. Harassment and discrimination is prohibited in the workplace or in any work-related setting outside the workplace. Every employee shares the responsibility for bringing to the City of Portland's attention conduct that interferes with providing a work environment free of illegal discrimination and harassment.

X. WHO IS COVERED BY THIS RULE?

- A. This rule covers all employees and applicants for employment with the City of Portland, as well as contractors providing services to the City of Portland such as outside vendors or consultants. Contractors providing a service to the City of Portland will be notified of this rule.

XI. DEFINITIONS

- A. Harassment: Verbal or physical conduct that is derogatory or shows hostility towards an individual because of his or her race, religion, sex, sexual orientation, gender identity, age, physical or mental disability (as defined by the Americans with Disabilities Act and State law), marital status, national origin, or other protected status in accordance with applicable law and:
 - 1. Has the purpose or effect of creating an intimidating, hostile, abusive, or offensive work environment; or,

2. Has the purpose or effect of unreasonably interfering with an individual's work performance; or,
 3. Otherwise adversely affects an individual's employment and employment related opportunities.
- B. Sexual Harassment: Unwanted sexual advances, requests for sexual favors, and other sexually oriented verbal or physical conduct constitutes sexual harassment under this rule where:
1. Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment; or,
 2. Submission to or rejection of such conduct is used as a basis for employment decisions affecting such individual; or,
 3. Such conduct has the purpose or effect of unreasonably interfering with an individual's work performance, or creating an intimidating, hostile, or offensive work environment.
- C. Discrimination: Unequal or different treatment of an individual in any personnel action on the basis of race, religion, sex, sexual orientation, gender identity, age, mental or physical disability (as defined by the American with Disabilities Act or ADA), marital status, national origin or other protected class under applicable law.

XII. EXAMPLES OF PROHIBITED CONDUCT

A. Verbal or Physical Conduct

1. Use of epithets, innuendoes or slurs because of an individual's race, religion, sex, sexual orientation, gender identity, age, physical or mental disability, marital status, or national origin, or other protected status under applicable law.
2. Jokes, pranks or other banter, including negative stereotyping that is derogatory or shows hostility because of race, religion, sex, sexual orientation, gender identity, age, physical or mental disability, marital status, national origin, or other protected status under applicable law.
3. Unwelcome physical touching or contact, such as pinching, kissing, grabbing, patting or hugging.

B. Written or Graphic Material

1. Material that is disparaging or displays hostility on the basis of race, religion, sex, sexual orientation, gender identity, age, physical or mental

disability, marital status, national origin, or other protected status in accordance with applicable law and is placed on walls or elsewhere on the employer's premises or circulated in the workplace is prohibited. This includes sending inappropriate jokes or other written or graphic materials via e-mail, the Internet or by fax, or downloading this material from the Internet.

XIII. RETALIATION PROHIBITED

- A. The City of Portland will not tolerate retaliation against any individual who reports discrimination or harassment, testifies, assists, or participates in any manner in an investigation, proceeding or hearing, regardless of the outcome of the complaint. Examples of retaliation towards an individual include demotion, suspension, failing to hire or consider hiring, failing to treat impartially when making employment related decisions, assigning the individual the least desirable jobs. It may also include more subtle forms such as shunning by co-workers.

XIV. MANAGERS AND SUPERVISORS EXPECTATIONS

- A. Managers and supervisors are expected to enforce this rule and maintain a productive, non-hostile work environment. Managers and supervisors must take immediate action to stop and prevent discrimination or harassment, where they know or have reason to know that it is occurring. Tacit approval of discrimination and/or harassment by, for example, laughing and treating a situation as a joke, failing to take action or advising an employee not to complain is prohibited. Managers and supervisors are responsible for ensuring that notes, comments, posters and other materials on walls, bulletin boards or elsewhere in the workplace, that are derogatory or show hostility toward an individual or group because of race, religion, color, sex, sexual orientation, gender identity, age, physical or mental disability, marital status, or national origin or membership in another protected class under applicable law are removed. Managers and supervisors are expected to educate employees about the impropriety of these items as well as the inappropriateness of jokes, slurs, or other negative verbal comments that violate this rule. Managers and supervisors are also responsible for educating employees that the use of City of Portland owned equipment, including vehicles and electronic devices such as computers, telephones, photocopiers, or faxes for any of these purposes is also prohibited.
- B. If a manager or supervisor receives a complaint from a City of Portland employee, an applicant, a member of the public, or a contractor about discrimination, harassment or retaliation, they should contact the Human Resources Coordinator or Site Team Manager as soon as possible, but no later than two working days after receiving the complaint.
- C. Supervisors and managers are expected to contact human resources personnel even if the person making the complaint requested that it be kept confidential.

Supervisors and managers should inform an individual making a complaint that strict confidentiality may not be feasible.

- D. Any supervisor or manager who is aware of harassment or discrimination and condones it by action or inaction will be subject to disciplinary action.

XV. WHAT CAN EMPLOYEES DO?

- A. Not engage in discrimination, harassment or retaliatory conduct in violation of this rule.
- B. If you believe you are being subjected to conduct that violates this rule, tell the offender to “stop it!” Say it firmly, without smiling or apologizing. Nothing prevents you from filing a complaint because you did not tell the offender that his or her behavior is unwelcome or ask the offender to stop.
- C. Promptly file a complaint using the procedure below, if you are subject to discrimination, harassment or retaliatory conduct prohibited by this rule. If you are witness to prohibited conduct, you are encouraged to bring that information to the attention of a supervisor.
- D. Nothing in this rule is intended to restrict an individual’s right to file a complaint with the Bureau of Labor and Industries or the Equal Employment Opportunity Commission, or to file a grievance under a union contract. The Portland Fire Fighters’ Association (PFFA) has a Human Relations Committee that provides support to members in dealing with discrimination and work environment issues. However, notifying a union steward or official does not constitute filing a complaint with the City of Portland under the complaint procedure outlined below.

XVI. COMPLAINT PROCEDURES

- A. Important Notice to All Employees:
 - 1. Employees who have experienced conduct they believe is contrary to this rule have an obligation to take advantage of the complaint procedure included in this rule. An employee’s failure to fulfill this obligation could affect his/her other rights. Every employee shares the responsibility for bringing to the City of Portland’s attention conduct that interferes with providing a work environment free of harassment and illegal discrimination.
- B. Internal Complaint Process
 - 1. Any individual who feels he/she has been the victim of prohibited discrimination or harassment is encouraged to notify the responsible person(s) of the inappropriateness of their conduct.

C. Who to Contact

1. A current City of Portland employee is also encouraged to discuss such concerns with his/her immediate supervisor. This will provide the supervisor with an opportunity to review the concerns of the individual. If the employee does not feel comfortable discussing the concerns with his/her immediate supervisor, the employee may contact:
 - a. Their supervisor's manager
 - b. The Bureau's Equal Employment Opportunity (EEO) representative
 - c. Bureau of Human Resources staff
 - d. The City of Portland's Diversity/Affirmative Action Office
 - e. Their Bureau director
2. A non-City of Portland employee such as an applicant, a member of the public or a contractor may contact the specific bureau where the alleged discrimination or harassment occurred or file a complaint with the City of Portland's Diversity Development/Affirmative Action Office.

XVII. INVESTIGATION STEPS

- A. All complaints must be thoroughly and promptly investigated. The individual making the complaint and the accused shall be notified of the results of the investigation and whether action will be taken. Retaliation will not be tolerated. Immediate action may be required in situations where prohibited harassment or discrimination has occurred.
 1. The responsible person receiving the complaint will complete the following steps:
 - a. Evaluate the complaint.
 - b. Determine whether there is reason to believe prohibited discrimination or harassment may have occurred.
 - c. When appropriate, the individual who receives the complaint may discuss options for informally resolving the complaint with the complainant. This is not a required first step.
 - d. Document what action and resolution efforts were taken and then communicate the results to the complainant, to appropriate management personnel, and to the accused.
 - e. Where corrective action is considered to be appropriate, communicate that fact to management personnel who will determine the appropriate corrective or disciplinary action in accordance with the administrative rule on discipline and any applicable collective bargaining agreement.

- f. Consistent with applicable rules and collective bargaining agreements, in determining the appropriate corrective action, the responsible manager will consider:
 - 1. Severity of the conduct
 - 2. Position/authority of the perpetrator
 - 3. Number/frequency of encounters
 - 4. Relationship of the parties
 - 5. Provocation/response of complainant
 - 6. Effect of action on complainant, and
 - 7. Effect of action on the work environment
- g. If necessary, take remedial action reasonably calculated to end discrimination or other conduct that violates this rule.

XVIII. EXTERNAL COMPLAINT PROCESS

- A. An external discrimination complaint is defined as any complaint of discrimination filed with a court or a state or federal enforcement agency. External discrimination complaints are handled by the Risk Manager and the City of Portland Attorney's Office. Any employee who receives a copy of notice of an external discrimination complaint shall immediately forward that complaint to the Risk Manager. The Risk Manager will ensure that the City of Portland Affirmative Action and Diversity Office, the City of Portland Attorney's Office, and the bureau involved are advised of the complaint. The Risk Manager and City of Portland Attorney's Office are responsible for issuing any communications regarding the complaint.

XIX. RIGHTS OF THE COMPLAINANT AND THE ACCUSED

- A. Confidentiality
 - 1. All information received in connection with inquiries, or with the filing, investigation, and resolution of workplace harassment complaints is treated as highly sensitive. Employees authorized by the City of Portland to receive and investigate complaints are required to maintain confidentiality to the extent possible. It is expected and anticipated that all parties involved in complaints will observe the same standard of sensitivity. It is emphasized that this practice is in the best interest of all parties; however, absolute confidentiality cannot be guaranteed.

XX. COMPLAINT RESOLUTION

- A. The Director of Human Resources, in cooperation with the bureau manager and Commissioner-in-Charge, and the City of Portland Attorney's Office shall have the authority to settle a discrimination complaint in accordance with Chapter 3.15 of the City of Portland Code.

John Klum
Fire Chief
Portland Fire & Rescue

PREPARED BY:	Mark Gift / Scott Fisher
REVISION DATE:	07/25/08
EFFECTIVE DATE:	07/25/08
REVIEWED BY:	Publications Committee
REVISED BY:	Lindsay Wochnick

PORTLAND FIRE & RESCUE
Portland, Oregon

July 8, 2010

GENERAL ORDER NO. 51

SWORN PERSONNEL GROOMING

I. GENERAL

- A. This order supersedes and rescinds General Order 51, dated May 30, 2008.
- B. The purpose of this general order is to establish personal grooming standards for the sworn members of Portland Fire & Rescue (PF&R) that contribute to uniformity of appearance, professionalism, esprit de corps and fire fighter safety. Members shall present an image of competence, efficiency and pride in PF&R. It is critical to the operations of PF&R that members are groomed in such a way as to instill confidence in the public.
- C. PF&R personnel shall maintain their appearance in a manner consistent with professionalism in the fire service and in keeping with applicable safety and accident prevention standards in the workplace. PF&R is the community's primary provider of emergency medical care. Therefore, all individuals shall be clean, neat and well groomed in consideration of the extremely close personal contact required between PF&R personnel and patients.
- D. PF&R will consider, and may approve, individual adjustments to these standards on a case-by-case basis. Such adjustments may be made for a demonstrated religious or medical need. Requests shall be made through the chain of command to the Fire Chief.

II. PERSONAL GROOMING

- A. Shaving
 - 1. Male members shall be clean-shaven at the beginning of each duty day. Exceptions are allowed for approved sideburns, mustaches and facial hair below the lower lip. Beards and goatees are prohibited.
- B. Sideburns
 - 1. Sideburns shall be neatly trimmed at all times, shall not extend downward beyond the lower part of the ear lobe and shall end in a clean horizontal line. They shall not be bushy and shall not be flared more than ½ inch (not more than ½ inch wider at the bottom than their natural width at the top).

The width of the sideburn must not extend to the area of the face where a Self-Contained Breathing Apparatus (SCBA) facepiece seals. Please see Attachment #1, Figure 1 for an example.

C. Mustaches

1. Mustaches shall be neatly trimmed at all times. The hair above the mouth shall not extend below the upper border of the lip; mustache hair shall not extend more than $\frac{1}{2}$ inch horizontally, or extend closer than $\frac{1}{4}$ inch to the horizontal line of the lower jaw and shall be no more than $\frac{1}{2}$ inch wide at any point. Mustaches shall not extend to the area of the face where the SCBA facepiece seals. Please see Attachment #1, Figure 2 for an example.

D. Hair below the lip

1. Hair centered immediately below the lower lip shall be neatly trimmed and shall be no larger than $\frac{1}{2}$ inch by $\frac{1}{2}$ inch. Hair below the lower lip shall not extend to the area of the face where the SCBA facepiece seals. Please see Attachment #1, Figure 2 for an example.

E. Tattoos, body art, brands

1. Tattoos, body art, or brands shall not be apparent or visible when wearing PF&R work, duty or dress uniforms. This should be accomplished by selecting uniform items that obscure the tattoo/body art from view. Sworn personnel employed by PF&R at the time of issue of this general order who have existing tattoos, body art or brands of an artistic or benign nature may be exempt from the visibility restriction if the existing body marking cannot be obscured from view by issued uniform items. This does not exempt current personnel from the restrictions against prohibited types of body markings noted below.
2. Tattoos, body art or brands that may be visible to other employees at any time that are prejudicial to good order, discipline and morale, or are of a nature to bring discredit upon PF&R, are prohibited. Examples of prohibited markings are tattoos, body art, or brands that are obscene, sexually explicit, denote a violent or exclusionary group, or advocate or symbolize discrimination against any gender, race, religion, ethnicity or nationality.

F. Hair

1. In the interest of safety and to maintain a professional image, hair must be clean, neatly trimmed and well groomed at all times. To achieve this, hair shall meet the following requirements at all times during the duty day.
 - a. Uniformed male personnel

- i. The hair on the top of the head shall be neatly groomed. The length and bulk of hair shall not be excessive or present a ragged, unkempt or extreme appearance; fullness shall be moderate and present a managed look. Hair shall be well trimmed and tapered or layered. Hair shall not be worn in fad styles such as a Mohawk, ducktail, bowl cut, mullet or spikes, or in any other way that does not meet the requirements noted in section F.1.a.
 - ii. When standing with head erect, an on-duty member's hair shall not extend below the top of the eyebrows in the front, and shall not fall more than one inch over the top of the ears on the sides or extend below the bottom edge of the collar of the duty uniform shirt in the back. Please see Attachment #1, Figures 1, 3 and 4 for examples.
Hair may be restrained as a matter of preference or to meet all of the length, style, grooming and other requirements noted in section F.1.a. Restraining shall be with a single ponytail, single braid, single bun, or by cornrow style braids. Please see Attachment #1, Figure 5 for example.
 - iii. When wearing an approved hat or cap, hair in front shall be groomed so it does not fall below the band of the headgear.
 - iv. Hair may be colored, frosted or tinted in a color naturally occurring in human hair. Etching or other extreme cutting is not permitted.
- b. Uniformed female personnel
- i. The hair on the top of the head shall be neatly groomed. The length and bulk of hair shall not be excessive or present a ragged, unkempt, or extreme appearance; fullness shall be moderate and present a managed look. Hair shall not be worn in fad styles, such as a Mohawk, ducktail, bowl cut, mullet or spikes, or in any other way that exceeds the length, style, grooming and color requirements noted in section F.1.b.
 - ii. When standing with head erect, an on-duty member's hair shall not extend below the top of the eyebrows in the front, and shall not extend below the bottom edge of the collar of the duty uniform shirt on the sides. While on duty, hair shall not extend below the horizontal shoulder to shoulder seam of the duty uniform shirt in the back. Although hair may extend to the shoulder to shoulder seam in the back it is required to be restrained if it extends below the bottom edge of the collar of the duty uniform. Please see Attachment #1, Figures 6, 7 and 8 for examples.
 - iii. Restraining of hair that is required as noted above and , hair that is restrained as a matter of preference must meet all of the length, style, grooming or other requirements noted in section F.1.b. Restraining shall be with a single ponytail, single braid,

single bun, or by cornrow style braids. Please see Attachment #1, Figures 8, 9, 10 and 11 for examples.

- iv. When wearing an approved hat or cap, hair in front shall be groomed so that it does not fall below the band of the headgear.
 - v. Hair may be colored, frosted or tinted in a color naturally occurring in human hair. Etching or other extreme cutting is not permitted.
- c. In no case shall the bulk or length of a member's hair interfere with the proper fitting of prescribed PF&R headgear (e.g., Nomex/PBI hood, helmet, SCBA facepiece).
 - d. During fire fighting operations hair shall be covered with the provided Nomex/PBI hood, and with the turnout coat when applicable.
 - e. Per the Occupational Safety and Health Administration (OSHA) Program Directive A-98 dated December 10, 1980 and revised October 21, 1993 (section A), "Employees working in proximity to moving machinery or equipment, where hair could present a hazard, shall have such hair contained within a covering such as a hat, cap, net or other similar retainer which need not be of solid construction, but of adequate size and strength to contain the hair."
 - f. Certain tasks we encounter throughout the duty shift require us to operate equipment in emergency and non-emergency situations, such as performing checks of apparatus and power equipment, grinding, etc. When engaged in these types of activities hair shall be restrained up or back, or kept under a PF&R approved head cover to prevent a safety risk.

G. Hairpieces and wigs

- 1. The wearing of a wig or hairpiece while in uniform shall be allowed for the purpose of covering natural baldness or a medical condition. If under these conditions a wig is worn, it shall be of natural appearance, not interfere with the proper performance of duty and conform to Section F "Hair" of this general order.

H. Hair Accessories

- 1. Hair accessories such as clips, rubber bands, pins, combs, or barrettes must be transparent or similar in color to the individual's hair color and shall be concealed as much as possible. Authorized accessories shall only be worn when needed to restrain or manage hair and at no time allowed for decorative purposes. The device used must not interfere with safe and proper use of prescribed PF&R headgear (e.g., Nomex/PBI hood, helmet,

SCBA facepiece).

I. Cosmetics

1. When worn, cosmetics shall be in good taste using conservative, natural-looking cosmetics.

III. JEWELRY

- A. Insignia shall not be worn, except those issued by PF&R and intended to be worn as part of the PF&R uniform.
- B. The wearing of a necklace or medallion about the neck is permitted and shall be worn under the PF&R shirt.
- C. Earrings shall be limited to the style referred to as "ear post." No more than one ear post is allowed per ear and that is allowed in the ear lobe only. The decorative front of the ear post shall not exceed ¼ inch in diameter. The ear post may be silver or gold in color, or may have a clear gemstone as the decorative front. Hoop or ring shapes are not allowed. No other visible body piercing jewelry shall be worn while wearing any PF&R uniform or while on duty. This includes, but is not limited to, nose rings, tongue studs, etc.
- D. Rings on fingers are permitted as long as they do not interfere with the quick donning of gloves or turnout coat. However, the wearing of rings is not recommended when responding to emergencies due to the potential for injury (e.g., electrical burns, crushing, entanglement). Rings with projections that compromise the integrity of EMS gloves are not permitted. Similarly, fingernails shall not be styled in a manner that delays the donning of gloves or compromises the integrity of EMS protective gloves. In no case shall fingernail length extend more than ¼ inch beyond the end of the fingertip. Fingernail polish, if worn, must be transparent, or similar in color to the nail or nail bed.

IV. IMPLEMENTATION

- A. Personnel are to be in compliance with this general order within 30 days of the date of issue.

V. ATTACHMENTS

- A. Sworn Personnel Grooming, Attachment #1

John Klum
Fire Chief
Portland Fire & Rescue

PREPARED BY:	John Klum
REVISION DATE:	07/08/10
EFFECTIVE DATE:	07/08/10
REVIEWED BY:	Publications Committee
REVISED BY:	Lyn Town

Portland Fire & Rescue

Firefighter Grooming Standards



Portland Fire & Rescue (PF&R) expects uniformed members to be well-groomed and professional in appearance when on duty. The grooming guidelines were developed as well to ensure safety and uniformity, promote pride in PF&R, and foster public respect for firefighters. Provided below is a partial, summarized list of PF&R's grooming standards. Meeting these grooming standards is a condition of employment. Grooming standards apply to all sworn members of PF&R.

- No beards or goatees.
- Hair below the lower lip shall be no larger than ½ inch by ½ inch.
- Sideburns must be neatly trimmed.
- Mustaches must be neatly trimmed.
- Tattoos, body art, or brands must not be visible while wearing work, duty, or dress uniforms.
- Tattoos, body art, or brands that may be visible to other employees at any time are prohibited if they are obscene, sexually explicit, denote a violent or exclusionary group, or advocate or symbolize discrimination against any sex, gender, race, religion, ethnicity, or nationality.
- Hair must be a color naturally occurring in human hair.
- For men, hair must not extend below the top of the eyebrows in front, shall not fall more than one inch over the top of the ears on the sides, or extend below the bottom edge of the collar of the duty uniform shirt in the back.
- For women: hair must not extend below the top of the eyebrows in the front, and shall not extend below the bottom of the collar of the duty uniform on the sides. While on duty, hair shall not extend below the horizontal shoulder-to-shoulder seam of the duty uniform in the back. Longer hair may be restrained with a single ponytail, single braid, single bun, or by cornrow-style braids.
- In no case shall the bulk or style of a member's hair interfere with wearing PF&R headgear, including hoods, helmets, and self-contained breathing apparatus facepieces.
- Cosmetics, if worn, must be conservative and in good taste.
- Necklaces or medallions around the neck must be kept under the PF&R shirt.
- Earrings are limited to "post" style; the decorative front may not be larger than ¼ inch. No more than one ear post is allowed per ear, and that post must be in the ear lobe. Ear plugs are not allowed. Earlobes expanded by rings are not permitted.
- Aside from earrings, no other visible body piercing jewelry is allowed while in uniform or on duty. This includes, but is not limited to, nose rings, tongue studs, eyebrow rings, etc.
- Rings on fingers are permitted as long as they do not interfere with quick donning of gloves or turnout coats.
- Fingernails may not compromise the integrity of protective gloves and, in all cases, may not extend more than ¼ inch beyond the end of the fingertip.
- Nail polish, if worn, must be transparent, or similar in color to the nail or nail bed.

Physical Agility Test

Prior to start, a mandatory 10-minute period will be provided for stretching and warm-up for each member. Each member will complete one event then move to the next event and complete it with no assigned rest period. The target time to complete the nine events is 8:02. Helmet, turnout jackets, Self Contained Breathing Apparatus (SCBA) facsimile (weight 21 lbs.) must be worn. To ensure the highest level of safety and to prevent injuries, no running is allowed between or during events except during the sled drag. Proper lifting techniques will also be enforced.

STATION 1—SIMULATED LADDER RACK

Lift a 24-foot aluminum extension ladder (weight 72 lbs.) by the rungs off the brackets on the training tower (height of brackets 67 inches), remove and place on the ground then place back on the brackets. Release grip to show ladder is secure on the rack. Repeat event for a total of two times.

Note: You are not allowed to rest one end of a ladder on the ground while the other end of the ladder is being placed on the hooks. To assist with balance, marks will be painted on the ladder to center of ladder.

Disqualifier: Ladder must be removed in a controlled manner, not dropped. Inability to complete event. Hands must be kept on the rungs at all times.

Rationale: This station is designed to simulate the critical tasks of lifting and handling an extension ladder. This event tests upper and lower body strength, balance, grip strength, and anaerobic capacity.

STATION 2—HOSE CARRY

Pick up the hose bundle (50 feet 2 ½ inch hose bundle, with nozzle attached-weight 59 lbs.) off the ground and place it on your shoulder. Carry it to the 5th floor balcony, announce “5th floor” loudly and return the hose bundle back to the starting point at the ground level.

Disqualifier: Dropping the hose bundle. Inability to complete event.

Rationale: This event simulates the critical task of lifting and carrying hose from a fire apparatus, carrying it to the emergency scene and returning it to the fire apparatus. This event tests aerobic capacity, upper and lower body strength, muscular endurance, and balance.

STATION 3—ELECTRIC FAN

Lift the electric fan (weight 50 lbs.) and place on simulated 7 feet door-frame, release grip showing fan is secure, then return fan to starting position on the ground.

Rationale: This event simulates the critical task of placing a fan for ventilation purposes. This event tests upper body strength, grip strength, anaerobic capacity, and balance.

Disqualifier: Dropping the fan. Inability to complete the event

Physical Agility Test

STATION 4—FAN PLACEMENT

Lift the gas fan facsimile (79 lbs.) off of its two-foot high platform and carry the fan for 75 feet around a safety cone and place it back on its platform.

Disqualifier: Dropping the fan. Inability to complete the event.

Rationale: This event simulates the critical task of placing a fan for ventilation purposes. This event tests upper body strength, grip strength, anaerobic capacity, and balance.

STATION 5 — LADDER RAISE

Raise a 25-foot straight ladder from the ground to the building and back down. Repeat event for a total of two times. Member must keep their hands on the rungs when raising, but can use the beams when lowering the ladder. Rungs may be skipped if desired. However, at the end of each raise, member must still touch the end rung of the ladder. Member shall maintain control at all times.

Disqualifier: Dropping the ladder. Inability to complete the event.

Rationale: This event simulates the critical task of placing a ground ladder at a fire structure to the roof or window. This event challenges the aerobic capacity, upper and lower body strength, balance, grip strength, and anaerobic endurance.

STATION 6—LADDER HALYARD

Raise and lower the halyard of a 35 feet ladder. Repeat event for a total of two times. The halyard must be lowered hand over hand in a controlled manner.

Disqualifier: Losing control of the halyard. Inability to complete the event.

Rationale: This event simulates the critical task of raising a ladder. This event tests upper body strength, lower body strength, grip strength, and anaerobic endurance.

STATION 7—BODY DRAG

Grasp a 165 lb. hose mannequin and drag it around a drum and back to the start of the station for a total of 70 feet. You are not allowed to grasp or rest on the drum at any time.

Disqualifier: Inability to complete the event. Lifting the hose mannequin completely off the ground.

Rationale: This event simulates the critical task of removing a victim or downed firefighter from a fire scene. This event tests upper and lower body strength, endurance, aerobic and anaerobic capacity, and grip strength.

STATION 8—FOAM BUCKET CARRY

Pick up the two foam buckets (weight-each 49 lbs.) and carry them 200 feet back to the starting point. Repeat again, for a total of 400 feet. If necessary, members may set the

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buckets down in a controlled manner, pausing momentarily to readjust your grip. This pause can only be done at the end of each 100 feet segment.

Disqualifier: Dropping the buckets. Inability to complete the event. Setting buckets down between 100' segments.

Rationale: This event simulates the task of carrying foam buckets to emergencies. This event tests upper body strength, grip strength, and aerobic capacity.

STATION 9—SIMULATED HOSE PULL

Pull a 125 lb. sled attached to a 20' length of 2 ½ inch hose and a nozzle 100 feet. The hose must be placed over the shoulder with the nozzle held in front of the participant. The nozzle and hose can only be grasped forward of the stripe on the hose. The entire length of the sled rails must remain in contact with the ground throughout the event.

Disqualifier: Inability to complete the event.

Rationale: This event simulates the critical task of dragging a charged hose line. This event tests upper and lower body strength, endurance, and aerobic capacity.

THIS CONCLUDES THE TIMED PORTION OF THE PHYSICAL AGILITY TEST.

STATION 10—AERIAL LADDER CLIMB

Following the completion of the Physical Agility test, you will be required to successfully climb a 100' aerial ladder to the height of 80' and back. The aerial ladder will be at a 70 degree climbing angle. You will be wearing a safety harness attached to your waist and a safety rope running the length of aerial ladder. You must climb up and down the ladder in a continuous and smooth motion. You should not stop at any time. The Aerial ladder climb is **not** timed.

Disqualifier: Stopping during the event. Inability to complete the event.

Rationale: This event simulates the critical task of climbing the ladder.