



ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 1

EO M221.01 – USE A STROP FOR SLINGING

Total Time:

90 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-602/PG-001, 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 handouts located at Annex A and either Annex B or C for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 as it allows the instructor to generate interest in slinging a strop.

Demonstration and performance was chosen for TP2 and TP3 as it allows the instructor to explain and demonstrate how to use a strop for slinging while providing an opportunity for the cadets to practice these skills under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have made a strop and used it for slinging.

IMPORTANCE

It is important for cadets to make and use a strop for slinging as it is a useful skill when working with rigging and handling lines. Making and using a strop allows cadets to safely hoist and lower a load.

Teaching Point 1**Describe a Strop**

Time: 5 min

Method: Interactive Lecture

STROP

A strop is a continuous loop in a line or wire rope. When using line, it can be made by tying the two ends together with a reef knot or by making a short splice in one length of line.

PURPOSE

A strop is used to pass around a case, spar, piece of line, etc. so as to provide an eye to be placed over a hook or shackle.

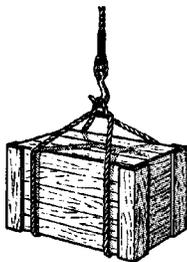


Figure 1 Strop on a Case

*Royal Navy, Admiralty Manual of Seamanship
1964, Her Majesty's Stationery Office (p. 195)*

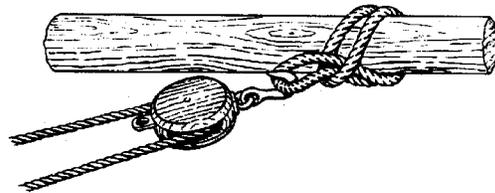


Figure 2 Strop on a Spar

*Royal Navy, Admiralty Manual of Seamanship
1964, Her Majesty's Stationery Office (p. 193)*

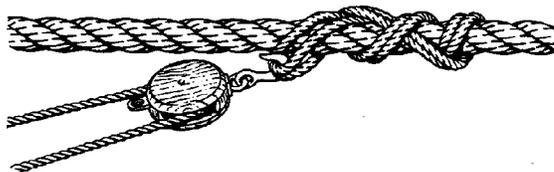


Figure 3 Strop on a Line

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 193)



Provide examples of pre-made strops on hand for the cadets to view.

CONFIRMATION OF TEACHING POINT 1**QUESTIONS**

- Q1. What is a strop?
- Q2. How is a strop usually made?
- Q3. What is the purpose of a strop?

ANTICIPATED ANSWERS

- A1. A strop is a continuous loop in a line or wire rope.
- A2. A strop is made by tying the two ends together with a reef knot or by making a short splice in one length of line.
- A3. A strop is used to pass around a case, spar, piece of line, etc. so as to provide an eye to be placed over a hook or shackle.

Teaching Point 2**Demonstrate and Have the Cadets Make a Strop**

Time: 60 min

Method: Demonstration and Performance

SHORT SPLICE**Purpose**

The short splice is used to join two pieces of line that are not required to pass through a block. When made with one piece of line a strop is created.



Figure 4 Short Splice

B-GN-181-105/FP-E00, CFCD 105 Fleet Seamanship Rigging and Procedures Manual (p. 5-58)

Ottawa, ON: Department of National Defence.

Three-Strand Line

Three-strand line consists of three strands twisted together in the same direction. This process is known as laying.

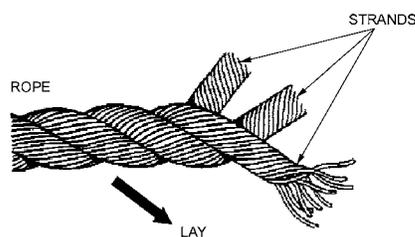


Figure 5 Line Lay

B-GN-181-105/FP-E00 (p. 5-11)



Explain and demonstrate the steps to making a strop using a short splice prior to the cadets completing their own. Distribute line and handouts to the cadets.

STEPS TO MAKING A STROP USING A SHORT SPLICE

1. Complete a whipping on both ends of the line at a distance from the line's end equal to 20 times the diameter of the rope (e.g. 2 cm diameter line requires a whip located at 40 cm from its end, 1/4 inch diameter line requires a whip located 5 inches from its end, etc.).

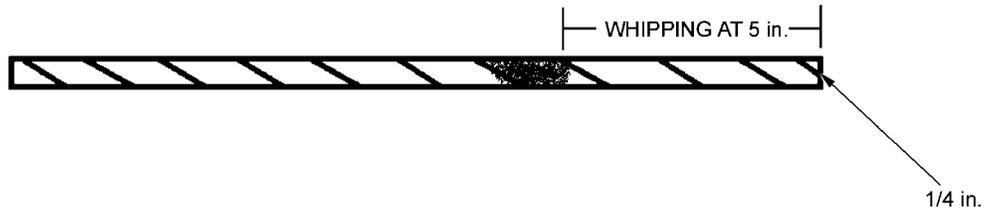


Figure 6 Example of Whipping Distance

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

2. Unlay the strands of the line back to the whippings and whip the ends of each strand.



Masking tape may be used to finish the ends of each strand, instead of a whipping.

3. Marry the ends of the line together so that one strand of each end lies between two strands of the opposite end.

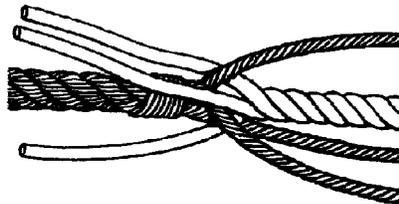


Figure 7 Steps of Line Marrying

B-GN-181-105/FP-E00 (p. 5-58)



Strands are spliced in the opposite direction of the line lay.

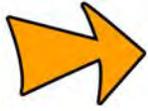


To prevent the married lines from loosening, place a small whip or a piece of tape around the join between lines A and B.



When making a short splice, finish splicing the end of line A before starting line B. Tape the strands (C, D and E) against line B until you are ready to splice that end.

4. Remove the whipping from line A.



To make tucking the strands easier the use of a marlin spike/fid is recommended.



Strands are always spliced in the opposite direction of the line lay.

5. Lay F over C, tuck it under E, and bring it out between D and E.



Figure 8 Steps of Line Marrying

B-GN-181-105/FP-E00 (p. 5-58)

6. Lay G over E, tuck it under D, and bring it out between D and C.



Figure 9 Steps of Line Marrying
B-GN-181-105/FP-E00 (p. 5-58)

7. Lay H over D, tuck it under C, and bring it out between C and E.

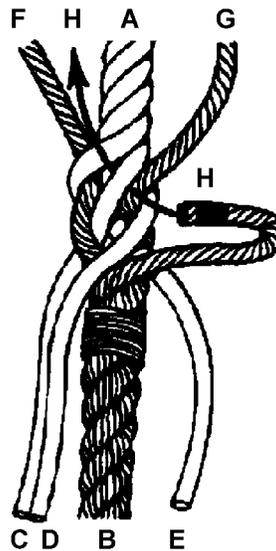


Figure 10 Steps of Line Marrying
B-GN-181-105/FP-E00 (p. 5-58)

8. Continue until all strands have been tucked under the strands of the other end of line.

 Once the initial tucks have been completed, continue the remaining tucks by going over one strand and under the next until the length of each strand is completely tucked into the other end of line.

9. Remove the whipping from line B.

10. Lay and tuck C, D and E in the same manner as F, G and H listed above.
11. To finish the splice, dog the ends. To do so, split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.



Figure 11 Completed Short Splice by Dogging

B-GN-181-105/FP-E00 (p. 5-58)



Allow the cadets to practice making a short splice.



Complete an additional splice with the cadets so they can follow along, asking questions and verifying the tucks are being completed properly.



Another option is to colour the ends of each strand with a different colour. This will clarify the tucking of each strand. As illustrated in Annex C.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. What is the purpose of a short splice?
- Q2. What is the process called when the three strands of line are twisted together in the same direction?
- Q3. How do you determine the amount of line required to complete the short splice?

ANTICIPATED ANSWERS

- A1. The short splice is used for joining two pieces of line that are not required to pass through a block.
- A2. Laying.
- A3. The distance required is equal to 20 times the diameter of the rope.

Teaching Point 3

Demonstrate and Have the Cadets Use a Strop for Slings

Time: 20 min

Method: Demonstration and Performance

PUTTING A STROP ON A SPAR



Explain and demonstrate how to attach a strop to a spar.

Place the strop around the spar. Pull the strop through itself exposing a loop which may be attached to a hook.

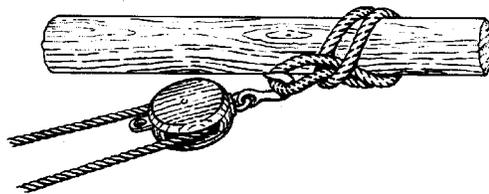


Figure 12 Strop on a Spar

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 193)



Allow the cadets to practice attaching a sling to a spar.

USING A STROP FOR SLINGING A BOX



Explain and demonstrate how to use a strop for slinging a box.

Whenever an item or a collection of packages is to be hoisted, it is attached to a hook through the use of a sling. A sling can be made with a single strop placed around the box, tucked through itself and attached to a hook or by using two strops; one located on either end of the item.

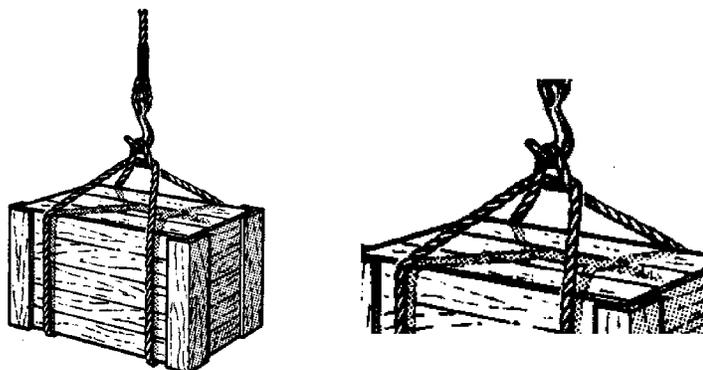


Figure 13 Sling a Box Using a Strop

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 195)

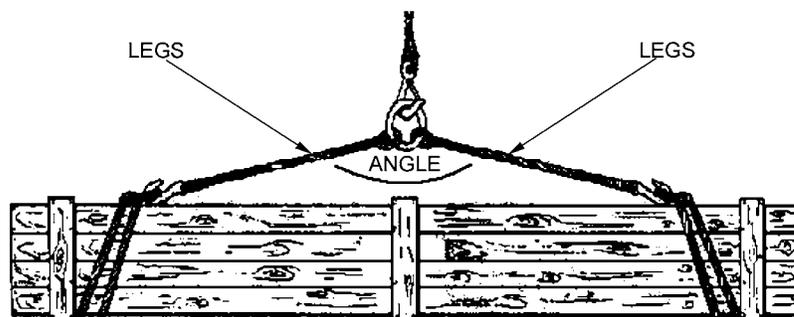


Figure 14 Sling a Case Using Two Strops

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 194)

When using strops for hoisting, the angle between the legs of the sling will determine the amount of stress the strops must endure. The recommended angle of work is between 0 degrees and 120 degrees. Figure 15 provides examples of some stress that a strop may be subject to when using slings.

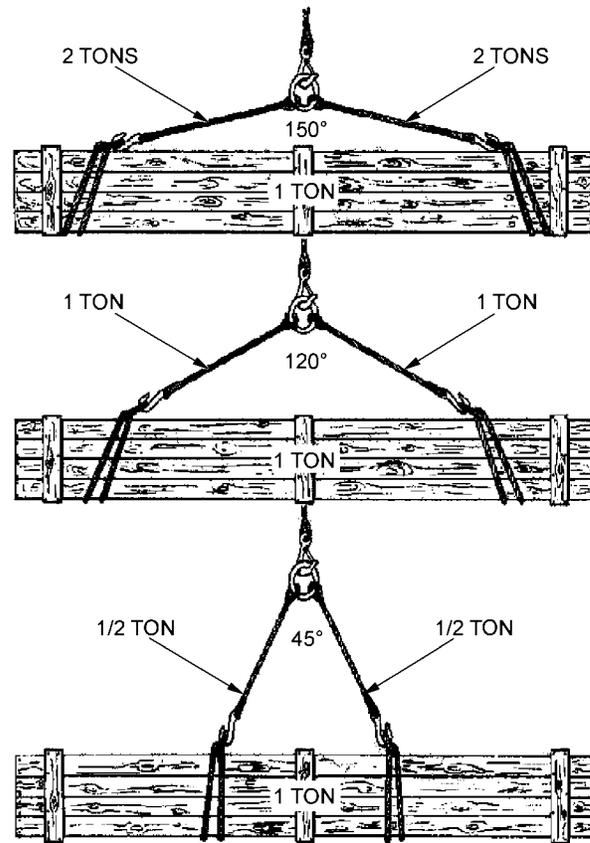


Figure 15 Stresses in the Legs of Slings

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 194)



The angles at which a sling is operated should be limited to prevent unnecessary stress on strops when hoisting items.



Allow the cadets to practice using a strop for slinging a box.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. What is a sling used for?
- Q2. What are the recommended angles of work for the legs of a sling?
- Q3. How do you use a strop to sling a box?

ANTICIPATED ANSWERS

- A1. Hoisting an item or a collection of packages.
- A2. Between 0 degrees and 120 degrees.
- A3. Place the strop around the box, tuck it through itself and attach it to a hook.

END OF LESSON CONFIRMATION

The cadets' participation in TP2 and TP3 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

The use of strops is a necessary component of slinging objects that require hoisting. Being able to make a short splice, hence completing a strop, will be a useful skill during Phase Three training when learning to rig sheer legs.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of Maritime Staff. (1997). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-003 (ISBN II 770973 5) Royal Navy. (1972). *Admiralty Manual of Seamanship 1964* (Vol. 1). London, England: Her Majesty's Stationery Office.

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STEPS TO MAKING A STROP USING A SHORT SPLICE

The strands of each line are tucked between the strands of the other line. The strands are laid against the lay and tucked under the next strand and emerging between this and the subsequent strand.

1. Complete a whipping on both ends of the line at a distance from the lines end equal to 20 times the diameter of the rope (e.g. 2 cm diameter line requires a whip located at 40 cm from its end, 1/4 inch diameter line requires a whip located 5 inches from its end, etc.).
2. Unlay the strands of the line back to the whippings and whip the ends of each strand.
3. Marry the ends of the line together so that one strand of each end lies between two strands of the opposite end.



To prevent the married lines from loosening, place a small whip or a piece of tape around the join between lines A and B.



When making a short splice, finish splicing the end of line A before starting line B. Tape the strands (C, D and E) against line B until you are ready to splice that end.

4. Remove the whipping from line A.



Strands are spliced in the opposite direction of the line lay.

5. Lay F over C, tuck it under E, and bring it out between D and E.
6. Lay G over E, tuck it under D, and bring it out between D and C.
7. Lay H over D, tuck it under C, and bring it out between C and E.
8. Continue until all strands have been tucked under the strands of the other end of line.
9. Remove the whipping from line B.
10. Lay and tuck C, D and E in the same manner as F, G and H listed above.
11. To finish the splice, dog the ends. To do so, split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.



Figure A-1 Completed Short Splice by Dogging

B-GN-181-105/FP-E00 (p. 5-58)

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SHORT SPLICE

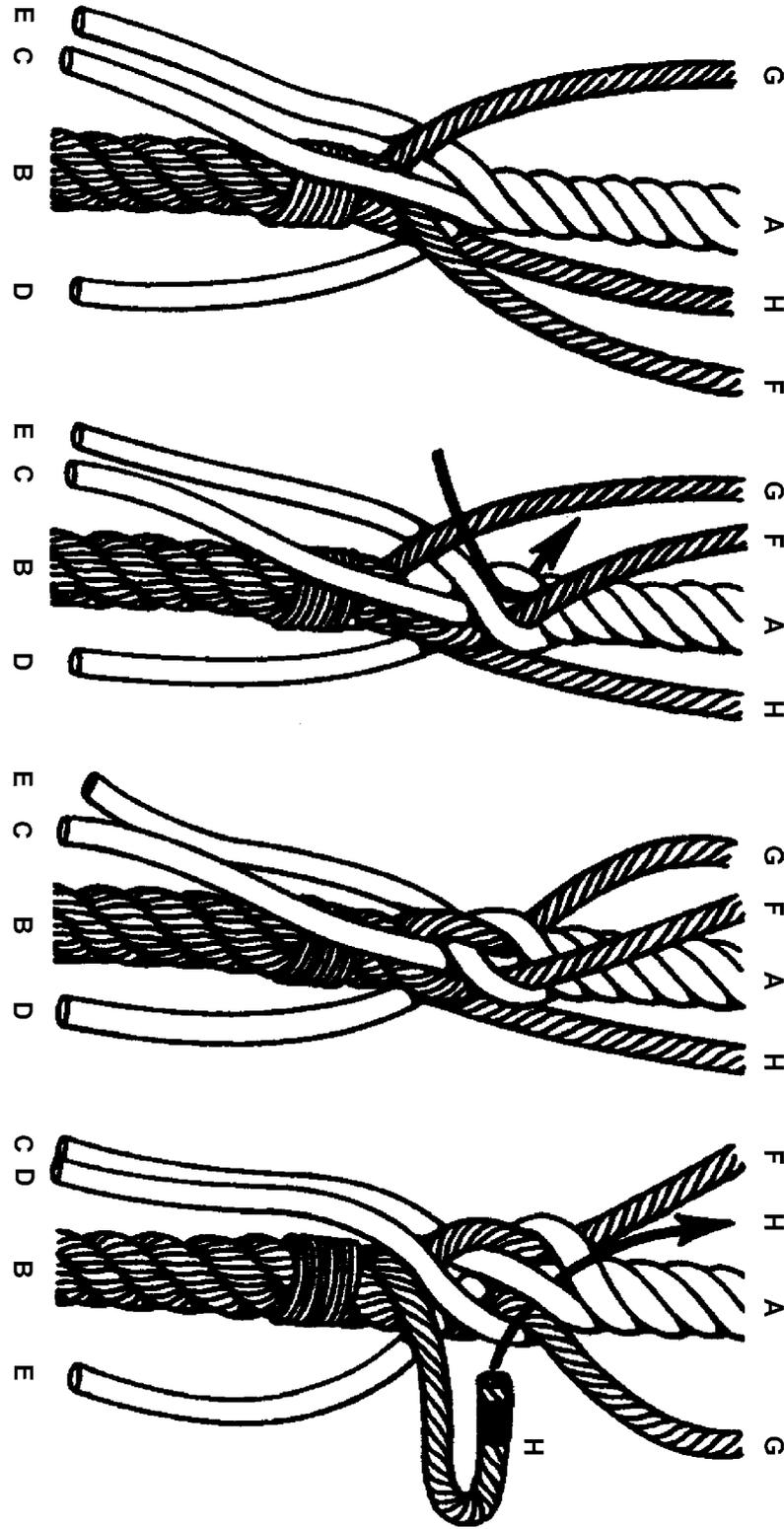


Figure B-1 Short Splice
B-GN-181-105/FP-E00 (p. 5-58)

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SHORT SPLICE (COLOUR ENDS)

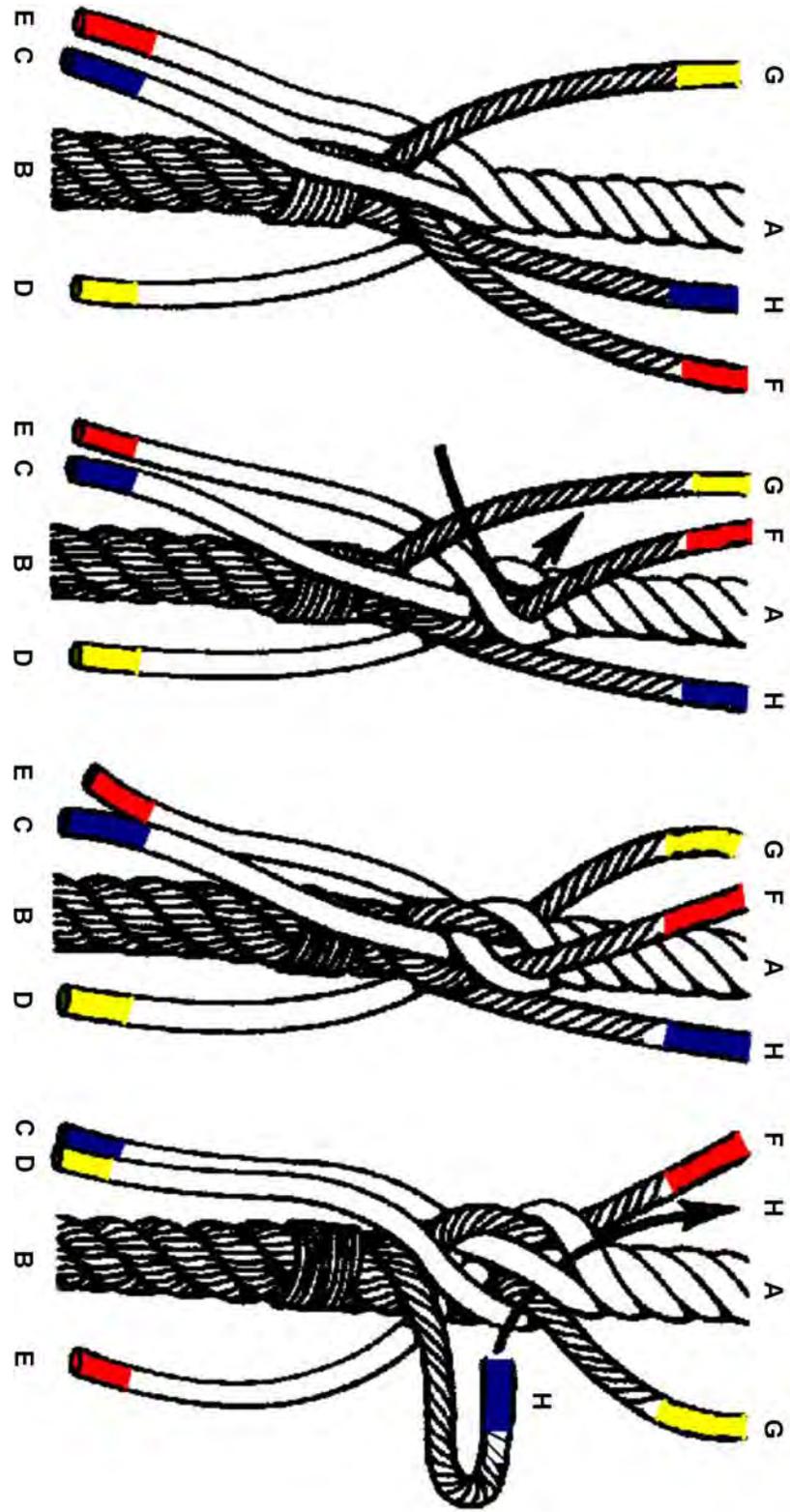


Figure C-1 Short Splice (Colour Ends)

B-GN-181-105/FP-E00 (p. 5-38)

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ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 2

EO M221.02 – MOUSE A HOOK

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-602/PG-001, 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 handout located at Annex A for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 as it allows the instructor to orient the cadets to mousing a hook.

Demonstration and performance was chosen for TP2 and TP3 as it allows the instructor to explain and demonstrate mousing a hook while providing an opportunity for the cadets to practice this skill under supervision.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have moused a hook.

IMPORTANCE

It is important for cadets to know how to mouse a hook as it is not only a practical skill when securing loads to a hook, but a safety precaution whenever any hook is under stress.

Teaching Point 1

Describe Mousing a Hook

Time: 5 min

Method: Interactive Lecture

MOUSING A HOOK

Mousing a hook is securely wrapping a length of line or small wire between the bill and shank of a hook.

PURPOSE

Mousing is used to prevent a load from slipping off a hook.



Identify the two parts of a hook, illustrated in Figure 1, that will be used when mousing a hook.

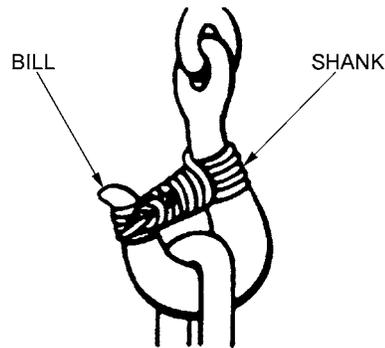


Figure 1 Completed Mousing

B-GN-181-105/FP-E00 (p. 5-46)



Have a hook moused to use as an example.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What is mousing a hook?
- Q2. What is used to mouse a hook?
- Q3. What is the purpose of mousing a hook?

ANTICIPATED ANSWERS

- A1. Mousing a hook is securely wrapping a length of line or small wire between the bill and shank of a hook.
- A2. Small line or whipping twine.
- A3. Mousing is used to prevent a load from slipping off a hook.

Teaching Point 2

Demonstrate and Have the Cadets Mouse a Hook

Time: 50 min

Method: Demonstration and Performance



Explain and demonstrate the steps to mousing a hook prior to the cadets completing their own. Distribute whipping twine, hook and handout to the cadets.



Coat hangers may be used in place of hooks. Bend one end of the coat hanger to serve as the bill of the hook.

MOUSING A HOOK

Steps to Mousing a Hook

1. Cut a length of whipping twine that is approximately six times the distance between the bill and shank of the hook (e.g. 10 cm distance between the bill and shank requires a 60 cm length of line, 2 inch distance between the bill and shank requires a 12 inch length of line, etc.).

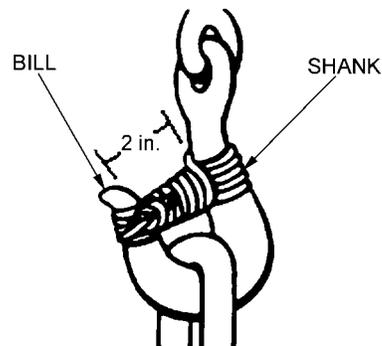


Figure 2 Example of Distance Between the Shank and Bill

B-GN-181-105/FP-E00 (p. 5-46)

2. Using the full length of twine, make a bight in the middle of the length of twine.



A bight is when you make a loop in a piece of line.

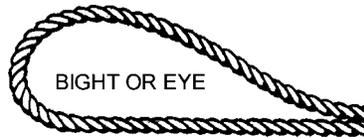


Figure 3 Bight

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 154)

3. Place the bight around the shank and pass the ends through the bight.
4. Tightly wrap the ends around the bill and back around the shank.

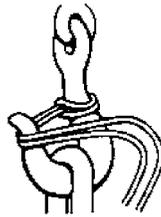


Figure 4 Mousing (Steps Three and Four)

B-GN-181-105/FP-E00 (p. 5-46)

5. Complete step four again, hauling the turns taut.
6. Holding one end of the whipping twine near the shank bring the other to the bill.



Tightly hold the whipping twine against the bill with your thumb and index finger.

7. Bring the piece of whipping twine near the shank up and around the shank.
8. Starting underneath, begin wrapping the end of the whipping twine around the turns made between the bill and shank in steps four and five.



Figure 5 Mousing (Steps Six to Eight)

B-GN-181-105/FP-E00 (p. 5-46)



Be sure to keep tension on the whipping twine to ensure the mousing does not slip off when completed.

9. Continue to wrap the whipping twine around the turns between the bill and the shank until it reaches the bill.

10. Complete the mousing by tying a reef knot between the two ends of the whipping twine at the bill of the hook.
11. Cut off the excess whipping twine.

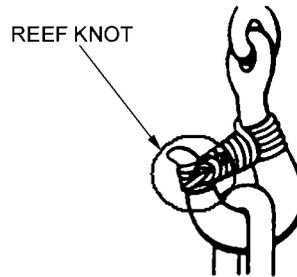


Figure 6 Mousing (Steps Nine to Eleven)

B-GN-181-105/FP-E00 (p. 5-46)



Allow the cadets to practice mousing a hook. The steps to mousing a hook are outlined in Annex A. Provide each cadet with a copy of these instructions.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. What is the first step in mousing a hook?
- Q2. What is a key point to remember when mousing a hook?
- Q3. What knot is used to end a mousing?

ANTICIPATED ANSWERS

- A1. Cut a piece of whipping twine to a length approximately six times the distance between the bill and the shank of the hook.
- A2. Be sure to keep tension on the whipping twine to ensure the mousing does not slip off when completed.
- A3. A reef knot.

END OF LESSON CONFIRMATION

The cadets' mousing a hook will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Mousing a hook is a practical skill that is still used in the Canadian Navy today when spring hooks are not available and a mousing must be applied. It is important to know how to mouse a hook in order to safely attach a load to any hook, preventing potential accidents and injuries.

INSTRUCTOR NOTES/REMARKS

Coat hangers may be used in place of hooks. Bend one end of the coat hanger to serve as the bill of the hook.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of Maritime Staff. (1997). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-003 (ISBN II 770973 5) Royal Navy. (1972). *Admiralty Manual of Seamanship 1964* (Vol. 1). London, England: Her Majesty's Stationery Office.

MOUSING A HOOK

Steps to Mousing a Hook

1. Cut a length of whipping twine that is approximately six times the distance between the bill and shank of the hook (e.g. 10 cm distance between the bill and shank requires a 60 cm length of line, 2 inch distance between the bill and shank requires a 12 inch length of line, etc.).
2. Using the full length of twine, make a bight in the middle of the length of twine.
3. Place the bight around the shank and pass the ends through the bight.
4. Tightly wrap the ends around the bill and back around the shank.
5. Complete step four again, hauling the turns taut.
6. Holding one end of the line near the shank bring the other to the bill.
7. Bring the piece of whipping twine near the shank up and around the shank.
8. Starting underneath, begin wrapping the end of the whipping twine around the turns made between the bill and shank in steps four and five.
9. Continue to wrap the whipping twine around the turns between the bill and the shank until it reaches the bill.
10. Complete the mousing by tying a reef knot between the two ends of the whipping twine at the bill of the hook.
11. Cut off the excess whipping twine.

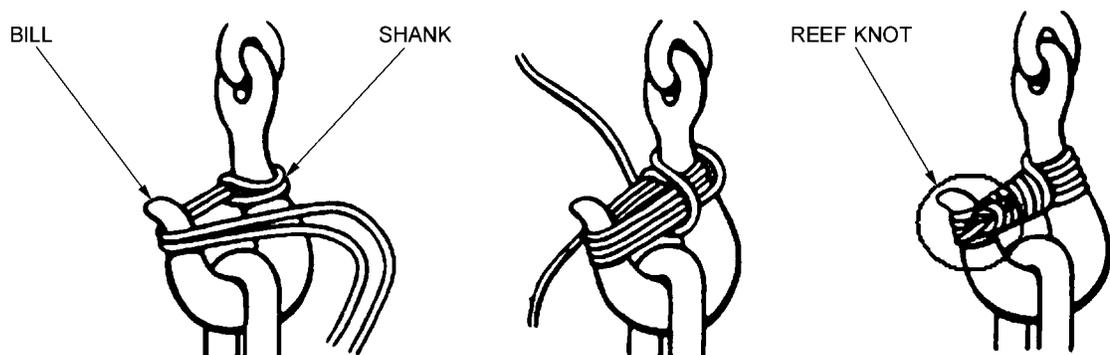


Figure A-1 Mousing a Hook
B-GN-181-105/FP-E00 (p. 5-46)

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ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 3

EO M221.03 – REEVE BLOCKS

Total Time:

30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-602/PG-001, 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.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 and TP2 as it allows the instructor to introduce blocks and to generate interest.

Demonstration and performance was chosen for TP3 as it allows the instructor to explain and demonstrate reeving a rope through a block while providing an opportunity for the cadets to practice this skill under supervision.

An in-class activity was chosen for TP4 as it is an interactive way to reinforce reeving a block and to confirm the cadets' comprehension of the material.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have reeved blocks.

IMPORTANCE

It is important for cadets to know how to reeve blocks as it is the first step in constructing pulley systems which will be introduced in future lessons. This skill will provide cadets with alternative options when lifting or moving heavy objects from one place to another.

Teaching Point 1**Describe the Parts of a Block**

Time: 5 min

Method: Interactive Lecture

WHAT IS A BLOCK?

A block is a pulley made of wood, metal, and/or synthetic-resin bonded fibre and, in some cases, a combination of wood and metal. It is used to provide assistance when moving objects from one location to another.



Have a block to use as an example.

PARTS OF A BLOCK

Crown. The top area of the block.

Cheek. The side housing of the block.

Pin. Secures the sheave between the cheeks.

Becket. An eye connected to the bottom of the block, used for securing the line when reeving two or more blocks.

Tail. The lower area of the block.

Sheave. The wheel found inside the cheeks of the block that the lines sits on.

Swallow. The space between the sheave and the crown of the block. This distance determines the maximum size of line a block can handle.

Head Fitting (Eye). An eye located at the top of the block, used for connecting the block to a deckhead, bulkhead, etc.

Tally plate. A metal plate that identifies a block's safe working load. It is fixed to the cheek of the block.

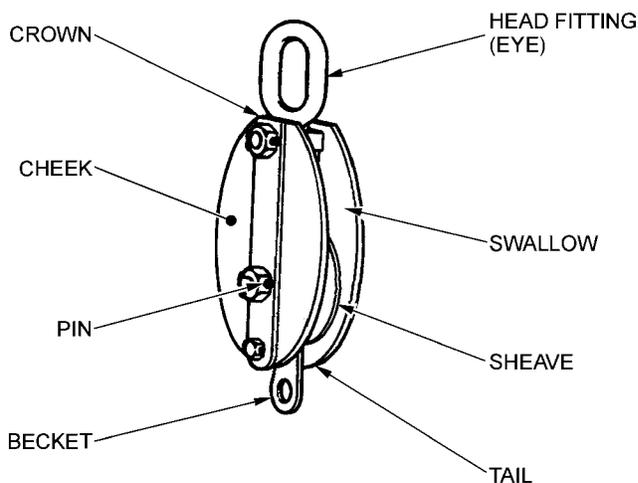


Figure 1 Parts of a Metal Block

B-GN-181-105/FP-E00 (p. 5-94)

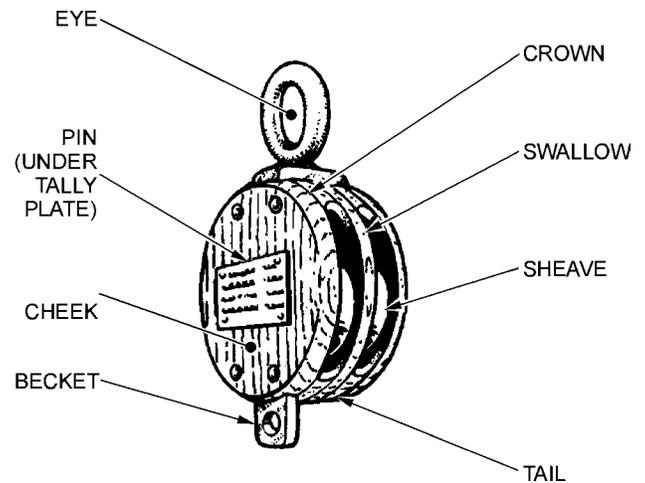


Figure 2 Parts of a Wooden Block

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 210)

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What is a block?
- Q2. What is the side housing of a block called?
- Q3. What is the swallow?

ANTICIPATED ANSWERS

- A1. A block is a pulley made of wood, metal, and/or synthetic-resin bonded fibre and, in some cases, a combination of wood and metal.
- A2. The cheek.
- A3. The space between the sheave and the crown of the block. This distance determines the maximum size of line a block can handle.

Teaching Point 2

Describe the Blocks for Reeving

Time: 5 min

Method: Interactive Lecture

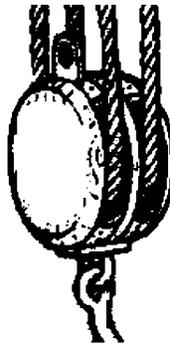
There are two different blocks that are commonly used in the Cadet Program.

Single Block. This block consists of one sheave. A single block can be used as a stand alone block, which will provide a change of direction when pulling a load. It can also be used in series with additional single or double blocks.

Double Block. This block consists of two sheaves. The double block is not a stand alone block, and is used in a series with other types of blocks.



SINGLE BLOCK



DOUBLE BLOCK

Figure 3 Single and Double Block

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 218)



Have a single and double block to use as an example.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. How many sheaves does a single block have?
- Q2. What type of block has two sheaves?
- Q3. What does a stand alone single block provide?

ANTICIPATED ANSWERS

- A1. One.
- A2. A double block.
- A3. A change of direction.

Teaching Point 3

Demonstrate and Have the Cadets Practice Reeving a Line Through a Block

Time: 10 min

Method: Demonstration and Performance



Explain and demonstrate how to reeve a line through a block.

REEVING

Lines are reeved through the sheave of the block.

When reeving blocks the line should be checked for kinks and tangles. Coiling or faking out the line will help prevent this from occurring.

Take one end of the line and feed it through the sheave of the block. When the line has been reeved through the block a figure eight knot shall be tied in the end.

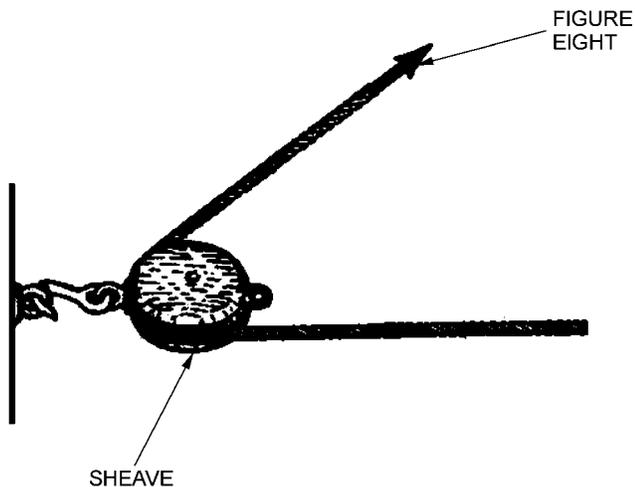


Figure 4 Reeving a Block

Royal Navy, Admiralty Manual of Seamanship 1964, Her Majesty's Stationery Office (p. 216)



Allow the cadets to practice reeving a single block. The block should be attached to a wall or object to prevent the block from moving while reeving.

CONFIRMATION OF TEACHING POINT 3

The cadet's participation in reeving blocks will serve as the confirmation of this TP.

Teaching Point 4

Conduct an Activity for Reeving Blocks

Time: 5 min

Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have cadets review the parts of a block and reeve blocks.

RESOURCES

- Block labels located at Annex A.
- Two single blocks per group.

- Tape.
- Bag per group.
- A length of line per group.

ACTIVITY LAYOUT

- Mark off a starting line.
- For each group, lay out one single block for labelling the parts five metres from the starting line.
- Lay another single block with a length of line at a distance five metres from the other block.
- Cut out the block labels and place them in a bag.

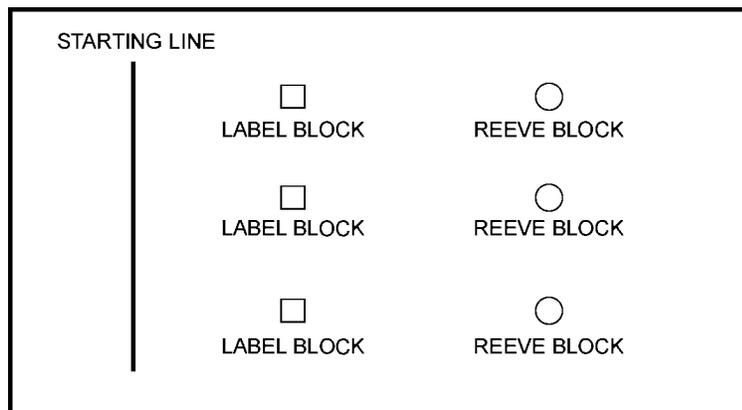


Figure 5 Activity Layout

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

ACTIVITY INSTRUCTIONS

- Divide the cadets into two groups.
- Have each group line up behind the starting line.
- On the starting signal, the first cadet must choose a label from the bag, run to the block, and place the label on the corresponding part.
- When the label is placed on the block, return to the starting line, where the next person will choose a label from the bag and run to the block and label it accordingly.
- If a team member labels a part incorrectly, the label is to be placed back into the bag.
- The first team to label the entire block correctly will advance to the other single block and reeve it.
- The block is reeved once the figure eight knot has been tied.
- The first team to correctly label and reeve the block is the winner.

SAFETY

This activity must be conducted in a large area that is free of obstructions.

CONFIRMATION OF TEACHING POINT 4

The cadet's participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the activity in TP4 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

For a block to work efficiently the line must move freely; therefore lines should be free of kinks and tangles when reeving blocks. This skill will be applied in future rigging tasks.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of Maritime Staff. (1997). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-003 (ISBN II 770973 5) Royal Navy. (1972). *Admiralty Manual of Seamanship 1964* (Vol. 1). London, England: Her Majesty's Stationery Office.

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BLOCK LABELS

HEAD FITTING (EYE)

SWALLOW

TAIL

CHEEK

CROWN

SHEAVE

BECKET

PIN

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ROYAL CANADIAN SEA CADETS

PHASE TWO

INSTRUCTIONAL GUIDE



SECTION 4

EO M221.04 – IDENTIFY COMPONENTS OF TACKLES

Total Time:

30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-602/PG-001, 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.

Prepare and rig the tackles that are to be presented during this lesson.

Photocopy the labels located at Annex A. Photocopy the handout located at Annex B for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1, TP3, and TP4 as it allows the instructor to introduce components of tackles and to create interest in ropework.

An in-class activity was chosen for TP2 as it is an interactive way to provoke thought, stimulate interest, and to confirm the cadets' comprehension of the parts of the tackle.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall identify components of tackles.

IMPORTANCE

It is important for cadets to know the components of tackles to understand how to use tackles at the maximum efficiency possible with minimal effort. The concepts surrounding tackles will provide assistance when completing future seamanship based tasks.

Teaching Point 1**Describe Tackles**

Time: 10 min

Method: Interactive Lecture

WHAT IS A TACKLE (PRONOUNCED “TAYCKLE”)?

A purchase is a mechanical device to which an applied pull or force is increased. A tackle is a purchase consisting of a rope rove through a block or multiple blocks, providing assistance to lifting a load. The amount of force of the pull required to lift a load is dependent on the number of sheaves in the blocks and the manner in which the rope is rove through them.

TYPES OF TACKLES

Single Whip. This is a tackle consisting of a line rove through a single block. It is used for hoisting light loads, and where speed of hoisting is an important factor.

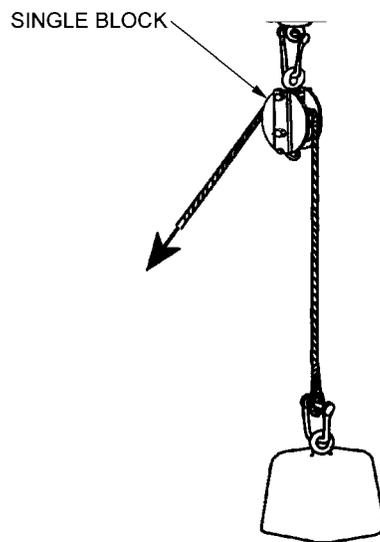


Figure 1 Single Whip

B-ON-050-002/PT-004, BR 67 Admiralty Manual of Seamanship (p. 3-154)

Double Whip. This is a tackle consisting of a line rove through two single blocks. It is mainly used for hoisting loads.

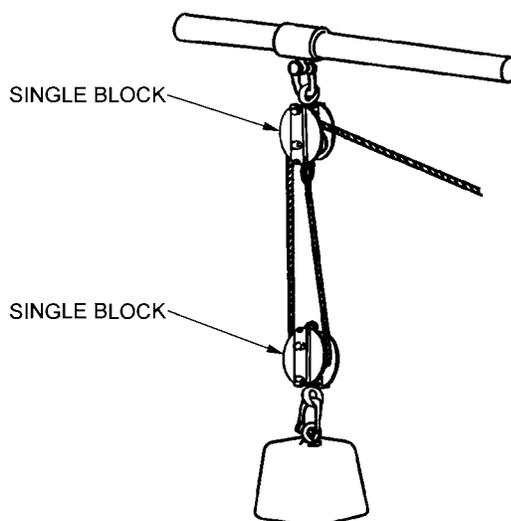


Figure 2 Double Whip

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

Luff. This is a tackle consisting of a line rove through a single and double block.

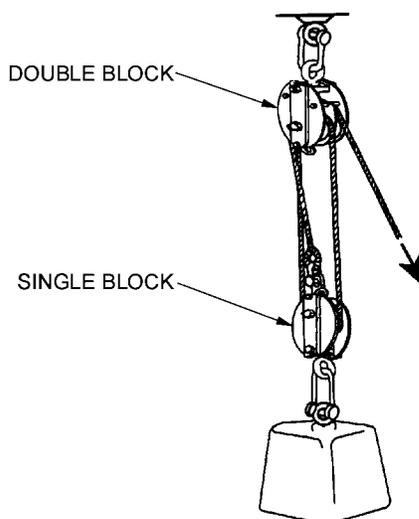


Figure 3 Luff

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

Two-fold Purchase. This is a tackle consisting of a piece of line rove through two double blocks. It is a useful general-purpose tackle, as it provides the greatest assistance of the four tackles described in this lesson.

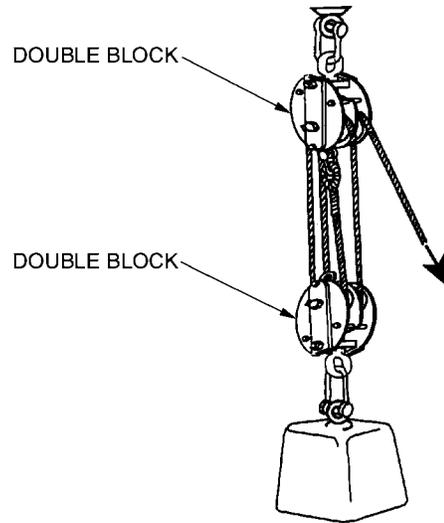


Figure 4 Two-fold Purchase

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)



The type of tackle used will depend on the assigned task. Things to consider will be, blocks available, length of line available, weight of the load, distance the load is to be moved, location, and the strength and number of people available to control the tackle.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What is a single whip tackle?
- Q2. What blocks make up a luff?
- Q3. What tackle is considered a useful general-purpose tackle?

ANTICIPATED ANSWERS

- A1. A line rove through a single block.
- A2. A single and a double block.
- A3. A two-fold purchase.

Teaching Point 2**Describe the Parts of a Tackle**

Time: 10 min

Method: In-Class Activity

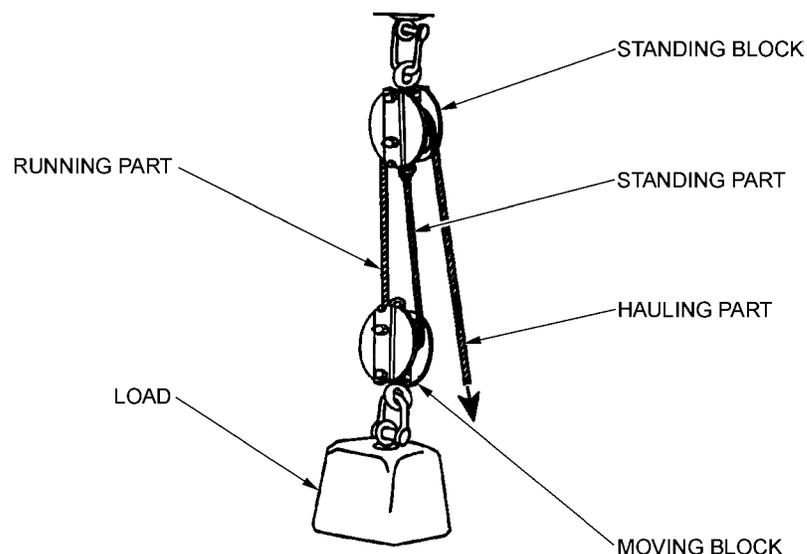
PARTS OF A TACKLE

Figure 5 Parts of a Tackle

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

Standing Block. This block is attached to a fixed surface and does not move when the tackle is being used.

Standing Part. This is the line attached to the standing block and is rove through the moving block.

Hauling Part. This is either hauled or eased out to hoist, lower, or move the load.

Moving Block. This block is attached to the load being hoisted/lowered/moved and moves when the hauling part is pulled or eased out respectively.

Running Part. This is the line that is rove through the moving and standing block.

Load. Any item or load, connected to a tackle, being hoisted or moved from one point to another.

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to review the parts of a tackle.

RESOURCES

- Two single blocks.
- Two metres of line.
- A load of 22 kg (50 lbs) or less.

- Tackle labels located at Annex A to this EO.
- Tape.

ACTIVITY LAYOUT

Rig two double whip tackles and place them in the front of the class.

ACTIVITY INSTRUCTIONS

- Divide cadets into two groups.
- Provide each team with a set of tackle labels and tape.
- Assign each group to a double whip.
- Have each group label the double whip.

SAFETY

N/A.



If there is a large group, make additional sets of labels and double whips.

CONFIRMATION OF TEACHING POINT 2

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

Teaching Point 3

Time: 20 min

Describe Mechanical Advantage

Method: Interactive Lecture

MECHANICAL ADVANTAGE

The amount by which the pull on the hauling part is multiplied by the tackle is called the mechanical advantage (MA) and, if friction is disregarded, this is equal to the number of parts of line emerging from the moving block.



For the point of this lesson friction will be disregarded.

Figure 6 is an example of the MA in a tackle. There are two lines attached to the moving block, therefore the MA equals two.

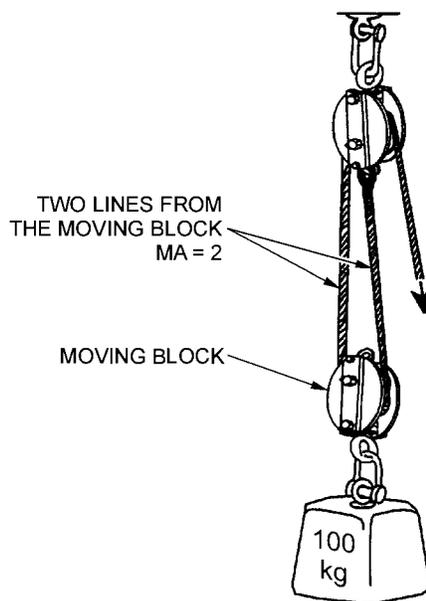


Figure 6 Mechanical Advantage

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-152)

The MA will change how heavy the load feels to the person(s) pulling on the hauling part. For example, in Figure 6 the MA equals two. Therefore, the weight felt would equal 50 kg for the 100 kg load, meaning the weight felt is equal to 1/2 the actual weight of the load.

The following formula is an easy way to determine the weight felt by the hauling part.

$$\text{WEIGHT} = (1 / \text{MA}) \times \text{Actual Load Weight}$$

Example:

MA equals three, load weight equals 300 kg

$$\text{WEIGHT} = (1/3) \times 300 \text{ kg}$$

$$\text{WEIGHT} = 100 \text{ kg}$$

MECHANICAL ADVANTAGE IN TACKLES

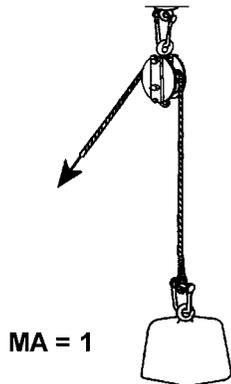


Figure 7 Single Whip MA

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

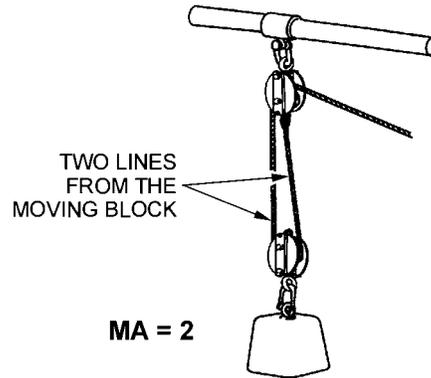


Figure 8 Double Whip MA

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

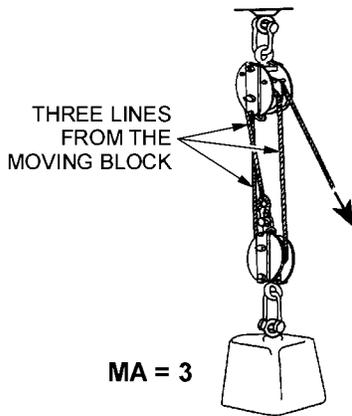


Figure 9 Luff MA

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

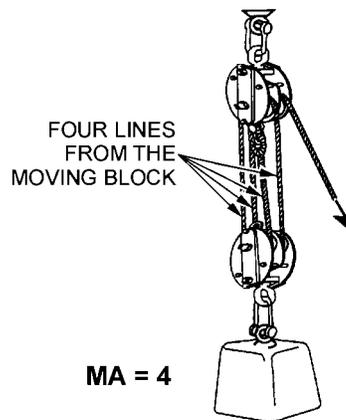


Figure 10 Two-Fold Purchase MA

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

RIGGING TO ADVANTAGE AND DISADVANTAGE

If a tackle from Figure 8 to Figure 10 was flipped upside down there would be an extra part of the line emerging from the moving block. The MA would therefore increase by one. When a tackle is rigged to this maximum MA it is rigged to advantage. When the tackle is rigged as in Figures 8 and 9 it is rigged to disadvantage. The single whip provides no advantage. The weight felt on the hauling part will be the actual weight of the load.

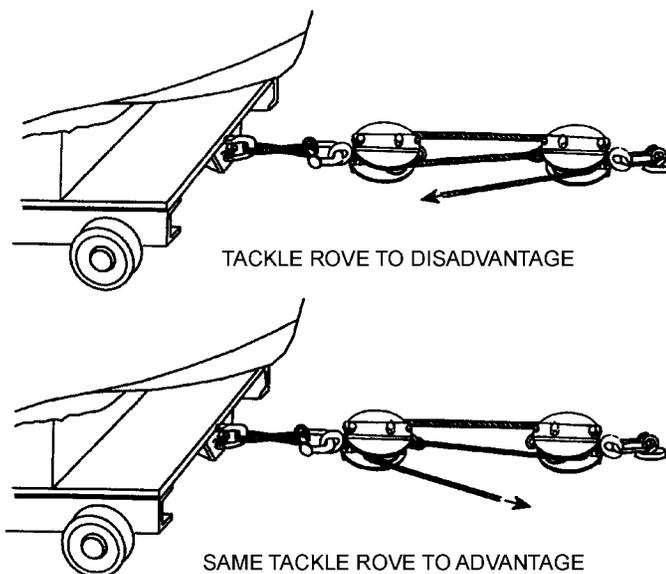


Figure 11 Rigging to Advantage and Disadvantage

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

Tackle	MA When Rigged to Disadvantage	MA When Rigged to Advantage
Single Whip	1	1
Double Whip	2	3
Luff	3	4
Two-Fold Purchase	4	5

Figure 12 Advantage vs. Disadvantage

D Cds 3, 2007, Ottawa, ON: Department of National Defence



Normal use of tackles will result in many tackles being rigged to disadvantage as it is easier to pull downwards on the hauling part. To maximize MA, change the direction of pull by reeving the hauling part through an additional single block.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. What is the MA of a double whip rigged to disadvantage?
- Q2. If the MA equals two and the actual load weight equals 500 kg, what is the weight felt by the hauling part?
- Q3. What is the MA of a two-fold purchase when rigged to advantage?

ANTICIPATED ANSWERS

- A1. Two.
 A2. 250 kg.
 A3. Five.

Teaching Point 4

Time: 10 min

Describe Velocity Ratio

Method: Interactive Lecture

VELOCITY RATIO

The ratio between the distance moved by the hauling part and the distance moved by the moving block is known as velocity ratio (VR) and is always equal to the number of parts of the line coming from the moving block.

The VR is directly related to the amount of MA of a tackle. MA is gained only at the expense of speed of work, or how much you must pull in order to move a load a desired distance. If the MA is increased so is the VR, therefore, requiring more line to move a load the desired distance.

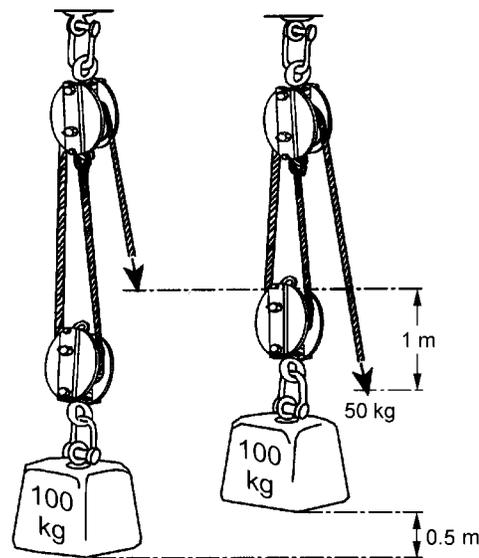


Figure 13 Velocity Ratio of a Tackle

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-152)

In Figure 13, in order to raise the load 0.5 m the hauling part is required to move a distance of 1 m.

If the distance the load must be moved and the VR are known, calculate the hauling part distance using the following formula:

$$\text{Hauling Part Distance} = \text{Distance the Load Must be Moved} \times \text{VR}$$

Example:

VR equals 2, distance the load must be moved 0.5 m.

$$\text{Hauling Part Distance} = 0.5 \text{ m} \times 2$$

Hauling Part Distance = 1 m

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

- Q1. What is the term for the ratio between the distance moved by the hauling part and the distance moved by the moving block?
- Q2. If there are four parts of the line emerging from the moving block, what is the VR?
- Q3. What is the hauling part distance required to move a load 20 m, with a tackle that has a VR of two?

ANTICIPATED ANSWERS

- A1. Velocity ratio.
- A2. Four.
- A3. 40 m.
-

END OF LESSON CONFIRMATION

Have cadets complete the handout located at Annex B.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

The ability to identify the components of a tackle will assist in completing ropework tasks more efficiently with minimal effort. Understanding the concepts surrounding tackles will provide the knowledge to maximize the use of these tackles.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C1-003 (ISBN II 770973 5) Royal Navy. (1972). *Admiralty Manual of Seamanship 1964* (Vol. 1). London, England: Her Majesty's Stationery Office.

C1-047 (ISBN 0 11 772695 8) B-ON-050-002/PT-004 Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: HMSO Publications Centre.

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TACKLE LABELS

STANDING BLOCK

RUNNING PART

STANDING PART

HAULING PART

MOVING BLOCK

LOAD

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TACKLES REVIEW

1. What type of blocks make up a luff tackle? _____.
2. What type of blocks make up a two-fold purchase? _____.
3. What is the following tackle called? _____.



Figure B-1 Tackle

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

4. Identify the tackle rigged to advantage/disadvantage? Circle the appropriate answer:

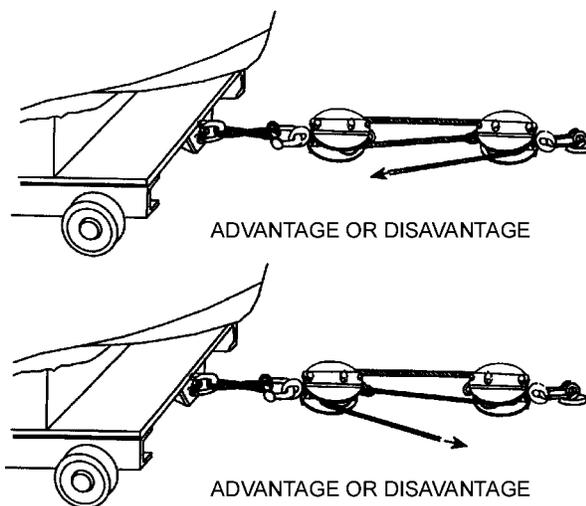


Figure B-2 Advantage or Disadvantage

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

5. What is the mechanical advantage (MA) of a luff when rigged to:
 - a. disadvantage _____.
 - b. advantage _____.
6. If you want to lift a load of 200 kg using a two-fold purchase rigged to advantage, what would be the weight felt by the hauling part? _____.

7. If you want to raise a load a distance of four metres using a double whip rigged to disadvantage, what would be the required hauling distance? _____.

TACKLES REVIEW – ANSWER KEY

1. What type of blocks make up a luff tackle? One single block and one double block.
2. What type of blocks make up a two-fold purchase? Two double blocks.
3. What is the following tackle called? A luff.



Figure C-1 Tackle

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

4. Identify the tackle rigged to advantage/disadvantage? Circle the appropriate answer:

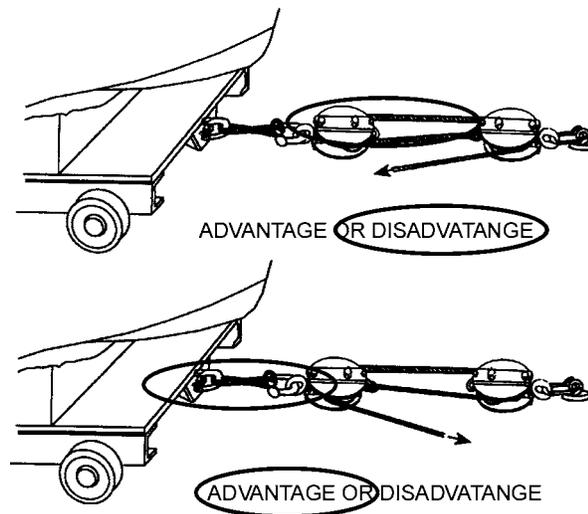


Figure C-2 Advantage or Disadvantage

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)

5. What is the mechanical advantage (MA) of a luff when rigged to:
 - a. disadvantage Two.
 - b. advantage Three.
6. If you want to lift a load of 200 kg using a two-fold purchase rigged to advantage, what would be the weight felt by the hauling part? Forty kilograms.

7. If you want to raise a load a distance of four metres using a double whip rigged to disadvantage, what would be the required hauling distance? Eight metres.



ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 5

EO M221.05 – RIG TACKLES

Total Time:

90 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-602/PG-001, 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 station cards located at Annex A.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for TP1 to TP4 as it allows the instructor to explain and demonstrate how to rig various tackles while providing an opportunity for the cadets to practice these skills under supervision.

An in-class activity was chosen for TP5 as it is an interactive way to reinforce rigging tackles and to confirm the cadets' comprehension of the material.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall rig tackles.

IMPORTANCE

It is important for cadets to know how to rig tackles to be able to perform tasks that would be otherwise too difficult to complete. This knowledge will provide assistance when completing future ropework tasks.

Teaching Point 1

Explain the Use of, Demonstrate, and Have Cadets Rig a Single Whip

Time: 5 min

Method: Demonstration and Performance

 Explain and demonstrate how to rig a single whip.

SINGLE WHIP

A single whip is used for hoisting light loads where speed is an important factor.

STEPS TO RIGGING

1. Lay a single block on its cheek.
2. Reeve the line through the sheave.
3. Finish rigging by tying a figure eight knot in the line's end.
4. Secure the standing block to a deckhead/post, etc.
5. Secure the line to the load.
6. Mouse all hooks.
7. Raise the load by hauling in on the hauling part.

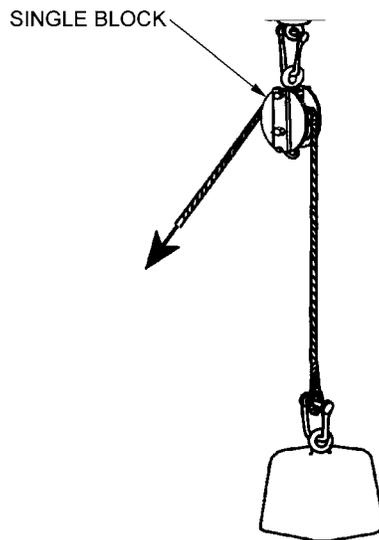


Figure 1 Single Whip

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

MECHANICAL ADVANTAGE

The single whip provides a mechanical advantage (MA) equal to one and is often used to change the direction of pull on the hauling part of a tackle.



Allow the cadets to practice rigging a single whip.

CONFIRMATION OF TEACHING POINT 1

The cadets' rigging of a single whip will serve as the confirmation of this TP.

Teaching Point 2

Explain the Use of, Demonstrate, and Have the Cadets Rig a Double Whip

Time: 15 min

Method: Demonstration and Performance



Explain and demonstrate how to rig a double whip.

DOUBLE WHIP

A double whip consists of two single blocks and is used for hoisting.

STEPS TO RIGGING

1. Lay two single blocks on their cheeks with the becket toward each other.
2. Label one block A and the other block B.
3. Starting with block A, secure the line to the becket with a bowline.
4. Reeve the other end of the line through the sheave of block B.
5. Reeve the line through the sheave of block A.
6. Finish rigging by tying a figure eight knot in the line's end.
7. Secure the standing block to a deckhead/post, etc.
8. Secure the load to block B.
9. Mouse all hooks.
10. Raise the load by hauling in on the hauling part.

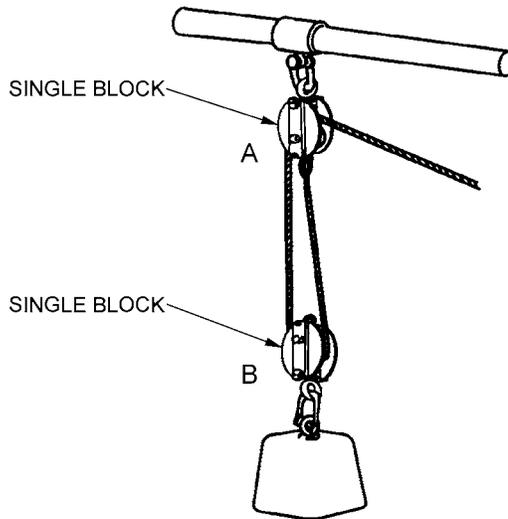


Figure 2 Double Whip

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

MECHANICAL ADVANTAGE

The double whip provides a mechanical advantage of two or three depending on the number of lines coming from the moving block. In Figure 2 the MA equals two (rigged to disadvantage). If this tackle was reversed, it would result in three lines coming from the moving block, changing the MA to three (rigged to advantage).



Allow the cadets to practice rigging a double whip to both advantage and disadvantage.

CONFIRMATION OF TEACHING POINT 2

The cadets' rigging of a double whip will serve as the confirmation of this TP.

Teaching Point 3

Explain the Use of, Demonstrate, and Have the Cadet Rig a Luff

Time: 20 min

Method: Demonstration and Performance



Explain and demonstrate how to rig a luff.

LUFF

A luff consists of one single block and one double block.

STEPS TO RIGGING

1. Lay the single and double blocks on their cheeks with the becket toward each other.
2. Label the single block A and the double block B.
3. Starting with block A, secure the line to the becket with a bowline.
4. Reeve the other end of the line through the lower sheave of block B.
5. Reeve the line through the sheave of block A.
6. Reeve the line through the upper sheave of block B.
7. Finish rigging by tying a figure eight knot in the line's end.
8. Secure the standing block to a deckhead/post, etc.
9. Secure the load to block A.
10. Mouse all hooks.
11. Raise the load by hauling in on the hauling part.

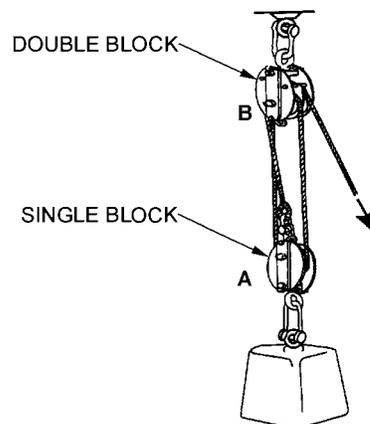


Figure 3 Luff

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-154)

MECHANICAL ADVANTAGE

The luff provides a mechanical advantage of three or four depending if it is rove to advantage or disadvantage. In Figure 3 the MA equals three (rigged to disadvantage) because there are three lines coming from the moving block. If this tackle was reversed, it would result in four lines coming from the moving block, changing the MA to four (rigged to advantage).



Allow the cadets to practice rigging a luff to both advantage and disadvantage.

CONFIRMATION OF TEACHING POINT 3

The cadets' rigging of a luff will serve as the confirmation of this TP.

Teaching Point 4

Explain the Use of, Demonstrate, and Have the Cadets Rig a Two-Fold Purchase

Time: 20 min

Method: Demonstration and Performance



Explain and demonstrate how to rig a two-fold purchase.

TWO-FOLD PURCHASE

A two-fold purchase is a useful general-purpose tackle and consists of two double blocks.

STEPS TO RIGGING

1. Lay the two double blocks on their cheeks with the becket toward each other.
2. Label one block A and the other block B.
3. Starting with block A, secure the line to the becket with a bowline.
4. Reeve the other end of the line through the lower sheave of block B.
5. Reeve the line through the lower sheave of block A.
6. Reeve the line through the upper sheave of block B.
7. Reeve the line through the upper sheave of block A.
8. Finish rigging by tying a figure eight knot in the line's end.
9. Secure the standing block to a deckhead/post, etc.
10. Secure the load to block B.
11. Mouse all hooks.
12. Raise the load by hauling in on the hauling part.

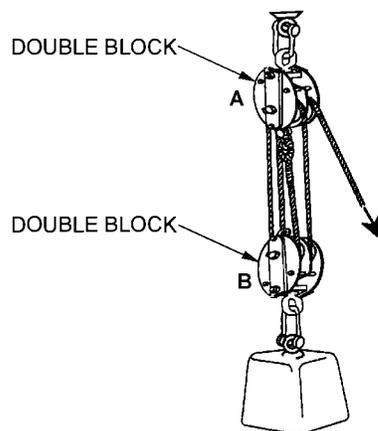


Figure 4 Two-fold Purchase

Command of Defence Council, BR 67 Admiralty Manual of Seamanship, Her Majesty's Stationery Office (p. 3-155)



Be careful not to cross the lines as you are reeving each block.

MECHANICAL ADVANTAGE

The two-fold purchase provides a mechanical advantage of four or five depending if it is rove to advantage or disadvantage. In Figure 4 the MA equals four (rigged to disadvantage) because there are four lines coming from the moving block. If this tackle was reversed, it would result in five lines coming from the moving block, changing the MA to five (rigged to advantage).



Allow the cadets to practice rigging a two-fold purchase to both advantage and disadvantage.

CONFIRMATION OF TEACHING POINT 4

The cadets' rigging of a two-fold purchase will serve as the confirmation of this TP.

Teaching Point 5

Conduct an Activity for Rigging Tackles

Time: 20 min

Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have cadets review rigging tackles.

RESOURCES

- Two single blocks.
- Two double blocks.
- Twenty-six metres of line.
- A load of 22 kg (50 lbs) or less.
- Bag (any type).
- Whistle.
- Stopwatch.
- Station cards located at Annex A.

ACTIVITY LAYOUT

- Mark off a start area.
- Next to the start area lay out two single blocks, two double blocks, and two lengths of line.
- Place the load at station two.
- Set-up the pylons as illustrated in Figure 5.
- Place a bag at each station.
- In each bag place the corresponding station card located at Annex A.

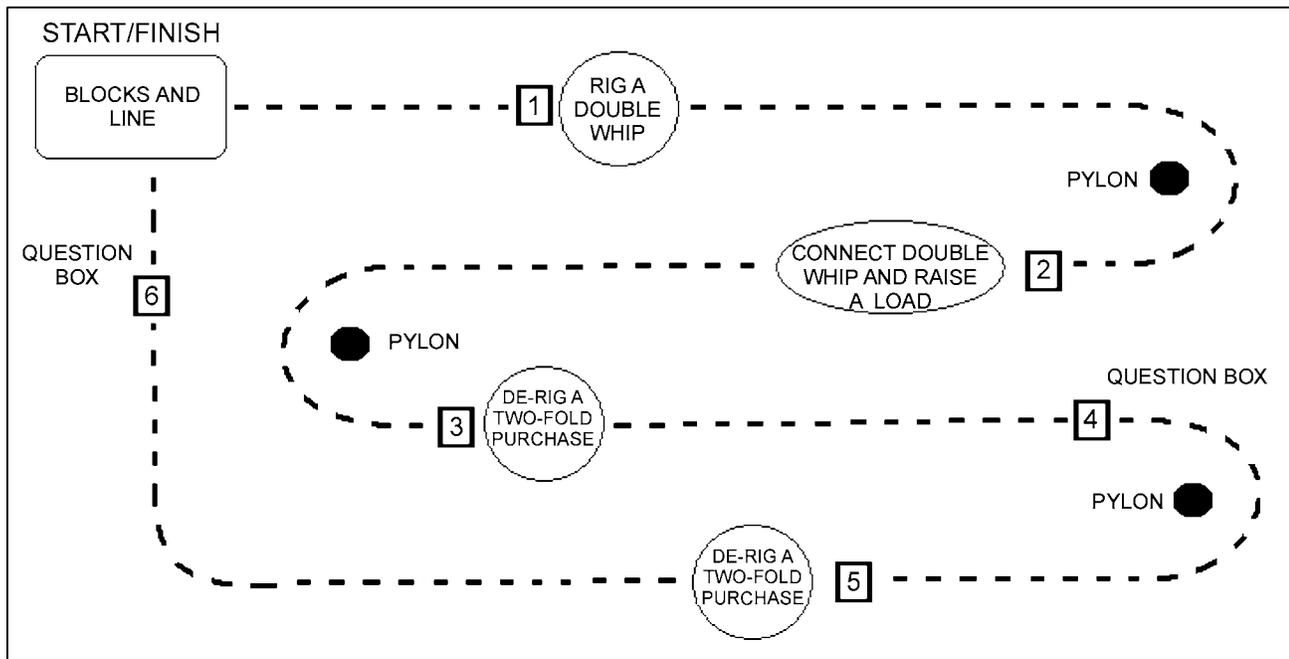


Figure 5 Tackle Run

D Cds 3, 2007, Ottawa, ON: Department of National Defence

ACTIVITY INSTRUCTIONS

1. Divide the cadets into two or more teams.
2. Have one team line up behind the start area.
3. On the whistle signal, the team must gather up the blocks and line located at the start area.
4. The team must then advance to each station consecutively and complete the task found on the card.
5. The team will continue the course until all tasks have been completed correctly.
6. The team is finished when all members have crossed the finish line.
7. If a team is unable to complete a task they will be required to return to the start line and re-start.
8. Have each team repeat steps two to eight.
9. The team that completes the tackle run with the fastest time is the winner.



If a team is required to re-start, review the areas in which the team had difficulties prior to allowing them another opportunity to complete the tackle run.

For each question answered correctly five seconds will be deducted from the team's finish time.

SAFETY

This activity must be conducted in a large area that is free of obstructions.

CONFIRMATION OF TEACHING POINT 5

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

END OF LESSON CONFIRMATION

The cadets' participation in the TPs will serve as the confirmation of this lesson.

CONCLUSION**HOMEWORK/READING/PRACTICE**

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Rigging tackles free of twists and tangles will enable the line to move freely through the blocks ensuring the tackle works efficiently. The ability to rig tackles will provide the necessary assistance to perform tasks that require the movement of heavy loads, with little difficulty.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C1-047 (ISBN 0 11 772695 8) B-ON-050-002/PT-004 Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: HMSO Publications Centre.

STATION CARDS

STATION ONE

RIG A DOUBLE WHIP. CARRY THE DOUBLE WHIP TO STATION TWO.

STATION TWO

THE DOUBLE WHIP IS TO BE RIGGED TO DISADVANTAGE. CONNECT THE DOUBLE WHIP TO THE LOAD AND RAISE THE LOAD TWO METRES. DE-RIG THE DOUBLE WHIP AND CARRY THE BLOCKS AND LINE TO THE NEXT STATION.

STATION THREE

RIG A TWO-FOLD PURCHASE. CARRY THE TWO-FOLD PURCHASE TO STATION FOUR.

STATION FOUR

QUESTION:
WHAT IS THE MECHANICAL ADVANTAGE OF A LUFF RIGGED
TO DISADVANTAGE?

CARRY THE TWO-FOLD PURCHASE TO STATION FIVE.

STATION FIVE

DE-RIG THE TWO-FOLD PURCHASE. CARRY THE BLOCKS AND
LINE TO STATION SIX.

STATION SIX

QUESTION:
WHAT IS THE MECHANICAL ADVANTAGE OF A TWO-FOLD
PURCHASE RIGGED TO ADVANTAGE?

CARRY THE BLOCKS AND LINE TO THE FINISH AREA.



ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 6

EO C221.01 – MAKE A BACK SPLICE

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-602/PG-001, 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 handouts located at Annexes A and B for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate making a crown knot and a back splice while providing an opportunity for the cadets to practice these skills under supervision.

INTRODUCTION

REVIEW

Review three-strand line from EO M221.01 (Use a Strop for Slinging).

OBJECTIVES

By the end of this lesson the cadet shall have made a back splice.

IMPORTANCE

It is important for cadets to know how to make a back splice as it is an effective way to finish the end of a line, preventing it from unlaying while it is in use.

Teaching Point 1**Explain the Use of, Demonstrate, and Have the Cadets Tie a Crown Knot**

Time: 25 min

Method: Demonstration and Performance

CROWN KNOT

A crown knot is used to begin the back splice and is a basis for more complicated knots, but is seldom used on its own. When finished, the crown knot leaves the three strands pointing back along the length of the line as illustrated in Figure 6.



Explain and demonstrate the steps to making a crown knot prior to the cadets completing their own. Distribute the handout located at Annex A to the cadets.

STEPS TO MAKING A CROWN KNOT

The strands in the following figures will be identified by capital letters, whereas loops formed between these strands will be identified by numbers.

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g., a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).

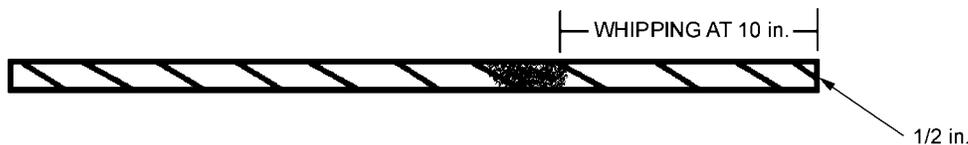


Figure 1 Example of Whipping Distance

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

2. Unlay the strands of the line back to the whipping and whip the ends of each strand.



Masking tape may be used as an alternate way of finishing the ends of each strand, instead of a whipping.

3. Spread the strands out in the form of a star.

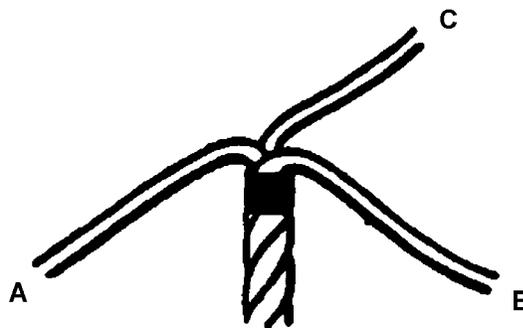


Figure 2 Star Formation
B-GN-181-105/FP-E00 (p. 5-38)

4. Bring strand A to the front to form a loop and lay it over strand B.

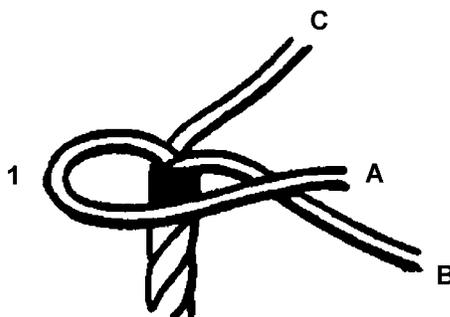


Figure 3 Step Four
B-GN-181-105/FP-E00 (p. 5-38)

5. Loop strand B over A and C.

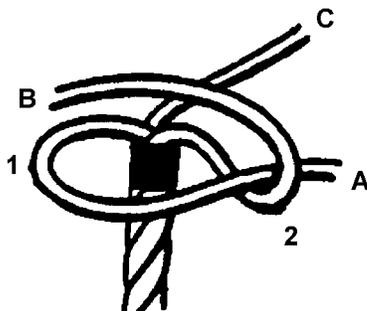


Figure 4 Step Five
B-GN-181-105/FP-E00 (p. 5-38)

6. Loop strand C over strand B and through loop 1.

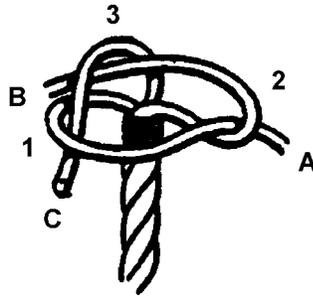


Figure 5 Step Six

B-GN-181-105/FP-E00 (p. 5-38)

7. Pull all strands taut until the crown knot is tidy and uniform.

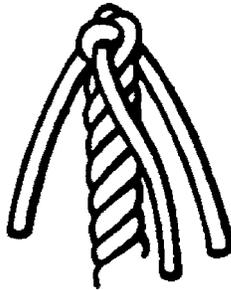


Figure 6 Finished Crown Knot

B-GN-181-105/FP-E00 (p. 5-55)



Allow the cadets to practice tying a crown knot.

Complete an additional crown knot with the cadets so they can follow along.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What is a crown knot used for?
- Q2. What distance should the whipping be from the end of the line?
- Q3. What is the final step in creating the crown knot?

ANTICIPATED ANSWERS

- A1. To begin the back splice as well as a basis for more complicated knots, but is seldom used on its own.
- A2. A distance equal to 20 times its diameter.
- A3. To pull all strands taut until the crown knot is tidy and uniform.

Teaching Point 2**Explain the Use of, Demonstrate, and Have the Cadets Make a Back Splice**

Time: 30 min

Method: Demonstration and Performance

BACK SPLICE

The back splice is used to finish the end of a line that is not required to pass through a block, eye plate or similar fitting.



Figure 7 Back Splice

B-GN-181-105/FP-E00 (p. 5-55)

Explain and demonstrate the steps to making a back splice prior to the cadets completing their own.

Distribute the handout located at Annex B to the cadets.

Cadets can use the same line from TP1 to complete the back splice.

STEPS TO MAKING THE BACK SPLICE

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g., a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).



Figure 8 Example of Whipping Distance

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

2. Unlay the strands of the line back to the whipping and whip the ends of each strand.



Masking tape may be used as an alternate way of finishing the ends of each strand, instead of a whipping.

3. Make a crown knot.

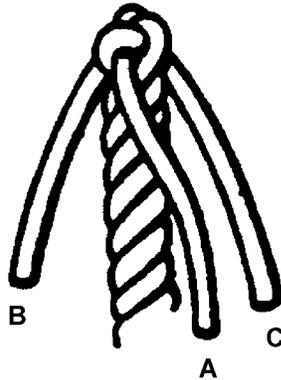


Figure 9 Crown Knot

B-GN-181-105/FP-E00 (p. 5-55)

4. Remove the whipping below the crown knot.



To make tucking the strands easier the use of a marlin spike/fid is recommended.



Always splice in the direction opposite the lay of the line.

5. Starting with A, lay it over the adjacent strand and tuck it under the next strand.

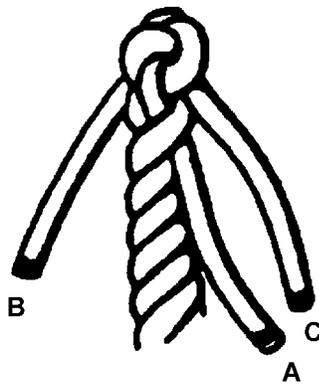


Figure 10 Back Splice

B-GN-181-105/FP-E00 (p. 5-55)

6. Lay B over the adjacent strand and tuck it under the next strand.
7. Lay C over the adjacent strand and tuck it under the next strand.
8. After each strand is tucked, pull the strands taut and tidy up the tucks until each strand is uniform.

9. Repeat tucking the strands two more times, hauling them taut.

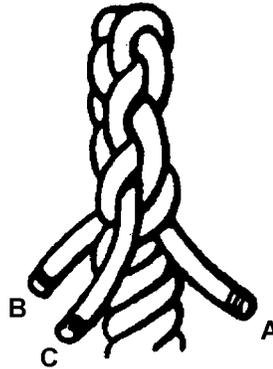


Figure 11 Back Splice

B-GN-181-105/FP-E00 (p. 5-55)

10. To finish the splice, dog the ends. To do so, remove the whipping and split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.



Allow the cadets to practice making a back splice.



Complete an additional splice with the cadets so they can follow along, asking them questions, and verifying they are making the tucks properly.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. What is a back splice used for?
 Q2. What distance should the whipping be from the end of the line?
 Q3. What knot is used to start a back splice?

ANTICIPATED ANSWERS

- A1. It is used to finish the end of a line that is not required to pass through a block, eye plate or similar fitting.
 A2. A distance equal to 20 times the diameter of the line.
 A3. A crown knot.

END OF LESSON CONFIRMATION

The cadets' participation in TP1 and TP2 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

A back splice is a useful and effective means of finishing the end of a line.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of Maritime Staff. (1997). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

STEPS TO MAKING THE CROWN KNOT

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g. a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).
2. Unlay the strands of the line back to the whipping and whip the ends of each strand.
3. Spread the strands out in the form of a star.
4. Bring strand A to the front to form a loop and lay it over strand B.
5. Loop strand B over A and C.
6. Loop strand C over strand B and through loop 1.
7. Pull all strands taut until the crown knot is tidy and uniform.

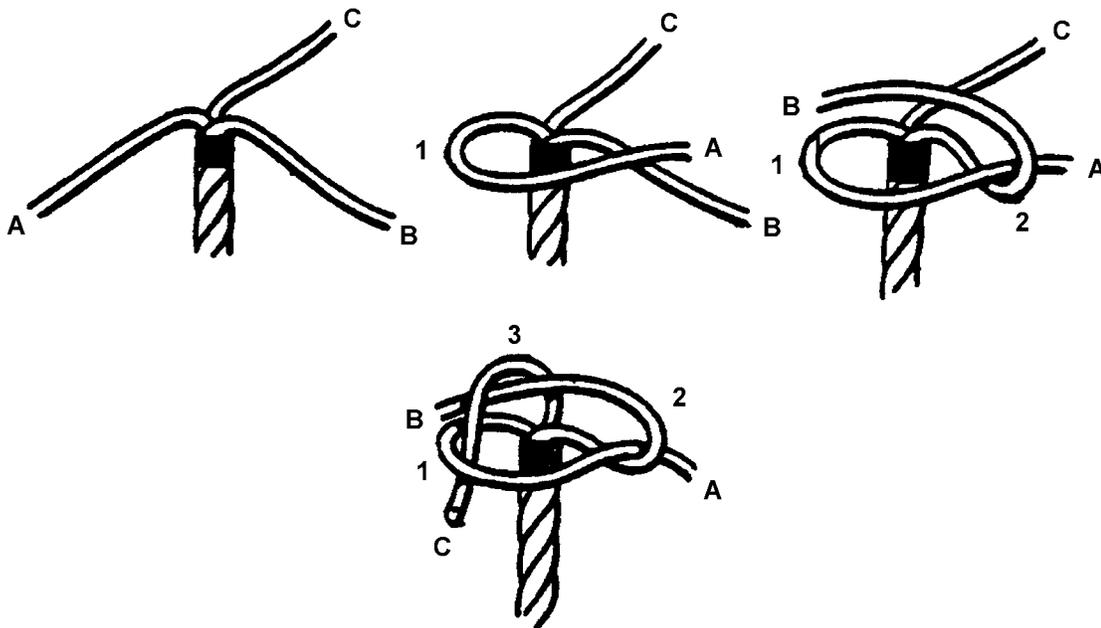


Figure A-1 Crown Knot

B-GN-181-105/FP-E00 (p. 5-38)

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STEPS TO MAKING THE BACK SPLICE

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g. a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).
2. Unlay the strands of the line back to the whipping and whip the ends of each strand.
3. Make a crown knot below the crown knot.
4. Remove the whipping.
5. Starting with A, lay it over the adjacent strand and tuck it under the next strand.
6. Lay B over the adjacent strand and tuck it under the next strand.
7. Lay C over the adjacent strand and tuck it under the next strand.
8. After each strand is tucked, pull the strands taut and tidy up the tucks until each strand is uniform.
9. Repeat tucking the strands two more times, hauling them taut.
10. To finish the splice, dog the ends. To do so, remove the whipping and split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.

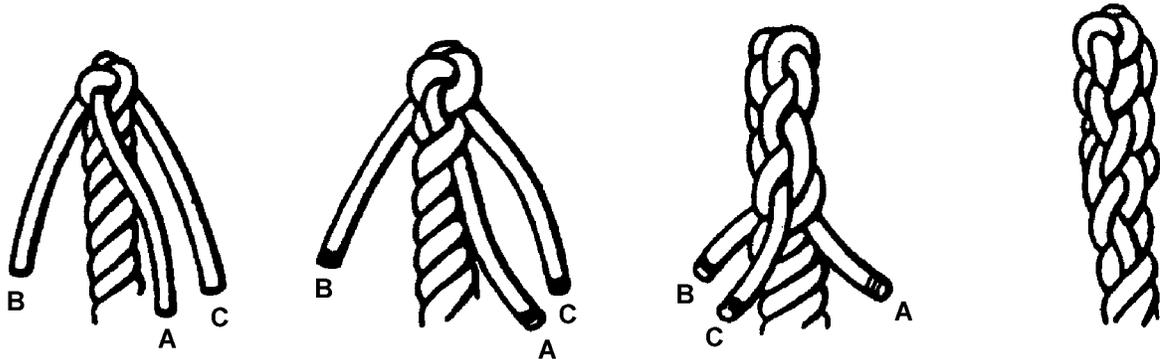


Figure B-1 Back Splice

B-GN-181-105/FP-E00 (p. 5-55)

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ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 7

EO C221.02 – MAKE AN EYE SPLICE

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-602/PG-001, 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 handout located at Annex A or B for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate making an eye splice while providing an opportunity for the cadets to practice this skill under supervision.

INTRODUCTION

REVIEW

Review three-strand line from EO M221.01 (Use a Strop for Slinging).

OBJECTIVES

By the end of this lesson the cadet shall have made an eye splice.

IMPORTANCE

It is important for cadets to know how to make an eye splice as it is a strong and effective means of making a permanent eye in the end of a line.

Teaching Point 1**Explain the Use of, Demonstrate, and Have the Cadets Make an Eye Splice**

Time: 55 min

Method: Demonstration and Performance

EYE SPLICE

An eye splice is used to make a permanent eye in the end of a line.



Figure 1 Eye Splice

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-93)



Explain and demonstrate the steps to making an eye splice prior to the cadets completing their own. Distribute the handout to the cadets.

STEPS TO MAKING AN EYE SPLICE

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g., a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).

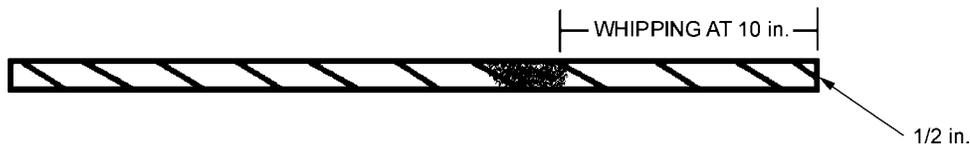


Figure 2 Example of Whipping Distance

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

2. Unlay the strands of the line back to the whipping and whip the ends of each strand.



Masking tape may be used as an alternate way of finishing the ends of each strand, instead of a whipping.

3. Mark the place intended for the crown of the eye, and bend the line back from there so as to bring the unlaidd strands alongside the place where the splice is to be made, with the left and middle strands lying on top of the line.

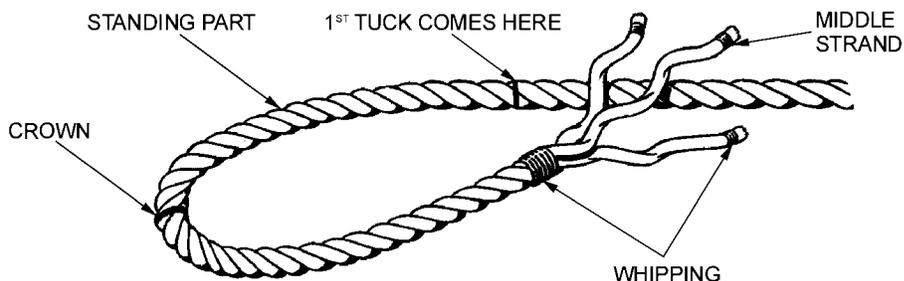


Figure 3 Start of an Eye Splice

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-92)



Strands in the following figures will be identified by letters, with the middle strand identified as letter A.

4. Tuck strand A, from right to left, under the nearest strand of the standing part.



The centre strand is always the first strand tucked.

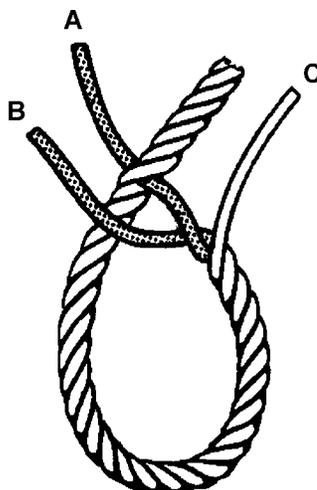


Figure 4 Step Four

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-93)

5. Tuck strand B, from right to left, under the next strand of the standing part.

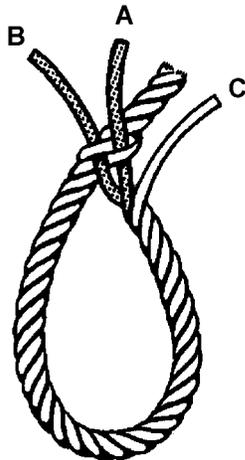


Figure 5 Step Five

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-93)

6. Turn the line over in order to bring the remaining strand C on the top, and then tuck strand C from right to left under the unoccupied strand of the standing part.

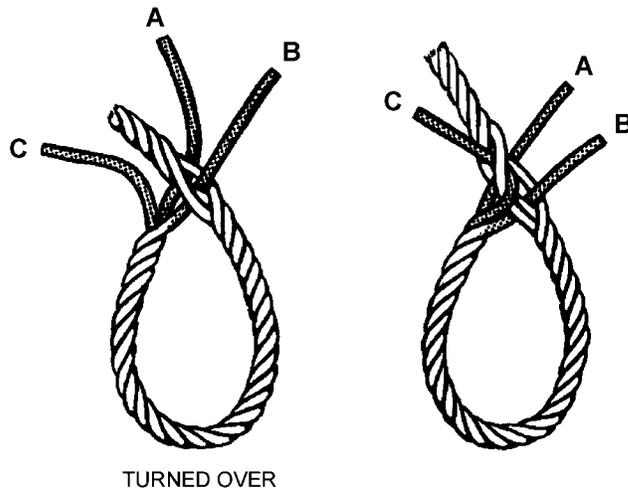


Figure 6 Step Six

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-93)

7. Beginning with strand C, haul each strand taut and tidy up the tucks until each strand is uniform.
8. Tuck all strands a second and third time.
9. Remove the whipping.
10. To finish the splice, dog the ends. To do so, split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.



Figure 7 Finished Eye Splice with Dogged Ends

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-93)



Allow the cadets to practice making an eye splice.



Complete an additional eye splice with the cadets so they can follow along, asking questions and verifying the tucks are being completed properly.



Another method of instructing this splice is to colour the ends of each strand with a different colour. This will help clarify the tucking of each strand. See Annex B.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What distance should the whipping be from the end of the line?
- Q2. What may be used as an alternate to whipping each strand?
- Q3. What is one way to finish an eye splice?

ANTICIPATED ANSWERS

- A1. A distance equal to 20 times the diameter of the line.
- A2. Masking tape.
- A3. Dogging the ends.

END OF LESSON CONFIRMATION

The cadets' making of an eye splice will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

An eye splice is a quick and effective means of making a permanent eye in the end of a line. An eye splice offers a strong alternative to basic knots in areas where a permanent eye would better suit the requirements for lines under strain.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C1-047 (ISBN 0 11 772695 8)/B-ON-050-002/PT-004 Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: HMSO Publications Centre.

STEPS TO MAKING AN EYE SPLICE

1. Complete a whipping at a distance equal to 20 times the diameter of the line, from the line's end (e.g. a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).
2. Unlay the strands of the line back to the whipping and whip the ends of each strand.
3. Mark the place intended for the crown of the eye, and bend the line back from there so as to bring the unlaied strands alongside the place where the splice is to be made, with the left and middle strands lying on top of the line.

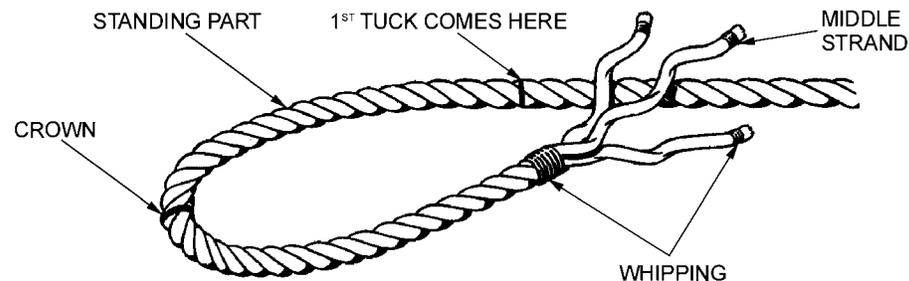


Figure A-1 Start of an Eye Splice

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-92)

4. Tuck strand A, from right to left, under the nearest strand of the standing part.
5. Tuck strand B, from right to left, under the next strand of the standing part.
6. Turn the line over in order to bring the remaining strand C on the top, and then tuck strand C from right to left under the unoccupied strand of the standing part.
7. Beginning with strand C, haul each strand taut and tidy up the tucks until each strand is uniform.
8. Tuck all strands a second and third time.

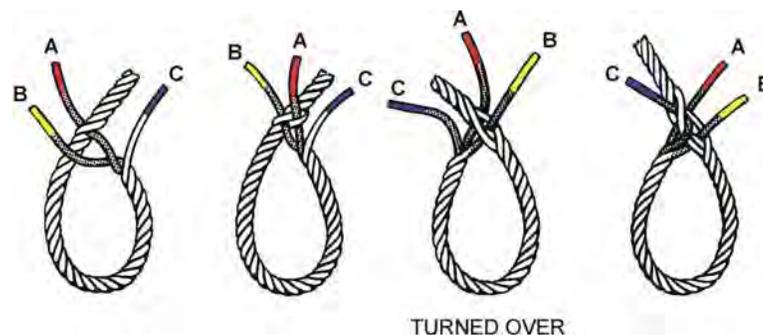


Figure A-2 Steps to Making an Eye Splice

Command of the Defence Council, BR 67 Admiralty Manual of Seamanship, HMSO Publications Centre (p. 3-92)

9. Remove the whipping.
10. To finish the splice, dog the ends. To do so, split the ends of each strand in half. Take each half and whip it to its neighbour over the adjacent strand.

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STEPS TO MAKING A LONG SPLICE

1. Complete a whipping on both lines at a distance equal to 20 times the diameter of the line, from the line's end (e.g. a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).



A long splice usually requires whippings at a distance equal to 40 times the circumference of the line. For the purpose of this TP use the distance outlined in step one.

2. Unlay the strands of the line back to the whippings and whip the ends of each strand.
3. Marry the ends of the line together so that one strand of each line lies between two strands of the opposite line.
4. Unlay strand H a total of four turns.
5. Lay strand E in the place of strand H.
6. Unlay strand D a total of four turns.
7. Lay strand F in the place of strand D.



A long splice usually requires the strands to be unlayed back a distance of 12 times the diameter of the line. For the purpose of this TP use the distance outlined in steps four and six.

8. Strands G and C remain at the marry.
9. Separate one-third of the thickness of each strand (this will be cut and discarded later).



The strands are separated and later cut away to maintain the diameter of the rope when it is spliced, enabling it to pass through a block.

10. Tie the remaining two-thirds of strands D and F in an overhand knot (if the lay of the line is in the same direction as EO C221.03, Figure 6 then tie it left over right).
11. Tie the remaining two-thirds of strands E and H in an overhand knot.
12. Tie the remaining two-thirds of strands C and G in an overhand knot.
13. Tuck the strands as in a short splice (over one strand and under the next).
14. Separate the strands in half (this will be cut and discarded later).
15. Tuck the remaining half of the strands as in a short splice.
16. Cut off any excess line (including the sections of the strands that have been separated).
17. Stretch the line out to haul the splice taut.

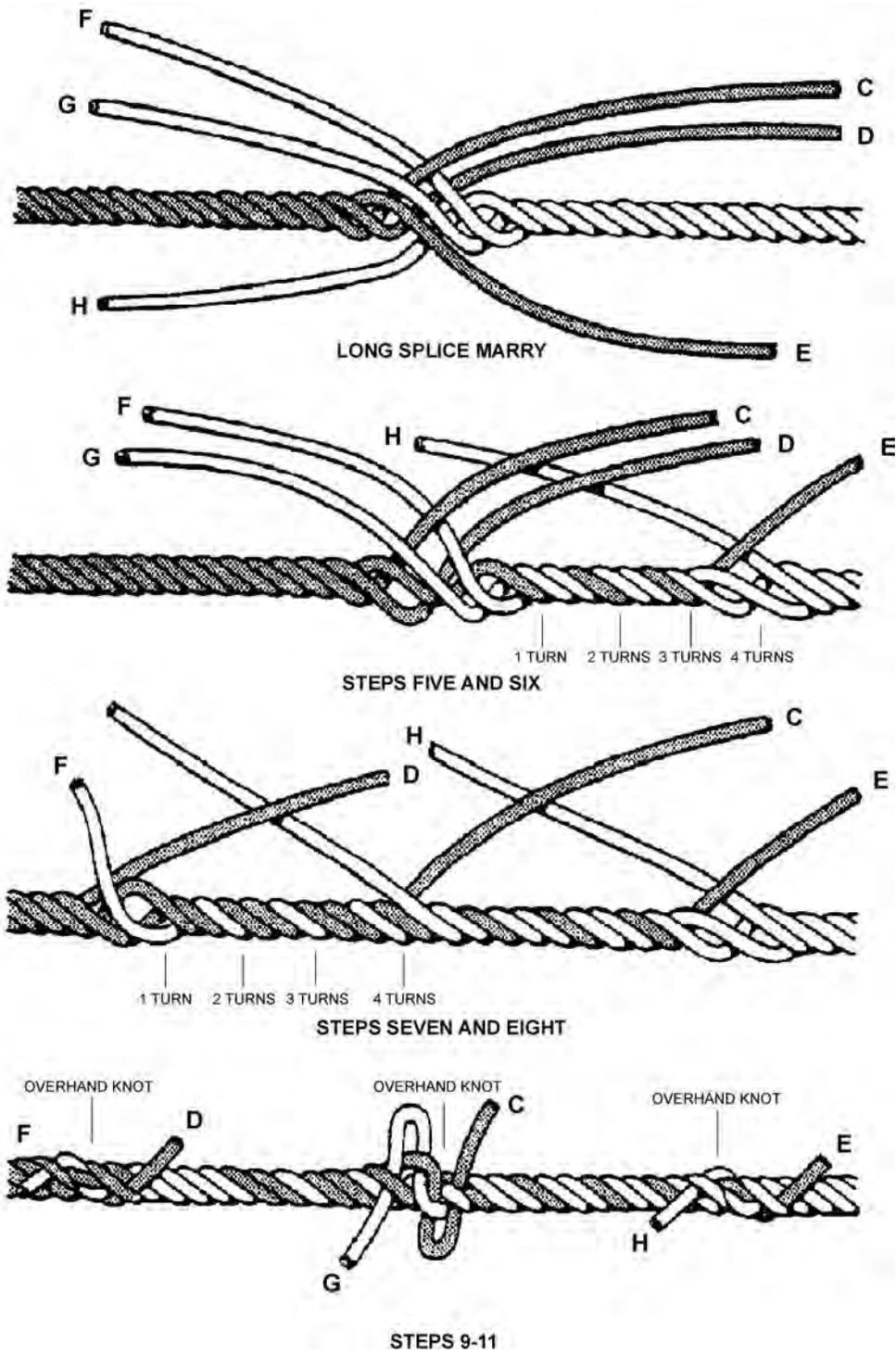


Figure B-1 Long Splice
B-GN-181-105/FP-E00 (p. 5-61)



ROYAL CANADIAN SEA CADETS
PHASE TWO
INSTRUCTIONAL GUIDE



SECTION 8

EO C221.03 – MAKE A LONG SPLICE

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-602/PG-001, 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 handout located at Annex A for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate making a long splice while providing an opportunity for the cadets to practice this skill under supervision.

INTRODUCTION

REVIEW

Review three-strand line from EO M221.01 (Use a Strop for Slinging).

OBJECTIVES

By the end of this lesson the cadet shall have made a long splice.

IMPORTANCE

It is important for cadets to know how to make a long splice as it is an effective way of connecting two lines of equal diameter without weakening the line, while allowing it to pass through a block.

Teaching Point 1**Explain the Use of, Demonstrate, and Have the Cadets Make a Long Splice**

Time: 55 min

Method: Demonstration and Performance

LONG SPLICE

A long splice is used to join two lines of equal diameter which are required to pass through a block. If the splice is made well, it will not increase the diameter or weaken the strength of the line.



Figure 1 Long Splice

B-GN-181-105/FP-E00 (p. 5-61)

Explain and demonstrate the steps to making a long splice prior to the cadets completing their own. Distribute the handout to the cadets.

STEPS TO MAKING A LONG SPLICE

1. Complete a whipping on both lines at a distance equal to 20 times the diameter of the line, from the line's end (e.g., a line 2 cm in diameter requires a whipping 40 cm from its end, a line 1/4 inch in diameter requires a whipping 5 inches from its end).

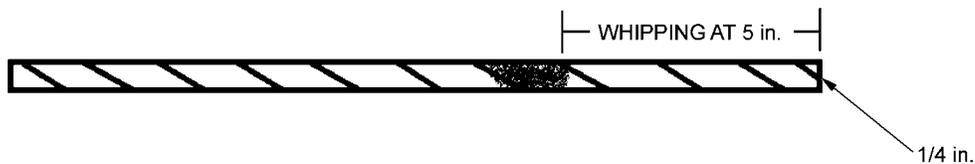


Figure 2 Example of Whipping Distance

D Cdts 3, 2007, Ottawa, ON: Department of National Defence

A long splice usually requires whippings at a distance equal to 40 times the circumference of the line. For the purpose of this TP use the distance outlined in step one.

2. Unlay the strands of the line back to the whippings and whip the ends of each strand.



Masking tape may be used as an alternate way of finishing the ends of each strand, instead of a whipping.

- Marry the ends of the line together so that one strand of each line lies between two strands of the opposite line.

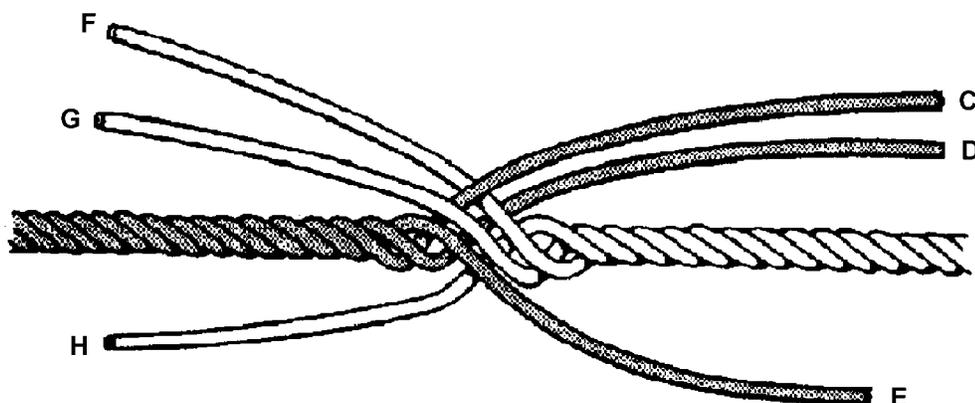


Figure 3 Long Splice Marry
B-GN-181-105/FP-E00 (p. 5-61)

- Unlay strand H a total of four turns.
- Lay strand E in the place of strand H.

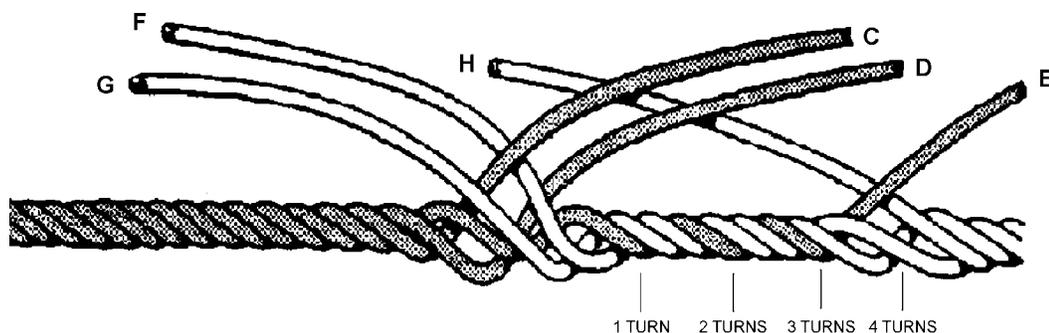


Figure 4 Steps Five and Six
B-GN-181-105/FP-E00 (p. 5-61)

- Unlay strand D a total of four turns.
- Lay strand F in the place of strand D.

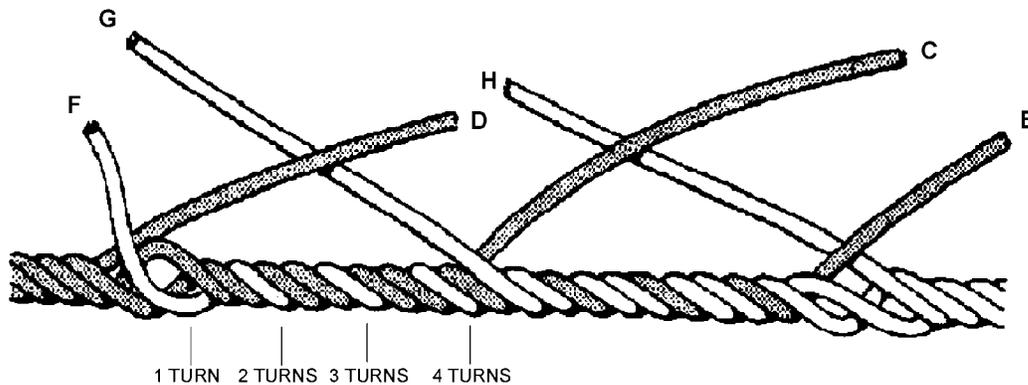


Figure 5 Steps Seven and Eight

B-GN-181-105/FP-E00 (p. 5-61)



A long splice usually requires the strands to be unlaid back a distance of 12 times the diameter of the line. For the purpose of this TP use the distance outlined in steps four and six.

8. Strands G and C remain at the marry.
9. Separate one-third of the thickness of each strand (this will be cut and discarded later).



The strands are separated and later cut away to maintain the diameter of the rope when it is spliced, enabling it to pass through a block.

10. Tie the remaining two-thirds of strands D and F in an overhand knot (if the lay of the line is in the same direction as Figure 6 then tie it left over right).
11. Tie the remaining two-thirds of strands E and H in an overhand knot.
12. Tie the remaining two-thirds of strands C and G in an overhand knot.
13. Tuck the strands as in a short splice (over one strand and under the next).
14. Separate the strands in half (this will be cut and discarded later).
15. Tuck the remaining half of the strands as in a short splice.
16. Cut off any excess line (including the sections of the strands that have been separated).
17. Stretch the line out to haul the splice taut.

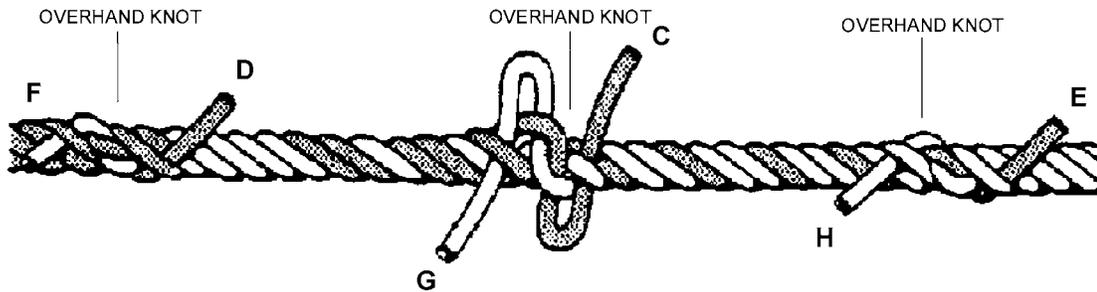


Figure 6 Steps 9–14

B-GN-181-105/FP-E00 (p. 5-61)



Figure 7 Finished Long Splice

B-GN-181-105/FP-E00 (p. 5-61)



Allow the cadets to practice making a long splice.



Complete an additional long splice with the cadets so they can follow along, asking questions and verifying the tucks are being completed properly.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What distance should the whipping be from the end of the line?
- Q2. What knot is used when tying the strands together?
- Q3. How do you finish a long splice?

ANTICIPATED ANSWERS

- A1. A distance equal to 20 times the diameter of the line.
- A2. Overhand knot.
- A3. Tuck the strands as in a short splice for three tucks.

END OF LESSON CONFIRMATION

The cadets' making of a long splice will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Although the long splice is more time consuming compared to other splices, it is one of the strongest splices, and can be used to join two lines of equal diameter. When a longer length of line is required to pass through a block and is not available, a long splice is a viable option that does not weaken the strength of the line.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of Maritime Staff. (1997). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-047 (ISBN 0 11 772695 8)/B-ON-050-002/PT-004 Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: HMSO Publications Centre.

STEPS TO MAKING A LONG SPLICE

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3. Marry the ends of the line together so that one strand of each line lies between two strands of the opposite line.
4. Unlay strand H a total of four turns.
5. Lay strand E in the place of strand H.
6. Unlay strand D a total of four turns.
7. Lay strand F in the place of strand D.



A long splice usually requires the strands to be unlayed back a distance of 12 times the diameter of the line. For the purpose of this TP use the distance outlined in steps four and six.

8. Strands G and C remain at the marry.
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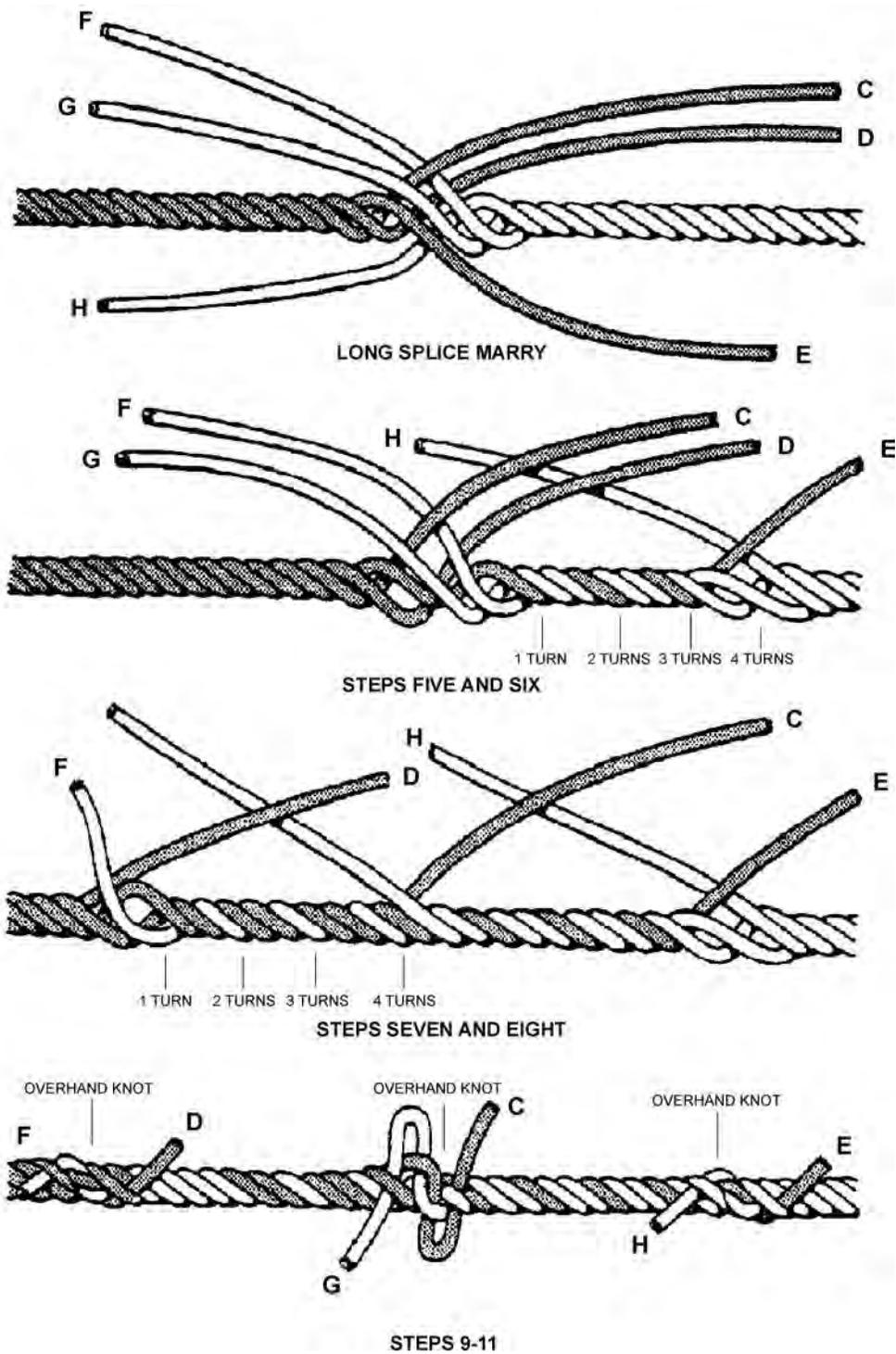


Figure A-1 Long Splice
B-GN-181-105/FP-E00 (p. 5-61)