ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 1

EO M321.01 – DESCRIBE SAFETY PROCEDURES FOR OPERATING LIFTING DEVICES

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-603/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 this lesson to introduce safety procedures for operating lifting devices.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have described safety procedures for operating lifting devices.

IMPORTANCE

It is important for cadets to be familiar with personal safety equipment, safe practices and danger zones while working with lifting devices as there is the potential for injury if safety procedures are not followed.

Teaching Point 1 **Discuss Safety Procedures and Equipment for Operating Lifting Devices**

Time: 15 min Method: Interactive Lecture

SAFE PRACTICES

It is essential that the following safe practices be applied at all times to avoid injury while working with lifting devices.

Personal Conduct

- Do not run or participate in horseplay.
- Do not stand in danger zones.
- Do not straddle or wrap lines around any part of the body.
- Do not stand in bights or coils of lines.
- Do not walk on spars.
- Do not throw equipment.

Clothing

- Avoid loose clothing while working with tackles.
- Avoid clothing with draw-strings or hanging zippers.

Use of Rigging Equipment

- Do not step over a tackle while it is under tension.
- Do not put hands through a tackle when choking a block.
- Do not put hands/fingers on a block under tension.
- Do not walk with an open knife.
- Do not cut towards the body.

PERSONAL SAFETY EQUIPMENT

The following personal safety equipment must be worn at all times while working with lifting devices:

- Hard hat,
- Issued cadet boots or safety boots, and
- Knife lanyard (if knife is used).

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. When shall safe practices be applied?

Q2. What types of clothing should be avoided when operating lifting devices?

Q3. What personal safety equipment must be worn at all times while working with lifting devices?

ANTICIPATED ANSWERS

A1. At all times.

A2. Loose clothing and clothing with draw-strings or hanging zippers.

A3. Personal safety equipment includes:

- Hard hat,
- Issued cadet boots or safety boots, and
- Knife lanyard (if knife is used).

Teaching Point 2 **Describe Danger Zones**

Time: 10 min Method: Interactive Lecture

DANGER ZONES

While operating lifting devices, there is the risk of injury due to a failure in the rigging equipment. To minimize this risk, danger zones have been determined that come into effect at specific times during the rigging.

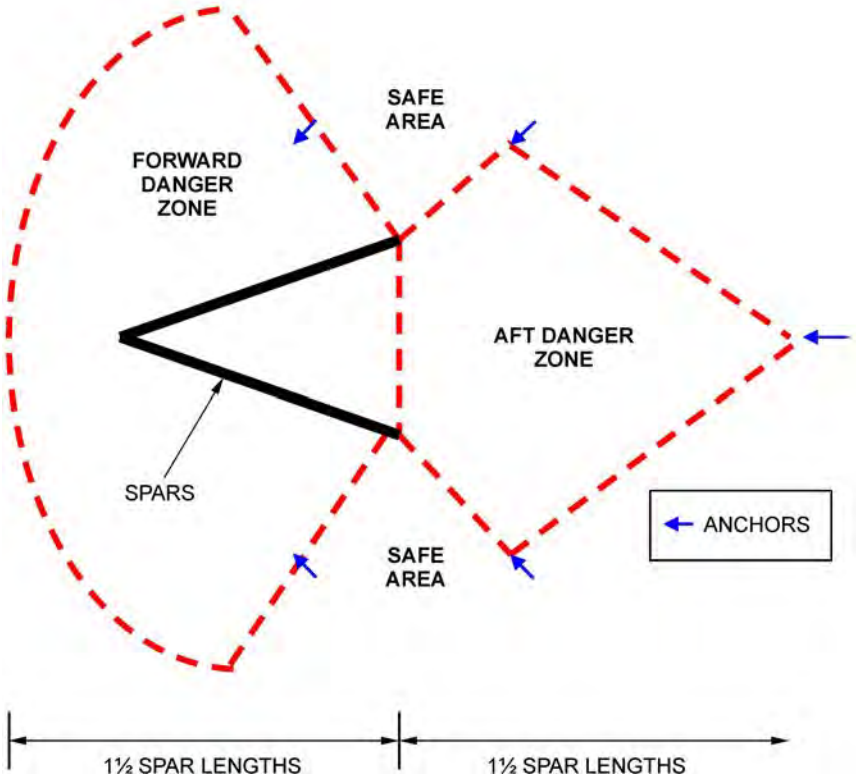
Sheers

There are two main danger zones when rigging sheers that must be observed:

1. **Forward Danger Zone.** When the topping lift is heaved in, an area within an arc approximately 1 and 1/2 spar lengths in front of the sheers and extending out from the heels becomes a danger zone (as illustrated in Figure 12-1-1). If the heel tackles or topping lift fails, the sheers may fall forward within this area.

2. **Aft Danger Zone.** When the topping lift is heaved in, the area approximately 1 and 1/2 spar lengths directly behind the sheers and extending out from the after heel anchors becomes a danger zone (as illustrated in Figure 12-1-1). If the sheers are raised too high or the load becomes unhooked, the sheers may snap back and fall backward into this area. This risk can be minimized by fitting a martingale to the sheers.

When the splay tackles and heel tackles have been tensioned and choked, the area inside the spars becomes unsafe. If the tackles were to release accidentally, the spars may snap back quickly along the ground.



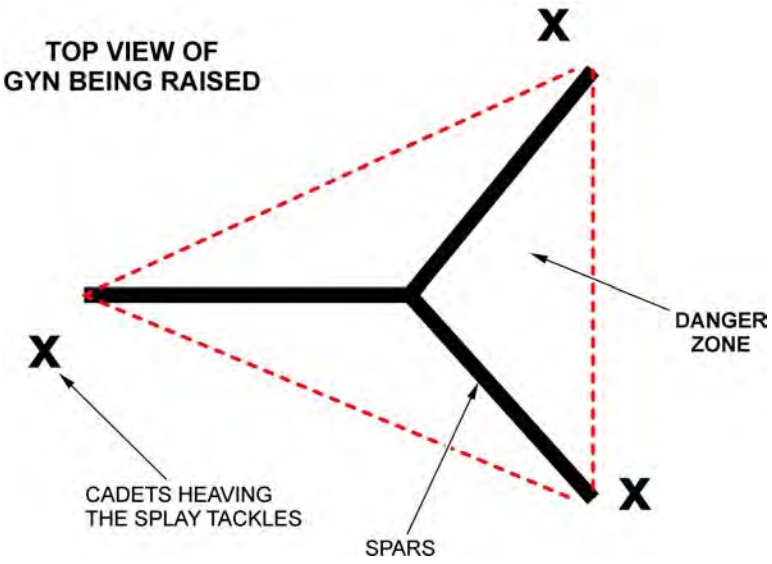
Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 4)

Figure 12-1-1 Sheers Danger Zones

Gyn

When the splay tackles are heaved in to raise the gyn, the area between the heels becomes a danger zone. Care should be taken when working with the splay tackles and the main purchase.

Heave in the splay tackles in small increments when the gyn nears its full height as it can be heaved off balance easily and fall to the side. Cadets who are working with the splay tackles should stand close to the heels until the gyn reaches full height (as illustrated in Figure 12-1-2).

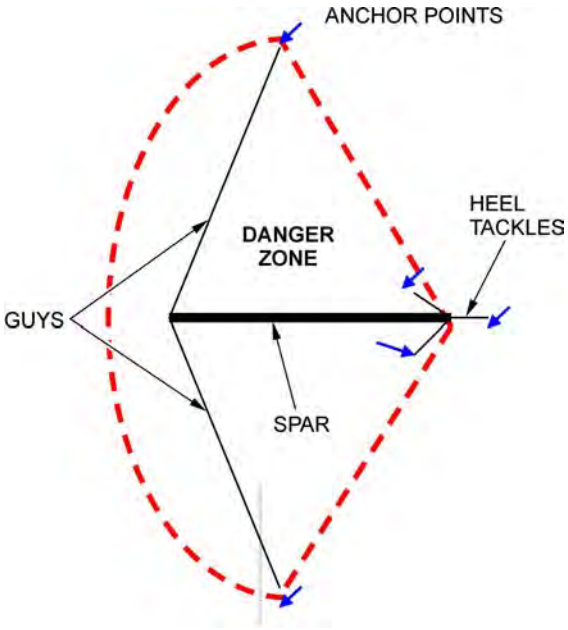


Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

Figure 12-1-2 Gyn Danger Zone

Standing Derrick

When the topping lift is heaved in to raise the standing derrick, the area within an arc approximately 1 and 1/2 spar lengths directly in front of the spar between the guy anchors becomes a danger zone. If the topping lift or one of the guys fails, the spar will fall within this area (as illustrated in Figure 12-1-3). The topping lift should be checked away before the load is hooked on or unhooked.



Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

Figure 12-1-3 Standing Derrick Danger Zone

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. When do the forward and aft danger zones of the sheers become active?

Q2. Why should care be taken when heaving in the splay tackles on the gyn?

Q3. What should be done before hooking on or unhooking the load on the standing derrick?

ANTICIPATED ANSWERS

A1. When the topping lift is heaved in.

A2. The gyn may become unstable when it nears full height.

A3. The topping lift should be checked away.

END OF LESSON CONFIRMATION

QUESTIONS

Q1. When should personal safety equipment be worn?

Q2. Why is the inside of the sheers a danger zone when the heel tackles are under tension?

Q3. What are danger zones?

ANTICIPATED ANSWERS

A1. At all times.

A2. The spars may snap back along the ground if the splay or heel tackles fail.

A3. Areas where there is a risk of injury due to a failure in the rigging equipment.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-603/PG-001, Chapter 3, Annex B, Appendix 4 (321 PC).

CLOSING STATEMENT

It is important to be familiar with the personal safety equipment, safe practices and danger zones while working with lifting devices as there is the potential for injury if safety procedures are not followed.

INSTRUCTOR NOTES/REMARKS

This EO shall be conducted prior to EO M321.02 (Rig Sheers, Section 2).

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of the Maritime Staff. (2000). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-131 Navy League of Canada. (2008). *NLP 101 Flotilla and Provincial Seamanship Competition Manual*. Toronto, ON: Navy League of Canada.

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ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 2

EO M321.02 – RIG SHEERS

Total Time: 150 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-603/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 and cut out the parts cards located at Annex A.

Photocopy the blank sheers diagram located at Annex B, the sequence for Station 3 located at Annex C and the sheers scoresheet located at Annex D.

Ensure that the cadets have their issued cadet boots with them.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1, 2 and 5 to present and illustrate the function, basic materials needed and the application of commands for rigging sheers.

Demonstration and performance was chosen for TPs 3, 4, 6 and 8 as it provides the instructor the opportunity to introduce sheers, demonstrate procedures and observe the cadets' rigging and de-rigging skills.

A practical activity was chosen for TP 7 as it is an interactive way to introduce the cadets to operating sheers in a safe and controlled environment. This activity contributes to the development of seamanship skills and teamwork in a fun and challenging setting.

INTRODUCTION

REVIEW

Review safe practices, personal safety equipment and sheers danger zones from EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

OBJECTIVES

By the end of this lesson the cadet shall, as a member of a group, rigged, operated and de-rigged sheers.

IMPORTANCE

It is important for cadets to rig sheers as it introduces sea activities of the Canadian Navy while stimulating an interest in seamanship specialty training. Although sheers are no longer used regularly by the Canadian Navy, it is a great way to foster teamwork and practice seamanship skills.

Teaching Point 1 **Explain the Function of Sheers**

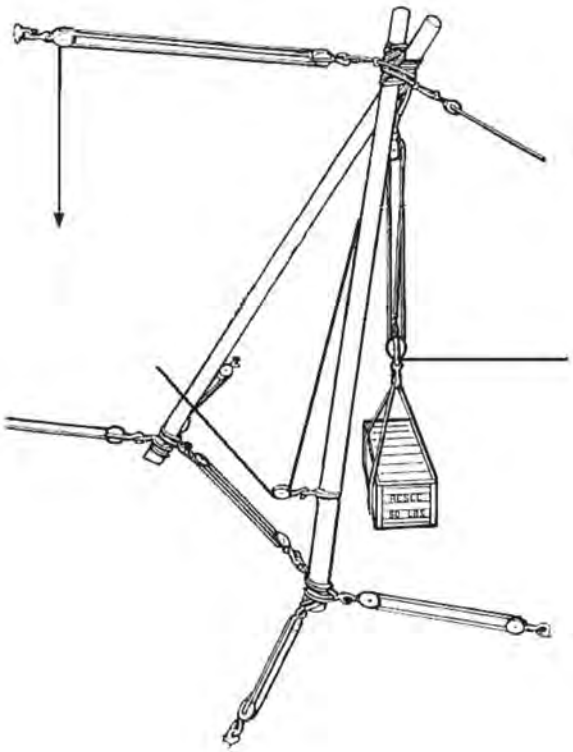
Time: 5 min Method: Interactive Lecture

SHEERS

Due to improvements in technology, improvised lifting devices are not as widely used today as in the past. However, when no suitable crane or hydraulic device is available on board or ashore for lifting a heavy object or equipment, some form of lifting device must be rigged. This may include sheers, a standing or swinging derrick or a gyn.

Sheers consist of a pair of spars called legs, which are lashed together and crossed near their heads. The heels of the spars are splayed apart a distance that is approximately one third the length of the spars used for the sheers. This splayed distance is maintained by the use of a splay tackle. The heel tackles provide firm tension on the heels and are placed in such a way to provide both lateral and fore-and-aft support. As sheers need no lateral support, side guys are not required.

Since sheers use two spars, they are stronger than a derrick of similar size. Sheers can be raised or lowered to a limited angle using a topping lift. Sheers are particularly suited for lifting loads vertically from the edge of a jetty onto the deck of a ship.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 197)

Figure 12-2-1 Assembled Sheers

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. How many spars are required to rig sheers?

Q2. What is the purpose of the splay tackle?

Q3. When are sheers used?

ANTICIPATED ANSWERS

A1. Two.

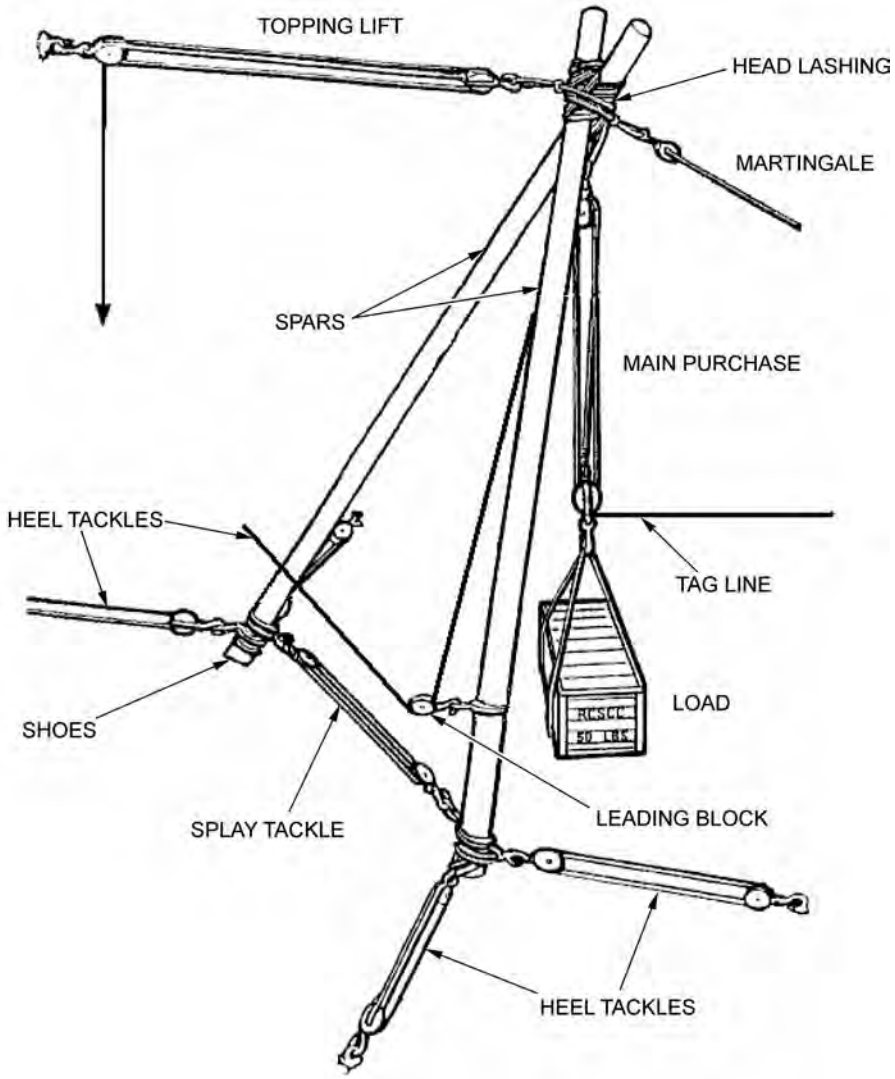
A2. To maintain the distance that the spars are splayed.

A3. For lifting loads vertically from the edge of a jetty onto the deck of a ship.

Teaching Point 2 **Describe the Parts of the Sheers**

Time: 10 min Method: Interactive Lecture

PARTS OF THE SHEERS

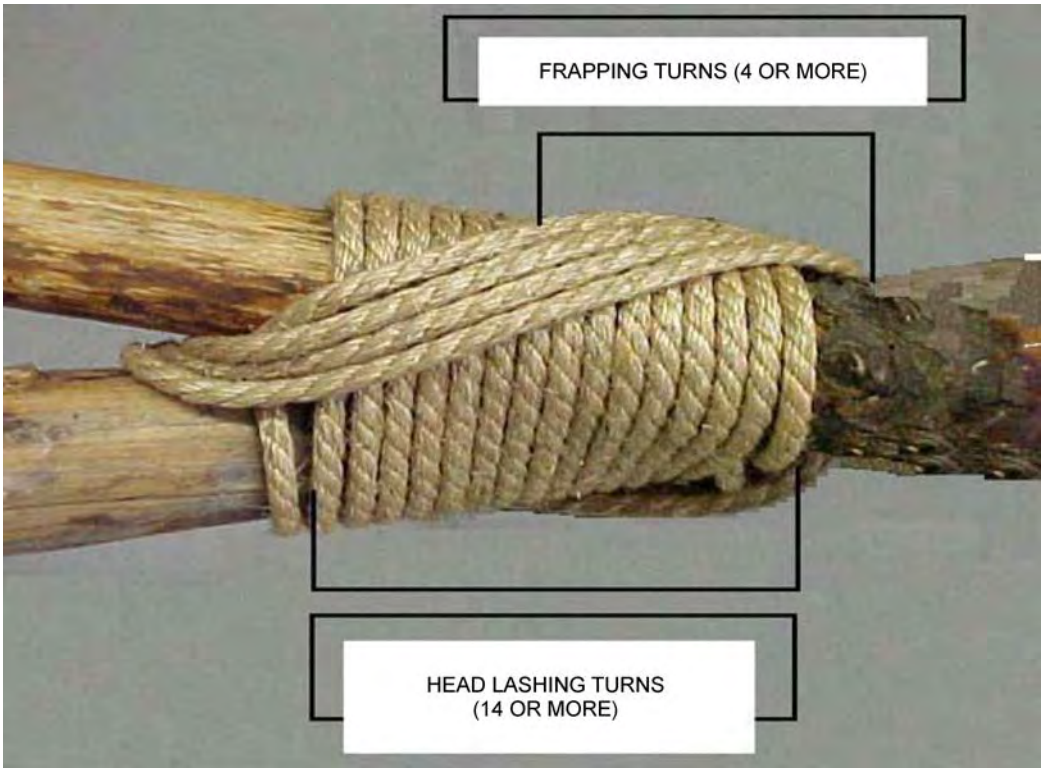


Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 197)

Figure 12-2-2 Assembled Sheers

Spars. Two spars are used as the legs of the sheers. The spars are crossed and lashed together with a head lashing.

Head Lashing. The head lashing forms the head of the sheers. The spars are lashed together using 14 or more turns around both spars followed by four or more frapping turns through the upper and lower crutch that forms when the spars are splayed apart (as illustrated in Figure 12-2-3).



Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 14)

Figure 12-2-3 Sheers Head Lashing

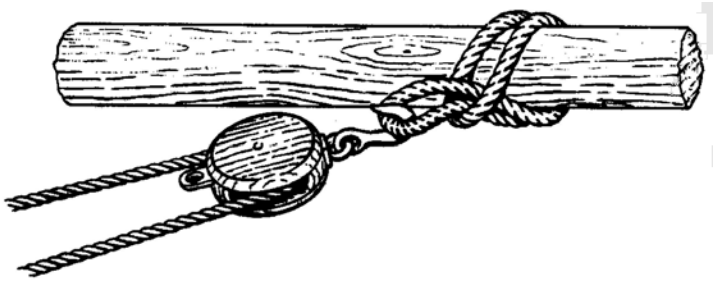
Topping Lift. The topping lift, consisting of a two-fold purchase, is used to raise or lower the sheers. If no suitable overhead attachment point exists, the topping lift can be anchored to the deck or ground a minimum distance of one and a half spar lengths from the heel anchor points.

The sheers should not be raised to an angle greater than 75 degrees from the ground or deck.

If the topping lift is anchored to the ground, the sheers should not be lowered to an angle less than 25 degrees from the ground.

Main Purchase. The main purchase, consisting of a two-fold purchase, is attached to the head of the sheers and is used to raise or lower the load.

Strops. Strops are a continuous loop in a line or wire rope. They are used to pass around a cask, spar, piece of line, etc to provide an eye to be placed over a hook or shackle (as illustrated in Figure 12-2-4).



Royal Navy, Admiralty Manual of Seamanship 1964 (Vol. 1), Her Majesty's Stationery Office (p. 193)

Figure 12-2-4 Strop on a Spar

Leading Block (for the Fall of the Main Purchase). The leading block is secured to one of the spars and the hauling part, or fall of the main purchase, is led through it. This block is used to change the direction of pull on the fall of the main purchase.

The fall of the main purchase refers to its hauling part which exits the standing block attached to the head of the sheers. The fall must be heaved in a downward motion, directly under the spars which would put a cadet within a danger zone. The leading block allows the line to be safely heaved in from the side of the sheers.

Splay Tackle. The splay tackle, consisting of a luff, prevents the spars from splaying – moving further apart – when they are under load.

Heel Tackles. The heel tackles, consisting of luffs, provide firm tension on the heels of the spars and also provide both lateral and fore-and-aft support.

Tag Line. A line, attached to the running block of the main purchase, used to retrieve the main purchase without stepping into the forward danger zone.

Martingale (if Fitted). If a suitable attachment point exists at the front of the sheers, a martingale may be led down from the head. This will prevent the sheers from springing up or back when hoisting and lowering a load.

Shoes (if Fitted). Shoes are usually square slabs of hardwood with a recess in their upper surface to take the heel of a spar. The length of each side should not be less that four times the diameter of the spar. They are used to distribute the weight of the load and the thrust of the spars over an area of the deck. When ashore, they are used to distribute the weight to prevent the spars from sinking into the ground.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is the purpose of the topping lift?

Q2. How many turns are required for the sheers head lashing?

Q3. Why is a leading block used for the fall of the main purchase?

ANTICIPATED ANSWERS

A1. To raise or lower the sheers.

A2. 14 or more.

A3. To redirect the hauling part so it may be heaved in from the side of the sheers.

Teaching Point 3 **Demonstrate and Have the Cadets Tie a Timber Hitch**

Time: 20 min Method: Demonstration and Performance

TIMBER HITCH

Use of a Timber Hitch

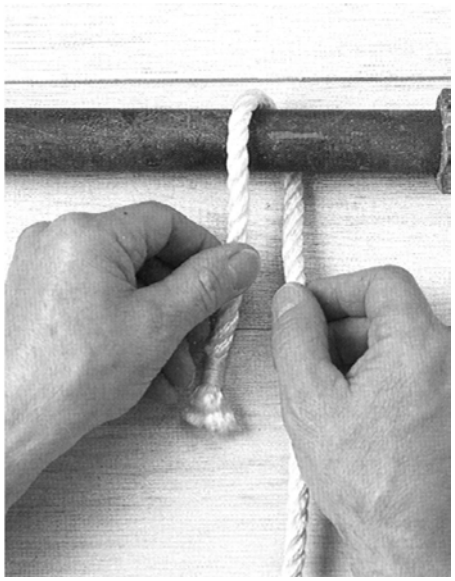
The timber hitch is used to tow, hoist or lower a spar. The more tension placed on the hitch, the more it will hold the spar. When the tension is released, the hitch will loosen.

To add directional stability or when tying the hitch to a tapered spar, an extra half hitch should be added beside the timber hitch on the side facing the direction of pull.

How to Tie a Timber Hitch

Demonstrate and have the cadets practice each step of making the timber hitch.

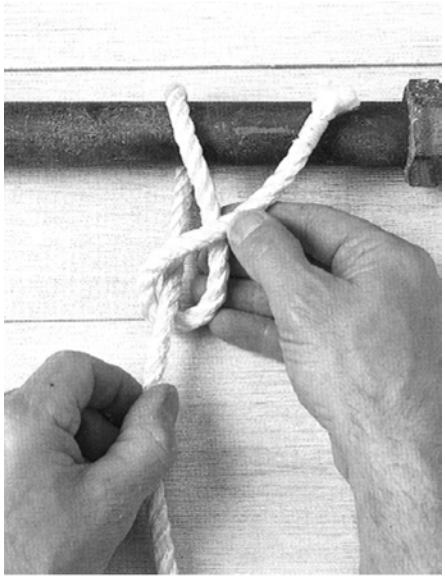
1. Pass the working end of a line around the spar and bring it to the front.



G. Budworth, The Ultimate Encyclopedia of Knots & Ropework, Anness Publishing Limited (p. 98)

Figure 12-2-5 Timber Hitch Step 1

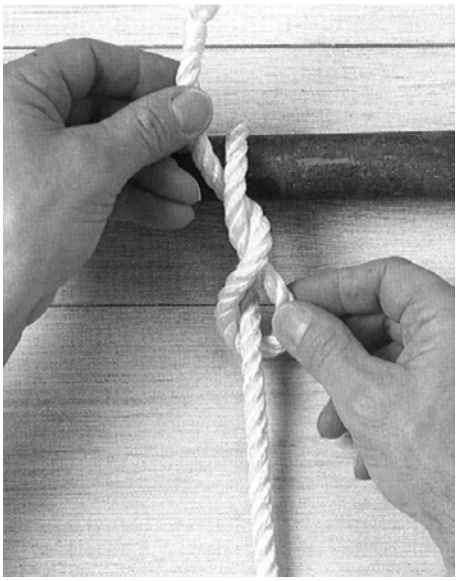
2. Take the end around the standing part and make a small loop.



G. Budworth, The Ultimate Encyclopedia of Knots & Ropework, Anness Publishing Limited (p. 98)

Figure 12-2-6 Timber Hitch Step 2

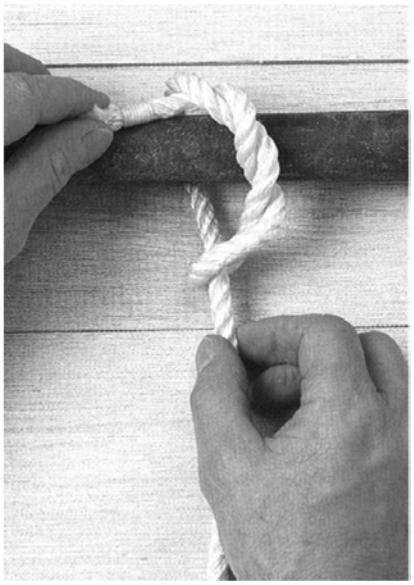
3. Tuck the working end between the standing end and itself.



G. Budworth, The Ultimate Encyclopedia of Knots & Ropework, Anness Publishing Limited (p. 98)

Figure 12-2-7 Timber Hitch Step 3

4. Bring the end around and repeat Step 3 until the required number of tucks are completed (minimum of three).

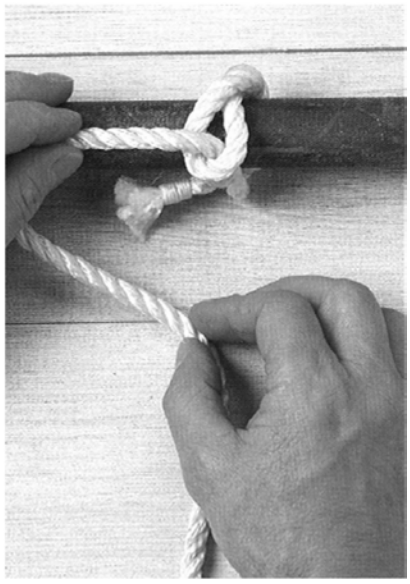


G. Budworth, The Ultimate Encyclopedia of Knots & Ropework, Anness Publishing Limited (p. 98)

Figure 12-2-8 Timber Hitch Step 4

Tucking in this fashion, to make a sliding noose, is known as “dogging”.

5. Pull on the standing end to tighten the hitch around the spar.



G. Budworth, The Ultimate Encyclopedia of Knots & Ropework, Anness Publishing Limited (p. 98)

Figure 12-2-9 Completed Timber Hitch

CONFIRMATION OF TEACHING POINT 3

The cadets tying a timber hitch will serve as the confirmation of this TP.

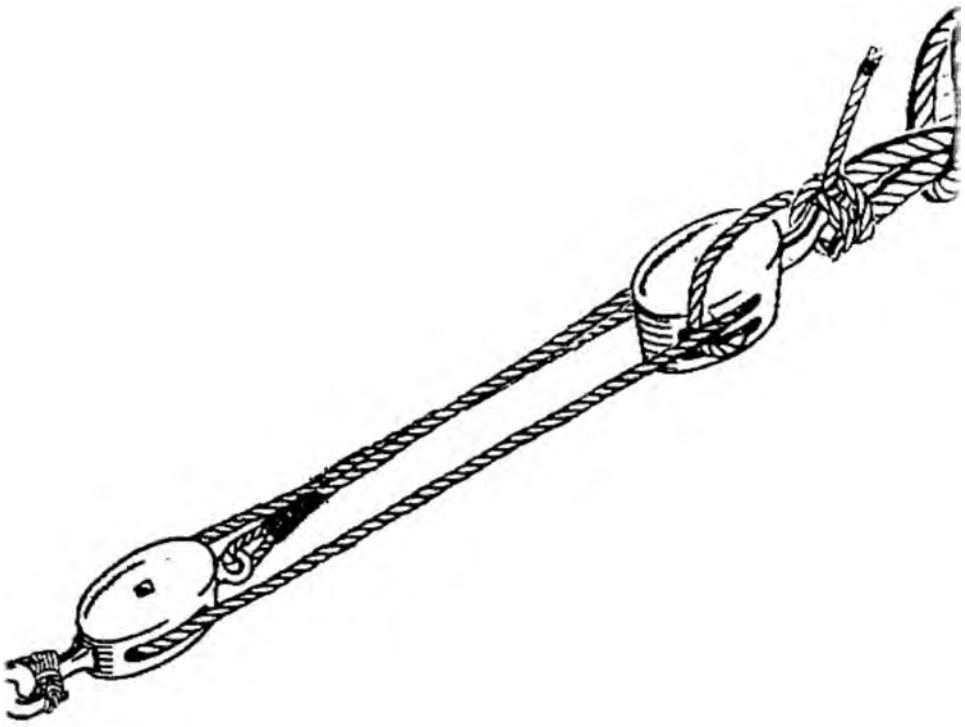
Teaching Point 4 **Demonstrate and Have the Cadets Choke a Luff**

Time: 20 min Method: Demonstration and Performance

CHOKING A LUFF

Demonstrate and have the cadets practice choking a luff.

To temporarily secure a luff under tension when there is no cleat available, the hauling part is passed underneath its adjacent running part where it fouls, or chokes, the block. Two half hitches may be added above the block to ensure that the choke does not slip.



Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 13)

Figure 12-2-10 Choking a Luff

This method should be used with luffs under light loads only, as damage to the rope may occur if the load is too heavy.

CONFIRMATION OF TEACHING POINT 4

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

Teaching Point 5 **Describe the Actions Taken in Response to Commands**

Time: 15 min Method: Interactive Lecture

COMMANDS

Heave in. Give a strong pull together on a line.

Check Away. Ease out a line under control.

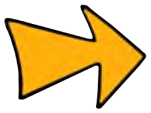
Avast. Stop.

Choke. Choke the standing block with the hauling part and secure it with two half hitches above the crown.

Secure. Make fast a line.

Handsomely. Slowly, carefully.

Roundly. Rapidly.



These are the most commonly used commands for working with sheers; however, the list is not exhaustive. Other commands may be used based on unit preferences.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS

Q1. What does the order HEAVE IN mean?

Q2. What order is given to make fast a line?

Q3. What does the order AVAST mean?

ANTICIPATED ANSWERS

A1. Give a strong pull together on a line.

A2. SECURE.

A3. Stop.

Teaching Point 6 **Demonstrate and Have the Cadets, as Members of a Group, Rig Sheers**

Time: 20 min Method: Demonstration and Performance

RIGGING SHEERS

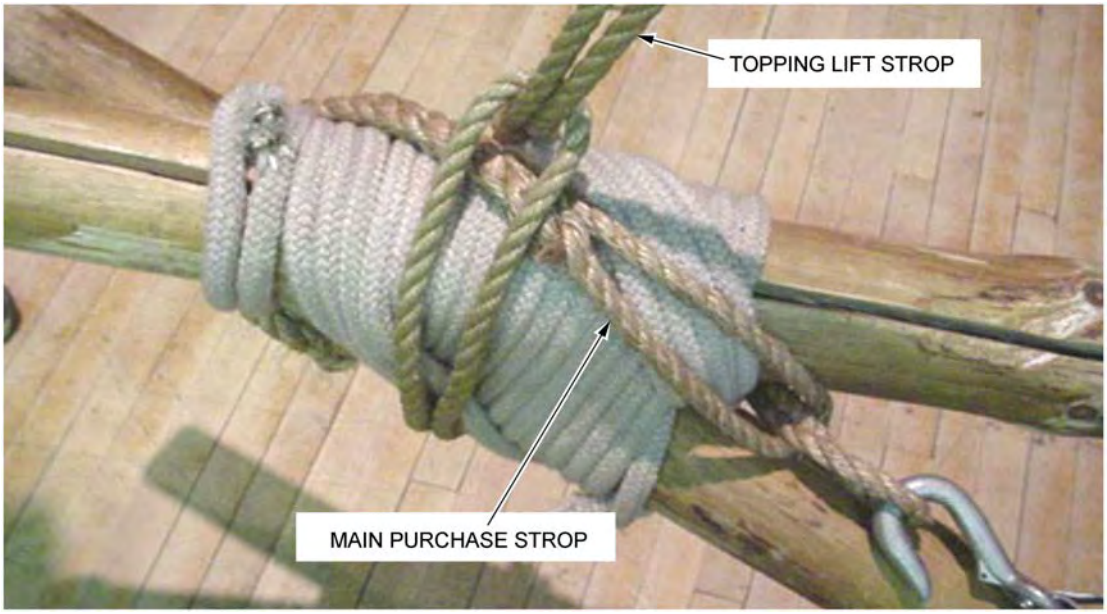
Demonstrate and have the cadets practice the steps for rigging sheers.

1. Lay the spars for the legs side by side, with their heels together and their heads supported clear of the ground or deck.

2. Start the head lashing with a timber hitch on one of the spars followed by 14 or more turns around both spars. Spread the spars apart to allow four or more frapping turns to pass around the spars and through the crutch formed above and below the spars (as illustrated in Figure 12-2-3). Finish the head lashing with a clove hitch on the spar opposite to the timber hitch. Once the head lashing is complete, splay the heels of the spars apart to a distance of one third the length of the spars used for the sheers.

3. Place the main purchase strop around the head lashing, following the path of the frapping turns (as illustrated in Figure 12-2-11). Ensure the bight of the strop is pointed down between the spars.

4. Place the topping lift strop around the head lashing and main purchase strop (as illustrated in Figure 12-2-11). Ensure the bight of the strop is pointed up from the head.

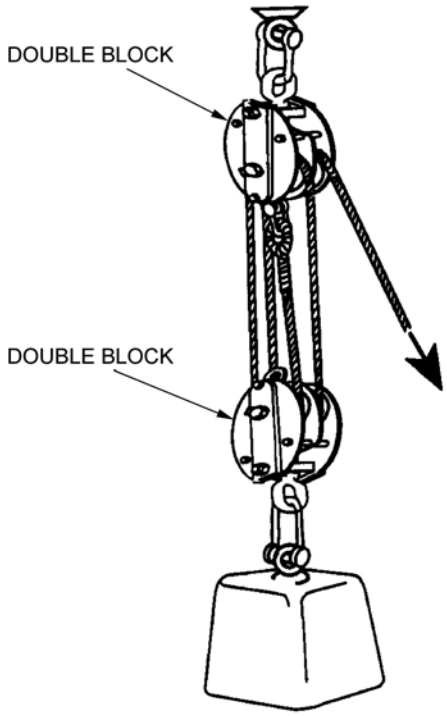


Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 14)

Figure 12-2-11 Topping Lift and Main Purchase Strops

5. Rig the main purchase using a two-fold purchase (as illustrated in Figure 12-2-12). Attach the standing block to the main purchase strop (as illustrated in Figure 12-2-11) ensuring that the main purchase is rigged to disadvantage with the hauling part exiting the standing block. Attach the tag line to the running block and lay it out so an end will be outside the danger zone when the sheers are raised.

6. Rig the topping lift using a two-fold purchase (as illustrated in Figure 12-2-12). Attach the standing block to the topping lift anchor point and the running block to the topping lift strop. Ensure the topping lift is rigged to disadvantage with the hauling part exiting the standing block. Tie a figure eight knot in the end of the hauling part.



BON-050-002/PT-004, BR 67 Admiralty Manual of Seamanship (p. 3-155)

Figure 12-2-12 Two-Fold Purchase

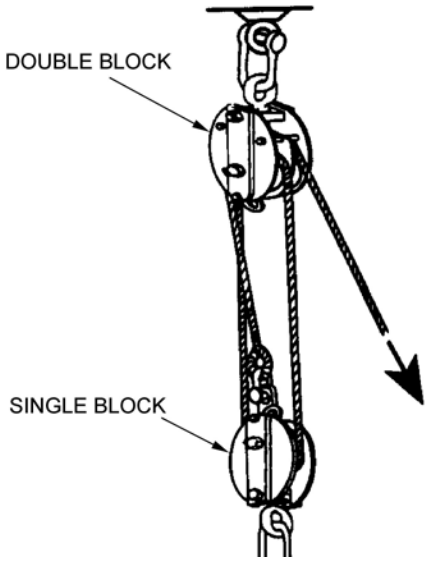
7. Attach strops to the feet of the spars (as illustrated in Figure 12-2-14) for the leading block, splay and heel tackles. Attach the splay tackle strops between the strops for the heel tackles. Attach the leading block strop above or between the heel tackle strops. Ensure the strops are placed together, as low as possible but no lower than one hands-width above the heels.

Placing the leading block strop between the heel tackle strops will stop it from sliding up the spar when the fall is heaved in.

8. Hook the leading block on to the strop. Reeve the fall of the main purchase through the leading block and tie a figure eight knot in the end. Coil the excess line and place it on the deck outside the danger zone, on the opposite side of the sheers from the side where the leading block is attached.

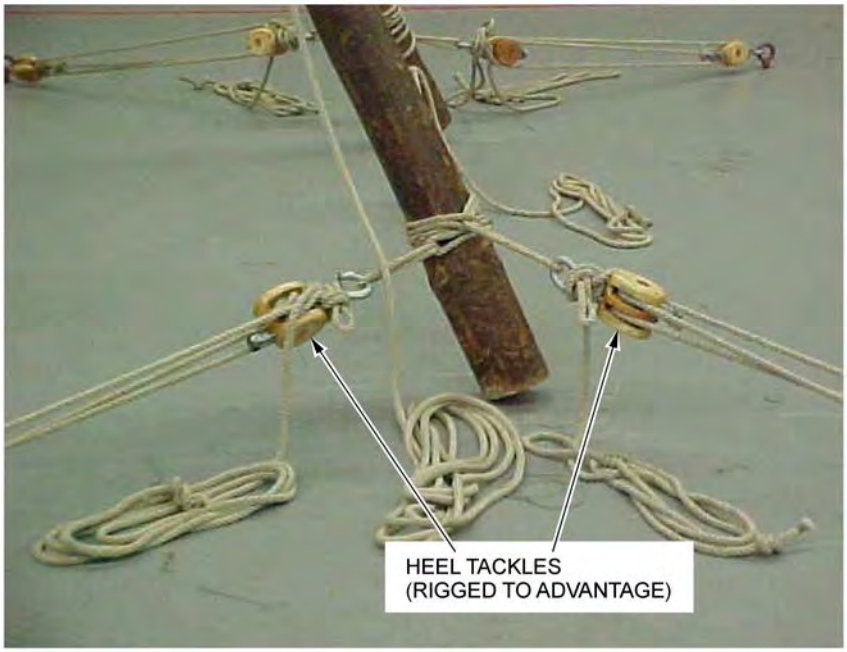
9. Rig the splay tackle using a luff (as illustrated in Figure 12-2-13) and attach to the strops between the spars and under the topping lift. Tie a figure eight knot in the end of the hauling part. Heave in the splay tackle to splay the heels of the spars apart to a distance approximately one third the length of the spars used for the sheers. Choke and secure the splay tackle. Coil any excess line and place it on the deck.

10. Rig the heel tackles using luffs (as illustrated in Figure 12-2-13) and attach to the strops and anchor points. Ensure that all heel tackles are rigged to advantage with the hauling parts exiting the running blocks attached to the spars (as illustrated in Figure 12-2-14). Tie a figure eight knot in the end of the hauling part.



BON-050-002/PT-004 (p. 3-155)

Figure 12-2-13 Luff



Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 14)

Figure 12-2-14 Heel Tackles Rigged to Advantage

11. Mouse all hooks (as illustrated in Figure 12-2-15).

B-GN-181-105/FP-E00, CFCD 105 Seamanship Rigging and Procedures Manual (p. 5-46)

Figure 12-2-15 Mousing a Hook

Mousing is not required for blocks equipped with a safety catch on the hook. If the safety catch has been removed or the spring is missing from the catch, the block must be replaced.

12. Heave in all heel tackles until they are evenly taut. Choke and secure them with two half hitches. Coil any excess line and place neatly on the deck. If the sheers are not positioned correctly, they can be adjusted by heaving in or checking away the individual heel tackles.

To adjust the position of the sheers, stand at the head facing the heels and use the following sequence:

1. Adjust the side-to-side position of the sheers by heaving in evenly on both heel tackles on the side the sheers are to move toward while checking away handsomely on the opposite heel tackles. When the sheers reach the correct position, avast checking away.
2. Adjust the fore-and-aft position of the sheers by heaving in evenly on both forward heel tackles (tackles closest to the head) while checking away handsomely on the after heel tackles. When the sheers reach the correct position, avast checking away.
3. Adjust the head of the sheers so that it is centred between the heels by heaving in on the after heel tackle on the side the head is to move towards while checking away handsomely on the opposite side's forward heel tackle. When the head is in the correct position, avast checking away.
4. Choke all heel tackles and secure them with two half hitches above the blocks.

13. Heave in on the topping lift handsomely until the sheers have been raised to an angle between 25 and 75 degrees from the floor. Choke and secure the topping lift.

If the topping lift is anchored to the deck, the head of the sheers must be picked up and held at chest height until the topping lift becomes taut. The person at the head of the sheers shall then step out of the danger zone.

14. Heave in on the tag line to pull the running block out of the danger zone, checking away on the fall of the main purchase if required. Secure the fall of the main purchase to the spar opposite the leading block with a round turn and two half hitches.

15. The sheers are now complete and ready for operation (as illustrated in Figure 12-2-2).

CONFIRMATION OF TEACHING POINT 6

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

Teaching Point 7 **Have the Cadets, as Members of a Group, Operate the Sheers**

Time: 40 min Method: Practical Activity

Demonstrate how to operate the sheers prior to starting the activity.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, as members of a group, operate the sheers.

RESOURCES

The list of required equipment for the sheers is located at A-CR-CCP-603/PG-001, Chapter 2, Annex C, Appendix 1.

When choosing the equipment for rigging the sheers, ensure that each item is compatible with the others (e.g., the blocks are suitable for the size of the line).

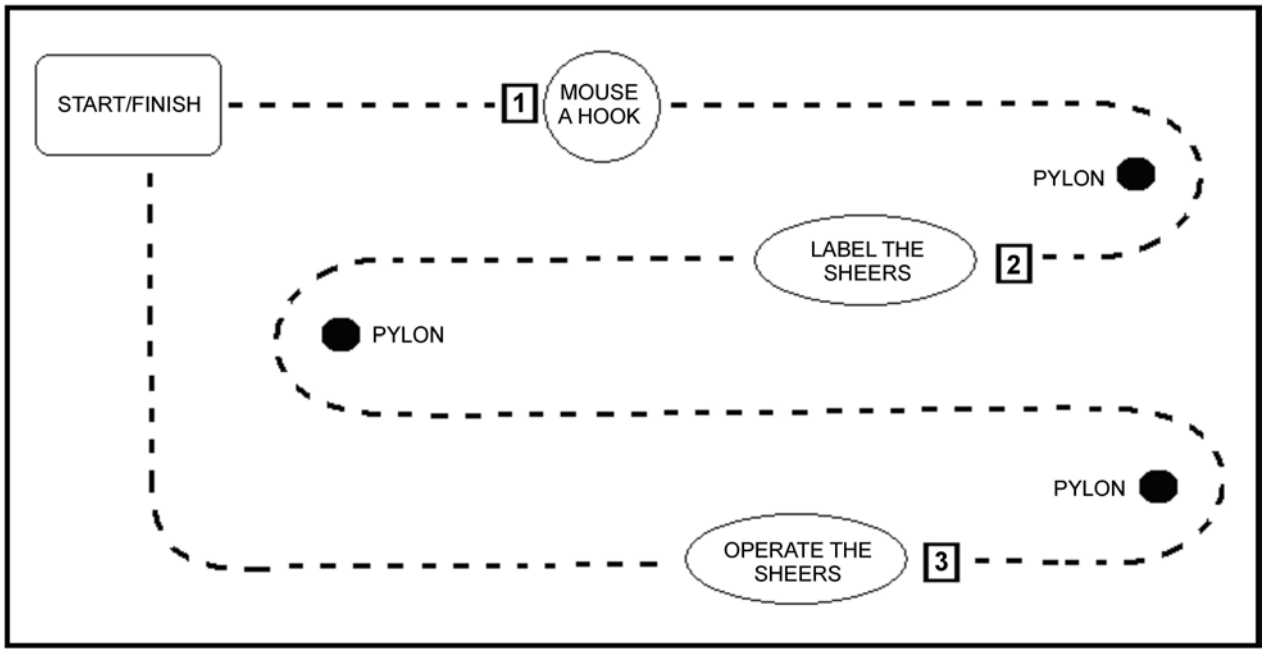
- Assembled sheers,
- Load of 22 kg (50 lbs) or less,
- Whipping twine,
- Pylons,
- Hooks,
- Hard hats,
- Parts cards located at Annex A,
- Picture/model of sheers (blank picture located at Annex B),
- Sequence for Station 3 located at Annex C,
- Scoresheet located at Annex D,
- Whistle, and

- Stopwatch.

ACTIVITY LAYOUT

- Mark off a start area.
- Set up the start area with various pieces of safety equipment.
- Set up Station 1 with whipping twine and hooks.
- Set up Station 2 with parts cards, tape and a picture/model of sheers.
- Set up Station 3 with the sheers, whipping twine and a load.

The sheers at Station 3 shall be fully rigged (as illustrated in Figure 12-2-1). If no overhead mounting point is available, anchor the topping lift at least one and one-half spar lengths back from the heel tackle anchors.



Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

Figure 12-2-16 Sheers Run

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of four.
2. Have the first group line up in the start area.
3. On the whistle signal, have the group put on their personal safety equipment and proceed to Station 1.

Ensure the time is started on the stopwatch at the whistle signal.

4. At Station 1, have each cadet in the group mouse a hook. Check the mousings for strength. If any of the mousings come off easily, that cadet will do another mousing. Upon successfully completing the mousings, have the group proceed to Station 2.
5. At Station 2, have the group label the picture/model of the sheers and then proceed to Station 3.
6. At Station 3, stop and record the time. Have the group operate the sheers by responding to commands listed at Annex C, as given by the instructor. Award points IAW the scoresheet located at Annex D.
7. Upon completion of Station 3, have the group continue to the finish line and tally the score.
8. Have each group complete the sheers run in the above sequence.
9. Declare the group with the most points the winner.

SAFETY

- Ensure the personal safety equipment is worn at all times.
- Ensure the cadets stay outside the danger zones while the sheers are raised.
- Ensure all hooks are moused or fitted with working safety catches.

CONFIRMATION OF TEACHING POINT 7

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

Teaching Point 8 — **Demonstrate and Have the Cadets, as Members of a Group, De-Rig Sheers**

Time: 10 min — Method: Demonstration and Performance

DE-RIGGING SHEERS

Demonstrate and have the cadets practice each step in de-rigging sheers.

1. Check away on the topping lift handsomely until the head of the sheers is resting on the deck. When the sheers near the deck, it is permissible to step into the danger zone to grab the head of the sheers and lower it by hand.
2. Release the choke on the heel tackles, being careful not to place hands in the running parts of the luffs.

Once the head is on the ground and the tension has been released from the heel tackles, the sheers are safe to de-rig.

3. Cut any mousings that have been applied and unhook the blocks from the strops.
4. Un-reeve the heel, splay, main purchase and topping lift tackles.
5. Remove the strops from the spars.
6. Untie the head lashing.

7. Coil all lines and secure the equipment as required.

CONFIRMATION OF TEACHING POINT 8

The cadets' participation in de-rigging sheers will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' rigging, operating and de-rigging sheers will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-603/PG-001, Chapter 3, Annex B, Appendix 4 (321 PC).

CLOSING STATEMENT

Rigging sheers requires teamwork. Sheers are a device that has many practical uses within the Canadian Navy, although it is not used as frequently today as in years past due to improvements in technology. Rigging sheers acts as an introduction to sea activities of the Canadian Navy while stimulating an interest in seamanship specialty training.

INSTRUCTOR NOTES/REMARKS

This EO shall be conducted after EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

This EO may be conducted as five consecutive periods on a weekend training day or over two training nights. Training night one will consist of TPs 1–4 for a total of two periods. Training night two will consist of TPs 5–8 for a total of three periods.

REFERENCES

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

C1-049 (ISBN 0-11-771958-7) Royal Navy. (1967). *Admiralty Manual of Seamanship 1967* (Vol. 2). Cambridge, England: Her Majesty's Stationery Office.

C1-064 (ISBN 1-55267-986-1) Budworth, G. (2001). *The Ultimate Encyclopedia of Knots & Ropework*. London, England: Anness Publishing Limited.

C1-131 Navy League of Canada. (2008). *NLP 101 Flotilla and Provincial Seamanship Competition Manual: Sheers*. Toronto, ON: Navy League of Canada.

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ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 3

EO C321.02 – RIG A STANDING DERRICK

Total Time: 150 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-603/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 and cut out the parts cards located at Annex E.

Photocopy the blank standing derrick diagram located at Annex F, the sequence for Station 3 located at Annex G and the standing derrick scoresheet located at Annex H.

Ensure that the cadets have their issued cadet boots with them.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1–3 to illustrate the function, parts and rigging commands for a standing derrick.

Demonstration and performance was chosen for TPs 4 and 6 as it provides the instructor the opportunity to introduce a standing derrick, demonstrate procedures and observe the cadets rigging and de-rigging a standing derrick.

A practical activity was chosen for TP 5 as it is an interactive way to introduce the cadets to operating a standing derrick in a safe and controlled environment. This activity contributes to the development of seamanship skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Review EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

OBJECTIVES

By the end of this lesson the cadet shall, as a member of a group, rigged, operated and de-rigged a standing derrick.

IMPORTANCE

It is important for cadets rig a standing derrick as it introduces them to sea activities of the Canadian Navy while stimulating an interest in seamanship specialty training. Although the standing derrick is no longer used regularly by the Canadian Navy, it is a great way to foster teamwork and practice seamanship skills.

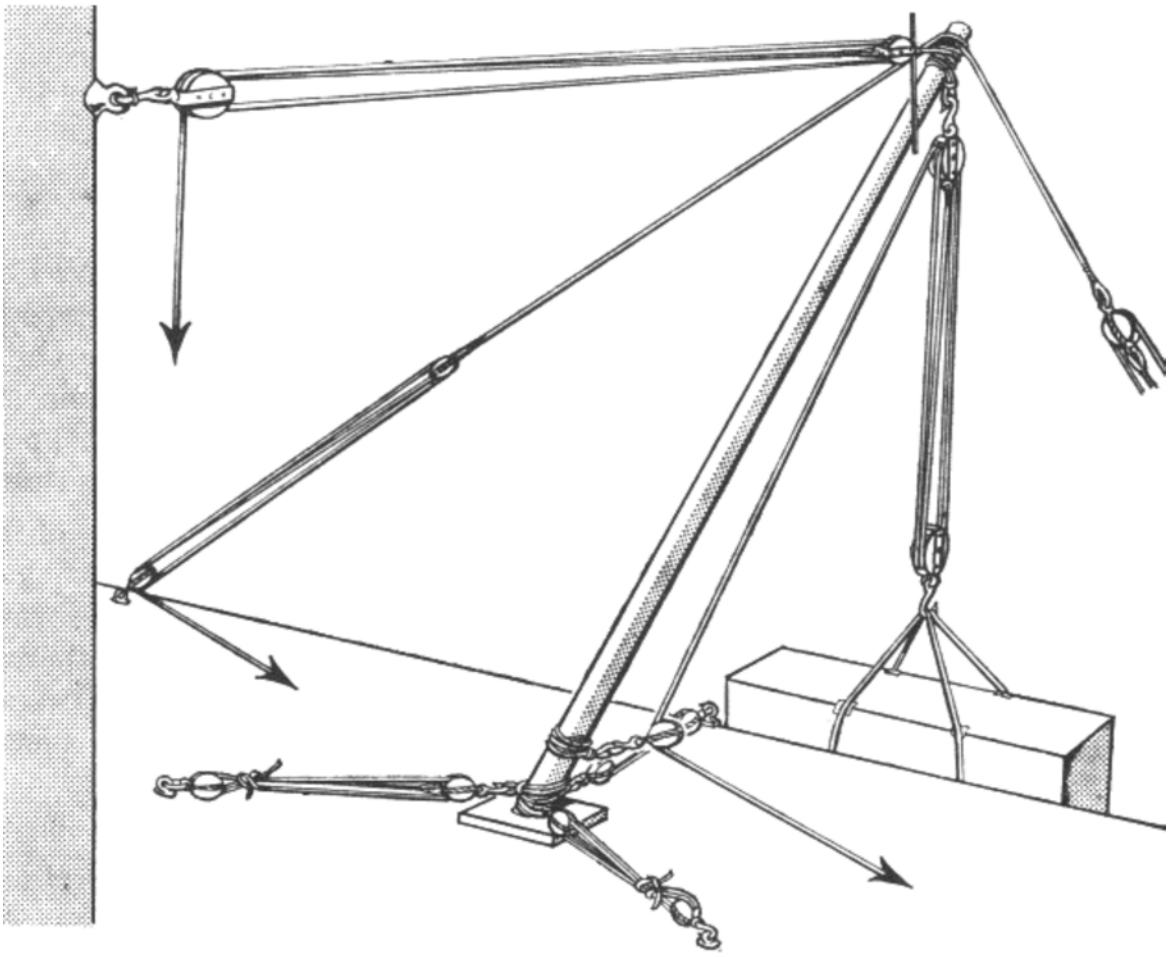
Teaching Point 1 **Explain the Function of a Standing Derrick**

Time: 5 min Method: Interactive Lecture

STANDING DERRICK

Due to improvements in technology, improvised lifting devices are not as widely used today as in the past. However, when no suitable crane or hydraulic device for lifting a heavy object or equipment is available on board or ashore, some form of lifting device must be rigged. This may include sheers, a standing or swinging derrick or a gyn.

A standing derrick is effective in situations that require the load to be hoisted and moved laterally a short distance from the lifting point. It can be rigged with less equipment than other lifting devices as only one spar is required.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 195)

Figure 12-3-1 Standing Derrick

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. When is a standing derrick used?

Q2. How many spars are required to rig a standing derrick?

Q3. What is a standing derrick used for?

ANTICIPATED ANSWERS

A1. When no suitable crane or hydraulic device is available on board or ashore.

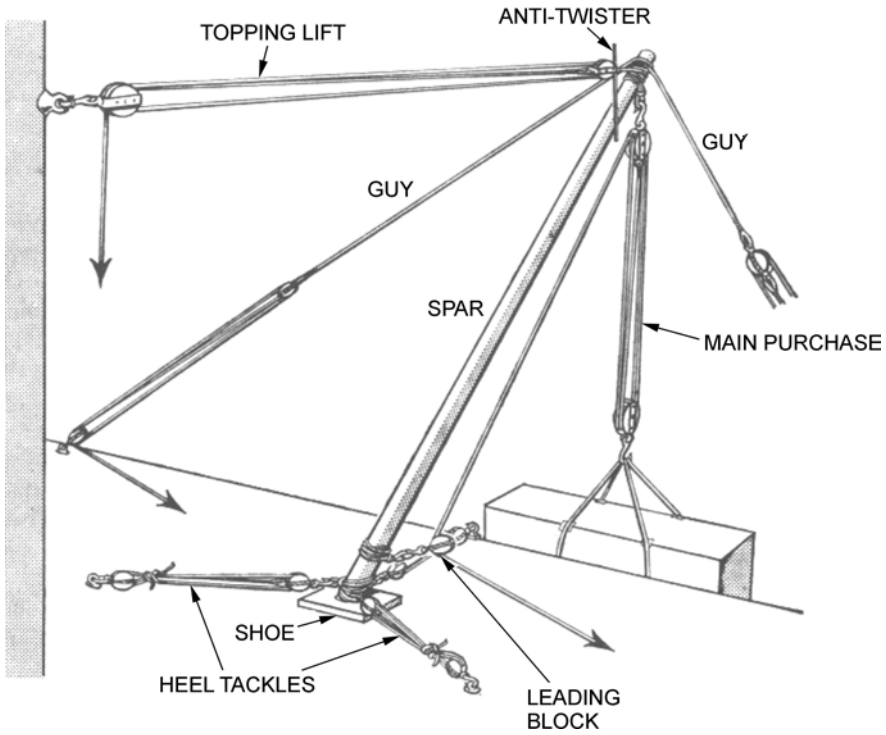
A2. One.

A3. Hoisting and moving loads laterally a short distance.

Teaching Point 2 **Identify the Parts of a Standing Derrick**

Time: 15 min Method: Interactive Lecture

PARTS OF A STANDING DERRICK



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 195)

Figure 12-3-2 Parts of a Standing Derrick

Topping Lift. The topping lift, consisting of a two-fold purchase, is used to raise or lower the standing derrick. If no suitable overhead attachment point exists, the topping lift can be anchored to the deck or ground a minimum distance of one and a half spar lengths from the heel anchor points.

If the topping lift is anchored to the ground, the standing derrick should not be lowered to an angle less than 25 degrees from the ground.

Side Guys. The side guys, consisting of luffs attached to a snotter at the head of the spar, are fitted to give lateral support. The snotter's length will determine how far the standing derrick may slew from side-to-side using the side guys.

A snotter is a length of line with an eye in each end (as illustrated in Figure 12-3-3).

Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

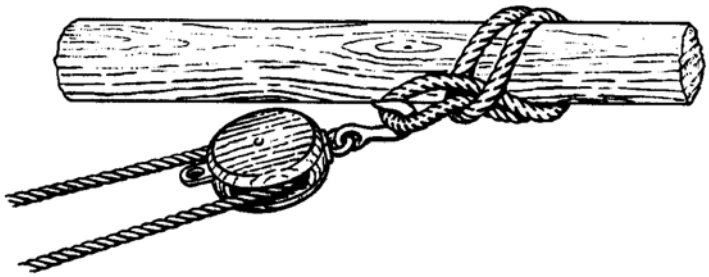
Figure 12-3-3 Snotter

Main Purchase. The main purchase, consisting of a two-fold purchase, is attached to the head of the spar and is used to raise or lower the load.

Spar. The spar is the main support system for the standing derrick. The side guys, topping lift and the main purchase are attached to the spar.

Anti-Twister. An optional piece of wood that is attached to the strop at the block of the topping lift used to prevent the topping lift from twisting.

Strops. Strops are a continuous loop in a line or wire rope. They are used to pass around a cask, spar, piece of line, etc to provide an eye to be placed over a hook or shackle (as illustrated in Figure 12-3-4).



Royal Navy, Admiralty Manual of Seamanship 1964 (Vol. 1), Her Majesty's Stationery Office (p. 193)

Figure 12-3-4 Strop on a Spar

Leading Block (for the Fall of the Main Purchase). The leading block is secured to the heel of the spar and the hauling part, or fall of the main purchase, is led through it. This block is used to change the direction of pull on the fall of the main purchase.

The fall of the main purchase refers to its hauling part which exits the standing block attached to the head of the derrick. The fall must be heaved in, in a downward motion, directly under the spar. The leading block allows the line to be safely heaved in from the side of the derrick.

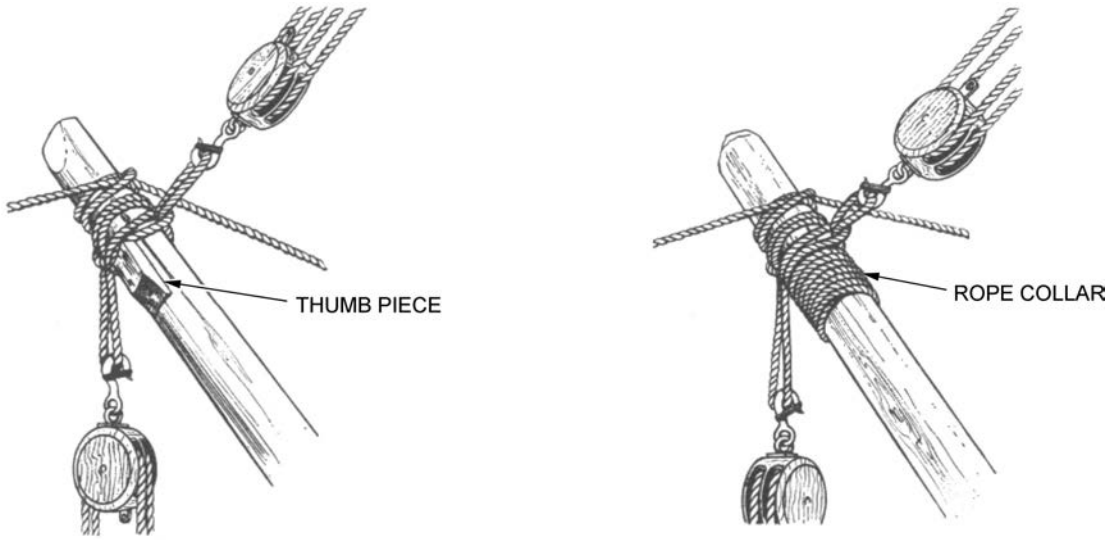
Heel Tackles. The heel tackles, consisting of luffs, are used to prevent the heel from moving.

Tag Line. A line, attached to the running block of the main purchase, used to retrieve the main purchase without stepping into the danger zone.

Martingale (Fore Guy) (if Fitted). If a suitable attachment point exists at the front of the standing derrick, a martingale or fore guy may be led down from the spar (not illustrated in Figure 12-3-2). This will prevent the spar from springing up or back when hoisting and lowering a load.

Shoe (if Fitted). The shoe is usually a square slab of hardwood with a recess in its upper surface to take the heel of a spar. The length of each side should not be less than four times the diameter of the spar. It is used to distribute the weight of the load and the thrust of the spar over an area of the deck. When ashore, it is used to distribute the weight to prevent the spar from sinking into the ground.

Thumb Pieces/Rope Collars (if Fitted). Thumb pieces/rope collars are used to prevent the strops from slipping on the spars (as illustrated in Figure 12-3-5). Thumb pieces are wooden pieces that are screwed or nailed to the spar. Rope collars are put onto the spar like a whipping.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 207)

Figure 12-3-5 Thumb Piece and Rope Collar

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is the minimum angle that the standing derrick may be lowered to when the topping lift is anchored to the floor?

Q2. What is the purpose of a martingale or fore guy?

Q3. What are heel tackles used for?

ANTICIPATED ANSWERS

A1. 25 degrees.

A2. To prevent the spar from springing up or back when hoisting and lowering a load.

A3. To prevent the heel from moving.

Teaching Point 3 **Describe the Action Taken in Response to Commands**

Time: 15 min Method: Interactive Lecture

COMMANDS

Heave in. Give a strong pull together on a line.

Check Away. Ease out a line under control.

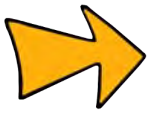
Avast. Stop.

Choke. Choke and secure the tackle(s).

Secure. Make fast a line.

Handsomely. Slowly, carefully.

Roundly. Rapidly.



These are the most commonly used commands for working with the standing derrick; however, the list is not exhaustive. Other commands may be used based on unit preferences.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What does the order HEAVE IN mean?

Q2. What order is given to make fast a line?

Q3. What does the order AVAST mean?

ANTICIPATED ANSWERS

A1. Give a strong pull together on a line.

A2. SECURE.

A3. Stop.

Teaching Point 4 **Demonstrate and Have the Cadets, as Members of a Group, Rig a Standing Derrick**

Time: 20 min Method: Demonstration and Performance

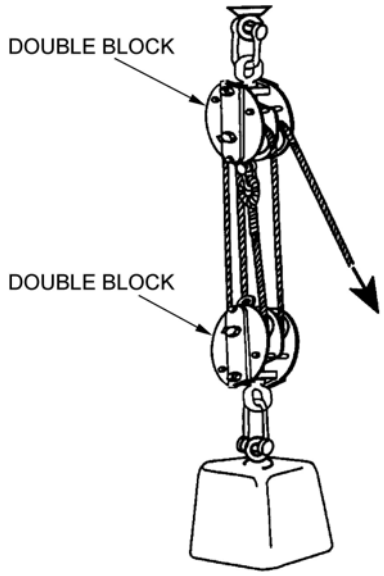
RIGGING A STANDING DERRICK

Demonstrate and have the cadets practice each step in rigging the standing derrick.

1. Place the strops for the main purchase and topping lift over the head of the spar. Attach thumb pieces/ rope collars to prevent the strops from slipping (as illustrated in Figure 12-3-5). Lay the strops close together to avoid a bending stress on the spar.

2. Rig the main purchase using a two-fold purchase (as illustrated in Figure 12-3-6). Attach the standing block to the main purchase strop. Ensure that the main purchase is rigged to disadvantage with the hauling part, or fall, exiting the standing block. Attach the tag line to the running block and lay it out so an end will be outside of the danger zone when the standing derrick is raised.

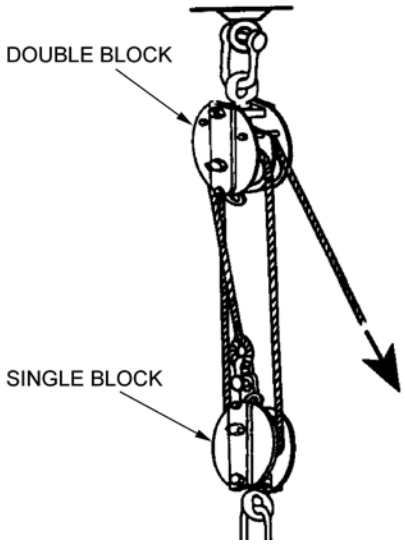
3. Rig the topping lift using a two-fold purchase. Attach the standing block to the topping lift anchor point and the running block to the topping lift strop. Ensure that the topping lift is rigged to disadvantage with the hauling part exiting the standing block. Tie a figure eight knot in the end of the hauling part.



BON-050-002/PT-004 (p. 3-155)

Figure 12-3-6 Two-Fold Purchase

4. Attach a snotter over the head of the spar, above the strops, using a clove hitch. Ensure that the eyes of the snotter extend equally from the spar. Rig the side guys using luffs (as illustrated in Figure 12-3-7). Attach the running blocks to the eyes in the snotter and the standing block to the side guys anchor point. Ensure that the side guys are rigged to disadvantage with the hauling parts exiting the standing blocks. Tie figure eight knots in the end of the hauling parts.



BON-050-002/PT-004 (p. 3-155)

Figure 12-3-7 Luff

5. Place the foot of the spar in a shoe if one is fitted.

6. Rig the heel tackles using luffs. Attach the standing blocks to the heel strops and the running blocks to the heel tackle anchor points. Ensure that the heel tackles are rigged to disadvantage with the hauling parts exiting the standing blocks. Tie a figure eight knot in the end of the hauling part.

7. Attach the leading block strop to the foot of the spar. Hold the strop in place with a thumb piece/rope collar. Reeve the fall of the main purchase through the leading block, tie a figure eight knot in the end and coil the excess line to one side of the spar.

8. Mouse all hooks (as illustrated in Figure 12-3-8).

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

Figure 12-3-8 Mousing a Hook

Mousing is not required for blocks equipped with a safety catch on the hook. If the safety catch has been removed or the spring is missing from the catch, the block must be replaced.

9. Heave in all heel tackles until they are evenly taut. Choke and secure the heel tackles. Coil any excess line and place neatly on the deck.

10. Heave in on the topping lift handsomely until the standing derrick has been raised to an angle between 25 and 75 degrees from the floor. Choke and secure the topping lift.

If the topping lift is anchored to the deck, the head of the spar must be picked up and held at chest height until the topping lift becomes taut. The person at the head of the spar shall then step out of the danger zone.

11. Heave in on the tag line to pull the running block out of the danger zone, checking away on the fall of the main purchase, if required.

12. The standing derrick is now complete and ready for operation (as illustrated in Figure 12-3-2).

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in rigging a standing derrick will serve as the confirmation of this TP.

Teaching Point 5 — **Have the Cadets, as Members of a Group, Operate a Standing Derrick**

Time: 75 min — Method: Practical Activity

Demonstrate how to operate the standing derrick prior to starting the activity.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, as members of a group, operate a standing derrick.

RESOURCES

The list of required equipment for a standing derrick is located in A-CR-CCP-603/PG-001, Chapter 2, Annex C, Appendix 1.

When choosing the equipment for rigging the standing derrick, ensure that each item is compatible with the others (e.g., the blocks are suitable for the size of the line).

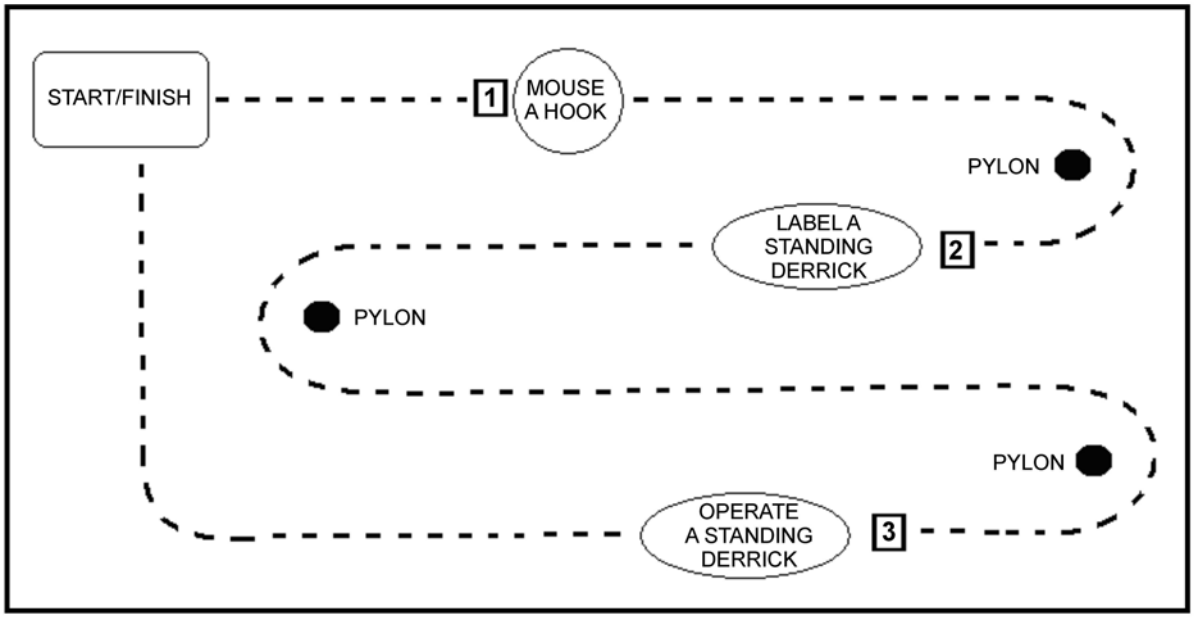
- Assembled standing derrick,
- Load of 22 kg (50 lbs) or less,
- Whipping twine,
- Pylons,
- Hooks,
- Hard hats,

- Parts cards located at Annex E,
- Picture/model of a standing derrick (blank picture located at Annex F if required),
- Sequence for Station 3 located at Annex G,
- Scoresheet located at Annex H,
- Whistle, and
- Stopwatch.

ACTIVITY LAYOUT

- Mark off a start line and set up personal safety equipment.
- Set up Station 1 with whipping twine and hooks.
- Set up Station 2 with the picture/model of the standing derrick and a bag/box with parts cards.
- Set up Station 3 with a standing derrick, whipping twine and a load.

The standing derrick in Station 3 shall be fully rigged (as illustrated in Figure 12-3-2).



Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

Figure 12-3-9 Standing Derrick Run

ACTIVITY INSTRUCTIONS

Encourage the cadets to cheer on the groups while the activity is conducted.

1. Divide the cadets into groups of four.
2. Have the first group line up behind the start line.
3. On the whistle signal, have the group put on their personal safety equipment and proceed to Station 1.

Ensure the time is started on the stopwatch at the whistle signal.

4. At Station 1, have each cadet in the group mouse a hook. Check the mousings for strength. If any of the mousings come off easily, that cadet will do another mousing. Upon successfully completing the mousings, have the group proceed to Station 3.
5. At Station 2, have the group label the picture/model of the standing derrick and then proceed to Station 3.
6. At Station 3, stop and record the time. Have the group operate the standing derrick by responding to commands from Annex G given by the instructor. Award points IAW the scoresheet found at Annex H.
7. Upon completion of Station 3, have the group proceed to the finish line and tally the score.
8. Repeat the activity for the remaining groups.
9. Declare the group with the most points the winner.

SAFETY

- Ensure the personal safety equipment is worn at all times.
- Ensure the cadets stay clear of all danger zones when the standing derrick has been raised.
- Ensure all hooks are moused or fitted with working safety catches.

CONFIRMATION OF TEACHING POINT 5

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

Teaching Point 6 — **Demonstrate and Have the Cadets, as Members of a Group, De-Rig a Standing Derrick**

Time: 10 min — Method: Demonstration and Performance

DE-RIG A STANDING DERRICK

Demonstrate and have the cadets practice each step in de-rigging the standing derrick.

1. Check away the topping lift handsomely, until the spar is resting on the ground.
2. Release the choke on the heel tackles, being careful not to place hands in between the running parts of the luff.

Once the spar is on the ground and the tension has been released from the heel tackles, the standing derrick is safe to de-rig.

3. Cut any mousings that have been applied and unhook the blocks from the strops.
4. Un-reeve the heel, guy, main purchase and topping lift tackles.
5. Remove the strops from the spar.
6. Remove the spar from the shoe.
7. Coil all lines and secure the equipment, as required.

CONFIRMATION OF TEACHING POINT 6

The cadets de-rigging a standing derrick will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' rigging, operating and de-rigging a standing derrick will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Rigging a standing derrick is an exercise that requires teamwork. The standing derrick is a device that has many practical uses within the Canadian Navy, although it is not used as frequently today as in years past due to the development of technology. It acts as an introduction to sea activities of the Canadian Navy while stimulating an interest in seamanship specialty training.

INSTRUCTOR NOTES/REMARKS

This EO should be conducted after EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

The cadets must wear issued cadet boots and hard hats while operating the standing derrick.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of the Maritime Staff. (2000). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-047 (ISBN 0-11-772695-8/BON-050-002/PT-004) Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: Her Majesty's Stationary Office Publications Centre.

C1-049 (ISBN 0-11-771958-7) Royal Navy. (1967). *Admiralty Manual of Seamanship 1967* (Vol. 2). Cambridge, England: Her Majesty's Stationery Office.

ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 4

EO C321.03 – RIG A GYN

Total Time: 150 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-603/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 and cut out the parts cards located at Annex I.

Photocopy the blank gyn diagram located at Annex J, the sequence for Station 3 located at Annex K and the gyn scoresheet located at Annex L.

Ensure that the cadets have their issued cadet boots with them.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1–3 to illustrate the function, parts and rigging commands for a gyn.

Demonstration and performance was chosen for TPs 4 and 6 as it provides the instructor the opportunity to introduce a gyn, demonstrate procedures and observe the cadets rigging and de-rigging a gyn.

A practical activity was chosen for TP 5 as it is an interactive way to introduce the cadets to operating a gyn in a safe and controlled environment. This activity contributes to the development of seamanship skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

Review safe practices, personal safety equipment and gyn danger zones from EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

OBJECTIVES

By the end of this lesson the cadet, as a member of a group, shall have rigged, operated and de-rigged a gyn.

IMPORTANCE

It is important for cadets to rig a gyn as it introduces them to sea activities of the Canadian Forces while stimulating an interest in seamanship specialty training. Although the gyn is no longer used regularly by the Canadian Navy, it is a great way to foster teamwork and practice seamanship skills.

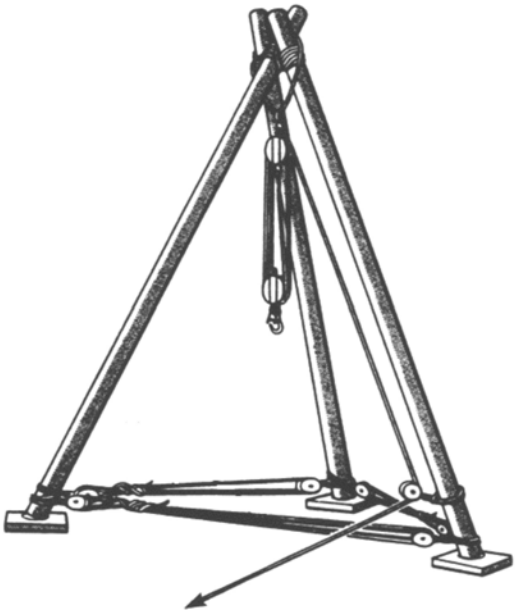
Teaching Point 1 **Explain the Function of a Gyn**

Time: 5 min Method: Interactive Lecture

GYN

Due to improvements in technology, improvised lifting devices are not as widely used today as in the past. However, when no suitable crane or hydraulic device is available on board or ashore for lifting a heavy object or equipment, some form of an improvised lifting device must be rigged. This may include, sheers, a standing or swinging derrick, or a gyn.

A gyn is the strongest of these types of improvised lifting devices and requires no additional rigging to support it. It is used for straight lifts only.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 198)

Figure 12-4-1 Assembled Gyn

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What is the strongest type of improvised lifting device?

Q2. When is a gyn used?

Q3. For what type of lift is a gyn used?

ANTICIPATED ANSWERS

A1. Gyn.

A2. When no suitable crane or hydraulic device is available on board or ashore for lifting a heavy object or equipment.

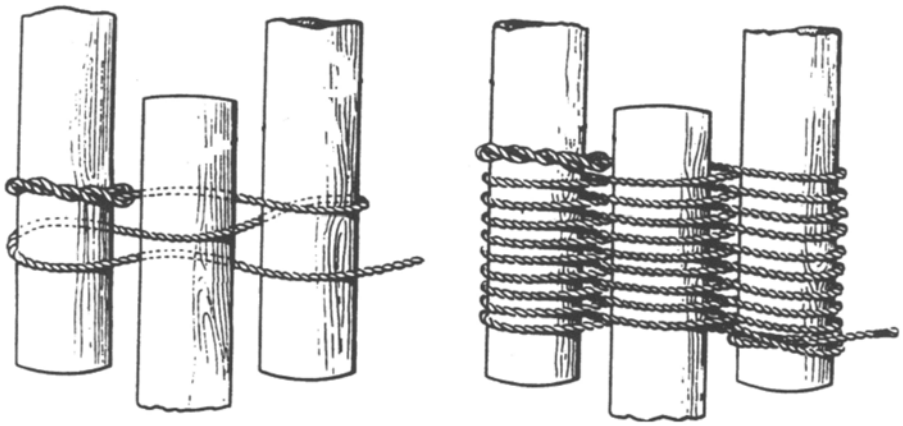
A3. Straight lifts.

Teaching Point 2 **Identify the Parts of a Gyn**

Time: 15 min Method: Interactive Lecture

PARTS OF A GYN

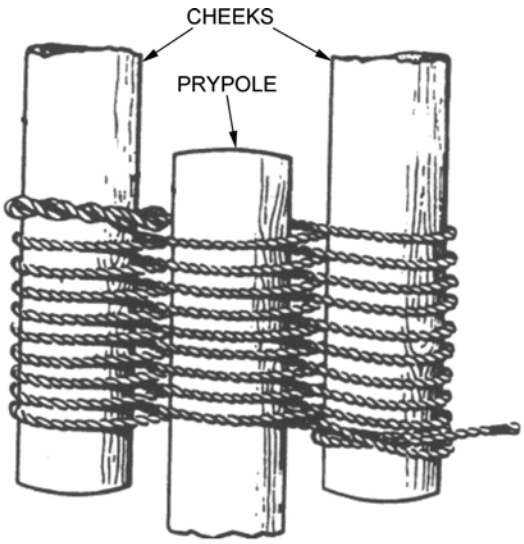
Head Lashing. The head lashing forms the head of the gyn. The spars are lashed together to form a tripod using six to eight figure-of-eight turns.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 207)

Figure 12-4-2 Head Lashing

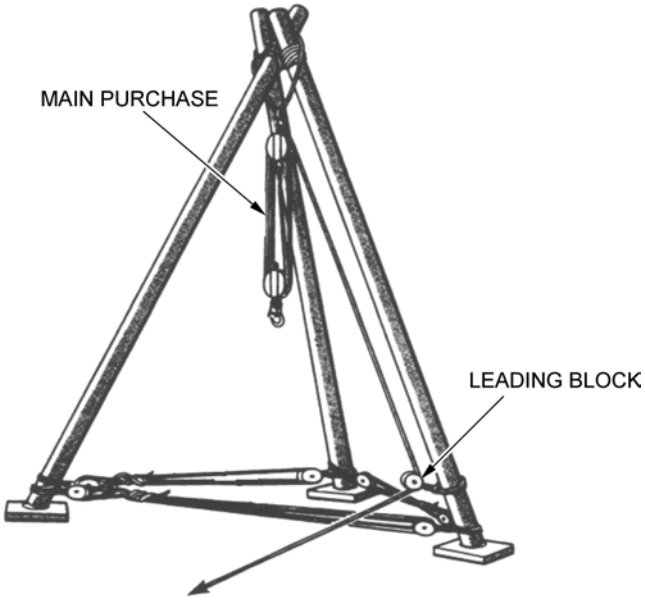
Spars. Spars are the basis of the tripod, acting as the legs of the gyn. There are three spars used in the rigging of the gyn. The heads of the spars are lashed together with a head lashing to connect them. When applying the head lashing, the spars are laid out parallel with the centre spar – the prypole – in the opposite direction from the other spars – the cheeks.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 207)

Figure 12-4-3 Spars

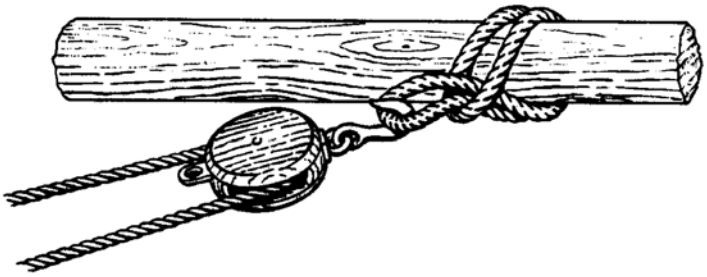
Main Purchase. The main purchase, consisting of a two-fold purchase, is attached to the head of the spars and is used to lift the load (as illustrated in Figure 12-4-4).



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 198)

Figure 12-4-4 Main Purchase and Shoes

Strops. Strops are a continuous loop in a line or wire rope. They are used to pass around a cask, spar, piece of line, etc to provide an eye to be placed over a hook or shackle (as illustrated in Figure 12-4-5).



Royal Navy, Admiralty Manual of Seamanship 1964 (Vol. 1), Her Majesty's Stationery Office (p. 193)

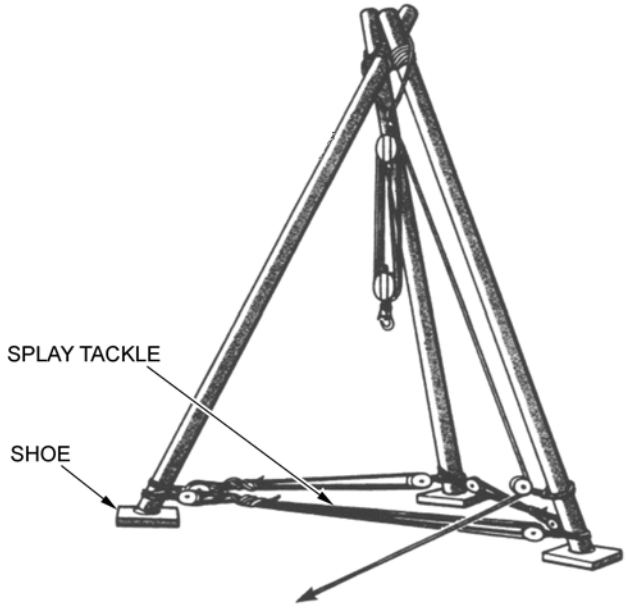
Figure 12-4-5 Strop on a Spar

Leading Block (for the Fall of the Main Purchase). The leading block is secured to one of the spars and the hauling part, or fall of the main purchase is led through it (as illustrated in Figure 12-4-4). This block is used to change the direction of pull on the fall.

The fall of the main purchase refers to its hauling part which exits the standing block attached to the head of the gyn. The fall must be heaved in, in a downward motion, directly under the spars. The leading block allows the line to be safely heaved in from the side of the gyn.

Splay Tackles. The splay tackles, consisting of luffs, are rigged between each leg to prevent the legs from splaying – moving further apart – when they are under load.

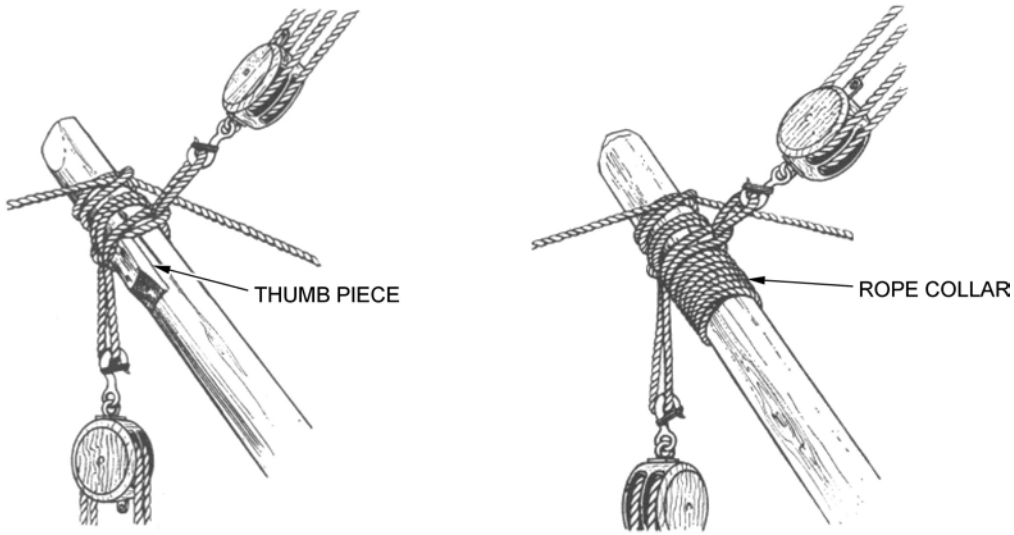
Shoes (if Fitted). Shoes are usually square slabs of hardwood with a recess in their upper surfaces to take the heels of the spars (as illustrated in Figure 12-4-6). The length of each side should not be less than four times the diameter of the spar. They are used to distribute the weight of the load and the thrust of the spar over an area of the deck. When ashore, they are used to distribute the weight so as to prevent the spar from sinking into the ground.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 198)

Figure 12-4-6 Splay Tackles and Shoes

Thumb Pieces/Rope Collars (if Fitted). Thumb pieces/rope collars are used to prevent the strops from slipping on the spars. Thumb pieces are wooden pieces that are screwed or nailed onto the spar. Rope collars are put onto the spar like a whipping.



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 207)

Figure 12-4-7 Thumb piece and Rope Collar

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What are splay tackles used for?

Q2. What is the centre spar called?

Q3. What are thumb pieces/rope collars used for?

ANTICIPATED ANSWERS

A1. To prevent the legs from splaying – moving further apart – when they are under load.

A2. Prypole.

A3. To prevent the strops from slipping on the spars.

Teaching Point 3 **Describe the Actions Taken in Response to Commands**

Time: 15 min Method: Interactive Lecture

Heave in. Give a strong pull together on a line.

Check Away. Ease out a line under control.

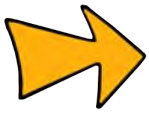
Avast. Stop.

Choke. Choke the standing block with the hauling part and secure it with two half hitches above the crown.

Secure. Make fast a line.

Handsomely. Slowly, carefully.

Roundly. Rapidly.



These are the most commonly used commands for working with the gyn. However, the list is not exhaustive. Other commands may be used based on unit preferences.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What does the order HEAVE IN mean?

Q2. What order is given to make fast a line?

Q3. What does the order AVAST mean?

ANTICIPATED ANSWERS

A1. Give a strong pull together on a line.

A2. SECURE.

A3. Stop.

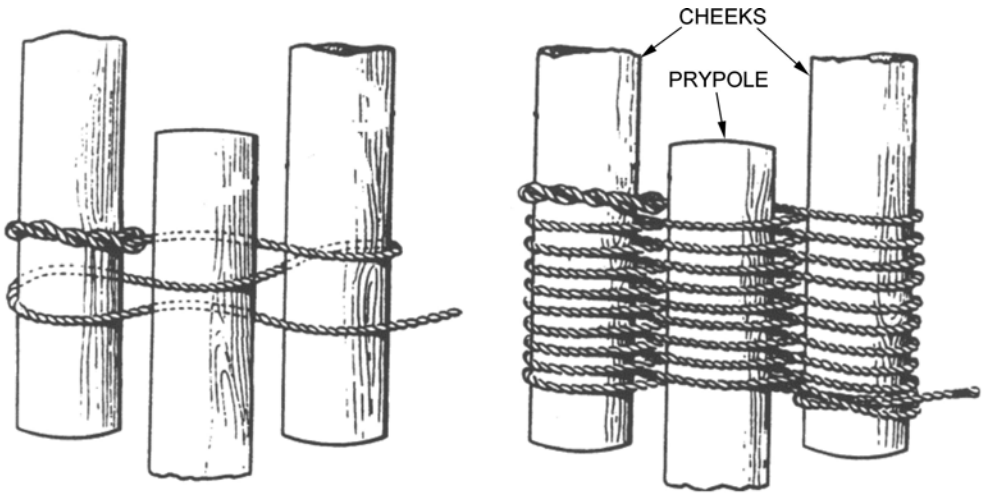
Teaching Point 4 — **Demonstrate and Have the Cadets, as Members of a Group, Rig a Gyn**

Time: 20 min — Method: Demonstration and Performance

RIGGING A GYN

Demonstrate and have the cadets practice each step in rigging the gyn.

1. Mark the position for the head lashing on the three spars to be used for legs. Lay the spars parallel to each other, five centimetres (two inches) apart, with the heel of the centre spar – the prypole – pointing in the opposite direction from the other two spars – the cheeks (as illustrated in Figure 12-4-8).



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 207)

Figure 12-4-8 Head Lashing

2. Support the heads of the spars above the deck. Start the head lashing with a timber hitch on one of the cheeks followed by six to eight figure-of-eight turns around the spars and finish with a clove hitch around the opposite cheek (as illustrated in Figure 12-4-9). Apply the lashing loose enough to allow the gyn to be raised but no so loose that it will slip once the gyn is erect.

An alternative approach to applying the head lashing is to place the three spars parallel with the heel of the prypole even with the heads of the cheeks. This allows the figure-of-eight turns to be applied easily over the ends. Once all turns are in place, the prypole is then slid back through the turns until the heads are positioned together (as illustrated in Figure 12-4-8).

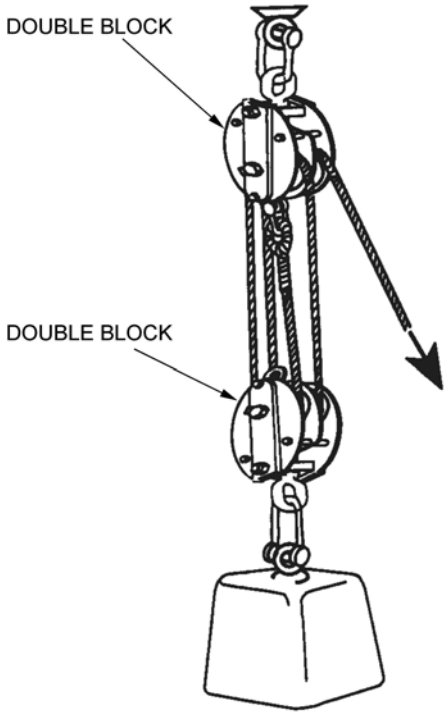
3. Place a rope collar around the prypole to prevent the head lashing from slipping down the spar when raising the gyn.

4. Place the main purchase strop around the head lashing (as illustrated in Figure 12-4-9). The strop goes under the head lashing and over the tip of the prypole. The bight on each side is slipped over the tips of the cheeks. Ensure that the splice is positioned so that it will not come in contact with the hook of the block once the gyn is raised.

Navy League of Canada, NLP 101 Flotilla and Provincial Seamanship Competition Manual, Navy League of Canada (p. 12)

Figure 12-4-9 Head Lashing Strop

5. Rig the main purchase using a two-fold purchase (as illustrated in Figure 12-4-10). Attach the standing block to the main purchase strop (as illustrated in Figure 12-4-9). Ensure that the main purchase is rigged to disadvantage with the hauling part exiting the standing block.

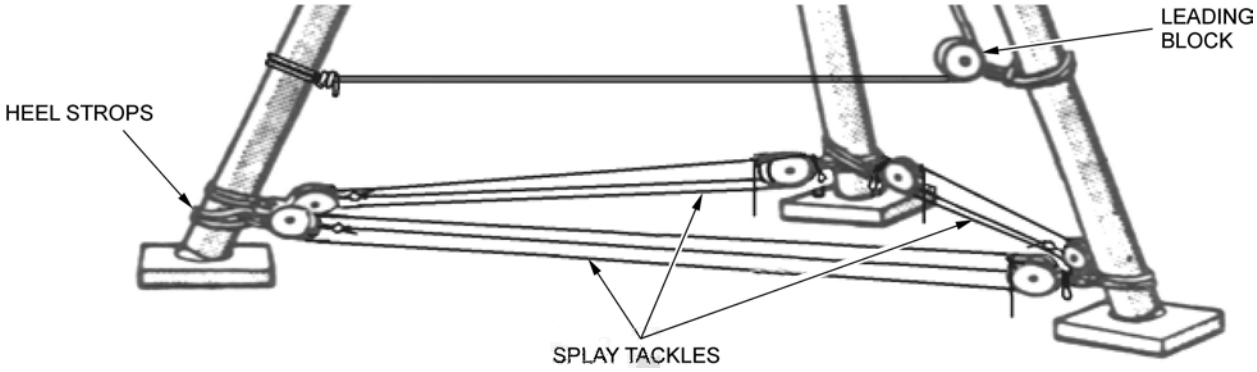


BON-050-002/PT-004 (p. 3-155)

Figure 12-4-10 Two-Fold Purchase

6. Place the splay tackle strops and the leading block strop at the feet of the spars (as illustrated in Figure 12-4-11).

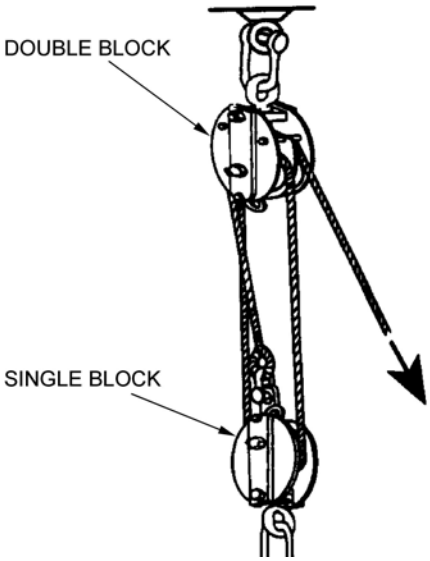
The strop for the leading block may be attached above or between the splay tackle strops.



Royal Navy, Admiralty Manual of Seamanship 1964 (Vol. 1), Her Majesty's Stationery Office (p. 193)

Figure 12-4-11 Gyn Splay Tackles

7. Rig the splay tackles using luffs (as illustrated in Figure 12-4-12) and attach to the strops between the spars. Tie figure eight knots in the ends of the hauling parts.



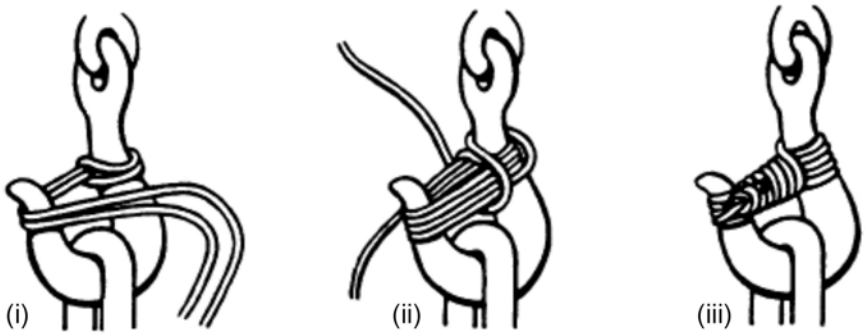
BON-050-002/PT-004 (p. 3-155)

Figure 12-4-12 Luff

8. Attach the leading block to the leading block strop and lead the fall of the main purchase through it. Tie a figure eight knot in the end of the fall.

9. Place thumb pieces/rope collars on the heels of the spars above the strops to prevent the strops from slipping up the spars.

10. Mouse all hooks (as illustrated in Figure 12-4-13).



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

Figure 12-4-13 Mousing a Hook

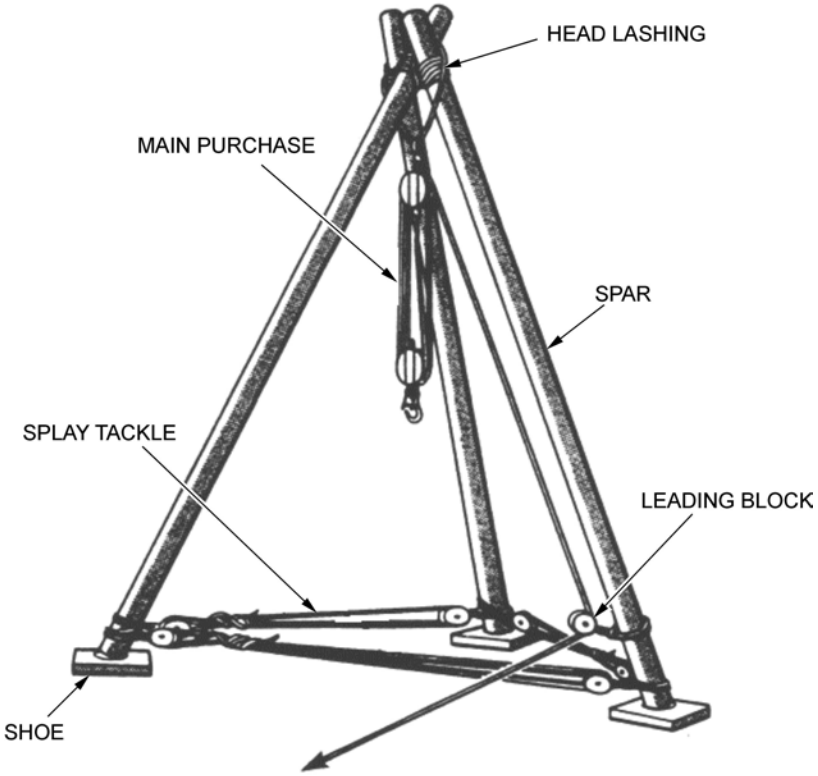
Mousing is not required for blocks equipped with a safety catch on the hook. If the safety catch has been removed or the spring is missing from the catch, the block must be replaced.

11. Raise the head of the gyn to chest height. Heave in the splay tackles to pull the heels together. Continue heaving in handsomely until the distance between the heels of the gyn are approximately one-third the length of the spars used for the gyn. Choke and secure the splay tackles. Coil any excess line on the deck beside the spars.

Extreme care should be exercised here as the gyn may topple over if the splay tackles are not heaved in evenly. It is advisable to heave in splay tackles individually once the gyn nears its full height.

If the splay tackles do not heave in easily, ensure that the head lashing has not been applied too tightly.

12. The gyn is now complete and ready for operation (as illustrated in Figure 12-4-14).



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 198)

Figure 12-4-14 Assembled Gyn

CONFIRMATION OF TEACHING POINT 4

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

Teaching Point 5 **Demonstrate and Have the Cadets, as Members of a Group, Operate a Gyn**

Time: 75 min Method: Practical Activity

Demonstrate how to operate the gyn prior to starting the activity.

ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadets, as members of a group, operate a gyn.

RESOURCES

The list of required equipment for a gyn is located in A-CR-CCP-603/PG-001, Chapter 2, Annex C, Appendix 1.

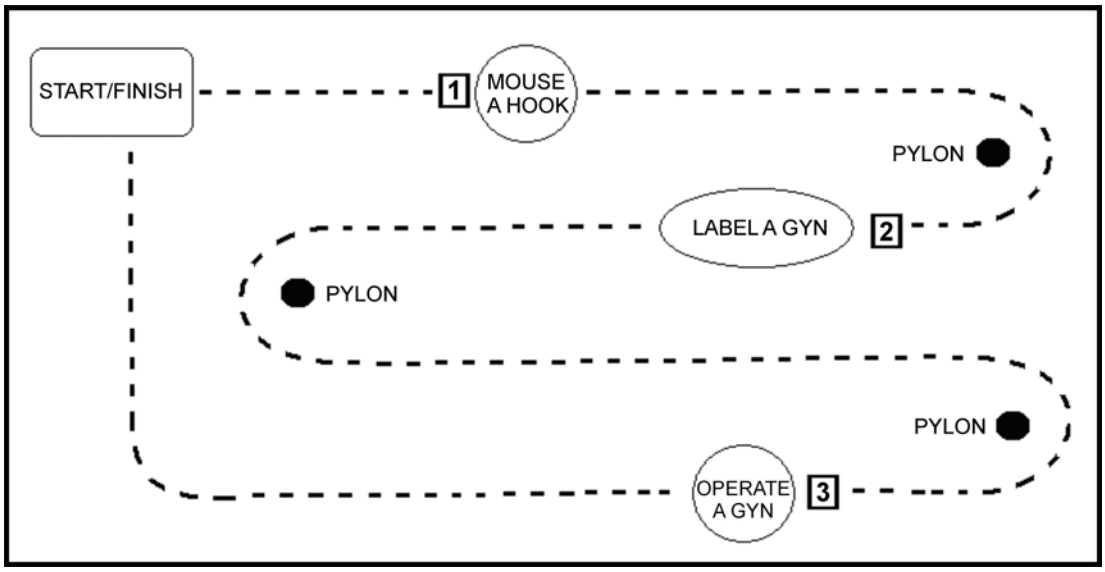
When choosing the equipment for rigging the gyn, ensure that each item is compatible with the others (e.g., the blocks are suitable for the size of the line).

- Assembled gyn,
- Load of 22 kg (50 lbs) or less,
- Whipping twine,
- Pylons,
- Hooks,
- Hard hats,
- Parts cards located at Annex I,
- Picture/model of a gyn (blank picture located at Annex J, if required),
- Sequence for station 3 located at Annex K,
- Gyn scoresheet located at Annex L,
- Whistle, and
- Stopwatch.

ACTIVITY LAYOUT

- Mark off a start area.
- Set up Station 1 with whipping twine and hooks.
- Set up Station 2 with parts cards, tape and a picture/model of a gyn.
- Set up Station 3 with a gyn, whipping twine and a load.

The gyn in Station 3 shall be fully rigged (as illustrated in Figure 12-4-14).



Director Cadets 3, 2007, Ottawa, ON: Department of National Defence

Figure 12-4-15 Gyn Run

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of three.
2. Have the first group line up in the start area.
3. On the whistle signal, the group is to put on their personal safety equipment and proceed to Station 1.

Ensure the time is started on the stopwatch at the whistle signal.

4. At Station 1, have each cadet in the group mouse a hook. Check the mousings for strength. If any of the mousings come off easily, that cadet will do another mousing. Upon successfully completing the mousings, have the group proceed to Station 2.
5. At Station 2, have the group label the picture/model of the gyn and then proceed to Station 3.
6. At Station 3, stop and record the time. Have the group operate the gyn by responding to commands from Annex K as given by the instructor. Award points IAW the scoresheet found at Annex L.
7. Upon completion of Station 3, have the group continue to the finish line and tally the score.
8. Have each group complete the gyn run in the above sequence.
9. Declare the group with the most points the winner.

SAFETY

- Ensure the personal safety equipment is worn at all times.
- Ensure the cadets stay clear of the load while it is in motion.
- Ensure all hooks are moused or fitted with working safety catches.

CONFIRMATION OF TEACHING POINT 5

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

Teaching Point 6 — **Demonstrate and Have the Cadets, as Members of a Group, De-Rig a Gyn**

Time: 10 min — Method: Demonstration and Performance

DE-RIG A GYN

Demonstrate and have the cadets practice each step in de-rigging the gyn.

1. Release the choke on the splay tackles, being careful not to place hands between the standing parts of the luff.
2. Check away on the splay tackles handsomely as the heels are pulled out to lower the gyn. To ensure that the gyn is lowered safely, have one cadet check away on the splay tackle and another cadet pull out each spar by hand.
3. Once the head of the gyn is at chest height, it may lowered by hand until it is resting on the deck.

The gyn is safe to de-rig once the head is resting on the ground.

4. Cut any mousings that have been applied and unhook the blocks from the strops.
5. Un-reeve the splay tackles and main purchase.
6. Remove the strops from the spars.
7. Remove the head lashing from the spars.
8. Coil all lines and secure the equipment as required.

CONFIRMATION OF TEACHING POINT 6

The cadets' participation in de-rigging a gyn will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' rigging, operating and de-rigging a gyn will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

The operation of a gyn is an exercise that requires teamwork. It is a device that has many practical uses within the Canadian Navy, although it is not used as frequently today as in years past due to improvements in technology. The gyn acts as an introduction to sea activities of the Canadian Forces while stimulating an interest in seamanship specialty training.

INSTRUCTOR NOTES/REMARKS

This EO shall be conducted after EO M321.01 (Describe Safety Procedures for Operating Lifting Devices, Section 1).

The cadets must wear issued cadet boots and hard hats while operating the gyn.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of the Maritime Staff. (2000). *CFCD 105 Fleet Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-003 (ISBN 11-770973-5) Royal Navy. (1972). *Admiralty Manual of Seamanship* (Vol. 1). London, England: Her Majesty's Stationery Office.

C1-047 (ISBN 0-11-772695-8/BON-050-002/PT-004) Command of the Defence Council. (1995). *BR 67 Admiralty Manual of Seamanship*. London, England: Her Majesty's Stationery Office Publications Centre.

C1-049 (ISBN 0-11-771958-7) Royal Navy. (1967). *Admiralty Manual of Seamanship 1964* (Vol. 2). Cambridge, England: Her Majesty's Stationery Office.

ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 5

EO C321.04 – MAKE A MONKEY'S FIST

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-603/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.

Complete a monkey's fist to be used as a model for the lesson.

Photocopy the monkey's fist pattern located at Annex N for each cadet if the alternative method will be taught.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to explain the use of the monkey's fist.

Demonstration and performance was chosen for TP 2 as it allows the instructor to demonstrate making a monkey's fist 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 made a monkey's fist.

IMPORTANCE

It is important for cadets to know how to make a monkey's fist as it introduces advanced ropework skills in a fun and challenging way, while providing a practical skill that can be used in today's maritime community.

Teaching Point 1 **Explain the Use of a Monkey's Fist**

Time: 5 min Method: Interactive Lecture

USE OF A MONKEY'S FIST

To get heavy lines from the ship to the shore or ship to ship, a light line known as a heaving line, is used to pull the heavier line across. To give weight to the end of the heaving line, a monkey's fist is often used.

When this knot is made, a small, round cork or wooden ball can be placed inside the knot prior to completion. Care should be taken that the finished knot is not so heavy as to be dangerous to the people ashore.

Sea cadets today will see this knot used on heaving lines as well as for many decorative uses such as finishing the ends of guide ropes and key fobs.

The monkey's fist has a special significance to a sailor because it is often the first thing that connects them with the land at the end of a voyage.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Why is the monkey's fist used?

Q2. What can be placed inside the monkey's fist?

Q3. Where can the monkey's fist be used decoratively?

ANTICIPATED ANSWERS

A1. To give weight to the end of a heaving line.

A2. A small round cork or wooden ball.

A3. At the end of a guide rope or key fob.

Teaching Point 2 **Demonstrate and Have the Cadets Make a Monkey's Fist**

Time: 45 min Method: Demonstration and Performance

STEPS FOR MAKING A MONKEY'S FIST

Demonstrate and have the cadets practice each step in making the monkey's fist.

To introduce cadets to the use of a knot-weaving board, an alternative method for making a monkey's fist is located at Annex M. This method introduces the cadets to knot-weaving used for more ornamental ropework.

1. Wind three turns around the hand (as illustrated in Figure 12-5-1).

B-GN-181-105/FP-E00 (p. 5-35)

Figure 12-5-1 Monkey's Fist Step 1

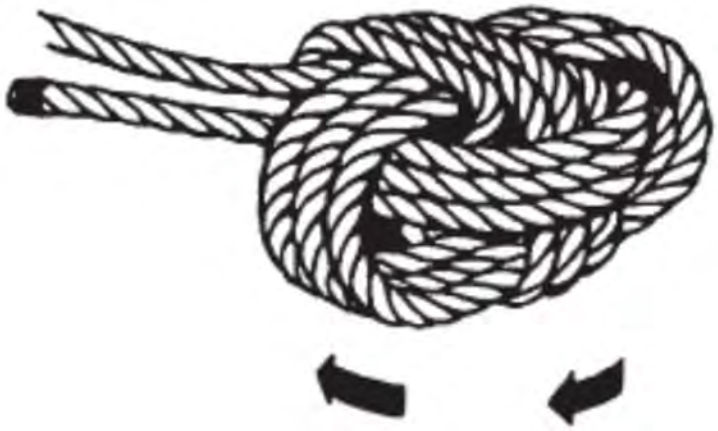
2. Pinch the turns together and pass a second set of three turns across and around the first three (as illustrated in Figure 12-5-2).

B-GN-181-105/FP-E00 (p. 5-35)

Figure 12-5-2 Monkey's Fist Step 2

3. Pass a third set of three turns around and across the second set but inside the first set, in the direction shown by the arrows (as illustrated in Figure 12-5-3).

If the knot is correctly made, the end will come out alongside the standing part.



B-GN-181-105/FP-E00 (p. 5-35)

Figure 12-5-3 Monkey's Fist Step 3

If required, insert a small, round cork or wooden ball into the centre of the knot before pulling the parts taut.

4. Carefully pull each part taut in the opposite direction from which it was tied until it becomes snug. The knot should be rolled around in a circular motion with the palms of the hands to even out the shape.

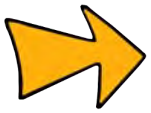
5. Use a fid or something pointed to pick and pull each cord to an even firmness.

When the last parts of the cord are tensioned, there is a tendency for the loose loop of cord to twist as it passes through the tightened sections. To prevent this twisting, maintain tension on the loop in one hand as the cord is drawn through, until it can no longer be easily grasped. The short loop should tuck in with little or no twist in it.

6. To finish the knot, seize the bitter end to the standing part where it comes out of the monkey's fist.

B-GN-181-105/FP-E00 (p. 5-35)

Figure 12-5-4 Completed Monkey's Fist



Tucking the bitter end inside the monkey's fist, then working all parts taut is another method of finishing off the knot.

CONFIRMATION OF TEACHING POINT 2

The cadets' completion of a monkey's fist will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' completion of a monkey's fist will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Making a monkey's fist provides a way of introducing advanced ropework skills in a fun and challenging way. A monkey's fist is used commonly for heaving lines in today's maritime community.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of the Maritime Staff. (2000). *CFCD 105 Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-102 Fukuhara, D. (2002). *Fancy Knotting: An Introduction*. Vancouver, BC: David Fukuhara.

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ROYAL CANADIAN SEA CADETS

PHASE THREE

INSTRUCTIONAL GUIDE

SECTION 6

EO C321.05 – MAKE A TURK'S HEAD

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-603/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.

Make a turk's head to be used as a model for the lesson.

Photocopy the turk's head pattern located at Annex P for each cadet if the alternative method will be taught.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to explain the use of the turk's head.

Demonstration and performance was chosen for TP 2 as it allows the instructor to demonstrate making a turk's head 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 made a turk's head.

IMPORTANCE

It is important for cadets to know how to make a turk's head as it introduces advanced ropework skills in a fun and challenging way, while providing a practical skill that can be used in rigging lifting devices and in ornamental ropework.

Teaching Point 1 **Explain the Use of a Turk's Head**

Time: 5 min Method: Interactive Lecture

USE OF A TURK'S HEAD

The turk's head is an ornamental knot that is supposed to resemble the turban once worn in Turkey. It may be made either as a standing or a running knot. A standing turk's head is made in the end of a line (as illustrated in Figure 12-6-1) and is used as an ornamental stopper knot. A running turk's head is made around a bight of rope, a stanchion or other fitting (as illustrated in Figure 12-6-2) using a single length of cord.

B-GN-181-105/FP-E00 (p. 5-40)

Figure 12-6-1 Standing Turk's Head

B-GN-181-105/FP-E00 (p. 5-42)

Figure 12-6-2 Running Turk's Head

In addition to its ornamental ropework uses, the running turk's head can be used on lifting devices as an alternative to a rope collar. When made taut around a pipe or hose, the turk's head will rival the holding strength of a metal clamp.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. How did the turk's head get its name?

Q2. In what forms can a turk's head be made?

Q3. What can a running turk's head be used for?

ANTICIPATED ANSWERS

A1. It is supposed to resemble the turban once worn in Turkey.

A2. Standing and running.

A3. Ornamental ropework, alternative to a rope collar, pipe or hose clamp.

Teaching Point 2 **Demonstrate and Have the Cadets Make a Turk's Head**

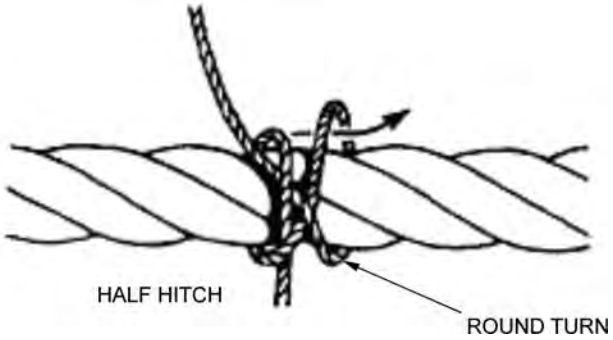
Time: 45 min Method: Demonstration and Performance

STEPS FOR MAKING A TURK'S HEAD

Demonstrate and have the cadets practice the steps for making a turk's head.

To introduce cadets to the use of a knot-weaving cylinder, an alternative method for making a turk's head is located at Annex O. This method introduces the cadets to knot-weaving used for more ornamental ropework.

1. Make a half hitch around a rope or fitting followed by a round turn (as illustrated in Figure 12-6-3).
2. Dip the end under the bight of the half hitch (as illustrated in Figure 12-6-3).



B-GN-181-105/FP-E00 (p. 5-42)

Figure 12-6-3 Steps 1–3

3. Cross the bight – that is on the same side as the lead end – underneath the other bight (as illustrated in Figure 12-6-3).
4. Pass the end down between the bights to the other side (as illustrated in Figure 12-6-4).

B-GN-181-105/FP-E00 (p. 5-42)

Figure 12-6-4 Step 4

5. Steps 3. and 4. are repeated until the rope is encircled (as illustrated in Figure 12-6-5).

B-GN-181-105/FP-E00 (p. 5-42)

Figure 12-6-5 Step 5

6. Follow the ends around as many times as required (as illustrated in Figure 12-6-6). Finish the knot by hauling all parts taut and trimming the ends off flush with the knot.

B-GN-181-105/FP-E00 (p. 5-42)

Figure 12-6-6 Step 6

CONFIRMATION OF TEACHING POINT 2

The cadets' making a turk's head will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' making a turk's head will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Making a turk's head introduces advanced ropework skills in a fun and challenging way. A turk's head is commonly used as a substitute for a rope collar and can also be used to decorate circular objects.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A1-004 B-GN-181-105/FP-E00 Chief of the Maritime Staff. (2000). *CFCD 105 Seamanship Rigging and Procedures Manual*. Ottawa, ON: Department of National Defence.

C1-102 Fukuhara, D. (2002). *Fancy Knotting: An Introduction*. Vancouver, BC: David Fukuhara.

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PARTS CARDS – SHEERS

SPLAY TACKLE	SHOE
STROP	HEAD LASHING
MAIN PURCHASE	LEADING BLOCK
SPAR	HEEL TACKLE
TOPPING LIFT	TAG LINE

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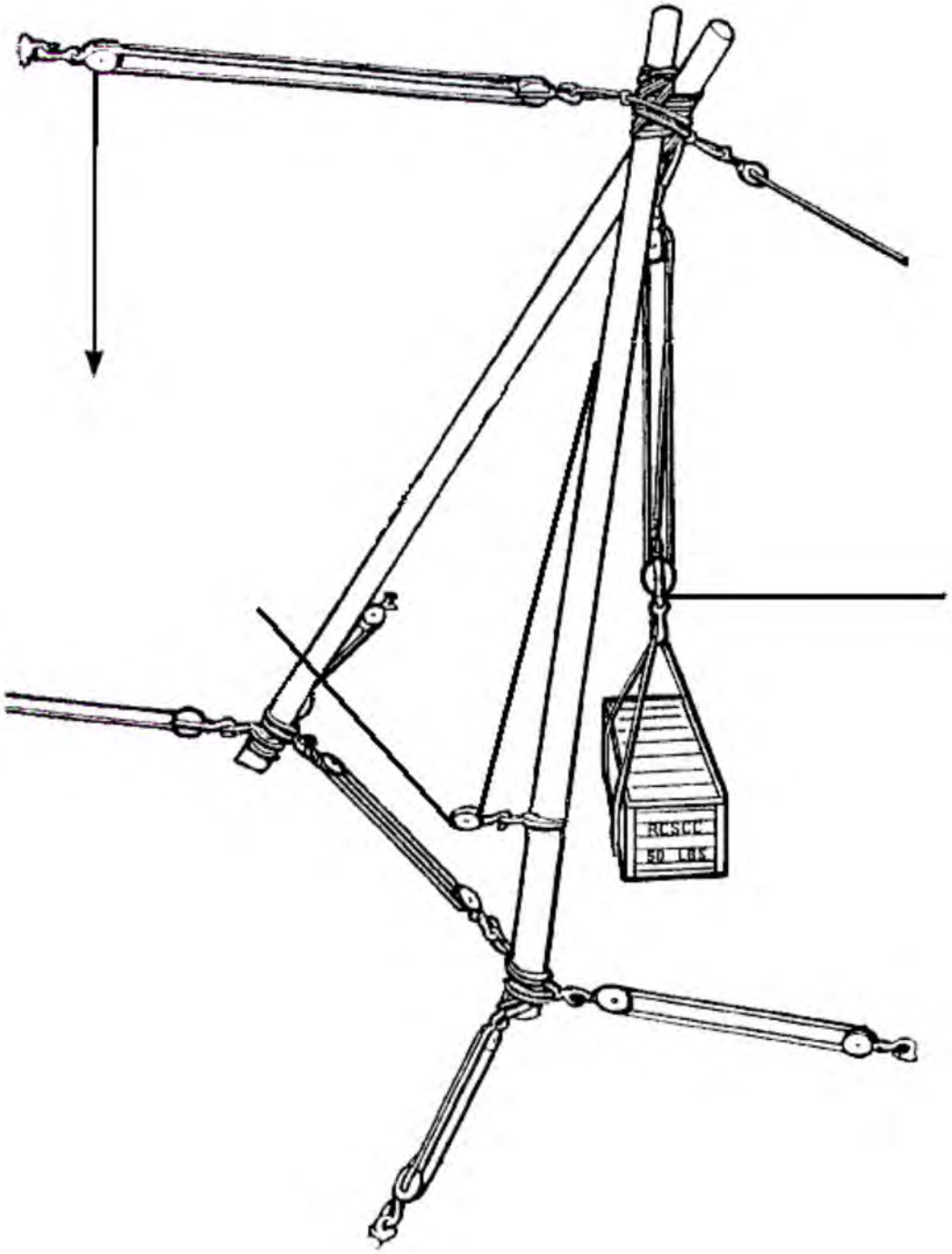
ASSEMBLED SHEERS



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 197)

Figure 12B-1 Assembled Sheers

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SEQUENCE FOR STATION 3 – OPERATING THE SHEERS

The sheers will be fully rigged and lowered to an angle of 30 degrees from the ground with the tag line attached to the main purchase and extended out of the forward danger zone.

The following sequence will be followed by each group for Station 3:

1. hook on the load (hook must be moused) – five points; and
2. respond to the following commands – five points each:
   (a) heave in main purchase;
   (b) avast;
   (c) secure main purchase;
   (d) heave in topping lift;
   (e) avast;
   (f) choke the topping lift;
   (g) check away main purchase;
   (h) avast; and
   (i) secure main purchase.

SAFETY INFRACTIONS

1. Not wearing a hard hat.
2. Not wearing issued cadet boots.
3. Running.
4. Horseplay.
5. Walking with an open knife.
6. Stepping over tackles under tension.
7. Putting hand through tackles when choking.
8. Putting hands/fingers on a block when the tackle is under tension.

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SHEERS SCORESHEET

Group	Overall Time/Points Conversion	Points for Operating the Sheers (35 point maximum)	Penalties (-)	Total Score
Example	4 min, 20 sec = 420 1 000 - 420 = 580	35	5	610

Notes:

1. The overall time will be converted into points and subtracted from 1000. For example, a time of 4 minutes and 20 seconds will be converted to 1000 minus 420 points, to give a score of 580.
2. When operating the sheers, five points will be given for every command followed properly.
3. Penalties will be issued as follows:
   a. 5 points for every part incorrectly labelled at Station 2,
   b. 25 points if mousing comes off too easily, and
   c. 50 points for every safety infraction (IAW Annex C) while operating the sheers.
4. The total score will be the points for the overall time plus the points for operating the sheers, minus any penalties.

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PARTS CARDS – STANDING DERRICK

TOPPING LIFT	**SHOE**
STROP	**SIDE GUY**
MAIN PURCHASE	**LEADING BLOCK**
SPAR	**THUMB PIECE/ROPE COLLAR**
MARTINGALE/FORE GUY	**HEEL TACKLE**

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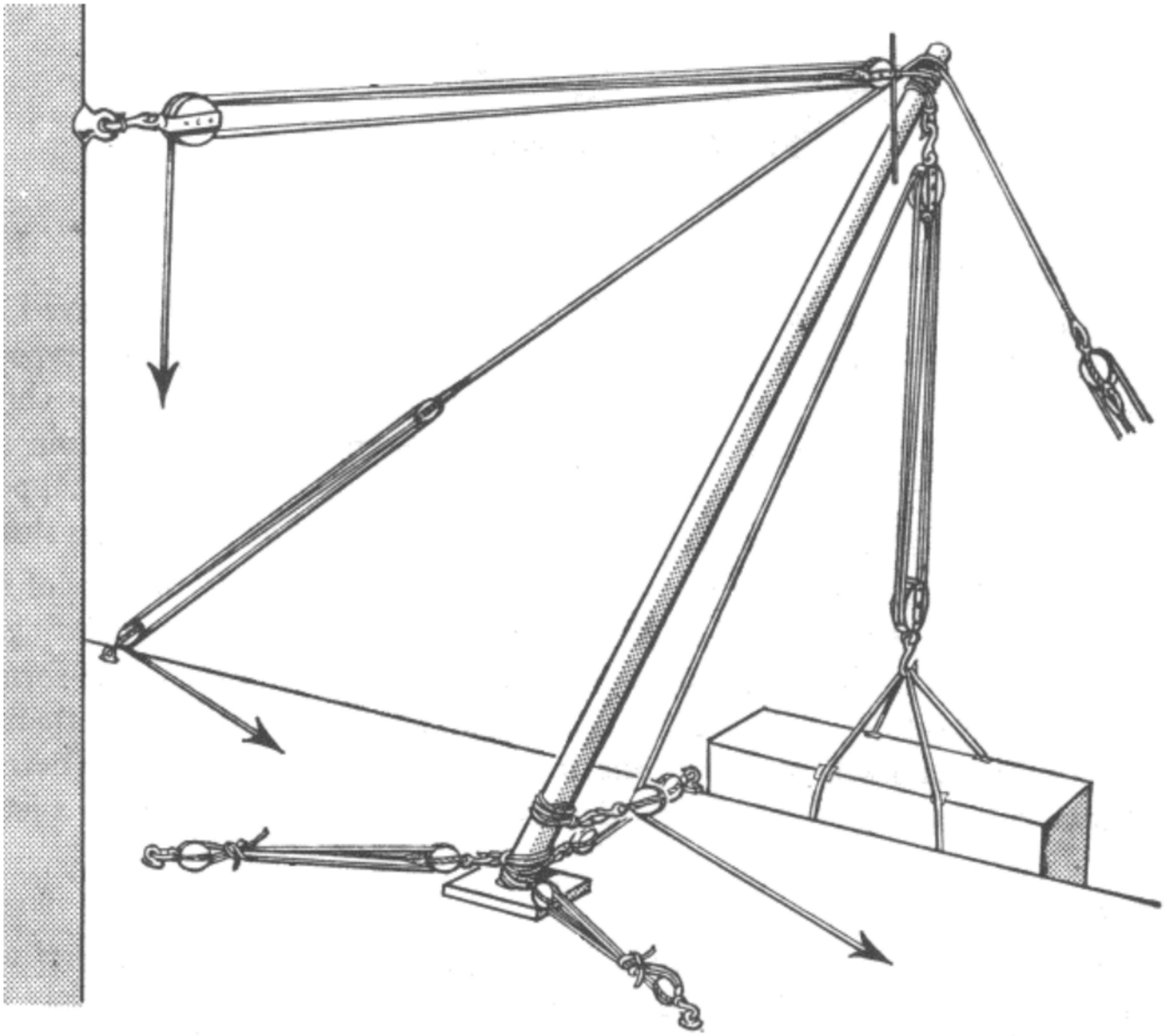
STANDING DERRICK



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

Figure 12F-1 Standing Derrick

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SEQUENCE FOR STATION 3 – OPERATING A STANDING DERRICK

The standing derrick will be positioned with the topping lift checked away and the head of the derrick on the ground. The main purchase is slackened to allow the running block to be hooked onto the load before the derrick is raised.

The following sequence will be followed by each group for Station 3:

1. hook on the load (hook must be moused – five points;
2. respond to the following commands – five points each:
   (a) heave in topping lift;
   (b) avast;
   (c) heave in main purchase;
   (d) avast;
   (e) heave in topping lift, check away guys;
   (f) avast;
   (g) heave in port guy, check away starboard guy;
   (h) avast;
   (i) heave in starboard guy, check away port guy;
   (j) avast;
   (k) check away main purchase;
   (l) avast; and
3. unhook the load – five points.

SAFETY INFRACTIONS

1. Not wearing a hard hat.
2. Not wearing issued cadet boots.
3. Running.
4. Horseplay.
5. Walking with an open knife.
6. Stepping over tackles under tension.
7. Putting a hand through tackles when choking.
8. Putting hands/fingers on a block when the tackle is under tension.

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STANDING DERRICK SCORESHEET

Group	Overall Time/Points Conversion From Station 1 & 2 (Substracted From 1000)	Points for Operating the Standing Derrick From Station 3 (35 point maximum)	Penalties (-)	Total Score
Example	4 min, 20 sec = 420 1000 - 420 = 580	35	5	610

Notes:

1. The overall time will be converted into points and subtracted from 1000. For example, a time of 4 minutes and 20 seconds will be converted to 1000 minus 420 points, to give a score of 580.
2. While operating the standing derrick, five points will be given for every command followed properly.
3. Penalties will be issued as follows:
   a. 5 points for every incorrectly labelled part at Station 1,
   b. 25 points if mousing comes off too easily, and
   c. 50 points for every safety infraction (IAW Annex G) while operating the standing derrick.
4. The total score will be the points for the overall time plus the points for operating the sheers, minus any penalties.

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PARTS CARDS – GYN

SPLAY TACKLE	SHOE
STROP	HEAD LASHING
MAIN PURCHASE	LEADING BLOCK
SPAR	THUMB PIECE/ ROPE COLLAR

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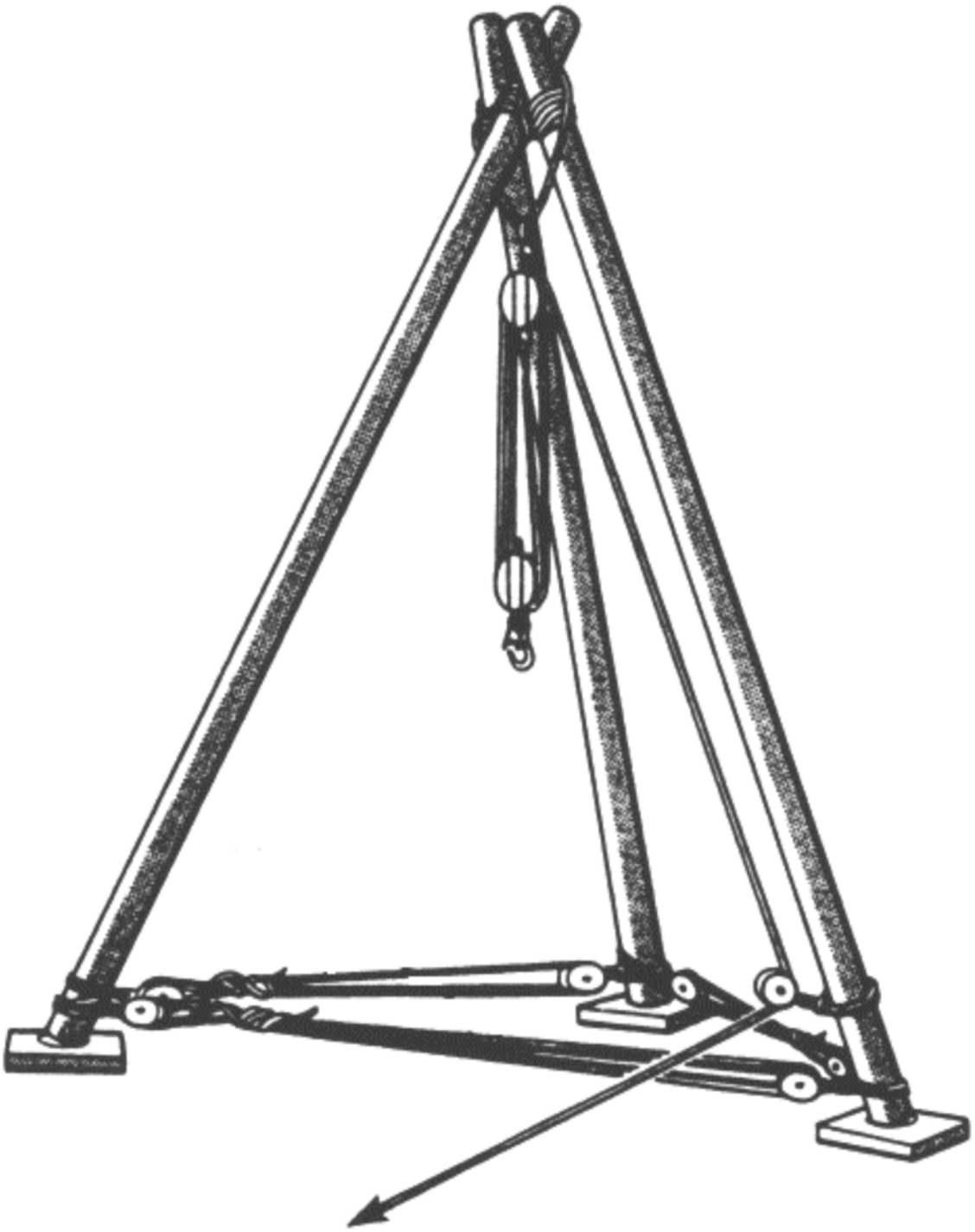
ASSEMBLED GYN



Royal Navy, Admiralty Manual of Seamanship 1967 (Vol. 2), Her Majesty's Stationery Office (p. 198)

Figure 12J-1 Assembled Gyn

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SEQUENCE FOR STATION 3 – OPERATING A GYN

The gyn will be fully rigged with the main purchase checked away to allow the running block to be hooked onto the load.

The following sequence will be followed by each group for Station 3:

1. hook on the load (hook must be moused) – five points;
2. respond to the following commands – five points each:
   (a) heave in main purchase;
   (b) avast;
   (c) secure main purchase;
   (d) check away main purchase;
   (e) avast; and
3. unhook the load – five points.

SAFETY INFRACTIONS

1. Not wearing a hard hat.
2. Not wearing issued cadet boots.
3. Running.
4. Horseplay.
5. Walking with an open knife.
6. Stepping over tackles under tension.
7. Putting hand through tackles when choking.
8. Putting hands/fingers on a block when the tackle is under tension.

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GYN SCORESHEET

Group	Overall Time/Points Conversion	Points for Operating the Gyn (35 point maximum)	Penalties (-)	Total Score
Example	4 min, 20 sec = 420 1000 - 420 = 580	35	5	610

Notes:

1. The overall time will be converted into points and subtracted from 1000. For example a time of 4 minutes and 20 seconds will be converted to 1000 minus 420 points, to give a score of 580.
2. When operating the gyn, five points will be given for every command followed properly.
3. Penalties will be issued as follows:
   a. 5 points for every part incorrectly labelled at Station 1,
   b. 25 points if mousing comes off too easily, and
   c. 50 points for every safety infraction (IAW Annex K) while operating the gyn.
4. The total score will be the points for the overall time plus the points for operating the gyn, minus any penalties.

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ALTERNATIVE METHOD FOR MAKING A MONKEY'S FIST

EQUIPMENT LIST

- 4 mm (3/16 inch) diameter line (cord),
- Corkboard or cardboard square,
- Straight pins,
- 25 mm (1 inch) diameter wooden or cork ball,
- Tape,
- Cutting tool, and
- Monkey's fist pattern.

KNOT WEAVING

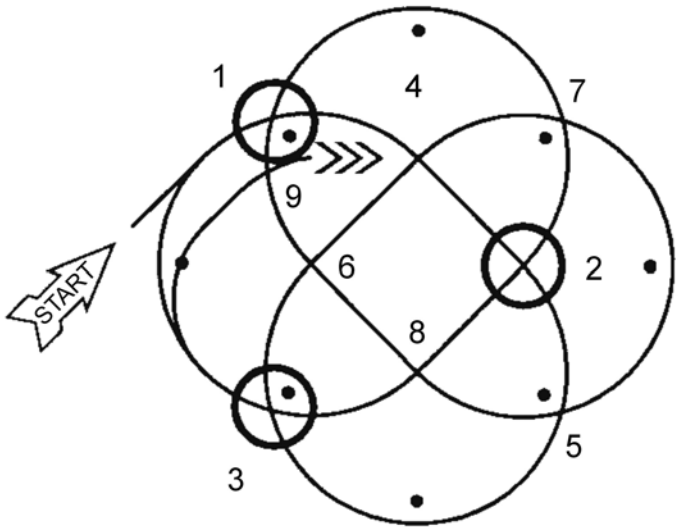
Introduction

As knots become more complicated, it becomes difficult to keep track of where cords are to be woven. One method of weaving intricate knots is the use of a knot-weaving board. The board consists of wood, cork or cardboard that allows a knot pattern to be affixed by pins or nails. The cord is woven around the pins following a given pattern which indicates the direction and where cords will cross under or over each other. The pins maintain the desired shape of the knot until it is complete.

Knot Patterns

To make knot weaving easier, a series of arrows, dots, circles, lines and numbers are used on the knot patterns. They are as follows:

- An outlined arrow with the word "START" indicates the starting position and the initial direction for laying the cord.
- The numbers are placed at alternate crossings on the diagram and are to be followed consecutively during the weaving process.
- A circle at a crossing indicates an underpass of a cord already there.
- A crossing with no circle indicates an overpass of a cord already there.
- A feathered arrow indicates the end of the pattern.
- Small dots on the pattern indicate the turning points and the placement of pins.

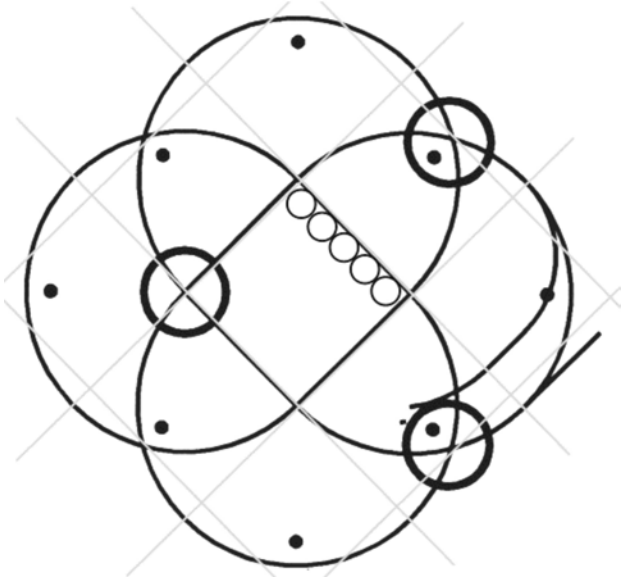


D. Fukuhara, Fancy Knotting: An Introduction, David Fukuhara (p. 11)

Figure 12M-1 Typical Knot Pattern

Scaling a Pattern

Each knot pattern is drawn on a square grid. This allows for visualization of the knot pattern and easy identification of which crossover points are overpasses and which are underpasses.



Director Cadets 3, 2007, Ottawa, ON: Department of National Defence

Figure 12M-2 Pattern Grid

Diameter of Cord	Length of Square's Side*
4 mm (3/16 inch)	20 mm (3/4 inch)
6 mm (1/4 inch)	30 mm (1 1/4 inch)
9 mm (3/8 inch)	45 mm (1 7/8 inch)
12 mm (1/2 inch)	60 mm (2 1/2 inch)
*This chart is based on a three-lead pattern. To change the number of leads in the pattern, add or substract a cord diameter from the square's side measurement accordingly.	

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Figure 12M-3 Pattern Scaling Chart

You can use the pattern for different sizes of line by scaling the size of the squares. The sides of squares should be roughly five cord diameters in length. The following guide may be used:

The term "lead" refers to a cord that follows the knot pattern to completion. For example, a three-lead knot has the cord following the pattern to completion three times.

Length of Cord

The length of cord required to weave the knot can be determined before weaving. With the pattern on the knot-weaving board, put a pin at each turning point. Pin one end of the uncut cord at the starting point. Lay the cord on the pattern following the numbers from start to finish ignoring the underpasses. Mark this length with a piece of tape. After removing the cord, cut a length of cord equal to three times this measurement and add 30 cm (12 inches). The extra length will allow for hiding the ends in the middle of the knot.

STEPS FOR MAKING A MONKEY'S FIST

Hand out the monkey's fist pattern located at Annex N to each cadet.

1. Cut out the monkey's fist pattern located at Annex N.
2. With the pattern on a knot-weaving board, put a straight pin at each turning point (as illustrated in Figure 12M-4).

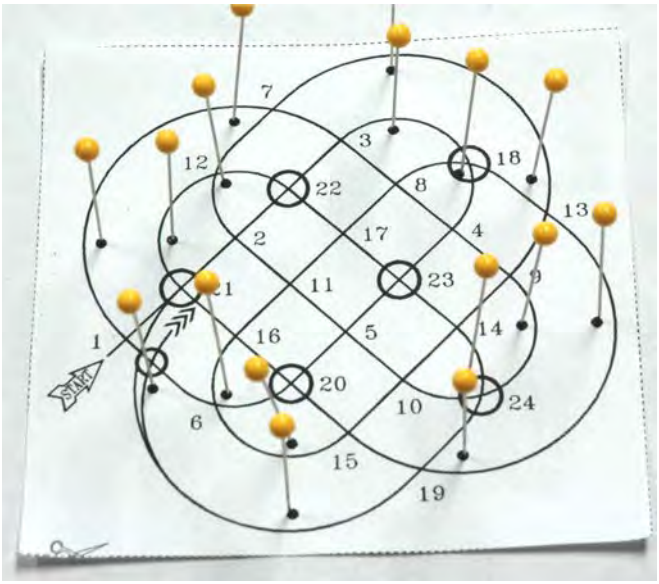

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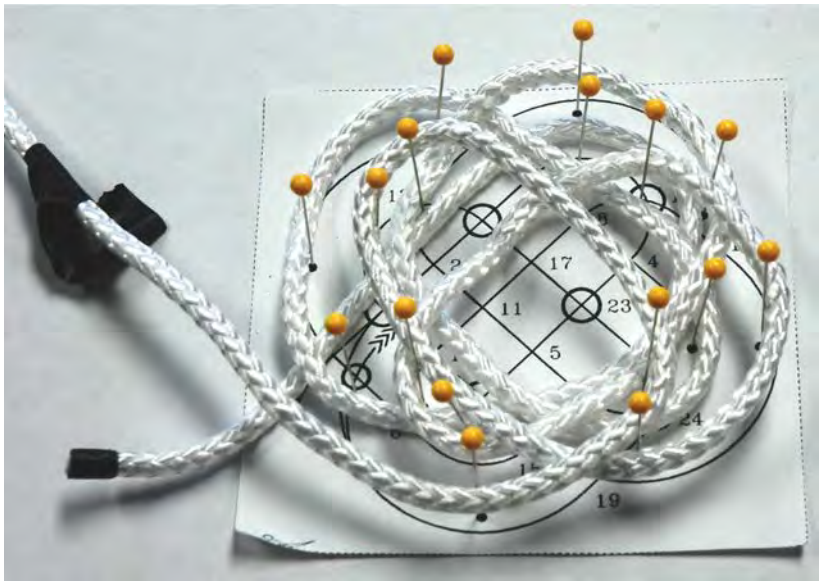
Figure 12M-4 Step 2

3. Lay the cord onto the pattern following the numbers from start to finish ignoring the underpasses (as illustrated in Figure 12M-5). Mark the one-third position and remove the cord from the pattern. Cut the cord to a length equal to three times the one-third length plus 30 cm (12 inches).



Director Cadets 3, 2008, Ottawa, ON: Department of National Defence

Figure 12M-5 Step 3

4. Pin the cord's one-third position onto the outlined arrowhead at the starting point (as illustrated in Figure 12M-6).

5. Lay the shorter length of cord onto the pattern following the numbers. At the turns, lay the cord around the pins and continue (as illustrated in Figure 12M-6). Pay attention to the underpasses at crossings with circles.

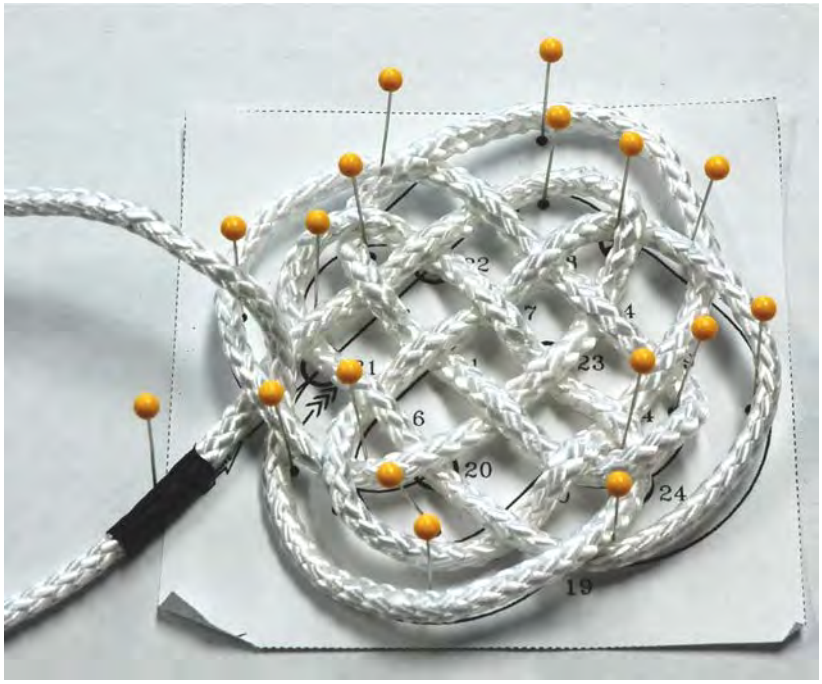


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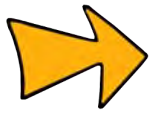
Figure 12M-6 Steps 4 and 5

6. When the cord is back to crossing number 1, the initial weaving sequence is complete. Check to ensure that the over and under sequence has been maintained from start to finish.

Any errors must be corrected now.



Once the initial lay of cord is complete, the pattern is no longer required.

7. Lay the remaining two-thirds of the cord following the previously laid cord in the opposite direction (as illustrated in Figure 12M-7).

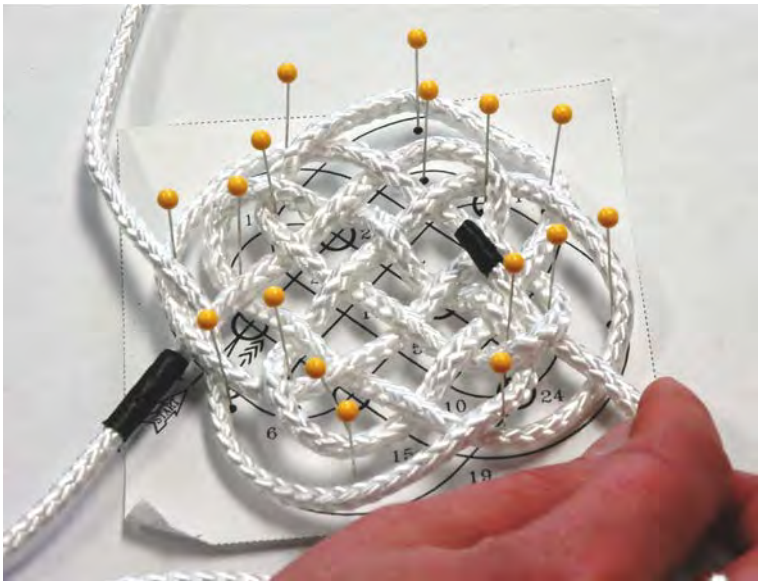


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Figure 12M-7 Step 7

Weaving may be done on the board or by hand after removing the pins.

8. Continue until you have the correct number of leads required (as illustrated in Figure 12M-8).

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Figure 12M-8 Step 8

9. After the weaving is complete, the slack must be taken out in small increments. The first part of the tightening is done without the cork or wooden ball inside (as illustrated in Figure 12M-9).

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Figure 12M-9 Step 9

10. Once the original opening begins to close, insert the cork or wooden ball (as illustrated in Figure 12M-10). The knot should be moulded around the ball in a circular motion using the palms of the hands until the original opening is no longer evident.

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Figure 12M-10 Step 10

11. Use a small fid or something pointed to pick and pull each cord into a firm tension.

When the last parts of the cord are tensioned, there is a tendency for the loose loop of cord to twist as it passes through the tightened sections. To prevent this twisting, maintain tension on the loop in one hand as the cord is drawn through, until it can no longer be easily grasped. The short loop should tuck in with little or no twist in it.

12. To finish the knot, the ends of the cord can be tied together to form a loop to attach to a heaving line. If the knot was tied on the end of a heaving line, lay the smaller end alongside the heaving line, whip them together for a short distance and cut off the excess (as illustrated in Figure 12M-11).

As this monkey's fist is constructed using the weaving method, the ends will not exit the knot from the same location.

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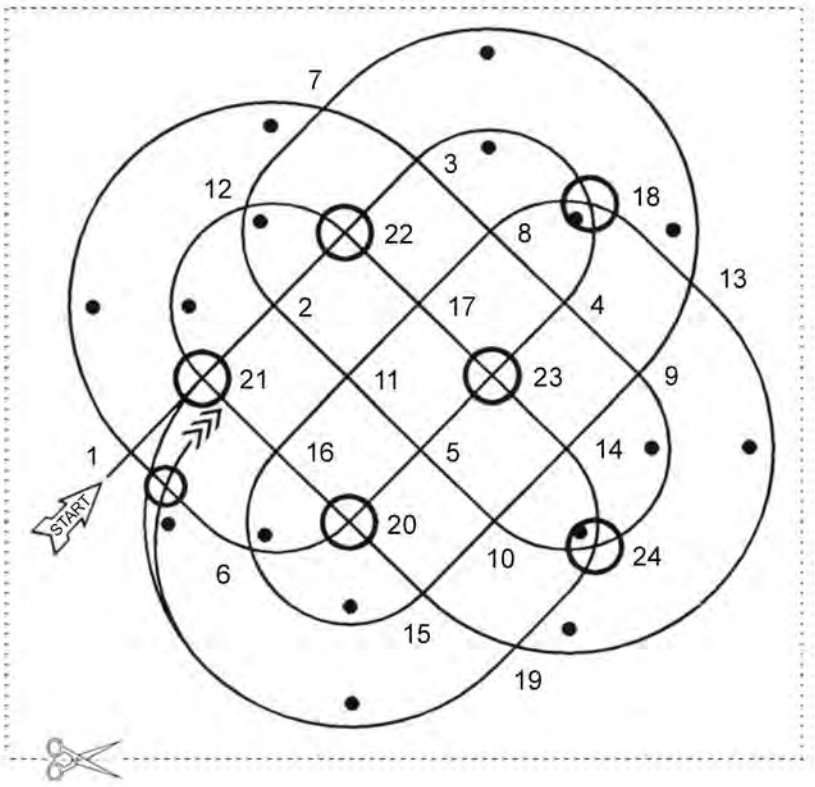
Figure 12M-11 Step 12

MONKEY'S FIST PATTERN



D. Fukuhara, Fancy Knotting: An Introduction, David Fukuhara (p. 42)

Figure 12N-1 Monkey's Fist Pattern

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ALTERNATIVE METHOD FOR MAKING A TURK'S HEAD

EQUIPMENT LIST

- 4 mm (3/16 inch) diameter line (cord),
- 40 mm (1 1/2 inch) thick foam,
- Straight pins,
- Paper clip,
- Transparent tape,
- Glue,
- Cutting tool, and
- Turk's head pattern.

KNOT WEAVING – CYLINDER METHOD

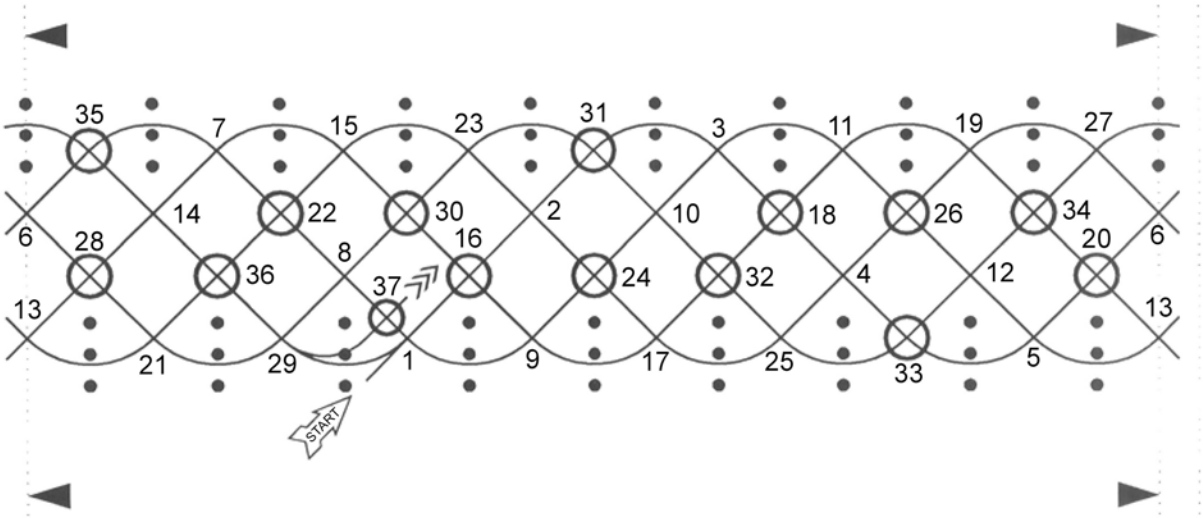
Introduction

As knots become more complicated, it becomes difficult to keep track of where cords are to be woven. One method of weaving intricate knots is the use of a knot-weaving cylinder. The cylinder consists of a rolled up piece of foam that allows a knot pattern to be affixed using tape or pins. The cord is woven around the pins following a given pattern, which indicates direction and where cords will cross under or over. The foam and pins maintain the desired shape of the knot until it is complete.

Knot Patterns

To make knot weaving easier, a series of arrows, dots, circles, lines and numbers are used on the knot patterns. They are as follows:

- An outlined arrow with the word "START" indicates the starting position and the initial direction for laying the cord.
- The numbers are placed at alternate crossings on the diagram and are to be followed consecutively during the weaving process.
- A circle at a crossing indicates an underpass of a cord already there.
- A crossing with no circle indicates an overpass of a cord already there.
- A feathered arrow indicates the end of the pattern.
- Small dots on the pattern indicate the turning points and the placement of pins.
- Two arrowheads at each end of the diagram aid in the alignment.



D. Fukuhara, Fancy Knotting: An Introduction, David Fukuhara (p. 11)

Figure 12O-1 Typical Knot Pattern–Cylinder Method

Scaling a Pattern

Each knot pattern is drawn on a square grid. This allows for visualization of the knot pattern and easy identification of which crossover points are overpasses and which are underpasses.

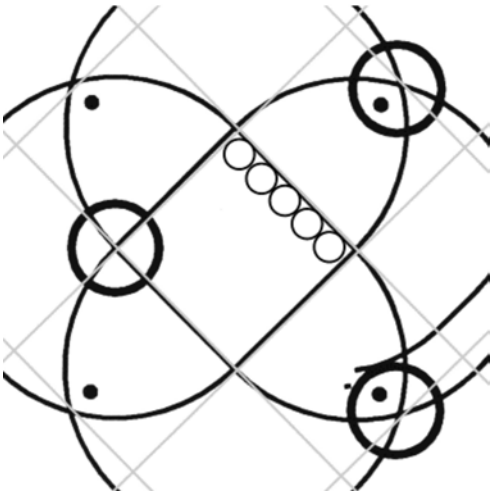


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Figure 12O-2 Pattern Grid

By scaling the size of the squares, you can use the pattern for different sizes of line. The sides of the squares should be roughly five times the diameter of the cord. The following guide may be used:

Diameter of Cord	Length of Square's Side*
4 mm (3/16 inch)	20 mm (3/4 inch)
6 mm (1/4 inch)	30 mm (1 1/4 inch)
9 mm (3/8 inch)	45 mm (1 7/8 inch)
12 mm (1/2 inch)	60 mm (2 1/2 inch)
*This chart is based on a three-lead pattern. To change the number of leads in the pattern, add or substract a cord diameter from the square's side measurement accordingly.	

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Figure 12O-3 Pattern Scaling Chart

The term "lead" refers to a cord that follows the knot pattern to completion. For example, a three-lead knot has the cord following the pattern to completion three times.

Length of Cord

The length of cord required to weave the knot can be determined before weaving. With the pattern on the knot-weaving cylinder, put a pin at each turning point. Pin one end of the uncut cord at the starting point. Lay the cord on the pattern following the numbers from start to finish ignoring the underpasses. Mark this length with a piece of tape. After removing the cord, cut a length of cord equal to three times this measurement and add 30 cm (12 inches). The extra length will allow the ends to be hidden in the middle of the knot.

STEPS FOR MAKING A TURK'S HEAD

Hand out the turk's head pattern located at Annex P to each cadet.

The turk's head pattern used for this lesson will make a decorative bracelet that can be worn around the wrist. The turk's head may also be used to decorate a cylindrical object by placing it over the end of the object and heaving each lead taut.

1. Cut out the turk's head pattern located at Annex P. Ensure that the pattern is cut out on the outside dotted line, leaving room for the pattern to overlap.

2. Using transparent tape, join the points of the arrowheads on the pattern together so that the pattern forms a cylinder (as illustrated in Figure 12O-4).

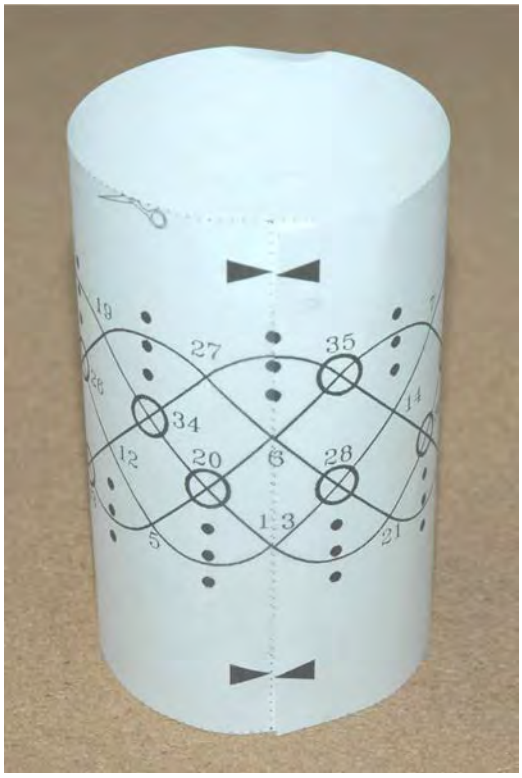

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Figure 12O-4 Step 2

3. Roll up a piece of foam and insert it into the pattern cylinder created in Step 2. Allow the foam to expand inside the pattern cylinder (as illustrated in Figure 12O-5).

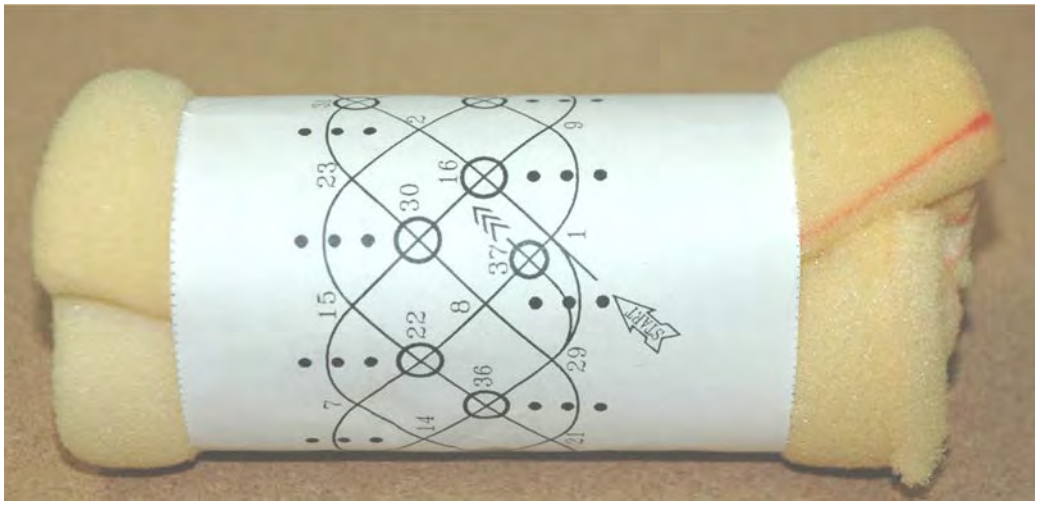

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Figure 12O-5 Step 3

If a larger piece of foam can be forced into the pattern cylinder, the foundation for making the turk's head will be firmer.

4. Insert straight pins through the dots printed on the pattern (as illustrated in Figure 12O-6). Leave 13 mm (1/2 inch) of each pin protruding to hold the cord in place as the turk's head is made.

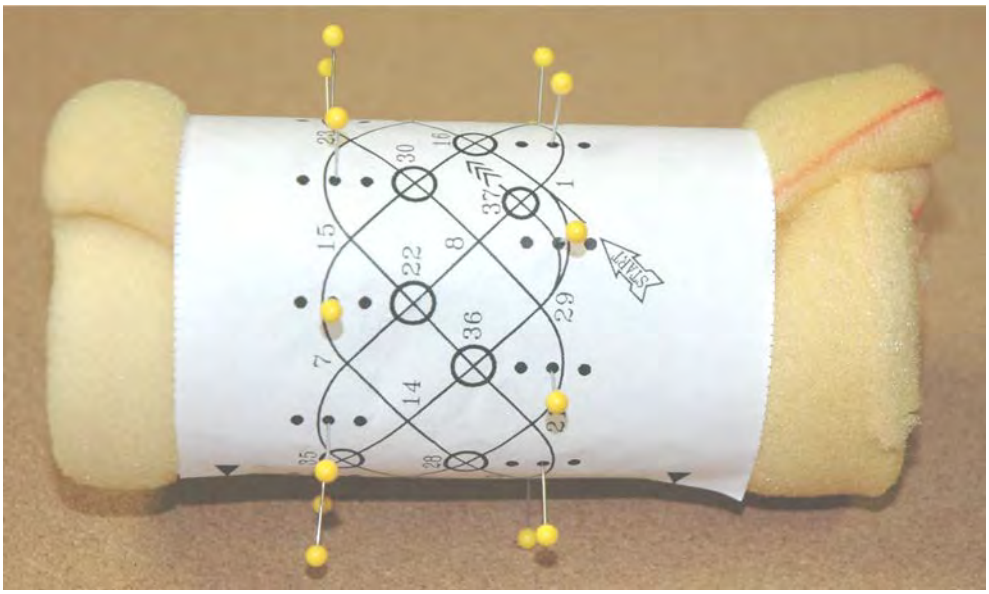

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Figure 12O-6 Step 4

There are three rows of dots on the turk's head pattern, located at Annex P, that are used for making different sized turk's heads. The outer row is used to make a larger diameter turk's head and the inner row is used to make a smaller one.

5. Lay the cord onto the pattern following the numbers from start to finish ignoring the underpasses (as illustrated in Figure 12O-7). Mark the one-third position and remove the cord from the pattern. Cut the cord to a length equal to three times the one-third length plus 30 cm (12 inches).

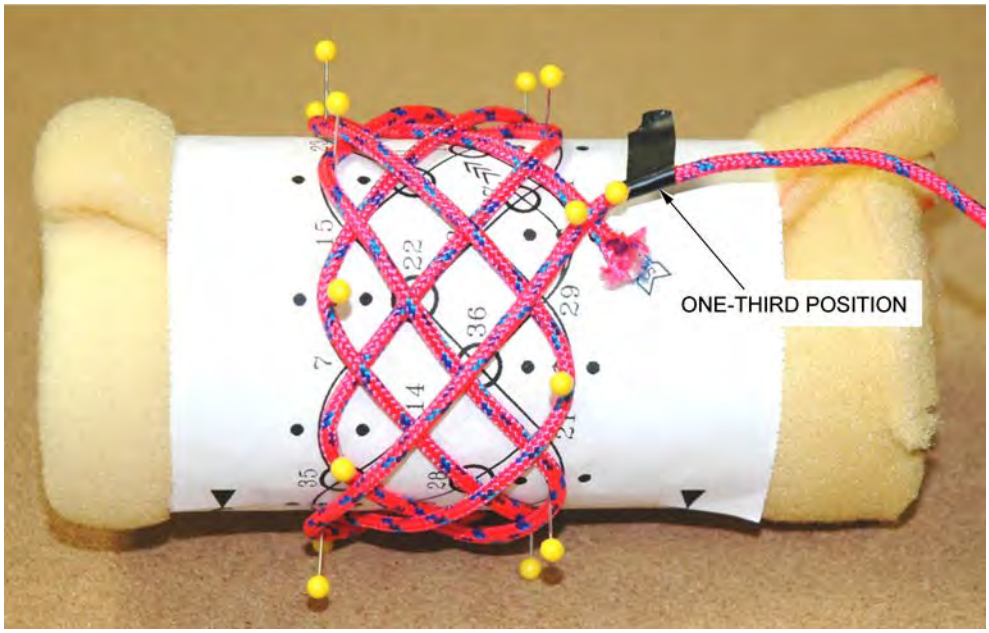

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Figure 12O-7 Step 5

6. Pin the cord's one-third position onto the outlined arrowhead at the starting point and wrap the one-third length around the blank portion of the cylinder (as illustrated in Figure 12O-8). Pin this one-third length to the cylinder to keep it neat for later use.

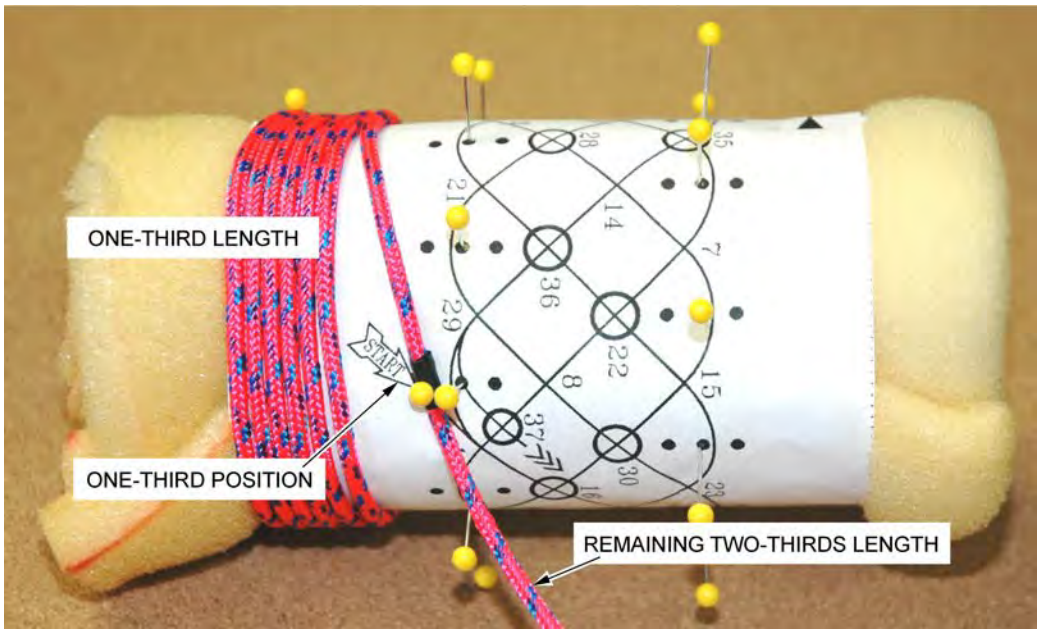

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Figure 12O-8 Step 6

7. Bend a paper clip to make a weaving needle (as illustrated in Figure 12O-9) and attach to the working end of the longer length of cord (the two-thirds length).

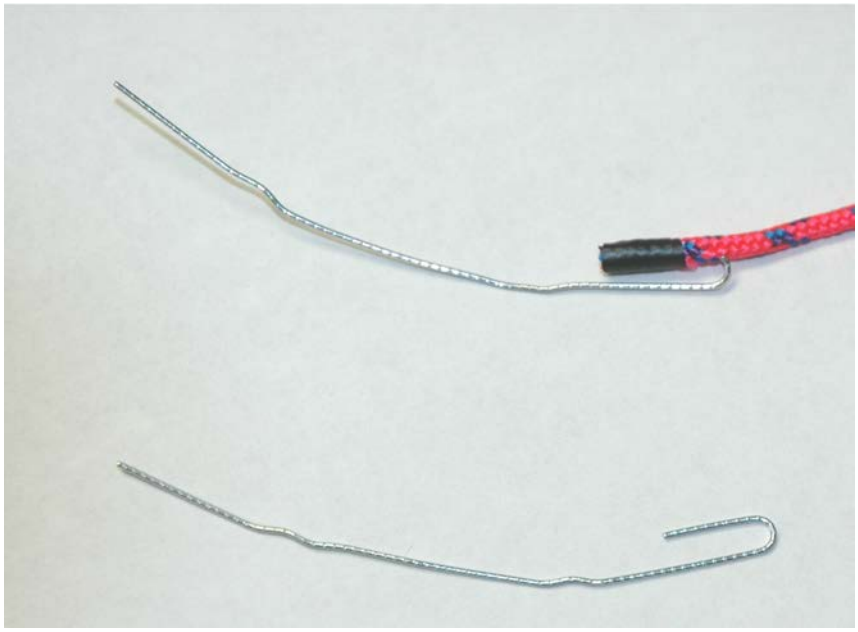

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Figure 12O-9 Step 7

8. Lay the longer length of cord (the two-thirds length) onto the pattern following the numbers. At the turns, lay the cord around the pins and continue. Use the weaving needle to pass the cord under any previously-laid cords at a circled crossing (as illustrated in Figure 12O-10).

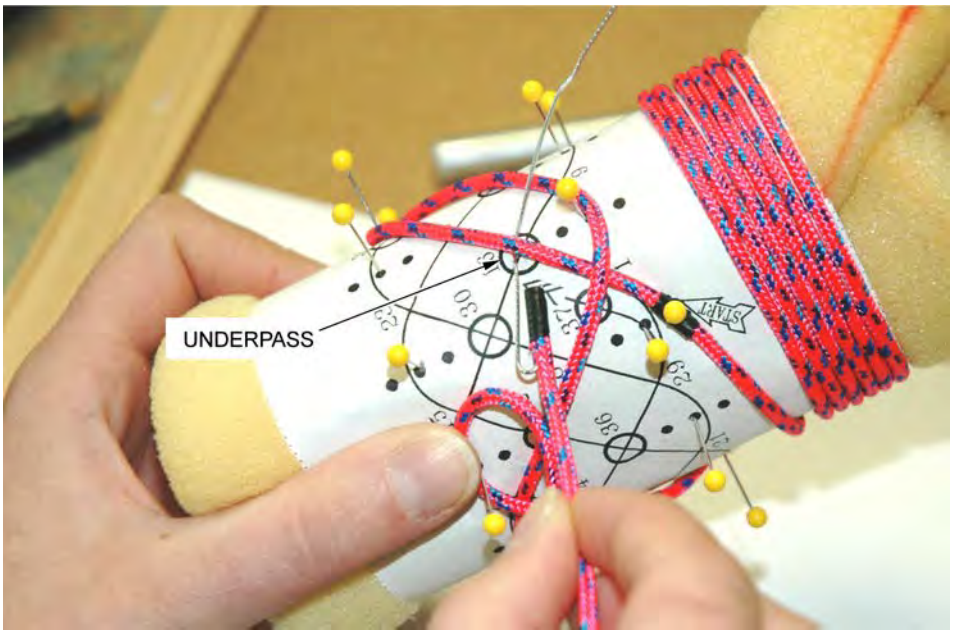

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Figure 12O-10 Step 8

9. When crossing number 37 is reached, check the weaving for any errors.

Correct any errors before proceeding to the next step.

10. Continue laying the cord side by side to the initial cord (as illustrated in Figure 12O-11) following it under or over at the crossings. When the cord reaches a turn and must pass on the inside of its arc (between the initial cord and a pin), remove the pin, lay the new cord beside the initial cord and re-insert the pin inside the new arc (as illustrated in Figure 12O-12). Moving the pin will maintain the overall shape of the turk's head.

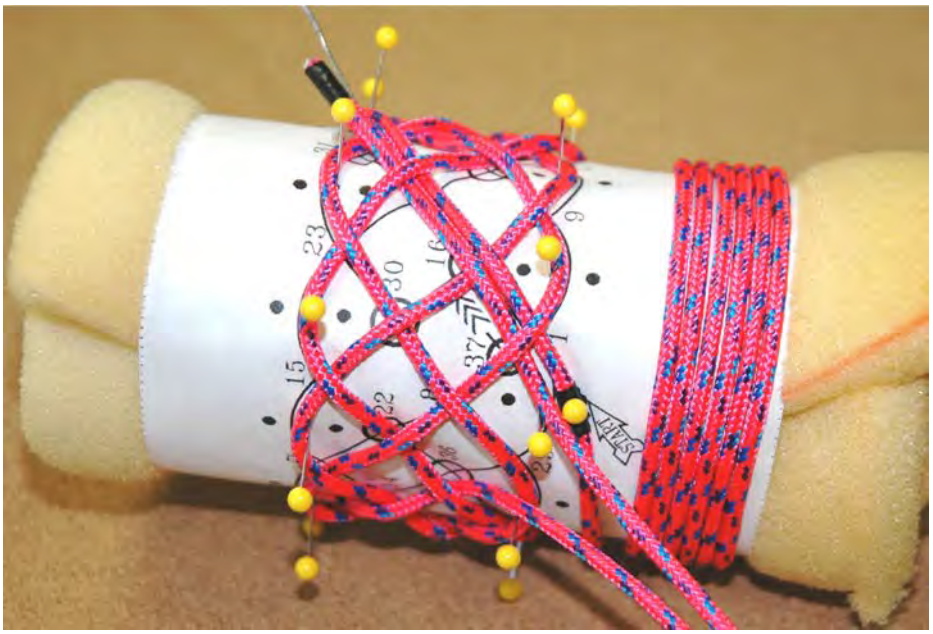

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Figure 12O-11 Step 10

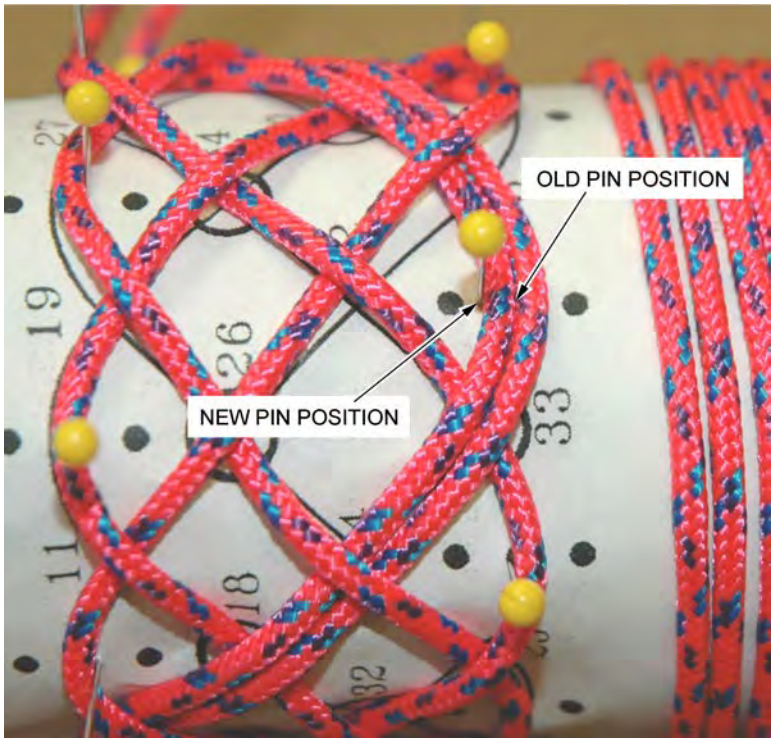

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Figure 12O-12 Moving a Turn Pin

Crossing number 37 on the pattern located a Annex P, is the same as crossing number 1.

11. When the cord is back to the start, undo the one-third length that was wound around the cylinder in Step 6. and lay it side-by-side to the cords previously laid but in the opposite direction (as illustrated in Figure 12O-13). Ensure that pins are moved on the inside arc of the turns (as illustrated in Figure 12O-12).

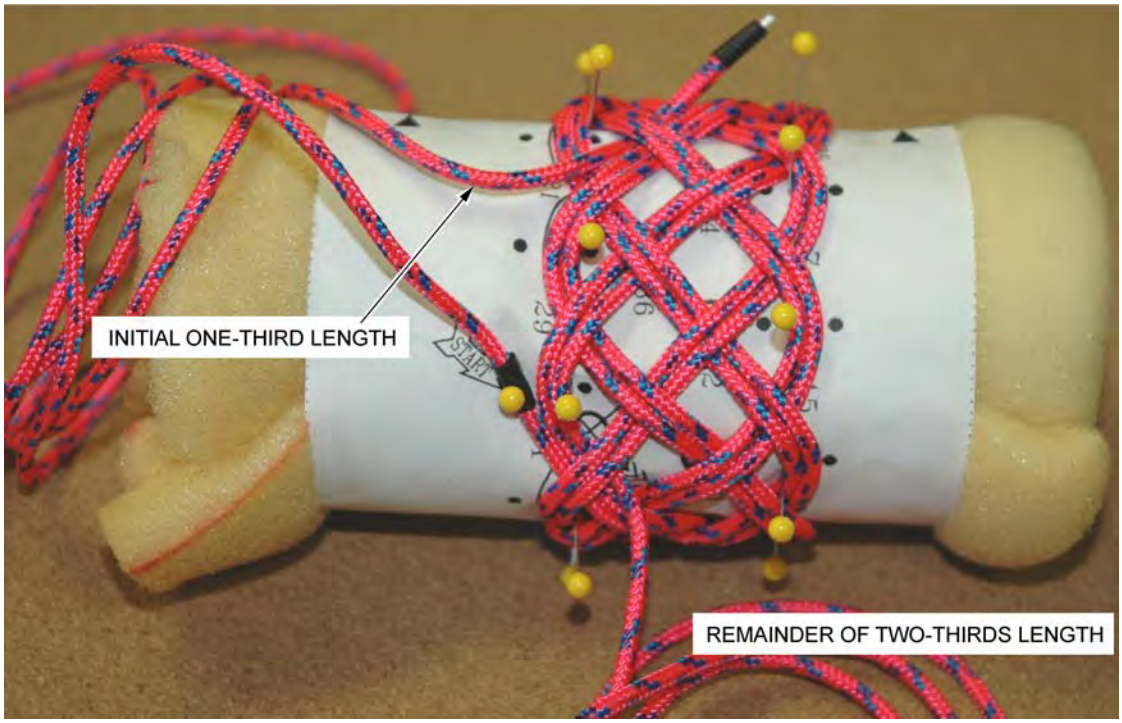

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Figure 12O-13 Step 11

12. When the turk's head shows three cords side-by-side everywhere, the weaving is complete. Remove the pins from the pattern and slide the turk's head from the cylinder. Ensure that the ends meet inside the turk's head and not on the outer rim (as illustrated in Figure 12O-14).

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Figure 12O-14 Step 12

13. To finish the turk's head, the cord can be glued to its adjacent cord for a length equal to four times the diameter of the cord and the excess cord can be trimmed (as illustrated in Figure 12O-15).

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Figure 12O-15 Step 13

An alternative to finishing the turk's head is to sew the cord to its adjacent cord for a length equal to four times the diameter of the cord and then trim the excess.

14. The turk's head bracelet is now complete and ready to wear (as illustrated in Figure 12O-16).

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Figure 12O-16 Finished Turk's Head Bracelet

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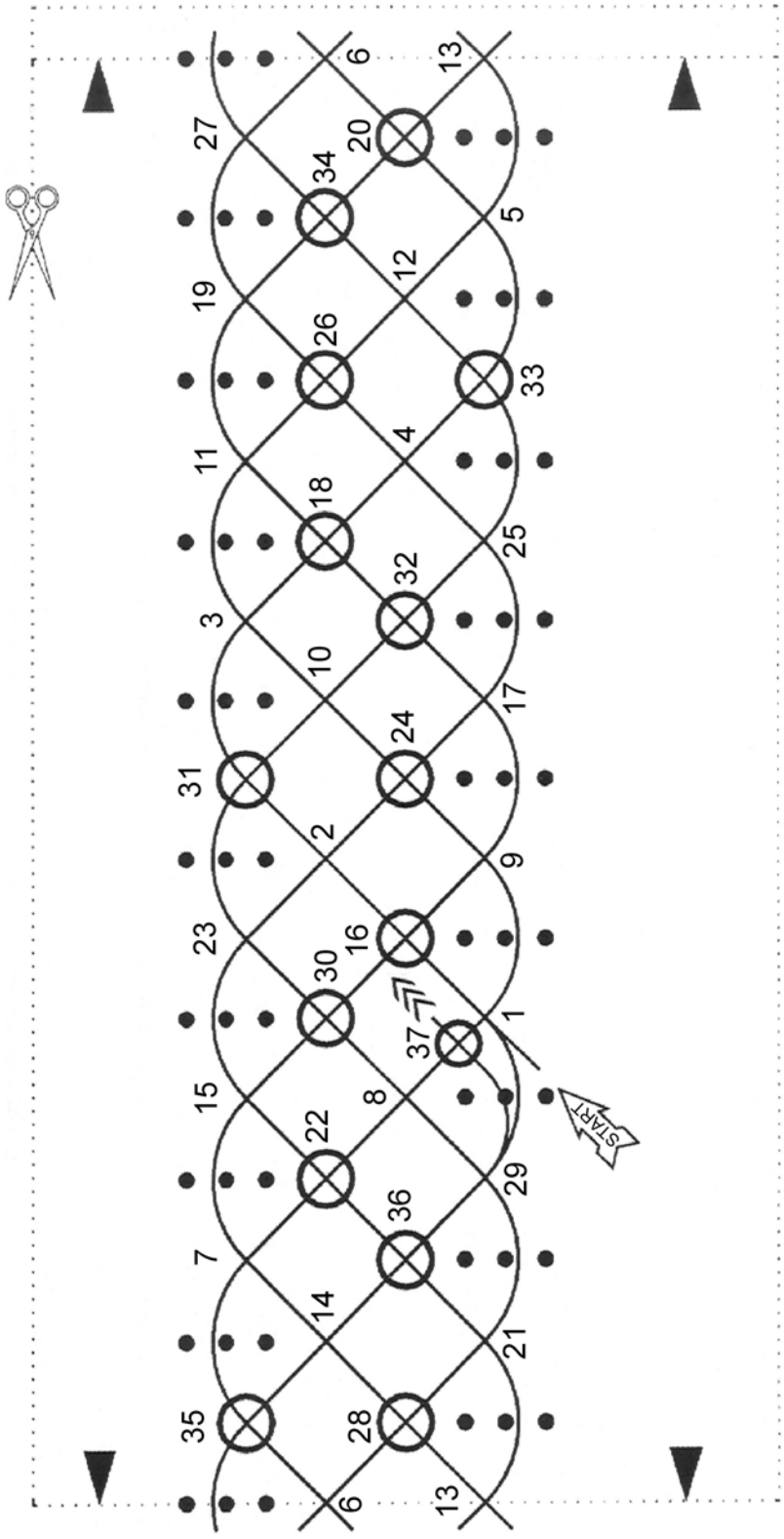
TURKS HEAD PATTERN



D. Fukuhara, Fancy Knotting: An Introduction, David Fukuhara (p. 23)

Figure 12P-1 Turk's Head Pattern