CHAPTER 11
Boats and Rescue

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CHAPTER 11
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11.1 Introduction

The employment of small boats is an integral part of naval operations. Boats are used for many purposes including rescue at sea, boarding operations, embarking and disembarking personnel, transferring stores, harbour surveys, harbour defence, and support of diving operations. Modern naval boats must be powerful, fast and manoeuvrable, and require highly skilled crews to effectively accomplish these missions.

Chapter 11 provides a description of small boats being used in the Canadian Navy, and outlines the procedures to be followed in their launch and recovery. The organization for rescue at sea is also described.

Even in today's Navy, the old service saying that "A ship is known by her boats" still applies. A smart boat and a seamanlike boat's crew is a sign of a tight and well-led ship.

11.2 General Service Boats

The following boats are used in the Canadian Navy.

11.2.1 Inflatable Rubber Boats (IRB)

All small boats except the RIB PC and the Landing Craft Vehicle Personnel (LCVP) are categorized as IRBs. The RIB 540 and RIB 472 are classified as IRBs because they use outboard motors for propulsion.

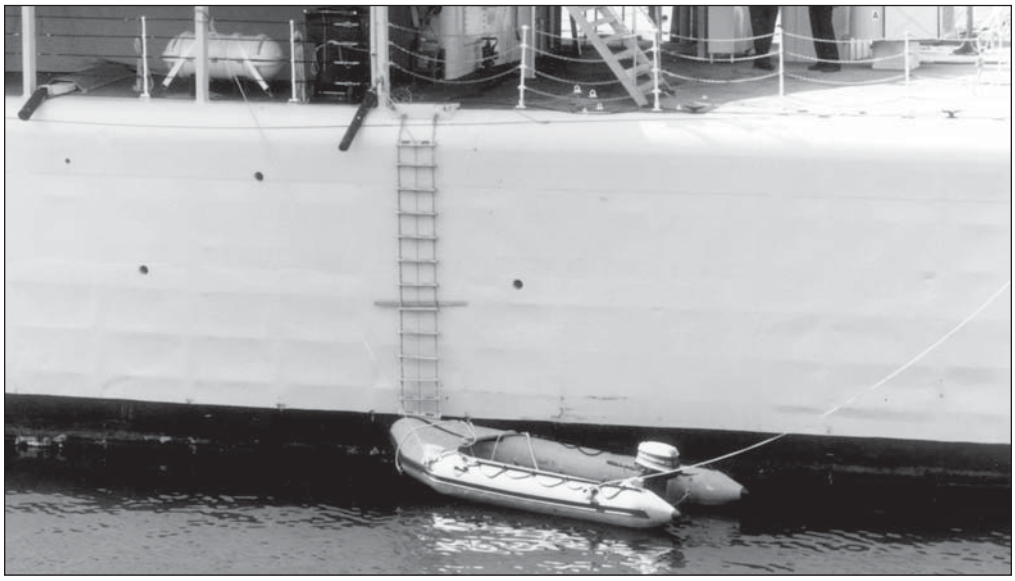


Figure 11.2-1 - Six-Man IRB

a. **Six-Man IRB Characteristics:**

Length overall: 4.2 m
Beam: 1.67 m
Fuel Capacity: Portable outboard motor tank(s)
Propulsion: 25 HP Outboard
Speed: 15 kts but dependent on payload and engine
Payload: 6 personnel or 500 kgs
Weight: 86 kgs (boat only)
Ship Class: VICTORIA

Figure 11.2-2 - Ten-Man IRB

b. **Ten-Man IRB Characteristics:**

Length overall: 4.7 m
Beam: 1.9 m
Fuel Capacity: Portable outboard motor tank(s)
Propulsion: 25 or 40 HP Outboard
Speed: 15 kts but dependent on payload and engine
Payload: 10 personnel or 1100 kgs
Weight: 110 kgs (boat only)
Ship Class: IROQUOIS/HALIFAX/KINGSTON/AOR

Figure 11.2-3 - KINGSTON Class RIB 540

c. **RIB 540 Characteristics:**

Length overall: 5.6 m
Beam: 2.15 m
Fuel Capacity: Portable outboard motor tank(s)
Propulsion: 12 volt electrical start outboard (max. 80 HP)
Speed: 30+ kts
Payload: 9 Personnel or 1030 kgs
Lifting Weight: 590 kgs (no crew)
Ship Class: KINGSTON

11.2.2 Rigid Inflatable Boat

Figure 11.2-4 - RIB PC

RIB PC Characteristics:

Length overall: 7.3 m
Beam: 3 m
Fuel Capacity: 132 litres
Propulsion: 165 HP turbo-charged Volvo Penta AQAD 41 6-cylinder diesel
Speed: 30+ kts
Payload: 18 Personnel or 3420 kgs
Lifting Weight: 1927.8 kgs and 2178 kgs dependant on date of manufacture (no crew)
Ship Class: IROQUOIS/HALIFAX/AOR

11.2.3 Landing Craft Vehicle Personnel

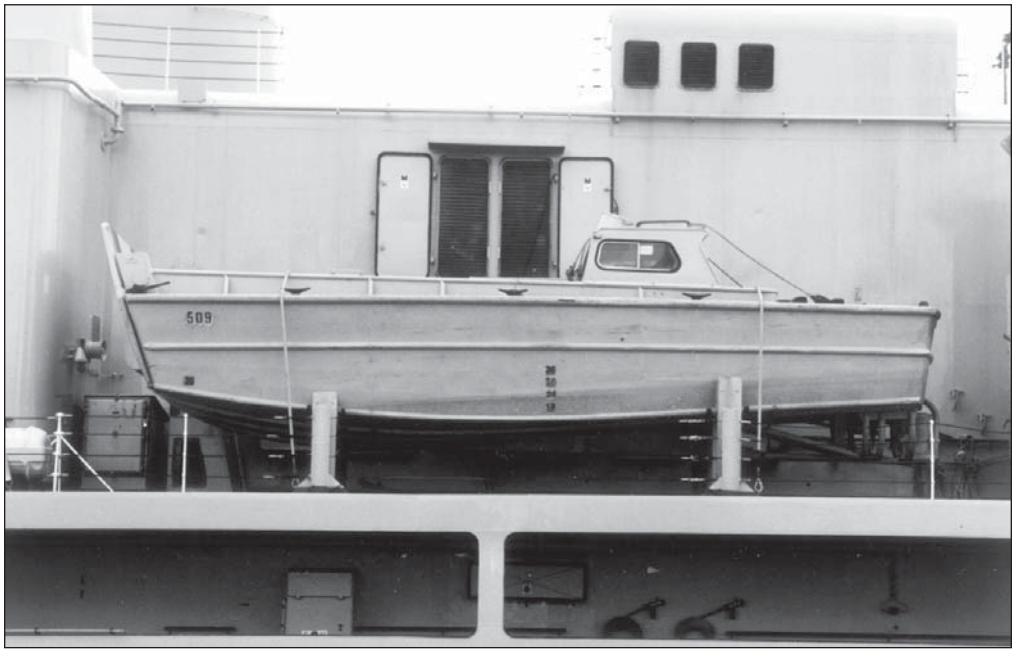


Figure 11.2-5 - LCVP

LCVP Characteristics:

Length overall: 10.9 m
Beam: 3.2 m
Fuel Capacity: 681 litres
Propulsion: 6 cylinder Cummings Diesel
Speed: 11 kts
Payload: Fair: 40 personnel (or 36 combat troops in full fighting order)
Foul: 30 personnel
Emergency: 50 personnel
3674 kgs
Weight: 6495.5 kgs
Ship Class: AOR

11.3 Boat Coxswain's Responsibilities

a. The duties and responsibilities of a boat coxswain are many. The manner in which the boat is handled, the smartness and keenness of the crew, and the general seamanlike appearance of the boat are a reflection of the ship and the Navy. When handling a boat, it is important that the coxswain anticipate and plan ahead. Consequently, no matter what the emergency, whether it is a "man overboard", a sudden engine failure, or a parted mooring line, the crew will be able to respond quickly and safely.

In general, the coxswain is responsible for:

(**1**) care and maintenance of the boat and its equipment;
(**2**) proper handling of the boat underway;
(**3**) discipline of passengers and crew; and
(**4**) observance of naval customs and marks of respect.

b. While it is not normally part of the coxswain's duties to carry out major repairs to boats, it is his responsibility to see that the boat is properly equipped at all times and that the equipment is kept in good working order. For this reason, when taking over a boat, the coxswain must ensure that:

(**1**) the boat is clean inside and out;
(**2**) all equipment is properly stowed and in good repair;
(**3**) the navigation lights, horn, compass and fire extinguisher are in good working order;
(**4**) there are enough life jackets for the passengers and crew plus 10%;
(**5**) sufficient fuel is on board, cooling water is available, lubricating oil levels are correct and the bilges are free of water;
(**6**) he has received a thorough briefing from the OOW/OOD on the boat tasking; and
(**7**) the crew has been properly briefed on its duties.

11.4 Small Boat Handling

Each type of boat handles differently, depending upon the environmental conditions and the payload. A boat's coxswain must know his boat's capabilities and be able to operate it in all conditions. The golden rule in all matters of boat handling is that the coxswain must anticipate his actions and determine the best approach in good time. When making plans, coxswains should remember that the extra two or three minutes spent in preparing a careful and seamanlike plan will inevitably save time and prevent damage to the boat or personal injury to passengers.

11.4.1 General

a. To properly and safely operate a boat, the coxswain must know the following:

(**1**) the Rules of the Road (International Regulations for the Prevention of Collision at Sea);
(**2**) the buoyage system in use in the operating area;
(**3**) how to read and follow a nautical chart;
(**4**) the local harbour/port regulations, particularly those governing speed limits; and
(**5**) how to operate and communicate with a radio.

b. The boat's coxswain will typically operate the boat using 'heads up' navigation. Before leaving the ship or jetty, the coxswain must be familiar with the chart of the area and ensure that the best scale chart is being used. During the passage, the coxswain determines the position of the boat by comparing the chart in the boat to reference points ashore. At sea, when outside of visual range to land, and especially in conditions of restricted visibility, it is recommended that a portable Global Positioning System (GPS) receiver be used to calculate the position and determine true courses to steer. The ship's Navigating Officer can instruct boat coxswains on the use of GPS.

Note.

The easiest way to take a compass bearing in a boat is to point the boat at the object being shot up (only if it is safe to do so).

c. The following are some general points to remember whenever handling a boat:

(**1**) **Safe Speed**. A boat must always be operated at a safe speed. Naval small boats are very powerful and fast. The limits of visibility, presence of other vessels, sea state, and the comfort of any passengers must be considered when operating a small boat.
(**2**) **Dress**. A boat's crew should always be in the same rig. If a specific dress is not ordered by Command, then the boat's coxswain must designate one. The weather, and duration and type of mission must be taken into account when choosing the dress. **Note**: Hats are not normally worn in a boat.
(**3**) **Personnel Safety**. A personal flotation device (positive buoyancy life jacket or floater jacket/suit) must be properly worn at all times. Safety helmets are to be worn by all personnel in the boat whenever it is being lowered or hoisted.

(**4**) **Visual Lookout**. The coxswain is to ensure that a visual lookout is maintained at all times while the boat is underway, primarily to avoid collision with other vessels and floating objects. Even small pieces of debris can cause severe damage to the leg of the boat engine and/or puncture the collar or hull of the boat. This is especially important at night and in reduced visibility as reaction time is diminished.

(**5**) **Never Cut Corners**. When rounding the corner of a vessel or jetty, keep well clear so that there is no danger of colliding with another vessel which may be coming around the corner on a converging course. When rounding the bow of a ship at anchor, stay well clear of the area where the cable enters the water.

(**6**) **Never Approach a Ship/Jetty "Head-On".** A head-on approach relies entirely upon the engine to stop the boat at exactly the right moment. If the engine or reverse gear fails, serious damage to the boat and possibly injury to personnel may occur. Always make an approach at an angle, so that if anything does go wrong, the boat can be turned away from danger.

(**7**) **Making an Approach**. When going alongside a ship at anchor or secured to a buoy, if possible, initially aim for a point off the quarter of the ship and then make your approach from astern of the ship's ladder. This approach will minimize the risk of interference from the boat's own wake.

(**8**) **Effect of the Propeller**. The effect of propellers on boats are complex. However, some simple rules do apply. In a single-screw boat, the bow will always tend to turn in the opposite direction to the normal rotation direction of the screw. Service boats have a right-hand screw, which means that their bows will move to port when going ahead and to starboard when going astern.

(**9**) **Altering Course**. Always look astern before altering course to ensure that another boat will not be cut off.

(**10**) **Inform the Crew**. The coxswain must keep the crew informed of his intentions so that they will be able to anticipate his orders and obey them smartly.

11.4.2 Hand Signals/Boat Communication

a. Reliable communications between a ship and her boat are important as a ship must know the location of her boats at all times. The coxswain must not leave the ship without a radio that has been tested and is operating correctly. In the event that the radio fails, a ship can still communicate with her boats by one of the following methods:

(**1**) By day or night:
- (a) a series of short flashes or blasts, steer more to starboard;
- (b) a series of long flashes or blasts, steer more to port; and
- (c) a steady light or blast, steer straight ahead.

(**2**) By night, a steady light may be used to illuminate a man or object in the water. The boat should steer for that spot.

(**3**) By day or night, the boat may be recalled by flashing or sounding the letter "Q" (morse: – – • –) or the hoisting of flag "Quebec" (solid yellow).

b. Hand signals are used by the boat deck I/C or quartermaster to communicate with boats. A boat's coxswain must know the four signals used and watch for them when approaching a ship.

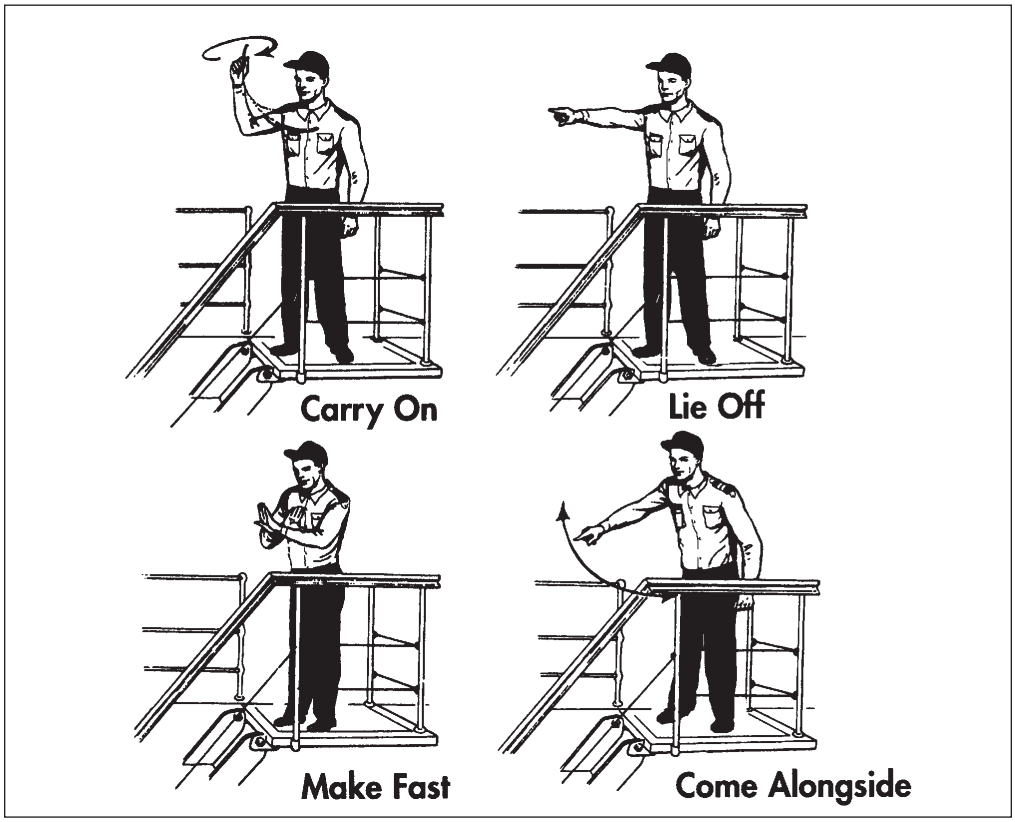


Figure 11.4-1 - Hand Signals

11.4.3 Anchoring

The following describes anchoring considerations and procedures.

a. Each service boat is provided with an anchor suitable for the size of boat. The anchor should be a Danforth type with 3 m of chain and 30 to 45 m of line.

b. If needed, an anchorage position that provides the best protection from the prevailing elements must be located on the chart. To determine the amount of anchor line required, consult the chart for the depth of water and type of bottom.

c. A general rule of thumb used to calculate the amount of line required is to use five to seven times the depth of water. Other factors such as current, wind, swinging circle, and the quality of the bottom (mud versus rock) must be considered.

d. The following describes the sequence to be followed when anchoring in a service boat:

(**1**) Ensure that the bitter end of the anchor line is securely attached to a strong point on the boat (i.e., towing bollard, towing bridle, eyepad).

(**2**) Approach the anchorage position by stemming the wind or current.

(**3**) At the desired position, put the boat in neutral and lower the anchor to the bottom.

(**4**) Once the anchor is on the bottom, place the boat in reverse and slowly gather sternway while the anchor line is paid out.

(**5**) Continue going astern slowly until the anchor line is paid out and has become taut (long stay). This will seat the anchor firmly in the seabed.

(**6**) Place the controls in neutral and watch to ensure that the anchor is holding. When satisfied, shut down the engine.

e. The following describes the sequence to be followed when weighing anchor:

(**1**) Start the engine while the bowsman commences heaving in on the anchor line. Slow headway can be used to assist in moving forward but care must be taken not to overrun the anchor line.

(**2**) The engine is put in neutral when the anchor line is up and down. The bowsman then heaves in the remainder of the line and hoists the anchor inboard.

(**3**) Once inboard, secure and stow the anchor and line.

Note.

If the anchor is fouled on the bottom, tie off the anchor line and proceed ahead slowly. This should free the anchor from the bottom.

11.4.4 Recovering a Man Overboard

The preferred technique for recovery is to:

a. Position the boat directly downwind of the casualty.

b. With the bow pointing directly into the wind, manoeuvre the boat slowly toward the casualty, being careful not to run him over.

c. Bring the casualty alongside the starboard side if possible. Any seas should be on the bow. If the casualty is unconscious, the bowsman (normally a diver or rescue swimmer) must enter the water to help the casualty into the boat.

d. Once the bowsman has control of the casualty, the coxswain must put the motor in neutral. He may then assist the bowsman getting the casualty inboard. Once inboard he must report state of the casualty.

e. The casualty should be hoisted inboard midships to reduce the chance of the bow being pushed around, possibly over the casualty, and to keep the casualty away from the propeller. Once inboard, the casualty must be immediately protected from hypothermia.

f. If the casualty is missed on the first attempt, the boat should circle, keeping the casualty on the inside of the circle. This keeps the propeller away from the casualty.

g. The Coxn must ensure that the casualty's head is aft and that the sling is free to come alongside.

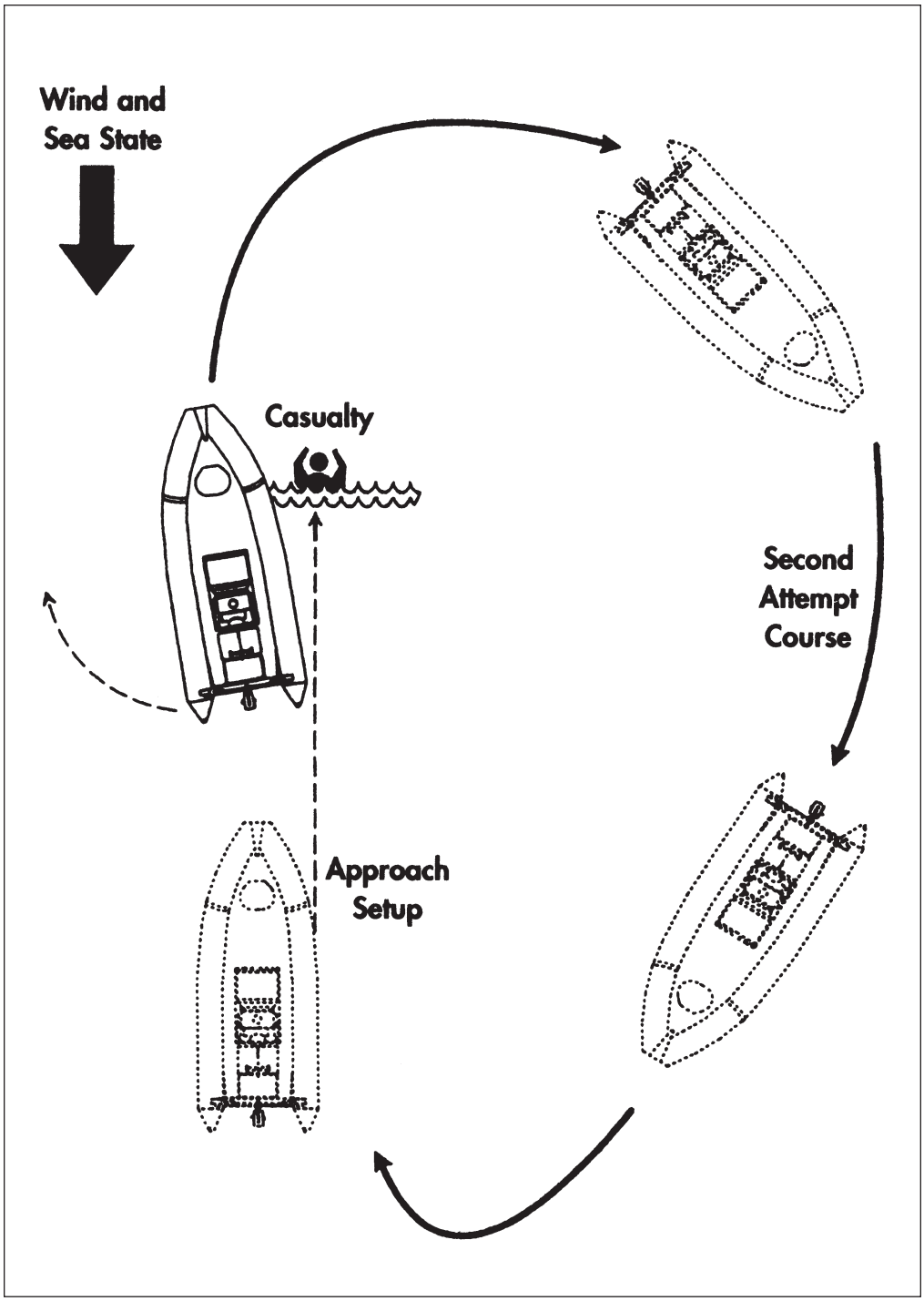


Figure 11.4-2 - Man Overboard Recovery

11.4.5 Proceeding Alongside

The full sequence of events for recovering a boat is explained later in this chapter for each class of ship. This section describes the steps for an approach on a ship underway and onto a jetty.

a. **Moving Ship**

(**1**) Approach the ship from abaft the beam at a 30 degree angle.

(**2**) Overshoot the recovery position and match the ship's speed to allow the bowsman to retrieve the boat rope.

(**3**) Once the boat rope is attached, the bowsman will report to coxswain "Boat Rope Hooked On".

(**4**) Ease back on the throttle to allow the boat to ride on the boat rope.

(**5**) The after steadying line is passed to the coxswain who attaches it to the outboard side aft.

(**6**) Continue to ride on the boat rope and steer the boat until the order "Hook On" is given. The bowsman normally hooks on.

(**7**) Continue to steer the boat until it is hoisted clear of the water. The engine is then shut down.

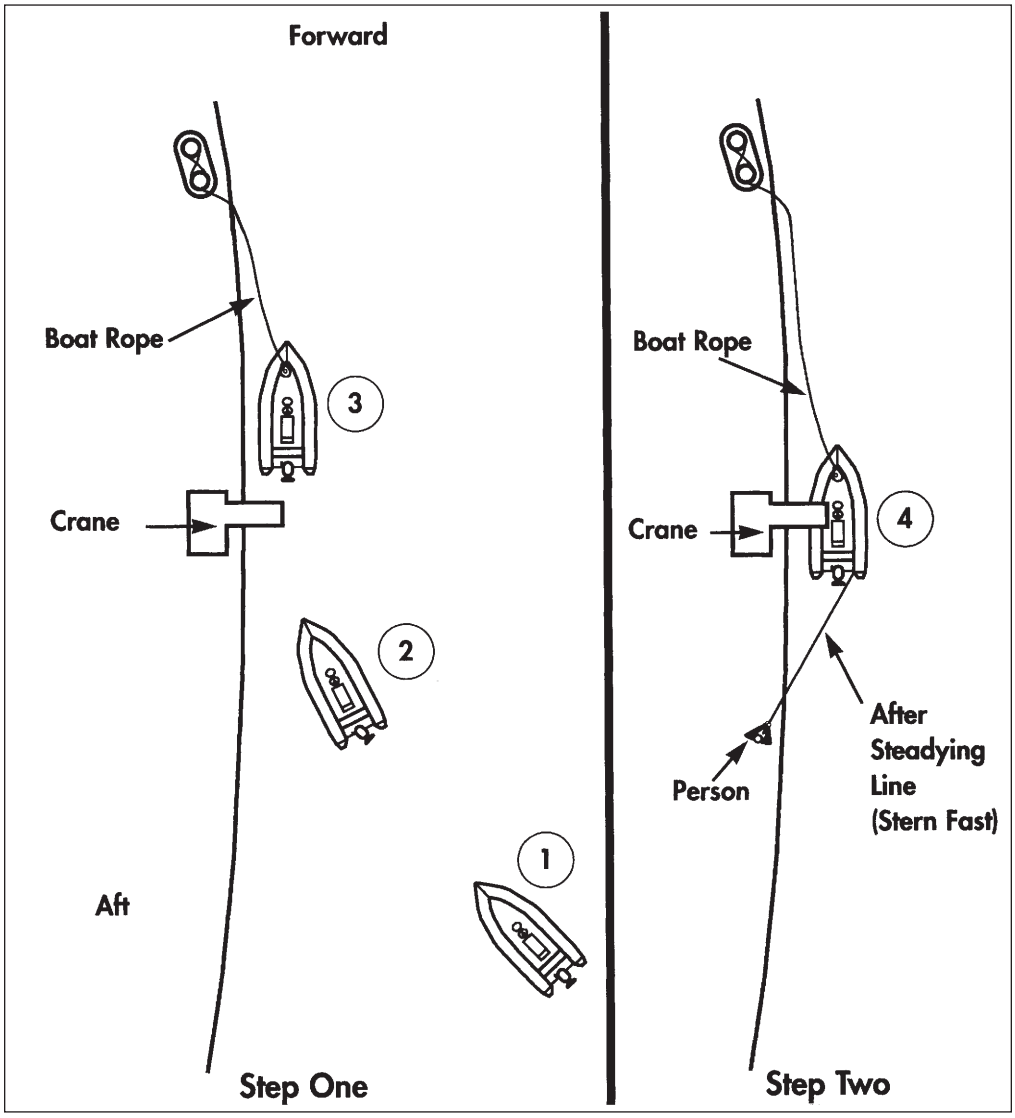


Figure 11.4-3 - Proceeding Alongside Moving Ship

b. **Jetty**

(**1**) Make a slow speed approach towards the jetty at a 30 degree angle.

(**2**) At one boat length away from the jetty, place the controls in neutral, and start to turn away from the jetty.

(**3**) At a one-half boat length away from the jetty, put the engine astern, and turn towards the jetty.

(**4**) Berthing lines are passed to the jetty and the boat is secured.

Note.

Coxswains must be aware of how the payload and speed will affect the performance of the boat when coming alongside.

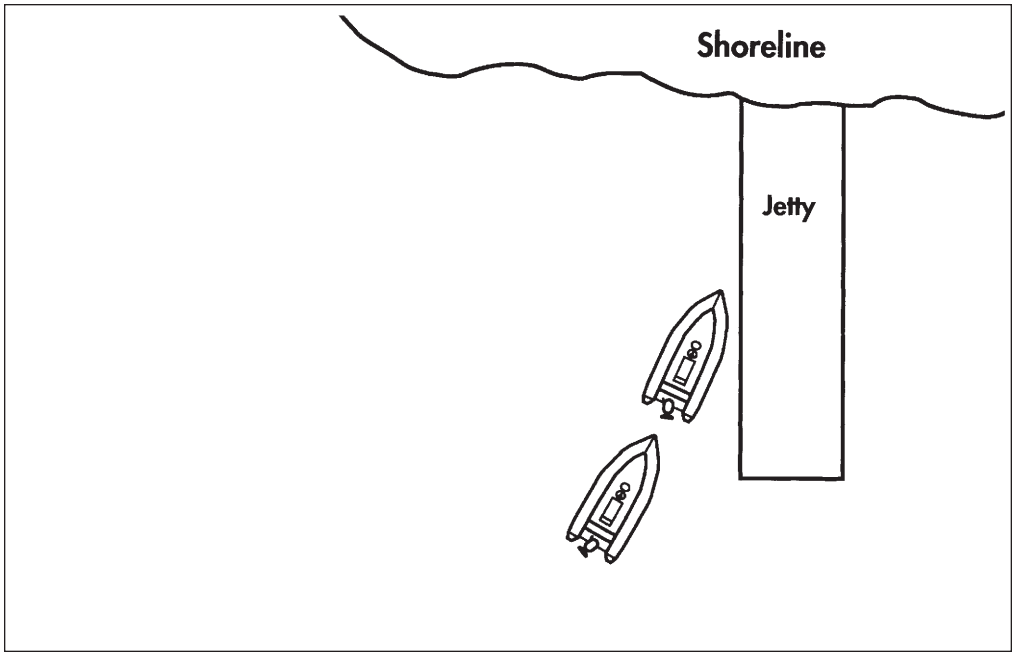


Figure 11.4-4 - Proceeding Alongside Jetty

11.4.6 Departing

The full sequence of events for launching is explained later in this chapter for each class of ship. This section describes the steps for a departure from a ship underway and from a jetty.

a. **Moving Ship**

(**1**) Just prior to the boat entering the water, the engine is started (RIB only).

(**2**) When the Cranston Eagle Hook is slipped, the boat continues to ride on the boat rope. Gradually steer outwards, keeping the boat parallel to the ship. Let go the after steadying line.

(**3**) Put the engine in gear and apply throttle to take the strain off the boat rope.

(**4**) The coxswain then orders the bowsman to slip the boat rope.

(**5**) Once the boat rope is slipped, the coxswain increases speed and proceeds.

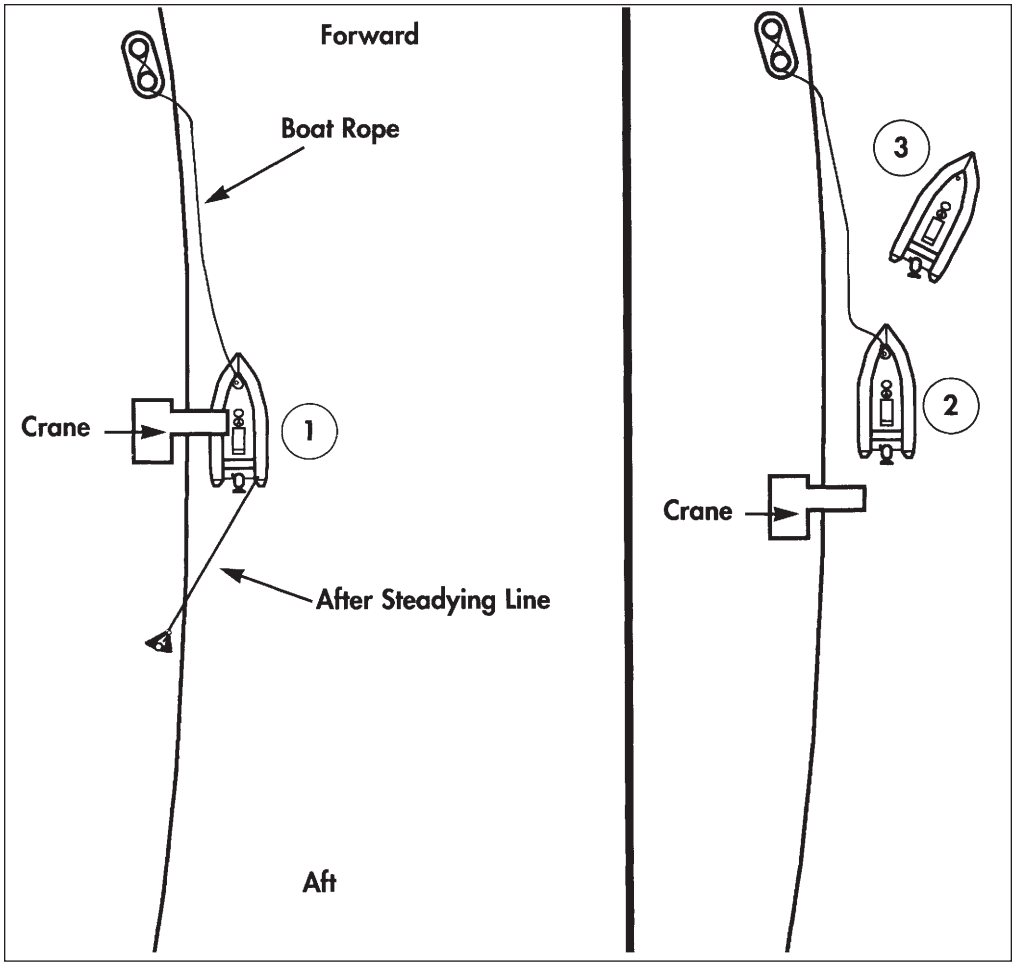


Figure 11.4-5 - Departing Moving Ship

b. **Jetty.** There are two methods of departing from a jetty: stern first or bow first.

(**1**) Stern First

(a) Let go the stern line.

(b) Turn the helm inward and use forward propulsion to cast the bow in towards the line of the jetty.

(c) Stop the engine, turn the helm away from the jetty, let go the bow line and proceed astern.

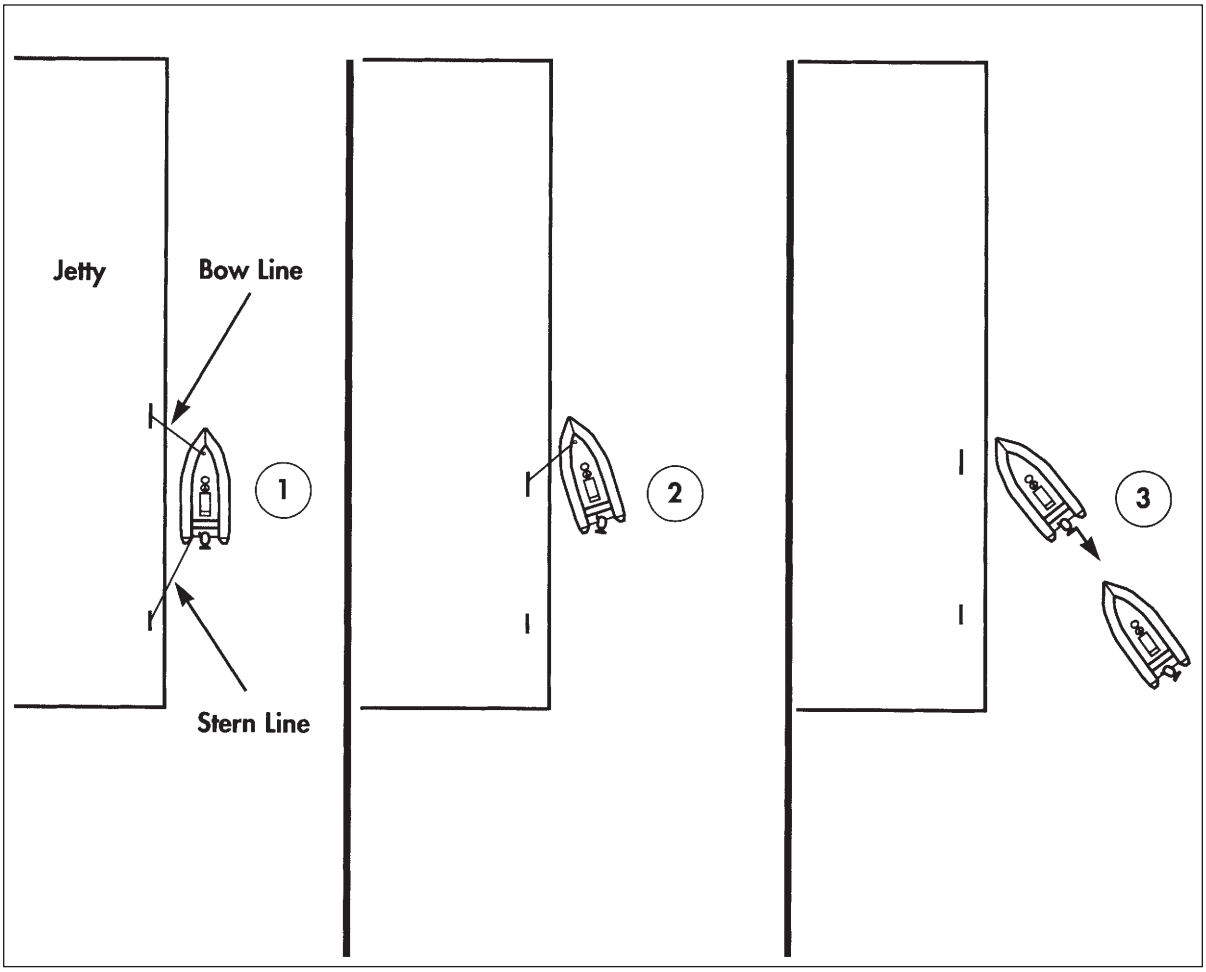


Figure 11.4-6 - Departing Jetty Stern First

(**2**) Bow First

(a) Let go the bow line.

(b) Turn the helm away from the jetty and use forward propulsion to cast the stern in towards the line of the jetty.

(c) Let go the stern line and proceed ahead slowly.

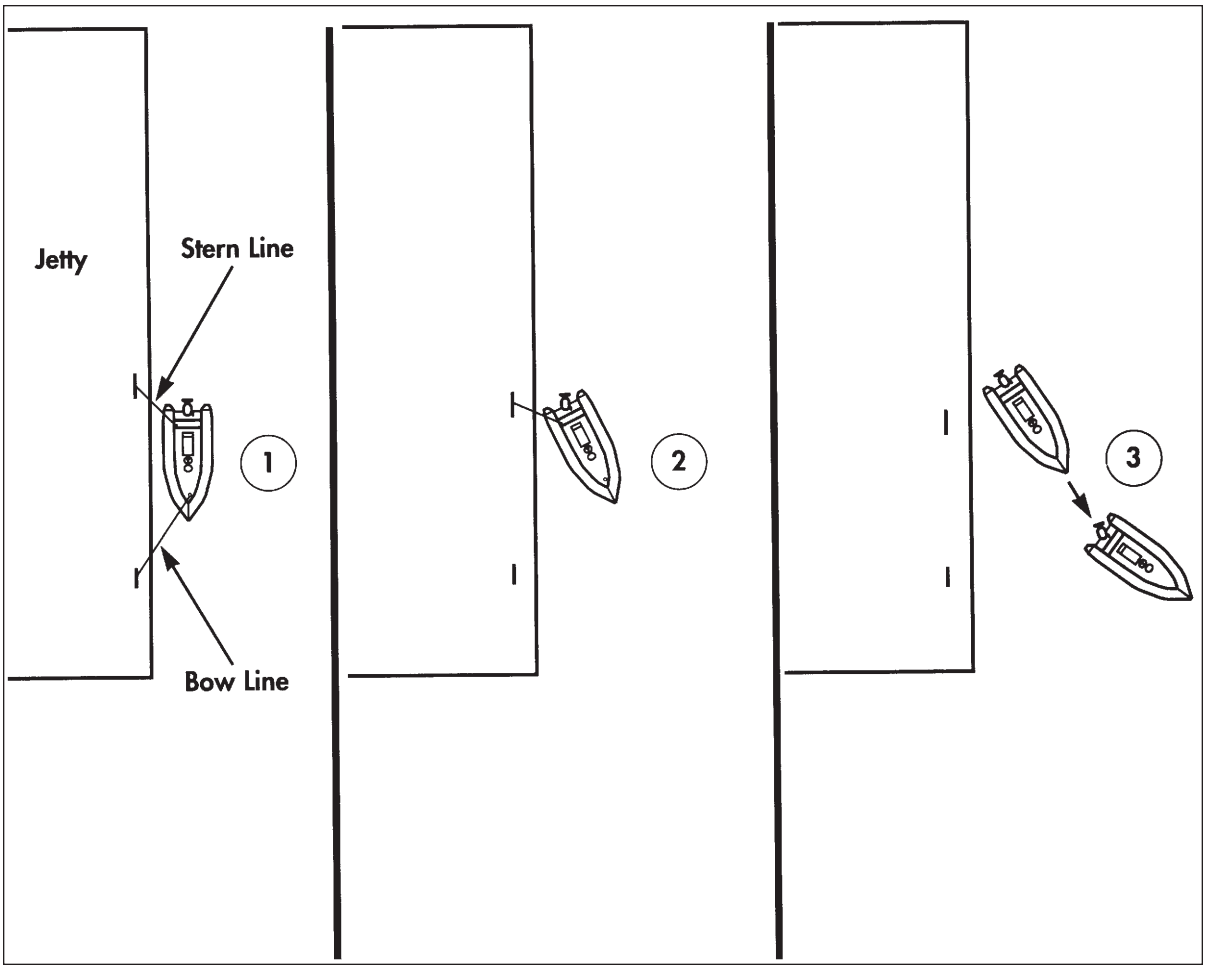


Figure 11.4-7 - Departing Jetty Bow First

11.4.7 Sticking

a. **Sticking.** The RIB is used to transport the Naval Boarding Party to and from vessels of interest. These ships, which normally only slow down to be boarded, will not provide a boat rope so the coxswain must hold the boat alongside while the team disembarks. This is known as sticking. It is easiest when the speed of the ship is between five to eight kts. It is common practice, and highly encouraged, for HMC Ships to conduct stick training for RIB coxswains during each home port arrival and departure.

(**1**) The RIB approaches the ship at a 30 degree angle and matches its speed.

(**2**) The coxswain positions the RIB between the bow and stern wave of the ship.

(**3**) The coxswain then steers toward the ship and makes contact.

(**4**) Inward helm and speed is maintained to keep the RIB in position.

Note.

The coxswain will have to adjust the RIB speed as personnel embark/ disembark, or if the payload changes.

b. **Breaking Away**

(**1**) The coxswain is to check astern to ensure a safe departure.

(**2**) Maintaining the same speed as the ship, slowly turn the helm outward.

(**3**) Once clear of the ship, accelerate and depart.

11.4.8 Towing

There are two ways a boat can tow another boat: alongside or astern. The alongside method is used for towing short distances or when direct control of the disabled vessel is required.

a. **Alongside.** The boat is secured to the other vessel by attaching a bow line first, canting the bow slightly inward. A stern line is next passed aft and heaved in. Lastly a spring is attached, leading aft.

Note.

If the vessel being towed is longer than the boat, the towing boat provides propulsion and the longer vessel steers.

b. **Towing Astern.** When towing astern, a bridle should be used to position the towline directly behind the boat. Care must be taken to ensure when passing the towline and during the tow that the towline does not foul the propeller.

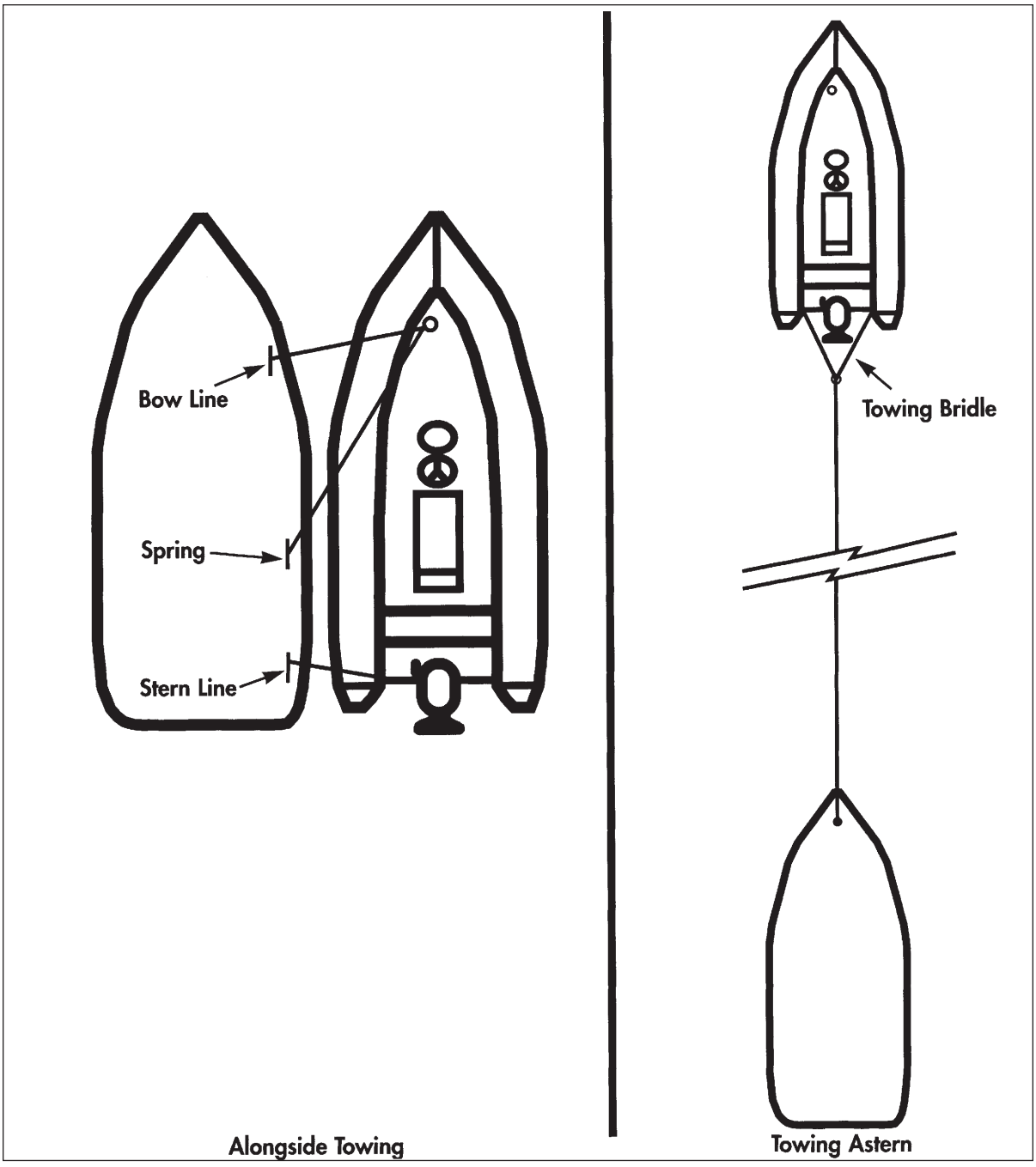


Figure 11.4-8 - Towing

11.4.9 Ceremonial

Many naval ceremonies such as changes of command, visits by VIPs, and inspections involve the use of boats. On these occasions, it is doubly important that the boat and crew be well turned out. For instructions on all aspects of ceremonial, refer to the *Manual of Ceremony for HMC Ships*.

11.5 Boat's Log

A log is to be kept on all boats and outboard engines. The log will describe any problems encountered, as well as all first-line maintenance conducted. This log should be kept with the boat or engine when conducting second- and third-line maintenance.

11.6 Boat Davits/Cranes and Common Equipment

11.6.1 Major Davit Systems

a. The arrangement for launching and recovering boats is different in each class of ship. Currently there are three major and several minor davit/crane systems in use in the Fleet.

(**1**) Sluing Arm Cranes, which have a boom that rotates around a central axis, are used in the IROQUOIS, AOR and KINGSTON Classes.

Figure 11.6-1 - IROQUOIS Class Crane

Figure 11.6-2 - KINGSTON Class Crane

Figure 11.6-3 - HALIFAX Class Davit

Figure 11.6-4 - AOR 509/510 Class Davit

(**2**) Knuckle Boom Cranes, that use articulated joints and hydraulics, are used in the IROQUOIS and HALIFAX Classes to launch the IRB. Maximum personnel capacity when launching and recovering with a 25 HP motor fitted is three due to the constraints on the IRB lifting points. When a 40 HP motor is fitted, only one man can be in the IRB during launch and recovery due to the added weight of the motor.

Figure 11.6-5 - HALIFAX Class IRB and Crane

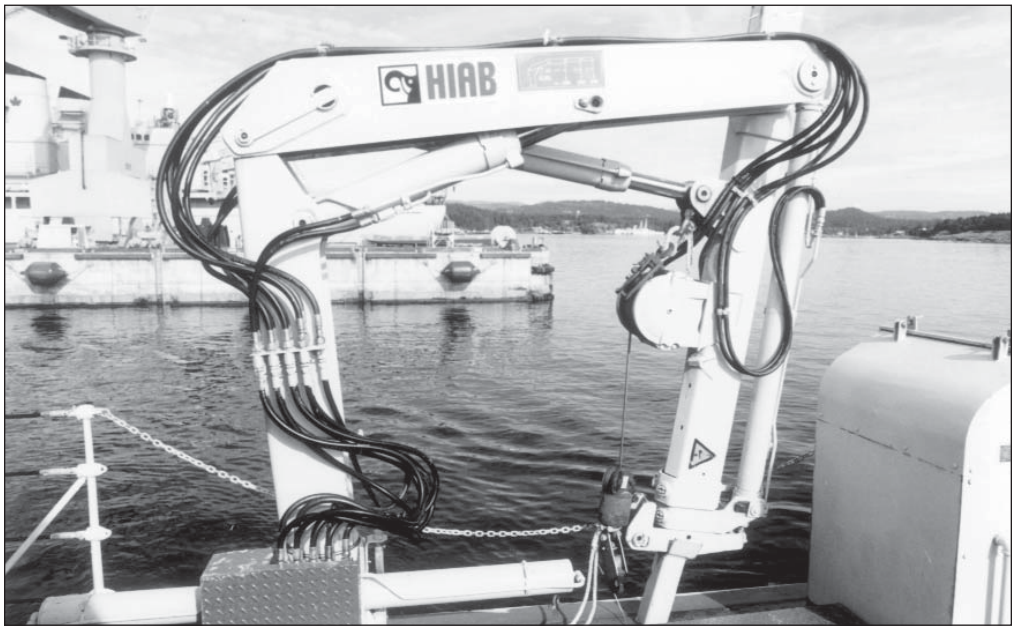


Figure 11.6-6 - IROQUOIS Class Crane

(**3**) AOR IRBs are launched and recovered using the accommodation ladder davits amidships. These davits are completely manual systems. Their fore and aft movement is controlled by the use of forward and after guys. When they are to be used to launch an IRB, they are fitted with double purchase falls reeved with 180 m of 21 mm circular double-braided nylon.

Note.

When operating any of the davit/crane hydraulics, the speed of movement can be adjusted from stopped through various speeds to the equipment's maximum speed. All movements should start slowly (handsomely) and only increase to maximum (roundly) when required.

Figure 11.6-7 - AOR Accommodation Ladder Davit (Rigged for IRB)

b. The IROQUOIS Class RIB is launched and recovered using the ARVA Single Arm Crane. The single arm crane slues the RIB in and out during launching or recovery. The crane is mounted on a pedestal on the port side of top part ship. It is operated electro-hydraulically from a separately mounted console which is located on its own raised platform. The RIB is stowed on a raised cradle in order to free up the deck for midships refuelling. The constant tension winch is designed to allow the RIB to ride the swells while maintaining constant tension on the whip wire. The whip wire is 38 m of 16 mm diameter 8 x 19 rotation resistant wire rope. At the maximum capacity of the crane (2484 kgs), the winch has a hoist speed of 27 m per minute. In the event of a power failure, the crane can be operated manually using a hand crank method. When launching or recovering the RIB, the maximum number of personnel to be carried will be four, depending on the weight of the RIB in use.

Note.

More positive control of the system can be maintained by remaining in manual during recovery.

c. The HALIFAX Class RIB is launched and recovered on the starboard side top part ship using the Schat Luffing Arm Davit. The davit arms are mounted on pivot pins. The hydraulic cylinder pivots the davit inboard or outboard. This is called luffing and can be accomplished in 10 seconds. The control console is mounted on the forward arm of the davit requiring the operator to move with the davit. The hoist winch is designed to allow the RIB to ride the swells while maintaining constant tension. The whip wire is 25 m of 16 mm diameter 18 x 7 galvanized non-rotating steel wire rope. At the Safe Working Load of 2300 kgs, the winch has a hoist speed of 27 m per minute. In the event of a power failure, the davit can be operated manually by using either the hand crank or the manual hydraulic pump located forward of the davit assembly. When launching and recovering the RIB, the maximum number of personnel to be carried will be four, depending on the weight of the RIB in use.

11.6.2 Orders and Hand Signals for Controlling Cranes

The boat deck I/C communicates with the crane operator using both orders and hand signals. It is important that both know the proper signals and their meanings thoroughly. The figure shown depicts the signals and the response to be taken.

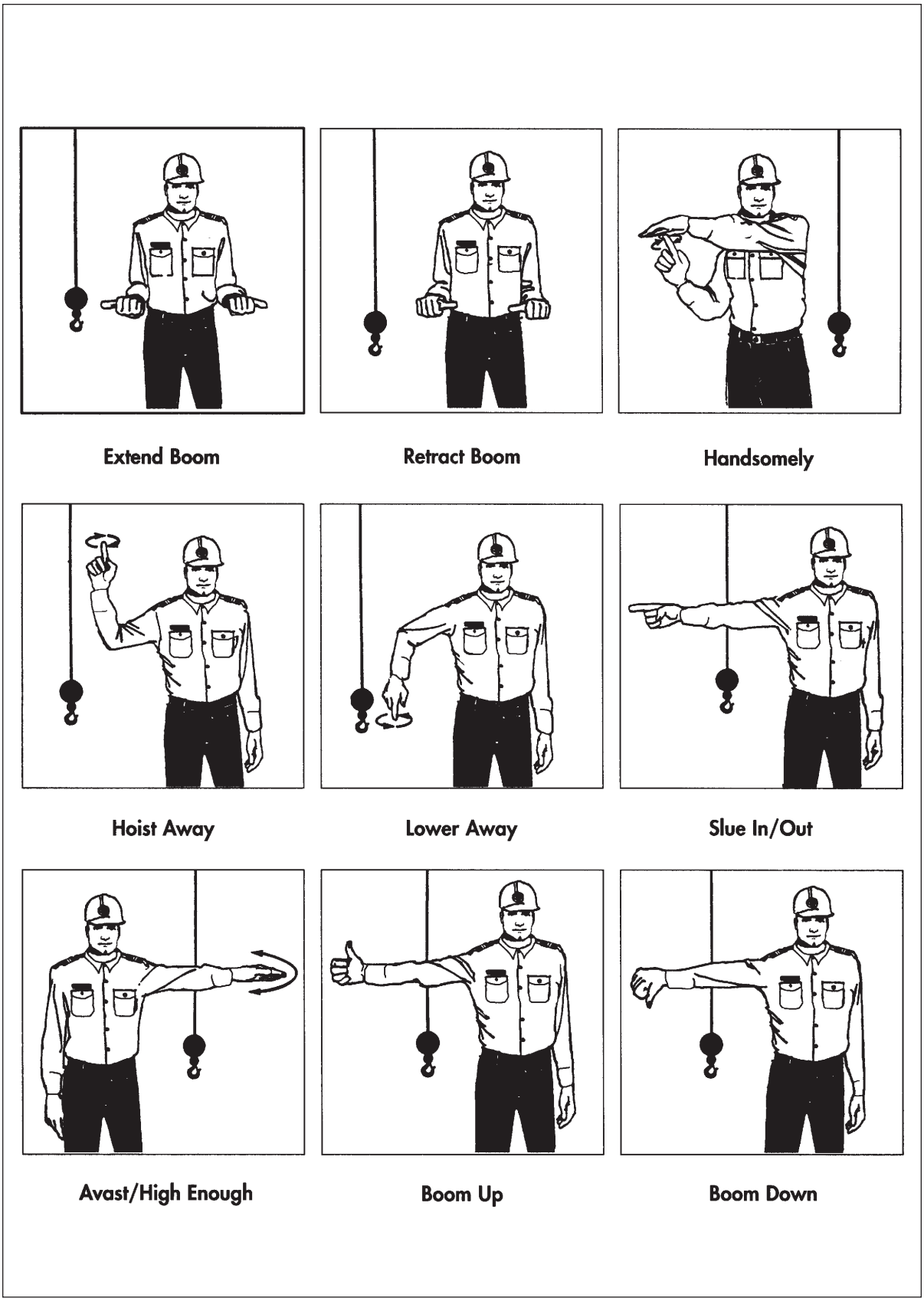


Figure 11.6-8 - Hand Signals for Controlling Cranes

11.6.3 Personnel Required to Launch/Recover Boats

Table 1 Personnel Required to Launch/Recover Boats (all Classes except AOR IRB)	
Position	**Number**
I/C Boat Deck (QL 6A BN)	1
Crane/Davit Operator (5A BN/NWT)	1
Boat rope/Bow line	2
After Steadying Line	2
Whip Control Line	1
Part Ship Communicator	1
Boat Coxswain (RIB/LCVP- QL 5A BN) (IRB - QL 3 BN) (non rescue only)	1
Bowsman (Diver/Rescue Swimmer)	1
Stern Sheetsman (ER - LCVP/RIB only)	1
DRP Rescue Swimmer/Diver	1*
Medical Assistant/PA	1*
Casualty Clearers	3*

** Rescue watch only*

Note.

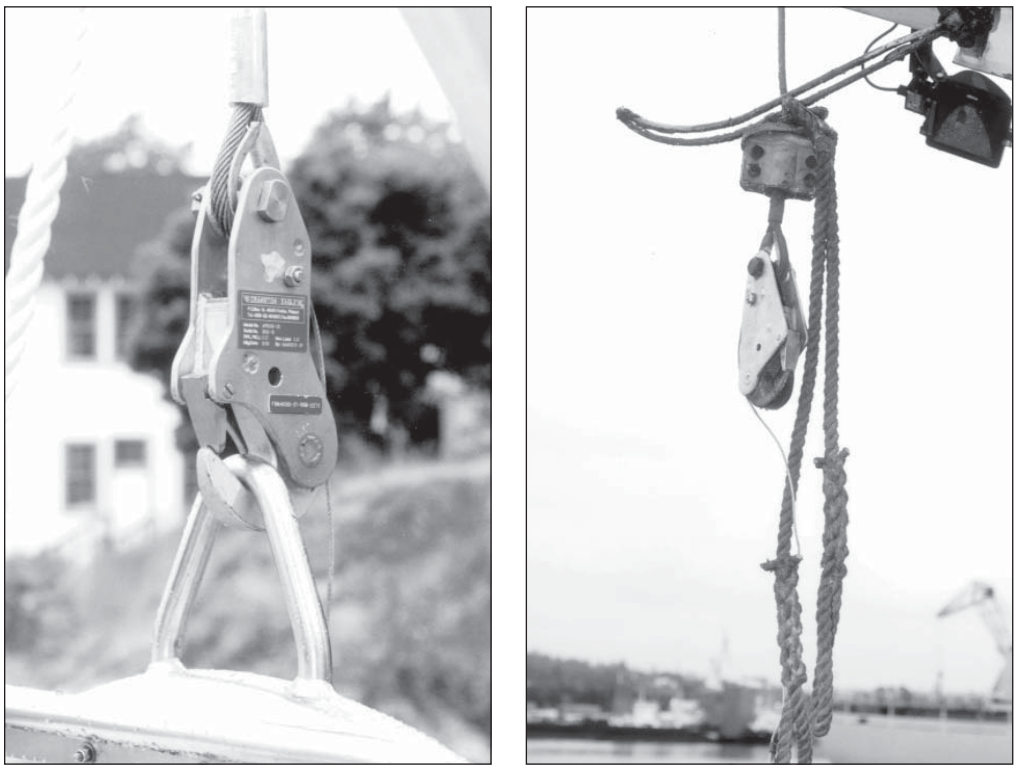
DRP is manned by personnel required to launch/recover boats

Table 2 Personnel Required to Launch/Recover AOR IRBs	
Position	**Number**
I/C Boat Deck (QL 6A BN)	1
After Guy	1
Forward Guy	2
Shepherd's Hook/Whip Control Line	1
Boatrope	2
Part Ship Communicator	1
Falls Personnel	20
Stern Fast	2
Coxswain	1
Bowsman (Diver)	1
Medical Assistant/PA	1*
Casualty Clearers	3*

** Rescue watch only*

11.6.4 Common Equipment

a. **Cranston Eagle Hook.** The Cranston Eagle Hook is a hook designed to facilitate the safe and quick launch and recovery of a boat. There are two sizes: a three-ton version for IRBs and a five-ton version for RIBs. The hook is designed to release when the release cable lanyard is pulled and the weight of the boat is off the hook. The self-locking feature prevents release when the hook is under a load of 250 kg or more.



Large (5 Ton) Small (3 Ton)

Figure 11.6-9 - Cranston Eagle Hook

Table 3 Cranston Eagle Hook Safe Working Loads

	Safe Working Load	Model
3 Ton	2000 Kg	APR206 - CB
5 Ton	3500 Kg	APR356 - CB

b. **Lifelines.** Lifelines are lines attached to the davit so that if the lifting gear fails, the crew will not fall with the boat. With sluing arm cranes, lifelines are secured above the Cranston Eagle Hook. All davits/cranes used for launching and recovering boats must have sufficient lifelines for all crew members. The only exception to this rule is with the AOR cranes which are used for launching the LCVP.

Figure 11.6-10 - HALIFAX Class Lifelines

c. **Boat Rope.** A boat rope is a length of polypropylene line 18 mm in diameter, with a 15 cm soft eye at the outboard end. The length will depend on the class of ship and the position where it is turned up. It should be of sufficient length to hold the boat directly under the recovery position. At approximately 3 m from the soft eye, a recovery line is spliced in which is used to recover or lower the boat rope.

Note.

A boat rope is not to be slipped until the engine is running properly and the order has been given by the coxswain.

Figure 11.6-11 - Boat Rope

d. **Stern Fast.** An after steadying line is a 12 m length of 12 mm diameter polypropylene line with a monkey's fist on the outboard end. It is used to control the stern of the boat during launch and recovery.

e. **Whip Control Line.** The hoist wire control line is a length of line attached to a bow shackle, which is shackled around the whip wire. The shackle floats on the whip wire and is used to hold the whip wire and Cranston Eagle Hook against the ship's side after the boat is launched, and before being hooked on during recovery.

11.7 Outboard Engines

11.7.1 Entitlement

a. The following table shows ship entitlement of outboard motors by class.

Table 4 Entitlement by Class

Class	15 HP Motor	25 HP Motor	40 HP Motor	75 HP Motor
IROQUOIS		3	1*	
HALIFAX		3	1*	
KINGSTON		2		1
AOR		6	1*	
OBERON	1			

** If required for operational reasons, ships may carry one 40 HP outboard for MIO duties. If fitted to a ten-man IRB it can only be launched and recovered with one crew member due to weight constraints.*

b. As the outboards are constantly exposed to a salt water environment, they require daily checks. These checks involve flushing the motor with fresh water. As well, every 30 days, the following external points are to be lubricated with triple-guard grease:

(**1**) throttle and shaft linkage,
(**2**) rear engine cover latch,
(**3**) starter neutral lockout, and
(**4**) tilt shaft.

11.7.2 Operating Procedures

Figure 11.7-1 - 25 HP Outboard Engine

a. **Pre-Start Checks**

(**1**) Check the fuel tank to ensure:
- (a) sufficient fuel;
- (b) the fuel tank is secured to the boat;
- (c) the fuel line is not wedged under the tank;
- (d) the fuel line is connected properly (arrow toward engine), and
- (e) there is enough slack in the fuel line to allow the engine to pivot.

(**2**) Remove the engine cover and look for any irregularities.

(**3**) Ensure the engine cover is properly secured.

(**4**) Ensure the motor is secured to the boat (clamps tight and chained).

(**5**) Check the propeller for damage.

(**6**) Check to ensure the trim/tilt lever is in the proper position.

(**7**) Check throttle grip operation.

(**8**) Check shift lever operation.

b. **Engine Start/Stopping Procedures**

Table 5 Outboard Engine Start/Stop Procedures	
Starting	**Stopping**
Secure engine kill switch lanyard to coxswain.	**Normal Shutdown**
Ensure control level is in neutral.	Allow engine to run at idle speed for one minute.
Adjust throttle to start position.	Push stop button until engine stops.
Prime fuel bulb.	**Emergency Shutdown**
Pull start cord until engine starts.	Pull the kill switch lanyard that is secured to coxswain.
Allow engine to warm up.	

11.8 Boat Maintenance

11.8.1 Troubleshooting

There are many faults that could cause the engine or electronic systems to fail. Initially, the Coxswain should check for the obvious faults. If unsuccessful, refer to the user's manual.

Table 6 Troubleshooting Suggestions - Maintenance		
Starter motor does not turn over	**Engine will not start or stops**	**Motor vibrates excessively /or makes little headway:**
Control lever not in neutral position	Kill switch not properly engaged/or wrong switch	Propeller blades bent, broken or missing
Loose battery wires	Out of fuel	Propeller fouled and/or restricted
Blown fuse	Fuel line disconnected or kinked	Carborator mixture adjustment not set correctly
Battery not turned on	Fuel system contaminated with water	Steering friction screw loose
	Engine flooded	Boat not inflated correctly
	Spark plug carboned or wet	
	Fuel pump filter obstructed	

11.8.2 Rubber Boat Repair

For best results repairs should be performed in temperatures of 18 to 25 degrees C. Avoid carrying out repairs in direct sunlight, rain or in conditions of high humidity. Repairs can be carried out on deflated or partially deflated boats.

Prepare the surfaces to be glued as follows:

a. Cut a patch about 75 mm larger than the tear in all directions.

b. Trace the position of the patch on the boat.

c. Scuff the areas of the patch and the boat with the buffer (sandpaper) taking care not to tear or rip the rubber.

d. Clean the patch and boat areas with solvent using a brush. Allow the solvent to completely evaporate.

e. Apply a second coat of solvent and allow to completely evaporate.

f. Apply a thin layer of adhesive to the patch and the boat. Wait until the adhesive is dry to the touch. Apply a second coat of glue and allow to dry.

g. Carefully apply the patch to the boat starting with one edge and ensuring that both surfaces are in contact without wrinkles.

h. Bone down the patch throughly and eliminate all air bubbles. (Use a spike as a roller).

i. Wait 24 hrs before re-inflating.

11.9 Rescue Stations

11.9.1 Rescue Stations at Sea

a. Rescue Stations are closed up in response to a man overboard from your own ship or your consort in order to maximize the capability of a ship to rescue the casualty. Circumstances may range from an aircraft crash in the sea to a man overboard. In either case, the standard rescue pipe is made (refer to SSOs) and personnel close up according to the Special Parties Board. When the alarm is raised, the lookouts and lifebuoy sentry release the Kisby Rings, and Pains-Wessex. A key component of the pipe that brings the ship to rescue stations shall be determination of the method of recovery, i.e., port/starboard, IRB/RIB, or helicopter. Factors to be considered by the OOW are:

(**1**) resources available,
(**2**) sea state, time of day, and wind,
(**3**) water temperature, and time the casualty has been in the water, and
(**4**) potential injuries of the casualty.

b. The primary rescue boat will normally be the IRB, especially in high sea states. Although an airborne helicopter might appear to provide the quickest means of recovery, experience has shown that it will take 15 - 25 minutes for the helicopter to fly to the man, transition to the hover, lower the guideline and conduct the hoist. On the other hand, a well-trained ship's crew will have the man back on board via boat in considerably less time.

c. At the same time, the Operations Room Supervisor marks the plot and begins reporting range and bearing of the casualty. Special Sea Duty watch on deck personnel close up to relieve personnel who are required to man/launch the boat. The OOW immediately manoeuvers the ship to return to the position of the casualty, taking into account the need to provide a lee for the boat. At night, a Williamson turn is used so that the ship retraces its track. Designated off watch NAVCOMs muster on the bridge to assist with searchlights and flares. This type of rescue is practised frequently at sea to ensure all personnel are familiar with their responsibilities.

Note.

If there is ever any suspicion that someone has gone over the side in daylight, Command should consider ordering a verification muster. At night, this is mandatory. (refer to SSOs).

11.9.2 Search and Rescue Team (SAR)

This organization is used to plan and co-ordinate the rescue response to a vessel in distress, under any and all circumstances. An emergency requiring the SAR team will normally involve all of the resources available to the ship and a great deal of co-ordination. Depending on the circumstances, the use of all the ship's boats, davits, Billy Pugh, ladders, and scramble nets must be considered.

The ship's Search and Rescue (SAR) Team consists of :

Table 7 SAR Team

Executive Officer	Navigating Officer
Heads of Departments	Medical Officer/Physician's Assistant
Departmental Chiefs	Sr NAVCOM

11.9.3 Rescue Stations in Harbour

When a person falls overboard from a ship in harbour, the reaction of the discoverer will always be the same; however, the method of rescue will depend on the time of day.

a. **Response**

(**1**) Throw a Kisby Ring with line attached if possible (one is kept at the brow position).

(**2**) Raise the alarm by shouting "Man Overboard" and inform the brow as quickly as possible.

(**3**) Do not enter the water but keep the person in sight.

b. **Reaction**

(**1**) The Brow Staff must:

(a) pull alarm box/911 (Esquimalt);

(b) make appropriate emergency pipe;

(c) call 9-911 (Halifax); and

(d) keep record of events.

(**2**) **OOD**. The options available to the OOD will depend on where the person is in relation to the ship, state of the person (unconscious/injured), the status of the ship's davits/cranes and boats, and whether or not it is during or after working hours. During working hours, the OOD usually has the expertise to launch a boat. Some of the options available are:

(a) lower a jumping ladder or scramble net;

(b) lower a rescue sling using the DRP;

(c) launch or send a boat;

(d) utilize a harbour craft that is in the area; and

(e) put a person over the side with a lifeline and life jacket (last resort only and highly weather dependant).

Note.

Regardless of the time of day or if they are part of the duty watch, all divers on board will dress, and all casualty clearing team members will muster to assist.

Note.

All MOBs are to be treated as potential hypothermia casualties and every effort is to be made to recover them in a horizontal manner, preferably in the rescue boat.

11.9.4 Man Overboard Dummy (OSCAR)

Figure 11.9-1 - OSCAR

Each ship uses a waterproof dummy (traditionally referred to as OSCAR because flag Oscar is the international signal for a man overboard) to give realism to man overboard exercises. The dummy simulates the weight of an adult and is difficult to manipulate just like an unconscious or distressed person. Each dummy wears a positive buoyancy life jacket and has reflective tape fitted to the head.

11.9.5 Pains-Wessex and Kisby Ring

Figure 11.9-2 - Pains-Wessex Smoke Marker and Kisby Ring

Note.

4 m lanyard which pulls the Pains-Wessex out of its securing bracket when the Kisby is thrown.

a. The Pains-Wessex is a combined day and night marker used to mark the position of a man overboard. It incorporates a smoke candle and two electric lights. The candle is mechanically ignited on deployment and the two lights are independently powered by water-activated electrical cells. These cells are sealed with watertight plugs which are pulled away when deployed. The smoke is dense orange in colour and is emitted for a minimum of 15 minutes. Each light will operate for a minimum of two hours. The marker is safe to operate in fuel and oil-covered waters.

b. HMC ships use two sizes of Kisby Ring: 50 cm and 76 cm. They consist of a hard plastic shell of international orange colour filled with a solid foam. Lifelines are attached around the outside perimeter. The 76 mm version is used on the upper decks and the smaller version is used in boats.

Note.

If the outside shell is cracked, the Kisby ring is to be removed from service.

c. The Pains-Wessex is designed to be fitted to the guardrail. A Kisby Ring is attached to the Pains-Wessex with a 3.6 m lanyard. When thrown, the Kisby Ring forcibly pulls the Pains-Wessex away from its mounting bracket, activating the smoke. A floating light fitted on top of the marker is activated by salt water.

d. Each ship has two sets of Pains-Wessex and Kisby Rings located on the quarterdeck and one set on either side of the bridge. Launching all four provides the casualty with several lifesaving devices to hold onto, and a “gate” for the OOW to manoeuvre the ship back through to rescue the casualty. (This is important at night when it is much more difficult to locate a person in the water.)

11.9.6 Diver Recovery Position (DRP)

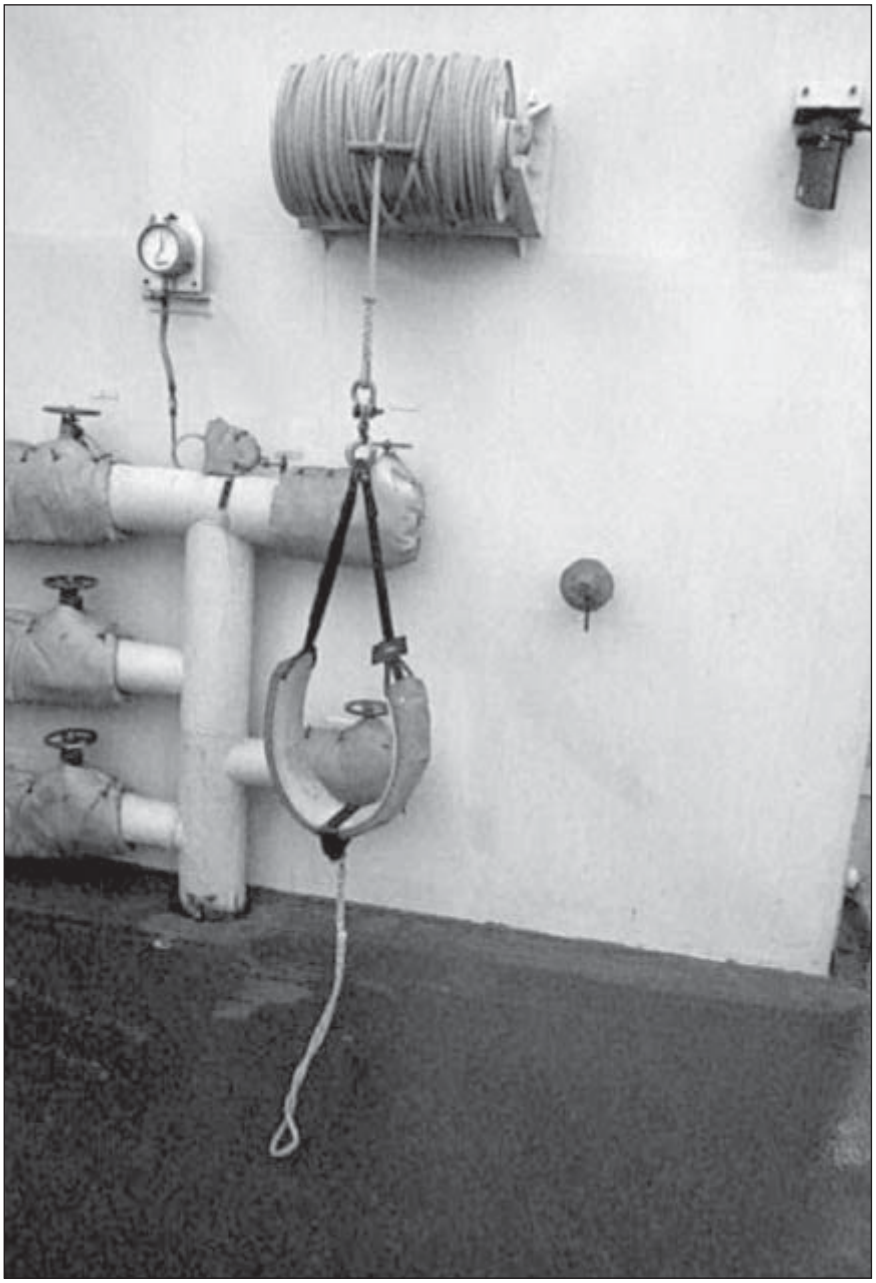


Figure 11.9-3 - DRP Rescue Line and Lifting Sling

a. When it is not possible or practical to launch a boat, a diver or rescue swimmer may be used to recover a man overboard. Each ship has a crane or davit, from which the necessary blocks can be rigged, designated as the Diver Recovery Position (DRP).

b. The following equipment is required to set up a DRP:

(**1**) a crane or rescue davit,
(**2**) two 6” snatch blocks,
(**3**) rescue sling,
(**4**) recovery line (180 m of 12 mm diameter polypropylene),
(**5**) a Kisby ring with 10 m of 12 mm diameter polypropylene attached,
(**6**) two damage control lights,
(**7**) two blankets,
(**8**) Stokes Litter,
(**9**) resuscitation apparatus, and
(**10**) first aid kit.

c. To rig the DRP, a six inch snatch block is secured to the head of the crane or davit and another six inch snatch block is secured to an eyepad on the deck to provide a good lead for the recovery line. The recovery line is rove through the blocks and a rescue sling is attached to the outboard end. On HALIFAX/ IROQUOIS Class ships, it is suggested that deck cranes be utilized as stand-alone (using power) or by rigging blocks. The DRP is not manned for rescue stations, but the equipment is rigged. If required, personnel closed up to launch the boat will man the DRP. The DRP can be used in two ways:

(**1**) If more than one immobile casualty is in an IRB thus putting it outside recovery weight limits, a rescue sling or Stokes Litter can be lowered to recover casualties using the DRP.
(**2**) When the diver is ordered to recover the casualty, he will jump from the ship while holding the rescue sling and swim to the casualty. The DRP line handlers will haul the diver and casualty back to the ship when the diver gives the signal that he is ready. A Kisby Ring, tended from the ship with the line, is to be lowered to the diver while waiting to be hoisted.

Note.

Only one person at a time is to be hoisted using the DRP. Six line handlers are required to man the recovery line.

11.9.7 Rescue Sling (Horse Collar)

Figure 11.9-4 - Rescue Sling (Horse Collar)

The rescue sling (Horse collar) is a padded web strap used to hoist one person at a time. It is worn under the arms and across the back with both ends secured to the life hook in front of the face. Arms are extended downward with hands clasped.

11.9.8 Stokes Litter (Stretcher)

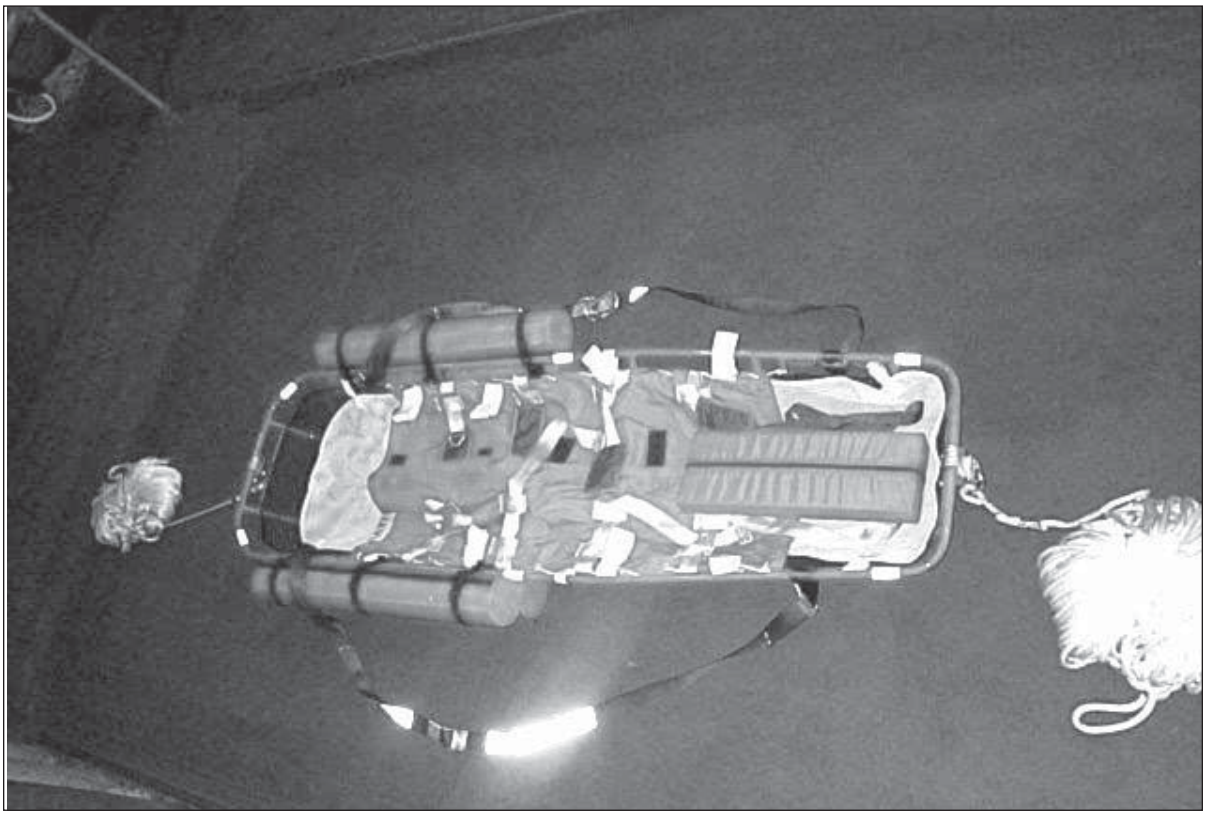


Figure 11.9-5 - Stokes Litter (Stretcher)

A Stokes Litter is a wire basket stretcher used to hoist casualties that are injured or unconscious or may have hypothermia. A flotation collar is fitted around the upper end of the litter to support the weight of the casualty and keep the head out of the water.

Note.

A Stokes Litter with flotation collar must be considered when hoisting a casualty with suspected hypothermia at the DRP as the use of a rescue sling could lead to fatal circulatory complications.

11.9.9 Billy Pugh Net

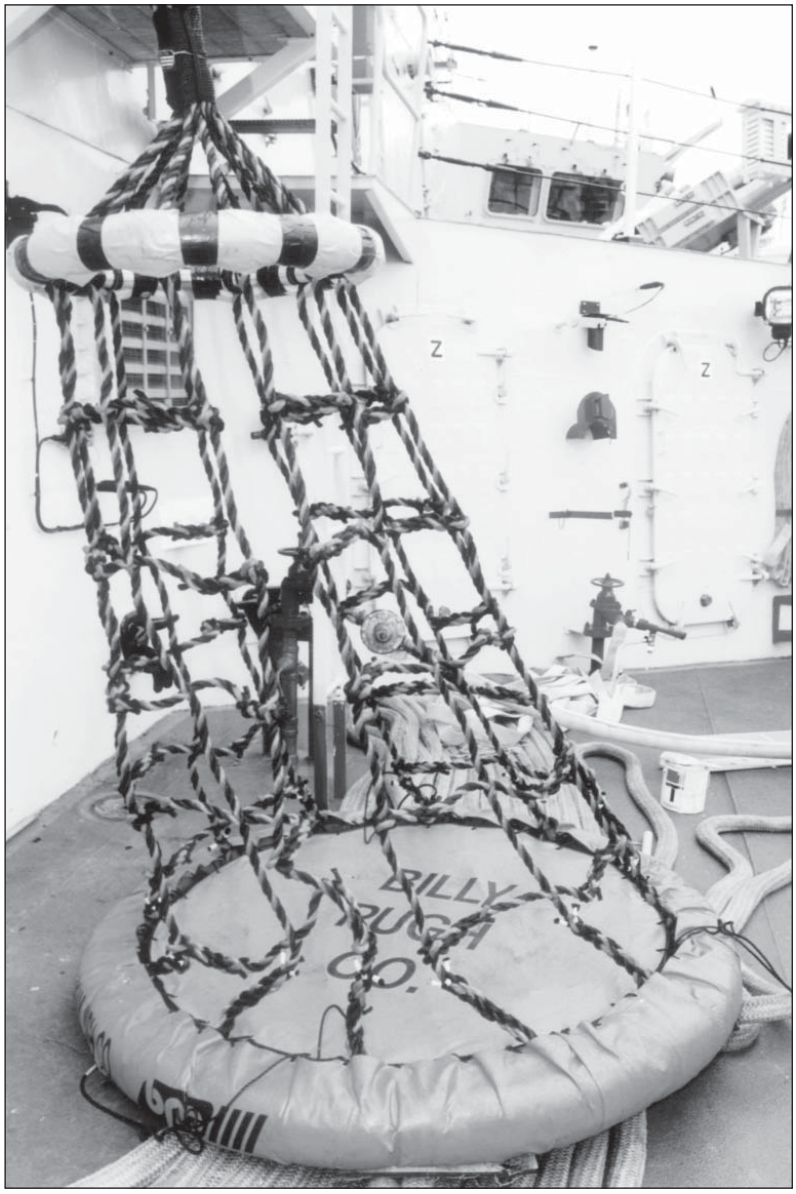


Figure 11.9-6 - Billy Pugh Net

A Billy Pugh Net is a collapsible, metal-framed polypropylene net used to lift personnel. The person(s) enters and sits in the net, keeping the legs inside. It has a safe working load of 1043 kgs and can lift four personnel at a time. It is commonly used to recover divers during an underwater hull search. It also is a useful tool to consider when recovering several personnel during SAR operations.

11.9.10 Lifebuoy Release Alarm

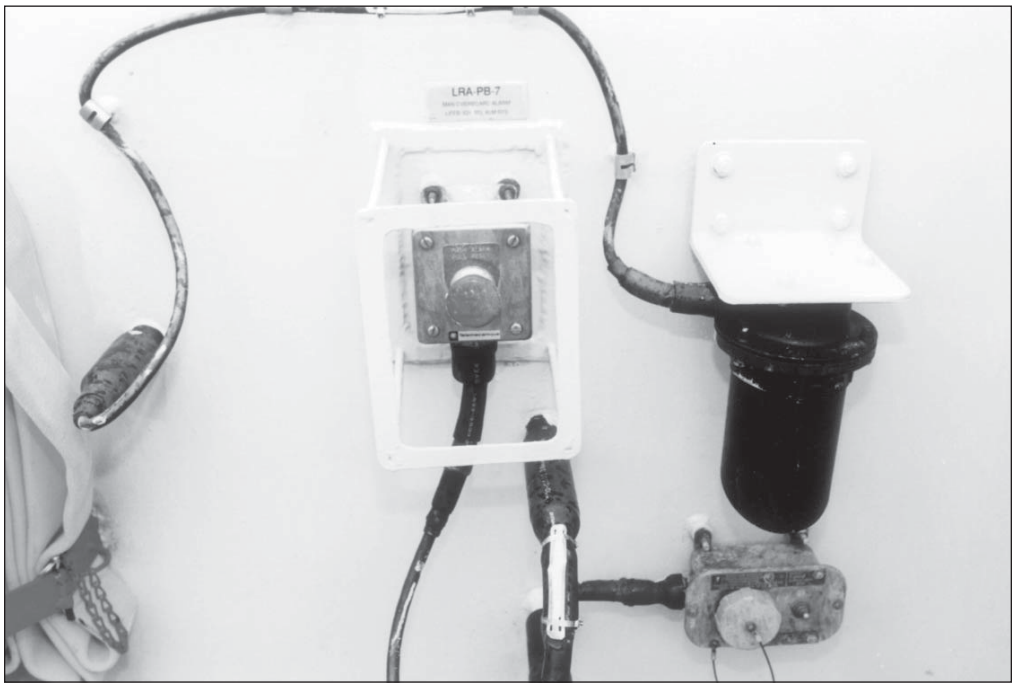


Figure 11.9-7 - HALIFAX Class Lifebuoy Release Alarm

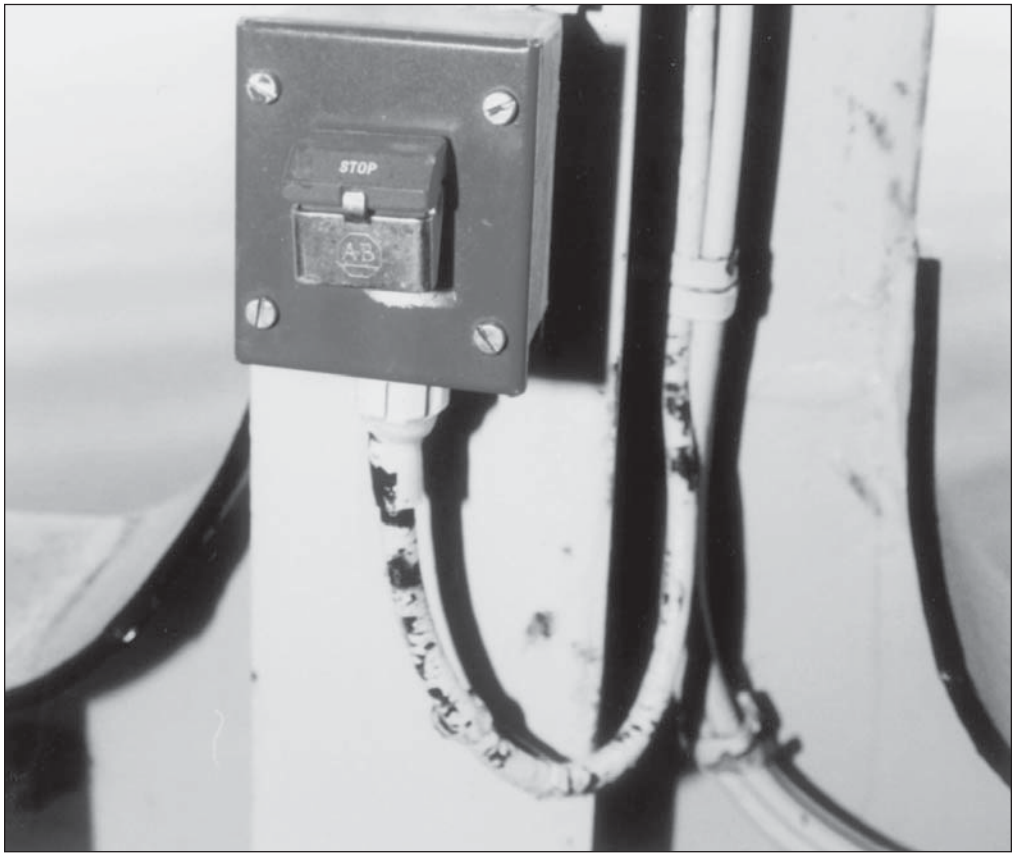


Figure 11.9-8 - IROQUOIS Class Lifebuoy Release Alarm

The number and location of the lifebuoy release alarms depends on the class of ship. All ships have at least one on the quarterdeck and one on the bridge. The alarm is used by the lifebuoy sentry to notify the OOW that a person has fallen overboard.

Note.

The Lifebuoy Release Alarm is to be tested daily at sea (after wakey-wakey) and during pre-sail checks.

Note.

KINGSTON class ships do not have lifebuoy release alarms as the lifebuoy sentry position is on the bridge looking aft.

11.10 Rescue Boat Equipment

a. In order to be ready to conduct a rescue at sea, it is essential that at least one boat (normally the IRB) be fully equipped with the following equipment. A radio for the boat's coxswain is also to be brought down from the bridge or CCR and a radio check conducted.

Table 8 Rescue Boat Equipment

Paddles
Repair kit
Bellows (boat pump)
Boat hook
Rescue sling with 20 m of 12 mm diameter polypropylene
Red/green chemlites (running lights)
At least one full tank of gas
Boat's bag
Boat's bag contents:
Blanket and toque
Spotlight
Quick release safety knife
First aid kit
Resuscitation apparatus
Bolt cutters (46cm)*
Crow bar*
Rescue (crash) axe*
Fire extinguisher (2 kg CO_2)*
Towline *

** RIB (PC) or LCVP only*

Note.

The Boat's Bag shall be packaged so that it is watertight.

Note.

The rescue equipment mentioned above is stowed in the vicinity of the rescue boat position and checked for serviceability at frequent intervals by the POOW.

11.11 Inflatable Rubber Boats (IRB)

11.11.1 General Description

a. **Six- and Ten-Man IRB.** An IRB is a lightweight, fast, manoeuvrable boat propelled by an outboard motor and is commonly referred to by the name Zodiac. It is effective in rough weather and is the primary rescue boat. The maximum load which can be hoisted/lowered with a 25 HP motor fitted is three personnel. With a 40 HP motor fitted, the load is reduced to one person. They can also be used to support diving and boarding operations. Normally fast and manoeuvrable, they are slow and hard to manoeuvre when fully laden.

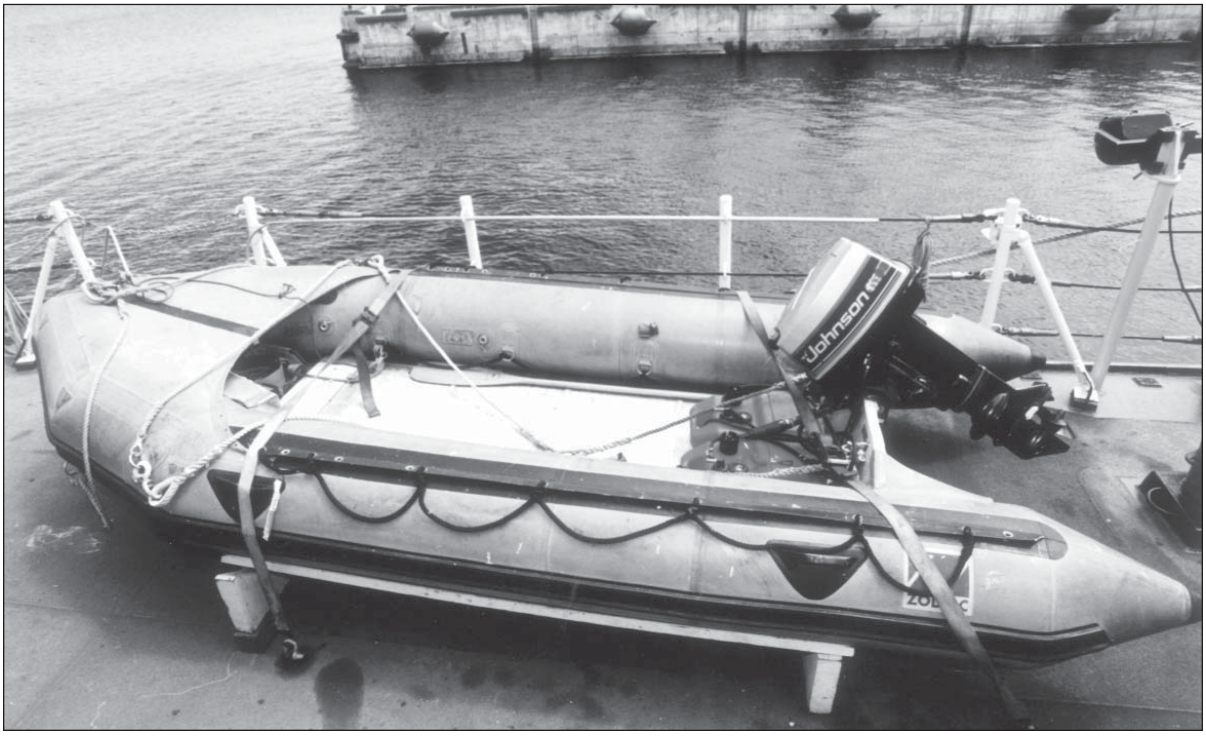


Figure 11.11-1 - IRB

The hulls of six- and ten-man IRBs are U-shaped buoyancy chambers. The chamber has five separate compartments to ensure that the boat will remain afloat should one of the compartments be punctured. A wooden transom is fixed to the hull to support the outboard motor. A groove between the bottom and the buoyancy chambers holds the floorboards in place. The floorboards are supplied in three or four separate pieces (depending on the model), two stringers and a bow floorboard. The floorboards are made of marine grade plywood or anodized aluminum. An independent inflatable keel gives the bottom of the boat a 'V' shape.

Figure 11.11-2 - RIB 540 (Used on KINGSTON Class Ships)

b. **RIB 540/472.** The hull and deck are constructed from Fibreglass Reinforced Plastic (FRP). Additional stiffening of the deck is provided by a core of end grain balsa in selected areas. The hull moulding incorporates planing strakes. As well, the aft or face of the transom is cored with two layers of marine grade plywood.

The deck moulding includes a bow locker, cable trough and non-skid on all walking surfaces. The bow locker is separated from the hull cavity by an FRP sole. A flush-fitting FRP hatch provides access to the bow locker. The boat is hoisted with a four-point webbing lift sling. The forward lift points are located on the inboard face of the bow locker. The aft lift points are on the forward face of the transom. A tow eye is located on the bow to facilitate towing.

The in-line control console is made of the same material as the hull. It incorporates a padded seat with the steering wheel, compass, switch panel and engine instruments mounted on the control face. A recess under the consoles has room to house two portable outboard gas tanks. The console is mechanically fastened to the deck amidships.

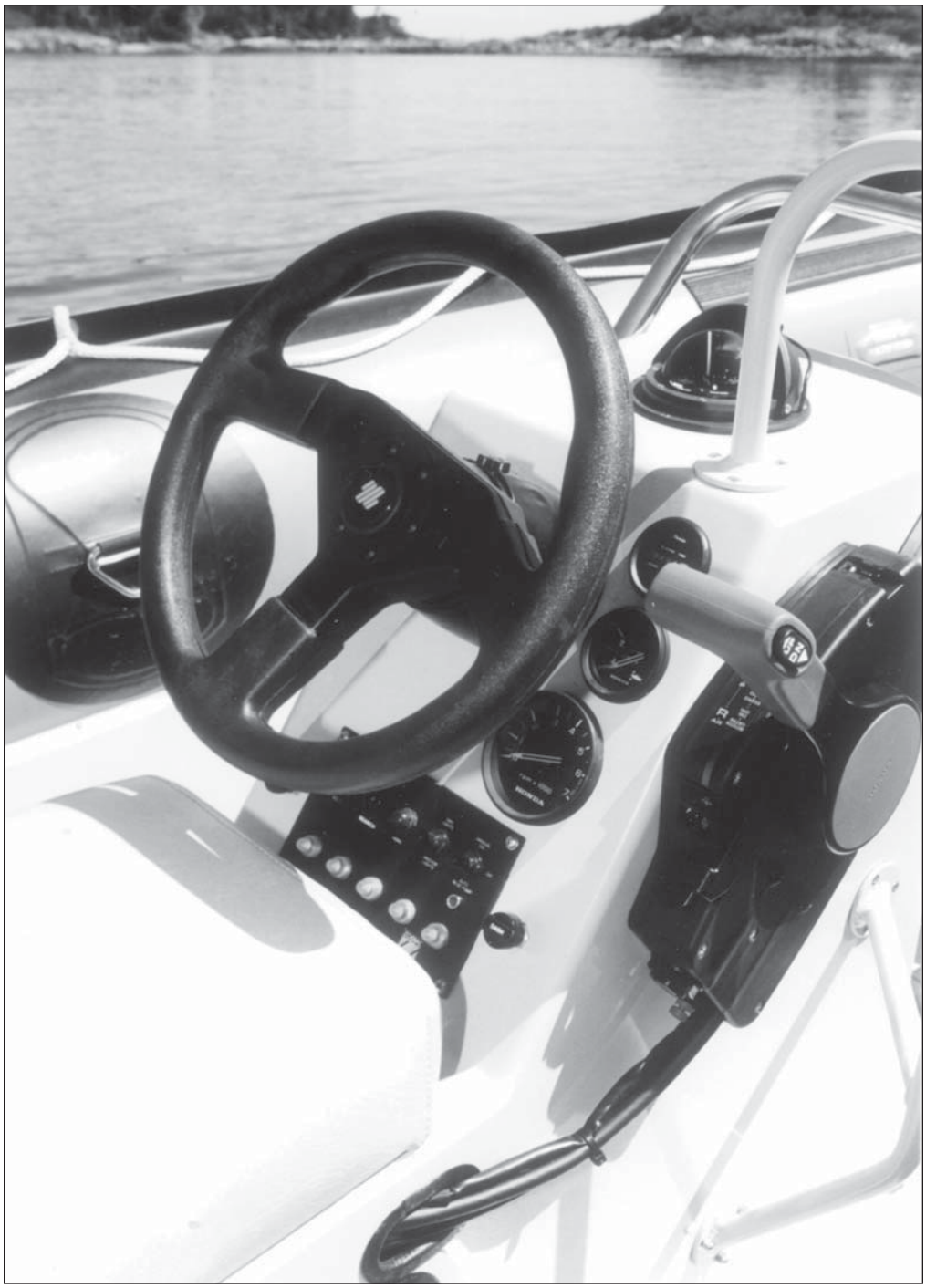


Figure 11.11-3 - Control Console 540

Figure 11.11-4 - Control Console 472

The inflatable collar is constructed from fabric which consists of a polyester core with a neoprene coating inside and a hypalon coating outside. It is divided into three airtight chambers. Each chamber has an inflation/deflation valve. Wear protection is provided by the full length extruded rubstrakes. A rope lifeline is attached at intervals along the lacing cuff on the top centreline of the collar.

Note.

A maximum of three personnel can be hoisted/lowered in either the 540 or 472.

Table 9 IRBs and Ship's Class

Class	Ten-Man	Six-Man	Location	Launch By
IROQUOIS	2		Port/Stbd AX	HIAB 61 Crane
HALIFAX	2		Port/Stbd TPS	Torpedo Recovery Crane
KINGSTON	1		Starboard	Crane
AOR	4		Port/Stbd Dispersal area	Falls on the Accommodation Ladder.
OBERON		1	Forward Torpedo Room	Hand

11.11.2 Manoeuvring

a. **Six- and Ten-Man IRB.** An IRB handles very differently than a RIB or LCVP. The coxswain operates the boat from a sitting position on the starboard side where the engine can be controlled and the boat steered. To alter course, the outboard engine is used like a rudder and, when going forward, turned in the opposite direction to which the boat is to be turned.

Most service outboard engines are equipped with a Kill Switch Lanyard. This lanyard is attached to the end of the engine handle and is designed to stop the engine when it is removed. Whenever operating the IRB, the other end of the lanyard must be attached to the coxswain so that if the coxswain falls overboard, the engine will stop.

Firm control of the outboard is essential when conducting turns as the engine will tend towards tightening the turn. High speed turns are dangerous and should be avoided. Gear changes must be done at low engine speeds (RPMs) because at higher engine speeds, control of the boat may be lost and the motor damaged.

The performance of the IRB is determined by its trim. In calm waters and with a normal payload, the boat should come up on plane very quickly. The trim of the boat is determined by the angle of the outboard engine. If the IRB's bow is pushed into the water, the leg is too close to the transom. If the IRB will not plane, the leg is too far away from the transom. When first attaching the outboard motor to the IRB, a test run should be made to ensure the trim is set correctly. Low inflation may cause cavitation under the hull.

b. **RIB 540/472.** The behaviour of the 540 and 472 RIBs are similar to the RIB (PC) but the coxswain must be aware that they are about four times lighter. As well, the outboards are capable of providing more power than is needed in most situations. Both RIBs are fitted with powerful outboards to carry heavy loads and transport boarding parties without losing speed. With a two-person crew at full throttle, the boat will plane across calm water in excess of 30 kts. At no time should a tight turn be attempted at this speed.

11.11.3 Checklist

a. **Six- and Ten-Man IRB.** When an IRB is issued, it will be supplied with the following:

Table 10 IRB Equipment
Paddles (2)
Foot Bellows
Gauge w/ adapter
Lifting sling
Bow line (spliced to handle)
Repair kit - leak stoppers - instructions - patches - scissors - sandpaper/buffer - brushes (2) - glue - cleaning solution (optional)

Note.

All IRBs and lifting slings are tested before issue. A tally plate is attached to the transom (inboard) and the lifting ring is stamped. If an IRB is received without the tally plate or stamp, it should not be used until tested. If the test date is over two years old, the boat must be retested.

Note.

Once the boat is inflated, the towing and lifting slings are attached, thus ensuring that the longer legs of the lifting sling go forward. Snap hooks are shackled to the eyelets on the after end for the after steadying line or sternfast.

b. **RIB 540/472.** The following is a list of equipment that comes with the RIB. It should be checked periodically to ensure it is in proper repair.

Table 11 RIB 540/472 Equipment	
Outboard engine	Lifting sling
Portable fuel tanks (2)	Bellows
Paddles (2)	Repair kit
Navigational light mast	

11.11.4 Pre-Launch Checklist

The pre-launch checklist is to be completed prior to each launch as follows.

Pre-Launch Checklist RIB 540/472

Description	Check Off
1. Rigid hull free of leaks or damage	_____
2. Inflatable collar free of any punctures or excess wear	_____
3. Inflatable collar attachments secure	_____
4. Inflatable collar at operating pressure (150 millibars)	_____
5. High capacity trunks up	_____
6. Bilge pump operational and switch on auto	_____
7. Sufficient fuel on board	_____
8. Fuel lines and filter free of leaks	_____
9. VRO tank (if fitted) full	_____
10. Battery electrolyte at proper level	_____
11. Battery fully charged	_____
12. Navigation lights operational	_____
13. Paddles on board and stowed	_____
14. Mooring lines on board	_____
15. Fire extinguisher on board and stowed	_____
16. Inflation pump on board and stowed	_____
17. Tube repair kit on board and stowed	_____
18. Flares on board and stowed	_____
19. Life jackets on board (1 per person + 10%)	_____
20. All hatches secured	_____
21. Steering system operates smoothly and freely without leaks	_____
22. Throttle and shift controls operate smoothly and freely	_____

11.11.5 Engine Start/Stop Procedure

Table 12 IRB and RIB 540/472 Start/Stop Procedures	
Starting	**Stopping**
Turn the battery switch to "ON".	**Normal Shutdown**
Ensure the engine kill switch lanyard is attached to the console switch and clipped to coxswain.	Reduce the engine temperature by allowing the engine to run at idle for two to three minutes.
Squeeze the fuel line primer bulb until it becomes firm.	Turn ignition switch to off.
Place control lever in the neutral position.	
Move the neutral throttle lever on the control head upwards (choke).	**Emergency Shutdown**
Move the ignition switch to the "START" position; release the switch when engine starts.	Turn ignition switch off right away or pull the kill switch lanyard attached to the coxswain.
Allow engine to warm up for 2 - 3 minutes (above 5°C), 5 minutes (below 5°C) if possible.	

Note.

The boat must be in the water to start, as the engine is water-cooled.

11.11.6 Procedures for IRB and RIB 540/472

During rescue stations, the I/C boat deck may place the boat outboard at deck level until the order to launch the boat is given. This is highly dependent on sea state and the manoeuvering of the ship.

a. **HALIFAX and IROQUOIS Class.** Ships are always rigged and ready to launch a rescue boat at sea. Both classes of ship use hydraulic knuckle boom cranes to launch their IRBs. If the system fails, there is no backup. However, in an emergency, manual recovery can be achieved by rigging a block and tackle on the accommodation ladder davit. With a minimum of twenty personnel, the IRB can be hoisted to almost deck level and manhandled on board (if possible the boat's crew should disembark before recovery).

b. **KINGSTON Class.** The KINGSTON Class has two boat stowage positions from which a boat can be launched. The primary position is the portable boat cradle located on the sweep deck which can be used for either RIB or IRB stowage. The secondary position is the permanent boat cradle located between the funnels on the starboard side. The IRB is the only boat that can be stowed and launched from this position. The RIB will normally be carried when the ship is deployed in coastal operations, fisheries, and sovereignty patrols. During minesweeping, route survey, and bottom object inspection operations, the IRB is carried at the funnel position due to the limited sweep deck space. Bottom object inspection operations include the use of a Remotely Operated Vehicle (ROV). Since there is an umbilical fitted to the ROV which remains attached to the crane, the IRB must be launched prior to deploying the ROV (see Chapter 13).

c. **AOR Class.** IRBs are launched and recovered using the accommodation ladder davits amidship. These davits are manually operated. Their fore and aft movement is controlled by the use of forward and after guys. When they are to be used to launch an IRB, they are fitted with double-purchase falls rove with 180 m of 21 mm diameter double-braided nylon.

Note.

A maximum of three personnel can be in the boat when launching/recovering the IRB and 472. If the IRB is fitted with a 40hp engine, only 1 crew member can be embarked. In KINGSTON Class vessels due to weight restrictions on the crane, the 540 RIB can only be launched/recovered with 1 person onboard.

Table 13
IROQUOIS/HALIFAX/KINGSTON/IRB Launch

Order	By/To	Response
HALIFAX AND KINGSTON CLASS - The crane/crane deck or boat shall not be manned until the pipe "RADHAZ Safe, RADHAZ Safe" is made.		
KINGSTON CLASS - The crane operator ensures 600v power is available and prepares the boat rope. He also ensures that the emergency stop is pulled out and that the light is on.		
Clear Away the Boat	I/C to designated personnel	Insert the plugs.
		Remove securing gripes.
		When "RADHAZ Safe", crane operator extends the boom and positions it directly above the IRB and veers sufficient wire.
		The hook is then attached to the IRB's lifting sling.
		The hoist wire control line is passed and manned.
		The after steadying line is hooked on to a snap hook on the outboard side and manned.
		The boat rope, having been rigged upon proceeding to sea, is now manned.
Man the Boat	I/C to boat's crew	The crew assume their position in the boat.
Ready in the Boat	Coxswain to I/C	Made once the boat is cleared away and the lifeline is manned.
Ready to Launch	I/C to Command by part ship comms	The boat is fully ready to be launched on order from Command.
Note. The boat may be put at deck level (when safe to do so) prior to the order to launch.		
Launch the Boat	Command to I/C via upper deck broadcast and part ship comms	
Boom Up/Hoist Away	I/C to crane operator	Crane operator raises the boom/hoists the boat.
High Enough	I/C to crane operator	Given when the boat is high enough to clear the guardrails.
Slue Out	I/C to crane operator	Crane operator slues the boom outboard.
		Designated personnel control the movement of the boat with boat rope and after steadying line.

Table 13
IROQUOIS/HALIFAX/KINGSTON/IRB Launch (cont)

Order	By/To	Response
Boom Down/ Lower Away	I/C to crane operator	Crane operator lowers the boom/veers the hoist wire.
Avast/Hook on the Boatrope (KINGSTON Class only)	I/C to designated personnel	The boat rope is hooked on and the bow line is removed.
Boat is at Deck Level	I/C to Command	If launch order not previously given.
Avast	I/C to crane operator	Given when the boom is approximately 0.5 m above the guardrails.
Lower Away	I/C to crane operator	Crane operator veers the hoist wire.
Avast	I/C to crane operator	Crane operator stops veering.
Slip When Ready	I/C to coxswain	
Slip	Coxswain to bowsman	The bowsman slips the Cranston Eagle Hook.
		The coxswain starts the engine.
		The after steadying line is slipped and recovered.
Boom Up/Hoist Away	I/C to crane operator	Crane operator raises the boom/hoists the wire clear of the boat and crew.
		Designated person pulls hoist wire clear.
Slip the Boatrope	Coxswain to bowsman	The boat rope is slipped and recovered.
Prepare to Recover the Boat	I/C to designated personnel	Re-set the Cranston Eagle Hook.
		Prepare the boat rope.
		Prepare the after steadying line.

Table 14
AOR/IRB Launch Procedures

Order	By/To	Response
Clear Away the Boat	I/C to designated personnel	Insert the plugs.
		Rescue davit is turned inboard while the boat is wheeled under it facing aft.
		The hook of the lower falls block is attached to the lifting sling.
		The remainder of the falls are led aft and manned by a minimum of 20 personnel, all inboard of the line.
		The forward and after guys are manned.
		The boat rope is brought inboard and secured to the towing bridle.
		The boat rope recovery line is also manned.
Man the Boat	I/C to boat's crew	The crew assumes their position in the boat.
Launch the Boat	Command to I/C via upper deck broadcast and part ship comms	
Take the Falls in Hand	I/C to falls personnel	
Hoist Away Hand over Hand	I/C to falls personnel	Boat is hoisted high enough to clear the gunwales.
High Enough	I/C to falls personnel	
Slue Out	I/C to guy personnel	The davit and boat are turned outboard and the guys turned up on cleats.
Lower Away Hand over Hand	I/C to falls personnel	The boat is lowered until it is in the water.
Light To	I/C to falls personnel	The falls are dropped to allow enough slack for the boat to ride until it is slipped.
Slip When Ready	I/C to coxswain	
Slip	Coxswain to bowsman	The bowsman slips the hook.
		The shepherd's hook is used to pull the falls against the ship's side and away from the boat's crew.

Table 14
AOR/IRB Launch Procedures (cont)

Order	By/To	Response
		The coxswain starts the motor.
		The coxswain slips the after steadying line.
Slip the Boat Rope	Coxswain to bowsman	The boat rope is slipped.
Overhaul the Falls	I/C to falls personnel	

Table 15
IROQUOIS/HALIFAX/KINGSTON/IRB Recovery

Order	By/To	Response
Recover the Boat	Command to I/C	I/C signals the boat to come alongside.
When the boat makes its approach, the bowsman will hook the soft eye of the boat rope to the snap hook of the bridle under the direction of the coxswain.		
Pass the After Steadying Line	I/C to designated personnel	After steadying line is passed to the coxswain who secures it to the outboard snap hook.
Boom Down/Lower Away	I/C to crane operator	Crane Operator lowers the hook to the boat by lowering the boom/hoist wire.
		The coxswain and bowsman position themselves midships between the legs of the sling. The bowsman holds the ring and lifting sling up ready to hook on.
Avast	I/C to crane operator	When hook is in the boat.
Hook On	I/C to coxswain	The bowsman hooks the Cranston Eagle Hook to the ring on the sling.
Hooked on Ready in the Boat	Coxswain to I/C	Boat's crew man lifelines.
Boom Up/Hoist Away	I/C to crane operator	Crane operator raises the boom/hoist wire roundly to clear the boat from the water.

Table 15
IROQUOIS/HALIFAX/KINGSTON/IRB Recovery (cont)

Order	By/To	Response
		Coxswain tilts motor up to clear the guardrail.
		Designated personnel control the boat with the boat rope and after steadying line.
		I/C will report to Command when the boat is clear of the water.
Avast	I/C to crane operator	Crane operator stops raising the boom/hoist wire.
		KINGSTON Class only - the boat rope is unhooked and bow line attached.
Hoist Away	I/C to crane operator	Crane operator heaves in on the wire until the boat clears the guardrails
High Enough	I/C to crane operator	Crane operator stops heaving in.
Slue In	I/C to crane operator	Crane operator swings the boom inboard.
		Designated personnel control the movement of the boat with the boat rope and after steadying line.
Avast	I/C to crane operator	Crane operator stops when the boat is in position.
Boom Down/Lower Away	I/C to crane operator	Crane operator lowers boom/veers the hoist wire.
Secure the Boat	I/C to designated personnel	Designated personnel unhooks Cranston Eagle Hook.
		Crane operator stows crane.
		Remove plugs.
		Pass the securing gripes.

CAUTION (HALIFAX Class).

Extra care must be taken when using the starboard boat because of the boiler blowdown overboard discharge located at the waterline at the recovery position. Each ship must have an SOP in place to ensure that the overboard discharge valve remains shut during boat operations.

Table 16
AOR IRB Recovery

Order	By/To	Response
Recover the Boat	Command to I/C	I/C signals the boat alongside.
		Falls are lowered to the waterline and held alongside using the shepherd's hook.
When the boat makes its approach, the Bowsman will hook the soft eye of the boat rope to the snap hook of the bridle under the direction of the Coxswain.		
Take the Falls in Hand	I/C to falls personnel	Pick up boats falls.
Hook On	I/C to coxswain	
Hooked On Ready in the Boat	Comms to I/C	
Hoist Away - Hand over Hand	I/C to falls personnel	All slack is taken out of the falls.
Heave In	I/C to falls personnel	Falls are heaved-in by walking aft
High Enough	I/C to falls personnel	When the boat is high enough to clear the guardrail.
Slue in the Davit	I/C to guy personnel	The boat is turned inboard.
Check Away - Hand over Hand	I/C to falls personnel	Boat is lowered into cradle or onto deck.
Secure the Boat	I/C to designated personnel	All gear secured for sea report to command.

Note.

The boat will be lowered directly to the deck if the boat has been used for rescue.

Figure 11.11-5a - KINGSTON Class RIB

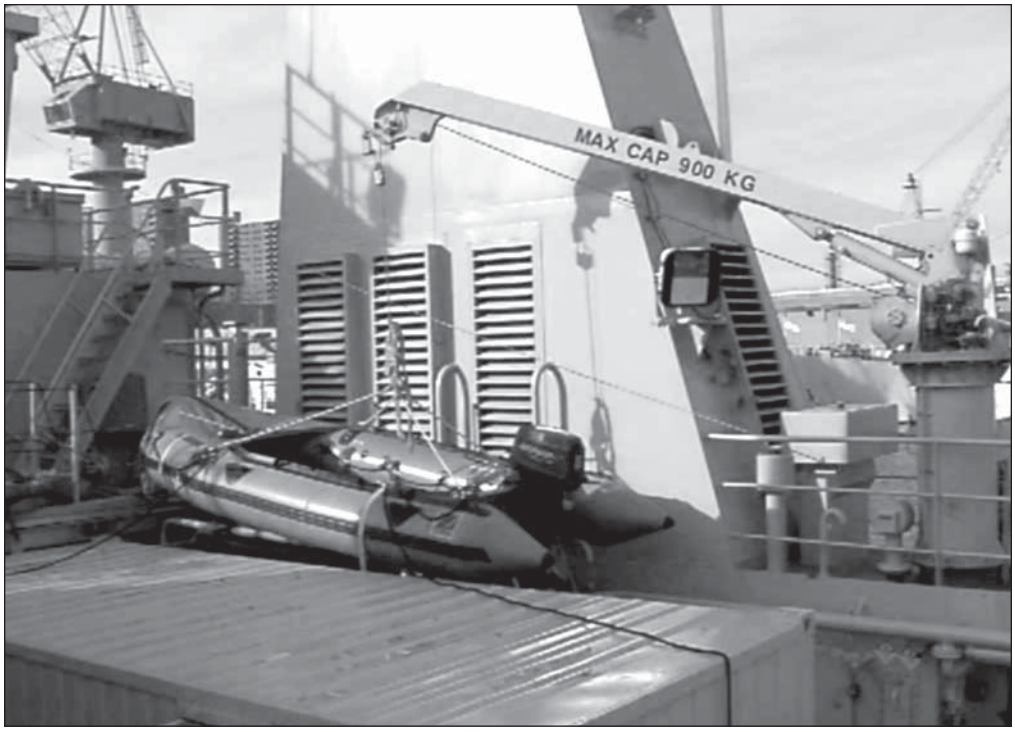


Figure 11.11-5b - KINGSTON Class RIB

Figure 11.11-6 - IROQUOIS Class IRB and Crane

Figure 11.11-7 - HALIFAX Class IRB and Crane

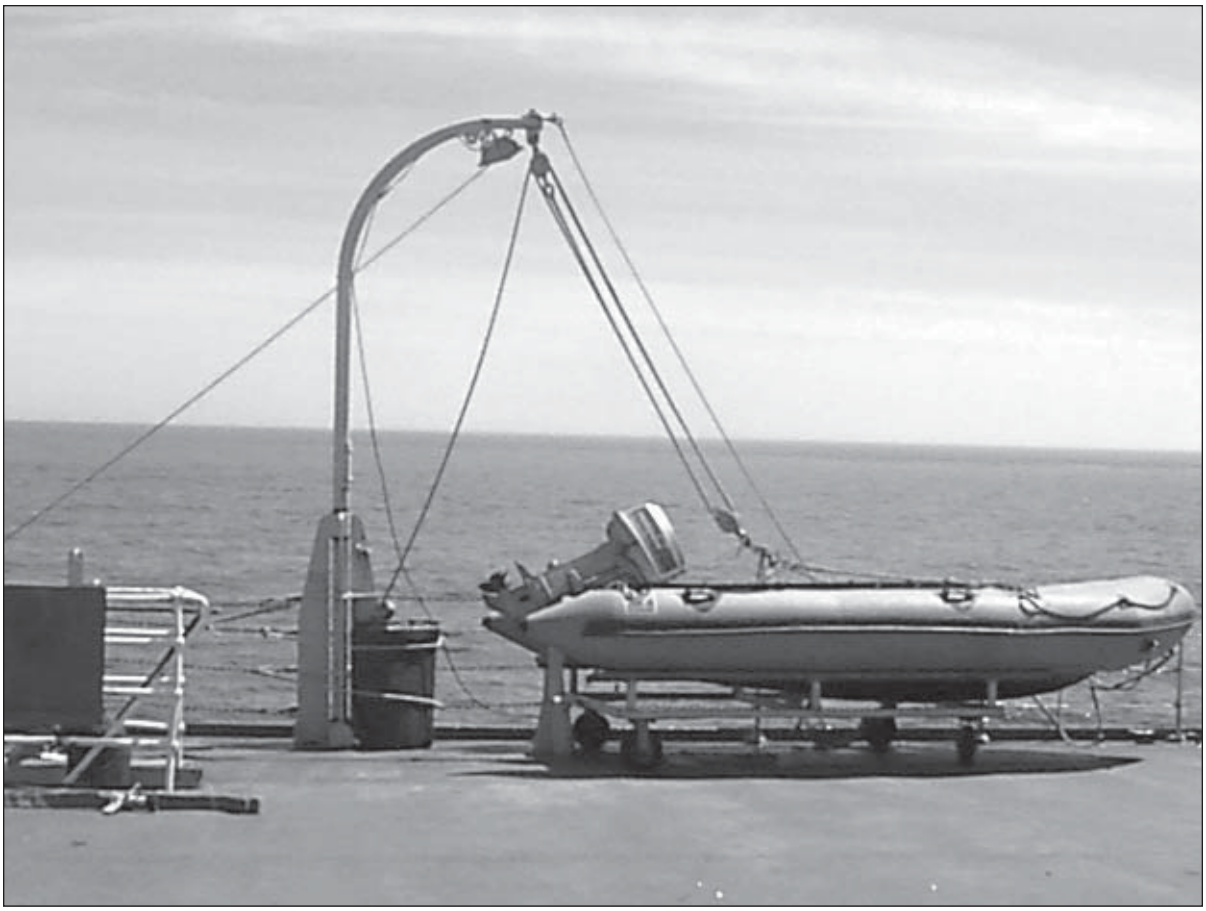


Figure 11.11-8 - AOR IRB and Davit

11.12 RIB PC

11.12.1 General Description

a. The RIB PC is a 7.3 m rigid inflatable boat consisting of an inflatable collar attached to a rigid hull. It is powered by a 165 HP turbo-charged Volvo AQAD 41 diesel engine. The engine is attached to a Volvo 290S/P Outdrive by a Carden driveshaft. A combined engine cover and console is located in the centre of the boat. Equipment stowage is provided aft in a stowage box, and forward in a below deck locker accessed through a deck hatch. Part of the RIB PC is a solid lift frame that allows the boat to be launched and recovered by a single arm davit. They are carried in the following HMC ships.

Table 17 RIB PC and Ship's Class

Class	Held	Launch By
IROQUOIS	1	Arva Single Arm Crane (port side)
HALIFAX	1	Schat Davit (Luffing Arm) (stbd side)
AOR (509/510)	2	Luffing Arm Crane (port/stbd side)

Note.

A maximum of four personnel are to be in the RIB during launching/recovery.

Figure 11.12-1 - RIB PC

b. The hull is constructed of Fibre Reinforced Plastic (FRP) with foam-cored internal frames and transom. The resin used to construct the hull, deck and console is a fire retardant vinyl-ester. The hull, combined with the cored deck, provides an extremely strong base for the diesel power plant and inflatable collar.

Note.

FRP hulls shall not be painted except by Fleet Maintenance Facility personnel using an approved epoxy paint.

c. The FRP control console covers the centrally located engine. Engine controls, gauges and steering are located on the after part of the console. The forward section of the cover forms a seat for passengers. The engine is accessed by lifting up the control console.

d. The inflatable collar is made of heavy-duty, neoprene-hypalon, polyamide fabric. The industrial quality tube is extremely damage-resistant. An exterior rubbing strake provides additional protection for the tube. The tube is divided into seven separate chambers to provide buoyancy in the event of a tube puncture. Inboard and outboard lifelines provide handholds for crew and passengers.

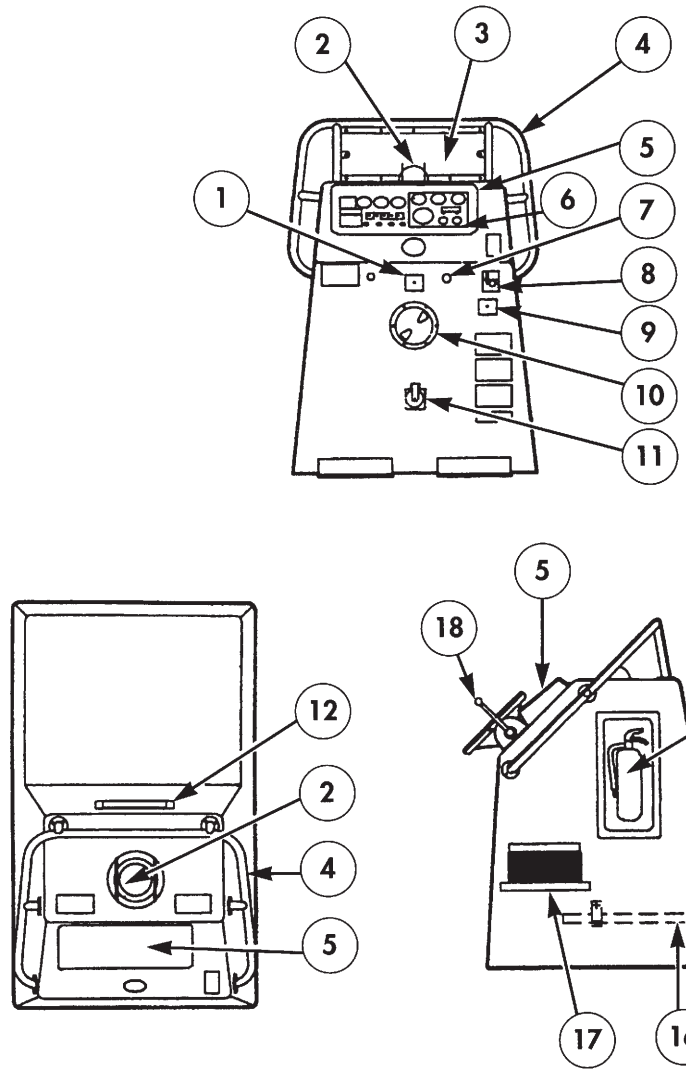


Figure 11.12-2 - RIB PC Control Console

1. Manual Stop
2. Compass
3. Windscreen
4. Handrail/Windscreen Frame
5. Instrument Panel and Box
6. Coxn Overboard Kill Switch
7. Engine Alarm Buzzer
8. FM200 Manual Release (Halon)
9. Engine Air Shutdown
10. Battery Switch Access
11. Shore Power Plug
12. Horn
13. Fire Extinguisher (Port/Starboard)
14. Seat Cushion
15. Console Latch
16. Console Support Rod
17. Engine Airbox
18. Single Lever Engine Control

11.12.2 Manoeuvring

a. **Steering.** RIBs are powerful boats which respond quickly to changes in engine power. When moving slowly, the RIB has a tendency to wallow but, when properly trimmed on plane, steering is very responsive.

b. **Turning.** RIBs lean steeply inwards when turning at high speeds, but the lift from the immersed side of the buoyancy tube keeps the boat stable at a constant angle during the turn. RIBs can be turned with complete confidence under full helm and power in calm weather. However, it is unwise to manoeuvre this sharply because a RIB will skid in a hard turn and the engine may race due to cavitation. A more effective turn can be made by reducing speed before putting the helm over, and then increasing speed again when the turn is complete. In rough weather, altering course across the direction of the waves requires care so that the RIB does not expose too much of its underside to a strong gust and increase the risk of capsizing.

c. **High Seas.** The RIB can operate safely in a high sea state (4 to 6 m), but the speed, and possibly the load, will have to be reduced. In rough weather, it is advisable to reduce violent slamming by steering in a series of zigzags across the direction of the sea. When running down sea, a RIB is less manageable. Constant attention to the boat's speed is required and frequent throttle adjustments are needed. The most important principle to be followed is to present a high bow to the wave which the RIB is about to overtake. The bow of a RIB lifts as the boat comes off or goes onto the plane. So, by slowing down just before the moment of encounter and accelerating quickly to start planing again, a RIB can be made to climb a wave rather than to plunge into it. The surfing situation should be avoided as this may lead to a RIB burying her bow into the tail of the wave ahead. Lastly, it must be remembered that the stern of a RIB is less buoyant than the bow, so it is inadvisable to allow a steep following wave to overtake and possibly swamp the boat over the transom.

d. **Loading.** The distribution of a load in a RIB affects its performance. A RIB is heavier at the bow when stopped or proceeding at slow speed, so the boat should be loaded with the weight towards the stern until it reaches sufficient speed to plane. An incorrect angle of trim will reduce both speed and range; therefore, coxswains must correctly adjust the trim for optimum performance.

11.12.3 Equipment Checklist

The following is the list of equipment that comes with the RIB. It should be checked periodically to ensure it is in proper repair.

Table 18 Equipment RIB PC

Equipment	Qty	Equipment	Qty
Canopy cover (forward)	1	Boat hook	1
Canopy cover (aft)	1	Fuel stripping container	1
Cover boat overall	1	Lifelines 16 mm 3-strand nylon	2
Handle w/ ball grip	1	Lifelines 10 mm	2
Anchor, Danforth	1	Blue towline 30 m of 18 mm three-strand polypropylene	1
Anchor line 30 - 45 m of 12 mm DB nylon	1	Centreline lifeline	1
Paddle 2 m	6	Fire extinguisher	2
Canopy rod 2.6 m	1	Search light	1
Canopy rod 3 m	1	First aid kit	1
Canopy rod 3.35 m	1	Cushion stowage box	1
Canopy rod 3.65 m	1	Cushion console	1
Sea anchor	1	Cushion backrest	1
Sea anchor line 30 m 7 mm 3-strand nylon	1	Plastic pail	1
		Painter line 18 mm DB nylon	1
Repair kit	1	Painter release shackle	1
Instrument protective cover	1	Ensign staff assembly	1
Cradle	1	Propeller marine SS	1
Single point hoisting adapter	1	Pressure relief valve caps	7
Kill switch and lanyard	2	Foot pump	1
Magnetic compass	1	Foot pump adapter	1
Compass guard	1	Life raft knife	1
Fuel sounding rod	1	Shore power cable	1
Emergency tiller	1	3/8” bow shackle (lifelines)	2
Kisby Ring and throwing line	2	3/8” bow shackle (anchor)	1
Bailer	1	3/8” bow shackle (attach painter release shackle)	1

11.12.4 Pre-Launch Checklist

The pre-launch checklist is to be completed prior to every launch.

1. **Bow Area**
   - a. Inflatable collar at operating pressure ❑
   - b. Contents of forward locker ❑
   - c. Locker dry ❑
   - d. Secure forward hatch ❑
   - e. Caps on relief valves ❑

2. **Fuel Level**
   - a. Full fuel tank ❑
   - b. Secure fuel cap ❑

3. **Engine Compartment**
   - a. Visual inspection ❑
   - b. Stripping valve open ❑
   - c. Operation of stripping pump ❑
   - d. Stripping valve closed ❑
   - e. Fuel/water separator bowl clear ❑
   - f. Fuel supply valve open ❑
   - g. Fuel return valve open ❑
   - h. Belt tension ❑
   - j. Coolant level ❑
   - k. Oil level ❑
   - m. Sea water strainer clean ❑
   - n. Secure console/engine cover ❑
   - p. Replace lifeline on console ❑

4. **Console/Engine Cover**
   - a. Disconnect shore power ❑
   - b. Battery switch to position No. 1 ❑
   - c. Voltmeter reads greater than 12 volts ❑
   - d. Battery switch to position No. 2 ❑
   - e. Voltmeter reads greater than 12 volts ❑
   - f. Reset battery switch to position No. 1 ❑
   - g. Outdrive trim pump (-5 to 12 degrees) ❑
   - h. Electric bilge pump ❑
     - (**1**) Manual ❑
     - (**2**) Switch set to automatic ❑
   - j. Lights ❑
   - k. Horn ❑
   - m. Steering wheel operated ❑

5. **Aft Stowage Locker**
   - a. Water intake valve open (outdrive) ❑
   - b. Manual bilge pump ❑
   - c. Float switch ❑
   - d. Reservalve pressure 20 to 30 psi ❑
   - e. Outdrive trim pump fluid level ❑
   - f. Secure aft stowage locker ❑

Figure 11.12-3 - RIB PC Pre-Launch Checklist

11.12.5 Engine Start/Stop Procedure

Table 19 RIB PC Start/Stop Procedure

Starting	Stopping
Ensure engine kill switch lanyard is attached to the switch on the console and clipped to the coxswain.	**Normal Shutdown**
Turn the battery switch to "1".	Allow engine to run at idle speed for one minute.
Trim the outdrive to "0".	Push stop button on control panel and hold until the engine stops.
Move the engine control lever to the "neutral" position.	
In cold weather below 5 degrees C, move the ignition switch to the "Glow" position and hold for 30 seconds.	**Emergency Shutdown**
Move the ignition switch to the "Start" position. Release the ignition switch when engine starts.	Pull out the manual stop handle located on the aft face of the console.
Check that the oil pressure gauge shows the normal value of 30 to 40 PSI and that the alarm is silent. If abnormal values show or the alarm sounds, move the engine switch to stop.	Pull the kill switch lanyard that is attached to coxswain.

Note.

The boat must be waterborne immediately after starting the engine.

Engine gauge readings should be:

Oil Pressure:	***30 PSI minimum @ 650 RPM***
	80 PSI minimum @ 3600 RPM
Voltmeter:	***13-15 Volts***
Temperature:	***167 - 194 degrees F***
Tachometer:	***600 - 3600 RPM***

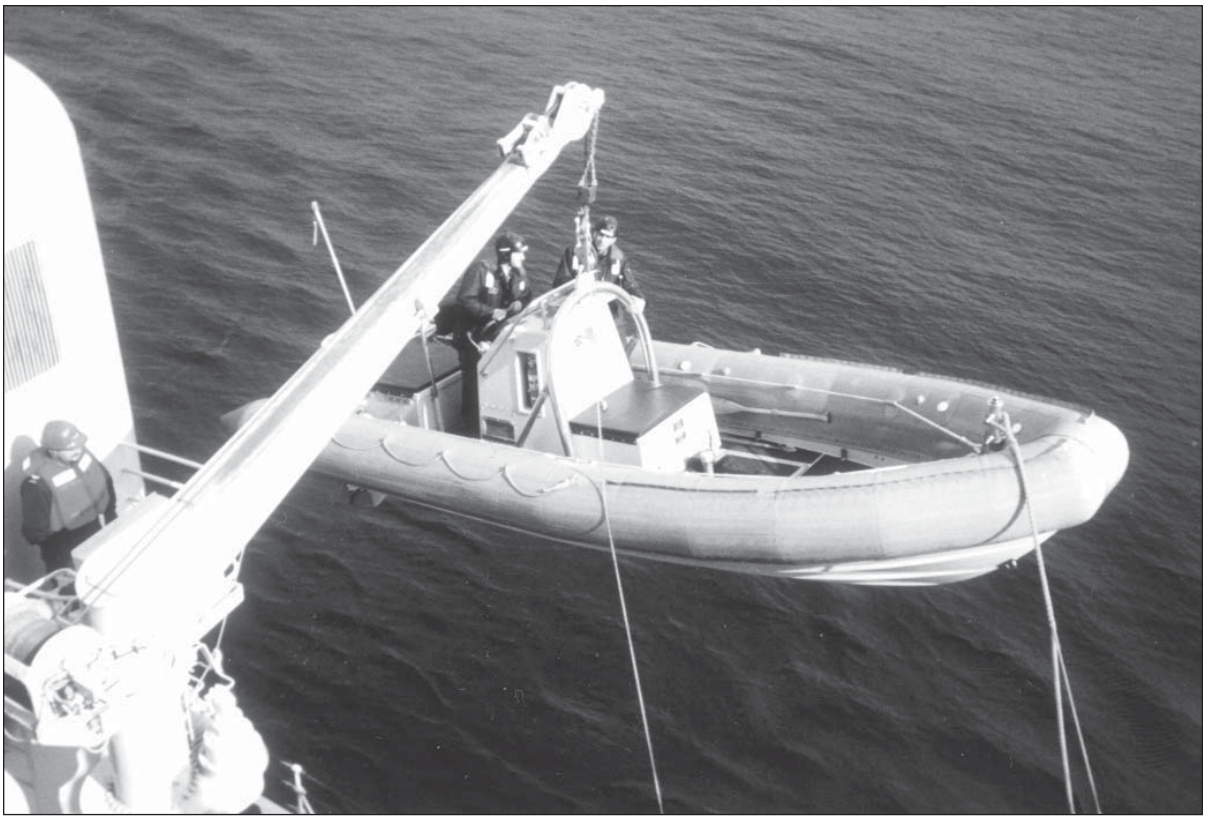


Figure 11.12-3 - IROQUOIS Class RIB and Crane

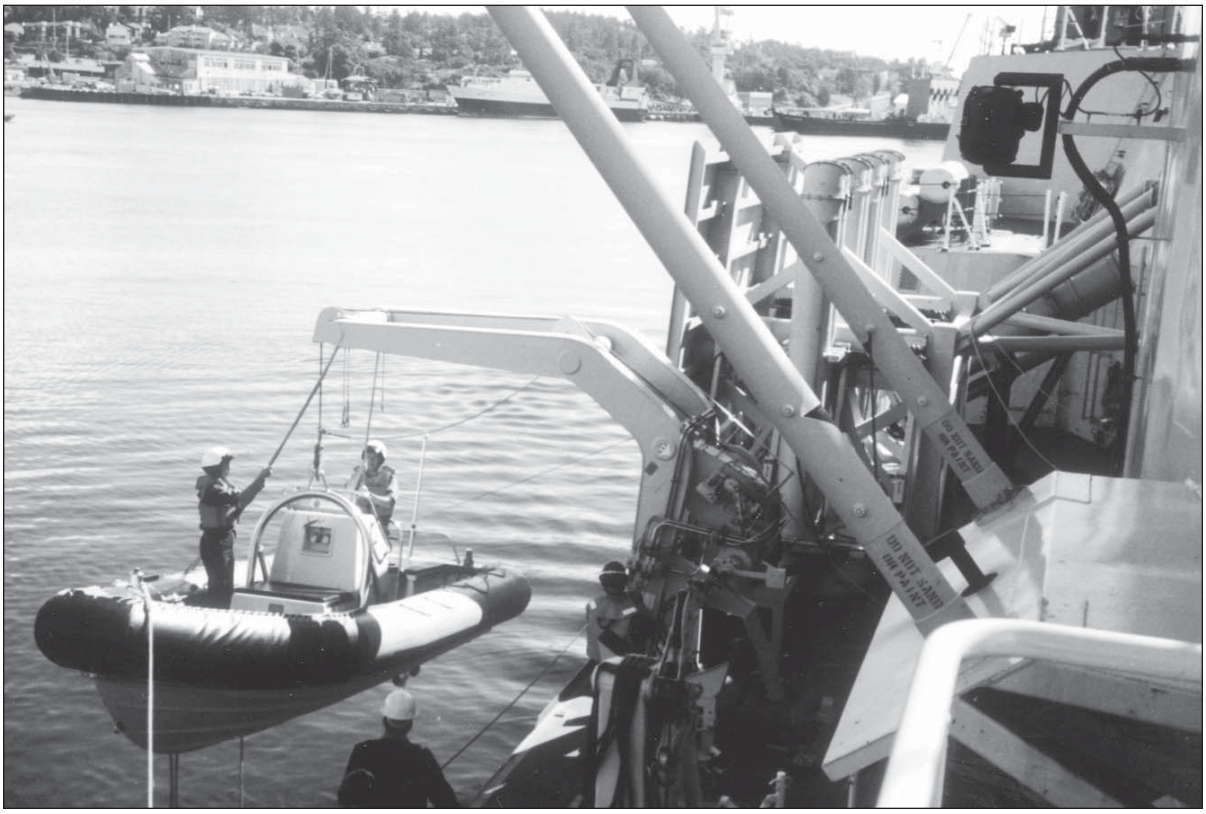


Figure 11.12-4 - HALIFAX Class RIB and Davit

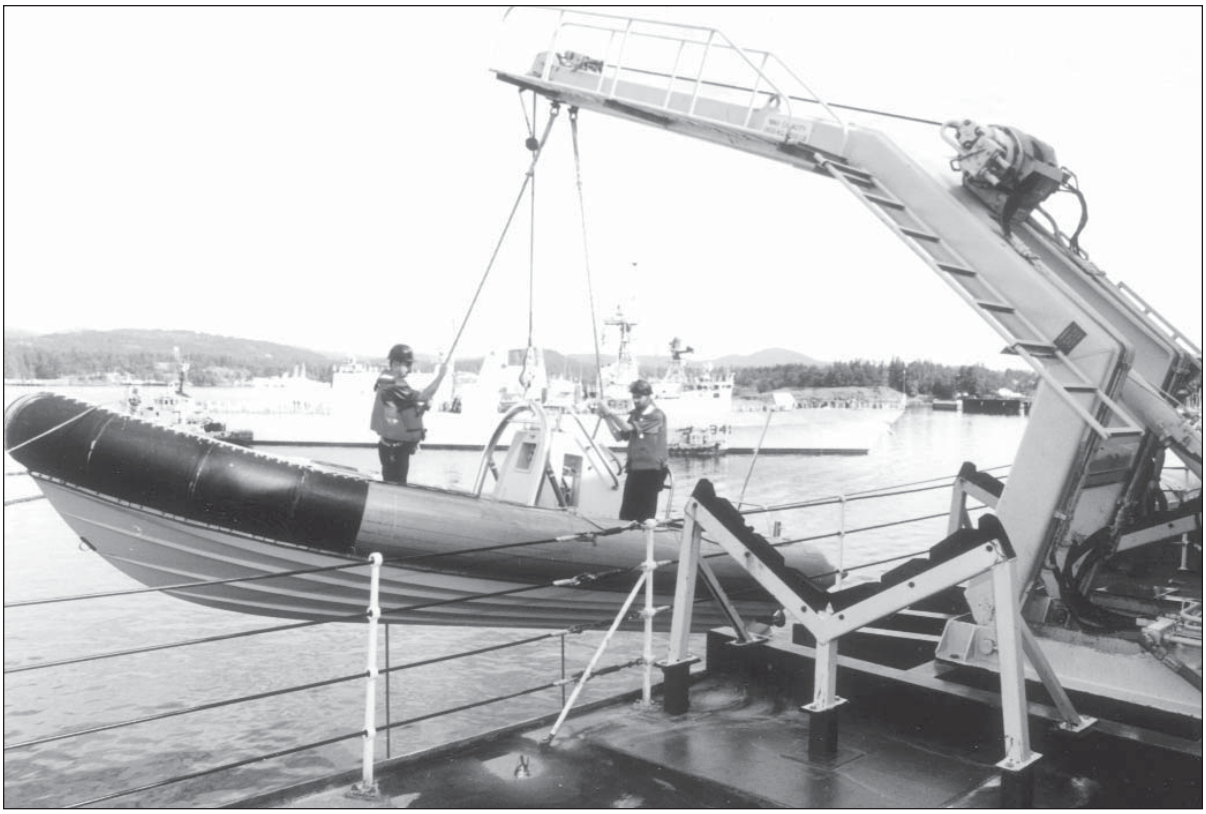


Figure 11.12-5 - AOR 509/510 RIB and Davit

11.12.6 Launch Procedures for RIB PC

Table 20 RIB PC Launch Procedures

Order	By/To	Response
Man the Boat	I/C to boat's crew	Boat's crew man the boat.
Clear Away the Boat	I/C to designated personnel	Prepare the boat for launch.
		Slip the securing arrangements (slips and gripes).
		Disconnect the Arctic Start (if connected)
		Prepare the boat rope and after steadying line.
		Shepherd's Hook is taken to 01 deck just below the RIB and manned to control the hoist wire (AOR).
		Crane operator ensures power available and "Motor Running" lamps are lit at the control panel.

Table 20 RIB PC Launch Procedures (cont)

Order	By/To	Response
Ready in the Boat	Coxswain to I/C	When boat is cleared away and lifelines manned.
Ready to Launch	I/C to bridge by part ship comms	The boat is fully ready to be launched on order from Command.
Launch the RIB	Command to I/C via upper deck broadcast and part ship comms	
Hoist Away	I/C to crane/davit operator	Crane/davit operator hoists RIB until it clears the chocks.
High Enough	I/C to crane/davit operator	Crane/davit operator stops hoisting.
Slue/Luff Out	I/C to crane/davit operator	Crane/davit operator slues/luffs the crane/davit outboard.
The boat rope and aft steadying line control the RIB.		
Lower Away	I/C to crane/davit operator	RIB is lowered.
Avast (if required)	I/C to crane/davit operator	When RIB is at deck level.
When the boat is waterborne the crane/davit operator must be prepared to operate the "Tension-Pay Out" lever in the "Pay Out" mode in conjunction with the "Hoist-Lower" lever in the "Lower" mode to put slack in the boats fall.		
Slip When Ready	I/C to coxswain	
Slip	Coxswain to bowsman	The bowsman slips the Cranston Eagle Hook.
		Care is to be taken not to attempt to slip while weight is on the hoist wire. Too hard a pull could cause the toggle wire on the hook to part.
Hoist wire control line/Shepherd's Hook is used to pull the whip and Cranston Eagle Hook away from the crew.		
Hoist Away	I/C to crane/davit operator	Crane/davit operator hoists the hook clear of the boat.
Let Go Aft	Coxswain to sternsheetman	The after steadying line is let go and designated personnel recover the line.
Slip the Boat rope	Coxswain to bowsman	Bowsman slips the boat rope and designated personnel recover it.

Note.

While the RIB is away, personnel required for launching will make preparations for recovery and reset the Cranston Eagle Hook.

11.12.7 RIB PC Recovery Procedures

For recovery of the RIB, permission is sought from the bridge. Designated personnel man their positions. The orders for recovering are as follows.

Table 21 RIB PC Recovery Procedures

Order	By/To	Response
Prepare to recover the RIB	I/C to designated personnel	Crane/davit operator ensures "Power On" and "Motor Running".
		Crane/davit to be slued/luffed outboard.
		Hook to be lowered approximately 2 m below deck level.
		After steadying line is made ready for use.
		Boat rope made ready for the boat to pick up.
Recover the RIB	Command to I/C via upper deck broadcast and part ship comms.	I/C signals RIB to come alongside.
When the boat makes its approach, the bowsman will hook on the boat rope under the direction of the coxswain.		
Pass the After Steadying Line	I/C to designated personnel	Aft steadying line is passed to boat's crew who secure it to the outboard towing bollard.
Designated personnel control the RIB with boat rope and after steadying line. The Cranston Eagle Hook is lowered into the boat by the crane/davit operator, putting the "Tension-Pay Out" lever to "Pay Out" and the "Hoist-Lower" lever to "Lower".		
Hook On	I/C to boat's crew	Bowsman hooks the Cranston Eagle Hook to the lifting point.
Note. Extreme caution is to be exercised when hooking up the Cranston Eagle Hook to the lifting point. A finger can easily be jammed at this part of the recovery.		
Hooked On Ready in the Boat	Coxswain to I/C	Boat's crew man lifelines.
Hoist Away	I/C to crane/davit operator	Crane/davit operator heaves in on the hoist wire.
		Designated personnel control the movement of the RIB with the boat rope and after steadying line.

Table 21 RIB PC Recovery Procedures (cont)

Order	By/To	Response
		Coxswain stops engine.
High Enough	I/C to crane/davit operator	When the boat is just below the crane/davit head.
Slue/Luff In	I/C to crane/davit operator	The boat and crane/davit are brought in until lined up with the chocks.
If unloading at deck level the "Avast" will be given when the RIB is approx. 0.5 m below deck level, at which time the boat will be slued/luffed in. On completion, the RIB will be hoisted to the crane/davit head.		
CAUTION: When sluing/luffing in, the RIB's hull must clear the chocks and guardrails. The boat's crew must be distributed in the boat so that it is lifted on an even keel.		
Lower Away	I/C to crane/davit operator	Designated personnel must be alert to correctly align the keel into the chocks.
Avast	I/C to crane/davit operator	Crane/davit operator stops lowering.
Secure the RIB	I/C to designated personnel	Flush out coolant lines with anti-freeze (winter only).
		Rig tie downs.
		Shut down the power to the hydraulic unit.
		Secure lifelines.
		Coxswain places keys in the outboard motor locker.
Clear the boat	I/C to boat's crew	Clear all personnel from the boat.
Boat secure for sea	I/C to Command	Boat secured for sea.

11.13 Landing Craft Vehicle Personnel (LCVP)

11.13.1 General Description

The LCVPs carried by AORs are used to transport personnel, supplies and ammunition. They require a minimum crew of three to operate: a coxswain, a bowsman and an engineer. The open cargo area is approximately 5.5 m in length by 2.1 m wide and is accessed by a drop-down ramp to ease embarkation/disembarkation. The ramp can be lowered hydraulically or manually. The cargo area is also protected above the waterline by armour plate which is capable of stopping small arms fire. The single screw and rudder are protected by a skeg to prevent damage during beaching operations. Fully loaded, the LCVP has a range of about 160 km at 9 kts. The maximum number of personnel to be hoisted/lowered is three.

Figure 11.13-1 - LCVP with Lifting Sling Fitted

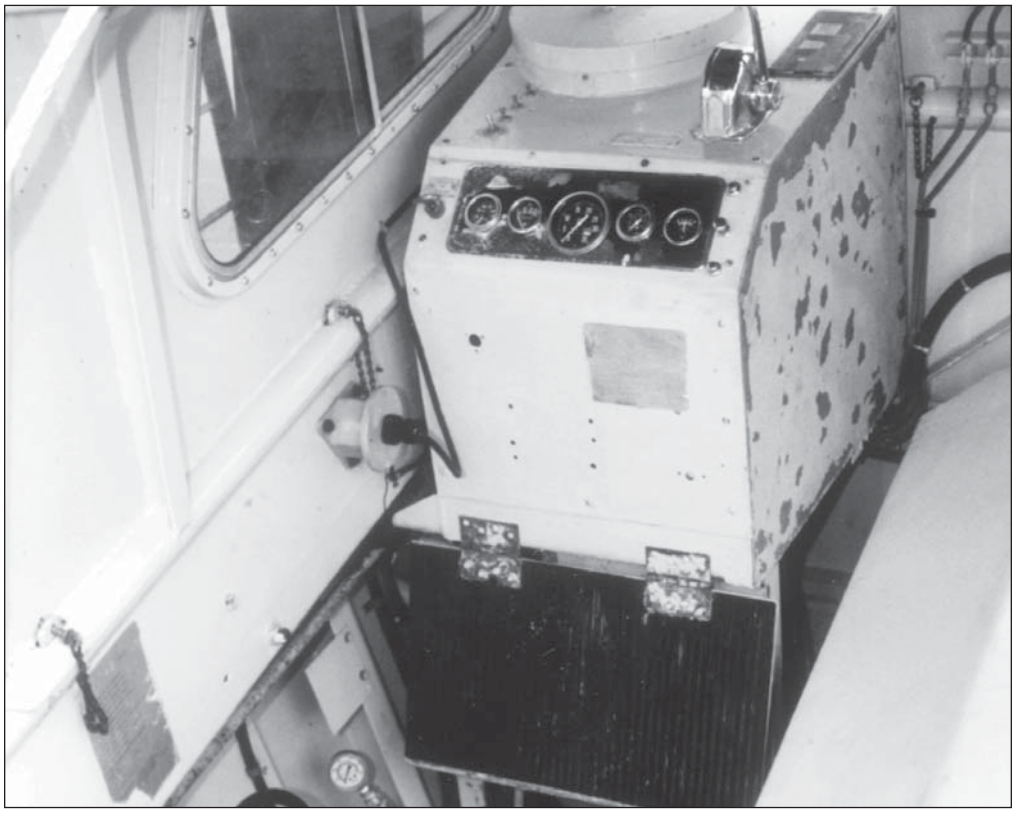


Figure 11.13-2 - LCVP Console

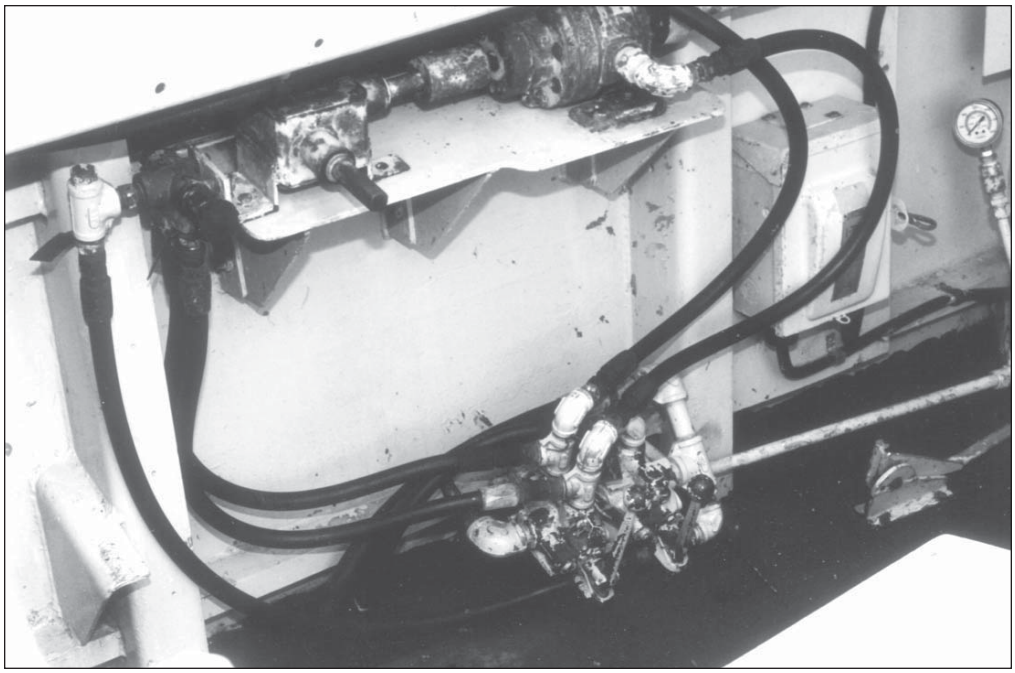


Figure 11.13-3 - LCVP Hydraulics

Figure 11.13-4 - AOR 509/510 Crane and LCVP

11.13.2 Manoeuvring

Since it is fitted with a single right-hand turning propeller, when moving forward the LCVP will turn more easily to port than to starboard. When wind becomes a significant factor, a turn can be started more quickly by turning away from the wind and allowing the wind against the large freeboard to work with the rudder in making the turn. In a sudden start with a rapid application of forward throttle, the stern tends to swing temporarily to starboard. Likewise, when going astern suddenly, the stern tends to swing to port. It is difficult to go astern in a straight line as, again, the high freeboard and small draft cause the LCVP to be affected by the wind. It may be necessary to periodically stop backing and apply forward thrust to control the bow.

11.13.3 Equipment Checklist

The following equipment should be stowed or made available depending on the operation:

Table 22 LCVP Equipment

Equipment	Qty	Equipment	Qty
Anchor Danforth 13.5 kgs	1	Boat hook	2
Anchor line with 3 m of 10 mm chain, 92 m of 24 mm nylon	1	Search light	1
Fire extinguisher	1	Jerry can of water	1
First aid kit	1	Jerry can of oil	1
50 cm Kisby Ring with 20 m of 12 mm polypropylene	2	Fuel sounding rod	1
Grapnel hook with 30 m of line	1	Anti-broaching lines 30 m of 24 mm DB nylon	2
Berthing lines 15 m of 24 mm DB nylon	2	Broom	1
Fenders	4	Steadying lines 25 m of 12 mm polypropylene	2
Two-fold purchase with 36 m of line	1	Engineer's tool bag	1

11.13.4 Pre-Launch Checklist

The following pre-checks are to be conducted prior to flashing up the LCVP:

Table 23 LCVP Pre-Launch Checklist
Ensure both plugs are in.
Sea water intake valve fully open.
Check oil level and coolant.
Check the position of the valves on the starboard side of engine. The upper valve is the overboard cooling water discharge and should be fully open. The lower valve is the Arctic recirculation valve and should be fully closed.
Check fuel level.
Check fuel water separator valve and bleed out water.
Open fuel valve.
Check steering and tiller flats.
Check for batteries.
Check lights and horn.
Check boats equipment.
Check flares.
Check mast and ensign.
Check bow and stern lines.
Check anchor and line.

11.13.5 Engine Start/Stop Procedure

Table 24 LCVP Start/Stop Procedures	
Starting	**Stopping**
Disengage clutch.	Allow engine to idle for about 5 minutes to cool down.
Push throttle forward slightly.	Pull out manual stop handle.
Press start button.	
Check hydraulics for capstan and ramp.	
Allow to warm up.	

Engine gauge readings should be :

Oil Pressure:	60 PSI minimum @ 600 RPM
	90 PSI minimum @ 2000 RPM
Voltmeter:	25/26 Volts
Temperature:	170 -180 Degrees F
Tachometer:	600 - 2200 RPM

11.13.6 LCVP Operations

a. **Beaching.** The proper beaching of a LCVP requires an experienced crew. The coxswain must know how to work the surf to advantage and the proper way to approach the beach. Only in extremely calm conditions and where there is little tidal range should the kedge anchor not be used. The greatest danger in beaching is that of broaching. Broaching is caused by the surf hitting the LCVP on the side or quarter, resulting in it being thrown broadside onto the beach. The approach should be made as following:

(**1**) Before entering the surf, line up the LCVP with the spot chosen to beach. Once the surf has been entered, the course should not be changed.

(**2**) Keep the LCVP at a 90 degree angle to the surf. The LCVP's angle to the surf is more important than the angle to the beach.

(**3**) Estimate the speed at which the waves are moving and adjust the speed to ride in just behind the crest.

Note.

If using the Kedge Anchor, let it go when 15 to 18 m from the beach.

(**4**) Hit the beach at a good speed so that the entire keel grounds. Keep the engine in gear to hold the boat securely on the beach.

(**5**) Lower the ramp.

b. **Anti-Broaching Lines.** Anti-broaching lines are used to help prevent broaching or to help correct a broach. They should be rigged and employed according to the following diagrams.

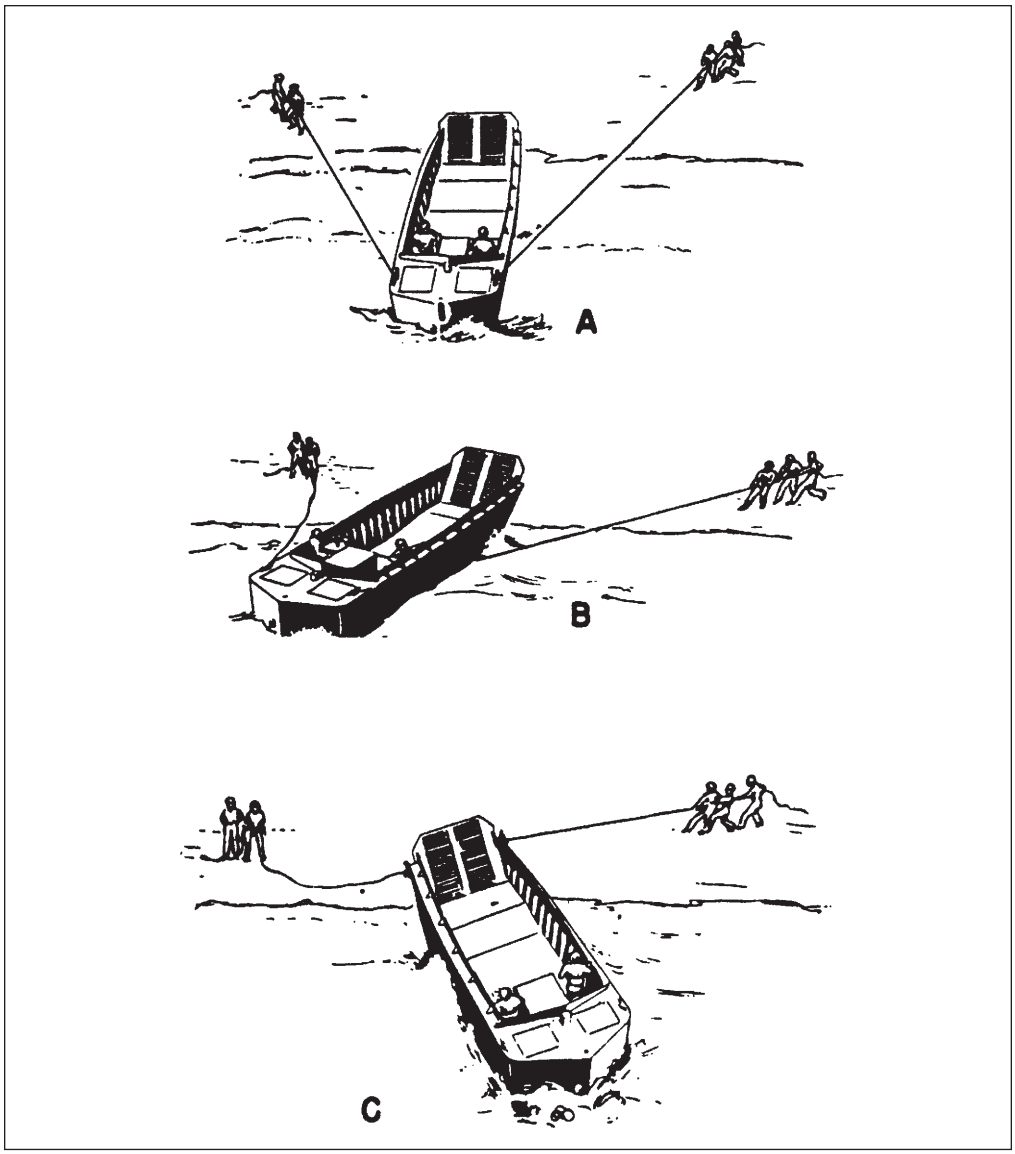


Figure 11.13-5 - Anti-Broaching Lines

Note.

Sometimes it is possible to free a broached LCVP without outside help. Put the rudder toward the beach and when a wave lifts the LCVP use full throttle. This should force the stern away from the shore.

c. **Withdrawing.** Withdrawing is the most difficult part of the operation. It is during this procedure that the boat is most easily broached. The departure should be made as following:

(**1**) Close the ramp. Never leave the beach with the ramp open.

(**2**) Put the rudder amidships.

(**3**) Shift the engine into reverse. Wait for a wave to float the LCVP, then use full throttle. If the bow begins to fall off, turn the rudder in the direction of the swing. This should bring the bow back, but ease the rudder soon to avoid over correcting.

Note.

If using the kedge anchor, heave in on the anchor line using the capstan when the LCVP is lifted by the wave. The engine may be used to assist, but ensure the line does not foul in the propeller.

(**4**) Continue going astern, keeping the waves directly astern.

(**5**) When it is safe to come about, on the crest of the next wave shift into forward and put the helm hard over. This should cause the LCVP to come about before the crest of the next wave arrives.

11.13.7 LCVP Launch/Recovery Procedures AOR Class

PRESERVER and PROTECTEUR carry two LCVPs, one on each side of the hangar. They are launched using the 15 ton fixed cranes located just forward of the flight deck. These cranes have a maximum outreach of 11 m. The double-purchase hoist uses 7/8" FSWR and a 363 kg block. Although these cranes are rated at a 15 ton lifting capacity, operators should be aware that restrictions have been issued due to structural and mechanical wear.

Table 25
AOR Class LCVP Launch Procedures

Order	By/To	Response
The crane operator must confirm with the MCR that sufficient power is available to operate the 15 ton crane. The operator should conduct a visual check of the crane area and flight deck and check the drums for loose or riding turns. Before starting, the control levers must be in neutral and the motors started one at a time. The ship must be stopped.		
Man the LCVP	I/C to boat's crew	Boat's crew man the LCVP.
Clear Away the LCVP	I/C to designated personnel	Prepare the LCVP for launch.
		Insert the plugs.
		Slip the securing arrangements.
		Rig fenders, bow line and after steadying line.
		Disconnect the Arctic start.
Boom Up/Slue Out	I/C to crane operator	Unhook crane from stowage cradle and slue outboard until it is over the boat.
Hook on When Ready	I/C to coxswain	Hook onto the lifting sling.
Hoist Away Handsomely	I/C to crane operator	Take minimum strain on hook.
Ready in the Boat	Coxswain to I/C	When boat is cleared away.
Ready to Launch	I/C to bridge	The boat is fully ready to be launched.
Launch the LCVP	OOW to I/C	
Hoist Away	I/C to crane operator	The LCVP is raised enough to clear the chocks. The crew is to stand on the outboard side of the LCVP.
High Enough	I/C to crane operator	Crane operator stops hoisting.
Slue Out	I/C to crane operator	Crane slues LCVP outboard.
Lower Away	I/C to crane operator	Using boom and hoist.
Slip When Ready	I/C to coxswain	
Slip	Coxswain to bowsman and engineer	The lifting sling is slipped from the crane hook.
Boom Up	I/C to crane operator	To raise the crane hook away from the crew.
Let Go Aft/Forward	Coxswain to bowsman and engineer	The bow line and after steadying line are removed and recovered on board.
Note: Always let go aft first.		

Table 26
AOR Class LCVP Recovery Procedures

Order	By/To	Response
Recover the LCVP	Command to I/C	Check with MCR for power.
		Make up heaving lines.
Slue Out	I/C to crane operator	Crane slued outboard.
Lower Away	I/C to crane operator	Hook lowered halfway to water.
		Wave the LCVP alongside.
		Heaving lines lowered and after steadying line and bow line brought on board.
Lower Away	I/C to crane operator	Hook lowered to LCVP using boom and hoist.
Hook On	I/C to coxswain	
Hooked On - Ready in the Boat	Coxswain to I/C	
Hoist Away	I/C to crane operator	Once hooked on the LCVP is hoisted clear of the water using the boom and then hoisted roundly.
High Enough	I/C to crane operator	When boat is high enough to clear chocks.
Slue In	I/C to crane operator	Until the LCVP is over chocks.
Lower Away	I/C to crane operator	Centring LCVP in chocks using the boom luff.
Secure the LCVP	I/C to designated personnel	The LCVP is secured for sea and reported to the Bridge.

11.14 VICTORIA Class

a. **IRB.** Submarines carry a six-man IRB which is usually stored and deflated above the Strongbacks in the forward torpedo room. The engine is also stored in the forward torpedo room and fuel is kept under the forward casing in a fuel bladder. Once the boat is inflated on the casing, it is launched and recovered by essentially "man-handling" it on and off the ballast tanks.

b. **Boat Transfer.** When a boat transfer is required, the CASO, SCRATCHER and swimmer obtain permission to "Man the Tower", then "Open the Fin Door", then "Proceed to the Casing".

Depending on the weather, personnel for the boat transfer will proceed to the casing via the conning tower or the accommodation space hatch.

Small boat coxswains effecting a boat transfer must usually drive their boats onto the main ballast tanks 20-40 ft in front of the fin at approximately a 45 degree angle. Many coxswains are reluctant to do this but it is the only way to ensure that personnel being transferred are able to step from the boat unto the ballast tank or vice versa, rather than jumping from one moving boat to another. The swimmer will be on the ballast tank holding onto a knotted line to assist personnel as required.

For larger boats and tugs, the transfers will take place close to the Foreplanes so as to prevent these heavier vessels from damaging the ballast tanks.

CHAPTER 12
Booms and Ladders

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CHAPTER 12
Booms and Ladders

12.1 Introduction

Booms and ladders are required when a ship is at anchor or secured to a buoy. Ladders and nets can also be used to embark and disembark personnel such as harbour pilots or boarding parties. As well, the accommodation ladder can be used as a temporary gangway if required.

12.2 Booms

Boat booms are fixed or swinging spars made of wood or metal. They are used to secure the ship's boats while the ship is secured to a buoy or at anchor.

12.2.1 Personnel Required

Table 1 Personnel Required

	HALIFAX	IROQUOIS	AOR
Quarterdeck I/C	1	1	1 each boom
Workers	3	3	6 each boom

Note.

KINGSTON class are not fitted with booms.

12.2.2 Equipment Required

Table 2 Equipment Required

EQUIPMENT	
Boat Boom	1
Gooseneck Fitting	1
Fore Guy	1
After Guy	1
Lizard	1
Boat Rope	1
Jacob's Ladder	1
Topping Lift	1
Block and Tackle*	1

* AOR 509/510 Class

Note.

AOR 509/510 requires one extra set of boom gear when rigging both booms.

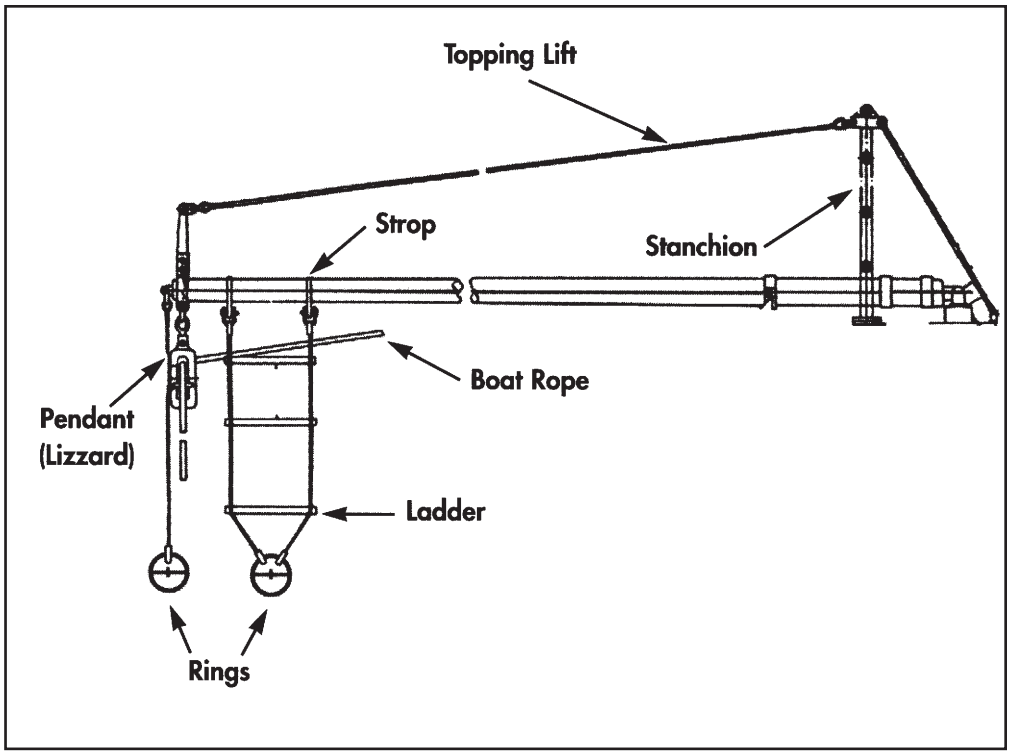

Figure 12.2-1 - Boom Rigging IROQUOIS, HALIFAX

12.2.3 Preparation – IROQUOIS, HALIFAX

(**1**) The boom is removed from its stowage position and laid out on the designated side.

(**2**) The gooseneck fitting is bolted to the deck and the inboard end of the boom is bolted to the gooseneck fitting.

(**3**) The topping lift is attached on the lug to the stanchion on the outboard end of the boom.

(**4**) The fore and after guys are attached to the lugs on the spider band on the outboard end of the boom.

(**5**) The lizard is attached to the lug fitted at the end of the boom.

(**6**) The boat rope block is attached to the lug at the base of the spider band.

(**7**) The upper ends of the Jacob's ladder are attached to the positioned strop on the boom.

(**8**) The collar assembly is opened so that when the boom is swung outboard it fits into the assembly.

Note.

The boom should be laid out and rigged upside down such that when the boom is lifted vertically and then laid outboard, the boom gear will lay in the proper position.

12.2.4 General Procedures – IROQUOIS, HALIFAX

(**1**) When ordered, the boom is lifted to a vertical position and then laid outboard. The movement of the boom is controlled by using the topping lift and guy lines.

(**2**) The boom is then lowered into the collar assembly and the clamp is closed.

(**3**) The topping lift and the fore and after guys are secured to the appropriate fittings.

(**4**) Finally, the boat rope is led forward far enough to ensure that the boat can lay easily at the boom.

12.2.5 Recovery – IROQUOIS, HALIFAX

(**1**) The collar assembly is opened and the topping lift and guy wires are heaved in, ensuring there is enough slack in the boat rope to allow the boom to be swung inboard and placed on deck.

(**2**) The boom is then de-rigged and removed from the gooseneck fitting.

12.2.6 Preparation – AOR 509/510 Class

a. To prepare the boom, the following must be done:

(**1**) The collar assembly is open and the topping lift and guy wires are heaved in, ensuring there is enough slack in the boat rope to allow the boom to be swung inboard and placed on deck.

(**2**) The boom is then de-rigged and removed from the gooseneck fitting.

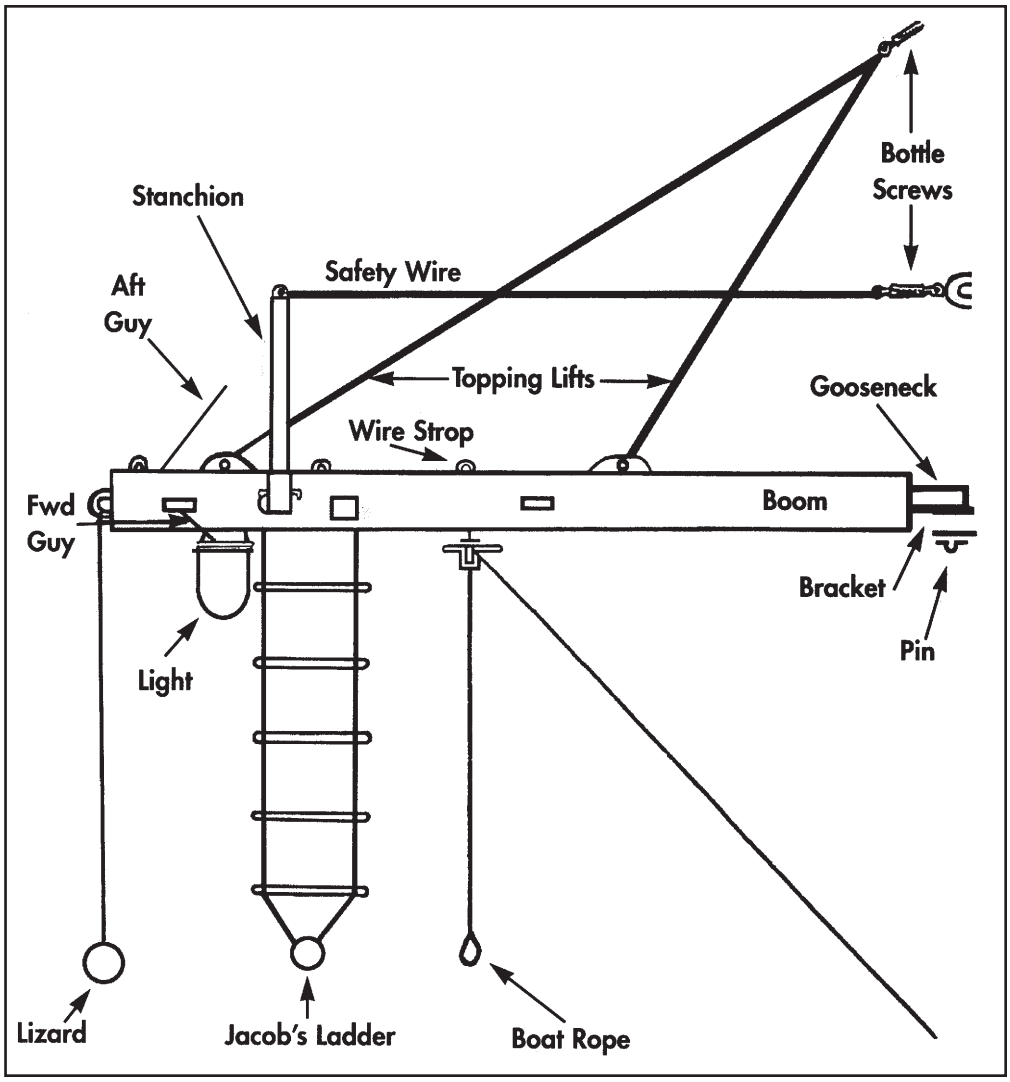

Figure 12.2-2 - Boom Rigging AOR 509/510

b. The following are the steps required for preparation in AOR 509/510 class:

(**1**) The boom is removed from its stowage rack and the lizard is shackled to the outboard end.

(**2**) A short wire strop is attached to the middle of the boom.

(**3**) A block and tackle is secured to the strop and then to an eye bolt on 02 deck (boat deck).

(**4**) The fore and after guys, boat rope and topping lift are laid out nearby.

12.2.7 General Procedures – AOR 509/510 Class

(**1**) One person is positioned on 02 deck to heave in on the lizard while the block and tackle is being heaved in. This will ensure that the outboard end of the boom is in the upper position as it is hoisted over the ship's side and lowered to the gooseneck bracket. (Access to gooseneck bracket is via the clam shell.)

(**2**) When the gooseneck on the inboard end of the boom is in its bracket, it is secured by placing a split pin through the hole in the bottom.

(**3**) With the boom still in a vertical position, the fore and after guys, boat rope and Jacob's ladder are placed in position.

(**4**) The safety wire stanchion is inserted into the boom and the safety wire is rigged.

(**5**) The legs of the topping lift are secured to their respective eyepads.

(**6**) The bottle screws are shackled fully extended to the eyepads on the bulwarks.

(**7**) The boom is lowered into position and the bottle screws tightened as necessary to take up the slack. The tackle and wire strop are removed and recovered.

Note.

Personnel working over the side rigging the gooseneck are to wear life jackets and safety harnesses.

12.2.8 Recovery – AOR 509/510 Class

(**1**) One person is positioned on the boom to secure a wire strop at the midway point and connect it to a block and tackle.

(**2**) The tackle is heaved in until the boom is in an upright position. One person is positioned on 02 deck to heave in on the lizard and hold the boom in place while the Jacob's ladder, boat rope, topping lift, safety wire, and fore and after guys are de-rigged and recovered.

(**3**) The split pin is removed from the bottom of the gooseneck and the boom is hoisted and swung inboard. All gear is de-rigged and secured.

12.3 Jumping Ladder

The jumping ladder is a portable ladder which can be lowered over the side of a ship at sea in order to embark and disembark passengers from boats. It consists of chain, wire or cordage side ropes which are rove through wooden treads. The ladder is rigged such that it reaches from the step plate to the waterline.

12.3.1 Preparation

Upon confirmation by Command as to which side the ladder is to be rigged, the I/C and three to four hands will ensure that the ladder, recovery line (approximately 13 m of 18 mm Polypropylene), and two 3/4" bow shackles are laid out at the rigging position.

12.3.2 General Procedures

(**1**) The inboard end of the ladder is shackled to the eyepads fitted on either end of the step plate, or on two other suitably tested eyepads.

(**2**) The recovery line is tied to the bottom of the ladder and led forward until needed.

(**3**) The tricing lanyard for raising and lowering the ladder is secured to a cleat.

(**4**) Guardrails are broken, and temporary guardrails rigged as necessary.

(**5**) The ladder is lifted over the side and the tricing lanyard and recovery line are checked away until the ladder is just above the waterline. The two lines are secured.

Note.

All ladders require anti-twisting battens. These are rigged at 3 m intervals and are normally 1.2 m in length.

12.3.3 Recovery

(**1**) Shorten in as much as possible by heaving in on the tricing lanyard. The recovery line is then used to haul the ladder inboard.

(**2**) All guardrails are re-rigged and the ladder disconnected and secured for sea.

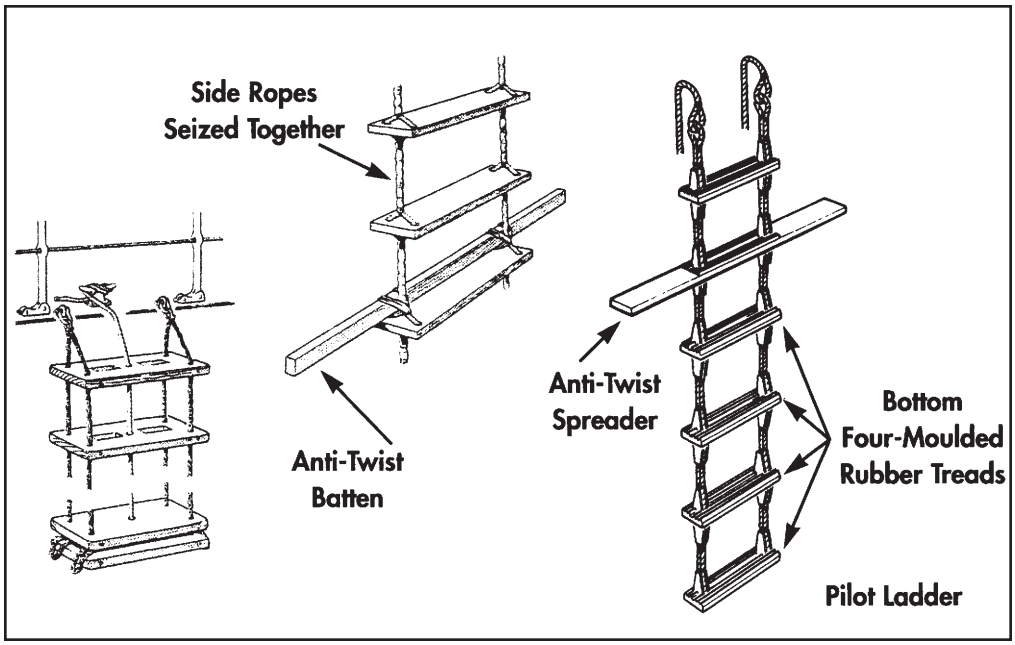

Figure 12.3-1 - Jumping Ladders

12.4 Mediterranean Ladder

The Mediterranean Ladder is a portable, rigid, vertical ladder which can be used for ceremonial purposes or when the accommodation ladder is not rigged. Ships are usually fitted with one ladder which can be rigged either port or starboard. Mediterranean ladders are only carried in the IROQUOIS and HALIFAX Classes.

12.4.1 Equipment and Personnel

(**1**) Besides the ladder itself, the following equipment is required: fore and after guys, two rope handrails, a rubbing chock, fender and two drop-nose pins.

(**2**) The I/C will be a 6A qualified PO2/MS Bosn. He/she will require a crane operator and five to six hands to assist in rigging the ladder.

12.4.2 Preparation

(**1**) Upon confirmation by Command on which side the ladder is to be rigged, the ladder shall be removed from its stowage position and placed on deck near the rigging position.

(**2**) The rope handrails are rigged through the eyebolts at the base of the ladder such that the manrope knots are at the bottom. These lines are led up through the manrope stanchions.

(**3**) The fore and after guys are shackled to the eyeplates at the base sides of the ladder.

(**4**) The fender is secured to the lower inboard end of the ladder.

(**5**) A strop is then secured around the centre rung of the ladder.

12.4.3 General Procedures

(**1**) Once the ladder is properly rigged, it is placed athwartships with the bottom end hanging outboard.

(**2**) The crane hook is secured to the strop and the weight is taken by the crane. Designated personnel take control of the guys to steady the ladder as it is being hoisted and lowered into position. The crane is trained outboard as the ladder is raised from the deck.

(**3**) Once the ladder is outboard and vertical, it is lowered into position with the lugs on the ladder lining up with the brackets on the step plate. The pins are inserted.

(**4**) The fore and after guys are secured to the ship's fittings and the manropes are secured to the stanchions on either side of the step plate. The strop is then removed.

12.4.4 Recovery

(**1**) The lifting strop is placed around the centre rung and hooked on to the crane hook.

(**2**) The rope handrails and guy lines are unfastened, keeping the guy lines in hand.

(**3**) As the crane takes the weight of the ladder, the pins are removed and the ladder is raised and swung inboard. The ladder is laid on deck and all equipment is de-rigged and stowed.

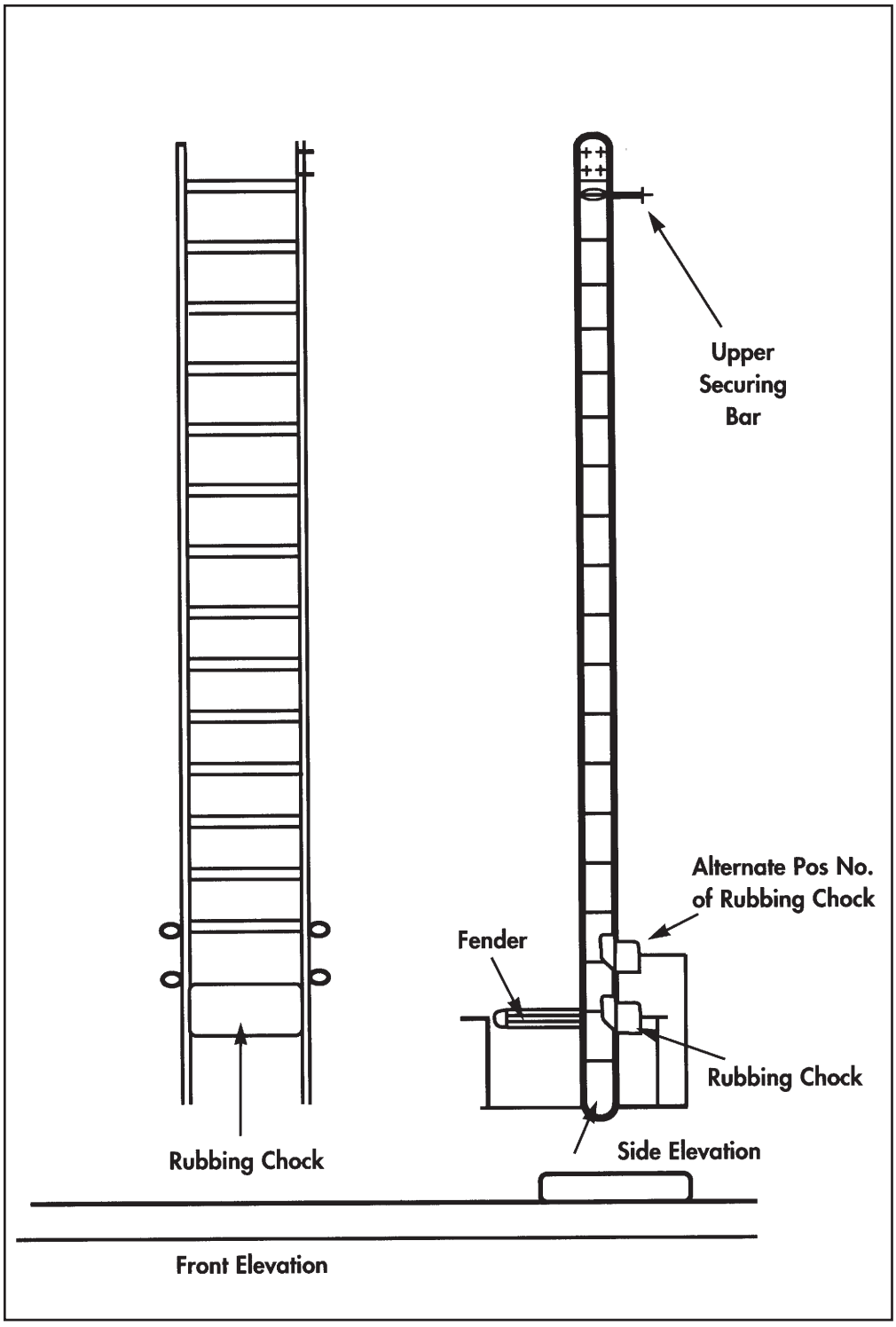

Figure 12.4-1 - Mediterranean Ladder

12.5 Jacob's Ladder

a. Jacob's ladders are constructed from steel wire rope strings 30 centimetre (cm) apart, and round wooden rungs (Canadian Elm) which are 40 cm long by 3.5 cm diameter. The rungs are inserted into the wire rope at 30 cm centres, so that three strands are on each side, and wire seizings are placed above and below to hold the rungs in position. When the ladder is used in conjunction with boat booms, a round thimble is seized in the bight of the wire to which the lazy painter of a boat can be secured.

b. These ladders are also fitted at hatches which are on escape routes from manned compartments and accommodation spaces. They are shackled at their upper ends to eyeplates and are stored rolled until required when their lower ends are secured to eyeplates by cordage tails. If these ladders are used against a vertical bulkhead, a pad should be secured between the top of the ladder and the bulkhead so that the ladder lies away from the bulkhead and provides better hand and foot holds.

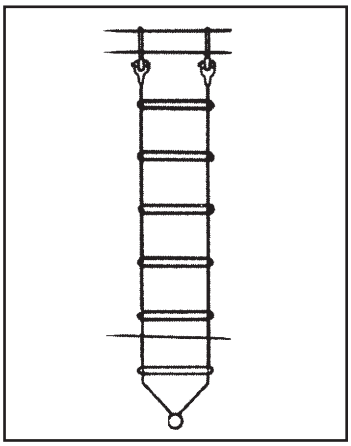

Figure 12.5-1 - Jabob's Ladder

12.6 Accommodation Ladder

The standard accommodation ladder has an upper and lower platform for easy embarkation/disembarkation. The ladder hinges from the after end of the upper platform which in turn hinges to the main deck. The lower platform is bolted to the ladder and supported by two stays fastened to the ladder. Both the lower platform and the ladder are held to the ship's side with struts. The lower platform has two positions to keep the platform at a convenient height above the water depending on the ship's draft. The gangway fittings or "furniture" consist of handrails which are supported by lightweight stanchions mounted on the ladder and platforms. Accommodation ladders are not carried in the KINGSTON Class.

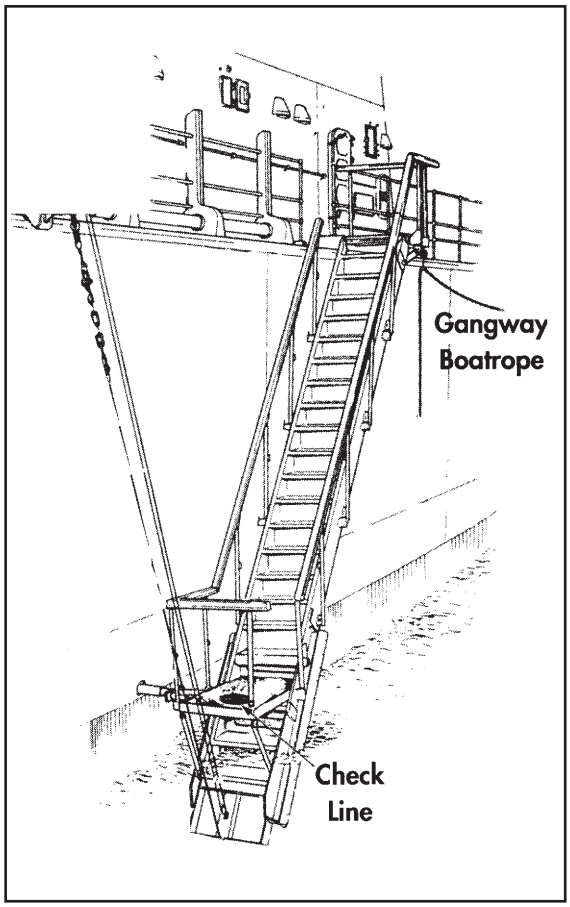

Figure 12.6-1 - Accommodation Ladder (General)

12.6.1 Personnel and Equipment

a. The I/C shall be a 6A qualified PO2/MS Bosn. A crane operator will be required as well as eight to twelve hands to assist with the rigging. Quarterdeck or top part ship hands can be used, or off-watch members of the Deck Department can be piped to close up.

b. The following table lists the equipment required to rig the accommodation ladder.

Table 3 Equipment–Accomodation Ladder

Block and tackle	Handrail stanchions
Handrails	Upper platform
Lower platform	Wishbone
Bridle	Lower platform stays
Two-legged Sling (IROQUOIS)	Forklift (AOR)

12.6.2 Preparations – HALIFAX Class

(**1**) The accommodation ladder is removed from its stowage and laid out on the port side top part ship aft of the breezeway.

(**2**) The wishbone is attached to the outer side of the upper platform. The inboard end is hinged to the step plate and lowered in place until the lug on the wishbone fits into the lug on the ship's side.

(**3**) The lower platform is fitted to the ladder.

(**4**) The chain bridle pendant is attached to the base of the ladder which is then attached to the davit.

(**5**) The four-legged sling is attached and is used for lifting the ladder.

(**6**) The numbered stanchions should then be fitted into the corresponding numbered brackets on the ladder and lower platform.

(**7**) One end of the wire pendant is attached to the davit and the other end to the ring on the chain bridle.

12.6.3 General Procedures – HALIFAX Class

(**1**) The ladder is hoisted, slued outboard and lowered into position until the upper end can be attached to the upper platform. The ladder is then lowered to the full extent of the bridal pendant.

(**2**) The lower platform stay is fitted to the bracket on the ship's side.

(**3**) The lifting sling is then removed and the boat rope and check line are rigged. The gangway boat rope is led well forward.

(**4**) The stray line is spliced into the boat rope near the after end and belayed to a cleat abreast the upper platform. This is used to recover the boat rope when not in use. The end of the boat rope is cheesed down on the upper platform when not in use.

12.6.4 Recovery – HALIFAX Class

(**1**) The boat rope is removed. The slings are rigged such that the ladder will be horizontal when raised.

(**2**) The lower platform securing pin is removed from the hull and the ladder is raised so that it is horizontal.

(**3**) The ladder is disconnected from the upper platform and swung inboard.

(**4**) The handrails, stanchions, lower platform and bridle are all removed and all equipment is secured.

12.6.5 Preparations – IROQUOIS Class

(**1**) The two-legged sling is fitted to the lugs at the head of the ladder, while the chain bridle is secured to the lugs at the foot of the ladder.

(**2**) A preventer (tag line) is passed around the ladder's upper side.

(**3**) The heavy stores davit is removed from its stowage and placed in the step near the foot of the ladder.

(**4**) The fore and after guys and the ladder pendant are secured to the ring of the chain bridle. The tackle is secured to the same ring.

12.6.6 General Procedures – IROQUOIS Class

(**1**) The tackle is heaved in and secured to the davit cleat.

(**2**) The crane is hooked on to the two-legged sling at the head of the ladder.

(**3**) The upper platform is placed in its brackets. With one line around the outboard cleat and another attached to the legs, the upper platform is lowered into position.

(**4**) The gripes are removed from the ladder and the ladder is heaved in with the HIAB crane. As the ladder comes up, it will tend to fall outboard. The rate of fall is controlled by the preventer.

(**5**) The ladder is lowered to the waterline.

(**6**) The stanchions, hand rails, and lower hull lugs are then inserted in place. If the ladder is to remain rigged for an extended period of time, the tackle is removed.

12.6.7 Recovery – IROQUOIS Class

(**1**) All furniture and stanchions are removed.

(**2**) A block and tackle is rigged to the lower end of the ladder and the ladder is hoisted to deck level.

(**3**) The bottom platform is removed and the HIAB crane is hooked onto the upper end of the ladder.

(**4**) The ladder is disconnected from the upper platform. Using the crane, davit and two preventers, the ladder is secured in its stowage position.

(**5**) The upper platform is removed from its bracket, and all gear is secured.

12.6.8 Preparations – AOR 509/510 Class

(**1**) Upon confirmation by Command as to which ladder will be used (AORs have one ladder stowed on either side), the hand winch falls are rigged on the ordered side, and hooked to the accommodation ladder yoke. The slack is taken up.

(**2**) The steadying lines are then secured to the accommodation ladder and the securing gripes removed.

12.6.9 General Procedures – AOR 509/510 Class

(**1**) Two steadying lines are secured to the ladder. One is secured at the centre rung bracket and then tied on to the mast on the forklift (positioned nearby). The second line is secured to the bottom outboard bracket and then turned up on the nearest deck cleat.

(**2**) With the weight taken up by the hand winch and using the steadying lines, the accommodation ladder is lowered to the horizontal position. Ensure that the wishbone is fully extended under the upper platform.

(**3**) The steadying lines are removed and the stanchions are placed in the appropriate fittings on the ladder and platforms. The hand rails are then fitted to the stanchions. (Hand rails are constructed of cordage versus wood.)

(**4**) The mobile accommodation platform is hoisted outboard by the mobile crane, lowered and positioned underneath the lower platform of the accommodation ladder.

(**5**) A hand who is wearing a life jacket and a safety harness descends the ladder and hooks on the mobile platform securing chains.

(**6**) The after end of the platform is secured by a two-legged sling attached to a two-fold purchase rigged from a beam clamp on the lower bulwarks.

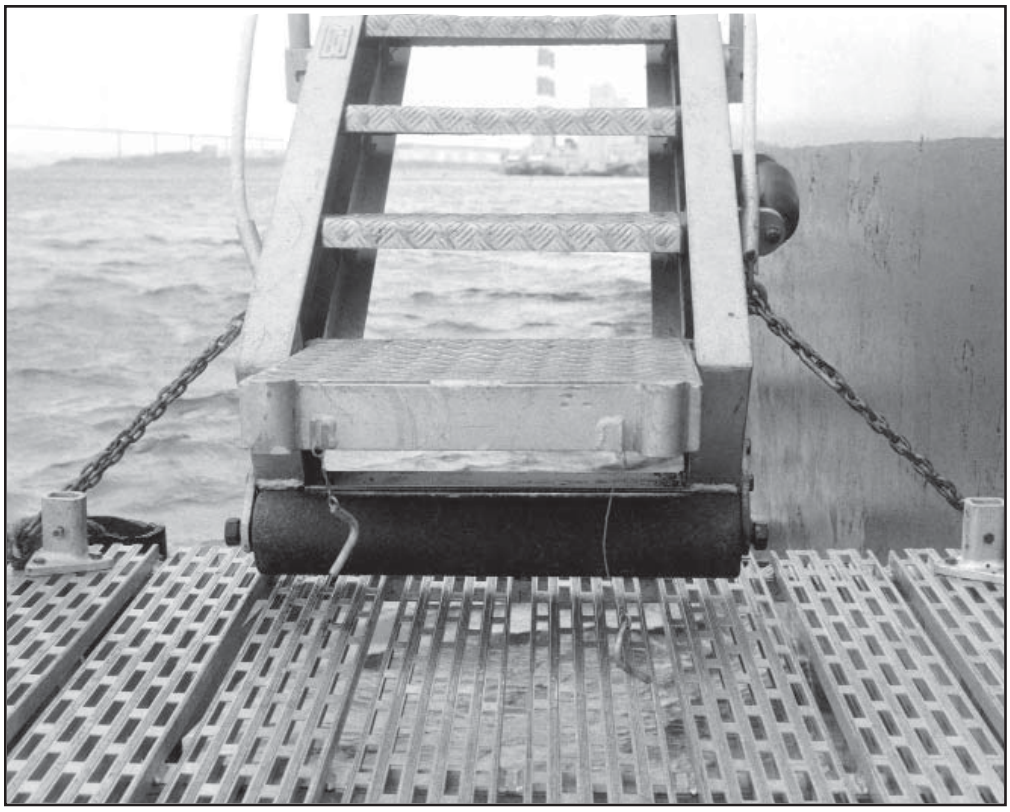

Figure 12.6-2 - Accommodation Ladder and Platform AOR 509/510

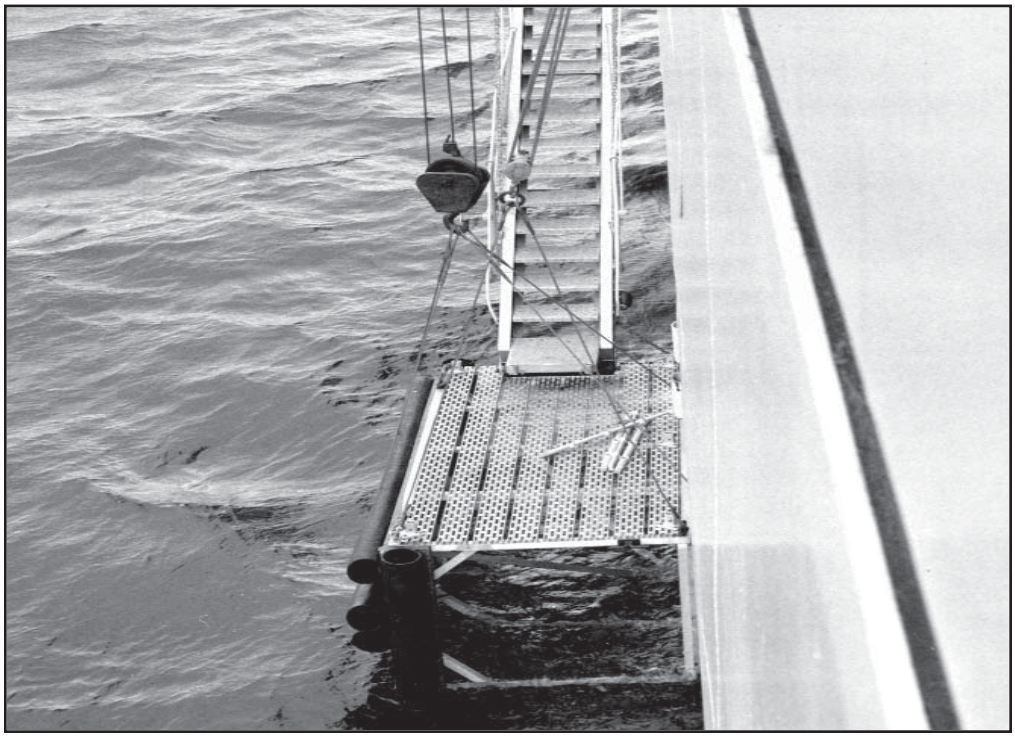

Figure 12.6-3 - Accommodation Ladder and Platform AOR 509/510

12.6.10 Recovery – AOR 509/510 Class

(**1**) A mobile crane is set up on the top part of the ship and secured to the mobile platform.

(**2**) The ladder and platform are raised until the ladder is horizontal.

(**3**) A hand who is wearing a life jacket and a safety harness is sent outboard to de-rig the hand rails and stanchions and rig steadying lines.

(**4**) The ladder is turned inboard by heaving in on the steadying lines (one again tied on to the mast of the forklift), and is then hand winched into its chocks and secured with gripes.

(**5**) The yoke is disconnected and all gear is secured.

12.6.11 HALIFAX Class Articulated Accommodation Ladder

Aim

(**1**) All Halifax class ships are being fitted with the new Articulated Accommodation ladder. So that all ships are rigging the ladder properly and safely the following is the SOP for the Articulated Accommodation ladder.

Equipment

(**2**) The following equipment is required.

(a) articulated accommodation ladder
(b) chain bridal
(c) lifting bridal
(d) lower platform
(e) safety step
(f) upper platform stantions
(g) dump light
(h) crane
(i) 20 ft strop
(j) safety belt

Procedure While at Anchour and Buoy

(**3**) The procedure for at anchor and buoy are as follows:

(a) Attach lower platform to bottom of ladder in position as required by operating conditions.
(b) Extend bail bracket into a position perpendicular to ship's side and pin in position.
(c) Attach one strop forward outboard of the pin securing the ladder to the forward stanchion and one strop aft outboard of the pin securing the ladder to the after stanchion.

(d) With the crane being outboard of the ladder approximately 6", take the slack so the weight can be evenly distributed between both strops.

(e) Remove securing pins from storage bars, hook on the chain bridal and manually push the ladder until the crane has all the weight.

(f) Ship down until ladder is resting in position on the bail bracket.

(g) Once the ladder is on the bail bracket, Send one person on the ladder to disconnect the strops. Hook on the hoisting sling assembly to lower after eyes at the bottom of the ladder hook the ring to the crane ("Alternate" hook upper triple block to aft eye in davit head lower block to ring of the hoisting sling). Hook single leg of chain bridal to the forward eye of the accommodation ladder davit.

(h) The same person will place the chain bridle and strong back (spreader bar) on the ladder using a rope to prevent it from falling in the water until the lower chains are hooked up to their appropriate position. Lash the spreader bar and the upper chain on the steps and clear ladder of all personnel.

(i) Remove pins from all hinged horizontal support braces from ladder and using crane if necessary, raise ladder about 1/2" and move ladder outboard until all the support braces are removed and inboard.

(j) Hoist ladder approximately 3" off bail bracket, secure bail bracket into its ships side stowage position. Remove lashing from spreader bar attach a tethering line to spreader bar. Lower ladder to full down position.

(k) Secure the turnbuckle assembly to the ship's side and using the ships crane to slew inboard to enable personnel to hook on the turnbuckle assembly to the lower platform.

(l) Have person remove hoisting sling assembly that was used to lower ladder in position and secure the crane.

(m) Place bumper on the lower platform.

(n) Raise handrails, rig upper and lower platform's stanchions and handrails.

(**4**) The following steps should be followed to bring the ladder up and secure it in the stow position:

(a) Secure the upper platform stanchions and handrails, lower ladder handrail for the stow position remove bumper and turnbuckle, hook on tethering line to spreader bar and hook on the hoisting sling assembly and hook on to the crane (Alternate 3 fold purchase).

(b) Whip up until the ladder clear the bail bracket, Place bail bracket it out position, slew inboard to place the ladder on the bail bracket.

(c) Using the crane, slew the ladder in place in all hinged horizontal support braces and put securing pins in. Remove chain bridle assembly.

(d) Disconnect hoisting sling assembly from the ladder and the crane.

(e) Attach one strop forward outboard of the pin securing the ladder to the forward stanchion and aft outboard of the pin securing the ladder to the after stanchion

(f) Whip up and slew inboard until the ladder is in place in its stowed position.

(g) Put securing pins to hold ladder in its stowed position, disconnect and secure the crane.

(h) Remove strop and secure ladder and equipment for sea..

Procedure While Used as a Brow

(**5**) When using the articulated ladder as a brow the steps are the same as for when at anchor with the exception of the following.

(a) The safety step is secured on the ladder instead of the lower platform.

(b) There is no requirement to use the spreader bar.

Personnel

(**6**) The personnel required for this evolution comprise of 6 personnel 1 I/C, 1 crane operator and 4 workers.

12.7 Pollution Control Booms

12.7.1 Introduction

a. Containment is the most important phase in the control of an oil spill. It prevents the spread of the oil on the water, thus minimizing environmental damage. Successful containment is very dependent upon response time. The principal containment device is the oil boom.

b. Booms are normally controlled and deployed by harbour authorities such as the Queen's Harbour Masters in Halifax and Esquimalt. However, there are occasions where ship's staff will be required to deploy the boom. For instance, in Halifax, if fuelling at the Imperial Oil Ltd. jetty, it is the responsibility of the fuelling ship to deploy the boom. As well, both dockyards have fitted boom reels on each jetty. In the event of a fuel spill alongside, it is again the responsibility of the ship spilling the fuel to deploy the boom.

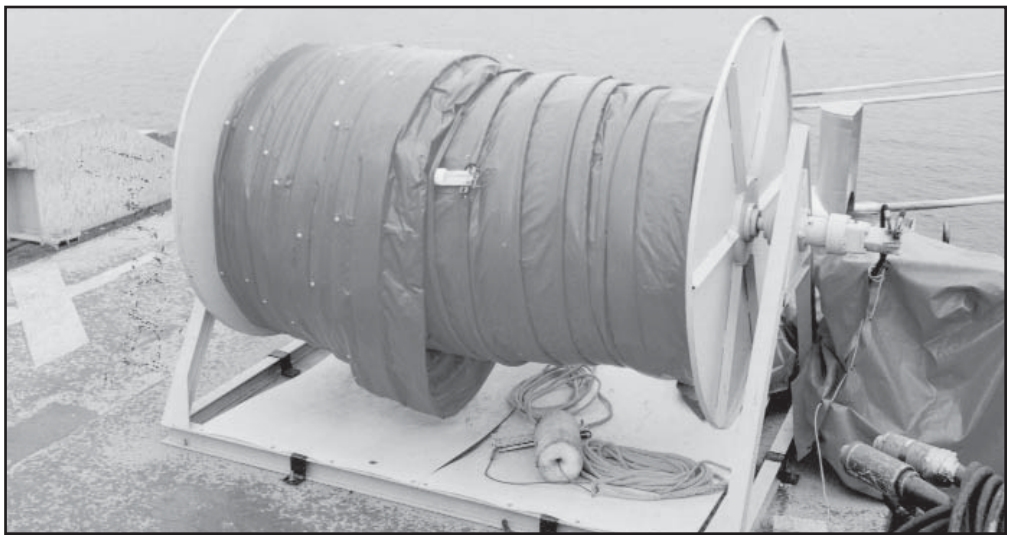

Figure 12.7-1 - Pollution Control Boom on Reel

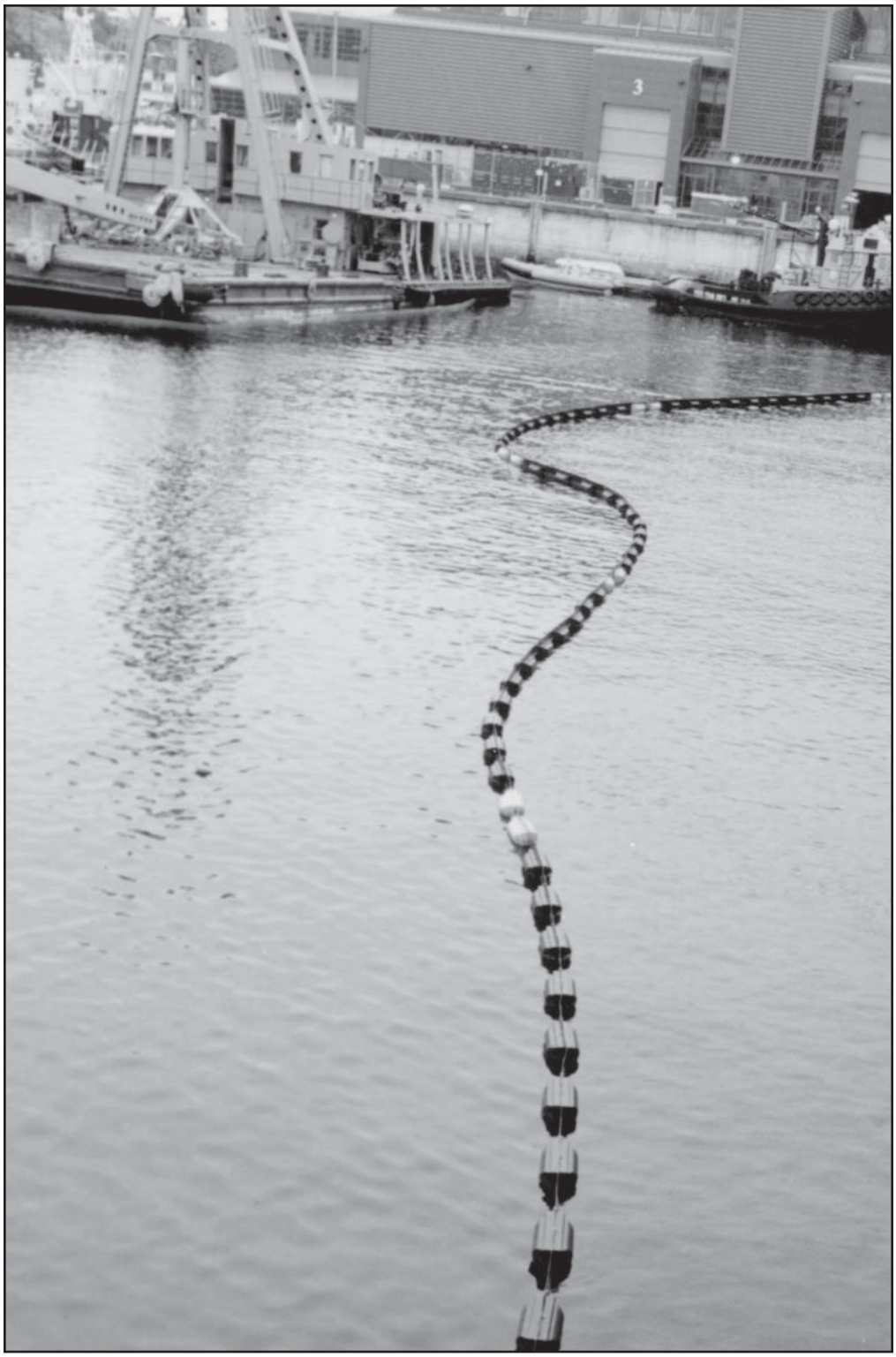

Figure 12.7-2 - Pollution Control Boom Deployed

12.7.2 Oil Booms

a. An oil boom is a manmade barrier placed on the water to prevent the spread and/or movement of distillates. There are many different types, shapes and sizes of booms available for this purpose. Booms have five basic components: flotation, skirt, tension member, ballast, and a coupling device. Other physical features are length, anchor points, lifting straps and colour.

b. Spill booms need enough draft or skirt to retain the anticipated spill. They also need enough freeboard or sail to keep the spill from splashing over the top of the boom. To maintain these capabilities in the face of current and waves, the boom requires stability and heave reponse. Stability is the ability to resist rotation and keep the skirt upright. Adding ballast to the bottom of the skirt improves stability. However, a stiff skirt and flotation which provides a counter moment is more effective. Nonetheless, all booms, regardless of design, fail in stability at approximately two knots of current.

c. Heave response is the ability of the boom to follow the contours of the waves. The boom must not submerge in a crest, nor come out of the water in a trough. To accomplish this, the boom requires maximum flexibility. Strength requirements often dictate the use of a deeper skirt and an extended sail to provide better heave response. This approach allows the water to move up and down on the skirt. Open water booms will have deep skirts.

d. To the inexperienced, pulling a boom onto the water may seem simple and uncomplicated; however, it is not. Wind, current, launching craft, dock conditions and boom length are variables that must be considered.

12.7.3 Launching an Oil Boom

(**1**) A proper bridle and/or paravane required for the prevailing conditions is to be selected and attached to the boom.

(**2**) A towing craft with adequate power (e.g., RIB, IRB) to tow the boom and manoeuvre in prevailing winds and current is to be used.

(**3**) All obstacles on the dock in the path of the boom are to be removed. Protruding nails or dock edges will easily tear boom materials. A roller or slide guide should be provided to reduce the chance of dock tears and to speed up the launching process.

(**4**) Extra personnel will be required to guide the boom out of its shoreline location.

(**5**) Plan to launch the boom in an upwind direction. Pulling at an angle to the wind direction will result in a curved launch which

can create problems at the launch site. The same applies to current, especially if it is strong.

(**6**) Allow 25 to 50 feet of rope or cable between the towing craft and the bridle of the paravane. This will permit the paravane or forward end of the boom to sit properly in the water during towing. Too short a line will pull the paravane or forward end of the boom out of the water. Too long a line requires more launching distance and adversely affects the towing radius. Straight line towing with a tow vessel producing a large wake requires more lead rope, approximately 60 to 100 metres.

(**7**) Move slowly while towing the first section of the boom off the shoreline location. This allows the boom to enter the water without excessive strain from the towing craft. As the length of boom on the water increases, the boat can increase speed. Take care not to feed a boom from the shoreline faster than the speed of the towing craft. This will result in a pile-up and possible entanglement of the boom at the water's edge. A slow but smooth and uninterrupted launch will nearly always improve response time.

(**8**) Communicate with the Coxn of the towing craft by voice or hand signals when launching short sections of boom. When launching booms of greater length, good radio communication is essential for a proper and trouble-free launch.

12.7.4 Boom Recovery

(**1**) The recovery of a boom from the water after use is as important to the overall effectiveness of pollution containment as is the launch. Carelessness at this stage of the operation may cause damage that renders a boom useless or re-pollutes the water. When a boom comes in contact with the oil spill, some of the oil will adhere to the boom and soil it. The degree of soilage can range from slightly stained to entirely coated with a tar-like subtance. After completion of the clean-up, the boom is to be towed slowly to its place of recovery to avoid contaminating the water. Rapid towing of the boom may wash off some of the oil, thus creating another spill.

(**2**) In removing the boom, handle it by its lifting strops versus the floats. Avoid dragging it over any rough surfaces, protruding nails or torn, rough lumber. Have sufficient personnel on the site to adequately and carefully recover the boom from the water. A surplus of personnel is not a waste, but rather a frugal insurance measure.

CHAPTER 13
KINGSTON Class Payloads

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CHAPTER 13
KINGSTON Class Payloads

13.1 Introduction

a. KINGSTON Class ships have been designed to fulfill a number of mission requirements. Prominent among them is mine countermeasures, which is further broken down into the following tasking areas:

(**1**) Mechanical Mine Sweeping (MMS);
(**2**) Seabed Inspection; and
(**3**) Route survey.

b. Unique to the KINGSTON Class concept of operations is the temporary fitting of mission-specific, interchangeable, modular payloads on the sweep deck to support the above three tasking areas. In addition, a fourth accommodation payload is embarked on occasion to house extra staff, such as occurs during equipment trials or workups.

c. The mission payloads are delivered in containers while alongside. Installation normally takes between 12 to 24 hours. Jetty cranes and In Service Support Contract (ISSC) personnel are employed to physically load and secure the containers on the sweep deck, with assistance being provided as required by the ship's Bosns. The accommodation payload is loaded by dockyard riggers. The ISSC is also responsible for ensuring all equipment is present and all systems run up and checked.

d. Once at sea, the rigging, launch and recovery of the equipment is conducted by the ship's company. Specialized MOC training required to operate and deploy the equipment is still being refined in conjunction with post-acceptance equipment trials; however, it is clear that Bosns will be directly involved. Detailed sequences of events, and preparation and equipment layout sections for each payload will be incorporated into future CFCD 105 amendments as soon as practicable.

13.2 Mechanical Mine Sweeping (MMS)

a. MMS is used as a defence against the buoyant, moored mines. Essentially, MMS involves the streaming of sweep wires astern of the ship. These wires are fitted with explosive cutters which are designed to sever the mooring lines of any mines which enter the path of the sweep gear. The mines either self-destruct underwater or are neutralized by gunfire or specially trained divers once they float to the surface.

b. The MMS system can be used in three tactically different ways as follows:

(**1**) Single Oropesa Sweep (single ship);
(**2**) Double Oropesa Sweep (single ship); and
(**3**) Team Sweep (two ships).

c. Oropesa sweeps are defined by the number of sweep wires deployed from one ship. If one wire is deployed, it is a Single Oropesa. If two are deployed, then it is a Double Oropesa. In all cases, a depressor wire is deployed in order to maintain sweep depth. Team deep sweeps require the operation and co-ordination of two ships, one acting as the guide and the other as the consort. Each ship deploys one sweep wire connected together to form an arc, with the sweep taking place between the two ships.

d. Two MMS payloads have been purchased to support KINGSTON Class operations, and procedures continue to be developed. Operating the MMS payload is a challenging task that can be compared in complexity to any major seamanship evolution such as RAS. Until the procedures are finalized and incorporated in a future amendment to this chapter, ships are to follow the MCDV MMS Operations & Maintenance Manual Part No. 7010E001-1 Interim.

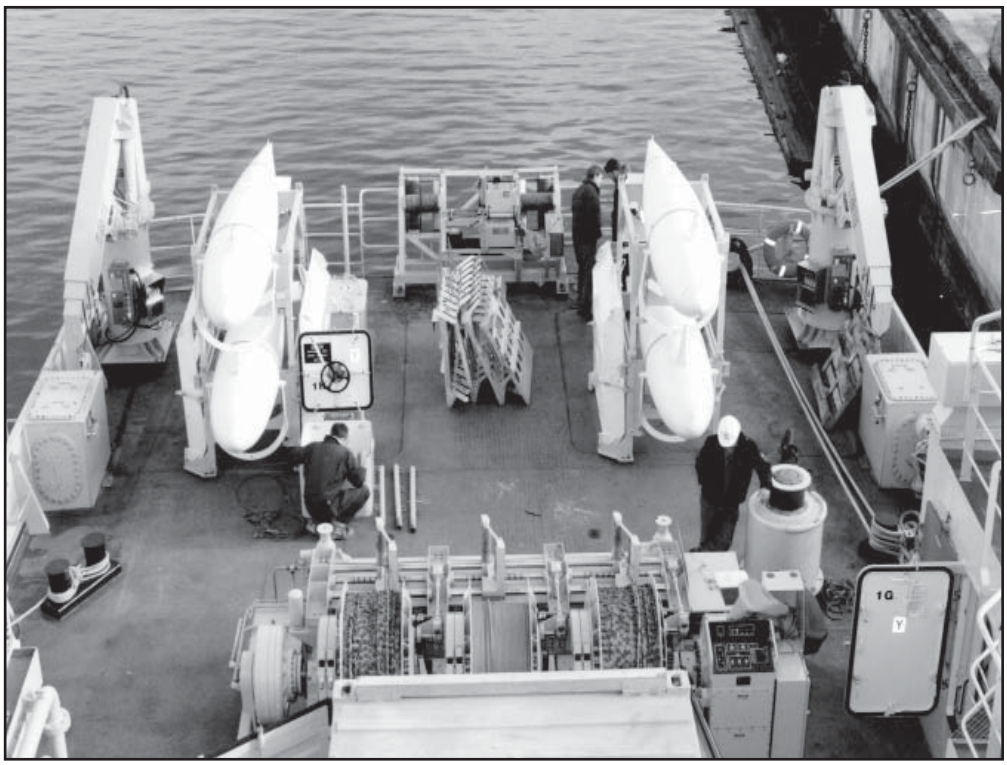

Figure 13.2-1 - KINGSTON Class Sweep Deck

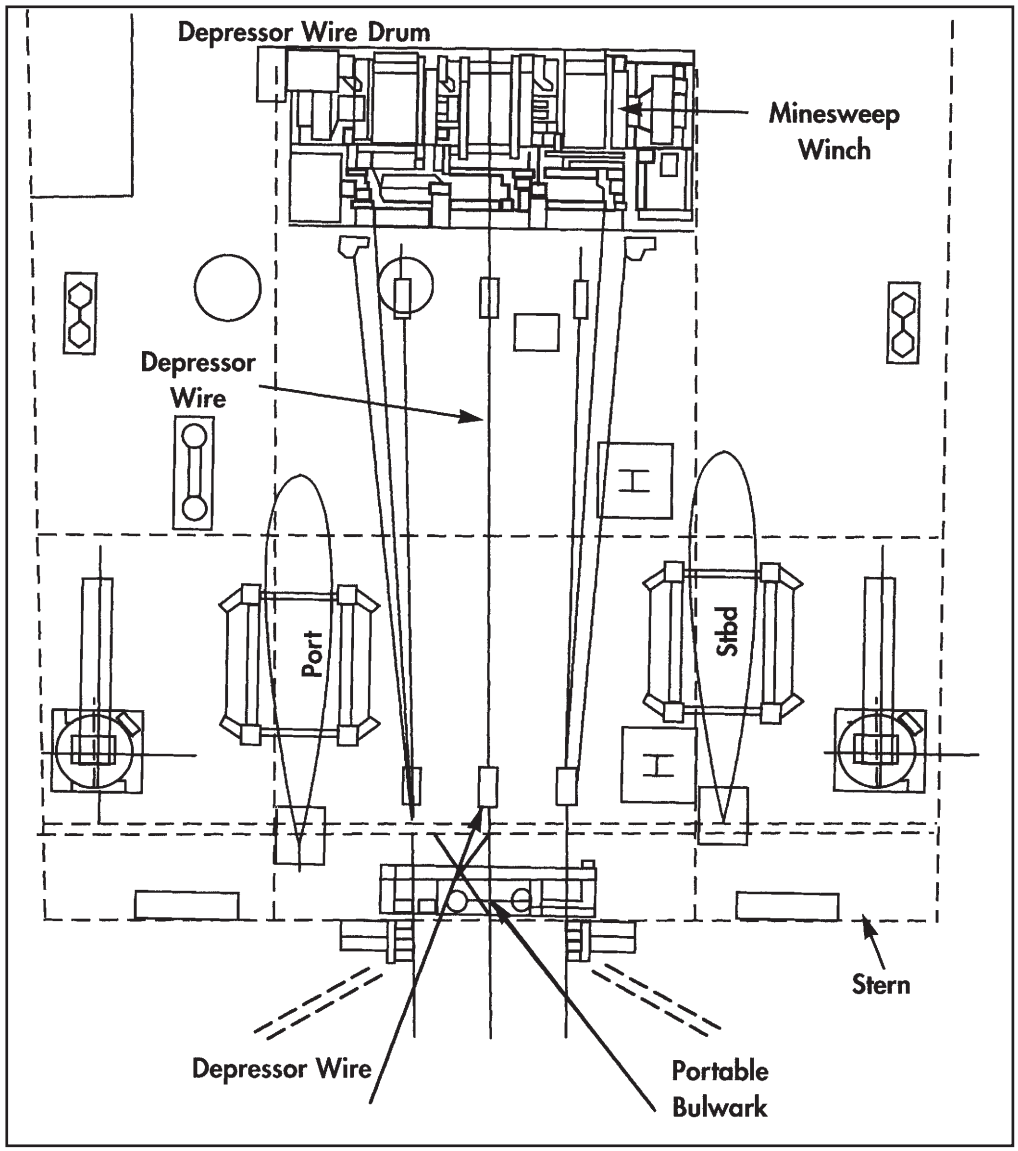

Figure 13.2-2 - Sweep Deck

13.3 Seabed Inspection

a. The seabed inspection payload consists of a Bottom Object Inspection Vehicle (BOIV) and supporting equipment. This Remote Operated Vehicle (ROV) is deployed to inspect suspicious objects (submerged on the bottom) that have been detected. The ships crane is used to launch and recover the ROV, as well as to support the umbilical cord. From a seamanship perspective, crane operation is all that is required as clearance divers will be embarked with the payload to operate the BOIV.

b. The requirement to dedicate the ship's crane in support of BOIV operations means that the crane will not be available for boat work. Therefore, an IRB must be launched prior to deploying the BOIV in the event that it is needed for rescue operations. In addition, the ship will either anchor, moor, or reduce speed to bare steerageway whenever operating the BOIV.

c. The ROV itself is of aluminum construction, weighs 734 kg, and can dive to depths of 300 m at a maximum speed of 4 knots. It is delivered in an ISO container. Rails are extended from the rear door of the container and over the MMS Pedestal. The ROV is then pulled out using block and tackle, and launched by crane from that position.

d. The primary reference to be consulted is the Mine Inspection Payload Manual - Isherwood Number BO 001-00.

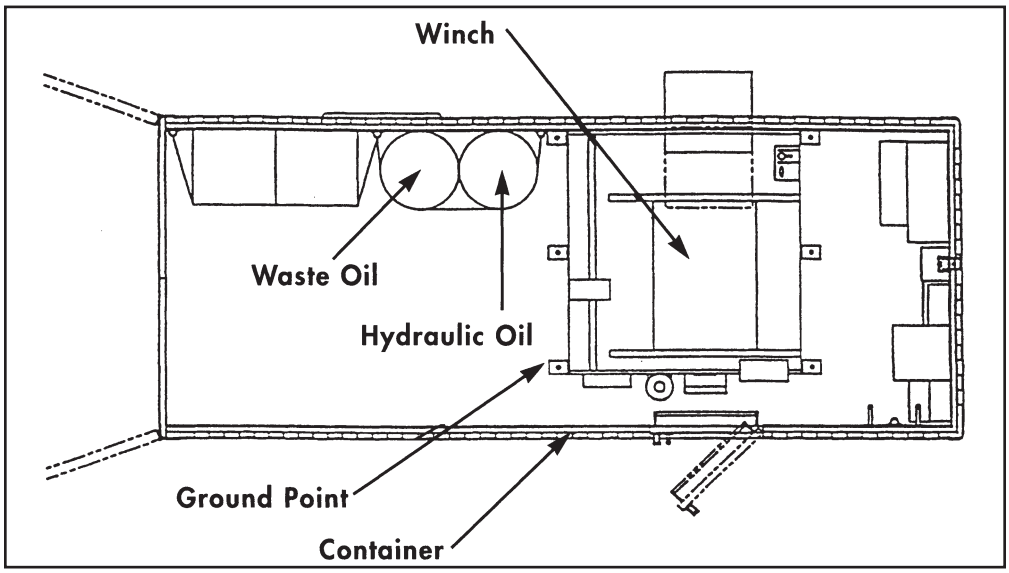

Figure 13.3-1 - Container Layout Schematic

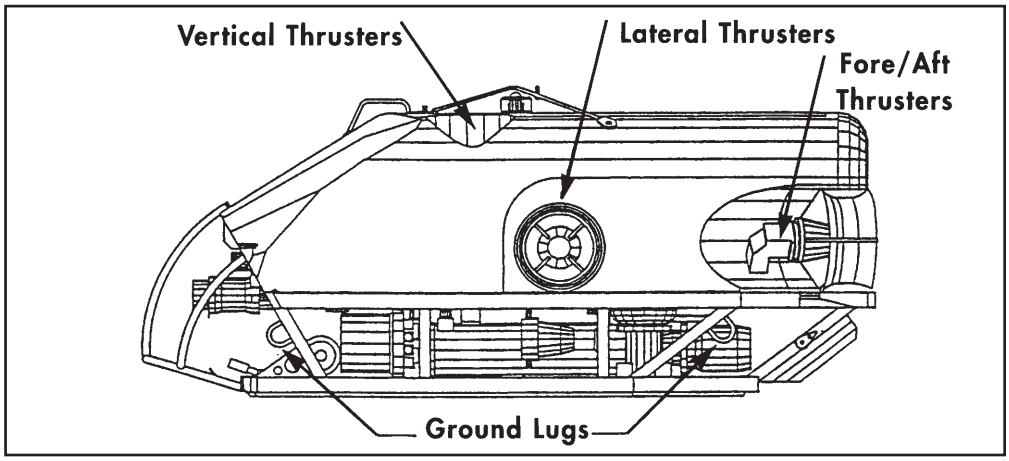

Figure 13.3-2 - ROV

Figure 13.3-3 - BOIV Deployed

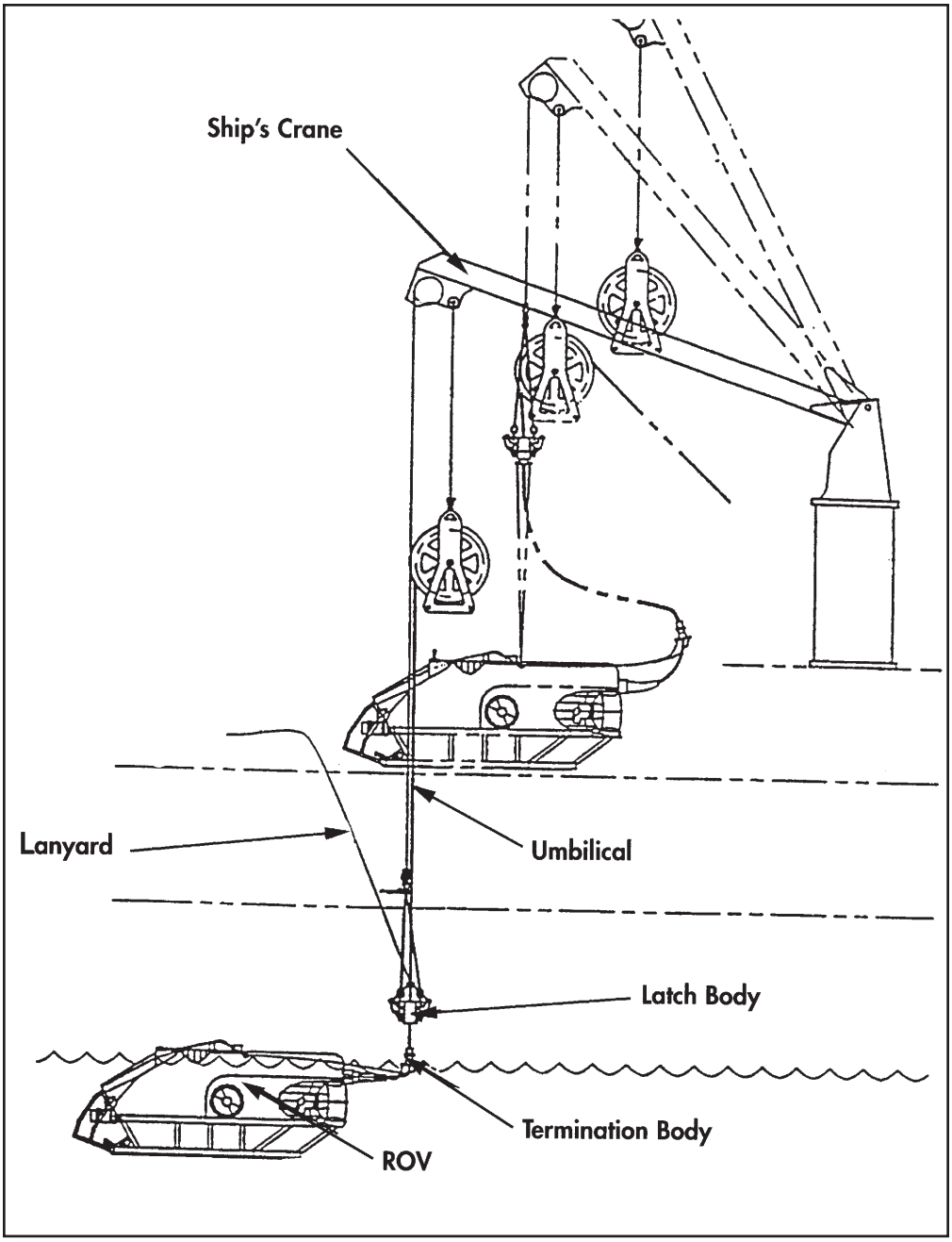

Figure 13.3-4 - BOIV Launch and Recovery

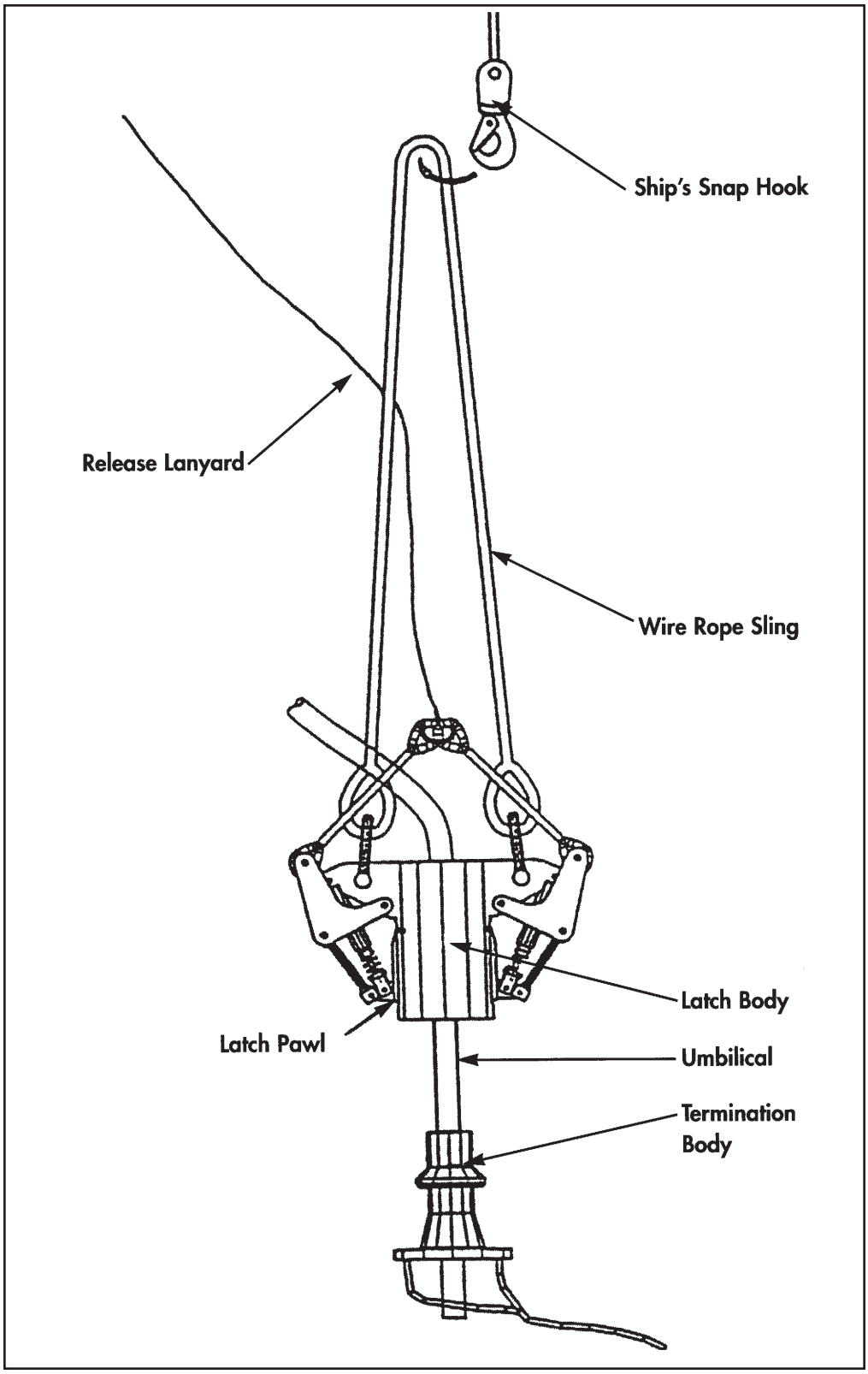

Figure 13.3-5 - Release and Capture Mechanism

Figure 13.3-6 - Release and Capture Mechanism

13.4 Route Survey

a. The route survey payload consists of a highly capable, multi-beam, side-scan sonar which is fitted in a stern-launched towfish. The controller and processing equipment is installed on board ship. It is used primarily to develop a detailed knowledge of the ocean floor by identifying the nature and location of all objects along selected shipping routes, anchorages and harbours. The towfish can be launched, towed and recovered in sea conditions up to and including Sea State 4.

b. Four payloads have been purchased to support KINGSTON Class operations. The self-contained payloads are mounted on the after ISO footings. Procedures for the deployment and operation of the towfish are being developed and will be incorporated in future amendments to this chapter.

Figure 13.4-1 - Route Survey Payload

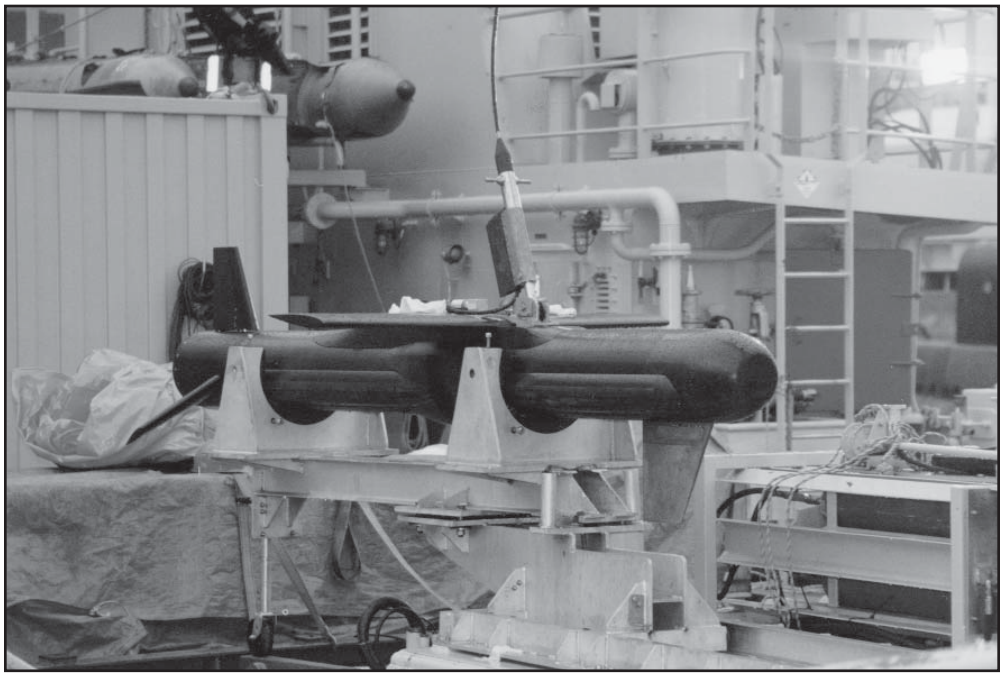

Figure 13.4-2 - Towfish

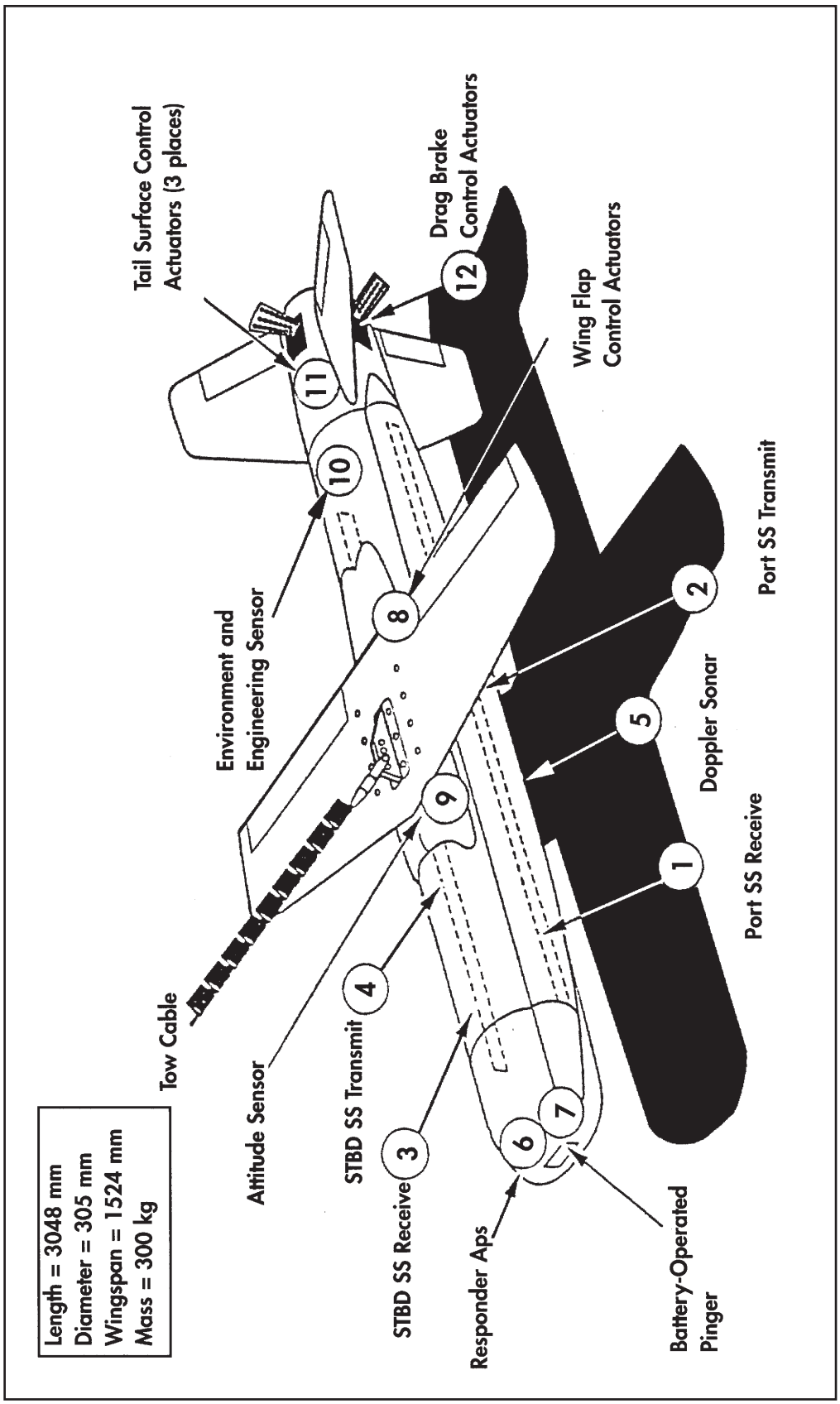

Figure 13.4-3 - Towfish Layout

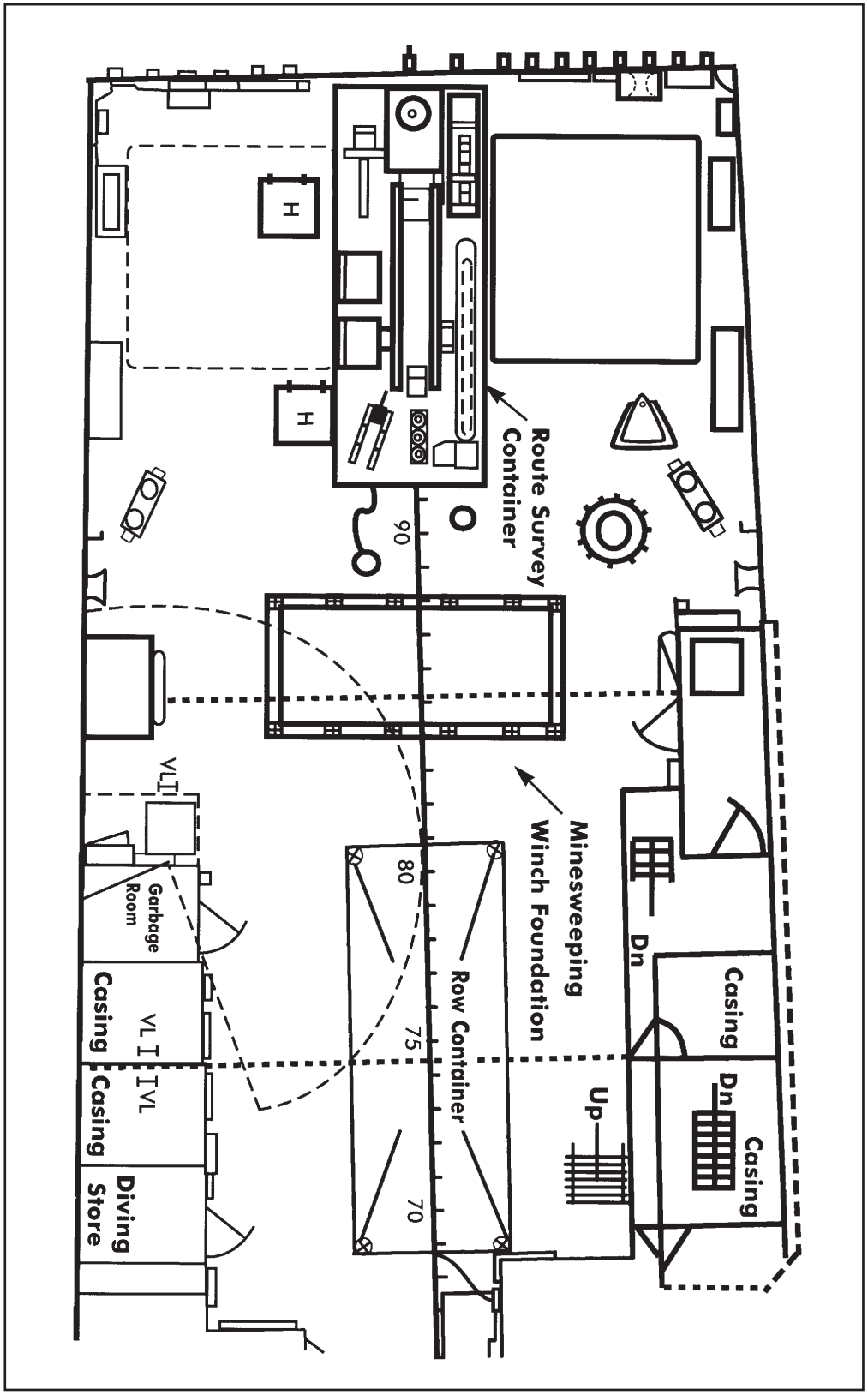

Figure 13.4-4 - RS Payload Aft

13.5 Accommodations

a. The accommodation payload is an ISO 1161 Container (19.88' long, 8.5' height and 8.0' wide), weighing between 2 and 2.5 tons. It is fitted on the forward end of the sweep deck between the funnels and contains:

(**1**) six permanent bunks and lockers in a sleeping area; and
(**2**) two extra bunks in the lounge area (no lockers).

b. There are eight standard accommodation payloads and one non-standard accommodation payload in service. The non-standard payload is slightly wider which results in the boat cradle having to be removed from the sweep deck.

CHAPTER 14
Sailing

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CHAPTER 14
Sailing

14.1 Sailing Introduction

Prior to the industrial revolution, all warships were powered by sail. Many customs, traditions and terminology in use in Canada's modern navy have their distant origins in the Age of Sail, particularly from the 19th century Royal Navy of Great Britain. When Canada's navy was founded in 1910, fighting ships of sail had been replaced by coal-burning ships of steel. Today, most warships are powered by gas turbines that are essentially identical to those fitted on large passenger aircraft.

Notwithstanding that sailing vessels no longer have a role to play in naval warfare, they still can play a key role in training junior officers and seamen. This is owing to the fact that there is no better way to gain an understanding of the sea than through sailing. As such, the Canadian Navy maintains three sailing vessels in its service: HMCS *Oriole* (Fig. 14.1-1) and H.M. Sail Training Vessels (HMSTV) *Goldcrest* (Fig. 14.1-2) and *Tuna*. Although recreational vessels such as the *Albacore* are not used for training, they are available for the use of military personnel.

The aim of this chapter is to reinforce the importance of sailing in understanding the sea, and to encourage all Canadian naval personnel to take advantage of every opportunity to sail whenever the occasion arises.

Figure 14.1-1 - HMCS *Oriole*

Figure 14.1-2 - *Goldcrest* (Tuna Class)

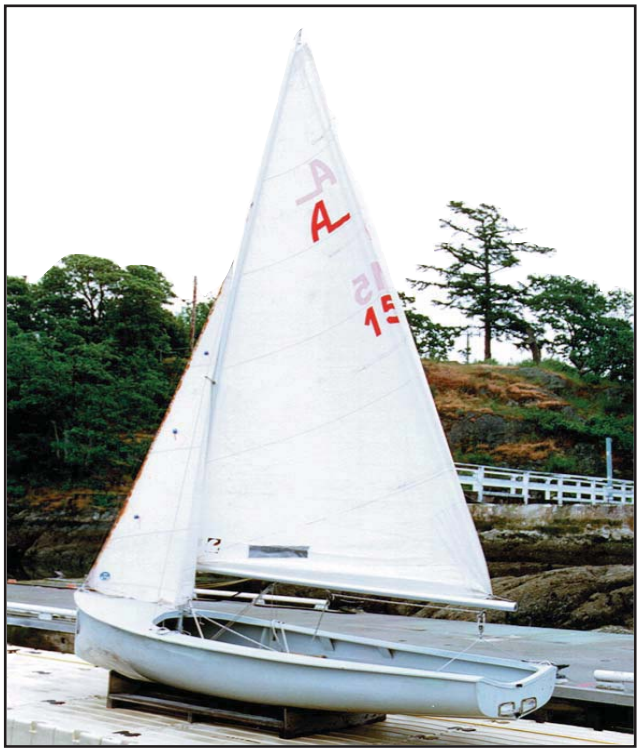

Figure 14.1-3 - *Albacore* (for recreational use)

14.1.1 Types of Sailing Vessels in the Canadian Navy

Built in 1921 and commissioned in 1948, HMCS *Oriole* is the oldest ship in the Canadian Navy. A ketch-rigged yawl, she is a near relative to a schooner but differs in that her aftermast (mizzen) is smaller than her mainmast and it is stepped further aft. HMSTV *Goldcrest* and HMSTV *Tuna* are 36 foot sloops, purchased in 1984 for training and recreation. They are based in Esquimalt and Halifax respectively.

14.2 Parts of a Sailboat

Backstay	A rope or wire leading aft from the masthead to support the mast. A running backstay is one that can be adjusted to change the shape of the mast (and sail).
Bolt Rope	A rope sewn in to the edge of a sail to reinforce it. It is always sewn on the side of a sail which will be to port when the sail is set.
Boom	A horizontal spar or pole attached to the mast at one end and used to support the bottom of a sail.
Centerboard (drop keel)	A keel that may be retracted.
Chainplate	A piece of hardware, built into the hull and deck, to which turnbuckles are attached.
Cleats	Fittings onto which sheets or halyards are belayed**.**
Cockpit	An opening in the deck from which the boat is steered.
Cringles	Eyes worked into the bolt rope at the side or corners of a sail. The halyard, the sheets and the tack hook are connected to them.
Earring	The lashing which secures the throat, peak, tack, or clew of a sail to a spar.
Eyelets	Eyes worked into the head or the foot of a sail for lacing to a spar.
Forestay	A rope or wire leading forward from the masthead to support the mast.
Gudgeons/Pintles	The fittings that connect the rudder to the hull and allow it to pivot. The pintles are vertical pins and the gudgeons are horizontal eyebolts into which the pintles fit.
Halyard	A rope by which a sail is hoisted or lowered. To settle a halyard is to ease it away.

Keel	The part of a boat which extends downward from the bottom of the hull. In a sailboat, the keel acts to balance the force of the wind and keep the boat upright in the water.
Mast	A vertical spar or pole, used to support a sail.
Mizzen Mast	The after mast in a ketch.
Reef Points	Short lengths of line secured to each side and through the sail about its foot which are used for reefing. A sail may have one, two or three sets of reef points.
Rudder	A flat blade attached to the stern and used to steer the boat.
Running Rigging	Comprises all movable ropes such as halyards and sheets.
Sheet	A rope bent to the clew of a sail. It is used to trim the sail as required and is named after the sail to which it is bent, e.g. **foresheet**, **mainsheet**, or **mizzensheet**. To **check a sheet** is to ease it off so that the sail is eased out. To **aft** a sheet is to haul it in so that the clew of the sail is hauled aft. To **let fly** a sheet is to let it run so that the sail flaps, spilling the wind from it.
Shrouds	Ropes or wires leading from the masthead to the sides of the boat which support the mast athwartships.
Standing Rigging	Comprises all permanently fitted and secured ropes such as stays and shrouds.
Tiller	A lever or handle used to turn the rudder.
Topping Lift	A rope used to hold up a boom.
Traveller	A rail or fitting which allows a block to move from one side to another.
Turnbuckle	An adjustable device used to tension a stay or shroud.
Vang	A rope, block and tackle or a hydraulic system used to keep a boom horizontal.
Wheel	An alternative to a tiller which turns the rudder by mechanical or hydraulic means.

14.3 Types of Sails

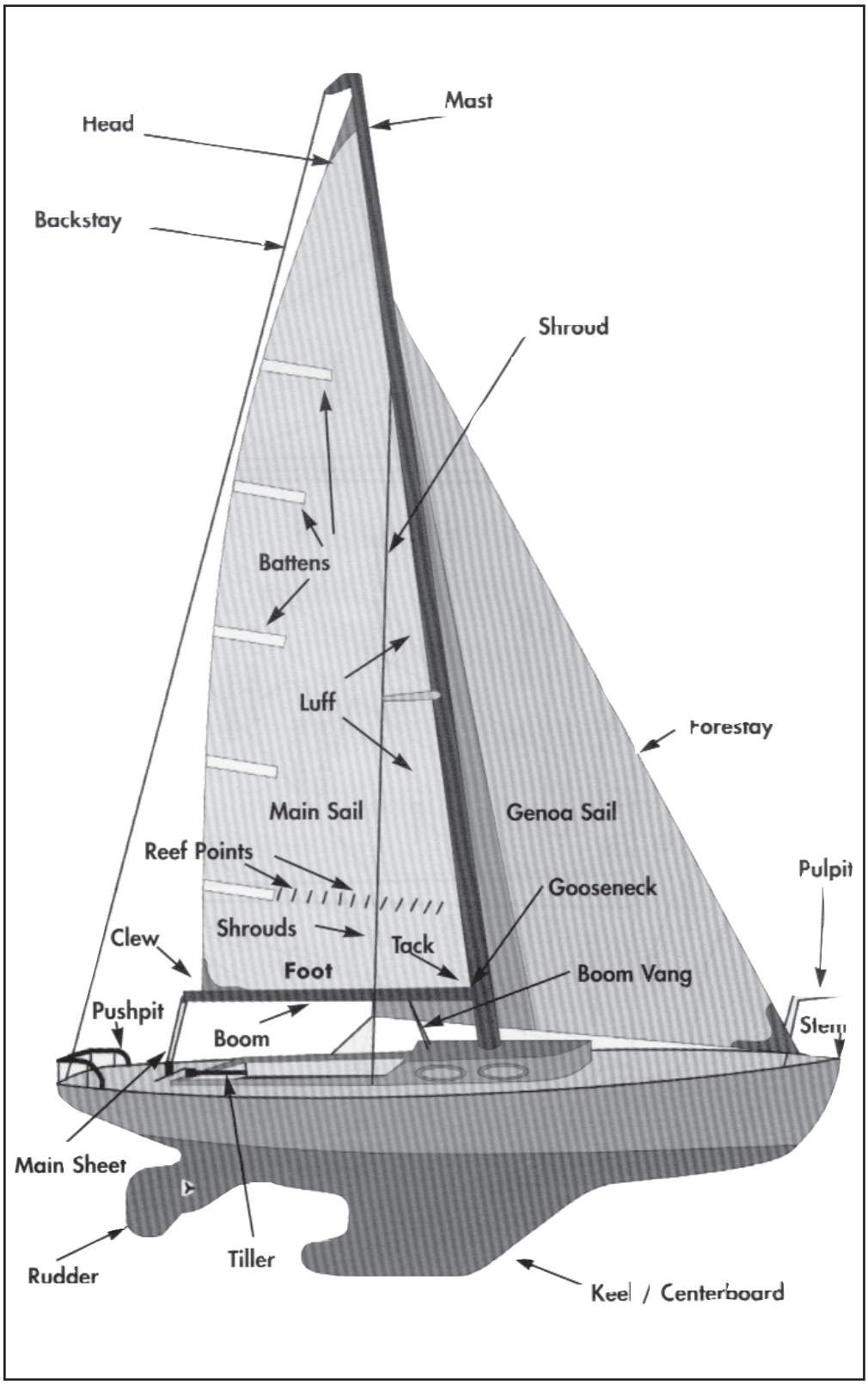

Figure 14.3-1 - Parts of a Sail and Sailboat

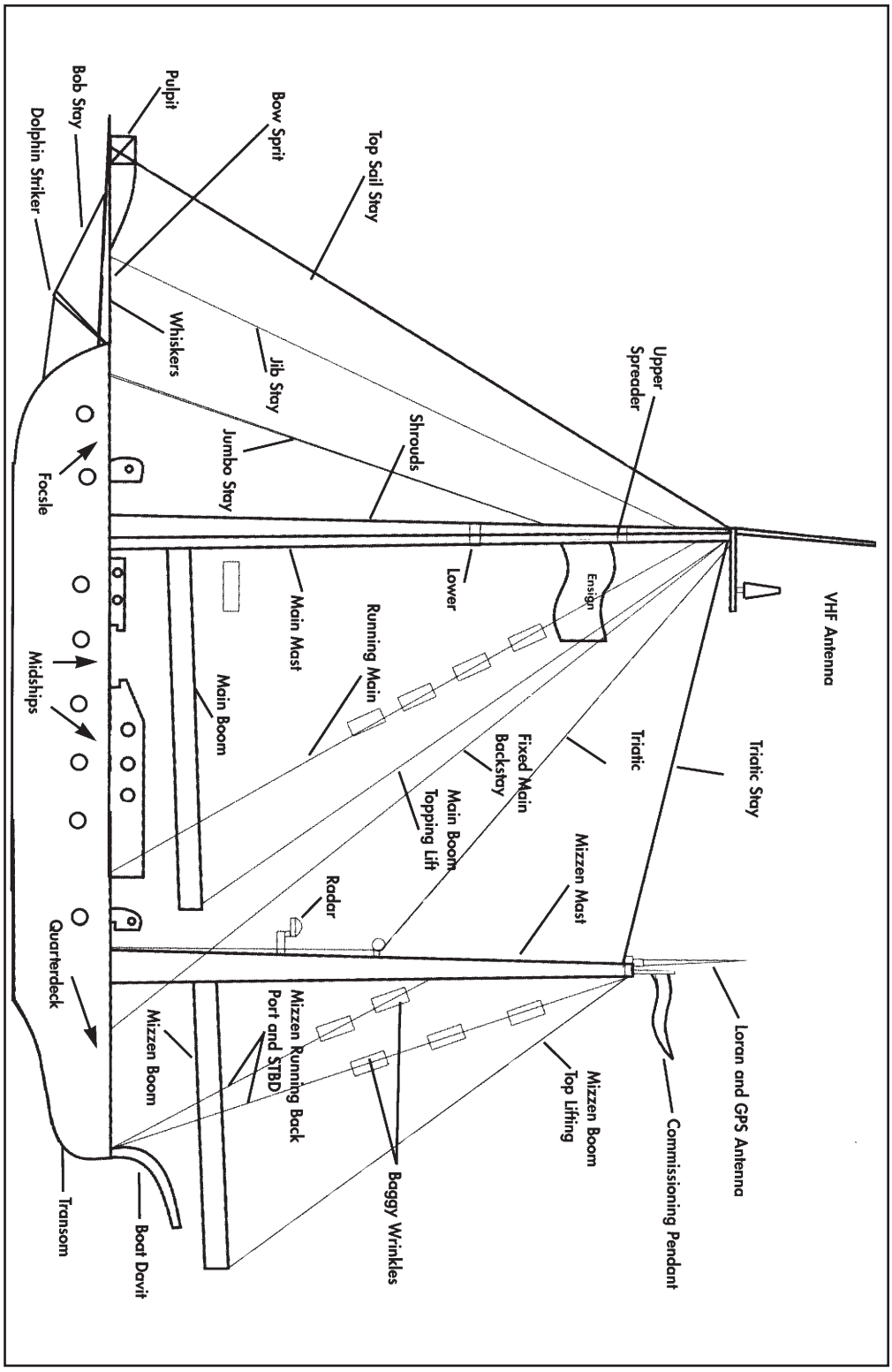

Figure 14.3-2 - HMCS *Oriole* Rigging

Foresail or Jib	The sail in front of the main sail. The foresail attaches to the forestay.
Gennaker	A combination Genoa and Spinnaker. This lightweight sail is used in light airs.
Genoa	A large foresail.
Main Sail	The primary sail on a boat. The main sail is attached to the mast and boom or yard.
Mizzen Sail	A triangular sail rigged on the mizzen mast.
Mizzen Stay Sail	A sail rigged between the main mast and the mizzen mast.
Spinnaker	A large colourful nylon sail that is set forward of the foresail, used when sailing before the wind.

14.4 Common Orders

Table 1 Common Orders and Actions

ORDER	ACTION
Avast	Stop
Let Fly	Let go instantly
Check Away	Let out under control
Haul Taut	Pull tight
Aft the Sheet	Pull in the sheet
Ease (the sheet)	Let out slowly
Hoist	Raise by pulling on the halyard
Ready About	Prepare to tack or gybe
Helm's A Lee	Boat is turning to tack, prepare to let fly

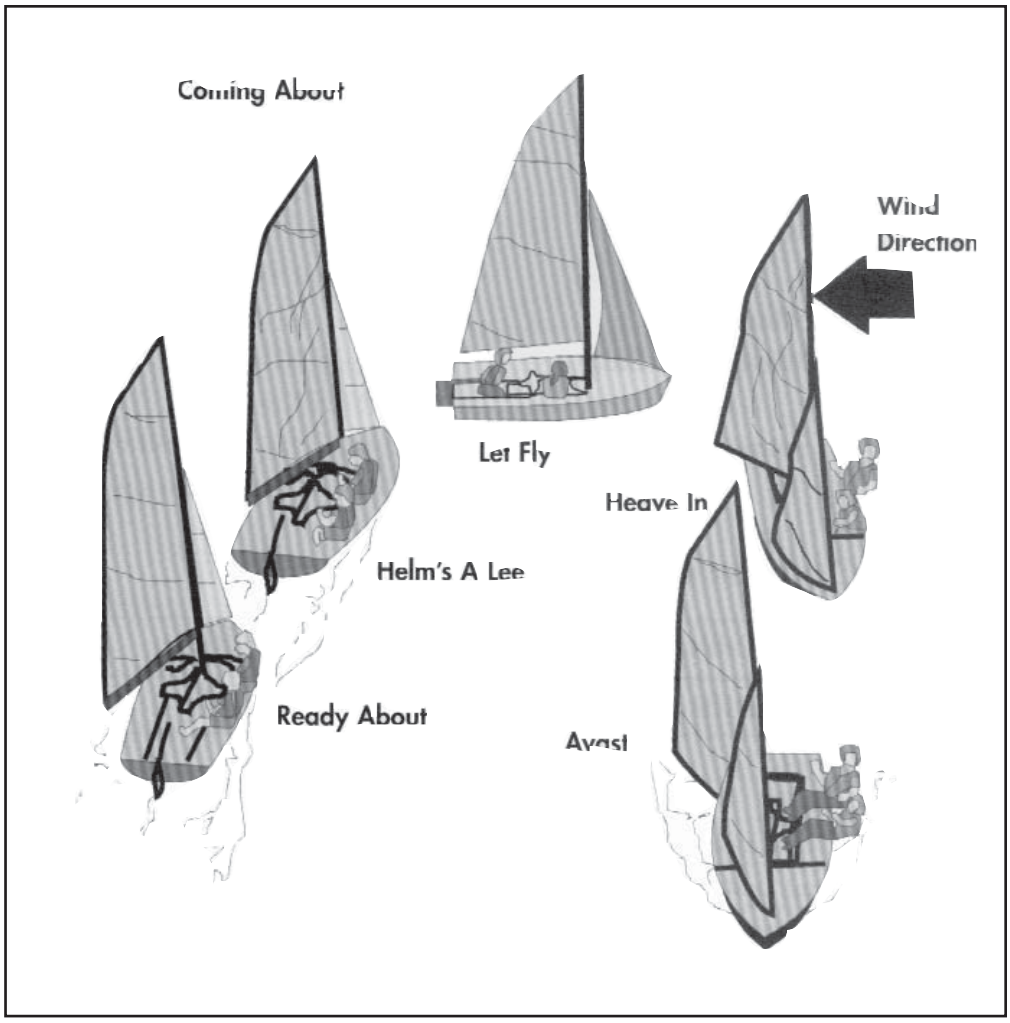

Figure 14.3-3 - Orders for Coming About

14.5 Sailing Terminology

To sail a boat effectively, a seaman should know how the wind acts on the sails to move the boat ahead. The relationship between the centre of pressure of the sail area and the boat's pivot point, how to set the sails, and how to optimally trim the sails when **beating, tacking, reaching, running or wearing** must be understood.

Beam Reaching	A sailboat is beam reaching when the wind is blowing from abeam.
Bearing Away	Altering course away from the wind until the boat is on her new course, or she gybes.
Beating	When the destination of a sailboat is directly up wind, she beats to windward by sailing close hauled in a series of alternate tacks.

Bend On	To secure a sail to a spar by its earrings and lacing.
Broad Reaching	Between beam reaching and running, the wind is abaft the beam.
Close Hauled	Sailing as close to the direction from which the wind is blowing as possible. This is usually no less than 40-50 degrees either side of the wind direction.
Close Reaching	Between beam reaching and close hauled.
Gybing	A manoeuvre to turn the boat, putting the stern through the wind, so that the wind is on the other side of the boat (opposite of tacking).
Head to the Wind	Pointing the bow of the boat directly into the wind.
Heave To	To keep the boat as near the wind and as stationary as possible.
In Irons	A boat is said to be "In Irons" when she is head up on the wind and will not pay off on either tack.
Leeward	The side opposite that from which the wind is blowing.
Let Fly	To let go instantly.
Luff	To let the boat come up to the wind.
Luffing	Altering course into the wind until the boat approaches being head to the wind.
Reaching	A sailboat is reaching when the wind is blowing from abeam, but she is not sailing close hauled.
Ready About	A warning order to prepare to tack.
Reefing	To **reef a sail** is to reduce the area it offers to the wind in order to prevent the boat from heeling over too far or capsizing. A sail is reefed by gathering up its foot to the desired line of reef points, and tying it off with reef knots. To **shake out a reef** is to increase the sail area.
Running (running free)	A boat is running when the wind is blowing from directly astern.
Starboard/ Port Tack	A boat is on a port tack when the wind is on her port side and on a starboard tack when the wind is on her starboard side.
Tacking (coming about)	A manoeuvre to turn the boat through the wind, so that the wind changes from blowing over one side of the boat to blowing over the opposite. The turn puts the bow into the wind (order *"Ready About"*).

Tailing	The sheet is pulled in by turning the winch handle and pulling on the sheet.
Windward	The side from which the wind is blowing.

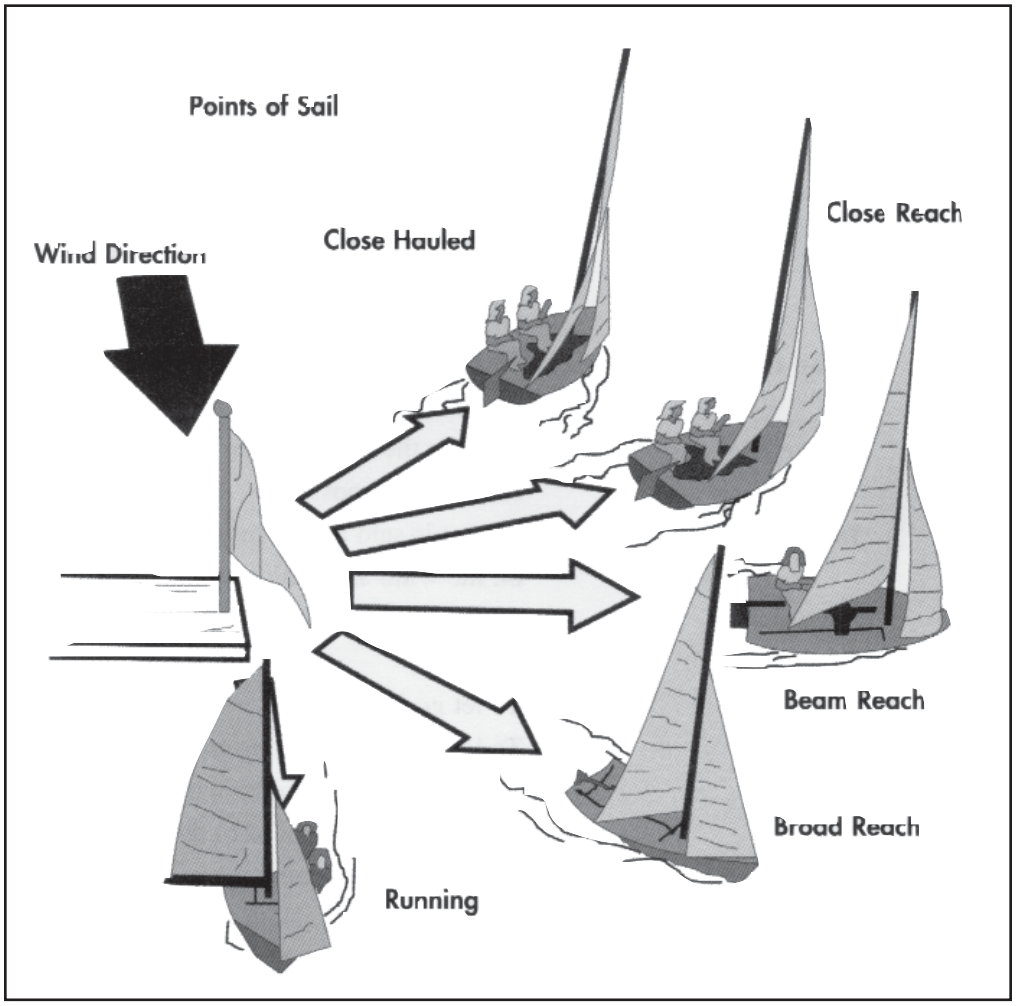

Figure 14.5-1 - Points of Sail

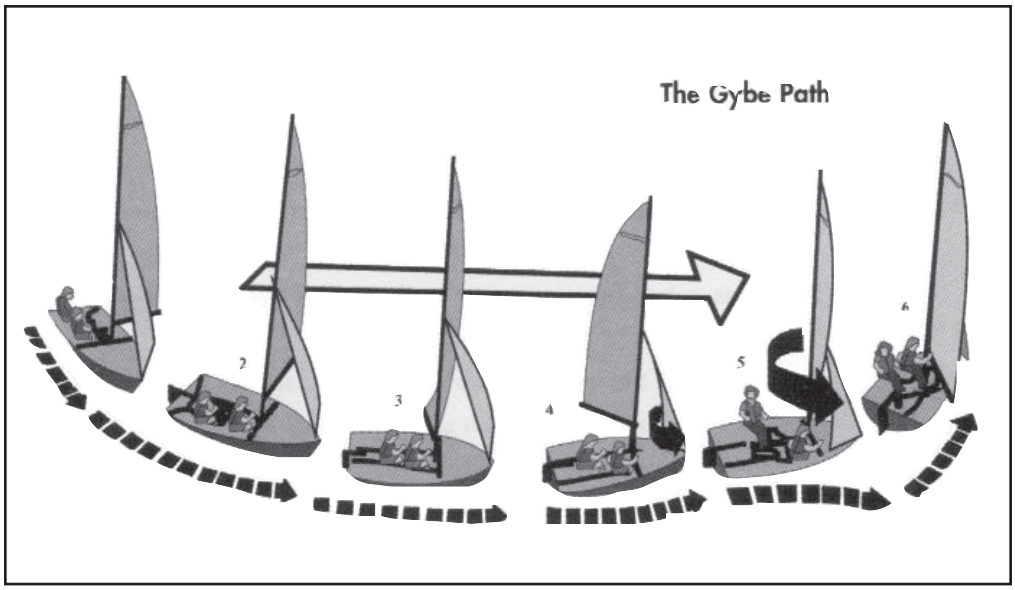

Figure 14.5-2 - Gybe Path

14.6 Safety

The following safety points are particular to sailboats.

(**1**) Always stay with your boat even if it breaks or capsizes.

(**2**) Wear an approved PFD or life jacket whenever you are on or around boats.

(**3**) Dress warmly for sailing and wear appropriate waterproof garments when conditions warrant.

(**4**) Before setting up a boat in the parking lot or wheeling it down to the water, always check that there is no overhead electric cable in the way. Look out for low hanging power cables while sailing, and come in immediately if thunderclouds develop.

(**5**) Protect your skin and eyes from the damaging effects of too much sunlight. Drink plenty of liquids (non-alcohol) on hot days and watch for signs of heat exhaustion.

14.7 Rules of the Road

a. The skipper of a sailing vessel is required to have a thorough knowledge of the **International Regulations for Preventing Collisions at Sea**. The following is a brief summary of those rules which pertain to sailing.

b. The rules state that everyone is responsible for preventing a collision. Every vessel must keep a proper lookout. Action to avoid a collision must be made in a positive manner, in ample time, and with due regard to good seamanship.

c. A give-way vessel is required by the rules to give way to the stand-on vessel. This is to be done in ample time and with positive movement so as not to create doubt as to her intentions. The stand-on vessel is required by the rules to maintain its course and speed until there is no longer a risk of collision. This in no way relieves the stand-on vessel from her responsibility to prevent a collision.

d. Sailboats, when meeting other sailboats, are governed by three rules:

(**1**) When the wind is coming from the starboard side of the vessel, the vessel is said to be on a starboard tack. When the wind is coming from the port side of the vessel, the vessel is said to be on a port tack. When each has the wind on a different side (opposite tack), the vessel on a port tack shall keep clear of the vessel on the other.

(**2**) When both have the wind on the same side (same tack), the vessel which is to be windward shall keep out of the way of the vessel which is to leeward.

(**3**) If a vessel on the port tack sees a vessel to windward and cannot determine with certainty whether or not the other vessel is on the port tack, she shall keep out of the way of the other.

e. Sailboats have right of way over most power-driven vessels. The exceptions are vessels not under command, vessels restricted in their ability to manoeuvre, and any vessel being overtaken. As well, sailboats are not to impede the safe passage of power-driven vessels in traffic lanes or in narrow channels.

Note.

If a vessel sounds five or more short blasts on its whistle, it is unsure of another vessel's intentions. ENSURE THAT VESSEL IS NOT YOURS.

ANNEX "A"
Publications

Publication Name	Date	Publication Number
Rigging & Procedures Manual (CFCD 105)	1997	B-GN-181-105/FP-E01
Admiralty Manual of Seamanship (BR67)	1995	B-ON-050-002/PT-004
Admiralty Manual of Navigation Vol.1 BR45(1)	1987-01-01	C-57-007-002/AF-001
Rigging Manual (ONTARIO)	1975-10-01	C-34-010-002/AM-000
Maritime Command Ships Standing Orders (SSO's)	1997	
Military Terminology (Part One)	1982-11-19	A-AD-121-E01/JX-000
Manual Seamanship (CFP152)	1977-09-08	A-PD-152-001/PT-001
Naval Shiphandling (Crenshaw)	1985	B-ON-050-001/PT-001
PRONOTES (Maritime Command Professional Notes)		
Heavy Weather Guide	1984	ISBN 0-87021-263X
Operational Readiness Requirements (CFCD102)	1993-04-01	
Boatswain Mate 2-3 (U.S.N.)		NAVEDTRA 10121-G 1
Lexicon for Boatswain 181	1977-03-01	A-AD-121-E01/1X-000
Manual of Ceremonial for HMC Ships	1994-07-14	
HELP Sea Rescue	1996-03-04	
Shipborne Helicopter Operating Procedures (SHOP)	1994-10-31	B-OG-282-000/FP-000
Safe Boating Guide	1995	ISBN-0-662-21247-6
Survival at Sea	1988-04-01	B-22-050-279/PT-001
A Seaman's Guide to the Rule of the Road	1995	B-GN-050-003/PT-000
International Regulations for Preventing Collisions at Sea, 1972 with Canadian Modifications		

Publication Name	Date	Publication Number
Naval Maintenance Management System Manual (NAMMS) Policy and Procedures	1994-02-23	C-03-005-012/AM-001
Ship's Maintenance Management Information System (SMMIS)	1987-07-03	C-03-005-012/AM-002
Workplace Hazardous Material Information System (WHMIS) Manual	1992	1SBN 0-459-56215-0
Specification for 20 Man Liferaft	1991-01-30	D-22-490-000/SF-001
Corsair 20 Marine Liferaft	1989-11-30	C-22-490-000/MS-001
Life Saving Equipment (CFP286)		B-GN-286-001/TS-001
Life Preserver Yoke, Maritime Pouch	1988-06-05	C-22-501-000/MB000
Life Preserver, Hazardous Duty	1995-03-10	C-22-552-000/MF-001
Jacket Buoyancy and Black	1996-01-10	C-22-554-000/MF-001
Verification of Eyepads-Eyebolts-Tie Down Cleats and Helicopter Tie Down	1992-01-10	C-57-007-002/NF-001 St. John INS-55-387
Dockyard Wire Splice Booklet		
Sampson Braid Splice Booklet		
Fleet Technical Bulletin Guardrails	1984-11-08	C-28-240-000-TP-001
QHM Pollution Containment Course (Esquimalt)		Handout
N 47 /QHM Marine Pollution Contingency Plan (Halifax)		Handout
IROQUOIS Rigging Warrant		GR282-H27-36001-01
HALIFAX Rigging Warrant	TBP	
AOR Rigging Warrant		509-H-41-21321-01
KINGSTON Rigging Warrant	TBP	
MSA Rigging Warrant	TBP	
OBERON Rigging Warrant		

Publication Name	Date	Publication Number
Testing of Shipboard Lifting Appliances	1986-03-01	C-28-020-001/TB-001
Encyclopedia of Fancy Knots, Bends and Hitches	1984	ISBN 0-87033-021-7
Ashley's Book of Knots	1994	ISBN 0-385-04025-3
Maritime Command Tug Assistance with or without a Pilot	1994-12-01	
Ships and Marine Craft	1993-02-19	C-23-000-000/AX-000
Deep Sea Lift Crane System Operating and Maintaining Instructions	1989-11-15	C-28-468-000/MS-001
Anchors, Chains, Cables and Associated Articles	1991-11-22	C-28-010-024/MS-001
Working, Handling, Survey and Repair of Anchor and Equipment	1977-10-01	BR 367 (1)
Fleet Mooring Handbook	1995-07-31	C-03-011-009/MS000
Ship to Ship Towing (Navy)	1996	ATP-43 (Navy)
NWP 43 Towing		
Replenishment at Sea	1997	ATP 16C (Navy)
Information Manual Replenishment at Sea	1983-04-26	C-28-007-007/JD-001
The Auxiliary Oiler Replenishment Handbook (Naval)	1994-02-28	
Probe and Receiver Fuelling System	1977-10-15	C-28-270-000/MS-000
MK III Kingpost	1981-02-27	C-28-268-000/MS-001
MK II Retractable Kingpost and Moving Padeye	1980-10-02	C-28-151-000/MJ-000
Kingpost HALIFAX Class	1988-12-22	C-28-463-000/MS-001
Zodiac Manual	N/A	Zodiac of North America Manufacturer
Operating Instructions 24 ft Rigid Inflatable Boat	1995-05-19	C-23-343-000/MB-001
Davit, Boat, Boom	1992	Allied Systems Company

Publication Name	Date	Publication Number
Hurricane-Technical Manual (530 OB-540 OB)	1994	M-B-10004
U.S. Pacific Fleet Amphibious Force Landing Craft and their Deployment	1974	Comphib Pac-Gen-P9110/1
Johnson Outboard Operators Manual	1992	212150
Outboard Maintenance Manual	1977-03-15	C-90-103-000/MP-000
Rigid Inflatable Boat Davit Type HSA 2300 Book 1 and 2	1996-02-23	C-28-400-000/MS-001
M III-K2 Hydraulic Crane Technical Manual	1991-06-10	C-28-470-000/MS-001
550 DC"12 Ton Diver's Crane	1979-10-25	C-28-311-000/MS-001
Basic Sailing Skills	1994	ISBN 0-920-232-17-5
4.6 Metre Albacore	1991-11-07	C-23-338-000/MS-001
Mine Inspection Payload-Isherwood		BO-001-00
Mechanical Mine Sweeping Operation & Maintenance Manual		7010E001-1 Interim

ANNEX "B"
Class Drawings

c o n t e n t s

ANNEX "B"
Class Drawings

B.1 Introduction

The following tables list all drawings available to ships which are related to the location, storage, specifications and rigging of seamanship equipment. Drawings are held by the FMFs and can be ordered from the FMF Fleet Support Engineering Officer.

B.2 Universal Class Drawings

Drawing Number	No of Sheets	Use
G-F-9-H27-0020087-02	1	1/4 Boom
G-R-9-H27-0020036-01	1	Chain Ladder
8555560	1	Diver Recovery Line
8951579	1	Jackstay Stirrup Associated Equipment
G-F-9-H27-0020021-01	1	Landing Brow
G-R-9-H27-0020028-01	1	Scramble Nets

B.3 HALIFAX Class Drawings

Drawing Number	No of Sheets	Use
G-F-9-H27- 0020087:01/02	1	1/4 Booms
G-R-9-H27-0020021-01	1	20 Foot Brow
SC8555559	1	Accommodation Ladder
SC8653136	7	Anchor & Cable
SC8555552	4	Awnings
SC8555557	1	Boat/Davit Arrangement
SC8755574	1	Boat Stowage
G-R-9-H27-0020036-01	1	Chain Ladder
SC8755573	1	Deck Cranes
8653168 8755573	1	Flag Staff Arrangements
SC8555562	1	Flight Deck Nets
SC8555541	7	Guardrail/Stanchion, Lifesaving Equipment
SC8455747	1	Lifesaving Arrangement
G-F-9-H27-0020037-01	1	Mediterranean Ladder
SC8455743	8	Mooring & Towing
SC8555555	2	RAS Stowage
SC8455748	7	Replenishment at Sea Liquid
SC8555554	7	Replenishment at Sea Light/Heavy Jackstay
8755802	1	Replenishment at Sea

HALIFAX Class Drawings (cont)

Drawing Number	No of Sheets	Use
9650040	7	Replenishment at Sea Rigging Arrangement
8555564	7	Rigging Arrangements for Upperdeck Equipment (only 4-7/6-7/7-7 apply)
SC8555553	12	Rigging Arrangements
G-R-9-H27-0020028-01	1	Scramble Nets
9251204	1	Touring Ladder
8653126	1	Weatherdeck Stowage
8555560	1	Weatherdeck Stowage
8555561	1	Weatherdeck Stowage
8555562	1	Weatherdeck Stowage

B.4 IROQUOIS Class Drawings

Drawing Number	No of Sheets	Use
8652059 GN-282-H27-36200	2	1/4 Boom Arrangements
8652052 GN-282-H26-34501	5	Accommodation Ladder
8652050 GN-282-H27-36300	6	Anchor and Cable Arrangements
8652051 GN-282-H27-36400	1	Awning and Stanchion Arrangements
GN280-H27-36401-01	3	Blackout Curtains
8652053	1	Boat Storage 10 Man Zodiac
GN-282-H41-36900	1	Davits, Ammunition & Stores
8652057 GN-282-H27-36201	2	Flagstaff Arrangements
8773956 GN-282-H27-36500	9	Guardrails/Stanchion
306101	9	King Post
306456	1	King Post Rigging
8774506	4	Upperdeck Ladder Key Plan
8773957 GN-282-H27-36502	1	Lifesaving Arrangements
8773959	4	Lifting Appliance
8831118	5	#3 Rope Store Arrangements
8773877	5	Replenishment at Sea Arrangements
IBM-8773877 GN-282-H41-36700	13	Replenishment at Sea Arrangements
8752004	11	Replenishment at Sea Arrangements
8651161	2	Replenishment at Sea Roller Fairleads Rigging Arrangements

IROQUOIS Class Drawings (cont)

Drawing Number	No of Sheets	Use
9468129	7	Replenishment at Sea /RIB Handling Arrangements
GN-282-H27-36000	1	Rigging Arrangement
8652060	1	Scramble Nets
8773686	1	Paint Store Arrangements
GN-280-H27-36302-01	3	Towing/Berthing/Mooring Arrangements
8773949	5	Weatherdeck Arrangements
8773946	2	Weatherdeck Arrangements
8773948	3	Weatherdeck Arrangements
8773947	4	Weatherdeck Arrangements
GN-282-H26-33705	1	Weatherdeck Stowage

B.5 AOR Class Drawings

Drawing Number	No of Sheets	Use
9651078	2	Jackstaff Modification
40262	1	Landing Craft Stowage
9551006	7	RIB and Davit Installation

B.6 AOR 509 Class Only Drawings

Drawing Number	No of Sheets	Use
509 -H-27-21347-01	1	AOR & Detail of Awning
9251515	2	Replenishment at Sea Station 1-2-3-4 Plan View
8952017	9	RIB Handling System
509-H-27-21340-01	1	Rigging Arrangement Station 1-2

B.7 AOR 510 Class Only Drawings

Drawing Number	No of Sheets	Use
9251649	2	Replenishment at Sea Station 1-2-3-4
50020	1	Shackle Elongated for Span Wire End Fitting

B.8 AOR 509/510 Drawings

Drawing Number	No of Sheets	Use
509-H-27-21289-00	1	Accommodation Ladder Jumping Ladder
509-H-27-21289-01	1	Accommodation Ladder Jumping Ladder
312769	1	Accommodation Ladder
509-H-28-27223	1	Anchor Windlass
509-H-41-21383-01	1	Boat Boom Arrangement
509-H-41-21383-00	1	Boat Boom Arrangement
MM-5372-D	1	Boom Stowage Arrangement 15 ton Crane
509-H-41-21349-01	1	Cranes-Derricks Lifting Device
509-H-41-21331-00	1	Eyepads for Jackstay Rig
MM-5344-D	2	Fixed Mast 15 Long Ton Crane
MM-5340-D	2	Fixed Mast 15 Ton Crane
509-H-27-21217-01	1	Forward Anchor Arrangement
628-9000-503	5	Fuelling
MM-5367-D	1	Gear Cover 15 Ton Crane
MM-5371-D	1	General Arrangement 15 Ton Crane
509-H-41-21331-01	1	Jackstay Transfer System
509-H-41-21332-01	1	Jackstay Transfer System
MM-5328-D	2	JIB Assembly 15 Ton Crane
509-H-35-21141-01	1	Landing Craft Stowage
509-H-35-21141-00	1	Landing Craft Stowage
509-H-27-21297-01	1	Mooring & Towing Arrangement
509-H-27-21297-00	1	Mooring-Towing Arrangement
509-H-41-21326-00	3	Replenishment Kingpost Station 3-4
509-H-41-21309-01	1	Replenishment Kingpost Station 1-2
509-H-41-21309-00	3	Replenishment Station 1-2
509-H-41-21306	1	Replenishment System Miscellaneous Sheaves
509-H-41-21340-00	4	Rigging Arrangement Replenishment Station
509-H-41-21334-01	1	Rigging Replenishment Station 3-4
509-H-27-21255-00	1	Scramble Nets
509-H-27-21255-01	1	Scramble Nets Arrangement & Detail
509-H-41-21327	2	Station 1-2-3-4
9251649	2	Station 1-2-3-4
509-H-27-21341-01	34	LIST FOLLOWING:
	01-34	Rigging Warrant

AOR 509/510 Drawings (cont)

Drawing Number	No of Sheets	Use
	02-34	Rigging Warrant List of Contents
	03-34	Landing Craft Stowage
	04-34	Rigging
	05-34	Scramble Net Arrangement Detail
	06-34	Boat Boom Arrangement
	07-34	Ammunition Stowage
	08-34	Ammunition Stowage
	09-34	Air Mechanic Workshop
	10-34	Mooring& Towing Arrangement
	11-34	Rigging Arrangement Replenishment Station
	12-34	Rigging Arrangement Replenishment Station
	13-34	Rigging Arrangement Replenishment Station
	14-34	Replenishment Station 1-2-3-4
	15-34	Jackstaff & Ensign Staff, Lifebuoy Stowage
	16-34	Safety Nets Flight Deck
	17-34	Leads Platform
	18-34	Trolley Hoist in Engine Room
	19-34	Hangar Arrangement 02 Deck Fame 87 1/2-106
	20-34	Hangar Arrangement Monorail Assembly
	21-34	Emergency Whistle Pull
	22-34	Rail & Stanchion
	23-34	Rail & Stanchion Portable Rail & Chain around Hatchways
	24-34	Accommodation Ladder Jumping Ladder
	25-34	Arrangement Detail Awning
	26-34	Arrangement Detail Awning
	27-34	Bosn Store Workshop 1 Deck Frame 20
	28-34	Bosn Store Workshop 1 Deck Frame 20
	29-34	Elevator Ammunition Dry Store
	30-34	Deck Crane 02 Deck Aft
	31-34	Mobile JB Crane
	32-34	Main Mast Stay
	33-34	Canvas List
	34-34	Signal Halyards

B.9 KINGSTON Class Drawings

Drawing Number	No of Sheets	Use
9558976	3	Anchor Arrangements
04-2224-101 to 109	1	Anchor Windlass
9558967	2	Mooring Arrangements
9558968	4	Rigging Arrangements
1976-00-49	1	Blake Stopper
1944-00-87	1	Bow Stopper
A3378-00	1	Original RIB and Stowage

B.10 OBERON Class Drawings

Drawing Number	No of Sheets	Use