CHAPTER IV

LADDERS

Ladders provide many uses in carrying out rescue procedures. They are used to gain access to upper and lower stories and roofs. They are also used as bridges, derricks, and stretchers. Rescue personnel should understand the use, care, and handling of ladders. To develop teamwork and skill with ladders requires practice.

A. TERMINOLOGY

1. Beam - The main structure part of a ladder.
2. Rungs - Cross members between the beams, used for climbing.
4. Extension ladder - A ladder consisting of two or more sections.
5. Bed - The lower section of an extension ladder.
6. Fly - The upper section of an extension ladder.
7. Heel or Butt - The bottom or ground end of the ladder.
8. Top or Tip - The top of the ladder.
9. Heelplate - The metal safety plate at the heel to help stabilize the ladder.
10. Halyard - Rope used to hoist the fly.
11. Pulley - The small grooved wheel through which the rope is drawn.
12. Lock or Dog - Metal devices used to hold the fly section in place when it is extended.

B. CARRYING LADDERS

1. One-Person Carry
   Shorter-length ladders and roof ladders can be carried and raised by one person. For a one-person carry, select a point near the center of the ladder. Insert one arm between the beams, and place the upper beam on the shoulder. Using both hands to steady the ladder, carry with the tip (if a roof ladder) or heel (if a straight ladder) first and slightly lower. (See Fig. 29)

   ![Carrying A Roof Ladder](image_url)

2. Two-Person Carry
   a. A Two-Person Shoulder Carry - When lifting the ladder from the ground, the rescue personnel should face the opposite direction from which they will carry the ladder, both on the same side. Next, they should reach across the ladder and grasp a rung with the palms of the hands down at the opposite
beam. As the rescue personnel lift and stand, they will turn around, placing their arms through the ladder and facing the direction in which they will travel with the ladder. The upper beam rests on the shoulders. (See Fig. 30-A) The lead person uses his hand to prevent injury to persons as he advances the ladder.

Two-Man Ladder Carry
Figure 30-A, 30-B

b. Two-Person Hip Carry - The rescue personnel stand at opposite ends of the ladder, facing the direction of intended travel. Next, they grasp rungs with the palms of the hands down, close to the nearest beam. As they lift and stand, the ladder will swing downward. The upper beam is carried under the arms. (See Fig. 30-B) The lead person uses his hand to prevent injury to people as the ladder is advanced.

C. SETTING AND RAISING LADDERS

Once ladders are raised into place, they should be set so they are easy and safe to climb. The following methods are used to determine the distance the heel of the ladder is placed from the building. An angle of 75 degrees is adequate for safe and easy climbing. An easy way to determine this angle is to divide the length of the ladder used by four. Example: If 32 feet of a 35-foot ladder is used, the heel is placed 8 feet from the building (32 divided by 4).

Another method is to set the ladder against the building at what you think is a 75-degree angle. Step on the first rung, and extend the arms, grasping the rung at eye level. If the body is straight, the ladder is at the proper angle. If not, adjust the ladder. The climber's arms are extended for climbing and his body is perpendicular to the ground, climbing is easy and safe. (See Fig. 31 on page 36)

1. One-Person Raise
   In raising ladders, the number of people required to carry the ladder will usually be the number required to raise it. For a one-person raise, use the following procedure:
a. Carry the ladder in the proper manner.
b. Place the heel of the ladder on the ground against the building or some stationary object.
c. With both hands raise the ladder to the vertical position by walking and pushing forward on alternate rungs. (See Fig. 32)

![Safe-Ladder Climbing Position](image1)

Figure 31

![One-Man Ladder Raise](image2)

Figure 32

d. When the ladder is in the vertical position, with both hands grasp the ladder on two rungs about three rungs apart. Lift the ladder off the ground, and carry the heel to the proper climbing position.
e. To lower, reverse the procedure.

2. Two-Person Beam Raise

a. Carry the ladder to the building, using the proper carrying method. The heel person will select the location for the raise, space the heel from the building, and determine if the ladder will be raised parallel or at right angles to the building.
b. To "heel" the ladder, the heel person places his inside foot on the bottom beam, reaches out and grasps the top beam with their hands well spaced. Their other foot is held back as far as possible to act as a counterweight. The heel person aids in raising the ladder by pulling on the top beam, steadying the ladder as it is raised, and holding down the heel with their foot. (See Fig. 33-A).

c. The second person faces the top of the ladder and, with their inside hand, palm back, grasps the rung and raises the ladder over their head. They swing under it and push the ladder upward while walking toward the heel. (See Fig. 33-A & 33-B)

Two-Man Ladder Raise
Figure 33-A, 33-B, 33-C

d. Once the ladder is in a vertical position, the two people move into position on opposite sides, facing each other through the ladder. The outside person steadies the ladder while the inside person (nearer the building) extends the fly by pulling on the halyard and secures it in place by seating the locks or dogs.

e. The ladder is then eased against the building, and the halyard is tied off. (See Fig. 33-C)

f. To lower the ladder, reverse the procedure.
3. **Two-Person Flat Raise**
   a. Carry the ladder to the building, using the proper carrying method. The heel person will select the location for the raise, space the heel from the building, and determine if the ladder will be raised parallel or at right angles to the building.
   b. The ladder is laid flat with the fly on the bottom.
   c. The heel person stands on the first rung, reaches forward and grasps a rung with both hands and assists in raising the ladder by pulling back on the rung and using his body as a counter weight. (See Fig. 34)
   d. The other person will face toward the top of the ladder. They will reach down, grasp a rung, and lift the ladder, turning their body so that it faces the heel of the ladder with the ladder raised over their head.
   e. They will then walk toward the heel of the ladder, pushing upward on the beams or rungs, hand over hand, until the ladder is in an upright position.
   f. The outside person will steady the ladder while the inside person will extend the fly and secure the locks.
   g. The ladder will then be eased against the building, and the halyard will be secured.

![Two-Man Ladder Raise](image)

**Figure 34**

D. **CLIMBING LADDERS**

In climbing ladders it is important to develop good rhythm. To acquire rhythm, step on every rung, and grasp alternate rungs while climbing. The rungs should be used for climbing unless you are carrying an object in your hand. Climb near the center of the rungs on the balls of the feet and keep the body straight.

When working from a ladder, use a leg lock for safety. (See Fig. 35 on page 39) To do this, pass the foot opposite the working side over the second rung above the one on which you are standing. Then pass the foot back on the rung or over the beam.

E. **BRIDGING GAPS WITH LADDERS**

When spaces between buildings or over damaged floors have to be bridged, ladders will handle the job very well. Boards should be placed on the ladders to give additional strength and to make passage over the ladder easier.