CIVIL DEFENCE ORGANISATION

- SOUTH AUSTRALIA -

RESCUE FROM HEIGHTS

Leaning Ladder; Ladder Derrick; Jib and Flying Fox

THE LEANING LADDER METHOD

The ladder is laid on the ground, lower section uppermost, with the bottom of the ladder towards the building. A snatch block is made fast above one of the rungs of the top section (e.g. fourth or fifth rung from the top according to requirements) by means of a wire bond.

A wire bond is attached to one ladder string by passing the running end back through the eye or hook. Three moderately loose round turns are then taken round both ladder strings and lashing, finished off with a clove hitch on the opposite side from where it was commenced. The hook of the block is then hooked on the bottom side of the lashing and given a half turn, causing the lashing to take on a figure of eight configuration (see Fig. 4, Ladder Derrick). The hook of the snatch block must be moused.

The 2" rope is used as the lowering line, one end of which is passed through the snatch block and fastened temporarily to the upper section of ladder.

The ladder is now raised to the vertical position and extended to the required height, carrying with it the snatch block. The running end of the rope is then passed under the lower rung of the bottom section of the ladder. When the required height has been reached the ladder is lowered gently against the wall. The top of the ladder should be made secure to prevent any side movement, the bottom should be on a firm foundation and lashed to pickets or otherwise secured to prevent movement.

With the casualty securely lashed to the stretcher, a chair-knot is secured in order to lower it in a horizontal position. The lowering rope is then made fast to the chair knot, using a round turn and two half hitches. One 40 foot lashing should be fastened to each of the outside "D's" of the stretcher (bowlines) at the head and feet to act as guide lines, in order to keep the stretcher clear of the wall as it is being lowered.

Four men are required on the ground to lower the stretcher, two men on the lowering rope and one man to each of the guide lines.

The stretcher is brought to the opening, the guide lines are dropped to the ground, at the same time the men on the lowering rope take up the slack, ready to take the weight of the stretcher when it is passed through the opening, the guide lines are grasped by the two men on the ground. The stretcher is lowered to the ground by the two men on the lowering rope by paying out; as the stretcher is sufficiently near ground level, the men on guide lines move the head and foot, grasp the handles of the stretcher, gently lower stretcher to the ground, remove lowering rope, guide lines, chair knot and lashing if not required, and carry the stretcher away.

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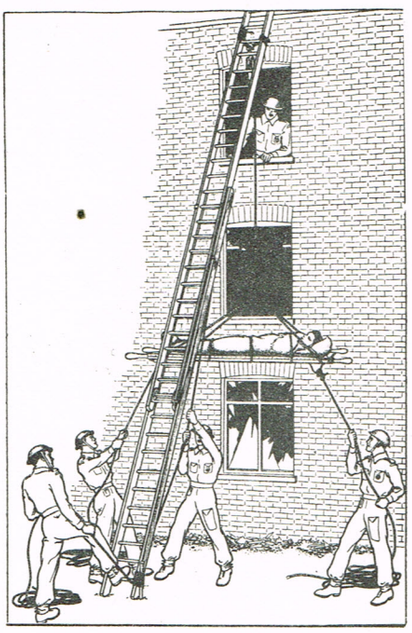

Fig. 1. The Leaning Ladder.

NOTE: In many cases it may be possible to use the chair knot only but this will largely depend upon the nature of the injuries to the casualty. (See Fig. 2)

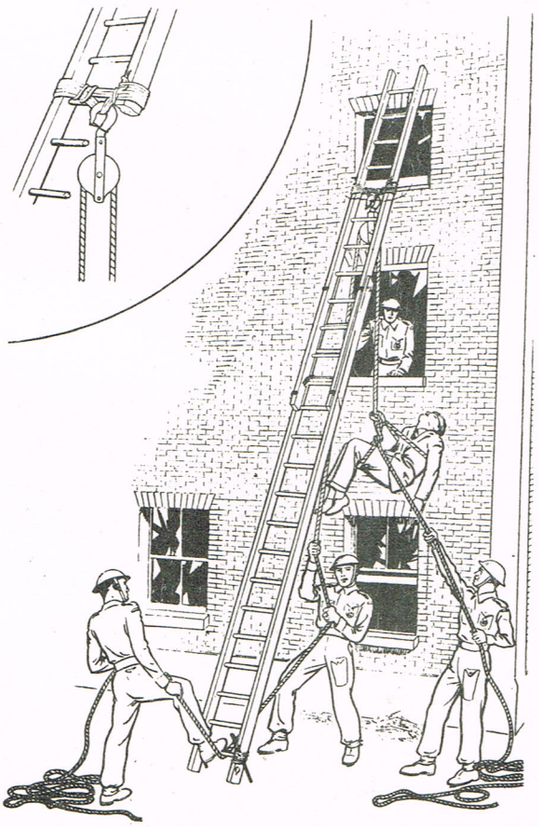

Fig. 2. The Leaning Ladder.

THE LADDER DERRICK

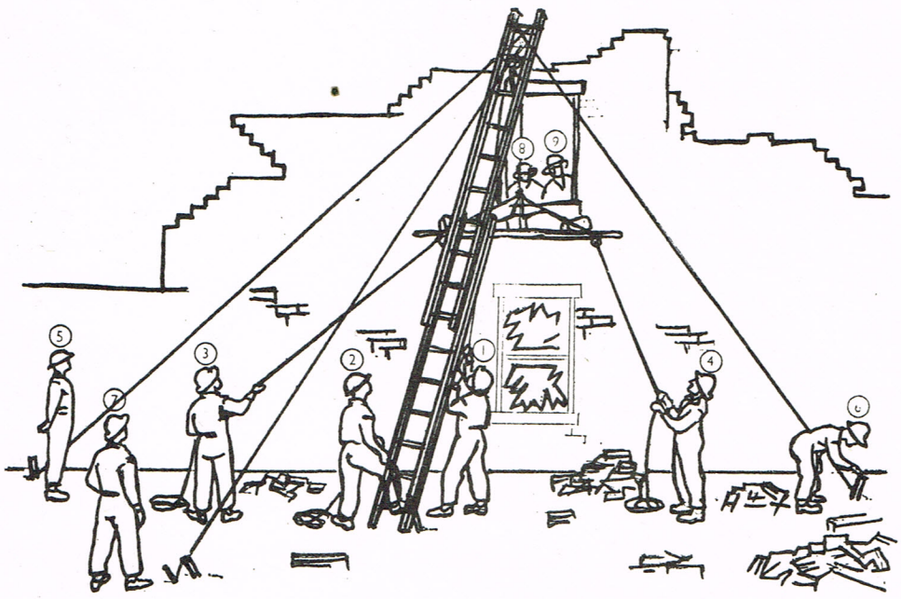

Fig. 3. The Ladder Derrick.

The normal principles used in erecting a derrick are employed in this method, but in this case only three guys are used. The ladder is placed on the ground with the lower section uppermost, is partially extended, with the bottom of the ladder in position towards the building.

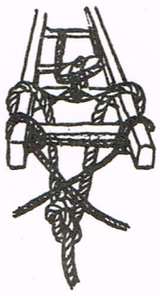

Fig. 4. Rigging done on the head of the ladder prior to erection.

The side guys consist of three 40 ft. lashings coupled together by the appropriate knots to form one length of rope. The centre of the middle one is found and fastened to both of the strings of the ladder near the top (just above the topmost rung) by means of a clove hitch. The guy ropes are then crossed over so that they tend to draw the strings of the ladder together when the weight comes on them.

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Pickets for the side guys must be positioned forward of the ladder foot as far as possible, at least in line with the building towards which the ladder derrick is being inclined.

The three inch rope is used for the back guy and must have been well stretched previously; it is attached to the top of the ladder by means of a half hitch around each string. The running end of the rope is then secured to the standing part by means of a bowline. It is important that this bowline should be in the centre of the ladder (midway between the two strings). The other end of the back guy is then taken away to a holdfast, being at least double the height of the ladder away from the foot of same. The hold-fast must be in line with centre of the ladder.

A wire bond is fastened to the top of the ladder in the same manner as for theleaning ladder method. The snatch block is then hooked to the far side wires of the bond, and the block given a half turn so that the wire bond lashing takes on the figure of eight configuration. The hook of the snatch block must be moused.

The 2" rope is used as a lowering line, one end of which is passed through the snatch block. After reeving theblock, the standing end of the rope should be fastened temporarily to the ladder.

The ladder thus prepared is now ready for erection, and having been raised to the vertical position, (carrying with it the snatch block reeved with the 2" lowering lines) is extended to the required height.

Under the direction of the leader, the top of the ladder is lowered towards the building, the strain being taken on the back guy until it is in the required position.

The back guy must then be fastened to its holdfast, and thereafter need not be moved. During the raising and positioning of the ladder the sides guys must be manned, and when the ladder is in the required position these guys must be made fast to their pickets.

The bottom of the ladder must be on a firm foundation and secured as for the "Leaning Ladder Method".

NOTE: Care must be exercised by the leader in assessing the position for the top of the ladder so as to leave sufficient clearance for a loaded stretcher, as subsequent luffing is undesirable.

If a stretcher has not already been taken to the casualty one must then be prepared, i.e., with its blankets, stretcher lashing and four 40' lashings, two of these lashings to be used as guide lines. A chair knot is made from a 40' lashing and the running end of the 2" rope secured to it with a round turn and two half hitches. The stretcher and its equipment are pulled up to the casualty, who is placed on and secured to it. Guide lines fastened to the "D's" at both ends of that side of the stretcher which will be furthest away from the building are dropped to men on the ground to control the stretcher during descent.

The 2" line which has been passed under the lowest rung of the ladder is paid out by the man footing the ladder, while the strain is taken by another man standing under the ladder.

The rope must be paid out hand over hand. When the stretcher is sufficiently near ground level, the men on guide lines move to the head and foot, grasp the handles of the stretcher, gently lower stretcher to the ground.

.../5

THE JIB METHOD (Fig. 5)

In some circumstances it is more suitable to lower a stretcher using this method.

The principles applied are those used in raising or lowering weights with the use of a jib. Care must always be taken to ensure that the rope is sufficiently well manned, at least three men normally being necessary.

In some instances it might be preferable to ease the strain by taking a turn around a picket or some suitable object.

Where it is found impossible to find a suitable place from which to suspend the snatch block, it will be necessary to erect a jib to carry it. This can be done in a number of ways:-

(a) If on the top floor, it may be possible to pass a jib over the wall plate, through the rafters, and securely lash it at the tail end of the ceiling joists.

(b) By resting the jib on a timber plate to distribute the load placed on an upper storey window sill, securing it to prevent movement at this point and fastening down the tail by lashing to a sound joint.

(c) By resting the jib on an "A" frame erected just inside the opening. The poles must rest on or be fixed to a sole plate and the tail end of the jib lashed to a sound joist.

Fig. 5. The Jib Method.

In all cases careful attention must be paid to the security of the jib at its support and at the point where it is tailed down. The overhang from the support to the point from which the snatch block is suspended should be kept to the minimum.

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A 15 ft. sash cord lashing is middled, and a clove hitch formed around the hook of the snatch block. The two ends of the cords are then crossed over on top of the jib and passed back through the jaw of the block, the ends passing in opposite directions. Three such turns are made and then similar type cross-over frapping turns passed around the lashing itself, finishing off with a reef knot.

The 2" rope is used as the lowering line, one end of which is passed through the snatch block and fastened temporarily.

The stretcher is prepared in the same manner as for the "Ladder Derrick Method", the lowering line is then fastened to the chair knot on the stretcher, using a round turn and two half hitches; guide lines fastened to the "D's" at both ends of that side of the stretcher which will be furthest away from the building are dropped to men on the ground to control stretcher during descent.

The men on the lowering line take up the slack ready to take the weight of the stretcher when it is passed through the opening.

The stretcher is lowered to ground by the two men on the lowering lines by paying out hand over hand; when the stretcher is near ground level, the men on the guide lines move to the head and foot, grasp the handles of the stretcher, gently lower stretcher to the ground.

THE FLYING FOX (Figs. 6 & 7)

In cases where large numbers of casualties are trapped in the upper floors of a building, or where the various ladder jib and suspension methods of rescue cannot be used, it may be necessary to set up a flying fox. The rigging is relatively simple to effect and can be adequately handled by a team of five men - two on the ground and three in the upper floor.

Briefly the method consists of a taut 3" rope extending from the top of the floor involved, to some secure holdfast on the ground. A snatch block from which the casualty and stretcher are suspended slide down the rope, controlled by guide and safety lines suitably attached.

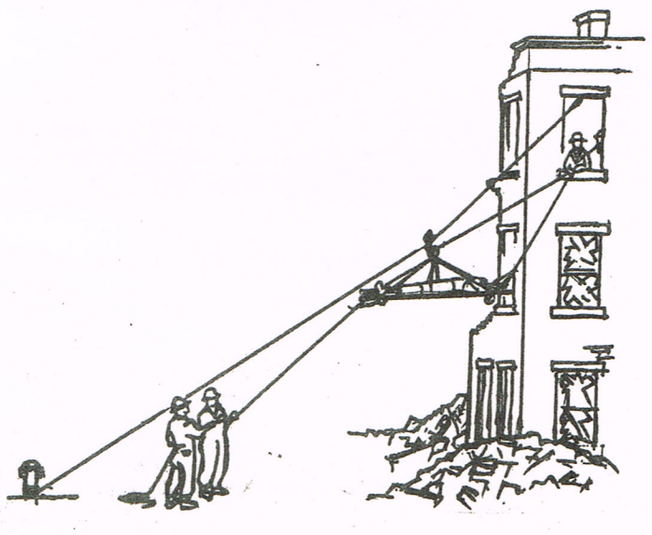

Fig. 6. The Flying Fox.

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Setting up the Flying Fox

1. The end of a 40 ft. lashing is dropped from the floor where the casualties are located, to the ground. It may be necessary to join a number of lashings together. The ground party makes the end of the 3" rope fast to the lashing and it is hauled up.

2. The 3" rope must then be adequately secured to either a ceiling joist or point that will allow sufficient space between the rope and window sill (if a window opening is being used) to allow the stretcher to pass cleanly beneath the rope. Two feet six inches should be regarded as a minimum distance between rope and sill. It is most important that the rope be made fast (some 10') inside the building so that the snatch block can be placed on the rope before the casualty passes out through the window.

3. A holdfast, either improvised or pickets, is organised on the ground, at right angles to the window, and at least one and a half times the vertical height removed from the building. The 3" rope is then hauled tight and made off on the holdfast with a round turn and two half hitches.

4. If it has not already been done, the casualty must be blanketed and lashed to a stretcher and a chair knot applied to it. The two free ends of the chair knot lashing are used to secure the hook of the snatch block to the actual knot of the chair knot itself. A cross-over lashing is used, taking at least two turns around the hook and the knot before the frapping turns are applied. The lashing is finished off with a reef knot.

5. Two guide lines (40' lashings joined together) sufficiently long to cover the full span of the 3" rope are then secured to the head and foot of the stretcher - through the two "D's" under the stretcher handles and made off with a bowline. The line on foot of the stretcher is then passed out of the window and taken up by the two men on the ground.

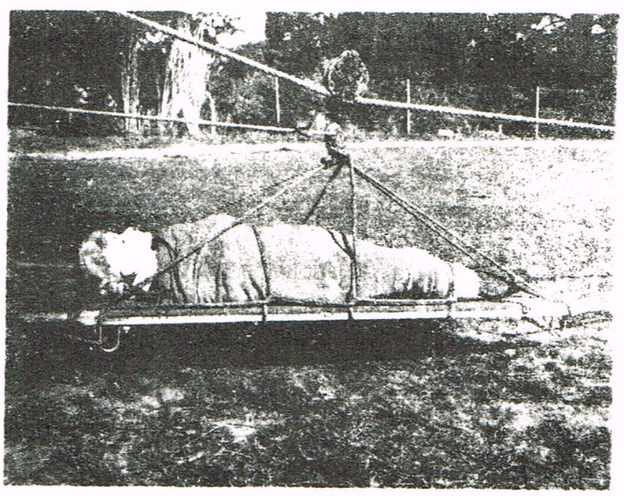

Fig. 7. The rigging of the stretcher for flying fox.

6. The stretcher can now be lifted up by two men on either side, the third man securing the snatch block over the 3" rope and making sure the pin is in position.

7. The lowering operation now commences with the three men in the upper floor lowering away hand over hand and the two man ground party taking in the slack in a similar fashion.

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NOTE: It is vitally important that there should be no slack in the guide lines as these not only control the descent of the stretcher but also act as safety lines. Should the 3" rope, chair knot or snatch block carry away then the stretcher can still be supported by the guide/safety lines; but only if the two teams are fully prepared for the sudden additional weight.

8. It will be appreciated that once the flying fox is rigged, any number of casualties can be brought down by it. The chair knot simply being removed from the loaded stretcher on the ground and a new stretcher, blankets and lashing fitted to the original chair knot and hauled up for the next casualty.

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