ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL FOUR

INSTRUCTIONAL GUIDE

SECTION 3

EO M490.03 – TIE KNOTS AND LASHINGS

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-804/PG-001, *Proficiency Level Four Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy the knot-tying and lashing instructions located at Attachments A and B for each cadet.

Cut lengths of braided rope for the cadets to tie the knots. The rope should be 10 mm (3/8 inch) in diameter and 3 m (10 feet) in length. Each cadet will require two lengths of rope.

Collect poles from natural resources. Poles should be approximately 2 m in length and 6 cm in diameter. Each cadet will require two poles.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to present background material on rope terminology.

A demonstration and performance was chosen for TPs 2 and 3 as it allows the instructor to explain and demonstrate tying knots and lashings while providing an opportunity for the cadets to practice and develop these skills under supervision.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have tied knots and lashings.

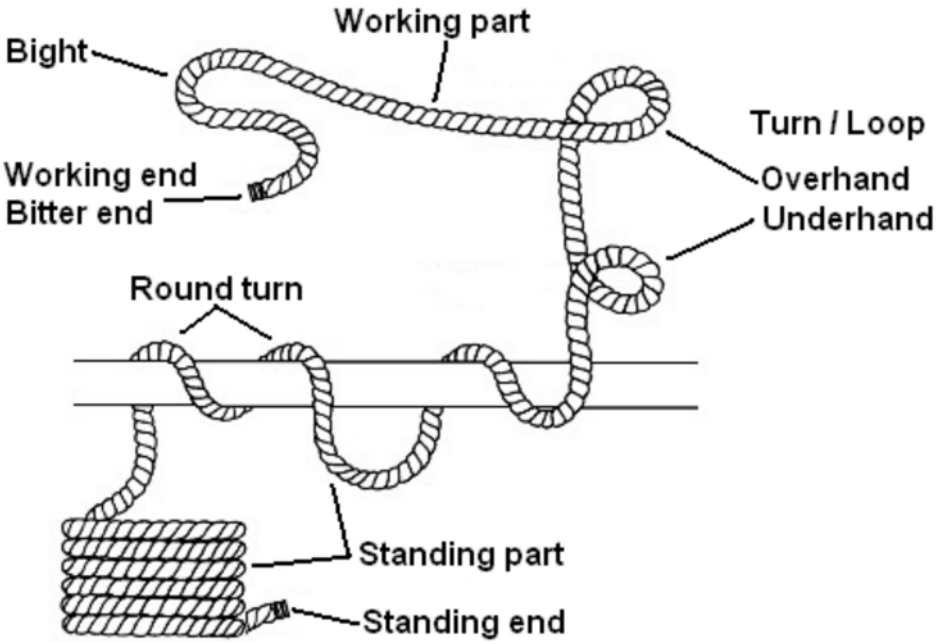
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IMPORTANCE

It is important for the cadets to know how to tie different knots and lashings in order to construct sturdy shelters, tents, snares and camp crafts.

Teaching point 1 **Describe the parts of a rope.**

Time: 10 min Method: Interactive Lecture



Note. From Lost Knowledge Site, by B. Green. 2006. Retrieved March 6, 2009, from http://lostknowledgesite.com/BackToBasics/Knots/Knots.html

Figure 1 Parts of a Rope

PARTS OF A ROPE

The following definitions will assist cadets when tying each knot or lashing:

Working end (Bitter end). The very end of the rope that is used for tying a knot.

Working part (Running part). is the short length of rope that is manipulated to make the knot.

Standing end. The end of the rope opposite the end being used for tying a knot.

Standing part. The section of rope that usually “stands still” during the knot-tying process. Often it is the longer end that leads away from the loop, bight or knot.

Turn or Loop. A part of rope that crosses over itself. The working part can be over or under the standing part in a crossing turn.

Bight. A loop in the rope that does not cross over itself.

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CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What part of the rope is called the working part?

Q2. What is a bight?

Q3. What is the standing end?

ANTICIPATED ANSWERS:

A1. The working part (running part) is the short length of rope that is manipulated to make the knot.

A2. A bight is a loop in the rope that does not cross over itself.

A3. The standing end is the end of the rope opposite the end being used for tying a knot.

Teaching point 2 **Explain, demonstrate and have the cadets tie knots.**

Time: 20 min Method: Demonstration and Performance



For this skill lesson, it is recommended that the instruction take the following format:

(1) Explain and demonstrate the complete knot while cadets observe.

(2) Explain and demonstrate each step required to complete the knot. Monitor cadets as they imitate each step.

(3) Monitor the cadets' performance as they practice the complete knot.

Note: Assistant instructors may be used to monitor the cadets' performance.

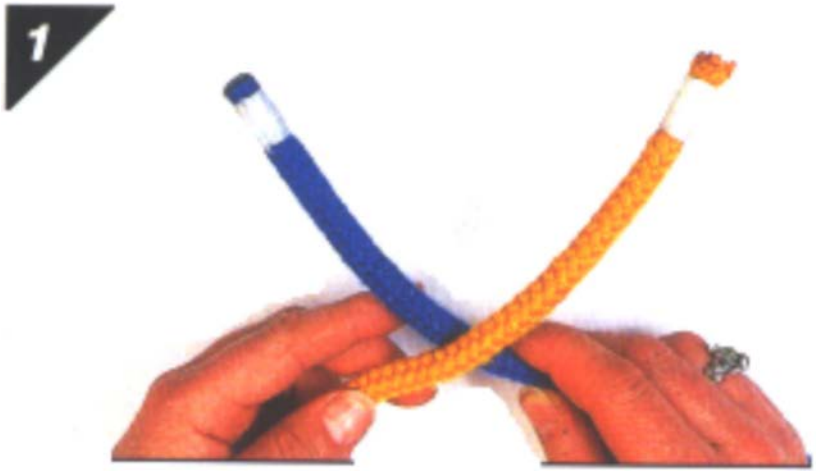
KNOTS

Reef knot. The reef knot is used for joining two ropes of equal diameter together. This knot can hold a moderate amount of weight and is ideal for first aid. It may be used when tying slings because the knot lies flat against the body.

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Steps for Tying a Reef Knot

1. Place the left-hand working end on the top of the right-hand working end.



Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 2 Step 1

2. Bring the left-hand working end under the right-hand working end.

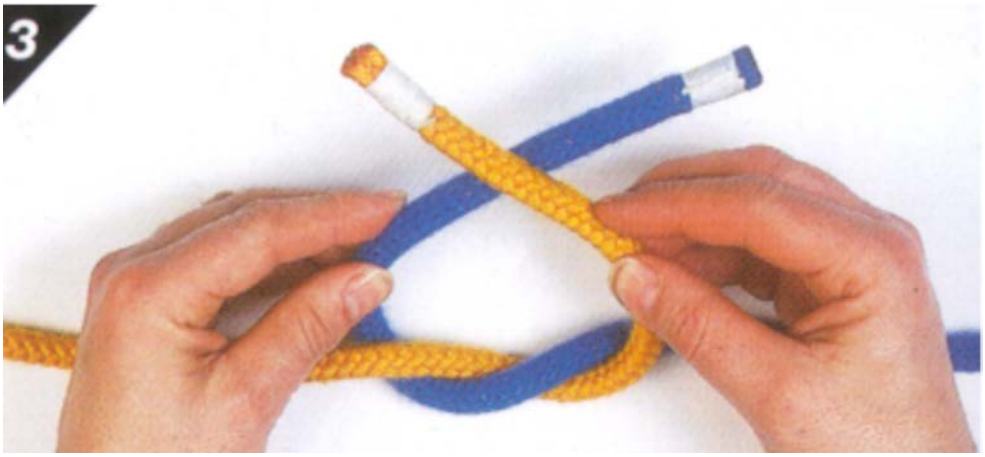


Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 3 Step 2

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3. Place the working end that is now on the right, on top of the working end that is now on the left.



Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 4 Step 3

4. Bring the working end that is on top under the other working end so it comes out at the same place it entered the knot.



Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 5 Step 4

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5. Pull tight to complete the reef knot.



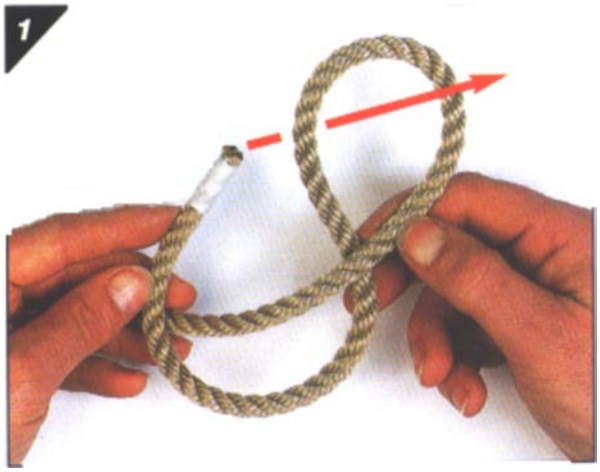
Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 6 Step 5

Figure-of-eight knot. The figure-of-eight knot is very simple and quick to tie. It makes an ideal stopper knot and is very easy to untie.

Steps for Tying a Figure-of-Eight Knot

1. Make a crossing turn with the working end passing under the standing part of the rope and then bring the working end over the standing part.



Note. From Pocket Guide to Knots and Splices (p. 44), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 7 Step 1

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2. Now tuck the working end up through the loop from behind, forming a figure-of-eight.



Note. From Pocket Guide to Knots and Splices (p. 44), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 8 Step 2

3. Pull tight to complete the figure-of-eight knot.



Note. From Pocket Guide to Knots and Splices (p. 44), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

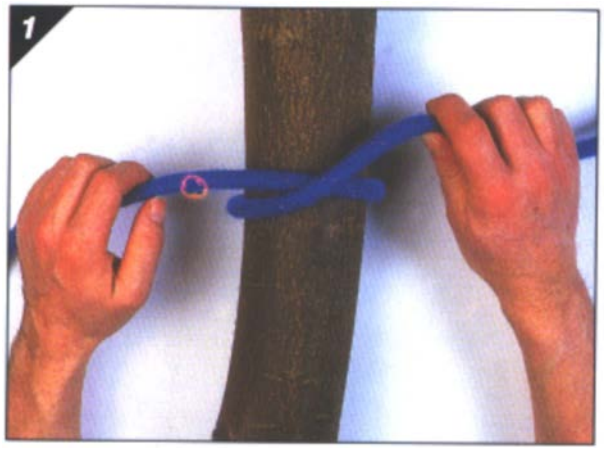
Figure 9 Step 3

Clove hitch. The clove hitch consists of two half hitches or crossing turns each made in the same direction. It is used to finish and start lashings and should not be used in a situation were the hitch has variable tension as it can work loose.

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Steps for Tying a Clove Hitch

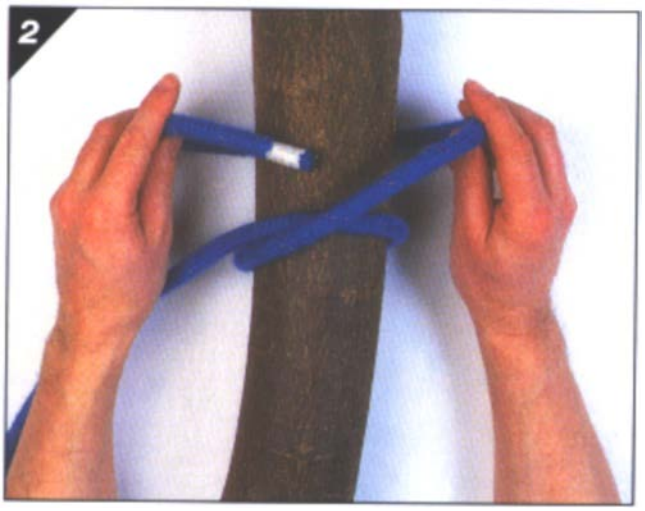
1. Make a turn around a pole / tree bringing the working end of the rope over and trapping the standing part of the rope. This makes the first half hitch.



Note. From Pocket Guide to Knots and Splices (p. 106), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 10 Step 1

2. Bring the working end behind the pole / tree, above the first half hitch.

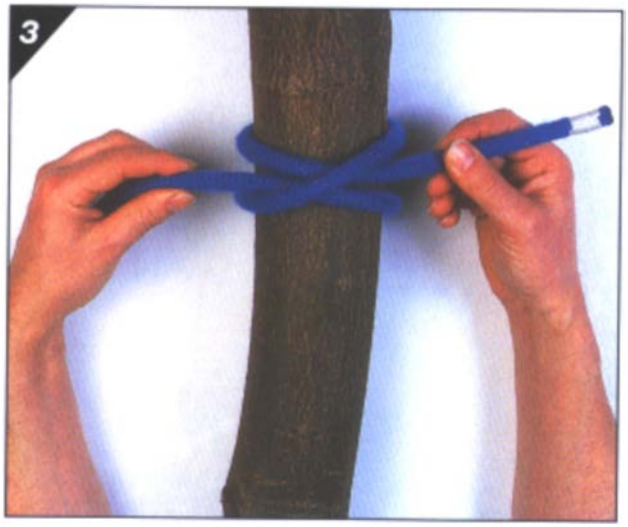


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Figure 11 Step 2

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3. Put the working end under the turn just made. This gives the second half hitch and forms the clove hitch.



Note. From Pocket Guide to Knots and Splices (p. 106), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 12 Step 3

4. Pull tight to complete the clove hitch.



Note. From Pocket Guide to Knots and Splices (p. 106), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 13 Step 4

Bowline. The bowline is a very secure knot that will not slip, regardless of the load applied. Use this knot whenever a non-slip loop is required at the end of a line.

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Steps to Tying a Bowline

1. A short distance back from the working end, make a crossing turn with the working part on top. Go on to form the size of the loop you require.



Note. From Pocket Guide to Knots and Splices (p. 163), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 14 Step 1

2. Bring the working end up through the crossing turn. It will go under first, and then lie on top of the other part of the turn.

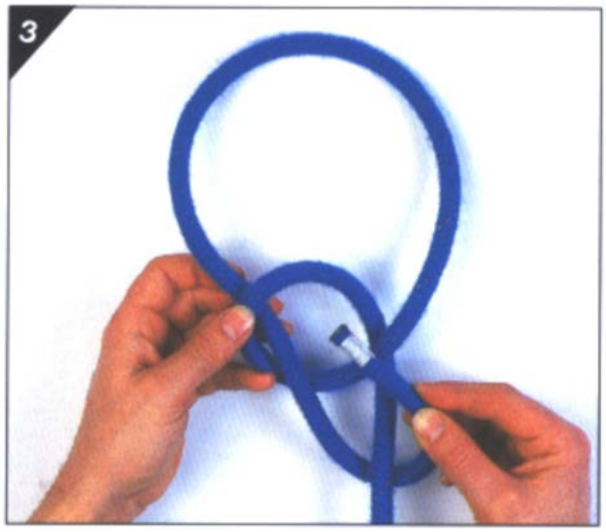


Note. From Pocket Guide to Knots and Splices (p. 163), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 15 Step 2

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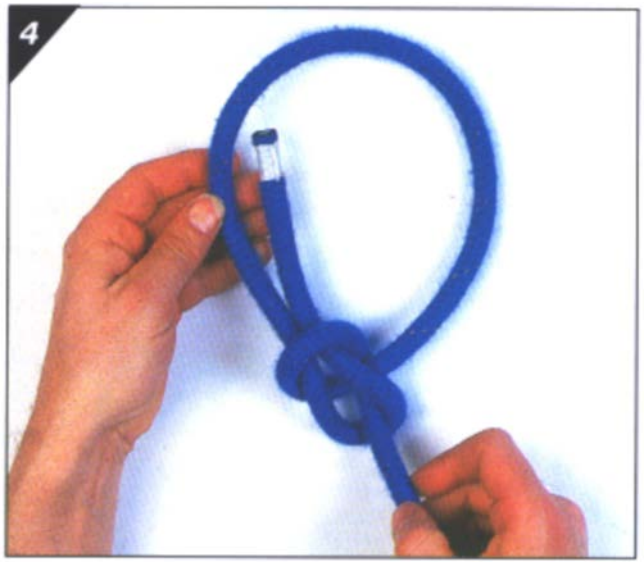
3. Bring the working end around behind the standing part and down through the crossing turn. A good way to remember this is: “the rabbit comes out of the hole, around the tree and back down the hole again”.



Note. From Pocket Guide to Knots and Splices (p. 163), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 16 Step 3

4. Pull tight by holding the working end and pulling on the standing part to complete the bowline.



Note. From Pocket Guide to Knots and Splices (p. 163), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 17 Step 4



Distribute Attachment A to the cadets, so they may practice the knots after the lesson.

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CONFIRMATION OF TEACHING POINT 2

The cadets' participation in tying knots will serve as the confirmation of this TP.

Teaching point 3 **Explain, demonstrate and have the cadets tie lashings.**

Time: 20 min Method: Demonstration and Performance



For this skill, it is recommended that the instruction take the following format:

(1) Explain and demonstrate the complete lashing while cadets observe.

(2) Explain and demonstrate each step required to complete the lashing. Monitor cadets as they imitate each step.

(3) Monitor the cadets' performance as they practice the complete lashing.

Note: Assistant instructors may be used to monitor the cadets' performance.

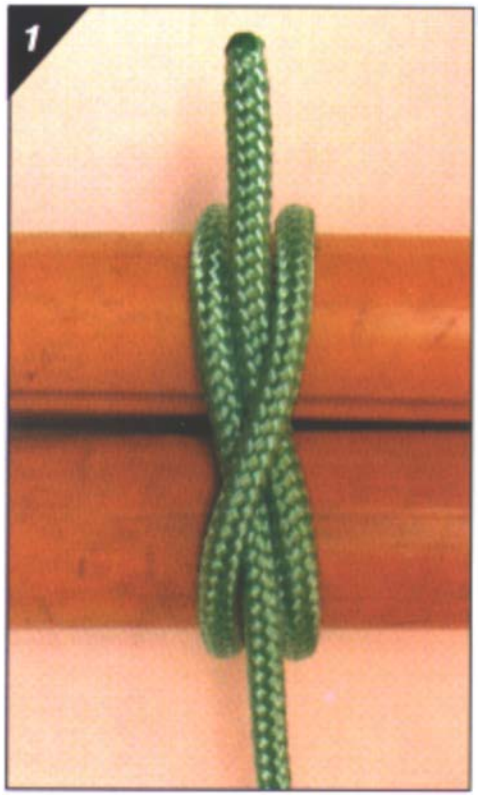
LASHINGS

Round lashing. Sometimes called a sheer lashing, the round lashing has two distinct uses. First, it creates an "A" frame or set of using a single lashing. Second, two or three round lashings can be used to bind together a couple of poles to make a longer spar. To make an "A" frame, tow poles are put side by side; the lashing is made at one end as illustrated in Figures 18–24. A slightly different approach is used to join two poles together to make a longer pole. The procedure is exactly the same, except the initial and final clove hitches are tied around both poles and there is no space left between the poles and no frapping is used. For extra strength to the spar, add extra lashings at the opposite end and middle of the adjoining poles.

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Steps to Tying a Round Lashing

1. Start by making a clove hitch around both poles.

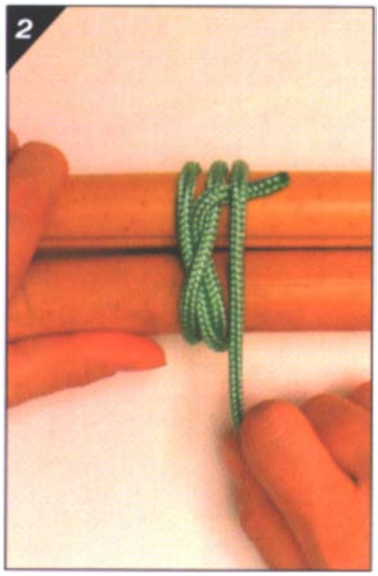


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Figure 18 Step 1

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2. Wrap around both poles, trapping the end of the clove hitch.



Note. From Pocket Guide to Knots and Splices (p. 184), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 19 Step 2

3. Carry on making eight to ten more turns round the pair of poles.

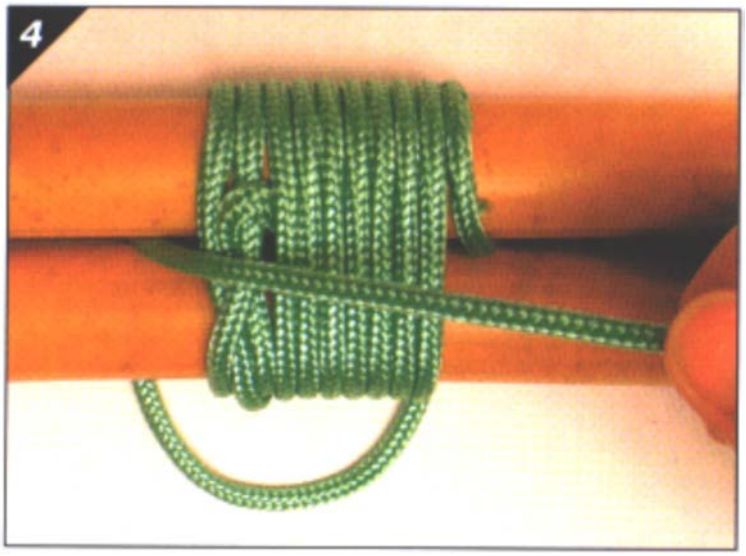


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Figure 20 Step 3

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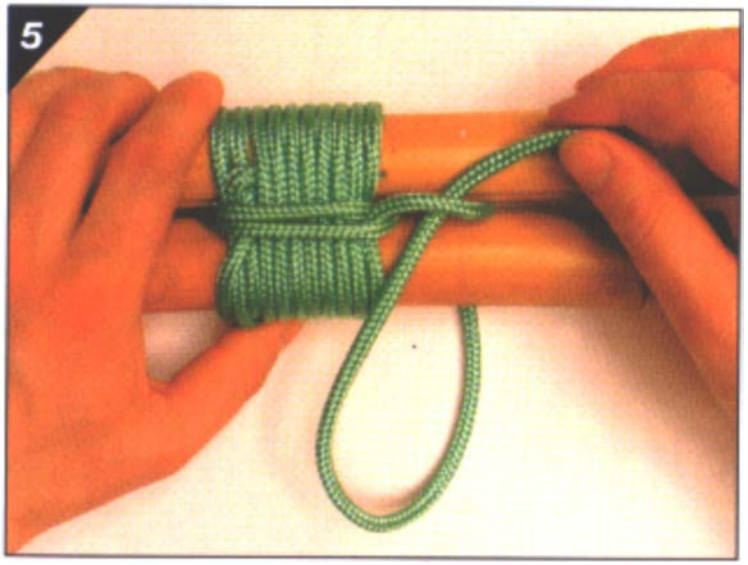
4. The lashing could now be finished with a clove hitch around both poles or put in a couple of frapping turns by bringing the end of the rope between the two poles.



Note. From Pocket Guide to Knots and Splices (p. 185), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 21 Step 4

5. Finish off with a clove hitch around one of the poles.

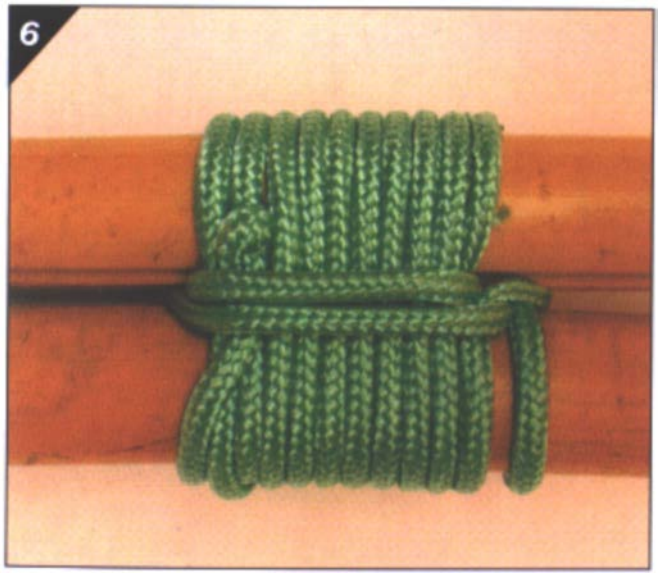


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Figure 22 Step 5

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6. Pull tight to finish the round lashing with the poles parallel.



Note. From Pocket Guide to Knots and Splices (p. 185), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 23 Step 6

7. If being used for an "A" frame then open the poles.



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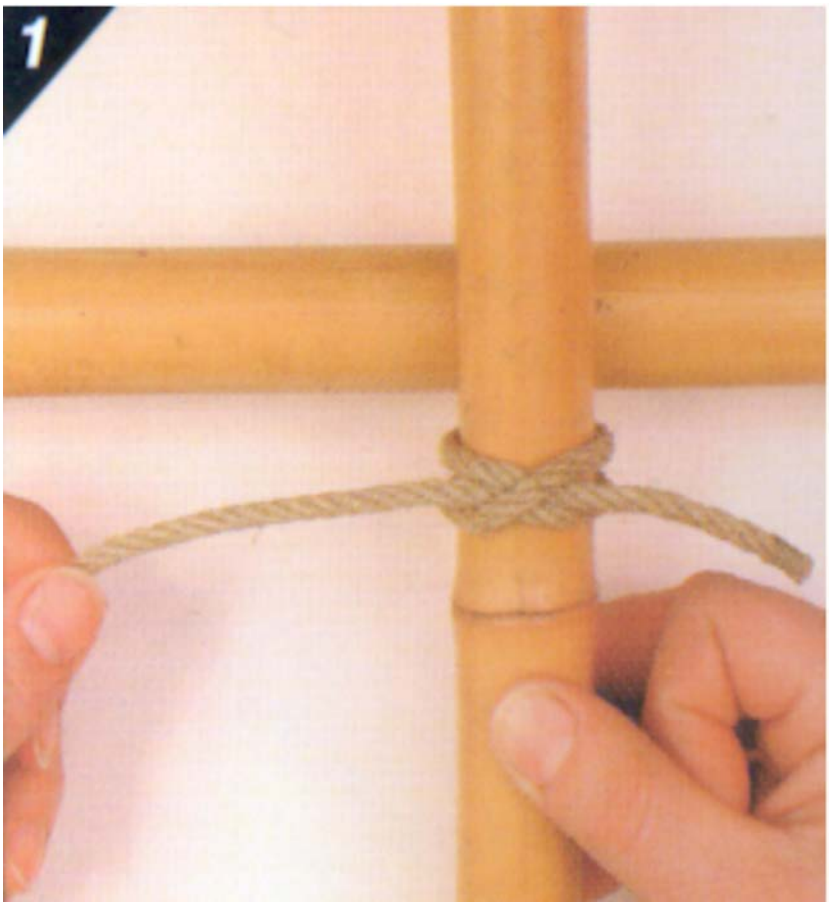
Figure 24 Step 7

Square lashing. A square lashing secures two poles together at 90 degrees and can be used in the construction of shelters and camp crafts. The cord used to make the lashing should be considerably smaller than the size of the poles. For the lashing to be effective, each turn must be pulled as tight as possible as it is made.

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Steps to Tying a Square Lashing

1. With the vertical pole on top of the horizontal pole, make a clove hitch on the vertical pole just below the horizontal pole.



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Figure 25 Step 1

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2. Bring all the cord around behind the horizontal pole.

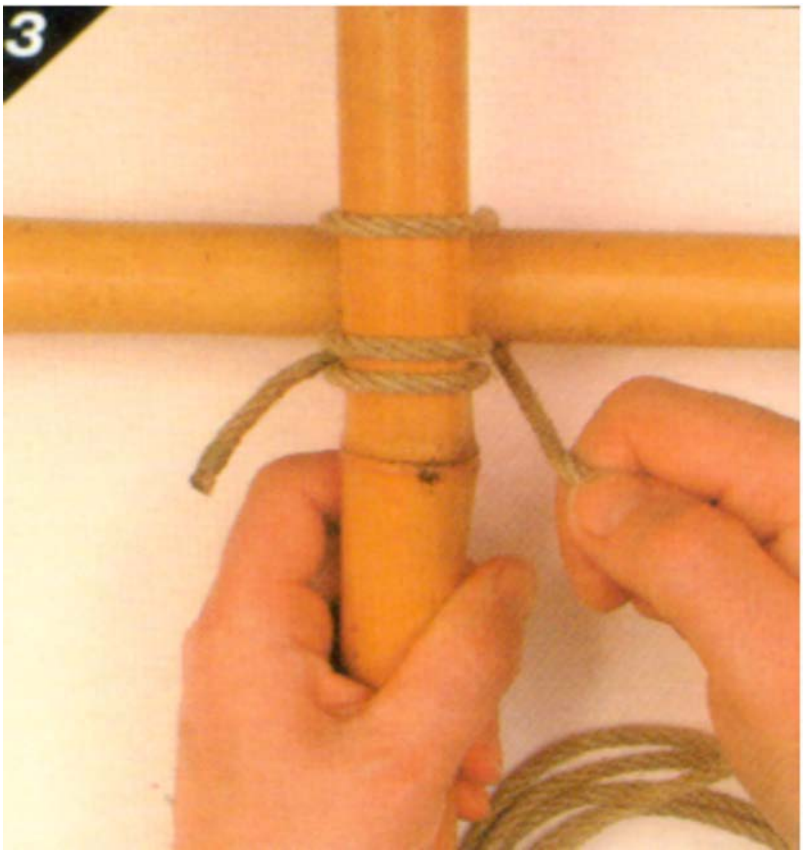


Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 26 Step 2

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3. Bring the cord over the vertical pole and back behind the horizontal pole to the clove hitch. Pull tight.

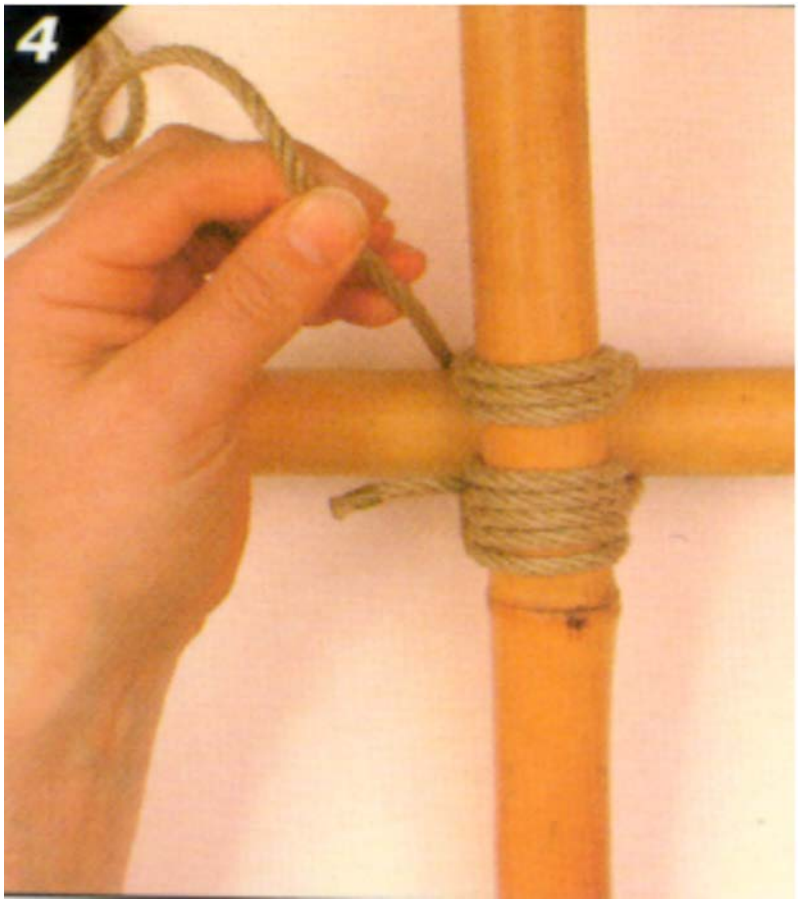


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Figure 27 Step 3

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4. Carry on making two or three more complete turns around the two poles, pulling tight after each turn.



Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 28 Step 4

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5. After passing the clove hitch, bring the cord around the horizontal pole from behind and start to wrap around the junction between the two poles. These are frapping turns—pull them as tight as possible.



Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 29 Step 5

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6. Make two frapping turns.



Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 30 Step 6

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7. Finish off with a clove hitch around the horizontal pole.



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Figure 31 Step 7

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8. Pull tight to complete the square lashing.



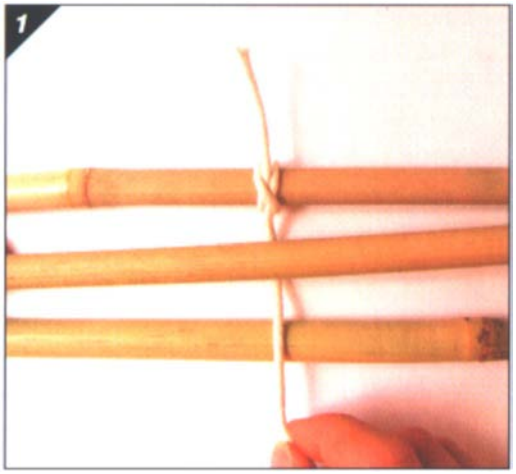
Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 32 Step 8

Figure-of-eight lashing. The figure-of-eight lashing is used to join three poles together to create a tripod. The tripod can be used for creating signal fires, shelters and camp crafts in a survival situation.

Steps to Lashing a Figure-of-Eight Lashing

1. Start with a clove hitch around one of the poles, and lead the rope under and over the other two poles.

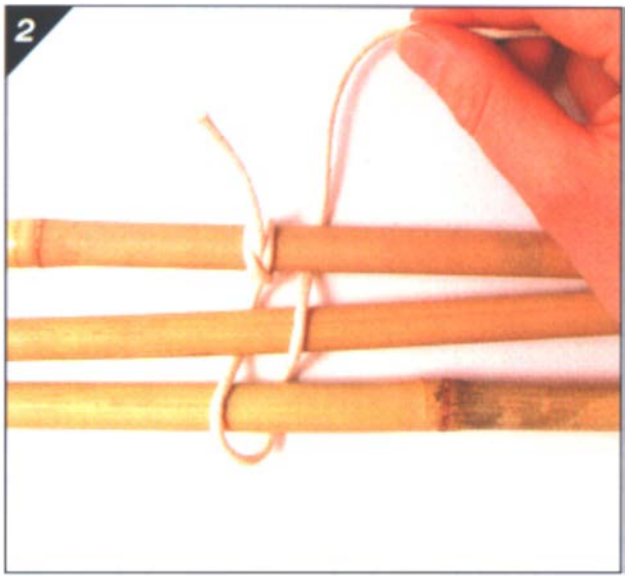


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Figure 33 Step 1

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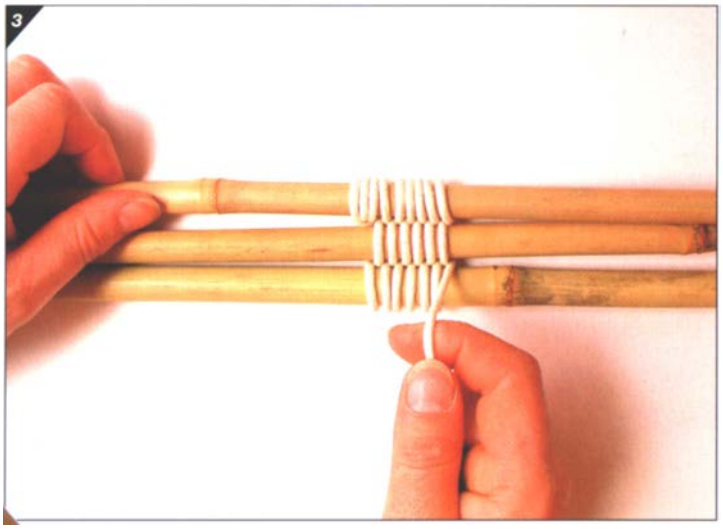
2. Go around the pole furthest away from the start and weave the rope back over and under.



Note. From Pocket Guide to Knots and Splices (p. 187), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 34 Step 2

3. Continue to weave the rope in the figure-of-eight manner for seven or eight full passes before bringing the rope up between two of the poles.

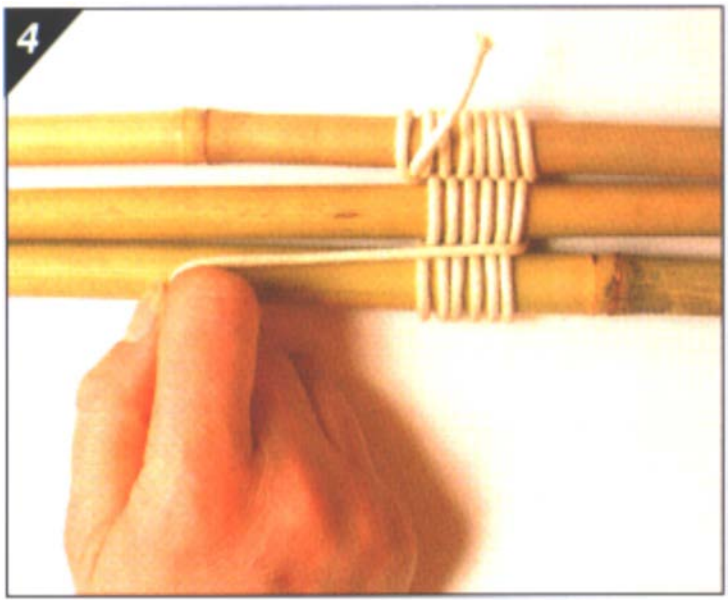


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Figure 35 Step 3

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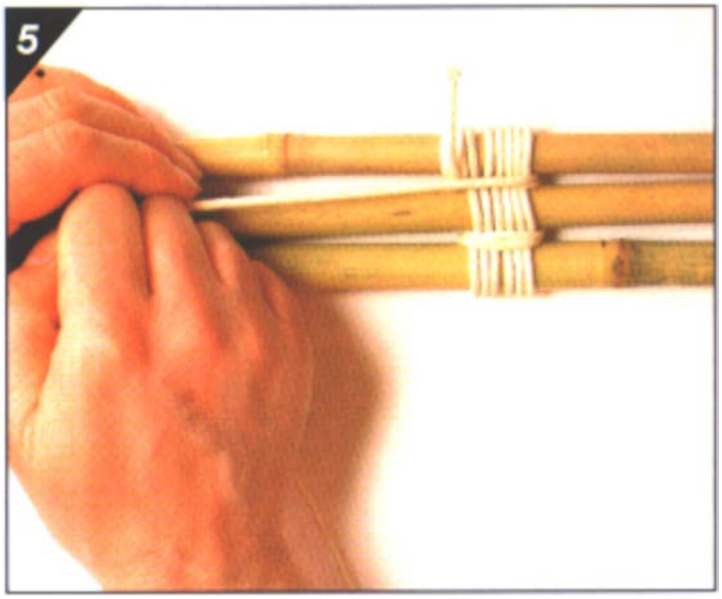
4. Pull the rope parallel to the poles and start to put in some frapping turns.



Note. From Pocket Guide to Knots and Splices (p. 188), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 36 Step 4

5. After making frapping turns between the first two poles move on to make frapping turns around the other pair of poles.

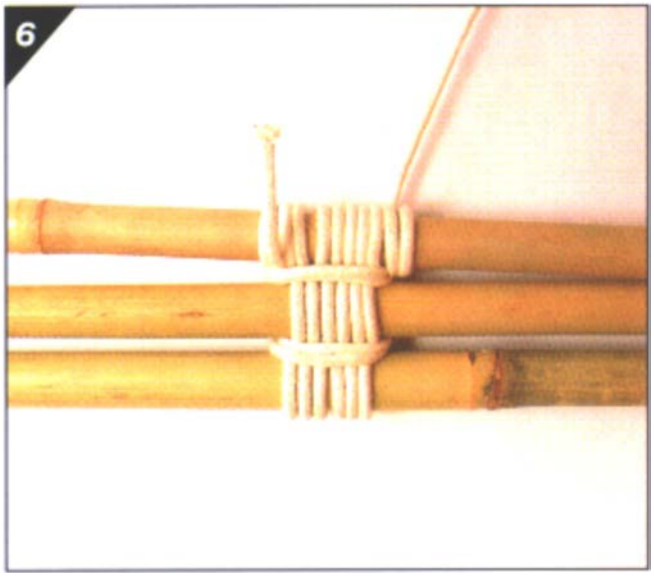


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Figure 37 Step 5

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6. Finish off with a clove hitch around the pole from which you first started.



Note. From Pocket Guide to Knots and Splices (p. 188), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 38 Step 6

7. Open to create tripod.



Note. From Pocket Guide to Knots and Splices (p. 188), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure 39 Step 7



Distribute Attachment B to the cadets, so they may practice the knots after the lesson.

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CONFIRMATION OF TEACHING POINT 3

The cadets' participation in tying lashings will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in tying knots and lashing will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-804/PG-001, *Proficiency Level Four Standard and Plan*, Chapter 3, Annex B, 490 PC.

CLOSING STATEMENT

It is important for the cadets to select the appropriate knot and lashing when constructing shelters, signal fires or camp crafts for safety and quality.

INSTRUCTOR NOTES / REMARKS

Cadets who are qualified Survival Instructor may assist with this instruction.

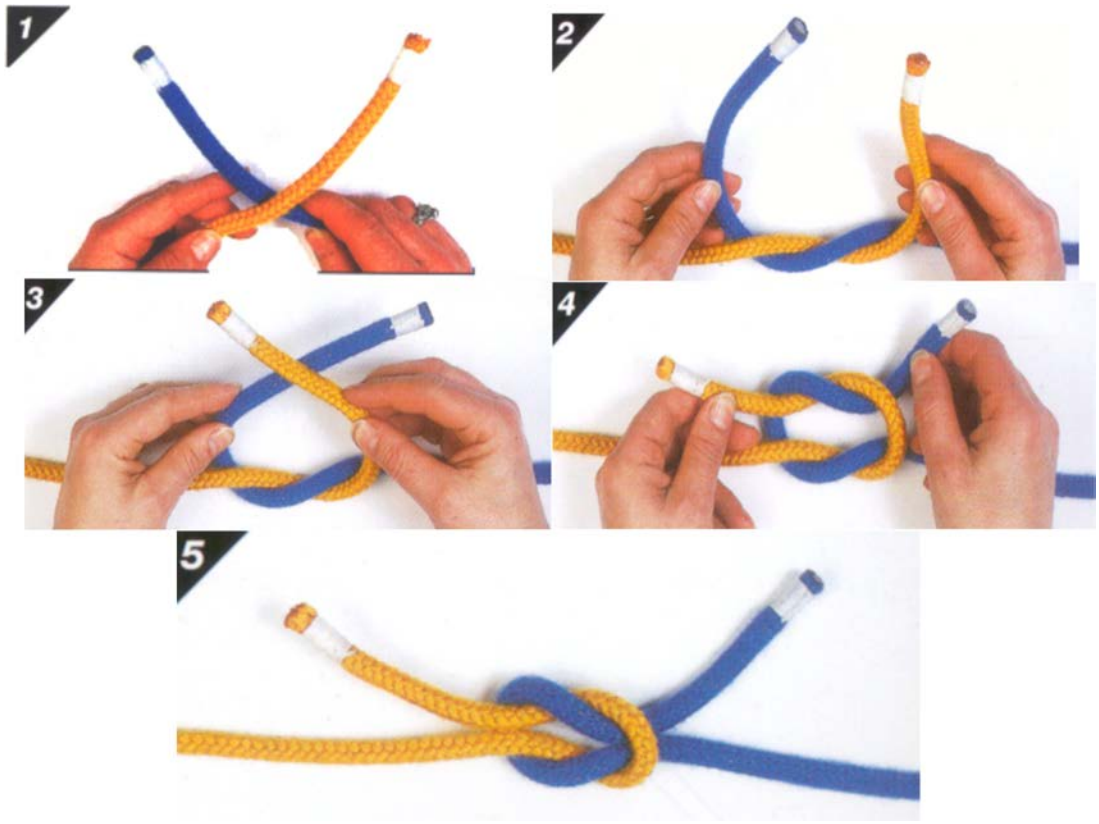
REFERENCES

C3-026 ISBN 1-55267-218-2 Pawson, D. (2001). *Pocket guide to knots and splices*. London, England: PRC Publishing.

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KNOT-TYING INSTRUCTIONS

REEF KNOT



Note. From Pocket Guide to Knots and Splices (p. 98), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure A-1 Steps 1–5

1. Place the left-hand working end on the top of the right-hand working end.

2. Bring the left-hand working end under the right-hand working end.

3. Place the working end that is now on the right on top of the working end that is now on the left.

4. Bring the working end that is on top under the other working end so that working end that is moving comes out at the same place it entered the knot.

5. Pull tight to complete the reef knot.

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KNOT-TYING INSTRUCTIONS

FIGURE-OF-EIGHT KNOT



Note. From Pocket Guide to Knots and Splices (p. 44), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure A-2 Steps 1–3

1. Make a crossing turn with the working end passing under the standing part of the rope and then bring the working end over the standing part.

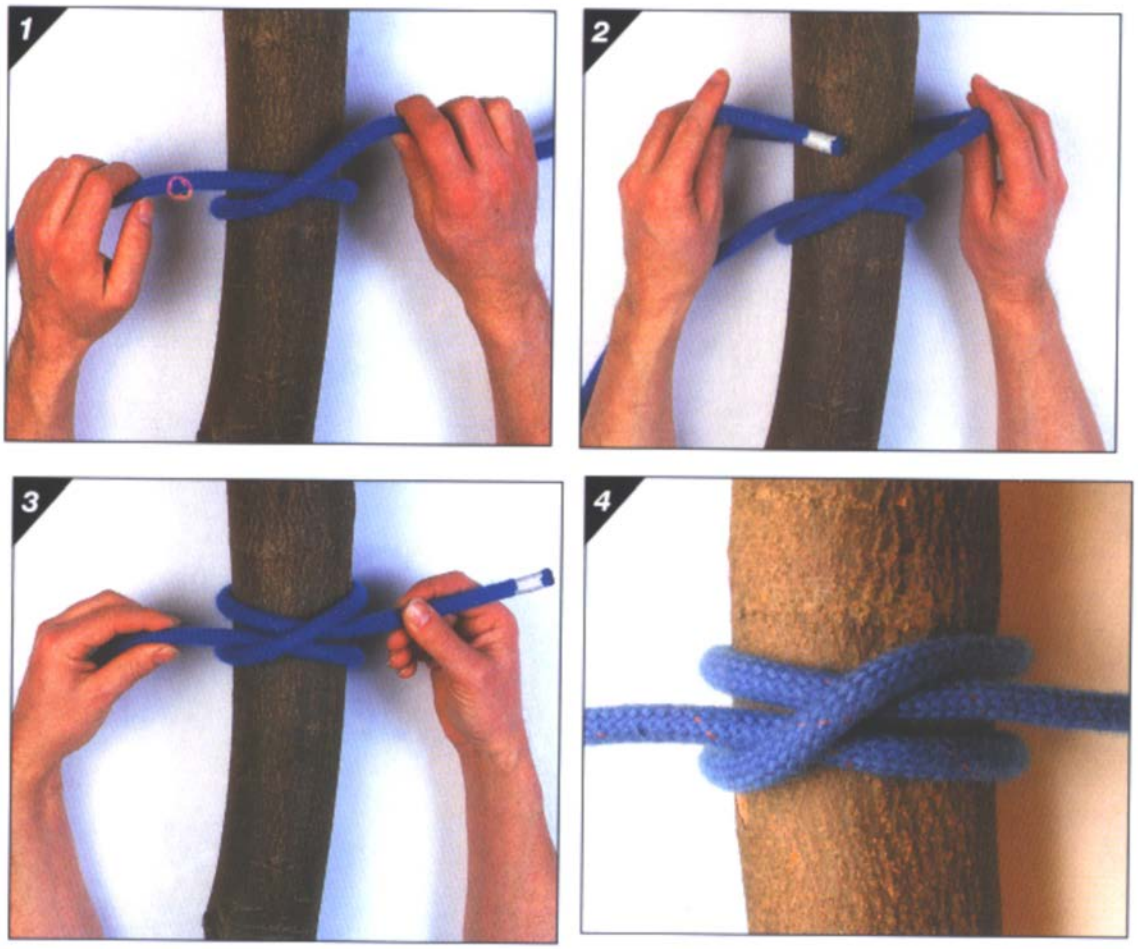
2. Now tuck the working end up through the loop from behind, forming a figure-of-eight.

3. Pull tight to complete the figure-of-eight knot.

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KNOT-TYING INSTRUCTIONS

CLOVE HITCH



Note. From Pocket Guide to Knots and Splices (p. 106), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure A-3 Steps 1–4

1. Make a turn around the pole / tree bringing the working end of the rope over and trapping the standing part of the rope. This makes the first half hitch.

2. Bring the working end round behind the pole / tree, above the first half hitch.

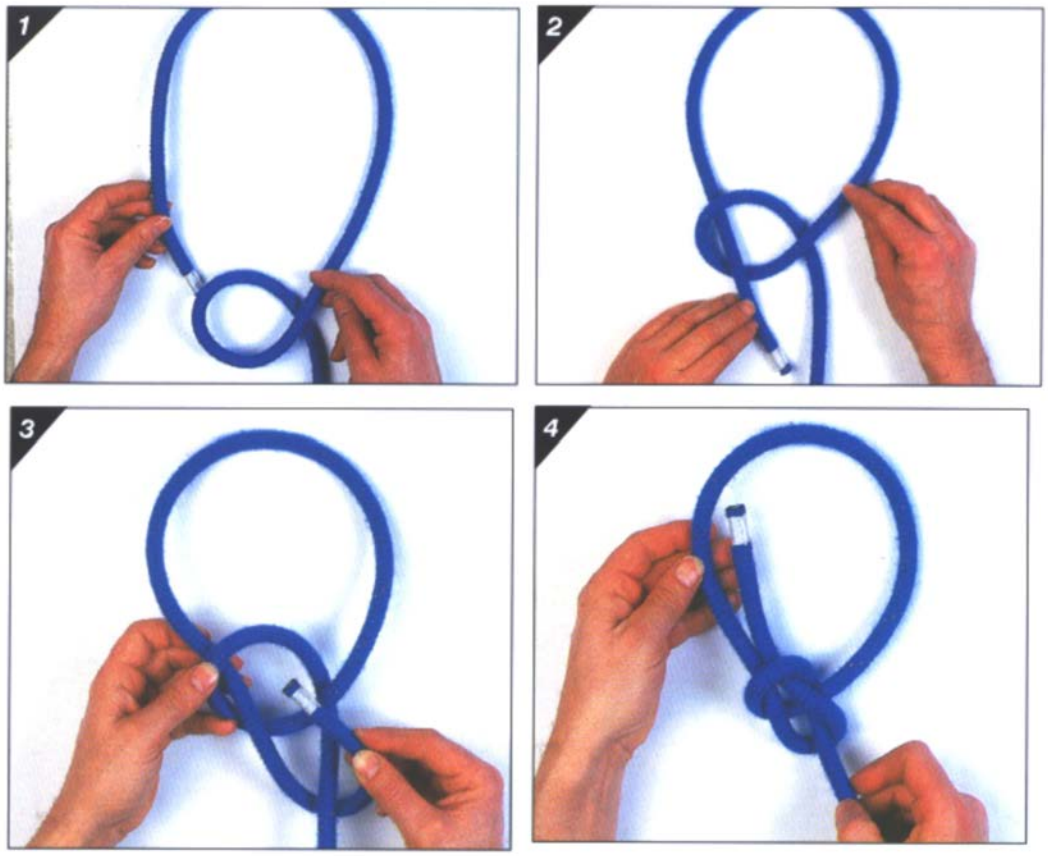
3. Put the working end under the turn just made. This gives the second half hitch and forms the clove hitch.

4. Pull tight to complete the clove hitch.

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KNOT-TYING INSTRUCTIONS

BOWLINE



Note. From Pocket Guide to Knots and Splices (p. 163), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure A-4 Steps 1–4

1. A short distance back from the working end, make a crossing turn with the working part on top. Go on to form the size of the loop you require.

2. Bring the working end up through the crossing turn. It will go under first, and then lie on top of the other part of the turn.

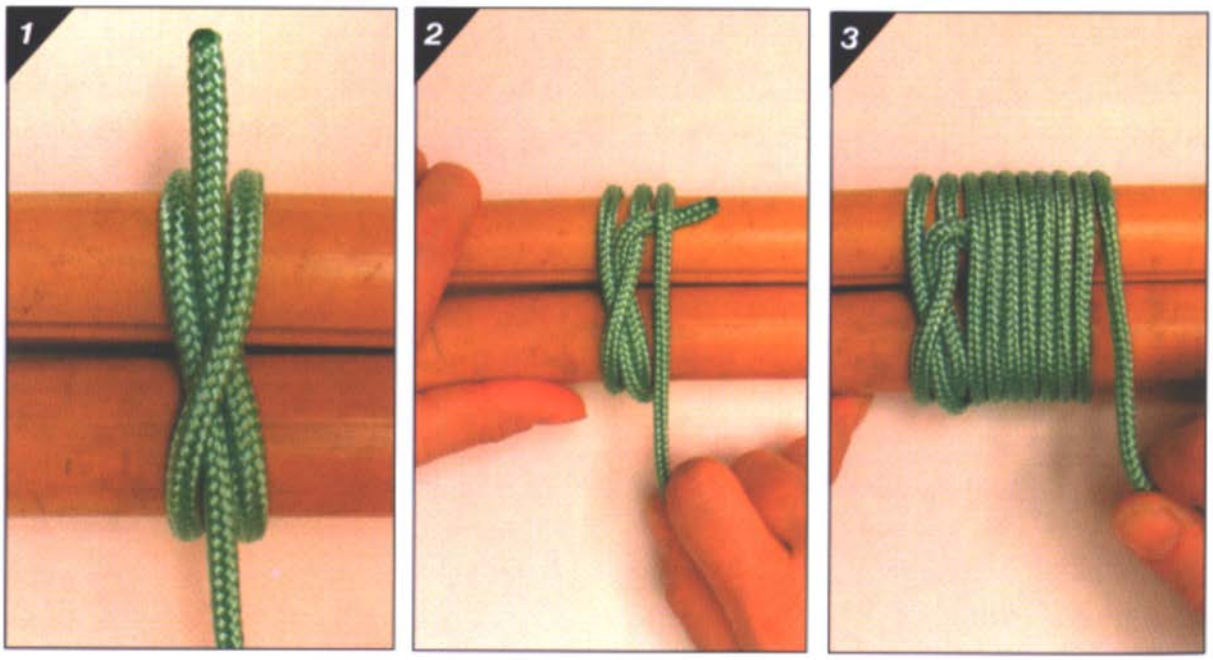
3. Bring the working end around behind the standing part and down through the crossing turn. A good way to remember this is: “the rabbit comes out of the hole, around the tree and back down the hole again”.

4. Pull tight by holding the working end and pulling on the standing part to complete the bowline.

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LASHING INSTRUCTIONS

ROUND LASHING

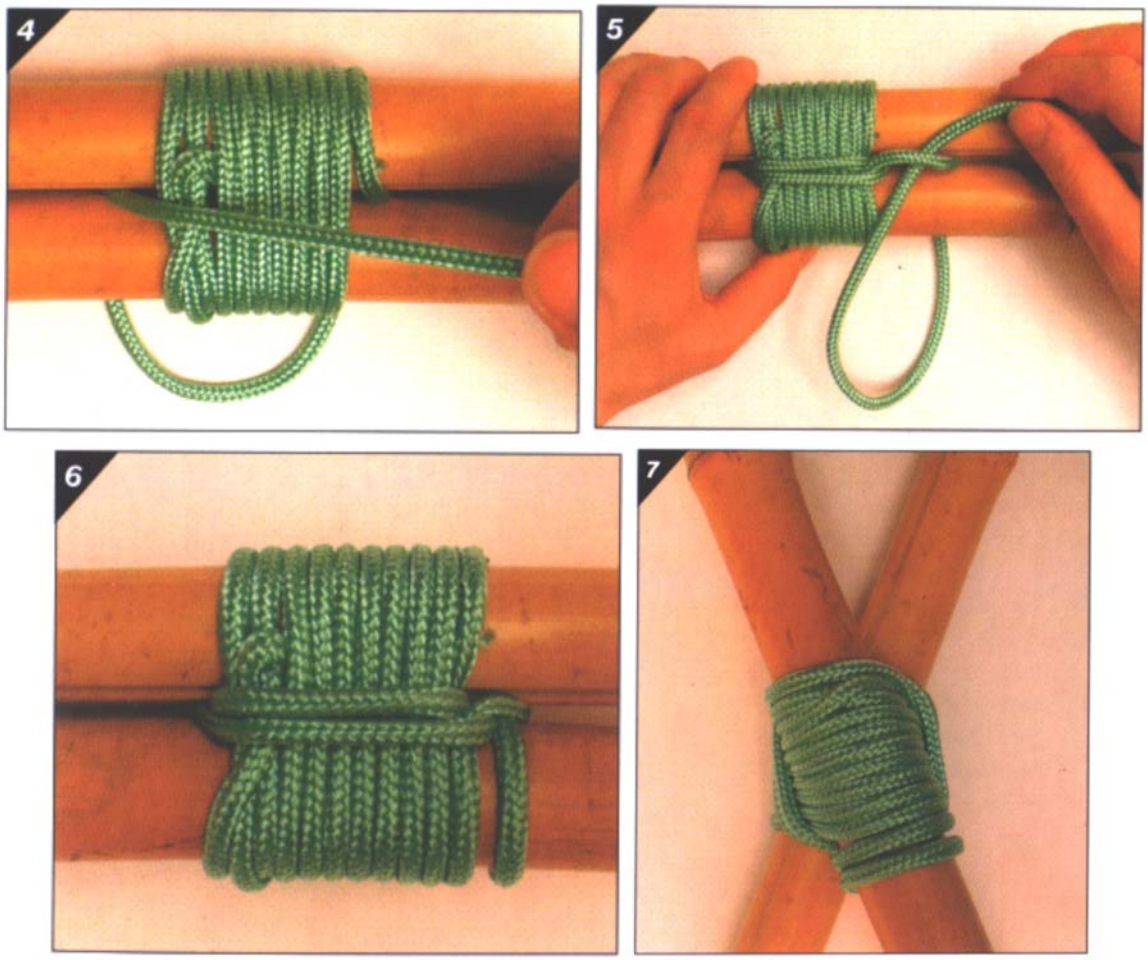


Note. From Pocket Guide to Knots and Splices (p. 184), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure B-1 Steps 1–3

1. Start by making a clove hitch around both poles.
2. Wrap around both poles, trapping the end of the clove hitch.
3. Carry on making eight to ten more turns round the pair of poles.

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Note. From Pocket Guide to Knots and Splices (p. 185), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure B-2 Steps 4–7

4. The lashing could now be finished with a clove hitch around both poles or put in a couple of frapping turns by bringing the end of the rope between the two poles.

5. Finish off with a clove hitch around one of the poles.

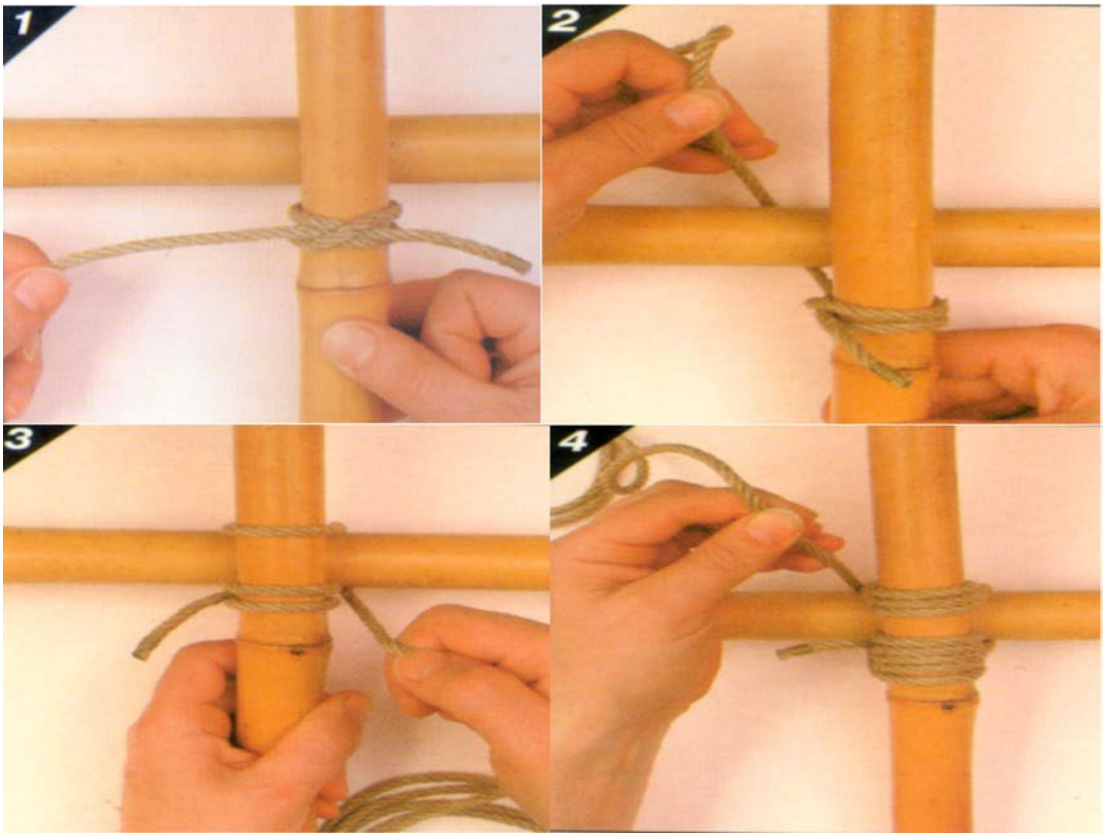
6. Pull tight to finish the round lashing with the poles parallel.

7. If being used for an "A" frame then open the poles.

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LASHING INSTRUCTIONS

SQUARE LASHING

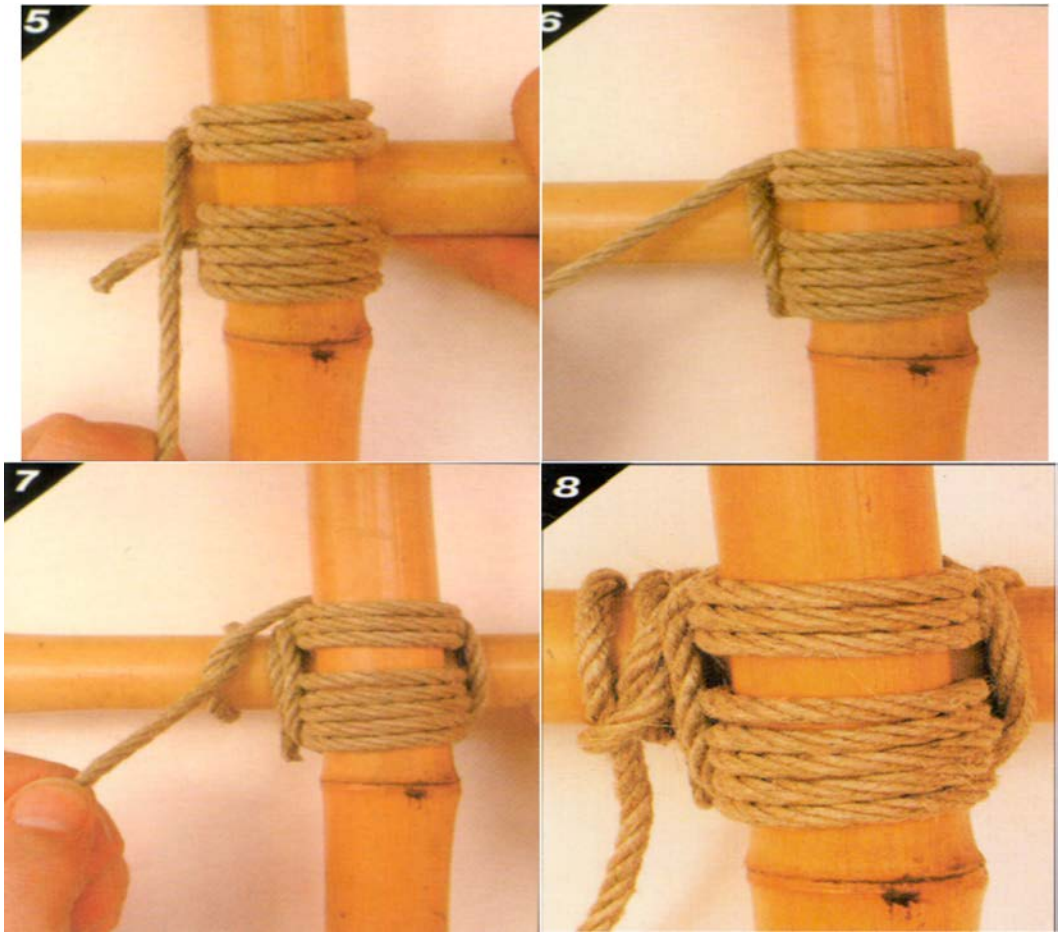


Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure B-3 Steps 1–4

1. With the vertical pole on top of the horizontal pole, make a clove hitch on the vertical pole just below the horizontal pole.
2. Bring all the cord around behind the horizontal pole.
3. Bring the cord over the vertical pole and back behind the horizontal pole to the clove hitch. Pull tight.
4. Carry on making two or three more complete turns around the two poles, pulling tight after each turn.

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Note. From Pocket Guide to Knots and Splices (p. 181), by D. Pawson, 2001, London, England: Prospero Books Inc. Copyright 2001 by PRC Publishing Ltd.

Figure B-4 Steps 5–8

5. After passing the clove hitch, bring the cord around the horizontal pole from behind and start to wrap around the junction between the two poles. These are frapping turns—pull them as tight as possible.

6. Make two frapping turns.

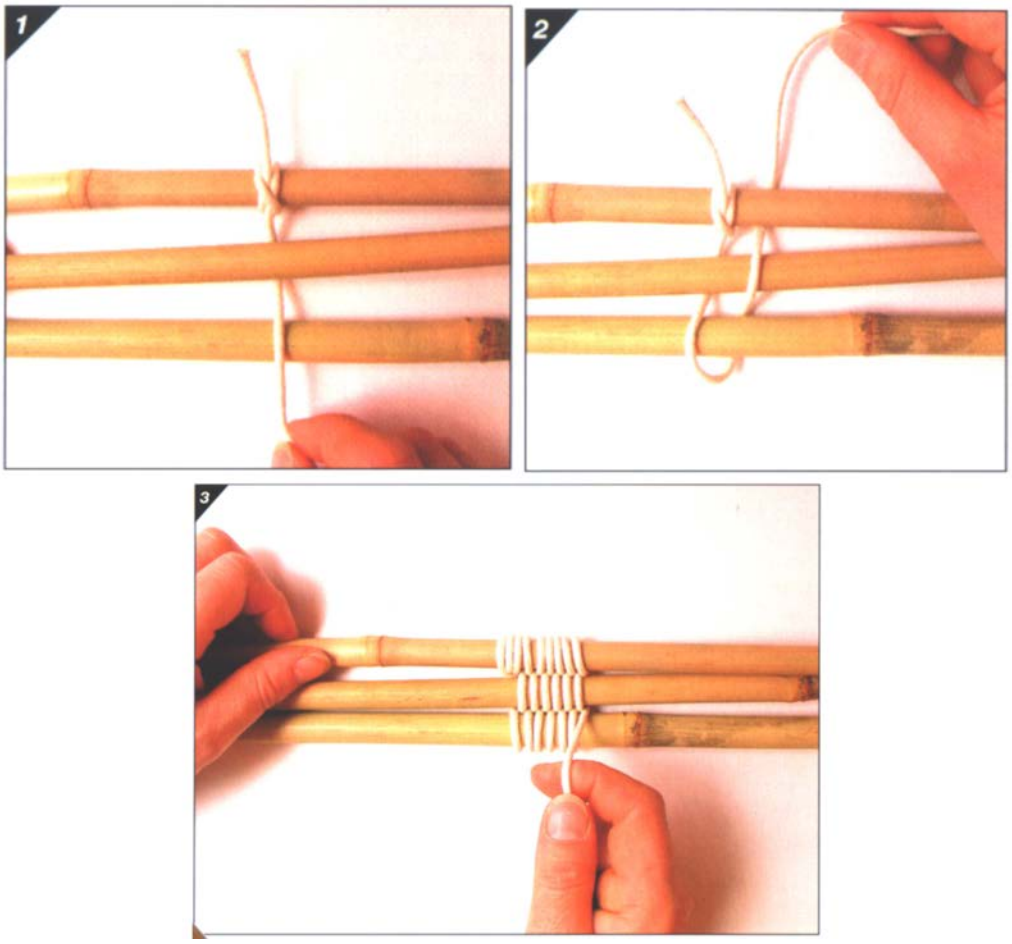
7. Finish off with a clove hitch around the horizontal pole.

8. Pull tight to complete the square lashing.

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LASHING INSTRUCTIONS

FIGURE-OF-EIGHT LASHING



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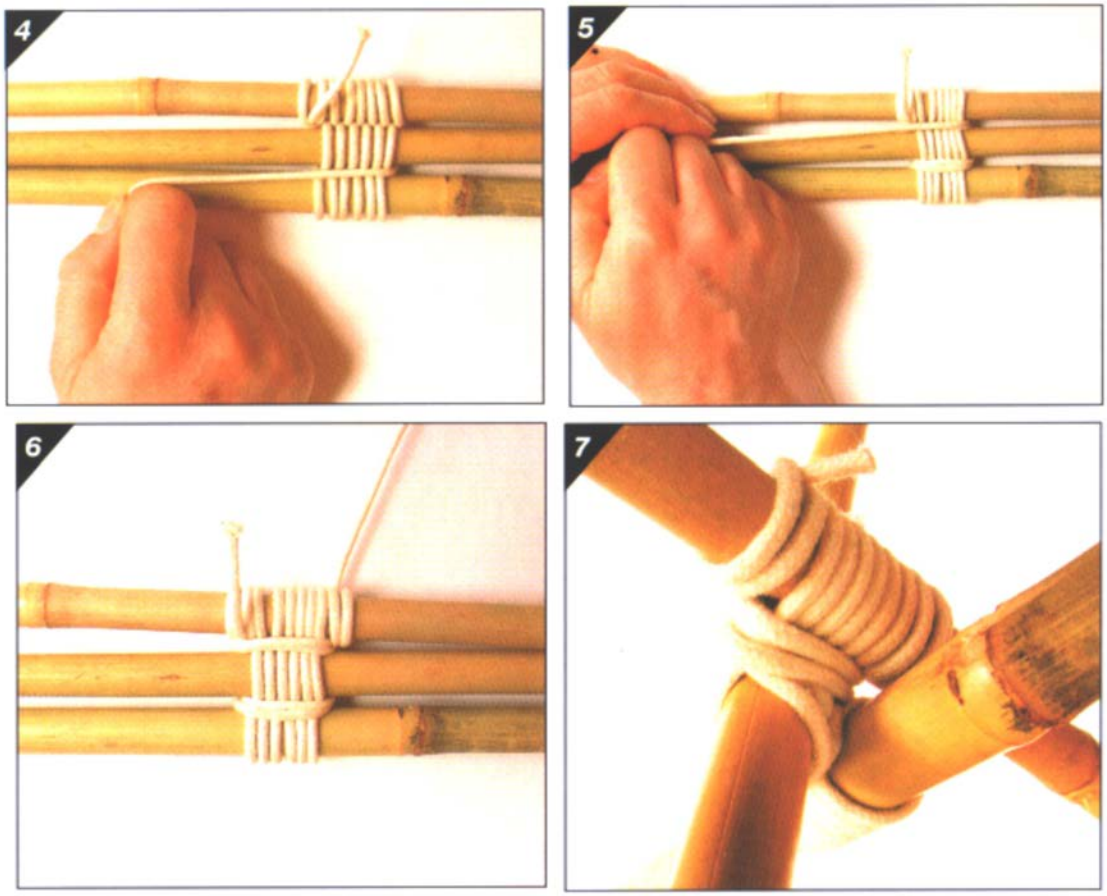
Figure B-5 Steps 1–4

1. Start with a clove hitch around one of the poles, and lead the rope under and over the other two poles.

2. Go around the pole furthest away from the start and weave the rope back over and under.

3. Continue to weave the rope in the figure-of-eight manner for seven or eight full passes before bringing the rope up between two of the poles.

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Figure B-6 Steps 4–7

4. Pull the rope parallel to the poles and start to put in some frapping turns.

5. After making frapping turns between the first two poles move on to make frapping turns around the other pair of poles.

6. Finish off with a clove hitch around the pole from which you first started.

7. Open to create tripod.

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