

## EXTENSION LADDERS AND ATTACHMENTS DESCRIPTION AND USE

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1. GENERAL			
1.01	This section describes the extension ladders and standard attachments used and specifies methods for using the ladders and attachments safely.		
1.02	This section is reissued to: <ul style="list-style-type: none"> <li>● Include information previously contained in Sections 081-300-105 and 081-740-106</li> </ul>		<p>Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.</p>

\*\*Reprinted to comply with modified final judgment.

## 2. DESCRIPTION

2.01 Extension ladders and their features are listed in Table A and are shown in Fig. 1, 2, and 3.

TABLE A  
EXTENSION LADDERS

EXTENSION LADDER	RATING	MATERIAL		AVAILABLE SIZES (FT) (NOTE 1)						FIG. NO.	
		RAILS	RUNGS	16	20	24	28	32	36		40
C	STD	Solid wood (Treated)	Solid wood (Treated)	X (Note 2)	X	X	X	X	X	X	1
E	STD	Fiberglass	Aluminum			X	X				2
D	MD	Laminated wood	Aluminum			X	X				3

*Note 1:* The size shown is the sum of the length of the two sections, not the length the ladder is designed to reach.

*Note 2:* Rope for raising top section is not provided with 16-foot ladder.

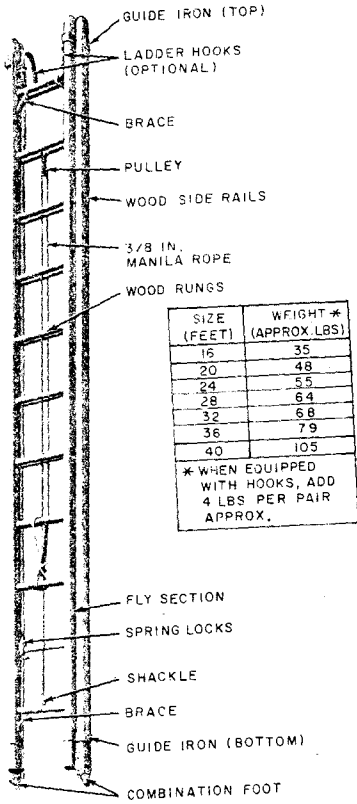


Fig. 1—C Extension Ladder

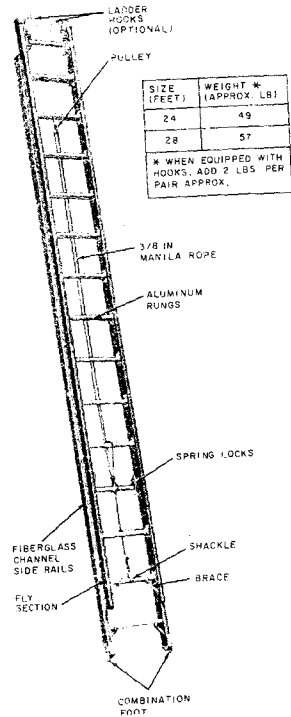


Fig. 2—E Extension Ladder

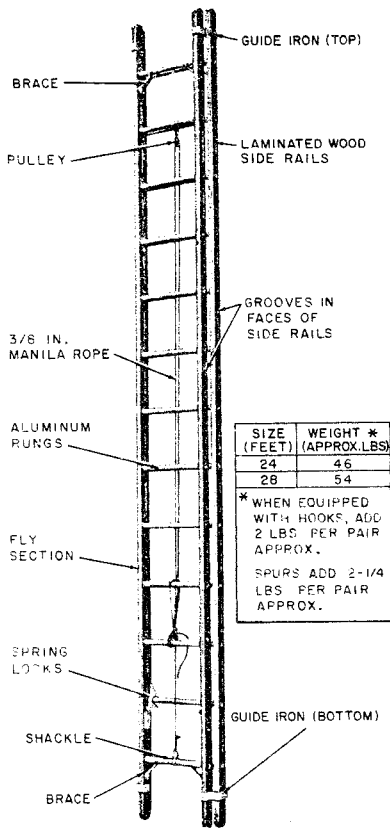


Fig. 3—D Extension Ladder (MFR DISC)

3. OPTIONS AND ACCESSORIES

3.01 The options and accessories available for use with extension ladders are listed in Table B and are shown in Fig. 4 through 22.

3.02 The installation and the use of extension ladder accessories, where applicable, are contained in Part 9 of this section.

**TABLE B**  
**EXTENSION LADDER ACCESSORIES**

ACCESSORY	RATING	FIG. NO.	FOR USE WITH EXTENSION LADDER	COMMENTS
Rail coating (protective finish)	STD	—	E	Factory option — to protect against prolonged adverse environmental effects
Ladder hooks	STD	4	C and E	Factory option — enables ladder to be used for work on aerial cables
Double pulley arrangement	STD	5	C and E	Factory option — provides an increased mechanical advantage in raising or lowering fly section of ladder
Combination foot	STD	6	C and E	Factory installed — provides secure footing on various surfaces
B ladder pulley kit	STD	7	All 20-, 24-, 28-, 32-, 36-, and 40-foot	Same as double pulley arrangement installed locally (see Fig. 8)
B ladder foot	STD	9	C and D	Temporarily installed to provide level footing on uneven surfaces
B ladder tread	STD	10	All	Provides more comfortable footing and reduces fatigue when working at constant height for extended period of time
B ladder leveling wedge	STD	11	All	Provides level footing on uneven surfaces
B ladder pad	STD	12	All	Improves stability and protects siding such as aluminum, asbestos, and vinyl against scratches and dents
C ladder platform	STD	13	All	Provides a seat for the crafts-person while aloft (used with D or E ladder support) (Note 1)
D ladder platform	STD	14	All	Reduces fatigue when working at constant height for extended period of time (Note 1)

*Note 1:* If the platform support hooks or lower supports and their associated latches do not slip readily over the rungs of the fiberglass ladder, they may be adjusted by spreading with a standard 1-inch iron pipe (1-5/16 inch od). The platform shall fit freely at all bearing points and the latches should readily engage.

TABLE B (Contd)

## EXTENSION LADDER ACCESSORIES

ACCESSORY	RATING	FIG. NO.	FOR USE WITH EXTENSION LADDER	COMMENTS
D ladder support	STD	15	C and D	Clamps to strand to support upper end of ladder providing area for sitting or standing between ladder and cable (See Fig. 15 thru 18) — cannot be used with E fiberglass extension ladder
E ladder support	STD	19	All	Clamps to strand to support upper end of ladder providing area for sitting or standing between ladder and cable (see Fig. 20 and 21)
Ladder pad	MD	22	C and D	Superseded by B ladder pad
B ladder support	MD	Not shown	C and D	Superseded by D ladder support—cannot be used on 6.6M strand
C ladder support	MD	Not shown	C and D	Superseded by E ladder support—cannot be used on 6.6M strand

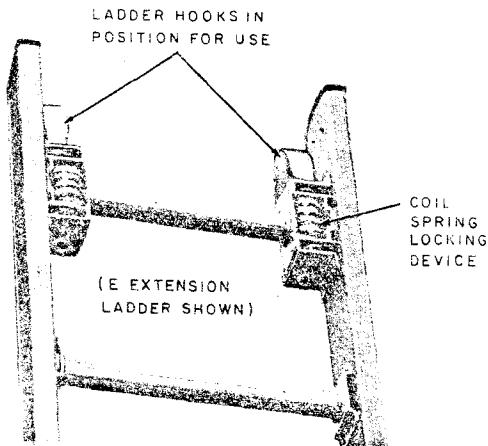


Fig. 4—Ladder Hooks

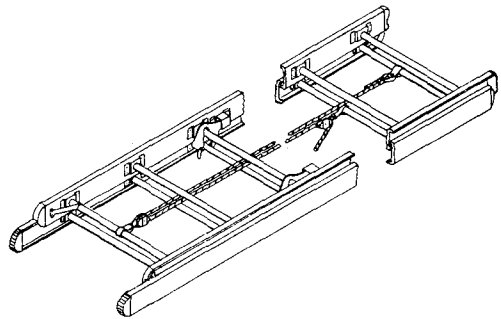


Fig. 5—Double Pulley Arrangement

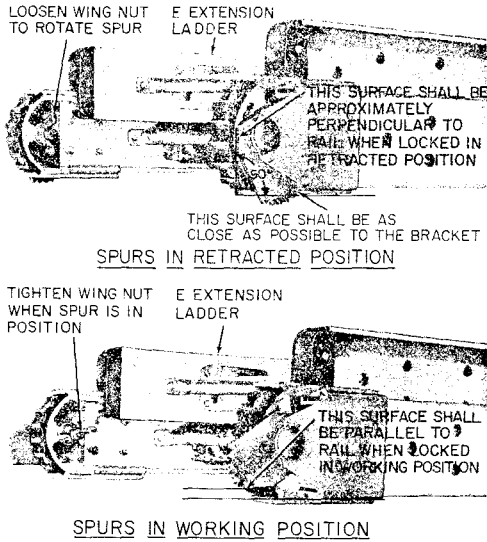
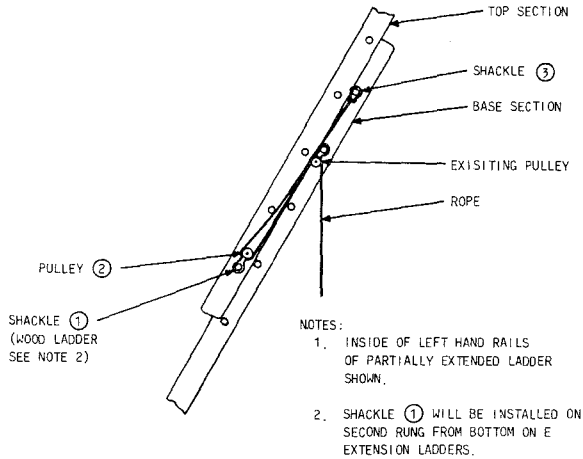


Fig. 6—Combination Foot



Fig. 7—B Ladder Pulley Kit



ASSEMBLY PROCEDURE :

1. REMOVE EXISTING LADDER ROPE BY REMOVING NUT AND BOLT FROM SHACKLE 1
2. INSTALL PULLEY SUPPLIED IN KIT 2 IN SHACKLE 1
3. INSTALL SHACKLE SUPPLIED IN KIT 3 ON TOP RUNG OF BASE SECTION AND ATTACH THE ROPE TO THIS SHACKLE WITH 1/4-20 NUT AND BOLT PROVIDED
4. THREAD ROPE THROUGH PULLEYS AS SHOWN ABOVE.

Fig. 8—Installing B Ladder Pulley Kit

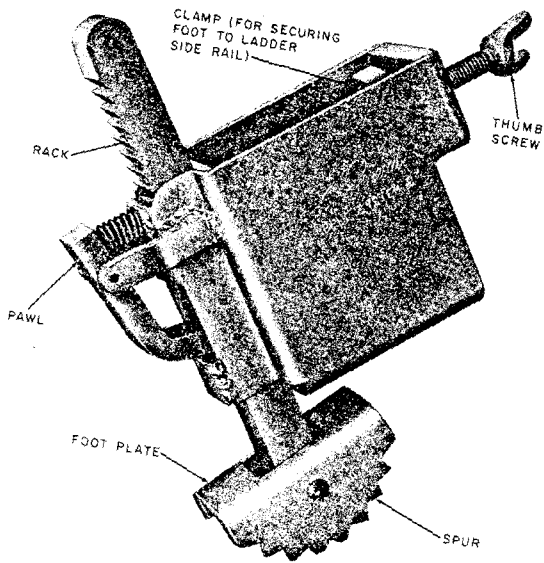


Fig. 9—B Ladder Foot

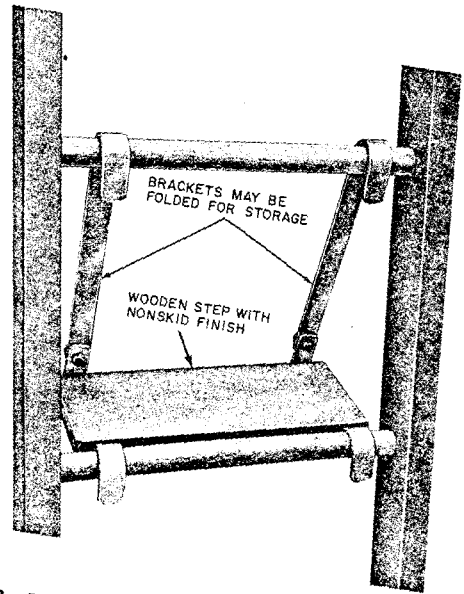


Fig. 10—B Ladder Tread in Working Position

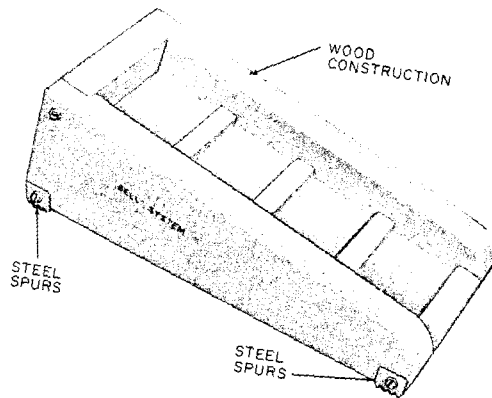


Fig. 11—B Ladder Leveling Wedge



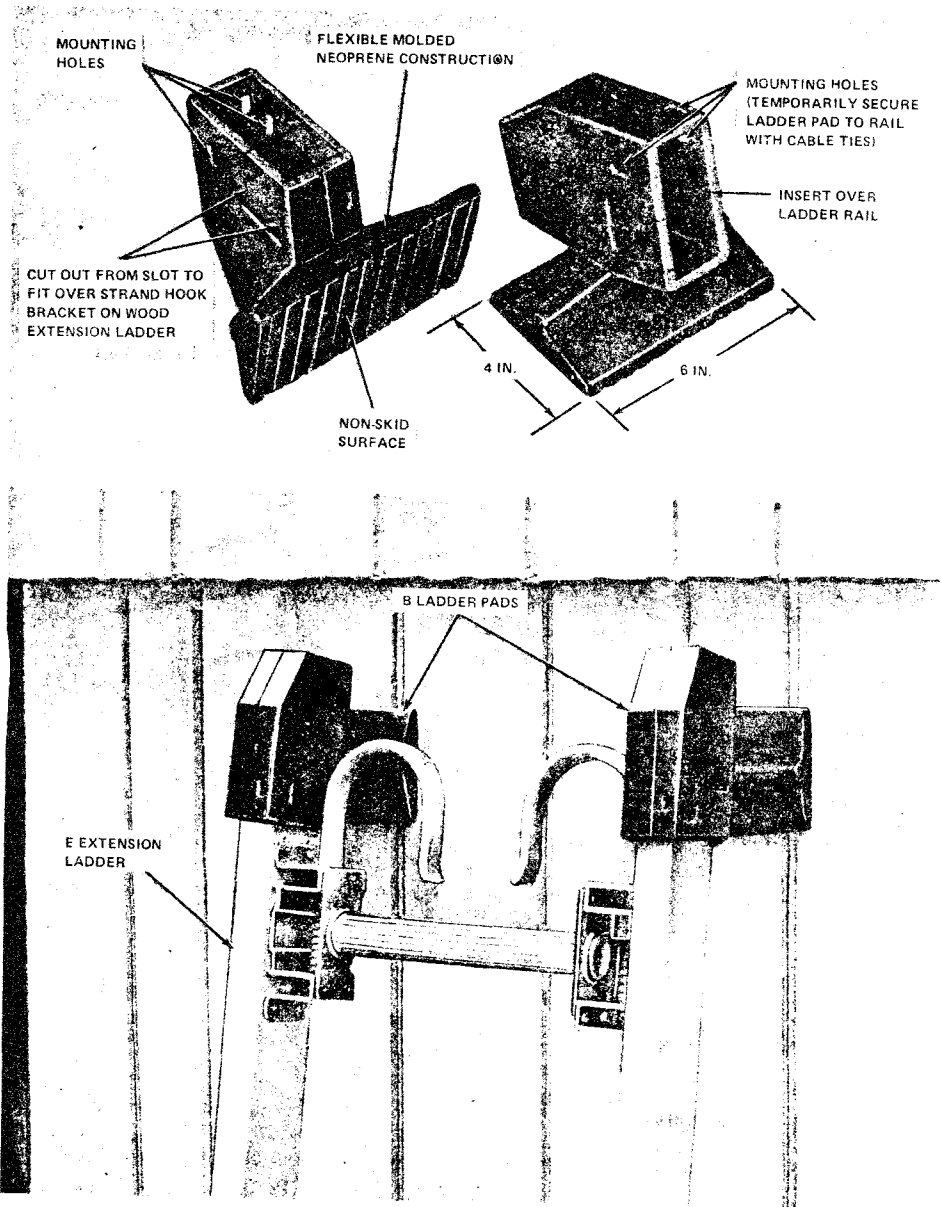


Fig. 12—B Ladder Pad

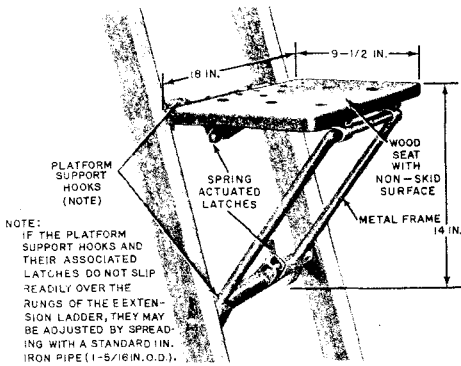


Fig. 13—C Ladder Platform

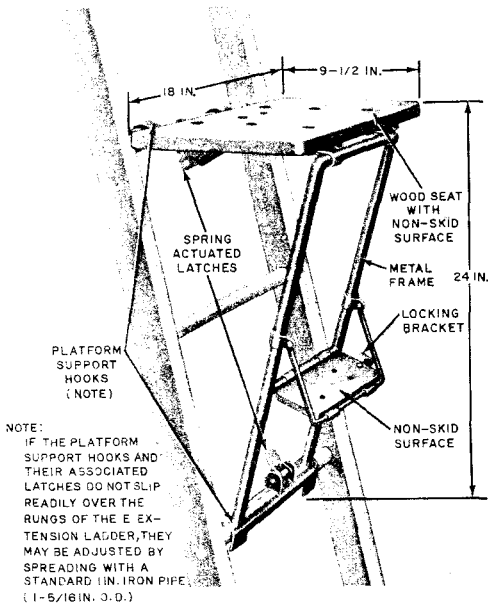


Fig. 14—D Ladder Platform

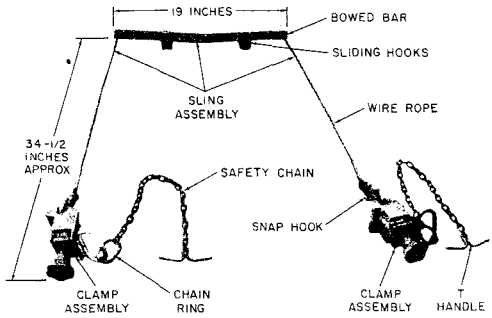


Fig. 15—D Ladder Support

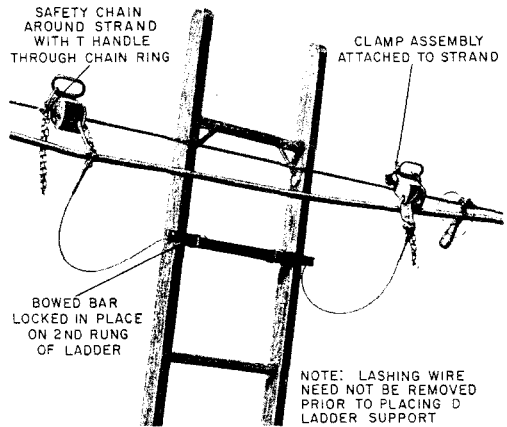


Fig. 16—D Ladder Support Attached to Strand

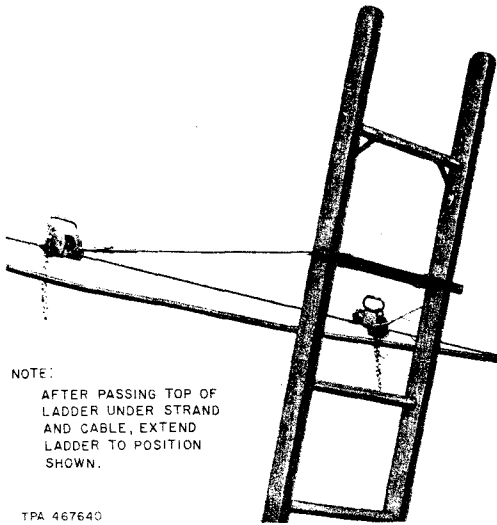


Fig. 17—D Ladder Support in Use

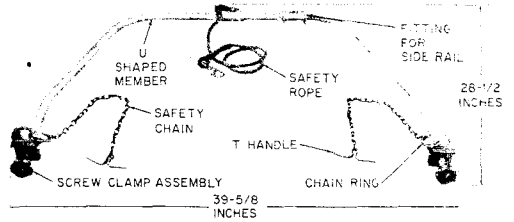


Fig. 19—E Ladder Support

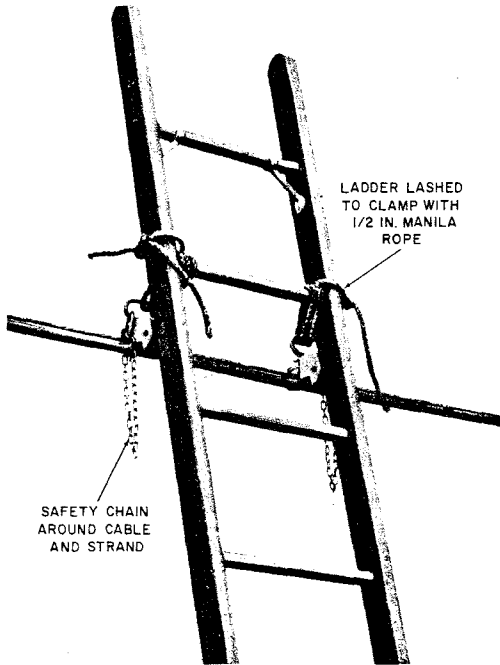


Fig. 18—Ladder Attached to Strand with D Ladder Support Clamps

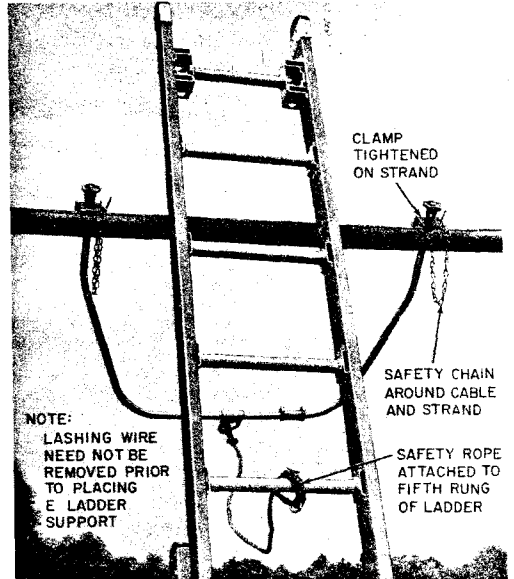


Fig. 20—E Ladder Support in Position on Strand

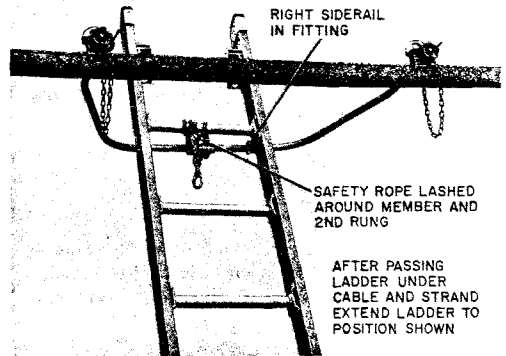


Fig. 21—E Ladder Support in Use

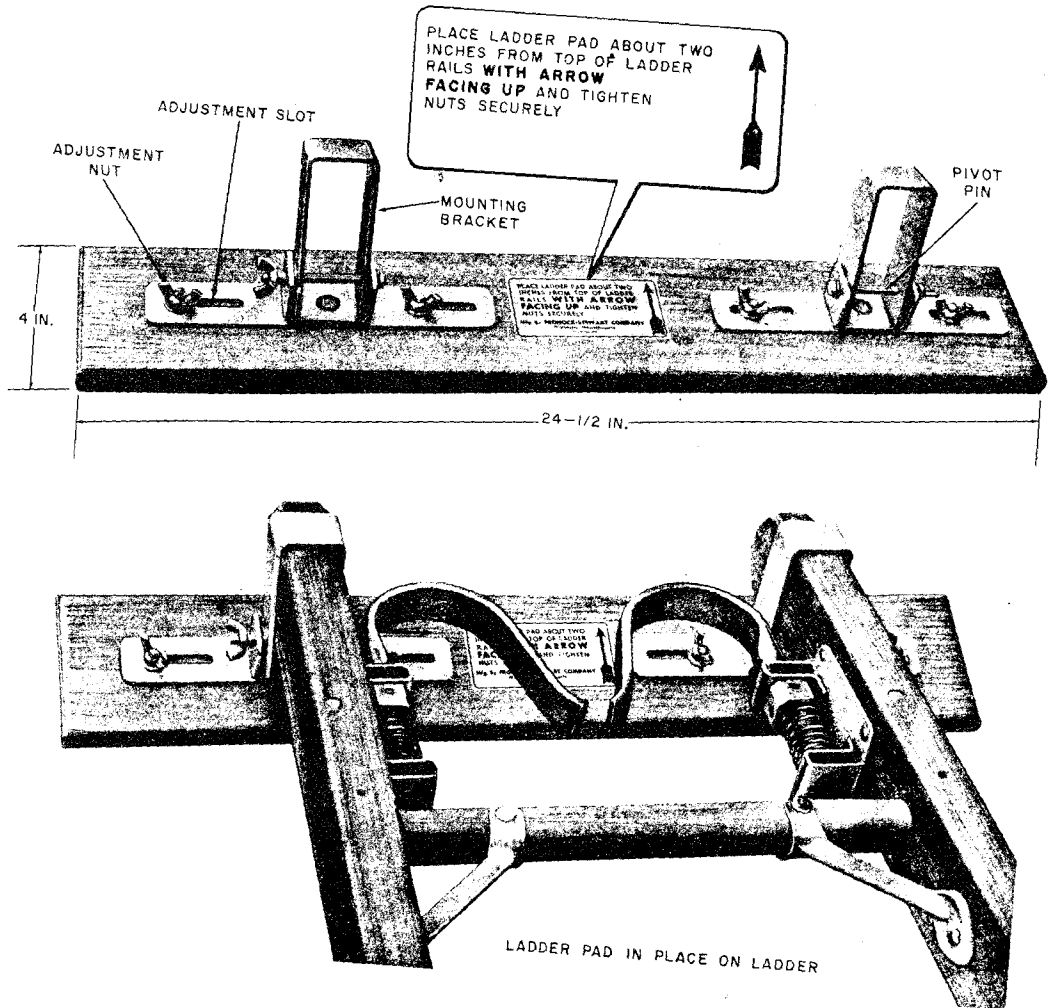


Fig. 22—Ladder Pad (MFR DISC)

**4. DEFINITIONS**

4.01 Table C lists terms which describe areas or conditions associated with the routine inspection of wood and/or fiberglass extension ladders.

**5. INSPECTION**

5.01 Before beginning any work with an extension ladder, it shall be determined that it is in satisfactory condition and that its appearance indicates neither deterioration nor damage sufficient to affect its safe use.

TABLE C  
TERMS AND DEFINITIONS

TERM	APPLICABLE LADDERS	DEFINITION
Check	Wood	Separations of the wood along the fiber direction that usually extend across the annual growth rings, usually resulting from stresses during seasoning
Chip	Fiberglass	Small piece of resin broken off an edge or surface
Compression failure	Wood	Buckling of fibers due to excessive compression along the grain which may appear as a fine crack, a fold or crease in the wood fibers, or as splintering of the wood fibers (see Fig. 23)
Crack	Fiberglass	A separation of the laminate, visible on opposite surfaces, and extending through the thickness.
	Wood	Fractures across the grain of the wood, usually resulting from mechanical stress
Open crack	Fiberglass	See-through separation of material
Surface crack	Fiberglass	A line-type crack in the resin surface not penetrating the subsurface glass layer
Crazing	Fiberglass	A pattern of fine hairline-type cracks on the surface or just below the resin surface with the appearance of a random spiderweb
Decay	Wood	Disintegration of the wood due to action of wood-destroying fungi
Delamination	Fiberglass	Separation of layers or strands of material exposing loose "white" glass fibers—when internal it could resemble a blister
	Wood	Separation of the plies in the laminated wood siderails due to failure of the glue bond
Flange	Fiberglass	Part of channel shaped fiberglass rail—also known as "leg" (see Fig. 24)
Fracture	Fiberglass	Rupture of the laminate surface without complete penetration to opposite side.
Gouge	Fiberglass	Deep groove penetrating the laminate and visible from the opposite side
Open Gouge	Fiberglass	A see-through gouge
Leg	Fiberglass	Part of channel shaped fiberglass rail, also known as "flange" (see Fig. 24)

TABLE C (Contd)

TERMS AND DEFINITIONS

TERM	APPLICABLE LADDERS	DEFINITION
Scratch	Fiberglass	A shallow groove in the resin surface not penetrating the subsurface glass layer
Scuff	Fiberglass	A mark in the surface resin caused by rubbing or scraping
Split	Wood	Separations of the wood fibers extending in the direction of the grain, usually from mechanical stresses
Toe	Fiberglass	Narrow area at ends of channel adjacent to flange (see Fig. 24)
Weathering	Fiberglass	Erosion of the surface resin due to environmental exposure
Web	Fiberglass	Wide section of channel between flanges (see Fig. 24)

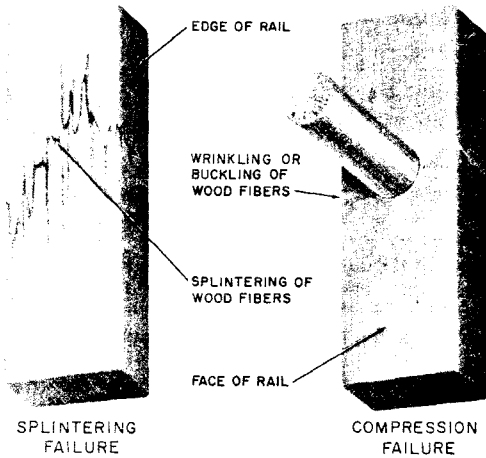


Fig. 23—Defects in Side Rails—Wood Ladder

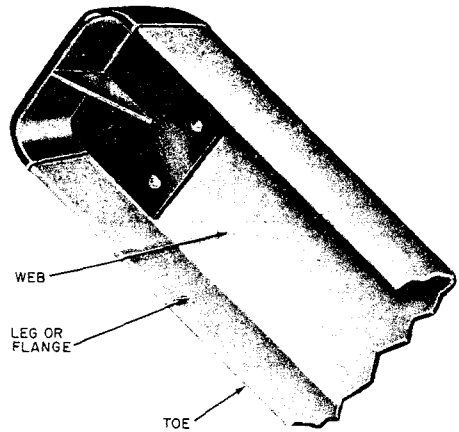


Fig. 24—Section of Ladder Rail—Fiberglass Ladder

**5.02** The ladder shall also be examined once a week to determine the condition of all of its parts. In order to facilitate careful inspection, the ladder shall be placed at a convenient height in a well lighted area. If any defects are found which cannot be corrected by the employee, or if the condition is such that there is doubt about the ladder being safe to use, it shall be exchanged in accordance with local procedures.

**5.03** Supervisors shall inspect ladders used by their forces at least once each quarter. The dead weight test for wood extension ladders may be omitted in this inspection (see paragraph 5.07).

#### **Wood Ladders**

**5.04** The inspection of wood extension ladders shall be made when the wood is dry. Absorption of moisture may cause swelling of the wood which could tend to conceal defects.

**5.05** Minor defects are to be corrected when detected. Wood may be dressed using a wood rasp, file, sandpaper or other suitable means. Significant amounts of wood must not be removed.

**5.06** When any of the limit of defects listed in Table D are exceeded, the ladder shall be removed from service.

**Note:** Hardware items may be repaired or replaced before the ladder is used. If not repairable, the ladder must be removed from service.

**5.07** Ladder sections shall be examined under the prescribed dead weight load inspection at 6-month intervals or in the event the ladder has been dropped, abused, damaged, or to determine if an apparent defect discovered in a weekly inspection is within acceptable limits.

TABLE D

WOOD LADDER WEEKLY INSPECTION

ITEM		INSPECT FOR	LIMIT OF DEFECTS (NOTES 1&2)	
			CONDITION	MAXIMUM
S I D E R A I L S		Checks	Reduction at corner	3/8 in.
		Cracks	Reduction other than corner	1/4 in.
		Splinters (Note 3)	Delamination	see "splits"
		Splits	Crushed or depressed	1/4 in.
		Decay	Decay	Unacceptable
		Compression failure (Note 5)	Checks (Note 4)	6 in. long, 1/2 in. deep
		Protruding nails (Note 6)	Cracks	Unacceptable
		Delamination	Splits	
			1 - End splits	
			Stop rivited	2 in. beyond rivet
			Not stop rivited	2 in.
			2 - Splits due to nailing	2 in. beyond each side of nail
	3 - Splits from rung or rivet hole	2 in. each side of hole		
	4 - Through split	2 in.		
	Longitudinal play (Note 7)	3/4 in.		
R U N G S	Wood	Cracks	Cracks - unacceptable	
		Splits	Splits - 2 inch maximum beyond tenon	
		Splinters	Checks - 6 inches long, 1/2 inch deep maximum	
		Checks (Note 4)	Decay at joints - unacceptable (Note 8)	
		Looseness	Wear - diameter less than 7/8 in.	
	Metal	Missing	Looseness - unacceptable	
		Decay	Splinters - acceptable if removable by dressing without exceeding minimum diameter limit	
		Excessive wear	Cracked	} Unacceptable
			Severely bent	
			Loose	
	Excessively worn			



TABLE D (Contd)

## WOOD LADDER WEEKLY INSPECTION

ITEM		INSPECT FOR	LIMIT OF DEFECTS (NOTES 1&2)
H A R D W A R E	Braces Brackets Rivets	Cracks Looseness Missing parts	Loose — (Note 9) Missing Broken Cracked Defective } Unacceptable
	Hooks Locks Shackle Pulley	Cracks Security Proper operation (Notes 10 and 11) Distorted, bent	Bent Broken Cracked Defective Distorted } Unacceptable Loose — (Note 9)
	Guide irons	Cracks Bending Security	Bent Broken Defective } Unacceptable
	Rope	Security Fraying Rot (expecially at pulley)	Excessive fraying or worn } Unacceptable (Note 12) Rotted
	Spurs	Crack Security Worn edges	Badly worn (Note 13) Broken Cracked } Unacceptable

*Note 1:* A ladder having a condition exceeding these limitations shall be removed from service.

*Note 2:* Defective hardware exceeding these limitations may be repaired or replaced. If not corrected, the ladder must be removed from service.

*Note 3:* Splinters shall be removed by dressing the rail with a wood rasp, file, knife, sandpaper, or other suitable means, subject to the minimum dimensions for siderails.

*Note 4:* Superficial checks due to weathering, not exceeding 1/8 inch in depth are permissible in any number.

*Note 5:* Compression failure in the wood fibers is most likely to occur at rung location. The wrinkles or creases may appear alone or with some splitting of the wood fibers on the opposite side of the rail. Ladders with this condition shall be removed from service.

*Note 6:* Protruding nails shall be driven flush and set with a nail set.

TABLE D (Contd)

WOOD LADDER WEEKLY INSPECTION

*Note 7:* Longitudinal play is due to looseness of the rungs and rung braces and shall not be greater than 3/4 inch.

*Note 8:* Decay at joints may be detected by tapping the rung near the side rail with a hammer handle and comparing the sound with that of sound rails. Do not strike rungs with head of hammer.

*Note 9:* Where practical, loose rivets shall be tightened, by placing the head of a lineman's hammer, or equivalent, against the head of the loose rivet. Peen the other end of the rivet with a ball peen hammer until tight. If this does not correct the condition, replace the ladder in accordance with local procedures.

*Note 10:* Locksprings shall function to keep the hooks in position to engage the rung.

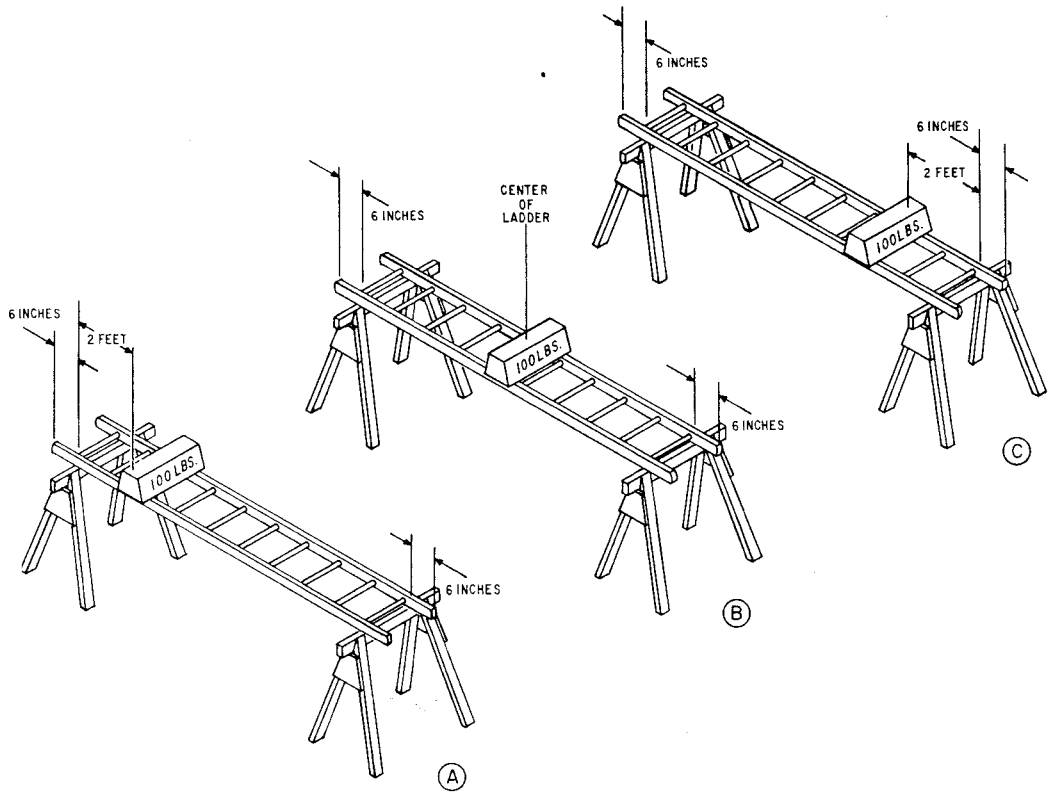
*Note 11:* The pulley sheave shall revolve freely.

*Note 12:* Replacement rope assembly available.

*Note 13:* Spurs to be rotated to make use of new teeth, or replaced.

**5.08** The dead weight load inspection, shown in Fig. 25, is not a strength test of the section but a means for disclosing defects and is of no value unless a careful visual examination is made while the section is under load. ***Under no***

***circumstance shall an assembled extended ladder be inspected in this manner.*** Do not apply a weight appreciably in excess of 100 pounds (such as the weight of a person) to the ladder section.



STEP 1—Position one section of extension ladder on supports of sufficient height so underside of each side rail may be examined thoroughly. (See A.)

STEP 2—Place weight, making sure it is equally supported by the two side rails. (See A.)

STEP 3—Examine the underedges and faces of each side rail carefully for signs of defects (see Table D). **Note:** The area around the junction of the rungs and side rails is the most susceptible area for fractures.

STEP 4—Reposition weight to center of ladder (see B) and repeat Step 3.

STEP 5—Reposition weight as shown in C and repeat Step 3.

STEP 6—Turn ladder section over and repeat Steps 1 through 5.

STEP 7—Repeat Steps 1 through 6 using other section of extension ladder.

Fig. 25—Dead Weight Inspection—Wood Ladder

**Fiberglass Ladders**

5.09 Fiberglass ladders in service shall be examined weekly in accordance with Table E. Suspend the ladder on supports or on a flat surface so the inside and outside siderails and corners can be inspected. The conditions listed in Table E for the fiberglass rails may occur at various locations along the rail but are more prevalent around rung attachments, rivet locations, and at or near points of concentrated stress, such as inside and outside corners of the channel, especially at guide locations.

5.10 A fiberglass ladder shall not be subjected to any weight test while being inspected.

**6. MAINTENANCE**

6.01 If properly handled and maintained, an extension ladder can be used for a considerable time without repairs or replacement. When required, replacement parts such as ropes, pulleys, spurs, etc, are available as noted in Part 5. Extension ladders requiring repairs which cannot be made locally shall be returned to a designated location and repaired under the company's established routine. Ladders withdrawn from service for repair or destruction shall be tagged or marked "**Dangerous, Do Not Use.**"

6.02 Depending on the type and extent of exposure, weathering of fiberglass ladders can cause erosion on the surface of the rails sufficient to expose the ends of the fiberglass fibers. Normal weathering resulting in a "dusting" will be washed off by rains or rubbed off by normal use. The ladder shall be kept clean by wiping with a clean cloth to remove any buildup of grease, grime, or other conductive materials. Rungs shall also be kept free from dirt, paraffin, oil, tar, etc. A ladder with foreign material on the rungs is dangerous (see paragraph 8.11).

6.03 For more severe weathering or use resulting in significant exposure of glass fiber, the rails should be treated with B ladder varnish (UV).

6.04 B ladder varnish (UV) is applied as follows:

- (1) Remove localized loose fibers from abrasion, rack damage, etc, by lightly touching up with emery paper or fine sandpaper.

- (2) Thoroughly clean the affected side rail surface of all oil, grease, wax, etc, using a stiff brush and a suitable detergent and water. Allow to dry thoroughly.

- (3) Apply the coating material to the rails with a brush. Allow a minimum of 4 hours drying time before use. For best results, two coats should be applied. When using this material, the same safety precautions applicable for any oil-based paint or varnish must be exercised.

6.05 Locks, springs, and pulleys on extension ladders in use shall be lubricated at least once a month by applying oil *sparingly* on the movable parts.

6.06 Worn or dull round wheel spurs may be adjusted as follows:

- (1) Remove nut, lockwasher, and shoulder bolt.
- (2) Rotate the toothed wheel 90 degrees, bringing the unused portion of the wheel in position for use.
- (3) Replace the bolt with the shoulder properly seated in the plate and wheel.
- (4) Replace the lockwasher and nut and tighten securely.

**Note:** Do not change the position of a wheel spur on only one side of the ladder; always change both, even though one may not be badly worn. Spurs on convertible ladder feet shall be replaced when excessively worn.

**Storage of Ladders**

6.07 Ladders that are not being used shall be stored where they will be dry and have good ventilation. Ladders shall not be stored near radiators, stoves, steampipes, or in any location where they will be subjected to excessive heat or dampness as this will appreciably shorten the life of the ladder.

6.08 Store ladders to provide ease of access for inspection and to prevent danger of accident when withdrawing a ladder for use.

TABLE E

## FIBERGLASS LADDER WEEKLY INSPECTION

ITEM	INSPECT FOR	LIMIT OF DEFECTS (NOTES 1&2)			
		CONDITION	MAXIMUM LIMIT		
			WIDTH (INCHES)	LENGTH (INCHES)	DEPTH (INCHES)
S I D E R A I L S	Chips	Scratches, scuffs	—	No limit	1/32
	Cracks	Dents, gouges (on long edge of toe)	—	1	1/16
	Dents	Dents, gouges (across flange or web)	—	1	1/32
	Fractures	Chips	1	1	1/32
	Gouges	Pinholes, pits	1/32 × 1/32		
	Splits	Weathering — Acceptable (Note 3) Surface Crack — 6 inches long Fracture (Web) — 3 inches long Fracture (Flange) — 2-1/2 inches long Gouge (Web) — 5/8 inch square by 1/8 inch deep Gouge (Flange) — 3/8 inch long by 1/8 inch deep Open gouge (Web) — 1/2 inch square Open Gouge (Flange) — 1/4 inch square Crack (Web) — 1 1/2 inches long Crack (Flange) — 3/4 inch long Open Crack (Web) — 3/8 inch long Open Crack (Flange) — 1/4 inch long			
	Scratches				
	Scuffs				
(Note 4)					
R U N G S	Cracks (Note 5)	Cracked	Unacceptable		
	Bending	Severely bent			
	Looseness	Loose			
	Excessive wear	Excessively worn			
H A R D W A R E	Braces	Missing	Unacceptable		
	Brackets	Broken			
	Rivets	Cracked			
		Defective			
	Hooks	Cracked	Unacceptable		
	Locks	Security			
Shackle	Freedom of operation (Notes 6 and 7)				
Pulley	Distorted				
	Bent	Bent			
		Defective			
		Distorted			

TABLE E (Contd)

FIBERGLASS LADDER WEEKLY INSPECTION

	ITEM	INSPECT FOR	LIMIT OF DEFECTS (NOTES 1&2)
H A R D W A R E	Guide Brackets	Cracks Bending Security	Bent Cracked Broken Loose Defective Unacceptable
	Rope	Security Fraying Rot (especially at pulley)	Excessive fraying or worn Rotted Unacceptable (Note 8)
	Spurs	Crack Security Worn edges	Badly worn Cracked Broken Unacceptable (Note 9)

*Note 1:* A ladder having a condition exceeding these limitations shall be removed from service.

*Note 2:* Defective hardware exceeding these limitations may be repaired or replaced. If not corrected the ladder must be removed from service.

*Note 3:* Acceptable unless exposed glass fiber becomes objectionable from a handling standpoint. (See paragraph 6.03)

*Note 4:* Cracks, splits, and fracture defects can be identified by stressing with the hands.

*Note 5:* Rungs may have longitudinal cracks along ribbing, or they may have cracks around the crimping joining the end plates.

*Note 6:* Lock springs shall function to keep the hook in position to engage the rung.

*Note 7:* The pulley sheave shall revolve freely.

*Note 8:* Replacement rope assembly available.

*Note 9:* Spurs to be rotated to make use of new teeth, or replaced.

6.09 Ladders stored in a horizontal position on ladder racks shall be supported at a sufficient number of points (a minimum of 3 points for 20- and 24-foot ladders and 4 points for longer ladders) to avoid sagging and permanent set.

6.10 Where ladder racks have not been provided, store ladders in a vertical position. If this is not practical, the ladders may be stacked flat in a horizontal position. Place wooden spacers between the floor and the lower ladder and between ladders to prevent side rails from becoming damaged by guide irons. Do not store ladders in any position where there is a chance of pressure being placed on them that might cause warping or twisting. Not more than six ladders shall be placed in one stack. Heavy objects shall not be permitted to rest on ladders in storage.

## 7. TRANSPORTING

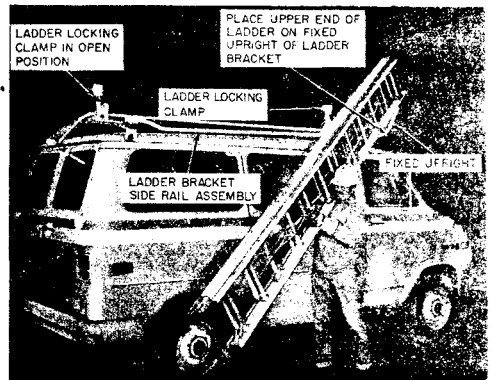
### Transporting on Vehicles

7.01 When transporting ladders on trucks or other motor vehicles, always fasten them securely in their proper position in the brackets provided for that purpose. Never use wire for securing a ladder to the brackets of a truck. A ladder hanging loosely on the brackets of a truck will be marred, cracked, and weakened by road shocks.

**Warning:** *The E fiberglass extension ladder shall be transported only on vehicles equipped with brackets designed for the fiberglass ladder or on vehicles whose brackets have been modified to accept the fiberglass ladder. Failure to use proper brackets may damage the ladder.*

**Note:** Ladder brackets designed to be used with both wood and fiberglass ladders shall be adjusted to fit the type of ladder being transported.

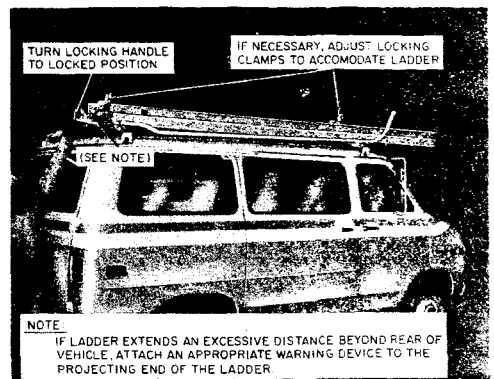
7.02 Mount ladders on vehicles equipped with roof-type ladder brackets as illustrated in Fig. 26.



1



2



3

Fig. 26—Mounting Ladder on Roof-Type Ladder Bracket

7.03 Mount ladders on vehicles equipped with ladder aid and roof-type ladder brackets as illustrated in Fig. 27.

7.04 Drivers of motor vehicles transporting ladders shall exercise caution to avoid letting the ladder strike trees, posts, walls, or other objects, especially when backing or turning corners. Any

ladder subjected to such a shock shall be carefully inspected prior to use in accordance with Part 5.

7.05 If an extension ladder extends an excessive distance (3 feet in most cases) beyond the rear of a motor vehicle, attach a warning flag or light to the projecting end of the ladder.



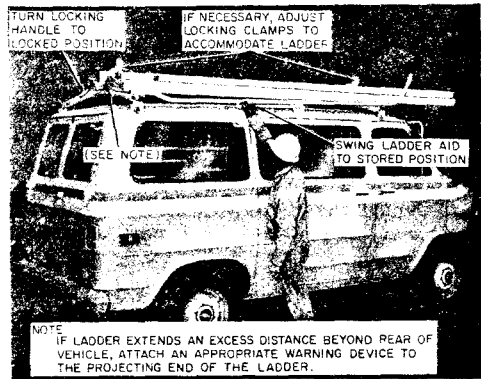
1



3



2



4

Fig. 27—Mounting Ladder on Roof-Type Ladder Bracket—Vehicle Equipped With Ladder Aid



**Transporting by Hand**

7.06 Carry extension ladders as shown in Fig. 28 or 29.

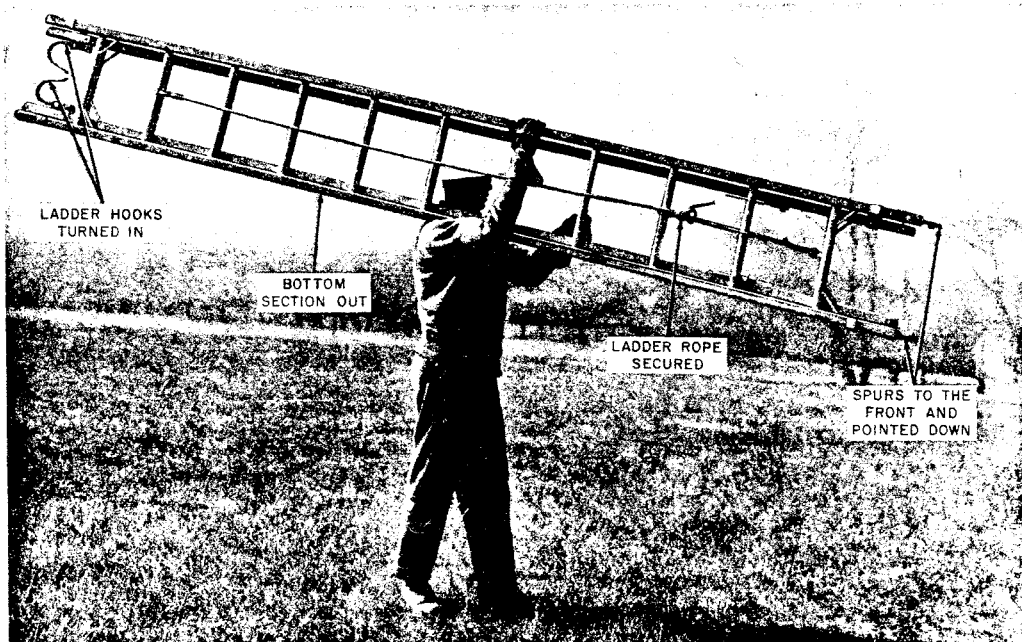


Fig. 28—One-Person Method of Carrying an Extension Ladder

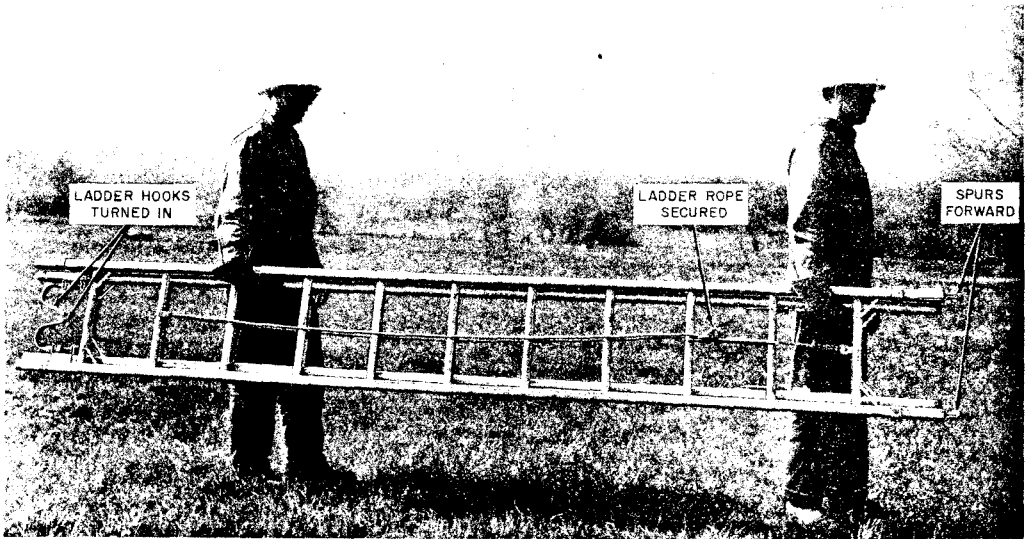


Fig. 29—Two-Person Method of Carrying an Extension Ladder

7.07 An alternate one-person method of carrying an extension ladder is shown in Fig. 30.

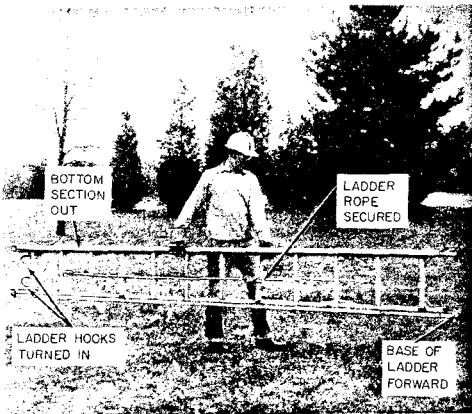


Fig. 30—Alternate One-Person Method of Carrying an Extension Ladder

## 8. SAFETY PRECAUTIONS

### Locating

8.01 Where possible, locate ladders on strand from the field side of the cable to avoid vehicular traffic.

8.02 If the ladder must be placed on the strand from the street side of the cable, the truck shall be parked in gear with the brakes set and wheels chocked to provide maximum protection for the ladder without obstructing traffic. In addition, warning signs, flags, traffic cones, or flashing signals shall be placed to divert traffic as discussed in Section 620-135-010.

8.03 Avoid placing a ladder in front of a doorway, especially where the door opens toward the ladder. If this is unavoidable, place barricades and block door open, or lock the door closed.

8.04 Avoid placing a ladder near passageways, moving machinery, or where pedestrians or any type of vehicles may strike or displace it. If

this is unavoidable, place warning devices or barricades at these locations.

**8.05** *Do not place a ladder inside or opposite an angle formed by wires or cables where loosening of the wire or cable attachments might cause the ladder to move or fall.*

**8.06** Do not place a ladder against a suspension strand which is held under tension by a strand puller only.

**8.07** Do not place a ladder against the support wire of multiple drop wire.

**8.08** Do not place a ladder where it may come in contact with power lines.

#### **Defective Ladders**

**8.09** Use only approved-type extension ladders.

**8.10** Do not use ladders with defective or missing rungs, defective side rails, or defective hardware items. (See Part 5.)

**8.11** Do not spill or splatter paraffin on a ladder. Wood or aluminum coated with paraffin is very slippery and can cause an accident.

#### **Handling**

**8.12** Do not carry an extension ladder from one location to another while it is extended. Fully retract the fly (upper) section, secure the ladder rope, and then extend it again at the new location.

**8.13** Point the spurs forward and downward when carrying a ladder on the shoulder.

**8.14** Do not swing the ladder into the path of passing vehicles or pedestrians when carrying a ladder or removing it from a vehicle.

**8.15** Extension ladders shall be erected with the fly section on top (toward the climber) of the base (lower) section in the overlap area.

**8.16** Keep hands and feet off the rungs when raising or lowering the fly section. Stand clear when the fly section is being lowered so it will not strike the feet. (See Part 9.)

**Note:** Do not allow fly section to free-fall while lowering.

#### **Securing Ladder**

**8.17** Ladders shall not be used to gain access to a roof unless the top of the ladder is extended at least 3 feet above the point of support, at eave, gutter, or roofline.

**8.18** Make certain that ladder locks are engaged properly and the ladder rope is tied securely to one of the rungs of the bottom section before climbing an extension ladder.

**8.19** If the ladder is equipped with ladder hooks and the ladder is to be used on aerial cable, turn the hooks to the working position before the ladder is raised. Ladder hooks shall be placed on the cable strand unless ladder is to be lashed as covered in Part 9. Do not turn the hooks in before descending the ladder.

**8.20** Ladders not equipped with ladder hooks shall be positioned against the strand with a minimum of 3 feet of ladder length extending above the strand when the craft person is in position on the ladder.

**Precautions While Using Ladders**

**8.21** Always select a ladder of sufficient length for the work to be done. The length of the ladder shall be such that the work can be performed when standing no higher than on the fourth rung from the top, thus permitting the side rails to be grasped conveniently. Do not place ladder on boxes, barrels, or other objects to obtain additional height. If the ladder is too short for the work at hand, obtain a longer ladder. The maximum working length for the various sizes of ladders is listed in Table F.

TABLE F

WORKING LENGTHS OF EXTENSION LADDERS		
SIZE OF LADDER (FEET)	MAXIMUM WORKING LENGTH (FEET)	MINIMUM NUMBER OF RUNGS OVERLAP
16	12	4
20	16	4
24	20	4
28	24	4
32	28	4
36	31	5
40	35	5

**8.22** Be especially careful when going up or down ladders during wet or icy weather.

**8.23** *Do not climb a ladder while wearing climbers.*

**8.24** Do not hurry when going up or down a ladder. Take one step at a time. Always face the ladder when going up or down and be sure to have both hands free.

**8.25** Only one person at a time is permitted on a ladder.

**8.26** When a ladder is lashed, or otherwise secured so that it cannot slip, shift, or fall, the security of the craft person may be improved by placing one leg between the rungs.

**8.27** When the top end of the ladder is secured to suspension strand or other support, the craft person shall secure himself by passing the safety strap around one or two rungs and around one side rail.

**8.28** When the ladder is properly placed on the strand, (hooks over strand or 3 feet above strand) pass the safety strap around the strand and one side rail between two rungs.

**8.29** *The craft person shall always remember to first make the ladder secure, and then secure oneself on the ladder, to avoid falling, in the event of slipping, loss of balance, or if something else goes wrong.* The manner in which the craft person is secured to the ladder will depend on the security of the ladder, and the nature of the work to be done.

**8.30** Do not throw tools or materials to a craft person working on a ladder; raise them by means of a handline. Be careful that tools or materials being used aloft cannot fall on persons passing below.

**8.31** Do not attempt to lean to the side so far that the outside shoulder is more than 12 inches beyond the side rail when working on a ladder that is not lashed. Loss of footing in this position may cause loss of balance. The weight being shifted to one side of the ladder may cause it to slip at the top. Descend and move the ladder to the proper location.

**8.32** When working from ladders do not allow drop wires, lashing wires, handlines, or ladder ropes to dangle to the ground where they may be struck by passing vehicles. A wire or rope caught on a passing vehicle may pull the ladder causing it to fall or it may pull the craft person off the ladder. The handline, when not in use, shall be tied to the lower portion of the ladder or pulled aloft.

**8.33** Do not slide down an extension ladder.

**8.34** Do not tie drop wires or pulling lines to ladders.

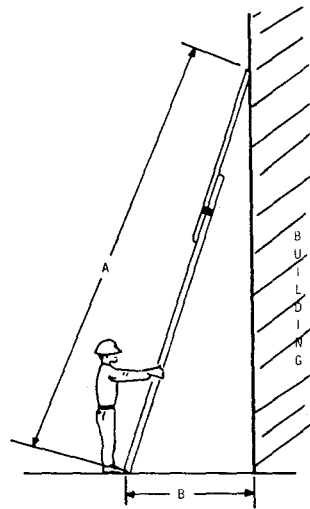
**8.35** Do not use a ladder in a horizontal position as a platform, runway, scaffold, or bridge.

## 9. USE

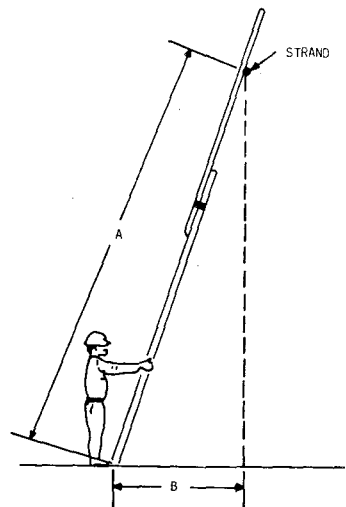
### Selecting Footing

**9.01** Before attempting to position a ladder, select the appropriate position (spur or pad) of the combination feet to provide maximum security of the base (see Fig. 6).

**9.02** Exercise care when positioning ladders before climbing. The correct angle is obtained when facing the ladder with your toes placed against the siderails; you should be able to grasp the siderails with your hands by reaching straight out (see Fig. 31 and 32). When this is accomplished, the ratio of B/A should be approximately 1/4.



**Fig. 31—Ladder Placed Against Wall**



**Fig. 32—Ladder Placed Against Strand**

**9.03** Set the ladder only on secure footing. Set

both feet of the ladder at the same level and on a line parallel to the surface on which the top of the ladder rests. If necessary, a B ladder leveling wedge on a B ladder foot for wooden ladders, may be used to level the base of the ladder (Fig. 9, 16, and 33) or earth may be removed

from beneath the high side to bring it to the level of the lower side. **Do not increase the length of a side rail by nailing, clamping, or tying a board to it.** If a ladder leans to the right or left, it is not properly placed. Figure 34 shows a ladder properly placed.

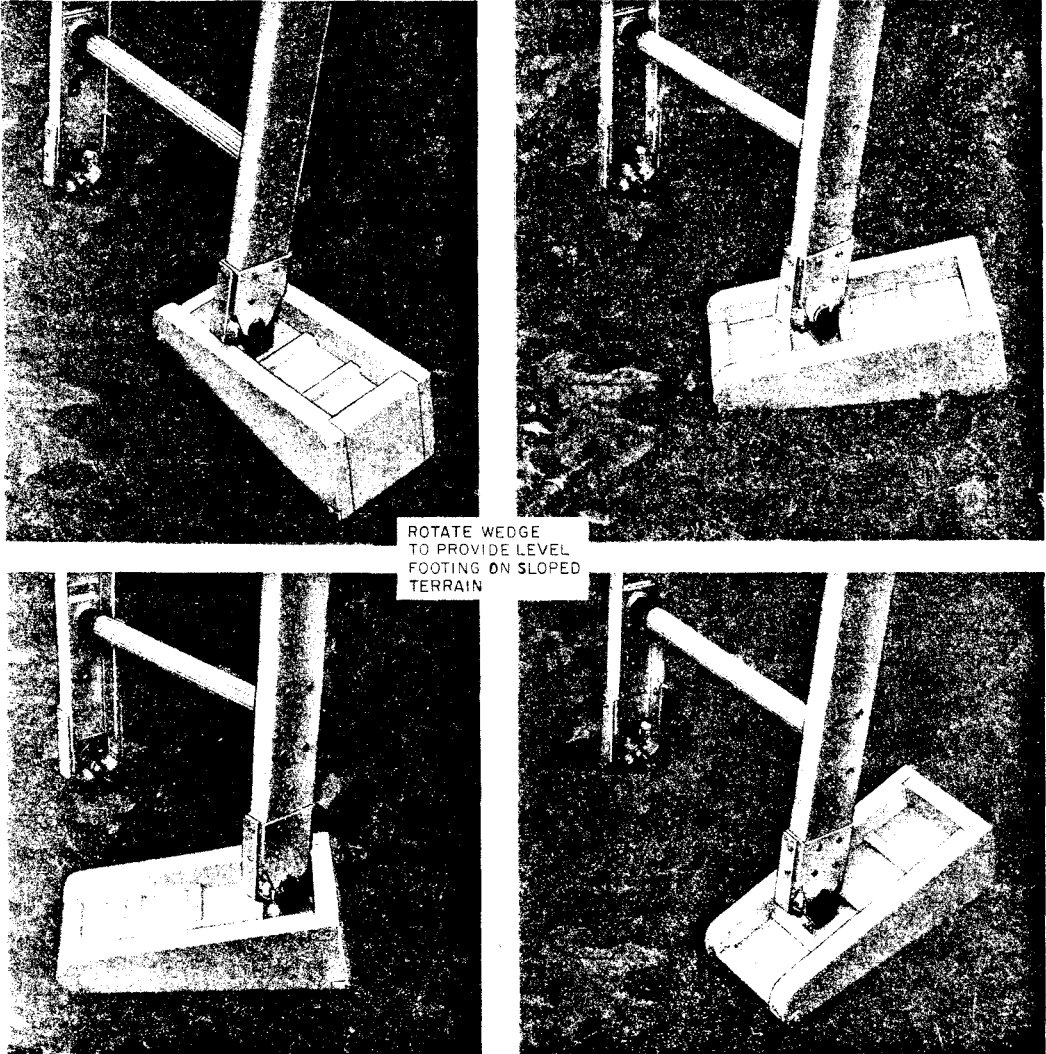
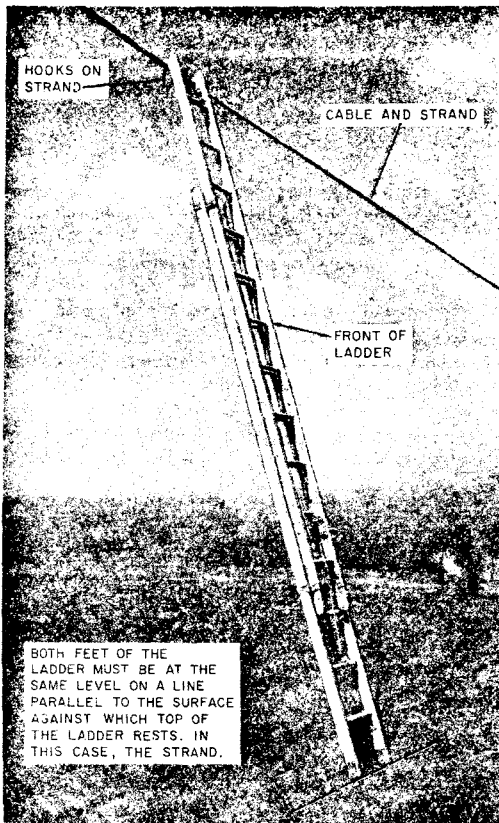


Fig. 33—B Ladder Leveling Wedge in Use



**Fig. 34—Base of Ladder Properly Positioned**

**9.04** When it is impossible to avoid placing the base of the ladder on a surface where it might slip, such as on wet or oily pavement, a

smooth floor, or icy or metal surfaces, tie the base of the ladder securely in place. If this is impractical, the ladder must be held by another craft person. The person holding the ladder shall be on the alert at all times to protect the person on the ladder and anyone passing below. Never leave a raised ladder unattended under these conditions. The ladder might slip and cause injury, damage, or both.

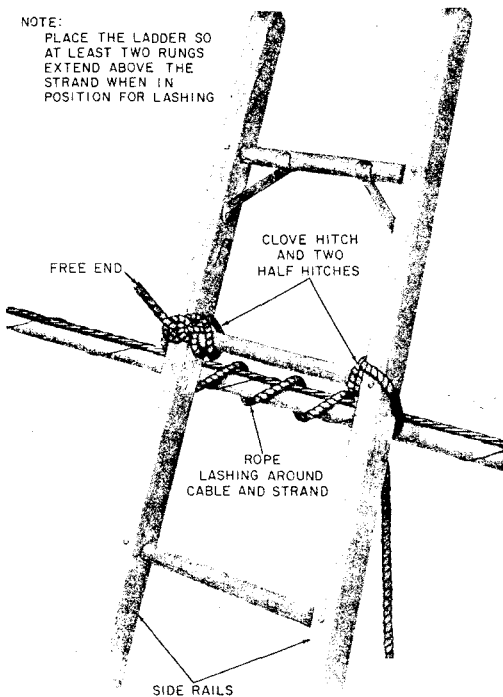
#### **Supporting Upper End**

**9.05** Objects against which the top of the ladder will be placed shall be sufficiently rigid and have ample strength to support the ladder and the craft person performing necessary work operations.

**9.06** Before placing a ladder against suspension strand, test the strength of the strand and its supports as outlined in Section 627-295-500.

**9.07** When using a ladder on a strand having a fairly steep slope, secure the ladder with rope to prevent the top of the ladder from sliding along the strand. Before raising the ladder, throw or place a handline over the strand and secure one end of the handline to the second rung from the top of the fly section. After placing the ladder on the strand, pull the other end of the handline taut and secure it to an adequate support on the uphill side of the ladder, such as a pole, tree, or digging bar firmly anchored in the ground. If no such anchorage is obtainable, secure the ladder to the cable and strand by throwing the handline over the strand again, so the rope passes twice around the cable and strand. Then tie the rope securely to a rung on the base section of the ladder.

**9.08** When a ladder is placed against the strand and heavy work such as pulling or lifting is to be done, lash the ladder to the strand with a short length of rope, as shown in Fig. 35. Where the cable is supported in rings, pass the lashing rope around the strand only; where the cable is lashed, pass the lashing rope around the strand and cable. **Do not move the base of the ladder after the upper end has been secured to the strand.**

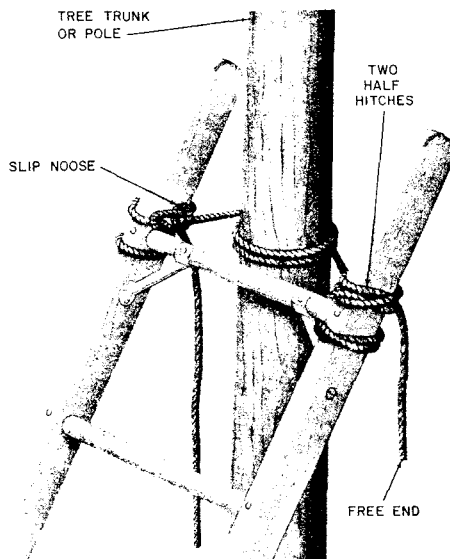


**Fig. 35—Lashing Ladder to Strand**

**9.09** When pushing or pulling heavy loads from a working position on a ladder, exercise care not to place undue stress on the ladder which would tend to dislodge it.

**9.10** When using a ladder on a suspension strand that is attached to a building wall, wherever possible place the ladder so that it will tend to push the wall attachment against rather than away from the building wall.

**9.11** When placing a ladder against a tree, select the tree trunk or its larger limbs for support. When it is necessary to place a ladder so the top rung rests against a tree trunk or similar object, a handline may be thrown or placed with a wire-raising tool or tree pruner handle over a tree limb, tied to the top rung of the ladder, and used to assist in raising the ladder. After the ladder has been placed, tie the free end of the handline to one of the lower rungs, thus holding the ladder until a more secure lashing is made. The ladder shall be lashed securely at one or two points to prevent the ladder from twisting or sliding when the craft person's weight is put on one side. The lashing can be made in the following manner with a second rope (Fig. 36):



**Fig. 36—Ladder Lashed to Tree or Pole**



- (a) Make a slip noose about 15 feet from the free end of the rope so that the noose will tighten when the free end of the rope is pulled.
- (b) Place the slip noose over the top end of one side rail.
- (c) Pass the free end of the rope down behind and under the top rung, then toward the front of the ladder, around the rail, and then back of the tree or pole.
- (d) Make two complete wraps around the tree or pole, then pass the rope twice around the opposite rail below the first rung and then up behind the rung.
- (e) Reverse the direction of wrapping and make two half-hitches on the rail so that the ladder is lashed tightly to the tree or pole.

9.12 Figure 37 shows an alternate method for lashing a ladder to a pole. This method makes it possible to lash the ladder prior to climbing.

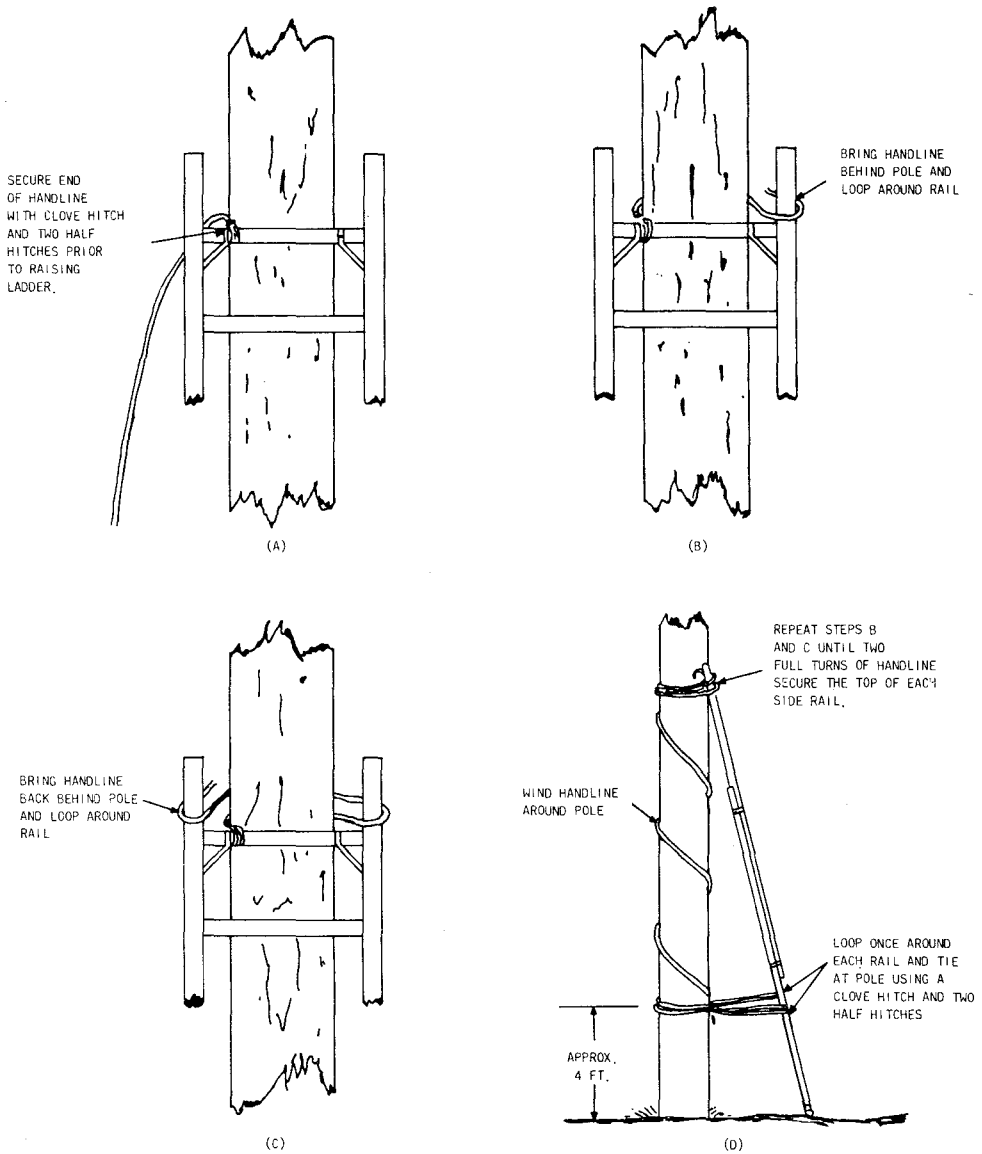


Fig. 37—Alternate Method of Lashing Ladder to Pole

9.13 Do not place an extension ladder against a window sash. If it is impractical to avoid a window, lash a board to the ladder as shown in Fig. 38 to provide support on each side of the window frame.



Fig. 38—Ladder Placed in Front of Window

9.14 Ladder strand hooks (Fig. 4) shall be used on lashed, ring-supported, and self-supporting cable when the ladder is not lashed to the strand.

**CAUTION:** When using ladder hooks on aerial cable, make certain the ladder is placed on firm and level footing to prevent the ladder from twisting or sliding along the strand.

A greater margin of safety is provided with the hooks in the working position even if the ladder is lashed to the strand and especially when placing and removing the ladder.

**Note:** Turn ladder hooks in between rails when the ladder is to be placed against building walls or other flat surfaces, mounted on trucks, or stored.

9.15 To prevent possible damage to a building having fragile siding, such as enameled aluminum, asbestos, etc, attach a **B ladder pad** (Fig. 12) to the top section of the ladder before it is placed against the structure.

9.16 The **D and E ladder supports** are used to support the upper end of the ladder permitting the craft person to sit or stand between the ladder and the cable using the C or D ladder platform (see Fig. 15 through 21).

Raising and Lowering (One-Person Method)

9.17 The one-person method of raising an extension ladder, 23 feet or less, to a suspension strand is illustrated in Fig. 39 through 43.

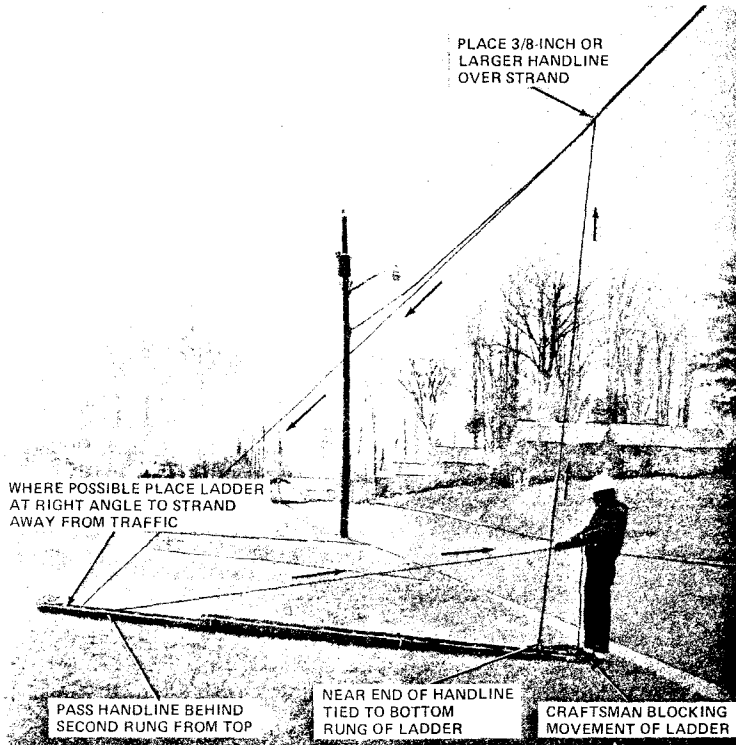


Fig. 39—Preparing to Raise Extension Ladder

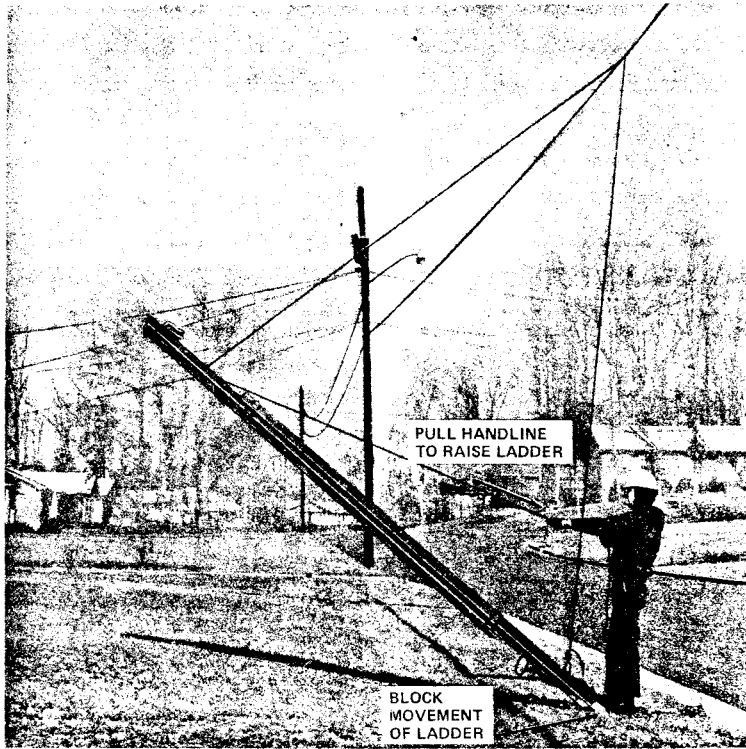


Fig. 40—Ladder Partially Raised

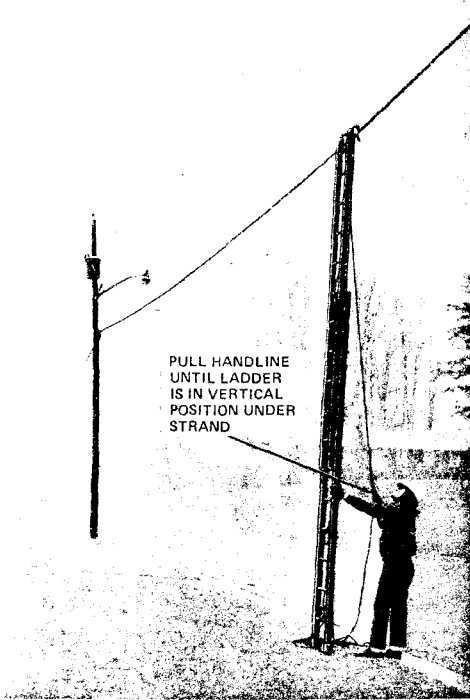


Fig. 41—Ladder in Vertical Position



Fig. 42—Method of Securing Handline

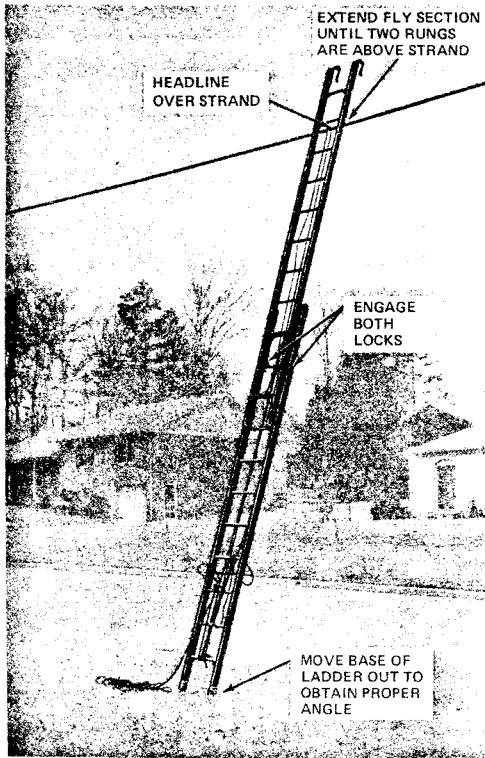


Fig. 43—Ladder in Working Position

9.18 The one-person method of raising an extension ladder, 28 feet or less, to a wall or building is illustrated in Fig. 44 through 46.

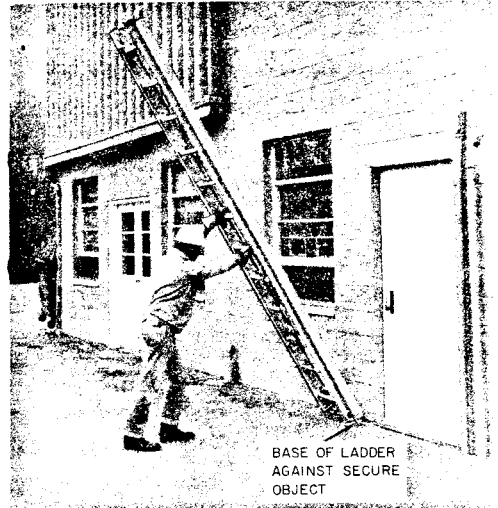


Fig. 44—One Person Raising Ladder

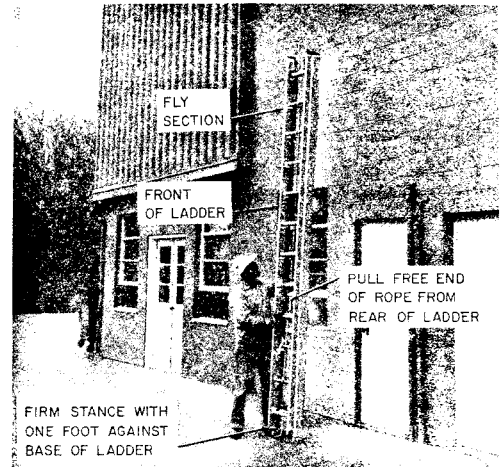


Fig. 45—Preparing To Extend Fly Section

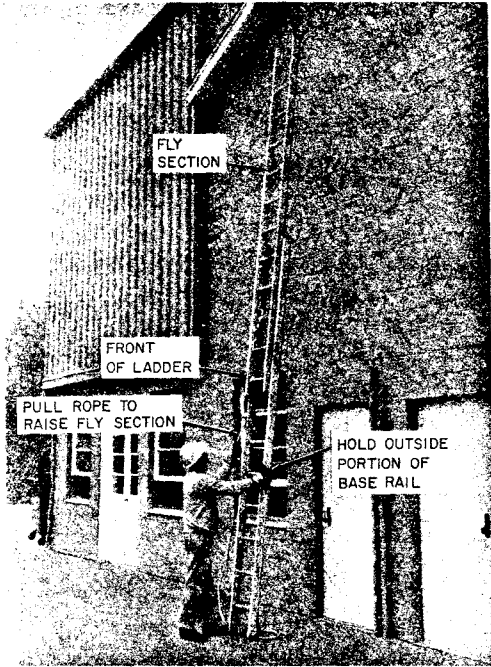


Fig. 46—Fly Section Extended

9.19 The one-person method of lowering an extension ladder, is illustrated in Fig. 47 and 48.



Fig. 47—Preparing To Lower Fly Section



Fig. 48—Fly Section Lowered



**Raising and Lowering (Ladders over 28 feet)**

9.20 Under certain ideal conditions, it may be possible for one craft person to safely raise and lower ladders longer than 28 feet (see paragraphs 9.17 through 9.19).

9.21 The two-person method of raising an extension ladder is illustrated in Fig. 49 and 50.



Fig. 49—Two Persons Raising Ladder

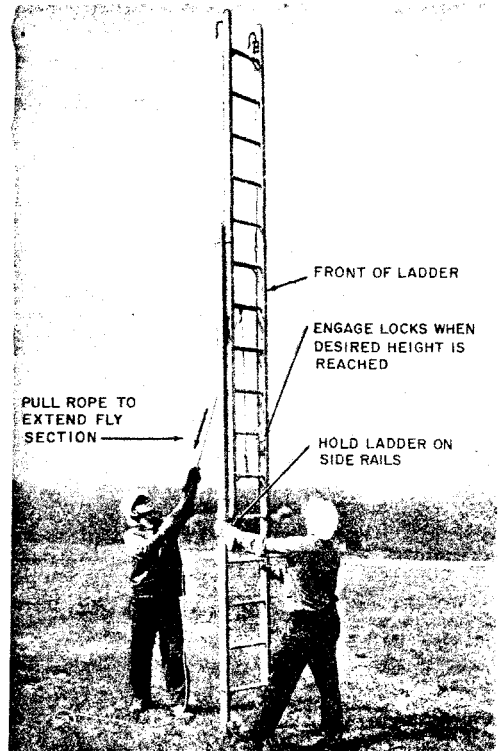


Fig. 50—Two-Person Method of Extending Fly Section