CHAPTER 7
Anchors, Cables and Buoywork

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CHAPTER 7
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7.1 Introduction

a. Canadian warships are frequently required to anchor, or moor to buoys. Anchoring is more common, and occurs in bays and harbours where fixed alongside berths are either unavailable, or inadequate i.e., lacking sufficient water depth alongside or jetty strength to support large ships. The ship lets the anchor go at the precise position calculated by the Navigating Officer, and pays out enough cable in relation to the depth of water to safely hold the ship. The anchors in the Canadian Navy are designed such that they bury themselves into the sea bottom. This, coupled with the weight of the veered anchor cable exerts a horizontal pull on the ship which is sufficient to hold her secure at the anchorage.

b. Mooring to buoys provides more security than an anchorage, as it is virtually impossible to drag ground tackle, whereas it is not uncommon for an anchor to be dragged in high wind conditions. Mooring often occurs in confined harbours where it is difficult to find sufficient searoom for a ship to swing safely on her anchor. In this case, the short scope of the mooring cable or bridle significantly reduces the swinging circle. In essence, the mooring or working cable is broken, led forward through the bullring, and secured to the buoy.

c. This chapter describes the anchor and cable arrangements, and associated equipment fitted in Canadian warships. The sequences of events for anchoring and coming to a buoy are described, followed by the Class-specific preparations and equipment layouts for each evolution. Although manoeuvring alongside using an anchor is an important skill applied by Commanding Officers when approaching a difficult berth, it is not covered here. From a seaman's perspective, it is simply another occasion for anchoring. However, the Mediterranean Moor is covered, as it is a complex evolution that involves the anchor and berthing lines to back the ship into a stern-to berth.

7.2 Terminology Used in Cable Work

To be able to properly work the ship's cable, and to facilitate effective communications between Command, the I/C and the members of the cable party, specific terms and phrases are used:

A' cockbill — An anchor is said to be a'cockbill when it has been eased out of the hawse pipe and hangs vertically by its ring. (HALIFAX Classes modify this by retaining the ring in the hawse pipe; otherwise, the anchor would be suspended too close to the waterline).

Anchor Aweigh	The anchor is said to be aweigh when it is immediately clear of the bottom.
Anchor Pocket	The recess in the ship's side where the anchor is stowed.
Clear or Foul Anchor	The anchor is reported clear or foul as soon as it is entirely sighted. To be clear, the anchor must be hanging from its ring, and be clear of both its own cable and of any obstruction such as a bight of rope or chain picked up from the seabed.
Clear Hawse	This term means that the cables are clear of one another when the ship is riding to two anchors.
Dragging	An anchor is said to be dragging when, instead of holding the ship, the ship drags it along the bottom; this may occur in heavy weather, in a strong current, or when insufficient cable has been paid out. A small amount of dragging on anchoring is necessary, in order to bury the anchor in the seabed.
Foul Hawse	A ship has a foul hawse if the cables are crossed or otherwise afoul of each other when she is riding to two anchors.
Long Stay	The cable is said to be at long stay when it is taut, reaches out well away from the hawse pipe and enters the water at an acute angle.
Ship Has Her Cable	A ship has her cable when she has dropped back on her cable and is riding to it.
Short Stay	The cable is said to be at short stay when it is taut, reaches out a short distance from the hawse pipe, and enters the water at a steep angle.
Shorten In	A ship lying at anchor is said to shorten in her cable when she heaves in part of it; for example, a ship riding to eight shackles of cable might shorten in to three shackles of cable in preparation for weighing anchor.
To Come To	A ship is said to come to an anchor as soon as she is riding by her anchor and cable.
To Grow	A cable is said to grow in the direction it leads outside the hawse pipe. When asked "How does the cable grow?", the reply is given by pointing the arm in that direction, and making the appropriate verbal report e.g. "Cable grows short stay to starboard", or "Cable grows up and down."
To Hang Cable	To hold it temporarily with a stopper or wire pendant.
To Snub	To snub a cable is to restrain it suddenly when it is running out, by applying the brake.

Underfoot A buoy or anchor is said to be underfoot when it is directly under the stem, and there is no slack in the cable.

Up-and-down The cable is said to be up-and-down when it hangs vertically from the hawse pipe and enters the water at a right angle.

Weighing Anchor The sequence of events culminating in heaving in the cable until the anchor is broken out of the bottom.

7.3 Ships' Cable

7.3.1 Sizes and Quantities Held

Anchor and mooring chain cables in use in the Canadian Navy are fabricated from Grade 2 or 3 forged special steel links. Except for the very smallest, the links are studded to prevent kinking. The cables are fabricated in lengths of 15 fathoms (90 feet/27.5 metres) and half-lengths of 7.5 fathoms (45 feet/13.75 metres), called shackles and half-shackles respectively. These shackles are combined to form the full length of the cable by means of joining shackles, either lugged or lugless. The standard joining shackle is the lugless pattern which will reeve through a common link. Shackles are numbered consecutively from their outer to inner end.

Table 1 - Cable Characteristics by Class

Class (1 anchor)	Description	Break Load (tonnes)	No. of Shackles Stbd Anchoring	No. of Shackles Port Mooring	Mooring Buoy Class
HALIFAX	Stud link GR3 48 mm	182	10	4*	1
IROQUOIS	Stud link GR2 46 mm	118	10	4	2
OBERON	Stud link GR2 25.4 mm	25	5	N/A	3
Class (2 anchor)	**Description**		**No. of Shackles Stbd**	**No. of Shackles Port**	
KINGSTON	Stud link GR3 28 mm	TBP	7	7	3
509 (PROTECTEUR/ PRESERVER)	Stud link GR2 66.7 mm	237	11	10	1

7.3.2 Cable Markings

a. When anchoring and mooring it is necessary to be able to tell, at a glance, how many shackles of cable have been paid out. Prior to the evolution commencing, Command will order the number of shackles "on deck" that are to be veered by the cable party. For anchoring, this could range from 4-10 shackles, while for mooring, the bridle is typically ordered to be of 1-2 shackles in length.

b. Marking the cable is achieved by painting the common links white on either side of the joining shackles. The number of common links painted indicates the shackle number. For instance, a joining shackle with three common links painted white on either side would mark the three shackle point. Often, the paint will be worn off by a combination of the effects of salt water corrosion and of the working of the cable. Therefore, the last painted link on either side of the joining shackles has wire served around the stud to assist in identifying the shackle number.

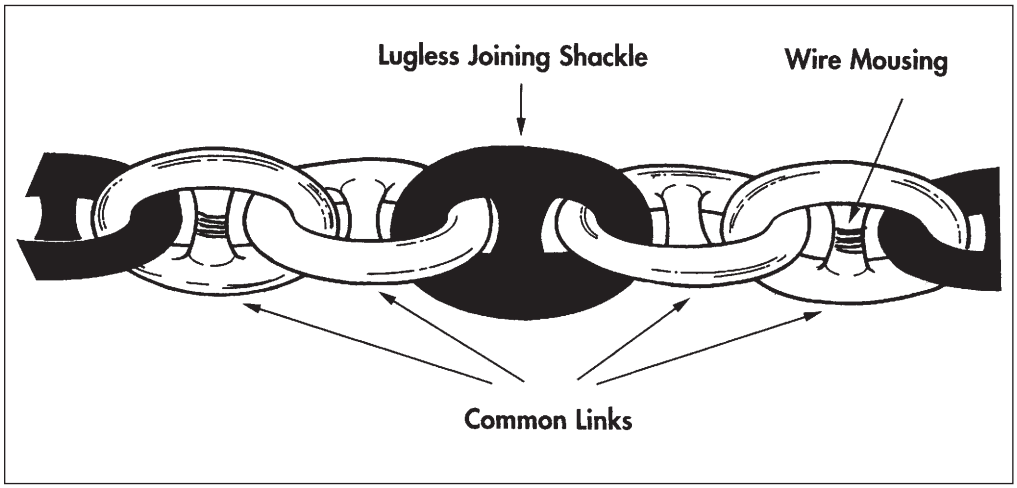


Figure 7.3-1 - Cable Markings (Two Shackles)

7.4 Cable Equipment

7.4.1 Fittings

The fittings described below are part of a ship's fitted equipment and are associated with the use of anchors and cables:

Blake Slip — A cable stopper used to back up the brake in the event it fails.

Bonnet — A bonnet is a fixed or portable cover for a naval pipe or compressor. It is designed to stop water from flooding the cable locker. Bonnets vary with the class of ship and are not fitted on all classes.

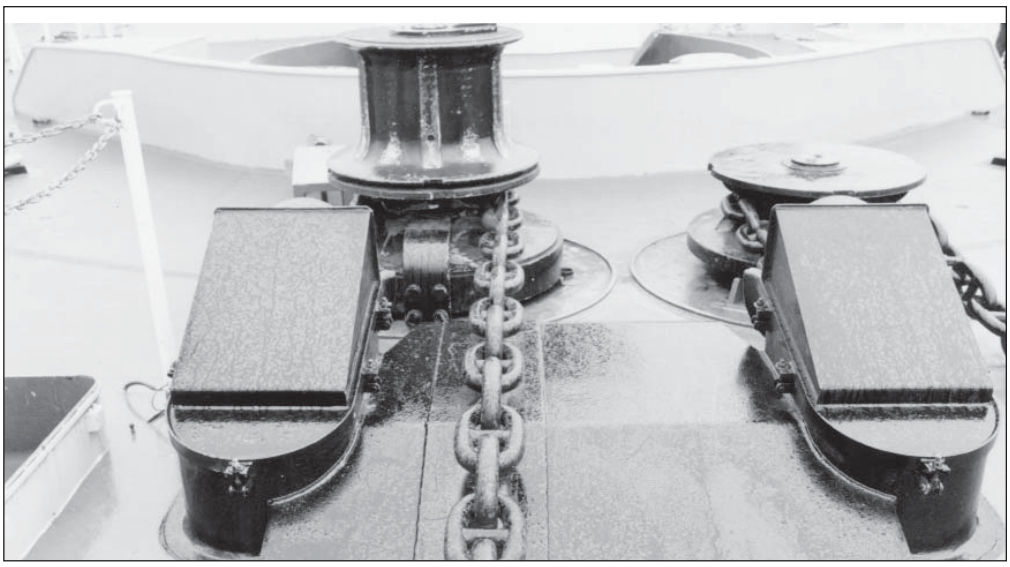


Figure 7.4-1 - HALIFAX Class Bonnets Fitted on Top of Deck Bolsters

Bottle-Screw Slip A cable stopper used to heave the anchor tightly home in the hawse pipe when securing for sea.

Bullring A bullring is fitted on the bow to give a direct lead for the head rope, picking-up rope, or ship's cable.

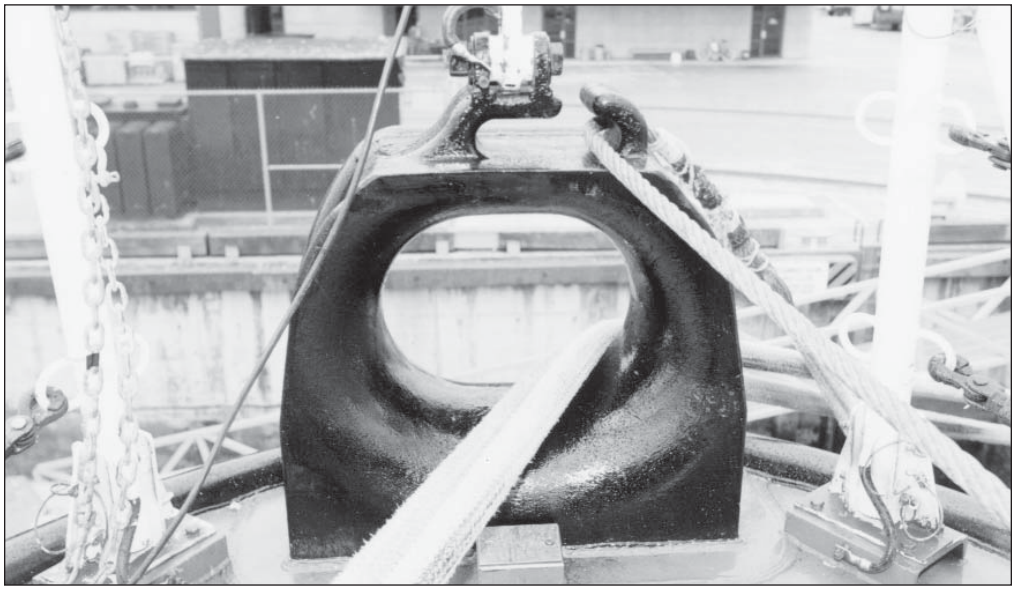


Figure 7.4-2 - Bullring with Angel Fairlead

Centreline Blake Slip A blake slip that is secured to the centreline deck clench. It is used for middling the weight between the blake and brake when towing, and for securing the working cable when secured to a buoy.

Deck Bolster The deck bolster is a pad, welded to the deck, where the ship's cables enter the upper end of the naval pipes and hawse pipes. It protects the deck from wear and keeps water from entering the naval pipes. A bonnet may be fitted on top of the bolster.

Figure 7.4-3 - Hawse Pipe with Deck Bolster

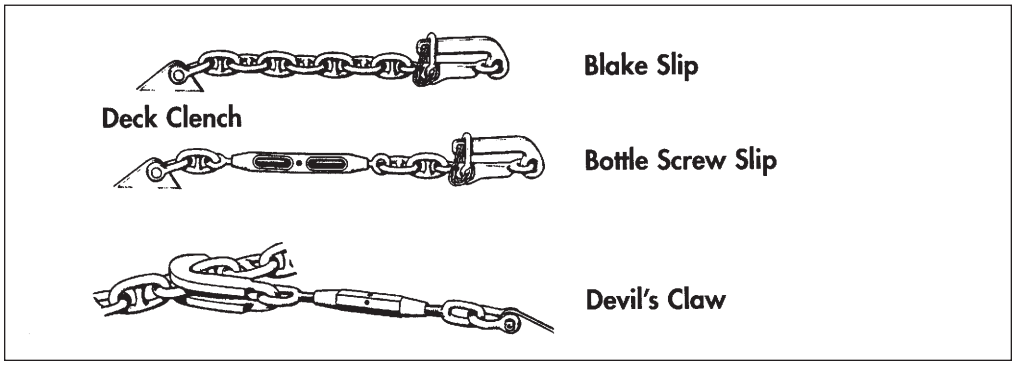


Figure 7.4-4 - Slips

Devil's Claw A cable stopper used to heave the anchor tightly home in the hawsepipe when securing for sea. (KINGSTON Class)

Hawse Pipe Pipe for the passage of the anchor cables out from the ship.

Naval Pipe Pipe for the passage of the anchor cables to and from the cable lockers. Their upper ends stand proud of the deck to ensure smooth working of the cable and to prevent water from finding its way below.

Figure 7.4-5 - Naval Pipe

Roller Bow Stopper A steel plate that manually drops down over the cable. It has a tongue that rests on the horizontal link with the face of the link, thus stopping the cable from paying out.

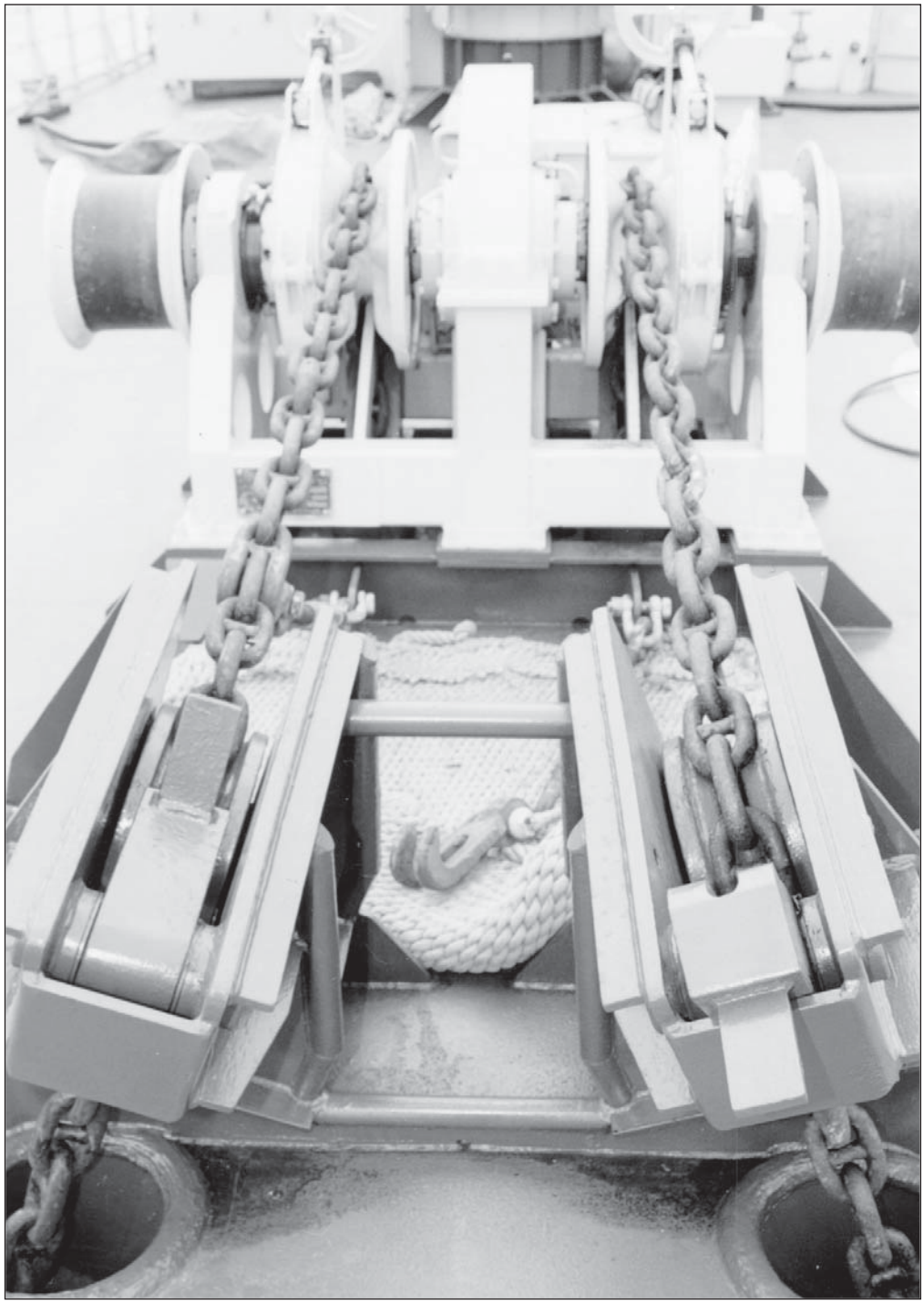


Figure 7.4-6 - Roller Bow Stopper KINGSTON Class

Windlass A motor-driven shaft connected to a cable holder/gypsy used for veering the cable under power, and for heaving in the cable.

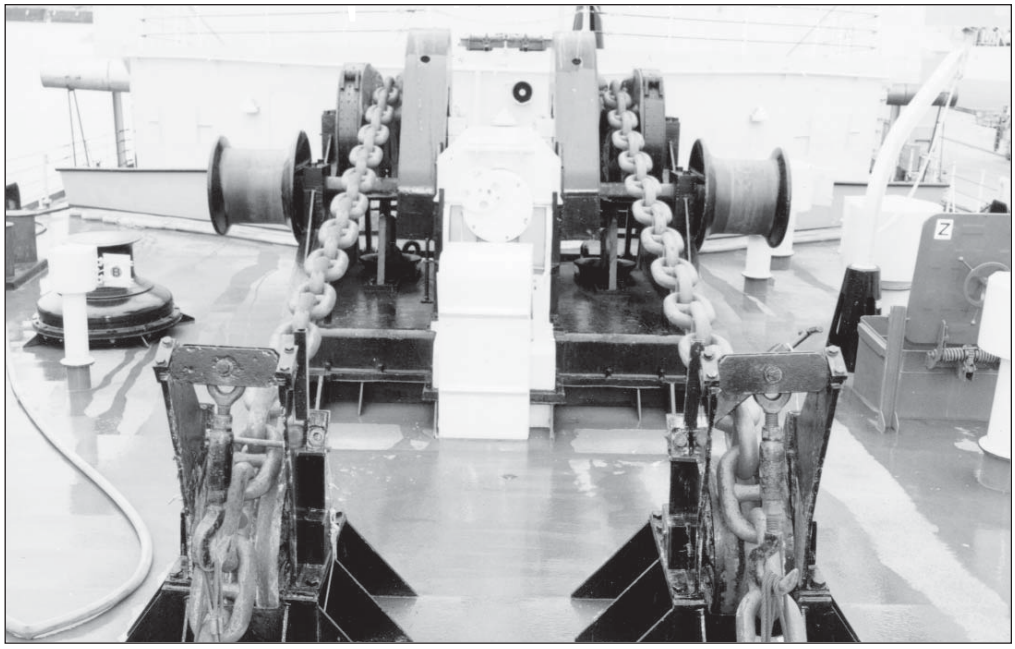


Figure 7.4-7 - Anchor Windlass AOR 509 Class

7.4.2 Portable Equipment

The portable equipment shown below comprises smaller pieces that are specifically associated with anchor and cable work.

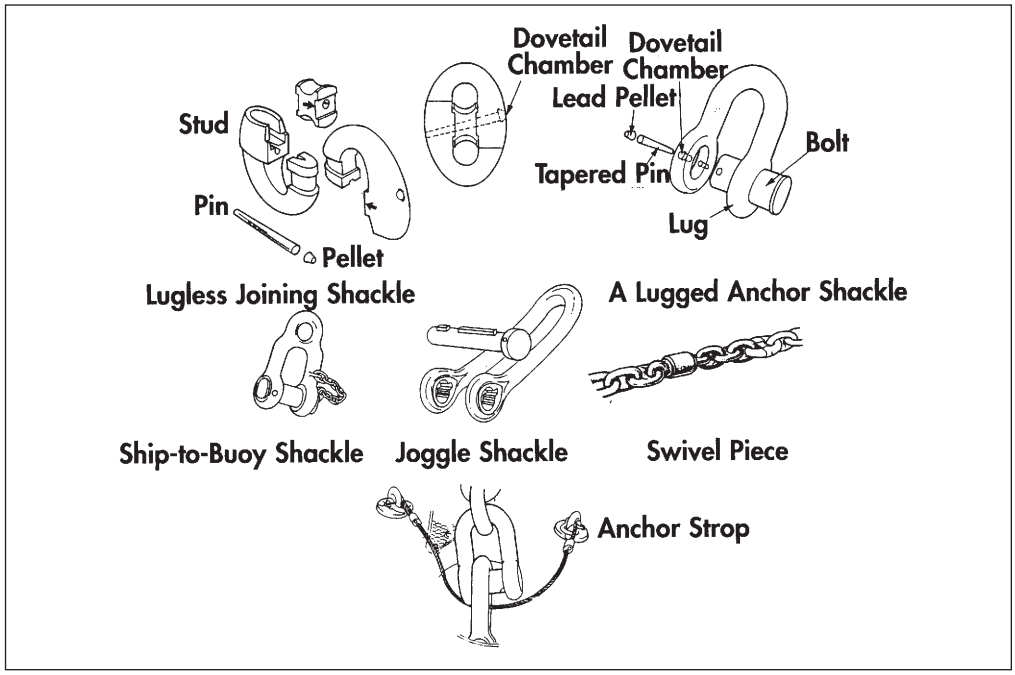


Figure 7.4-8 - Portable Equipment

Lugless Joining Shackle - Lugless joining shackles are used to join together those shackles of cable which must pass over the cable holder/gypsy. They consist of three pieces, one of which is the stud. The two main parts are attached to the ends of the cable and then are fitted together. The stud then slides in place and locks the whole. The stud is secured in place by hammering a tapered pin and lead pellet into a hole drilled diagonally through all three parts of the shackle. The hole is tapered, and when the pin is driven right home, a small conical recess called the dovetail chamber is left clear above its head. The three main components of lugless joining shackles are not interchangeable, because each shackle is made as one unit.

Lugged Joining Shackle - Lugged joining shackles are used to secure the ends of the ship's cable when they have no requirement to pass over the gypsy. They are also used to secure the slips to the deck clenches. A lugged joining shackle is a straight shackle with a bolt secured by a tapered pin. The pin fits into a tapered hole drilled through the bolt and one lug of the shackle. Lugged joining shackles are commonly referred to by the name of the equipment with which they are used i.e., anchor shackle, towing shackle.

Ship-to-Buoy Shackle - Ship-to-buoy shackles are used for securing the ship's bridle to the buoy shackle (ring) fitted on top of a mooring buoy, or to the reducing link which is secured to the buoy shackle. It can be used with either a lugged or a lugless joining shackle.

Joggle Shackle - A joggle shackle is a long and slightly curved shackle used to secure a wire rope or hawser to the cable. It is rarely used but could prove invaluable in some instances, such as "pointing ship" when an after spring hawser is led forward from a quarterdeck fairlead and secured to the anchor cable in order to prevent swinging and to maintain the ship on a desired heading.

Swivel Piece - A swivel piece is a swivel attached between the anchor and the ship's cable. It is fitted to prevent the ship's cable from twisting when at anchor.

Anchor Strop - An anchor strop is a wire pendant used to hold the anchor when catting it.

Note.

All shackles are to be leaded to prevent the tapered pins from coming out. When inserting the lead pellets, goggles must be worn.

Note.

Testing of Anchors, Cables and Associated Fittings is to be conducted IAW C-28-010-024/MS-001.

7.5 Personnel Requirements

Focsle part ship hands and the Cable Party, as designated on the Watch & Station Bill and Special Parties Board, are required in all instances when anchoring, weighing anchor, and coming to or slipping from a buoy. Special Sea Dutymen will also be required. When use of the boat is planned, as is the case with buoywork, then the rescue watch, boat's crew and buoy jumpers will be required.

7.6 Anchoring

7.6.1 General

a. A ship can be secured to the seabed by means of her ground tackle, i.e., her anchors and cables. The anchor holds by laying flat on the bottom until the pull of the ship on the cable drags the anchor along the bottom. The tripping palms then tilt the flukes which dig themselves into the bottom. After a further amount of dragging, the anchor embeds itself completely until it holds. For the anchor to maintain its hold, the pull of the cable must always be horizontal where the cable emerges from the seabed. The ship is held at her anchorage by a combination of the anchor and the cable laid along the seabed. Normally ships will only go to an anchorage using a single anchor, however ships with two anchors may, on occasions, use both to ride out a gale.

b. The amount of cable required for any particular anchorage is determined by Command and depends on a combination of the following factors: water depth at the anchorage, weight of cable, length of stay, weather, and the nature of the sea bottom. A common rule is to veer a number of shackles equal to one and a half times the square root of the depth of water in metres.

c. There are two methods of laying the ship's cable on the seabed: the running anchorage and the dropping anchorage. In both instances the anchor is dropped with the ship moving slowly either ahead or astern in order to ensure that the cable is laid out from the anchor and not piled up on top of it. The choice of a running or dropping anchorage is dependent upon prevailing wind and current conditions. Since the ship will swing with the combined effect of the wind and current, it is preferred that the cable be laid out downwind/stream. If the approach is upwind/stream, then a dropping anchorage is ideal, with the ship making a sternboard downwind/stream away from the anchorage position after letting go. If the approach is downwind/stream, then the running anchorage is best, with the ship maintaining slight headway after letting go, and swinging 180 degrees into the wind/stream as the cable is laid out.

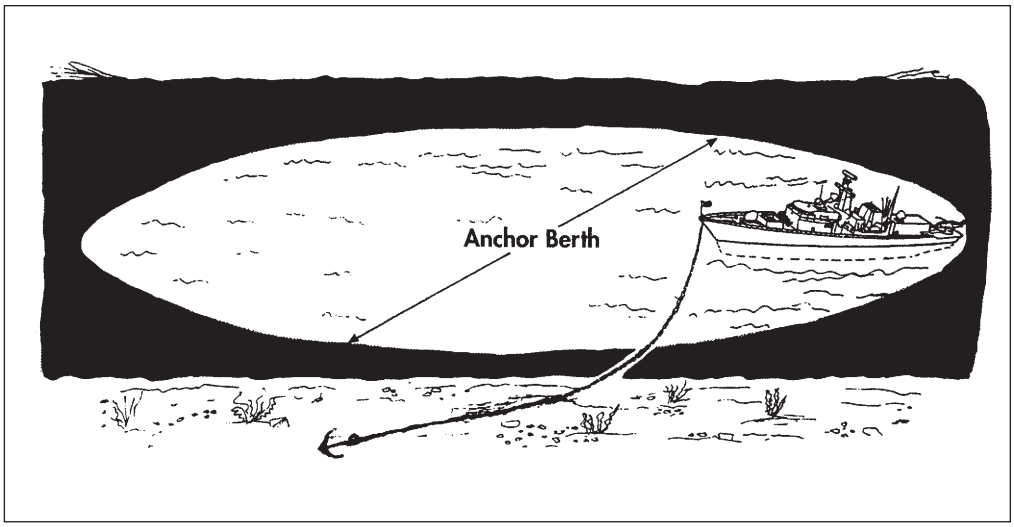


Figure 7.6-1 - Ship at Single Anchorage

7.6.2 Anchors Used on HMC Ships

All warships use stockless anchors. Although there are a number of different designs of stockless anchors, they all share the same distinguishing features.

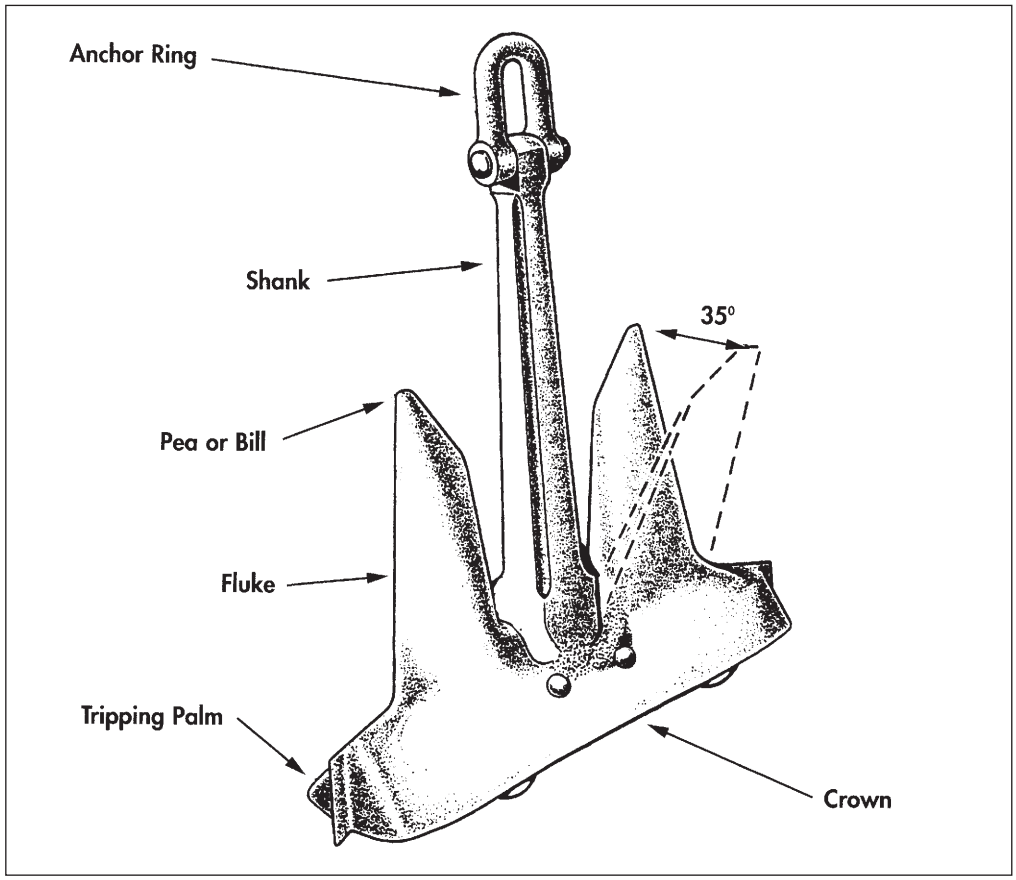


Figure 7.6-2 - Parts of an Anchor

Figure 7.6-3 - HALIFAX Class Pool KM 2835 kg

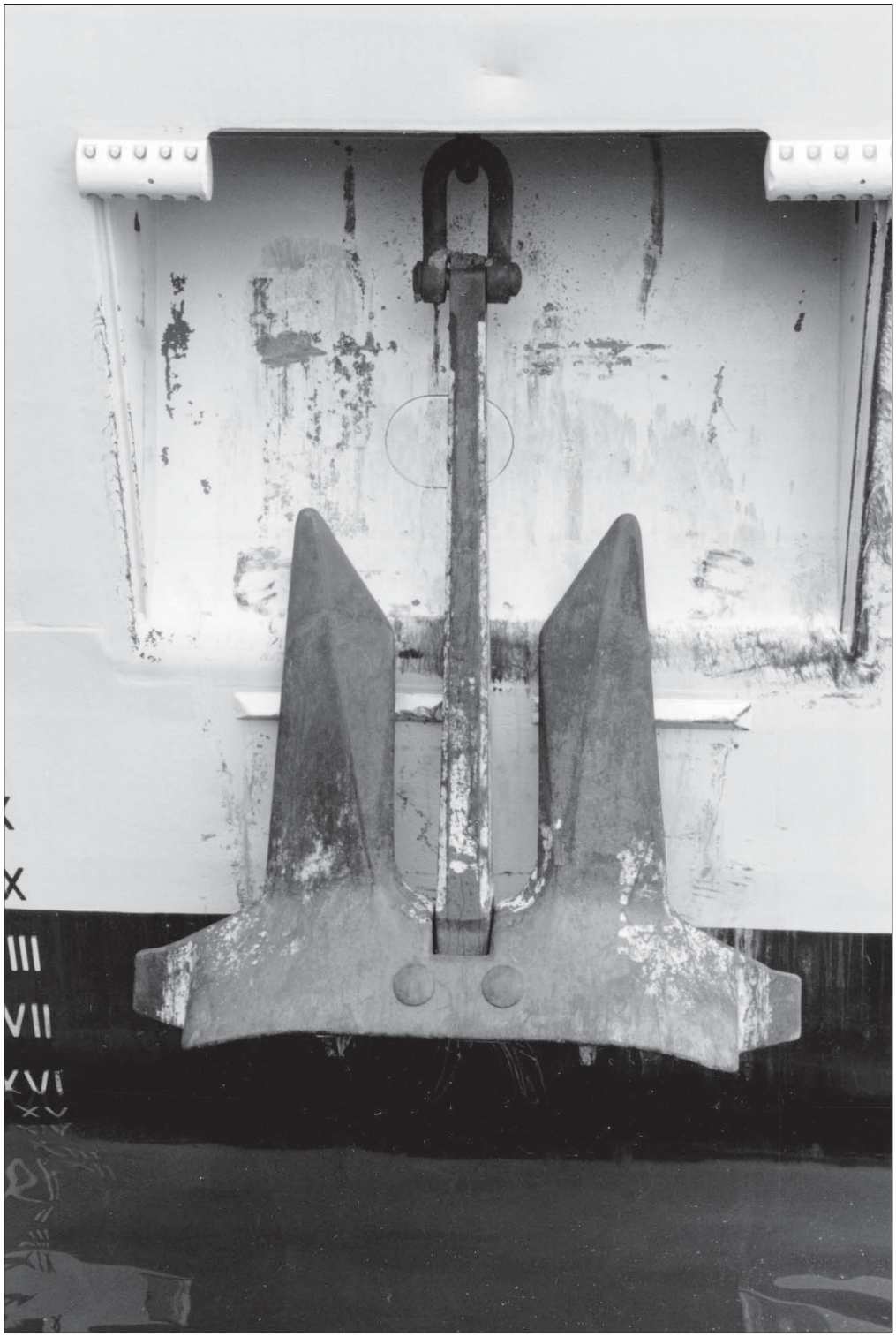


Figure 7.6-4 - IROQUOIS Class Marine Fluked Stockless 2360 kg

Figure 7.6-5 - KINGSTON Class Danforth 800 kg

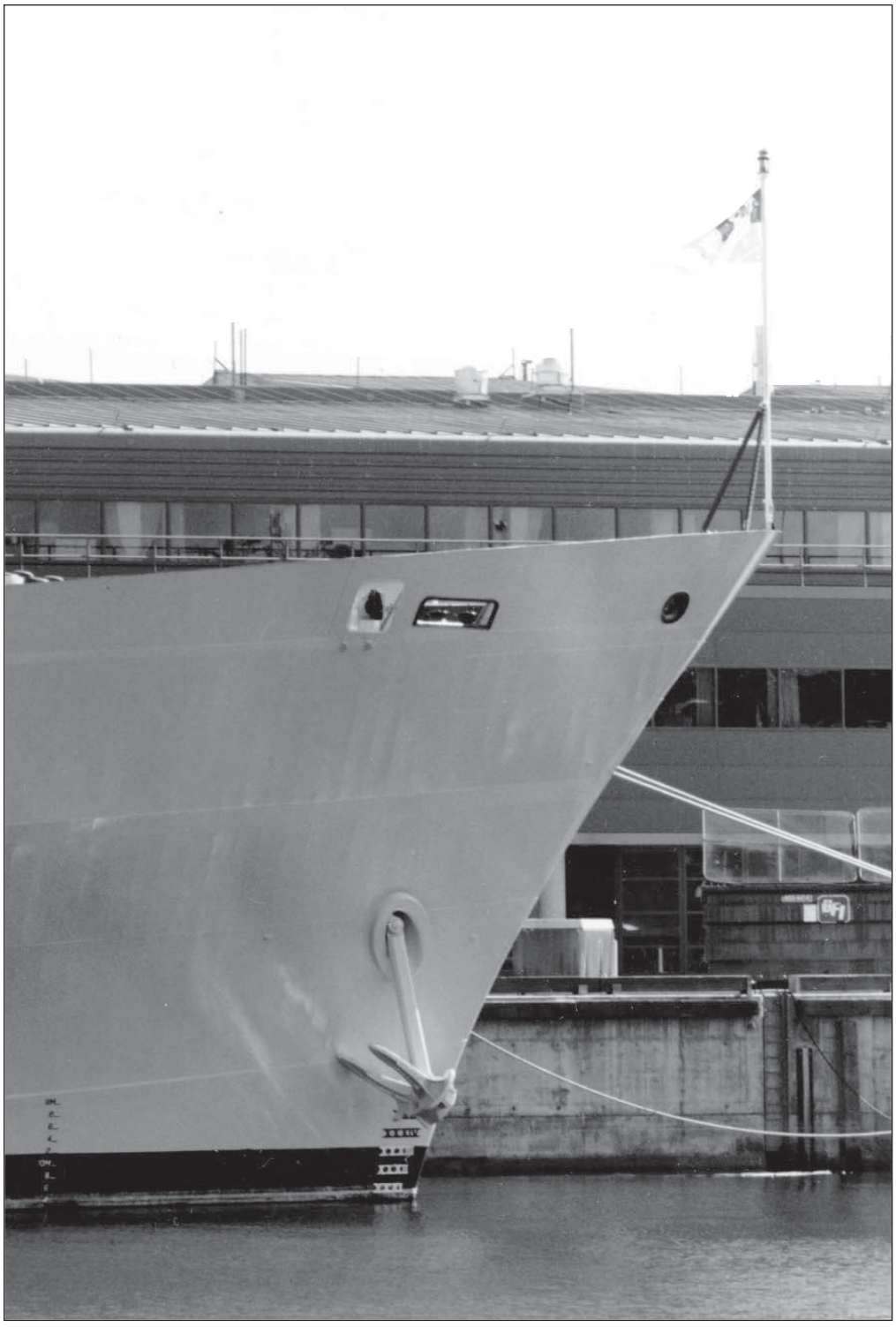


Figure 7.6-6 - AOR 509 Class Marine Fluked Stockless 5448 kg

Figure 7.6-7 - OBERON/UPHOLDER Class Byer's Type 813 kg

Figure 7.6-8 - Boat's Anchor

7.6.3 Common Associated Equipment Used for Anchor/Cable Work

The following table lists common miscellaneous non-fitted equipment that is required as for anchoring/mooring, regardless of ship's class:

Table 2 Equipment - Anchor/Cable Work	
Cable Jack	Pry Bar/Cable Bar
Anchor Flag/Wand (Red/Green)	Mousing Line/Wire
Hard Hats	Knife/Spike
PFDs	Cable Bag
Safety Goggles	Fire Hose
Safety Harnesses	Chemlites
Sledgehammer	Comm Set
Jack Staff	Anchor Chain(s) [Platform]
Portable Light	

Cable Bag A cable bag should be readily available when working cables. Its contents should be no less then what is depicted below.

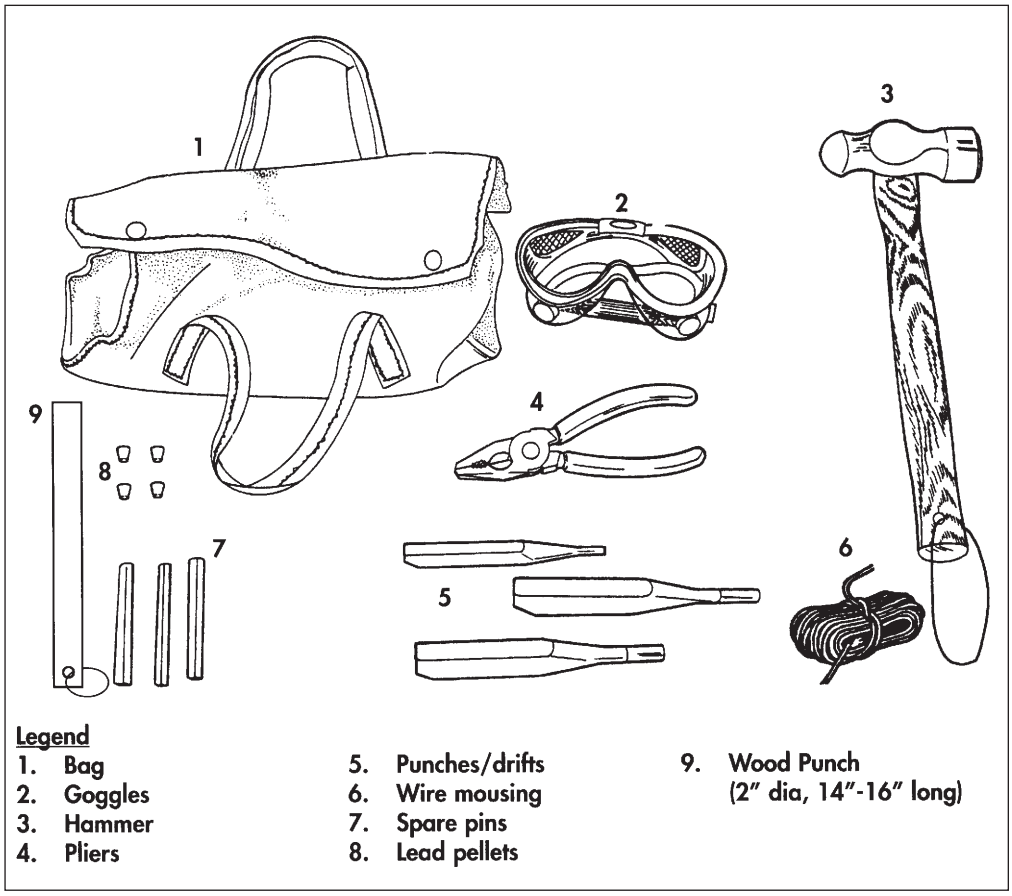


Figure 7.6-9 - Cable Bag

Cable Jack A cable jack is used to assist the cable worker in lifting the cable so that the slips can be removed or attached.

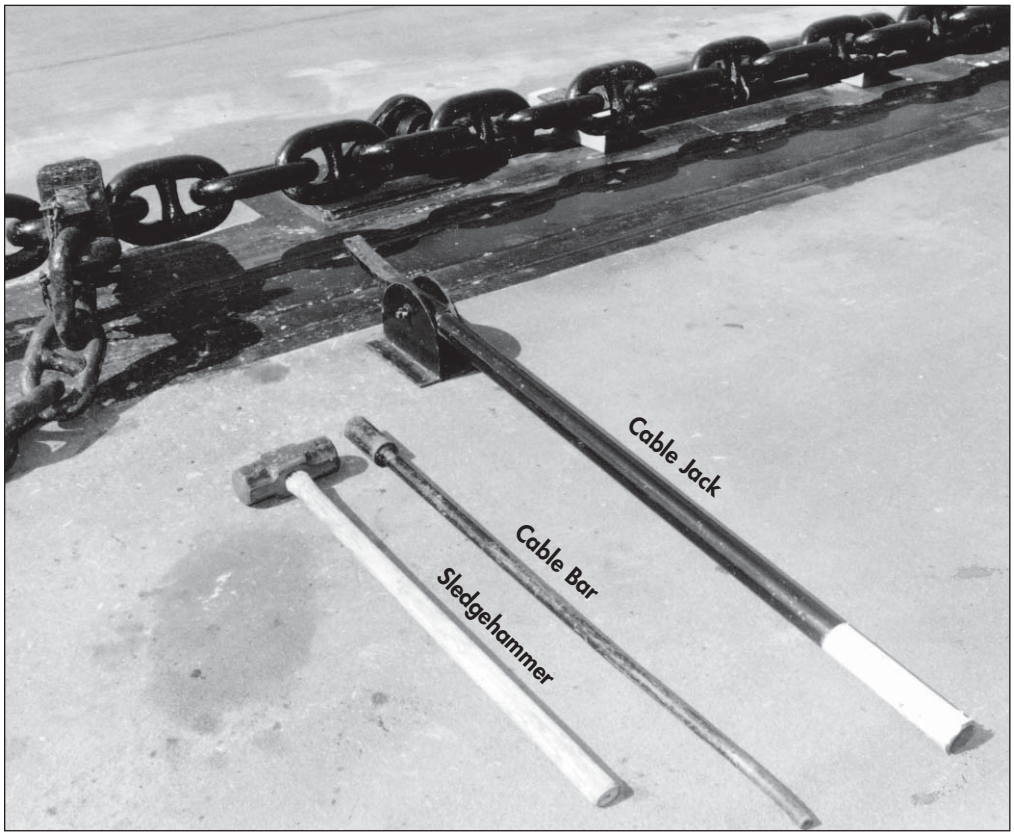


Figure 7.6-10 - Cable Jack

7.6.4 Sequence of Events: Anchoring

The following table reflects the generic sequence of events to be followed when anchoring. Preparations and equipment layout specific to each Class are shown in sections 7.13 - 7.18.

7.6.4 Sequence of Events: Anchoring

Order	From	Action Taken
Make Closing-up Report	Command	When all required personnel have closed-up, an initial report is made. When all preparations are complete and a safety briefing has been given, the I/C directs the SSD Communicator to report: "Cable Party closed up. Anchor a'cockbill, riding on the brake and blake."
Man the Chains	Command	FX Officer mans the chains at two cables to the anchorage position.
Stand By (Executive Officer raises anchor flag)	Command	Blake slip is removed. FX Officer raises arm.

7.6.4 Sequence of Events: Anchoring (cont)

Order	From	Action Taken
Let Go (Executive Officer lowers anchor flag)	Command	When the ship is at the anchorage position, the brake is released on the windlass and the anchor is let go. The FX Officer lowers his arm, and commences pointing the direction of the cable and making reports as to how the cable grows. e.g., " Three shackles at the waterline, cable grows up and down."
Snub	I/C	The cable is allowed to run freely until the anchor touches bottom (normally 2-3 shackles), and then it is snubbed to prevent it from piling up. As the ship moves away from the anchorage position, the flukes open and dig into the bottom.
Off/On Brake	I/C	As the cable is approaches a long stay, the brake is released and more cable is paid out until it returns to a short stay. The cable is snubbed again, and the process is repeated until the ordered amount of cable is out, and the brake is re-applied. The FX Officer and I/C observe the cable closely. After growing to a long stay, a noticeable shudder will be seen on the cable and an audible metallic click heard before it begins returning to a short stay. This indicates that the anchor and cable are holding. The FX Officer then reports that "The ship has her cable."
On Blake	I/C	Once the ship has her cable, the blake slip is secured to the cable to prevent any slippage should the brake fail.
Secure	Command	The weight is middled between the blake slip and the brake. All gear is secured with the exception of a life jacket, safety harness with line attached, and a flashlight. A cable watch is established. Normally the cable is reported to the OOW every 15 minutes or as ordered by Command.

7.6.5 Sequence of Events: Weighing Anchor

The following table reflects the generic sequence of events to be followed when shortening in the cable and weighing anchor.

7.6.5 Sequence of Events: Weighing Anchor

Order	From	Action Taken
Commence Shortening In to (ordered #) Shackles on Deck	Command	See below.
Engage	I/C	The windlass is engaged in preparation for heaving in the cable.
Off Brake	I/C	The brake is released.
Heave In	I/C	The cable is heaved in a short distance in order to remove the weight from the blake slip.
Avast	I/C	Stop heaving in.
On Brake	I/C	Brake is applied.
Off Blake Slip	I/C	The blake slip is removed and cleared from the cable.
Man the Chains	I/C	FX Officer mans the chains.
Off Brake	I/C	The brake is released.

7.6.5 Sequence of Events: Weighing Anchor (cont)

Order	From	Action Taken
Shorten In	I/C	Cable is heaved in until the ordered amount is "on deck". The FX Officer will pass continuous reports on how the cable grows and the number of shackles remaining at the waterline.
On Anchor Wash	I/C	Cable worker opens valve to the anchor wash.
Avast	I/C	Cable has been shortened in to desired length as ordered by Command.
On Brake	I/C	The brake is applied.
Weigh Anchor	Command	This is the executive order to bring the anchor home or to recover it to the a'cockbill position until the ship leaves pilotage waters.
Off Brake	I/C	The brake is released.
Heave In	I/C	Cable party commences heaving in. If excessive strain comes on the cable prior to it being aweigh (i.e., long stay and a moaning windlass) the I/C must inform Command so that engines can be used to bring the ship closer to the anchorage position and ease the strain. The FX Officer gives continuous reports to Command of how the cable grows, number of shackles at the waterline, and the following: "Anchor is Aweigh", "Anchor is in Sight", "Anchor is Clear/Fouled", and "Anchor is Clear of the Water".
Avast	I/C	Given when the anchor is a'cockbill or home, as ordered.
On Brake	I/C	Brake is applied.
On Blake	I/C	The Blake slip is secured to the cable.
Disengage	I/C	If the anchor is to remain ready for letting go until the ship leaves pilotage waters, the windlass is disengaged so that the anchor is a'cockbill and riding on the brake and blake.
Secure	Command	Executive order to secure the anchor and focsle for sea.
Engage	I/C	The windlass is engaged to prepare to heave in.
Off Blake	I/C	The blake slip is removed and cleared from cable.
Off Brake	I/C	The brake is released.
Heave In	I/C	The cable is heaved in to bring the anchor home.
On Brake, On Blake	I/C	The brake is applied and the blake slip is attached.
Disengage	I/C	Windlass is disengaged and shut down.
Secure the Anchor for Sea	I/C	Bottle screw slip is attached and associated gear is secured for sea. On completion, the FX Officer reports "Focsle secured for sea" to the Executive Officer

7.7 Mooring

7.7.1 General

a. Mooring a ship implies securing to the seabed by attaching the ship's cable to a buoyed ring on the end of a riser pendant that is itself secured to the seabed by means of ground tackle.

b. The three main parts of a mooring are the ground tackle, the riser pendant and the buoy. The ground tackle consists of two or more anchors, with a ground arm of mooring chain shackled to each and led to a central mooring ring. The combined effect of the embedded anchors and weight of ground tackle supply the mooring with its holding power.

The riser pendant is shackled to the central mooring ring, and provides the connection between the vessel secured to the buoy and the ground tackle. It is through the riser pendant that the forces of wind, tide, current and waves, acting upon the vessel, are transmitted to the bottom where they are absorbed.

c. The purpose of the mooring buoy, as shown in figure 7.7-1, is to support the weight of the riser pendant. It is usually cylindrical in shape and constructed of steel. It is divided into watertight compartments. The riser pendant passes up through a central trunk in the buoy and is attached to a large external ring or buoy shackle. Smaller reducing links are fitted to the buoy shackle to accommodate the ship-to-buoy shackle.

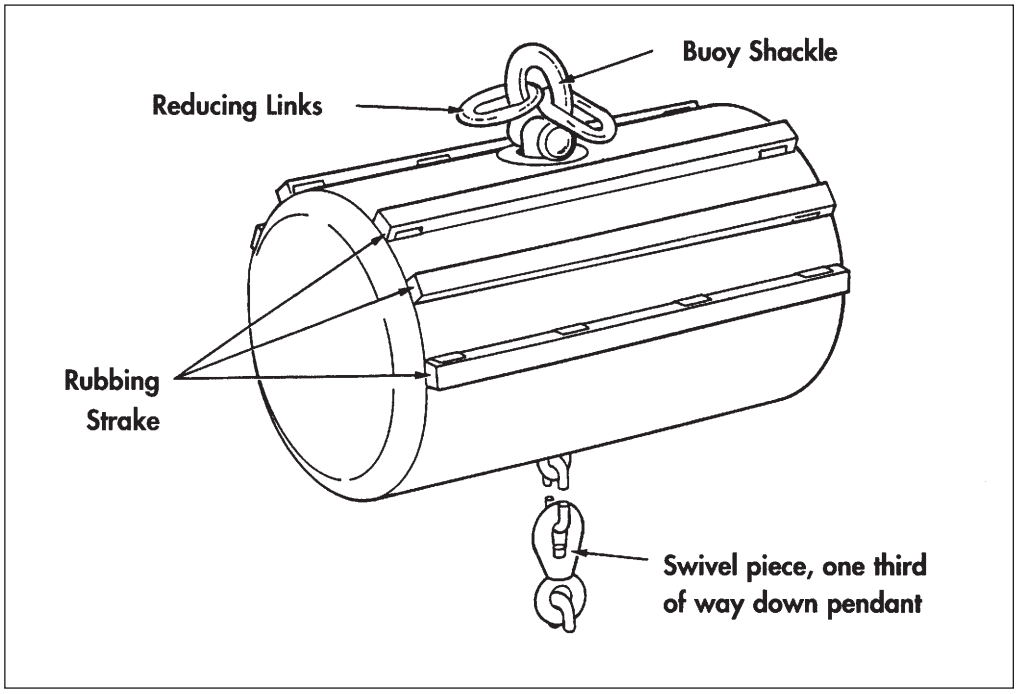


Figure 7.7-1 - Standard Mooring Buoy

7.7.2 Types of and Classifications of Moorings

a. There are three types of permanent moorings: the single-buoy or swinging mooring, the two-headed or head-and stern-mooring, and the multiple-buoy or trot mooring.

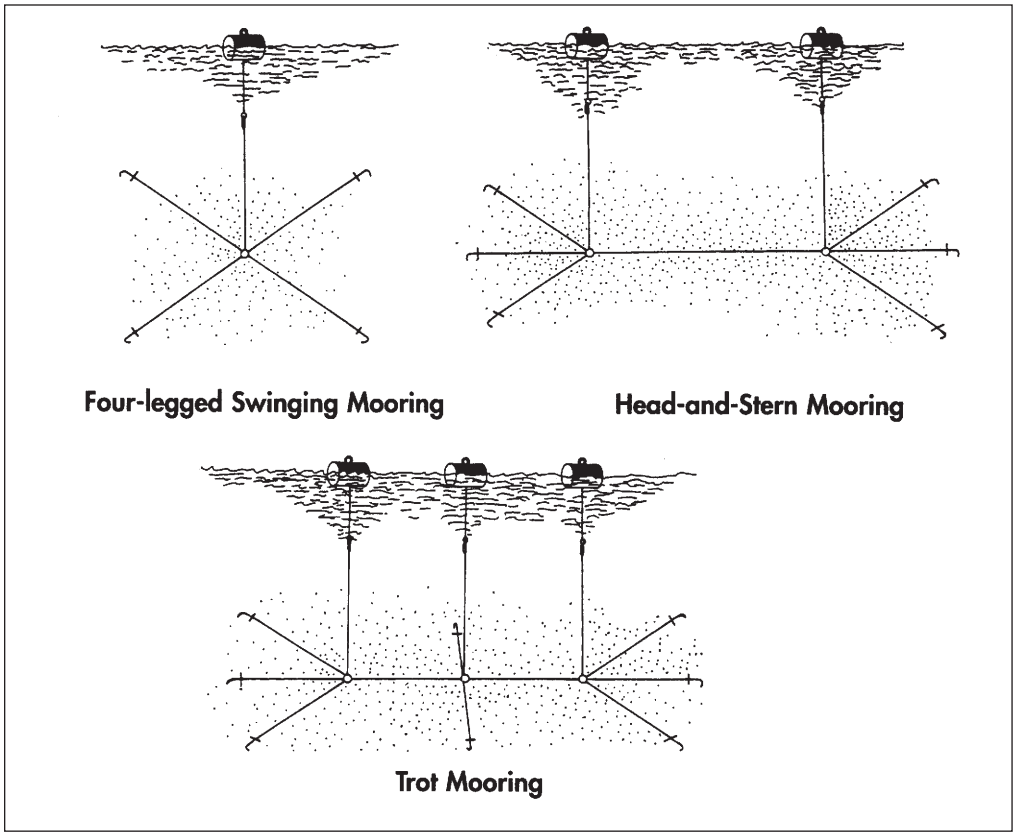


Figure 7.7-2 - Types of Moorings

(**1**) The swinging mooring is more suited to exposed locations because the secured vessel can swing freely around it, thus taking up the most advantageous position under the combined influence of wind, current, tide and wave action.

(**2**) The head and stern mooring is employed where space is limited in a harbour or waterway. It consists of two sets of ground tackle joined on the seabed, two riser pendants, and two mooring buoys.

(**3**) The trot mooring is also employed where space is limited, and is intended for mooring more than one ship. Ships secure head and stern between two consecutive buoys.

b. Moorings are further classified in terms of the maximum size of the ship's anchor cable which may be safely attached to the mooring as follows:

(**1**) Class 1 (AOR Mooring) - for ships with anchor cable breaking strength not exceeding 241 tonnes;

(**2**) Class 2 (DDH Mooring) - for ships with anchor cable breaking strength not exceeding 122 tonnes;

(**3**) Class 3 - for ships with anchor cable breaking strength not exceeding 45 tonnes; and

(**4**) Class 4 - for ships with anchor cable breaking strength not exceeding 25 tonnes.

c. All mooring systems operated by the Canadian Navy are Class 1 AOR moorings, and fall under the control of QHM Halifax and Esquimalt. The single moorings, such as those laid in Bedford Basin and Pedder Bay, are all four-legged (four ground arms).

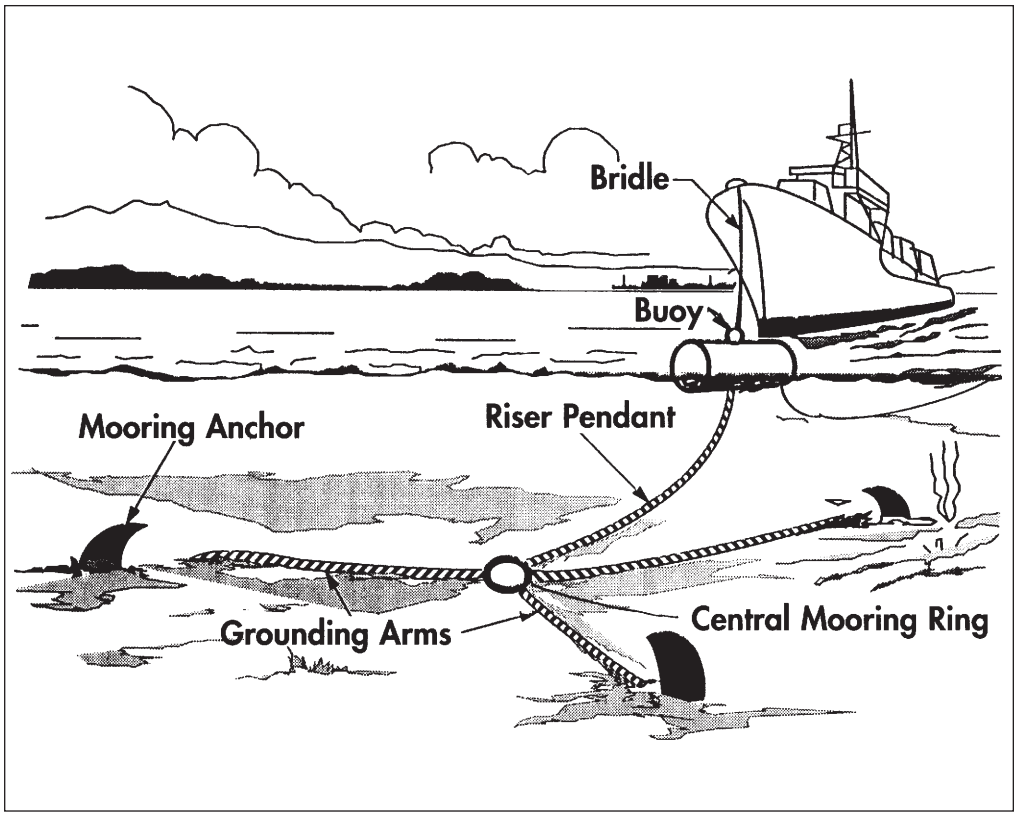


Figure 7.7-3 - Parts of Mooring

7.8 Single Mooring: Coming to a Buoy

7.8.1 Lines Used for Mooring

The following table shows types and characteristics by ships' Class of all lines used when coming to a single buoy.

Table 3 Lines Used for Mooring

Type	Length in Meters	Diameter in Millimeters	Make
Heaving Line	37	6	Sash Cord
Light Messenger	60	12	Polypropylene
Ranging Line	65	24	Polypropylene
Picking-Up Rope			
HALIFAX	110	56	Double-braided nylon
IROQUOIS	110	56	Double-braided nylon
KINGSTON	110	40	Double-braided nylon
AOR	110	87.5	Double-braided nylon
OBERON	46	42	Double-braided nylon
Wire Strop	**Size**		
HALIFAX	24(6x36) SWR		
IROQUOIS	24(6x36) SWR		
KINGSTON	SWR		
AOR	SWR		
OBERON	SWR		

7.8.2 Common Associated Equipment Used in Coming to a Buoy

In addition to the equipment described in Section 7.4, the following table lists common miscellaneous non-fitted equipment that is required as for single mooring evolutions, regardless of ships' class.

Table 4 Equipment (see above) - Coming to a Bouy

Shot Mat	Heaving Lines
Centreline Blake Slip	Bullropes
Snatch Block	Ship-to-Buoy Shackle
Ranging Line	Light Messenger
Picking-Up Rope	

7.8.3 Sequence of Events: Coming to a Buoy

The following table reflects a generic sequence of events to be followed when coming to a single buoy ahead. Preparations and equipment layout specific to each class are shown in sections 7.13 - 7.18.

7.8.3 Sequence of Events: Coming to a Buoy

Order	From	Action Taken
Make Closing-Up Report	Command	When all required personnel have closed up, an initial report is made. When all preparations are complete and a safety briefing has been given, the I/C directs the SSD Communicator to report "Ready to come to the buoy."
Launch the Boat	Command	The boat (IRB or RIB as determined by Command) is launched with crew and buoy jumpers embarked. Buoy jumpers are to wear sea boots (not running shoes), with wet weather gear a recommended option to protect clothing from guano on the buoy. After launch, the boat's Coxn is to position the boat off the ordered bridge wing at 50-100 metres.
Order boat alongside, and pass the messenger	Command	Boat Coxn positions the boat 10-15 metres from the focsle in preparation for receiving the messenger.
Pass Messenger to the Boat	I/C	Messenger is passed to a buoy jumper in the boat.
Control of the Buoy Jumpers: Strict control of the movement of the jumpers on/off the buoy is critical to their safety. They can not be allowed onto the buoy when there is any risk that the ship may overrun the buoy and knock them into the water. There are **two control methods** available to Command to ensure safe control. **Firstly**, Command can retain control at all times, providing positive direction to the boat Coxn as to when to put the jumpers on the buoy, and when to get them off. The advantage to this method is that Command orders main engine movements and best appreciates the expected movement of the ship with respect to wind and current. The disadvantage is that the buoy and boat are often out of sight beneath the bow, which hinders the Command appreciation of rapidly changing relative movements of the ship, boat and buoy. However, the FX Officer is expected to order the jumpers off the buoy whenever he recognizes an unsafe situation developing. **Secondly**, control of the boat and jumpers can be passed to the FX Officer for the entire mooring sequence once the messenger is in hand. The advantage to this method is that the FX Officer always has the buoy and boat in sight. This, coupled with informative reports of engine movements from Command, allows him to decide when it is best to put the jumpers on and off the buoy. The disadvantage is that miscommunication between Command and the FX Officer with respect to engine movements might lead to a dangerous situation; however, Command always retains a veto, i.e. Command can order the jumpers off the buoy as soon as any safety hazard is deemed to exist.		
Buoy Jumpers on the Buoy	Command or FX Officer	Boat Coxn positions boat next to the buoy without placing the boat between the buoy and the ship. Jumpers proceed onto the buoy with the messenger in hand.
Pass the Picking-Up Rope	I/C	The wire pendant on the picking-up rope is passed through the buoy shackle and the snap hook is secured to the picking-up rope.
Buoy Jumpers off the Buoy	Command or FX Officer	Buoy jumpers clear the buoy and the boat lays off in a safe position.
Down Slack Picking Up Rope	I/C	Slack is removed from the picking-up rope by hand.

7.8.3 Sequence of Events: Coming to a Buoy (cont)

Order	From	Action Taken
Turns to the Capstan	I/C	Line handlers will take four complete turns on the capstan.
Heave in Handsomely	I/C	The capstan operator heaves in handsomely, bringing the buoy under foot.
Buoy Jumpers on the Buoy	Command or FX Officer	Buoy jumpers attach ship-to-buoy shackle to reducing link; pin is inserted and leaded.
Buoy Jumpers off the Buoy	Command or FX Officer	Buoy jumpers clear the buoy; boat lays off in a safe position.
Veer Picking-Up Rope	I/C	The picking-up rope is veered in order to transfer the weight to the ship's cable.
Buoy Jumpers on the Buoy	Command or FX Officer	Buoy jumpers remove the picking-up rope from the buoy by unhooking the wire pendant.
Buoy Jumpers off the Buoy	Command or FX Officer	Buoy jumpers clear the buoy; boat lays off in a safe position. The picking-up rope is recovered onto the focsle.
Veer Cable	I/C	Cable is veered to the ordered amount of cable out.
Secure Bridle	I/C	The bridle is secured on deck with the centreline blake slip.
Veer Cable	I/C	The weight is middled between the blake slip and the windlass.
Secure	Command	FX part ship hands, cable party, and boat's crew and lowerers are secured; cable watch is set. Reports are made to the OOW every 15 minutes.

Note.

1. Mooring Windlass automatic clutch replaces break for Halifax Class.
2. Roller shackle method is also available during inclement weather.

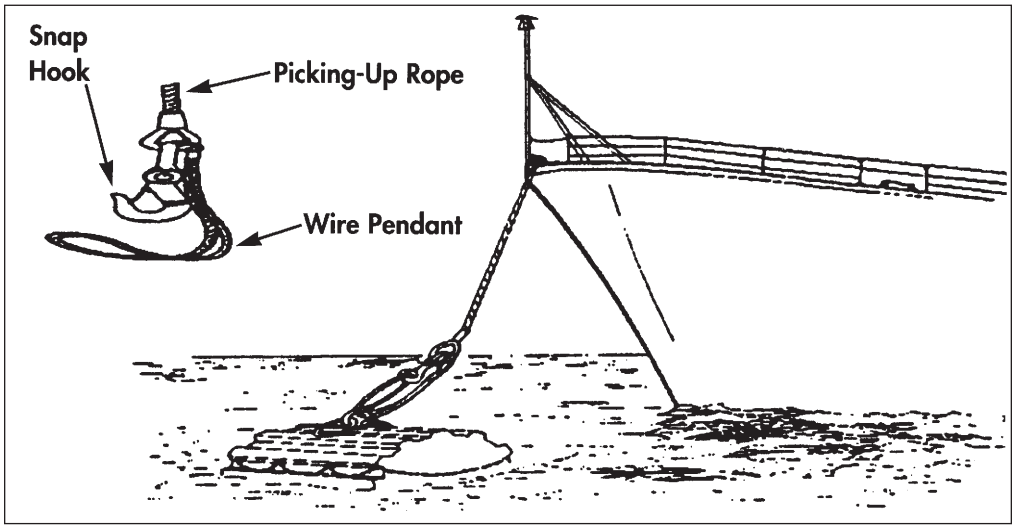


Figure 7.8-1 - Wire Pendant and Picking-Up Rope Attached to Buoy

7.8.4 Sequence of Events: Slipping from a Buoy

The following table reflects the generic sequence of events to be followed when slipping from a single mooring ahead. Closing up reports, boat launch and control of the buoy jumpers are as per the sequence of events for coming to a buoy.

7.8.4 Sequence of Events: Slipping from a Buoy

Order	From	Action Taken
Boat ordered into position	Command	Boat lays off the focsle in preparation for taking the messenger in hand.
Shorten In	Command	The I/C orders the blake slip removed, the brake released, and the mooring cable heaved in until the buoy is underfoot.
Order boat alongside, and pass the messenger	Command	Boat Coxn positions the boat 10-15 metres from the focsle in preparation for receiving the messenger.
Pass the Messenger to the Boat	I/C	The messenger is passed to a buoy jumper in the boat.
Buoy Jumpers on the Buoy	Command or FX Officer	The boat Coxn positions the boat next to the buoy without placing the boat between the buoy and the ship. Buoy jumpers proceed onto the buoy with the messenger in hand and heave in on the slip rope. The soft eye of the slip rope is passed up through the buoy shackle back onto the focsle. It is secured to the senhouse slip on the bollard strop.
Passing the Slip Rope. There are **two methods** used to pass the slip rope. **First,** the slip rope is passed out the angel fairlead (bullring in KINGSTON Class) (pedestal roller in AOR 509), through the buoy shackle, and back onboard through the forward port fairlead and onto the senhouse slip. This method is preferred in AORs and the KINGSTON Classes. **Second,** the slip rope is passed out the forward starboard fairlead, through the buoy shackle, and back on board through the port forward fairlead. This method is preferred in the IROQUOIS and the HALIFAX Classes.		
Buoy Jumpers off the Buoy	Command or FX Officer	Buoy jumpers clear the buoy; boat lays off in a safe position.
Down Slack Slip Rope	I/C	Line handlers remove slack from the slip rope by hand.
Turn up the Slip Rope	I/C	Line handlers turn up the slip rope with four turns on the bollard.
Veer to the Slip Rope	I/C	Ship's cable is veered until the slip rope takes up the weight, and the cable with the ship-to-buoy shackle is left slack.
Buoy Jumpers on the Buoy	Command or FX Officer	Buoy jumpers remove the ship-to-buoy shackle.
Buoy Jumpers off the Buoy	Command or FX Officer	Buoy jumpers clear the buoy; boat lays off in a safe position.
Heave in on the Cable	I/C	The cable is heaved in until it is recovered on deck. (Note: constant tension must be kept on the slip rope to ensure it does not foul during recovery of the cable.)
Standby to Slip	I/C	The cable worker designated to slip places himself in a safe position near the senhouse slip with hammer in hand.
Slip	Command	The I/C orders the senhouse slip tripped. The ship backs away from the buoy, and the slip rope is recovered.

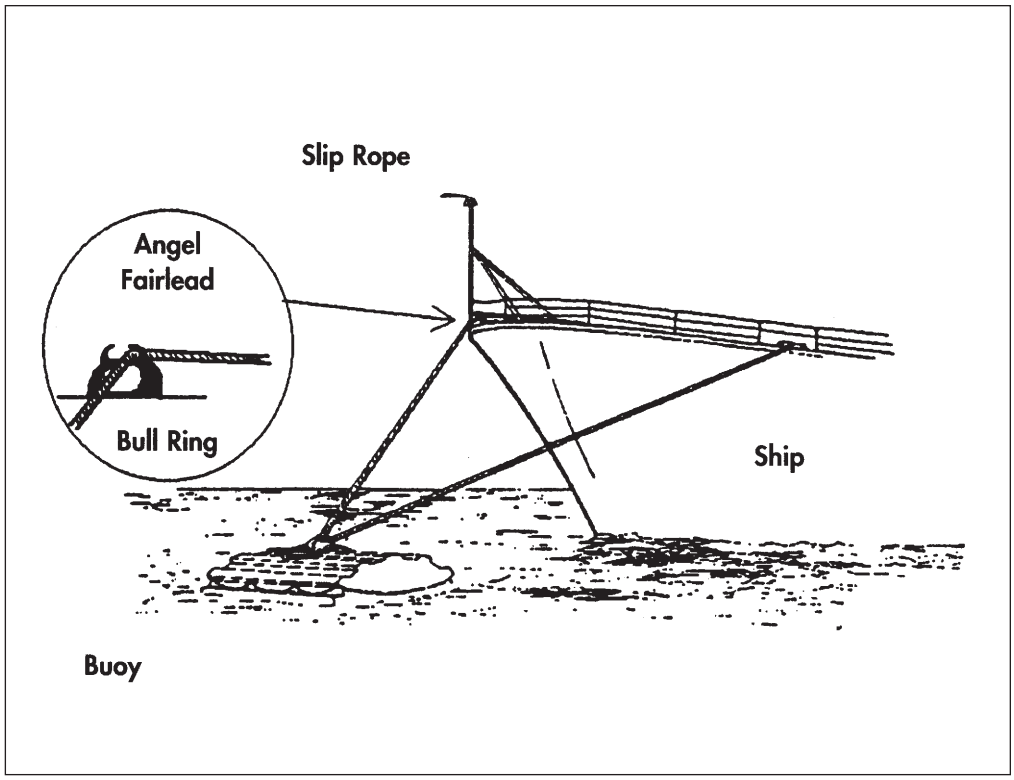


Figure 7.8-2 - Method 1 – Slip Rope Rigged for Self-Slipping

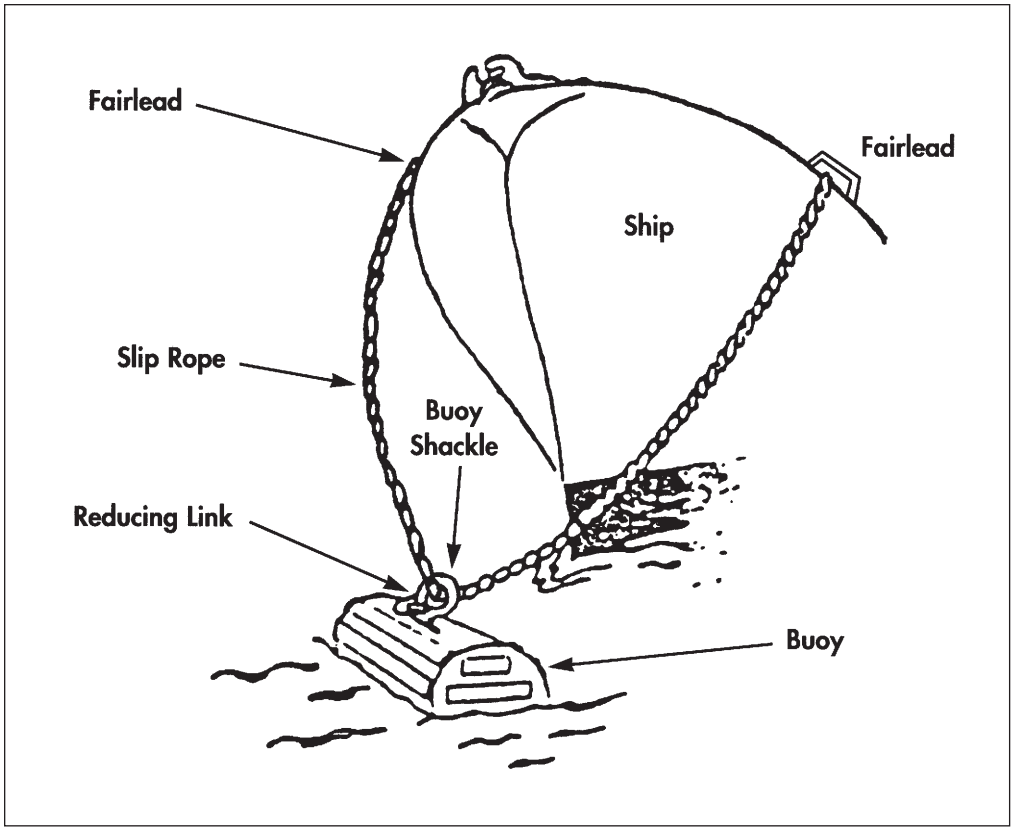
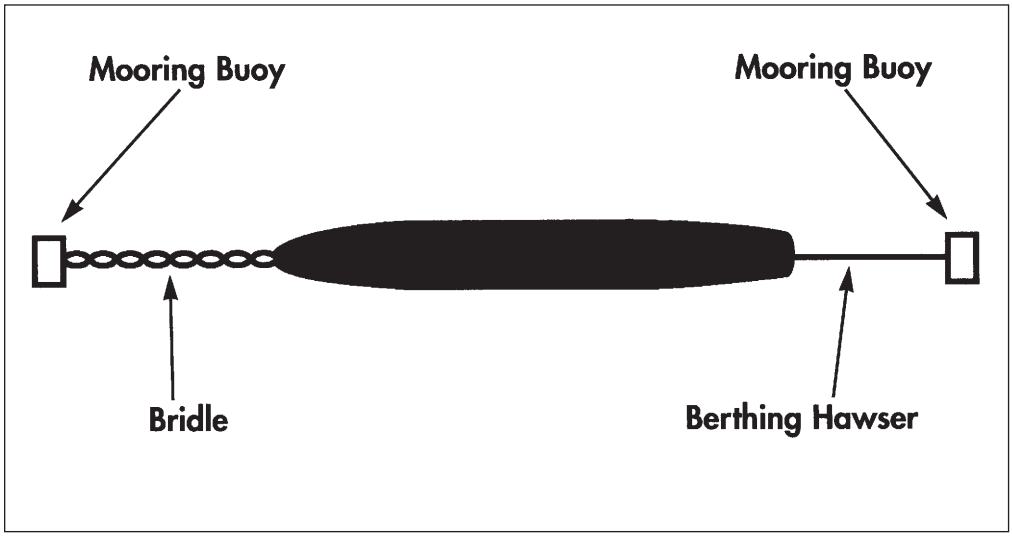


Figure 7.8-3 - Method 2 – Slip Rope Rigged for Self-Slipping

7.9 Two Point Mooring

a. Securing to head-and-stern buoys is straightforward from a seamanship perspective, although the ship handling challenge is significantly increased. The head buoy is normally "snatched" first, following the sequence of events described above for a single mooring. Greater scope on the bridle may initially be needed to allow Command greater flexibility in manoeuvring the stern towards the second buoy.

b. The sequence of events for snatching the stern buoy differs due to the absence of cable arrangements on the quarterdeck. Instead of the mooring cable, the eye of a berthing hawser is passed through the buoy shackle and held in place with a 4' x 4' wooden fid. Depending on weather and the expected stay at the buoys, two hawsers may be passed, one from either quarter fairlead. In addition, the towing hawser can be employed. The after capstan is used to take the slack out of the line(s). Once both head and stern buoys have been snatched, the weight between the two is middled.



7.9-1 - Two Point Mooring

c. The following table shows the sequence of events that occurs aft when securing to a stern buoy. It is assumed that the ship has secured to the buoy ahead.

7.9 Sequence of Events: Two Points Mooring

Order	From	Action Taken
Make Closing-Up Report	Command	I/C makes initial report when Quarterdeck part ship hands have closed up. Equipment required aft comprises hawsers, 4 x 4 fid, axe and rope stopper, as well as standard associated equipment for working lines. Once complete, and safety briefing has been given, I/C directs SSD Communicator to report: "Ready to secure to stern buoy."
Launch the Boat	Command	A second boat with a second set of buoy jumpers may be launched, or Command may choose to use the same boat and jumpers that worked on the head buoy. The boat shall take position on the ordered quarter at 50-100 metres.
Boat Proceed to Port/Stbd Quarter and Take Messenger in Hand	Command	Boat Coxn positions boat 15-20 metres off the quarter. Messenger is passed to buoy jumper in boat. **Note: Boat control remarks in single mooring sequence of events apply.**
Buoy Jumpers on the Buoy	Command or AX Officer	Boat Coxn positions boat next to the buoy without placing the boat between the buoy and the ship. Jumpers proceed onto the buoy with the messenger in hand. Buoy jumpers will pull messenger and hawser through the buoy shackle on the buoy, pass a bight of the hawser through the eye and insert a 4 x 4 fid.
Buoy Jumpers off the Buoy	Command or AX Officer	Boat Coxn lays off in a safe position.
Down Slack the Hawser	I/C	Hawser is down slacked by hand, rove through the bollard and taken to the capstan.
Turns on the Capstan	I/C	Line handlers will take minimum of 4 turns on the capstan.
Heave In/Veer	I/C	The hawser is adjusted in order to middle the weight between the head and stern buoys.
Pass the Stopper	I/C	The stopper is passed around the hawser.
Veer to the Stopper	I/C	The hawser is veered to ease the weight to the stopper.
Light To, Turn Up	I/C	Turns are taken off the capstan and turned up on the bollard.
Off Stopper	I/C	Stopper is removed.
If more than one hawser is being passed, the above steps will be repeated.		

7.10 Four Point Mooring

a. On rare occasions when a stationary mooring is necessary, such as required for de-perming or static sound ranging, a ship will be required to moor to four buoys. The mooring cable is not used. Instead, berthing hawsers are used fore and aft to secure buoys on either bow and either quarter. The sequence of events for passing the lines (fore and aft) is identical to that described above for securing to a stern buoy.

b. Two or possibly three boats (with buoy jumpers) will be used. The key is to snatch one buoy at a time, commencing with the windward buoys. Once they are secured, the process is repeated for the leeward buoys.

c. All part ship hands, as well as extra boats crews, will be required. The evolution must be thoroughly planned and briefed beforehand, especially with respect to Command intentions and communications.

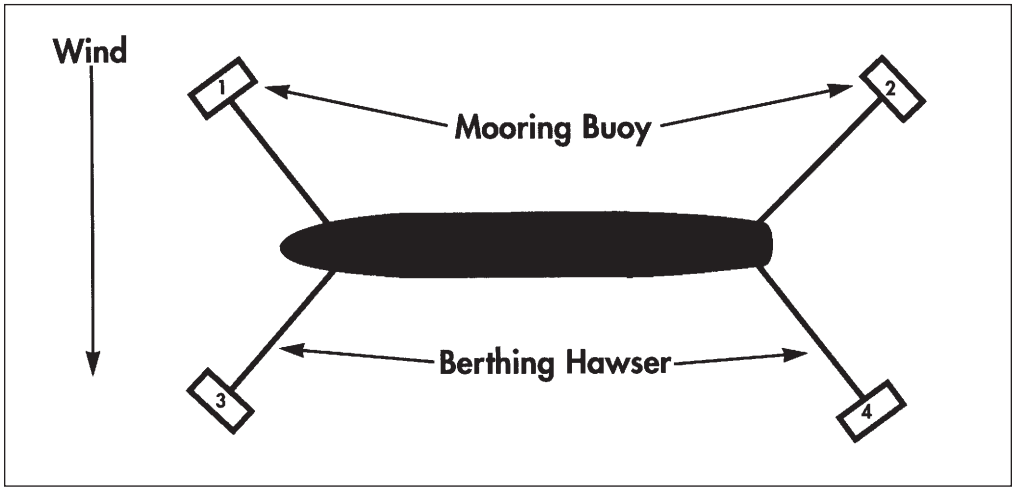


Figure 7.10-1 - Four Point Mooring

7.11 Mediterranean (Med) Mooring

7.11.1 General

a. A Med Mooring describes a unique berthing arrangement which involves a ship placing her anchor(s) on the harbour bottom, and then veering her cable while simultaneously twisting the stern toward the jetty and making a sternboard approach to a stern-to berth. A brow is then placed from the stern onto the jetty. Ships fitted with two anchors are best suited for the Med Moor as they can be placed so that they form an approximate 60-degree angle with the bow, thereby providing excellent stability.

b. The advantage of a Med moor is that little jetty space is required, and so several ships can berth side by side in a small and/or congested harbour. In addition, each ship has a separate brow to the jetty, which is often preferred over being berthed outboard in a nest. This arrangement is very popular in European ports, thus the name.

c. Since Canadian warships usually conduct Med moors only when deployed overseas, it can be a very challenging evolution due to a lack of practice, both from the perspectives of shiphandling and seamanship. As with all seamanship

evolutions, a well-conceived and briefed plan is critical to the safe and smart conduct of a Med moor. Clear communications between Command and the parts of ship is vital, especially if/when transferring the con from the bridge to the flight/quarterdeck during the final phases of the approach.

d. During a Med moor, the personnel and equipment requirements and sequence of events for anchoring are identical to those described in section 7.6, except that a marker buoy must be attached to the anchor prior to letting go so that the anchorage position is clearly marked. The line must be of sufficient length to reach the surface of the water at high tide. Tugs are often required, depending on weather, sea room in the harbour, and the class of ship. The personnel and equipment requirements on the quarterdeck are the same as for a normal berthing. The major difference occurs in berthing procedures aft, where a unique line arrangement is used to hold the stern fast to the jetty.

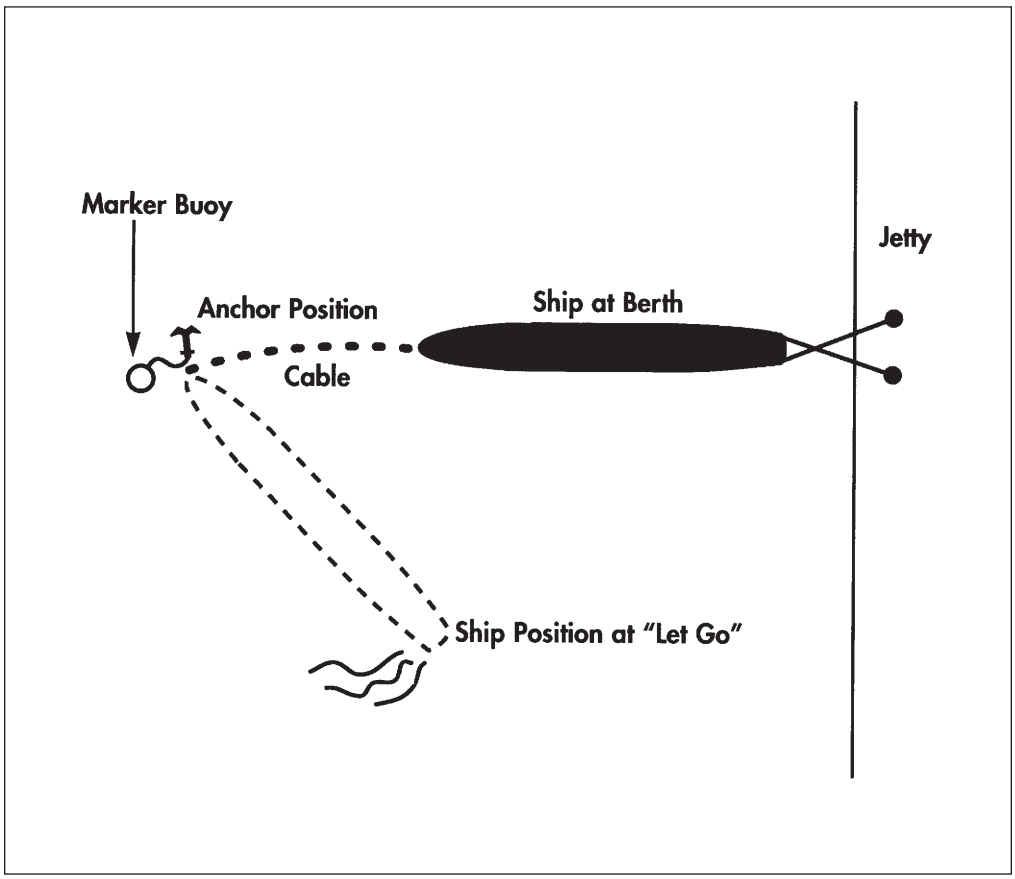


Figure 7.11-1 - Med Mooring

7.11.2 Sequence of Events: Mediterranean Mooring

a. The following table shows the sequence of events that occurs aft when conducting a Med Mooring. All orders are given by the I/C.

7.11.2 Sequence of Events: Mediterranean Mooring

Order	Action Taken
Fire Gunline/Bolo	Contact is made with the berthing party via a gunline, bolo, or heaving line.
Take the Line in Hand.	The soft eye of the hawser is passed out through the towing fairlead and led to the jetty.
Heave in Handsomely.	Slack is taken out of the stern line and strain put on to assist the ship in closing the jetty. Concurrently, the cable is being veered on the focsle.
Avast	The stern is in position to pass and cross port/stbd lines.
Throw for the Spring Lines	Two spring lines are sent to the jetty crossing port and stbd.
Down Slack Lines	By using line handlers and the capstan, the slack is removed from the lines.
Avast	Spring lines are turned up.
Double Up	Lines are doubled up
Once the ship is secured in position, the brow is placed at the stern.	

b. When leaving a Med Mooring, a detailed plan that takes prevailing circumstances into account will be required. The normal method is to let the lines go aft, and then heave in the cable(s), using engines to keep clear of obstructions. Command may require one or two lines to remain on the jetty, and to be checked away as the ship moves forward from the berth, in order to maintain greater control over the movement of the stern.

7.12 Safety

7.12.1 Seamanship Briefing

a. Prior to all anchoring and mooring evolutions, a command briefing will be conducted by the Deck Officer. The seamanship briefing will follow the Navigating Officer's general briefing of the weather and navigation plan. In many cases, for more complex evolutions such as a Mediterranean or Four Point Mooring, the briefing will take place several hours or even the previous evening before the evolution, so that everyone has time to hoist in the plan and make the necessary preparations. The following personnel will, as a minimum, be in attendance: Executive Officer, Deck Officer, Navigating Officer, Focsle Officer, Chief Bosn's Mate, Senior Naval Communicator, Part Ship I/Cs and Cable Party I/C.

b. Following is a briefing format to be followed:

(**1**) Captain Sir, ladies and gentlemen, (OWN SHIP) will be anchoring at (LOCATION) at (TIME).

(**2**) (PORT/STARBOARD) watch Special Sea Dutymen, Cable Party and Focsle Part Ship hands will be required to close up at (TIME), at which time the chains will be rigged on the starboard side, the jackstaff raised, and the anchor made ready for letting go, riding on the blake and brake.

(**3**) The dress for this evolution, as discussed with the Executive Officer, will be (DRESS).

(**4**) The Focsle Officer, Focsle I/C and Cable, Party I/C will be (NAMES).

(**5**) As briefed by the Navigator, (OWN SHIP) will be anchoring in (DEPTH) metres. This will be a dropping anchorage, with seven shackles on deck being required. The blake slip will be removed when the order "Stand By" is given at one half cable to the anchorage position. The intention on letting go is to allow the cable to run freely for two shackles, which will put the anchor on the bottom. The cable will then be snubbed until it grows to a long stay. The Cable I/C will then control the paying out of the cable using the brake so that it is laid properly on the bottom.

(**6**) Effective communications are essential. Primary shall be (INTERNAL COMM.), with secondary being (PRC 1 Channel).

(**7**) I/Cs are to thoroughly brief all closing up personnel on their duties and the sequence of events.

(**8**) If required, a debrief will be conducted on completion of the evolution. Place and time to be promulgated.

(**9**) Sir, this completes the briefing. Are there any questions?

(**10**) The Chief Bosn's Mate will now brief the safety-related aspects of the evolution.

7.12.2 Cablework Safety Briefing

a. It is imperative that the Chief Bosn's Mate and the I/Cs give a thorough briefing to all personnel involved in cable work prior to the evolution beginning. As well as the general shipboard safety items listed in chapter 4, the following safety points must be covered:

(**1**) Goggles must be worn by the Cable Party when letting go the anchor and inserting the lead pellets.

(**2**) Never stand directly behind the cable when letting go.

(**3**) Never straddle the cable or take shortcuts across it.

(**4**) The boat Coxn is never to allow the boat to get between the ship and a buoy.

(**5**) The Focsle Officer must wear a safety harness and floatation device (other than PFD) when manning the chains.

(**6**) The Naval Jack is not to be hoisted at the jackstaff until all work on the cable has been completed.

(**7**) Tools are to be kept well clear of the cable.

(**8**) The snap back zone safety criteria are to be followed once the picking-up rope is rigged.

(**9**) Care must be exercised when slipping the slip rope.

7.13 IROQUOIS Class

7.13.1 Anchoring and Weighing Anchor

a. IROQUOIS class ships are fitted with a single stockless marine fluked anchor. The cable locker is divided into port and starboard compartments. The starboard compartment houses the anchor cable (ten shackles in length), while the port compartment houses the mooring or working cable (four shackles in length). A cable clench is fitted in each compartment of the cable locker to secure the bitter end.

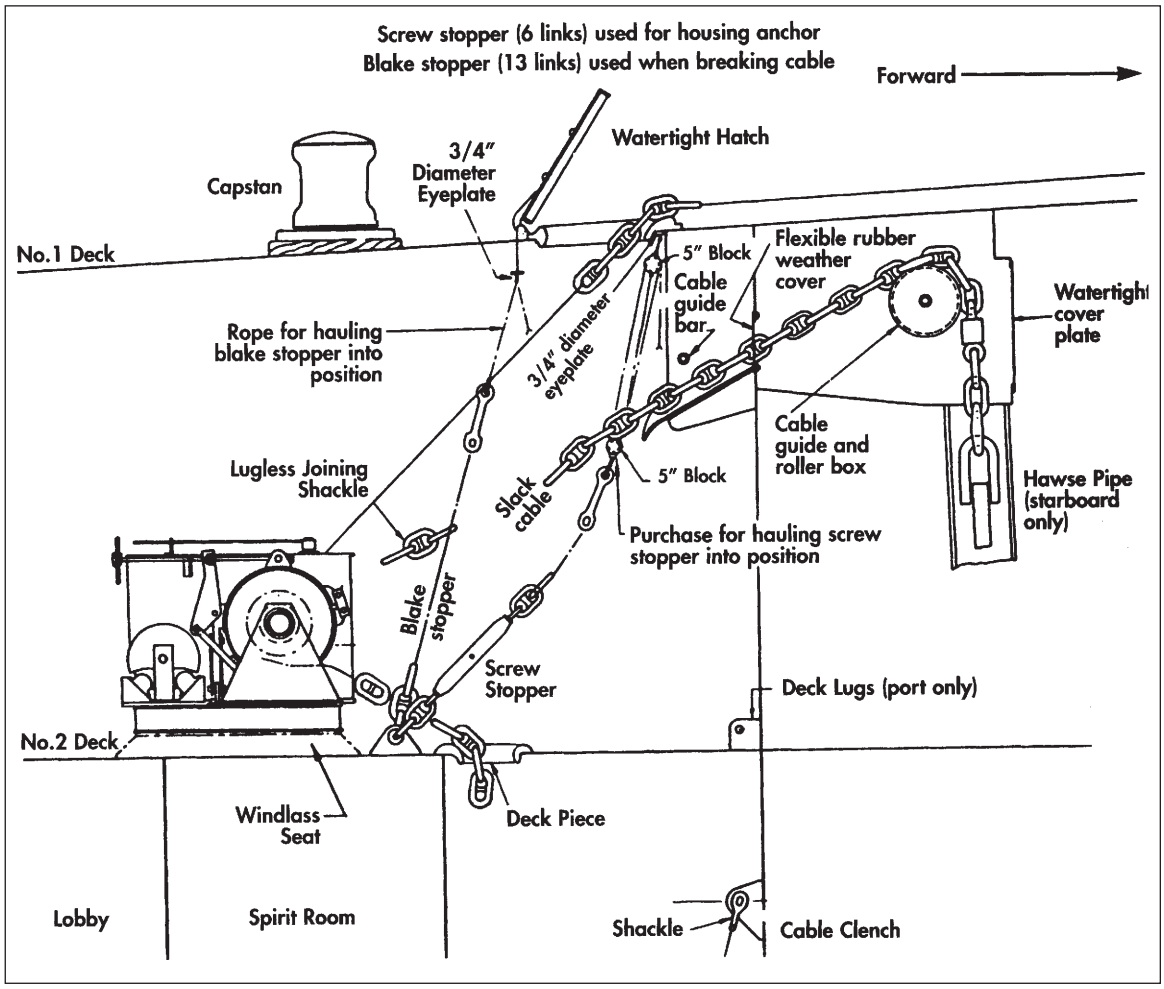


Figure 7.13-1 - IROQUOIS Class Anchor and Cable Arrangement

b. **Equipment Layout - Rigging the Anchor Platform (chains)**

(**1**) The anchor platform and guardrails are removed from their stowage in the anchor windlass compartment and brought to the focsle for assembly.

(**2**) The platform can only be rigged on the starboard side of the focsle. It is secured to the brackets fitted outboard of the guardrail.

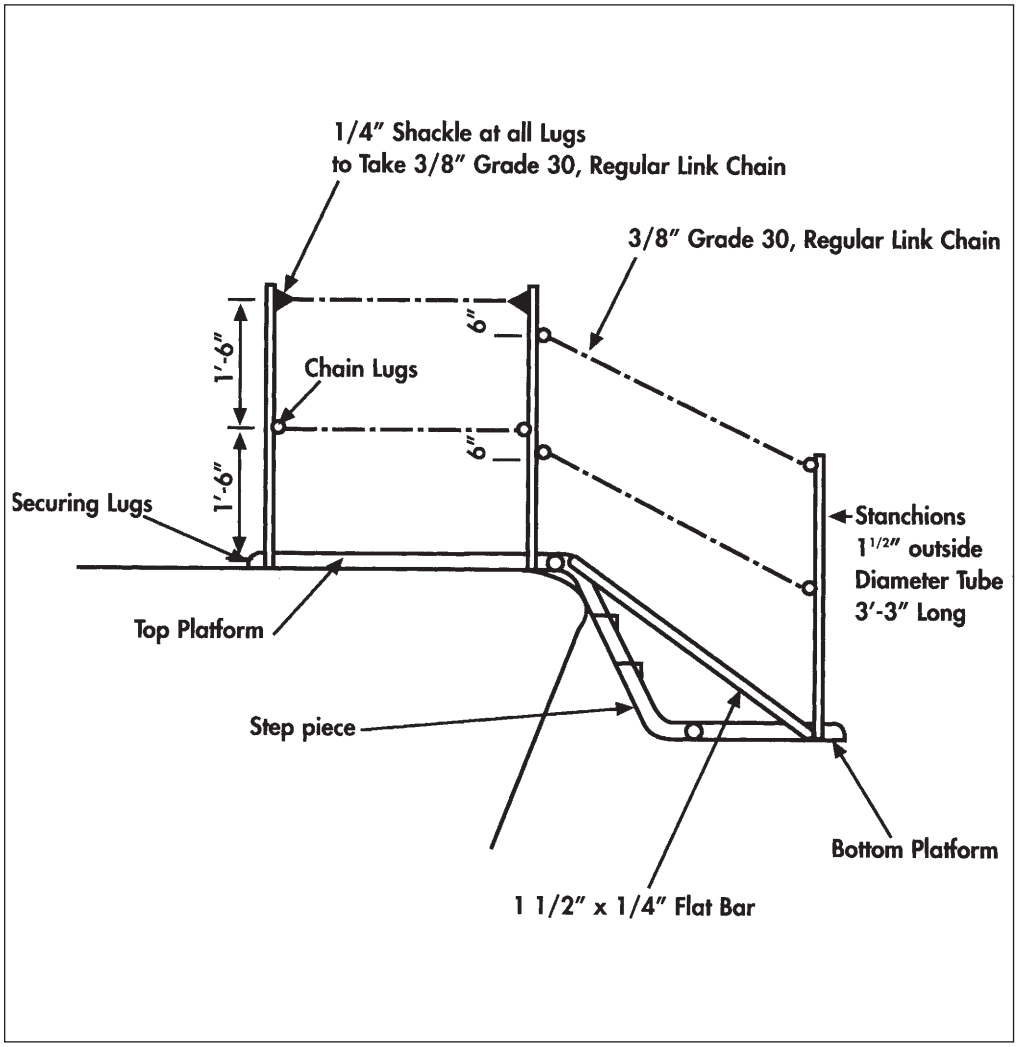


Figure 7.13-2 - IROQUOIS Class Anchor Platform

c. **Anchor Windlass/Capstan.** The anchor windlass, which is powered by an electric motor, is located in the cable deck and is used exclusively for working the anchor and mooring cables. The capstan, which is located on the focsle and is powered by hydraulics, is designed for working lines only .

d. **Preparations for Anchoring**

(**1**) Ensure the brake is on.

(**2**) In order to ensure that there is sufficient power available to start the windlass, permission must first be obtained from the Machinery Control Room. Once done, apply power and engage the clutch.

(**3**) Open the view port and remove the cable locker cover.

(**4**) Remove the bottlescrew and Blake slips, in that order.

(**5**) The brake is released and the cable veered far enough to ensure that the anchor is free of the anchor pocket or a'cockbill (eight links).

(**6**) The brake is then re-applied, the Blake slip put back on, and the clutch disengaged. The anchor is now ready for "Letting Go".

e. **Preparation and Procedure for Weighing Anchor**

(**1**) The chains are manned.

(**2**) A fire hose is laid out and charged on the focsle.

(**3**) Power is applied to the windlass, and the clutch engaged. Concurrently, the anchor wash is activated (valve located in No. 1 Rope Stores).

(**4**) The brake is removed and the cable is heaved in until the anchor is home and strain comes on the cable.

(**5**) The brake is re-applied and the Blake and bottlescrew slips are secured to the cable. The bottlescrew slip is then tightened down in order to prevent the anchor from banging in the anchor pocket.

7.13.2 Coming to A Buoy

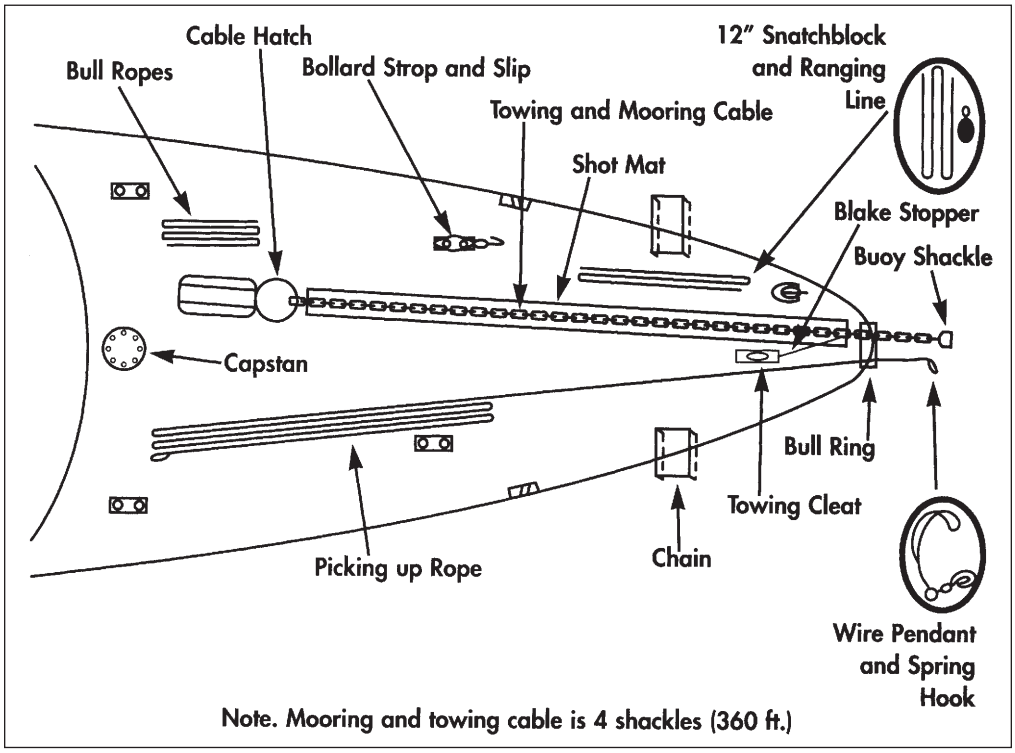


Figure 7.13-3 - IROQUOIS Class Coming to a Buoy Layout

a. **Preparation and Equipment Layout - Hanging Judas Method**

(**1**) Check the power supply, and then apply power to the windlass.

(**2**) Secure a 12" ranging snatch block with a 3/4" shackle to the farthest forward eye pad on the focsle.

(**3**) Lead the ranging line forward from the capstan to the ranging snatch block and reeve through the block. The ranging line is then lead back to the cable hatch and lowered into the cable deck and secured to the end of the mooring cable with a bowline.

(**4**) Simultaneously veering the cable and heaving in on the ranging line with the capstan, haul enough mooring cable up from the cable deck and onto the focsle to allow for the ship-to-buoy shackle to hang 4-6 feet above the waterline once it is passed through the bullring (Hanging Judas). Apply the brake. Use the bullropes and the tag line to fake the cable out on deck.

(**5**) Attach the ship-to-buoy shackle to the end of the mooring cable.

(**6**) Tie a 4-foot tag line to the cable approximately 6-8 links above the ship-to-buoy shackle to assist the buoy jumpers in retrieving the ship-to-buoy shackle once on the buoy.

(**7**) Fake the picking-up rope fore and aft along the starboard side of the focsle with wire strop and snap hook (outboard end) inboard. Pass the outboard end out through the angel fairlead such that the wire strop and snap hook are outboard of the angel fairlead and then back inboard over the guardrail on the port side and placed on deck.

(**8**) Secure a messenger (at least 30 metres of 18 mm polypropylene) to the wire strop and fake on deck on the port side.

(**9**) Using bull ropes, heave the ship-to-buoy shackle forward and out through the bullring, and lower the cable so that it is riding on the brake, suspended 4-6 feet above the waterline.

(**10**) Secure a centreline Blake slip to the deck clench located midships forward on the focsle.

b. **Preparation and Equipment Layout - Roller Shackle Method.**

(**1**) The alternate method to lower the ship-to-buoy shackle and cable down to the buoy is to run the cable along the picking-up rope using a roller shackle. This method is used in foul weather.

(**2**) The procedures for this method are the same as for the "Hanging Judas" method, with the following exceptions:

(a) Range out sufficient mooring cable to allow for ten links to pass outside the bullring.

(b) Attach the ship-to-buoy shackle to the end of the cable.

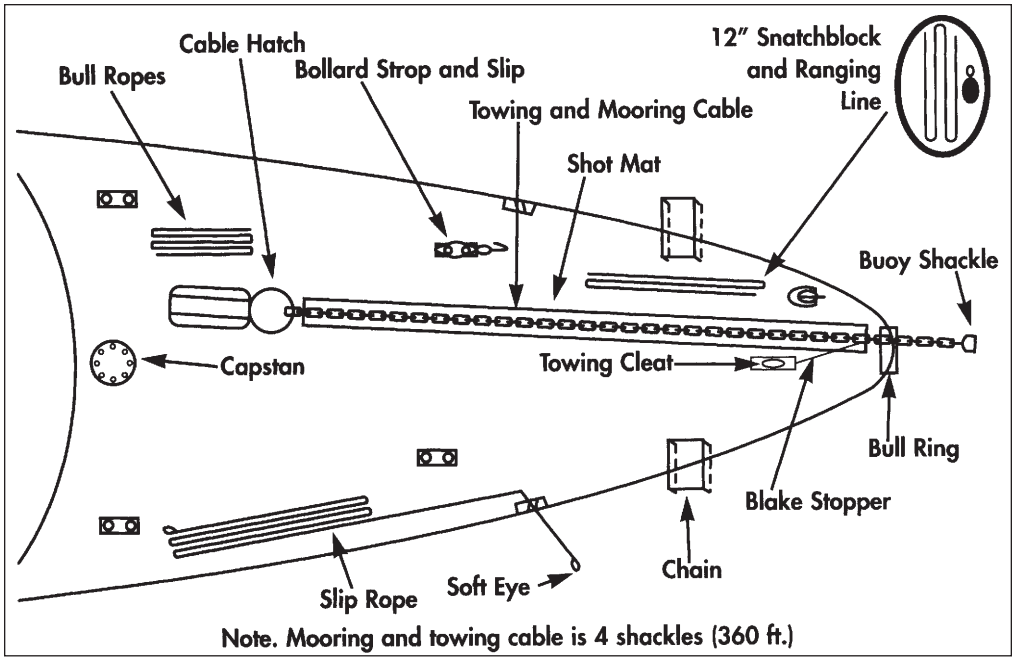


Figure 7.13-4 - IROQUOIS Class Slipping from a Buoy Arrangement

(c) Fake the picking-up rope fore and aft along the starboard side of the focsle.

(d) Pass the picking-up rope through the angel fairlead so that the wire strop and snap hook are outboard of the angle fairlead. A bight of line is brought back through the bullring.

(e) Attach the cable seven links back from the ship-to-buoy shackle to the picking-up rope using a roller shackle (the roller shackle is passed over the picking-up rope with the roller resting on the picking up rope and the bow of the shackle secured to the seventh link of the cable using manila lashing).

c. **Slipping From A Buoy Equipment Layout.**

(**1**) Rig a bollard strop and senhouse slip onto the forward bollard on the port side.

(**2**) Fake out the slip rope fore and aft on the starboard side inboard to outboard so that the soft eye can be led out through the forward fairlead on the starboard side, down through the buoy shackle, and back up through the forward fairlead on the port side where it is secured to the senhouse slip.

7.13.3 Mediterranean Mooring

a. Ship handling when conducting a Med mooring in IROQUOIS Class ships is made more difficult because of the single anchor arrangement, which limits the amount of control the Captain has over the movement of the bow during the sternboard approach to the jetty. In addition, visual appreciation of distance to the jetty is poor due to the hangar obstructing a clear view astern. Therefore, it is recommended that the Command Position be re-located aft to the flight deck with the Executive Officer remaining on the bridge. Conversely, the Executive Officer can proceed aft and pass conning recommendations via radio to the Captain on the bridge.

b. **Equipment Preparation and Layout**

(**1**) The focsle is prepared for coming to anchor. If berthing in a nest, hawsers will be required between focsles.

(**2**) Four berthing hawsers are faked down on the Quarterdeck. If additional springs or breast lines to adjacent ships in a nest are required, two additional hawsers will be laid out.

(**3**) Preparations are made for the brow to be positioned on the port side of the Quarterdeck leading aft to the jetty.

(**4**) The anchor is let go as per normal circumstances, with the intent being to lay it evenly on the seabed as the ship backs towards the jetty.

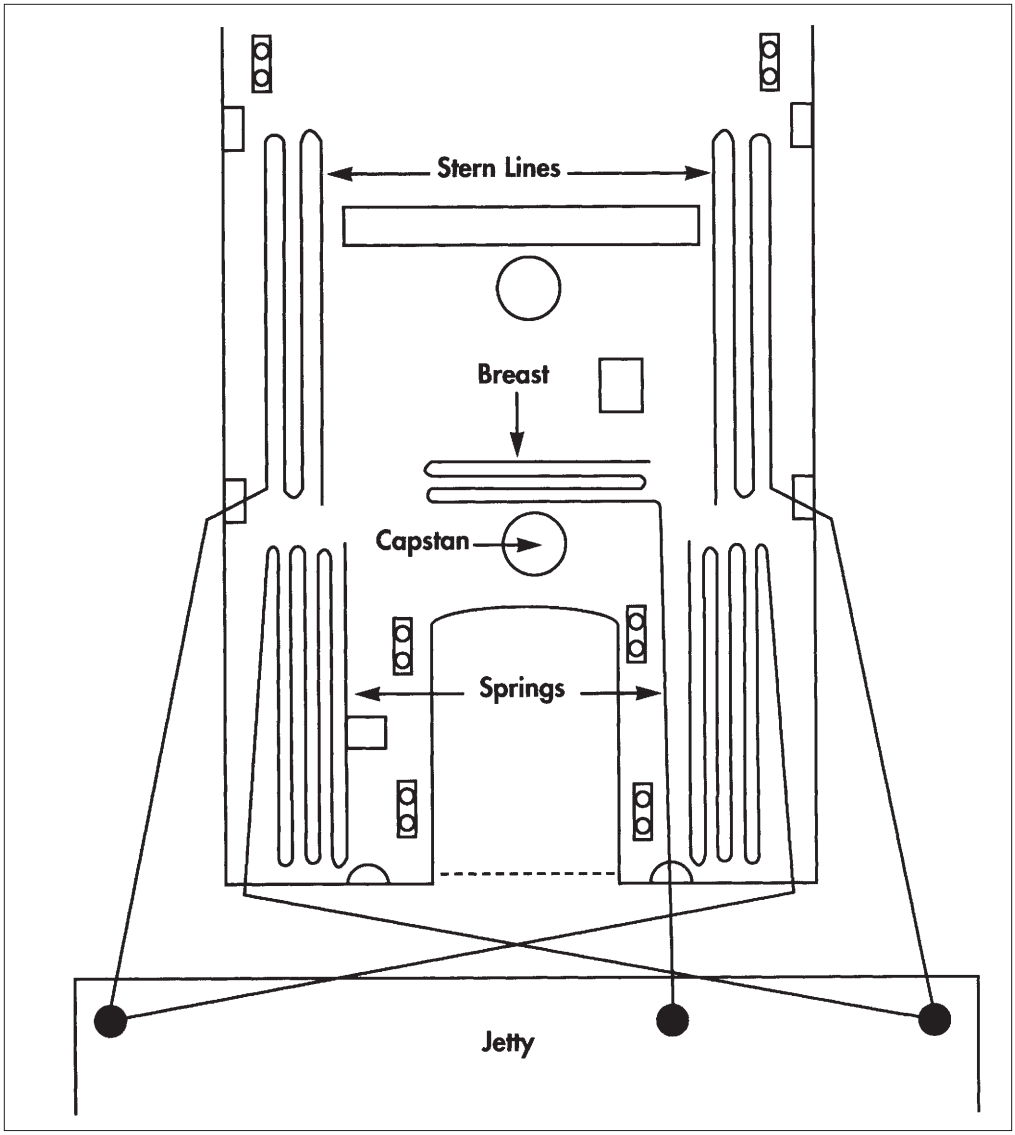


Figure 7.13-5 - IROQUOIS Class Mediterranean Mooring Arrangment

7.14 HALIFAX Class

7.14.1 Anchoring and Weighing Anchor

General

a. HALIFAX Class ships are fitted with a single bower anchor. The anchoring system is designed to hold the ship in a 70-knot wind with a 4-knot current from the same direction on a firm sand bottom at a 45-metre depth of water, with all cable paid out.

b. The cable locker is divided into port and starboard compartments by a longitudinal non-watertight bulkhead. The starboard compartment houses the anchor cable (10 shackles in length), while the port compartment houses the mooring cable (2-4 shackles in length). A cable clench is fitted in each compartment of the cable locker to secure the bitter end.

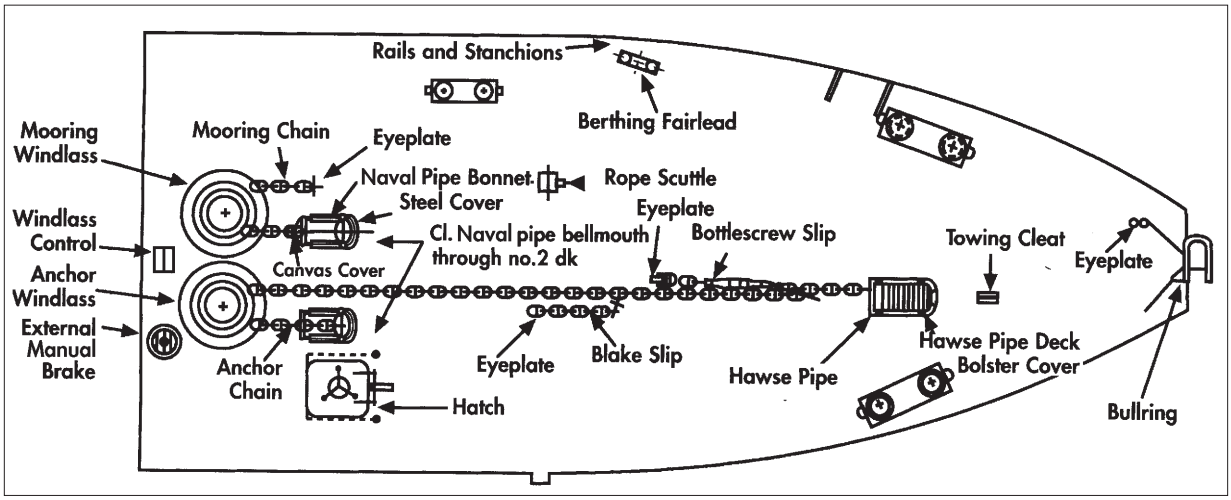


Figure 7.14-1 - HALIFAX Class Anchor and Cable Arrangement (Top View)

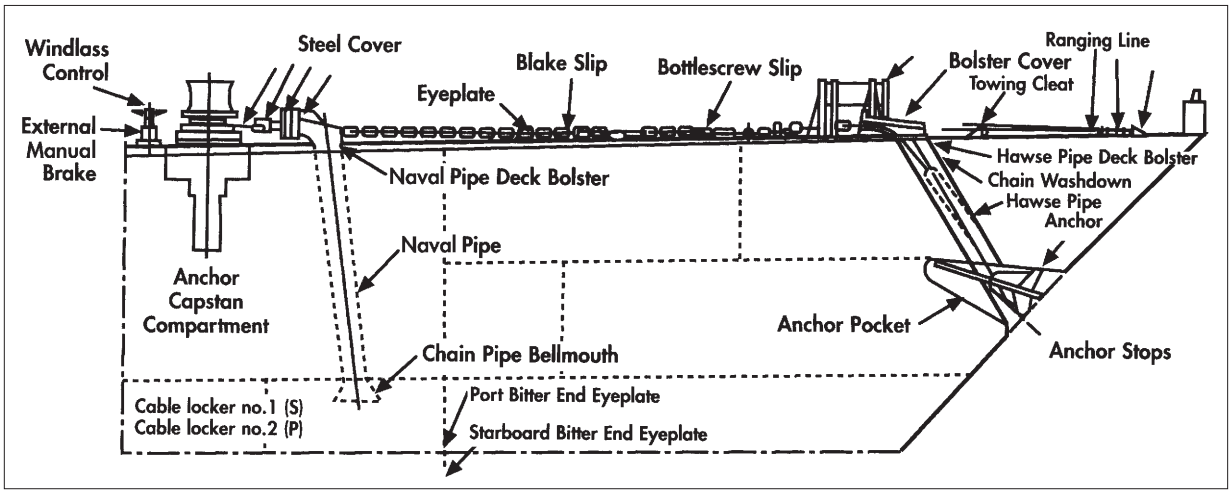


Figure 7.14-2 - HALIFAX Class Anchor and Cable Arrangement (Side View)

c. **Equipment Layout–Rigging the Chains – Anchor Platform.**

(**1**) The chains can be rigged on the port or starboard side of the focsle. The choice will depend on the prevailing weather.

(**2**) The outboard eyeplate is secured to the fixed eyepad (No.5 stbd, No.6 port) on the deck edge.

(**3**) The chain platform is lowered so that it is outboard of the guardrails.

(**4**) The two strong backs are secured to the platform at one end, and to the reversible eyepads on the other (No.3&No.7 starboard, No.4&No.6 port).

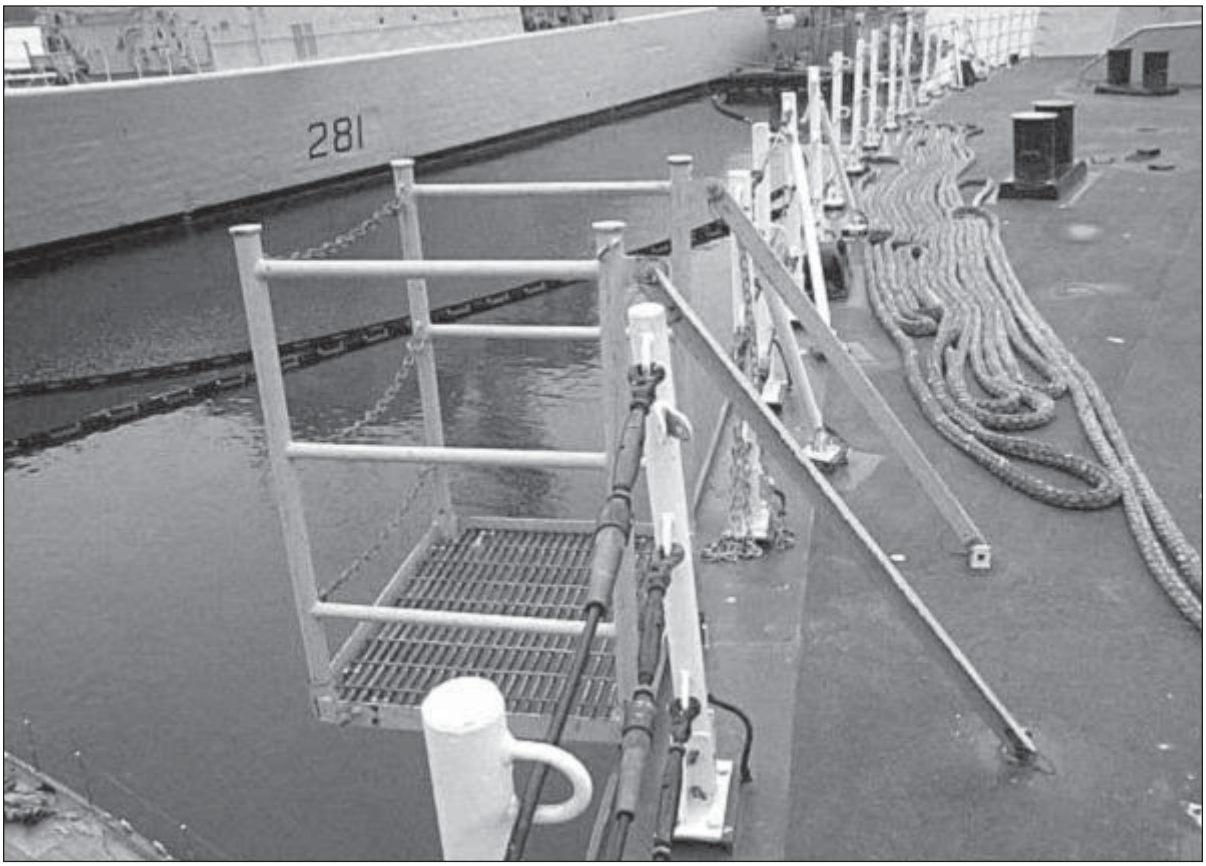


Figure 7.14-3 - Chain Platform HALIFAX Class

d. **Anchor Windlass/Capstan.** An electric vertical shaft combined windlass/capstan is fitted on the focsle forward of the gun and starboard of the centreline for anchor cable and line handling. The capstan is independently clutched and braked and is capable of handling lines of up to 56 mm diameter.

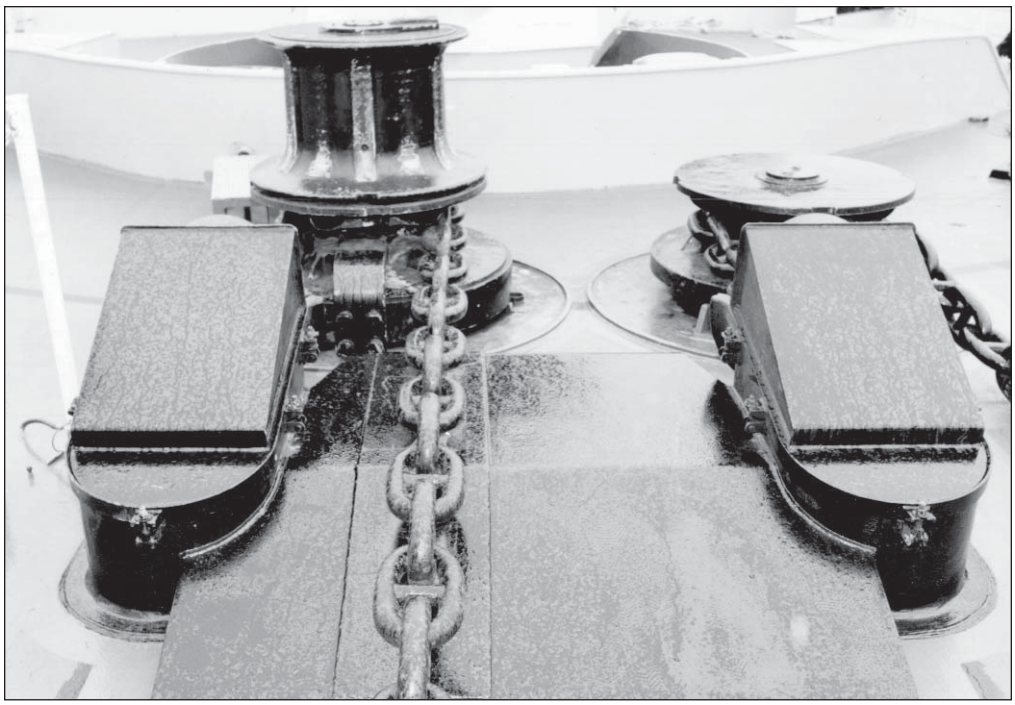


Figure 7.14-4 - HALIFAX Class Forward Capstan Arrangement

The common control console is a pedestal type and is of watertight construction.

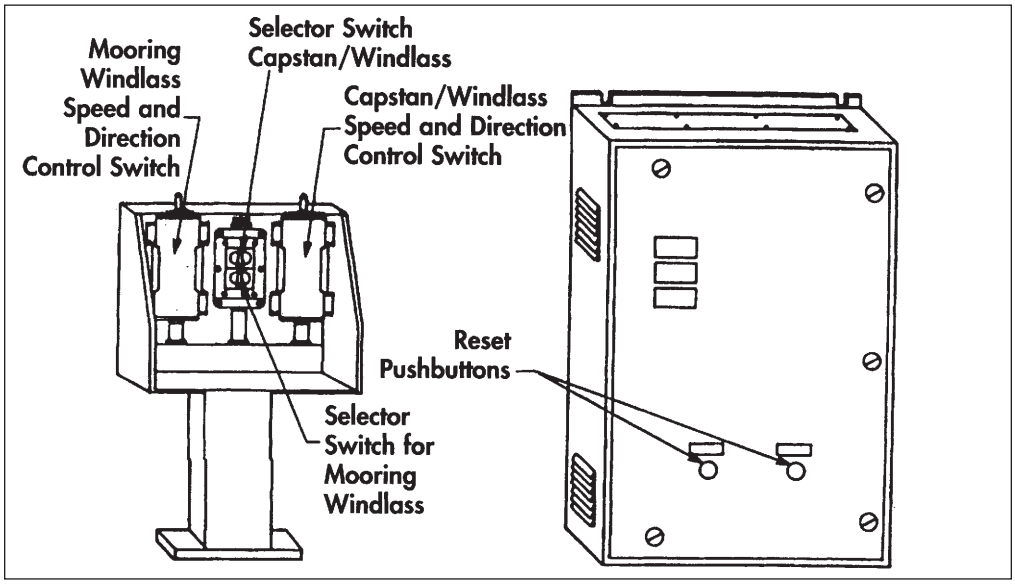


Figure 7.14-5 - Control Console and Motor Controller

e. **Preparations for Anchoring**

(**1**) The grate may be removed from the hawse pipe.

(**2**) Ensure the brake is on.

(**3**) In order to ensure that there is sufficient power available to start the windlass, permission must first be obtained from the Engineering Officer of the Watch in the Machinery Control Room. Once done, apply power and engage the clutch.

(**4**) Remove the bottlescrew and Blake slips in that order. A cable jack will be required to raise the cable sufficiently high enough to remove the slips.

(**5**) The brake is released and the cable veered far enough to ensure that the anchor is free in the pocket, or at a'cockbill(4 to 6 links).

(**6**) The brake is then reapplied, the Blake slip is put on, and the clutch disengaged. The anchor is now ready for "Letting Go".

f. **Preparation and Procedure for Weighing Anchor**

(**1**) The chains are manned.

(**2**) A fire hose is laid out and charged.

(**3**) Power is applied to the windlass. Concurrently, the automatic anchor wash is activated (valve located in No.1 rope stores).

(**4**) The cable is heaved in until the anchor is home and strain comes on the cable.

(**5**) The brake is applied and the Blake and bottlescrew slips secured to the cable. The bottlescrew slip is then tightened down in order to prevent the anchor from banging in the anchor pocket.

Note.

The flukes must trip aft as the shank approaches and enters the hawse pipe or the anchor will not seat in the anchor pocket. If the flukes have not tripped, veer the anchor to the water and allow the force of the water to trip the flukes; another option is to let the anchor go to half shackle.

7.14.2 Coming to A Buoy

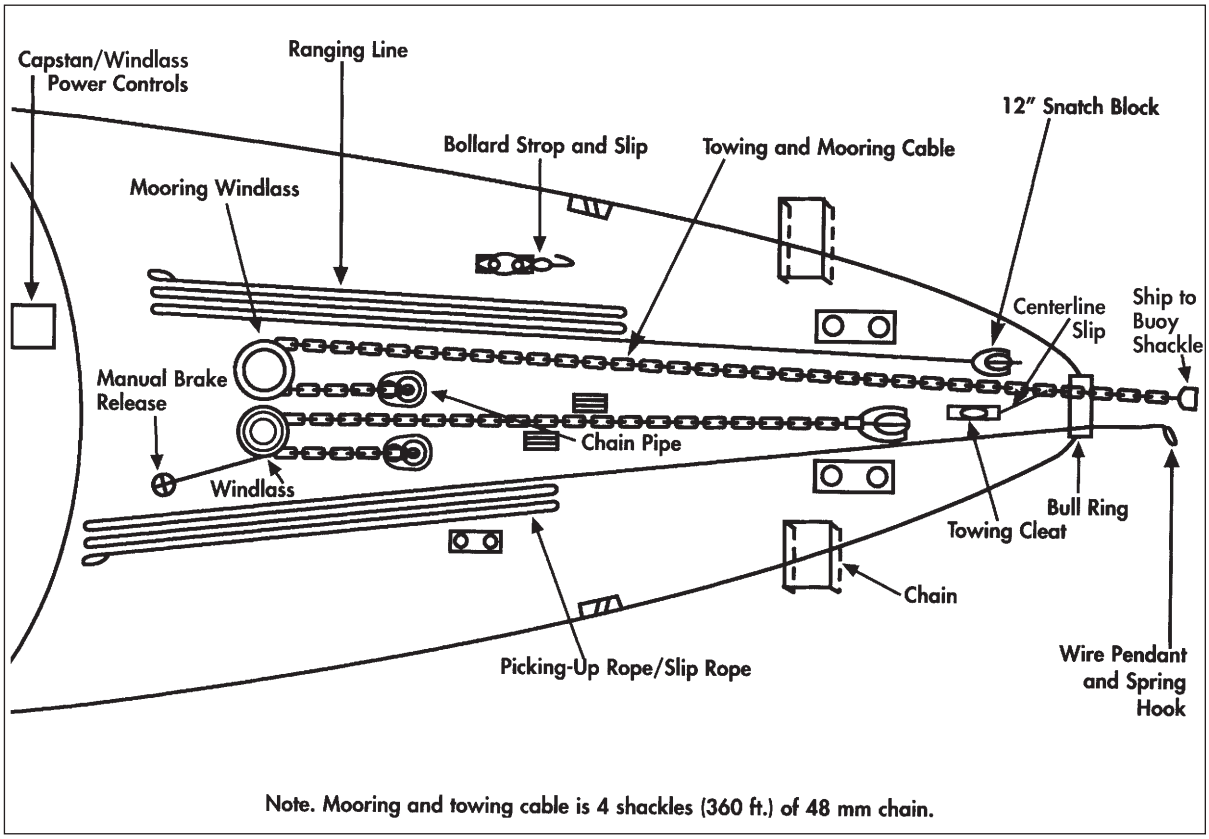


Figure 7.14-6 - HALIFAX Class Mooring Arrangement

a. **Preparation and Equipment Layout – Hanging Judas Method.**

(**1**) Check the power supply, and then apply power to the mooring windlass. Disconnect Port cable.

(**2**) Secure a 12 inch ranging snatch block with a 3/4" shackle to eyepad No.2 on the focsle.

(**3**) Tie the ranging line to the cable with a bowline and reeve it through the ranging snatch block.

(**4**) Simultaneously veer the cable and heave in on the ranging line until sufficient cable is ranged out on deck to allow for the ship-to-buoy shackle to hang 4 - 6 out clear of the bullring. Apply the brake.

(**5**) Attach the ship-to-buoy shackle to the end of the mooring cable.

(**6**) Tie an eight-foot tag line to the cable approximately 6 - 8 links up from the ship-to-buoy shackle to assist the buoy jumpers in retrieving the ship-to-buoy shackle once on the buoy.

(**7**) Fake the picking-up rope fore and aft along the starboard side ready for use. Pass the outboard end through the angel fairlead such that the wire strop and snap hook are outboard of the angel fairlead.

(**8**) Secure a messenger to the wire strop over the guardrail and fake on deck.

(**9**) Using bullropes and the tag line, heave the ship-to-buoy shackle forward and through the bullring, and lower the cable, so that it is suspended 1 - 2 metres above the waterline.

b. **Preparation and Equipment Layout – Roller Shackle Method**

(**1**) The foul weather alternate method is to use a roller shackle to lower the ship-to-buoy shackle and cable down the picking-up rope.

(**2**) Following the above procedures, range out sufficient mooring cable to allow for six to ten links to pass outside the bullring.

(**3**) Attach the ship-to-buoy shackle to the end of the cable.

(**4**) Fake the picking-up rope fore and aft along the starboard side of the focsle.

(**5**) Pass the picking-up rope through the angel fairlead so that the wire strop and snap hook are outboard of the angel fairlead. A bight of line is brought back through the bullring.

(**6**) The cable is secured to the picking-up rope with a roller shackle. This should be done approximately eight links back from the ship-to-buoy shackle in such a way that the roller shackle will be allowed to ride freely on the picking-up rope.

c. **Slipping from a Buoy**

(**1**) Rig a bollard strop and senhouse slip onto the forward bollard on the port side.

(**2**) Fake out the slip rope fore and aft on the starboard side inboard to outboard so that the soft eye can be led out through forward fairlead on the starboard side, down through the buoy shackle, and back up through the forward fairlead on the port side, where it is secured to the senhouse slip.

7.14.3 Mediterranean Mooring

a. **General.** Shiphandling when conducting a Med Mooring in HALIFAX Class ships is made more difficult because of the single anchor arrangement, which limits the amount of control the Captain has over the movement of the bow during the sternboard approach to the jetty. In addition, visual appreciation of distance to the jetty astern is very poor due to the flair of the hangar wings. Therefore, it is recommended that the Command Position be re-located aft to the flight deck or the hangar top, with the Executive Officer remaining on the bridge. Conversely, the Executive Officer can proceed aft, and pass conning recommendations via radio to the Captain on the bridge.

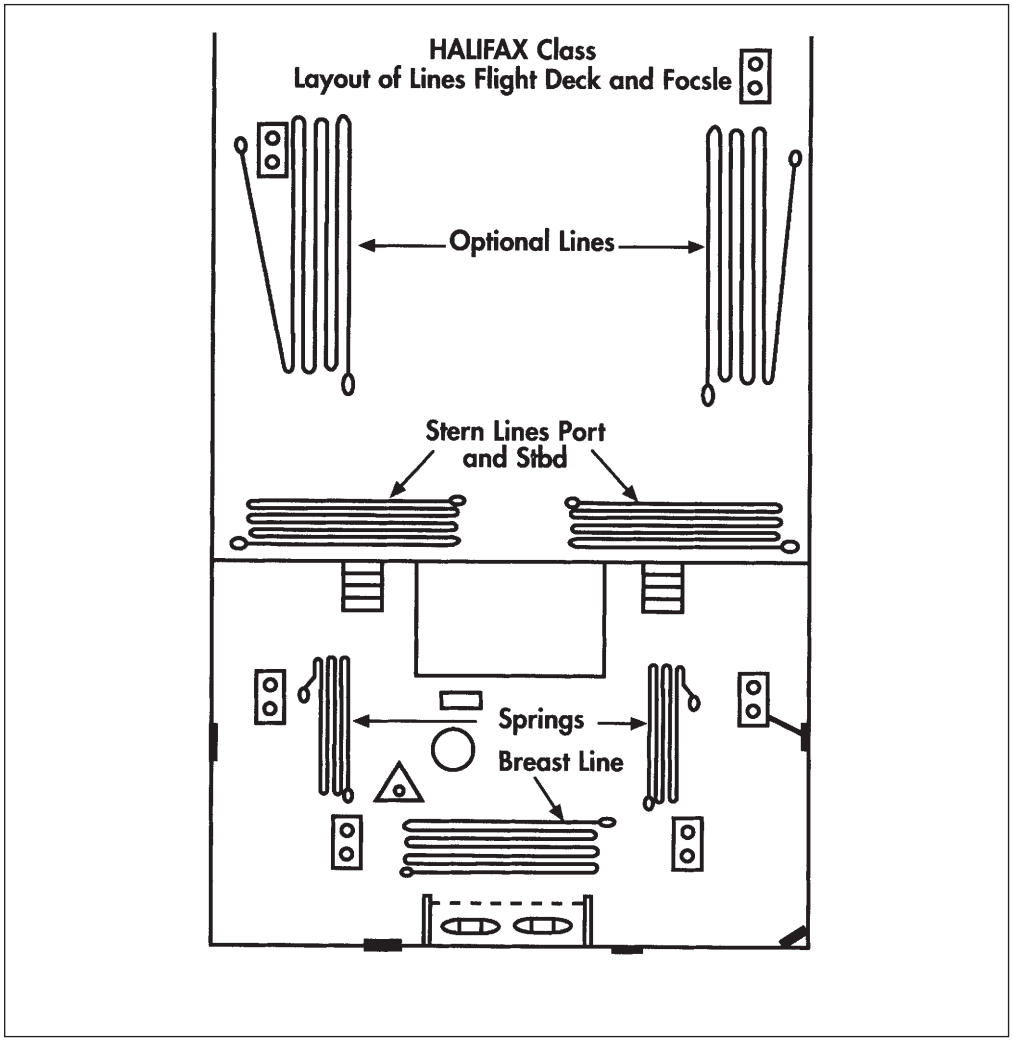


Figure 7.14-7 - HALIFAX Class Mediterranean Mooring Layout

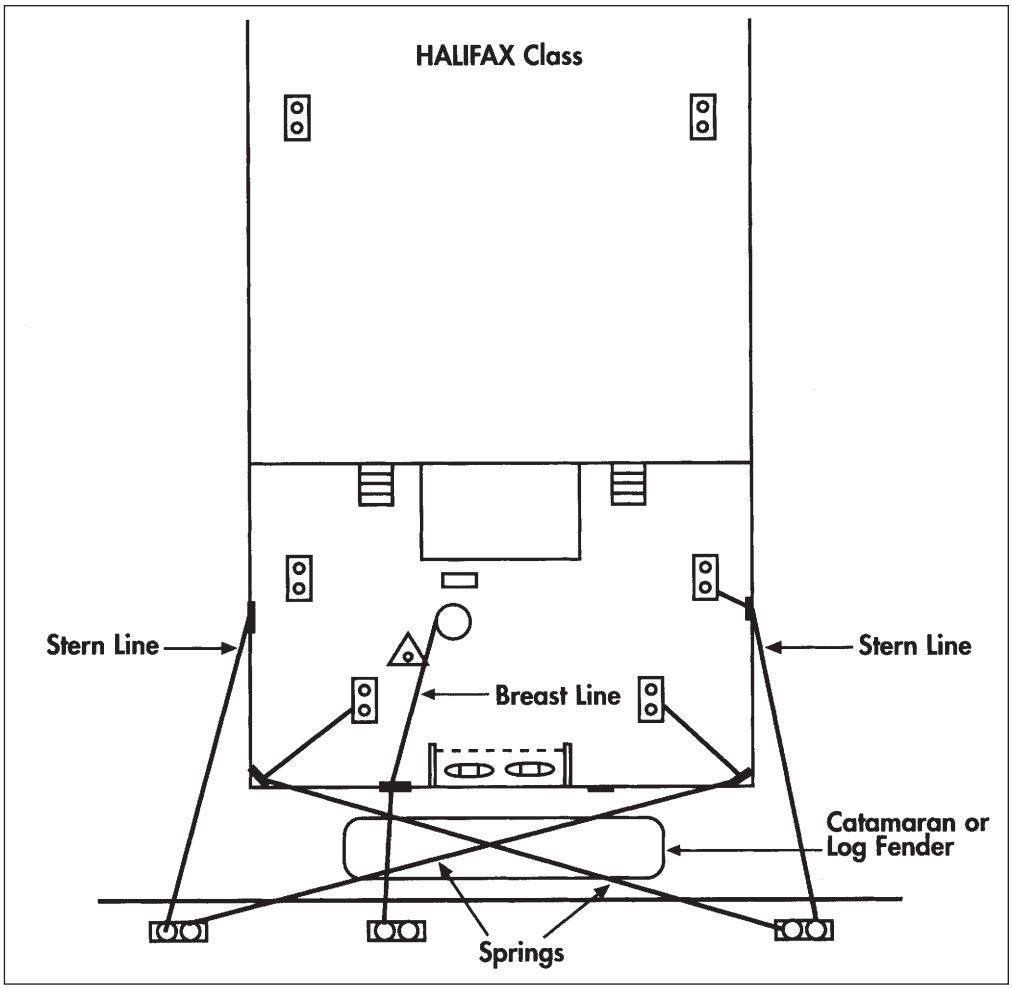


Figure 7.14-8 - HALIFAX Class Mediterranean Mooring Arrangement

b. **Equipment Preparation and Layout**

(**1**) The focsle is prepared for coming to anchor. If berthing in a nest, hawsers will be required between focsles.

(**2**) Two hawsers are faked out on the after end of the flight deck, two hawsers are faked down fore and aft on the quarter deck, and one line is faked athwartships on the Quarter Deck. If additional springs or breast lines to adjacent ships in a nest are required, two additional hawsers may be laid out on the forward end of the flight deck just aft of the bollards.

(**3**) Depending on the intended location of the brow, remove either one of the .50-calibre HMG mountings on the Quarterdeck, or one of the life rafts adjacent to the ensign staff. This will allow room for the brow.

(**4**) The anchor is let go as per normal circumstances, the intent being to lay it evenly on the seabed as the ship backs toward the jetty.

(**5**) A stern line is taken to the jetty and is heaved in so as to hold the stern onto the jetty.

(**6**) The two lines on the Quarterdeck are passed out the quarter fairleads and crossed as springs to prevent side to side movement. The two lines on the after end of the flight deck are passed to the jetty to assist in holding the stern to the jetty.

7.15 AOR 509 Class

7.15.1 Anchoring and Weighing Anchor

General

a. PROTECTEUR (509) is fitted with a Guillotine system. The class is fitted with two marine fluked stockless anchors.

b. The cable locker is divided into port and starboard compartments. The port anchor cable is ten shackles in length, while the starboard anchor is eleven shackles long.

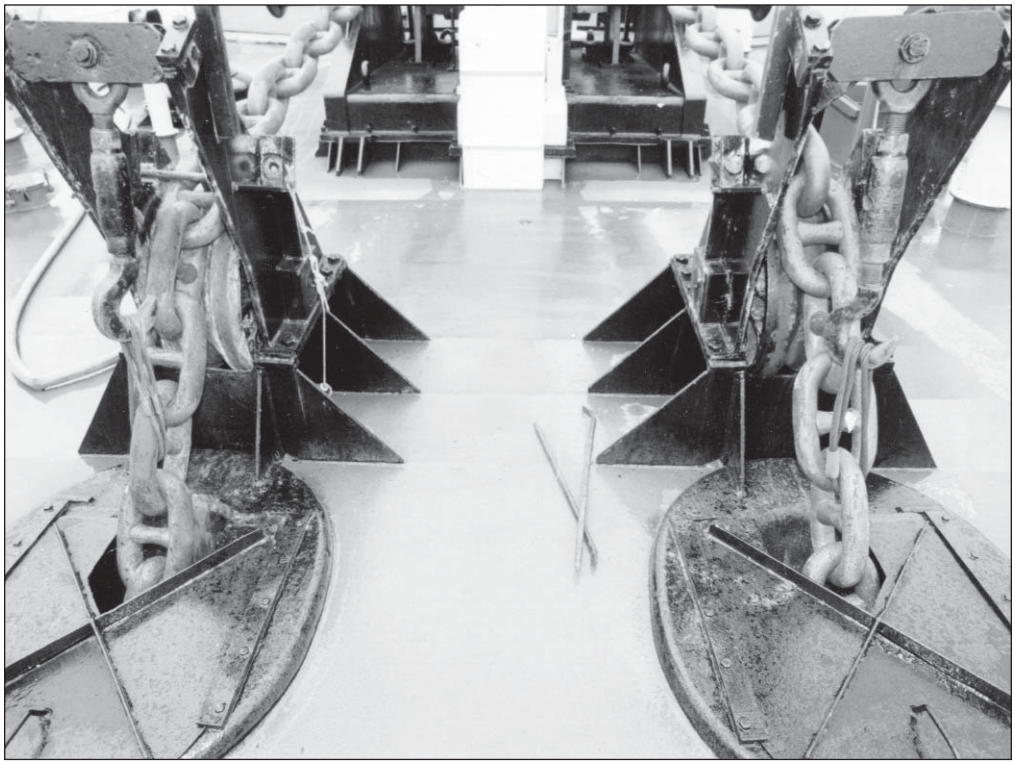


Figure 7.15-1 - AOR 509-Roller, Bottlescrew and Hook

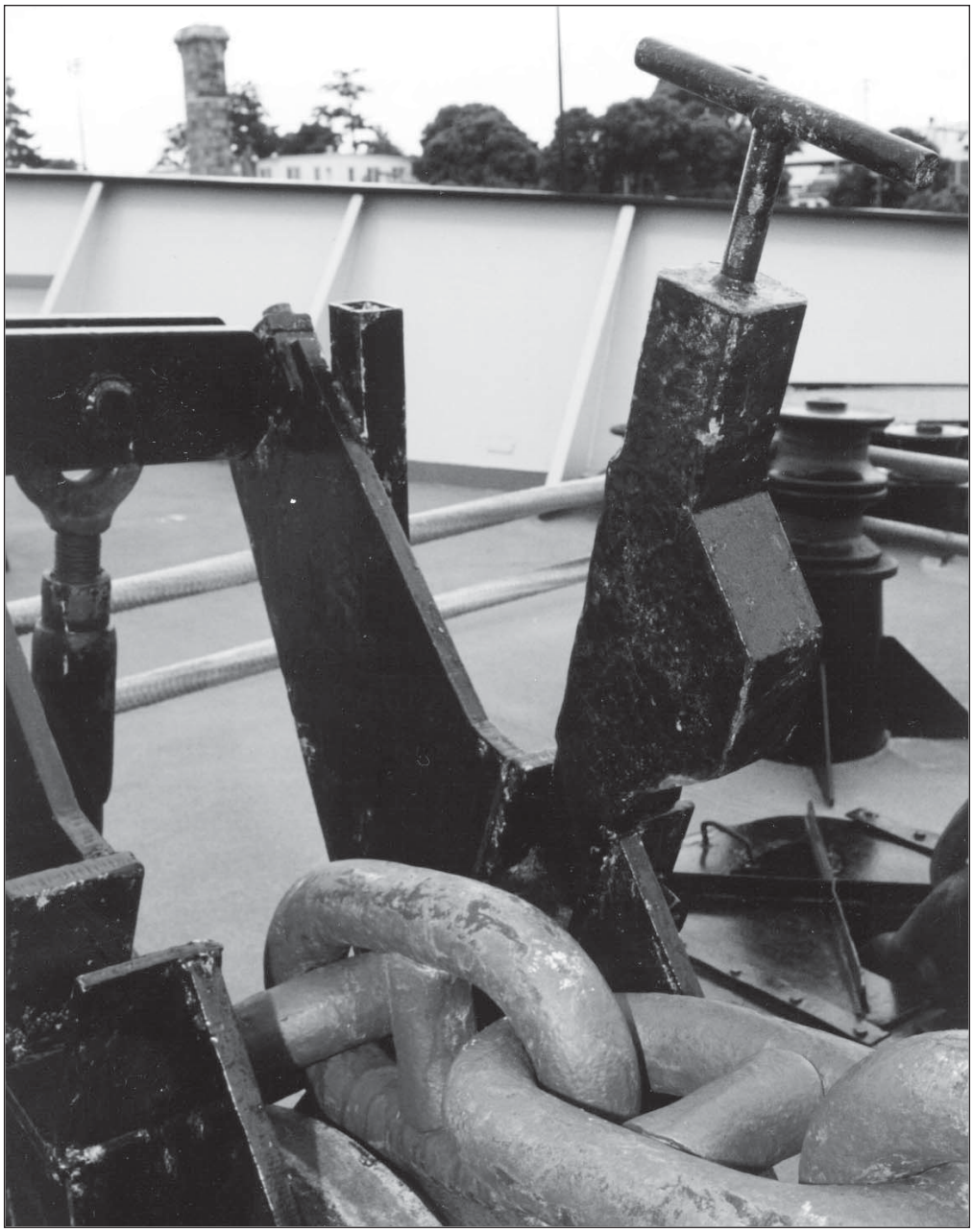


Figure 7.15-2 - AOR 509 Guillotine

c. **Preparation and Equipment Layout**

(**1**) Ensure the brake is on.

(**2**) Apply power to the windlass and engage the clutch.

(**3**) Remove the hawse pipe covers and the sea lashings on the bottle-screw slip. Using a tommy bar, remove the bottle-screw slip.

(**4**) Remove the blake slip/guillotine, release the brake, and veer the cable until the anchor is free of the pocket or a'cockbill.

(**5**) The brake is then re-applied, the blake slip/guillotine put on, and the clutch disengaged. The anchor is now ready for "Letting Go". (See Sequence of Events - 7.6-4.)

Note.

Guillotine not required to be removed when weighing anchor.

d. **Preparation and Procedure for Weighing Anchor.**

(**1**) A fire hose is laid out and charged.

(**2**) Power is applied to the windlass, and the clutch engaged. Concurrently, the anchor wash is activated (valve located Forward Bosn's workshop).

(**3**) Remove the blake slip/guillotine.

(**4**) The cable is heaved in until the anchor is home and strain comes on the cable.

(**5**) The brake is applied and the blake and bottlescrew slips secured to the cable.

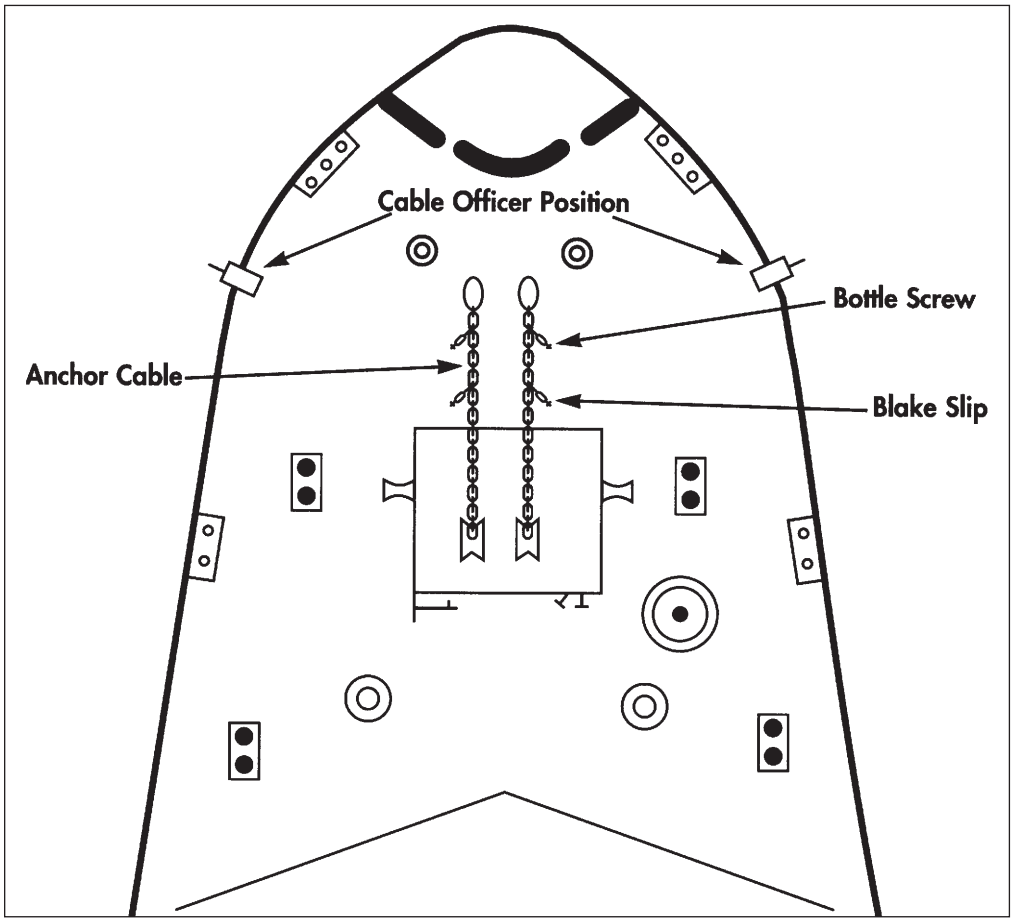


Figure 7.15-3 AOR Weighing Anchor

7.15.2 Catting the Anchor: AOR 509 Class

a. **General.** In order for 509 Class ships to come to a buoy, the anchor on the working cable must first be "catted". This is a lengthy evolution, and one that occurs rarely. Essentially, catting the anchor means the anchor is hanging by the catting necklace so that the cable can be broken and used as a mooring cable. In all other classes, this is unnecessary as Blake and bottlescrew slips hold the anchor in place, while the broken cable is led forward through the bullring.

b. **Equipment Preparation, Layout and Sequence of Events.**

(**1**) As this is a unique seamanship evolution, there are some pieces of equipment not normally seen. A complete list of equipment required follows.

Table 5 Equipment–Catting the Anchor

Catting Pendant	Cable Bag
Catting Necklace	Carpenter Stopper
Shepherd's Hook	Wire Strop Bullropes
Bollard Strop with Blake Slip	Shot Mats

(**2**) Secure the catting necklace to the after eyepad, below the Berger fairlead.

(**3**) Pass the catting pendant through the Berger fairlead from outboard to inboard. Ensure the catting pendant and the picking-up rope are faked down well clear of the working area.

(**4**) Attach a wire strop to the end of the catting pendant.

(**5**) After the boat has been launched, lower the anchor under power until the anchor ring is approximately four feet above the waterline.

(**6**) Lower the catting pendant to the waterline, and bring the boat alongside.

(**7**) The boat's crew attaches the catting strop to the anchor ring. The boat then stands off clear of the area.

(**8**) Slack is taken out of the catting pendant by hand and lead around the top forward deadhead, and aft to the warping drum. Twelve turns are placed on the drum. The pendant is then passed around the after deadhead and backed up by ten personnel who are positioned along the breakwater. The anchor is now ready to be catted.

(**9**) Engage the windlass, release the brake, and veer the anchor cable. This will result in the catting pendant being heaved in, thereby raising the anchor. The warping drum turns in an opposite direction to the gypsy for just this purpose.

(**10**) Just before the fitting on the end of the pendant reaches the Berger fairlead, the order "Avast" is given and the brake is applied.

(**11**) Pass the necklace through the anchor ring by lowering the attached line through the anchor ring and then hooking it with a shepherd's hook and pulling it up. Secure the necklace to the forward padeye below the Berger fairlead.

(**12**) The brake is released and the cable is heaved in. Concurrently, the catting pendant is veered until all weight is on the necklace.

(**13**) The brake is re-applied and the bottlescrew slip secured to the cable. The catting pendant is transferred from the warping drum to the after bollard, with all slack removed.

(**14**) The brake is released and the cable is veered (bullropes will be required) until the joining shackle reaches the shot mat.

(**15**) The brake is re-applied. The cable is now ready to be broken in preparation for coming to a buoy.

c. **Recovering The Anchor**

(**1**) Release the brake, and heave in on the ship's cable until the end with the joining shackle is on deck over the shot mat. Re-apply the brake and remove the ship-to-buoy shackle in preparation for re-attaching the two ends of the anchor cable. Ensure that the anchor cable has no twists.

(**2**) Release the brake, and heave in, so as to take the slack out of the cable aft of the bottlescrew slip. Re-apply the brake.

(**3**) Transfer the catting pendant from the bollard to the warping drum. (Same procedure as for raising the anchor).

(**4**) Release the brake and veer the anchor cable so that the catting pendant is heaved in. Continue until the weight is off the necklace.

(**5**) Apply the brake and slip the necklace.

(**6**) Release the brake and heave in on the anchor cable so that the catting pendant is veered. Lower the anchor to approximately four feet above the water line. Re-apply the brake.

(**7**) Bring the boat alongside so that the boat's crew can remove the catting strop from the anchor ring.

(**8**) Remove the catting pendant and strop and secure the gear. Bring the anchor home using standard procedures and secure for sea.

Note.

If a power loss occurs at any time during this evolution, a carpenter stopper will be required on the catting pendant, with the chain bridle being secured to the after Pedestal Fairlead.

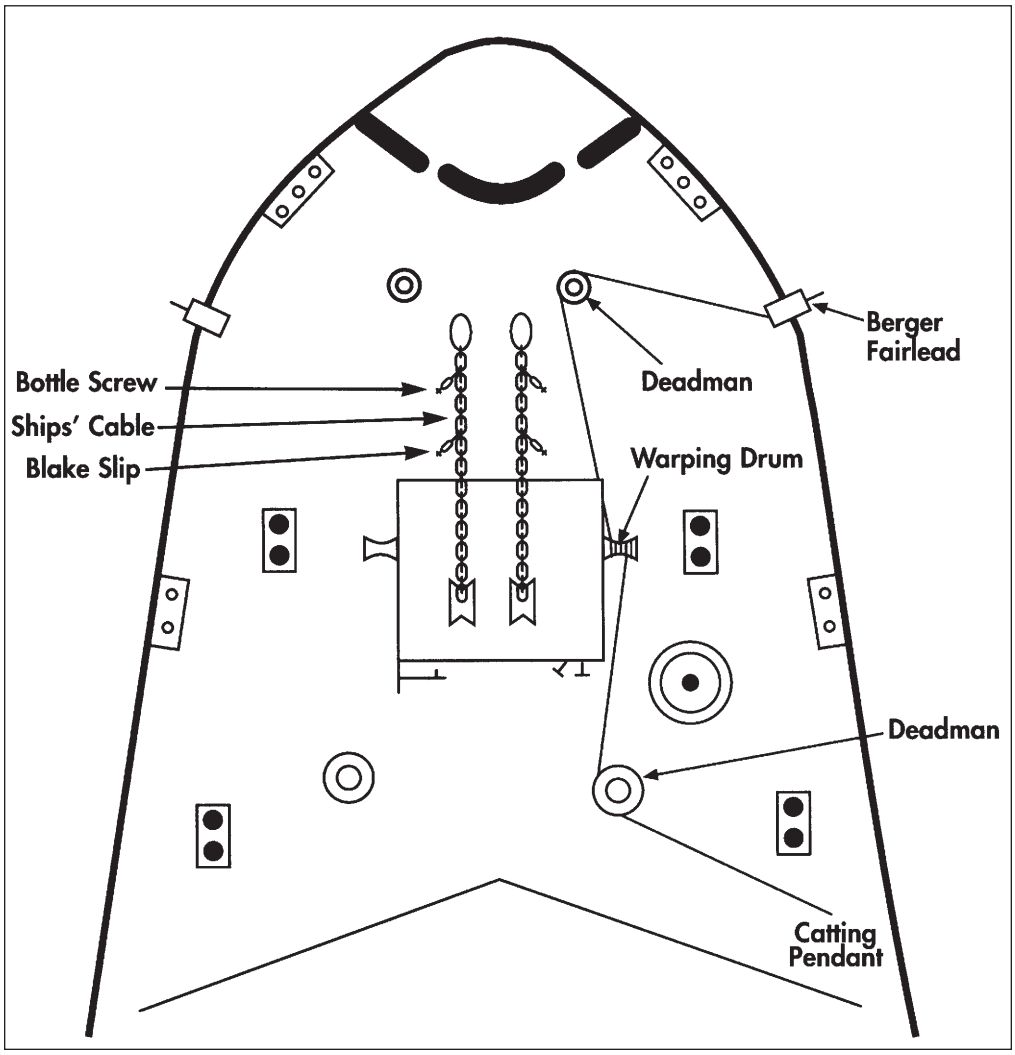


Figure 7.15-4 Catting the Anchor – AOR 509 Class

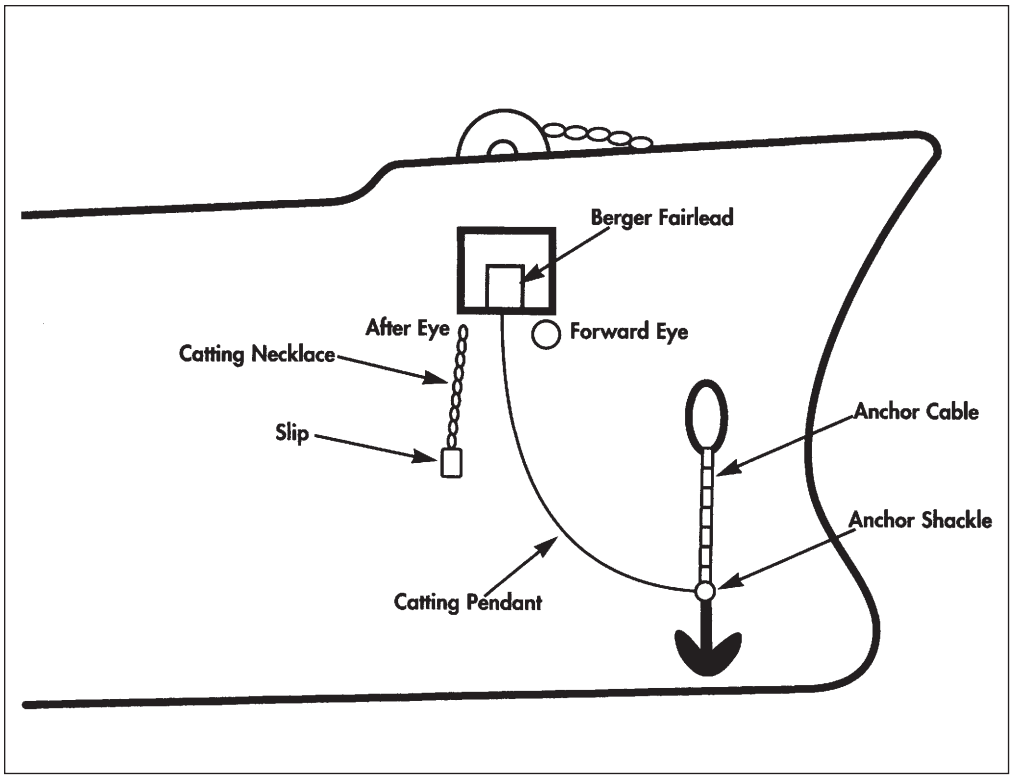


Figure 7.15-5 Catting the Anchor

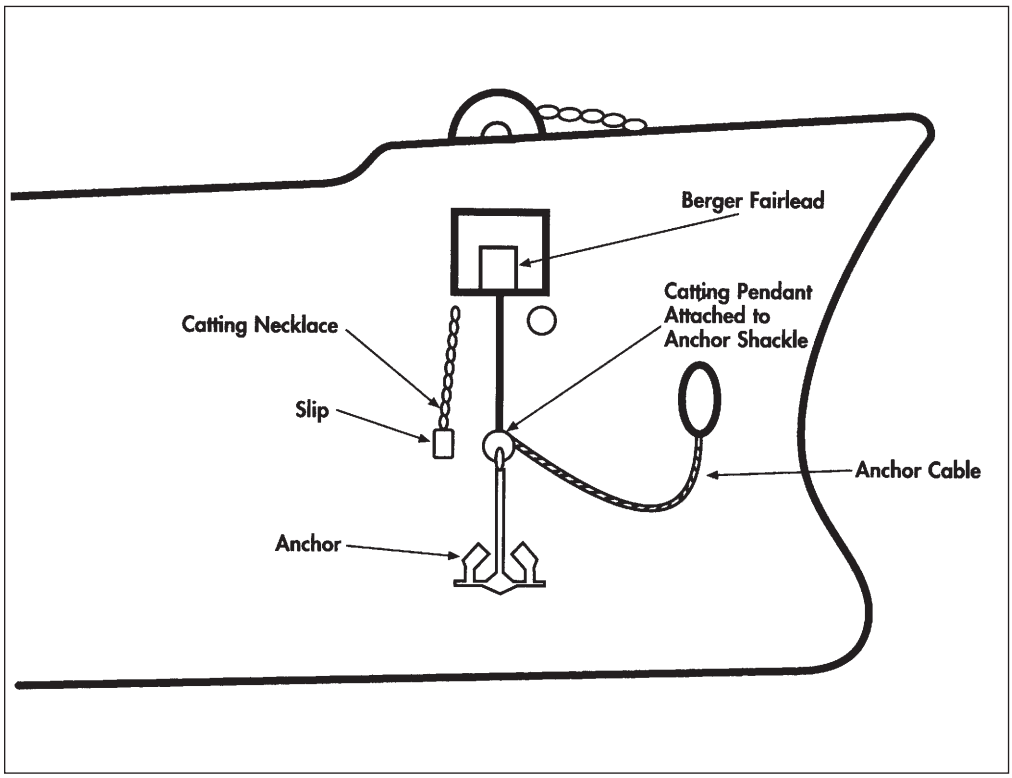


Figure 7.15-6 Catting the Anchor

7.15.3 Coming to a Buoy: AOR 509/510

a. Equipment Preparation and Layout - Hanging Judas

(**1**) In preparation for coming to a buoy, it is first necessary to cat the anchor following the procedures described in article 7.15.2.

(**2**) Once the anchor has been catted, a ship-to-buoy shackle is fitted to the outboard end of the mooring cable (either port or starboard). A 30-foot length of one-inch line is attached to the ship-to-buoy shackle as a tag line to assist the buoy jumpers.

(**3**) The picking-up rope is faked down fore and aft alongside the windlass on the working cable side of the focsle.

(**4**) The light messenger is faked down fore and aft outboard of the picking-up rope with the outboard end led out through the forward roller fairlead.

(**5**) With the clutch engaged, release the brake and veer sufficient cable to feed it down the hawsepipe until the ship-to-buoy shackle is suspended approximately six feet above the waterline. Re-apply the brake.

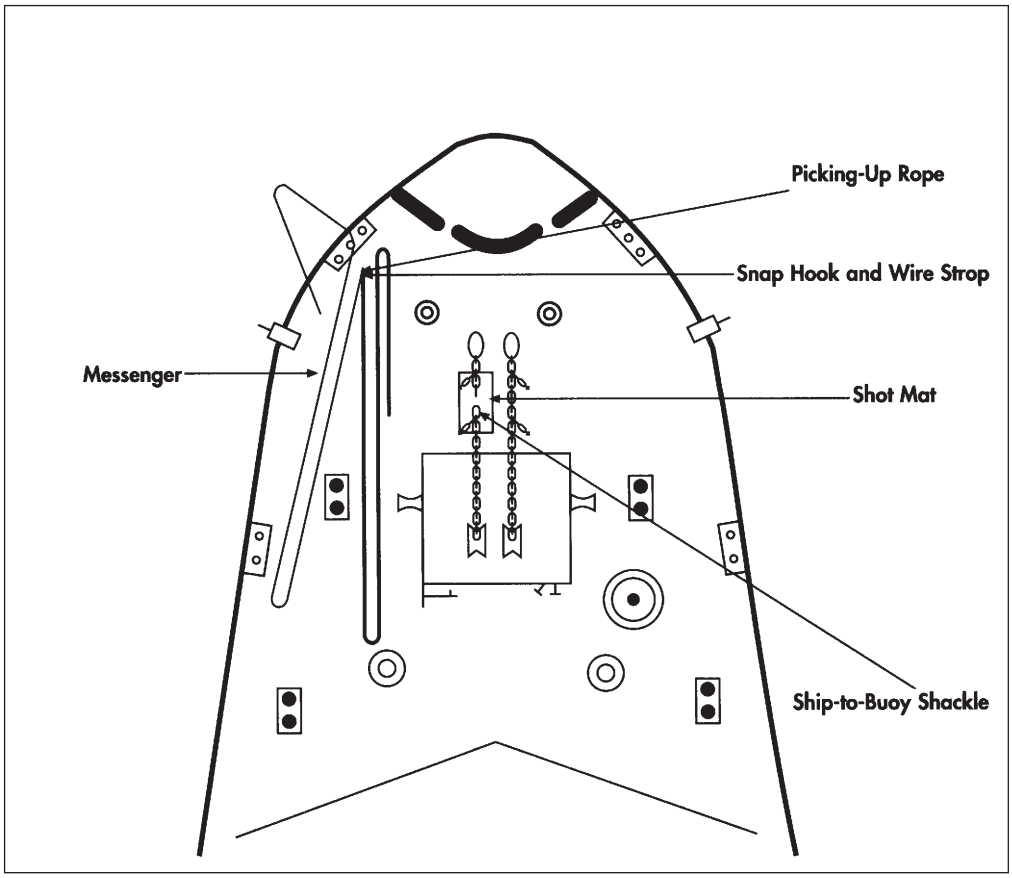


Figure 7.15-7 - Layout Coming to a Buoy – AOR 509/510 Class

b. **Slipping from a Buoy**

(**1**) Rig a bollard strop and senhouse slip onto the forward bollard on the port side. Fake out a slip rope fore and aft on the starboard side inboard to outboard, so that the soft eye is led out through the starboard roller fairlead to the buoy and up through the port roller fairlead.

(**2**) Once the buoy has been slipped, the anchor will have to be uncatted.

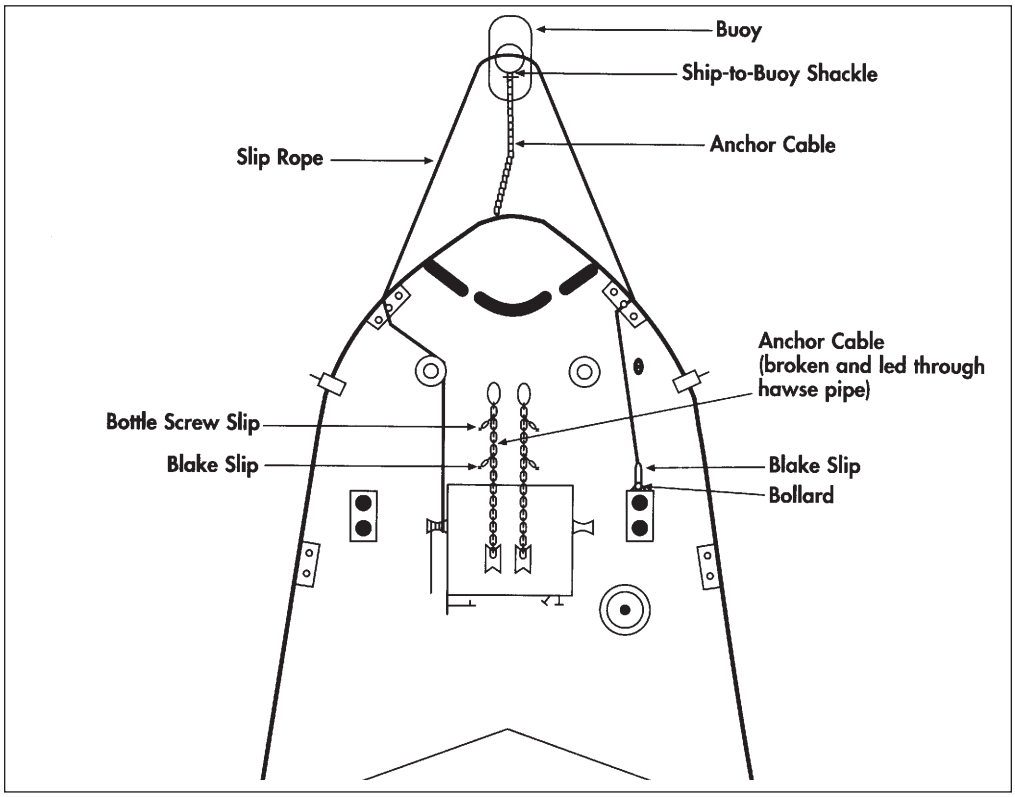


Figure 7.15-8 - Layout for Slipping from a Buoy–AOR 509/510 Class

7.15.4 Mediterranean Mooring

a. Shiphandling when conducting a Med mooring in an AOR is very difficult due to the limited manoeuvrability of the ship. The single screw arrangement, coupled with the high freeboard (and the absence of a bow thruster in the 508 Class) make the ship highly susceptible to wind when manoeuvring. Tugs will definitely be required as the ship twists towards the second anchorage, and then conducts the sternboard approach to the jetty.

b. **Equipment Preparation and Layout**

(**1**) The focsle is prepared for coming to anchor. Both anchors will be required. If berthing in a nest, hawsers will also be required between focsles.

(**2**) The RIB is made ready for launch in the event that it is intended to pass the messenger for the first sternline ashore by boat vice heaving line.

(**3**) A jumping ladder is rigged in preparation for embarking a harbour pilot.

(**4**) Three hawsers are brought up to the Quarterdeck. Two are faked down fore and aft forward of the port and starboard towing fairleads. Once passed to the jetty, they will be crossed to prevent side to side movement of the ship. The third hawser is faked down athwartships forward of the after centreline fairlead. It will be the first line ashore and will provide a direct lead to the jetty to assist in holding the stern in.

(**5**) Two hawsers are faked down fore and aft at the port and starboard fairleads aft of the breezeways to be used as breasts.

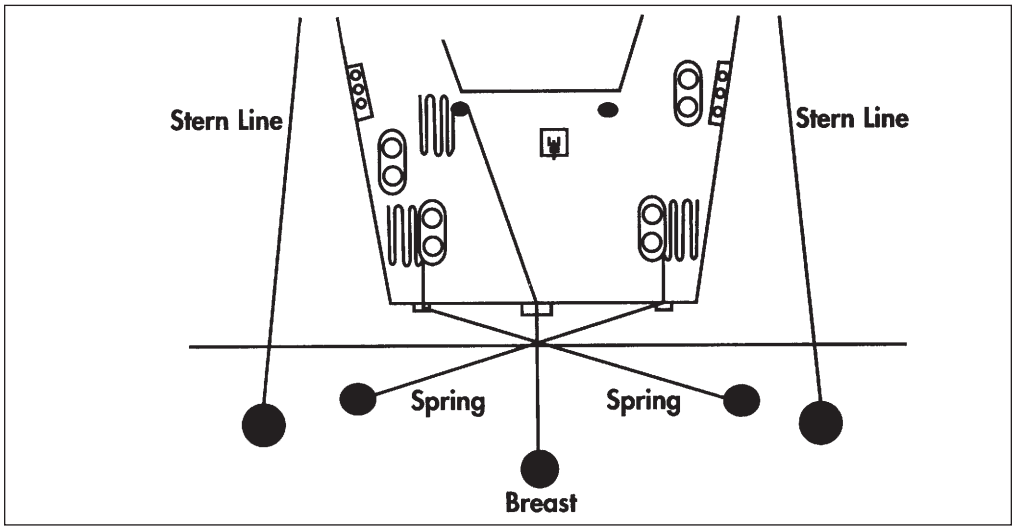


Figure 7.15-9 - Mediterranean Mooring Layout – AOR 509/510 Class

7.16 KINGSTON Class

7.16.1 Anchoring and Weighing Anchor

General. KINGSTON Class ships are fitted with two items of cable gear that are unique in the Canadian Navy-the Roller Bow Stopper and the Devil's Claw

a. **Roller Bow Stopper.** There is no Blake slip in the KINGSTON Class. Its function is replaced by the roller bow stopper. The cable rides through the roller bow stopper prior to entering the hawse pipe. The Stopper is engaged in order to hold the cable fast. This is achieved by the tongue of the Stopper resting on the horizontal link and pressing against a vertical link.

b. **Devil's Claw.** This is a two-pronged claw attached to a bottlescrew which grasps the vertical links. Its function is the same as the bottlescrew slips on larger warships.

Figure 7.16-1 – Anchor and Cable Arrangements – KINGSTON Class

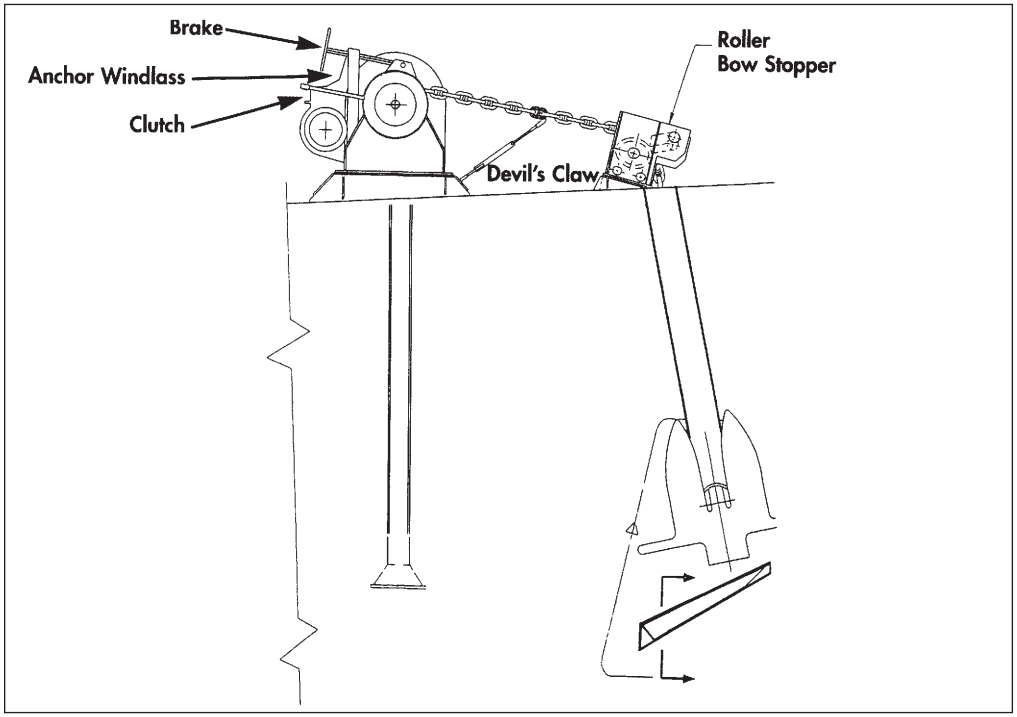


Figure 7.16-2 - Devil's Claw Arrangement

c. **Personnel Requirements**

(**1**) Safety Officer
(**2**) I/C
(**3**) Brake Operator
(**4**) Cable workers

d. **Equipment Preparation, Layout and Sequence of Events**

(**1**) Establish communications with Command via the Deck/Weapons Net.
(**2**) In order to ensure that there is sufficient power (600v) available to start the windlass, permission must first be obtained from the Engineering Officer of the Watch. Once done, apply power, engage the clutch and veer anchor A'cockbill.
(**3**) Clear away both anchors by removing the devil's claw.
(**4**) Remove the roller bow stopper on the working cable.

Note.

On closing up, the I/C must ensure that the roller bow stopper is not locked. If there is too much weight riding on the roller bow stopper, it becomes locked and the tongue will not release.

(**5**) The brake and roller bow stopper are then re-applied, and the clutch is disengaged.
(**6**) The I/C reports to Command: "Bridge focsle, both anchors cleared away, port/stbd anchor a'cockbill riding on brake and roller bow stopper."
(**7**) At "Stand By", or when ordered by Command, the roller bow stopper is removed.

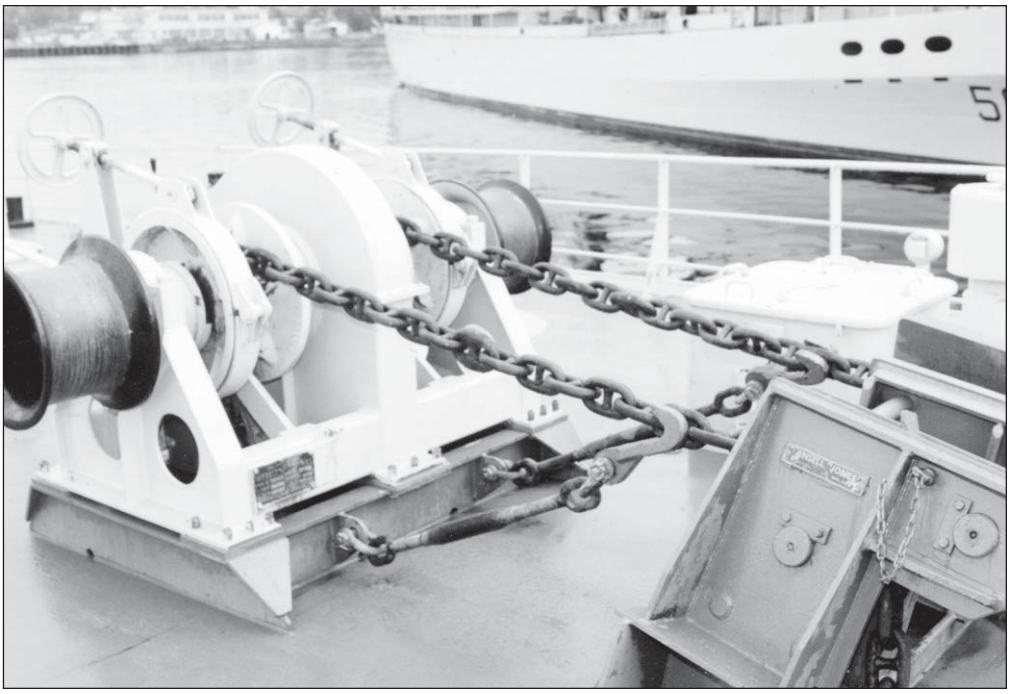


Figure 7.16-3 - Cable Arrangement – KINGSTON Class

e. **Weighing Anchor**

(**1**) Power is applied to the windlass and the clutch engaged (ensure that 600v power is available).

(**2**) The anchor wash system is activated by opening the valve in rope stores.

(**3**) The cable is heaved in until the anchor is home.

(**4**) The brake is applied and the roller bow stopper and devil's claw secured to the cable.

(**5**) Cable wash is turned off.

7.16.2 Coming to a Buoy

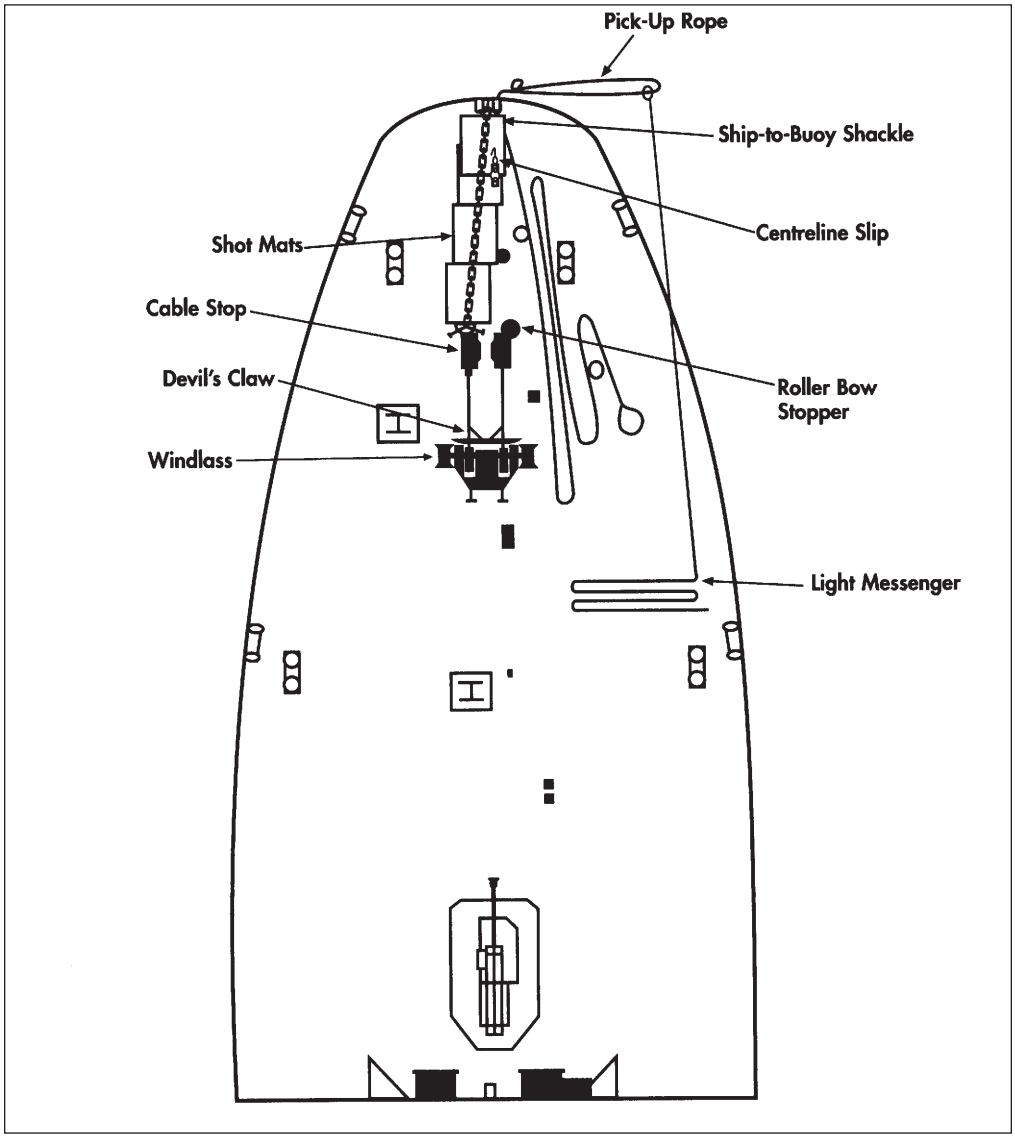


Figure 7.16-4 - KINGSTON Class Coming to a Buoy Equipment Layout

Preparation and Equipment Layout

(**1**) In order to ensure that there is sufficient power (600v) available to start the windlass, permission is obtained from the Engineering Officer of the Watch. Once done, power is applied and the clutch engaged.

(**2**) The blake slip is secured to the centreline deck clench.

(**3**) Shot mats are placed on the deck from the centerline deck clench forward to the bullring and under the Devil's Claws, in order to protect the deck.

(**4**) The brake is released and the mooring cable veered until the joining shackle is on deck. The brake is re-applied.

(**5**) The mooring cable is broken at the joining shackle.

(**6**) The brake is released and bullropes are used to assist in ranging sufficient cable out on deck to allow for the ship-to-buoy shackle to hang 4-6 feet above the waterline once it is passed through the bullring (Hanging Judas). The brake is re-applied.

(**7**) The ship-to-buoy shackle is secured to the end of the mooring cable with a lugless joining shackle.

(**8**) A four-foot tag line is attached to the cable 4 links inboard from the ship-to-buoy shackle.

(**9**) The brake is released. Using bullropes and the tag line, the ship-to-buoy shackle is heaved forward and through the bullring, and lowered so that the cable is riding on the brake, suspended 4-6 feet above the waterline. Note: positive control of the cable must be maintained.

(**10**) The picking-up rope is faked down fore and aft on the starboard side of the focsle. The outboard end is passed through the bullring such that the wire strop and snap hook are outside of the bullring.

(**11**) The light messenger is faked down athwartships on the starboard side of the focsle and tied on to the picking-up rope

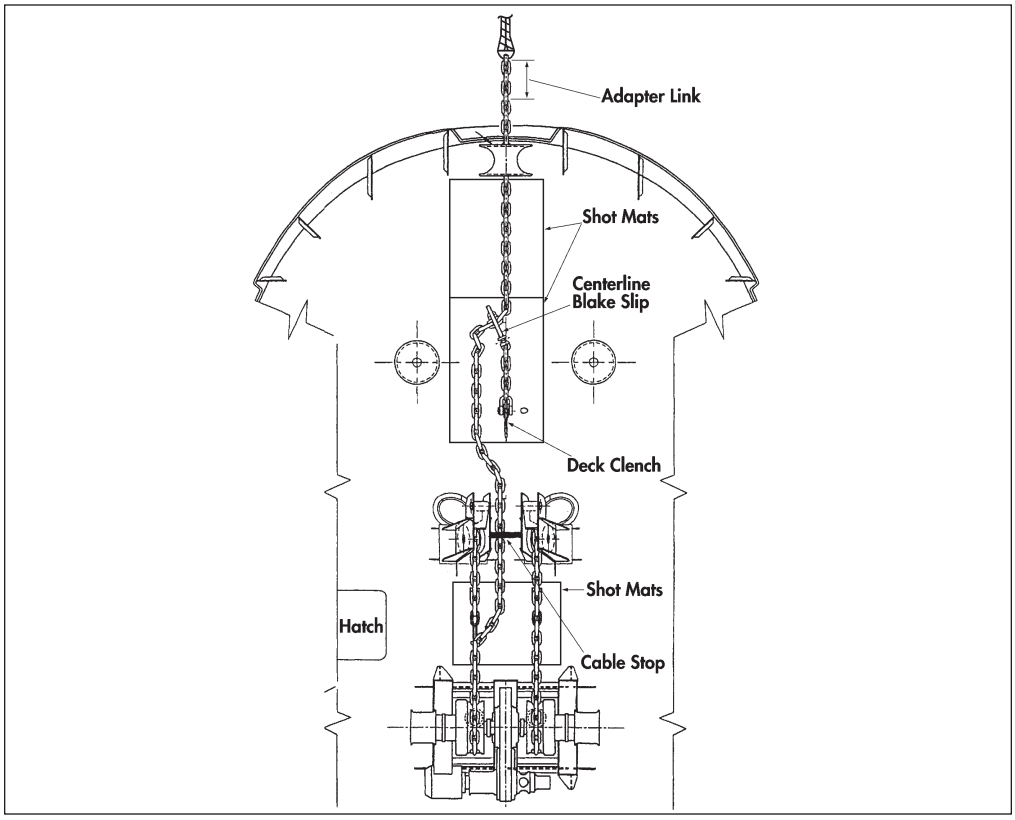


Figure 7.16-5 - KINGSTON Class Cable Arrangement for Coming to a Buoy

7.16.3 Mediterranean Mooring

General

a. Of all classes of ship in the Canadian Navy, the KINGSTON Class is best-suited to conduct a Med Moor due to the twin anchor arrangement, and the excellent view aft from the bridge. Still, it is unlikely that a Med Moor will be come a frequent occurrence, as the KINGSTON Class rarely deploys to those areas where Med mooring is common.

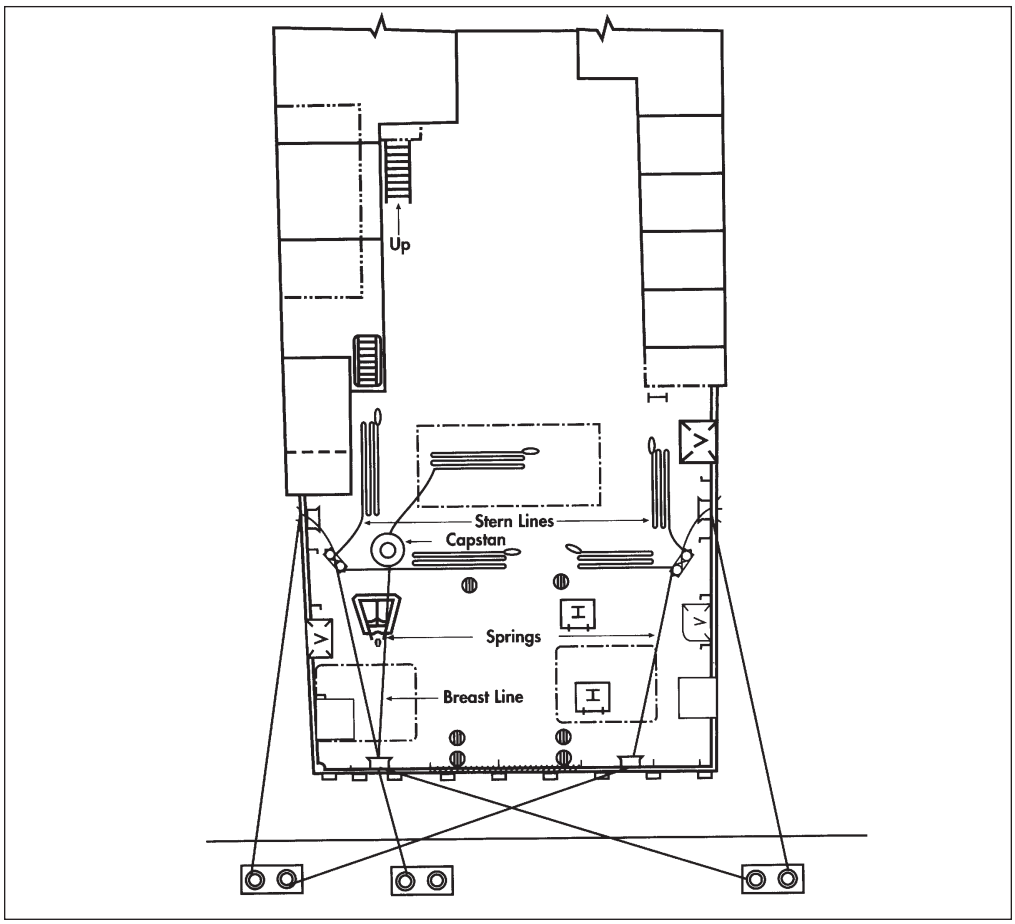


Figure 7.16-6 - KINGSTON Class Mediterranean Mooring Arrangement

b. **Preparation and Equipment Layout**

(**1**) Due to the scope of the many concurrent tasks inherent to the conduct of a Med moor, all off-watch personnel are required to close up as line handlers.

(**2**) The focsle is prepared for coming to anchor. If berthing in a nest, hawsers will be required between focsles.

(**3**) Berthing hawsers are brought up from the Z-Drive Compartment and an extra line is brought aft to the Sweep Deck from the focsle.

(**4**) Two hawsers are faked down fore and aft on the Sweep Deck forward of the bollards on either side. They will be crossed once passed to the jetty via the after fairleads to prevent side to side movement. The location of the lines may have to be shifted if a payload package is embarked, e.g., Mechanical Mine Sweeping (MMS) package.

(**5**) Two hawsers are faked down athwartships aft of the MMS winch platform. They will be led through the after quarter fairleads and used as foresprings.

(**6**) A fifth hawser to be as a breast line, is faked down athwartships on the MMS winch platform. This will be the first line passed ashore with a direct lead aft to assist in holding the stern onto the jetty.

7.17 VICTORIA Class

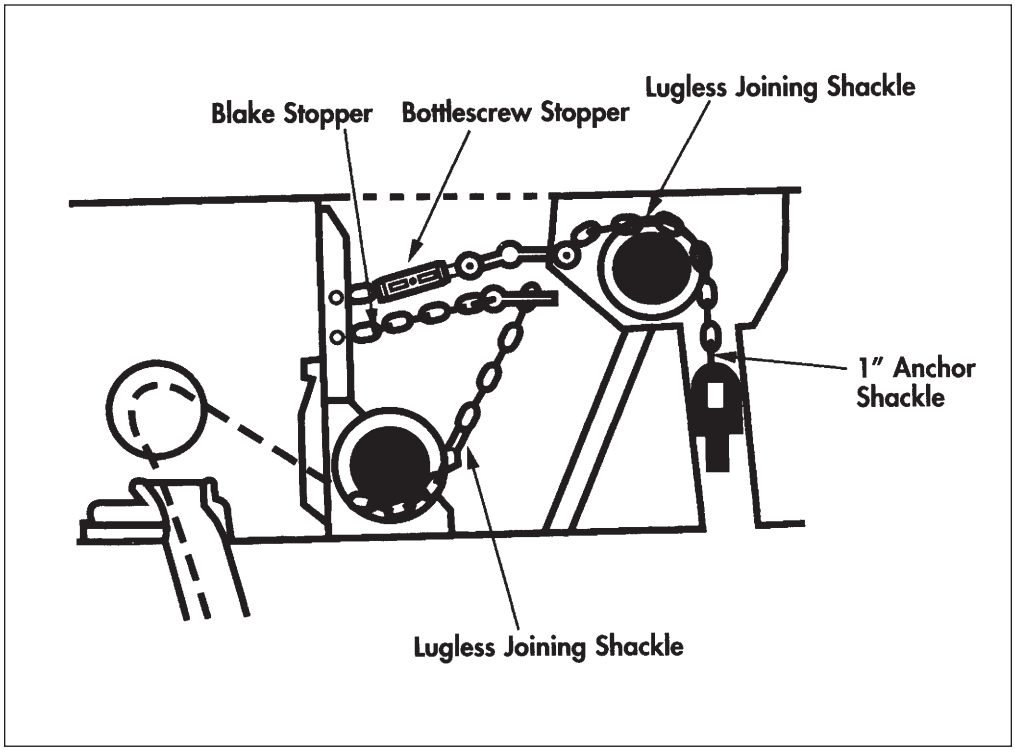


Figure 7.17-1 - Blake and Screw Stoppers

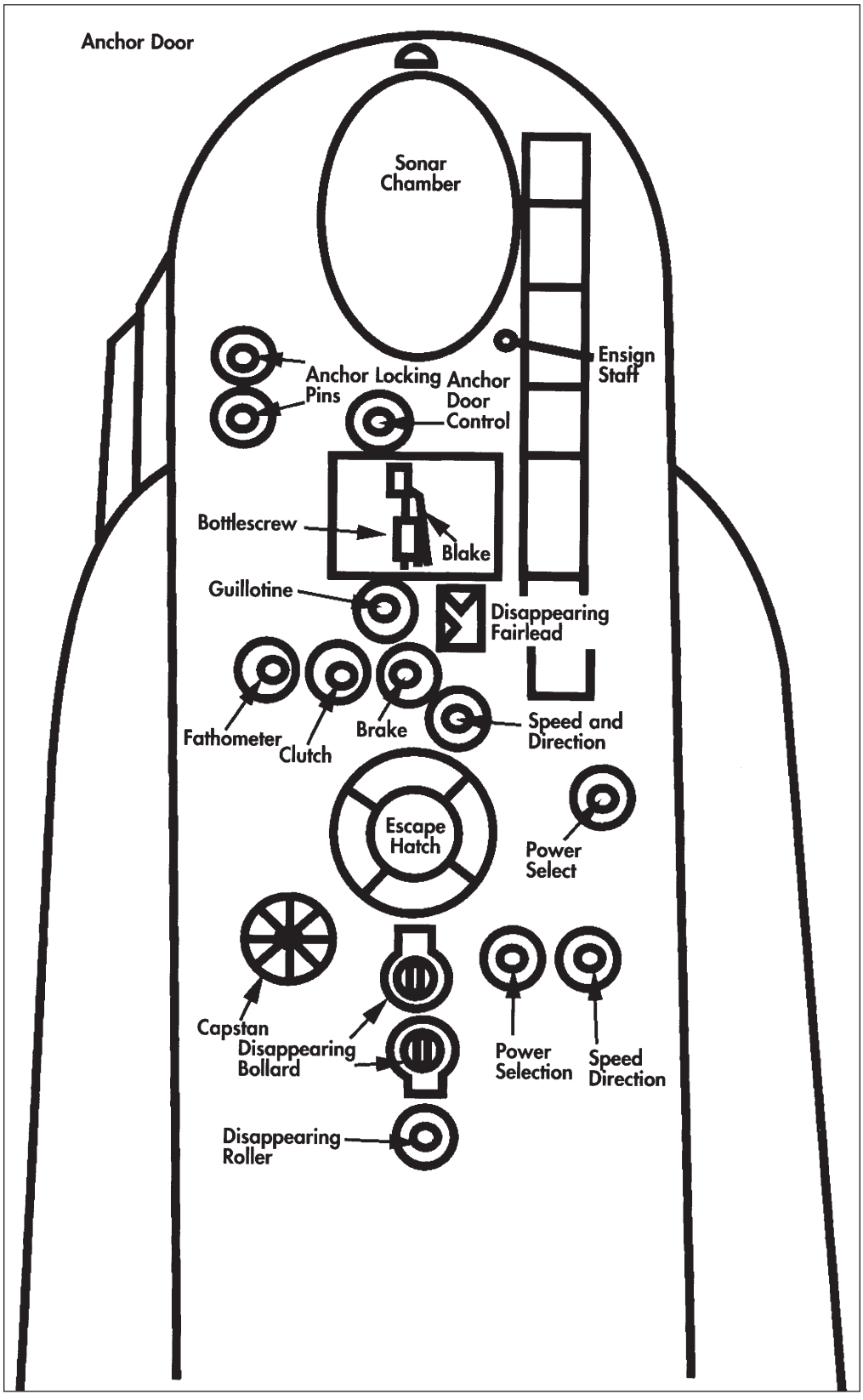


Figure 7.17-2 - VICTORIA Class Upper Deck Fittings

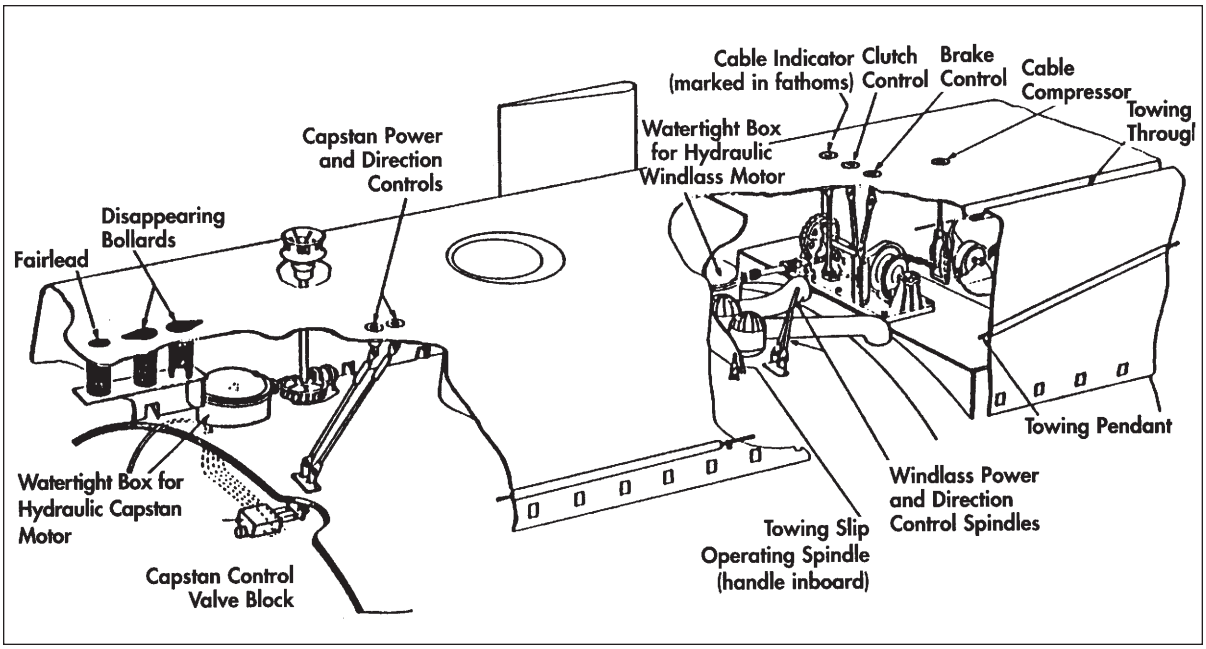


Figure 7.17-3 - Arrangement of Capstan and Anchor Gear in Casing

7.17.1 Anchoring

a. **Personnel Required**

(**1**) Casing officer
(**2**) SCRATCHER
(**3**) Dickie
(**4**) Communications number
(**5**) Swimmer

b. **Equipment Required**

(**1**) General casing bag
(**2**) Capstan & windlass control bar
(**3**) Rescue bag and reel
(**4**) Casing jewellery as required

c. **Procedure**

(**1**) Personnel will man the casing. The anchor compartment flap is then removed and the anchor made ready for letting go. Ceremonial gear is erected and anchor lights rigged if required. Communications are established with the bridge by voice, PRC, or hand signals. The anchor is made ready for letting go as follows:

(**a**) out anchor pocket door pins,
(**b**) open anchor pocket door,
(**c**) off compressor,
(**d**) clutch in,
(**e**) off bottlescrew, brake, and Blake slip,
(**f**) veer the anchor out until it is a'cockbill,
(**g**) on brake and Blake slip,
(**h**) clutch out, and
(**i**) report anchors a'cockbill riding on the brake and Blake, ready for letting go.

(**2**) The Blake slip is removed when the standby is given.

7.17.2 Weighing Anchor

a. **Personnel Required**

(**1**) Casing officer
(**2**) SCRATCHER
(**3**) Dickie
(**4**) Communications number
(**5**) Swimmer
(**6**) One man to operate cable wash down

b. **Equipment Required**

(**1**) General casing bag
(**2**) Capstan & Windlass control bar
(**3**) Rescue bag and reel
(**4**) Fire hose for cable wash down

c. **Procedure**

(**1**) When the cable party closes up, the windlass is connected up with the brake on.
(**2**) When the casing officer receives the order to weigh anchor or shorten in, he will in turn give the order heave in and switch on cable wash.
(**3**) When the anchor leaves the water, the speed of heaving in must be decreased to allow the anchor to tumble and be in the correct position to enter the anchor pocket.

(**4**) The anchor should be prepared for letting go and not secured until the order to do so is received from the OOW/Captain.

(**5**) Secure the anchor for sea as follows:

(**a**) heave in the anchor fully home with the windlass,
(**b**) on bottlescrew and tighten up,
(**c**) on guillotine,
(**d**) on blake slip,
(**e**) out clutch,
(**f**) lash cable, bottlescrew and, blake slip,
(**g**) shut anchor pocket door,
(**h**) in anchor pocket door pins, and
(**i**) replace anchor compartment flap.

7.17.3 Coming to a Buoy

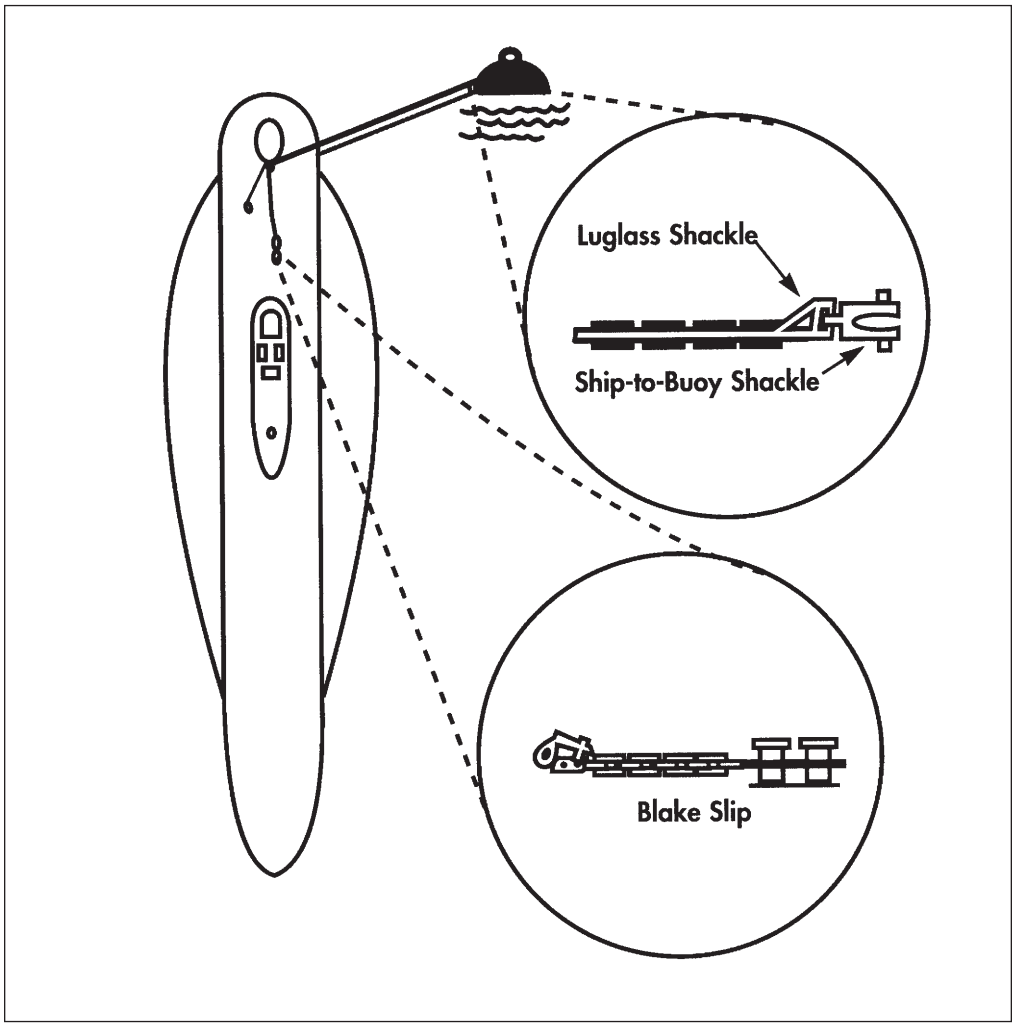


Figure 7.17-4 - VICTORIA Class Coming to a Buoy

a. **Personnel Required**

(**1**) Casing officer
(**2**) SCRATCHER
(**3**) Dickie
(**4**) 2 M/S and below
(**5**) Swimmer

b. **Equipment Required**

(**1**) General casing bag
(**2**) Capstan & windlass control bar
(**3**) Ship-to-buoy shackle
(**4**) No. 1 Line
(**5**) Man overboard bag & reel
(**6**) Casing Jewellery as required

c. **Procedure**

(**1**) The cable is broken just inboard of the bottlescrew slip, which is left holding the anchor and a short end of cable. The free end of the cable is led out through the hawse pipe and the ship-to-buoy shackle is secured to the end of the cable. At the same time the picking-up rope (No. 1 Line) is faked out ready on the casing. The buoy jumper wears a full safety harness attached to a tended line. Either a bollard strop or Blake slip is rigged over the forward bollards and the forward fairlead is put into position.
(**2**) When the submarine is close enough to the buoy the order will be given "BUOY JUMPER TO THE BUOY". Once he is on the buoy, the picking-up rope is passed to him and he passes it through the buoy shackle.
(**3**) Buoy jumper returns to the casing.
(**4**) The other end of the picking-up rope is taken to the capstan.
(**5**) Heave in until the buoy is under foot.
(**6**) Buoy jumper returns to the buoy with cable bag.
(**7**) Once on the buoy, the cable is passed to the buoy jumper, who then secures it to the reducing link on the buoy using the ship to buoy shackle.
(**8**) Buoy jumper returns to the casing.
(**9**) Heave in on the cable, and slacken off on the picking-up rope.
(**10**) Buoy jumper returns to the buoy and removes the picking-up rope and returns to the casing.

(**11**) Veer the cable to the required length so that the submarine is safe to swing around the buoy.
(**12**) On brake.
(**13**) On compressor.
(**14**) Out clutch.
(**15**) Secure casing.

7.17.4 Slipping from a Buoy

a. **Personnel Required**

(**1**) Casing officer
(**2**) SCRATCHER
(**3**) Dickie
(**4**) 2 M/S and below
(**5**) Swimmer

b. **Equipment Required**

(**1**) General casing bag
(**2**) Capstan & windlass control bar
(**3**) Ship-to-buoy shackle
(**4**) No. 1 Line
(**5**) Man overboard bag & reel

c. **Procedure**

(**1**) To slip from a buoy, the picking-up rope is used as a slip rope by using the soft eye end.
(**2**) Pass the soft eye end down through the starboard mooring pipe and back on to the casing. The hook end is then taken to the capstan.
(**3**) In clutch.
(**4**) Off compressor.
(**5**) Off brake.
(**6**) Heave in on the cable until the buoy is under foot.
(**7**) When ordered, “Buoy jumper to the buoy”.
(**8**) Pass the soft eye end of the picking-up rope to the buoy jumper, who will pass it through the buoy shackle and back through the starboard mooring pipe.
(**9**) Pass the soft eye through the starboard mooring pipe and secure it to the Blake slip.

(**10**) Buoy jumper returns to the casing.

(**11**) Heave in on the slip rope until the slip rope has the strain.

(**12**) Veer on the cable until there is enough slack on the cable to take off the ship-to-buoy shackle. Buoy jumper returns to the buoy to slip the ship-to-ship buoy shackle.

(**13**) Bring the cable and shackle back onto the casing.

(**14**) Buoy .jumper returns to the casing.

(**15**) Veer on the capstan until the buoy is clear of the bow, turn up on the capstan (or bollards).

(**16**) Remove the ship-to-buoy shackle.

(**17**) Heave in on the cable and guide it back through the hawse pipe and under the casing.

(**18**) Using the lugless shackle connect up the cable again to the anchor.

(**19**) On the order “Slip” knock off the Blake slip and heave in the slip rope.

(**20**) Depending on the situation, prepare the anchor for letting go or secure the anchor for sea.

(**21**) Secure the casing.

CHAPTER 8
Towing

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Figure/Table **Page**

figures & tables

CHAPTER 8
Towing

8.1 Introduction

Towing provides a means of moving ships to safety when they become disabled as a result of enemy action or occurrences such as collision, grounding, fire, or engineering failure. HMC ships can be called upon at short notice to render assistance to other vessels and are equipped to supply or receive a tow either forward or aft. They also carry equipment that is compatible with ships of other navies. Under normal circumstances the towing ship will supply the tow, but each situation will dictate the requirements. Equipment, procedures and instruction relating to ship-to-ship towing between NATO warships is covered in ATP 43 Ship-to-Ship Towing. ATP 43 also addresses methods of towing structurally damaged ships.

8.2 Approach

The approach on a disabled vessel is dependent on many factors. Wind and current affect the drift and yaw rate, and how the vessel is oriented. Usually a disabled ship will be approached from the windward side. This eliminates the risk of the disabled ship drifting down upon the towing ship during the final phase of the approach. The towing ship aims to pass close abeam to facilitate firing of the gunline, and then stops with her stern several hundred feet forward of the bow of the disabled ship. At this range, the gear can be passed quickly and safely.

8.3 Communications

a. **External.** A disabled vessel should, if possible, communicate with the towing vessel using radio, flashing light or flag hoist. Information such as the disabled ship's heading, rate of drift and yaw, and any relevant engineering information are helpful to the Commanding Officer of the towing ship. The disabled vessel should also signal when she is ready to be towed. Communications between personnel on the quarterdeck of the towing ship and on the focsle of the disabled vessel while passing the gear are accomplished using standard replenishment communication equipment and signals.

b. **Internal.** When towing another vessel, reliable communications between the quarterdeck and the bridge are vital. Normally, the Executive Officer is stationed on the quarterdeck in order to provide the Captain with a command appreciation of the relative movements of the ships, and to provide recommendations for engine orders. The Executive Officer communicates with the bridge using the ship's internal communication system or a PRC. During the approach, and while the gear is being passed, the Commanding Officer relies upon reports from the quarterdeck on the overlap and range to the disabled vessel. As the gear is being passed, the quarterdeck must report the location of the messengers and towing hawser. The quarterdeck and

bridge must work together, controlling the rate at which the gear is passed and any use of engines required to manoeuver in order to avoid fouling the propellers. Once it is established, the quarterdeck must monitor the tow carefully, assessing the strain on the towing hawser, and making recommendations to the bridge as speed is increased.

8.4 Methods of Establishing Contact

There are a variety of methods used to establish contact with a vessel which requires towing. Establishing contact for a grounded vessel or a vessel drifting on to a lee shore will be different than for a vessel dead in the water on the high seas. A calm weather contact will differ from a foul weather one. The primary method of establishing contact is by gunline or bolo. Other methods are by boat, by streaming the messengers astern on a float, or even by helicopter. Command, with recommendations from the CBM/DeckO, will determine the method to be used. Whichever method is used, it is imperative that the tow be passed as quickly and as safely as possible.

Figure 8.4-1 - IROQUOIS Class Receiving Heavy Messenger Forward

8.5 Towing Equipment Used by HMC Ships

The following is a list of common towing equipment found on HMC ships. Weight and size of the equipment will vary depending on the class and tonnage of the vessel:

a. **Towing Slip.** The towing slip is located on the quarterdeck and is fixed to the towing cleat. This provides a means of slipping the tow at a moment's notice in the event of an emergency.

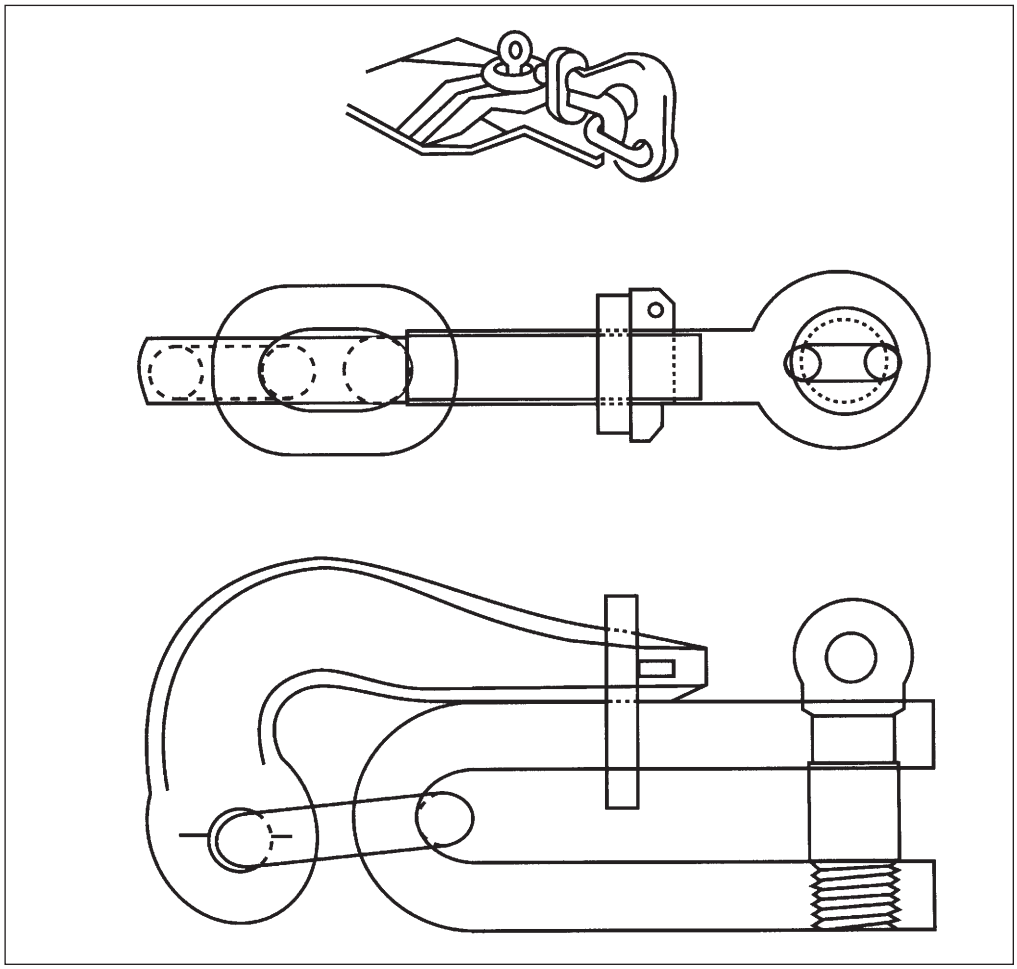

Figure 8.5-1 - Towing Slip

b. **Towing Pendant**. The towing pendant, used to counter chafing, is a wire pendant with hard eyes spliced at both ends. One end is shackled to the towing hawser by a Baldt anchor shackle. The other end uses a towing shackle and a NATO link, to connect the towing pendant to the towing slip.

c. **Towing Shackle**. The towing shackle is a lugged joining shackle. It is used to secure the towing pendant to the towing slip, or the towing hawser to the ship's cable.

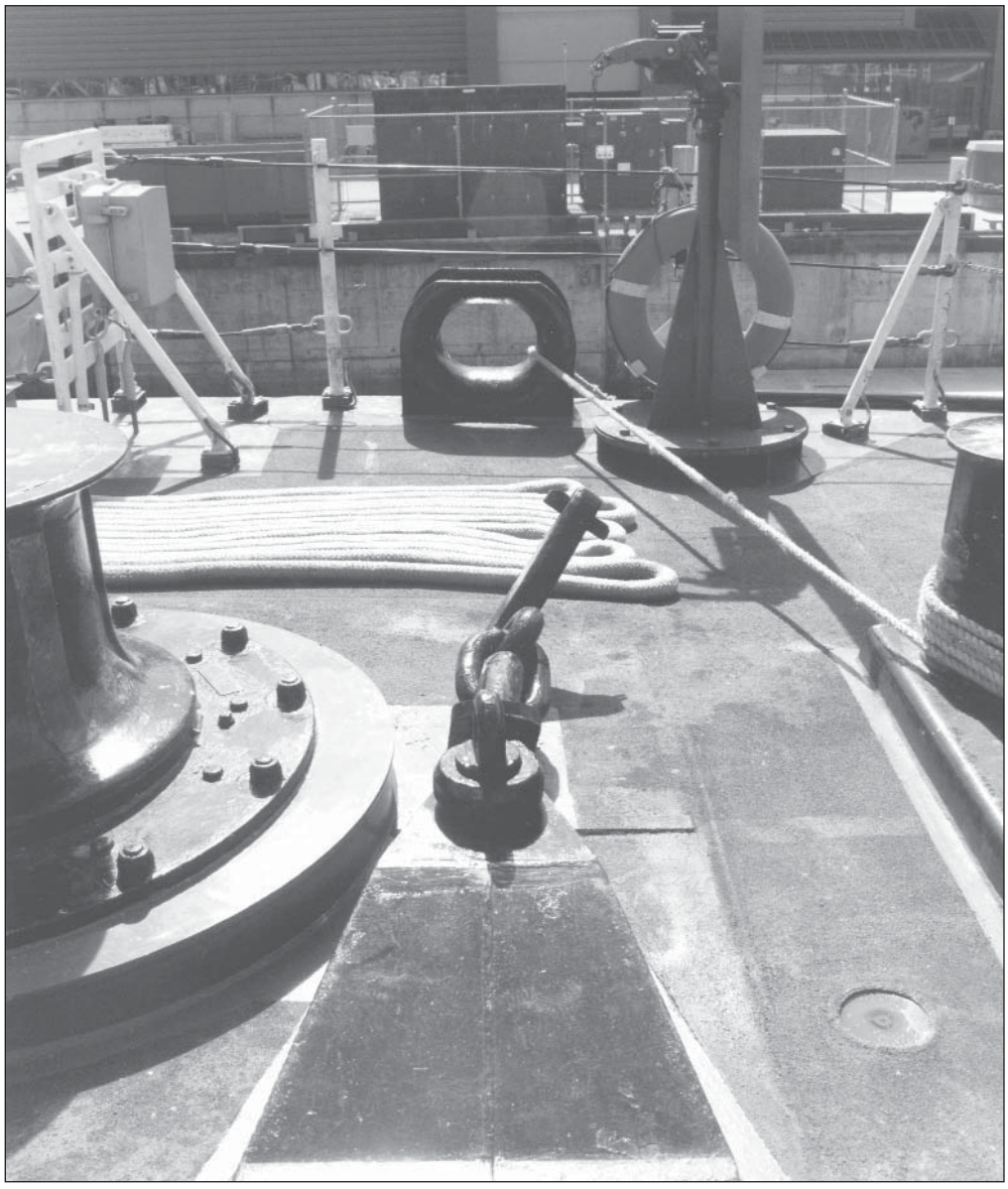

Figure 8.5-2 - Towing Slip HALIFAX Class

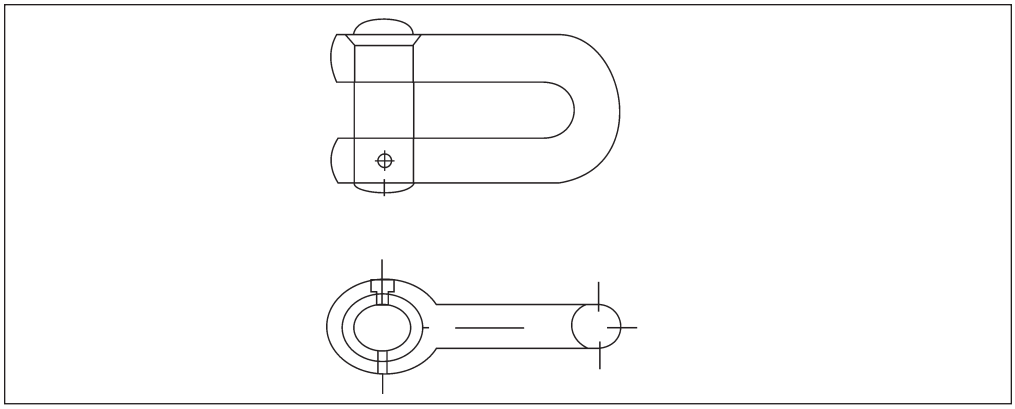

Figure 8.5-3 - Towing Shackle

d. **Towing Hawser**. The towing hawser is a double-braided nylon line. It varies in size and length depending on the class of ship. (See Table 2 pg 8-12)

e. **Baldt Anchor Shackle**. The Baldt anchor shackle is used to attach the towing hawser to one of the following: the ship's cable, NATO link or towing pendant.

f. **Lugless Anchor Shackle**. The lugless anchor shackle may be used to attach the towing shackle to the towing pendant and the pendant to the towing hawser.

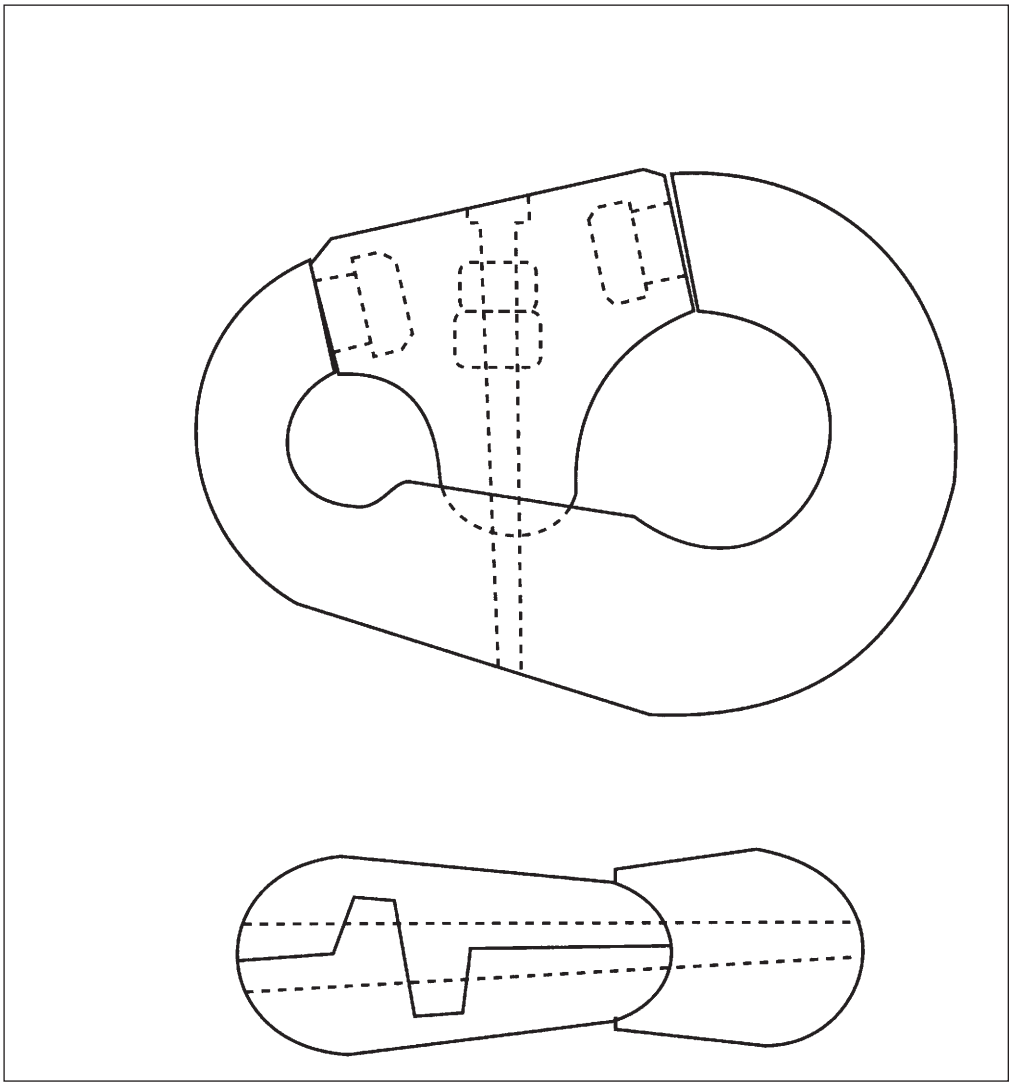

Figure 8.5-4 - Baldt Anchor Shackle

Figure 8.5-5 - Baldt Shackle

g. **NATO Link**. The NATO link is used to improve interoperability between the ship being towed and the ship towing. This link was manufactured to fit any cable equipment regardless of class of ship or country of origin. Its purpose is to connect the towing hawser to the cable of the ship being towed. If the ship being towed is also providing forward, then the NATO link will not be required. During towing exercises between two Canadian ships where the towing ship is providing aft, the NATO link is to be used in order to progress training.

Figure 8.5-6 - NATO Link

h. **Center Line Blake Slip.** The centreline blake slip is used to middle the weight of the cable between the brake and the blake slip. It should be placed on the cable forward of a lugless joining shackle so the tow can be slipped quickly in an emergency.

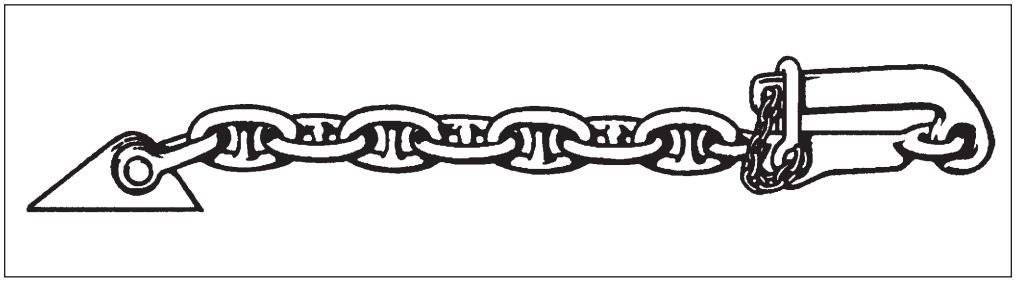

Figure 8.5-7 - Centerline Blake Slip

i. **Recovery Messenger.** The recovery messenger is a polypropylene line attached to the towing hawser when supplying aft. It is used to recover the towing hawser by creating a bight in the hawser.

j. **Common Associated Equipment Used in Towing.** The following table lists common miscellaneous non-fitted equipment that is required or necessary for towing evolutions, regardless of ship class.

Table 1 - Equipment	
Line-Throwing Gun	Axe/4x4
Pry Bar	Comm Set
Bolo/Gunline Projectiles	Sledgehammer
Mousing Line/Wire	Paddles/Wands/Vests
Shot Mats	Bolt Cutters
Knife/Spike	Binoculars
Hard Hats	Grappling Hook
Cable Bag	Cable Jack
Personal Flotation Devices	Snatch Block
Bull Ropes	Tommy Bars
Safety Harnesses	Bollard Strop (509/510 only)
Chemlites	Bollard Slip (509/510 only)
Center Line Slip	Hazardous Duty Lifejackets

k. Lines Used for Towing. The following table lists the types and characteristics of all lines used during Canadian towing operations.

Table 2 - Lines Used during Towing			
Type	**Length in Meters**	**Diameter in Millimeters**	**Make**
Light Messenger	65	12	Polypropylene
Heavy Messenger	110	24	Polypropylene
Recovery Messenger	35	24	Polypropylene
Ranging Line	65	24	Polypropylene
Towing Hawser	**Length in Meters**	**Diameter in Millimeters**	**Make**
HALIFAX	336	64	Double-braided nylon
IROQUOIS	360	64	Double-braided nylon
KINGSTON	180	48	Sampson Polytron
AOR*	336	80	Double-braided nylon
VICTORIA	100	40	Double-braided nylon
Towing Pendant	**Length in Meters**	**Diameter in Millimeters**	**Make**
HALIFAX	7	38	FSWR
IROQUOIS	11	38	FSWR
KINGSTON	9	22	FSWR
AOR	6.4	48	FSWR
VICTORIA	N/A	N/A	N/A

*The 509 Class towing hawsers are marked at the inboard end at the point where they are turned up on the bollard.

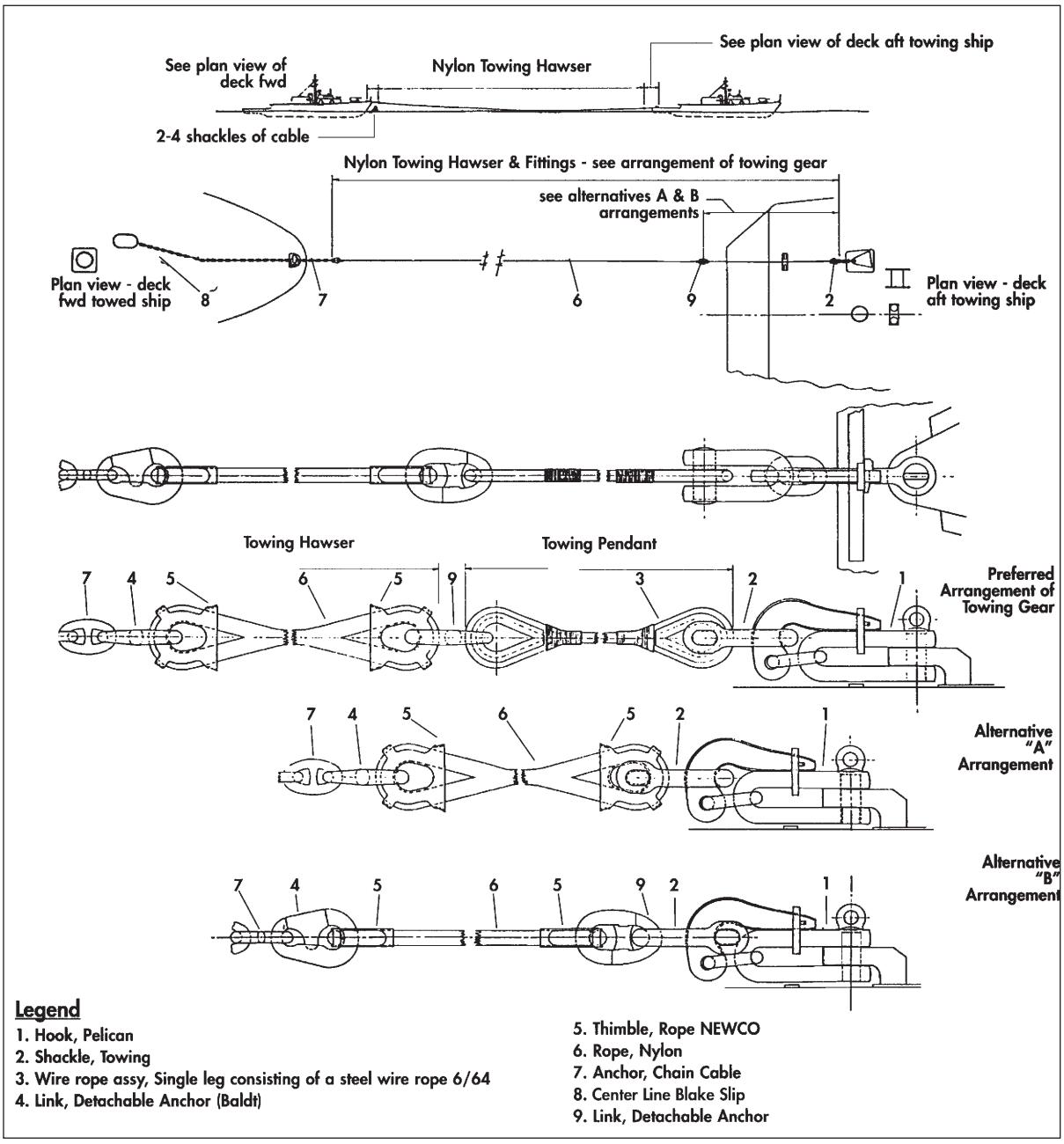

Figure 8.6-1 - General Towing Arrangement

8.6 Personnel Required

In the HALIFAX and IROQUOIS Classes, RAS Team No. 1 is required for towing. In AORs, all off-watch Deck Department personnel are required to rig for towing and supplying the gear. Lower decks must be cleared to recover the tow. In the KINGSTON, towing is an all-ship evolution. Special sea dutymen are also required.

8.7 Sequence of Events Supplying Forward and Receiving Aft

Note: The towing ship will always pass the gunline.

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Light and heavy messenger are payed out hand over hand. The towing hawser is payed out as required.	**Heave In**	Check Away (Acknowledged)	Gunline is heaved in hand over hand until the light messenger is in hand. The messenger is then passed through the towing fairlead.
			Heave In the Heavy Messenger		Heavy messenger is walked in by forming a continuous circle until the towing shackle is on board.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	The towing shackle is attached to the towing slip, then pinned and moused. Lashings are removed if required.
			Check Away on the Heavy Messenger		Heavy messenger is checked away to transfer the weight to the towing slip. Light and heavy messengers are coiled down in preparation for slipping.
	Hooked On (Acknowledged)		**Show Hooked On**	Hooked On (Given)	Hooked on is passed to indicate that all rigging complete.

8.7 Sequence of Events Supplying Forward and Receiving Aft (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Veer the Cable		Ship's cable is veered to desired number of shackles as ordered by Command.			Quarterdeck and aft end of flight deck cleared of non-essential personnel.
Pass the Center Line Blake slip		Center line blake slip is passed forward of the lugless joining shackle. Pin is inserted and moused.			
Veer the Cable		Cable is veered to middle the weight between the brake and blake slip.			
Show Hooked On	Hooked On (Given)	Hooked on is passed to indicate that all rigging is complete. Non-essential personnel are cleared aft of the break water.		Hooked On (Acknowledged)	

When commencing the tow, the XO and station supervisor will ensure that the towing hawser does not become fouled in the screws and that no undue strain is placed on the towing hawser as the ship starts to make way.

While towing, the XO and station supervisor will watch for strain on the towing hawser and any irregularities in the rigging.

The ship will secure the tow when the ship being towed is turned over to another vessel, is out of danger, or has rectified its engineering failure.

Secure	Secure (Acknowledged)		**Secure**	Secure (Given)	Attach heavy messenger to towing pendant.
Heave In on the Cable		Ship's cable is heaved in so that the centreline blake slip can be removed.			
Off Center Line Blake slip		Center line blake slip is removed			
Heave In on the Cable		Ship's cable is heaved in until sufficient towing hawser can be taken in hand.			

8.7 Sequence of Events Supplying Forward and Receiving Aft (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Give Prepare to Slip	Prepare to Slip (Given)	Towing hawser is taken in hand		Prepare to Slip (Acknowledged)	Three turns of the heavy messenger are taken around the bollard and backed up. Station workers remove mousing and pin and stand by with hammer to slip.
Slip	Slip (Given)		**Slip**	Slip (Acknowledged)	Towing pendant is slipped and eased out hand over hand.
Heave In	Check Away (Acknowledged)	Towing hawser is walked in by forming a continuous circle. Heavy and light messengers are recovered in the same manner.	**Give them Heave In**	Heave in (Given)	Heavy and light messengers are checked away hand over hand. When the strain is off the messengers, they are removed from the bollard and the bitter end of the light messenger is walked to the fairlead.
The bitter end of the light messenger is tossed over the stern and the supplying ship continues to heave in until the light messenger is on board.					

8.8 Sequence of Events Supplying Aft and Receiving Forward

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on the whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and personnel have taken cover.
		Gunline fired			Gunline received
Avast	Avast (Given)	Gunline is attached to light messenger	**Avast**	Avast (Acknowledged)	Gunline is taken in hand

8.8 Sequence of Events Supplying Aft and Receiving Forward (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Check Away	Heave In (Given)	Station workers check away light and heavy messengers hand over hand, keeping them clear of the screws.	**Heave In**	Check Away (Acknowledged)	Gun line is heaved in hand over hand until the light messenger is in hand. The messenger is then passed through the bull-ring.
		Towing hawser is paid out under control, keeping it clear of the screws.	**Heave In**		Light and heavy messengers are walked in by forming a continuous circle until the Baldt shackle is on board.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Baldt anchor shackle is secured to ship's cable, pinned and leaded.
			Check Away on the Heavy Messenger		Heavy messenger is checked away to transfer the weight to the ship's cable.
Hooked On	Hooked On (Acknowledged)		**Show Hooked On**	Hooked On (Given)	
			Remove the Heavy Messenger		Heavy messenger is removed. Light and heavy messengers are coiled down in preparation for slipping.
			Veer the Cable		Ship's cable is veered to desired number of shackles as ordered by Command.
			Pass the Centreline Blake slip		Centreline blake slip is passed forward of the lugless joining shackle. Pin is inserted and moused.

8.8 Sequence of Events Supplying Aft and Receiving Forward (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
			Veer the Cable		Cable is veered to middle the weight between the brake and blake slip.
	Hooked On (Acknowledged)		**Show Hooked On**	Hooked On (Given)	Hooked on is passed to indicate that all rigging complete.

When starting the tow, the XO and station supervisor will ensure that the towing hawser does not become fouled in the screws and that no undue strain is placed on the towing hawser as the ship starts to make way.

While towing, the XO and station supervisor will watch for strain on the towing hawser and any irregularities in the rigging.

The ship will secure the tow when the ship being towed is turned over to another vessel, is out of danger, or has rectified its engineering failure.

Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	
			Heave In on the Cable		Ship's cable is heaved in so that the centreline blake slip can be removed.
			Off centreline Blake slip		centreline blake slip is removed
			Heave In on the Cable		Ship's cable is heaved in until towing hawser is on board.
			Attach the Heavy Messenger		Heavy messenger is attached to the NEWCO thimble with a bowline. Three turns are taken on the bollard and backed up.
			Veer the cable		Cable is veered to transfer the strain from the cable to the heavy messenger.
Take the Recovery Messenger in Hand			**Break the cable**		Ship's cable is broken to remove it from the towing hawser.
		Recovery messenger is taken in hand.			

8.8 Sequence of Events Supplying Aft and Receiving Forward (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Heave In	Check Away (Acknowledged)	Recovery messenger is heaved in until the towing hawser can be taken in hand. The towing hawser is then walked in by forming a continuous circle. Heavy and light messengers are recovered in the same manner.	**Give Them Heave In**	Heave In (Given)	Heavy and light messengers are checked away hand over hand. When the strain is off the messengers they are removed from the bollard and the bitter end of the light messenger is walked to the bullring.
The bitter end of the light messenger is tossed overboard and the supplying ship continues to heave in until the light messenger is on board.					

8.9 Emergency Breakaway

In the event that the towing ship must jettison the towing hawser in an emergency, the following actions will take place.

a. The ship will reduce speed to take some strain off the towing gear.

b. The towing pendant is then slipped from the towing slip and eased out of the towing fairlead by checking away on the recovery messenger. Once clear of the ship, the heavy messenger can be cut, if necessary.

c. The ship being towed can also jettison the towing hawser by breaking the joining shackle aft of the centreline blake slip and then tripping the slip.

Note.

Both of the above methods are extremely dangerous and personnel must be fully aware of the danger zone produced by the snap back or whipping of the cable. All non-essential personnel shall remain well clear.

8.10 Seamanship Briefing

A tow can either be an evolution conducted in an emergency or a deliberate exercise conducted for training. In either case, prior to conducting a tow, a Command brief shall be held. The following personnel will, as a minimum, be in attendance: Executive Officer, Deck Officer, Safety Officer, Chief Bosn's Mate, Senior Naval Communicator, and Station Supervisor.

The following briefing format will apply to most scenarios:

a. Captain Sir, ladies and gentlemen, (OWN SHIP) will be conducting a tow with (SHIP) at (TIME). In accordance with the intentions message, (OWN SHIP) will tow/be towed by (SHIP). (OWN SHIP) will receive/provide forward/aft.

b. (PORT/STARBOARD) watch Special Sea Dutymen and RAS Team No. 1 (or as required) will be required to close up at (TIME) at which time the station will be rigged.

c. The dress for this evolution, as discussed with the Executive Officer, will be (DRESS).

d. The Station Supervisor for this evolution will be (NAME) and the Safety Officer will be (NAME).

e. The sequence of events for the tow will be as follows: (DESCRIBE PASSING OF GEAR. IF WORKING WITH A NON-CANADIAN UNIT, PROVIDE DETAIL ON ANY DEPARTURES FROM STANDARD CANADIAN RIGGING AND TOWING SOPs).

f. Due to the inherently dangerous nature of this evolution, Station Supervisors are to thoroughly brief all personnel upon closing up on their duties and the sequence of events. The Safety Officer will pay close attention during the evolution for safety infractions.

g. In the event of an emergency, the aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment. (DESCRIBE EMERGENCY BREAKAWAY PROCEDURE FOR THE STATION.) Lines that are or may become fouled must be cut.

h. If required, a debrief will be conducted on completion of the evolution. Place and time to be promulgated.

i. Sir, this completes the briefing. Are there any questions?

j. The Chief Bosn's Mate will now brief the safety-related aspects of the evolution.

8.11 Towing Safety Briefing

It is imperative that the Station Supervisors give a thorough safety briefing to all personnel involved in the tow prior to the evolution starting. The Safety Officer is to ensure all points are covered. In addition to the general shipboard safety items listed in Chapter 4, the following safety points must be covered:

a. All personnel will take cover and remain under cover until the gunline is fired.

b. Personnel must pay particular attention to where they place their hands and feet because lines faked out on deck can pay out very quickly.

c. As most towing equipment is very heavy, personnel are to ensure they use proper lifting techniques.

d. Goggles must be worn by the station workers removing and inserting the lead pellets.

e. Never straddle the cable or take short cuts across it.

f. All non-essential personnel are to be cleared from the focsle/quarterdeck before the towing ship puts strain on the towline.

Note.

Safety lessons learned from previous towing exercises should be stressed during the Towing Safety Briefing.

8.12 IROQUOIS Class

8.12.1 Towing Forward – Supply

Preparation and Equipment Layout:

a. The extended length shot mat is laid out to protect the deck.

b. Rig a 12” ranging snatch block on the eyepad farthest forward on the port side of the focsle in line with the cable hatch with a 3/4” shackle.

c. Run the ranging lines through the snatch block, from the capstan, and to the cable deck. Use the ranging lines to bring the centreline blake slip up through the cable hatch and secure it to the midship deck clench on the focsle.

d. Engage the clutch, release the brake, and veer the port cable. Simultaneously, heave in on the ranging messenger to bring sufficient cable up on deck. Re-apply the brake.

e. Attach the towing pendant to the towing hawser using a lugless anchor shackle.

f. Fake out the towing hawser on the starboard side of the focsle so that the towing pendant and towing shackle are led to the bullring, and the outboard end of the towing hawser pays out from centreline to outboard. Lead the inboard end up around the centreline blake slip and back to the port cable.

g. Connect the inboard end of the towing hawser to the port cable with a Baldt shackle.

h. The inboard end of the heavy messenger is attached to the NEWCO thimble with a bowline and stopped along the towing pendant with tarred marlin up to and including the towing shackle. These seizings are to be approximately 45 cm apart and no less than eight wraps each. Ensure that the last seizing is as close to the end as possible with four extra wraps applied. This will minimize the chances of fouling in the other ship's towing fairlead.

i. The heavy and light messengers are faked out on the port side inboard to outboard. The end of the light messenger is led forward, out through the bullring and back over the guardrail of the engaged side.

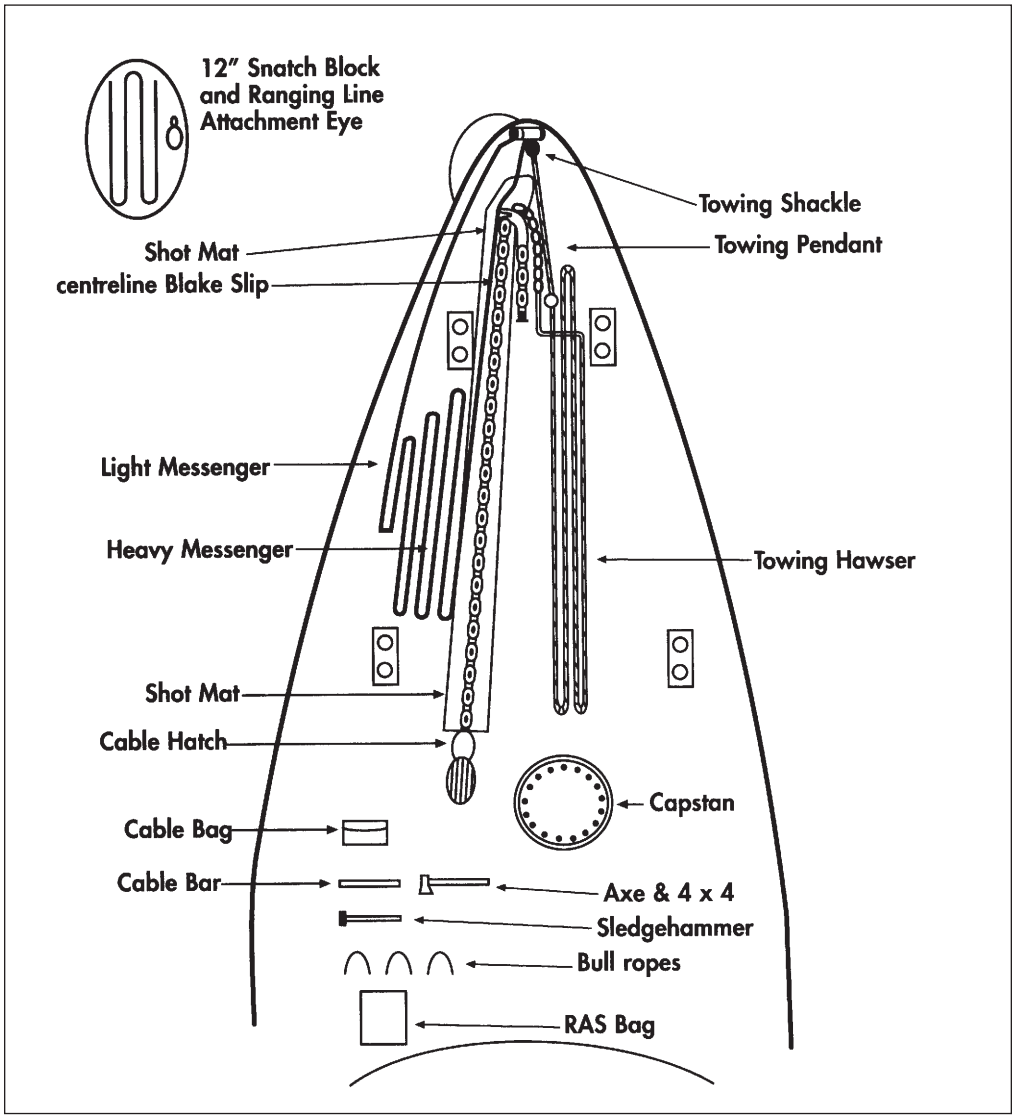

Figure 8.12-1 - IROQUOIS Class Supply Forward Tow

8.12.2 Towing Forward – Receive

Preparation and Equipment Layout:

a. The extended length shot mat is laid out to protect the deck.

b. Rig a 12" ranging snatch block on the eyepad farthest forward on the port side of the focsle in line with the cable hatch with a 3/4" shackle.

c. Run the ranging messenger through the snatch block, from the capstan, and to the cable deck. Use the ranging messenger to bring the centreline blake slip up through the cable hatch and secure it to the midship deck clench on the focsle.

d. Engage the clutch, release the brake, and veer the port cable. Simultaneously, heave in on the ranging messenger to bring sufficient cable up on deck. Re-apply the brake.

Figure 8.12-2 - Towing Receive Forward Layout

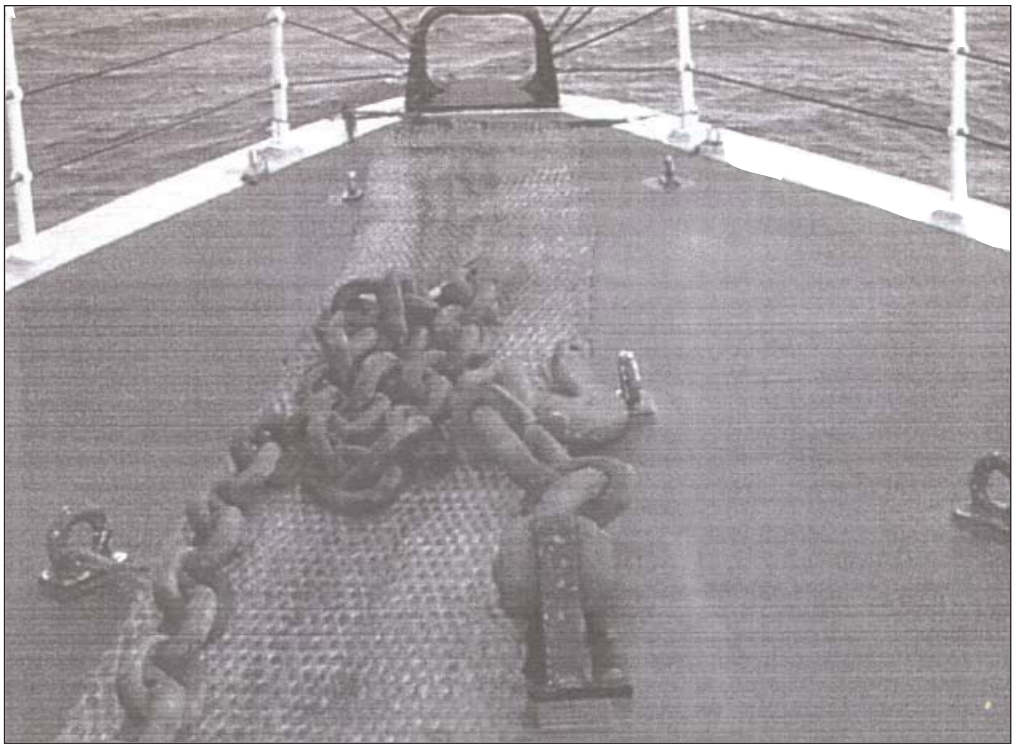

Figure 8.12-3 - Towing Receive Forward Centreline Blake Slip

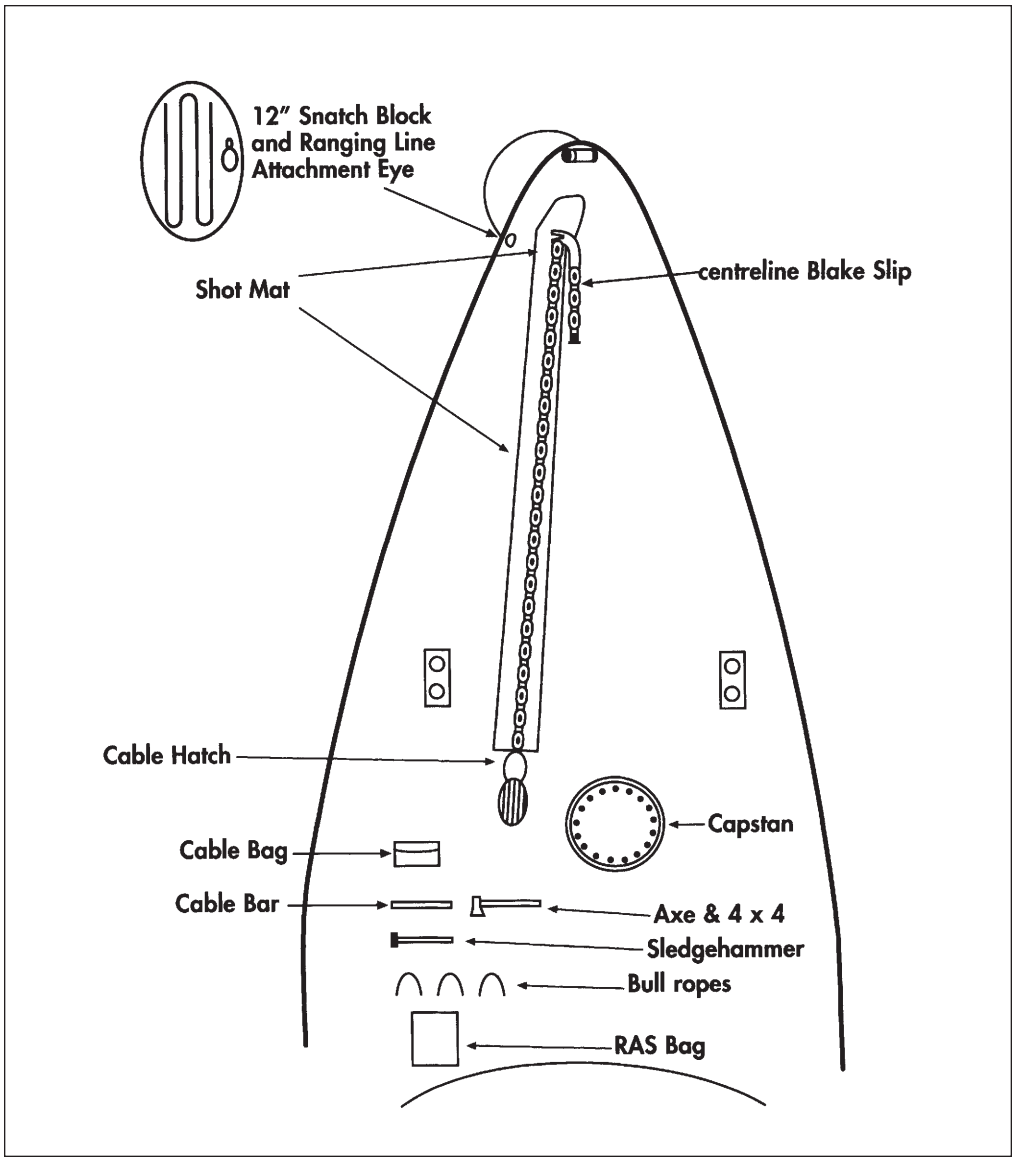

Figure 8.12-4 - IROQUOIS Class Receive Forward Tow

8.12.3 Towing Aft – Supply

Preparation and Equipment Layout:

a. The towing hawser is faked out on the port side of the quarterdeck from inboard to outboard. (The inboard end of the towing hawser is secured to the towing pendant with a lugless anchor shackle.) The NATO link is secured to the outboard end of the towing hawser with a Baldt shackle.

b. The pendant is then attached to the towing slip with a towing shackle. Ensure that the pin in the slip is moused.

c. The heavy and light messengers are then faked out on the port side of the quarterdeck inboard to outboard. Ensure the heavy messenger is led through the towing fairlead to the starboard side.

d. The towing pendant and sufficient towing hawser is lead aft and through the towing fairlead. When the pendant is at its full length, approximately 1 to 2 m will hang down over the transom. This will allow the remainder of the gear to be passed without fouling.

e. Secure the recovery line 15 to 25 m from the inboard end of the towing hawser with a rolling hitch. This will be used to recover the tow.

f. Raise the flight deck netting.

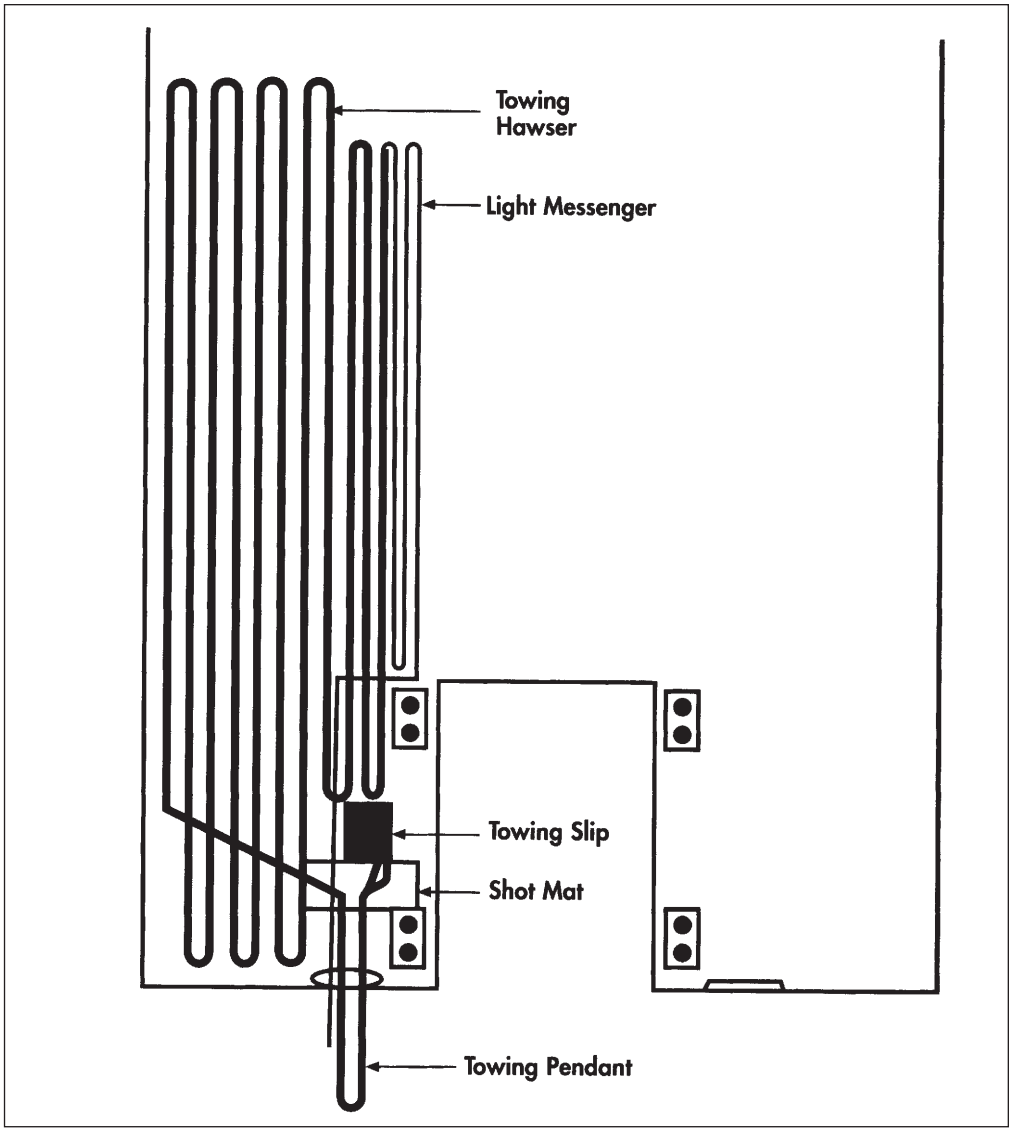

Figure 8.12-5 - IROQUOIS Class Supply Aft Tow

8.12.4 Towing Aft – Receive

Preparation and Equipment Layout:

a. Prepare the towing slip. Ensure that the pin is moused.

b. Rig one shot mat in the dump adjacent to the towing slip and one over the AX hatch.

c. Provide a towing shackle (required only if supplying ship's gear is not compatible).

d. Raise flight deck netting.

8.13 HALIFAX Class

8.13.1 Towing Forward – Supply

Preparation and Equipment Layout:

In the HALIFAX Class, the port cable is designed for use in towing and mooring operations. An electric vertical shaft windlass is fitted on the focsle to port of the anchor capstan/windlass for working the towing and mooring cable. The control pedestal is located aft of the breakwater in line with the mooring windlass.

a. Shot mats are laid out to protect the deck. The 12" ranging snatch block is shackled to eyepad No. 2 with a 3/4" shackle. (See Table 3 Ch. 5 for eyepad location)

b. A centreline blake slip is shackled to the deck clench (eyepad No. 1) forward of the hawse pipe.

c. Disconnect the port cable and attach the ranging line to the end. The ranging line is led forward and passed through the ranging snatch block and back to the capstan.

d. Veer the cable, simultaneously heave in on the ranging line to bring sufficient cable on deck.

e. Attach the towing pendant to the towing hawser using a lugless anchor shackle.

f. Fake out the towing hawser on the starboard side of the focsle so that the towing pendant and towing shackle are led to the bullring, and the outboard end of the towing hawser pays out from centreline to outboard. Lead the inboard end up around the centreline blake slip and back to the port cable.

g. Connect the inboard end of the towing hawser to the port cable with a Baldt shackle.

h. The inboard end of the heavy messenger is attached to the NEWCO thimble with a bowline and stopped along the towing pendant with tarred marlin up to and including the towing shackle. These seizings are to be approximately 45 cm apart and no less than eight wraps each. Ensure that the last seizing is as close to the end as possible with four extra wraps applied. This will minimize the chances of fouling in the other ship's towing fairlead.

i. The heavy and light messengers are faked out on the port side inboard to outboard. The end of the light messenger is led forward, out through the bullring and back over the guardrail of the engaged side.

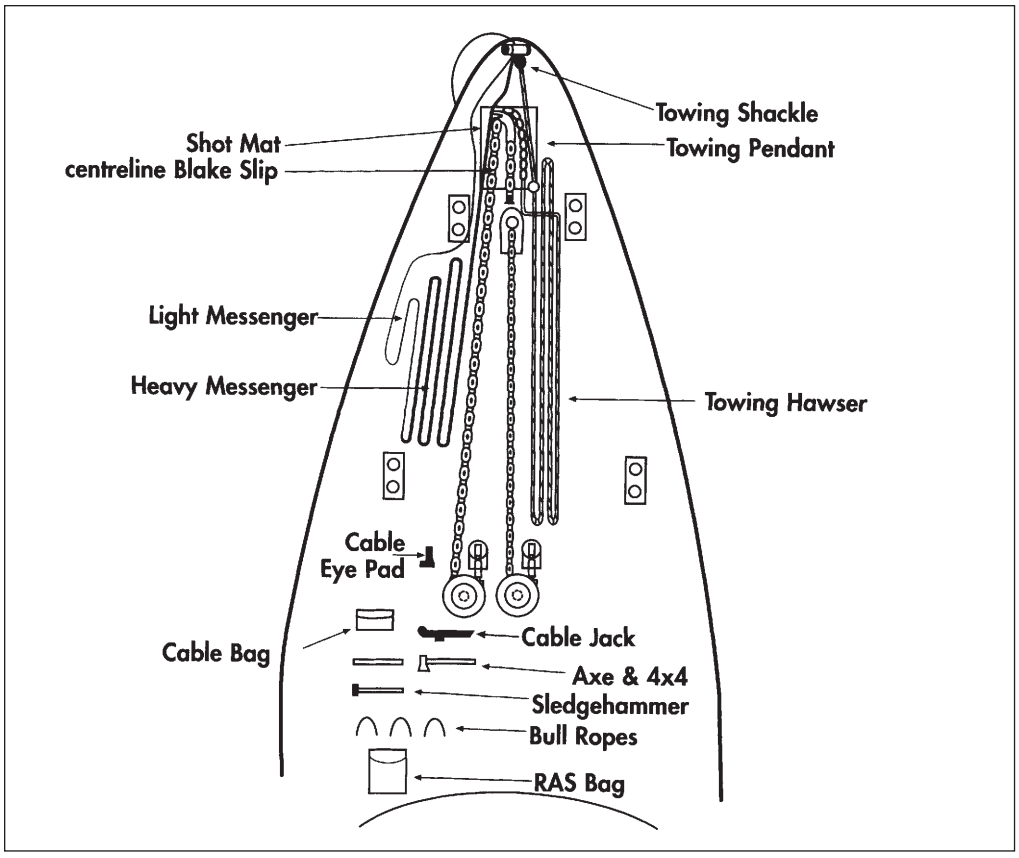

Figure 8.13-1 - HALIFAX Class Supply Forward Tow

8.13.2 Towing Forward – Receive

Preparation and Equipment Layout:

a. Shot mats are laid out to protect the deck. The 12” ranging snatch block is shackled to eyepad No. 2 with a 3/4” shackle.

b. The centreline blake slip is shackled to the deck clench (eyepad No. 1) forward of the hawse pipe.

c. Disconnect the port cable and attach the ranging line to the end. The ranging line is led forward and passed through the ranging snatch block and back to the capstan.

d. Veer the cable. Simultaneously, heave in on the ranging line to bring sufficient cable up on deck.

8.13.3 Towing Aft – Supply

Preparation and Equipment Layout:

a. Lash two shot mats over the port steps leading from the flight deck to the quarterdeck and one over the AX hatch.

b. The towing hawser is faked out on the port side of the flight deck from inboard to outboard. The inboard end of the towing hawser is secured to the towing pendant with a Baldt shackle.

c. The towing pendant is then attached to the towing slip with a towing shackle. Ensure that the pin in the slip is moused.

d. The towing pendant and sufficient towing hawser is lead aft and through the towing fairlead. When the pendant is at its full length, approximately 1 to 2 m will hang down the transom. This will allow the remainder of the gear to be passed without fouling. Attach a NATO link to the towing hawser with a Baldt shackle.

e. Fake out the light and heavy messenger on top of the towing hawser with the inboard end of the heavy messenger secured to the towing hawser’s NEWCO thimble with a bowline, and then stopped along the Baldt shackle, including the NATO link.

f. Once this is completed, a length of towing hawser approximately equal to that of the towing pendant is taken out through the towing fairlead.

g. The light messenger is then passed out through the towing fairlead and lead forward over the flight deck netting on the engaged side.

h. Secure the recovery line 15-25 m from the inboard end of the towing hawser with a rolling hitch. This line will be used to recover the tow.

i. Raise the flight deck netting.

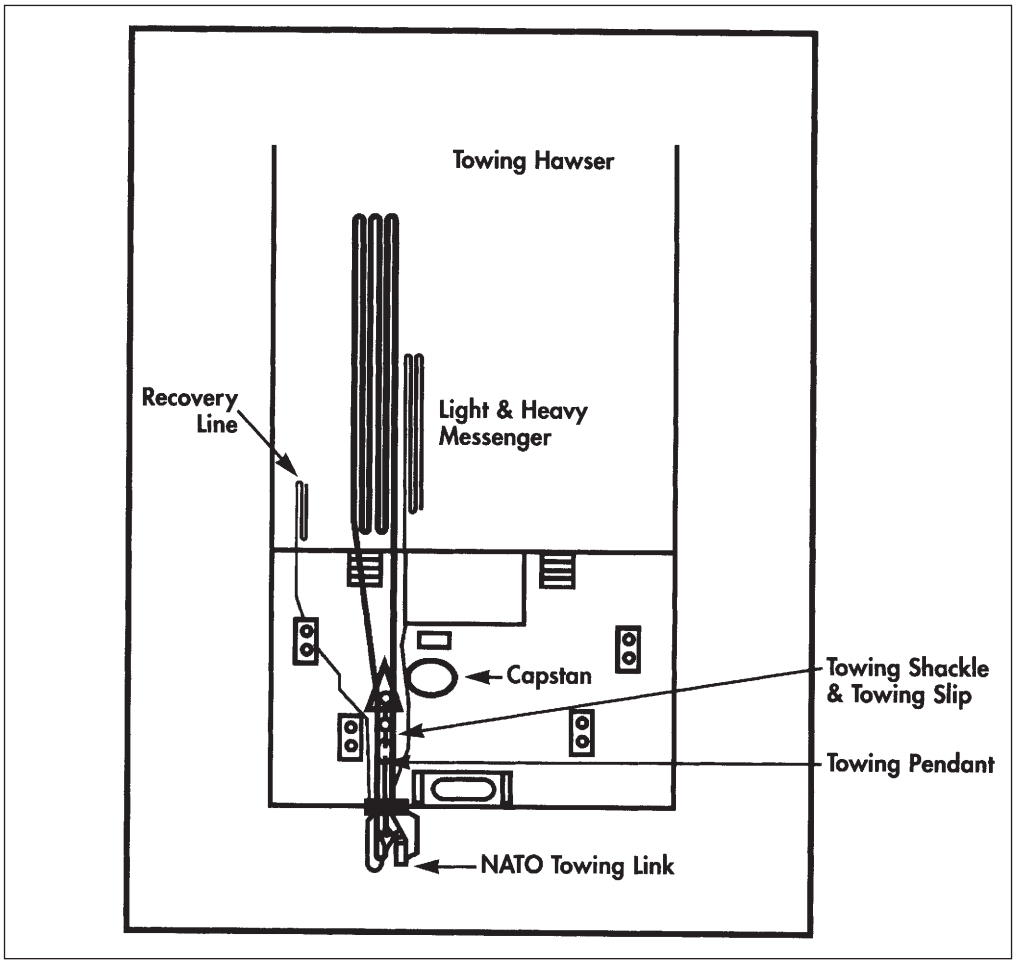

Figure 8.13-2 - HALIFAX Class Supply Aft Tow

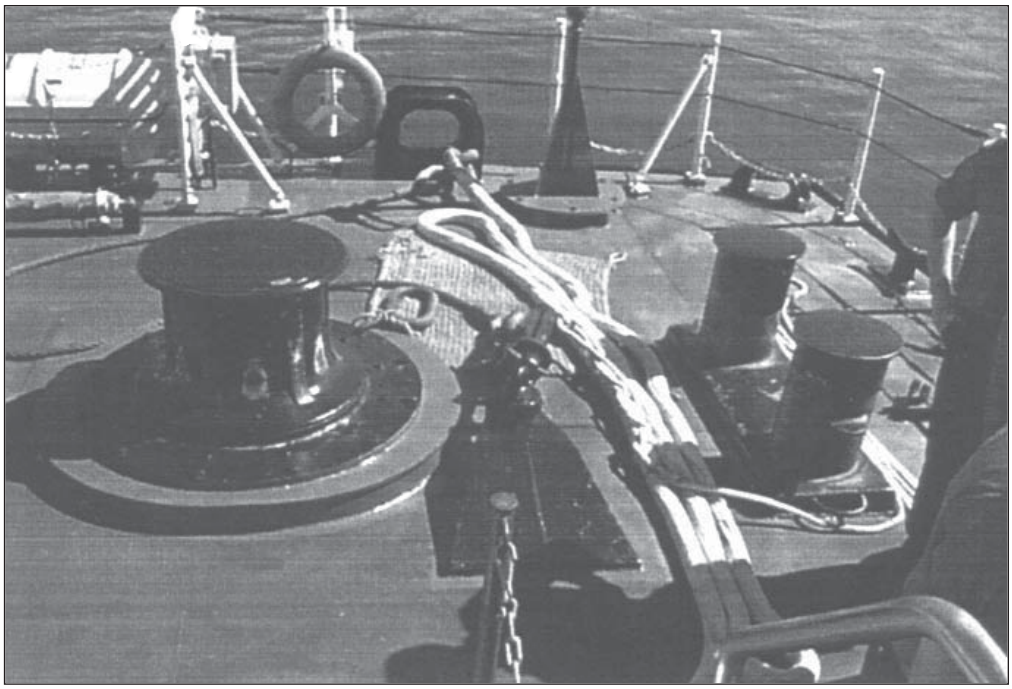

Figure 8.13-3 - HALIFAX Class Supply Aft Tow

8.13.4 Towing Aft – Receive

a. Prepare the towing slip. Ensure that the pin is moused.

b. Rig one shot mat in the dump adjacent to the towing slip.

c. Provide a towing shackle and NATO link (required only if the supplying ship's gear is not compatible).

d. Raise the flight deck netting.

8.14 KINGSTON Class

To conduct a tow, KINGSTON Class ships use two items which are unique in the Canadian Navy. They are the Adapter Link and NYLITE Rope Thimble.

a. **Adapter Link:** three links of cable, which enable the towing hawser to be attached to the ship's cable.

b. **NYLITE Rope Thimble:** a plastic thimble in the end of the towing hawser.

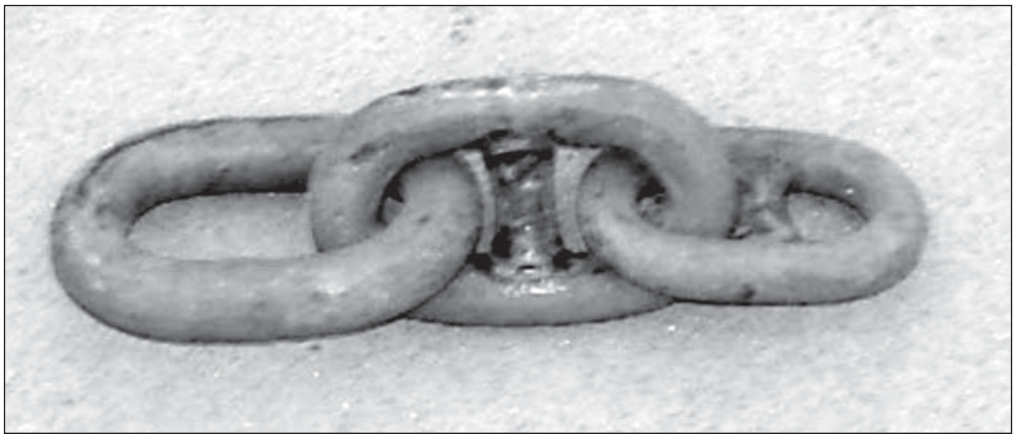

Figure 8.14-1 - Adapter Link

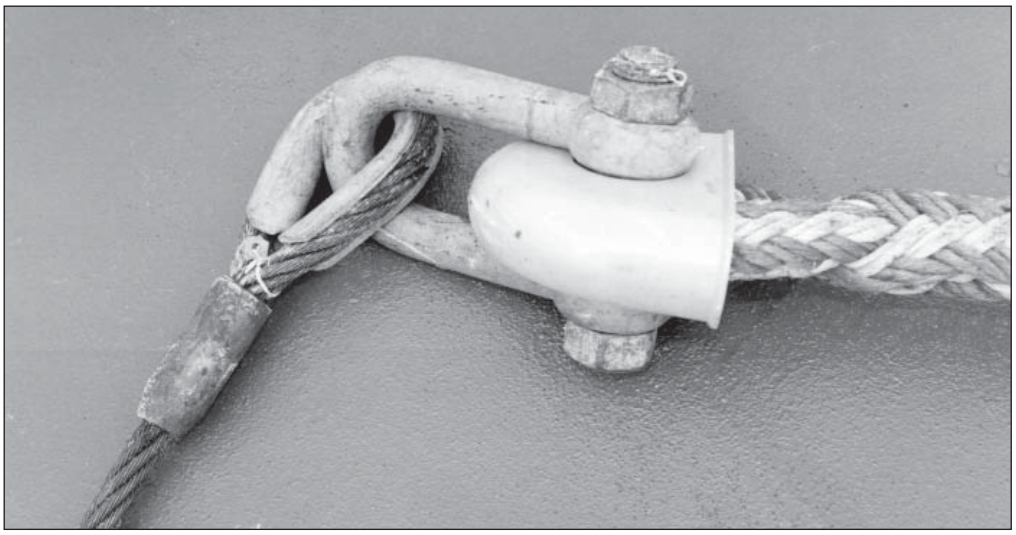

Figure 8.14-2 - Towing Pendant Attached to Towing Hawser

8.14.1 Towing Forward – Supply

Preparation and Equipment Layout:

a. Place shot mats on deck from centreline deck clench to the bullring and under the Devil's Claws.

b. Shackle centreline blake slip to deck clench.

c. Ensure 600v power is available and flash up the anchor windlass.

d. Engage the clutch and release the brake.

e. Leave the devil's claw and roller bow stopper engaged.

f. Using bullropes, veer the cable until the joining shackle is on the deck. Place cable bar through the cable at naval pipe.

g. Fake out the towing hawser on the starboard side of the focsle, inboard to outboard, and lead the outboard end forward to the bullring.

h. Break the cable, remove cable bar and using bullropes, veer until end of cable is forward of the centerline blake slip. Reinsert cable bar and attach cable to the outboard end of the towing hawser using the adapter links.

i. Attach the towing shackle to the outboard end of the towing pendant and lead the towing shackle to the bullring. The inboard end of the towing pendant is attached to the inboard end of the towing hawser using the U shackle provided. Fig 8.14.2.

j. Fake the heavy messenger outboard and attach it to the U shackle where the towing pendant joins the towing hawser. It is then stopped along the towing pendant with tarred marlin up to and including the towing shackle.

k. Fake the light messenger outboard to inboard and secure it to the heavy messenger. The end of the light messenger is led forward, out through the bullring and back over the guardrail of the engaged side.

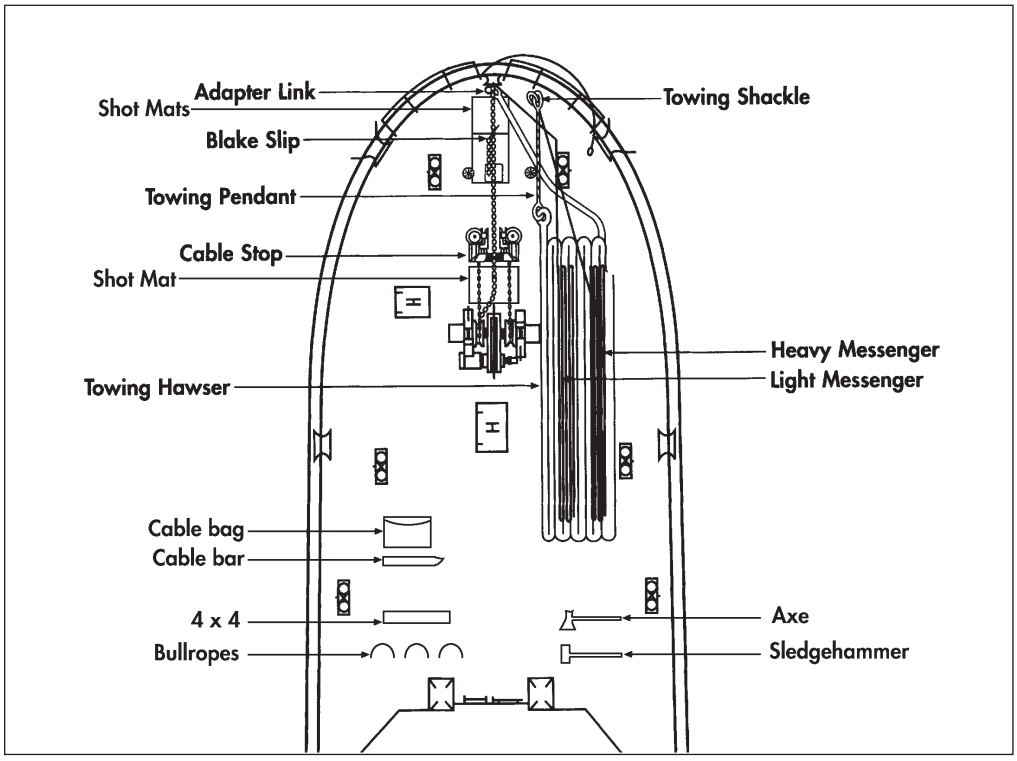

Figure 8.14-3 - KINGSTON Class Towing Forward Supply Equipment Layout

8.14.2 Towing Forward – Receive

Preparation and Equipment Layout:

a. Place shot mats on deck from centreline Blake slip to the bullring and under the Devil's Claws.

b. Shackle centreline blake slip to deck clench.

c. Ensure 600v power is available and flash up the anchor windlass.

d. Engage the clutch and release the brake.

e. Leave the devil's claw and roller bow stopper engaged.

f. Veer the cable until the joining shackle is on deck and insert the cable bar at the Naval pipe. Breakthe cable, remove the cable bar and, using bullropes, veer the cable until the end of the cable is forward of the centerline blake slip. Reinsert the cable bar and attach cable to the towing hawser using the adapter links.

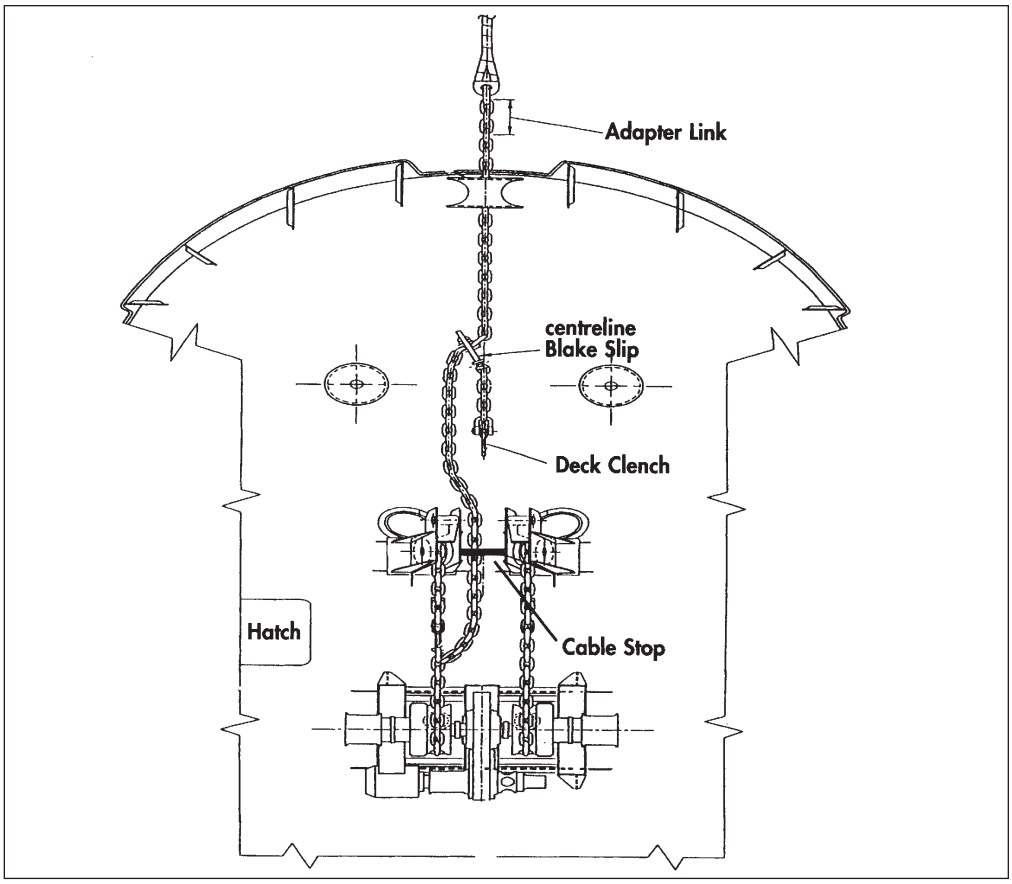

Figure 8.14-4 - KINGSTON Class Towing Forward Receive Equipment Layout

8.14.3 Tow Supply Aft KINGSTON Class Vessels

a. The I/C will give the safety brief, detail off personnel, explain their duties and responsibilities during the evolution;

b. The towing hawser is faked out on the sweepdeck inboard to outboard, Starboard Side (towing pennant inboard);

c. The towing pennant is attached to the towing hawser by a “U” Shackle;

d. The inboard end of the towing pennant is then passed out through the starboard fairlead and lead along the stern and back in through the port fairlead;

e. A shot mat is placed under the towing slip;

f. A towing Shackle is attached to the inboard end of the towing pennant and then placed over the towing Slip. The slip is closed, pin is inserted and moused with wire mousing;

g. The towing pennant and hawser are lashed to the bottom of the guardrail with tarred marlin;

h. The recovery line is lead out the port fairlead and run along the transom to the towing hawser and attached to the nylite thimble with a bowline. It is faked fwd of the Capstan (there is to be no strain on the recovery pennant at any time);

i. The Adapter Link Assembly is attached to the outboard end of the towing hawser at the nylite thimble;

j. The heavy messenger is faked out on the starboard side of the towing hawser with the eye outboard;

k. The light messenger is faked inboard to outboard, on the starboard side of the heavy messenger, with the eye outboard;

l. The inboard end of the heavy messenger is tied to the outboard end of the towing hawser appox 2M up the towing hawser (from the nylite thimble) using a rolling hitch and then lashed at intervals to the towing hawser with tarred marlin; (see note 3)

m. The adapter assembly is lashed to the heavy messenger with tarred marlin for ease of handling, particularly for the receiving ship;

n. The inboard end of the light messenger is passed through the eye of the heavy messenger and tied off using a double sheet bend (these messengers may be long spliced together). The eye of the light messenger is passed out through the starboard fairlead and lashed to the top guardrail, so it can be easily located when the gun line is to be tied off.

Note.

1. Weather Depending - A length of 4x4 is laid forward of the towing hawser, athwartships and secured to the minesweeping winch platform and the firemain support. The forward end of each fake in the towing hawser is then lashed to the 4x4 with tarred marlin.

2. Minesweeping Gear Embarked - When the minesweeping payload is embarked, the layout of the equipment will be on the port side of the Z Drive and Motor Room Hatches. All otters and depressors must be properly stored on deck and sweep wires turned up on their reels.

3. Alternate Method Rigging - The alternate method of attaching the heavy messenger to the towing hawser is by tying a bowline to the nylite thimble and lashing the adapter assembly to the heavy messenger.

Figure 8.14-5 - Towing Team KINGSTON CLASS

Figure 8.14-6 - Personal Protection Equipment, Safety Gear and Paddles KINGSTON CLASS

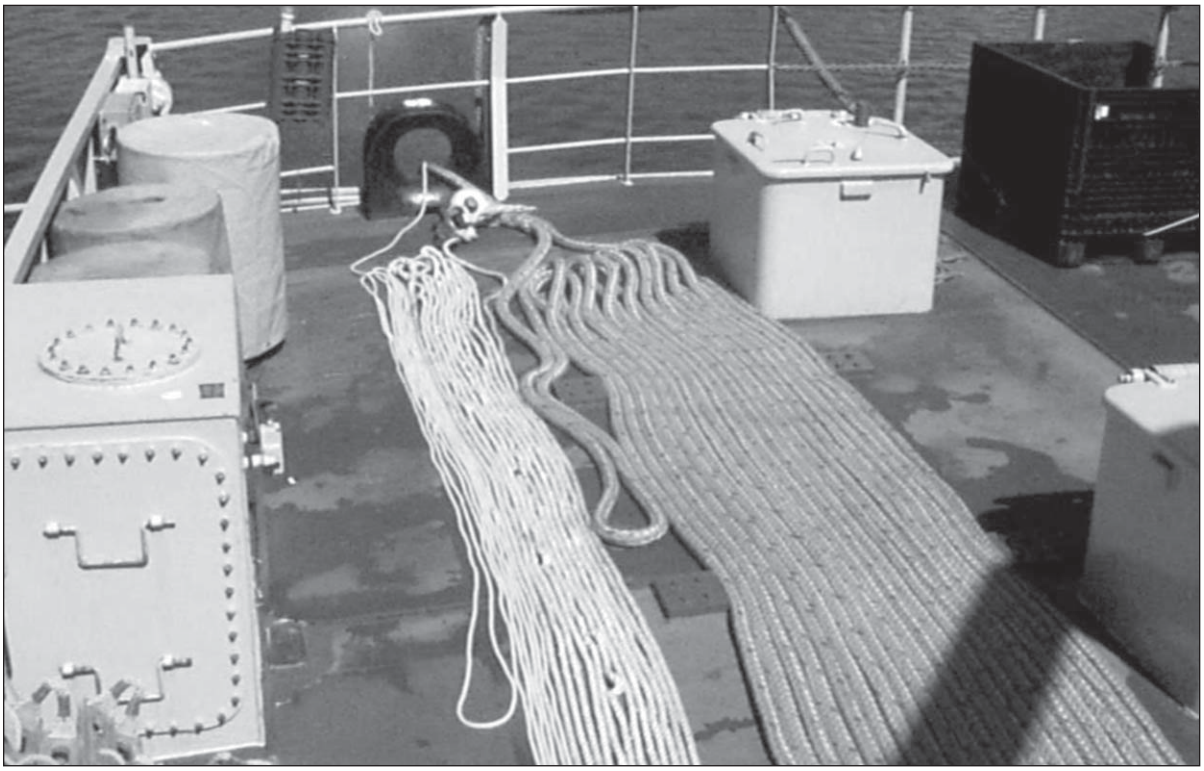

Figure 8.14-7 - Towing Lay Out Supply Aft KINGSTON CLASS

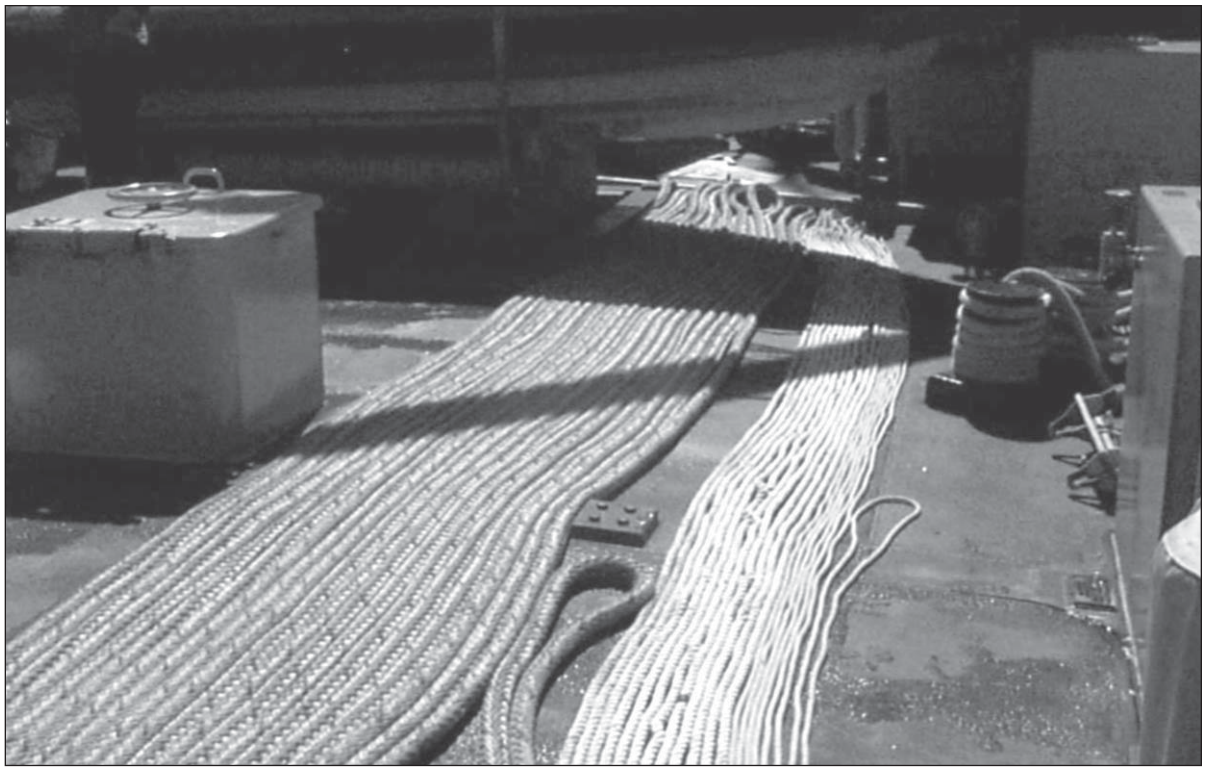

Figure 8.14-8 - Lay Out Supply Aft (looking fwd) KINGSTON CLASS

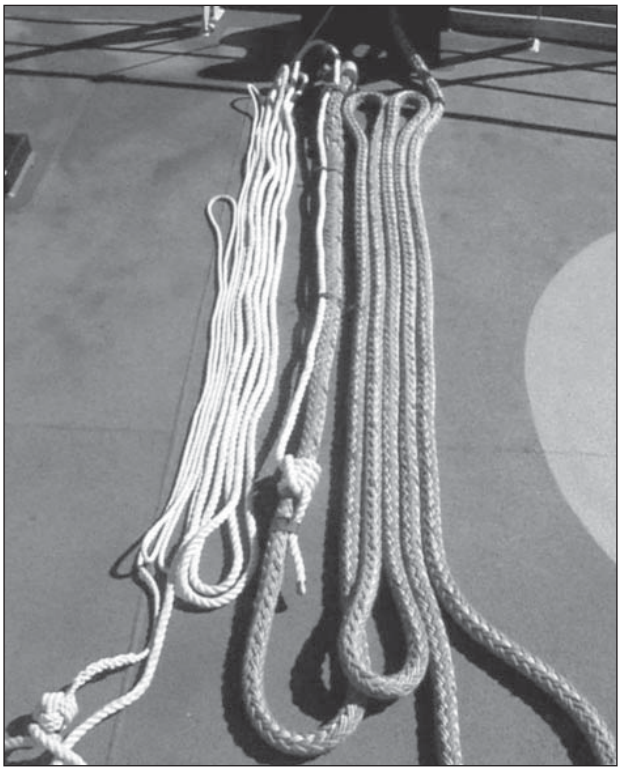

Figure 8.14-9 - Heavy Messenger attached to Towing Hawser (Primary Method) KINGSTON CLASS

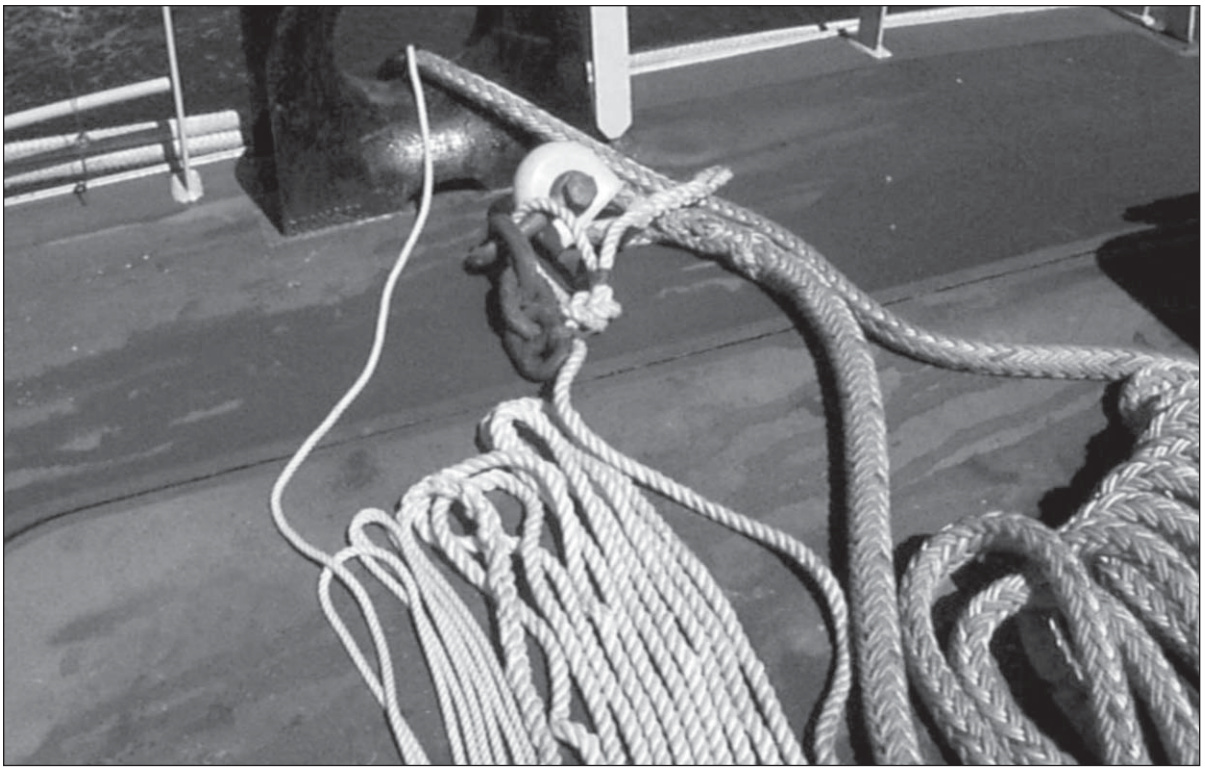

Figure 8.14-10 - Heavy Messenger Attached to Towing Hawser (Alternate Method) KINGSTON CLASS

Figure 8.14-11 - Stern View of Towing Pennant, Towing Hawser & Recovery Line (lashed to guard rail) KINGSTON CLASS

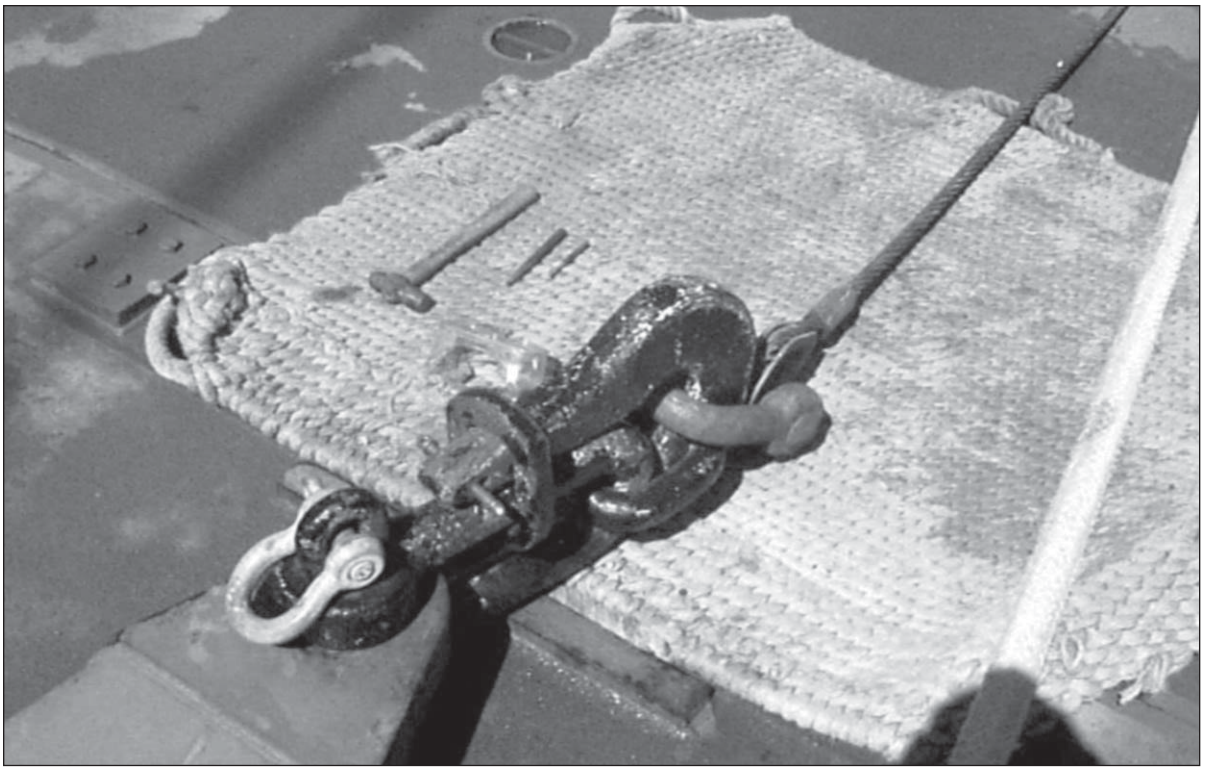

Figure 8.14-12 - Towing Slip (towing pennant attached) and Cable Tools KINGSTON CLASS

Figure 8.14-13 - Sweep Deck View of Towing Lay out KINGSTON CLASS

8.14.4 Towing Aft – Receive

Preparation and Equipment Layout:

The only preparation required to receive a tow aft is to place a shot mat at the towing slip position and open the towing slip.

8.15 AOR 509/510 Class

8.15.1 Towing Forward – Supply

Preparation and Equipment Layout:

a. The light and heavy messengers are faked out on the focsle on the opposite side from the tow. The lines are faked out from outboard to inboard commencing with the light messenger outboard.

b. The inboard end of the heavy messenger is led forward over the bulwarks and around the bow. It is then brought back inboard through the forward roller fairlead and attached to the NEWCO thimble on the towing hawser by a bowline.

c. The towing hawser is faked out on the engaged side inboard to outboard. A 4 x 4 stopper is secured to a strong point on the breezeway deck immediately aft of the towing hawser to which the after bights of the towing hawser are stopped.

d. The inboard end of the towing pendant is secured to the towing hawser with a lugless anchor shackle. Secure the towing shackle to the outboard end of the towing pendant.

Note.

A NATO link may be fitted to the outboard end of the towing pendant if the receiving ship's towing slip or fairlead is not compatible with PROTECTEUR/PRESERVER's gear.

e. The heavy messenger is seized to the towing pendant every 45 cm commencing at the inboard end of the towing pendant and working forward to and including the towing shackle.

f. Bring the marked end of the towing hawser to the forward bollards and fill with turns. The lead for the running end must come from the bottom of the bollard.

g. Lead the hawser aft to the after bollard and fill the bollard with turns. Leave a section of hawser approximately 15 m in length in order to freshen the nip during a long tow.

h. Secure the end of the towing hawser to the bollard strop on the roller pedestal.

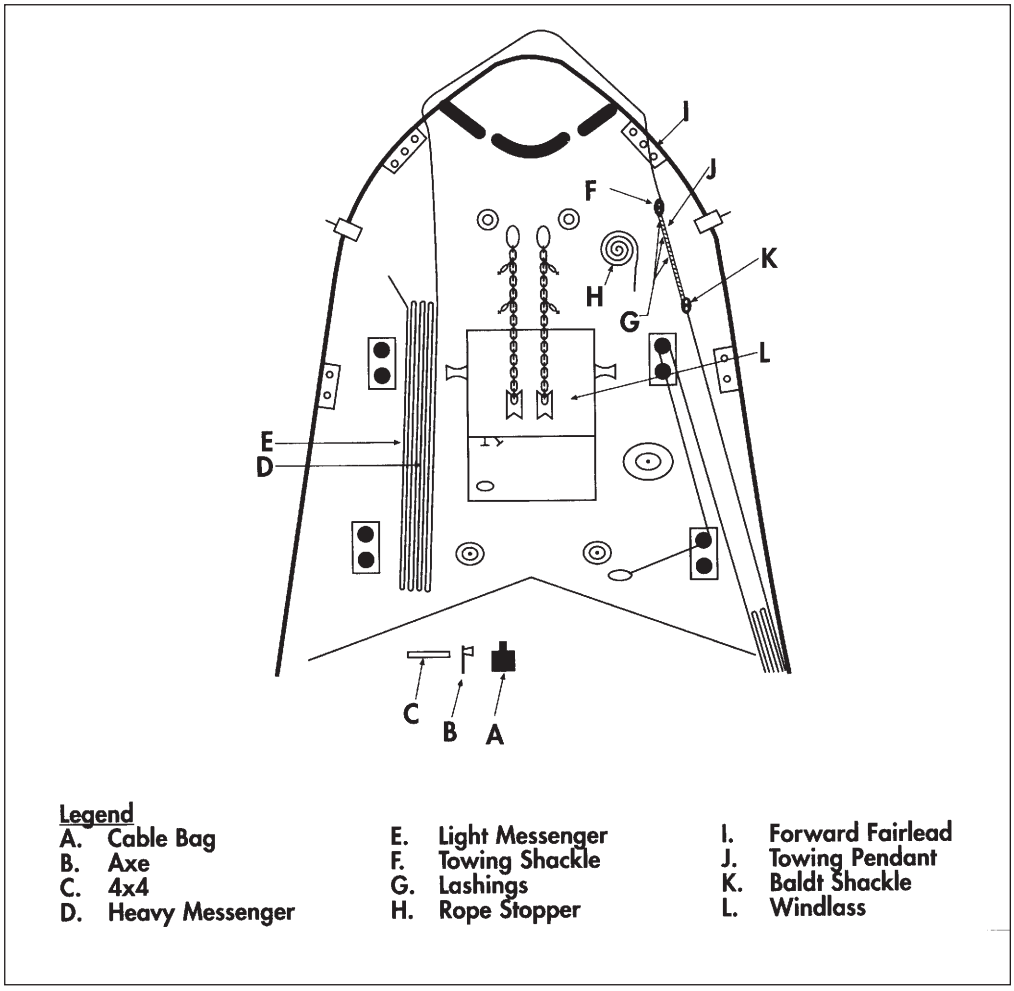

Figure 8.15-1 - AOR 509/510 Class Towing Forward – Supply

8.15.2 Towing Forward – Receive

Preparation and Equipment Layout:

a. This is a simple evolution that merely requires that a bollard strop and slip be rigged on the after bollard of the side on which the tow will be received.

b. The supplying ship closes to a safe working distance and passes a gunline with a light/heavy messenger attached to it. This is led through the forward roller fairlead and heaved in by the line handlers until there is enough towing hawser aboard to fill two bollards plus 15 extra metres.

c. The forward bollards are filled first and then the after bollards. Finally, it is taken to the bollard slip that is secured to the after pedestal roller.

8.15.3 Towing Aft – Supply

Preparation and Equipment Layout:

a. The towing hawser is faked out fore and aft along the starboard breezeway. Forward bights of the towing hawser fakes are secured to a 4 x 4 strong back which has been secured to the deck. Fakes are secured to the 4 x 4 by means of a single turn of tarred marlin.

b. The inboard end of the towing hawser is secured to the towing pendant with a lugless anchor shackle.

c. The inboard end of the pendant is fitted with a towing shackle, which is then secured to the towing slip starboard side aft in line with the towing fairlead. Ensure the pin in the slip is moused.

d. On the outboard end of the towing hawser attach the NATO link to the NEWCO thimble with a Baldt shackle.

Note.

A NATO link may be attached to the Baldt shackle if the receiving ship's cable is incompatible with PROTECTEUR/PRESERVER's.

e. The heavy and light messengers are faked out on the port side with the light messenger outboard.

f. The inboard end of the heavy messenger is led out over the bulwarks across the stern and back in through the starboard towing fairlead and attached to the outboard end of the NEWCO thimble by means of a bowline and then lashed every 45 cm out to and including the NATO Link.

g. The recovery line is bent on to the towing hawser 15-25 m from the inboard end with a rolling hitch. This line will be used to recover the tow.

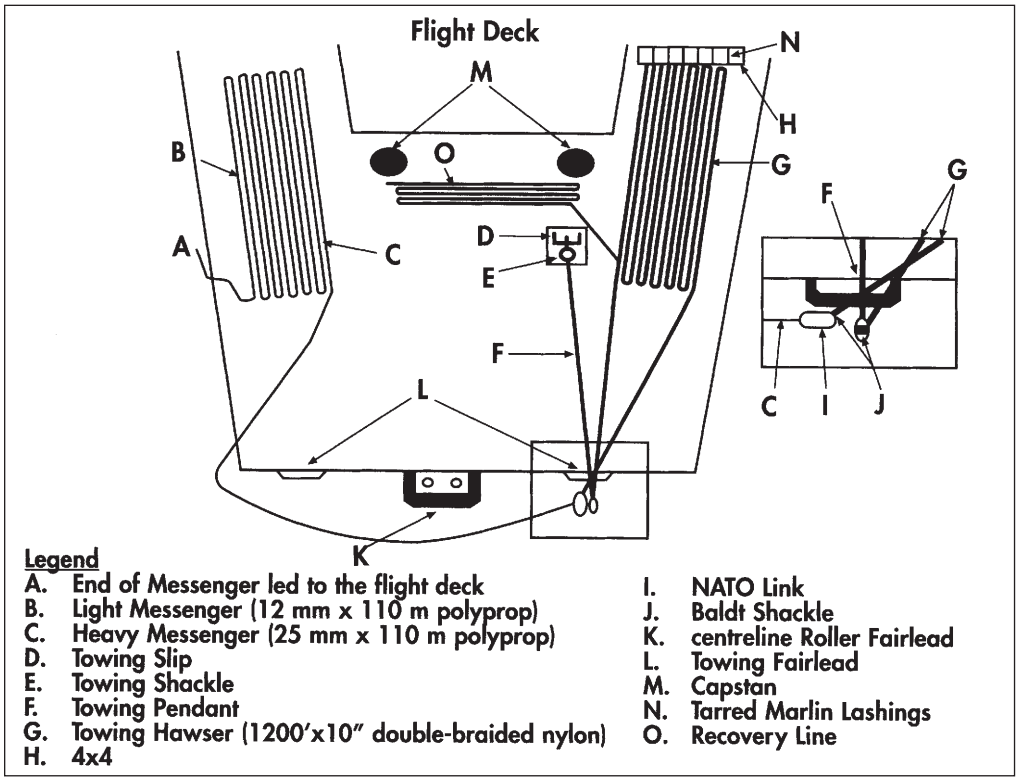

Figure 8.15-2 - AOR 509/510 Class Towing Aft – Supply

8.15.4 Towing Aft – Receive

Preparation and Equipment Layout:

Equipment setup is very simple for this evolution. All that is required is a towing slip with a shot mat rigged beneath it and associated gear laid out close at hand.

8.16 VICTORIA Class

8.16.1 Towing Forward – Receive

a. Personnel Required:

(**1**) Full casing party; and
(**2**) Swimmer.

b. Equipment Required:

(**1**) General casing bag;
(**2**) Capstan and windlass control bar;
(**3**) Towing shackle; and
(**4**) One 7 m length of 15 mm diameter rope.

c. Procedure:

(1) The cable is broken, brought up on deck and rigged with the towing shackle as for going to a buoy. The forward fairlead is raised and the clip rope is attached to it. The other end is rove through the towing shackle and then laid to one side.

(2) The gunline and then light and heavy messengers are passed through the forward fairlead and heaved in by the casing party. If the weight is too great, the capstan can be used. The towing hawser will come aboard and is then shackled to the submarine's cable. The slip rope is now manned by three men and backed up to take the weight of the towing hawser and cable. The heavy messenger is then received and the tow and cable slipped. The cable is veered approximately 1 to 2 inches and secured by the blake, brake and guillotine.

(3) To slip the tow, the cable is heaved in and the slip rope is rigged around the towing hawser eye. The blake will again be veered as the slip rope is heaved in until the towing hawser and cable are on deck. The towing shackle is then removed and the heavy and light messengers reconnected. The lines are then slipped and the towing vessel recovers. The cable must then be reconnected to the anchor.

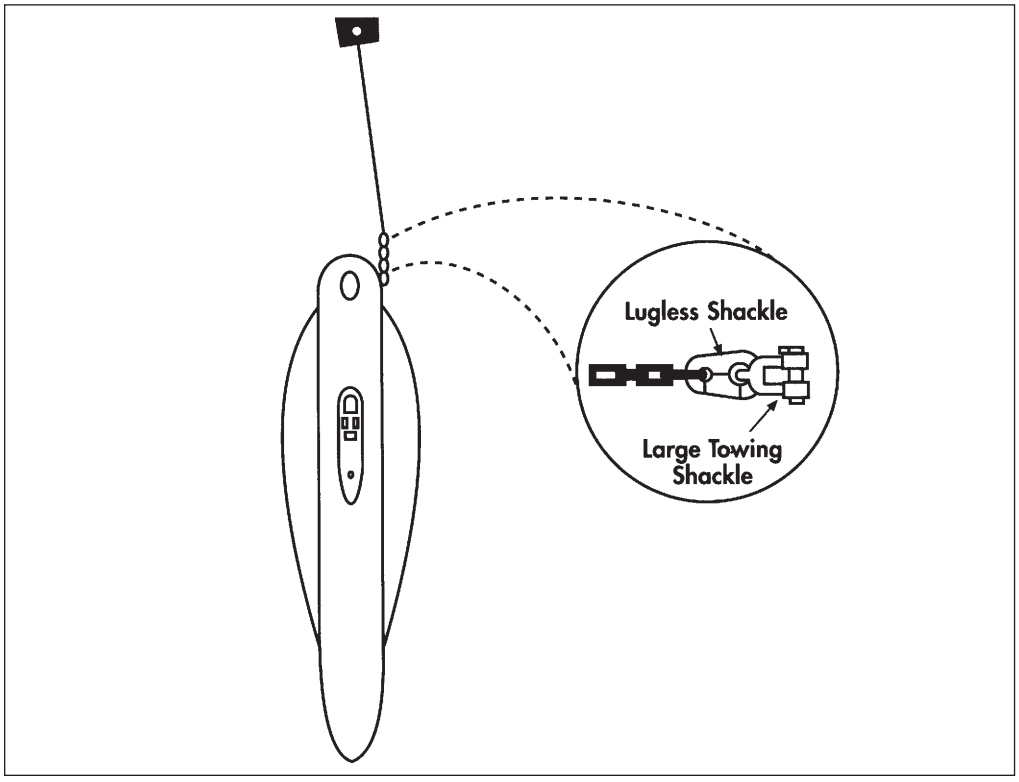

Figure 8.16-1 - VICTORIA Class Towing Using Submarine Anchor Chain

8.16.2 Towing Aft – Supply

Due to the design of a submarine, it is a very poor vessel to conduct a tow. A submarine is not equipped with a towing hawser, so it is always preferable for her to receive. If a submarine must provide, one of her berthing hawsers will be used. The evolution is one that must be well thought out and depends on sea state, distance of travel and size of vessel being towed.

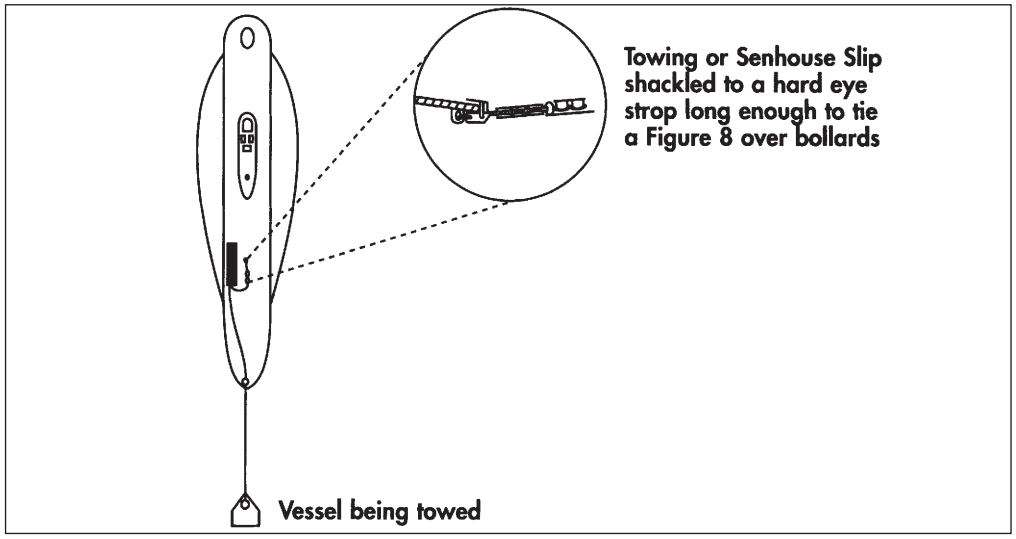

Figure 8.16-2 - VICTORIA Class Towing from Astern

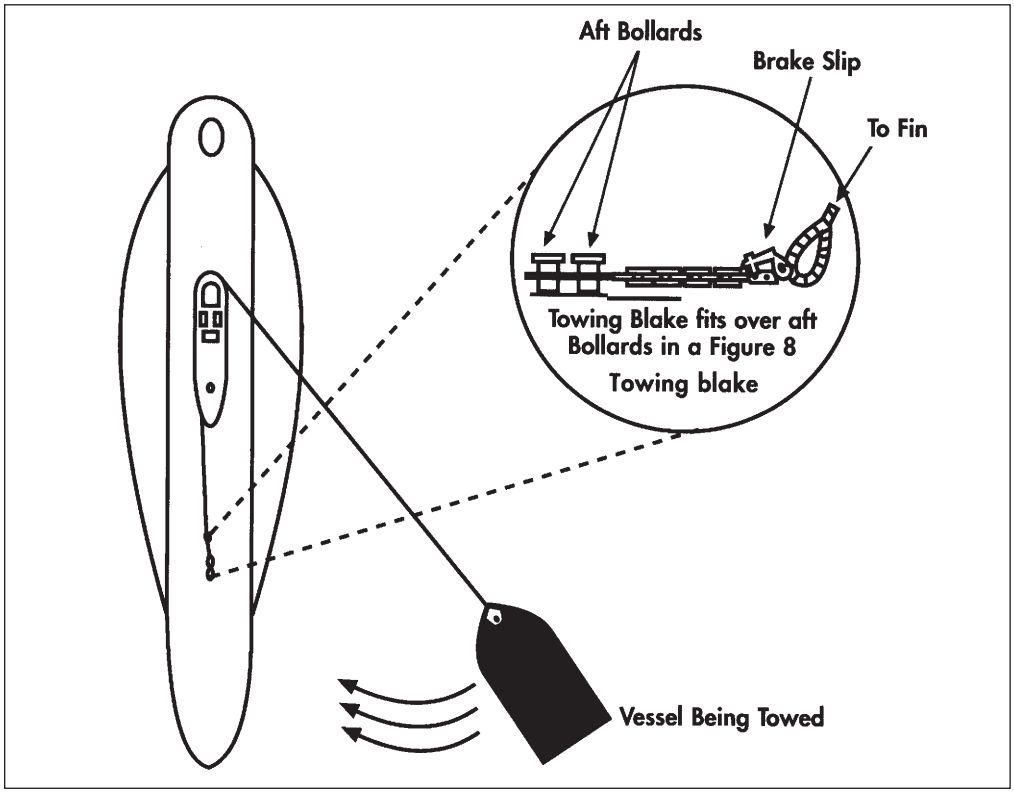

Figure 8.16-3 - VICTORIA Class Towing another Vessel

8.16.3 Emergency Towing:

a. Personnel Required:

(**1**) Casing Officer;
(**2**) SCRATCHER;
(**3**) DICKIE;
(**4**) six to eight OS-LS; and
(**5**) Bridge signalman.

b. Equipment Required:

(**1**) Bridge coaming roller assembly;
(**2**) Bridge snatch block;
(**3**) Control room snatch block;
(**4**) One rope stopper;
(**5**) Towing shackle;
(**6**) General casing bag;
(**7**) Axe;
(**8**) Gunline, rifle and ammo;
(**9**) One roll of polypropylene floating line; and
(**10**) Batons for bridge signalman.

c. Procedure:

(**1**) When the order "STAND BY TO TOW FORWARD" is passed the following action will take place:
  (a) Check towing slip is secured;
  (b) Rig the bridge for transfer (same as light line transfer);
  (c) Remove towing pendant covering plate and free up the eye; and
  (d) Secure towing shackle to pendant.

(**2**) When the gunline is passed, the light and heavy messengers will come across and be rove through the transfer assembly to the control room. The towing hawser will then be heaved across. The eye of the hawser is secured to the towing pendant by the towing shackle. The heavy messenger is then removed. As the strain comes on, the towing hawser will rip the pendant out of its securing points on the fin and starboard casing and pull it out tight until it is towing the submarine.

(**3**) To slip this tow, the slip is operated and the towline is then heaved aboard the towing vessel.

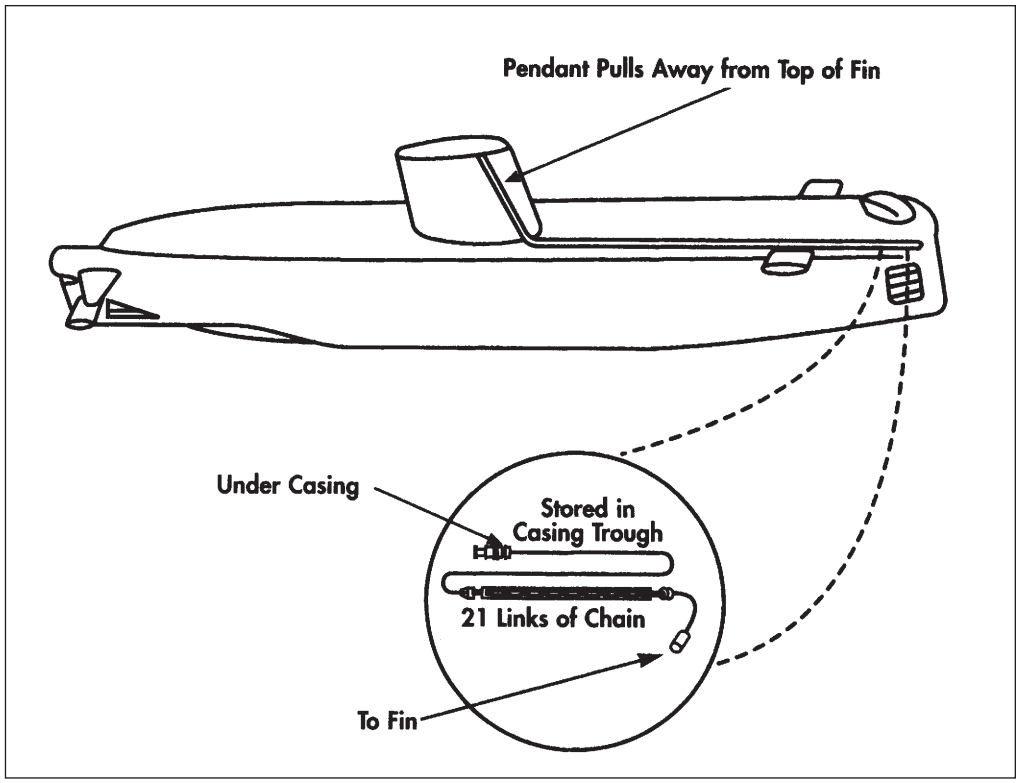

Figure 8.16-4 – VICTORIA Class Emergency Submarine Towing Pendant

CHAPTER 9
Replenishment at Sea

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CHAPTER 9
Replenishment at Sea

9.1 Introduction

a. In order for a ship to conduct prolonged operations away from shore bases for extended periods, a ship must conduct a RAS (Replenishment at Sea). Underway Replenishment (UNREP) is achieved when a Supply or Auxiliary Oil Replenishment (AOR) Class ship steams a steady course and speed while another, the receiving ship, closes to and maintains station abeam at a distance of 24 - 36 m. In operations using tensioned spanwires or high lines, the distance may be increased to 42 m or more. Any ship can be tasked as a supplying unit; however, for the purposes of this and follow-on articles, the supply ship will be referred to as the AOR.

b. When the receiving ship is in station, the AOR passes the gear required to effect the replenishment. Transfer then takes place and can range from small stores items to pallets of ammunition and barrels of fuels, for both the ship and embarked helicopter(s). It is normally the duty of the receiving ship to maintain station on and correct distance from the AOR.

c. The primary reference to be consulted prior to replenishment operations with NATO countries is *ATP 16-current edition (Navy), Replenishment at Sea*. ATP 16 provides background information and detailed procedures to support CFCD 105 and provides naval forces with a common knowledge base of RAS problems. Areas of concern to seamen include differences in equipment, span-wire/highline tensions, variations in procedures, locations of stations and liquids and heavy transfer capabilities.

9.2 Types and Methods of Replenishment

9.2.1 Methods of Replenishment

There are three principal methods of replenishment: Abeam, Astern and Vertical.

a. **Abeam Replenishment.** By far the most common, the abeam method involves two ships steaming side-by-side at an optimum distance of 24 - 36 m. All commodities, liquids and personnel can be transferred. Often, a three-ship RAS will occur, with the AOR transferring to two ships simultaneously, one stationed on either side.

b. **Astern Replenishment.** With the astern method, the receiving ship takes station astern of the AOR at an optimum distance of 150 m. Only fuel can be transferred, which limits this method's utility. The astern method is not conducted frequently in the Canadian Navy since none of the AORs are configured to do so. It is a method more common among other NATO navies.

c. **Vertical Replenishment (VERTREP).** VERTREP refers to the use of a helicopter to transfer commodities or personnel between ships, or to and from shore-based units. When a Helicopter Air Detachment (HELAIRDET) is embarked, personnel from the Air Department are responsible for all aspects of VERTREP. However, when no HELAIRDET is embarked, it is the responsibility of the Deck Department to provide Bosns trained in VERTREP operations.

9.2.2 Types of Replenishment

There are six types of replenishment used in the Canadian Navy: Light Line, Light Jackstay, Heavy Jackstay, Liquids Transfer, Consolidation and VERTREP.

a. **Light Line.** This is a simple evolution used to transfer light stores of up to a maximum weight of 23 kg, e.g., spare parts and mail. It is a very quick evolution as it involves few personnel and very little preparation is required. A distance line is not normally required.

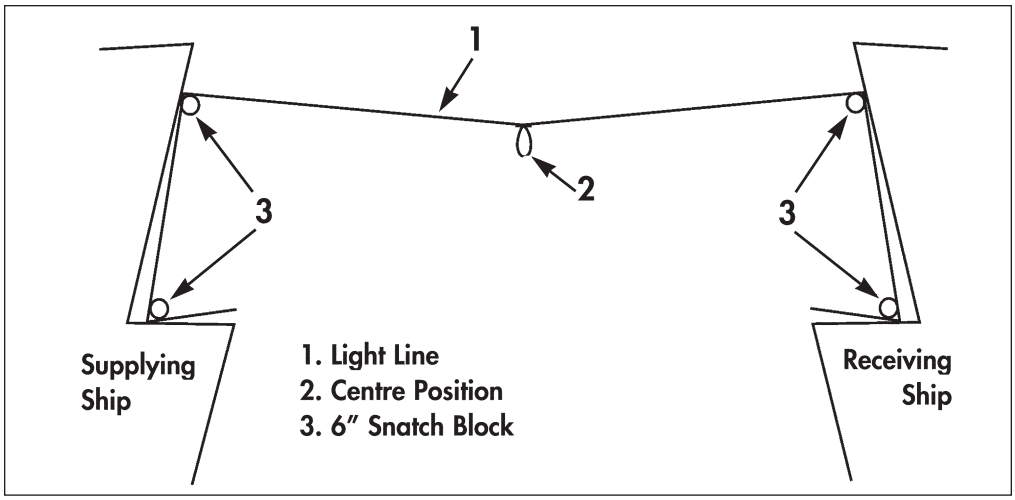


Figure 9.2-1 - Light Line

b. **Light Jackstay.** This type of replenishment, normally conducted at the forward stations, is used to transfer medium amounts of provisions up to a maximum weight of 227 kg per load. As well, this is the method used to transfer personnel between ships whenever the use of boats or helicopters is deemed to be operationally inexpedient. This is a labour-intensive evolution as the entire transfer is conducted by hand. The jackstay line is manned by a minimum of 20 personnel and the inhaul/outhaul lines by a minimum of six personnel.

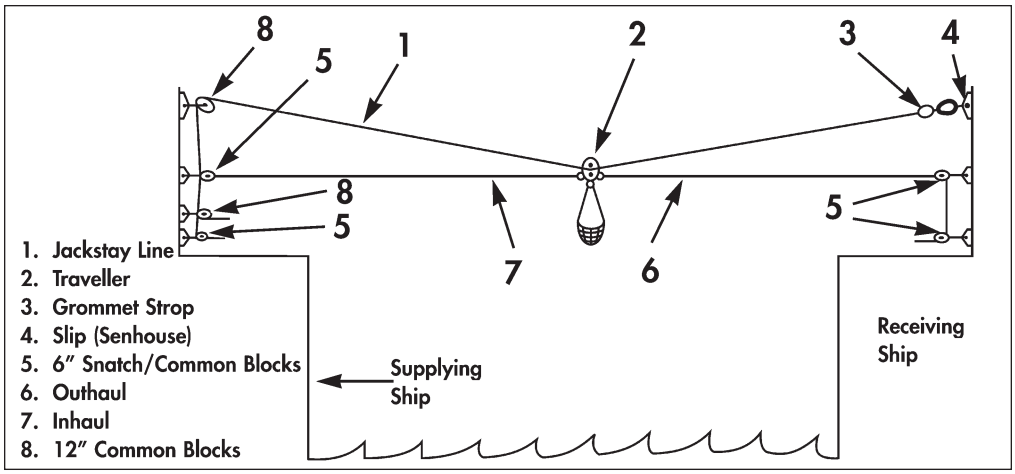


Figure 9.2-2 - Light Jackstay

c. **Heavy Jackstay.** This type of replenishment is used to transfer heavy amounts of provisions and ammunition (including torpedoes) up to a maximum weight of 1365 kg per load. The heavy jackstay comprises a tensioned rig system, with all wires being kept under constant tension by the AOR. The load is suspended from a traveller which is hauled back and forth by winches controlled in the AOR.

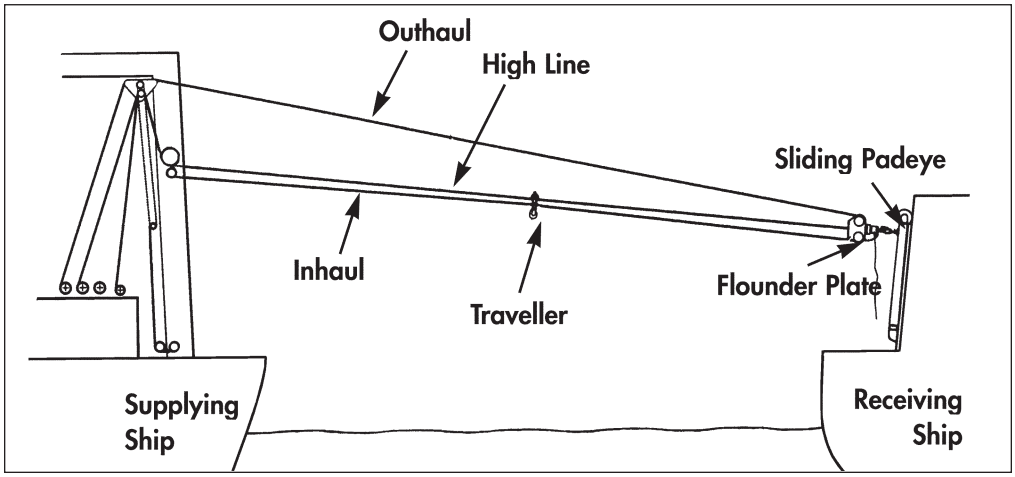


Figure 9.2-3 - Heavy Jackstay

d. **Liquids Transfer.** This type of replenishment can be conducted either abeam or astern to transfer fuels (distillate/aviation fuel) and water. The abeam method involves the AOR supplying fuelling hoses suspended from a spanwire, with all wires being kept under constant tension by the AOR (with the exception of the slack rigs fitted on some allied AORs). There are two types of fittings used by the Canadian Navy to transfer distillate: the Probe Receiver Assembly, and the NATO "B"; with the preferred fitting being the Probe Receiver. There is only one principal type of fitting used to transfer aviation fuel:

the NATO standard F44 coupling (Carter Underwing Type). With the astern method, the fuelling hoses are streamed astern of the AOR and the receiving ship hauls the hoses on board and takes on fuel at her forward station. The fitting used for this evolution is the NATO "B".

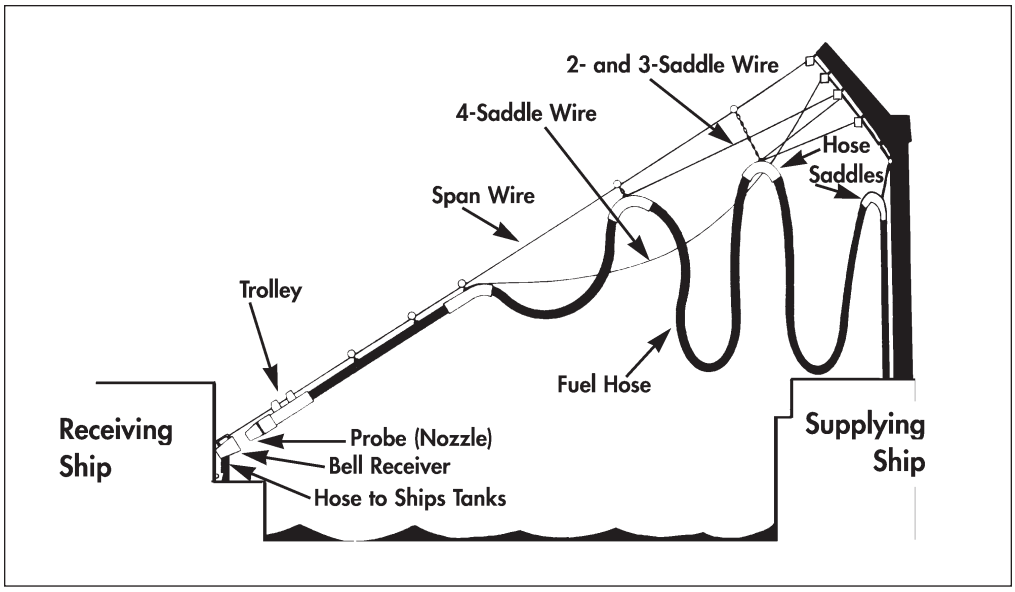


Figure 9.2-4 - Liquid Abeam Method

e. **Consolidation.** This type of replenishment is used for the transfer of provisions or liquids between AORs, and most commonly refers to the re-fuelling of an AOR by a larger AOR with a greater fuel tank storage capacity. For Canadian AORs, a consolidation RAS implies the receiving of fuel from a larger allied navy AOR during extended deployments abroad when a shore-based fuel depot may not be available. One AOR will pass a tensioned rig system to the other via the abeam method and execute the transfer.

f. **VERTREP/Hoist.** This type of replenishment is used to transfer provisions and personnel. The provisions may be suspended below the helicopter (VERTREP) or held within the cargo area with the personnel, in which case a winch is used to hoist the stores. The maximum weight that can be transferred depends on the type of helicopter being used, the number of crew and the type of equipment embarked, as well as the amount of fuel remaining in the helicopter.

9.3 RAS Capabilities of HMC Ships

The following tables list HMC ships by Class, and indicate the RAS stations and commodities that are transferred at each.

9.3.1 HALIFAX Class

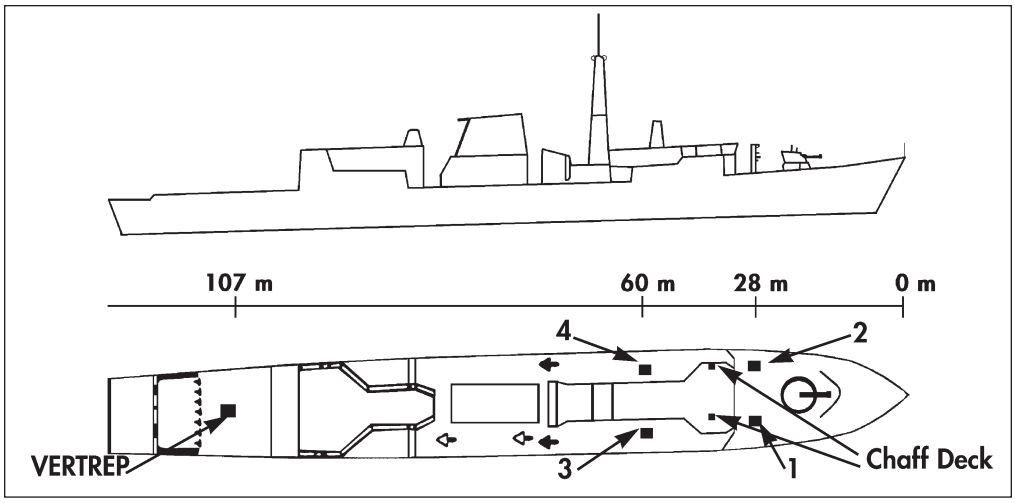


Figure 9.3-1 - HALIFAX Class

Table 1 RAS Stations HALIFAX Class

RAS Stations	1 and 2	3 and 4	Flight Deck/FX	Chaff Deck
Method	Light Jackstay Heavy Jackstay Liquids	Light Jackstay Heavy Jackstay Liquids	VERTREP	Light Line
Commodity	Personnel Provisions Ammunition Distillate Aviation Fuel Water	Provisions Ammunition Distillate Aviation Fuel Water	Personnel Provisions Ammunition	Provisions

9.3.2 IROQUOIS Class

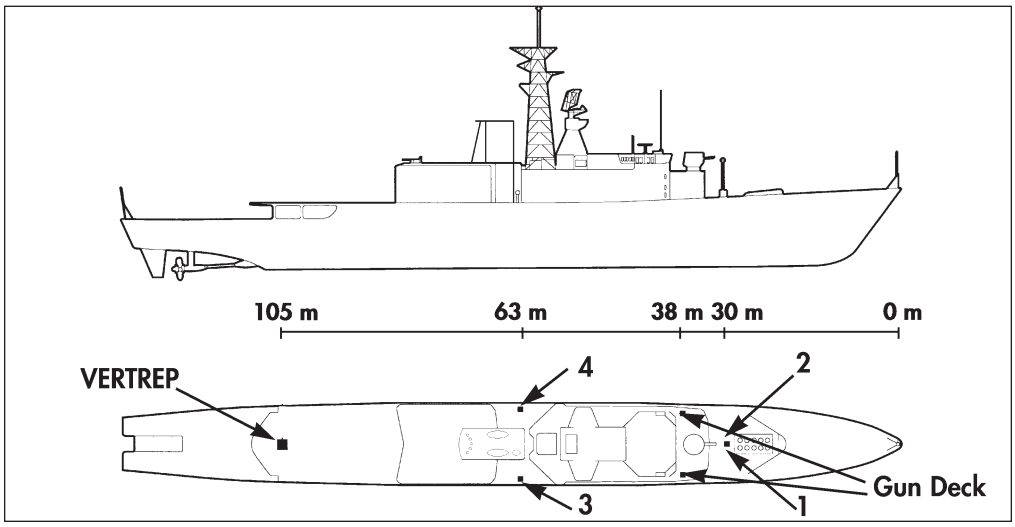


Figure 9.3-2 - IROQUOIS Class

Table 2 RAS Stations IROQUOIS Class				
RAS Stations	**1 and 2**	**3 and 4**	**Flightdeck/FX**	**Gun Decks**
Method	Light Jackstay Heavy Jackstay	Liquids	VERTREP	Light Line
Commodity	Personnel Provisions Ammunition Water	Distillate Aviation Fuel Water	Personnel Provisions Ammunition	Provisions

9.3.3 KINGSTON Class

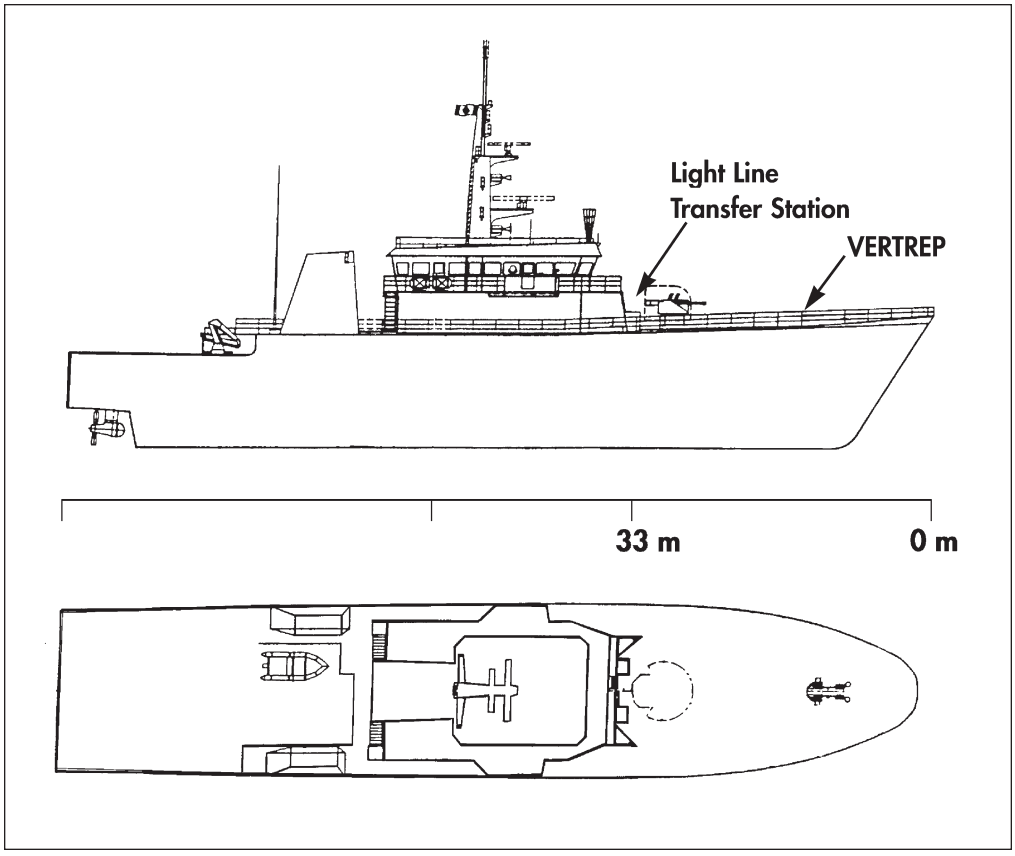


Figure 9.3-3 KINGSTON Class

KINGSTON Class ships are currently capable of light line transfers of provisions only. VERTREP can be conducted.

9.3.4 AOR 509/510 (PRESERVER/PROTECTEUR) Class

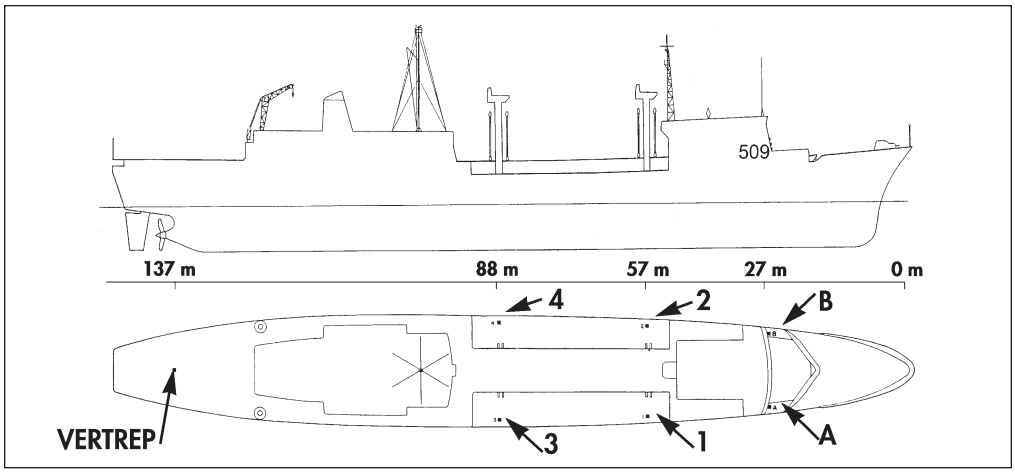


Figure 9.3-4 - AOR 509/510 Class

Table 3 RAS Stations AOR 509/510 Class				
RAS Stations	**A and B**	**1 and 2**	**3 and 4**	**Flightdeck**
Method	Light Line Light Jackstay	Heavy Jackstay Light Jackstay Liquids	Heavy Jackstay Light Jackstay Liquids Consolidation	VERTREP
Commodity	Personnel Provisions Ammunition Water	Provisions Ammunition Distillate Aviation Fuel Water	Provisions Ammunition Distillate Aviation Fuel Water	Personnel Provisions Ammunition

9.3.5 VICTORIA Class / UPHOLDER

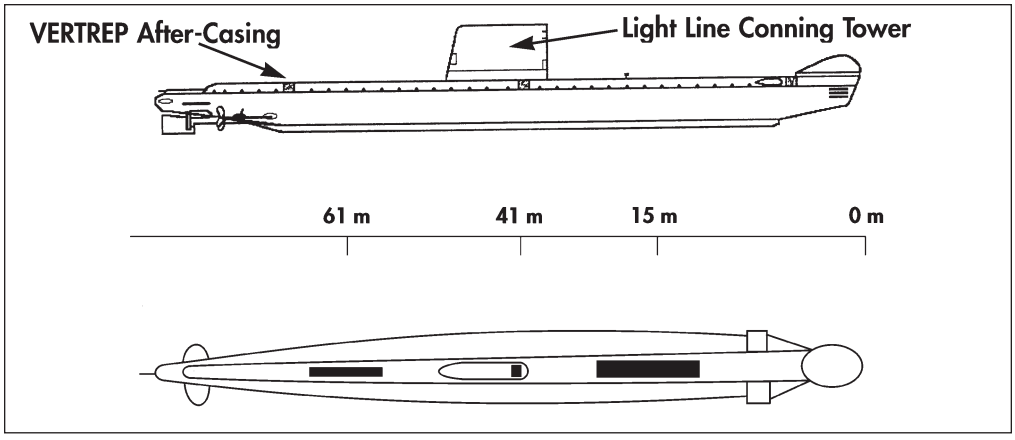


Figure 9.3-5 - VICTORIA Class / UPHOLDER

VICTORIA Class submarines are capable of conducting light line transfers of provisions from the conning tower, as well as VERTREP over the forward- (preferred) or after-casing.

9.4 Station Keeping

9.4.1 Approach/Departure

Safe approaches can be made from either the beam or quarter station, but under most circumstances the evolution will be accomplished faster from the quarter. Therefore, for tactical reasons, this is the preferred method. Approach speed from the quarter will be approximately 5 knots greater than the signalled RAS speed, with the receiving ship remaining well clear of the AOR's stern pressure interaction zone (approximately 48 m) while moving into station. During the approach, radar antennae should be stopped until gunlines/bolos are passed. If weather conditions require it, the AOR will pass amount of yaw being experienced prior to the approach. Once alongside, the receiving ship will move into 30 - 36 m to pass the gear. Similarly, during the breakaway once the RAS is complete, the receiving ship will avoid the bow interaction zone by moving out initially before increasing speed. Ships are to avoid opening until all lines are in the water enroute to the AOR. This is especially important when breaking away from a light jackstay. Only when the ships are at least 48 m apart and steering diverging courses will the receiving ship increase speed, initially 5 - 7 knots greater than RAS speed.

9.4.2 Ship Interaction and Stationing

a. By far the most pronounced source of interaction between ships during RAS operations results from the Venturi effect, when great volumes of water pass between the ships at close quarters. Zones of unequal water pressure are created which tend to either bring ships together or push them away. With Canadian ships, the Venturi effect is generally considered to be negligible at 48 m, noticeable at 30 m and pronounced at 15 m. While alongside at 30 m, a destroyer will experience a force of attraction which will tend to draw her into the AOR. Concurrently, the bow will be forced out as a result of counteracting bow pressure zones. It is therefore likely that the destroyer will adopt a small angle of yaw outwards and will have to carry some inward helm.

b. The forces generated by the tensioned spanwire(s) must also be recognized and dealt with. Under normal circumstances, Canadian AORs will apply 5443 kg tension on their wires. With ships of 3000 tons or more (HALIFAX/IROQUOIS) there is no question of "reeling" the ship in, but steering effects are certainly felt, the degree to which is determined by:

(**1**) the amount of tension,
(**2**) the location and height of the attachment points relative to the ship's pivot, and
(**3**) the displacement, draft and trim of the ship.

c. With the fuelling point low and central, no noticeable effect is experienced when the AOR tensions the spanwire unless the receiving ship is very light or is heeled inward slightly. With the kingpost forward, on tensioning, the receiving ship will initially be heeled inward causing her to tend to turn away, followed by a steady turning pressure slightly forward of the pivotal point, turning her toward. Normally, it will be necessary to compensate by steering away and carrying a few degrees of helm. In any event, once tension is applied, the forces involved are much less noticeable than the forces due to the Venturi effect at normal distances or from sea conditions, and should easily be taken into account by the Officer of the Watch and the Special Sea Duty Helmsman.

d. Once the hookup of gear on the receiving ship is complete, the following distances are the accepted norms:

(**1**) Initial alongside in fair weather for passing gear and hooking up is 30 m. This should be increased to 36 m in adverse weather conditions.

(**2**) When hookup is complete and delivery started, the receiving ship should ease out to 36 m in fair weather and up to 45 m in adverse weather. For personnel transfers, 24 - 30 m is recommended.

(**3**) During the breakaway sequence, since the AOR spanwire/highline cannot be paid out after the wires are detensioned, the receiving ship should ease toward the AOR 4 - 6 m to ensure that all residual tension due to friction through the running rigging is relieved, and remain there until all gear including the distance line is clear of the ship's side.

e. During replenishment, it is important for the receiving ship to maintain station on the AOR such that the transfer points are abeam one another. In the event that the receiving ship moves ahead or falls back such that the angle between station exceeds 30 degrees, the replenishment must stop.

9.4.3 Distance/Phone Line

a. For abeam transfers, the distance between ships is measured by a distance line which has a coloured marker flag every 6 m (see Figure 9.4-1). The zero metre end is secured to a strong point on the guide ship, with the other end being manned and kept taut by the receiving ship. The distance line is positioned so that it is visible from the bridge and is at a right angle to the centre line. The characteristics for the distance line are:

(**1**) Line 103 m of 13 mm 3-strand polypropylene with an Ingle field clip at each end. The core of the line is a ship-to-ship phone cable complete with three terminals which is for bridge-to-bridge and station-to-station communications.

(**2**) Marker Flags 230 mm canvas equilateral triangles painted sequentially green, red, yellow, blue and white. The numbers, which are painted on both sides of the triangle, have a minimum height of 75 mm. The numbers on the white and yellow triangles are black, while those on other triangles are white.

b. For night-time RAS, the distance line is fitted with coloured chemlites to mark the 6 m intervals. A red chemlite is secured to the receiving ship side of the marker flags with the exception of the 18, 30, 42 and 54 metre marker flags, which are bracketed by blue chemlites.

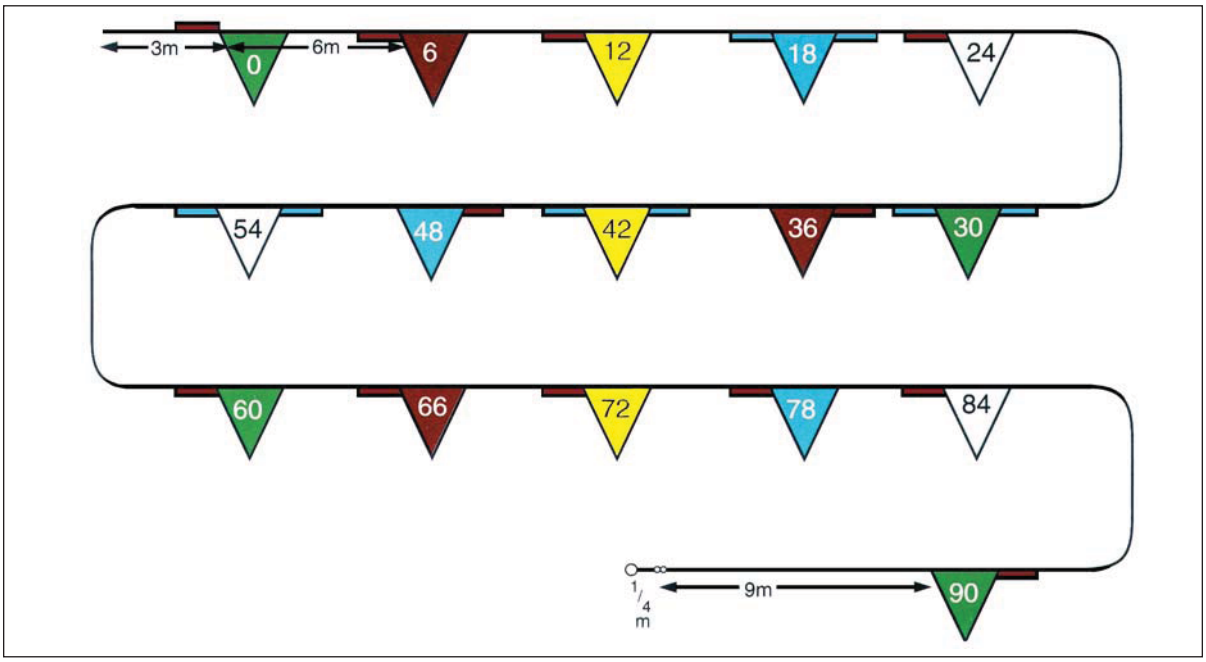


Figure 9.4-1 - Self-Tautening Distance Line Showing Position of Day and Night Markings

9.4.4 Marker Buoy

For a liquid astern replenishment, the AOR will stream a marker buoy astern. The receiving ship will maintain station on the rooster tail made by the marker buoy. Slight lateral movement will not greatly affect the replenishment, but if the receiving ship drops too far astern, unnecessary strain will be placed on the hoses and associated equipment.

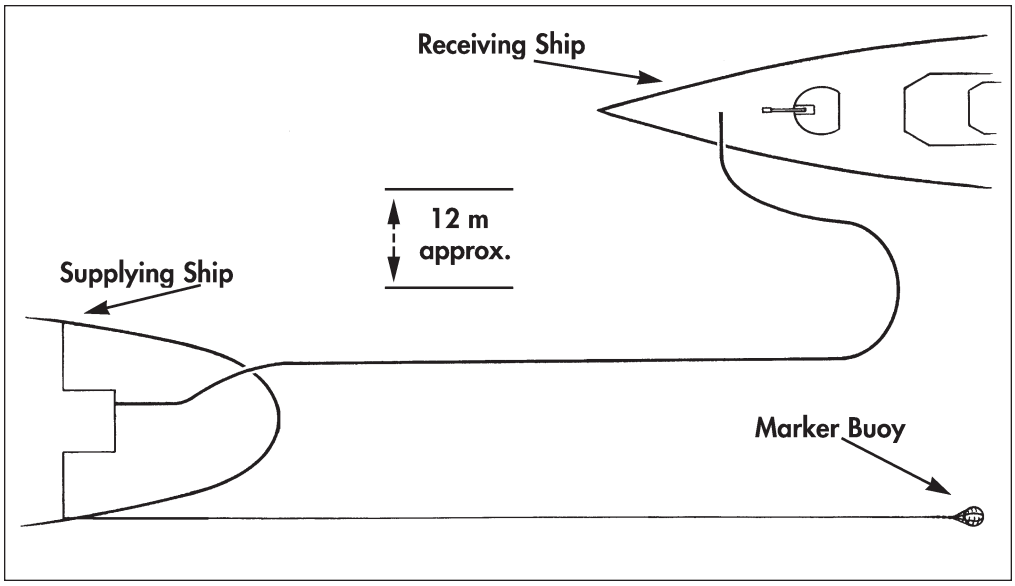


Figure 9.4-2 - Station Keeping Distances for Astern Fuelling

9.5 Communications and Signalling

9.5.1 Tactical Communication

a. As with all aspects of naval operations, effective communications are the key to the conduct of successful RAS evolutions. Prior to a RAS, important direction and information can be gained from reviewing ATP 16, which lists the characteristics of all NATO AORs. In addition, the OPTASK RAS tactical message contains specific directions concerning RAS from the Officer in Tactical Command (OTC) of the Task Group. As well, each ship's OPSTAT UNIT message lists details of RAS stations and capabilities. Finally, it is common practice for the Commanding Officers of AORs, especially in the Canadian Navy, to promulgate detailed amplifying instructions containing recent lessons learned, station idiosyncrasies, and their particular requirements for customer ships.

b. The ship's whistle is used to communicate the ship's intentions. During a RAS, there is often a requirement to alter course due to the proximity of land and/or shipping, or to maintain the navigation track. This is executed using CORPEN NOVEMBER procedures, which involves altering together in 5 or 10 degree steps to the ordered course. Each step is initiated on the ship's whistle as follows:

(**1**) One Blast - altering my course to starboard, and
(**2**) Two Blasts - altering my course to port.

9.5.2 Flag Hoists

Before and during a RAS, ships communicate with each other by using different flags and pendants that are hoisted and lowered to various positions on the yardarm by the Naval Communicators:

Signal	Meaning
 **Romeo** **Displayed on fore yardarm on side rigged**	**Delivering ship (abeam method)** **At the dip:** I am steady on course and speed and am preparing to receive you on side on which this Flag is hoisted. **Close up:** I am ready for your approach. **Hauled down:** When messenger is in hand.
 **Romeo** **Displayed on side hose being used**	**Delivering ship (astern method)** **At the dip:** I am steady on course and speed, and am preparing to stream hose on this quarter. **Close up:** I am ready for your approach. **Hauled down:** Hose is on deck of receiving ship.
 **Romeo** **Displayed on fore yardarm on side rigged**	**Receiving ship (abeam method)** **At the dip:** I am ready to come alongside. **Close up:** I am commencing approach. **Hauled down:** When messenger to hand.
 **Romeo** **Displayed on side hose being received**	**Receiving ship (astern method)** **At the dip:** I am ready to close and take hose. **Close up:** I am commencing approach. **Hauled down:** Hose grappled and in hand on deck.
 **PREP** **Displayed at the outboard yardarm**	**At the dip:** Expect to disengage in 15 minutes. **Close up:** Am disengaging at final station. **Hauled down:** All lines are clear.
 **Bravo** **Displayed where best seen**	**Close up:** Transferring fuel or explosives. **At the dip:** Temporarily stopped transfer. **Hauled down:** Transfer completed.

Figure 9.5-1 - Flag Hoists Used during Daylight Replenishment

9.5.3 Thunder Whistles

The station supervisor will signal his/her intentions by the use of a thunder whistle:

(**1**) One Blast by Firing Ship - prepare to receive my gunline/bolo,
(**2**) Two Blasts by Receiving Ship - ready to receive your gunline/bolo, personnel have taken cover, and
(**3**) Three Blasts by Receiving Ship - lines lost. Pass another line (commence cycle again with one blast).

9.5.4 RAS Paddles and Wands

a. For all methods of replenishment, the primary means of station-to-station communication are the RAS paddles by day and the RAS wands by night. The paddles are 30 cm x 30 cm and are individually painted red, green (with one 25 mm white diagonal stripe corner-to-corner), yellow and white. The paddles can be used individually or collectively in various positions or manners to indicate certain actions, or in order to pass information.

b. The colour of the paddle or wand, if used by itself or in conjunction with others, signifies a certain meaning:

(**1**) Red - working lines or wires,
(**2**) Green - working fuels (distillate, aviation fuel),
(**3**) Yellow - blow through,
(**4**) White - working water,
(**5**) Green/Green - communications,
(**6**) Red/Yellow - tension/detension, and
(**7**) Red/Green - secure.

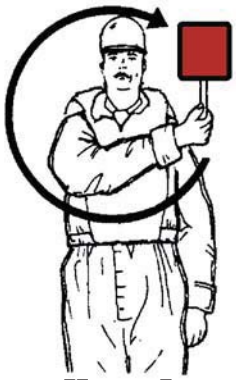
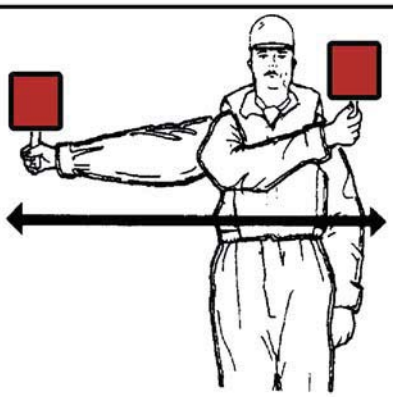
Signal	Remarks
 Heave In	Signalman moves red signal device in a continuous complete circle in front of the body. When/where appropriate the other ship answers with the 'Check Away' signal.
 Avast	Signalman moves red signal device horizontally in front of the body, meaning for the other ship to avast heaving or checking away as appropriate.
 Check Away	Signalman moves red signal device vertically in front of the body, meaning for the other ship to check away the appropriate line, wire or hose until another signal is given.

Figure 9.5-2 - RAS Paddle Signals

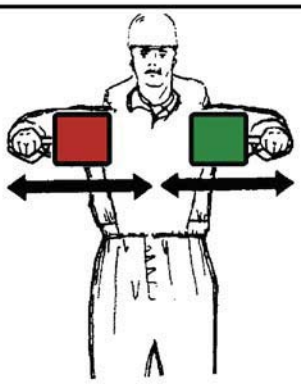
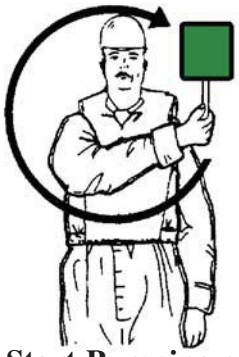
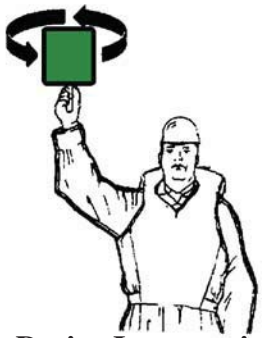
Signal	Remarks
 **Hooked Up or Connected**	Signalman, with red signal device in right hand and green signal device in left hand, touches devices horizontally in front of the body at shoulder height, meaning 'Hooked Up or Connected'. Initiated by receiving ship and acknowledged by delivering ship with same signal.
 **Start Pumping or Commence Transfer**	Signalman moves green signal device in a continuous complete circle in front of the body. This signal, executed by either ship, indicates 'I am ready to start pumping'. When repeated by the other ship, begin transfer and commence signalling with red paddle. If not ready to commence operation, the Avast signal is used.
 **Desire Increase in Pumping Pressure**	Signalman on the receiving ship moves green signal device in a continuous circle over his head to indicate to the delivering ship that an increase in pumping pressure is desired.

Figure 9.5-2 (cont) - RAS Paddle Signals

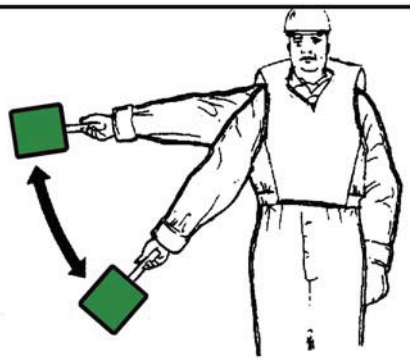
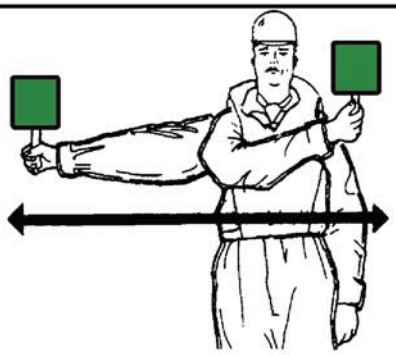
Signal	Remarks
 **Desire Decrease in Pumping Pressure**	Signalman on the receiving ship moves green signal in an arc on his right side from shoulder to knee level to indicate to the delivering ship that a decrease in pumping pressure is desired.
 **Stop Pumping or Cease Transfer**	Signalman moves green device horizontally in front of the body. This signal, executed by either ship, indicates 'Stop pumping' or 'Cease transfer'.
 **Start Blow Through**	Signalman moves amber signal device in a continuous circle in front of the body. The signal, meaning 'Start blow through now', is repeated until the delivering ship acknowledges by repeating the signal, indicating that it has commenced blow through.

Figure 9.5-2 (cont) - RAS Paddle Signals

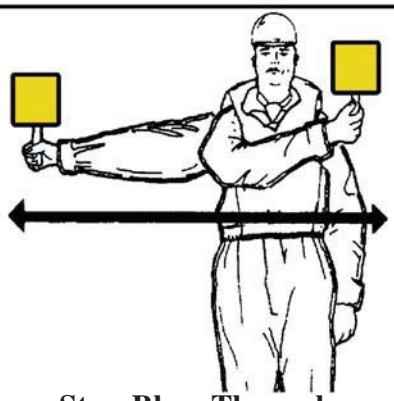
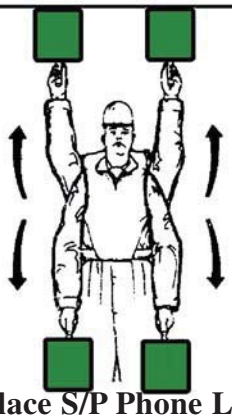
Signal	Remarks
 **Stop Blow Through**	Signalman moves amber device horizontally in front of the body. The signal, given by the receiving ship to indicate 'Stop blow through' is acknowledged by the 'Stop blow through' signal from the delivering ship, indicating that it has stopped blow through.
 **Test S/P Phone Line**	Signalman raises two green signal devices overhead to form a 'Steeple', meaning 'Test your phone/phone lines'.
 **Replace S/P Phone Line**	Signalman waves two green signal devices vertically in front of the body, meaning 'Replace your phone line'.

Figure 9.5-2 (cont) - RAS Paddle Signals

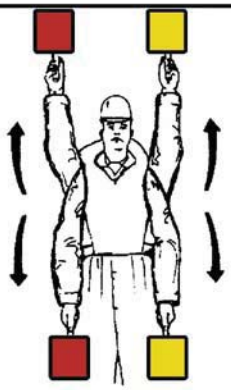
Signal	Remarks
 **Tension Down**	Signalman holds red signal device in right hand and amber signal device in left hand with arms extended over head to form a 'V'. This signal, initiated by receiving ship, means 'I am ready to be tensioned'. When initiated by the delivering ship, it means 'I am tensioning'.
 **Detension**	Signalman, with red signal device in right hand and amber signal device in left hand and with arms extended vertically over head, waves both signal devices vertically in front of the body until acknowledged by other ship. Initiated by receiving ship, signal means 'Detension'. Answered by delivering ship or initiated by delivering ship, signal means 'I am detensioning'.
 **Replenishment Completed at this Station, Commence Unrigging**	Signalman holds red signal device in right hand and a green one in left hand. He crosses both hands and arms over each other above his head. This means 'Replenishment completed at this station, commence unrigging'.

Figure 9.5-2 (cont) - RAS Paddle Signals

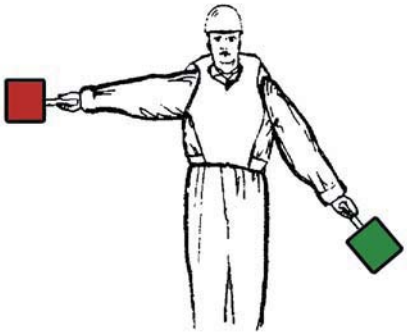
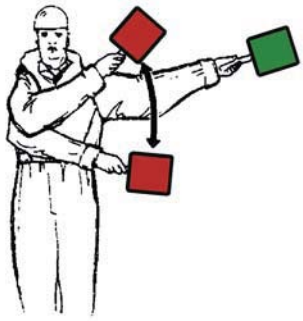
Signal	Remarks
 **Prepare/Preparing to Trip Pelican Hook**	Signalman holds red signal device in right hand, in the horizontal. In left hand he holds green signal device at a 45^0 angle from the body. Signal given by delivering ship indicates 'Prepare to trip pelican hook'. Signal answered by receiving ship indicates 'I am preparing to trip pelican hook'.
 **Ready to Trip Pelican Hook**	Signalman holds red signal device in right hand, at the vertical. In left hand he holds green signal device at a 45^0 angle from the body. Signal from both receiving ship and delivering ship indicates 'I am preparing to trip pelican hook'.
 **Trip Pelican Hook**	Signalman holds red signal device in right hand and green signal device in left hand. He makes chopping motion with right arm on left elbow which is raised about shoulder height. Signal given by delivering ship indicates 'Trip pelican hook'. Signal answered by receiving ship indicates 'I am tripping pelican hook'. When pelican hook is tripped, receiving ship signals 'Heave in'.

Figure 9.5-2 (cont) - RAS Paddle Signals

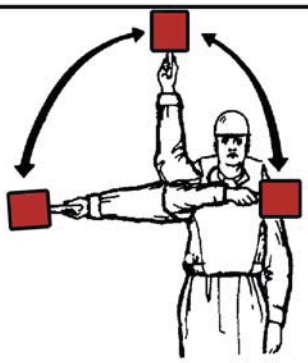
Signal	Remarks
 **Prepare for Emergency Breakaway**	The delivering ship or receiving ship may initiate an emergency breakaway. Signalman of initiating ship rapidly waves red signal device in a semi-circle arc over head, meaning 'Prepare for an emergency breakaway'. Other ship acknowledges by repeating the signal with a red signal device, meaning 'Understood', 'I am preparing for an emergency breakaway'. Once initiated, the delivering ship assumes control.
 **Ready for Emergency Breakaway**	Each ship continues making the prepare signal until ready to execute the emergency breakaway. When ready, each signalman holds the red signal device vertically overhead to indicate 'Ready for emergency breakaway'.
 **Execute Emergency Breakaway**	The signalman of the delivering ship drops the red signal device straight downwards, meaning 'Execute emergency breakaway now'. The receiving ship acknowledges by repeating the signal.

Figure 9.5-2 (cont) - RAS Paddle Signals

9.6 Night RAS Lighting

The correct use of lighting for night-time RAS is essential for proper station-keeping and the safe conduct of the RAS.

9.6.1 Contour Lighting and the Wake Light

Normally, two blue contour lights and a blue wakelight are exhibited by the AOR when she signals that she is steady on the RAS course and speed (Romeo at the dip). Contour lights assist the Captain/OOW of the receiving ship to develop an accurate assessment of the AOR's aspect. These two lights are located at the fore and aft extremes of that portion of the ship's side that parallels the ship's keel (e.g., abeam the forward house and hangar in Canadian AORs). The wakelight illuminates the AOR's wake in order to assist the Captain/OOW in estimating the lateral separation from the AOR during the approach. All three lights are extinguished on the first thunder whistle blast once alongside.

Note.

When the wake light is in use, the white stern light is darkened.

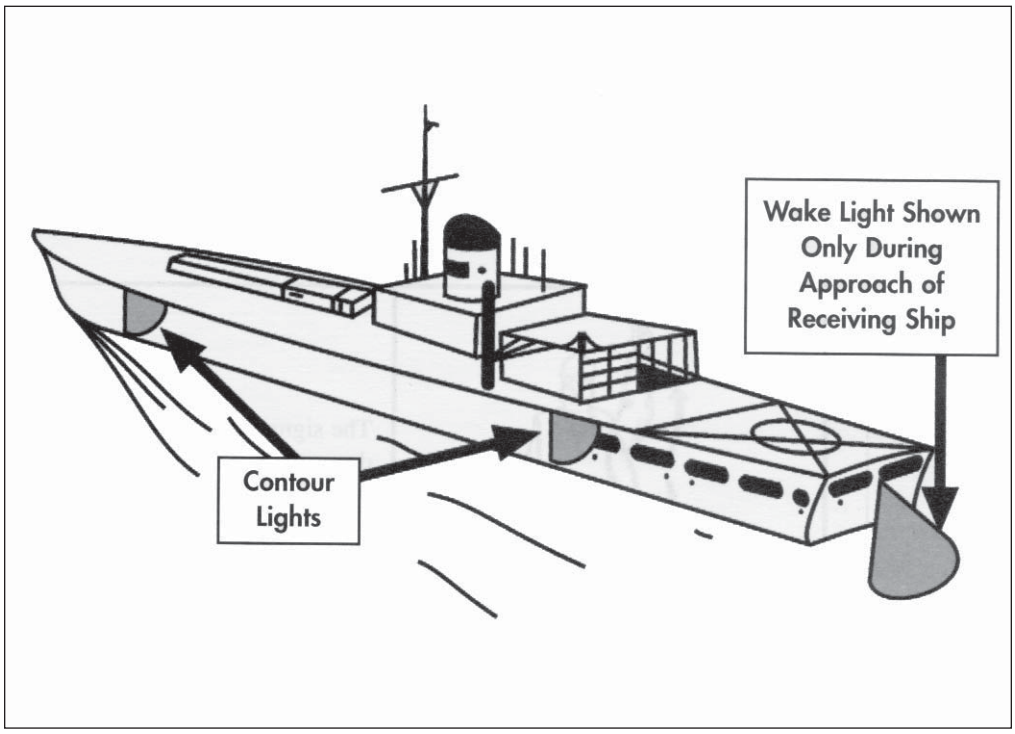


Figure 9.6-1 - Contour and Wake Lights

9.6.2 Dump Lighting

The working areas on deck and in the cargo landing areas shall be illuminated by red lighting only. Lights shall be equipped with shields or shades of sufficient dimension, and positioned so as to avoid illuminating the other ship participating in the replenishment operation. The exterior deck lighting arrangements may be portable.

Note.

Dump lights will be on during rigging preparations, and then extinguished until the receiving ship is alongside and the first thunder whistle is sounded.

9.6.3 Chemlites

Red chemlites are used to illuminate the moving components of the RAS rigging, i.e., blocks, lines, travellers, hose saddles, probes, the line throwing rifle projectile and bolo, and the markings on the distance line (see 9.4.3, Distance/Phone Line, p. 9-16). Blue chemlites are also used to illuminate the markings on the distance line. Green chemlites are used solely for the safety marking of personnel. All personnel working at a RAS station will have a green chemlite conspicuously attached to their outer layer of clothing (PML type).

9.7 Common Associated Equipment Used for RAS Evolutions

a. The following table lists common miscellaneous non-fitted equipment that is required as necessary for RAS evolutions, regardless of ship class:

Table 4 Equipment - RAS Evolutions

Bolo/Gunline Projectiles	Line Throwing Gun
Shot Mats	Hard Hats
Positive Buoyancy LJ	Safety Harnesses
or Hazardous Duty LJ	Sledge Hammer safety goggles
Fire Axe	Pry Bar
Bolt Cutters	Chemlites
Knife/Spike	Stirrups
Paddles/Wands/Vests	Easing Out Pendant
Cargo Bags	Length of 4x4 Wood
Common Blocks	Shepherd's Crook
Snatch Blocks	Personal Flotation Device
Mail Bag	
Mousing	

b. The following table shows additional miscellaneous non-fitted equipment unique to AORs:

Table 5 Equipment Unique to AORs	
Kline Grip	AeroQuip Tie Downs
Wire Strops	Salvage Strops
Wire Slings	Cargo Nets
Torpedo Coffin Slings	Torpedo Trucks
Pallet Jack	Safety Pallets
Forklift	

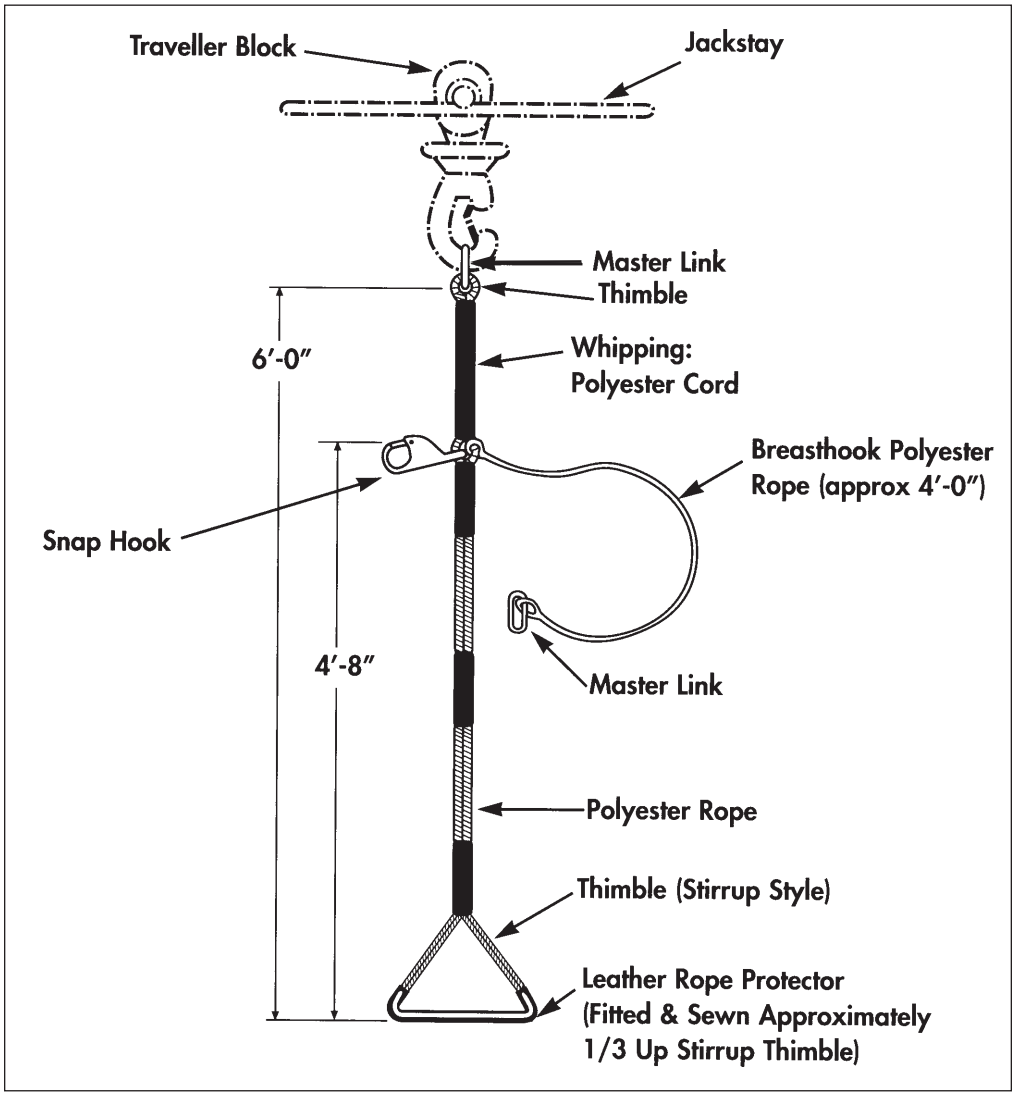


Figure 9.7-1 - Jackstay Transfer Stirrup

9.8 Lines Used for Replenishment

The following table shows the types and characteristics of all lines used during Canadian RAS operations:

Table 6 Lines - RAS/Seamanship Operations			
Type	**Length in Metres**	**Diameter in Millimetres**	**Make**
Distance Line	103	13	3-Strand Polypropylene
Distance Line Messenger	65	12	3-Strand Polypropylene
Light Line	110	18	3-Strand Polypropylene
Light Jackstay	146	32	Braided Polyester
Inhaul	120	16	Braided Polyester
Outhaul	120	16	Braided Polyester
Light Messenger (Jackstay/Towing)	65	12	3-Strand Polypropylene
Heavy Messenger (Jackstay/Towing)	110	24	3-Strand Polypropylene
Light Messenger (Fuel/Heavy)	65	12	3-Strand Nylon
Heavy Messenger (Fuel/Heavy)	110	24	3-Strand Nylon
Flounder Plate Messenger	110	18	3-Strand Nylon
Recovery Messenger	65	12	3-Strand Nylon
Hose Messenger	110	18	3-Strand Nylon
Remating Line	20	18	3-Strand Nylon
Easing Out Pendant	Class Specific	9.5	Manilla or Nylon

9.9 Fuelling Fittings

The Canadian Navy uses a variety of hose fittings to transfer fuel between ships. The following is a brief description of the ones most commonly used.

9.9.1 Probe Receiver (Distillate)

The probe receiver is the most common fitting used for transferring distillate.

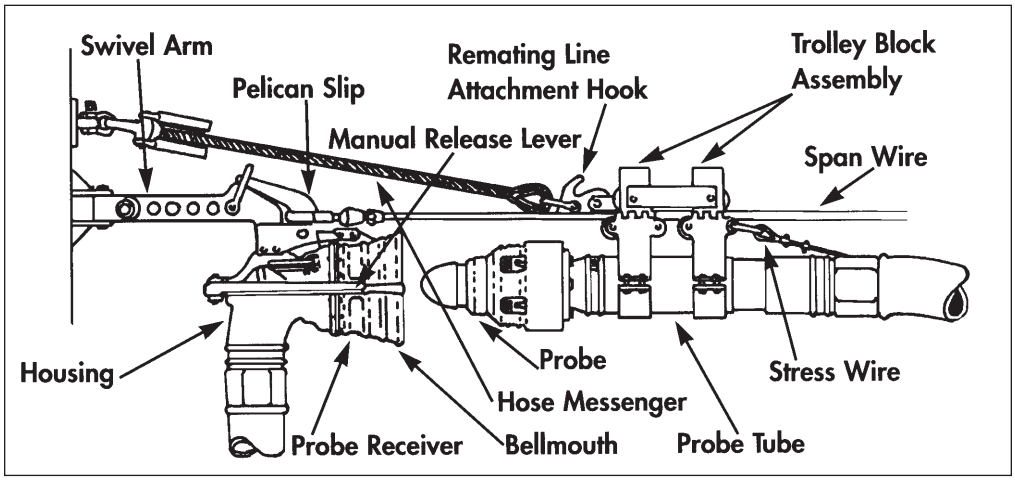


Figure 9.9-1 - Probe and Bell Receiver Assembly

a. **Probe**. The probe assembly consists of three major components: the probe, probe tube and trolley block assembly. The probe is the major component of the three. Its assembly includes six spring-loaded locking mechanisms which are triggered by six spring-loaded lock arms as the probe is mated in the probe receiver. The trigger-locking mechanisms lock the probe in the receiver. The probe also includes a spring-loaded sliding sleeve valve which is actuated as the probe is mated and allows the transfer of fuel. The nose of the probe is tapered and provides self-alignment features.

b. **Receiver**. The receiver consists of three major components: a bellmouth, a housing and a manual release lever assembly. The bellmouth has internal tapering surfaces which provide a self-aligning feature for proper engagement of the probe. It also contains an internal surface for triggering the locking mechanisms of the probe. The next component, the housing, is permanently bolted to the bellmouth. Its assembly includes two spring-loaded flags which provide visual indication of proper engagement of the probe and receiver, and a seal to provide a leakproof connection with the probe. The last component, the manual release lever assembly, is bolted to the housing and may be installed on either side of the housing. Its assembly includes a plunger which is actuated by the lever to disengage the probe and also seals to prevent leakage.

9.9.2 Hose Coupling NATO (Distillate)

The Hose Coupling NATO was designed to allow NATO navies the capability of replenishing one another. All NATO warships carry the "A" end of the coupling which is a breakable spool, and all NATO AORs carry the "B" end of the coupling which is a flanged adapter assembly. This method of fuelling is commonly referred to as NATO "B".

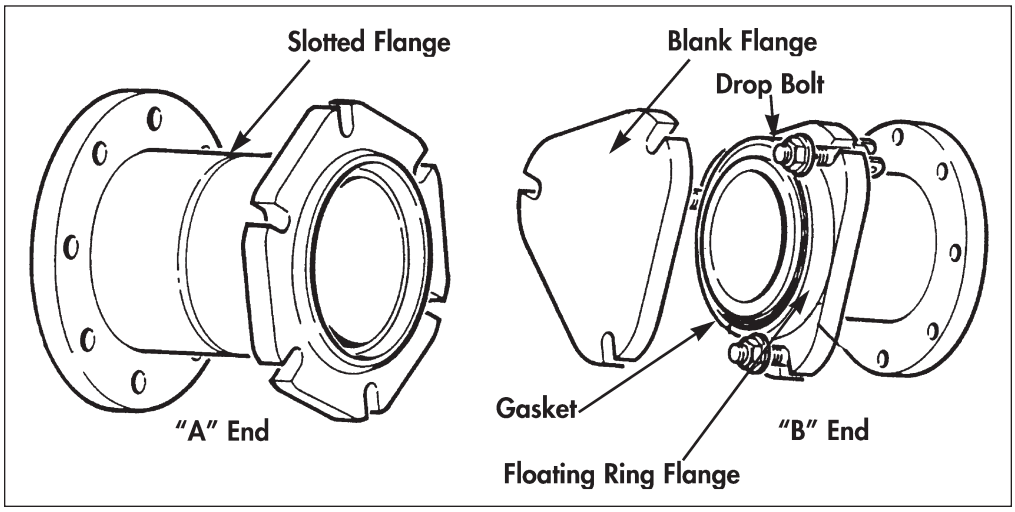


Figure 9.9-2 - NATO "B" Coupling

a. **"A" End**. The NATO breakable spool "A" end consists of a cast-iron spool with a standard hose flange on one end and a slotted flange on the other. A machined groove around the spool weakens it to permit it being broken easily in an emergency by a blow from a sledgehammer.

b. **"B" End**. The "B" end is a flanged adapter assembly consisting of a hose flange on one end and a special floating ring flange with drop bolts on the other. The floating ring flange can be rotated to bring the drop bolts into line with the slots in the "A" end. A gasket mounted in the outboard side of the "B" end provides an oil tight fit. A blank flange is attached to prevent spilling when passing the gear.

9.9.3 NATO Standard F44 Coupling (Carter Underwing Type)

The NATO Standard F44 Coupling consists of male and female couplings. It is commonly used for Helicopter In-Flight Re-Fuelling (HIFR) and is poised to become the NATO standard fitting. The female coupling is supplied by the AOR and the receiving ship supplies the male coupling.

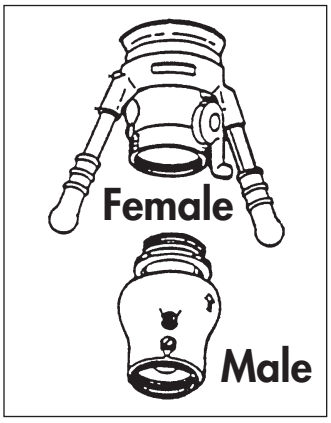


Figure 9.9-3 - Nato Standard F44 Coupling

9.10 Personnel Required (RAS Teams/RAS Board)

a. Personnel requirements for RAS evolutions vary widely, from the labour-intensive multi-station light jackstay forward (supply)/fuelling midships, to the simple light line transfer. All departments and rank levels are involved, with specific or generic skill levels being defined for each position and evolution. Individual assignments are reflected in the departmental Watch and Station Bills and the RAS Board (see Tables 7 and 8, p. 9-35 and 9-36).

b. The RAS Board for HALIFAX/IROQUOIS Class is divided into five teams, with the composition of each team meeting the requirements of specific RASs as follows:

RAS Team 1 - Light Jackstay (Supply)
RAS Team 2 - Light Jackstay (Receive)
RAS Team 3 - Liquids
RAS Team 4 - Heavy Jackstay
RAS Team 5 - Light Line

Notes.

1. RAS teams are also utilized for other evolutions as the personnel source is already in place, i.e., Towing (see Chapter 7 of this manual).

2. RAS Boards are not necessary on the KINGSTON and VICTORIA Classes.

3. RAS Boards for AORs are divided into teams based on personnel assignments for each station.

Table 7 RAS Board (HALIFAX/IROQUOIS Class) Showing Personnel, Position and Qualification

PORT WATCH	RAS TEAM 1 LIGHT JACKSTAY SUPPLY	RAS TEAM 2 LIGHT JACKSTAY RECEIVE	RAS TEAM 3 FUELLING	RAS TEAM 4 HEAVY JACKSTAY	RAS TEAM 5 LIGHT LINE	STBD WATCH
PO/MS Bosn QL 6A	Station Supervisor	Station Supervisor		Station Supervisor	Station Supervisor	PO/MS Bosn QL 6A
LS/OS Bosn	Station Worker/Gunman	Station Worker/Gunman		Station Worker/Gunman	Station Worker/Gunman	LS/OS Bosn
LS/OS Bosn	Station Worker	Station Worker		Station Worker	Station Worker	LS/OS Bosn
LS/OS Bosn	Signalman	Signalman		Signalman	Signalman	LS/OS Bosn
LS/OS ATR	Inhaul Nos. 1-6	Outhaul Nos. 1- 6		Messenger Nos. 1-6	Line Handler Nos. 1-6	LS/OS ATR
LS/OS NCIOP	Intership Phone	Intership Phone	Intership Phone	Intership Phone		LS/OS NCIOP
Designated ET				Winch Operator		Designated ET
P2 Supply	I/C Jackstay Relay			I/C Storing Party		P2 Supply
Eng Dept	Jackstay Workers Nos. 1-10			Storing Party Nos. 1-10		Eng Dept
Supply Dept	Jackstay Workers Nos. 11-20			Storing Party Nos. 11-20		Supply Dept
LS/OS Supply	Bridge Comms	Bridge Comms	Bridge Comms	Bridge Comms		LS/OS Supply
LS/OS Supply	FX Comms	FX Comms		FX/TOP Comms		LS/OS Supply
LS/OS Supply			TOP Comms			LS/OS Supply
LS/OS NCIOP	Distance Line Nos. 1-2	Distance Line Nos. 1-2-3	Distance Line Nos. 1-2-3	Distance Line Nos. 1-2-3		LS/OS ATR
Inboard Lookout	Distance Line No. 3	Distance Line No. 4	Distance Line No. 4	Distance Line No. 4		Inboard Lookout
PO/MS Bosn QL 6A			Station Supervisor			PO/MS Bosn QL 6A
LS/OS Bosn			Station Worker/Gunman			LS/OS Bosn
LS/OS Bosn			Station Worker			LS/OS Bosn
LS/OS Bosn			Signalman			LS/OS Bosn
Designated ET			Winch Operator			Designated ET
LS/OS ATR			Line Handler Nos. 1-5			LS/OS ATR
Firefighter			Firefighter			Firefighter

Table 8 RAS Board (AOR 509/510 Class) Showing Personnel, Position and Qualification

RAS TEAM 1	RAS TEAM 2	RAS TEAM 3	RAS TEAM 4	RAS TEAM A LIGHT LINE/LIGHT JACKSTAY	RAS TEAM B LIGHT LINE/LIGHT JACKSTAY	RAS DECK
PO/MS Bosn QL 6A	Station Supervisor	Station Supervisor	Station Supervisor	Station Supervisor	Station Supervisor	RAS Deck Supervisor
MS BN						Winch Watcher
LS/OS BN	Station Worker/Gunline	Station Worker/Gunline	Station Worker/Gunline	Station Worker/Gunline	Station Worker/Gunline	Winch Watcher
LS/OS BN	Station Worker	Station Worker	Station Worker	Station Worker	Station Worker	Winch Watcher
LS/OS BN	Station Worker	Station Worker	Station Worker	Station Worker	Station Worker	
LS/OS BN	Station Worker	Station Worker	Station Worker			
LS/AB BN	Saddles/Traveller Operator	Saddles/Traveller Operator	Saddles/Traveller Operator			
LS/AB BN	Spanwire/Highline Operator	Spanwire/Highline Operator	Spanwire/Highline Operator			
LS/AB BN	Distance Line	Distance Line	Distance Line	Distance Line	Distance Line	
LS/OS NCIOP	Distance Line	Distance Line	Distance Line	Distance Line	Distance Line	
LS/OS Supply	Station Comms	Station Comms	Station Comms	Station Comms	Station Comms	
LS/OS HT	LCO Comms	LCO Comms	LCO Comms			
LS/OH SUPPLY	Bridge Comms	Bridge Comms	Bridge Comms	Bridge Comms	Bridge Comms	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	
LS/OS ATR				Inhaul/Outhaul	Inhaul/Outhaul	

Notes.

1. During heavy jackstay, additional RAS teams may be required to handle cargo.
2. For jackstay supply, designated personnel from the engineering and supply departments will man the jackstay.
3. Designated engineering personnel will close up on RAS Deck whenever winches are flashed.

9.11 Sequence of Events Light Line

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Note: The supplying ship fires the gunline unless the receiving ship has a helicopter on deck. This is for all seamanship operations.					
Avast	Avast (Given)	Gunline is attached to light line.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Light line is payed out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline is heaved in hand over hand until sufficient light line is on deck to reeve through blocks.
Avast	Avast (Acknowledged)	Line handlers keep light line out of the water.	**Avast**	Avast (Given)	Station workers pass light line through blocks.
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On signal is passed to indicate that all rigging is complete and ready to commence transfer.
Hook On	Hooked On (Given)	Cargo bag being transferred is hooked on.		Hooked On (Acknowledged)	
Give them Heave In	Heave In (Given)		**Heave In**	Check Away (Acknowledged)	Load is transferred to the receiving ship.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Cargo bag is unhooked.
Note: 1. Permission must be requested for the transfer of cargo from Command before first load.					
Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	Light line is removed from the blocks.
Heave In	Check Away	Light line is heaved in hand over hand until recovered on board.	**Check Away**	Heave In	Light line is checked away until bitter end is tossed overboard.

9.12 Sequence of Events Light Jackstay

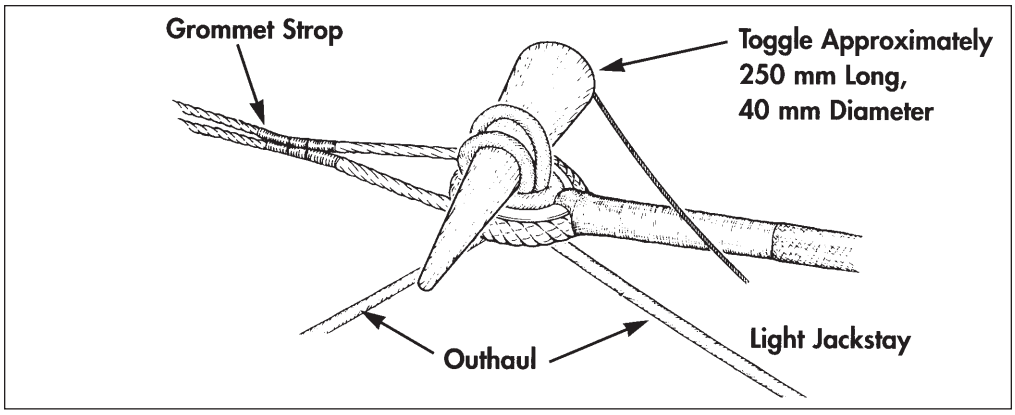


Figure 9.12-1 - Toggle

Figure 9.12-2 - Light Jackstay

9.12 Sequence of Events Light Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Light messenger is payed out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline/light messenger is heaved in hand over hand.
Avast	Avast (Given)	Station workers attach distance line messenger and outhaul to light messenger.	**Avast**	Avast (Acknowledged)	
Check Away	Heave In (Given)			Check Away (Acknowledged)	Outhaul is heaved in hand over hand.
Avast	Avast (Acknowledged)	Line handlers keep outhaul out of the water.	**Avast**	Avast (Given)	Station workers detach distance/ telephone line and attach it to tag line leading to command.
Check Away on the Outhaul	Heave In (Acknowledged)	Station workers check away the outhaul hand over hand.	**Heave In on the Outhaul**	Check Away	Station workers heave in the outhaul hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Station workers pass outhaul through 6” snatch blocks.
Check Away on the Outhaul	Heave In (Acknowledged)	Station workers check away the outhaul hand over hand.	**Heave In on the Outhaul**	Check Away (Given)	Station workers heave in the outhaul hand over hand.

9.12 Sequence of Events Light Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Take the jackstay in hand		Jackstay workers take the jackstay in hand and check away hand over hand as it pays out.			
Take the Inhaul in Hand		Inhaul workers take the inhaul in hand and check away hand over hand as it pays out.			
Avast	Avast (Acknowledged)	Line handlers keep line out of the water.	**Avast**	Avast (Given)	Station worker passes slip through grommet strop, puts in pin and removes toggle.
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On signal is passed to indicate that all rigging complete and ready to commence transfer.
Haul Taut the Jackstay		The jackstay workers haul taut the jackstay. The rig is inspected to ensure it is correct and that no lines are fouled.			
Heave In on the Inhaul	Check Away (Given)		**Check Away on the Outhaul**	Heave In (Acknowledged)	Traveller is returned to supplying ship.
Avast	Avast (Given)		**Avast**	Avast (Acknowledged)	
Walk Back the Jackstay. Check Away on the Inhaul		Jackstay and Inhaul workers check away so that test weights can be hooked onto traveller hook.			
Hook On the Test Weights		Test weights are hooked on after permission is obtained from command.			

9.12 Sequence of Events Light Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Hooked On	Hooked On (Given)			Hooked On (Acknowledged)	
Haul Taut the Jackstay		Jackstay workers haul taut the jackstay hand over hand. Station workers control the test weights as they are raised.			
Check Away on the Inhaul	Heave In (Given)	Inhaul workers check away hand over hand.	**Heave In on the Outhaul**	Check Away (Acknowledged)	Outhaul workers heave in on the outhaul hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	
Walk Back the Jackstay					

Note: Station workers will unhook the test weights as soon as the load is safely on deck.

	Hooked On (Acknowledged)		**Hook On the Test Weights**	Hooked On (Given)	Test weights are hooked on after permission is obtained from command.
Haul Taut the Jackstay		Jackstay workers haul taut the jackstay hand over hand.			Station workers control the test weights as they are raised.
Heave In on the Inhaul	Check Away (Given)	Inhaul workers heave in hand over hand.	**Check Away on the Outhaul**	Heave In (Acknowledged)	Outhaul workers check away hand over hand.
Avast	Avast (Given)		**Avast**	Avast (Acknowledged)	
Walk Back the Jackstay		Station workers control the test weights as they are lowered and unhooked.			Outhaul workers keep the outhaul out of the water.
Hook On		Load is hooked on.			

Notes: 1. Permission must be obtained from command each and every time personnel are to be hooked on.
2. If just transferring cargo, permission to hook on is requested only once at the start of the transfer.

	Hooked On (Given)		**Hooked On (Acknowledged)**		
Haul Taut the Jackstay		Station workers control the load as it is raised.			

9.12 Sequence of Events Light Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Check Away on the Inhaul	Heave In (Given)	Inhaul workers check away hand over hand.	**Heave In on the Outhaul**	Check Away (Acknowledged)	Outhaul workers heave in on the outhaul hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	
Walk Back the Jackstay		Jackstay workers check away on the jackstay.			Station workers control the load as it is lowered and unhooked.
			Hook On		Station workers hook on the load.
	Hooked On (Acknowledged)			Hooked On (Given)	
Haul Taut the Jackstay		Jackstay workers haul taut the jackstay hand over hand.			Station workers control the load as it is raised.
Heave In on the Inhaul	Check Away (Given)	Inhaul workers heave in hand over hand.	**Check Away on the Outhaul**	Heave In (Acknowledged)	Outhaul workers check away hand over hand.
Avast	Avast (Given)		**Avast**	Avast (Acknowledged)	
Walk Back the Jackstay		Station workers control the load as it is lowered and unhooked.			Outhaul workers keep the outhaul out of the water.

Note: This procedure continues until the transfer of cargo is complete and the order "Secure" is given from Command.

Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	
Haul Taut the Jackstay		Jackstay workers haul taut the jackstay hand over hand.			
Check Away on the Inhaul	Heave In (Given)	Inhaul workers check away hand over hand.	**Heave In on the Outhaul**	Check Away (Acknowledged)	Outhaul workers heave in hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Traveller is pulled tight to NEWCO thimble by the outhaul to take the load off the grommet strop.
Walk Back the Jackstay		Jackstay workers check away on the jackstay.			

9.12 Sequence of Events Light Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Stand By to Slip	Stand By to Slip (Given)		**Out Pin**	Stand By to Slip (Acknowledged)	Station worker removes mousing and pin. With hammer in hand, waits for the order to trip senhouse slip.
Slip	Slip (Given)		**Slip**	Slip (Acknowledged)	Station worker trips senhouse slip.
Heave In on the Inhaul. Heave in on the Jackstay	Check Away (Given)	Station workers assist in bringing traveller over the guardrail.	**Check Away on the Outhaul**	Heave In (Acknowledged)	Outhaul workers check away on the outhaul hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Station workers remove outhaul from snatch blocks.
Heave In on the Outhaul	Check Away (Acknowledged)		**Check Away on the Outhaul**	Heave In (Given)	Outhaul workers check away on the outhaul hand over hand.

Notes:
1. The bitter end of the outhaul is tossed over the side and the supplying ship keeps heaving in until it is recovered on board.
2. The light messenger is removed and returned earlier during the transfer of loads.
3. During a “CORPEN NOVEMBER”, the transfer of stores may continue at the CO’s discretion, but at no time shall personnel be transferred.

9.13 Sequence of Events Heavy Jackstay

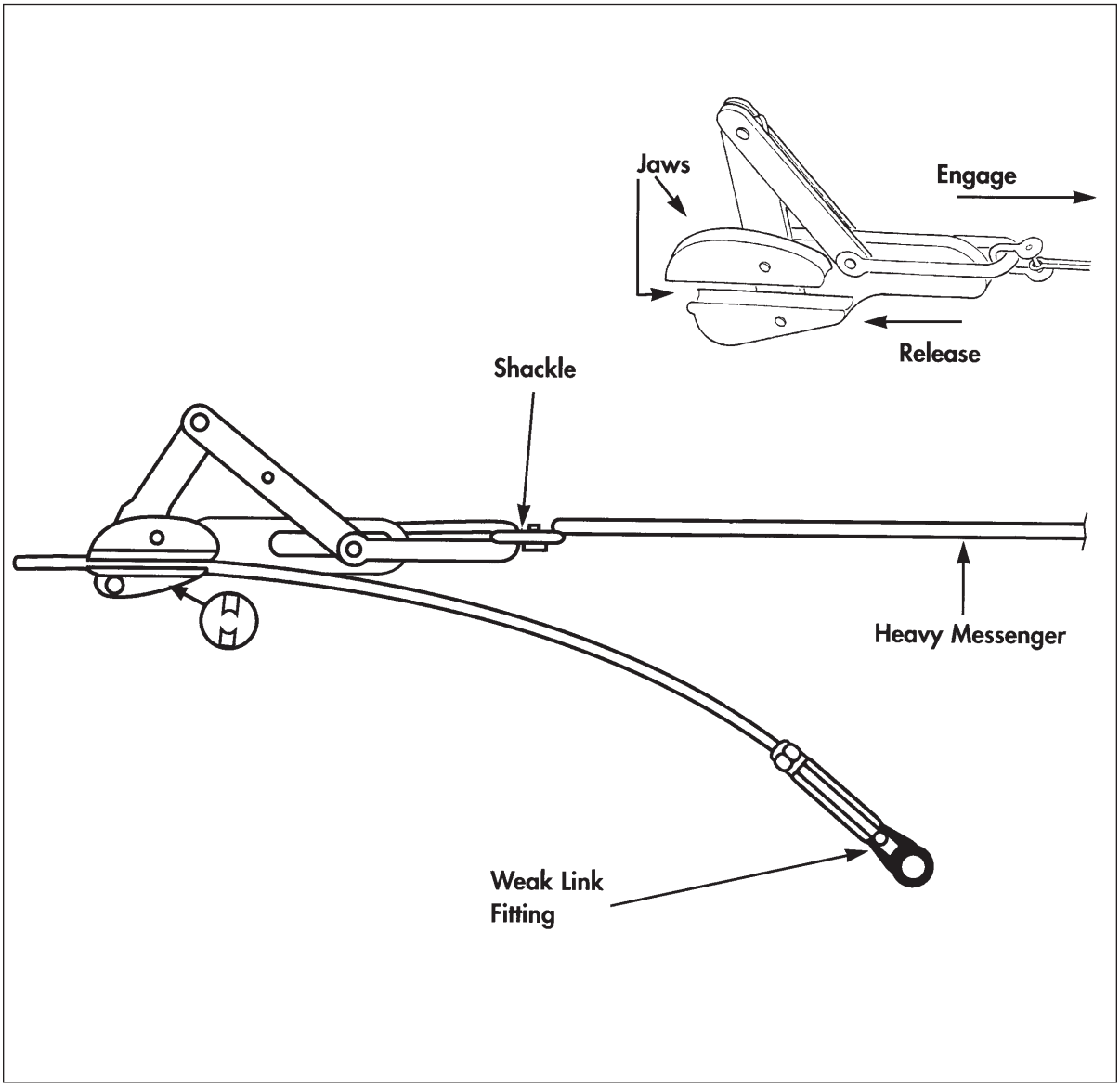


Figure 9.13-1 - Kline Grip

The Kline grip is used to attach the heavy messenger to the highline/spanwire.

Figure 9.13-2 - Torpedo Transfer Heavy Jackstay

9.13 Sequence of Events Heavy Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Messengers are paid out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline/light messenger is heaved in hand over hand.
Note: Light messenger is to be taken through the blocks at this point, but **NEVER** taken to the winch.					
Avast	Avast (Given)	Station workers attach distance line messenger to light messenger.	**Avast**	Avast (Acknowledged)	
Check Away	Heave In (Given)			Check Away (Acknowledged)	Messengers are heaved in hand over hand.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	Station workers unhook distance/ telephone line and attach distance line messenger to tag line leading to command.
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand.	**Heave In**	Check Away (Given)	Heavy messenger is heaved in hand over hand until sufficient line is on board to take 3 turns on the winch.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	3 turns are taken on the winch.

9.13 Sequence of Events Heavy Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand until transferred to highline, then the highline is veered.	**Heave In Roundly**	Check Away (Given)	Heavy messenger is heaved in under power until the Pelican slip attached to the highline is in position to be hooked onto the elongated link.
Note: Temporary guardrail is lowered to allow highline and Pelican on board and is then raised on completion.					
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Pelican slip is attached to the elongated link on the sliding padeye.
			Veer		Heavy messenger is veered until weight comes off the messenger. The Kline grip is removed. Flounder plate messenger is removed from Pelican slip and attached to the kline gripper.
			The light and heavy messengers are coiled down and stopped off with lashing.		
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On signal is passed to indicate that all rigging complete.
			Up Padeye		Padeye is raised.
Tension Down	Tension Down	Cage operator heaves in on the highline and places it in tension.	**Tension Down**	Tension Down	Station supervisor must get permission from command before giving the signal to tension down.
Up "D" Ring		"D" ring is raised to allow gravity to help send flounder plate across.	**Down Padeye**		Padeye is lowered to allow gravity to help bring flounder plate across.
	Heave In (Given)	Flounder plate is sent to receiving ship.	**Heave In**	Check Away (Acknowledged)	Flounder plate messenger is heaved in to bring flounder plate across.

9.13 Sequence of Events Heavy Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Station workers attach the swivel snap hook of the flounder plate to the link on the bottom of the Pelican slip. The flounder plate messenger is removed and faked out on deck.
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	
			Up Padeye		Padeye is raised.
		Outhaul winches are put in tension (the inhaul is already in tension).			
Send the Traveller Across	Heave In (Given)	Traveller is sent across to test equipment and rigging.		Check Away (Acknowledged)	
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	
Down "D" Ring		"D" ring is lowered to help receiving ship hook on the load.	**Down Padeye**		Padeye is lowered to allow station workers to hook on light and heavy messengers.
					Station workers hook on light and heavy messengers to traveller.
Up "D" Ring		"D" ring is raised to help receiving ship lift load off the deck.	**Up Padeye**		Padeye is raised to lift load off the deck.
Heave In	Check Away (Given)	Cage operator brings traveller home.		Heave In (Acknowledged)	
Avast	Avast (Given)			Avast (Acknowledged)	
Down "D" Ring		"D" ring is lowered to lower the load onto the deck.	**Down Padeye**		Padeye is lowered to help supplying ship lower load to the deck.

Notes: 1. This procedure continues until the transfer of cargo is complete and the order "Secure" is given from command.
2. The temporary guardrail is lowered as the load nears the ship and is then raised as soon as the load is on board.

9.13 Sequence of Events Heavy Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	
Up "D" Ring			**Up Padeye**		Padeye is raised slightly.
Switch Outhaul to Speed		Done automatically by AOR.			
	Heave In		**Down Padeye**	Check Away	Station workers attach the flounder plate messenger, then heave in until the flounder plate swivel snap hook can be removed, then pass the easing out pendant.
Heave In Outhaul	Check Away (Acknowledged)	"D" ring is kept in the raised position to prevent the wire from "bird caging" as the flounder plate is recovered.	**Give Heave In**	Heave In (Given)	Padeye is kept in the lowered position to prevent the wire from "bird caging" as the flounder plate is recovered.
			The flounder plate messenger is checked away hand over hand through the upper block on top part ship and both blocks on the fx.		
			Up Padeye		Padeye is raised slightly.
Detension	Detension (Given)	Cage operator detensions the highline and keeps it clear of the water.	**Detension**	Detension (Acknowledged)	Station Supervisor must get permission from command before giving the signal to detension.
	Stand By to Slip (Given)		**Out Pin**	Stand By to Slip (Acknowledged)	Station worker removes mousing and pin from Pelican hook and stands by with a hammer.
Slip	Slip (Given)	Heave in the highline.	**Slip**	Slip (Acknowledged)	Station worker trips the Pelican hook.
			Up Padeye		The padeye is raised as the easing out pendant is checked away to clear the deck.

9.13 Sequence of Events Heavy Jackstay (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
			Check Away the Easing Out Pendant		Station worker eases the highline over the side, and then releases the easing out pendant.
Note: Supply ship recovers the highline.					

Note: In order to hasten heavy jackstay transfers, a pallet jack can be sent with the first load of the heavy jackstay on request of the receiving ship. When transferring to IROQUOIS Class ships, the pallet jack **MUST** be sent on the first load.

9.14 Sequence of Events Liquids Transfer (Probe)

Figure 9.14-1 - Probe Fuelling AOR 509/510 and IROQUOIS Class

9.14 Sequence of Events Liquids Transfer (Probe) (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft, and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Messengers are paid out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline/light messenger is heaved in hand over hand.
Note: Light messenger to be secured to tag line and then be taken through the blocks at this point, but NEVER taken to the winch.					
Avast	Avast (Given)	Station workers attach distance line messenger to light messenger.	**Avast**	Avast (Acknowledged)	
Check Away	Heave In (Given)			Check Away (Acknowledged)	Messengers are heaved in hand over hand.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	Station workers unhook distance/tele-phone line and attach to tag line leading to Command.
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand.	**Heave In**	Check Away (Given)	Heavy messenger is heaved in hand over hand until sufficient line is onboard to take turns on the winch.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	Station workers take 3 turns on the winch.
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand until transferred to spanwire.	**Heave In Roundly**	Check Away (Given)	Heavy messenger is heaved in under power until the weak link can be attached to the swivel arm.
Note: Temporary guardrail is lowered to allow spanwire on board and is then raised on completion.					

9.14 Sequence of Events Liquids Transfer (Probe) (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Weak link is attached to the Pelican hook on the swivel arm assembly.
			Veer Handsomely		Heavy messenger is veered until weight comes off the messenger. The Kline grip is removed.
			The light and heavy messengers are coiled down and made ready to return to the supply ship.		
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On signal is passed to indicate that all rigging complete.
Tension Down	Tension Down	Cage operator heaves in on the spanwire and places in tension.	**Tension Down**	Tension Down	Station Supervisor must get permission from command before giving the signal to tension down. Immediate area is cleared of personnel.
			Up Temporary Guardrail		
	Heave In (Given)	Probe is sent to receiving ship.		Check Away (Acknowledged)	
			On Goggles		All personnel around the fuelling position will don goggles before the probe arrives.
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On is given if probe is properly seated and indicator flags are up.
4 Saddle in Tension		Cage operator heaves in and puts 4 saddle in tension.			
Start Pumping	Start Pumping (Acknowledged)		**Start Pumping**	Start Pumping (Given)	Rig easing out pendant.
			Pumping will continue until the ship has received the required amount of fuel.		

9.14 Sequence of Events Liquids Transfer (Probe) (cont)

SECONDARY COMMODITY:

If a second commodity is to be passed, such as JP5 or water, an extra length of 4" hose (pig tail) is hooked under the probe.

Note: A second commodity can only be transferred once the fuelling rig is properly hooked on.

A remating line is attached to the hook on the probe trolley. It is passed through the lead blocks insuring that there is a 12' slack after which four turns are placed on the winch. This is to prevent weight from coming down on the secondary hose should the probe pull out. The remating line is then used to reseat the probe.

To connect the secondary hose (JP5):

a. unclip from main hose point;
b. unscrew cover cap and connect to ship's service; and
c. connect male and female fittings.

Note: The signalman must ensure that he points aft with his/her green paddle/wand for JP5 and forward for distillate when he is signalling Start or Stop Pumping

The remating line is removed after the second commodity transfer is completed.

			Remove the recovery messenger		Station worker removes the recovery messenger and attaches it to the heavy messenger.
Heave In	Check Away (Acknowledged)	Station workers recover the lines.	**Check Away**	Heave In (Given)	Station workers return the messengers.
Stop Pumping	Stop Pumping (Acknowledged)		**Stop Pumping**	Stop Pumping (Given)	

Note: The AOR switches to zero pressure and allows gravity to drain the hoses.

Secure	Secure (Given)	Once hoses are flat.	**Secure**	Secure (Acknowledged)	Once hoses are flat.
4 Saddle in Speed		Cage operator puts slack in saddle wire.			
			Release the probe		Station workers release the probe.

Note: The Kline grip is attached to the bottom of the probe carrier either in a bag or attached to a snap hook.

Heave In	Check Away (Acknowledged)	Probe is brought home.	**Give Heave In**	Heave In (Given)	
Detension	Detension (Given)	Cage operator detensions the spanwire and keeps it clear of the water.	**Detension**	Detension (Acknowledged)	Station Supervisor must get permission from command before giving the signal to detension. Immediate area is cleared of personnel.

9.14 Sequence of Events Liquids Transfer (Probe) (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
			Down Temporary Guardrail		Temporary guardrail is lowered in preparation for slipping.
	Stand By to Slip (Given)		**Out Pin**	Stand By to Slip (Acknowledged)	Station worker removes mousing and pin from Pelican hook and stands by with a hammer.
Slip	Slip (Given)	Heave in the spanwire.	**Slip**	Slip (Acknowledged)	Station worker trips the hook.
			Check Away the Easing Out Pendant		Station worker eases the spanwire over the side and then releases the easing out pendant.
Supply ship recovers the spanwire.					

9.15 Sequence of Events Liquid RAS NATO "B" Method

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on whistle (Acknowledged)	Red paddle is held aloft, and two blasts are given on the whistle to indicate ready to receive gunline and that personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave In (Given)	Messengers are paid out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline/light messenger is heaved in hand over hand.
Avast	Avast (Given)	Station workers attach distance line messenger to light messenger.	**Avast**	Avast (Acknowledged)	
Check Away	Heave In (Given)			Check Away (Acknowledged)	Heavy messengers are heaved in hand over hand.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	Station workers unhook distance/tele-phone line and attach to tag line leading to command.
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand.	**Heave In**	Check Away (Given)	Heavy messenger is heaved in hand over hand until sufficient line is on board to take 3 turns on the winch.
Avast	Avast (Acknowledged)	Line handlers keep heavy messenger out of the water.	**Avast**	Avast (Given)	Station workers take 3 turns on the winch.

9.15 Sequence of Events Liquid RAS NATO "B" Method (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Check Away	Heave In (Acknowledged)	Heavy messenger is paid out hand over hand until transferred to spanwire.	**Heave In Roundly**	Check Away (Given)	Heavy messenger is heaved in under power until the weak link can be attached to the Pelican hook on the swivel arm.
Note: Temporary guardrail is lowered to allow spanwire on board and is then raised on completion.					
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	Weak link is attached to the Pelican hook.
			Veer		Heavy messenger is veered until weight comes off the messenger. Kline grip is removed. Hose messenger is rove through and tended until required.
			The light and heavy messengers are coiled down and made ready to return to the supply ship.		
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	Hooked On signal is passed to indicate that all rigging complete.
Tension Down	Tension Down	Cage operator heaves in on the spanwire and places in tension.	**Tension Down**	Tension Down	Station Supervisor must get permission from command before giving the signal to tension down. Immediate area is cleared of personnel.
	Heave In (Given)	NATO "B" is sent to receiving ship.	**Heave In on the Hose Messenger**	Check Away (Acknowledged)	Hose messenger is heaved in.
			On Goggles		All personnel around the fuelling position will don goggles before the rig arrives.

9.15 Sequence of Events Liquid RAS NATO "B" Method (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
			Hook on the Hose Hanging Pendant		Station workers secure the hose hanging pendant to the baby saddle "D" ring.
	Hooked On (Acknowledged)			Hooked On (Given)	Hooked On signal is passed to indicate that all rigging is complete.
4 Saddle in Tension		Cage operator heaves in and puts 4 saddle in tension.			
			Station workers unhook NATO "B" fitting and manually connect the fittings together.		
	Hooked On (Acknowledged)		**Hooked On**	Hooked On (Given)	
Start Pumping	Start Pumping (Acknowledged)		**Start Pumping**	Start Pumping (Given)	Rig easing out pendant.
			Pumping will continue until the ship has received the required amount of fuel.		

SECONDARY COMMODITY:

If a second commodity is to be passed, such as JP5 or water, an extra length of 4" hose (pig tail) is lashed under the probe for JP5 and a fire hose is used for water.

Note: A second commodity can only be transferred once the fuelling rig is properly hooked on.

To connect the secondary hose (JP5):

(a) unclip from main hose point;
(b) unscrew cover cap and connect to ship's service; and
(c) connect male and female fittings.

Note: The signalman must ensure that he points aft for JP5 and forward for distillate when he is signalling Start or Stop Pumping.

9.15 Sequence of Events Liquid RAS NATO "B" Method (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
				Remove the Recovery Messenger	Station worker removes the recovery messenger and attaches it to the heavy messenger.
Heave In	Check Away (Acknowledged)	Station workers recover the lines.	**Check Away**	Heave In (Given)	Station workers return the messengers.
Stop Pumping	Stop Pumping (Acknowledged)		**Stop Pumping**	Stop Pumping (Given)	
Note: The AOR switches to zero pressure and allows gravity to drain the hoses.					
Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	
			Station workers unhook the NATO "B" fitting and manually connect the fittings back to the rig.		
4 Saddle in Speed		Cage operator puts slack in saddle wire.			
			Release the Hose Hanging Pendant		Station workers release the hose hanging pendant.
Heave In	Check Away (Acknowledged)	Rig is brought home.	**Check Away on the Hose Messenger**	Heave In (Given)	Line handlers check away hand over hand.
Detension	Detension (Given)	Cage operator detensions the spanwire and keeps it clear of the water.	**Detension**	Detension (Acknowledged)	Station Supervisor must get permission from command before giving the signal to detension. Immediate area is cleared of personnel.
	Stand By to Slip (Given)		**Out Pin**	Stand By to Slip (Acknowledged)	Station worker removes mousing and pin swivel arm assembly and stands by with a hammer.
Slip	Slip (Given)	Heave in the spanwire.	**Slip**	Slip (Acknowledged)	Station worker trips the hook.
			Check Away the Easing Out Pendant		Station worker eases the spanwire over the side and then releases the easing out pendant.

9.16 Sequence of Events Stern Fuelling

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Commence Streaming		Marker buoy is payed out to a distance ordered by command.			
Positioned Streamed to between 121-146 metres		Cable is veered to distance ordered.			
Stream the Hose		Veer until hose is fully deployed.			

Note: When the fuelling assembly is being payed out through the stern fairlead, caution is be exercised as damage can occur to the fuelling assembly, and the risk of injury to personnel is highest. Veering at that point must be at dead slow speed.

			Grapnel the Messenger		The messenger picked up and the float assembly hauled on deck
			Heave in Handsomely		Hose messenger heaved in until hose hanging pendant in line with flounder plate
			Avast		Hook on hose hanging pendant, connect up hoses
Start Pumping	Start Pumping	Pumping commenced at a slow rate.	**Start Pumping**	Start Pumping	Receive fuel
Stop Pumping	Stop Pumping	Engine room to stop cargo pump.	**Stop Pumping**	Stop Pumping	Fuelling TX stopped
Start the Blow Through	Start Blow Through	15 second blow through.	**Start the Blow Through**	Start the Blow Through	Either excess fuel is blown through, sucked back or gravity fed.
Stop the Down Through	Stop Blow Through		**Stop the Blow Through**	Stop the Blow Through	Pressure is taken off hoses
Secure	Secure		**Secure**	Secure	Ship prepares to return gear
Prepare to Slip		Receiving ship prepares to slip.			Fuel hose capped off
Slip	Slip	Receiving ship lowers gear into water.	**Slip**	Slip	All gear lowered into the water/ then rec. ship slows down
Recover Fuel Hose		Heave in dead slow, then half speed.			
Heave In Dead Slow		When fuelling assembly is in sight at approximately 30 metres.			
Secure Fuelling Station					

9.17 Emergency Breakaway

a. An emergency breakaway may be initiated by either ship in response to any emergency. The sounding of six short blasts on the ship's whistle will most probably be the first indicator that an emergency breakaway is being initiated. A verbal order from command to the RAS deck will be made simultaneously. Emergencies could result from RAS equipment failure, steering gear or main propulsion breakdowns, or when an imminent risk of collision exists. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment. Lines are not to be thrown overboard, but should be returned as quickly as possible. Lines that are or become fouled must be cut.

b. An emergency breakaway is essentially an accelerated return of gear with minimal signals. The following items must be taken into consideration:

(**1**) **Light Line**. If the load is in transit, the run is completed; on arrival, the load is removed.

(**2**) **Light Jackstay:**

(a) If the traveller is in transit, the run is completed; on arrival, the load is unhooked.

(b) If the traveller is on either ship the load is unhooked.

(**3**) **Heavy Jackstay:**

(a) The initial action is for the AOR to recover the traveller (and the load if it is hooked on). This may involve stopping the traveller on an outboard run.

(b) If the traveller is on deck on the receiving ship, the load is unhooked. The padeye is then raised and the Heave In signal given before continuing with the Prepare for Emergency Breakaway signal.

(**4**) **Fuelling (Probe)**. If distillate and aviation fuel are being transferred concurrently, the AOR must ensure that the receiving ship removes the remating line and the aviation fuel fitting before releasing the probe.

(**5**) **Fuelling NATO "B"**. The breakable spool should be broken.

(**6**) **Distance/Telephone Line**. Returned as soon as the telephone connections are disconnected.

9.18 RAS Briefing

a. Prior to all RAS evolutions, a command briefing will be conducted. This briefing to the Captain will normally take place on the bridge in the wardroom or in another suitable location, and will occur as early as the day prior to the RAS, and as late as 15 minutes prior to the RAS Teams and Special Sea Dutymen being piped to close-up. The following personnel will, as a minimum, be in attendance: Executive Officer, Deck Officer, Engineering Officer, Supply Officer, Safety Officer, Chief Bosn's Mate, Senior Naval Communicator and Station Supervisor.

b. The following is a briefing format to be followed:

(**1**) Captain Sir, ladies and gentlemen, (OWNSHIP) will be conducting a (TYPE OF RAS) with (AOR) on our (PORT/STARBOARD) side (FORWARD/MIDSHIPS) at (TIME). In accordance with the Task Group Commander's intentions promulgated by message this morning, (OWNSHIP) will be the third of three ships replenishing. It is anticipated that (OWNSHIP) will be ordered into Lifeguard Station during the first two ships' RAS. The (PORT/STARBOARD) Rescue Watch will be closed up at that time. This in-scale diagram shows (OWNSHIP) alongside (AOR) and the stations that will be used for replenishing.

(**2**) (PORT/STBD) watch Special Sea Dutymen and RAS Team(s) (NUMBER) will be required to close up at (TIME), at which time the station will be rigged.

(**3**) The dress for this evolution as discussed with the Executive Officer will be (DRESS).

(**4**) The Station Supervisor for this evolution will be (NAME) and the Safety Officer will be (NAME).

(**5**) The following commodities will be received/passed:

(a) (PERSONNEL),

(b) (PROVISIONS/AMMUNITION), and

(c) (FUEL/WATER).

(**6**) The sequence of events for the RAS will be as follows: (DESCRIBE PASSING OF RIG AND SEQUENCE OF TRANSFER. IF WORKING WITH A NON-CANADIAN AOR, PROVIDE DETAIL ON ANY DEPARTURES FROM STANDARD CANADIAN RIGGING AND RAS SOPs).

(**7**) Due to the inherently dangerous nature of this evolution, Station Supervisors are to thoroughly brief all personnel upon closing up on their duties and the sequence of events. The Safety Officer will pay close attention during the evolution for safety infractions.

(**8**) In the event of an emergency breakaway, the aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment. Lines are not to be thrown overboard, but should be returned as quickly as possible. Lines that are or become fouled must be cut. The AOR will initiate the order to slip.

(**9**) If required, a debrief will be conducted on completion of the evolution. Place and time to be promulgated.

(**10**) Sir, this completes the briefing. Are there any questions?

(**11**) The Chief Bosn's Mate will now brief personnel on the safety-related aspects of the evolution.

9.19 Replenishment Safety Briefing

It is important that the Chief Bosn's Mate and the Station Supervisors give a thorough safety briefing to all personnel involved in the replenishment prior to the evolution starting. As well as the general shipboard safety items listed in Chapter 4, the following safety points must be covered:

a. **General:**

(**1**) All personnel will take cover and remain under cover until the gunline is fired.

(**2**) Minimum personnel are to be placed aft of the rigging. If required aft, they are to clear the area upon completion of the task.

(**3**) Station Supervisors must take positive control of dump workers and order them into and out of the dump area as required and when safe to do so.

b. **Tensioned Rigs:**

(**1**) Always remain clear and under cover if possible when the rig is being put in tension or detensioned.

(**2**) Never pass under a rig whether in tension or not. The only exception is under the direction of the Station Supervisor during special transfers.

(**3**) Personnel are to remain clear of upper platform directly above fuelling station when tensioning and detensioning.

Note.

The padeye must be in the upper position when this action is authorized during a heavy jackstay.

(**4**) Never turn your back to the rig.

c. **Station Workers:**

(**1**) Never turn your back to the load.
(**2**) Never stand outboard of the load.
(**3**) Never stand under the load.
(**4**) If possible, do not place yourself between the load and the bulkhead and/or rigging.
(**5**) Remain clear of temporary guardrails.
(**6**) When directed, station workers are to wear tethered safety harnesses when working in the dump area with a temporary guardrail rigged.
(**7**) All dump workers must wear positive Hazardous Duty lifejackets and/or floater jackets.

d. **Fuelling:**

(**1**) Goggles are worn by all personnel in the fuelling area and any personnel aft of the rig.
(**2**) One layer of clothing must be worn by all at the fuelling position, taking care to ensure that as much skin as possible is covered.
(**3**) Action in the event of a fuel spill.

Note.

Safety lessons learned from previous replenishments should be stressed during the RAS Safety Briefing.

9.20 VERTREP/Hoist

a. **Acronyms:**

SAC - Shipborne Aircraft Controller
FDD - Flight Deck Director
FLYCO - Flight Deck Co-Ordinator
VCO - VERTREP Control Officer

b. VERTREP/Hoist may be conducted when a HELAIRDET is not embarked, in accordance with SHOP Chapter 9, provided the following conditions have been satisfied:

(**1**) FLYCO is manned by the Senior Firefighter.

(**2**) All damage control positions are manned as per Flying Stations for class of ship (including two rescue swimmers).

(**3**) Positions normally manned by the Air Department personnel will be manned by the ship's staff.

(**4**) The following personnel are required and must be Flight Deck qualified:

Table 9 Personnel - VERTREP

Personnel	Position	Qualification
Senior Firefighter	FLYCO	SGT/MCPL
Bosn	FDD	PO/MS
Bosn	Deck Crew	LS/OS
Bosn	Deck Crew	LS/OS

c. **Dress.** The personnel involved in the VERTREP/Hoist will wear NCDs with sleeves rolled down and the following safety items: head protection (with chin strap drawn), goggles, ear defenders, life jackets and leather gloves (for handling wires and loads).

The following equipment is required: red and green paddles or wands, a grounding rod, and nylon or steel cargo slings.

d. **Sequence of Events.**

(**1**) Ship will close up as per Flying Stations.

(**2**) FLYCO will close up and establish normal communication with the bridge and pass pertinent information, i.e., load density, type and weight.

(**3**) The bridge will pass the flying course, relative wind, true wind, altimeter setting and RADHAZ Safe to the helicopter.

(**4**) When ready, the VCO will give "Signal Charlie" for VERTREP. The trafficators will be turned to green and the helicopter will make its approach.

(**5**) The FDD will hold up the green paddle to let the helicopter know the deck is clear and ready (the FDD paddles back up the trafficators).

(**6**) When the helicopter is in position, FLYCO by PA system will direct the FDD to hook or unhook the load. The FDD will send in the two-deck crew. FLYCO will switch the trafficators to amber and the FDD will hold up the red paddle. This indicates to the pilot that the drop zone/deck is fouled (personnel working under the helicopter).

(**7**) The deck crew will ground and hook or unhook the load.

(**8**) The FDD will clear the drop zone/deck of personnel. When the area is clear, the FDD will lower the red paddle and hold up the green.

(**9**) FLYCO will switch the trafficators to green, indicating that the helicopter is clear to depart.

(**10**) FLYCO will inform the bridge of the helicopter's departure (which side) and turn control over to the SAC.

Note.

All personnel being hoisted or lowered from the helicopter will wear a safety helmet and ear defenders. The helicopter will lower these items in a weighted bag, if required.

When personnel are being lowered, the hoist wire is to be grounded before they touch the deck. Before hooking on personnel, the hoist wire is also to be grounded.

9.21 IROQUOIS Class - Replenishment at Sea

9.21.1 Light Line Transfer

a. There are two stations on IROQUOIS Class ships from which light line transfers can be conducted on either side of the gun deck.

b. **Equipment Layout - Gun Deck.** The light line is faked out on deck athwartships so that it will pay out from aft to forward.

Note.

A configuration change recommending the installation of permanent eyepads to receive the 6″ snatch blocks is being considered.

Note.

During all IROQUOIS RAS operations, 3/4″ shackles are used on all 12″ blocks with the exception of a 7/8″ shackle used on the Kingpost Sliding Padeye.

9.21.2 Light Jackstay Supply

IROQUOIS Class ships are fitted with a portable Sampson post consisting of a tubular steel mast supported by forestays and backstays. It is used solely for the conduct of light jackstay transfers. On rare occasions the Kingpost could be used to conduct Light Jackstays. Eye plates on the Sampson post allow for the rigging of blocks and slips.

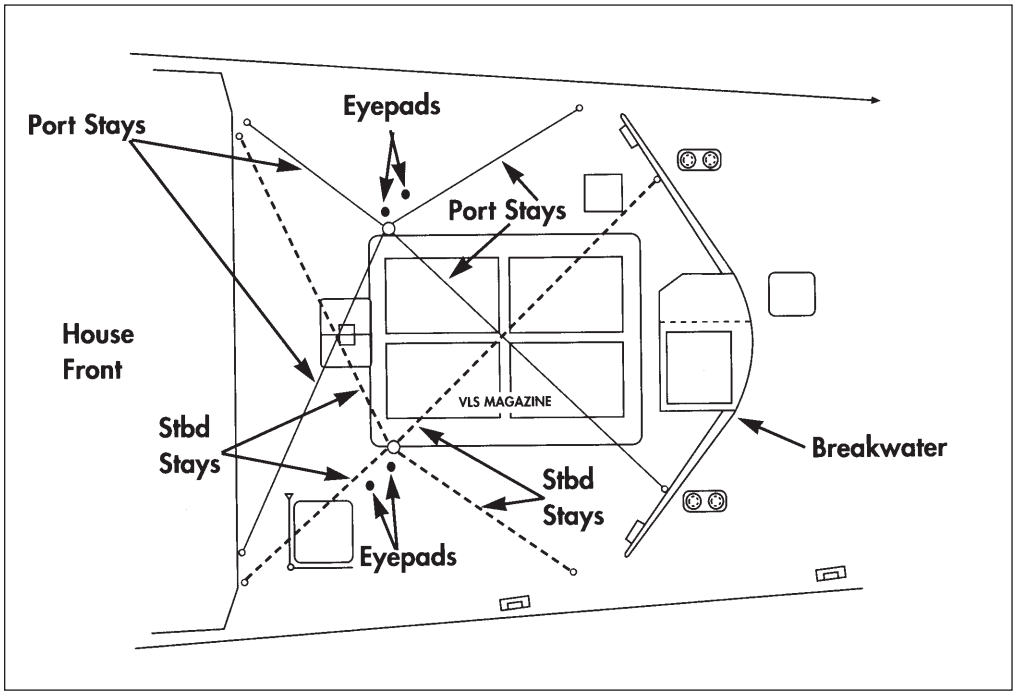


Figure 9.21-1 - Sampson Post Layout

Figure 9.21-2 - Light Jackstay Supply Port (Looking Aft)

a. **Preparation and Equipment Layout:**

(**1**) Hook the Sampson post winch cable to the Sampson post padeye, and raise the post approximately 3 feet. Hook on the forestays and backstays.

(**2**) Attach the upper and lower 12" common blocks for the jackstay, as well as the upper and lower 6" common blocks for the inhaul/outhaul. All four blocks are shackled to the appropriately sized eyepads fitted on the Sampson post.

(**3**) Fully raise the Sampson post and tighten the forestays. Remove the Sampson winch cable and secure it to the winch.

(**4**) Fake out the jackstay line along the guardrail by the breakwater so that it pays out from inboard to outboard. Fake out the inhaul along the face of the house from the aft to forward and centreline outboard so that it pays out forward to aft. Fake out the messenger and outhaul in the dump area so that they pay out from inboard to outboard.

(**5**) A messenger is passed from the bridge to the station to facilitate passing the telephone/distance line to the bridge.

(**6**) Check communications with the bridge.

b. **Securing Equipment:**

(**1**) On completion of the evolution, hook up the Sampson post lifting wire to the padeye.

(**2**) Remove the two backstays and lower the Sampson post into its cradle using the Sampson winch.

(**3**) Remove the four blocks and the forestays. Raise the guardrails and stow all of the gear. Ensure all turnbuckles are fully extended prior to stowage.

Figure 9.21-3 - Light Jackstay Supply Port (Looking Forward)

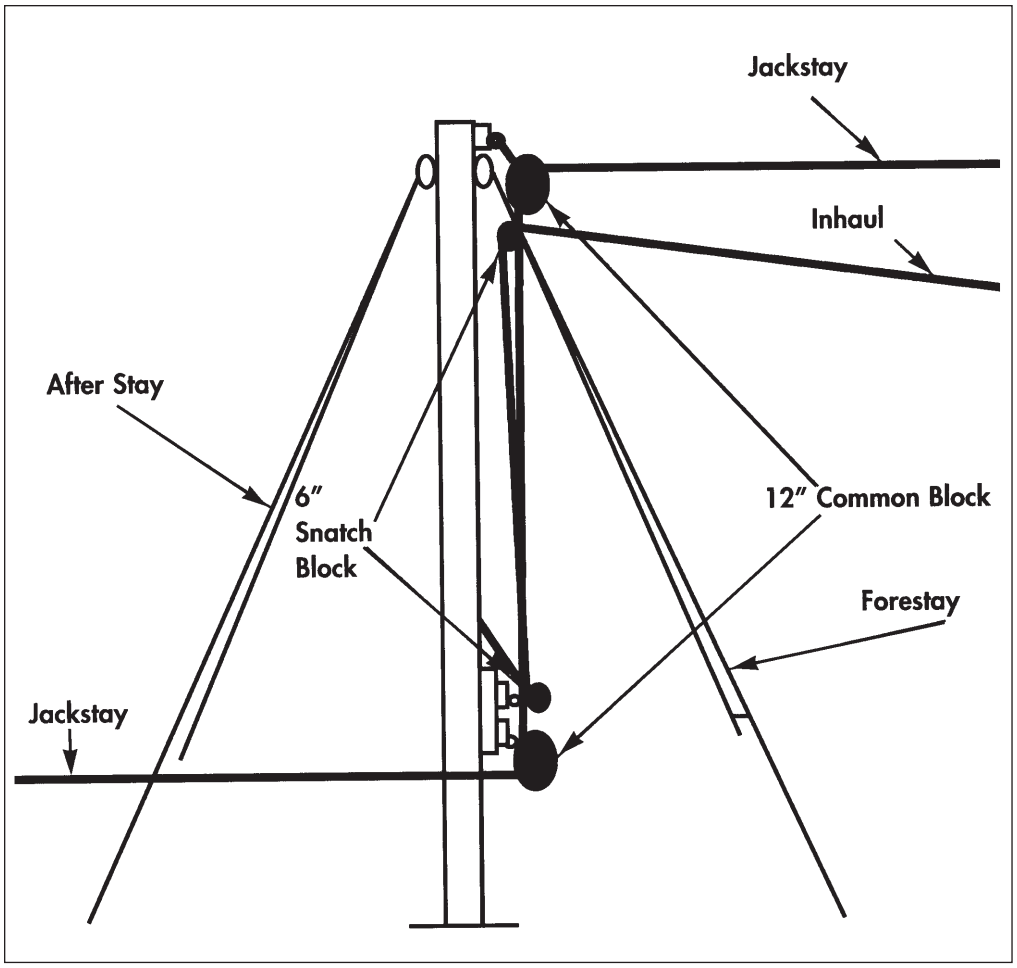


Figure 9.21-4 - Light Jackstay Supply

9.21.3 Light Jackstay Receive

a. **Preparation and Equipment Layout:**

(**1**) Hook the Sampson post winch cable to the Sampson post padeye, and raise the post approximately 3 feet. Hook on the forestays and two backstays.

(**2**) Shackle the senhouse slip onto the uppermost large padeye on the Sampson post. Shackle two 6" snatch blocks for the inhaul/outhaul onto the smaller upper and lower eyepads fitted on the Sampson post.

Figure 9.21-5 - Light Jackstay Receive Port

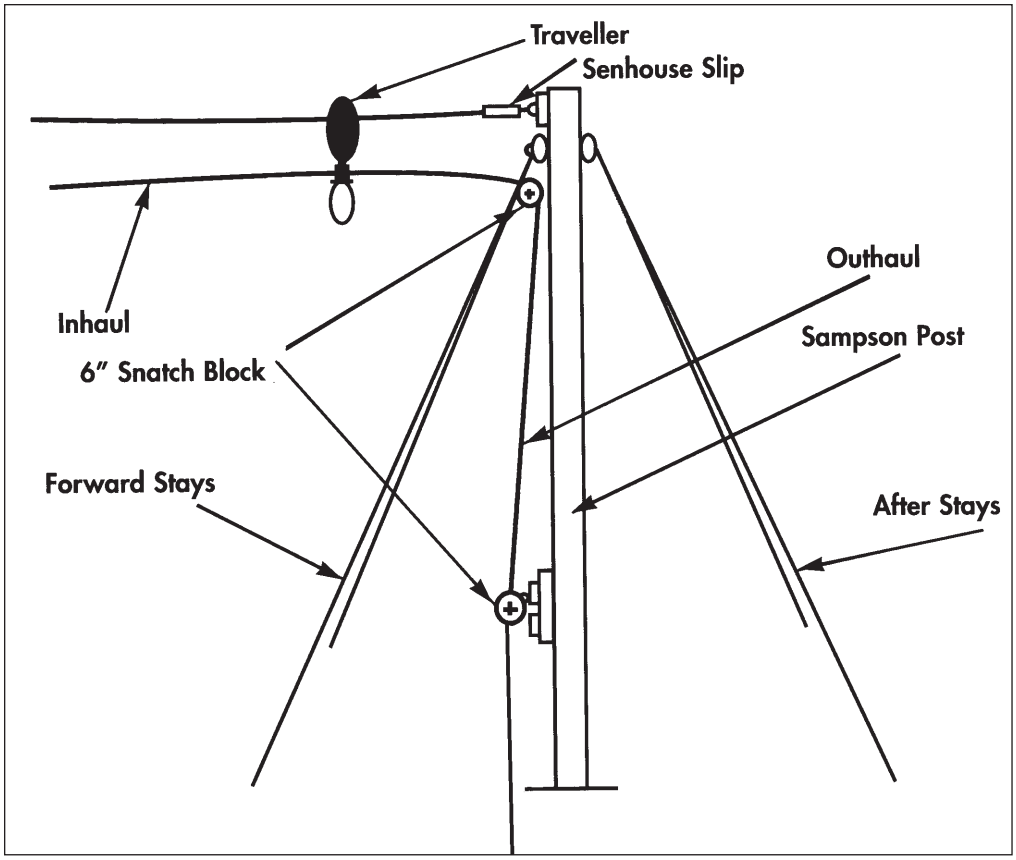


Figure 9.21-6 - Light Jackstay Receive

(**3**) Fully raise the Sampson post and tighten the forestays. Remove the Sampson post winch cable from the post and secure it.

b. **Securing Equipment:**

(**1**) On completion of the jackstay transfer, hook up the Sampson post lifting wire to the padeye.

(**2**) Remove the two backstays and lower the Sampson post into its cradle using the Sampson winch.

(**3**) Remove the senhouse slip, the two 6" blocks and the forestays. Raise the guardrails and stow all of the gear. Ensure all turnbuckles are fully extended prior to stowage.

9.21.4 Solids Replenishment - MK II Retractable Kingpost

IROQUOIS Class ships are fitted with a retractable kingpost which is normally used during heavy jackstays only. It is raised and lowered by an electric motor and chain assembly as discussed below.

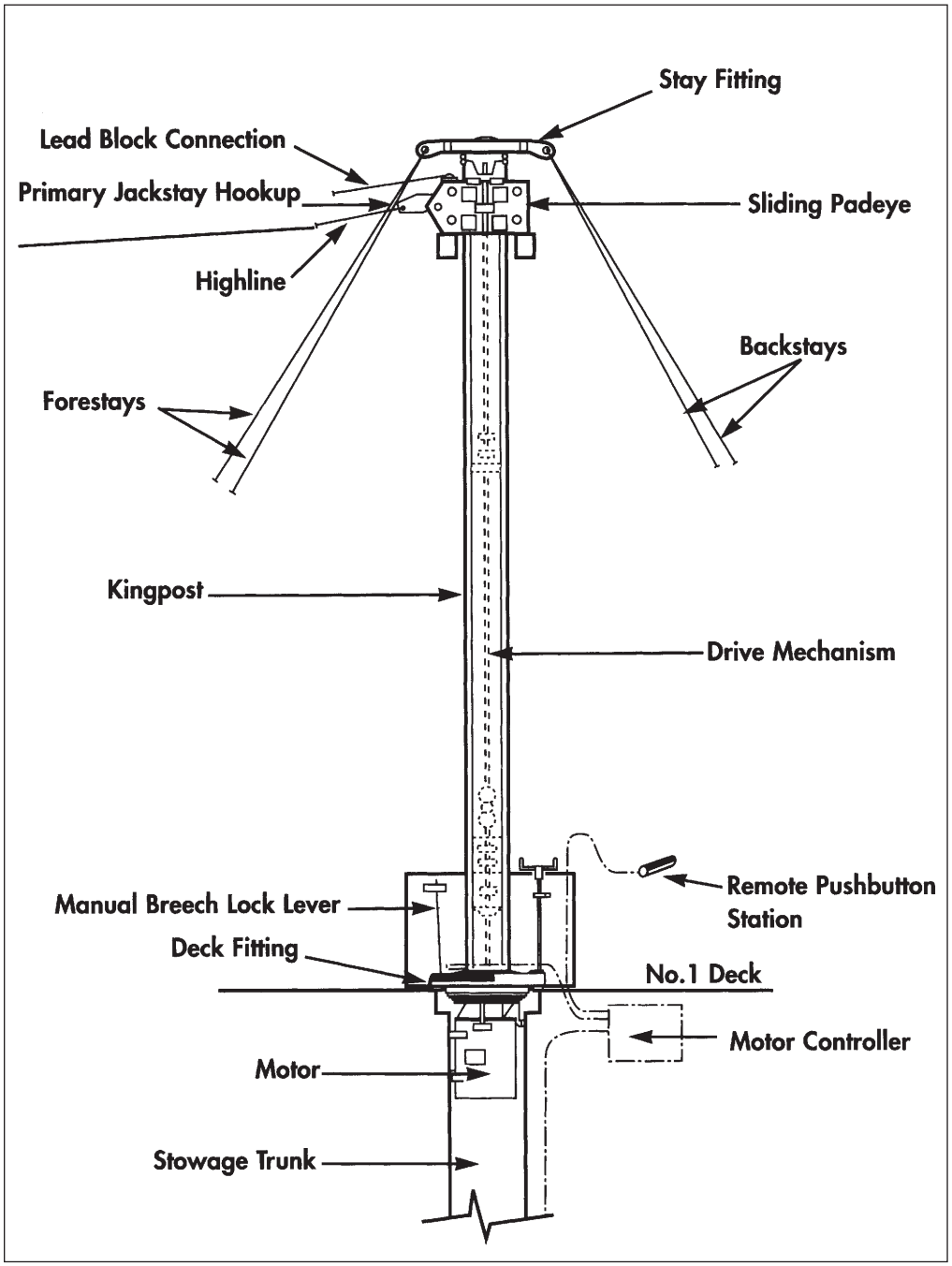


Figure 9.21-7 - Mark II Retractable Kingpost and Moving Padeye

a. **Preparation and Equipment Layout:**

(**1**) Raise the kingpost using the Trifor in accordance with standard procedures.

(**2**) When the kingpost reaches a workable height, hook on the forestays to the upper eyepads on the post with 2-1/4" shackles for the backstays, and 1-3/8" shackles for the forestays.

(**3**) Raise the post the remainder of the way and secure the stay slips to the eyepads on deck (large elongated eyepads).

(**4**) Tighten the bottle-screw on the backstays first, until the kingpost is vertical, followed by the forestays.

(**5**) Raise the travelling padeye to a workable height. Rig the elongated link to the padeye by removing the large pin and reinserting it through the link.

(**6**) Shackle the upper 12" snatch block to the padeye above the elongated link. Shackle the lower 12" snatch block to the designated padeye on the deck.

(**7**) Place a shot mat below the kingpost box. Remove the guardrails and rig temporary ones in their place.

Notes.

1. Personnel must be familiar with C-28-151-000/TB-002, Technical Bulletin (Marine) Operating Instructions for Retractable Post Mark II (Kingpost) in order to properly operate the kingpost.

2. Only the special TRIFOR 163 wire rope should be used. Personnel must be familiar with the TRIFOR TU-32 Operating Instructions (blue pamphlet) in order to properly operate the Trifor machine.

b. **Securing Equipment:**

(**1**) On completion of the evolution, the padeye is lowered to a workable height, and the upper snatch block and elongated link are removed.

(**2**) The lower snatch block is removed from the deck.

(**3**) The kingpost is lowered and the backstays and forestays unhooked. The turnbuckles are fully extended and secured.

(**4**) The kingpost, TRIFOR machine, wire and associated equipment are stowed.

9.21.5 Liquids Transfer

a. **General.** Ships of the IROQUOIS Class are equipped with a water-displaced fuel system. Water displaced by fuel during a replenishment is discharged overboard. The total distillate (F76) capacity is 592 tonnes (752 cubic metres/4730 barrels). The total aviation fuel (F44) capacity is 71.8 tonnes (91.4 cubic metres/574 barrels). Due to the positioning of the boat davit on the port side top part ship, the preferred location for liquids transfer is on the starboard side.

The two liquid RAS stations are designed to simultaneously receive:

(**1**) DFO at 247 tonnes per hour (215 cubic metres) for the two forward tanks, and 218 tonnes per hour (175 cubic metres) for the after tanks, and

(**2**) JP5 at 21 tonnes per hour (27 cubic metres).

b. **Fuelling Station 3 Starboard Preparation and Equipment Layout.**

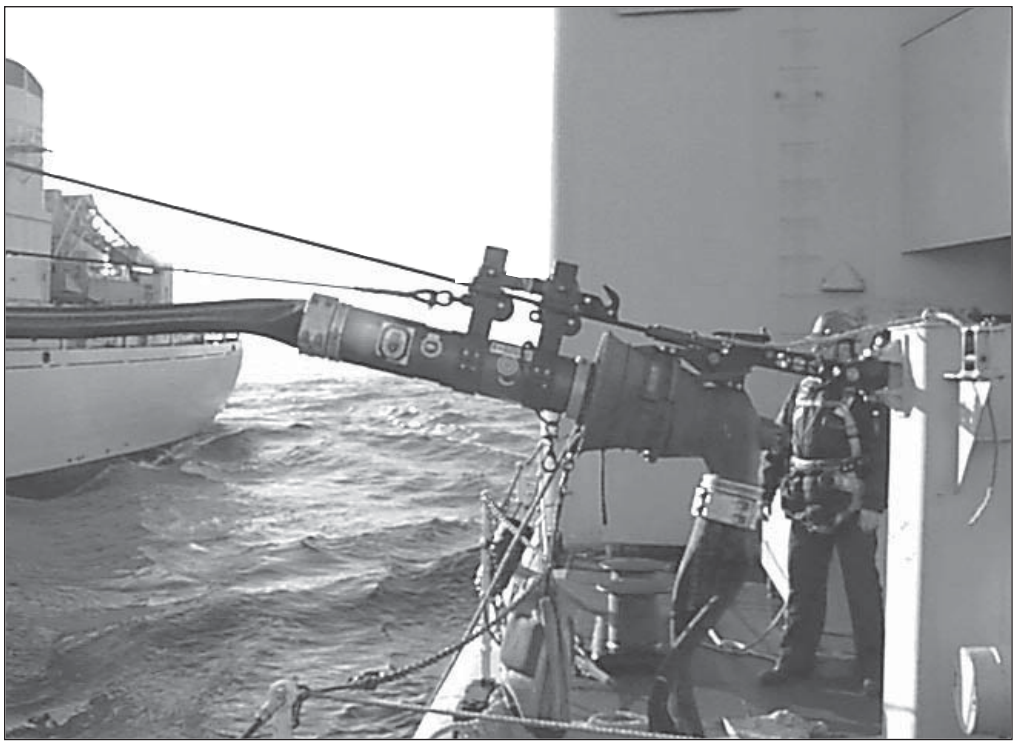


Figure 9.21-8 - Liquid RAS Stbd

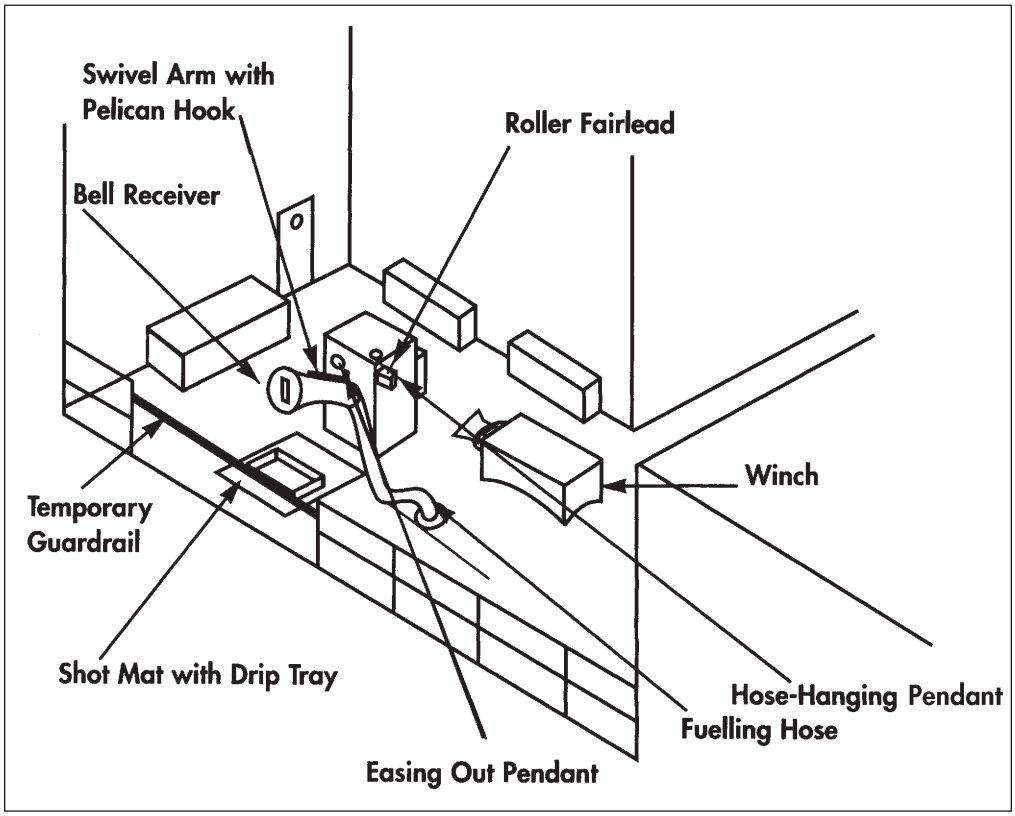


Figure 9.21-9 - Liquid RAS Layout Stbd

The gear is rigged as follows:

(**1**) A roller fairlead is bolted to the fuelling post, and the heavy messenger rove through the roller fairlead directly to the winch drum.

(**2**) The easing out pendant is rigged through the padeye on the fuelling post.

(**3**) A shot mat with drip tray is positioned on deck under the bell receiver. Another drip tray is placed under the hose connection elbow fitting.

(**4**) The messenger from the flag deck is rigged to the fuelling position in preparation for passing the distance line.

(**5**) The guardrail is removed and replaced with a temporary one.

c. **Fuelling Station 4 Port Preparation and Equipment Layout.**

Figure 9.21-10 - Liquid RAS Station 4

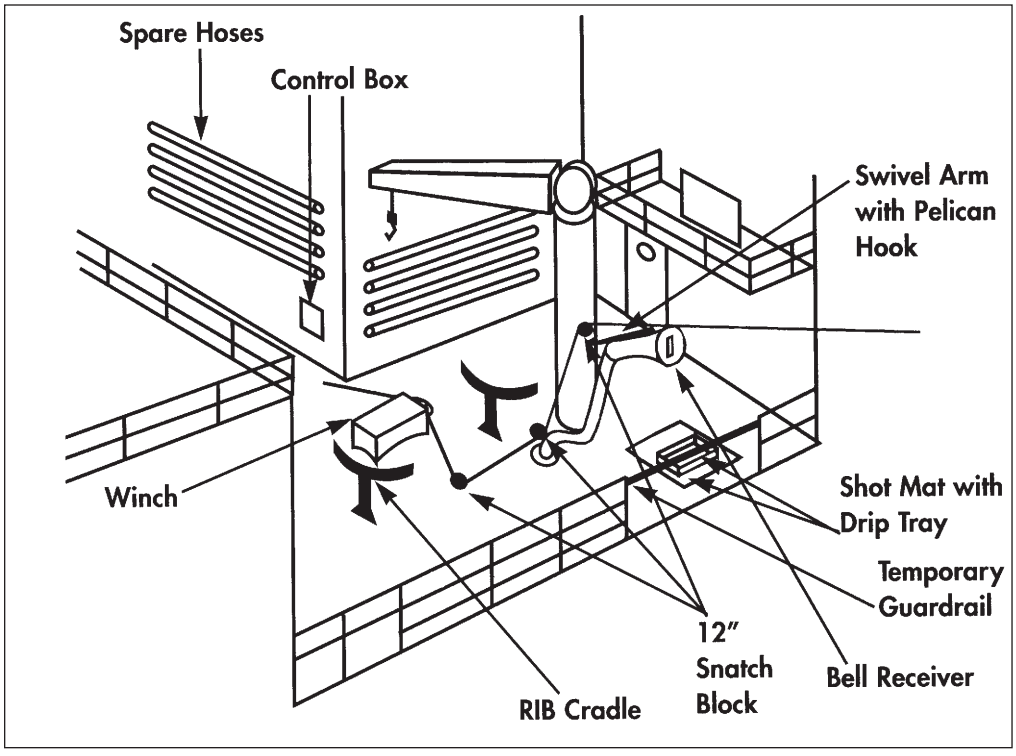


Figure 9.21-11 - Liquid RAS Layout Port

The gear for the three block arrangement is rigged as follows:

(**1**) The upper 12" snatch block is shackled to the forward padeye above the bell receiver on RIB crane post.

(**2**) The first of the lower 12" snatch blocks is shackled to the padeye on the deck at the base of the RIB crane post. The second lower 12" snatch block is shackled to the padeye on the deck forward of the winch.

(**3**) The easing out pendant is passed through the after padeye on the RIB crane post.

(**4**) A shot mat with drip tray is positioned on deck under the bell receiver, and another drip tray is placed under the hose connection elbow fitting.

(**5**) The messenger from the flag deck is rigged to the fuelling position in preparation for passing the distance line to the flag deck.

(**6**) The guardrail is removed and a temporary one is rigged in its place.

9.21.6 Remating Line

If two or more commodities are being received simultaneously, i.e., distillate (F76), aviation fuel (F44) and/or water, a 20 m, 18 mm circumference remating line is passed. One end has a 6" soft eye while the opposite end is whipped. The eye is passed over the hook of the probe carriage and then led through the messenger blocks to the winch. Approximately 2-3 ft of slack are left in the line and turns are taken up on the drum. Should the probe unseat itself, this will allow the probe to shut off completely without being pulled so far out as to apply strain to and damage the F44 rig. The remating line can then be used to re-seat the probe. Once the transfer of F44 and/or water is completed, the re-mating line may be removed.

9.21.7 NATO "B" Stations 3 and 4

The preparations for a NATO "B" fuelling are the same as with the probe receiver, except with the rigging at the receiving ship's fuelling point and the associated hose end fittings. Essentially, the swivel arm assembly replaces the probe receiver and a hose hanging pendant (1 m long, ref. class drawing DDDS-00084) is shackled to the padeye on the forward side of the RIB crane post on the port side, and on the RAS post on the starboard side.

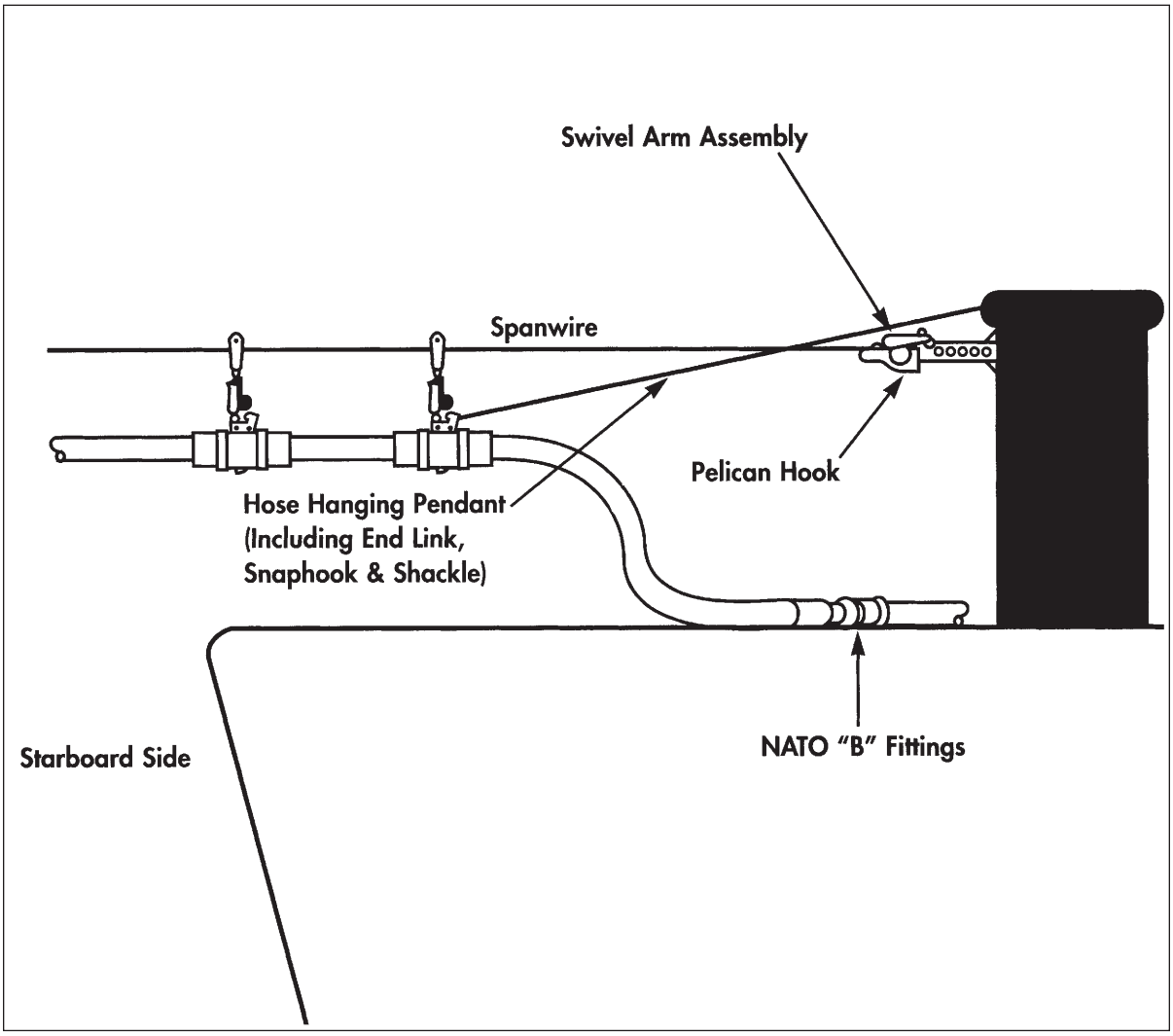


Figure 9.21-12 - Liquid RAS NATO "B" Starboard

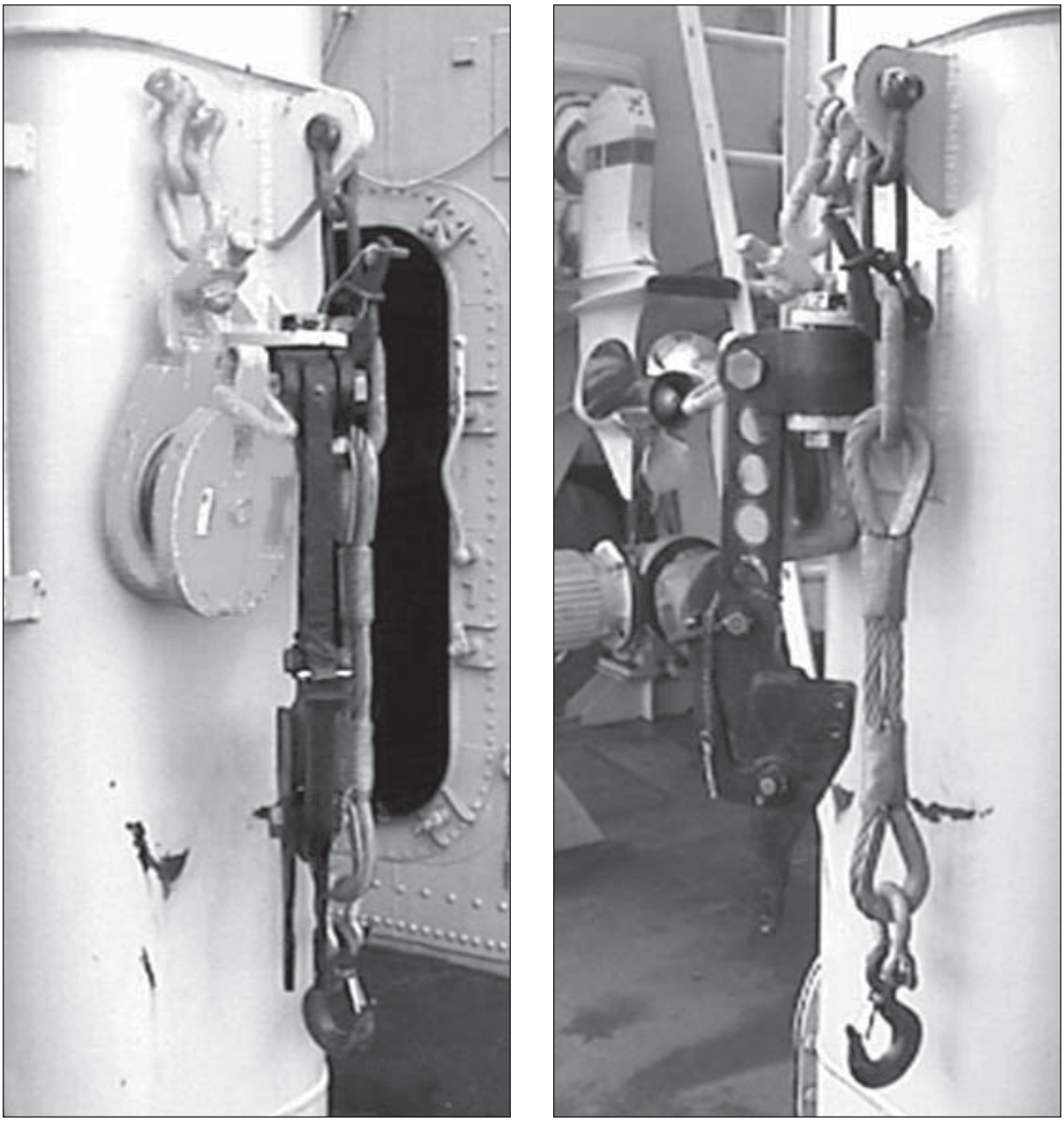


Figure 9.21-13 - NATO “B” Setup Port

9.22 HALIFAX Class - Replenishment at Sea

Note.

All HALIFAX Class fixed and reversible eyepads have been assigned numbers. They are listed in Chapter 5 Tables 3 & 4, and illustrated in foldout Figure 5.23-1. Refer to these tables/figure in conjunction with descriptions in this section.

9.22.1 Light Line Transfer

a. **Equipment Layout.** The light line is faked out fore and aft on the Chaff Deck (01 deck aft of the bridge wings). The port station is located over the hatch leading to the port breezeway and the starboard station is located over the forward life raft. Blocks are rigged port-side to eyepads No.6 (P)and No.8 (P), and on the starboard side to eyepads No.5 (S) and No.7 (S).

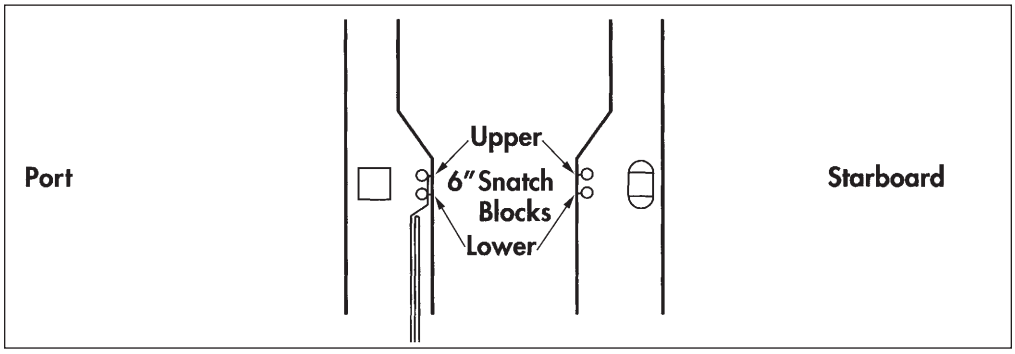


Figure 9.22-1 - Top View Light Line Receive Stbd Supply Port

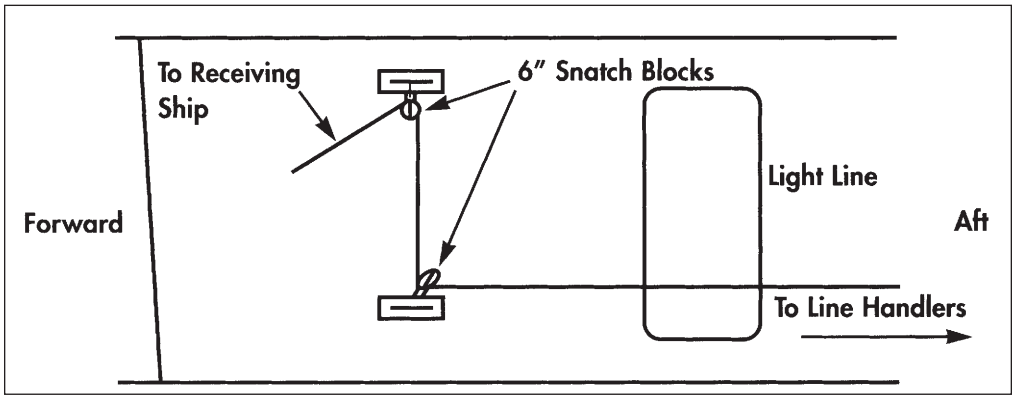


Figure 9.22-2 - Side View Light Line Supply Layout Port

9.22.2 Light Jackstay Supply

The HALIFAX Class is configured to conduct light jackstays at the forward stations and midships.

Preparation and Equipment Layout: Stations 1 and 2

The kingpost is raised in accordance with standard procedures and the gear is laid out as follows:

(**1**) The upper 12” common block of the jackstay is secured to the elongated link on the sliding padeye by a 7/8” shackle.

(**2**) The lower 12” common block of the jackstay is shackled to the reversible padeye No. 16 (R) or No. 15 (R) used for the heavy messenger while conducting solids or liquids replenishment operations.

(**3**) The 6” common block of the inhaul is shackled to the eye which is directly under the elongated link.

(**4**) The lower block of the inhaul is shackled on the padeye of the bollard on the engaged side.

(**5**) The jackstay is faked out on the designated side so that it pays out from the centre line to outboard. The inhaul is faked out athwartship so that it pays out forward to aft. The messenger and outhaul are faked out in the dump area so that they pay out from outboard to inboard.

(**6**) A bight of the outhaul is passed through the eye of the Newco thimble on the jackstay and secured in place with a toggle.

(**7**) The stream adapter plate is raised to the top of kingpost.

(**8**) The telephone/distance line is checked ready for use. Confirm communications with the bridge.

Notes.

1. *Personnel must be familiar with C-28-463-000/MS-000 Sliding Padeye Receiving Unit Bulkhead Mounted and Retractable in order to properly operate the kingpost.*

2. *Shackles connected to the elongated line on the sliding padeye must be 7/8″ to fit over the elongated link.*

Figure 9.22-3 - Light Jackstay Supply Station 1

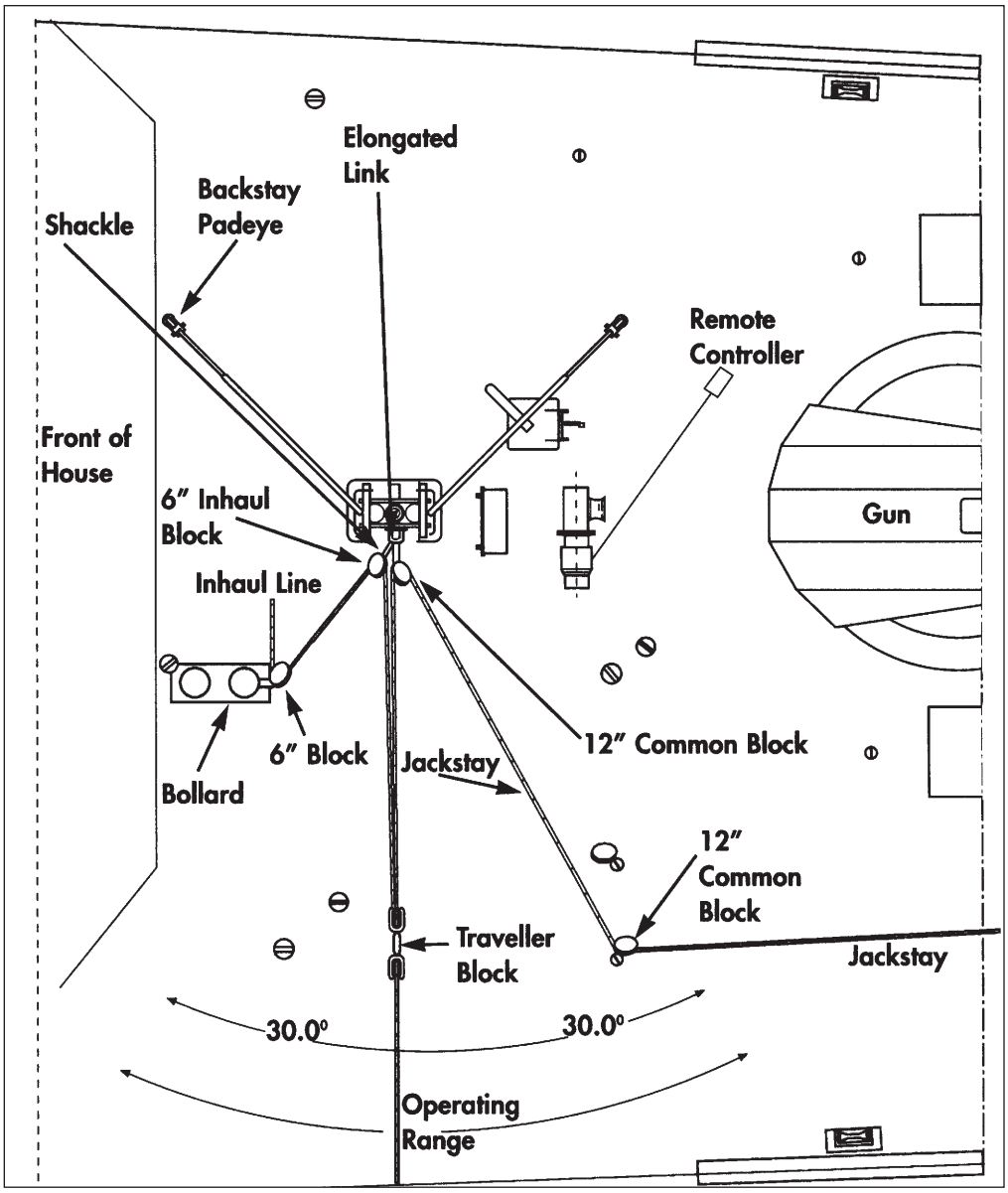


Figure 9.22-4 - Light Jackstay Supply Station 1

9.22.2.1 Light Jackstay Supply - Preparation and Layout (Stations 3 & 4)

The sliding Padeye is raised in accordance with standard procedures and the gear laid out as follows:

(**1**) The upper 12" common block of the jackstay is secured to the elongated link on the stream adapter plate by a 7/8" shackle.

(**2**) The lower 12"common block of the jackstay is shackled to padeye No. 25 (R) or No. 28a (R), used for heavy messenger while conducting solids or liquids replenishment operations.

(**3**) The 6" common block of the inhaul is shackled to the eye directly under the elongated link by a 3/4" shackle.

(**4**) The lower 6" block is shackled to padeye No. 23 (R) or No. 26 (R) for port and starboard operations respectively.

(**5**) The jackstay is faked out on the designated side so that it pays out from the centre line to outboard. The inhaul is faked out athwartships so that it pays out foreard to aft. The messenger and outhaul are faked out in the dump area so that they pay out from outboard to inboard.

(**6**) A bight of the outhaul is passed through the eye of the Newco thimble on the jackstay and secured with a toggle.

(**7**) The telephone/distance line is checked ready for use. Confirm communications with the bridge.

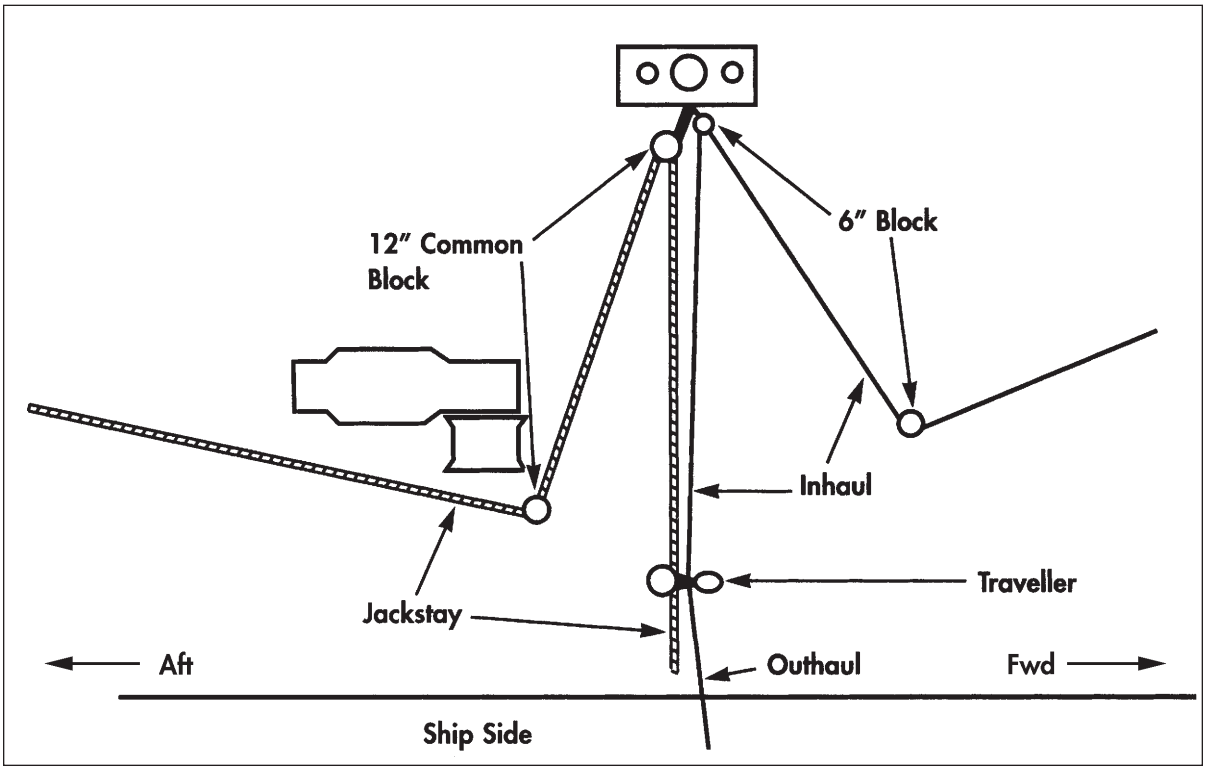


Figure 9.22-5 - Light Jackstay Supply Station 3 Stbd

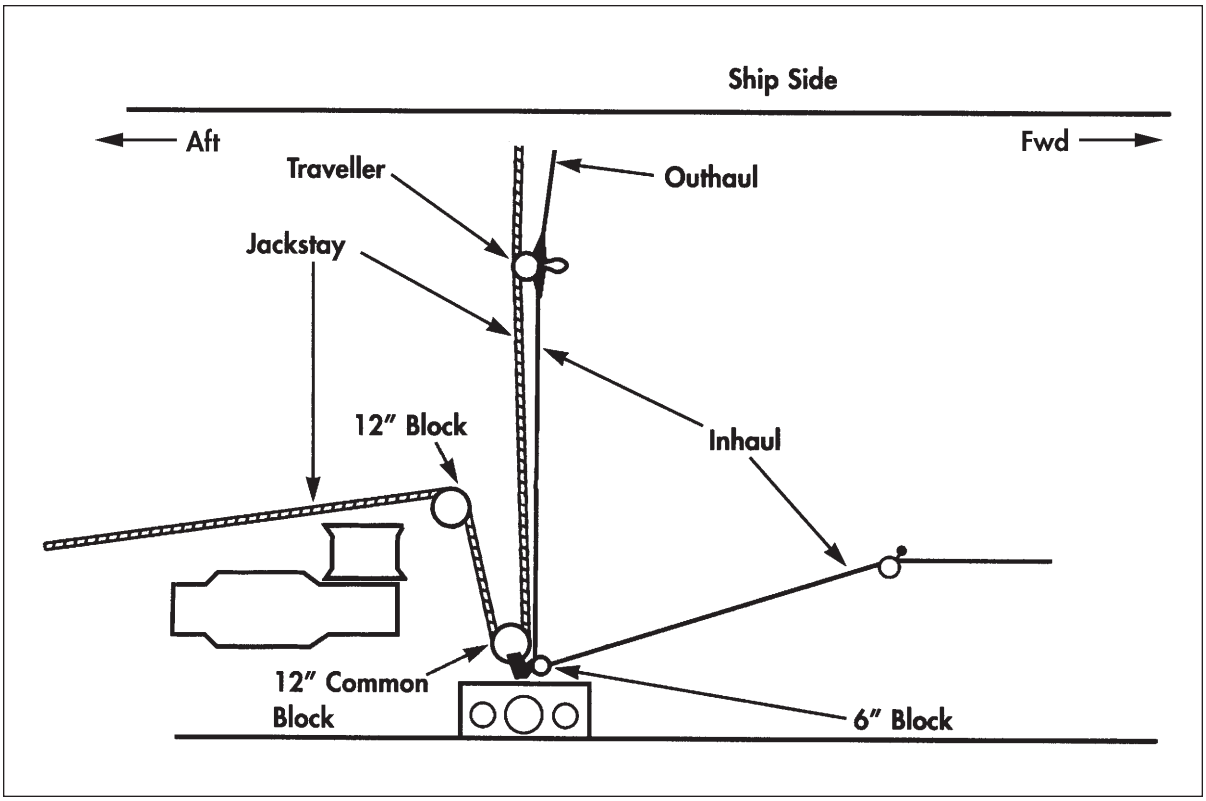


Figure 9.22-6 - Light Jackstay Supply Station 4

9.22.3 Light Jackstay Receive–Preparation and Equipment Layout.

The kingpost is raised in accordance with standard procedures (with platform) and the gear laid out as follows:

(**1**) A senhouse slip is shackled to the elongated link on the stream adapter plate.

(**2**) The upper inhaul 6” snatch block is shackled to the eye directly under the elongated link.

(**3**) The lower 6” snatch block is shackled to the Bollard padeye. All shackles are to be moused.

(**4**) The slip on the stream adapter plate will be “laying on its side”. The pin on the shackle and the retaining pin on the slip must be passed down from the top and securely moused.

(**5**) Confirm communications with the bridge.

(**6**) Tag line is passed from the station to the bridge to facilitate passing Distance/Phone Line to the bridge.

(**7**) Once the gear is received and secured to the stream adapter plate the sliding padeye is raised to the top.

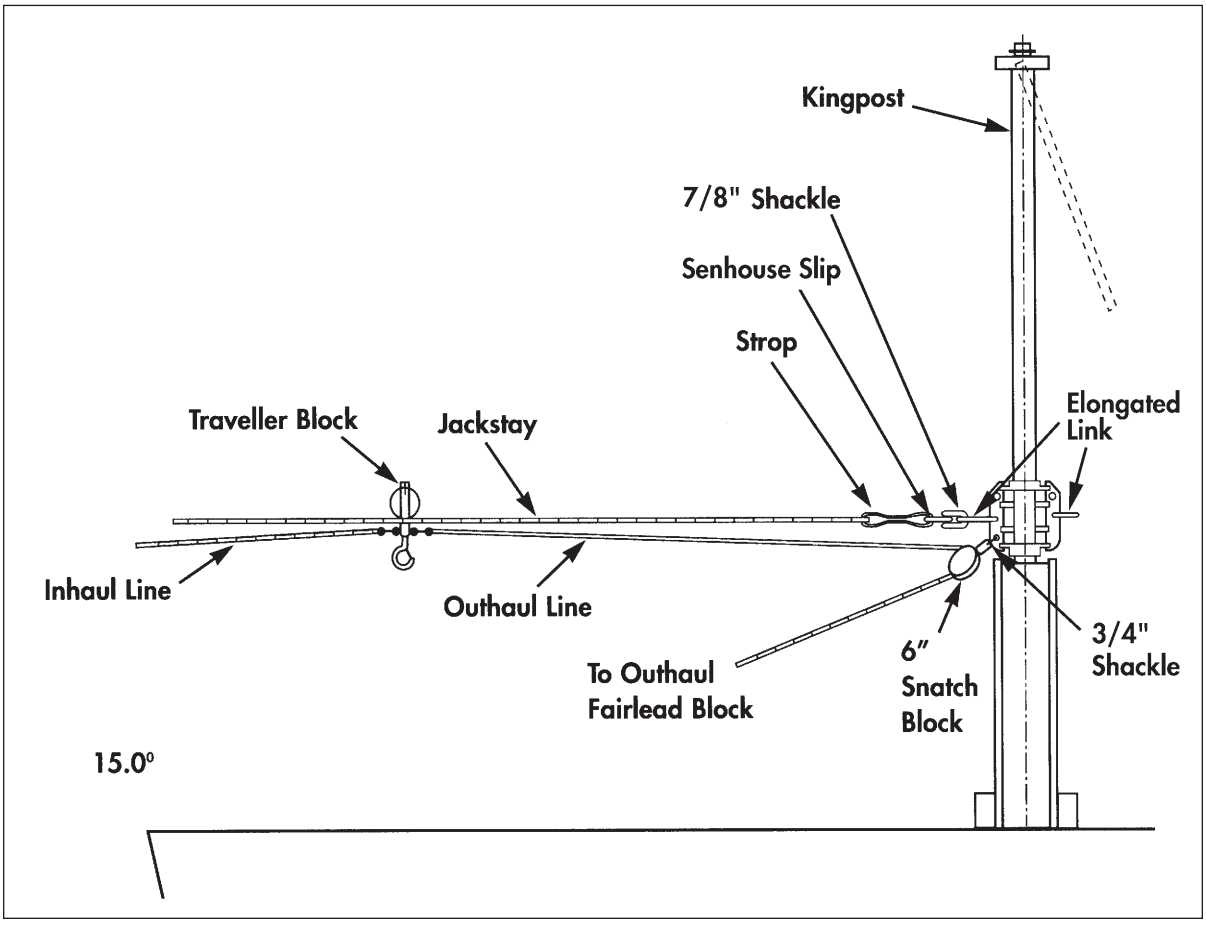


Figure 9.22-8 - Light Jackstay Receive

Figure 9.22-9 - Light Jackstay Receive Station 1

9.22.3.1 Light Jackstay Receive - Preparation and Layout (Stations 3 & 4)

The Sliding Padeye is raised in accordance with standard procedures and the gear laid out as follows:

(**1**) A senhouse slip is shackled to the stream adapter plate.

(**2**) The upper inhaul 6” snatch block is shackled to the eye directly under the elongated link.

(**3**) The lower inhaul 6” snatch block is shackled to padeye No. 25 (R) or No. 26 (R). All shackled are to be moused.

(**4**) The slip on the stream adapter plate will be “laying on its side”. The pin on the shackle and the retaining pin on the slip must be passed down from the top and securely moused.

(**5**) Confirm communications with the bridge.

(**6**) A messenger is passed from the station to the bridge to facilitate passing the telephone/distance line to the bridge.

(**7**) Once the gear is received and secured to the stream adapter plate, the sliding padeye is raised to the top.

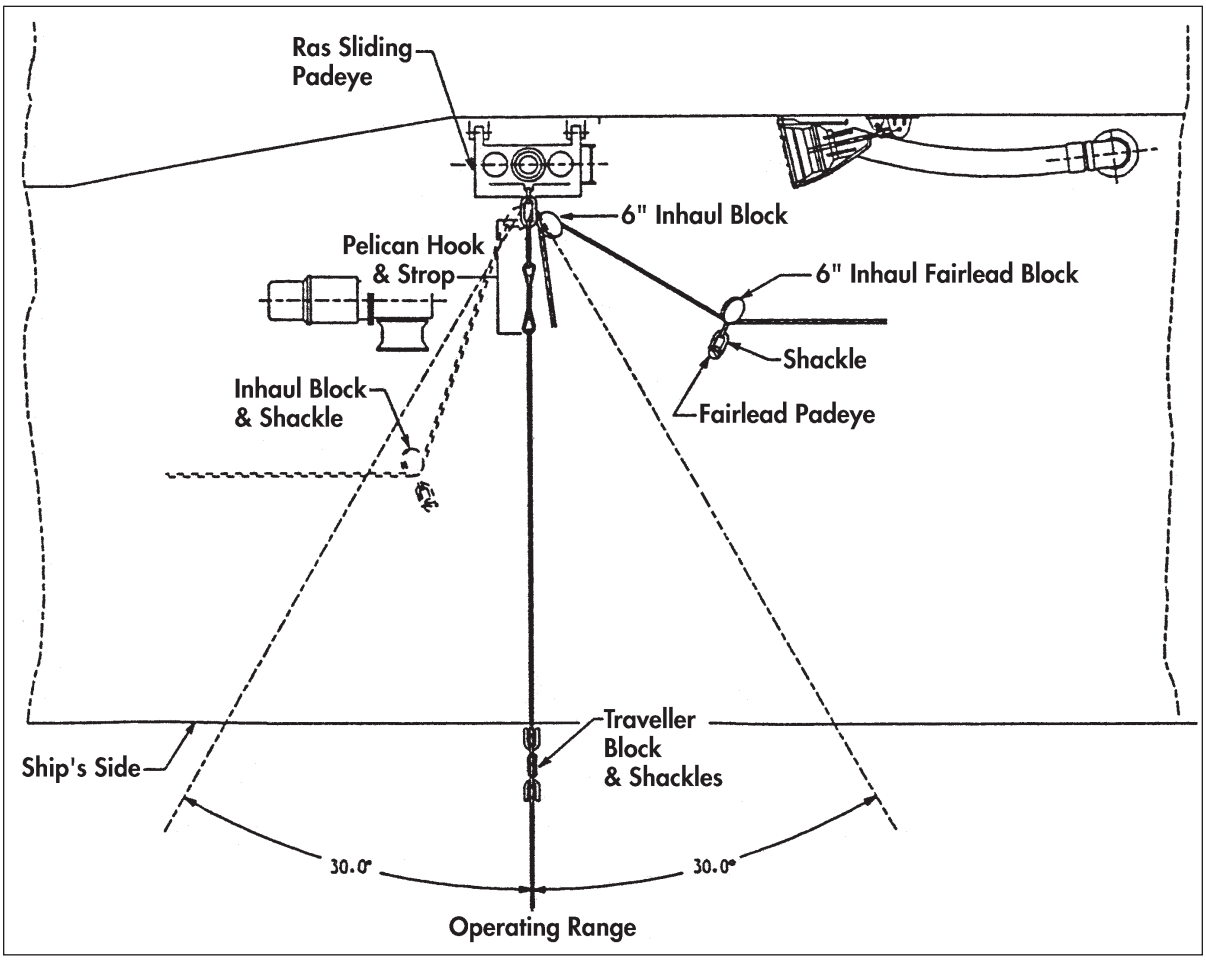


Fig 9.22-10 - Light Jackstay Receive (Stn 3 & 4)

9.22.4 Solids Replenishment

a. **Stations 1 and 2 Heavy Jackstay Preparation and Equipment Layout**.

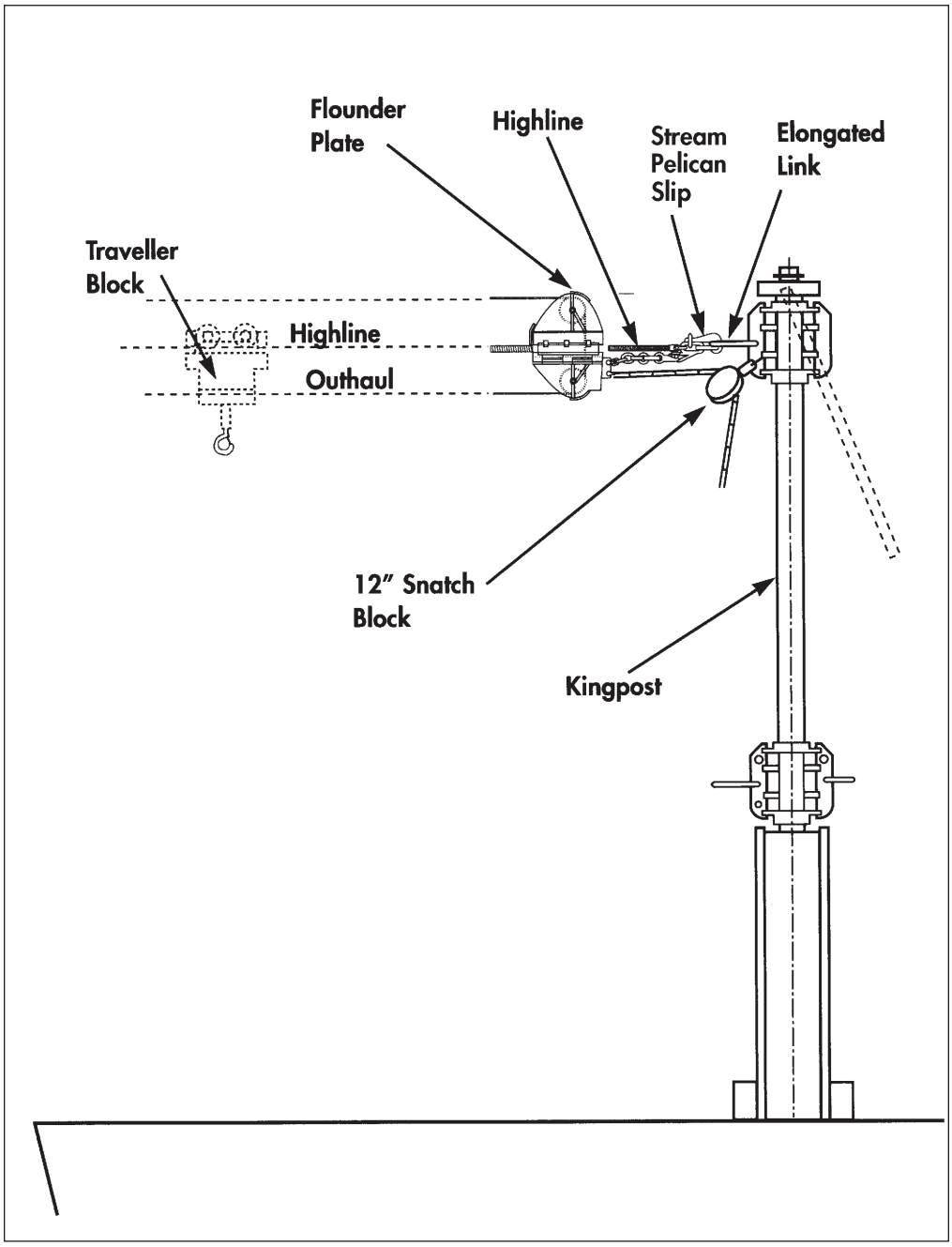


Figure 9.22-11 - Heavy Jackstay Receive Station 1 or 2

The forward solids transfer position is designed to receive up to 1364 kg on each transfer. The kingpost is raised in accordance with standard procedures. A portable platform, which can be rigged port or stbd, is used so that dump workers are able to safely connect up or slip messengers and highline. The remaining gear is laid out as follows:

(**1**) The upper snatch 12” block is shackled to the eye directly under the elongated link on the stream adapter plate.

(**2**) The lower 12” snatch block is shackled to reversible padeye No. 16 (R) or No. 15 R). It is the lead block for guiding the messengers to the winch.

(**3**) The easing out pendant is secured to the staple on the sliding padeye. When rigged, it is led through the eye of the slip on the highline and secured to the cleat on the stream adapter plate.

(**4**) A tag line is passed from the station to the bridge to facilitate passing the telephone/distance line to the bridge.

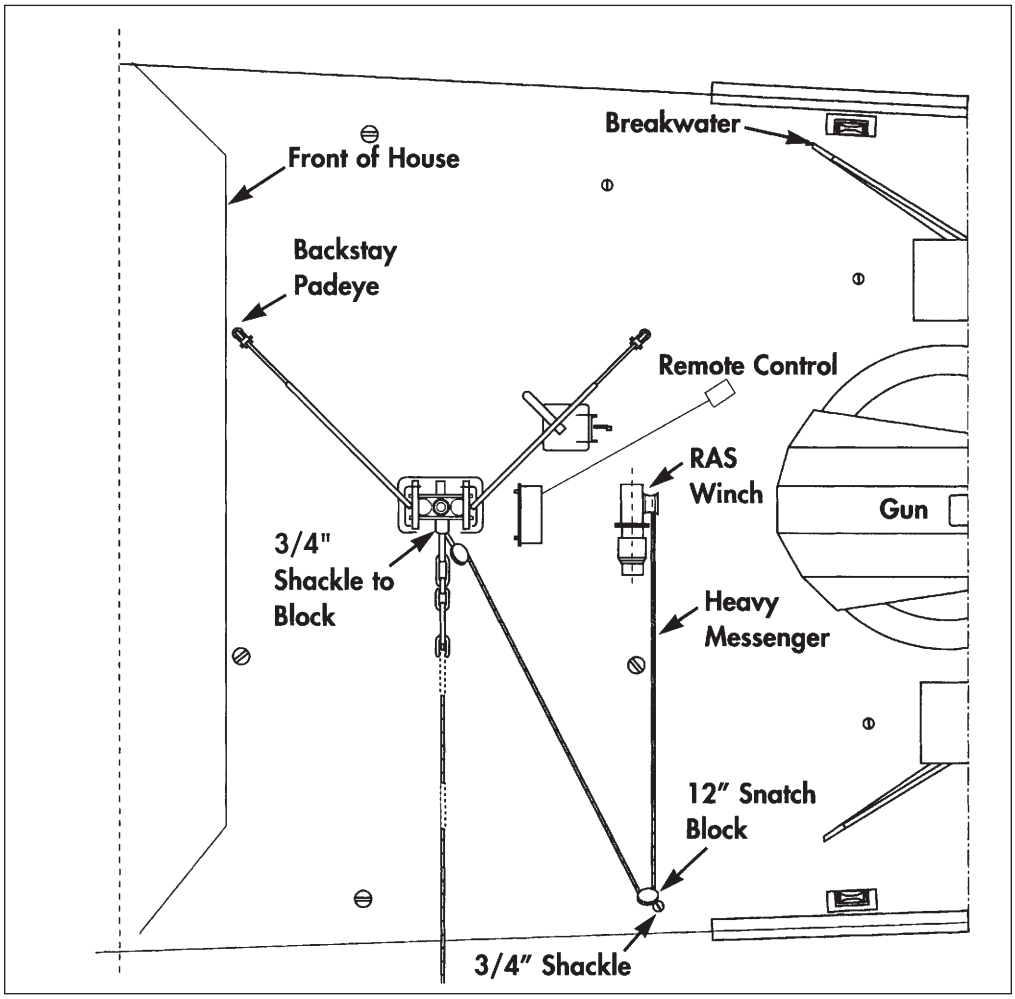


Figure 9.22-12 - Heavy Jackstay Layout Station 1

b. **Station 3 Heavy Jackstay General Layout.** The bulkhead mounted sliding padeye receiving unit is located on top part ship. The remaining gear is laid out as follows [see Figure 9.22-13]:

(**1**) The upper 12” snatch block is shackled to the eye directly under the elongated link on the stream adapter plate.

(**2**) The lower 12” snatch block is shackled to reversible padeye No. 23 (R) (old), No. 25 (R) (new) as indicated in the diagram. [See Figure 9.22-14.]

(**3**) The easing out pendant is secured to the staple on the sliding padeye. When rigged, it is led through the eye of the slip on the highline and secured to the cleat on the sliding padeye.

(**4**) The line-handling winch is located aft of the station. A tag line is passed from the station to the bridge to facilitate passing the telephone/distance line to the bridge.

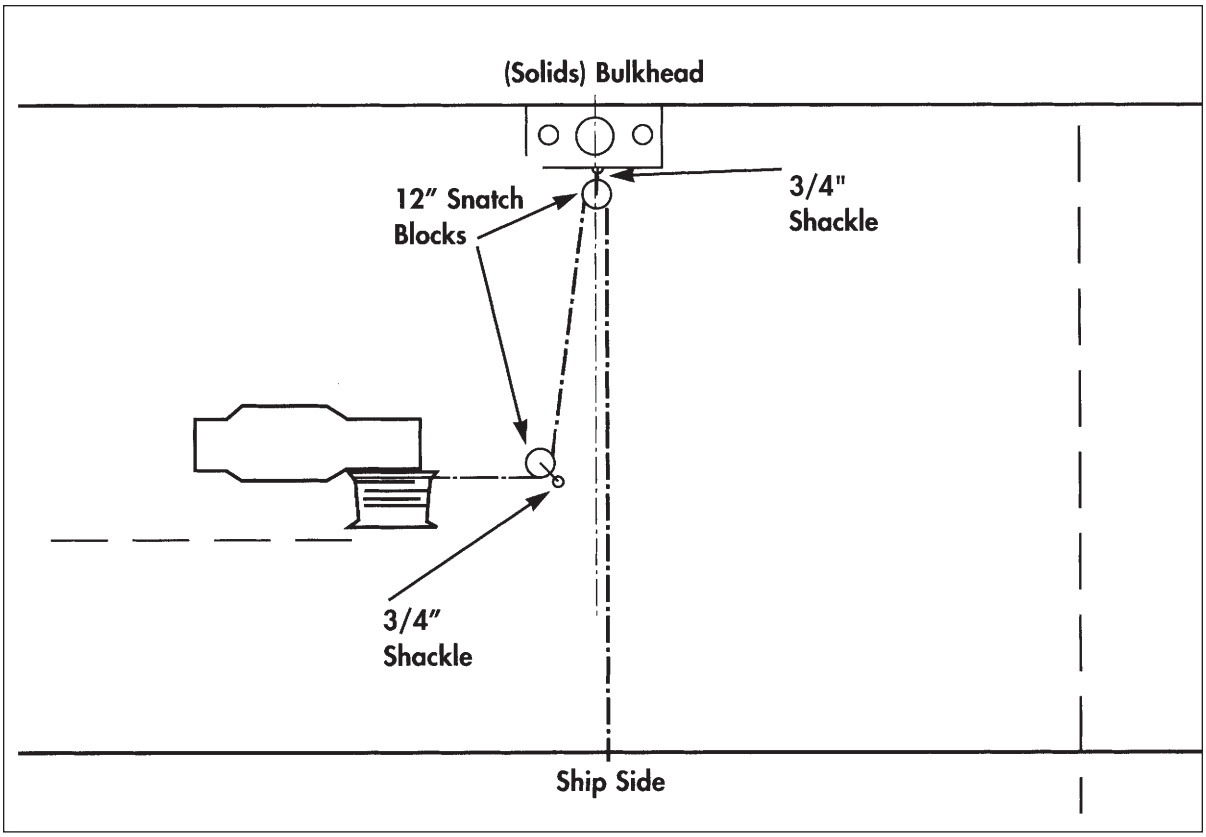


Figure 9.22-13 - Heavy Jackstay Station 3

c. **Station 4 Heavy Jackstay Layout.** The winch is remotely controlled, allowing the winch operator to work away from the line handlers. The bulkhead mounted sliding padeye receiving unit is located on top part ship. The remaining gear is laid out as follows:

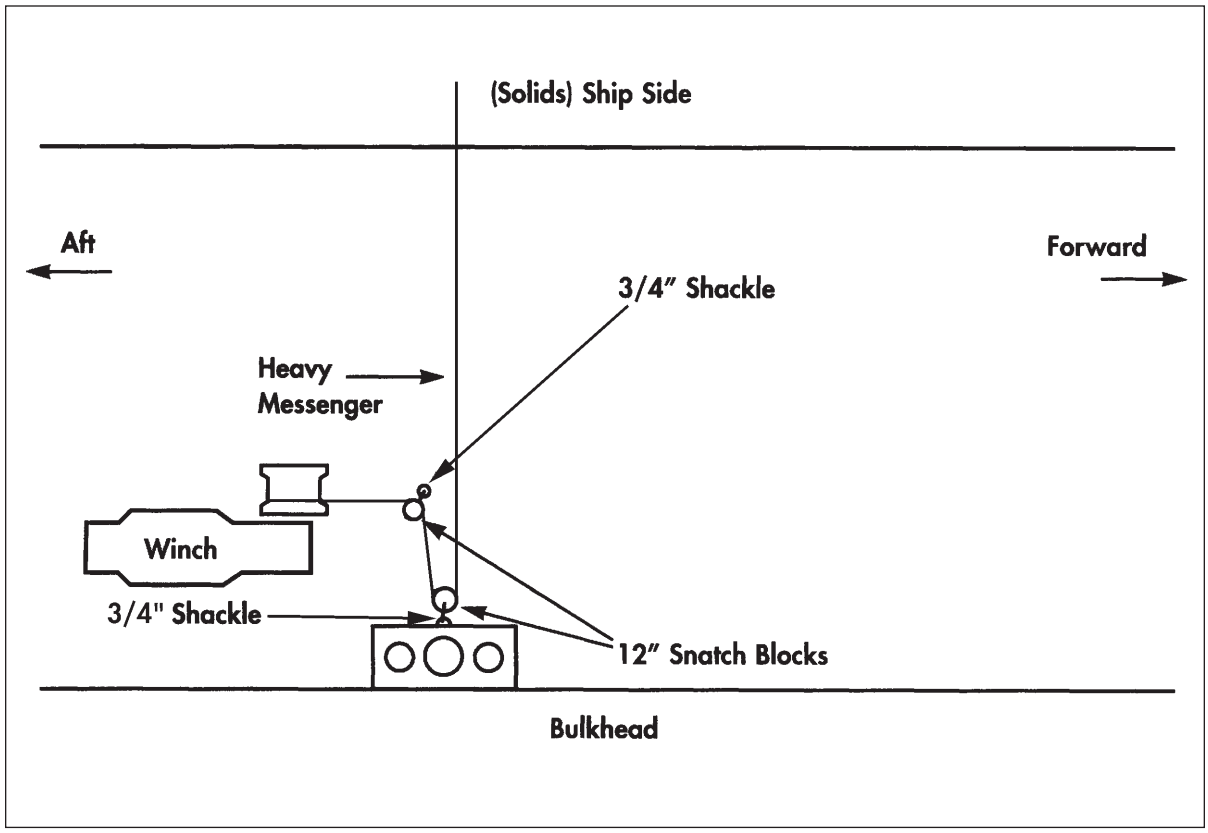


Figure 9.22-14 - Heavy Jackstay Station 4

(**1**) The upper 12” snatch block is shackled to the eye directly under the elongated link on the sliding padeye.

(**2**) The lower 12” snatch block is shackled to the reversible padeye No. 28 (R).

(**3**) The easing out pendant is secured to the staple on the stream adapter plate. When rigged, it is led through the eye of the slip on the highline and secured to the cleat on the stream adapter plate.

(**4**) The line-handling winch is located aft of the station. A tag line is passed from the station to the bridge to facilitate passing the telephone/distance line.

9.22.5 Liquids Transfer

a. **General.** All liquid RAS Stations are designed to simultaneously receive:

(**1**) DFO at 714 tonnes per hour (620 cubic metres);

(**2**) JP5 at 85 tonnes per hour (68 cubic metres); and

(**3**) Water at 60 tonnes per hour (60 cubic metres).

b. **Fuelling Forward Stations 1 and 2 Preparation and Equipment Layout.** The kingpost is raised in accordance with standard operating procedures (with platform). The remaining gear is rigged as follows:

(**1**) Standing on the platform, fit the Refuelling Joint Assembly (RJA) ensuring long end placed on top. A stainless steel pin is passed down through the top of the RJA, with a cotter pin inserted.

(**2**) The upper 12” snatch block is shackled to the upper padeye on the RJA.

(**3**) The lower 12” snatch block is shackled onto reversible padeye No. 15 (R), No. 16 (R) located on the deck in line with the line-handling winch.

(**4**) The bell receiver is rigged to the RJA.

(**5**) The easing out pendant is secured to the staple on the sliding padeye. When rigged, it is to be lead through the eye in the weak link assembly on the spanwire and then secured to the cleat on the stream line adapter plate.

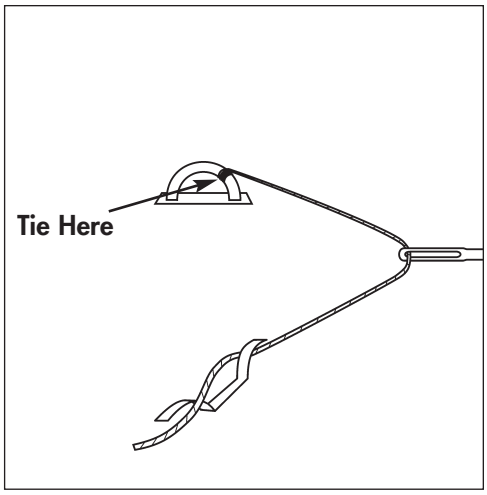


Figure 9.22-15a - Easing Out Pendant

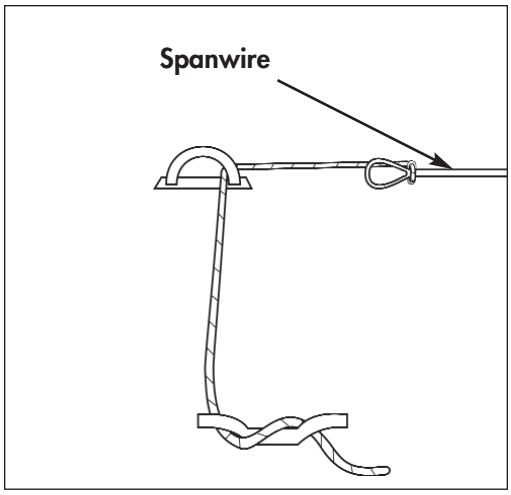


Figure 9.22-15b - Easing Out Pendant

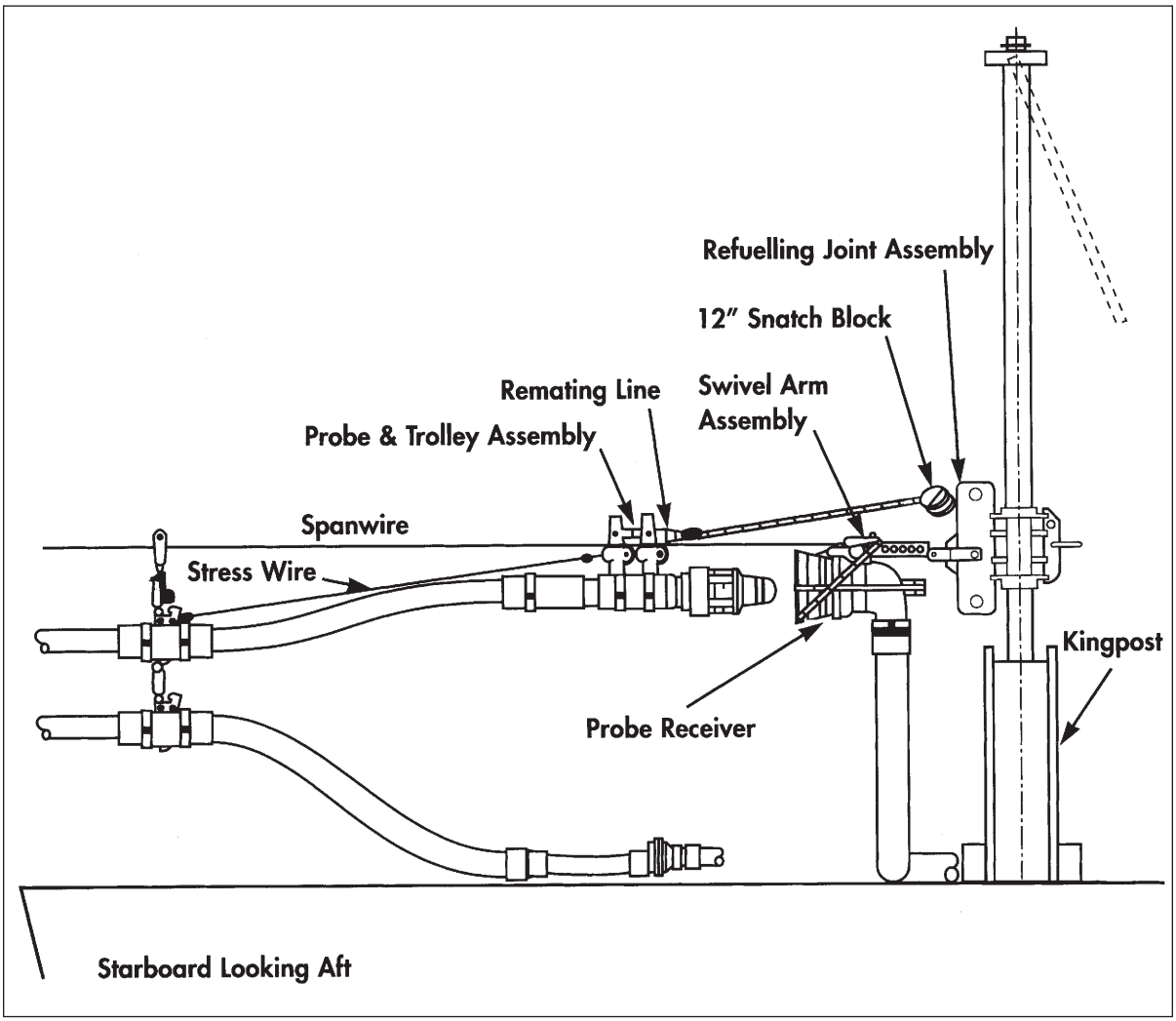


Figure 9.22-16 - Probe & JP5 Coupling Duo Configuration Stations 1/2 Using New Refuelling Joint Assembly

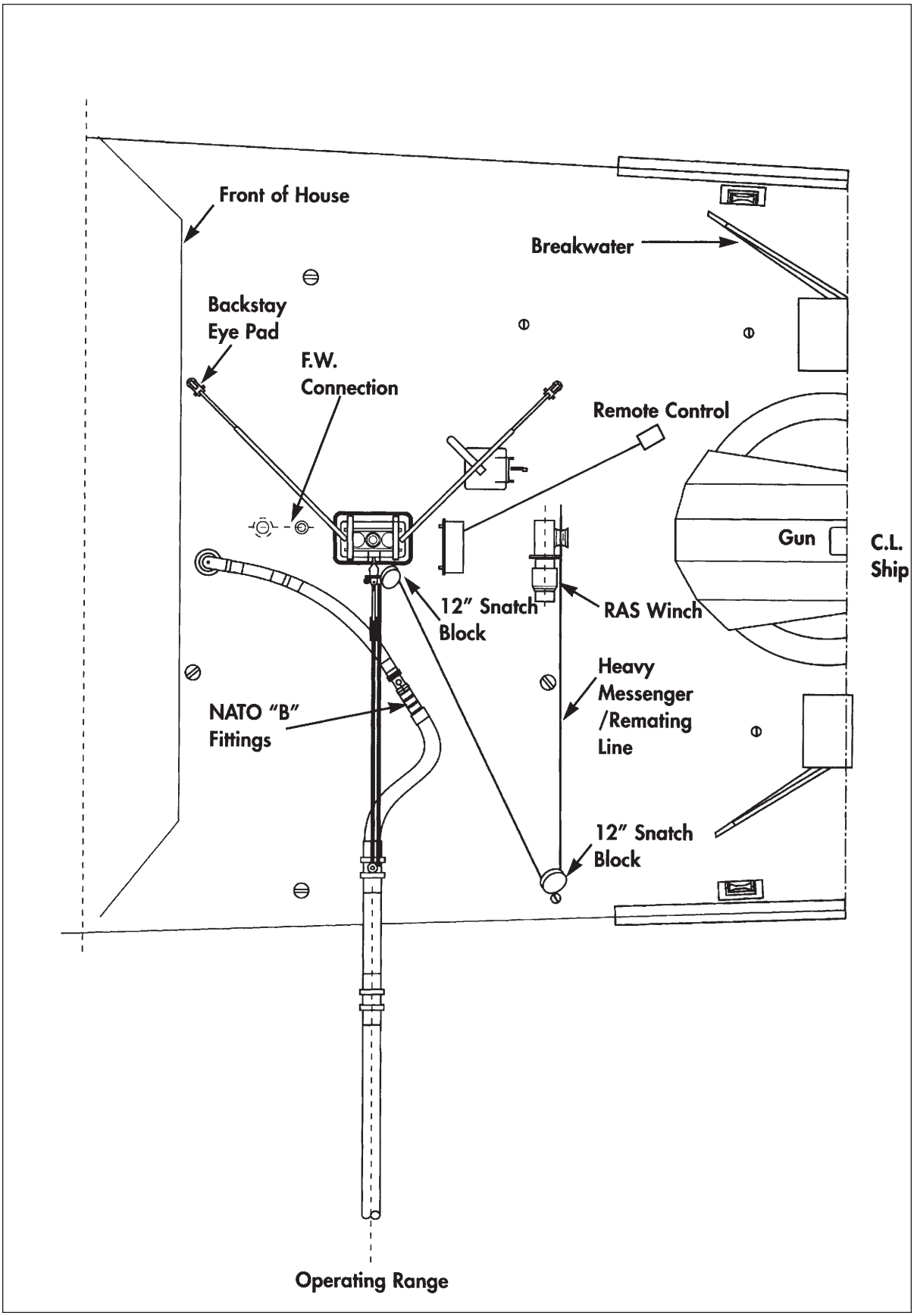


Figure 9.22-17 - NATO "B" Arrangement Station 1

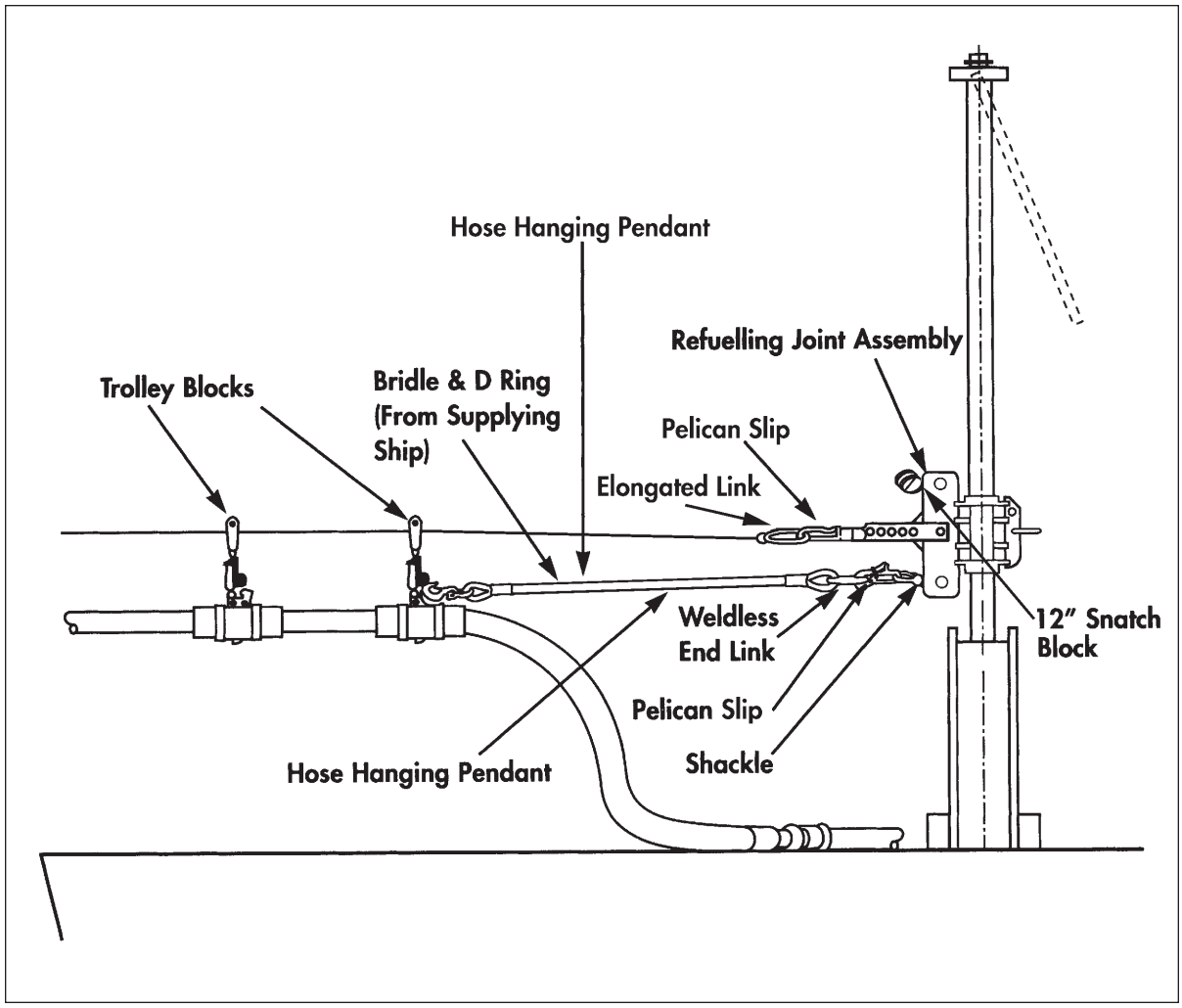


Figure 9.22-18 - NATO "B" Arrangement Fwd Using Refuelling Joint Assembly

c. **Fuelling Midships Stations 3 and 4 Preparation and Equipment Layout.**

(**1**) **Station 3 Starboard** - The gear is rigged as follows:

(a) The bell receiver is mounted on the bulkhead at Frame 24.

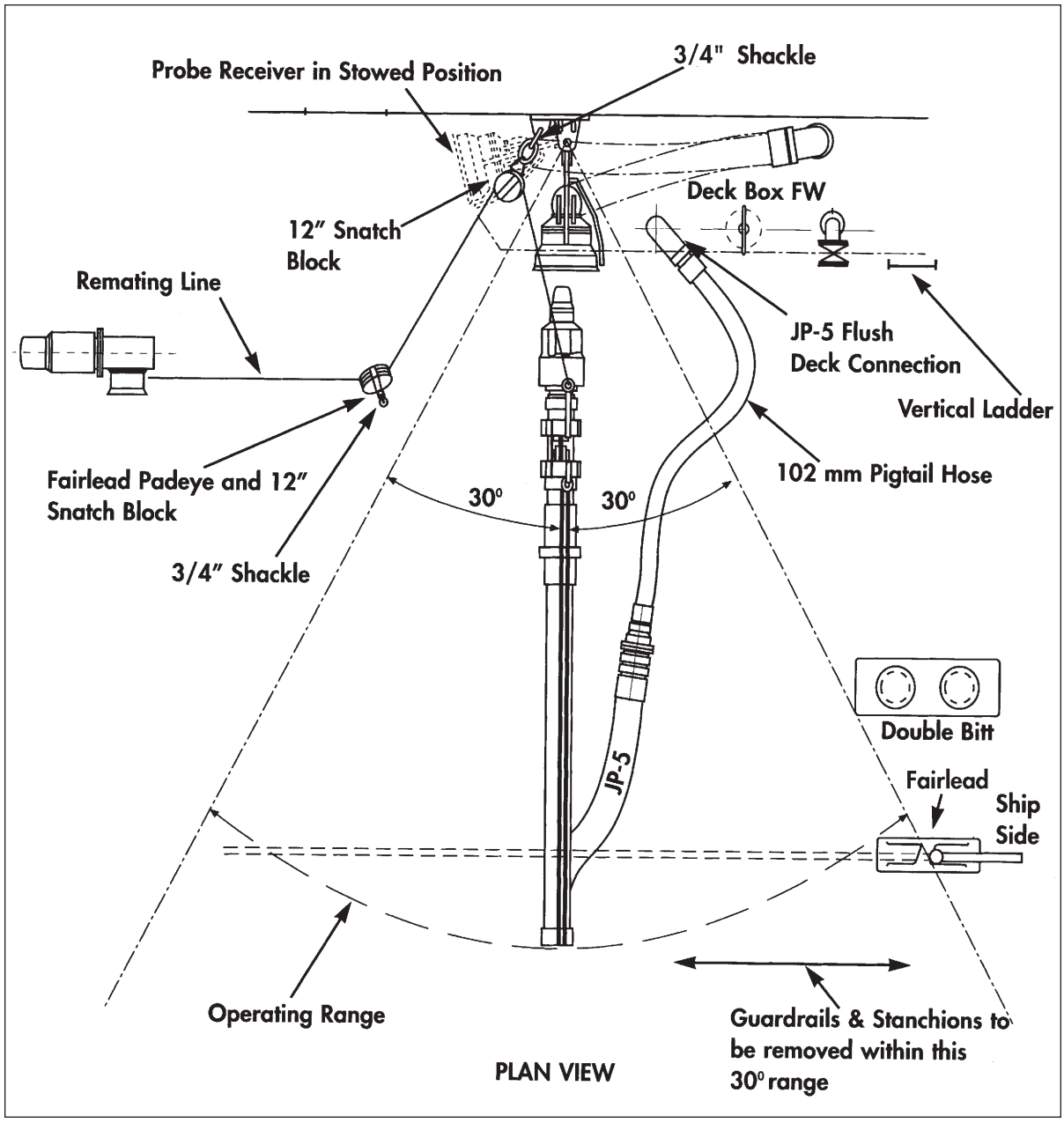


Figure 9.22-19 - Probe & JP5 Arrangement Station 3

(b) The upper 12" snatch block is shackled to the padeye No. 21 (S) located above the bell receiver.

(c) A lower 12" snatch block is shackled on reversible padeye No. 23 (R) on the deck aft of Frame 24 in line with the line-handling winch.

(d) The easing out pendant when rigged is to be secured to the staple forward of the fuelling adapter plate and lead through the eye in the weak link on the spanwire, and then secured to the cleat below the staple forward of the fuelling adapter plate.

(**2**) **Station 4 Port** - The gear is rigged as follows:

(a) The bell receiver is mounted on the bulkhead at Frame 24.

(b) The upper 12" snatch block is shackled to padeye No. 22 (P) located above the bell receiver.

(c) The lower 12" snatch block is shackled on reversible padeye No. 24 (R) (port - will be re-located but keep No.) between Frames 23 and 24 in line with the line-handling winch.

(d) The easing out pendant, when rigged, is to be secured to the staple forward of the fuelling adapter plate and lead through the eye in the weak link on the spanwire, and then secured to the cleat below the staple forward of the fuelling adapter plate.

(**3**) **On Halifax Class, Station 3 & 4** -

(a) The Station Captain, when positioned fwd of the dump, is not to proceed aft of the ladder leading to the flag deck. When he is aft of the dump, he is not to proceed fwd of the RAS winch.

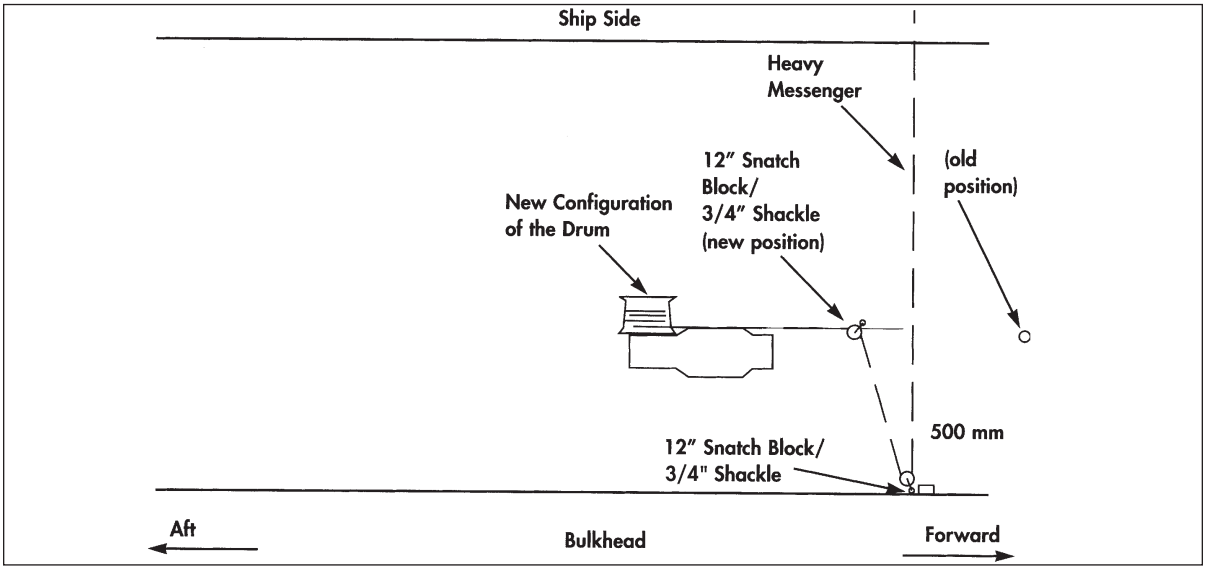


Figure 9.22-20 - Fuelling Arrangement Station 4

9.22.6 Remating Line

If two or more commodities are being received simultaneously, i.e., distillate (F76), aviation fuel (F44) and/or water, a 20 m, 18 mm circumference remating line is passed. One end has a 150 mm soft eye while the opposite end is whipped. The eye is passed over the hook of the probe carriage and then led through the messenger blocks to the winch. Approximately .6-1 m of slack is left in the line and four turns are taken up on the drum. Should the probe unseat itself, this will allow the probe to shut off completely without being pulled so far out as to apply strain to and damage the F44 rig. The remating line can then be used to re-seat the probe. Once the transfer of additional commodities (JP5 and/or water) is completed, the remating line may be removed.

9.22.7 NATO " B" Stations 1, 2, 3 and 4

The preparations for a NATO "B" fuelling are the same as with the probe, except with the rigging at the receiving ship's fuelling point and the associated hose end fittings. Essentially, the swivel arm assembly replaces the probe receiver, and a hose hanging pendant (either 2.9 m long for forward kingpost or 2.35 m long for focsle astern fuelling and top part ship positioning) is secured to a 5 ton slip directly below the swivel arm assembly.

Note.

The hose requirement for top part ship is one section of 1.1 m and for the FX one section of 1.1 m plus a section of 2.4 m.

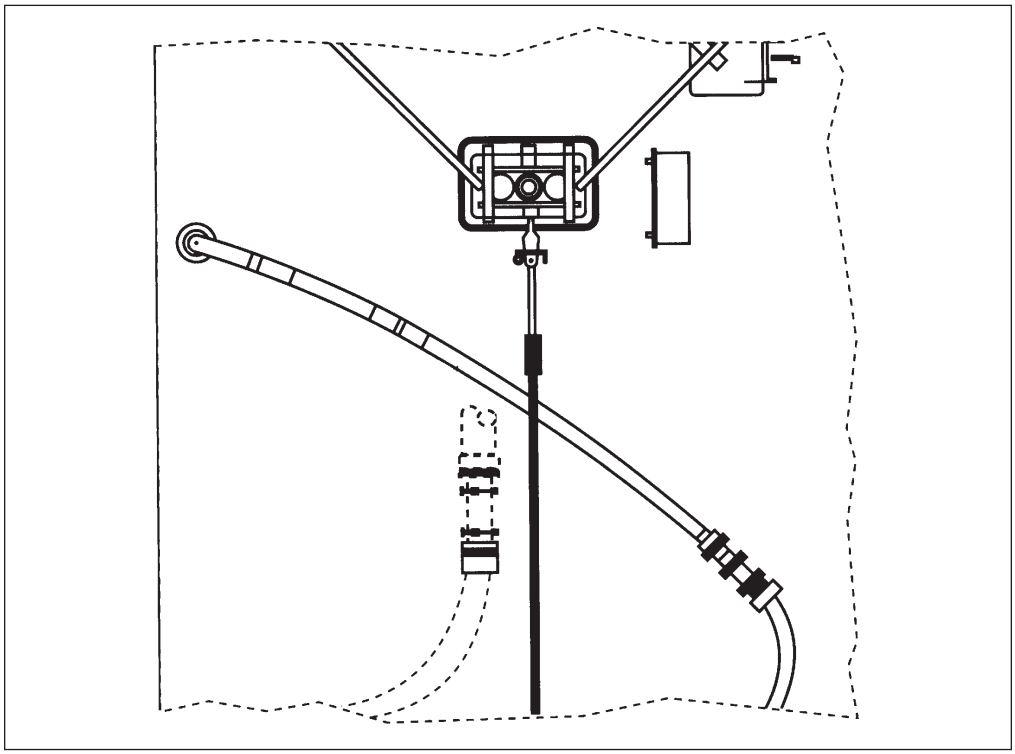


Figure 9.22-21 - NATO "B" Arrangement Station 1 Top View

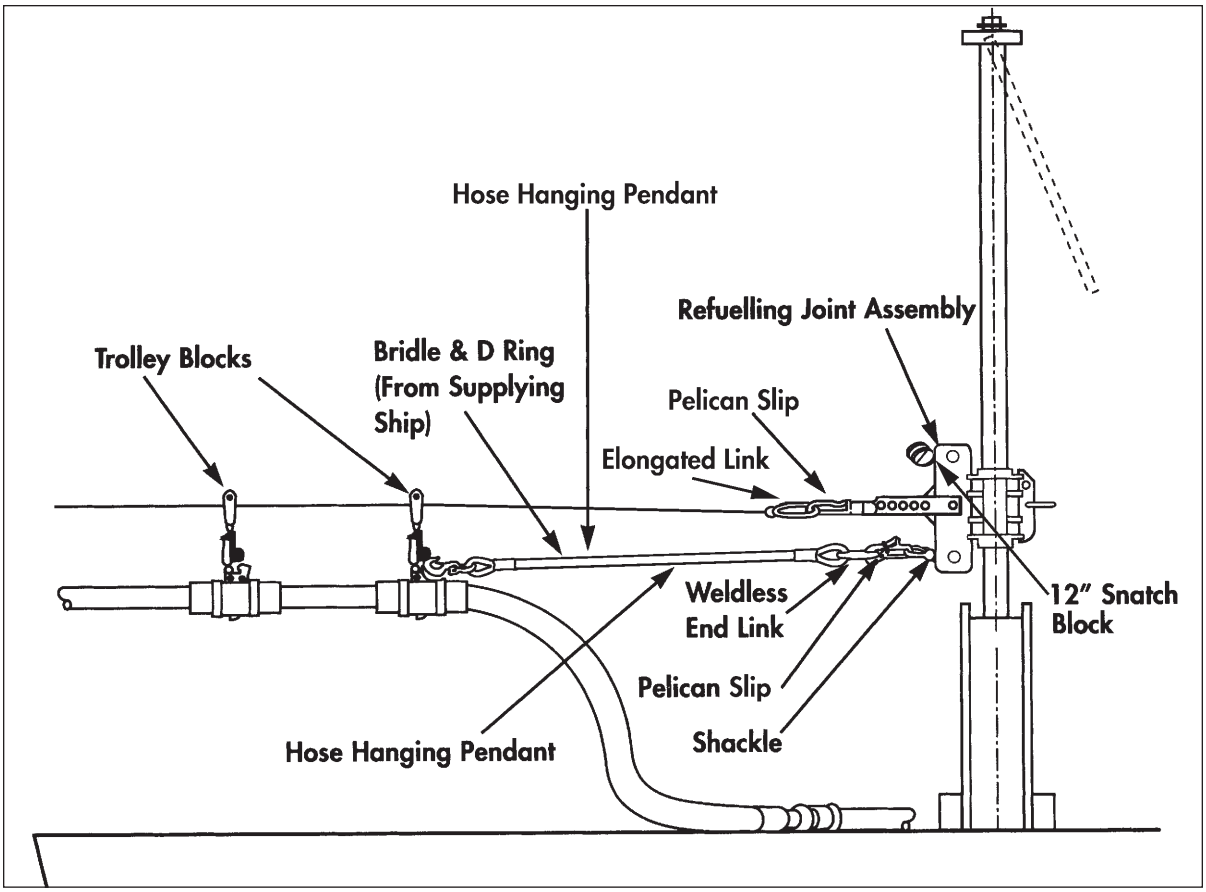


Figure 9.22-22 - NATO "B" Arrangement Station 1 Using Refuelling Joint Assembly

9.22.8 Astern Fuelling

a. **Definitions.**

Messenger	The line used to bring the fuelling rig on board.
Easing out line	The line used for returning the rig to the water. It is attached to the bridle with a wooden toggle.
Toggle recovery line	The line attached to the toggle. It is long enough to reach the waterline from the focsle and to be turned up on the bollards.
Float assembly	Attached to the end of the messenger.

b. **Equipment Layout.** The forward fuelling position is used for astern fuelling. The roller fairleads for the fuelling hose are located at Frame 7.5 port and starboard. The hose hanging pendant padeye No. 11 (R) and No. 12 (R) are also located at Frame 7.5, within the breakwater on either side of the 57 mm gun mounting. The messenger lead block reversible eyepads No. 15 (R) and No. 16 (R) are located in line with the winch drum approximately 5 m from the centre line.

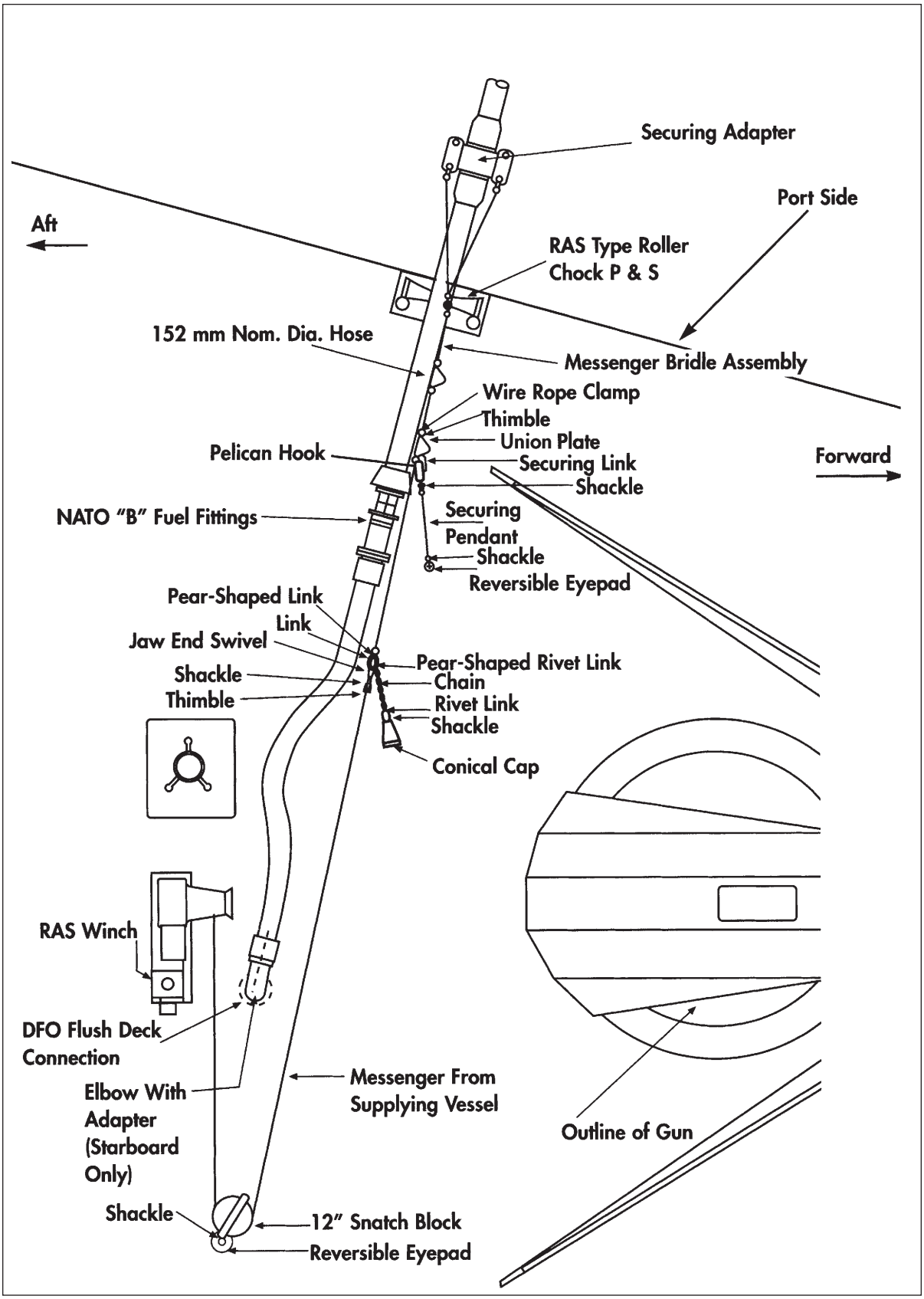


Figure 9.22-23 - HALIFAX Class Astern Fuelling Layout

c. **Procedure**

(**1**) **General:**

(a) The AOR will stream a hose messenger astern with the float assembly attached.

(b) As the ship makes her approach, a grapnel hook is thrown across the hose messenger. The messenger and float assembly are hauled up on deck until both can be taken in hand.

(c) The messenger is disconnected from the float and passed through the roller fairlead on the engaged side. It is then led across the deck to the 12" snatch block rigged to the padeye No. 15 (R) or No. 16 (R) on the disengaged side and led back to the winch.

(d) The hose messenger is heaved in until the hose-hanging pendant is in line with the bridle flounder plate.

(e) The Pelican hook of the hose-hanging pendant is secured to the flounder plate.

(f) The messenger is veered until the weight is on the hose-hanging pendant. While the Fuelling Party is hooking up the hose, remove the messenger from the block and winch, and then re-attach the messenger to the float.

(g) The messenger and float outboard of the guardrail are secured aft of the roller fairlead, and ready for slipping.

(h) On direction from the Station Supervisor, the Fuelling Party will remove the conical cap from the "B" end of the breakable spool. A 30 mm (1 1/2") socket must be used to open the air valve so that the flotation air is bled off. Once the air is bled off, the cap is removed.

(i) The end plate of the "B" fitting is removed. The "basket" is removed and checked for "pigs" (internal plugs designed to prevent fuel spills between successive fuel transfers. If there are any pigs in the basket, they are removed and the basket is placed back in the hose.

(j) The hose is then positioned so that the drop bolts on the "B" fitting can be engaged with the corresponding lugs in the "A" fitting. Once the fittings are secured together, the signals "Hooked On" and "Start Pumping" can be passed to the AOR.

(k) On completion of fuelling, the AOR will open the hose at the supply end and place a pig in the hose. On the order to "Blow Through", the hose will be charged with air, forcing the pig through the hose until it is caught in the basket.

(l) The air is bled off the hose and the fittings are disconnected. If any pigs were removed by the receiving ship, the basket is removed and all pigs are placed back in the hose. The basket, end plate and conical cap are then replaced on the hose.

d. **Procedures for Slipping the Astern Fuelling Rig.** The dump crew rigs the easing out line to the pear-shaped link on the bridle. The end of the original messenger is taken in from outboard and re-shackled to the bridle. The easing out line is secured to the bridle using a toggle with recovery line. It is kept in hand, ensuring that no strain comes on it prematurely. The easing out line is then passed through the lead block to the winch. The weight of the rig is taken up by the easing out line, and the hose-hanging pendant is disconnected. It is then veered and the hose assembly is eased out over the side. Once the hose is at the waterline, the recovery line is turned up on a bollard. The easing out line is veered until the recovery line releases the toggle. The messenger and float are paid out as the ship drops back in station, and then is finally slipped.

9.23 AOR 509/510 CLASS - Replenishment at Sea

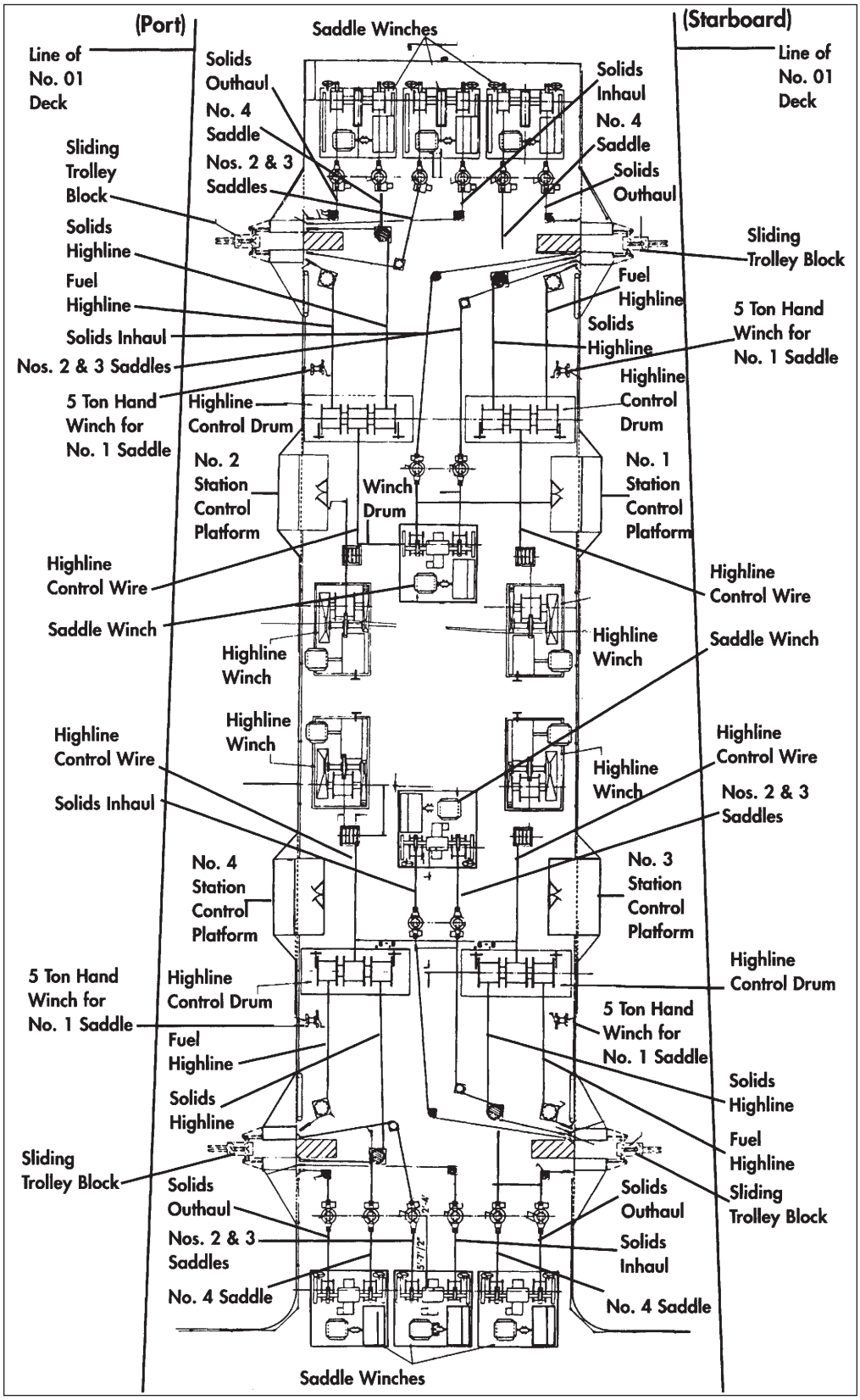


Figure 9.23-1 - Top View Winch Deck Configuration

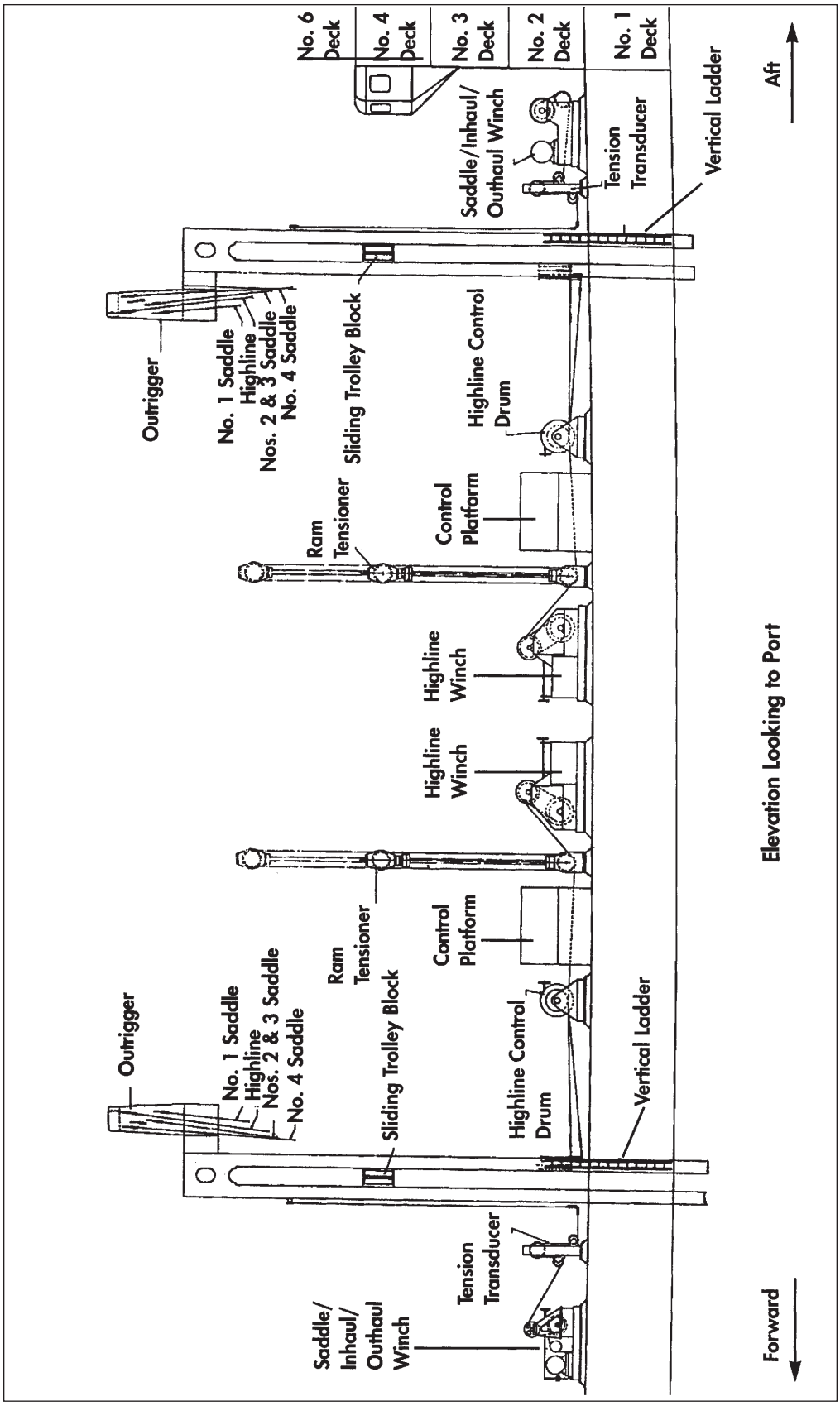


Figure 9.23-2 - Side View Winch Deck Configuration

9.23.0 General

a. AOR 509/510 are fitted with a STREAM (Standard Tension Replenishment Alongside Method) rig, allowing replenishment of solids or liquids from up to four stations simultaneously. Each fuelling station is fitted with two 7" hoses in over/under saddles, permitting liquid commodities to be transferred. Fuelling hoses are supported by four hose saddles rigged on a ram-tensioned support line (spanwire). The saddles and spanwire are controlled by winches that have separate controls. The spanwire and saddle wire winches can be controlled automatically or manually.

b. Each station is equipped with 3 winches - Inhaul, Outhaul and Highline/ Spanwire - controlled from a control station. These winches serve dual functions. They are used to transfer provisions between ships and are rerigged to transfer liquids. The highline winch wire at each station is led through a ram tensioner to a control drum. Horizontally mounted drums on either side of the control drum carry the solid highline and liquid spanwire; these are the actual spanwires/highlines which are led through the lead blocks to the top of the kingposts to the receiving ship. To operate the desired highline, a clutch is engaged to the appropriate drum. Tension is automatically maintained on the highline or spanwire by the ram tensioner and a winch. As the ship rolls, the ram moves up or down to take in or pay out wire as necessary to keep the highline/ spanwire at constant tension. Inhaul and outhaul winches are self-contained units consisting of two drums mounted horizontally. Through clutches, brakes and gearing, either the drum for the saddle wires or the drums for the inhaul/outhaul can be selected. To transfer provisions, a traveller transporting the cargo is supported by the tensioned highline and the inhaul/outhaul winches which pull the traveller back and forth between ships.

9.23.1 Light Line Transfer

a. **General.** Gear for light line transfers is normally stored in the upperdeck storage lockers on the port and starboard sides of the forward breezeways. Stations Alfa and Bravo are normally used as the light line transfer points; however, Stations 1 and 2 are commonly used when liquids or solids transfers are simultaneously planned for Stations 3 and 4. In fact, light lines may be conducted anywhere along 01 Deck if need be.

b. **Preparation and Equipment Layout.**

(**1**) The upper 6" snatch block is shackled to the light jackstay tripod on 02 Deck, and the lower 6" snatch block is shackled to the bulkhead padeye on 01 Deck at Station Alfa or Bravo.

(**2**) The light line and distance line (if used) are normally fed directly from their storage cans but may be faked down fore and aft along the breezeway if desired.

(**3**) If the light line transfer is to take place while fuelling or conducting a solids transfer, then the outboard end of the light line is to be lead aft to the appropriate station. It is then secured to the light messenger. In this way, the transfer can take place as part of the passing of the gear for fuelling or heavy jackstay.
[Fig. 9.23-3 Light Line]

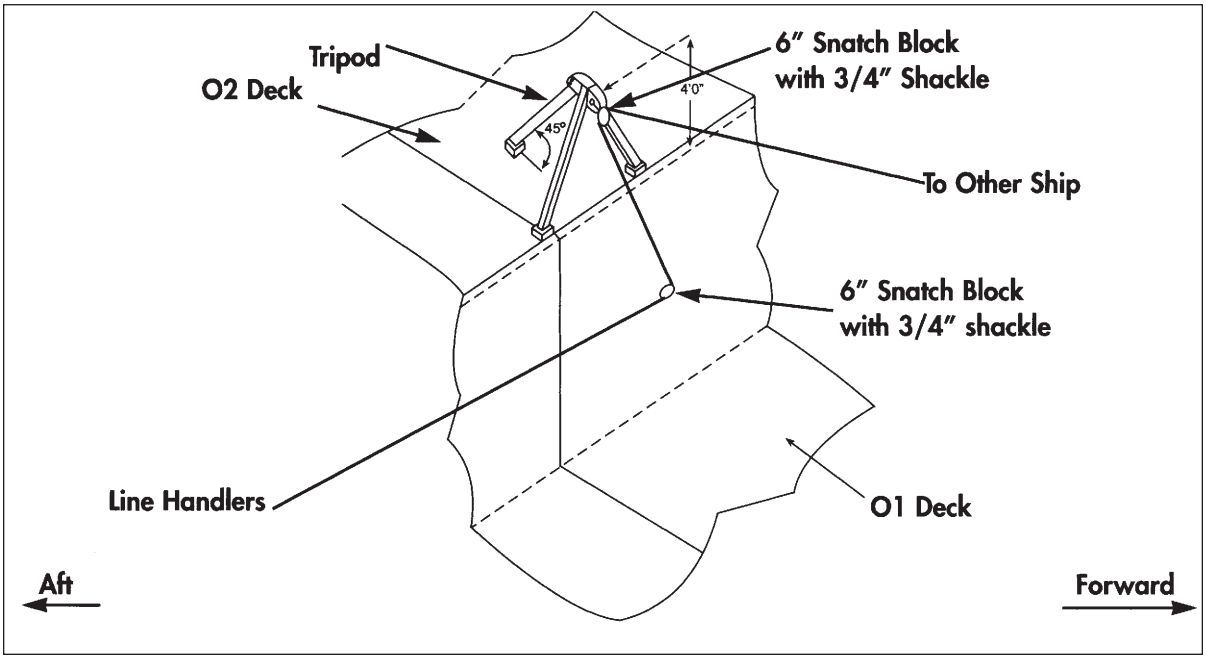


Figure 9.23-3 - Light Line Layout Starboard

9.23.2 Light Jackstay

a. **Preparation and Equipment Layout Supply.**

(**1**) Stations Alfa/Bravo are designated as the light jackstay stations; however, Stations 1 and 2 are fitted with strong points to allow for rigging light jackstays if necessary.

(**2**) The upper 12” common block of the jackstay is secured to the uppermost tripod padeye with a 7/8” shackle, while the lower 12” common block is secured to the lower bulkhead padeye, also with a 7/8” shackle.

(**3**) The two 6” common blocks on the inhaul are secured with 3/4” shackles to the two inner tripod eyepads.

(**4**) The outboard end of the inhaul is shackled to the inboard side of the traveller found on the jackstay. The inboard end of the outhaul is shackled to the outboard side of the traveller.

(**5**) The jackstay is faked out fore and aft, inboard to outboard. The inhaul is faked out fore and aft forward of the station, while the outhaul is faked out fore and aft immediately below the station. The light messenger is faked out fore and aft between the ship’s side and the outhaul.

b. **Preparation and Equipment Layout Receive.**

(**1**) The Senhouse slip is secured to the uppermost padeye on the tripod with a 7/8” shackle.

(**2**) The two 6” snatch blocks are secured to the next two eyepads down using 3/4” shackles.

9.23.3 Heavy Jackstay

Preparation and Equipment Layout.

(**1**) Stations 1, 2, 3 and 4 are designated as solids transfer stations.

(**2**) The light and heavy messengers are faked down fore and aft outboard of the fuel drain wells, with the heavy messenger being inboard. The bitter end of the heavy messenger is secured to the Kline grip tail using a 7/8” shackle.

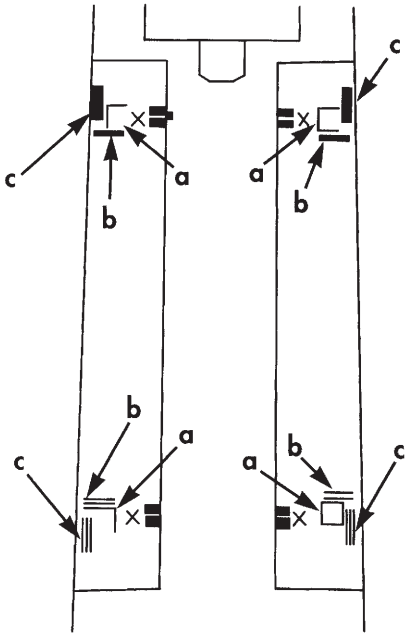
(**3**) The flounder plate messenger is faked out athwartships forward of the drain wells. One end of the flounder plate messenger is tied with a bowline to the Kline grip tail, while the other end is secured to the lower shackle on the outboard face of the flounder plate.

(**4**) The RAS deck PO directs the flashing and readying of the winches, and the Station Supervisor orders slack to the highline and the raising of the "D" ring to a height dictated by the size of the load and the requirement for the load to clear the bulwarks and guardrails. The sliding "D" ring is operated by the cage operator.

(**5**) The Kline grip is placed on the highline at the proper height for the receiving ship [see Table No.10 pg 9-116].

Note.

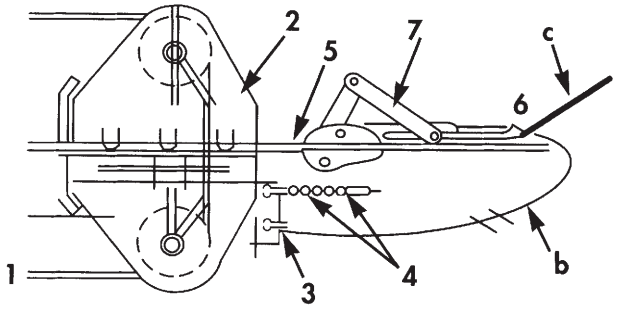
Shot mats are only required to be laid out if ammunition is being transferred.



LEGEND

a. Fuel Drain Well
b. Flounder Plate
c. Light and Heavy Messenger
x in drawing indicates flounder plate, highline and Kline grip arrangement

Heavy Jackstay Station Layout



LEGEND

1. Outhaul
2. Flounder Plate
3. 7/8" Shackle
4. Securing Necklace & Snap Hook
5. Highline 1 1/8"
6. 7/8" Shackle
7. 1 1/8" Kline Grip

Flounder Plate/Messenger Layout

Figure 9.23-4 - Heavy Jackstay Station Rigging Arrangement

9.23.4 Liquids Transfer

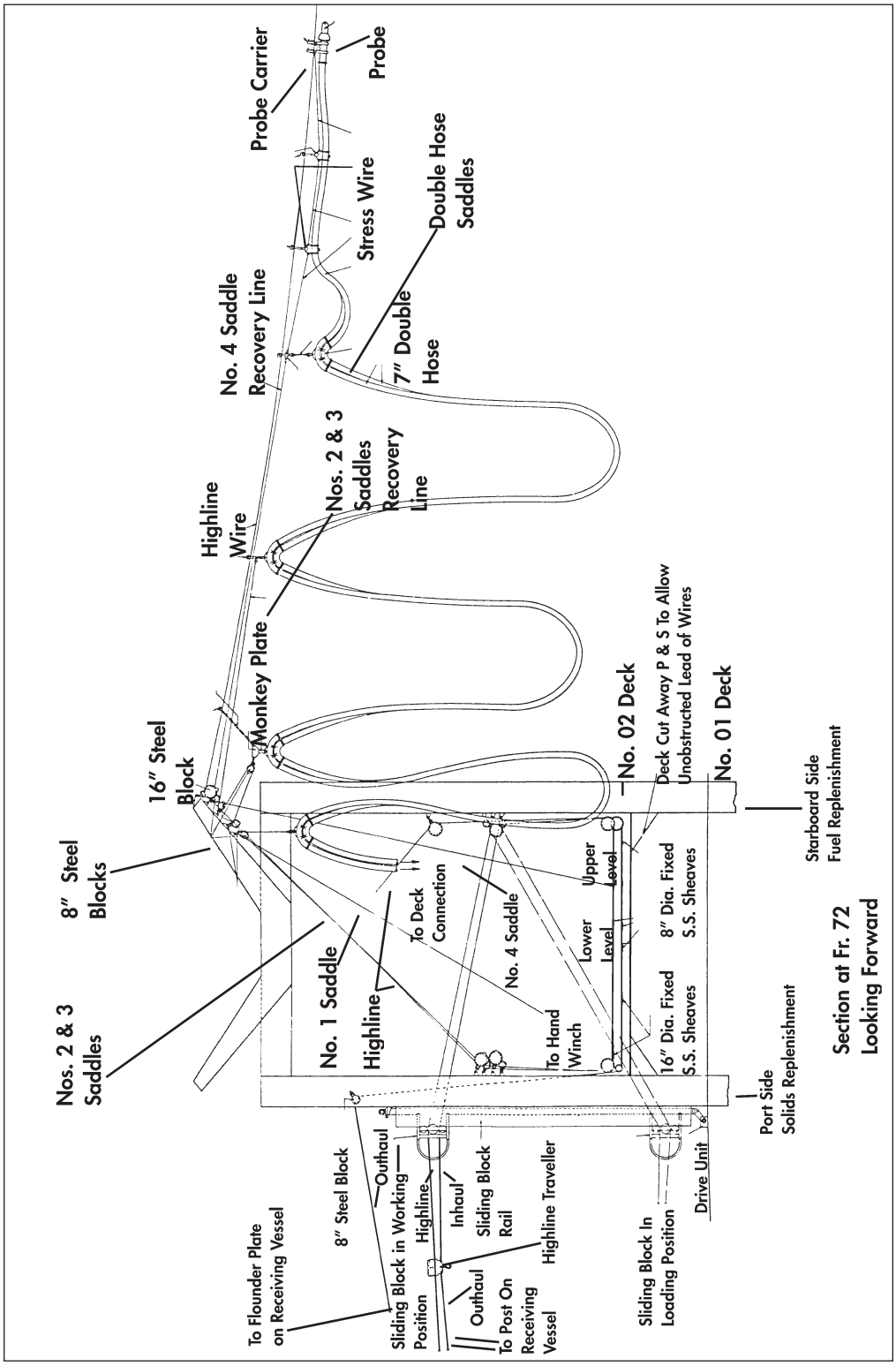
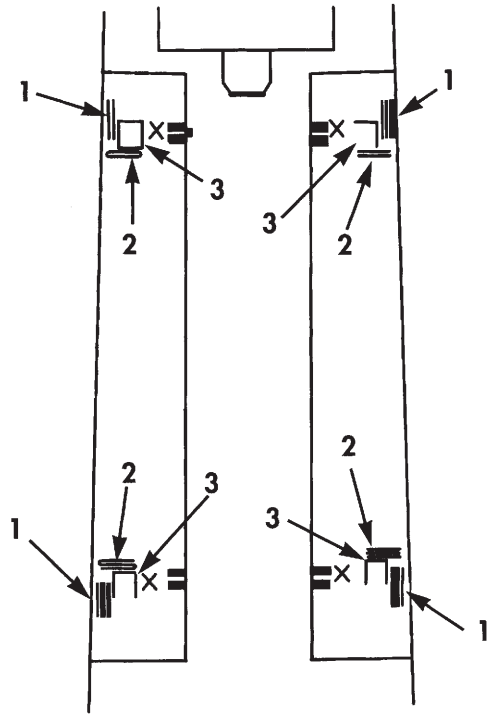


Figure 9.23-5 - Liquid and Heavy Stations with Hose Configuration

Figure 9.23-6 - Probe Fuelling AOR 509/510 and IROQUOIS Class

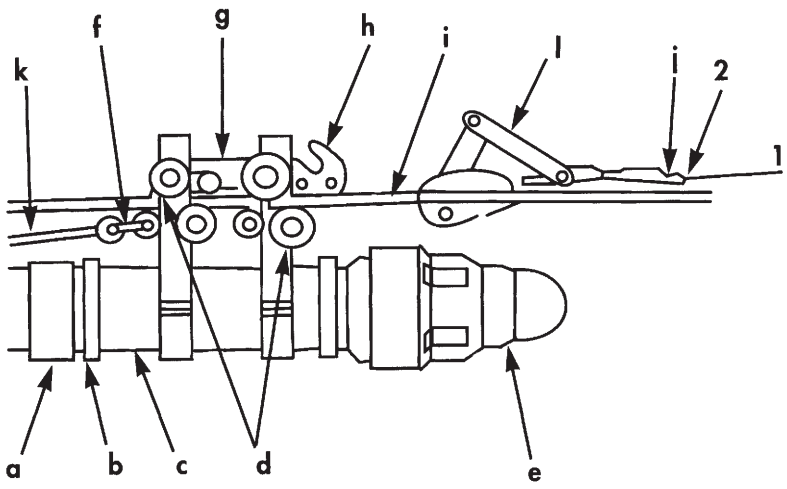


Legend

1. Light and Heavy Messenger
2. Recovery Line
3. Fuel Drain Well

x in drawing indicates probe spanwire and Kline grip arrangement

Fuelling Station Layout



Legend

a. Hose Coupling
b. Split Clamp
c. Probe Tube
d. Hinge Pins and Cotter Pins
e. Probe
f. 1/2″ Shackle
g. Trolley Block Assembly
h. Remating Line Messenger Attachment
i. Span Wire 7/8″
j. 7/8″ Shackle
k. Outboard Stress Wire
l. 7/8″ Kline Grip

Probe/Spanwire & Kline Grip Arrangement

Figure 9.23-7 - Fuelling Station Layout

a. **Preparation and Equipment Layout.**

(**1**) Stations 1, 2, 3 and 4 are rigged with double hoses for the simultaneous transfer of distillate (F76) and aviation fuel (F44). Station 2 is normally also rigged to transfer water. However, all stations can be used to transfer water if necessary.

(**2**) The light and heavy messengers are faked out fore and aft outboard of the fuel drain wells. The heavy messenger is faked inboard with its bitter end secured to the Kline grip tail with a 7/8" shackle.

(**3**) The recovery lines and hose messenger lines (when required) are faked out athwartship. The running end of the recovery line is secured to the Kline grip on the same shackle used for the heavy messenger. A large snap hook is shackled to the pendant carrier to facilitate recovery of the Kline grip.

(**4**) Once the winches are engaged, the Station Supervisor will order slack in the spanwire so that the Kline grip can be placed on it, in accordance with the table below. The probe tail is taken outboard, and then led inboard through the fairlead and turned up on the staghorn. This prevents the rig from falling back when the spanwire is slipped from the deck. The hose securing gripes are removed and the station is ready to commence the transfer.

Table 10 Kline Grip Height/Spanwire Slack

CLASS	HALIFAX	IROQUOIS	AOR (509/510)
HEIGHT: (Liquids)	18" - 24"	12"	24"-36"**
HEIGHT: (Solids)	18"-24"	18"-24"	24"-36"**

**** Consolidation RAS - Receive Only**

b. **Station Layout Liquids - Rigging of End Fittings.**

(**1**) **NATO "B"- Robb Coupling.**

(a) The probe, probe carrier, outboard stress wire, and the 10' outboard length of 7" hose are removed from the rig.

(b) A 10' length of 7" hose is connected to the outboard baby saddle. This hose is fitted with a NATO "B" fitting.

(c) Two teflon highline guide rollers with slips are fitted on the spanwire. The fitted length of hose and the NATO "B" fitting are secured by chain to the slips on the guide roller. One chain is positioned at the midpoint of the fitted 10' hose length of hose, while the second one is positioned around the NATO "B" fitting on the outboard end.

(d) A two-legged bridle is fitted to the outboard baby saddle, and the pigtail is transferred to the NATO "B" - Robb Coupling.

(**2**) **Aviation Fuel Couplings.**

(a) The F44 NATO Standard Coupling is rigged with a 20ft, 2 1/2" fuelling hose. The inboard end of this short length of hose is rigged with an AeroQuip fitting to facilitate attachment to the 20' length of 4" hose run from the outboard baby saddle by means of a 7" to 4" reducer.

(b) This short length of hose is suspended under the probe carrier by a chain or lashing secured to a snap hook rigged by chain under the probe or under the outboard baby saddle.

9.23.5 Consolidation RAS

a. **509/510 - Supplying Ship.** The same gear and layout is employed as in a single ship transfer. The only difference is that the 509/510 may supply two liquid rigs, or two solid rigs from Stations 1 and 3 or Stations 2 and 4, depending on circumstances.

b. **509/510 - Receiving Ship.**

(**1**) **General**. AORs are capable of receiving fuel from other AORs and are frequently tasked with doing so. AORs can receive liquids at all stations in much the same manner as other ships.

(**2**) **Personnel Requirements**. In addition to the RAS team closed up at the fuelling station, a RAS team will be required on the focsle to operate the capstan and handle lines. Alternately, the spanwire may be hauled across by hand - a minimum of 20 personnel will be required.

(**3**) **Preparation and Equipment**

Probe Receiver

(a) The 7” fuelling hoses are rigged from the probe receiver to the embarkation point.

(b) Emergency breakaway equipment, repair tools and fuel spill gear are prepositioned in the dump area. Drip trays are rigged under the probe receiver and hose connections.

(c) A section of the bulwark is removed and stowed clear of the fuelling position (AOR 509 only). A temporary guardrail is rigged.

(d) One 12” snatch block is rigged above the probe receiver and two 12” snatch blocks are secured to eyepads on deck with 7/8” shackles, allowing messengers to be led to the anchor windlass on the focsle. A tag-line is then rove through the lead blocks and the running end led outboard.

(e) An easing out pendant is rigged from the strong point.

NATO “B”/Robb Coupling

(a) A hose-hanging pendant is rigged from the upper padeye at the fuelling station strong point with a 7/8” shackle. The easing out pendant is rigged from the strong point.

(b) A 1" Pelican slip is secured to the strong point using a 7/8" shackle. Alternately, a swivel arm assembly is used.

(c) The 12" snatch blocks are rigged in the same manner as for receiving the probe.

(d) The 7" fuelling hoses are rigged from the embarkation point to the fuelling station.

(e) Fuel spill response equipment is prepositioned in the dump area.

(**4**) **Procedures.** The procedures as outlined in 9.13, 9.14 and 9.15 are followed.

9.23.6 Cargo Drop Reel Operations

a. Canadian AORs are also capable of delivering stores and ammunition to ships which are not equipped with a sliding padeye. This is accomplished by removing the traveller from the highline and installing the cargo drop reel in its place.

b. When delivering to fixed eyepads, the Cargo Drop Reel (CDR) is used to lower cargo from the tensioned highline to the deck of the receiving ship. The CDR is rated to 2600 kg; however, due to the AOR maximum limit of 1365 kg and the 295 kg weight of the CDR, the maximum load that can be transferred from the AOR and lowered onto the receiving ship's deck is 1070 kg. Loads of up to 70 kg can be lifted from the deck of the receiving ship for transfer to the AOR.

c. The CDR is controlled by an operator stationed in the load-landing area (dump) of the receiving ship. The operator pulls a nylon lanyard to release the brake and lower/raise the loads.

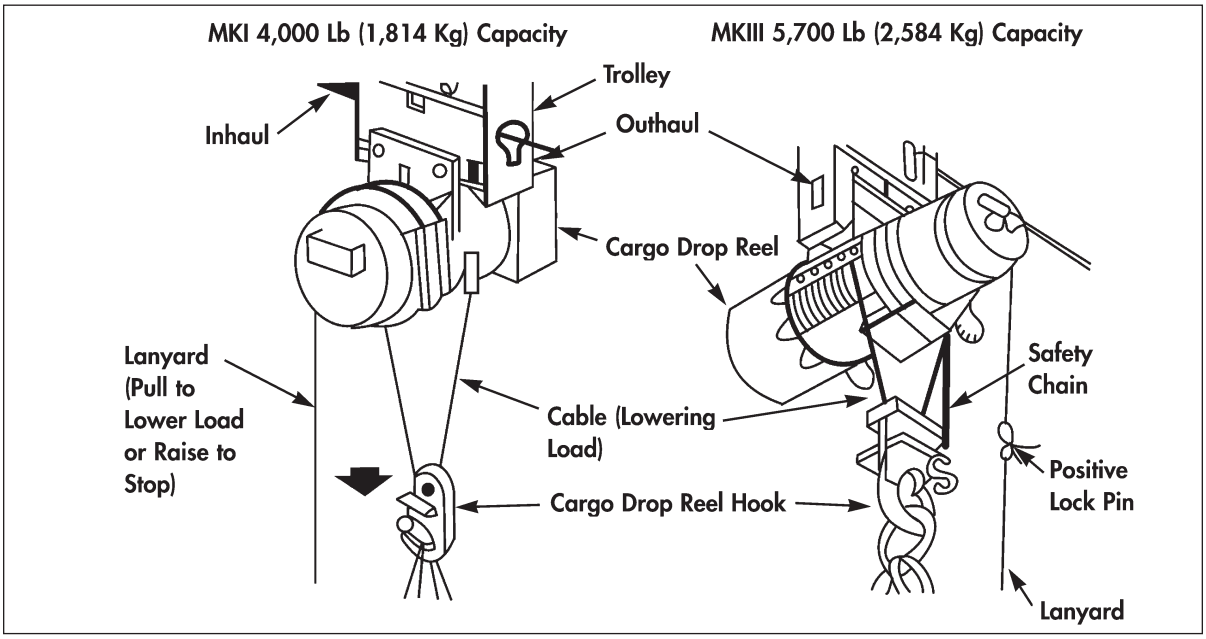


Figure 9.23-8 - Cargo Drop Reel

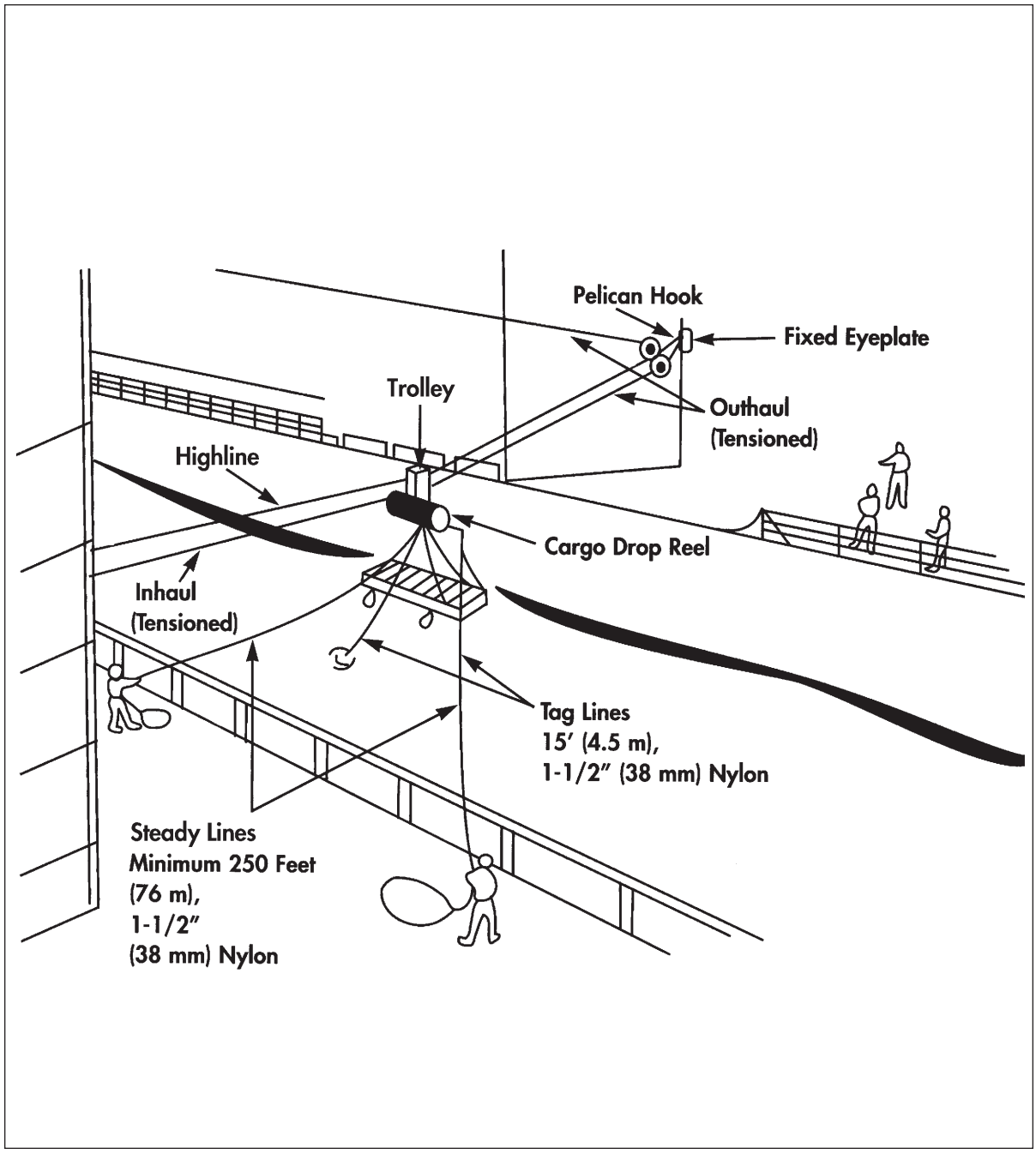


Figure 9.23-9 - Heavy Jackstay Using Cargo Drop Reel

9.23.7 Cargo Drop Reel Capabilities/Limitations

Maximum working load on hook:	1500 kg
Minimum load lowering capacity:	70 kg
Maximum drop distance:	10 m
Lanyard pull force (approx.):	20 kg

9.23.8 Continuous Messenger

a. **General.** The CONTINUOUS messenger is an alternative to Kline Gripe method to pass rigs between ships. It is a continuos messenger 800 ft (243.8 m) long which incorporates a light messenger, a heavy messenger, a hose/flounder plate messenger and a remating line. The CONTINUOUS messenger may be used for liquid or solid replenishments.

b. **Description.** The continuous messenger is made up as shown in Figures 9.23-10 and 9.23-11. Essentially, it is 800 ft (243.8 m) of continuous graduated 3-strand nylon with tapered splices as follows:

(**1**) 200 ft (60.9m) of 1 1/2" (12mm dia) 3-strand nylon with a soft eye at the outboard end. The inboard end is spliced into (b);

(**2**) 534 ft (162.6 m) of 3 " (24mm dia) 3-strand nylon. A brummel/englefield hook is spliced into the inboard end of this section; and

(**3**) 60 ft (18.3m) of 2 1/4 " (18mm dia) 3-strand nylon. The outboard end of this section has a brummel/englefield hook spliced into it. A soft eye is spliced to the inboard end to allow attachment to the probe trolley assembly.

Approx 1" to 2" beckets are spliced into the messenger at distances of 190 ft (57m) from the outboard end and 350 ft (106.6 m) from the inboard end to allow attachment of distance phone lines and the spanwire/highline.

c. **Procedure.** The CONTINUOUS messenger is laid out on the AOR forward to aft, the inboard end shackled to the probe trolley assembly. The distance/phone line is attached to the outboard beckets and the span wire/highline is lashed to the inboard beckets. The messenger recovery line is attached to the base of the fueling probe and faked out.

Once the gunline has been passed, it is secured to the outboard end of the CONTINUOUS messenger. The messenger is then paid out hand over hand. When the receiving ship has a sufficient amount of the 24mm dia section onboard, it is then taken to a winch and the spanwire/highline hauled across. Ships not equipped with winches will require a minimum of twenty personnel to haul the spanwire/highline across.

When the spanwire/highline is hooked up to the receiving ship, it is tensioned down and the remainder of the messenger passed. The AOR will pay out saddle wires to allow the probe to be hauled across by the receiving ship and seated in the probe receiver. The messenger return line is paid out with the probe.

Once the probe is properly seated the CONTINUOUS messenger is removed from the messenger attachment hook and returned with the messenger return line. If required, the CONTINUOUS messenger may be broken at the brummel/englefield hooks and the 60' (18.3m) section retained for use as a remating line. On completion it is returned with the probe.

When conducting a heavy jackstay, the inboard end of the CONTINUOUS messenger is secured to the flounder plate. The 60' (18.3m) section is replaced with a longer 200' (60.9m) section. Once the flounder plate is secured in place, the CONTINUOUS messenger is broken at the brummel/englefield hooks and returned on the traveler. The 200' (60m) section is retained for use when returning the flounder plate.

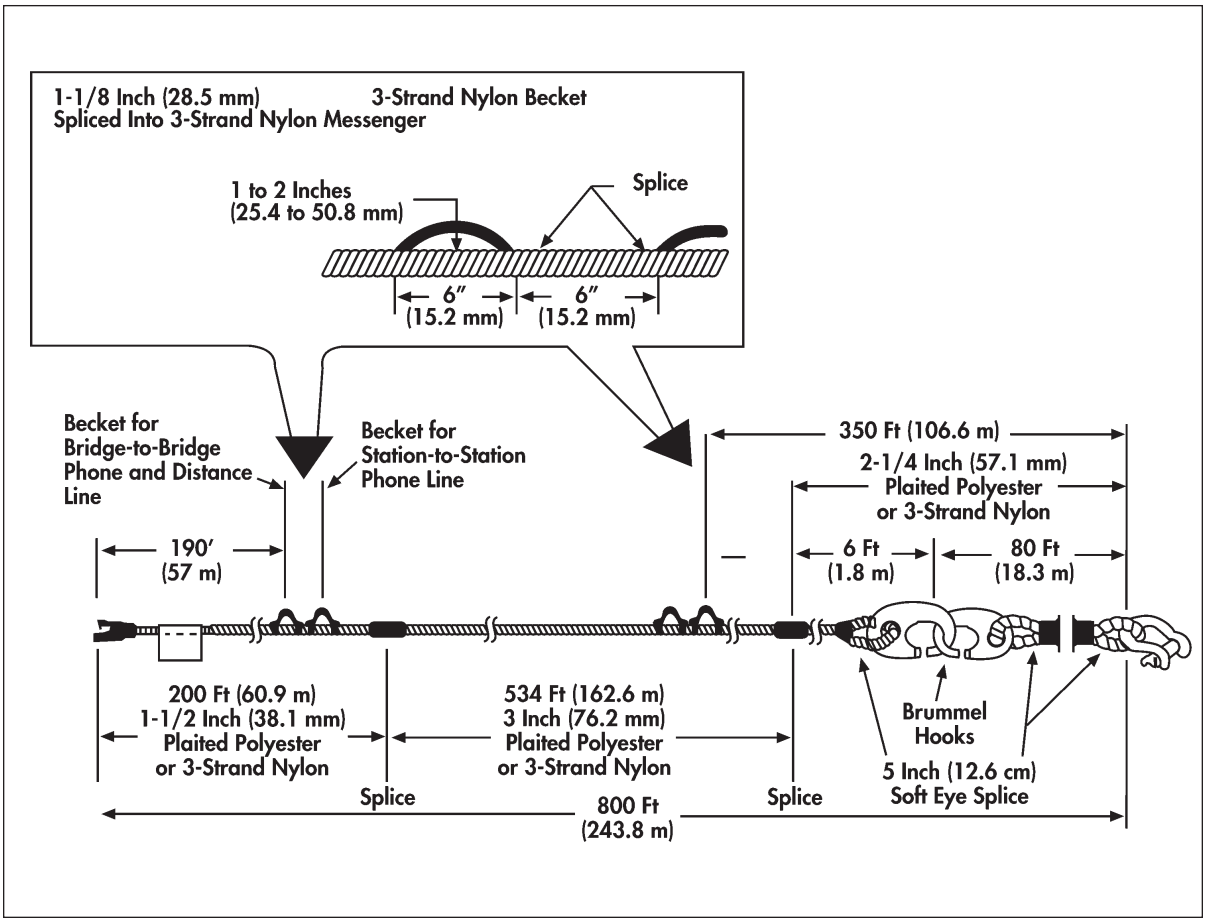


Figure 9.23-10 - Continuous Messenger

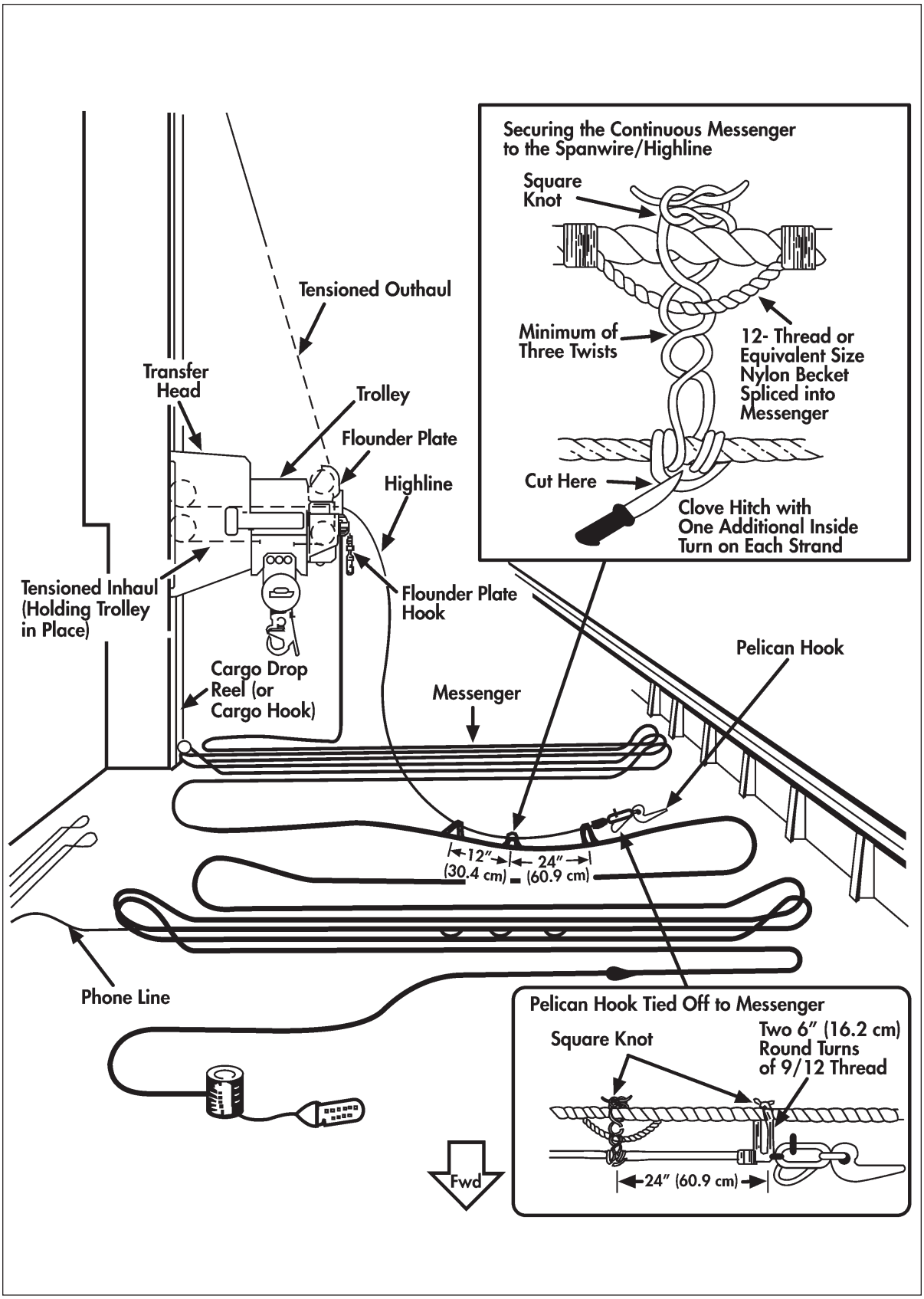


Figure 9.23-11 - Continuous Messenger

9.24 KINGSTON CLASS - Replenishment at Sea

9.24.1 Light Line Transfer.

a. **Personnel Required.**

(**1**) 1 Safety Officer - CBM/DECK O.
(**2**) 1 Station Supervisor - MS/LS.
(**3**) 5 Line Handlers - LS/AB/OS.
(**4**) 2 Dump Crew - LS/AB/OS.
(**5**) 1 Paddle Man - LS/AB/OS.
(**6**) 1 Gun Man/Bolo Man - LS/AB/OS.

b. **Equipment Required.**

(**1**) 2 x 6” snatch blocks, and
(**2**) 2 x bow shackles.

c. **Equipment Preparation and Layout.** The light line stations are on the most forward portion of the house port and starboard side. The upper 6” snatch block is attached to the top edge of the house with a bow shackle. The lower 6” snatch block is attached to the deck eye immediately below. The outboard end of the light line is passed through the blocks and made ready to be attached to the gun line. The remainder of the light line is faked out fore and aft on the focsle so it pays out inboard to outboard. Shot mats are arranged in the appropriate places on deck in the dump area. A positive buoyancy life jacket is placed in the small cargo bag and all cargo is wrapped in plastic. Communication is established with the bridge.

9.25 VICTORIA Class - Replenishment at Sea

9.25.1 Light Line Transfer.

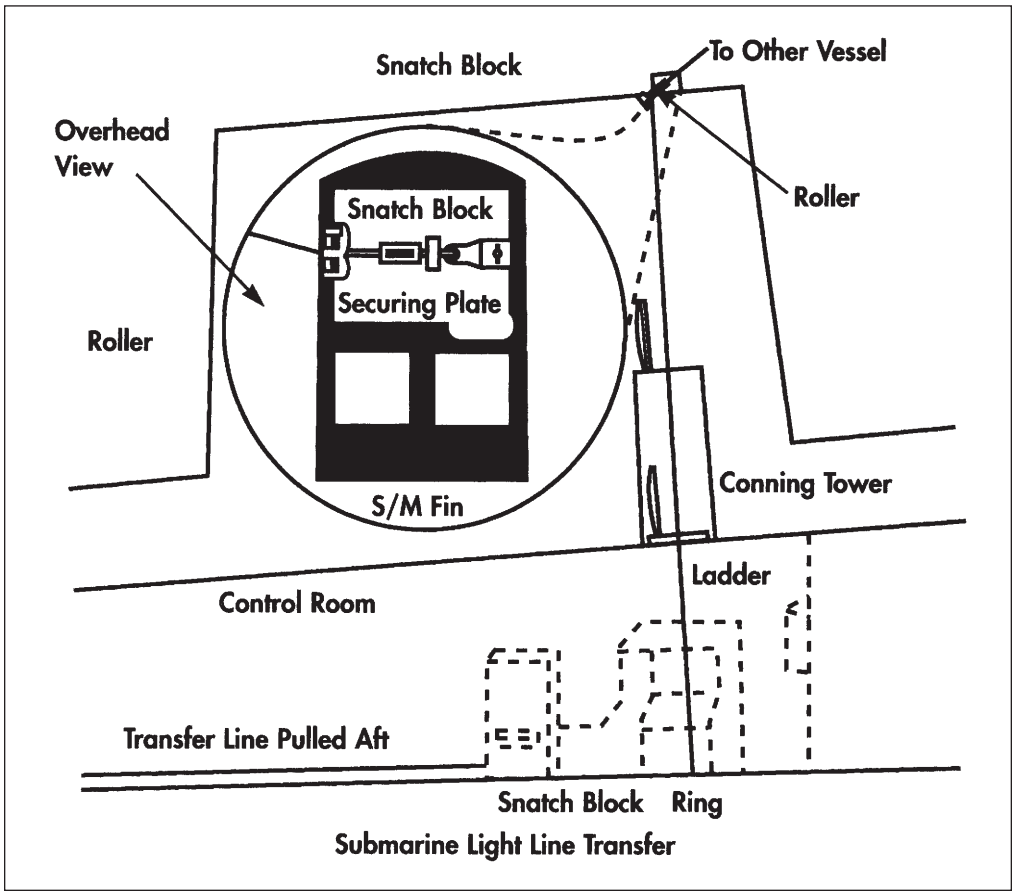


Figure 9.25-1 - Cutout of Submarine Conning Tower

a. **Personnel Required.**

(**1**) Casing Officer.
(**2**) 1 Casing Party 2 I/C.
(**3**) After Casing Supervisor.
(**4**) 6-8 OS LS.

b. **Equipment Required.**

(**1**) bridge roller assembly,
(**2**) bridge snatch block, and
(**3**) control room snatch blocks.

c. **Preparations and Equipment Layout.**

(**1**) A system of fixed eyes and removable blocks are provided so that a line may be led vertically downward from the bridge to the control room.

(**2**) The routine for rigging is as follows:

(a) Rig the bridge coaming roller.

(b) Remove blank cover plates in bridge deck.

(c) Rig bridge snatch block.

(d) Rig control room snatch block.

d. **Procedures.**

(**1**) The light line is brought on board and rove through the bridge roller and snatch block and through the bridge deck. The After Casing Supervisor leads the line down the tower and through the control room assemblies and then the line is manned by the control room personnel.

(**2**) The Casing Party 2 I/C will man the dump area and the Casing Officer will order the control of the light line by the control room staff. One signalman will be required to pass light line control signals with the transfer vessel.

CHAPTER 10
Buoys and Targets

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CHAPTER 10
Buoys and Targets

10.1 Introduction

HMC Ships often carry three basic types of targets: the Larne Target, the High Speed Plastic Target, and the Inflatable Surface Target, commonly referred to as the Killer Red Tomato. They are used as stationary or moving targets for exercising the ship's combat systems and personnel. Ships also carry a Quick Reaction Marker Buoy and have the capability of streaming a Fog Buoy.

10.2 Larne Target

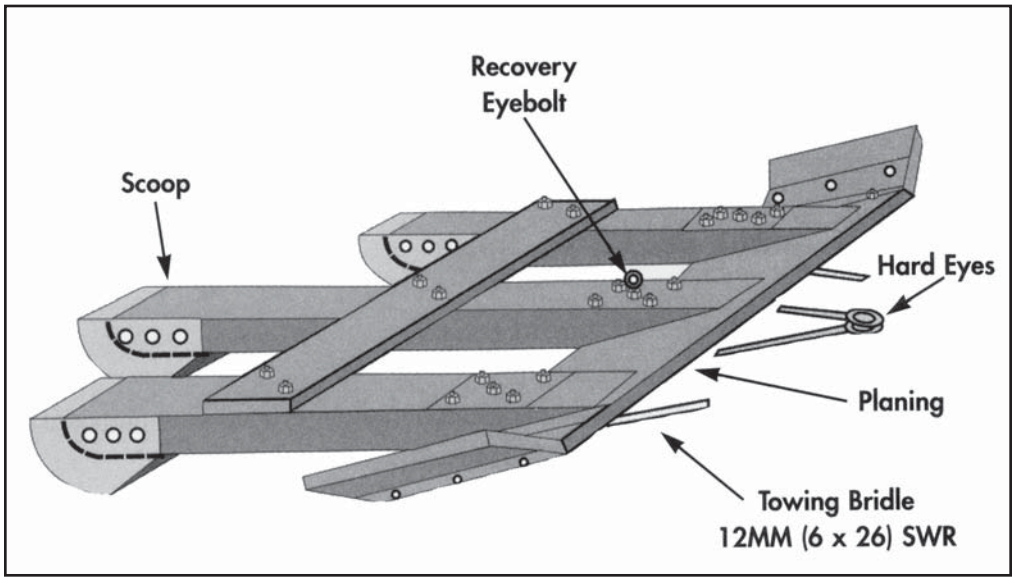

Figure 10.2-1 - Larne Target

a. **Description**. The Larne Target is a simple raft target measuring 1.5 metres (m) x 1.3 m, consisting of a centre and two wing scoop boards, a tie bar and planing board. The scoops produce plumes or "rooster tails" of water which are clearly visible and are easily detected by radar. The plumes serve as targets for gunnery exercises, including air-to-surface engagements.

The tow line is approximately 1524 m of 24 mm diameter double-braided nylon. It is marked every 305 m with a coloured whipping so that when streaming the target, an accurate determination of how much line has been paid out is made. The marks are red (305 m), yellow (610 m), blue (915 m), and black (1220 m).

Table 1 Equipment Required - Larne Target	
Equipment	
Line-Throwing Gun *	Mousing Line
Bolo/Gunline Projectiles *	Knife/Spike
Hard Hats	Comm Set
PFDs	Paddles/Wands/Vests *
Safety Harnesses	Rope Stoppers
Axe/ 4 x 4	Grapnel

* These items are only required for transferring the target from one ship to another while underway.

b. **Personnel Required**. RAS Team No. 5 will be required for the launch, recovery and/or transfer of the Larne Target.

10.3 Streaming the Larne Target

a. **Rigging:**

(**1**) The towline is faked out on deck inboard to outboard so that it is free for running.

(**2**) The towline is then led through the after fairlead and brought back onboard over top of the guard rail.

(**3**) The towline is shackled and moused with wire to the swivel piece on the towing bridle. Lengths of 10 mm manila line are passed to either corner to prevent the target from flipping over when launching.

Note.

These lengths of line are rigged for self-slipping. Once the target is in the water, the lines are recovered back onboard.

(**4**) A rope stopper is attached to a strong point on the deck so that it can be passed around the towline.

b. **Streaming:**

(**1**) In order to stream the target, the ship will slow to 3-5 kt.

(**2**) The target is manhandled over the stern and checked away, using the tow line and the manila lines, until it is clear of the transom.

(**3**) Three turns are taken around the bollard and the towline is eased out using the momentum of the ship.

(**4**) Once the desired tow length has been reached, the stopper is passed and the towline is turned up fully on the bollard to secure the towline. The stopper is then removed and command is informed that the target is streamed.

(**5**) To prevent excessive chafing of the towline, canvas is parcelled around the towline and served with tarred marlin where it passes through the fairlead.

(**6**) As the ship's speed is increased and during the firing exercises, the station supervisor will monitor the towline for excessive chafing. The station supervisor will recommend freshening the nip (veering or heaving in a short length so that the chafing point is changed) if required.

10.4 Transferring the Larne Target while Underway

The Larne Target can be transferred to another ship while streamed. This is done to allow all ships the opportunity to exercise their weapons systems.

a. **Rigging:**

(**1**) A light messenger (65 m of 12 mm diameter polypropylene) is faked out on deck.

(**2**) One end is passed over the guardrail, through the fairlead and bent onto the end of the towline.

(**3**) A rope stopper is attached to a strong point on the deck.

(**4**) Equipment listed in the Table 1 is laid out on deck.

b. **Transferring**. The ship streaming the target will be the guide ship and the ship receiving the target will make her approach as if conducting a RAS. Care should be taken during the approach to avoid running over the tow line and target. Once in position, the ships should reduce speed to approximately 8-10 kt to safely pass the towline.

All but the last 92 m of the towline will be streamed prior to transferring. The following table shows the sequence of events for transferring the target while underway.

10.4.1 Sequence of Events for Transferring Larne Targets

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on the whistle (Given)	Red paddle is held aloft and one blast is give on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on the whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave Around (Given)	Light messenger is payed out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline is heaved in hand over hand until light messenger is on board.
Avast	Avast (Acknowledged)	Line handlers keep light messenger out of the water.	**Avast**	Avast (Given)	Station workers pass light messenger though aft fairlead.
Check Away	Heave Around (Acknowledged)	Light messenger and towline are payed out hand over hand.	**Heave In**	Check Away (Given)	Light messenger and towline are heaved in hand over hand.
Avast	Avast (Given)		**Avast**	Avast (Acknowledged)	
Pass the Stopper		Stopper is passed around the towline.	**Take Turns on the Capstan**		Line handlers take 3 turns on the capstan.
Note: The stopper being passed is a length of manila line and will be cut after the strain is taken to allow the tow line to clear the ship.					
Off Turns and Ease to the Stopper		Line handlers take turns off the bollard and ease to the stopper.			
The turns are removed under control to allow the strain to be picked up gradually by the stopper.					

10.4.1 Sequence of Events for Transferring Larne Targets (cont)

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Check Away	Heave Around (Given)	Towline is payed out hand over hand until all the line is gone and the stopper is holding the towline.	**Heave In Handsomely**	Check Away (Acknowledged)	Towline is heaved in under power.
Cut the stopper		Station workers cut the stopper.			
Note: The stopper is under strain and care must be taken when cutting.					
The towline runs out the fairlead and all weight is passed to the receiving ship.					
Secure	Secure (Given)		**Secure**	Secure (Acknowledged)	
The supplying ship will make the departure as the receiving ship is now the burdened vessel and will become the guide.			The station supervisor will heave in or veer the tow line until the desired amount is streamed astern.		
			Canvas is parcelled around the towline and served with tarred marlin. The towline is then veered until the parcelling is between the towline and fairlead. This is to prevent excessive chafing of the towline.		
			Avast. Pass the Stopper		Station workers pass the stopper.
			Ease to the Stopper		Capstan operator veers handsomely until the stopper takes the strain.
			Light to Turn up		Line handlers remove the turns from the capstan and take turns on the bollard.
			Command will increase speed and the station supervisor will observe the rigging during the firing exercise. The station supervisor will inform Command if excessive chafing starts and the nip requires freshening.		

10.5 Recovering the Larne Target

a. **Recovery:**

(**1**) The ship reduces speed to 3 -5 kt to facilitate the recovery.

(**2**) A rope stopper is passed around the towline.

(**3**) The turns are removed from the bollard and the strain is eased to the rope stopper.

(**4**) Three turns are taken on the capstan and the towline is heaved in handsomely until the strain is removed from the stopper.

(**5**) The stopper is removed and the towline is heaved in roundly until the target is just off the transom.

(**6**) The towline is heaved in handsomely as the target is hauled up the transom. Avast is given when the target is at the fairlead.

(**7**) The target is hauled on board over the guardrail by the station workers as the towline is veered as required.

(**8**) The target and towline are disconnected and all associated rigging equipment is secured.

Note.

A grapnel may be required to help recover the target once it has reached the transom. The grapnel is lowered under control so as not to foul the propellers.

10.6 High Speed Plastic Target (HSPT)

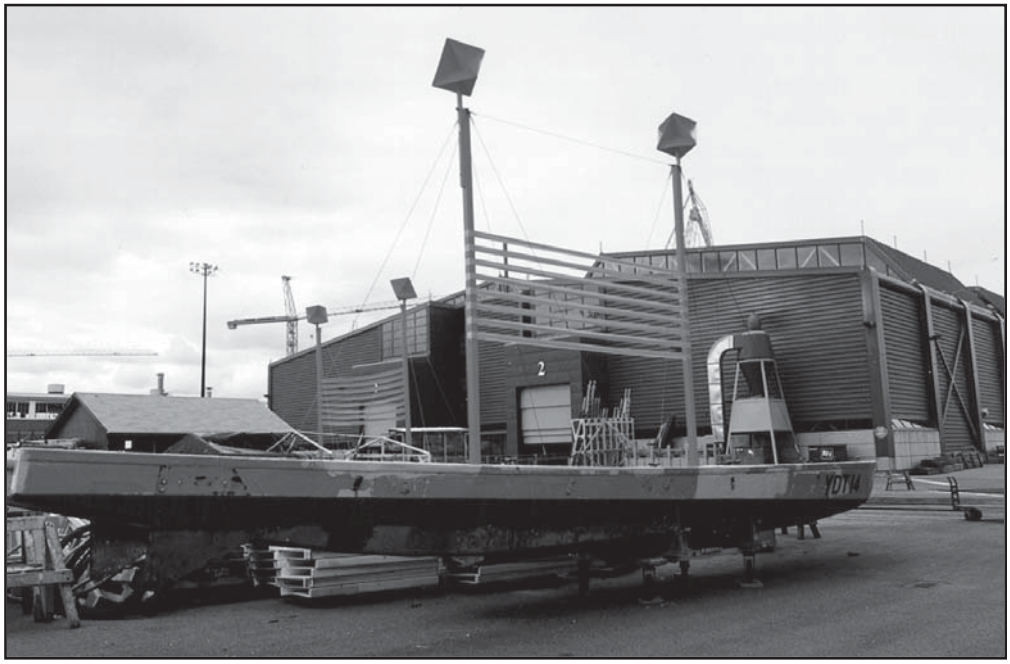

Figure 10.6-1 - High Speed Plastic Target

a. **Description**. The HSPT is a large target of fibreglass construction used for gunnery practice. The HSPT measures 14.3 m (L) x 2 m (W) x 1.4 m (H). With the two masts in place, it has a height of 6.7 m. A radar reflector is fitted to at least one mast. Fully rigged, the HSPT weighs between 2450 and 6350 kg.

The towline is 1500 m of double-braided 24 mm diameter nylon. It is marked every 152 m to measure the amount of line passed out. There are two soft eyes spliced in the towline: one at the end which is the towing eye, and the other, spliced 92 m from the end, which is the transfer eye.

As this target is very large and heavy, the only ships capable of launching it are the AOR Classes. The target is stowed in the hangar and is launched using the helicopter cranes. After launch, the target can be towed by an AOR or transferred to another ship for towing.

Table 3 Equipment Required - HSPT Equipment

Line-Throwing Gun *	Mousing Line
Bolo/Gunline Projectiles *	Knife/Spike
Hard Hats	Comm Set
PFDs	Paddles/Wands/Vests *
Safety Harnesses	Rope Stoppers
Axe/ 4 x 4	Steadying Lines
Sledgehammer	Grapnel

* These items are only required for transferring the target from one ship to another.

b. **Personnel Required**. Prior to the launching of the target, a RIB must be launched. The following personnel are required for the target launch:

Table 4 Personnel Required - HSPT	
Flight Deck	
I/C and Crane	PO/MS Bosn
Director	
Crane Operator	MS/LS Bosn
Line Handlers	6 ATR
Comm Number	1 ATR
Quarterdeck	
Station Supervisor	PO/MS Bosn
Line Handlers	4 ATR
Steadying Line	2 ATR
Handlers	
Comm Number	1 ATR
Station Signalman *	LS/OS Bosn
Gunman *	LS/OS Bosn

* These positions are manned only for transferring the target from one ship to another.

If the target is to be transferred to a ship, RAS Team No. 5 will be required on the receiving ship.

10.7 Launching the Target

a. **Rigging:**

(**1**) The target is moved to the flight deck and positioned under the leeward side helicopter crane.

(**2**) The sail is then attached to the target using the crane and all the stays are secured to the target.

(**3**) The four-legged lifting sling is attached. (The longer legs are shackled to the after end of the target.)

(**4**) The towline is faked out on the leeward side of the quarterdeck.

(**5**) To prevent excessive chafing of the towline, canvas is parcelled around the towline where it passes through the fairlead and served with tarred marlin.

(**6**) The towing eye or transfer eye is placed on the towing slip (pinned and moused) depending on whether or not the AOR will tow the target or transfer it to another ship.

(**7**) The hard eye is passed through the fairlead on the quarterdeck and passed up the appropriate side to the flight deck.

(**8**) The hard eye is shackled to the swivel piece on the towing bridle and moused with wire.

(**9**) The two steadying lines are attached to the target and passed to the line handlers below.

b. **Launching:**

(**1**) The ship must be dead in the water to launch the target.

(**2**) The RIB is launched.

(**3**) The target is hoisted and swung outboard and lowered into the water. The target is controlled by the steadying lines. Note: The whip is veered to ensure that no strain is placed on the lifting gear by the swell.

(**4**) The RIB is called in and the lifting sling is unshackled from the target. Once unshackled, the crane hoists the lifting sling back on board.

(**5**) The steadying lines are detached from the target and hauled back on board.

(**6**) The ship gathers headway and streams the target. The RIB is recovered simultaneously.

(**7**) When the target is fully streamed, the transfer or gunnery exercise can commence.

10.8 Transferring the Target while Underway

a. **Rigging:**

(**1**) A light messenger (65 m of 12 mm diameter polypropylene) is faked out on deck.

(**2**) One end is passed over the guardrail, through the fairlead and bent onto the towing eye of the towline.

(**3**) The transfer eye is attached to the towing slip.

(**4**) Equipment listed in the Table 3 is brought out and placed on deck.

b. **Transferring**. The AOR streaming the target will be the guide ship and the ship receiving the target will make her approach as if conducting a RAS. Care should be taken during the approach to avoid running over the towline and target. Once in position, the ships should reduce speed to approximately 8-10 kt to safely pass the towline.

10.8.1 Sequence of Events for Transferring the Target (HSPT) to another Ship

Supplying Ship			Receiving Ship		
Order	**Signal**	**Action**	**Order**	**Signal**	**Action**
Show Red	One blast on the whistle (Given)	Red paddle is held aloft and one blast is given on the whistle to indicate ready to fire gunline.	**Show Red**	Two blasts on the whistle (Acknowledged)	Red paddle is held aloft and two blasts are given on the whistle to indicate ready to receive gunline and personnel have taken cover.
		Gunline fired.			Gunline received.
Avast	Avast (Given)	Gunline is attached to light messenger.	**Avast**	Avast (Acknowledged)	Gunline is taken in hand.
Check Away	Heave Around (Given)	Light messenger is payed out hand over hand.	**Heave In**	Check Away (Acknowledged)	Gunline is heaved in hand over hand until light messenger is on board.
Avast	Avast (Acknowledged)	Line handlers keep light messenger out of the water.	**Avast**	Avast (Given)	Station workers pass light messenger through aft fairlead.
Check Away	Heave Around (Acknowledged)	Light messenger and towline are payed out hand over hand.	**Heave In**	Check Away (Given)	Light messenger and towline are heaved in hand over hand.
Avast	Avast (Acknowledged)		**Avast**	Avast (Given)	
			Hook On		The towing eye is passed through the towing slip. The slip is pinned and moused.
	Hooked On (Acknowledged)		**Show Hooked On**	Hooked On (Given)	
Check Away		Line handlers check away on the towing line streaming all remaining line astern.			
Prepare to Slip	Prepare to Slip (Given)	Station workers prepare to slip by removing the mousing and pin, then stand by with the sledgehammer.		Prepare to Slip (Acknowledged)	The quarterdeck is cleared of all personnel until strain is taken by the towline.

10.8.1 Sequence of Events for Transferring the Target (HSPT) to another Ship (cont)

Supplying Ship		
Order	**Signal**	**Action**
Slip	Slip (Given)	
Secure	Secure	
The supplying ship will make the departure as the receiving ship is now the burdened vessel and will become the guide.		

Receiving Ship		
Order	**Signal**	**Action**
	Slip (Acknowledged)	
	Secure (Acknowledged)	
Command will increase speed and the station supervisor will watch rigging during the shoot. The station supervisor will inform command if excessive chafing occurs on the towline.		

10.9 Returning the HSPT to the AOR

a. **Rigging:**

(**1**) The towing ship recovers 92 m of the towline, removes the towing eye from the towing slip and attaches the transfer eye. This is achieved by reducing speed to bare steerageway and attaching a recovery messenger (65 m of 18 mm diameter polypropylene) to the towline using a rolling hitch close to the fairlead. The recovery messenger and towing line are then heaved in by hand or by using the capstan.

Note.

Heaving in by hand will require the closing up of extra personnel.

(**2**) The light messenger and towing line are faked out on deck.

(**3**) One end is passed over the guardrail, through the fairlead and bent onto the towing eye of the towing line.

(**4**) All associated equipment is brought out and placed on deck.

b. **Transferring**. The sequence of events for transferring the HSPT from a ship to the AOR is identical to transferring it from the AOR to a ship.

10.10 Recovering the HSPT by AOR Class

a. **Rigging:**

(**1**) The crane with the lifting sling is positioned to recover the target.

(**2**) Two steadying lines are prepared.

b. **Recovery:**

(**1**) The AOR prepares to recover the towing line. This is done by reducing speed to bare steerageway and attaching a recovery messenger (65 m of 18 mm diameter polypropylene) to the towing line using a rolling hitch close to the fairlead. The recovery messenger and towing line are then heaved in by hand or capstan.

(**2**) The RIB is launched.

(**3**) The ship must be dead in the water to recover the target.

(**4**) The RIB moves the target to the recovery position.

(**5**) Steadying lines and the four-legged lifting sling are attached (longer legs are shackled to the after end of the target).

(**6**) The target is then hoisted out of the water as quickly and safely as possible to prevent damage to the sail.

(**7**) The target is properly placed on the dolly, de-rigged and secured.

10.11 Inflatable Surface Target

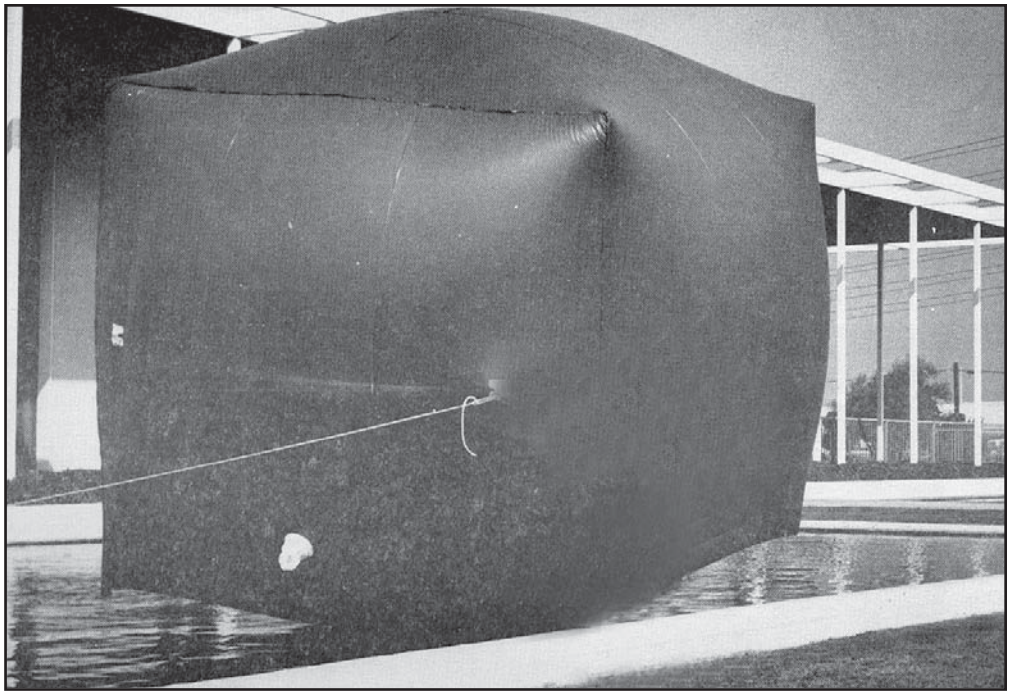

Figure 10.11-1 - Inflatable Surface Target (aka Killer Red Tomato)

a. **Description**. The KRT is a 0.3 m^3 (inflated) inflatable rubber gunnery target, international orange in colour. It weighs 16 kg and can be detected on radar at ranges of up to 10 miles (16 km) depending on sea state and radar tuning. It also comes with a repair kit to patch small holes.

The KRT is inflated on the flight deck or in the hangar using a Double Bottom (DB) fan. Once inflated, reflective tape (tin foil) is attached to the KRT to enhance its radar cross section. On each end there are two eyelets which can be used to help lower the KRT into the water. Sea drogues (AFFF cans with holes in them) can also be attached to these eyelets to help reduce drift and to aid in recovery (10 m of 8 mm diameter manila line will be required).

b. **Launching**. The KRT is launched from the flight deck by checking away on the lines attached to the eyelets. If the drogues are attached, they are then tossed overboard.

c. **Recovery:**

(**1**) The KRT can be recovered by four to six personnel, usually from the watch on deck, and from the quarterdeck.

(**2**) The ship will approach the KRT from up wind.

(**3**) The Watch on Deck (WOD) will prepare a minium of two grapnels.

(**4**) The KRT will be grapnelled by throwing the grapnels over the line attached to the drogues.

(**5**) The KRT is then hauled on board. Due to the nature of the target, the material tears easily, and, therefore, care must be taken not to damage it.

(**6**) Once on board, Command is informed and the KRT is deflated and stored for future use.

10.12 Quick Reaction Marker Buoy (QRMB)

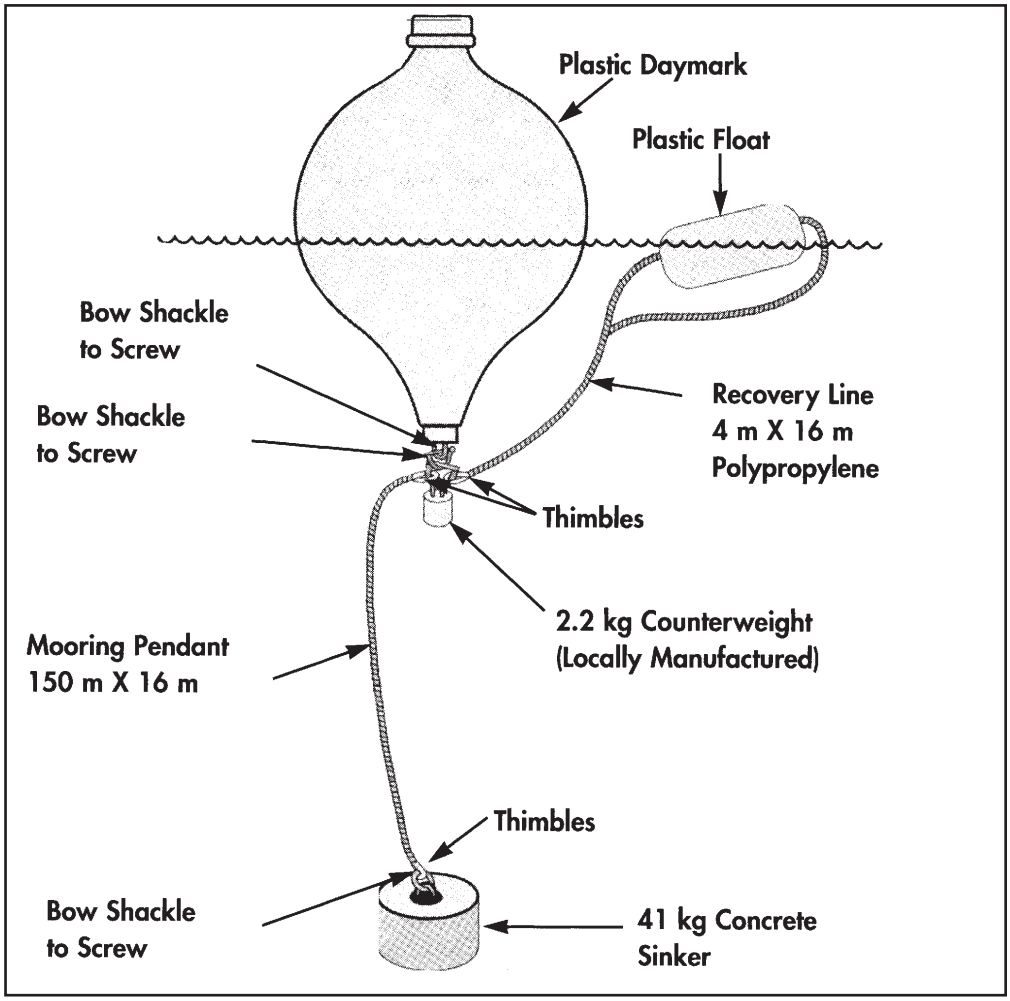

Figure 10.12-1 - Quick Reaction Marker Buoy

a. **Description**. The QRMB is essentially a plastic float attached to a weight by a length of line. It is normally stowed on the quarterdeck lashed to the guardrails. It is very easy to rig and can be quickly deployed by one person (usually the Lifebuoy Sentry). The QRMB is used as a temporary marker to indicate a position of interest, e.g., a sunken submarine or ditched aircraft.

b. **Rigging:**

(**1**) The rigging of the QRMB is very simple. The mooring line is attached to the float which is then lashed to the guardrail (outboard) with one lashing of sailmaker's twine. This is to prevent the float from moving but will easily part when strain is placed on it. (Recovery line is shackled to the bottom of the float.)

(**2**) The mooring line is then coiled down in a canister so that the end attached to the float is at the bottom of the canister and the end attached to the concrete sinker is on top.

(**3**) The concrete sinker with the mooring line attached is then placed outboard and over top of the guardrail. It is then lashed in position. Note: If tarred marlin or manila line is used, a knife must be available at all times.

Note.

During Flying Stations, the QRMB must be adequately secured to prevent it from becoming a flight safety hazard.

c. **Deploying:**

(**1**) The QRMB is deployed by the lifebuoy sentry upon direction from Command via the upper deck broadcast.

(**2**) The lifebuoy sentry will then cut the lashing on the concrete sinker and jettison it overboard.

(**3**) The mooring line will pay out freely from the canister, the strain will part the lashing and the float will fall free.

(**4**) The lifebuoy sentry will then report to command that the QRMB is deployed.

d. **Recovery:**

(**1**) The QRBM can be recovered by four to six personnel, usually the WOD, supervised by the Petty Officer of the Watch. It is recovered at the Diver Recovery Position (DRP).

(**2**) The ship will approach the QRMB from up wind.

(**3**) The WOD will prepare a minimum of two grapnels.

(**4**) The QRMB will be hooked by throwing the grapnels over the recovery line.

(**5**) The QRMB is hauled on board and the mooring line is rove through the DRP blocks.

(**6**) The mooring line is then heaved in, recovering the concrete sinker.

(**7**) Upon recovery, the QRMB is stowed or re-rigged on the quarterdeck.

10.13 Fog/Marker Buoy

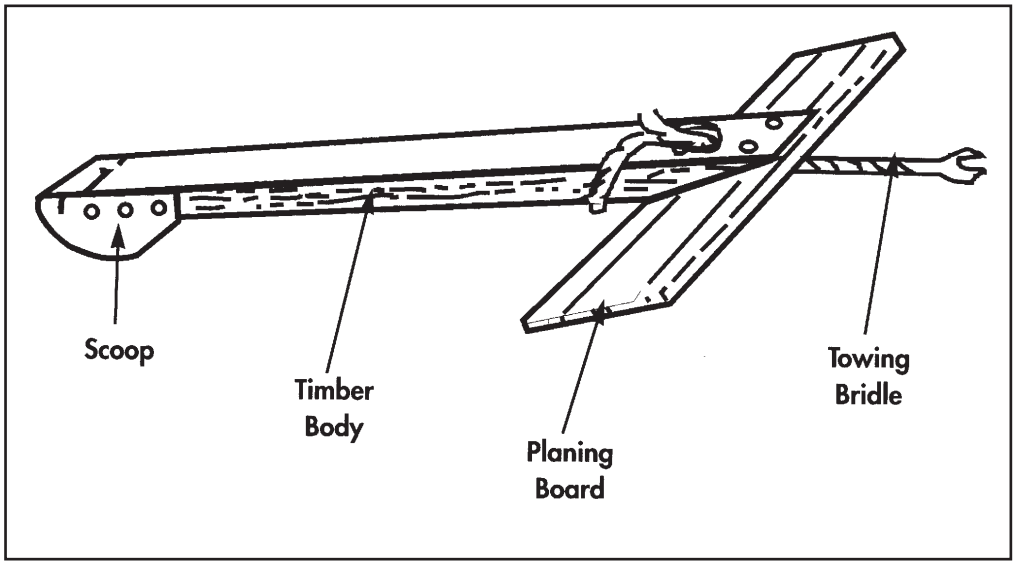

Figure 10.13-1 - Fog/Marker Buoy

a. **Description**. The fog or station keeping marker buoy is a 1 m long timber body with a metal scoop at one end and a 0.6 m planing board at the other. When streamed, it produces a plume of water that another ship will use to keep station. This method of station keeping may be used when operating in dense fog without radar, as well as for astern fuelling.

The fog/marker buoy is towed by a towline (550 m of 12 mm diameter double-braided nylon, markered every 92 m).

Table 6 Equipment Required - Fog/Marker Buoy

Hard Hats	Mousing Line
PFDs	Knife/Spike
Safety Harnesses	Comm Set
Axe/ 4 x 4	Rope Stoppers
Grapnel	

b. **Personnel Required**. RAS Team No. 5 will be required for the launch and recovery of the fog/marker buoy.

10.14 Streaming the Fog/Marker Buoy

a. **Rigging:**

(**1**) The towline is faked out on deck inboard to outboard, so that it is free for running.

(**2**) The towline is then led through the fairlead and brought back on board over top of the guard rail.

(**3**) The towline is shackled and moused with wire to the swivel piece on the towing bridle.

(**4**) A rope stopper is attached to a strong point on the deck so that it can be passed around the towline.

b. **Streaming:**

(**1**) In order to stream the target, the ship will reduce speed to 3-5 kt.

(**2**) The target is manhandled over the stern and checked away using the towline until it is clear of the transom.

(**3**) Three turns are taken around the bollard and the towline is eased out using the momentum of the ship.

(**4**) When sufficient line is payed out, canvas is parcelled around the towline and served with tarred marlin. The towline is then checked away until the parcelling is between the towline and fairlead. This is to prevent excessive chafing of the towline.

(**5**) The stopper is passed and the towline is turned up fully on the bollard to secure the towline. The stopper is then removed.

(**6**) Command will increase speed and the station supervisor will watch rigging during the towing. The station supervisor will recommend freshening the nip (veering or heaving in a short length so that the chafing point is changed) if required.

10.15 Recovering the Fog/Marker Buoy

Recovery:

(**1**) The ship reduces speed to 3 -5 kt to facilitate the recovery.

(**2**) A rope stopper is passed around the towline.

(**3**) The turns are removed from the bollard and the strain is eased to the rope stopper.

(**4**) Three turns are taken on the capstan and the towline is heaved in handsomely until the strain is removed from the stopper.

(**5**) The stopper is removed and the tow line is heaved in roundly until the target is just off the transom.

(**6**) The towline is heaved in handsomely as the target is hauled up the transom. Avast is given when the target is at the fairlead.

(**7**) The target is hauled on board over the guardrail by the station workers and the towline is veered as required.

(**8**) The target and towline are disconnected and all associated rigging equipment are secured.

10.16 Floats

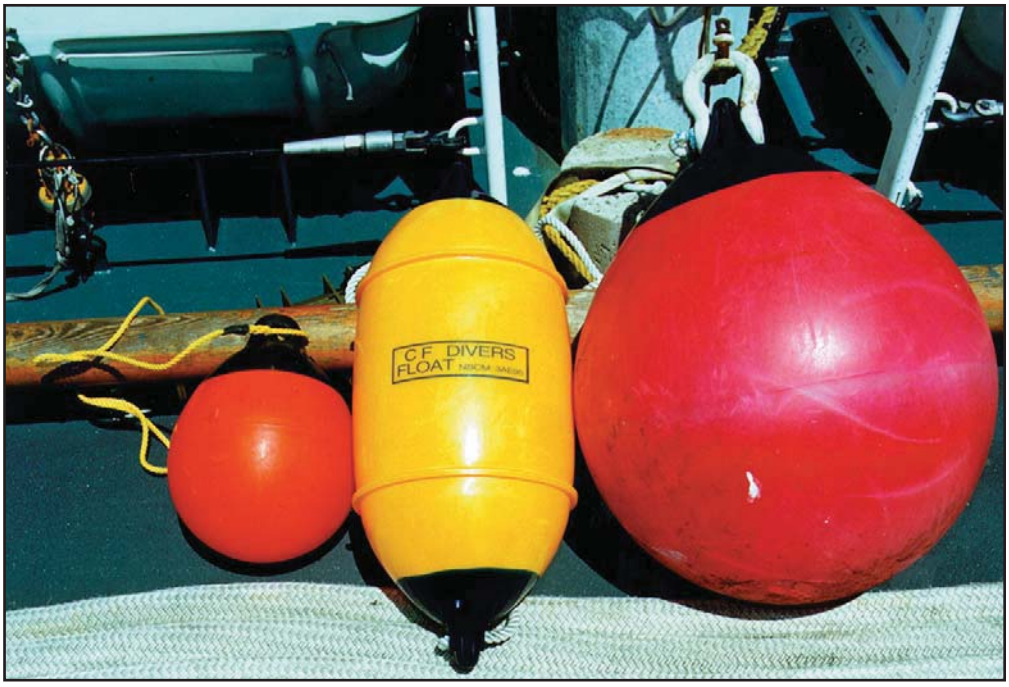

Figure 10.16-1 - Floats

Description. Floats come in various sizes, colours and shapes. The names associated with them vary with the manufacturer. They are used as temporary markers for various reasons, e.g., to mark lost equipment or the position of the ship's anchor. They can also be used for diving operations.

10.17 Torpedo Recovery

Figure 10.17-1 - Torpedo Recovery Clamp

Torpedo recovery is a joint Deck and CSE Department evolution. The Deck Department is responsible for launching the IRB and retrieving the torpedo. Once the torpedo is alongside, the Naval Weapons Technicians are responsible for hoisting and securing the torpedo. The following sequence describes the recommended recovery method.

(**1**) Boat's crew and lowerers are closed up.

(**2**) The boat's crew is briefed on where to attach the towline to the torpedo and IRB.

(**3**) The IRB is launched as described in Chapter 11.

(**4**) Once the IRB is clear of the ship's hull, two fenders are lowered (to be placed between the ship and torpedo) and the torpedo clamp is attached to the crane.

Figure 10.17-2 - Fenders Placed between the Ship and Torpedo

(**5**) The boat's crew will recover the torpedo and tow it back to the ship so that it is between the ship and boat, resting on the fenders.

(**6**) The boat's crew secures the IRB alongside and the torpedo clamp is lowered and attached to the torpedo.

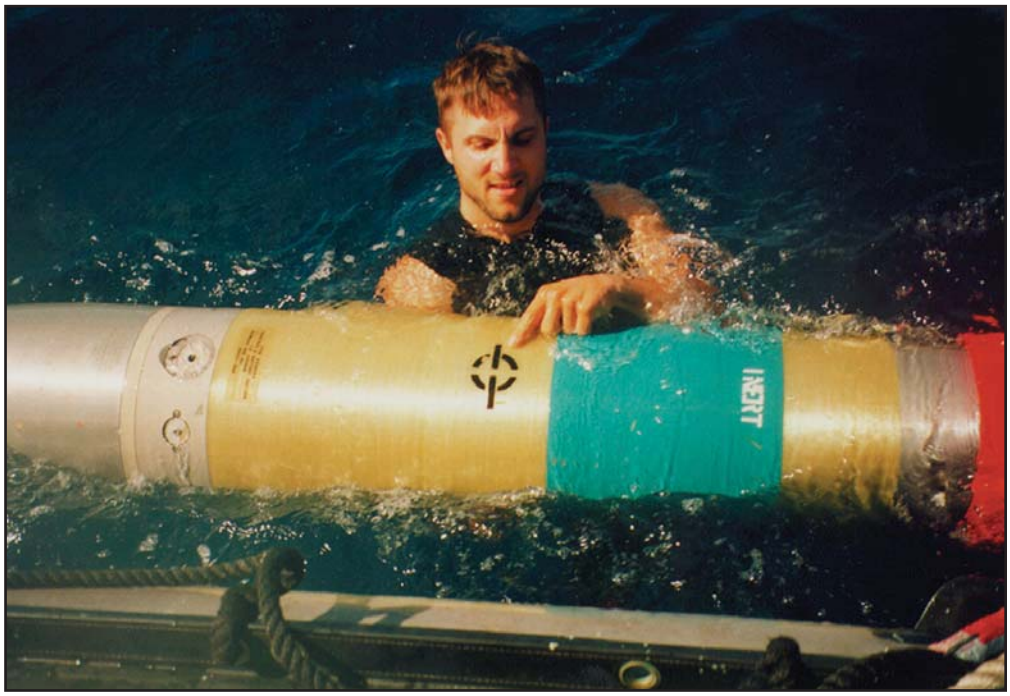

Figure 10.17-3 - Position where Torpedo Clamp is Secured

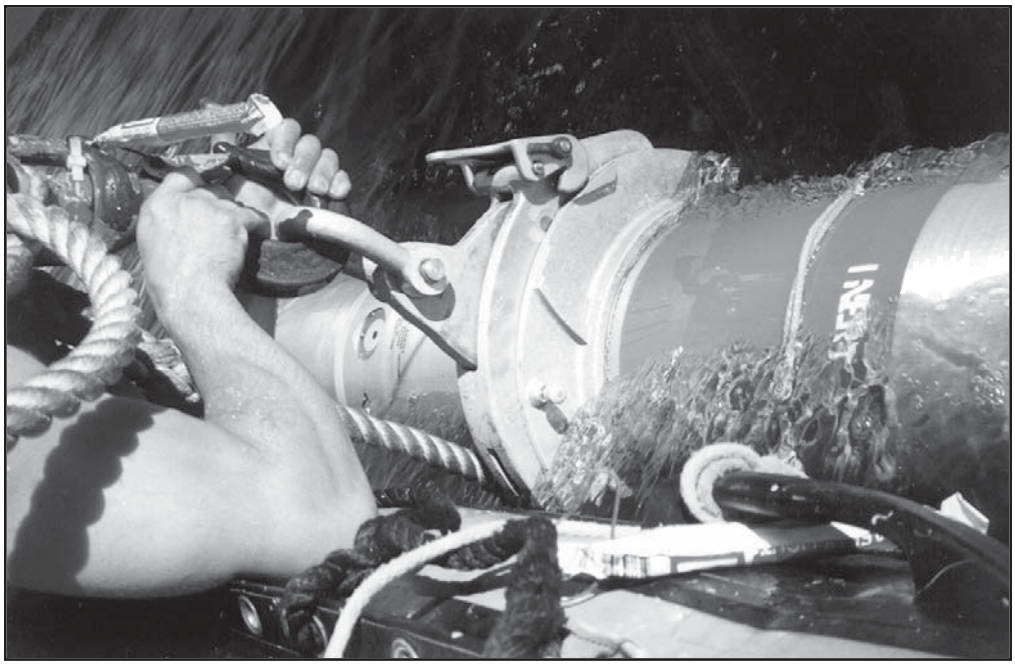

Figure 10.17-4 - Torpedo Clamp Secured

(**7**) The IRB is slipped and lays off as the torpedo is hoisted. This is for the safety of the boat's crew. It will also take several minutes to recover the torpedo and get ready to recover the IRB.

(**8**) The IRB is recovered as described in Chapter 11.