

MANILA ROPE

DESCRIPTION AND USE

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1. GENERAL

1.01 This section covers the procedure for the proper use, care, and maintenance of manila rope. It also describes and illustrates the methods for splicing and serving manila rope and tying the various knots and lashings commonly used in construction work that have been found to be most satisfactory.

1.02 This section includes and combines the information pertaining to manila rope formerly contained in Sections 081-510-011, 081-510-200, 081-510-201, and 081-510-202. This section replaces the above listed sections which are cancelled.

1.03 To prevent accident or injury, the knots, bends, hitches, and lashings described in this section *should be used only for the purposes specified.*

1.04 Carefully observe the safety precautions in the use and handling of manila rope (Part 2).

2. SAFETY PRECAUTIONS

2.01 Safety to life and property requires that rope must be in good condition, well cared for, and properly used. When using rope:

(a) Inspect all rope for surface imperfections before using. Rope that is used to support aerial platforms, as tree slings, or other similar purposes shall be thoroughly inspected before use. The rope shall be inspected not only for surface imperfections but also for its internal condition as described in Part 10. *Never use a rope that is in a doubtful condition.*

(b) Be thoroughly familiar with the proper methods of handling rope. Faulty knots or hitches in rope under strain may slip and cause serious accidents.

(c) Determine the proper size of rope to handle the load by referring to Table A in Part 4. *Do not overload any size of rope.*

(d) *Never use manila rope containing any metal strand.*

(e) Avoid twists and kinks in rope. Kinks seriously weaken the rope and may result in breakage under moderate tension. Kinks in rope should be turned out by hand *before* the rope is stressed.

(f) When moving from one location to another, do not drag the rope along the ground.

(g) Do not stand unnecessarily close to or straddle a rope under tension.

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- (h) Do not stand in the inside angle or in the path of rope being paid out or under tension.
- (i) Do not spill hot solder or paraffin on ropes.
- (j) Avoid sudden jerks in raising or lowering a load.
- (k) Do not use frozen rope.
- (l) Keep ropes away from acids, eg, storage batteries, or surfaces upon which acid may have been spilled during storage or transportation.
- (m) Select a reasonably smooth rounded surface in making rope fast.
- (n) Wet or damp rope shall not be used around high voltage wires except in an emergency and then only when the workmen are protected by rubber gloves.
- (o) Handline shall not be attached to the belt when working aloft. Fasten it to a crossarm, cable strand, or similar structure.
- (p) Handline or other rope secured aloft, when not in use shall be coiled or secured at a point near the ground to prevent it from being blown about.
- (q) When tying knots or hitches in rope leave enough end to ensure that it will not pull out.
- (r) Rope shall be so placed to form no obstruction on highways or thoroughfares. Temporary guys shall afford sufficient clearance for passing vehicles.
- (s) Rope, which is considered no longer adequate for use in blocks or as a pulling line, should not be used for lashing.

3. CORDAGE TERMS

3.01 The cordage terms as pertaining to these practices are as follows:

Bight: A section of rope turned back on itself.

Turn or Loop: A turn in a rope with ends extending in opposite directions.

Round Turn or Bend: Any turn in a rope around itself or other object (Fig. 1).

Knot: A combination of bights and turns arranged so the tight part of the rope will bear on the free end of the rope.

Hitch: Attaching a rope to an object so it can be readily detached.

Half Hitch: A turn in the rope arranged so that a section of the turn will bear on another section of the turn.

Haul: To pull on a rope.

Running Part or Fall End: That part of a rope in motion or which is hauled upon, ie, the free end or part.

Standing Part: That part of a rope which is stationary or around which turns are taken in making hitches and bends, ie, the tight end or part.

Seized: Two parallel parts of rope bound together.

Serve or Whip: To wrap the ends of rope to keep the strands from unraveling.

Splice: Two ropes joined together by interweaving their strands.

Taut: Hauled tight or under tension.

4. SELECTION AND USES OF MANILA ROPE

4.01 The approximate weight of the load to be hauled, lifted, or held must be known before selection of the size of rope can be determined. With knowledge of the weight of the load and the rigging that is to be used, select the proper size rope from Table A. ***The working strength of the rope, designated in Table A, must not be exceeded by the load to be applied.***

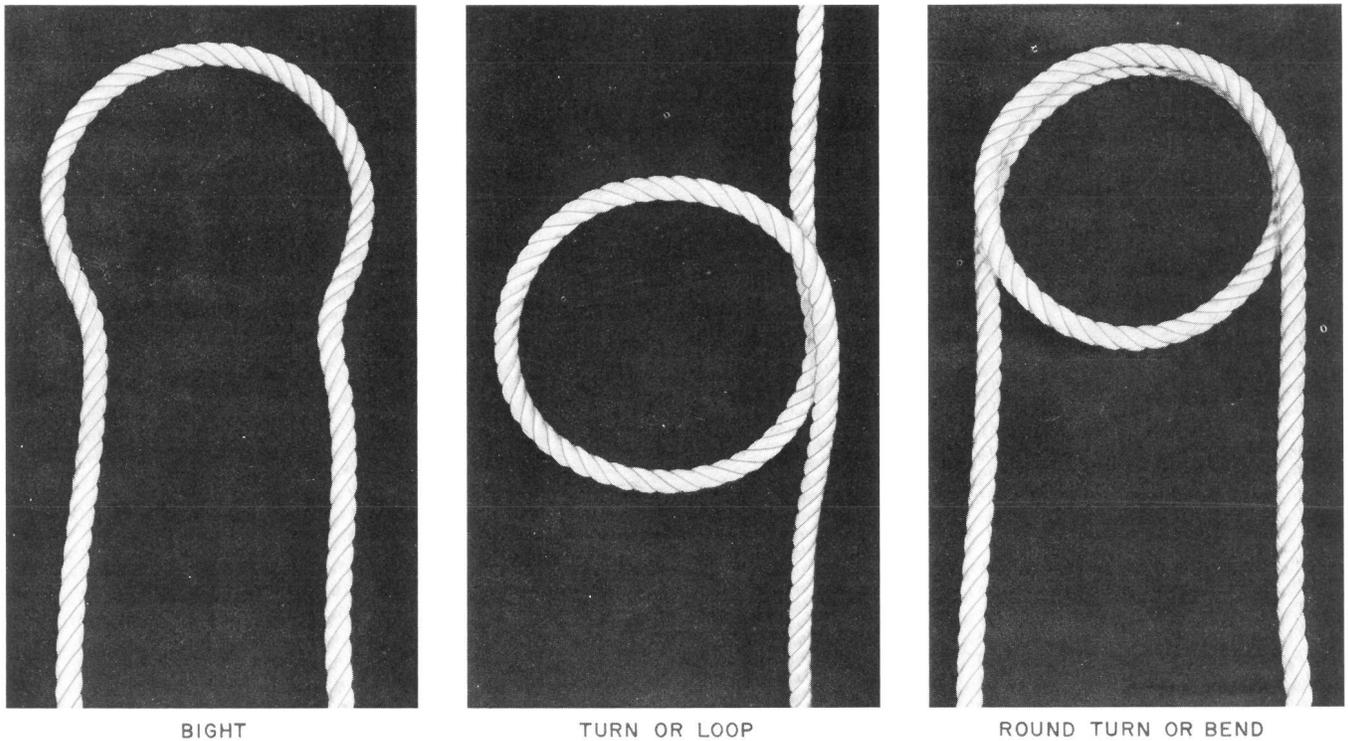


Fig. 1—Cordage Terms Illustrated

TABLE A — STANDARD MANILA ROPE					
SIZE DIAMETER (INCHES)	BREAKING STRENGTH OF NEW ROPE (POUNDS)**	SAFE WORKING STRENGTH OF NEW ROPE (POUNDS)*	NET WEIGHT OF COILS POUNDS (MAXIMUM)		WEIGHT OF ROPE (IN POUNDS PER FOOT)
			1200 FEET	600 FEET	
1/4	600	170	24.0		.020
3/8	1,350	370	49.2		.041
1/2	2,650	750	90.0		.075
5/8	4,400	1,200	159.6		.133
3/4	5,400	1,500		100.0	.167
1	9,000	2,500		162.0	.270
1 1/4	13,500	3,200		250.8	.418
1 1/2	18,500	5,200		359.0	.600

* Half the value of the loads specified in this table shall be used if rope has been in service more than 6 months. New rope loses 1/3 to 1/2 of its strength in 6 months of ordinary use.

** Spliced rope has approximately 80% of the strength of new rope.

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4.02 If the load requires the use of blocks, the simplest rigging should be selected to accomplish the work safely and without loss of time. Section 081-510-203 describes the use of manila rope with blocks. If the rope is to be used as a lashing, use the size specified in Table B in Part 5.

5. USE OF MANILA ROPE FOR LASHING

5.01 Lashings are used for the purpose of making temporary attachments to objects in connection with raising, lowering, hauling, or holding a load.

5.02 Do not use manila rope for lashing if it is considered unsafe for use in blocks, pulling lines, or other uses. The rope used for lashing blocks shall be determined from Table B and must be in good condition.

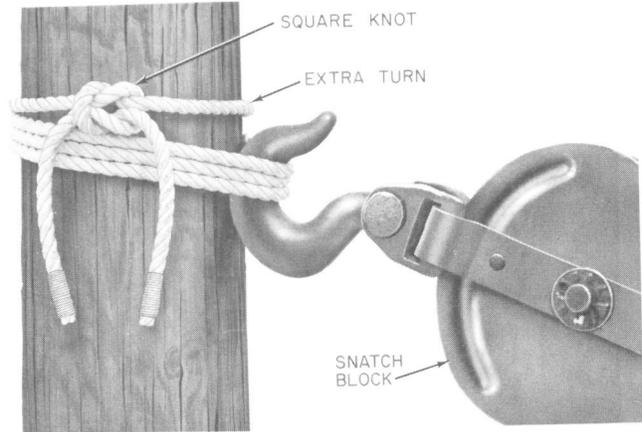


Fig. 2—Lashing for Perpendicular Pull

5.04 Lashings for holding blocks used in raising equipment cabinets, cross-connecting terminals, and loading coil cases or where the pull is parallel to the axis of the pole is shown in Fig. 3. The number of turns of rope around the pole shall be equal to the number of turns of rope through the hook of the block.

SIZE OF BLOCK	REQUIRED NUMBER OF TURNS THROUGH HOOK OF BLOCKS FOR FOLLOWING SIZES OF ROPE—			
	3/8"	1/2"	5/8"	OR 3/4" 1"
3 in. — 1 sheave	2	—	—	—
3 in. — 2 sheave	3	2	—	—
3 in. — 3 sheave	4	3	—	—
4 in. — 3 sheave	—	4	3	—
6 in. — 3 sheave	—	—	4	3
8 in. — 3 sheave	—	—	—	4
6 in. snatch	—	—	4	3
8 in. snatch	—	—	—	4
Wire rope snatch	—	—	—	4

5.03 Lashing for holding a snatch block used for pulling up strand or where the pull is perpendicular to the axis of the pole is shown in Fig. 2. Observe that the knot for securing the lashing is tied in an extra turn taken around the pole and never in any turns passing through the hook. This facilitates later removal of the rope because the knot is not unduly tightened; and it removes the weakest turn of the rope from the greatest stressed area of the lashing.

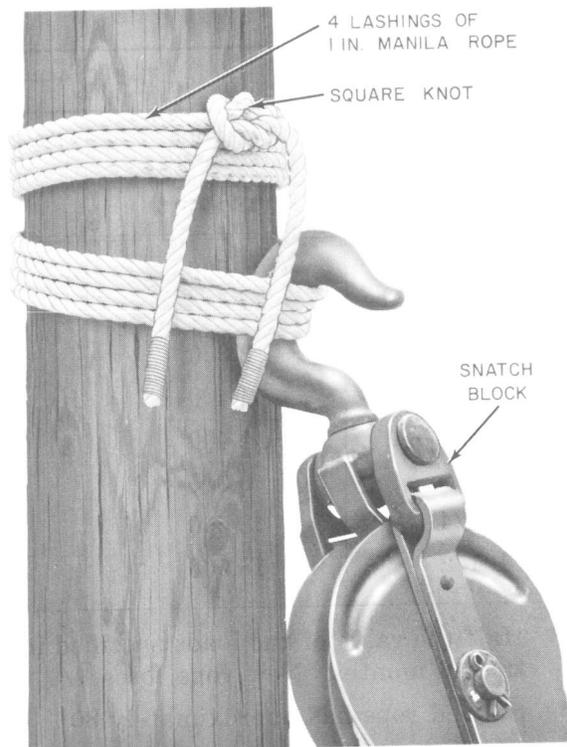


Fig. 3—Lashing for Parallel Pull

5.05 Lash poles together at top and bottom with 3/4-inch rope as illustrated in Fig. 4. The bottom lashing shall be placed about 5 feet from the ground and the top lashing not less than three-fourths of the height of the pole from the ground. The knot used to secure the ends of the lashing rope shall be a square knot.

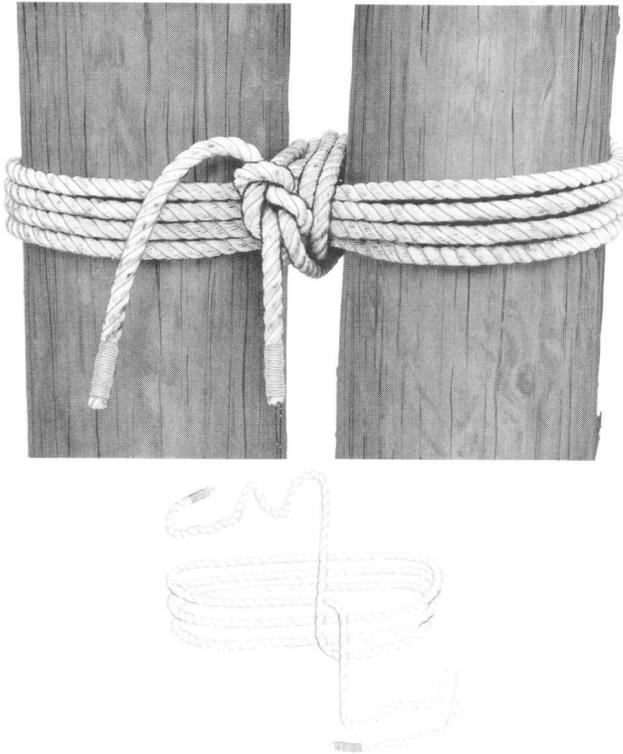


Fig. 4—Lashing Poles

6. SERVING AND SPLICING MANILA ROPE

6.01 The ends of the rope, if not crown spliced, shall be whipped or served with a strong cord or twine to keep the strands from unraveling. As a temporary expedient, the ends may be secured with friction tape.

6.02 The operations required for serving the ends of rope are as follows:

(a) Unlay one strand of the rope back a little more than one turn, to a point where the whipping is to begin. Under this strand lay the twine, leaving the end marked 1, 8 or 10 inches long as shown in (A). Then relay the strand into the rope, keeping it tightly twisted and firmly held in place.

(b) Let the short end of twine 1 hang down the rope. Wind the long end marked 2 once around the rope, just above the short end as shown in (B).

(c) Lay end of twine 1 along the rope toward its end and there bend it back, thus forming the open bight 3 as shown in (C) which can be pulled in under the whipping when tucking the ends.

(d) Lay the sides of the bight 3 in a groove of the rope. Wind the long end 2 around the rope and the doubled twine, being careful to pull it up tightly and to leave no vacant spaces between the turns as shown in (D).

(e) Continue winding, or whipping, as far as desired, then pass the long end 2 up through the bight 3 as shown in (E). By pulling on the free end 1 of the bight 3, draw the long end of the twine 2 downward underneath the whipping, to about the center, not all the way through.

(f) Finish the whipping by cutting off both protruding ends of the twine as close as possible as shown in (F). Cut off excess rope. Fig. 5 illustrates the steps described.

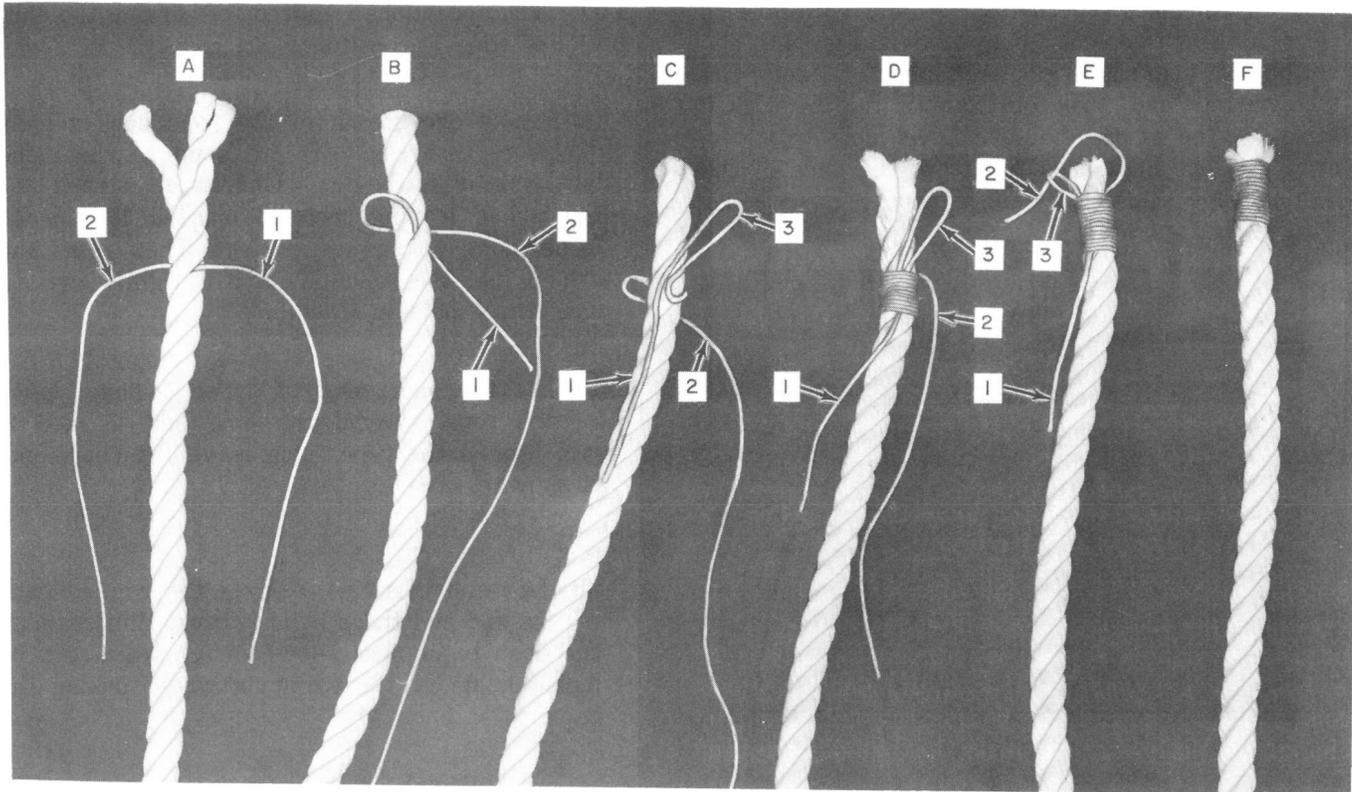


Fig. 5—Method of Serving Rope

6.03 The crown splice is used to permanently keep the ends of rope from unraveling.

6.04 The operations required to make a crown splice are as follows:

- (a) Unlay the rope for 10 to 12 inches and hold it in one hand with the loose ends up.
- (b) Take strand 1 on the left and lay it across the end of the rope between the other two strands as shown in (B).
- (c) Take strand 2 back and down over strand 1 as shown in (C).
- (d) Take strand 3 across strand 2 through bight in strand 1 as shown in (D).
- (e) Pull all ends tight as shown in (E).

(f) Continue tucking each successive strand over the nearest strand and under the next strand of the main rope as shown in (F).

(g) Tuck until about four complete operations are made.

(h) Roll between two surfaces, under pressure, as between foot and floor, to smooth out, then cut off surplus ends flush with the outside strands. (H) shows the splice when completed (Fig. 6).

6.05 The short straight splice is used to unite the ends of two ropes by interweaving their strands and when properly made it has 80 percent of the strength of the rope. Fig. 7 describes and illustrates the procedure for making a short straight splice.

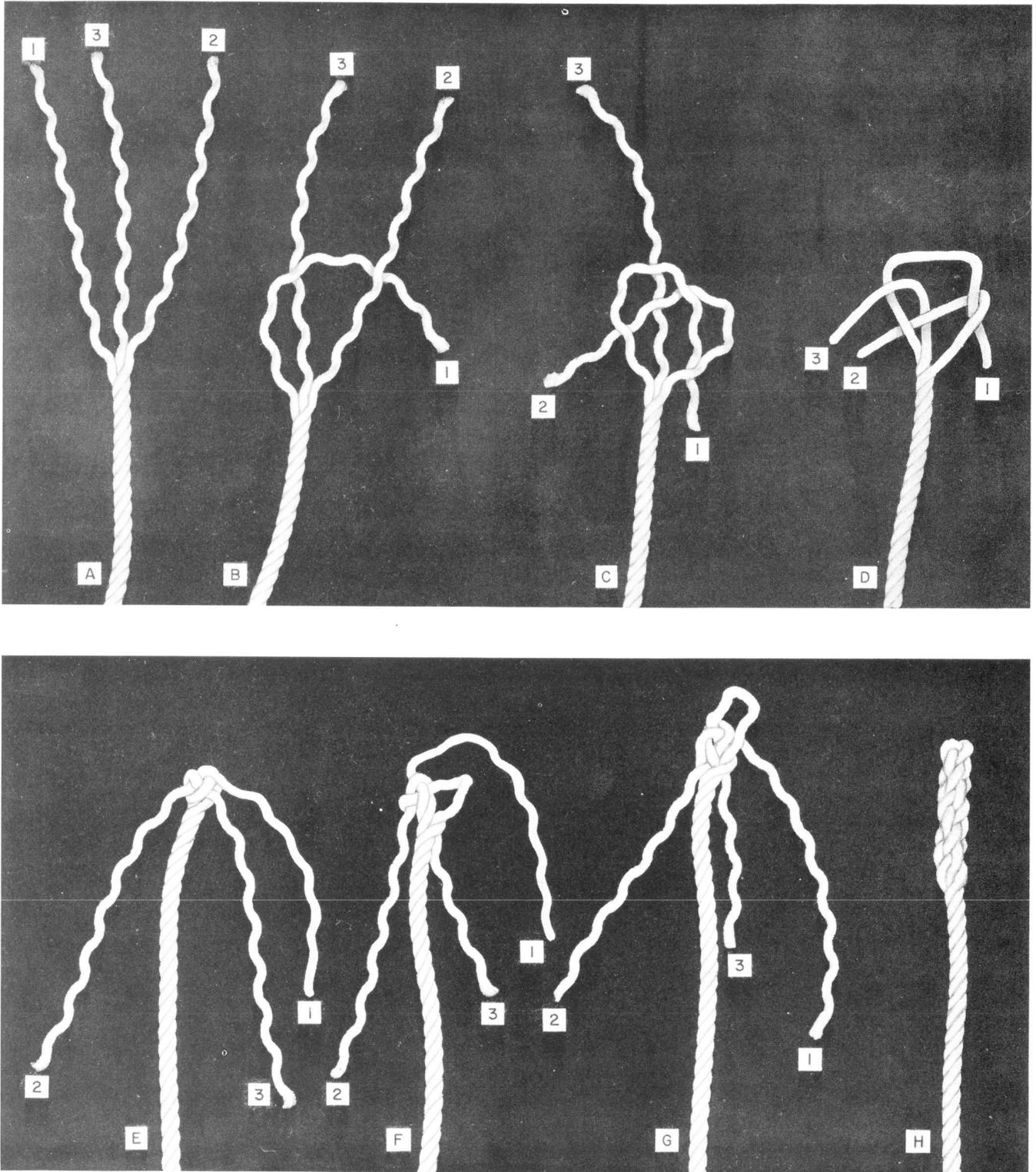
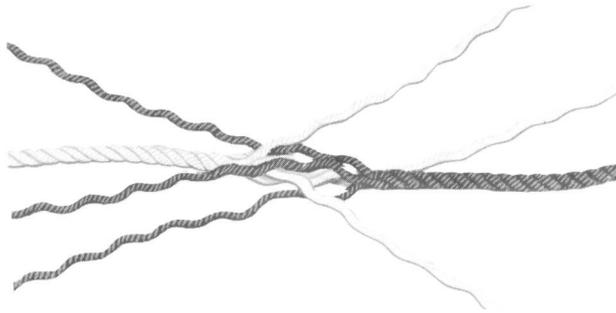
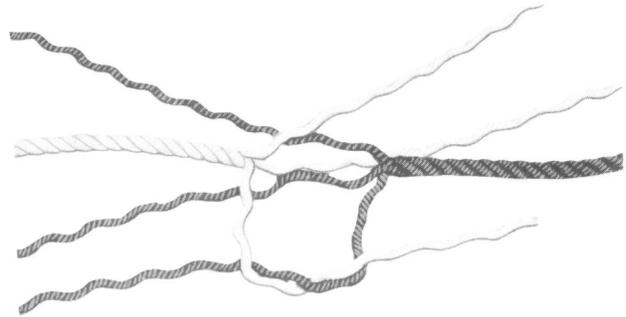


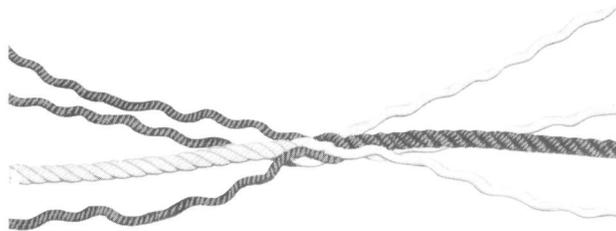
Fig. 6—Method of Making a Crown Splice



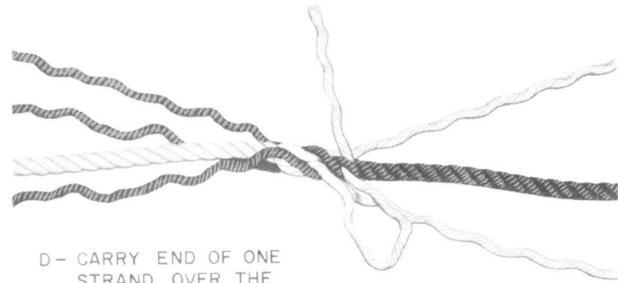
A - UNTWIST STRANDS OF EACH ROPE AND BUTT ENDS. LAY STRANDS OF ONE ROPE ALTERNATELY BETWEEN STRANDS OF OTHER ROPE.



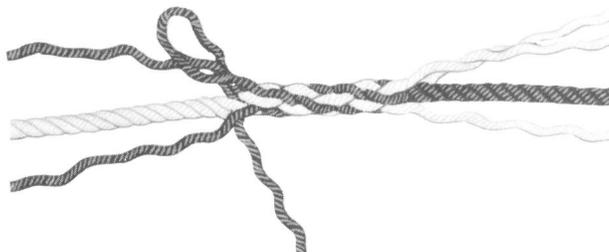
B - TIE EACH STRAND OF ONE ROPE TO CORRESPONDING STRAND OF OTHER ROPE WITH AN OVERHAND KNOT.



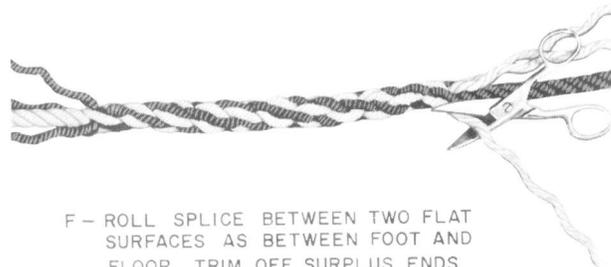
C - PULL OVERHAND KNOTS TIGHT.



D - CARRY END OF ONE STRAND OVER THE ADJACENT STRAND AND TUCK IT UNDER THE NEXT STRAND. PROCEED TO SUCCESSIVE STRANDS IN ORDER UNTIL FOUR TUCKS HAVE BEEN MADE WITH EACH STRAND.



E - AFTER COMPLETION OF FOUR TUCKS ON ONE END OF THE SPLICE, FOLLOW THE SAME PROCEDURE FOR OTHER END OF SPLICE. SEE NOTE.



F - ROLL SPLICE BETWEEN TWO FLAT SURFACES AS BETWEEN FOOT AND FLOOR. TRIM OFF SURPLUS ENDS FLUSH WITH THE OUTSIDE STRANDS.



G - COMPLETED SPLICE SHOULD BE FIRM WITH NO LOOSE ENDS.

NOTE:

PROCEDURE ILLUSTRATED IS FOR 1/4-INCH ROPE. ADD 1 ADDITIONAL TUCK FOR EACH NEXT LARGER SIZE ROPE. ROPE SIZES FROM 1/4-INCH UPWARD ARE 3/8, 1/2, 5/8, 3/4, 1, AND 1-1/4 INCHES.

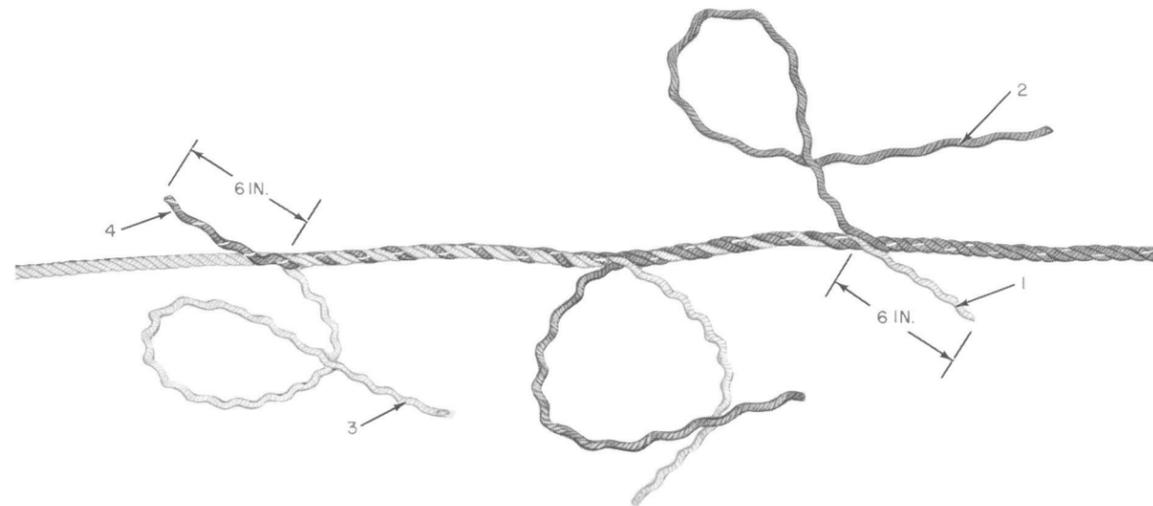
Fig. 7—Making a Short Straight Splice

6.06 The long straight splice is used to unite the ends of two ropes required for passing over the sheaves of blocks by interweaving their strands. When the long straight splice is properly

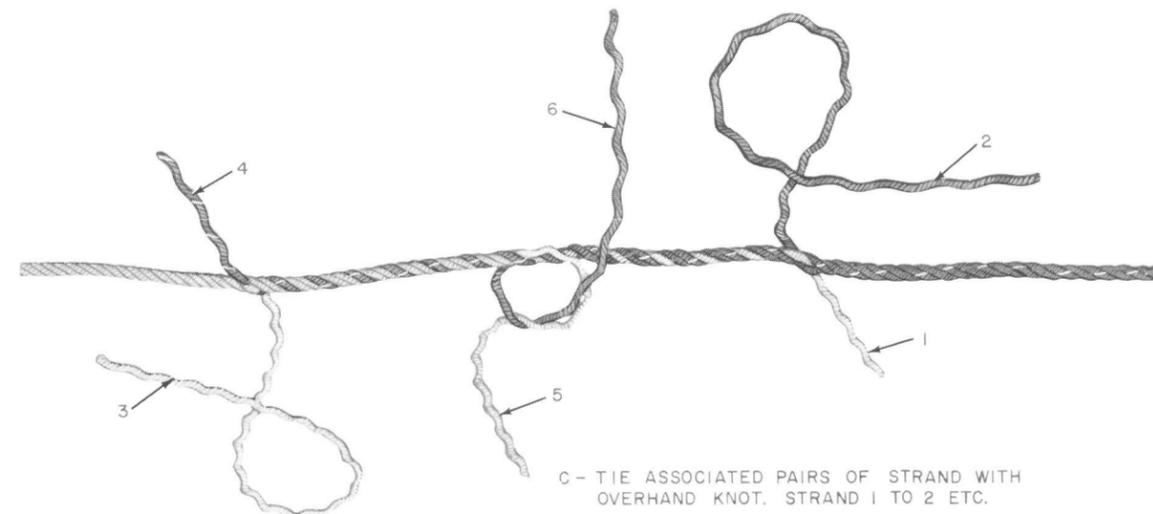
made it has 90 percent of the strength of the rope and is therefore stronger than the short straight splice. Fig. 8 illustrates and describes the proper procedure for making a long straight splice.



A - UNLAY 1 STRAND OF EACH ROPE 10 OR 12 TURNS. LOCK AND DRAW ENDS OF ROPE TOGETHER.

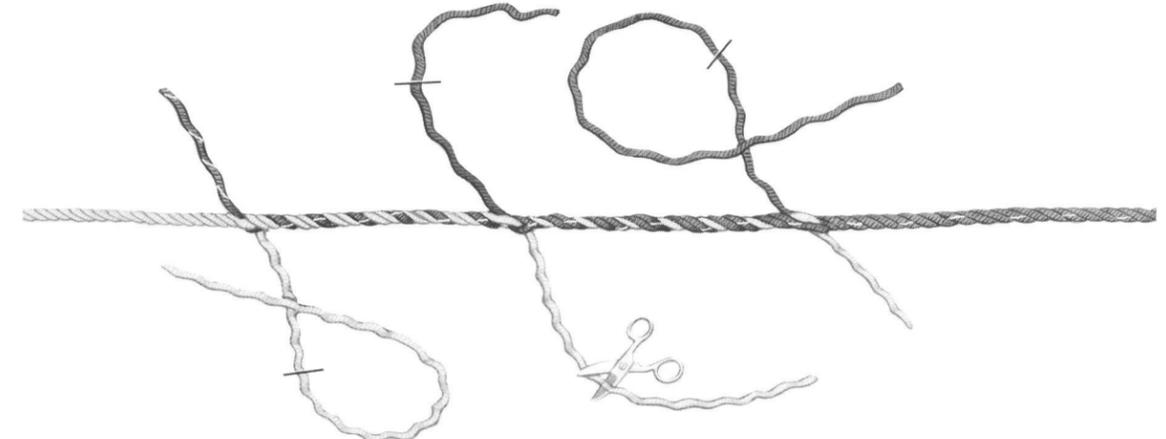


B - CONTINUE UNLAYING STRAND 2 REPLACING WITH STRAND 1 UNTIL 6 INCHES REMAIN. REPEAT PROCESS IN OPPOSITE DIRECTION WITH STRANDS 3 AND 4. STRANDS 5 AND 6 REMAIN AT INITIAL STARTING POINT.

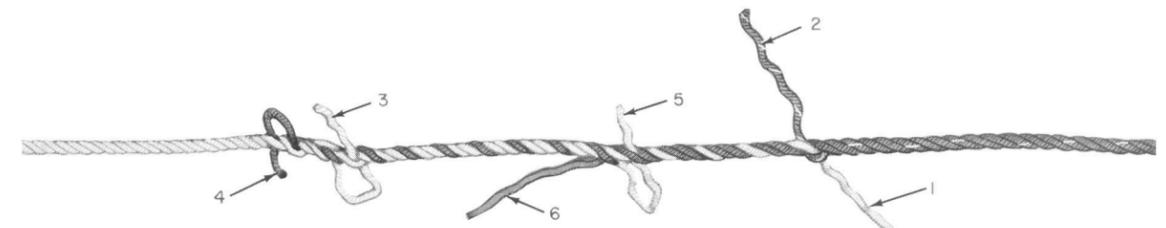


C - TIE ASSOCIATED PAIRS OF STRAND WITH OVERHAND KNOT. STRAND 1 TO 2 ETC.

NOTE:
ROPES ARE SHOWN IN DIFFERENT SHADES TO CLEARLY ILLUSTRATE SPLICING.



D - PULL OVERHAND KNOTS UP TIGHT. CUT SURPLUS STRAND LEAVING 6 INCH ENDS.



E - CARRY END OF STRAND 4 OVER THE ADJACENT STRAND AND TUCK UNDER NEXT STRAND. MAKE 2 MORE TUCKS. REPEAT WITH STRAND 3 IN OPPOSITE DIRECTION. PROCEDURE IS SAME AT OTHER SPLICE POINTS.



F - PULL TUCKS UP TIGHT. ROLL SPLICE BETWEEN 2 FLAT SURFACES. TRIM SURPLUS ENDS



G - COMPLETED LONG STRAIGHT SPLICE.

NOTE:
ROPES ARE SHOWN IN DIFFERENT SHADES TO CLEARLY ILLUSTRATE SPLICING.

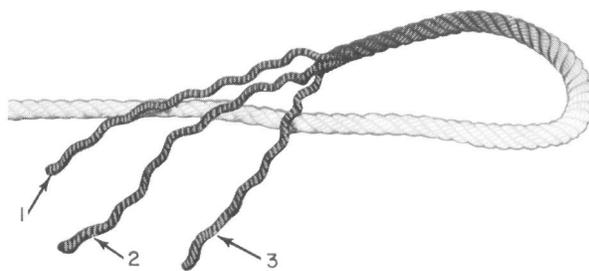
Fig. 8—Making a Long Straight Splice

6.07 The eye splice is used to form a permanent loop or eye in the end of a rope. On eye splices, which will be subjected to heavy wear on the inside of the eye, it is advisable to splice an

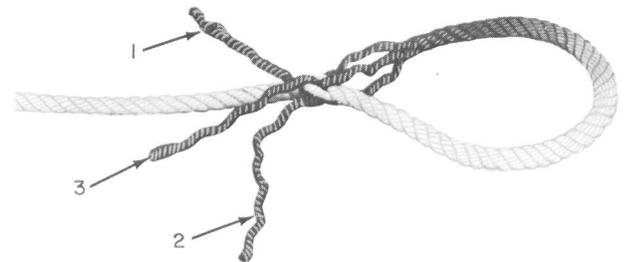
oval thimble in the eye. Fig. 9 describes the steps for making an eye splice. This splice has 90 percent of the strength of a straight rope.

* NOTE:

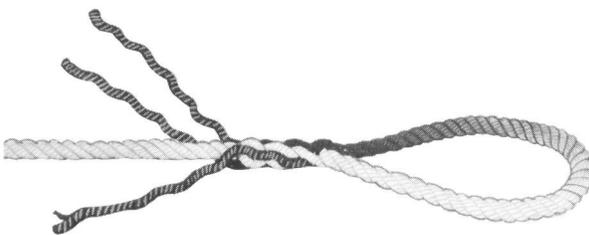
ROPE IS NORMALLY SINGLE COLOR. IT IS SHOWN HERE AS TWO COLOR FOR THE PURPOSE OF CLEARLY ILLUSTRATING THE SPLICE.



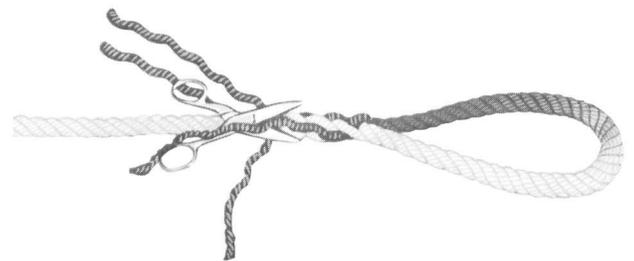
A—UNTWIST THE STRANDS 1,2,3 AND FORM A BIGHT.*



B—SELECT STRAND 2 AND TUCK IT UNDER STRAND OF MAIN ROPE. TUCK 1 UNDER ADJOINING STRAND AND 3 UNDER REMAINING STRAND.*



C—PULL ENDS DOWN TIGHT AND COMPLETE FOUR TUCKS WITH EACH STRAND.*



D—AFTER COMPLETING FOUR TUCKS, ROLL SPLICE BETWEEN TWO FLAT SURFACES AND TRIM SURPLUS ENDS.*



E—COMPLETED SPLICE SHOULD BE FIRM WITH NO LOOSE TUCKS.*

Fig. 9—Making an Eye Splice

7. KNOTS, BENDS, AND HITCHES

7.01 The knots, bends, and hitches described and illustrated are those most commonly used in telephone work and have been found to be satisfactory. *They shall be used only for the purposes specified.*

7.02 The strength of manila rope containing a knot is reduced by approximately 60 percent as the bend in the rope places most of the strain on the external or outside fibers.

7.03 The figure 8 knot is intended for use in preventing the end of a rope from running through blocks. It is made as shown in Fig. 10.

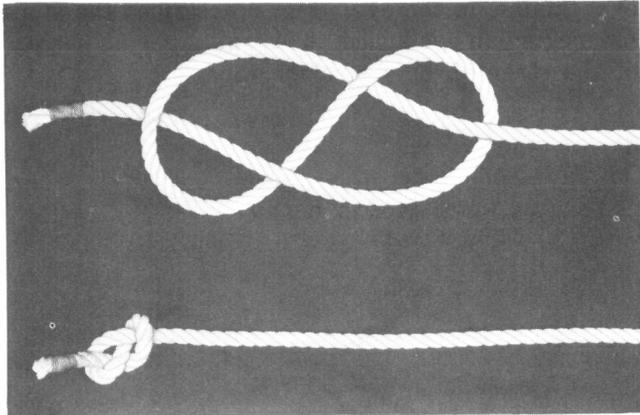


Fig. 10—Figure 8 Knot

7.04 The square knot (Fig. 11) is intended for use in joining ends of the *same size rope* that may be placed under strain, eg, joining the ends of ladder and pole lashings. A square knot joining two ropes of unequal size is very apt to slip and should not be used. See 7.07 for tying unequal size ropes together. Note that in the

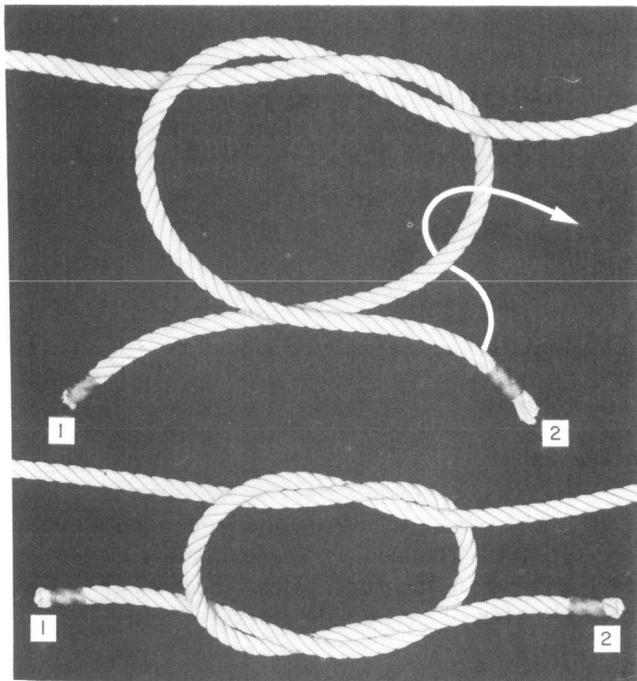


Fig. 11—Tying a Square Knot

square knot the free ends of the rope are on the same side of the knot when properly tied. The square knot is a simple combination of two overhand knots.

7.05 If a square knot is improperly made, a granny or false square knot will result which will not hold and should never be used. Fig. 12 illustrates the granny and a false square knot so they may be readily identified and avoided. Notice the close similarity of these knots to the true square knot.

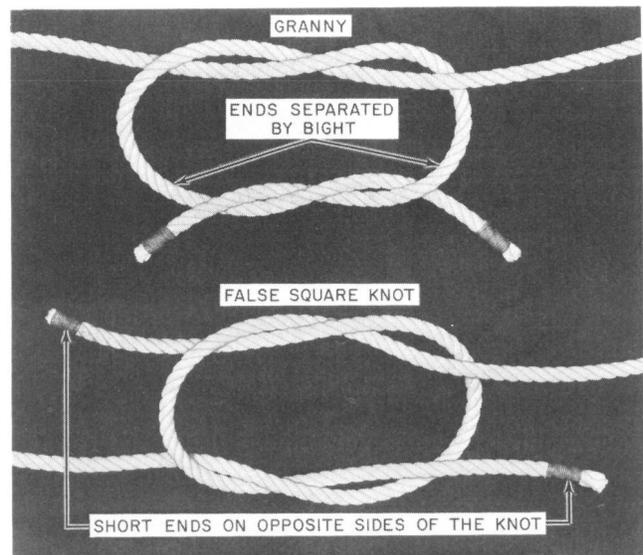


Fig. 12—Granny and False Square Knot

7.06 The single bowline is used in making hitches of all types and is formed in various ways depending upon the conditions under which the work is done. It is a tie of universal use and is the best known method for forming a bight that will not slip under tension and may easily be untied.

7.07 The single bowline is intended for use in attaching rope to hook or block and for joining the ends of different size ropes. Where it is necessary to secure a single bowline to a ring or eye-bolt, pass the end of the rope through the ring or eye-bolt before tying the bowline. Fig. 13 illustrates the procedure for tying a single bowline.

7.08 The single intermediate bowline is intended for use in attaching rope to the hook of blocks where the end of the rope is not readily

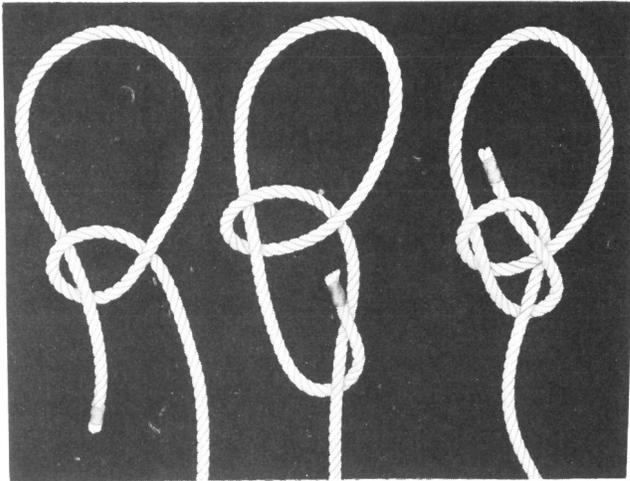


Fig. 13—Tying a Single Bowline

available. Fig. 14 shows the method of tying the single intermediate bowline by using a bight for tying the knot instead of the end of the rope.

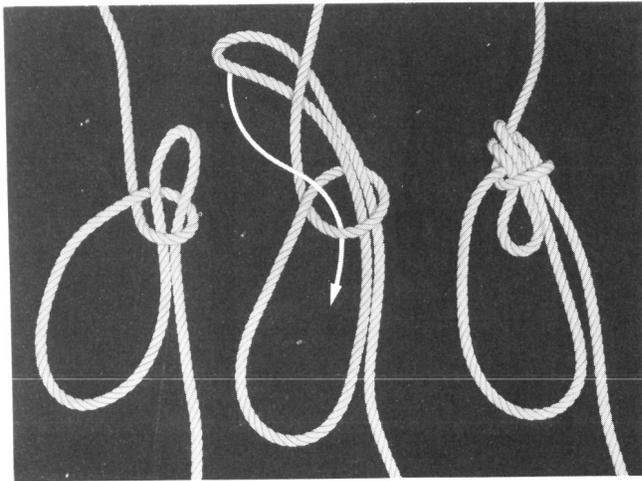


Fig. 14—Tying Single Intermediate Bowline

7.09 The double bowline is intended for use in tying at intermediate points. This knot permits two ropes to pass through an eye or over a hook to evenly distribute the load and wear. Tying a double bowline is shown in Fig. 15.

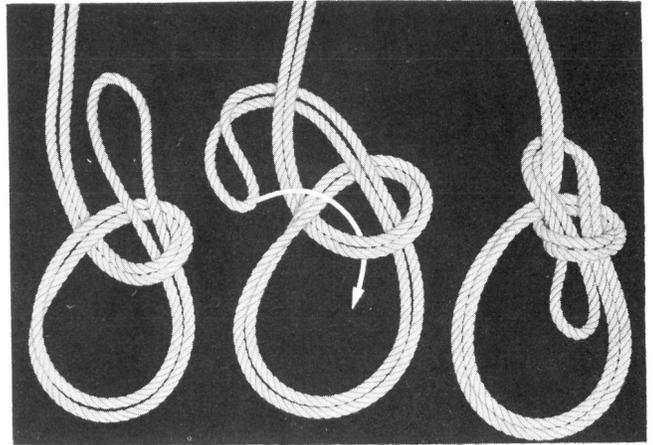


Fig. 15—Tying Double Bowline

7.10 The double bowline on a bight is intended for use as a semipermanent eye in the middle or end of a rope to engage with a hook or other similar fastening. This knot shown in Fig. 16 allows two ropes to pass through the clevis and take the wear instead of one. On this knot the bight is slipped over the two loops to form the knot. This is the basic difference from a double bowline.

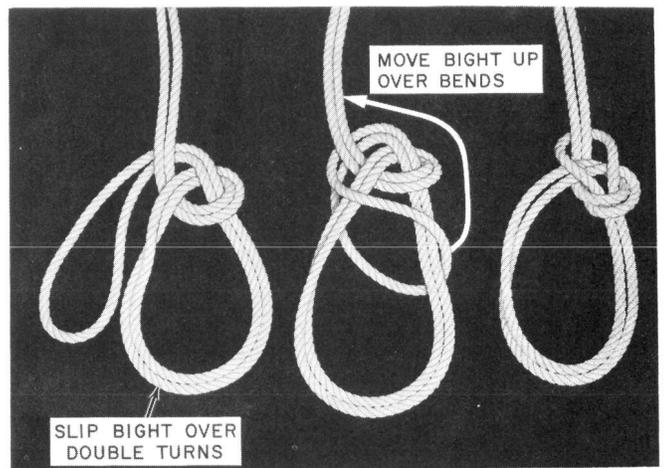


Fig. 16—Double Bowline on a Bight

7.11 The block becket bend is intended for use in attaching the rope to the eye of a guy

or the becket of a block where a temporary connection is required. Each turn of this knot applies pressure against another turn to prevent slipping. Fig. 17 illustrates the method for tying a block becket bend.

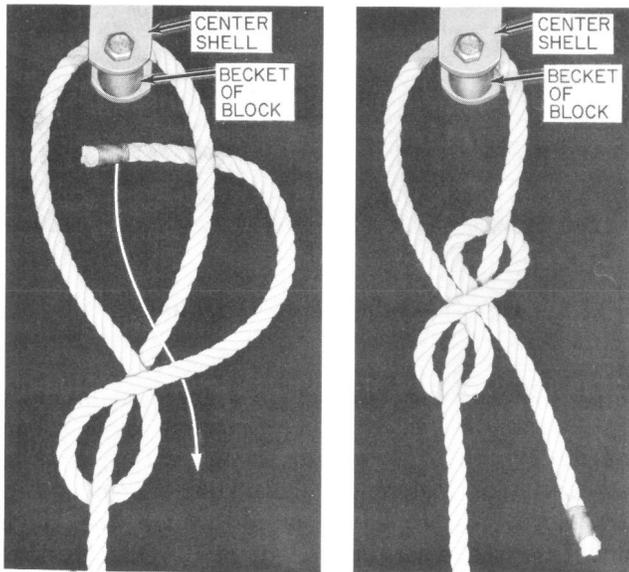


Fig. 17—Tying a Block Becket Bend

7.12 The clove hitch is intended for use in attaching tools or materials to handlines. It may also be used in guying gin poles when the tension is equally divided along the guy ropes in directly opposite directions thus avoiding the need for tying cumbersome knots. This hitch will stand stress in either direction without slipping when properly set. It can be quickly made and easily undone. The clove hitch is composed of two half-hitches made at either the end of a rope or in the middle without access to the ends.

7.13 The method for making a clove hitch without access to the ends of the rope for passing over low objects or an object such as a crowbar is illustrated in Fig. 18. It is simply made by grasping the rope at separate points and making a twist in opposite directions at each point to form two loops. Then pass one loop in front of the other loop so the two running parts of the rope fall in the center of the two loops.

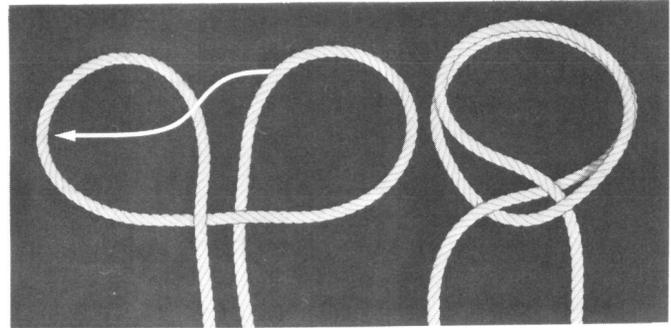


Fig. 18—Clove Hitch for Open End Objects

7.14 The method for tying a clove hitch around a stationary object such as a pole with the end of the rope available is shown in Fig. 19.

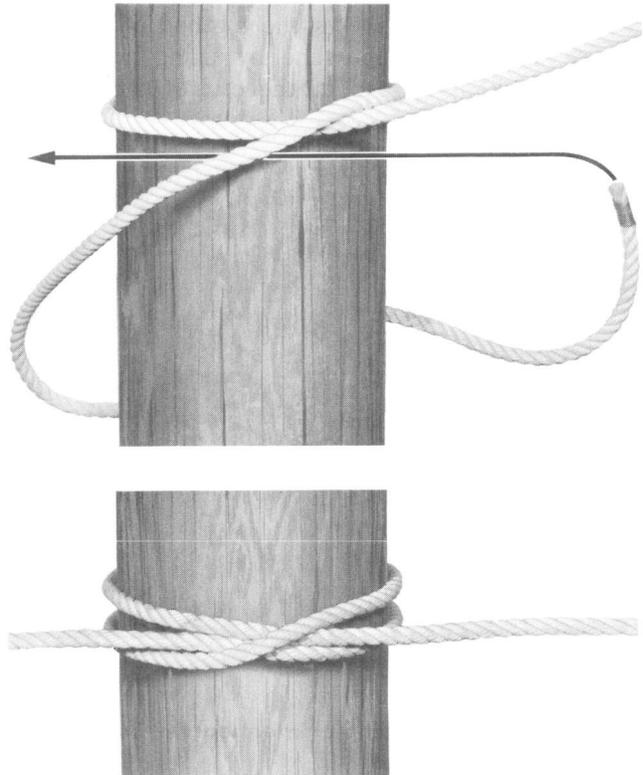


Fig. 19—Clove Hitch on Stationary Object

7.15 The clove hitch with half hitches is intended for use in temporarily guying poles. The

half hitches around the standing part strengthen the holding power of the clove hitch considerably. Placing half hitches on a clove hitch is shown in Fig. 20.

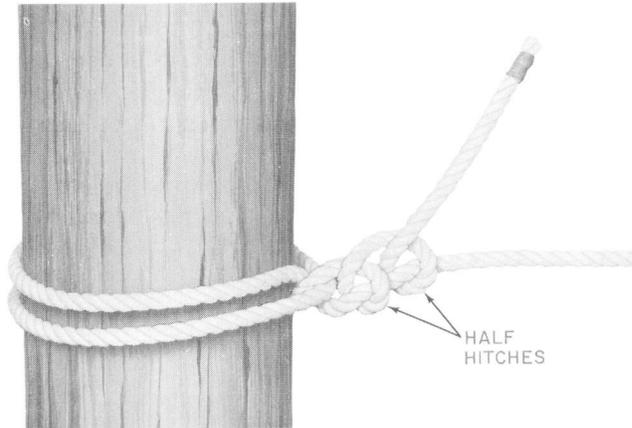


Fig. 20—Clove Hitch with Half Hitches

7.16 The snubbing hitch is intended for use in securing temporary guys to poles and trees. It is made by taking two turns around the pole or tree and tying two or more half hitches on the standing part of the rope as shown in Fig. 21.

7.17 The taut rope hitch is intended for use in attaching one rope to another rope supporting a load for the purpose of taking a hold on a rope under tension that has a broken or cut strand, or to snub the fall end in a tackle block in order to secure a new hold. The operations required to make a taut rope hitch are as follows:

- (a) After the snubbing rope has been secured to anchorage, take a half hitch around the taut rope. Then make a second turn around the taut rope crossing over the half hitch to wedge in behind it.

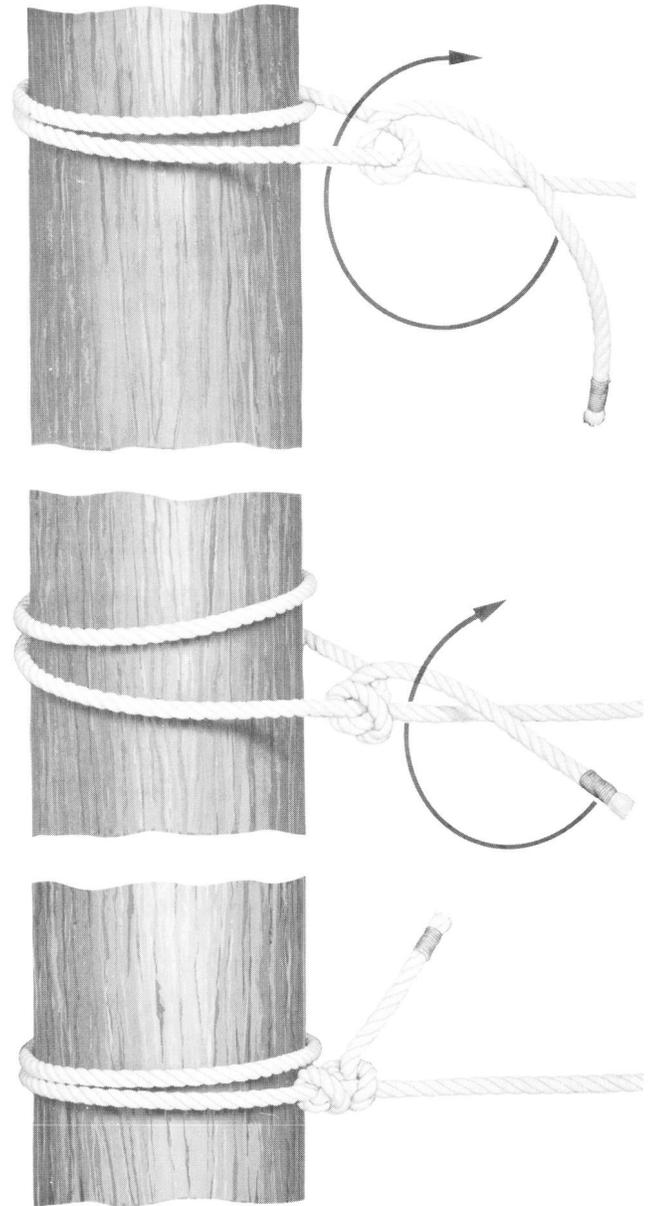


Fig. 21—Tying Snubbing Hitch

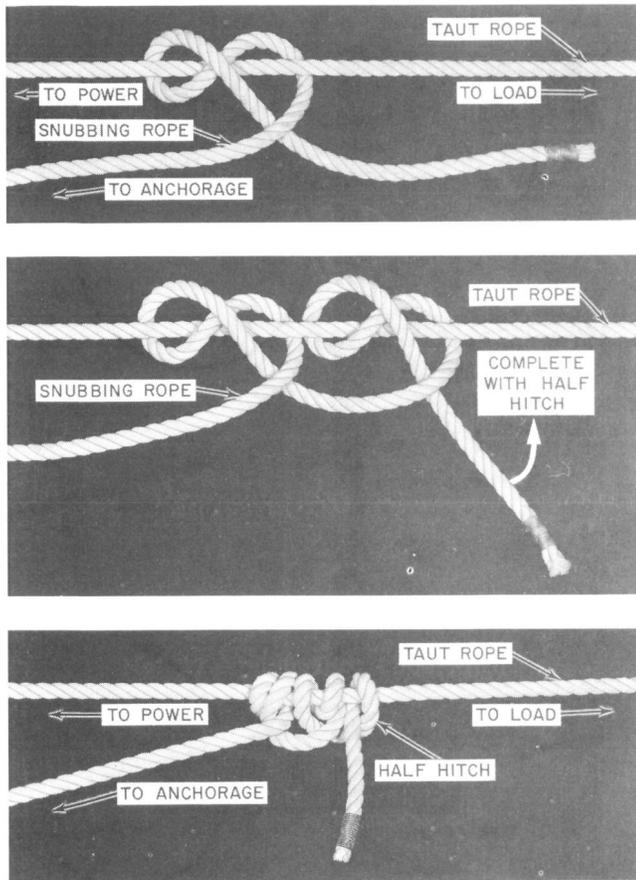


Fig. 22—Tying Taut Rope Hitch

(b) Repeat operation (a) on the opposite side of the snubbing rope. Finish off the turns with an additional half hitch or with two additional half hitches, if considered necessary (Fig. 22).

7.18 The catspaw is intended for use in attaching rope to hook of block. It provides a double rope over the hook and permits a load to be carried on either end of the rope. It is made by grasping the center of the rope at two separate points and making three twists in opposite directions with each hand as shown in Fig. 23.

7.19 The double blackwell hitch is intended for use in attaching rope to hook of blocks where space is limited. Note that taut standing part of the rope crosses over the free or short end twice; once at the top of the hook and again in the turn of the hook as shown in Fig. 24.

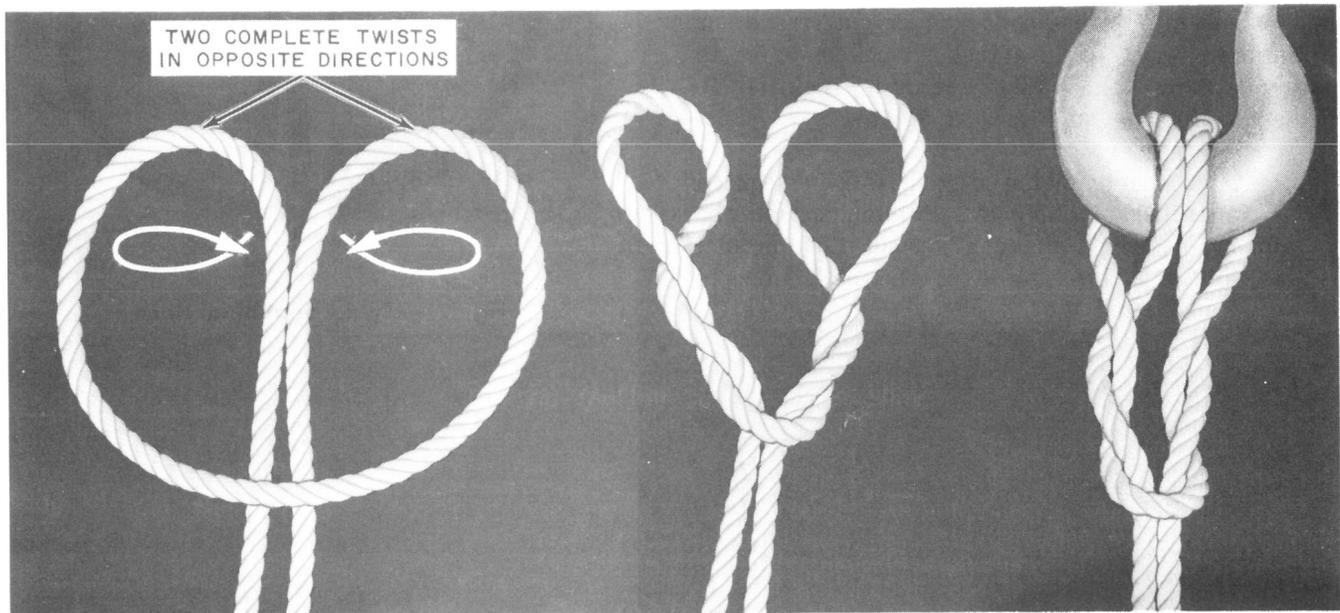


Fig. 23—Making Catspaw Rope Sling

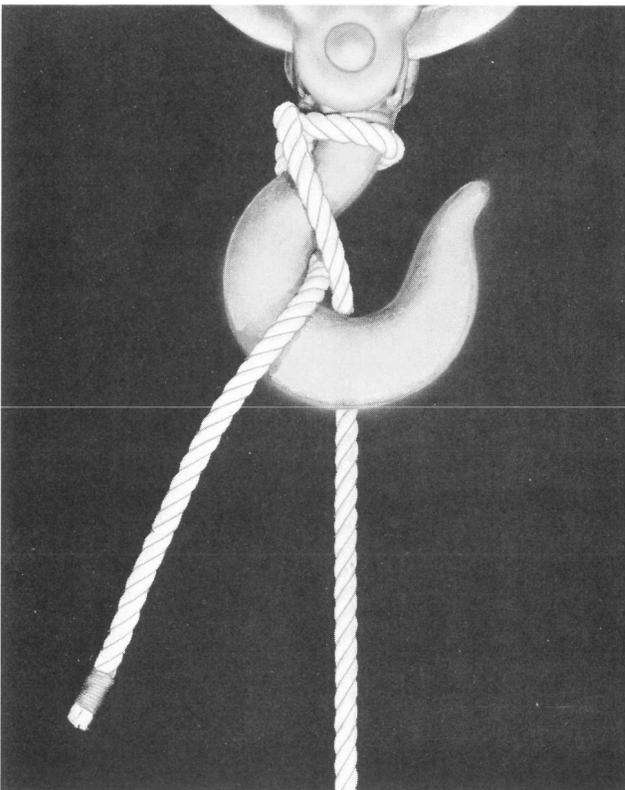
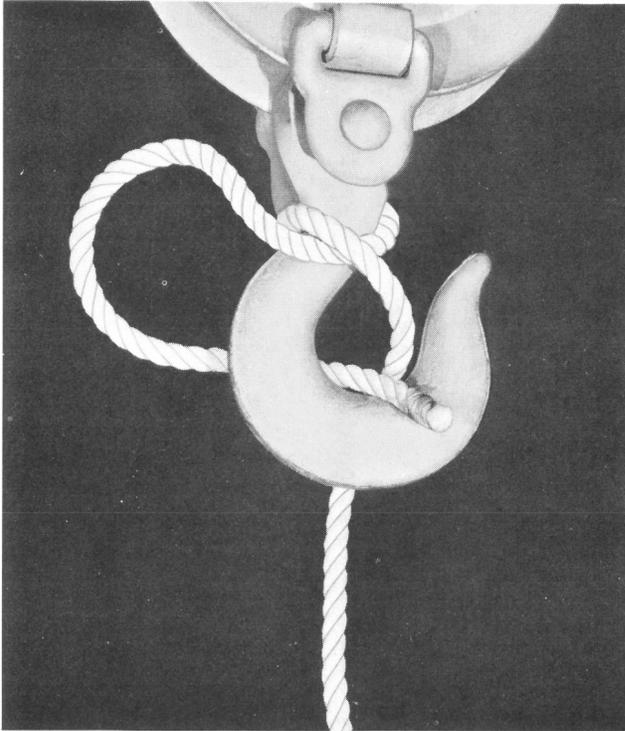


Fig. 24—Tying Double Blackwell Hitch

7.20 The timber hitch is intended for lowering tree limbs in connection with tree pruning work (Fig. 25).

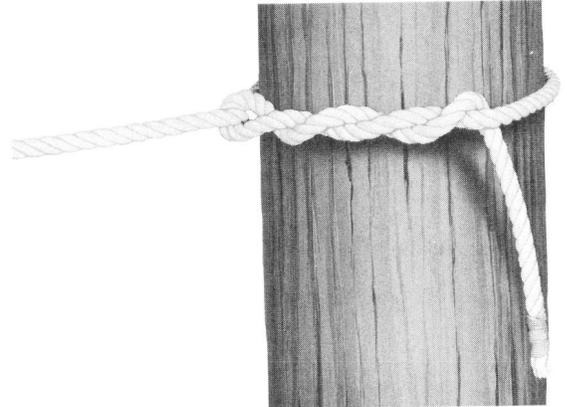
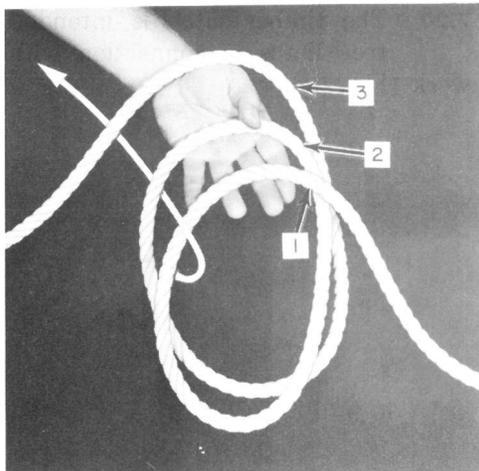


Fig. 25—Tying a Timber Hitch

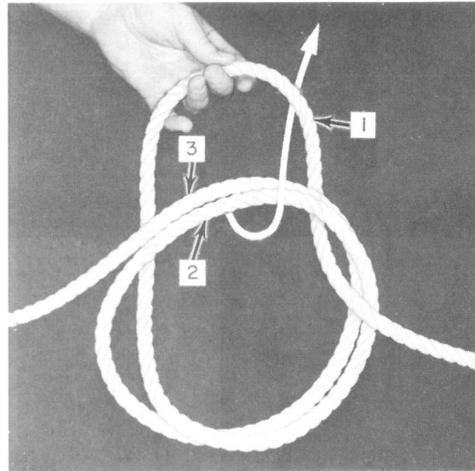
7.21 The farmer's knot is intended for use where a second pull is required, such as taking the slack out of strand before making the final pull. Load can be applied to either end of the rope or to the loop. (If the strain is great, use a double bowline on a bight for the last pull). The farmer's knot can also be used in forming a rope net for use over electric light or trolley wires when dismantling and removing wires.

7.22 The operations required to make a farmer's knot are as follows:

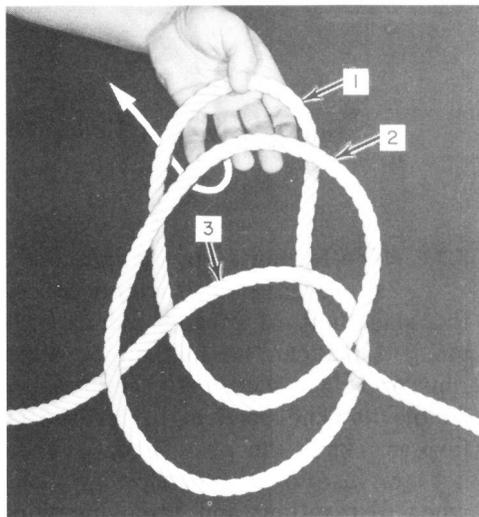
- (a) Form two round turns and hold them as shown above thus bringing side by side the three ropes 1, 2, and 3.
- (b) Pass 1 under 2 as indicated and up between 2 and 3.
- (c) Pass 3 under 1 and up between 2 and 1.
- (d) Pass 2 under 3 and up between 3 and 1.
- (e) Pull 2 out to form a loop and tighten the knot to the condition shown (Fig. 26).



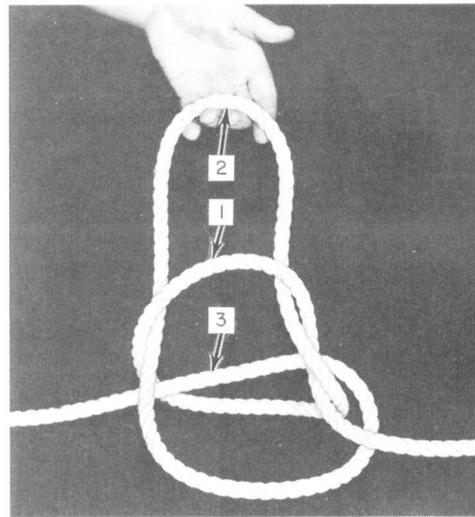
STEP 1



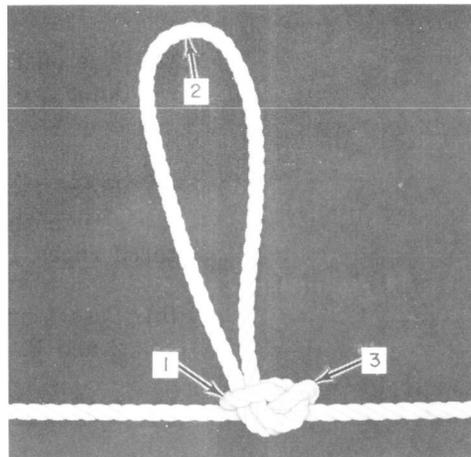
STEP 2



STEP 3



STEP 4



STEP 5

Fig. 26—Tying a Farmers Knot

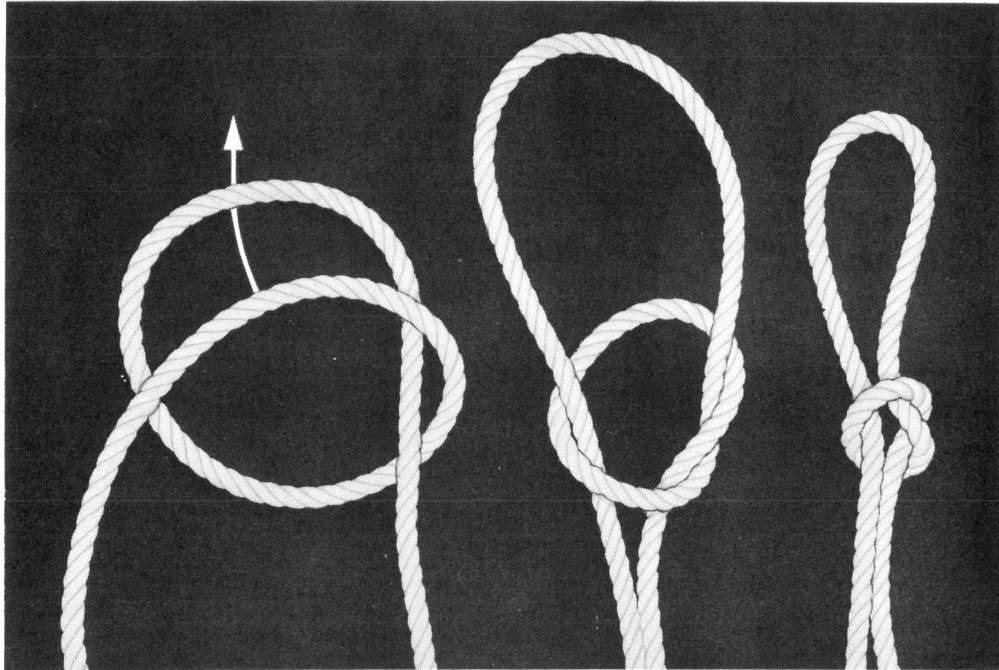


Fig. 27—Running Knot or Slip-Noose

7.23 The running knot or slip-noose shown in Fig. 27 is intended for use in securing tools to handlines where it is desired to have the rope fit tightly around the object to which it is attached.

8. COILING AND UNCOILING ROPE

8.01 Coil used rope when not placed on reels by laying out a turn of the desired size and making the turns in a clockwise direction (Fig. 28).

8.02 In uncoiling used rope, turn the coil over and draw the end first laid down from the inverted coil. Before uncoiling see if coil has been upset during handling and there is a possibility of selecting the wrong end.

8.03 Remove new rope from a coil, as described. This method retains the rope in its proper form and prevents kinks.

- (a) Remove burlap wrapping and binding material, then secure outside end of rope on coil to an adjacent turn.
- (b) Lay coil on flat side with the inside end of rope nearest to floor.

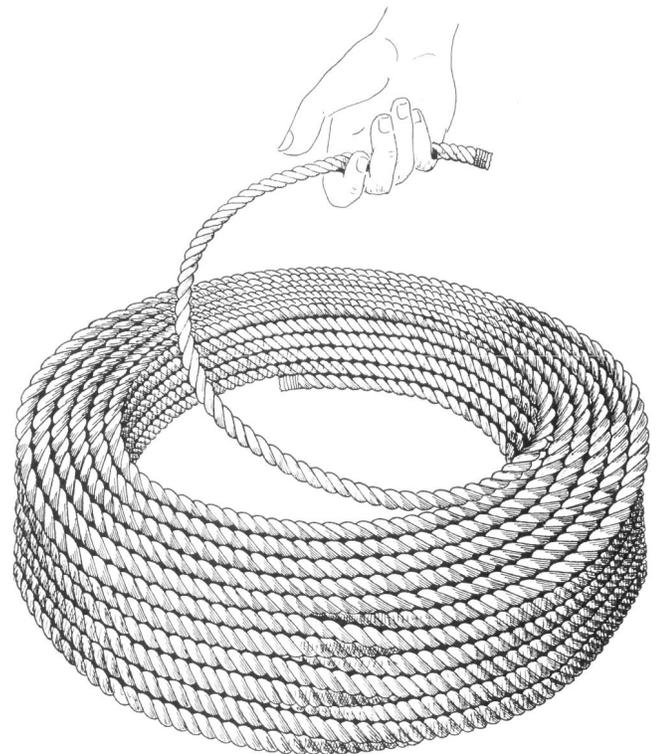


Fig. 28—Proper Method For Coiling Rope

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- (c) Reach down through center of coil, grasp inside end of rope and withdraw from top of coil (Fig. 29).

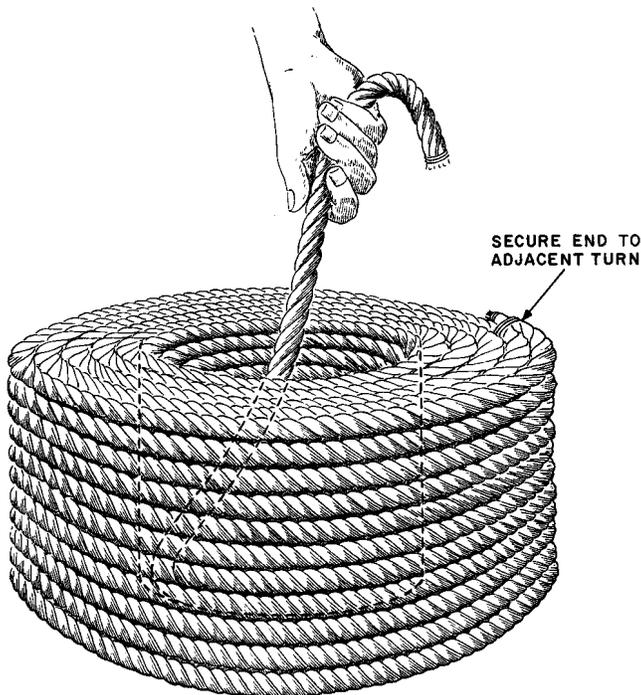


Fig. 29—Proper Method for Uncoiling New Rope

9. REASONS FOR INSPECTION OF MANILA ROPE

9.01 The strength of manila rope may be reduced through one or more of the following causes and damage or personal injury may occur through the parting of the rope.

- (a) **Overstressing:** Rope loses its strength through the repetition of ordinary tension, overloading, and sudden stresses.
- (b) **Internal Friction:** Internal friction is caused chiefly through working ropes over sheaves which are too small or running rope around too small an object. This has a tendency to break the internal fibers.
- (c) **External Wear:** Dragging rope over rough or sharp surfaces or over itself wears and cuts through the external fibers.
- (d) **Mud, Sand, and Grit:** Hauling rope through mud, sand, and grit will collect small particles

of sharp substances which will gradually work between the fibers and grind them into a fine powder.

(e) **Chemicals:** The common commercial chemicals, such as are used in storage batteries and uric acid, exert a very injurious effect on rope fiber.

(f) **Wet and Dampness:** The strength of rope is not reduced by becoming wet if precautions are taken to promptly dry it. Rope, when not thoroughly dried or when stored in damp places, becomes subject to mildew and will rot rapidly.

(g) **Other causes:** Misalignment of tackle or kinks in rope may cause broken or cut fibers.

Kinks should be turned out by hand before stressing the rope. To avoid cutting ropes by tools or materials, do not carry rope on the floor of the truck. Carefully examine any rope that has been run over by vehicles or heavy equipment.

10. INSPECTION OF MANILA ROPE

10.01 In view of the numerous conditions that may affect the strength of manila rope, examinations shall be made at regular intervals to determine the condition of the rope throughout its entire length.

10.02 Each employee, on receipt of rope and at least once during each week of use, shall make an inspection of the *surface* of the rope as outlined in 10.05 to determine whether any fault may have developed. Inspection of the *internal* condition of the rope as described in 10.06 shall be made at least once a month.

10.03 Each employee shall at all times assume the responsibility of determining that the rope is in good condition and that its appearance does not indicate deterioration or injury sufficient to affect its strength.

10.04 Manila rope shall be checked and inspected periodically (not less than 3 month periods) and the employee performing this work shall see that all instructions contained herein are complied with.

10.05 The important conditions to look for on the surface of the rope are:

- (a) Abrasion (broken fibers).
- (b) Cuts.
- (c) Extremely soft (badly worn rope is extremely soft and has lost its stretch).
- (d) Decayed or burned by a hot substance or chemical.

10.06 To inspect the internal condition of the rope it is necessary to separate the strands of rope at 3 foot intervals, and at any other location that appears or feels suspicious. Observe the inner part for:

- (a) Broken fibers
- (b) Fine powder, which determines the presence of grit
- (c) Mildew or mold
- (d) Change in color of fibers.

10.07 If there is any doubt as to the condition of the rope being satisfactory or safe for further use, it shall be exchanged at once for a rope in good condition in accordance with the company's established routine.

11. CLEANING MANILA ROPE

11.01 Hauling rope through mud, sand, and grit will collect small sharp particles which will gradually work between the fibers and grind them into a fine powder. For this reason rope shall, so far as practicable, be kept free from dirt. If rope is covered with mud, allow it to dry as soon as practicable. After the rope is dry, whip it up and down upon a smooth flat surface such as a paved road to remove the embedded dirt.

12. STORING AND TRANSPORTING ROPE

12.01 New rope shall be left in the original coil until required for use and shall be stored in a dry place in a manner to provide a free circulation of air. Used rope not required in service shall be stored in the same manner after it has

been coiled (Part 8) or placed on reels. Do not store new or used rope unless it is completely dry. To dry rope, hang it up in loose coils on harness hooks, rounded pegs, or the equivalent to permit a free circulation of air around it and through its coils as shown in Fig. 30.

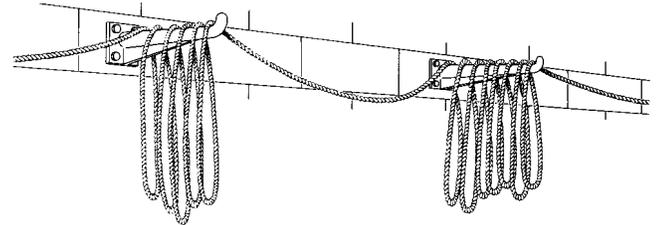


Fig. 30—Proper Method for Drying Rope

12.02 Rope should be thoroughly dried as soon as practicable after it becomes wet. The drying should be done by placing the rope in the sunshine or in warm room. Rope, wet or dry, should never be hung over a hot radiator or placed too near a fire.

12.03 Hand lines, ropes, block and tackle shall be hung on brackets provided for this purpose; the floor of the truck should be kept clear to prevent tripping employees, cutting rope with edged tools, and tangling of rope. Never store or transport rope near a storage battery as the acid or alkali will seriously injure the rope.

12.04 Do not carry rope in a truck compartment containing sharp-edged tools.

13. DISPOSITION OF MANILA ROPE

13.01 Manila rope found to be defective from any causes described in this section shall be disposed of in accordance with the company's established routine.

13.02 Rope drawn from stock for a particular job shall, upon completion of the work and when there is no known need for it, be returned to the storeroom. It should be tagged as satisfactory or defective as conditions warrant.