INSTRUCTOR GUIDE

TOPIC: BACK TO BASICS: GROUND LADDERS

TIME REQUIRED: THREE HOURS

MATERIALS: VARIOUS GROUND LADDERS, STRUCTURE

REFERENCES: ESSENTIALS OF FIRE FIGHTING, FIFTH EDITION, IFSTA, CHAPTER 10

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PREPARATION:

MOTIVATION: Ground ladders are one of those pieces of equipment that we are required to carry on every engine and truck. We are also expected to know how to select and use them. Although apparatus carry ground ladders, they may not used as they could and should be. Carrying and raising ground ladders requires teamwork, communications, and an attention to detail. The emergency scene should not be the place to practice ladder work, especially when someone needs to be rescued or a ladder is needed to support fire attack or ventilation.

OBJECTIVE (SPO): The student will demonstrate a basic understanding of carrying, raising, and working with various size ground ladders.

OVERVIEW:

Ground Ladders
* Ground ladder operations
* Ground ladder practical

GROUND LADDERS

SPO The student will demonstrate a basic understanding of carrying, raising, and working with various size ground ladders.

EO 1-1 Identify how to use various fire service ground ladders.

EO 1-2 Raise all portable ladders carried on the apparatus using the flat or beam raise and work from those ladders.

The purpose of this drill is to review and build on basic skills with the emphasis on improving efficiency and teamwork. It is assumed that the participants have some basic knowledge of the subject matter. The focus of the drill should include personal and team safety. The drill should include minimal instruction and maximum skills practice. The drill should also be conducted with the normal staffing that would respond on an engine or truck on a structure assignment.

I. GROUND LADDER OPERATIONS (1-1)

NOTE: The level of detail provided in this section is included to emphasize the various steps in the process and to point out areas where potential accidents can occur because minor points are overlooked or shortcuts are taken. It is very to safe ladder operations that every member of the team be observant for every other member and that the team members communicate throughout the process to reduce or avoid injury.

A. Handling Ground Ladders

1. Several ways to carry ground ladders from apparatus

    a. Generally dependent on how they are loaded on the apparatus
    b. May be carried using the beam or flat
    c. May be carried tip first or heel first
    d. Placement of apparatus at the scene may have some impact on how the ladders are carried (some ladders on trucks may be loaded heel first so that they do not have to be turned when working in tight alleys)

2. Method used should require the least maneuvering and time
3. There should be no need to lay a ladder on the ground after carrying it to the building and before raising it
4. One way to avoid extra movement is to carry it with rungs and trusses parallel to ground - once the heel is in position near the wall, lower it to the ground while the upper part of the ladder is raised from shoulder height
5. Ladder can then be pivoted and extended if necessary
6. Two- and three-person ladders carried using a beam carry can be quickly placed for the beam raise
7. Two-person ladder carried using a flat carry is carried with firefighters on opposite corners
8. Three-person ladder carried using a flat carry is carried with two firefighters at each end of one beam and one in the middle on other beam
9. Ladders should be raised using a flat raise when possible since both beams are in contact with the ground
10. If the manufacturer makes no recommendation, position the fly section of the ladder away from the building
11. Climbing angle is determined by the height of the raise where it contacts the building (not the length of the raise) and the distance from the heel to the base of

the building - heel to building distance is one-quarter of height of the raise (working height)

12. When the ladder is being raised on very soft ground, an axe handle or other similar object can be placed under the bottom rung to reduce the distance the beams sink into the ground

B. Safety

1. When working with ladders be constantly aware of obstructions that will affect raising and working on ladders. This could include soft ground where the heels could sink into the ground, uneven terrain, weak spots such as doors and windows in sidewalks, tree branches, roof or balcony overhangs, or wire of any kind.
2. Once the ladder is raised, it should be tied in to building or heeled by a firefighter
3. Ladders should not be overloaded – one firefighter per section or firefighters should be at least ten feet apart at the normal climbing angle
4. If the climbing angle is decreased or hose is being carried up, the distance between those on the ladder should be increased to twenty feet
5. Once a ladder is used to enter a building, it should be left in place as an exit (never move a ladder that has been used until the firefighters that used it have exited)
6. Climb with the back straight and use the legs for climbing rather than the arms
7. Climb in a smooth manner using and try to avoid making the ladder bounce unnecessarily
8. One hand should be in contact with the ladder at all time; if a tool is being carried and only one hand is free, that hand should be sled on the underside of the beam
9. When working on a ground ladder, secure to the ladder using a ladder belt or a leg lock
10. When climbing with tools, if both hands are not free to grasp the rungs, the free hand should be sled on the underside of the beam to maintain hand contact with the ladder
11. Firefighters need to be careful when carrying tools up ladders to avoid dropping them

C. Methods of Lifting

1. Lift with legs rather than with the back
2. Face the direction opposite the direction of travel
3. Bend knee closest to ladder (do not kneel since it can cause the use of the back rather than the legs for lifting)
4. Place one hand on the rung

    a. Facing forward for a beam carry
    b. Facing rearward for a flat carry
    c. Personnel on each end of the ladder should be positioned so that they end up between the first and second rungs (this provides a better position to

protect the tip and heel of the ladder from people walking into it or the tip or heel striking someone)

5. When more than one person is involved in the lift, the person with the best view of the overall operation gives the commands (if there are two people, the person on the right should give the commands)
6. Lift in a smooth, continuous manner, turning 180 degrees as the ladder is being lifted so that the ladder is being carried heel-first to the position of use unless it is a roof ladder that is being carried to the roof

D. Ladder Placement

1. Important to select proper length ladder, especially when straight ladder is used
2. For rescue in a window, the ladder should be placed against or just under the windowsill
3. For firefighting operations in a window, the ladder should be placed with one rung inside the window if the window is wide enough; if not place the ladder at the windowsill or beside the window
4. If the ladder is being used for ventilation in a window, it should be placed on the windward side of the window with the tip even with the top of the window
5. When placed at the front railing of a balcony or fire escape, or at a wall beside a railing or fire escape, extend the ladder two to four rungs above the railing for good handhold
6. Ladders raised to the roof should be five rungs above the roof wall

E. Flat Lifting, Carrying, and Raising

1. Two people

    a. Firefighter 1 is located at the heel end on the first rung
    b. Firefighter 2 is located on the tip end on the second rung
    c. Both firefighters squat beside the ladder on opposite corners, facing the tip, with the knee closest to the ladder bent
    d. Both firefighters grasp the respective rungs with the near hand (hand facing rearward)
    e. Both firefighters stand using their legs while lifting the ladder
    f. Pivot into the ladder as it is raised
    g. Both firefighters place the beam closest to them on their shoulder and the free arm on the opposite beam to stabilize the ladder
    h. Carry the ladder to where it is to be used
    i. Firefighter 1 places the heel end on the ground approximately one-quarter of the working length away from the building
    j. Firefighter 1 heels the ladder by placing both feet on the first rung, both hands on the third rung, and leans backwards to act as a counter-balance

k. Firefighter 2 checks for overhead obstructions
l. Firefighter 2 walks the ladder to a vertical position by grasping the beams or the rungs
m. Once the ladder is vertical, Firefighter 1 places the side of one foot and the shoulder on the same side against one of the beams
n. Firefighter 2 places a toe against the same beam that Firefighter 1 has placed a foot against and places the other foot in a boxer style stance
o. Firefighter 2 places one hand on each beam watching that they will not interfere with the extension of the ladder
p. Firefighter 1 unties the halyard if needed and extends the ladder in a hand over hand motion
q. Firefighter 2 determines when the ladder has been raised to the proper height and advises Firefighter 1
r. Once the ladder has been raised to the proper height, Firefighter 1 moves to the back of the ladder, assumes a boxer style stanch, outstretches his/her arms, and grasps a rung with both hands
s. Firefighter 2 places one foot on the bottom rung and both hands on the rungs
t. Both firefighters gently lower the ladder into the building
u. Firefighter 2 checks the angle by placing one toe against each beam, standing straight with arms outstretched and palms touching the beams
v. Adjust the ladder angle as needed
w. If the ground is soft, Firefighter 2 stands on the bottom rung to set the ladder in the ground
x. Firefighter 1 checks the dogs to make sure they are locked in place and ties off the halyard before anyone is allowed to climb the ladder

2. Three people

a. Firefighter 1 is located at the heel end on the first rung
b. Firefighter 2 is located on the tip end on the second rung
c. Firefighter 3 is located on the middle on the opposite side
d. All three firefighters squat beside the ladder with Firefighters 1 and 2 on the same side, facing the tip, with the knee closest to the ladder bent
e. All three firefighters grasp the respective rungs with the near hand (hand facing rearward)
f. All three firefighters stand using their legs while lifting the ladder
g. Pivot into the ladder as it is raised
h. All three firefighters place the beam closest to them on their shoulder and the free arm on the opposite beam to stabilize the ladder
i. Carry the ladder to where it is to be used
j. Firefighter 1 places the heel end on the ground approximately one-quarter of the working length away from the building

k. Firefighter 1 heels the ladder by placing both feet on the first rung, both hands on the third rung, and leans backwards to act as a counter-balance
l. Firefighter 2 checks for overhead obstructions
m. Firefighters 2 and 3 walk the ladder to a vertical position by each grasping a beam
n. Once the ladder is vertical, Firefighter 1 places the side of one foot and the shoulder on the same side against one of the beams
o. Firefighter 2 places a toe against the same beam that Firefighter 1 has placed a foot against and places the other foot in a boxer style stance
p. Firefighter 2 places one hand on each beam watching that they will not interfere with the extension of the ladder
q. Firefighter 3 places a toe against the outside of the other beam and grasps the beam with both hands
r. Firefighter 1 unties the halyard if needed and extends the ladder in a hand over hand motion
s. Firefighter 2 determines when the ladder has been raised to the proper height and advises Firefighter 1
t. Once the ladder has been raised to the proper height, Firefighter 1 moves to the back of the ladder, assumes a boxer style stanch, outstretches his/her arms, and grasps a rung with both hands
u. Firefighters 2 and 3 place their inside foot on the bottom rung and both hands on the rungs
v. All three firefighters gently lower the ladder into the building
w. Firefighter 2 checks the angle by placing one toe against each beam, standing straight with arms outstretched and palms touching the beams
x. Adjust the ladder angle as needed
y. If the ground is soft, Firefighter 2 stands on the bottom rung to set the ladder in the ground
z. Firefighter 1 checks the dogs to make sure they are locked in place and ties off the halyard before anyone is allowed to climb the ladder

F. Beam Lifting, Carrying, and Raising

1. One person

a. Turn the ladder on its beam
b. Squat beside the ladder, facing the tip, with the knee closest to the ladder bent
c. Grasp the middle rung with the near hand (hand facing forward)
d. Stand using the legs while lifting the ladder
e. Pivot into the ladder as it is raised
f. Place the free arm between the two rungs so that the upper beam comes to rest on the shoulder
g. Carry the ladder to the area where it is to be used

h. Lower the heel to the ground at the base of the building using the building to heel the ladder (ladder should be in a flat position at this point)
i. Check for overhead obstructions
j. Raise the ladder to a vertical position against the building using either the beams or the rungs (if the ladder is an extension ladder, the fly section should be against the building)
k. If the ladder is an extension ladder, untie the halyard if needed and extend the fly section to the desired height using a hand over hand straight downward motion while having a shoulder and the side of a foot against the ladder to hold it against the building
l. Grasp a lower beam (generally the second rung) with one hand to lift the heel of the ladder and an upper rung (generally the fourth rung) to hold the tip against the building
m. Move the heel of the ladder away from the building to the proper position by lifting with the lower hand and pushing in with the upper hand
n. Check the climbing angle by the toes against the beams and stretching the hands out (the back should be straight and the palms should rest on the rungs of the ladder)
o. If the ladder is an extension ladder, roll the ladder over so that the fly section is on the outside of the ladder
p. If the climbing angle is not correct, adjust the heel as needed
q. If the ground is soft, stand on the bottom rung to set the ladder in the ground
r. Check the dogs to make sure they are locked in place and tie off the halyard before anyone is permitted on the ladder

2. Two people

a. Turn the ladder on its beam
b. Firefighter 1 is located at the heel end on the first rung
c. Firefighter 2 is located on the tip end on the second rung
d. Both firefighters squat beside the ladder on the same side, facing the tip, with the knee closest to the ladder bent
e. Both firefighters grasp the respective rungs with the near hand (hand facing forward)
f. Both firefighters stand while lifting the ladder and using their legs
g. Pivot into the ladder as it is raised
h. Both firefighters place the free arm between two rungs so that the upper beam comes to rest on the shoulder
i. Carry the ladder to where it is to be used
j. Firefighter 1 places the heel end on the ground approximately one-quarter of the working length away from the building
k. Firefighter 1 heels the ladder by placing one foot on the bottom beam and grasping the upper beam with both hands leaning backwards to act as a

counterbalance (make sure the legs are clear of the upper heel plate when the ladder is being raised)

l. Firefighter 2 checks for overhead obstructions
m. Firefighter 2 walks the ladder to a vertical position by grasping the lower beam
n. Once the ladder is vertical, Firefighter 1 places the side of one foot and the shoulder on the same side against one of the beams
o. Firefighter 2 places a toe against the same beam that Firefighter 1 has placed a foot against and places the other foot in a boxer style stance
p. Firefighter 2 places one hand on each beam watching that they will not interfere with the extension of the ladder
q. Firefighter 1 unties the halyard if needed and extends the ladder in a hand over hand motion
r. Firefighter 2 determines when the ladder has been raised to the proper height and advises Firefighter 1
s. Once the ladder has been raised to the proper height, Firefighter 1 moves to the back of the ladder, assumes a boxer style stanch, outstretches his/her arms, and grasps a rung with both hands
t. Firefighter 2 places one foot on the bottom rung and both hands on the rungs
u. Both firefighters gently lower the ladder into the building
v. Firefighter 2 checks the angle by placing one toe against each beam, standing straight with arms outstretched and palms touching the beams
w. Adjust the ladder angle as needed
x. If the ground is soft, Firefighter 2 stands on the bottom rung to set the ladder in the ground
y. Firefighter 1 checks the dogs to make sure they are locked in place and ties off the halyard before anyone is allowed to climb the ladder

3. Three people

a. Turn the ladder on its beam
b. Firefighter 1 is located at the heel end on the first rung
c. Firefighter 2 is located on the tip end on the second rung
d. Firefighter 3 is located on the middle
e. All three firefighters squat beside the ladder on the same side, facing the tip, with the knee closest to the ladder bent
f. All three firefighters grasp the respective rungs with the near hand (hand facing forward)
g. All three firefighters stand using their legs while lifting the ladder
h. Pivot into the ladder as it is raised
i. All three firefighters place the free arm between two rungs so that the upper beam comes to rest on the shoulder
j. Carry the ladder to where it is to be used

k. Firefighter 1 places the heel end on the ground approximately one-quarter of the working length away from the building
l. Firefighter 1 heels the ladder by placing one foot on the bottom beam, both hands on the top beam, and leans backwards to act as a counter-balance
m. Firefighter 2 checks for overhead obstructions
n. Firefighters 2 and 3 walk the ladder to a vertical position by each grasping the lower beam
o. Once the ladder is vertical, Firefighter 1 places the side of one foot and the shoulder on the same side against one of the beams
p. Firefighter 2 places a toe against the same beam that Firefighter 1 has placed a foot against and places the other foot in a boxer style stance
q. Firefighter 2 places one hand on each beam watching that they will not interfere with the extension of the ladder
r. Firefighter 3 places a toe against the outside of the other beam and grasps the beam with both hands
s. Firefighter 1 unties the halyard if needed and extends the ladder in a hand over hand motion
t. Firefighter 2 determines when the ladder has been raised to the proper height and advises Firefighter 1
u. Once the ladder has been raised to the proper height, Firefighter 1 moves to the back of the ladder, assumes a boxer style stanch, outstretches his/her arms, and grasps a rung with both hands
v. Firefighters 2 and 3 place their inside foot on the bottom rung and both hands on the rungs
w. All firefighters gently lower the ladder into the building
x. Firefighter 2 checks the angle by placing one toe against each beam, standing straight with arms outstretched and palms touching the beams
y. Adjust the ladder angle as needed
z. If the ground is soft, Firefighter 2 stands on the bottom rung to set the ladder in the ground
aa. Firefighter 1 checks the dogs to make sure they are locked in place and ties off the halyard before anyone is allowed to climb the la

G. Working with ladders

1. Securing to ladders - Firefighters can secure to a ladder using a leg lock or a ladder belt

a. Leg lock

1) Climb the ladder to the desired height
2) Advance one rung above the desired locking position

3) Slide the leg on the opposite side from the working side over and behind the rung that is being locked on
4) Hook the foot either on the rung or the beam
5) Rest on the thigh
6) Step down with the opposite leg (this may have to be done before the foot can be hooked on the rung

b. Ladder belt

1) Connect the hook on the ladder belt to the desired rung
2) Hook opening should face downward
3) Ladder belt should be snug around the waist
4) NFPA Class II or Class III harness with a carabiner can be used in place of a ladder belt

2. Roof ladders

a. One person

1) Carry the roof ladder to the main ladder
2) Set the roof ladder down and open the hooks outward
3) Tilt the roof ladder up using the base of the building to heel the roof ladder and raise it so that it rests against the main ladder or the building
4) Climb the main ladder until the shoulder is about two rungs above the midpoint of the roof ladder
5) Reach through the rungs of the roof ladder and place the roof ladder on the shoulder
6) Climb to the top of the main ladder using one hand to hold onto the roof ladder while the other hand is sled on the underside of the beam during climbing
7) Lock into the main ladder at the edge of the roof using a leg lock or ladder belt
8) Tilt the roof ladder so that as much of the upper part as possible rests on the roof
9) Take the roof ladder off the shoulder
10) Use a hand over hand motion to push the remaining portion of the roof ladder on the roof (beam or flat)
11) Push the roof ladder up the roof until the hooks pass over the edge of the peak and secure solidly (must be turn flat before hooking the roof)
12) Check the roof ladder to make sure it is secured before getting on it

b. Two people

1) Both firefighters carry the roof ladder to the main ladder
2) Both firefighters set the roof ladder down and Firefighter 1 opens the hooks outward
3) Firefighter 1 tilts the roof ladder up using the base of the building to heel the roof ladder and raise it so that it rests against the main ladder or the building
4) Firefighter 2 climbs the main ladder until the shoulder is between the first and second rungs on the tip end
5) Firefighter 1 picks up the ladder until the shoulder is between the first and second rungs on the heel end
6) Both Firefighters reach through the rungs of the roof ladder and place the ladder on their shoulder
7) Both Firefighters climb the main ladder using one hand to hold onto the roof ladder while the other hand is sled on the underside of the beam during climbing
8) At the top of the main ladder Firefighter 1 locks into the main ladder at the edge of the roof using a leg lock or ladder belt
9) Firefighter 1 tilts the roof ladder so that as much as the upper part as possible rests on the roof
10) Firefighter 1 takes the roof ladder off the shoulder
11) Both Firefighters use a hand over hand motion to push the roof ladder on the roof (beam or flat)
12) As Firefighter 2 pushes the roof ladder to Firefighter 1 and the roof ladder is being placed on the roof, the roof ladder should be tilted downward and against the roof (must be turned flat before hooking the roof)
13) Both Firefighters push the roof ladder up the roof until the hooks pass over the edge of the peak and secure solidly
14) Firefighter 1 checks the roof ladder to make sure it is secured before getting on it

3. Moving ladders

    a. If possible, the ladder should be rolled rather than moved if the entire ladder needs to be moved
    b. Rolling involves grasping one beam and turning it over
    c. If the heel needs to be repositioned, firefighters should grasp a lower rung, pick up the heel using their legs, and move the heel of the ladder to the desired position

4. Working with tools

a. When working with tools on a ladder, the firefighter should be secured to the ladder with a leg lock or ladder belt
b. If the work involves breaking glass, the firefighter should be above the window so that the glass does not follow the path of the tool
c. If the work involves ventilation, the firefighter should be working on the leeward side of the window

5. Working with hoselines

    a. The technique used is going to depend on whether the hose is charged or uncharged
    b. For an uncharged line, the first firefighter take the nozzle and hose, passes the hose under one arm on the side on which they will exit the ladder, pass the hose across the chest, and drape the nozzle over the opposite shoulder
    c. On the uncharged, other firefighters will be spaced fifteen feet apart with about 25 feet of hose between them, the hose placed on the shoulder on the side they will exist the ladder, and the excess hose draped over the edge of the ladder
    d. The hose will be advanced up the ladder as the firefighters carry it until the first and second firefighters enter the structure.
    e. The third firefighter takes a leg lock and continues to advance hose as needed
    f. For a charged line, the first firefighter grasps the nozzle with one hand and the underside of the ladder with the other hand
    g. Other firefighters grasp the hose at ten to fifteen foot intervals with the opposite hand grasping the underside of the ladder
    h. Firefighters advance hose until the first and second firefighter enter the structure
    i. Other firefighters take a leg lock and continue to advance hose as needed

6. Supporting ventilation

    a. If ventilation is to be performed from a ladder, the firefighter should take a leg lock or use a ladder belt to secure to the ladder on the side opposite of that on which they will be working, working on the windward side, with the ladder placed even with the top of the window, and the tool handle above the material being opened
    b. If ventilation is to be performed on a pitched roof, a roof ladder should be placed on the roof to provide better footing and to better distribute the weight on the roof
    c. If ventilation is to be performed on a flat roof, a roof ladder can be used to better distribute the weight on the roof
    d. Ladders may also be used to hang smoke removal equipment over openings

7. Ladder rescue

    a. Rescue techniques will depend on whether the victim is conscious or unconscious
    b. For a conscious victim, a firefighter may be able to climb down behind the victim to provide support
    c. For an unconscious victim, the method used is going to depend on size and weight
        i. For a small or light-weight victim, the rescue may be able to carry the victim on their outstretched arms
        ii. For a heavier or larger victim, the firefighter should be positioned on the ladder so that the victim can be rested on the firefighter's knee and facing the ladder
        iii. The rescuer should place his/her arms under the victims arms with the hands protecting the victim's face
        iv. The victim's arms and legs should be outside the beams of the ladder
        v. The rescuer should alternate knees as the victim is lowered (the rescuer should place their toes rather than their foot arch on the ladder for ease in moving their feet)
        vi. One knee should be bent and in place between the victims legs as the victim is lowered

II. GROUND LADDER PRACTICAL (1-2)

A. Demonstrate the following using ground ladders:

1. One, two, and three person beam carries
2. Two and three person flat carries
3. One, two, and three person raises
4. Placement for fire fighting, rescue, and roof operations
5. Climbing
6. Securing to a ladder
7. Advancing charged and uncharged hoselines
8. Support ventilation (working with tools)
9. Ladder rescue

B. Provide an opportunity for students to practice

REVIEW:

Ground Ladders
* Ground ladder operations
* Ground ladder practical

REMOTIVATION: Ladder work is something that needs to be practiced on a regular basis so that it can be accomplished efficiently on the emergency scene. Teamwork is important to working with ladders safely.

ASSIGNMENT:

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EVALUATION: