

Chapter 5 – Basic Ladders

BASIC GROUND LADDERS

Overview

Ladders have a major role in the fire service. A member must be able to ascend and descend from one level to another when performing emergency operations.

Stairways are ordinarily accessible, but sometimes they may be involved in fire or other hazards. Members must therefore need to provide their own means of ascent or descent to upper floors. Rescue, roof top operations, ventilation, and fire stream operation may also require the extension and proper placement of fire service ladders.

Fire service ladders demand close and coordinated teamwork. The safety of citizens and members depends on the member's ability to perform all operations quickly, using established and proper techniques.

GENERAL LADDER INFORMATION

Ladder Uses

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

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

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

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

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

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

Ladder Nomenclature and Definitions

Members must be able to identify the parts of a ladder so they can understand ladder commands and be able to inspect the ladder.

BABY LADDER – A small extension ladder that is carried on all ladder trucks and engine companies. They vary in length from 10 to 14 feet.

BED - The main section of an extension ladder from which the fly is extended.

BEAM - The principle structural member of the ladder where the rungs are secured. Beams may be solid or trussed.

BUTT - The bottom end of the ladder opposite the tip.

CABLE - Used in multiple-fly extension ladders to extend fly sections in addition to the halyard.

CABLE ANCHOR - Used to anchor the end of the cable to the fly section.

FOLDING LADDER – The folding attic ladder has hinged rungs whereby the two beams can be folded together.

DOGS - The mechanism that keeps the fly(s) from retracting once they are properly set on the desired rung. These are also referred to as "Pawls" or "Locks".

EXTENSION LADDER - Extension ladders are ladders with two or more sections, and with the exception of baby ladders, are extended with a halyard. In Seattle, they vary in length from 10 to 45 feet.

FLY - The extendable and retractable section or sections of an extension ladder.

GUIDES - The metal strips on an extension ladder which guide the fly section or sections while being extended or retracted.

HALYARD - The rope used to extend or retract the fly.

HALYARD ANCHOR - The device used to anchor the halyard line to the fly section.

HOOKS - The curved metal hooks at the tip end of a roof ladder.

LADDER ANCHOR - A metal hook and rope device used to secure the tip of a ladder to its objective to prevent tipping

PULLEY - The grooved metal wheel over which the halyard or cable is drawn when extending or retracting the flies.

ROOF LADDER - A straight ladder with folding hooks at the tip end used for maintaining secure footing when operating on a pitched roof.

RUNGS - Horizontal cross members of the ladder, used when climbing. Rungs on fire service ladders are usually round and spaced 14 inches apart.

RUNG PLATES - The metal plate where the rungs are set in the beam.

SPIKE - The metal point at the butt end of a tormentor pole.

SPURS - Protrusions at the butt of a ladder to prevent slipping when in the raised position, and to protect the end of the beams.

STOPS - Prevents the extension of a fly section out of the top of the bed.

SWIVEL - Attaches the tormentor pole to the right and left beams on the bed section of a 40 foot or longer ladder.

TIP - The uppermost end of the ladder (opposite the butt).

TORMENTOR POLES - The poles attached to the upper bed section of a 40' or larger extension ladder. They are used to assist in raising, lowering, pivoting, and stabilizing of the ladder.



Figure 5.1 - Ladder nomenclature

LADDER CONSTRUCTION

Solid and Trussed Beam Ladder Construction

Ladders are designed with solid or trussed beams. The solid beam is a solid piece of material of the shape and size to provide the maximum strength for fire service work.

Trussed ladders are designed to increase strength in relation to weight. When using longer ladders, trussed beam ladders are often used rather than solid beam because the weight of the trussed beam ladder will be less, although just as strong. Trussed ladders come in several designs. Although trussed beamed ladders are used in the fire service, Seattle uses them for certain roof ladders and those too, will soon be phased out.

NOTE: It is good practice to write the measured length (of the ladder when the fly(s) are retracted) on the inside of each beam near the butt. This allows members to better judge the distance in which they must extend the fly(s) to the desired target height.



A typical solid beam ladder

TYPES OF LADDERS

Baby Ladder

The baby ladder is a small extension ladder carried on both ladder trucks and engine companies. They vary in length when extended from 10' to 14'. Baby ladders are primarily used in gaining access to lower elevations on the exterior of buildings, salvage work, and gaining access to scuttles inside buildings.

Roof Ladder

The **primary purpose** of the roof ladder **is to establish secure footing on a pitched roof** (Fig. 5.3). The hooks provide a means of anchoring the ladder over the roof ridge or some other roof part and a working member can then use the ladder for support while removing shingles, cutting holes, and performing other ventilation and fire fighting operations.

Additionally, a roof ladder can allow easier access to the bottom of a fire escape by using the hooks over the rungs and the spurs on the ground.

Roof ladders vary in length from ten to twenty feet. Twelve to fourteen being the most common size carried.





Members standing on and working from a roof ladder

Folding Ladder

This ladder is constructed so that when folded, it measures approximately 4 inches in width. It is usually 10 feet in length and cannot be extended. Since it can be difficult to maneuver an extension or straight ladder around corners, in hallways, and in stairwells, this ladder proves itself very useful. It is also commonly called an "attic" ladder.



Extension Ladder

Extension ladders have two or more sections and are extended with a halyard. The only exception to this is a baby ladder, which does not have a halyard due to its height. In Seattle, extension ladders vary in measured length from 10 to 45 feet. A bangor ladder is pictured in Fig. 5.6 next page

They are adjustable in height and their size is designated by the length of the ladder measured when the ladder is fully extended. Ladders 40 feet or longer are equipped with poles to assist in handling and placement. These poles are called "tormentor" poles. The following table of weight comparison is a source of Duo-Safety ladder company maufacturer.

Fire Service Ladder	Approximate Weight
24' Extension Ladder	72 lbs
26' Extension Ladder	92 lbs
35' Extension Ladder	129 lbs
40' Extension Ladder	215 lbs
45' Extension Ladder	240 lbs
12' Roof Ladder	24 lbs
14' Roof Ladder	28 lbs
18' Roof Ladder	44 lbs

SAFETY PRECAUTIONS

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

Ground Ladder Safety Standards for Members

WAC 296-305-06005

This section establishes the minimum requirements for the construction, care and use of the common types of ladders used in fire operations.

- (1) Ladder locks or pawls on extension ladders shall be so fastened or secured to the beams that vibration and use will not cause loosening of bolts and nuts.
 - (a) Pawls or ladder locks shall be so constructed that the hook portion of the pawl that engages the rung shall have sufficient bearing surface or area to prevent the hook from cutting into rungs when engaged.
 - (b) Such hooks shall be properly finished to eliminate sharp edges and points.
- (2) Staypoles or tormentors shall be furnished on all extension ladders over forty feet. Staypole or tormentors spikes shall not project beyond the butt of the ladders when nested.
- (3) All ladders shall be stored in a manner to provide ease of access for inspection, and to prevent danger of accident when withdrawing them for use.
- (4) Members shall climb and descend ground ladders with the fly out, for safety purposes, when not in conflict with the manufacturer's recommendations. Even when ladders are routinely used in the fly out configuration, in adverse conditions members shall be permitted to climb and descend ground ladders with the fly in to assure secure footing.
- (5) All ladders regardless of type shall be inspected thoroughly after each use. Records shall be kept of the inspections and repairs.
- (6) The following metal ladder components shall be checked:
 - (a) Rungs for welds, damage or weakness caused by overloading or bumping against other objects, looseness and cracks, etc.
 - (b) Beams for welds, rivets and bolts, signs of strain or metal fatigue, and deformation from heat or overloading.
 - (c) Bolts and rivets for tightness.

- (d) Butt spurs for excessive wear or other defects.
- (e) Halyards for the same defects listed for wood ladder halyards and cables halyards, for fraying or breaking.
- (f) Heat sensor label, when provided, for change indicating heat exposure.
- (6) **Not applicable for Seattle Fire Department**. This deals with wooden ladders.
- (7) Methods of fastening ladder halyards, either of wire or fibrous material, shall be in a manner that the connection is stronger than the halyard.
- (8) Any defect noted in the above visual inspection shall be corrected prior to testing.

Lifting Ladders

Lifting should be done with the knees bent in a squatting position, with the back straight. This places the load on the heavy muscles in the thighs and not on the back. Lift with the legs and keep the load close into the body.

Do not lift by stooping over with the legs straight. This places the load on the sensitive back and abdominal muscles.

Keeping the toes pointed slightly inward rather than spread out lessens the chance of abdominal injury.

Ensure good footing before lifting and that the hand grip is firm and substantial. When two or more members lift together, their actions should be in unison.

The use of preparatory commands, such as "Prepare to lift, ---Lift," will ensure that all members are in unison.

If in doubt or a member is not ready, early communication from members is vital to preventing unnecessary injuries.

LADDER OPERATION PROCEDURES

Members must know what action to take when the ladder command is given to ensure a smooth, coordinated movement in lifting, carrying, spotting, raising, pivoting, extending, retracting and lowering a ladder.

Commands shall be given by the member in charge in a loud, clear, and concise voice: prompt and exact response is required.

Members will be able to take charge of a ladder and issue all the commands and directions necessary to accomplish needed movements of a ladder.

When using tormentor poles, the member in charge will be on the right pole.

When two or more members are carrying a ladder, the member in charge shall be in the position noted below for correct spotting of the ladder:

- 1. On the right beam, at the center, for a cradle carry.
- 2. On the right beam, at the center or butt, for a 3 member flat carry.
- 3. At the right butt on a 4 or 5 member flat carry.
- 4. At the butt for all beam carries.

NOTE: If a sufficient number of members are available to carry the ladder, the officer may opt to stand out and give commands.

PROPER LADDER AND CLIMBING ANGLES

When sizing-up a situation; decide the use for the ladder, type of ladder needed, and the length of ladder most suitable to the situation. Ladders have their greatest strength when in a vertical position and their least strength in a horizontal position.

To ensure safety, ease of climbing, and to support the greatest weight, ladders should be placed at the proper angle. This is considered to be about 70 degrees (from horizontal.) To achieve this angle, the butt of the ladder should be a fixed distance out from the surface supporting the top of the ladder. This is generally accepted as one quarter of the height from the ground to the point where the ladder rests against the objective. All extension ladders are raised with the fly section(s) toward the building.

A simple and effective way to determine if a ladder is set at the proper angle for climbing is to take a standing position with your toes against the ladder spurs, extend your arms straight out, and your fingers should fall on the rung at about shoulder level (Fig. 5.7).



Checking for Proper Climbing Angle

WORKING LOAD LIMITS

For safety, there are a maximum number of people permitted on a ground ladder at one time. These recommendations are from the ladder manufacturer.

Length or Type of Ladder	Maximum Load
Less than 30 feet	2
30 feet or longer	3

The maximum number of people listed above includes anyone being rescued or carried down the ladder and should not be exceeded. Loads exerted on these ladders for drill purposes or normal fire ground operations should not exceed 750lbs.

NOTE: NFPA requires that ALL fire service ground extension and roof ladders have a 4:1 safety factor designed into the working load limits.

When a member is working on a ladder, the fly section(s) shall be properly secured using the halyard or a body loop, so that the fly(s) cannot retract.

Refer to the manufacturer's manual for the maximum load specifications for aerial ladder apparatus.

LADDER COMMANDS

The importance of proper and adequate communication between members that are handling ladders cannot be over emphasized. Ladder commands must be spoken clearly and loud enough to be heard by all members of the ladder team. During fire operations, there is often a great deal of noise - members must hear the commands.

Commands will normally be given by the member in charge of the operation. The officer, or member in charge, should be positioned on the right beam of the ladder during the removal and carrying of ladders. When poles are used, the member in charge will be positioned at the right pole. When the ladder is in position, the member on the right beam (or right pole when applicable) will give the commands to complete the raise and placement of the ladder into the objective. If additional personnel are available, the member in charge may stand out, achieving a better vantage point to give commands. Members shall be alert to warn others of danger, or to inform the member in charge of unsafe conditions.

LADDER COMMANDS – ALPHEBETICAL

"ADJUST THE BUTT" - The command given to adjust the butt of the ladder (to the right, left, in or out) to the proper climbing angle or squaring it to the building.

"ALL DOGS ARE LOCKED" - Statement made by members after checking to ensure that the dogs are secured properly to the desired rung after extending the flies.



Dogs between rungs during extension of the fly



Correctly locked dog



The dog on the right is NOT locked

"EXTEND THE FLY" - The fly section of the ladder is extended to the desired height by pulling down on the halyard.

"FLY SIDE AROUND" - A command given by the member on the tormentor poles to the member on the fly side of the ladder to come and take the left tormentor pole once the ladder has come to the vertical and is stabilized.

"GROUND THE BUTT" - A command given to lower the butt end of the ladder prior to raising it to the vertical. (Used in cradle and beam carries).

NOTE: During a cradle carry, cradle raise, this command would order the members to place the butt on the ground and raise the ladder all in one motion.

"HALT" (pause) "LOWER" - The member shifting the ladder stops and lowers the butt to the ground.

"HIGH" - The command issued when the fly is at the desired height. The fly is then locked at the next highest rung. Care must be taken to ensure that **all the dogs** are locked.

"INTO THE BUILDING" - The member(s) on the bed side of the ladder, with the member on the fly side assisting them, lower the ladder into the building. When lowering a ladder into a building, the members on the bed side of the ladder (during a 3 person evolution) must ensure that their inside foot is placed on the bottom rung, to keep the butt of the ladder from moving. If one member is on the bed side, both hands should grasp the fourth rung and the left foot would be on the bottom rung in the center. If two members are on the bed side, their inside hands should grasp the fourth rung and their outside hands would grasp the respective beams.

"LADDER COMING THROUGH" - Warning statement called out to advise others that a ladder is being carried through their area.

"LEFT POLE AROUND" - The left pole member gives their pole to the right pole member and moves to the fly side of the ladder.

"LIFT" (pause) "SHIFT" - The member lifts the ladder and moves in the direction indicated.

"LOWER THE FLY" - The member on the right beam lowers the fly section(s). It is necessary for the member on the right beam to lower the fly, due to the fact that the halyard, as it goes through the upper pulley, is angled to the right side. If a ladder were ever to have the halyard come from the left side of the pulley on a 3 person evolution the member on the left would lower the fly.

"LOWER THE LADDER" - Lower the ladder to the ground.

"MOVING" - The member gives this command when they start moving with the tormentor pole to get in position before and after the pivot a 40' or greater extension ladder. Only one pole can be moving at a time. **"ON THE (RIGHT OR LEFT) BEAM, PIVOT IN"** - The ladder is pivoted toward the flies on the designated beam. (Ladders are pivoted 1/4 turn unless directed otherwise.)

"ON THE (RIGHT OR LEFT) BEAM, PIVOT OUT" - The ladder is pivoted toward the bed on the designated beam. (Ladders are pivoted 1/4 turn unless directed otherwise.)

"ONCE AROUND" - All members working with the ladder, move one position clockwise. (This command is generally used only for training purposes to ensure that all members get an equal chance to practice in each position.)

"**OUT FROM THE BUILDING**" - The tip of the ladder is pulled away from the building to a vertical position.

"OUT WITH THE POLES" – The command given by the person in charge to move the poles from the set position into position to pull the ladder "out from the building".

"OVERHEAD CLEAR" - The statement issued prior to raising, or prior to passing the poles on a tormentor ladder, to indicate that the area above the ladder is clear of wires or obstructions. Announce before lowering the ladder if it is lowered in a different direction than it was raised or lowered by different personnel. Also used prior to shifting a ladder.

"PASS THE POLES" - The command given by the member in charge to the member(s) who will be footing the ladder on the raise, to unseat the tormentors and pick them straight up so the two members on the beams can continue the movement of the poles to the member in charge.

"PREPARE TO RAISE" - The preparatory command which precedes the next command, "RAISE."

"PREPARE TO SHIFT (RIGHT/LEFT)" – The preparatory command to cue the member(s) to move into position to perform the lift/shift.

"READY" (pause one step) "HALT" - A preparatory command for spotting given when bringing in a ladder to raise it. When it is given the personnel carrying the ladder will take one more step before stopping forward motion.

"RAISE" - Indicates that the members should now begin to raise the ladder toward the vertical position.

NOTE: This shouldn't be confused with the command "LIFT", which is the command for the ladder coming horizontally off the ground into the member's hands or to the shoulders.

"RELEASE THE HALYARD" - The halyard is untied by the member on the right beam. This accomplished all while the left foot is on the bottom rung near the center.

"RELEASE THE TIP" - Remove the ladder anchor from the fly or tip.

"SECURE THE HALYARD" - The member on the right beam places their left foot on the bottom rung, in the center. The member then pulls the slack rope through the second and third rung space, wraps the excess slack around the third rung, then ties a round turn and two half-hitches around the halyard above the third rung. The bight or slack on the last half-hitch should be moved to the objective side of the ladder so that it will be out of the way of the climbing member(s). (Fig's 5.54-5.60)

"SECURE THE TIP" - The tip of the ladder (fly section) will be secured to the building with a ladder anchor.

"SET" - The command given when the member moving with a tormentor pole has reached their ready position and is prepared for the next action.

"SET THE POLES" - When the ladder is in the proper position for climbing, the poles are moved from the butt to a position parallel to the objective and the spike is allowed to *rest* on the ground.

"SHIFT" - start moving the ladder in the indicated direction while it is in the raised position.

"STOW THE LADDER" - Return the ladder to the apparatus or storage area, tip first.

"TO THE SHOULDER" – An optional statement given after "PREPARE TO LIFT" that alerts members of the intent to lift the ladder to the shoulder

LADDER CARRIES

Members should know the exact location of each ladder on the apparatus and how it is secured. This memorization ensures that any ladder can be located and placed into operation without delay.

Generally, ladders are carried in the same manner in which they are nested on the apparatus. Ladders nested flat on the apparatus are carried flat. Ladders nested on the beams are beam carried.

Ladders are usually carried butt end first when removing ladders from the apparatus and tip end first when returning them to the apparatus. Members shall avoid walking backward while carrying ladders.

The nesting process may sometimes make it necessary to remove more than one ladder for an operation. Unused ladders must be removed from the apparatus and placed in a safe position if it is not possible for them to be left on the apparatus in a locked position.

Exercise caution when carrying ladders. More accidents occur while handling ladders than while climbing them. Many of these occur at night when there is inadequate light, especially if there is smoke in the air or uneven terrain.

Beam Carry

One Member - From the Ground 28' Extension Ladder or Less

Ladder is lying flat on ground with fly section(s) on top.

OPTION ONE: Low Shoulder Beam Carry

Identify the center of the ladder. Position yourself at the center of the ladder and face it.

Squat down and grasp hold of the closest beam with both hands.

Lift the beam from the ground and allow it to rest on its outside beam so the bed of the ladder is next to you. Simultaneously, step in toward the ladder.

Place your body in a semi-squat position. The tip of the ladder is picked up and the ladder is placed on the inside thigh while keeping the butt of the ladder resting on the ground. Place the inside arm between the rungs, by or at the center (balance point), and grasp the upper beam of the ladder in front of the rung so the rung will rest against the arm to keep it from twisting.

Rise to a standing position with the ladder resting on the shoulder. The outside hand takes hold of the most comfortable rung in front of the chest for stabilization and balance.

The butt end of the ladder should be tilted slightly downward to allow for clear forward vision. (Fig. 5.11)



Low shoulder beam-carry

OPTION TWO: High Shoulder Beam Carry

Identify the center of the ladder. Position yourself at the top 1/3 of the ladder and face it.

Squat down and grasp hold of the closest beam with both hands.

Lift the beam from the ground and step in toward the ladder allowing it to rest on its outside beam so the bed of the ladder is now next to you. Lift the tip of the ladder leaving the spur on the ground as you come to a standing position. Move toward the butt raising the tip until you can step under the lower beam with your shoulder at the center of the ladder. Lift the butt end off the ground.

The inside hand takes hold of the bottom beam to secure the ladder to the shoulder. The outside hand grasps the upper beam for the best stabilization and balance. (Fig. 5.12 next page)



High shoulder beam-carry

Beam Carry

One Member – (LADDER TRUCK) 28' or Less Extension Ladder

OPTION ONE: Low Shoulder Beam Carry

Unlock ladders. Pull the ladder straight back and when the ladder is free of the ladder rack, set the butt end on the ground. Face the butt while standing at the center of the ladder. With your inside hand grasp the closest beam and rotate it up so the bed section is toward you. It is then carried the same as a side mounted ladder.

OPTION TWO: High Shoulder Beam Carry

Same as above, but use the high shoulder carry.

Beam Carry

One Member – (ENGINE) 26' or Less Ground Extension Ladder

OPTION ONE: Low Shoulder Beam Carry

Remove the locking devices which secure the ladder. (Fig. 5.13) Identify the center of the ladder. Remove the ladder from the apparatus and place the butt of the ladder on the ground while supporting the tip of the ladder.

Place the inside arm through the rungs near the center, and grasp the upper beam of the ladder in front of the rung so the rung will rest against the arm to keep it from twisting.

OPTION TWO: High Shoulder Beam Carry

Unlock the ladder. Step to the center of the ladder so that the lower beam is resting on the shoulder. The inside hand takes hold of the lower beam to secure the ladder to the shoulder. The outside hand grasps the upper beam for the best stabilization and balance. (Fig. 5.14)



Unlock the two ladder locks ensuring that the halyard and cable do not get hung up on the lock handles



Placing the butt on the ground then removing the tip before placing the ladder on the shoulder can make this easier on the member

Beam Carry

Two Members – From the Ground 35' or Less Ground Extension Ladder

(Steps outlined are for carrying a ladder to the objective.)

The member in charge will be at the butt.

The members approach the ladder and position themselves between the 2nd and 3rd rungs from the tip and the butt of the ladder. (Figure 2.16)

They lift the inside beam from the ground and step in toward the ladder rolling the ladder away from themselves so that the bed section is toward them. The members then face the butt, kneel down with their inside knee up. Lift the ladder up onto their inside leg. Place the inside arm between the 2nd and 3rd rung from the ends. (Figure 2.17)

While still in the kneeling position, the members will grasp the nearest rung on the fly side with the inside hand. They place the outside hand on the most comfortable rung on the bed side.

The members stand up, lifting the ladder to the shoulder with inside hand. (Figure 2.18)



The members take proper position at the beamed ladder.



Members assume the "PREPARE TO LIFT" position



The members then beam carry the ladder to the objective

Beam Carry

Two Members – (ENGINE) 26' or Less Ground Extension Ladder

The member in charge will be at the butt.

Unlock the ladders. Facing the butt, with their outside hand on the upper beam and the inside hand between the 2nd and 3rd rungs from the ends, the members remove the ladder from the side of the apparatus.

When the ladder is clear, they place their inside hand through the rungs and carry the ladder to the objective.



Two members removing the ladder from the apparatus



Two members advance the ladder to the objective using a beam carry

Cradle Carry

Two Members, (LADDER TRUCK) 35' or Less Ground Extension Ladder

One member is positioned on each side of the ladder.

They release the ladder locks and begin to pull the ladder out of the rack. When they have removed the ladder approximately halfway, they face the ladder and spread their arms a comfortable distance on the beams, continuing to pull the ladder out until it is free of the ladder rack. The ladder is then carried to the objective.



Two members directly opposite each other "PREPARE TO LIFT" for a cradle carry

Flat Carry (LADDER TRUCK)

Three Members – 35' or Less Ground Extension Ladder

The member in charge will be in the center on the right beam (see Diagram # 1 below) or at the right butt position (see Diagram # 2 below).



When removing the ladder from the apparatus, two of the members grasp the ladder and begin to pull it from the ladder rack. The member on the side of the ladder with two members will continue out with the butt of the ladder. When the ladder is sufficiently removed from the rack, the single member will grasp the beam in the center of the ladder, while the other two members, on the opposite side of the ladder, will grasp the beam between the 2nd and 3rd rungs from the ends.

Once the ladder has been removed from the rack it will be raised with the command "TO THE SHOULDER" and carried to the objective.

Flat Carry

Three Members – From the Ground 35' Ground Extension Ladder or Less

Certain scenarios arise where the ladder is found already removed from the apparatus, and on the ground. An array of equipment, including ground ladders, may be found in the staging area.

Note the placement of members in the two options between Figures 5.21 & 5.23. The team gets into position and kneels facing the tip with their inside knee down. On the command, "Lift", the members stand up and pivot in toward the ladder and end up facing the butt end with the ladder on their shoulder. The ladder can then be carried to the objective.

The member in charge is on the right beam. This is the "PREPARE TO LIFT" position



"LIFT" All members stand and lift to the left shoulder as they turn 180 degrees to face the other direction which will be the butt end.



The member in charge is at the right butt. This is the "PREPARE TO LIFT" position

Flat Carry (LADDER TRUCK)

Four or Five Members – (LADDER TRUCK) 40' or Longer, Ground Extension Ladder

Two members are positioned on each side of the ladder rack at the rear of the apparatus.

One member on each side pulls the ladder out of the rack until they have positioned themselves between the second and third rungs. The two members continue pulling until the ladder is almost free of the ladder rack (use caution so that the ladder is not pulled completely out of the rack and falls to the ground).

The two remaining members, positioned on each side of the beams, grasp the ladder between the second and third rungs from the tip just before it is free of the ladder rack (see Diagram #1.)

When the ladder is free of the ladder rack and the member at the right butt position gives the command "To the shoulder," the ladder is lifted to the shoulder and carried to the objective.

When five members are available, the ladder is carried with four, allowing the member in charge to stand out and spot the ladder, then step in to receive the poles (see Diagram #2.)



Seattle Fire Department



Ladder Control

LADDER CONTROL & POSITIONING

Spotting and Positioning Ladders WAC - NFPA 1932/ SFD L&I Variance

When positioning a ladder for raising, approach the building at a 90 degree angle whenever possible. If a beam raise is used, pivot the ladder so that the bed is away from the building before extending the fly. For safety purposes, approach parallel to the building only if space does not allow a perpendicular access. On a beam raise parallel to the building, raise the ladder with the fly toward the objective when possible. Ladders are normally positioned into the left side of the window or opening when ready for climbing so that the ladder can be exited on the member's right. The ultimate factor governing the final position of the ladder will be dependent on fire conditions, anticipated future conditions and wind. **Generally, SFD ladders will be utilized in the fly "IN" configuration.**

Tip Positions for Different Uses

- ACCESS If the window or opening is too small to accommodate the width of the ladder and allow people to climb on or off, place the ladder tip below the opening as one would for rescue. Use extreme caution in this type of placement because the tip of the ladder may not be mechanically held from falling such as being inside of a window opening. It this situation exists there is the possibility of a ladder slipping to one side or the other on the face of the building.
- **RESCUE** Place the tip of the ladder immediately below the lower edge or sill of the opening and remove people over the sill and down the ladder.

NOTE: It is important, during a rescue, that the fly is extended to the proper distance and the dogs are locked before the ladder is placed into the building or within the victims reach. Victims can/will jump or grab at the ladder tip before it is set against the objective.

- **WORKED FROM** The best place is along side the window or opening on the windward side if possible. Examples of this would be the need for elevated exterior ventilation efforts from a ground ladder.
- **<u>FIRE STREAMS</u>** Fire streams that are to be operated from a ground ladder should have the ladder tip placed just above the top of the opening (header). This will allow the hose line to be placed away from the window opening while still giving the hose team members the best vantage point for defensive operations into the desired area.

NOTE: It is not advisable to place ladders in this position or subject them to visible flames or elevated temperatures for any amount of time should these conditions be present at the window or opening of the desired hose stream placement.

Other Ladder Spotting Considerations

- When spotting a ladder, avoid setting it in front of windows and doorways which may become involved in fire. Ladders should be placed at the corners of the structure if conditions permit.
- Determining the correct amount of extension prior to lowering the ladder into the building will result in correct tip placement. Bear in mind the relationship between the length of halyard pulled, and the number of sections the ladder has. When extending the fly of a two section ladder, each click of the dogs results in 14 inches of extension. When extending the fly of a three section ladder, each click of the dogs results in 28 inches of extension.
- When extending a ladder to a roof, when possible, place at least 5 rungs of the ladder above the parapet or gutter line. This allows for an easier and safer transition from the ladder to the roof and back again. It will also provide a landmark for members on the roof. They will be able to easily locate the ladder in case a rapid evacuation of the roof is necessary.
- When a window or opening is tall and wide enough for the ladder tip to be placed inside the opening, ensure that 2 to 3 rungs are placed above the sill line. This ensures that hands can be used to grip the

ladder once the member is above the sill level and while transitioning into the building.

Heeling Ground Extension Ladders

The purpose of heeling a ladder is to keep the butt under control and prevent it from shifting or moving. This is accomplished by applying body weight to the ladder through placement of feet on the bottom rung or spurs.

Heeling the Ladder – Flat Raise

- <u>One member at the butt</u>: The member at the butt of the ladder steps up onto the bottom rung, grasps the halyard bundle with either hand and allows their weight to hang back. The other hand is rested on the beam to maintain balance. (Figure 5.28)
- With most ladders, the halyard is grasped between the 2nd and 3rd rungs; however, on some ladders it may be necessary to grasp the halyard between the 1st and 2nd rungs.
- The member footing will step off the rung just prior to the ladder coming to the vertical position.
- Just before the ladder has come to the vertical, step down, grasp the outside of each beam of the bed section with both hands at shoulder level keeping the back leg locked.



Member at the butt, preparing to heel the ladder after the "PREPARE TO RAISE" command



Member at the butt healing the same ladder during a flat raise

Heeling the Ladder – Lowering to the Ground

<u>One member at the butt</u>: As the ladder leaves the vertical position, the member will step on the bottom rung with both feet, at the same time grasp all the ropes of the halyard in either hand and allow the body weight to hang back. Use the other hand to maintain balance. (Figure 5.29)



Member at the butt, on the fly side in the "PREPARE TO LOWER" position

Heeling the Ladder – Beam Raise and Lower

Raising

With the ladder on its beam, the member heeling the ladder stands facing the tip at the butt on the bed side, and checks the direction in which the ladder will be raised for obstructions and personnel, then states, "Overhead Clear." The member will place the appropriate foot on the spur of the beam that is on the ground. (Example: when raising on the right beam, the right foot is used for footing. When raising on the left beam, the left foot is used). The other foot drops back a step. In this position, the outside shoulder is slightly ahead; as the ladder is raised, the outside hand reaches out to grasp the bed side beam and the other hand is placed on the fly side beam.





After "RAISE" the member on the beams walks the ladder up with a hand-over-hand motion

Members sit in a "PREPARE TO RAISE" position during a beam raise

Lowering

While the ladder is in the vertical position, the member in charge will designate the beam on which the ladder will be lowered. The member on the bed side will place the appropriate foot on the inside portion of the spur of the designated beam (example: right spur right foot, left spur left foot). The other foot will be placed one foot out away from the ladder, both feet will be approximately shoulder width apart. The hands will be placed on the opposite beam designated. The hand that is placed on the bed section beam will be at approximately at shoulder height; the hand on the beam of the fly section will be placed below the other. The member footing the ladder will check the direction in which the ladder will be lowered for obstructions and personnel, and state "Overhead clear, clear behind, ladder coming down." (Fig. 5.32, next page)

NOTE: To prevent injury, at no time should the groin, rear leg, or knee be In line with the spur of the ladder.



"PREPARE TO LOWER" during a beam lower

Footing the Ladder – Vertical Position

A ladder will be **footed** any time it is shifted, pivoted, or brought to the vertical as well as any other time it is unsteady while in the vertical position. The main purpose being that it prevents the ladder from rocking left and right. If ever the ladder is starting to tip left or right, early footing will prevent the member's loss of control. (Fig. 5.33 & 5.34)



One member on the bed side "footing" the ladder



Two members on the bed side "footing" the ladder in unison

Bed Side Responsibilities

One member: As a ladder comes to vertical and is pivoted or shifted, the member will grasp the bed section beams, step up on the first rung with their left foot, and heel the ladder with their weight until it is steady. Once the ladder is stable, the member steps down with the right foot following the beam so that the right toe of the boot ends up against the spur. The left foot then steps down and back, ending up approximately two to three feet from the butt of the ladder.

Two member: With two members footing the ladder on the bed side, both members step up on the rung with their inside foot applying their full weight to stabilize the ladder. When steady, they both step down with the outside foot to the spur, and then the inside foot back approximately two feet.

Fly Side Responsibilities

After the ladder has come to the vertical, the member on the fly side will step back from the spurs with both hands grasping the outside of each bed section beam. The member then steps back, into a comfortable staggered foot position, allowing for good balance and stability. The feet should be placed approximately one to two feet back from each other, and about shoulder width apart. Once the member has obtained the desired foot position, the member should then allow the ladder to lean in slightly toward the objective, to assist in the extension of the ladder.

Heeling the Ladder – Lowering Into the Objective

One Member Facing the Objective – Bed Side:

When the command "INTO THE BUILDING" is given, the member on the bed side will place their left foot on the center of the bottom rung keeping the other foot off the ground and back for counterbalance. Grasp the 4th rung from the spur and using the weight of their body to prevent the base of the ladder from sliding out, lower the ladder to the objective. The member on the fly side will assist this movement with their hands on the beams.

Two Members Facing the Objective – Bed Side:

When the command "INTO THE BUILDING" is given, the members on the bed side will place their inside foot on the bottom rung of the ladder keeping the other foot on the ground. Using the inside hand to grasp the 4th rung from the spur, and the outside hand on the appropriate beam, they use the weight of their bodies to prevent the base of the ladder from sliding out as they lower the ladder to the objective. The member on the fly side will assist this movement with their hands on the beams.



One member on the bed side going "INTO THE BUILDING"



Two members on the bed side going "INTO THE BUILDING"

One Member With Back to the Objective – Fly Side:

When the command "INTO THE BUILDING" is given, the member on the fly side of the ladder will have both hands grasping the outside of each beam of the bed section. The member then steps back, into a comfortable staggered foot position, allowing for good balance and stability. The feet should be placed approximately one to two feet back from each other, and about shoulder width apart. Once the member has achieved the desired foot position, the member should then bring the ladder into the objective. This is to be accomplished in unison with the member(s) on the bed side of the ladder.

Heeling the Ladder – Out From the Objective

One Member Facing the Objective – Bed Side:

When the command "OUT FROM THE BUILDING" is given, the member on the bed side places their left foot on the center of the bottom rung, keeping the other foot on the ground. Grasp the 4th rung from the spur and using the weight of their body to prevent the base of the ladder from sliding, slowly pulls the ladder out from the objective. After the ladder has come to the vertical position, the

member will place the right foot on the right spur when stepping down from the rung. The member on the fly side will assist this movement with their hands on the beams.

Two Members Facing the Objective – Bed Side:

When the command "OUT FROM THE BUILDING" is given, the members on the bed side place their inside foot on the bottom rung of the ladder keeping the other foot on the ground and grasp the 4th rung from the spur using the weight of their bodies to prevent the base of the ladder from sliding. Slowly pull the ladder out from the objective and to a vertical position. The member on the fly side will assist this movement with their hands on the beams. After the ladder has come to the vertical position, the members will place their outside foot on the spur while stepping down from the rung.

One Member With Back to the Objective – Fly Side:

When the command "OUT FROM THE BUILDING" is given, the member on the fly side of the ladder will have both hands grasping the outside of each beam of the bed section. The member then steps back, into a comfortable staggered foot position, allowing for good balance and stability. The feet should be placed approximately one to two feet back from each other, and about shoulder width apart. Once the member has obtained the desired foot position, slowly push the ladder out away from the objective to a position just short of vertical. This is to be accomplished in unison with the member(s) on the bed side of the ladder.

PIVOTING LADDERS

Less than 40' in length

Pivoting is defined as the turning of the ladder in the appropriate direction on a designated spur while it is in the vertical position.

The member giving the commands will first designate the beam on which the pivot will be made. Then, as part of the same command, will designate the direction of the pivot (in or out).

Example: "ON THE RIGHT BEAM, PIVOT IN."

To help avoid confusion for members on the fly side, member(s) **on the bed side** will slap the beam that is designated for the pivot.

The term "IN" means the ladder will be pivoted on the designated beam toward the fly side of the ladder.

The term "OUT" means the ladder will be pivoted on the designated beam toward the bed side of the ladder.

 Example: Command - "ON THE LEFT BEAM, PIVOT OUT" The ladder is tipped slightly onto the left beam then rotated one quarter turn toward the bed side.

(Every pivot command assumes a 1/4 turn unless directed otherwise in the command. Example: "On the right beam, pivot 1/8 turn out.")



The members on the bed section of the ladder will foot the ladder after each pivot.

Example: Command - "ON THE LEFT BEAM, PIVOT IN" The ladder is tipped slightly onto the left beam then rotated one quarter turn toward the fly side.



One member in the ready position for a pivot command



One member beginning "ON THE LEFT BEAM PIVOT IN"
Members on the bed side

When the order is given to pivot, place hands on both bed side beams and push the ladder onto the designated beam and pivot the ladder in or out to the appropriate place. Set the ladder and foot it.

Member on the fly side

When the order is given to pivot, place your hands on both fly side beams, push the ladder onto the designated beam and pivot the ladder in or out to the appropriate place. Help steady the ladder. The member(s) on the bed side will foot the ladder.

PIVOTING LADDERS

40' or Greater in Length

When the ladder is stabilized in the raised position, both members on the poles stand facing each other approximately 10 feet apart on the bed side.

<u>Right pole position</u>: With the right pole crossing the front of the body the member has the right hand extended up the pole as far as possible and their left hand near their left hip on the spike.

Left pole position: With the left pole crossing the front of the body the member has the left hand as far up the pole as possible and the right hand near their right hip on the spike.

Rules for the Pole Positions:

- 1. Always watch the tip of the ladder, glancing down when needed
- 2. Never walk backwards.
- 3. Only one member on the poles moves at a time.
- 4. Ensure the stability of the ladder prior to moving the poles to a new position.
- To move correctly on command, the member pays attention to their hand position.

Example: <u>Right pole position</u>: Facing the other pole member, your left hand is on the spike and your arms are spread out. Your **left hand is IN** closest to your body, and your **right hand is OUT** away from your body. (see Diagram #1)

<u>Left pole position</u>: Facing the other pole member, your right hand is on the spike and your arms are spread out. Your **right hand is IN** closest to your body, and your **left hand is OUT** away from your body. (see Diagram #1 below.)





Pivots of a bangor ladder begin and end in this position

Commands: "ON THE RIGHT BEAM, PIVOT (IN OR OUT)" "ON THE LEFT BEAM, PIVOT (IN OR OUT)"

The member on the right pole will move on the command, "On the right beam, pivot out" because their right hand is out, and will also move for the command "On the left beam, pivot in" because their left hand is in.

The member on the left pole will move on the command "On the left beam, pivot out" because their left hand is out and "On the right beam, pivot in" because their right hand is in (see Diagram #2 below).



When the pivot command is given, the member on the designated pole will move to the other side of the pole around the end so that it can be moved without walking backward. The member will then walk forward until the pole is 2 feet past being in line with both beams. The member will again move to the other side of the pole while still holding onto it so that both pole members are again facing each other. The next step is to lean the ladder onto the designated beam for the pivot. To accomplish this correctly do the following:

- If the command is IN, push IN on the ladder with the pole so the beam closest to you comes off the ground slightly and the ladder is able to be pivoted on the designated beam.
- If the command is OUT, pull OUT from the ladder with the pole so the beam furthest away from you comes off the ground slightly and the ladder is able to be pivoted on the designated beam.

• Example: "ON THE LEFT BEAM, PIVOT OUT"



The member in charge gives the command "ON THE LEFT BEAM, PIVOT OUT"



The member on the left pole moves to a position just past parallel with the left beam, then slightly pulls the ladder on to its left beam



The members at the butt pivot the ladder out on the left beam, then foot the ladder. The member in charge moves into original position When the command is given to pivot the ladder, the member on the bed side, on the respective beam, will first designate the beam that the ladder will be pivoted on by slapping it twice.

When the ladder is pivoted to the desired position it is set and footed, each and every time.

The member on the pole that has not moved will then move back to the appropriate position when the ladder is steady. Any further movement by the pole position that moved first may now be executed to ensure proper distance and placement between the two pole members.

Strong and clear team communication is critical. Members on the poles shall talk to one another using simple commands such as "Push" or "Pull." As an example, if the ladder was leaning toward the member on the left pole after a pivot, the member on the right pole would loudly state "Push." The left pole member would then push in on the ladder with the pole until the ladder was vertical.

NOTE: Any member of the team may request that a pole member "Pushes" or "Pulls" if the safety of the team or stability of the ladder is in question.

All members should develop the habit of watching the tip of the ladder, glancing at other positions when needed.

SHIFTING LADDERS

One Member

26' or Less Ground Extension Ladder

This operation is performed so that a ladder can be moved parallel to a building or object while in the vertical position, and can be accomplished by a command or on an individual basis.

If the member is given the command to shift, they will be first given a preparatory command of "prepare to shift" and then the direction in which the ladder is to be shifted.

• Example: Command - "PREPARE TO SHIFT-RIGHT"

The member will be on the bed side of the ladder when the command is given and move to the opposite beam called for. Example: "Prepare to

shift right," the member will move to the left beam. The member will at the same time reach down and grasp the 2nd rung of the bed section with the right hand and reach around to the fly of the ladder with the left hand and grasp the right beam. When shifting to the left reverse the procedure. If you are shifting right, your right hand will be lifting the ladder on the bed section. If you are shifting left, your left hand will be lifting the ladder on the bed section.

The next action is to state "OVERHEAD CLEAR"; the path that the ladder will take is checked to assure that there are no overhead obstructions.

The next command will be "LIFT", the member will lift the ladder off the ground using the leg muscles (not the back) and allow the ladder to balance on the shoulder and slightly across the front of the body.

The next command is "SHIFT"; the ladder will be moved in the direction ordered. Move forward in the direction of travel and monitor the position of the ladder being carried. Also watch for overhead obstructions.

The next command is "HALT - LOWER", the member will take one additional step forward then bring the feet together and come to a stop, set the ladder to the ground, and then foot the ladder.



Ready position, waiting for commands



"PREPARE TO SHIFT LEFT" position



"LIFT" position, awaiting the "SHIFT" command



"PREPARE TO SHIFT RIGHT" position

Two Members

35' or Less Ground Extension Ladder

• Example: Command - "PREPARE TO SHIFT-RIGHT"

The member on the bed side of the ladder will slap the right beam when the command is given. The member on the fly side faces the right beam, reaches through the fly sections between the 2^{nd} and 3^{rd} rungs with the right hand and grasps the 2^{nd} rung of the bed section near the right beam. Their left hand grasps the fly section(s) of the right beam about shoulder height. The member on the bed side faces the right beam and grasps the 2^{nd} rung of the bed section. The right beam and grasps the side faces the right beam and grasps the 2^{nd} rung of the bed section near the left beam with their left hand. The right hand grasps the right beam of the bed section. Both members should be squatting so the lifting will be done with the legs.

The next action is to state "OVERHEAD CLEAR"; the path that the ladder will take is checked to assure that there are no overhead obstructions.

The next command will be "LIFT", the members will lift the ladder off the ground in unison using the leg muscles (not the back) and balance the ladder tilting the tip slightly back.

The next command is "SHIFT"; the ladder will be moved in the direction ordered. Move forward in the direction of travel and monitor the position of the ladder being carried. The bed side member watches the ground and the fly side member watches the tip for obstructions

The next command is "HALT - LOWER", the members will take one additional step forward then bring the feet together and come to a stop, set the ladder to the ground, and then foot the ladder.



"LIFT" position

EXTENDING / LOWERING THE FLY

One Member Fly Extension

Place the inside of the right foot to the back of the right spur of the ladder. (Fig. 5.51) Be sure the toe is not in a position where the fly section could drop. Position the knee of the same leg on the bed side of the right beam. The opposite foot should be a comfortable distance in back to help keep the balance of the ladder. Reach up using a hand-over-hand motion to extend the halyard. (Fig. 5.49 & Fig. 5.50)

NOTE: While extending the fly section keep the ladder balanced by using your right shin to "push" against the right beam. That will assist in keeping the ladder away from you. If the ladder begins to lean away from you too far, pull back on the halyard until you regain control. Again, the shin and halyard should be used to control the "too close and too far away".

When the command "HIGH" is given the fly is locked at the next highest rung. Ensure that the dogs are locked. Do not put hands or feet in position where they can be injured by the movement of the fly section(s).

NOTE: At no time shall any member reach through a rung space or touch a rung with the hands or feet until all dogs are locked.



Member using the right shin to "push" the ladder away



Member using the halyard to "pull" the ladder back



Using the inside of the right foot around the right spur

Two Member Fly Extension

One member is on the fly side and one on the bed. The member on the bed side will place their right toe against the right spur of the ladder, extends the flies to the desired height. The opposite foot should be a comfortable distance in back to help keep the balance of the ladder. Reach up using a hand-over-hand motion to extend the halyard. While extending the fly section keep the ladder balanced by pulling straight down and inline with the center of the ladder as much as possible.

The member on the fly side will place both hands on the beams of the bed section and maintain the balance of the ladder with the ladder slightly tilted toward the objective.

When the command "HIGH" is given the fly(s) is/are locked at the next highest rung. Ensure that the dogs are locked. Do not put hands or feet in position where they can be injured by the movement of the fly section(s).

NOTE: At no time shall any member reach through a rung space or touch a rung with the hands or feet until all dogs are locked.



Two member "EXTEND THE FLY"

Three Member Fly Extension

There are two members on the bed side, and one on the fly side.

Command "EXTEND THE FLY"

The two members on the bed side both reach for the halyard with their **inside** hand. The taller member (or member on the right beam, if the members are the same height) calls "**HIGH**" and takes the higher hand position on the halyard, during extension, until the fly is extended to the proper height. The second member will take hold of the halyard with their inside hand just below the other member's hand during extension. Both members on the bed side will have their outside toe in front and against their respective bed side spurs.

 Care must be taken to maintain the proper hand placement for both members and to establish a smooth rhythm while extending the fly. When the ladder is extended to the desired height the command "HIGH" is given. This is the signal to lock the dogs on the next highest rung.

The member on the fly side will place both hands on the beams of the bed section, at shoulder height and maintain the balance of the ladder with the ladder titled slightly in to the objective. The feet are placed shoulder width apart, one foot ahead of the other. The foot closest to the ladder will be about one to one and a half feet away from the butt of the ladder, hands at shoulder level. The fly-side member should be using body weight to manipulate the ladder in or out. This is accomplished by locking the back leg, getting a good stance, and locking the arms. (Fig. 5.53)



Three member "EXTEND THE FLY"

- Command "LOWER THE FLY"
 - When lowering the flies on any ladder only the member on the right beam manipulates the halyard. If the member on the right beam is having difficulty getting the fly(s) in motion, the other member may assist in that process then turn the halyard over to the member at the right beam.

NOTE: It is important to lower the flies of the ladder using a hand-over-hand method. Do not let the halyard slide through your hands.

SECURING THE HALYARD

2 Section Ladder

After the fly is extended, the dogs are locked, and the ladder is into the building, the fly section must be secured. Tying the halyard is the primary method to accomplish this requirement. When sufficient halyard is available, the excess is pushed from the bed side of the ladder between rungs 3 and 4, then pulled back toward the member between 3 and 2. (This is best remembered as "Push 4/3, Pull 3/2"). A round turn is made around rung 3 and two halfhitches are placed above the rung around the halyard.

3 Section Ladder

This process is the same as above with one difference. When sufficient halyard is available, the excess is pulled from the fly side of the ladder between rungs 2 and 3. A round turn is made around rung 3 and two half-hitches are placed above the rung around the halyard.

Insufficient Halyard Length

If an insufficient length of halyard is available due to minimum extension of the ladder, the fly must be secured by using a utility strap (See Diagram #1 and #2 below). A hose knot is formed around the lowest set of double rungs, then a round turn is made on the rung below by passing the tail end behind and under the rung. Tie two half hitches on the vertical part of the utility strap. Another option would be to extend the halyard using a hose knot with the utility strap on the halyard between rungs 2 and 3 then tying a round turn and two half hitches on the third rung.



The member securing the fly shall have the left foot on the bottom rung of the ladder to keep the butt from sliding out when pulling on the halyard. Any excess halyard that is left after tying will be pushed through to the fly side of the ladder.



Member with left leg on bottom rung in the center



(3 section ladder) Reaching between rungs 2 and 3, grab the halyard slack on the fly side



(2 section ladder) Push halyard from bed side through rungs 3 and 4, then back through 2 and 3. This is known as "push 4-3 and pull 3-2"



Pull the recently grabbed slack toward you between rungs 2 and 3



Tie a round-turn around rung three



Tie a half-hitch around the halyard above rung 3



Tie a second half-hitch directly above the first with the final bight of halyard pushed to the fly side.

ADJUSTING THE BUTT OF A LADDER

This operation is performed while the ladder is in the vertical position and against the objective with the halyard secured. Use good lifting technique to avoid injuring the back.

One Member on the bed side (Fig. 5.61)

Reach down with either hand and grasp the 1st or 2nd rung from the spur, and with the other hand grasp the 4th or 5th rung, and lift the butt of the ladder up off the ground and while looking up adjust the ladder as needed.

Two Members on the bed side (Fig. 5.62)

The member on the right beam will reach down with the left hand and grasp the 1st or 2nd rung from the spur, and with the right hand grasp the 4th or 5th rung. The member on the left beam will reach down with the right hand and grasp the 1st or 2nd rung from the spur, and with the left hand grasp the 4th or 5th rung. Together both members will lift the butt of the ladder up off the ground and adjust the ladder as needed.



One member "ADJUST THE BUTT" for climbing or lowering



Two member "ADJUST THE BUTT" for climbing or lowering

CLIMBING

Proper climbing methods should always be employed in ascending and descending ladders. The following safety items are to be checked before climbing:

- 1. Ladder spurs are secure and will not slip.
- 2. Wedge the ladder on uneven ground.
- 3. The ladder is resting firmly on the objective.
- 4. Ladder locks are secured on all flies and the bed section.
- 5. The tip is properly secured with a ladder anchor or the ladder is footed at the butt. Members facing the objective will look up when heeling a ladder.
- 6. The fly has been properly secured with the halyard or body loop.
- 7. Verify proper climbing angle (approximately 70 degrees).
- 8. If the ladder is equipped with tormentor poles, ensure that they are properly set. The poles should be parallel to the building whenever possible.
- 9. When climbing a ground extension ladder place your hands on the rungs **or slide them up the beams**. On an aerial ladder, use the trussed hand rail. When on a straight ladder fire escape, always climb with your hands on the beams, not on the rungs.

Ladder climbing should be done smoothly and rhythmically in order to minimize bouncing and swaying. In ascending or descending a ladder, climb near the center of the rungs on the arch of the foot.

While climbing, the back should be near perpendicular with the ground and the climber's arms almost fully extended. The hands should be grasping the rungs palms down and one hand should be grasping a rung at all times while climbing (or sliding up/down a beam). It is also acceptable to use the beams to climb. The hands should run behind the beams for increased safety to the climber.

Securing the Ladder

Ladder tips (or fly section rungs) will sometimes need to be secured with a ladder anchor. For example in extended operations, operating fire streams or working from a ladder while locked in, all require the tip to be secured. In some situations it may be necessary to have a member stabilize (foot the ladder) and control the butt of the ladder.

Using a Ladder Anchor

The ladder anchor should be brought to the tip or fly section being secured by the safest means possible. Two common methods taught are holding it in a hand while sliding that hand along a beam or simply placing it in a pocket while climbing.

When you reach the window sill, balcony, railing, or parapet edge, secure the hook over the object (attempt to sink the hook into drywall to hook the actual sill or structural member of a parapet wall). Make a loop starting with going <u>over</u> the 1st rung below the sill/edge, then take the rope behind and under the 2nd rung and make a round-turn. Next, tie two half hitches to the rope that extends from the 1st to 2nd rung (Fig. 5.63 & 5.64)

Maintain three points of contact with the ladder using your feet and at least one hand or one arm when working on the ladder.



The hook is placed over the parapet or sill and a loop is made with the rope, start over the top of the 1st rung below the sill/top of wall or roof line



The rope is then brought behind the second rung below the sill/wall/roof line



Bring the end up to form a round turn on rung 2



Tie two half-hitches above rung 2 onto the rope between the two rungs

Leg-Locking In

Members performing work while on a ladder should be locked-in so that both hands are free for use. (Fig. 5.67)

The procedure for locking-in is to climb one rung above the height at which you desire to work. Using the leg opposite the side on which you wish to work, circle the leg over and back under the rung above the one on which you are standing. Step down one rung, locking in with the leg.

It is necessary to adjust this operation as all members are not the same height. Some lock their toe under the next rung down, while others lock it on the beam. Shorter members may find it comfortable not to step down after locking-in. The overall goal is to establish a secure position.

NOTE: Members shall not lock in (leg-lock) on any ladder that is not secured at the tip or any type of aerial ladder device.



Member shown locked-in to work off of the right (left leg-lock)

UNEVEN TERRAIN

Wedging is a technique used to stabilize the butt of a ladder when the terrain at the spurs is uneven.

All ladder companies carry wooden wedges. A member can use these wedges one at a time or two wedges opposing each other. Other materials that are available at the scene may also be used to even up the base of the ladder, such as tarps.

If a spur is not touching the ground after the ladder is placed into the climbing position, it is steadied by placing the wedge or tarp between the spur and the ground making positive contact with both. (Fig. 5.69 & 5.70)





LADDER RAISES

The Seattle Fire Department uses three different ladder raises:

- Cradle raise.
- Beam raise.
- Flat raise.

General Rules

- Raise the ladder perpendicular to the building if possible.
- On flat raises, ladders are placed so that when raised to a vertical position, the fly side of the ladder is toward the building.
- Members should watch the tip of the ladder when raising, lowering, extending or retracting the fly, and when pivoting or shifting a ladder.

There are many reasons for watching the tip of a ladder:

- First and foremost, above the tip is where the action is. Jumpers, falling debris and fire conditions are in this area
- To determine if the ladder is tipping, leaning or beginning to fall
- To watch for falling material from the objective
- To consistently watch for overhead obstructions

Beam Raise

One Member

26' or Less Ground Extension or Straight Ladder

To raise the ladder: From the beam carry position, (one member low or high shoulder beam carry) bring the ladder to the desired location and check the overhead area for obstructions.

The member places the bottom spur of the ladder to the ground

Low Shoulder Carry

Grasp the top beam with the outside hand while removing the inside hand from between the rungs to grasp the lower beam. To help support the weight and keep the balance of the ladder during the movement of the hands, lift the inside knee up to support the lower beam. If necessary raise the ladder up on its lower beam, and when almost to vertical pivot the ladder 1/4 turn so that the fly is closest to the building. When the ladder has come to a vertical position it shall be footed.

This technique to raise a ladder is to be completed in a quick and smooth manner to keep the butt of the ladder from sliding out.

High Shoulder Carry

Raise the ladder up on its lower beam, when it's almost to the vertical, pivot the ladder 1/4 turn so that the fly is closest to the building. Again, when the ladder has come to a vertical position, foot it.

- Extend the fly to the desired height and verify that the dogs are locked.
- Lower into the building by placing the left foot on the bottom rung while holding onto the fourth rung up from the butt with both hands.
- Secure the halyard.
- Adjust the butt if necessary.

To lower the ladder

- Release the halyard.
- Place left foot on the bottom rung, and with the hands on the fourth rung, pull the ladder tip out from the building.
- Lower the fly.
- Once the fly is lowered and the ladder locks are set, prepare to lower the ladder to the ground. If needed, shift the butt of the ladder to the building and prepare to lower.
- Turn your head and look in the direction to which the ladder will be lowered to ensure that there are no obstacles in your path, including the overhead. State in a loud clear voice "OVERHEAD CLEAR, CLEAR BEHIND, LADDER COMING DOWN." This will alert personnel in the area that a ladder is about to be lowered.
- With hands on the beams, using a sliding hand on the beams, or hand-over-hand technique on the rungs, lower the ladder to the ground.

Beam Raise

Two Members

35' or Less Ground Extension or Straight Ladder

This method is most commonly used for raising the ladder when it is beam carried to the objective. Beam carries can be accomplished on either shoulder as long as both members are on the bed side. Typically, if taken from an apparatus, beam carries will be on the right shoulder.

From the beam carry position, bring the ladder to the desired location. The member in charge (the member at the butt) will check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where a ladder is to be raised.

• Command - "GROUND THE BUTT" (Fig. 5.71)

The member on the butt will lower the butt of the ladder so that the spur of the lower beam will be grounded at the desired point.

• Command "PREPARE TO RAISE" (Fig. 5.72)



Members have just "GROUND THE BUTT" for a beam raise



Members have now moved to the "PREPARE TO RAISE" position

The member at the tip (# 2) will then remove the ladder from the shoulder and prepare to raise the ladder on its beam.

If a beam raise parallel to the objective is necessary and the butt has been grounded with the bed toward the objective, the member at the tip can quickly roll the ladder over their head. This will properly place the fly toward the objective, avoiding the necessity to pivot the ladder 180 degrees when vertical. The member at the butt (#1) will heel the ladder on the bed side for a beam raise.

Command "RAISE"





The bed-side member completes the raise by footing the ladder while the fly side member temporarily pulls slightly to counteract the bed side weight

Two members performing a beam "RAISE"

The member at the tip (#2) will raise the ladder by moving toward the butt with a hand-over-hand motion on the beam. (Fig. 5.73)

When the ladder reaches the vertical position, member (#1) will foot the ladder from the bed side. The member on the fly side (#2) maintains the balance of the ladder in a vertical position by placing both hands on beams. (Fig. 5.74)

Right shoulder carry with objective on fly side of ladder.



• Command "EXTEND THE FLY"

The member on the bed side will place their right toe against the right beam of the ladder. With a hand-over-hand technique on the halyard, extend the fly to the desired height. The member on the fly side will place both hands on the beams and maintain the balance of the ladder, with the ladder slightly tilted to the objective. The feet are placed shoulder width apart one foot ahead of the other. The foot closest to the ladder will be about one to one and a half feet away from the butt of the ladder.

• Command "HIGH"

The fly is extended to the next rung and checked to see that the dogs are locked.

• Command "INTO THE BUILDING"

The members on both sides of the ladder lower the ladder into the building. The member facing the objective (bed side) will foot the ladder by placing a foot on the bottom rung while holding onto the fourth rung up from the spur with both hands. The member on the fly side will assist lowering the ladder into the building.

The member on the bed side will secure the halyard and both members will then adjust the butt if needed.

• Command "SECURE THE TIP."

The member that was on the fly side as it was lowered into the building will secure the tip with a ladder anchor.

To lower the ladder

Command "RELEASE THE TIP"

The member that was on the fly side as it was lowered into the building will release the tip.

The member on the bed side will release the halyard.

Command "OUT FROM THE BUILDING"

The members on both sides of the ladder bring the ladder out from the building. The member facing the objective (bed side) will foot the ladder by placing a foot on the bottom rung while holding onto the fourth rung up from the butt with both hands. The member on the fly side will assist bringing the tip out from the building with hands on the beams.

• Command "LOWER THE FLY"

The member on the bed side will lower the fly hand-over-hand.

• Command "PREPARE TO LOWER ON THE (RIGHT or LEFT) BEAM"

The member on the bed side will foot the ladder.

The member on the fly side of the ladder will step to the designated beam and grasp the beam with both hands.

The member footing the ladder on the bed side will check the direction in which the ladder will be lowered for obstructions and personnel and state "OVERHEAD CLEAR, CLEAR BEHIND, LADDER COMING DOWN."

• Command "LOWER"

The fly side member (# 2) will slowly walk backward while grasping the beam of the ladder with a hand-over-hand motion and lower it to the ground.

Command "PREPARE TO LIFT"

The members will go to the positions needed for the carry (cradle or beam) and prepare to lift.

• Command "LIFT"

The ladder is lifted.

Command "STOW THE LADDER"

The members will return the ladder tip first to the apparatus.

Beam Raise

Three Members

35' or Less Ground Extension Ladders

This raise is accomplished the same as a two member beam raise with the exception that after spotting the ladder to the correct location, and after it has come to the vertical position, the member in charge (#1) will step in at the right beam.

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Two members performing a beam "RAISE"

From the beam carry position, bring the ladder to the desired location. The member in charge (the member standing out) will check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where a ladder is to be raised.

• Command - "GROUND THE BUTT"

The member on the butt (# 2) at this time, will lower the butt of the ladder so that the spur of the lower beam will be grounded at the desired point.

Command "PREPARE TO RAISE"

The member at the tip (#3) will then remove the ladder from their shoulder and get set to raise the ladder on its beam.

If a beam raise parallel to the objective is necessary and the butt has been grounded with the bed toward the objective, the member at the tip can quickly roll the ladder over their head. This will properly place the fly toward the objective, thereby avoiding the necessity to pivot the ladder 180 degrees when vertical.

Command "RAISE"

The member at the tip (# 3) will raise the ladder by moving toward the butt with a hand-over-hand motion on the beam.

When the ladder reaches the vertical position, member #2 will foot the ladder from the bed side, member #3 will assist in stabilizing the ladder on the fly side. When it is secure, #2 moves to the left beam, bed side, and #1 steps in at the right beam, bed side. (See Diagram below on this page).





The member in charge steps back in (on the right beam) after the ladder comes to the vertical position and foots the ladder with the other member

• Command "EXTEND THE FLY"

The two members on the bed side both reach for the halyard with their inside hand. The taller member (or member on the right beam, if the members are the same height) calls "HIGH" and takes the higher hand position on the halyard until the fly is extended to the proper height. The second member will take hold of the halyard with their inside hand just below the other members hand. Both members on the bed side will have their outside toe in front and against the bed side spurs.

Command "HIGH"

When the ladder has reached the desired height, the member in charge will call out "HIGH". Both members on the bed side will extend the fly section of the ladder up to the next rung and check to see that the dogs are locked.

Command "INTO THE BUILDING"

The members on both sides of the ladder lower the ladder into the building. The members on the bed side will foot the ladder with their inside foot on the bottom rung, while holding onto the fourth rung up from the spur with the inside hand and the beam with the outside hand. The member on the fly side will assist bringing the ladder into the building with hands on the beams.

• Command "SECURE THE HALYARD"

The member on the right beam, bed side, will secure the halyard.

• Command "ADJUST THE BUTT" (if applicable).

The butt is then adjusted, if needed; by members #1 and #2 then will again be footed.

Command "SECURE THE TIP"

The member on the fly side as it was lowered into the building will secure the tip with a ladder anchor.

To lower the ladder

• Command "RELEASE THE TIP"

The member on the fly side as it was lowered into the building will release the ladder anchor from the tip.

• Command "RELEASE THE HALYARD"

The member on the right beam bed side, will release the halyard.

• Command "OUT FROM THE BUILDING"

The members on both sides of the ladder bring the ladder out from the building. The members on the bed side will foot the ladder with their inside foot on the bottom rung while holding onto the fourth rung up from the spur with the inside hand on the rung and the outside hand on the beam. The member on the fly side will assist bringing the tip out from the building with hands on the beams.

• Command "LOWER THE FLY"

The member on the bed side right beam will lower the flys hand-overhand. Both members will have their outside toe on the bed side spur.

 Command "PREPARE TO LOWER ON THE (RIGHT or LEFT) BEAM"

At this time, the member in charge on the right beam (#1) will step out to a position to observe the direction in which the ladder will be lowered and check for obstructions and personnel before stating "OVERHEAD CLEAR, CLEAR BEHIND, LADDER COMING DOWN."

The member on the bed side will heel the ladder.

The member on the fly side of the ladder (#3), will step to the designated beam and grasp the beam with both hands.

• Command "LOWER"

The member on the designated beam will slowly walk backward while grasping the beam of the ladder with a hand-over-hand motion and lower it to the ground.

Command "PREPARE TO LIFT"

The members will proceed to the positions needed for the carry (flat, beam) and prepare to lift.

• Command "LIFT"

The ladder is lifted.

Command "STOW THE LADDER"

The members will return the ladder tip first to the apparatus.

Flat Raises

One Member

26' or Less Ground Extension or Straight Ladder

Carry the ladder into the desired location. Check the overhead area for obstructions and place the butt of the ladder against the building with the fly side up. Lay the ladder on the ground (see Diagram #1 below.)

Position your body so that you are at the tip looking down the ladder toward the butt and the objective (see Diagram #2, inside Diagram 1 Box.) Crouch down, grasp the tip of the ladder and lift, keeping the back straight and lifting with the legs.



When the ladder reaches shoulder height, step under the ladder and walk the ladder hand-over-hand using the center of the rungs or slide your hands along the beams until the ladder is in the vertical position and flat against the building.



above the head walking up the rungs or sliding the hands up the beams



Member has walked ladder to the vertical, against the objective

M bb o

Member adjusts the butt for climbing or to prepare for extension of the fly

- Pull the butt out from the building by grasping the first and fourth or the second and fifth rungs and adjust the butt. (Fig. 5.79)
- Placing the left foot on the bottom rung and grasping the fourth rung from the spurs pull the tip out from the building. Step down with the right foot to the right spur.
- Extend the fly to the desired height and ensure the dogs are locked.
- Lower into the building. The member will foot the ladder with the left foot on the bottom rung while holding onto the fourth rung up from the spur with both hands.
- Secure the halyard.
- Adjust the butt if applicable.

To lower the ladder

• Reverse the process.

Flat Raise

Three Member

35' or Less Ground Extension Ladder

From a flat carry, bring the ladder to the objective and properly position. The member in charge, the member on the right beam or right butt (see Diagram #1 and 2, next page) will check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel survey of the area where a ladder is to be raised.

- Command "READY HALT"
- Command "LOWER THE LADDER"

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Place the ladder on the ground, fly side up.

Command "PREPARE TO RAISE"



"PREPARE TO RAISE" position



"RAISE" the two bed-side members will lift the tip off the ground and walk up the beams handover-hand



Both bed-side members foot the ladder in unison



Each member slides their outside foot down the beam to the ground and step back with the inside leaving the tip of the boot in contact with the beam

One member on the right beam and two members on the left

The personnel will rotate clockwise. The member in charge (#1) will move up the right beam toward the tip and stop between rungs 2 and 3. The member on the left beam tip (#2) will move to a position opposite #1 on the left. The member on the left beam butt (#3) will rotate to the butt of the ladder and heel it. This will be accomplished by standing on the bottom rung, crouching down and grasping the halyard bundle. (Diag. 3 below)

Two members on the right beam and one member on the left

Personnel will rotate clockwise. The member in charge (#1) will move up the right beam toward the tip to approximately 1/3 of the length of the ladder from the tip. The member on the right beam tip (#2) will move around the tip of the ladder to approximately 1/3 of the length of the ladder from the tip on the left beam. The member on the left beam (#3) will rotate to the butt of the ladder and heel it. This will be accomplished by standing on the bottom rung, crouching down and gripping the halyards. (Diag. 4)



Command "RAISE"

The ladder is raised to the vertical position by the two members on the beams. Using a hand-over-hand motion with both hands on the beam. When the ladder comes to a vertical position the members on the bed side will foot the ladder, then place their outside toe in front and against the bed side spurs. The member at the butt will step up onto the bottom rung, and grasp the halyard ropes in both hands. When the ladder comes to a vertical position the member on the butt will step back off the ladder and place both hands on the beams and their feet are placed shoulder width apart, one foot ahead of the other to maintain the balance of the ladder. The ladder will be slightly tilted towards the objective.

The remainder of the evolution has been covered.

Flat Raise

Four Member

40' Tormentor Ground Extension Ladder or Greater

Carry the ladder to the objective and properly position. The member in charge (the member on the right beam at the butt) will check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where a ladder is to be raised.



Members in the "PREPARE TO LIFT" position



The command "LIFT" has been given and executed

- Command "READY HALT"
- Command "LOWER THE LADDER"

Place the ladder on the ground, fly side up.

Command "PREPARE TO RAISE - PASS THE POLES"

The member in charge (#1) will begin to move to a position to receive the poles. The member on the left beam at the butt (#4) will move to the butt of the ladder between the spurs and prepare to pass the poles. The two members at the tip will stay in their positions to help pass the poles (Diagram #1)





"PREPARE TO RAISE – PASS THE POLES"

Overhead clear is stated and officer receives the poles

The member in charge will again check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where the poles are to be passed.

The member in charge (#1), has moved to a position facing the tip of the ladder and prepares to receive the spikes of the poles. The member on the butt (#4) will release the poles and pass them to the members on the beams. The members on the beams (#2 and #3) will continue passing the poles to the member in charge.



The member on the poles (#1) grasps a pole in each hand with arms on the outside of the poles while standing between the poles. The poles also may be held with the spikes between the middle and ring fingers with palms up and both arms on the outside of the poles while standing between the poles. • Command "RAISE"

The member in charge of the poles must take care that the swivels are rotated outward and to hold the poles outward from the body when the ladder first lifts off the ground. The poles are pulled back in once they have passed the beams. (Fig. 5.89 & 5.90)







Poles brought back in tight with body after tip has cleared

The ladder is raised to the vertical position by the two members on the beams, using a hand-over-hand motion with both hands on their respective beam. When the ladder comes to a vertical position the members on the bed side will foot the ladder, then place their outside toe in front and against the bed side spurs. The member at the butt will step up onto the bottom rung, and grasp the halvard ropes in both hands as the ladder is raised. When the ladder comes to a vertical position the member on the butt will step back off the ladder and place both hands on the beams at shoulder height and their feet are placed shoulder width apart, one foot ahead of the other to maintain the balance of the ladder. The foot closest to the ladder will be about one to one and a half feet away from the butt of the ladder. The ladder will be slightly tilted to the objective. The member on the poles will assist in pushing the ladder to the vertical position. Note: The poles must be kept low to the ground during the initial stages of the raise and the member on the poles must not push too soon. wait until the ladder is over the head of the members on the beam.

When the pole member is certain that the ladder is stable in the vertical position, that member will give the command: "FLY SIDE AROUND." The member on the fly side of the ladder (#4), will move to receive the left tormentor pole from the member in charge and will turn, walk out laterally to the pole position, then move around to the outside of the pole so that #1 is in view (see Diagrams #2 and #3 below.) When #4 is in control of the

ladder, #1 makes the same movements on the right side. The members are then in a position on the outside of the poles facing each other. The member on the right pole will have the pole crossing the front of their body with their right hand extended to the pole at shoulder height, with the elbow slightly bent. The left hand will be holding the spike of the pole near the side of the left hip. The member on the left pole will have the pole crossing the body with their left hand extended to the pole at shoulder height, with the elbow slightly bent. The right hand will be holding the spike of the pole near the side of the right hip. Never allow the spike of the pole to point into your body.

Both members on the poles will be standing at an angle **outside the beams** by approximately four feet (see Diagram #3).





"FLY SIDE AROUND" fly member takes control of the left pole. Pole members move into proper position. Fly extension or pivoting can now begin.

Command "EXTEND THE FLY"

The two members on the bed side both reach for the halyard with their inside hand. The taller member (or member on the right beam, if the members are the same height) calls "HIGH" and takes the higher hand position on the halyard until the fly is extended to the proper height. The
second member will take hold of the halyard with their inside hand just below the other member's hand. Both members outside toes are placed in front and against the bed side spur.

Care must be taken to maintain the proper hand placement for both members and to establish a smooth rhythm while extending the fly.



"EXTEND THE FLY" The taller member calls out "high" once. Extension of the fly immediately begins afterward

• Command "HIGH"

The members on the bed side that are raising the flies will lock the dogs at the next highest rung. The member in charge (#1) will check that the dogs are locked and state "ALL FOUR DOGS ARE LOCKED." It is the responsibility of all personnel to be aware that all the dogs are locked.

Command "INTO THE BUILDING"

The members on the bed side will heel the ladder with their inside foot on the bottom rung, while holding onto the fourth rung up from the spur with the inside hand and the beam with the outside hand. The members on the poles will lower the ladder into the objective using the poles to guide the tip to the proper placement.

Command "SECURE THE HALYARD"

The member on the right beam will secure the halyard.

• Command "ADJUST THE BUTT" (if applicable).

The butt is then adjusted by the Members who extended the fly.

• Command "SET THE POLES"

The poles are moved from the butt to a position parallel to the objective and the spike is allowed to rest on the ground.

Command "SECURE THE TIP"

The member at the left butt when lowering in will secure the tip with a ladder anchor.

To lower the ladder

• Command "RELEASE THE TIP"

The member that was at the left butt when lowering in will release the ladder anchor from the tip.

• Command "OUT WITH THE POLES"

The pole members move to the position for lowering the ladder.

Command "RELEASE THE HALYARD"

The member on the right beam bed side will release the halyard.

Command "OUT FROM THE BUILDING"

The members on the bed side at the butt will foot the ladder and assist the pole members in bringing the tip out from the building.

• Command "LOWER THE FLY"

The member on the right beam bed side will lower the fly hand-over-hand.

Command "PREPARE TO LOWER, LEFT POLE AROUND"

The member on the left pole (#4) will give it to the right pole member (#1) and move to the fly side of the ladder and prepare to foot it. The member in charge (#1) on the poles will check the direction in which the ladder will be lowered for obstructions and state "OVERHEAD CLEAR, CLEAR BEHIND, LADDER COMING DOWN." It is the responsibility of all personnel to survey the area where the ladder will be lowered.

Command "LOWER"

The member on the fly side will step up onto the bottom rung and grasp the halyard tightly with the hands.

The members on the bed side will slowly walk backward while grasping the beam with a hand-over-hand motion until they are just short of the pole swivels. They will then turn out from each other and lower the ladder to the ground.

Command "PASS THE POLES"

The member in charge will again check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to be observant of the area where the poles are to be passed.

The member in charge passes both poles to the members on the beams and moves to the right butt of the ladder. The members on the beams will swing the poles over head and pass them to the member at the butt of the ladder. The member at the butt will set the poles on the ladder and move to the left beam at the butt.

• Command "PREPARE TO LIFT"

The members will prepare to lift the ladder with a flat carry.

• Command "LIFT"

The ladder is lifted to the shoulder in unison

Command "STOW THE LADDER"

The members will return the ladder tip first to the apparatus.

Cradle Raise

Two Member

35' or Less Ground Extension or Straight Ladder

This method is used following the cradle carry when the two members are directly across from each other on the beams of the ladder (Diagram #1)

The member in charge (on the right beam) checks the overhead for obstructions and says "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where a ladder is to be raised.

• Command "GROUND THE BUTT"

Both members put weight on the butt end of the ladder forcing it to the ground.

Both members continue to place weight on the butt with the lower hand while raising the ladder with the upper hand until the ladder is in the vertical position. The member on the right beam (#1) will move to the bed side of the ladder and foot the ladder. The member on the left beam (#2) will move to the fly side of the ladder to hold the ladder in a vertical position, tilted slightly into the objective.





"GROUND THE BUTT" All in one motion, members ground the butt and begin raising the ladder to the vertical



Member on left beam moves clockwise to the fly side just before vertical position is reached



The ladder is footed and ready for extension or pivoting

From this point on, the evolution has been covered in detail in the previous sections. The positions, commands and executions do not change.

Flat lower

The member on the fly side will heel the ladder.

The member on the bed side will slowly walk backward while grasping the center of the rungs with a hand-over-hand motion to the end of the ladder and lower it to the ground.

Cradle lower

Both members will move to the beams and with a hand-over-hand motion down the beams move toward the tip. At the mid-section or balance point of the ladder they will turn to face each other and assume the cradle carry stance allowing the tip of the ladder to move down. Do not allow the tip to hit the ground.

Cradle Carry, Flat Raise

Two Member

35' or Less Ground Extension Ladder

From the cradle carry position bring the ladder to the desired location. The member in charge (the member on the right beam #1) will check the overhead area for obstructions and state "OVERHEAD CLEAR." It is the responsibility of all personnel to survey the area where a ladder is to be raised.

- Command "READY HALT"
- Command "LOWER THE LADDER"

Place the ladder on the ground, fly side up.

• Command "PREPARE TO RAISE" (Fig. 5.96)

Member #1 moves to the tip to lift the ladder, and #2 moves to the butt to foot the ladder. (Diagrams 1 and 2 below.)



The ladder is raised to the vertical position by #1 with a hand-over-hand motion on the center of the rungs. The member at the butt will grasp the halyards tightly, and step up on the bottom rung with both feet as the ladder is raised. The ladder is then footed by the member on the bed side.

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"PREPARE TO RAISE" position

"RAISE" shown at midpoint during the raise

The rest of this evolution, including a flat, beam or cradle lower has been covered.

SUPLEMENTAL BASIC LADDER SKILLS

Roof Ladder Up a Ground Extension Ladder

No commands are needed to perform this operation.

Carry the roof ladder from the apparatus to the location at the base of the ground extension ladder.

Place the roof ladder on the ground with the beams straddling the same beam (of the ground extension ladder) that you expect to work off of. The extension ladder must be properly placed and footed for climbing and perpendicular to the objective. This will keep the butt of the roof ladder from lifting off the ground when the ladder is raised to the vertical position.

Move to the tip of the roof ladder. Pick up the tip and open the hooks of the ladder to the upward positions. <u>Make certain that the hooks are in the locked position.</u>



Roof ladder placed against the respective beam on the side the task will be performed on the roof



Open the hooks on the roof ladder so they face up (ensure locking)

Facing the tip of the roof ladder, raise the ladder to the vertical position, hand-over-hand on the rungs.

Turn the roof ladder so that the hooks are to the outside, facing away from the extension ladder. Lay the roof ladder beam on the rungs and against the chosen beam of the ground extension ladder. The hooks of the roof ladder are now facing out away from the ground ladder.

Climb the ground ladder with the chosen arm over the beam of the roof ladder to balance it. The opposite hand will grasp a rung or the respective beam of the ground ladder. Climb the ladder to a position to reach between rungs 2 and 3 or 3 and 4 from the tip of the roof ladder (first rung at the tip doesn't constitue a rung). Put the arm that is closest to the roof ladder through this rung space and pull the roof ladder onto the shoulder.



Raise the roofer to the ground ladder and rotate the roofer so that the hooks point away from the ground ladder.



Another option is to raise the roofer and leave it flat against the ground ladder, leaving room for the member to climb



Member puts arm through rung 2 or rung 3 on their shoulder and climbs



Member reaches a point where their waist level is just above the roof line and places the roof ladder onto the roof.

Using the foot nearest the roof ladder, push the butt of the roof ladder off the ground ladder so that it hangs to the side, clearing the ground ladder. Begin to climb the ground ladder as seen in (Fig. 5.102), using the rungs **or** beams. Keep the hand and arm that is carrying the roof ladder high when climbing to help prevent the roof ladder from sliding off the shoulder.

Climb the ladder to the position where the roof ladder is to be used.

If the ground ladder has been secured, the member can lock in below the roof gutter, sill, or parapet, which will free up both hands to lift the roof ladder into position.

If the ground ladder is not anchored the member can take a position with their body half way above the roof gutter, sill, or parapet. Reach through the rungs of the extension ladder with one hand, and with a hand-overhand motion on the rungs of the roof ladder, lift it into the desired position on the objective.

<<<u>NEVER</u> LEG-LOCK ON AN UNSECURED LADDER>>

- After the roof ladder has been lifted to its mid-point, position the ladder so its hooks are facing down, and lower them to the roof. Push the ladder toward the peak until the hooks pass over the peak of the roof.
- When properly placed, the roof ladder beam will be directly in line with the outside of the extension ladder beam, and be perpendicular to the roof eaves.
- Test the hooks by pulling downward on the ladder to ensure the hooks are set properly.

Removing the Roof Ladder

- Climb the ground ladder to the position of the roof ladder.
- If the ground ladder has a ladder anchor, the member can lock in on the ground ladder below the roof gutter, sill, or parapet, which will free up both hands to lower the roof ladder.
- If the ground ladder is not anchored the member can take a position with their body half way above the roof gutter, sill, or parapet. Reach through the rungs of the extension ladder with one hand, and with a hand-over-hand motion on the rungs, lower the roof ladder.
- Rotate the roof ladder so the hooks are away from the ground ladder. Slide the ladder down on the beam to a position where the member can place the same arm between the 2nd and 3rd rung. Unlock if applicable.

- Descend the ground ladder until the spurs of the roof ladder come in contact with the ground. Lay the beam of the roof ladder on the rungs and against the same beam of the ground extension ladder. The hooks of the roof ladder are now facing out from the ground ladder.
- Climb down the ground ladder with the same arm as was used to deploy the ladder over the beam of the roof ladder to balance it. The practice of hand placement is the same as ascending the ladder. When the Member has reached the ground, pull the roof ladder out to the vertical position and rotate it so that the hooks face the extension ladder.
- Ensure the beams of the roof ladder are straddling the chosen beam of the ground extension ladder. This will keep the butt of the roof ladder from lifting off the ground when the ladder is being lowered.
- Lower the ladder to the ground, secure the hooks, and stow the ladder.

Ground Ladder (26' or less) Up an Extension Ladder – With and Without a Body Loop

- A ladder is placed into the building and the ladder anchor is secured. The ladder must be extended far enough beyond the roof, sill or parapet to allow the member to lock in above it.
- The 26' ladder is laid on the ground at the base of the ground ladder with the left spur of the 26' ladder next to the right beam of the extended ground extension ladder. If the members use body loops to carry the 26' ladder up the ground extension ladder, they would use a hose knot, and place two body loops around the right beam of the 26' ladder at this time. One body loop would be placed between the 2nd and 3rd rung from the butt and the other between the 2nd and 3rd rung from the tip.
- The 26' ladder is raised to the vertical position and pivoted out on the left beam so that it can be laid onto the rungs next to the right beam of the extended ground ladder.

- While one member steadies the 26' ladder, the other climbs the extended ground extension ladder and passes the right arm between the 2nd and 3rd rungs from the tip (or through the body loop if used) of the 26' ladder and rests it on the shoulder.
- When the first member is in position, the second member takes their position in the same manner between the 2nd and 3rd rung from the butt.
- Lifting together, the members begin to climb with their right arms held high while climbing the ground extension ladder with their hands on the rungs.
- The member on the bottom will coordinate the climbing by saying "STEP" when each rung is to be climbed.
- The member at the tip will lock-in above the roof, parapet or sill and withdraw the arm from between the rungs or body loop while setting the tip of the 26' ladder onto the edge of objective.



Two members begin to carry a ladder up a ground extesnion ladder



The tip member locks in, then guides the ladder while the butt member keeps stepping

- The member on the bottom will then continue to climb until the 26' ladder reaches the balance point on the objective. The member that is locked in will assist by keeping the ladder balanced on its beam.
- The member on the bottom will withdraw the arm from between the rungs or body loop so that the member on top can tip the ladder into the room or onto the roof.

• The member at the top unlocks, steps over the 26' ladder onto the objective and pulls the ladder in while the other member steadies it on its beam.



At the fulcrum point, the butt member releases his shoulder and holds the ladder in place



The tip member steps onto the objective and pulls the ladder onto the deck

- The member on the bottom then climbs the ladder and steps onto the roof or into the building.
- The 26' ladder is then carried to the objective.
- This operation is reversed to bring the ladder down.

Hoisting a Ladder With a Rope

- The ladder is placed at the proper climbing angle, unextended, with the fly toward the building, directly below the spot where it is to be hoisted.
- The end of a roof rope is secured to a fixed object at the desired upper location and dropped to the ground.
- A member on the ground grasps the rope and takes a bight of the line at the spur of the ladder. The member climbs the ladder and passes the bight from the bed side to the fly side through the first full rung space above the center of the ladder. The bight passes behind the left beam, then around to the front side of the bed section. Continue with the bight past the right beam and then around and behind it pulling the slack back through the same rung space from the fly side to the bed side. Use the slack to tie a bowline on the line leading to the upper level. The knot is adjusted to the lateral center of the ladder. (Figs 5.108 – 5.111)



The rope runs down the bed side from the destination above



A bight is made and passed through to the fly side and around the left beam



The bight then passes over the bed section and around the right beam and through the rung space back to the bed section



A bowline with a bight is tied where the bight crosses the rope that leads to the destination

The member on the ladder will climb to the ground and direct the members hoisting it to take a strain (load the rope). The ladder is pivoted 180 degrees as the ladder begins to leave the ground so the fly side is out. This will keep the tip of the ladder out from the building and the butt against the building, helping to prevent the tip from getting caught on objects as it goes up. At this time a half hitch can be tied to one spur to help control the ladder from the ground if enough rope is available.

Command "HOIST AWAY"

The member on the ground steadies the ladder and assists in guiding it while being hoisted, with the remaining tail line of the rope.



Pivot the ladder so that the bed side is toward the building before hoisting

The members hoisting the ladder will pull the rope in a hand-over-hand manner until the ladder and knot come up to the sill or parapet.

Grasping the tip of the ladder, the members hoisting will turn the ladder on its beam and pull the remaining portion into the objective.

To lower the ladder

The procedure is reversed.

The ladder is lowered bed side out with the knot on the outside of the ladder. This places the butt of the ladder out from the building and the tip of the ladder against the building.

Lowering a Ground Extension Ladder From an Overpass or a Parapet Wall

Drop a rope or line to measure the distance from the bottom of the pit or well to the edge, rail or wall at your elevation and add six feet to that length. Tie a marker knot in the rope at the desired length. The six feet will allow enough to extend over the wall once the ladder is in its final climbing position.

Lay the ladder down and turn it up on a beam. Utilizing the halyard, extend the flies of the ladder out to equal the length of the measured rope,

including the extra six feet (Fig. 5.113). Secure the halyard (Fig. 5.114). Make sure the dogs are locked, then using body loops, tie the rungs of the fly and bed section together in two places. If applicable, tie the first fly section to the second fly section in the same way. Use the same knot that is used for securing the fly for climbing when there is insufficient halyard (Fig. 5.115).



Lay the ladder on its beam, extend the fly to the length of rope to the knot



Secure the Halyard

Lay the ladder down on its fly side. Place the rope on top of the bed section. Starting with the tail end of the rope at the butt, begin tying a bowline with a bight from the bed side at the next rung space below the center point of the ladder (Fig. 5.116).



Secure all fly sections



Tie the hoisting knot one rung space below the center point



Finished hoisting knot



Ensure that the rope is headed toward the tip

Place the ladder bed side down with the spurs hanging over the objective, and the rope laying straight under the ladder toward the tip (Fig. 5.119).



Four mebers carry the ladder (2 at the edge)

Three to four members will position themselves (depending on the size of the ladder) along the ladder, one on the right beam and one on the left beam at the center of the ladder. Depending on the size of the ladder, one or two members will work the rope (Fig. 5.120).



2 members at the tip with the rope

The two members at the center of the beams will begin to push the ladder over the edge of the rail or parapet. As the ladder passes the mid-point the tip will come to a vertical position. The ladder is held in the vertical position as it is lowered. The one or two members on the rope will allow the ladder to slide down while keeping tension on the rope (Fig. 5.121).



As the ladder reaches its fulcrum, assist the ladder from not slamming into the wall/building

Once the ladder has reached the bottom it is adjusted to the proper climbing angle and flipped over so that the bed is out and the fly in (Fig. 5.122)



Rotate the ladder so that the fly sections are "in" and adjust for climbing

One member will support the tip of the ladder while it is being climbed.

Lowering a Ladder Into a Pit or Well

Drop a rope or line to measure the distance from the bottom of the pit or well to the edge, rail or wall at your elevation and add six feet to that length. Tie a marker knot in the rope at the desired length. The six feet will allow enough to extend over the wall once the ladder is in its final climbing position.

Lay the ladder down and turn it up on a beam. Utilizing the halyard, extend the flies of the ladder out to equal the length of the measured rope, including the extra six feet. Make sure the dogs are locked, then using body loops, tie the rungs of the fly and bed section together in two places. If applicable tie the first fly section to the second fly section in the same way. Use the same knot that is used for securing the fly for climbing when there is insufficient halyard.

Tie the "hoisting knot" at the butt of the ladder from the bed side between the 2nd and 3rd rungs.

Place the ladder bed side down with the spurs hanging over the objective and the rope laying straight under the ladder toward the tip.

Three to four members will position themselves (depending on the size of the ladder) along the ladder. One on the right beam and one on the left beam, both at the tip of the ladder. Depending on the size of the ladder, one or two members will work the rope.

The two members on the tip of the ladder will begin to raise it to a vertical position hand-over-hand on the beams, moving toward the butt. The one or two members on the rope will allow the ladder to slide into the pit or well only after it has been raised sufficiently to slide down into the pit or well opening.

Once the ladder has reached the bottom it is adjusted to the proper climbing angle and flipped so that the bed section is out and the fly in.

One member will support the tip of the ladder while it is being climbed.

Exterior Venting of Windows With a Ground Ladder

Procure a ladder that will reach the objective from the ground, and position it to the left or right of the window to be ventilated. Extend the fly so that the tip will be as close to the top of the window as possible. Lower it into the building next to the window to be ventilated, using standard ladder techniques.

• Command "SECURE THE HALYARD"

With the halyard secured and the fly toward the building, shift the butt of the ladder over to the center of the window to be ventilated.

Command "OUT FROM THE BUILDING"

With goggles or facepiece in place, bring the ladder out from the building to the vertical position and pivot it to the center of the window to be ventilated.

Command "PREPARE TO VENTILATE"

The member on the fly side of the ladder now leaves their position and moves to a safe place away from the base of the ladder to avoid falling glass.

• Command "VENTILATE"

If one member is on the bed side of the ladder, they will place either foot on the bottom rung and forcefully push the ladder into the window. At impact, the member on the bed side will step back to a safe place. All members should be aware of falling glass.

If two members are on the bed side of the ladder they will place their inside foot on the bottom rung and push the ladder into the window. At impact, the members on the bed side will step back to a safe place. All members should be aware of falling glass.

When the ladder hits the window, whether the glass breaks or not, the butt of the ladder may slide out.

Command "OUT FROM THE BUILDING"

Ensure that no additional glass will fall before a member is positioned under the ladder on the bed side to bring the ladder out from the building.

All members now return to the ladder and bring it out from the building to the vertical position by the standard method, then pivot and lower it into the building on the opposite side of the vented window. Now shift the butt over four feet and the tip over two feet. Continue the procedure shifting the butt and tip in equal amounts until the next window is reached.

Repeat the above ventilation process until the task is completed. If the windows are a significant distance apart, lower the ladder, and carry it to the next location.

NOTE: Falling glass is an extreme hazard. Additionally, often times ventilating with the tip of the ladder is difficult using the "fly-in" method, meaning it is lowered into the window with both beam sections striking the panes simultaneously. To concentrate more of the force of the ladder in one spot consider beam lowering the ladder into the window. The guides and concentrated forces of just one beam will provide better striking power.

Newer energy efficient windows (EEW) may have multiple panes (sometimes up to 3). These windows can be very difficult to vent from an exterior position even when using the ladder in a beam configuration to break the glass (especially if they are not weakened by heat from the fire). The corners of glass are the weakest points. Aiming for the center of the window is the least effective method. Instead, aim as close to the corners as possible.