

CIVIL DEFENCE ORGANISATION
SOUTH AUSTRALIA

LADDERS - HANDLING AND TESTING

INTRODUCTION

Ladders play an important part in rescue operations and it is essential that their construction and uses should be fully understood. Ability to handle and move ladders quickly and safely is an indication of good training and will ensure freedom from accidents, and maximum efficiency.

Each Rescue Party is issued with (A) two short ladders, which can be coupled (or one short extension ladder of two sections), and (B) a 30 foot (maximum) extension ladder.

SHORT LADDERS

- (a) Two short ladders, each 8 feet long, coupled together form a ladder approximately 13 feet long. A ladder of this size can reach first-floor windows of most dwelling houses and also into basements, and will prove valuable when making a reconnaissance.
- (b) Care must be taken that the reinforcement of the ladder is always on the underneath side of the load, and that firm foundation is found for the bottom of the ladder. In some cases it may be necessary to tie or anchor the bottom; and at other times the top of the ladder may have to be fastened, when one man must "foot" the ladder until the top has been secured. If an anchorage for top or bottom of the ladder is not practicable, the ladder must be footed while in use.
- (c) These short ladders may also be employed when getting over obstacles, damaged walls, gaps and so on. For bridging a gap, ladders can be used by placing one (or two side by side) over the opening (reinforcement if any, on the underside) and laying a board or boards on the rungs. Where possible, one length of board should be used on one ladder, but if this is not practicable care must be taken to overlap the ends of the boards where they meet in such a way that the rescuer will not trip when carrying a casualty. The ladder or ladders must be long enough to bridge the gap and to have adequate support at either end.
- (d) These ladders must be examined periodically for excessive wear or damage.

EXTENSION LADDERS, 30 FEET

The normal issue is the 30 foot extension ladder which is in two sections, the upper section sliding on and between the sides of the lower section. Pawls are fitted to the lower end of the sliding section and operate on a rotating shaft; hauling lines are taken through sheaves fixed near the top of each string of the lower section, brought down and fastened to hooks or cleats at the bottom of this ladder, one cleat being attached to the pawl shaft, thus providing endless lines by means of which the top section can be extended, and the pawls which are mounted on the sliding section can be engaged and tripped or released. The metal tongues fitted to the top section of the ladder slides into grooves cut in the strings of the bottom section.

To make it easily distinguishable in the dark the strings of the bottom section should bear a white line to indicate the "limit of safety" when extended for use - the overlap of the ladders is normally five rungs. Similarly the "bottom" of the ladder should have a 6-inch band of white paint. The ladder is strengthened on the underside of all strings by galvanised wire which is stretched tautly in the groove along the edge of the strings, being secured at the head and foot and kept in position by staples. The ladders are further strengthened by cross-ties of wrought iron rod from string to string at intervals. Ladders should not be painted as paint would hide incipient defects. Clear varnish or treating the bare wood with linseed oil usually proves satisfactory.

STANDARD TEST OF 30 FOOT EXTENSION LADDER

- (a) Extension ladders should be tested monthly or more often if necessary. The first test is a visual examination followed by a practical test of the strings and rungs.
- (b) Examine the condition of the strings, rungs, pulleys and pawls and lubricate working parts, (keep lubricant off extending rope.) Look for obvious defects, especially any displacement of anchoring or reinforcing wires, cracks or shakes in the strings or rungs, loose rungs or missing wedges, riveting of cross ties and position of washers, bent or twisted pawls or pawl shaft, bent cleats, loose guides, frayed ropes, and defective fastenings of ropes to pawl shafts. Pay particular attention to the condition of the strings at the bottom of the lowerhalf of the ladder.
- (c) If the examination is satisfactory, lay the ladder flat on the ground with the strengthening wire on the strings towards the ground; extend it to the length shown by the white marking lines on the main ladder, lift it on to two trestles (or boxes, etc.) positioned about two feet from either end; measure the distance of a point in the middle of the span from ladder to ground.
- (d) A man approximately 12 stone should sit gradually on the centre of the ladder, after it has reached its limit of sage he should spring smartly off, when the ladder should resume its previous position. If there is a discrepancy between the first and second measurements, further inspection should be made, paying particular regard to the anchoring or stretching of the reinforcement. If it appears that serious stretching has taken place in the reinforcing wire, or other defects become apparent during this test, the ladder should be returned to store.
- (e) To test the extending rope, the ladder is erected in its closed state against a wall, two men grip a rung of both the upper and lower sections together to prevent any sliding movement whilst two men endeavour to extend the ladder by pulling on the rope. If the rope proves to be sound, the ladder is extended to its full height and two men again apply their weight to the rope.
- (f) After this test, the ladder should be halved (see para. "Halving Ladders") and each half raised so that the weakest parts of the rungs and sockets may be tested. Each rung should be "jumped" by a man who has ascended the ladder. The correct method is to transfer the man's weight sharply downwards from each rung to the next with the feet separated as far as the strings will permit. The height of the jump should not be increased nor used to deliver a violent blow to the rung. The ladders should be erected as nearly vertical as safety conditions permit, the head being secured and two men stationed at the foot. The ladders should be reversed and the remaining rungs "jumped".

ANGLE OF LADDERS WHEN RAISED (Fig.1)

When a ladder is raised the angle which it makes with the ground should not be too great or too acute. As a general rule the foot of the ladder should be placed at a distance from the base of the wall about equal to one quarter of the height to be reached and the ladder should be extended so that the head of the ladder should not be less than 4 feet above the stepping-off point 28 feet above ground, the distance of the foot of the ladder from the wall should never be more than half the height to be reached.

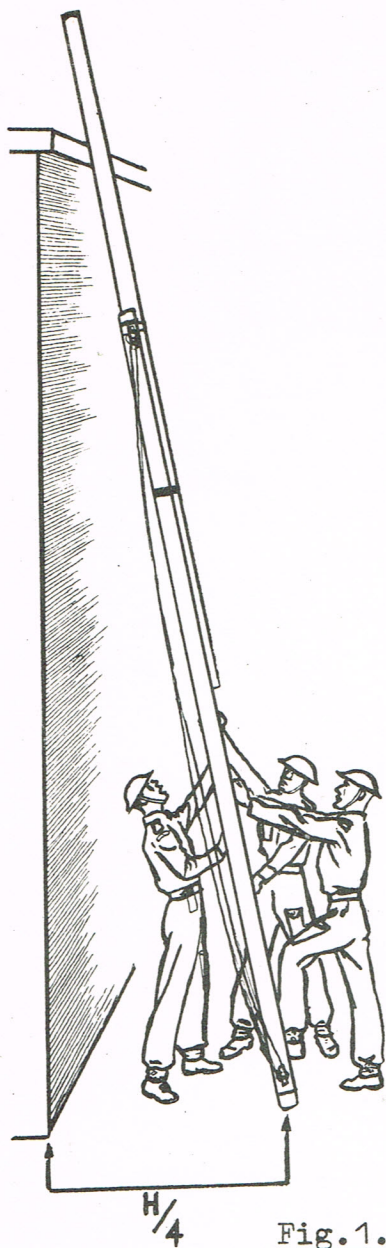


Fig.1.

SECURING THE HEAD OF THE LADDER

(Fig.2.)

When it is necessary to secure the head of a ladder, this may be done with a lashing or piece of sashcord. The usual method is by tying it to a piece of timber which is long enough to spread across and inside the width of the window opening.

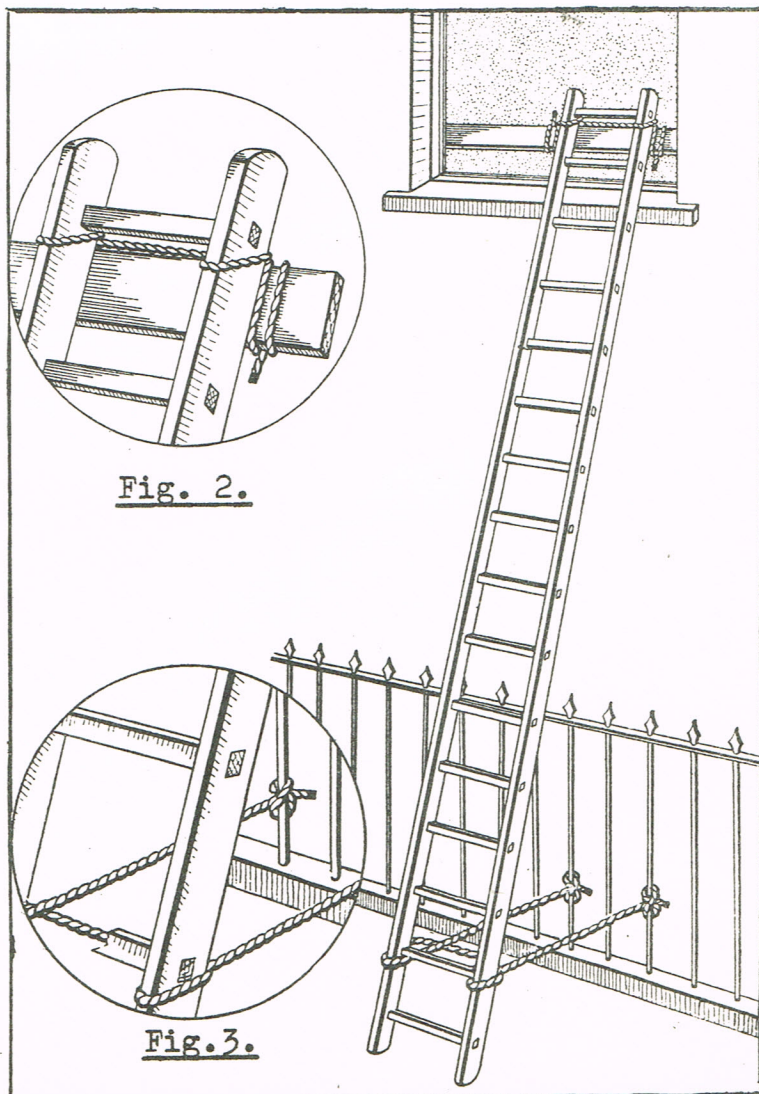


Fig. 2.

ANCHORING THE FOOT OF THE LADDER

(Fig.3.)

This may be done by means of fastening to an improvised picket or pickets, or tying back to any secure object behind the ladder, e.g., railing, gateposts, etc.

Fig.3.

LADDER CLIMBING

The ladder should be climbed steadily, keeping the body erect, the head upright, the arms straight but not tense, without any tendency to hug the ladder, and the hands grasping the rungs at a level between waist and shoulders. It must be remembered that the legs and not the hands carry the weight of the body when climbing, and at each step the ball of the foot, not the arch, should be placed on the rung.

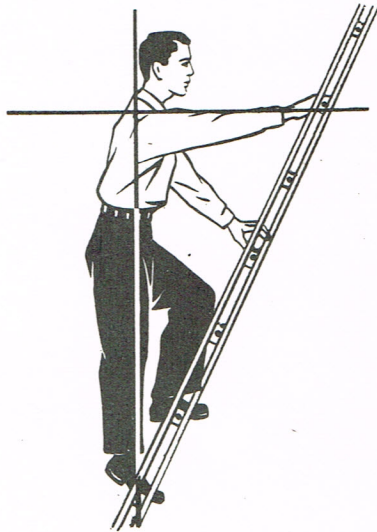


Fig. 4.

The Correct Method of Ladder ClimbingHALVING LADDERS

- (a) In some cases the complete ladder may not be required, or two lengths equal to the length of each section of an extension ladder may be called for, and this can be achieved by halving the ladder - i.e., by removing the sliding extension from the main ladder.
- (b) The ladder should be first placed on the ground, the sliding extension uppermost. The method of halving as follows; with the ladder lying on the ground, the ropes are uncoupled from the hooks or cleats, the pawls freed and the upper extension withdrawn. To reassemble the upper extension is placed between the strings of the main ladder and pushed forward into its correct position the ropes are re-connected to the cleats, pawls are placed in position on the lowest rung of the main ladder.

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