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# **BR 67**

## **ADMIRALTY MANUAL OF SEAMANSHIP**

**By Command of the Defence Council  
Fleet Commander & Deputy Chief of Naval Staff**

**ADMIRALTY MANUAL OF SEAMANSHIP**

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## CHAPTER 7

### REPLENISHMENT AT SEA

#### SECTION 1- ROYAL NAVY AND ROYAL FLEET AUXILIARY

##### 07001. Introduction

The technique of replenishment at sea (RAS) permits the restocking of a ship with personnel, ammunition (including missiles), provisions, fuel and water while underway. The book of reference giving details of, and procedures for, the various replenishment rigs within NATO navies is **ATP-16, Replenishment at Sea**, which also gives information on any changes to equipment and the current policy on conducting replenishment at sea. This chapter describes replenishment between Royal Navy and Royal Fleet Auxiliary vessels. Replenishment must be accomplished in the shortest possible time consistent with safety, because the ships engaged are restricted in movement and therefore more vulnerable to attack. However, speed of replenishment depends on the experience of the ship handler and the efficiency of those working the gear; consequently a newly worked-up ship will not normally attain the same speed of transfer as a ship which has carried out numerous transfers. Individual ships are provided with As fitted drawings which give full details of the layout of RAS gear and of highpoint and screen attachment points for slips and leading blocks. These drawings also show the test diagrams for the RAS rigs of the ship. **BR 3027, Management of Safe Use, Examination and Testing of Lifting Plant** gives details of the test loads to be applied to replenishment-at-sea equipment and rig attachment points.

##### 07002. Types and methods of replenishment

a. **Abeam transfer of solids.** Heavy stores and ammunition up to a maximum load of two tonnes can be transferred by Heavy Jackstay, using the Conventional Heavy Jackstay rig, the Mk 1A rig, or the Moveable highpoint rig. These are described later in this chapter.

b. **Vertical replenishment (Vertrep).** Vertrep is defined as the use of helicopters for the transfer of stores or ammunition between ships or between ship and shore, by day or night. It is particularly useful for small-scale replenishment, because there is no need for ships to work at close quarters. Modern RFA stores-ships are equipped with one or more helicopters assigned to the Vertrep task. The method is described later in this chapter.

c. **Abeam transfer of liquids.** Fuel, water and lub oil can be transferred by abeam replenishment. The types of rig used; probe, jackstay, large derrick, latched derrick and Crane, are described later in this chapter.

**Note.** *The end connection for large derrick, jackstay fuelling and crane rigs is either QRC or NATO B.*

d. **Astern transfer of liquids.** Fuel only can be transferred by astern replenishment using either the float method or the Hudson reel (AORs, and AOs). The methods used are described later in this chapter.

e. **Light stores and personnel.** For personnel and light stores up to 250 kilograms the light jackstay rig is used. Stores up to 14 kilograms in weight can be transferred by light line transfer. Both methods are described later in this chapter.

**WARNING**  
**WHEN SIMULTANEOUSLY REPLENISHING FROM FORWARD AND AFT RIGS, FUEL MUST NOT BE REPLENISHED FROM THE FWD RIG IF AMMUNITION IS BEING REPLENISHED AFT.**

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### 07003. Definitions within a replenishment unit

a. A replenishment unit is defined as a group of ships consisting of one or more delivering ships with one or more receiving ships replenishing and/or ships in waiting and/or lifeguard station. Within a replenishment unit the following definitions apply:

- (1) *Control Ship*. The ship controlling the RAS operation of the unit.
- (2) *Unit Guide*. The replenishment unit guide.
- (3) *Delivering Ship*. The ship delivering the rig(s).
- (4) *Receiving Ship*. The ship receiving the rig(s).
- (5) *Approach Ship*. The ship making the approach/ship that has made the approach.
- (6) *Supplying Ship*. The ship that supplies the item(s) to be transferred.
- (7) *Customer Ship*. The ship that receives the transferred items.

b. The above definitions are the central factors that control the RAS organisation. Unless otherwise ordered, the **control ship** will be the **unit guide** and the **delivering ship**. Where this is not the case the OTC must designate these tasks to the desired ship. Similarly, the **receiving ship** will be the **approach ship** unless otherwise ordered by the OTC. It should be noted that the **delivering ship** (the ship that provides the rigs) need not necessarily be the **supplying ship** (the ship that provides the stores).

### 07004. Types of RAS points in warships

a. RAS points, often referred to as high points, are locations in the ship from which replenishment evolutions are conducted; they can be one of the following types:

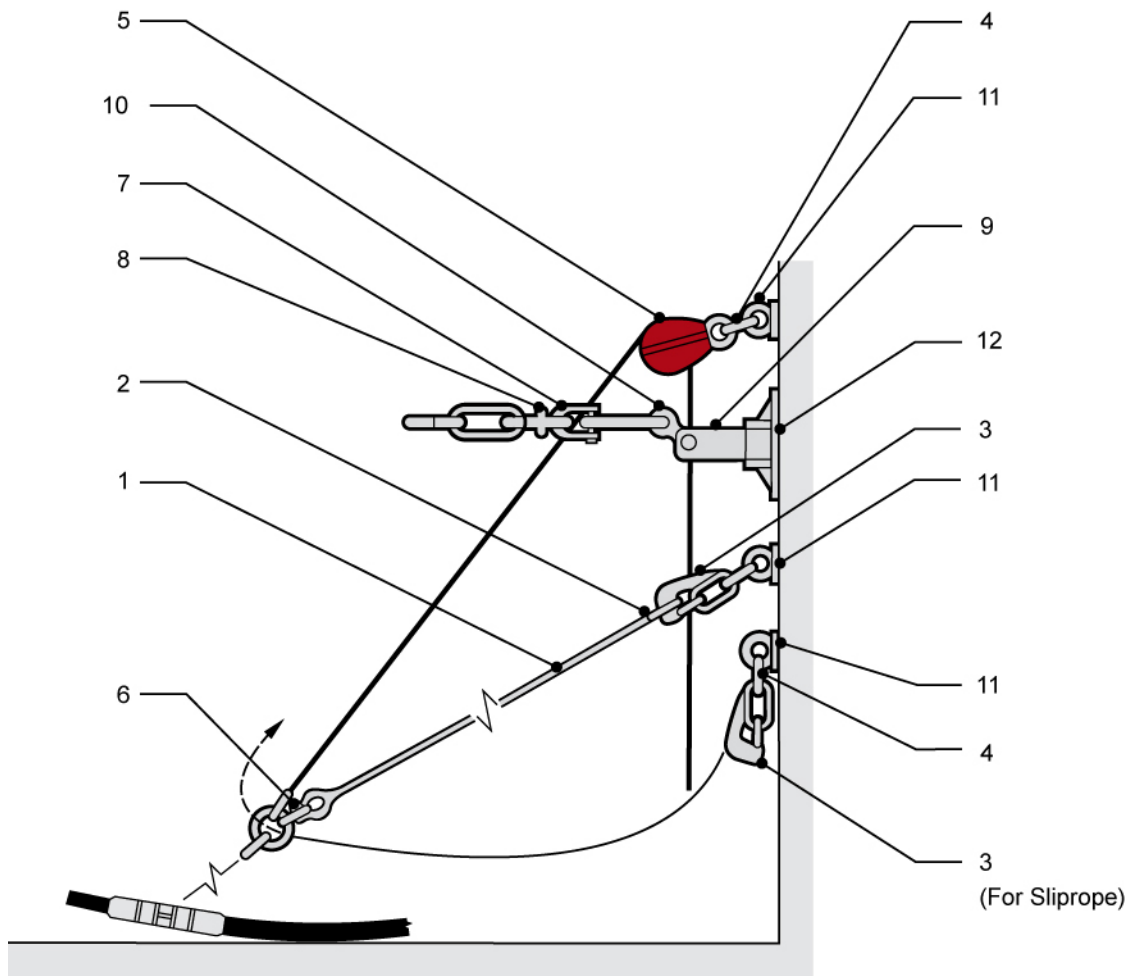
b. **Deck attachment point**. For astern fuelling only. Consists of an eyeplate for the connection of a hose-securing pendant, and eye plate(s) for the connection of roller shackle(s) for the hoseline lead.

c. **Screen attachment points**. Figs 7-1 and Fig 7-2 show a multi rig reception arrangement capable of receiving all types of abeam refuelling rigs. It consists of eyeplates to carry a leading block and hose-hanging pendant, and a base plate to which can be connected, depending on requirements, either a probe receiver or swivel joint link assembly for the connection of a jackstay. Fig 7-3, Fig 7-4 and Fig 7-5 show screen attachment points capable of receiving derrick crane and boom refuelling rigs, and heavy and light jackstay rigs. Various permutations of these arrangements will be found throughout the fleet and it is important that As fitted drawings are examined to ascertain precise rigging arrangements for individual ships, but see also the Warning box below.

#### WARNING

**IT IS IMPORTANT WHEN RIGGING RAS POINTS THAT SHIP'S 'AS FITTED' DRAWINGS ARE FOLLOWED TO DETERMINE THE POSITION OF BLOCKS, SLIPS, PENDANTS, GUYS AND STAYS. IF UNABLE TO COMPLY OTHER SUITABLY SITED AND TESTED EYEPLATES MAY BE USED, HOWEVER AN S2022 MUST BE RAISED. IF A SAFE RIG CANNOT BE ACHIEVED OPERATIONAL DEFECT ACTION IS TO BE TAKEN.**

Fig 7-1. Screen attachment multi rig reception point rigged for jackstay/derrick fuelling



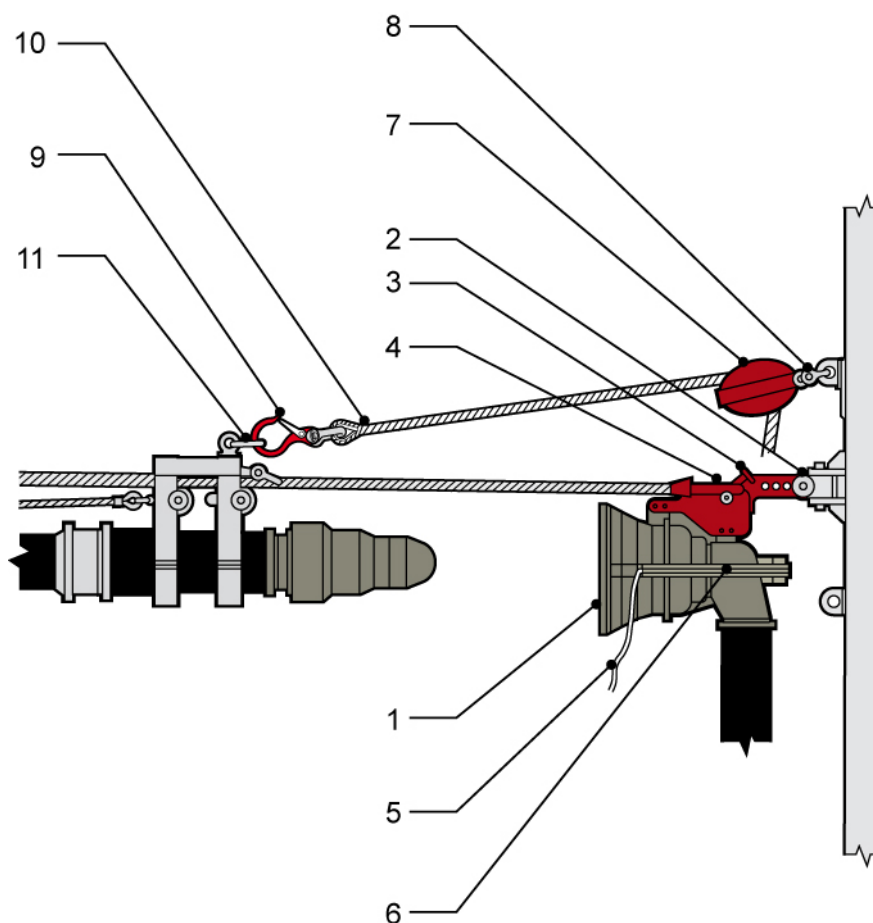
| No. | ITEM                                    | NSN No.       | No. | ITEM                   | NSN No.       |
|-----|---|---------------|-----|------------------------|---------------|
| 1*  | Hose hanging pendant<br>20mm 6 X 36 SWR | 0231/523-8649 | 7   | Shackle                | 0263/721-6096 |
| 2*  | Link                                    | 0249/458-9487 | 8   | Slip                   | 0263/414-9835 |
| 3   | Slip                                    | 0263/414-9747 | 9   | Swivel arm joint       | 0249/525-7299 |
| 4   | Shackle                                 | 0263/721-6093 | 10  | Swivel joint link assy | 0249/525-7325 |
| 5   | Snatch block                            | F218/190-6915 | 11  | Eyeplate               | 5120/419-5144 |
| 6*  | Spring hook                             | 0263/539-3523 | 11  | Eyeplate baseplate     | DRG 002541826 |
|     |   |               | 12  |                        |               |

\* Integral part of hose hanging pendant

**Note.** Items 7, 8, 9 and 10 required for jackstay rig only.

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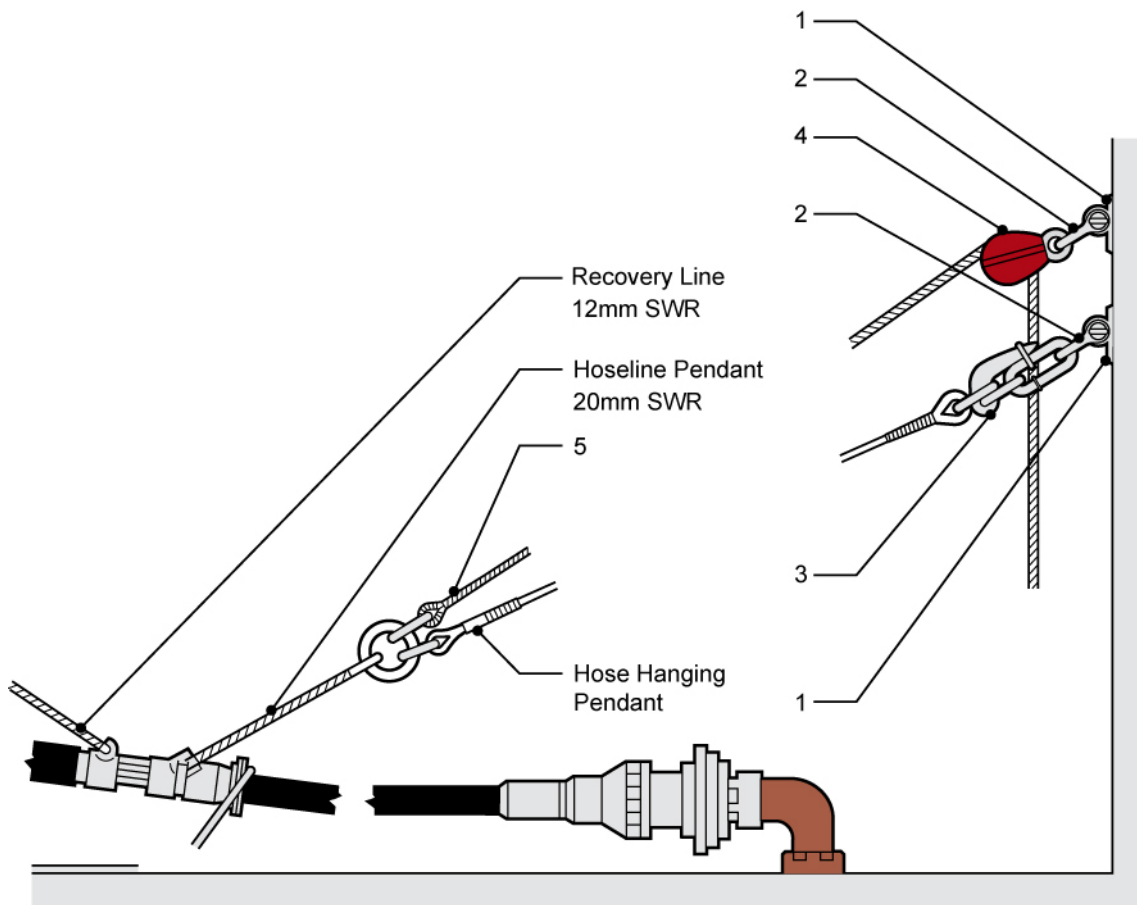
**Fig 7-2. Screen attachment multi rig reception point rigged for probe fuelling**



| No. | ITEM                      | NSN No.          |
|-----|---------------------------|------------------|
| 1   | Probe receiver            | 0249/00-850-5146 |
| 2   | Swivel arm joint          | 0248/525-7299    |
| 3   | Pelican hook              | 0249/525-7298    |
| 4   | Jackstay terminal fitting | 0249/529-2242    |
| 5   | Release lanyard           | -                |
| 6   | Release lever             | -                |
| 7   | Snatch block              | F218/190-6915    |
| 8   | Shackle                   | 0263/721-6093    |
| 9   | Spring hook               | 0263/539-3523    |
| 10  | Hoseline                  | -                |
| 11  | Shackle                   | 0263/543-4551    |



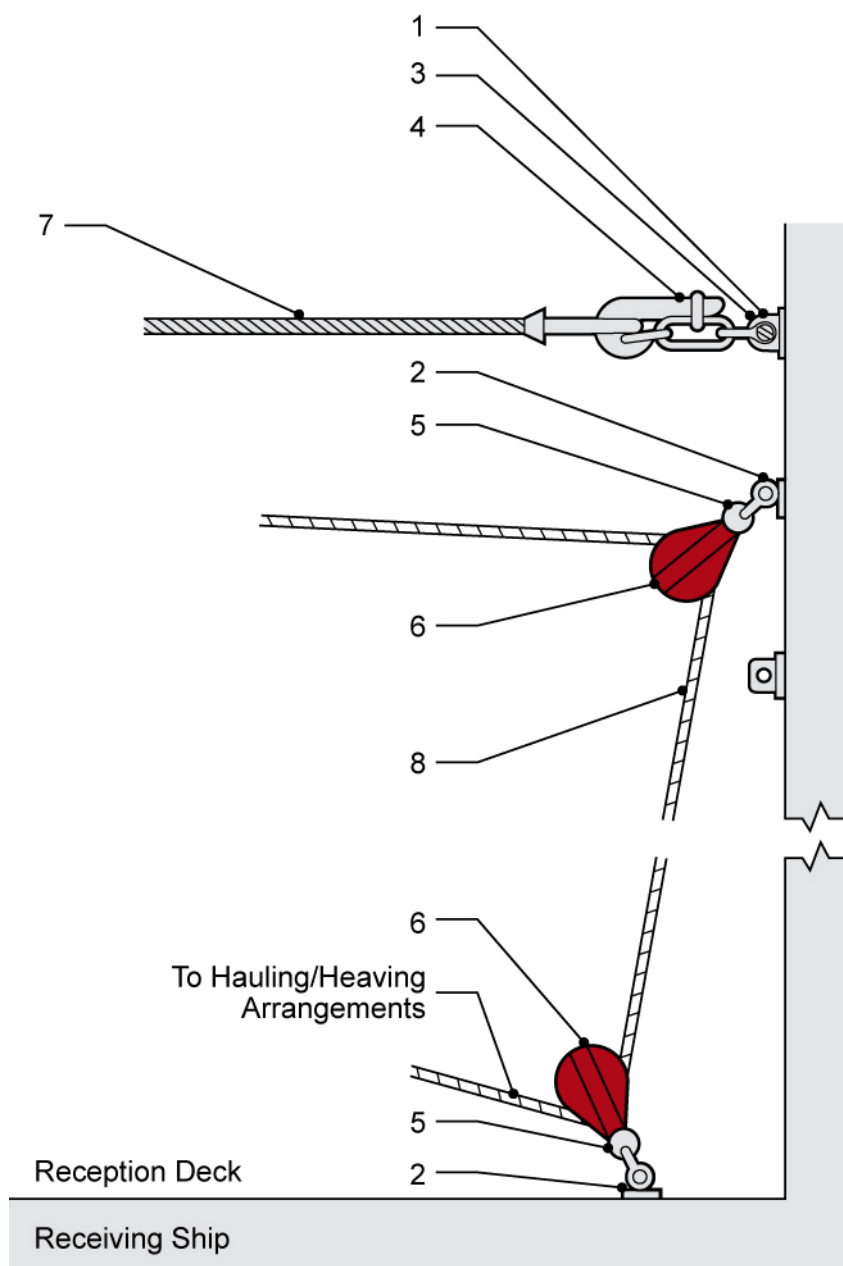
Fig 7-3. Screen attachment point for reception of derrick, crane and boom fuelling rigs



| No. | ITEM         | NSN No.                              |
|-----|--------------|--------------------------------------|
| 1   | Eyeplate     | 5120/419-5144                        |
| 2   | Shackle      | 0263/721-6093                        |
| 3   | Slip         | F219/132-6804 (MWV)<br>0263/414-9747 |
| 4   | Snatch block | F905/867-8379 (MWV)<br>F218/190-6915 |
| 5   | Hoseline     | -                                    |

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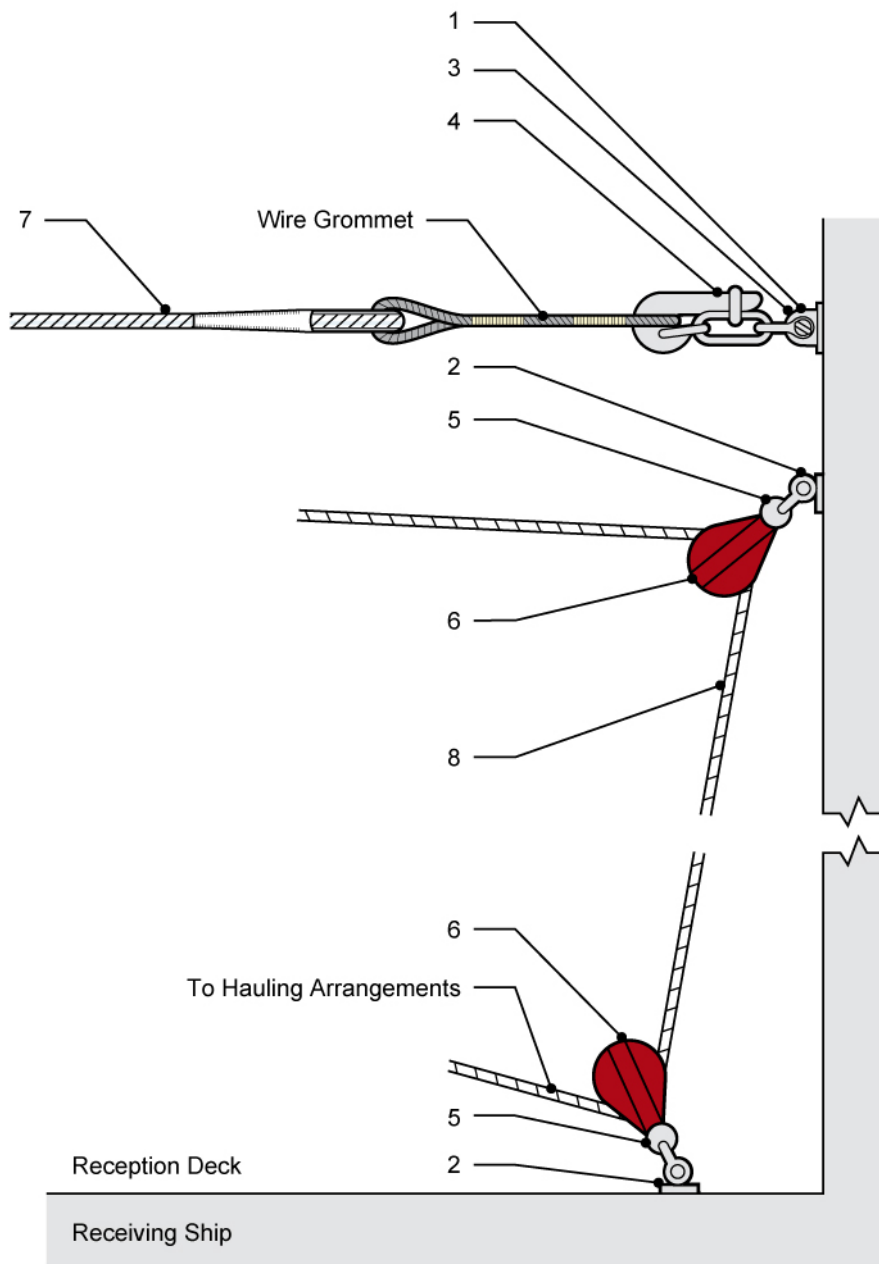
**Fig 7-4. Screen attachment point rigged for heavy jackstay reception**



| No. | ITEM          | NSN No.       |
|-----|---------------|---------------|
| 1   | Eyeplate      | 0262/419-5146 |
| 2   | Eyeplate      | 0262/419-5144 |
| 3   | Shackle       | 0263/721-6096 |
| 4   | Slip          | 0263/414-9835 |
| 5   | Shackle       | 0263/721-6093 |
| 6   | Snatch block  | F218/190-6915 |
| 7   | Jackstay wire | -             |
| 8   | Inhaul        | -             |

**Note.** Light Jackstay rigs can be secured to heavy jackstay rig screen attachment points.

Fig 7-5. Screen attachment point for light jackstay



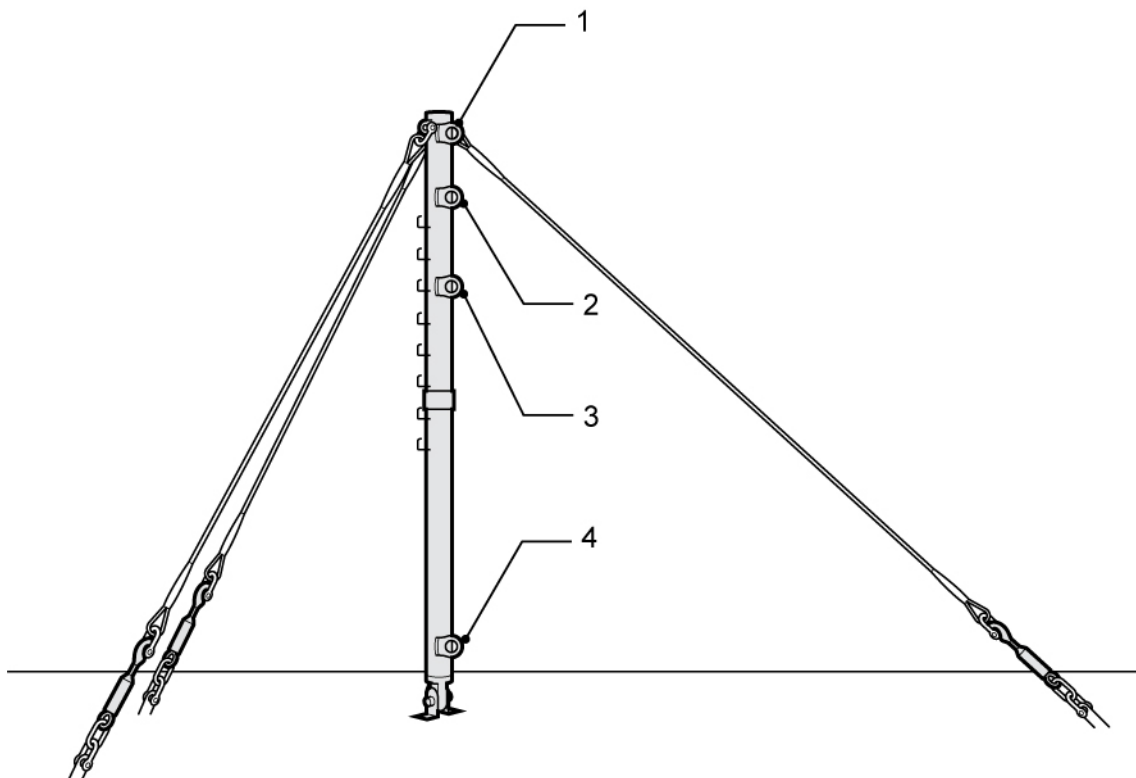
| No. | ITEM           | NSN No.   |
|-----|----------------|---|
| 1   | Eyeplate       | 0262/419-5144   |
| 2   | Eyeplate       | 0262/419-5143   |
| 3   | Shackle        | 0263/721-6093   |
| 4   | Slip           | F219/132-6804 (MWV)<br>0263/414-9747<br>F905/867-8379 (MWV) |
| 5   | Shackle        | 0263/721-6090   |
| 6   | Snatch block   | 0246/521-2794   |
| 7   | Light jackstay | 3940/776-5755   |
| 8   | Outhaul        | 3940/776-5757   |

**Note.** When rigged for supplying light jackstay, item 4 is replaced by a leading block, NSN No 0246/521-2799.

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d. **Portable stump mast.** (Fig 7-6). Certain ships are provided with a portable stump mast for abeam replenishment in locations where permanent RAS points are impractical, ie flight decks. It consists of a tubular steel mast supported by guys and backstay(s). Eyeplates on the mast allow for the attachment of blocks and rigging slips similar to screen attachment points. Mast height, size and configuration of stays, and details of rig reception capabilities vary and ship's As fitted drawings must be consulted to ascertain precise details.

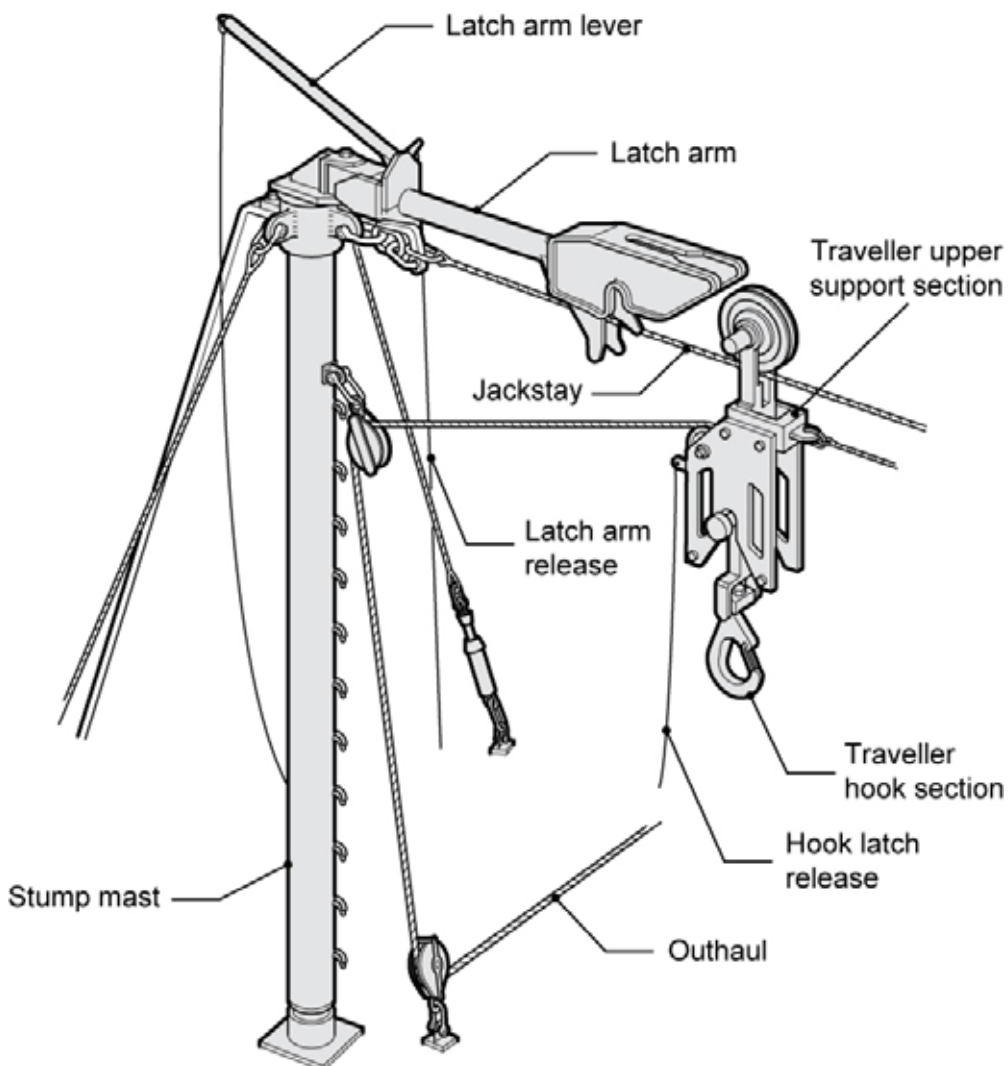
**Fig 7-6. Typical portable stump mast**



| No. | ITEM                          | NSN No.       |
|-----|-------------------------------|---------------|
| 1   | Jackstay eyeplate             | 5120/419-5146 |
| 2   | Outhaul block eyeplate        | 5120/419-5144 |
| 3   | Hose hanging pendant eyeplate | 5120/419-5144 |
| 4   | Outhaul block eyeplate        | 5120/419-5144 |

e. **Universal drop-reel traveller system.** Using a conventional jackstay rig, the Universal Drop Reel traveller (UDRT) system allows the jackstay to remain tensioned while the load is lowered on to the receiving ship's deck by use of the outhaul winch. The system is mounted at the head of a stump mast, as shown in Fig 7-7. The latch arm holds the traveller at a fixed distance from the stump mast and is secured to a fitting at the head of the mast by means of a universal joint. This allows the latch arm to rest on the tensioned jackstay. The latch arm lever provides control of the arm while the jackstay is being rigged. The traveller is in two parts. The upper section, with the extended sheave spindles, runs on the jackstay and carries the upper outhaul pulley. The traveller hook section is held to the upper support section by the reeving of the outhaul. These two sections are positively locked together for the transfer operation. On arrival at the latch arm, the traveller is locked by a mechanically operated latch. A device in the traveller's upper support section allows the traveller hook latch to be released. The load can then be lowered by veering on the outhaul. To disengage the traveller for return to the delivering ship, the two sections are automatically locked together by tensioning the outhaul and then the latch arm release is manually operated.

**Fig 7-7. Stump-mast-mounted drop reel assembly**

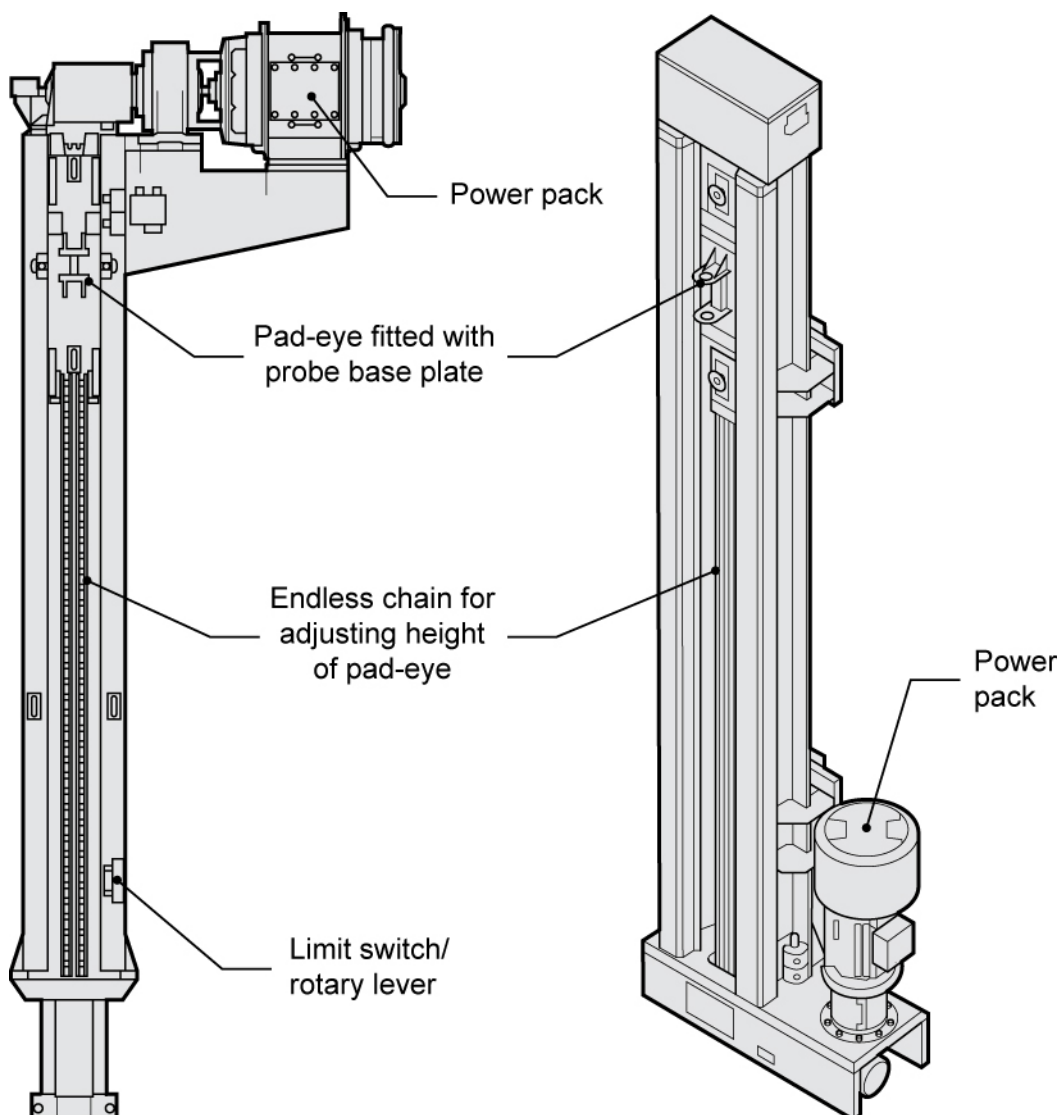


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f. **Moveable reception highpoint (sliding pad-eye).** This arrangement, (Fig 7-8) fitted in Type 23 frigates and certain other ships, has been designed primarily to receive the moveable highpoint replenishment rig, although it is capable of receiving conventional rigs (See Fig 7-9, Fig 7-10 and Fig 7-11). The height of the pad-eye, to which is welded eyeplates for the attachment of replenishment rigs, is adjusted on a vertical track way by means of an electric motor powered chain drive, allowing the jackstay to remain under tension whilst loads are traversed, lowered or hoisted. The two types of sliding pad-eye are shown in Fig 7-8.

**Note.** *The upper and lower travel limits of the sliding pad-eye are to be marked on the frame of the structure with 50mm black painted lines. Operators must raise/lower the pad-eye between these marks and not rely on the limit switches. (The limits vary ship to ship and must be established by the maintainer).*

**Fig 7-8. Moveable reception highpoints (sliding pad-eyes)**



| No. | ITEM                        | NSN No.       |
|-----|-----------------------------|---------------|
| 1   | Eyeplate                    | 0232-419-5144 |
| 2   | Baseplate                   | -             |
| 3   | Eyeplate                    | 0232-419-5144 |
| 4   | Slip                        | 0263-414-9747 |
| 5   | Shackle                     | 0263-721-6093 |
| 6   | Slip                        | 0263-414-9835 |
| 7   | Hose hanging pendant (20mm) | F218-523-8649 |
| 8   | Snatch block                | F218-190-6915 |
| 9   | Spring hook                 | 0263-539-3523 |
| 10  | Slip rope                   | -             |
| 11  | Shackle                     | 0263-721-6093 |
| 12  | Link                        | F217-458-9487 |
| 13  | Shackle                     | 0263-721-6093 |
| 14  | Shackle                     | 0232-419-5144 |
| 15  | Swivel joint link assembly  | 0249-525-7325 |

Fig 7-9. Sliding pad-eye jackstay fuelling reception

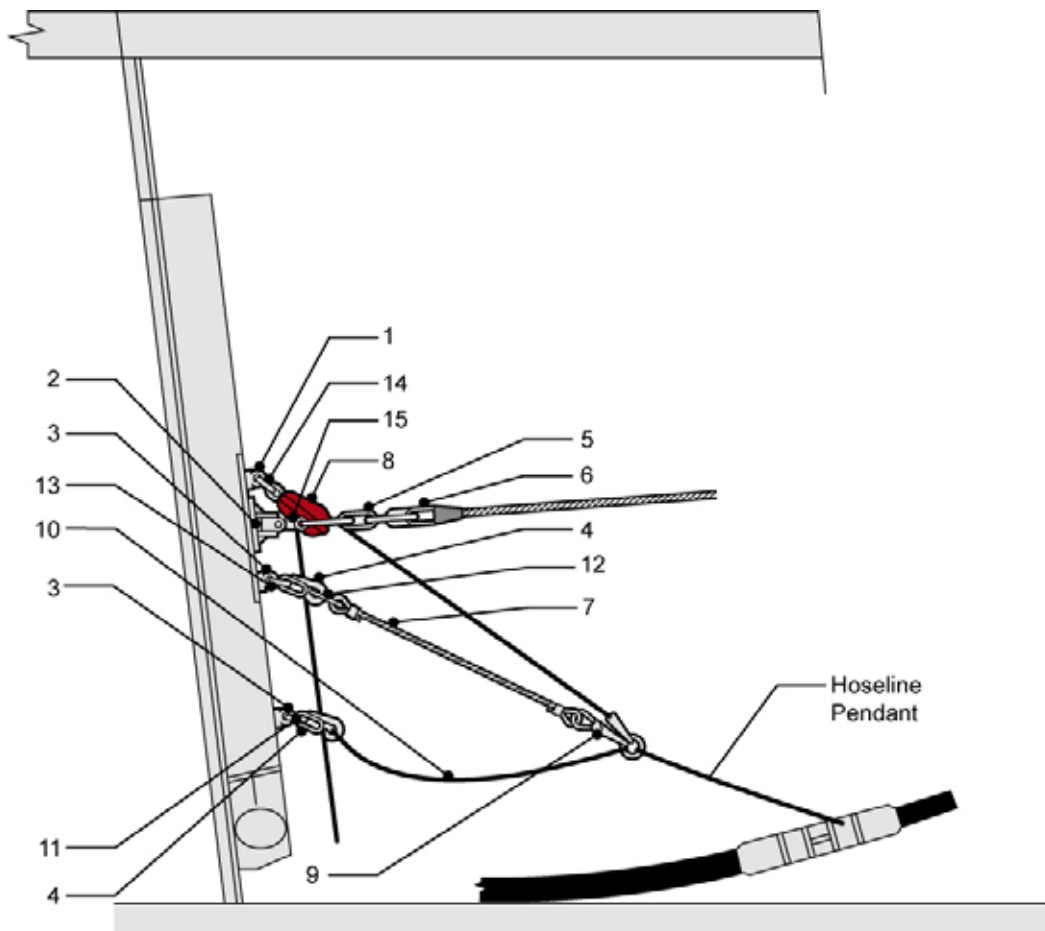
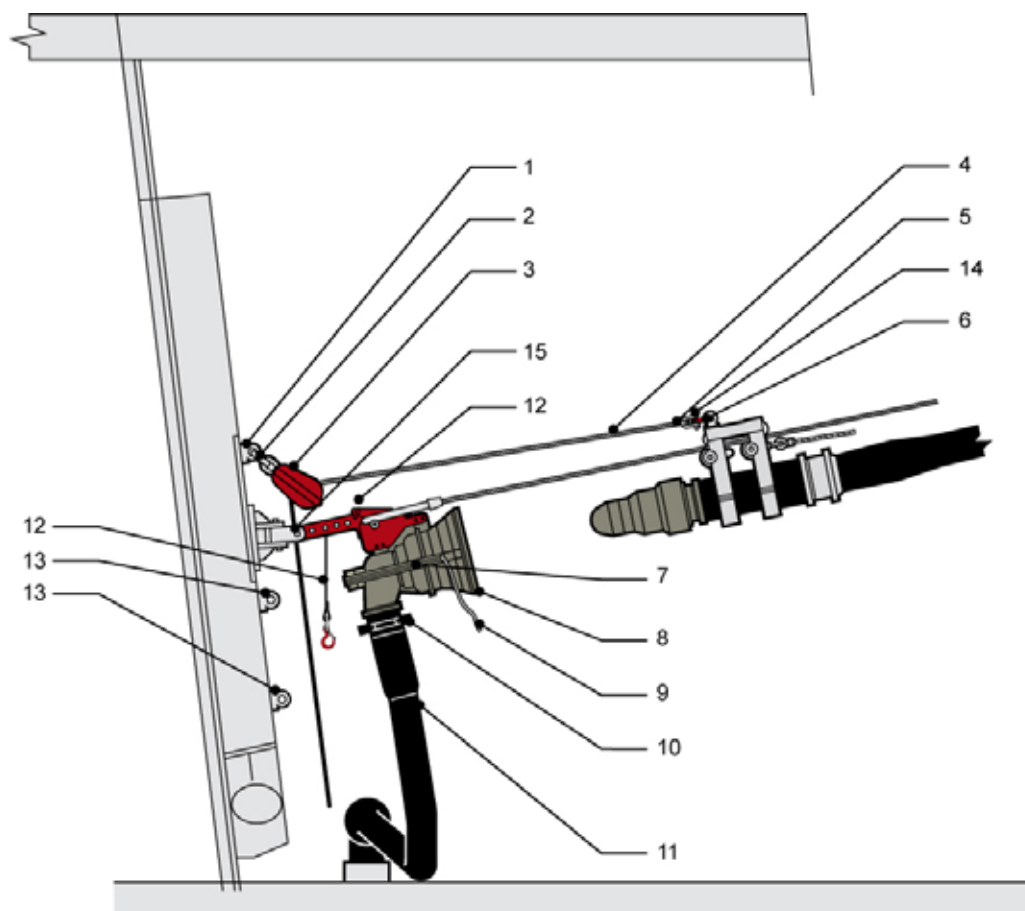


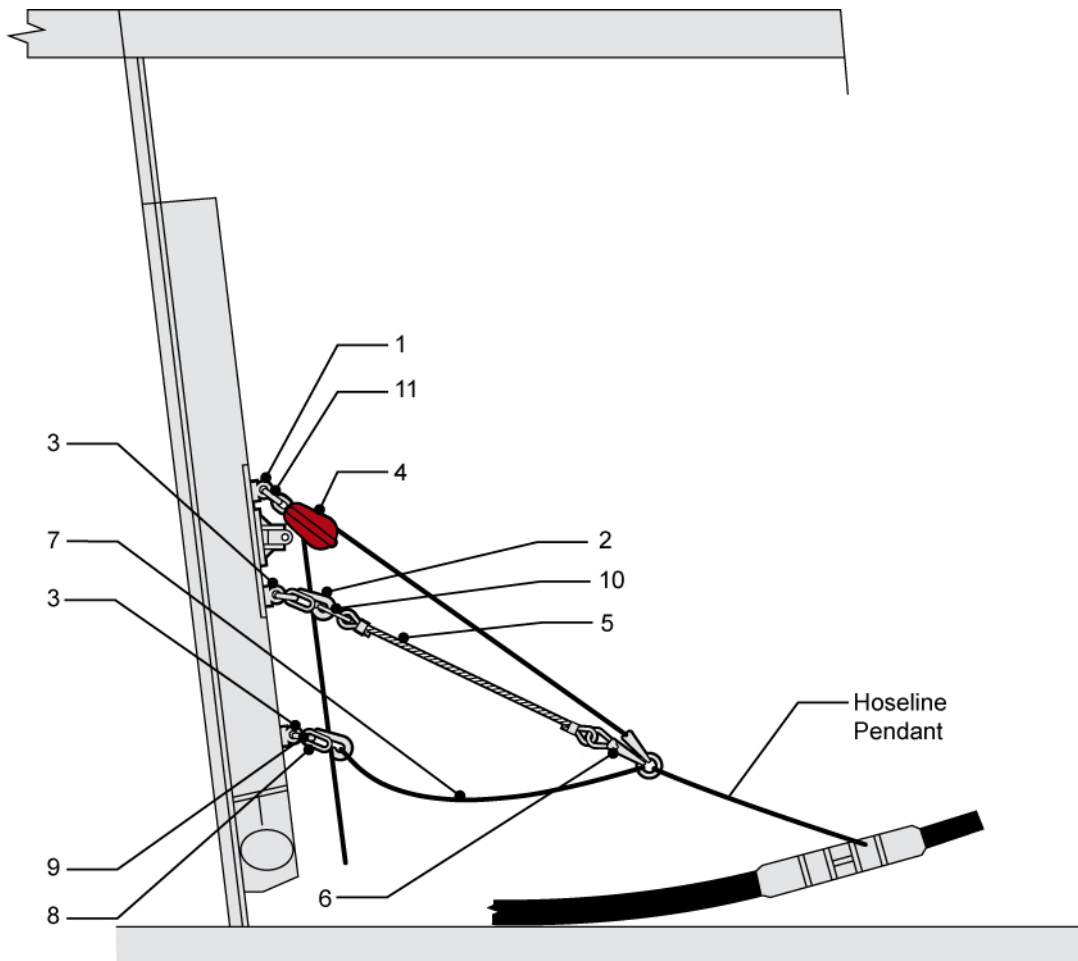
Fig 7-10. Sliding pad-eye probe fuelling reception



| No. | ITEM                                  | NSN No.          |
|-----|---------------------------------------|------------------|
| 1   | Eyeplate                              | 0232-419-5144    |
| 2   | Shackle                               | 0263-721-6093    |
| 3   | Snatch block                          | F218-190-6915    |
| 4   | Hoseline                              | F032-357-2994    |
| 5   | Thimble                               | -                |
| 6   | Spring hook                           | 0263-539-3523    |
| 7   | Release lever                         | -                |
| 8   | Probe receiver                        | F217-00-850-5146 |
| 9   | Release lever lanyard                 | -                |
| 10  | Adaptor                               | 0249-206-8596    |
| 11  | Fuel hose to deck connection          | 0249-533-4450    |
| 12  | Retaining pendant                     | -                |
| 13  | Eyeplate                              | 0232-419-5144    |
| 14  | Shackle                               | 0263-721-6093    |
| 15  | Swivel arm assembly with pelican hook | See BR 6583(001) |



Fig 7-11. Sliding pad-eye derrick fuelling reception



| No. | ITEM                        | NSN No.       |
|-----|-----------------------------|---------------|
| 1   | Eyeplate                    | 0232-419-5144 |
| 2   | Slip                        | 0263-414-9747 |
| 3   | Eyeplate                    | 0232-419-5144 |
| 4   | Snatch block                | F218-190-6915 |
| 5   | Hose hanging pendant (20mm) | F218-523-8649 |
| 6   | Spring hook                 | 0263-539-3523 |
| 7   | Slip rope                   | -             |
| 8   | Slip                        | 0263-414-9747 |
| 9   | Shackle                     | 0263-721-6093 |
| 10  | Link                        | F217-458-9847 |
| 11  | Shackle                     | 0263-721-6093 |

**07005. Station keeping – distance line for abeam replenishment**

a. A steady course and speed by the delivering ship and correct station-keeping by the receiving ship are most important. For abeam transfers, the distance between ships is measured by a distance line. (Fig 7-12a). The zero end is secured to a strong point in the guide ship, with the zero flag parallel to the ship's side, and the other end is kept taut in the consort at a position visible from the bridge and at right angles to the fore and aft line. The UK RAS distance line can be adapted for either day or night replenishment and, for daylight replenishment, may be rigged as a self-tautening line. Specification for the line and markers is as follows:

(1) *Line.* 102 metres of 8.5mm braided polyester (NSN 0350-120-8692) with an Inglefield clip at each end.

(2) *Marker flags.* 230mm pre-coloured acrylic equilateral triangles (Fig 7-12b), painted in the colours shown. The numbers, painted on both sides of the triangle, have a minimum height of 75mm. Numbers on white or yellow background are to be black; those on other backgrounds are to be white.

(3) *Night colours.* A blue cyalume light is to be inserted in each pocket of the 18, 30, 42 and 54 metre markers. All other markers are to have a red cyalume light inserted in the pocket. Fig 7-12b shows details of cyalume light pocket arrangements.

(4) *Weight.* A finished length of 250mm x 8.5mm polyester braidline, one end fitted with a monkey's fist weighted to one kilogram, and, at the other, with a non-swivel Inglefield clip.

b. **Operating procedure (by day).** The non-guide ship provides the weighted monkey's fist for use with the Self-tensioning Distance Line. When the distance line comes to hand it is led through the designated fairlead on the engaged side, the monkey's fist is clipped to the outboard end of the distance line and then led across the fo'c'sle and out through a fairlead on the disengaged side, the end is allowed to trail freely in the sea so that the drag tightens the line. Two ratings are needed to tend the line.

c. **Operating procedure (by night).** Because of the likelihood of the cyalume lights snagging and breaking free in the fairleads, the night distance line must be hand held and not rigged as a self-tensioning line. Two hands are normally required for this task.

d. **Minor war vessels (MWVs) – modified distance line.** When MWVs are operating together conducting light-line transfers, there exists the possibility that the full-length distance line, streamed astern in the self-tautening mode, could foul the ship's propellers. To alleviate this potential problem the following onboard modification allows a 60m distance line to be available for light-line transfers with other MWVs, whilst retaining the facility of a full-length distance line when operating with RN/RFA/NATO units other than MWVs:

(1) Measure and cut the line at 3.2m from the leading edge of the 60m pennant.

(2) Attach non-swivel Inglefield clips, NSN No 0330/749-7124, 200mm from each bitter end, and secure in place by a half-hitch and whipping.

(3) From 8.5mm braidline, NSN No 0350/120-8692, manufacture a pendant to a finished length of 400mm, with non-swivel Inglefield clips attached at each end as described above. This pendant is used to join the two sections when a full-length distance line is required. The 60m distance line can be used in the self-tautening mode, but full-length distance lines when used in MWVs must always be manned.

Fig 7-12a. Self-tautening distance line showing position of day and night markings

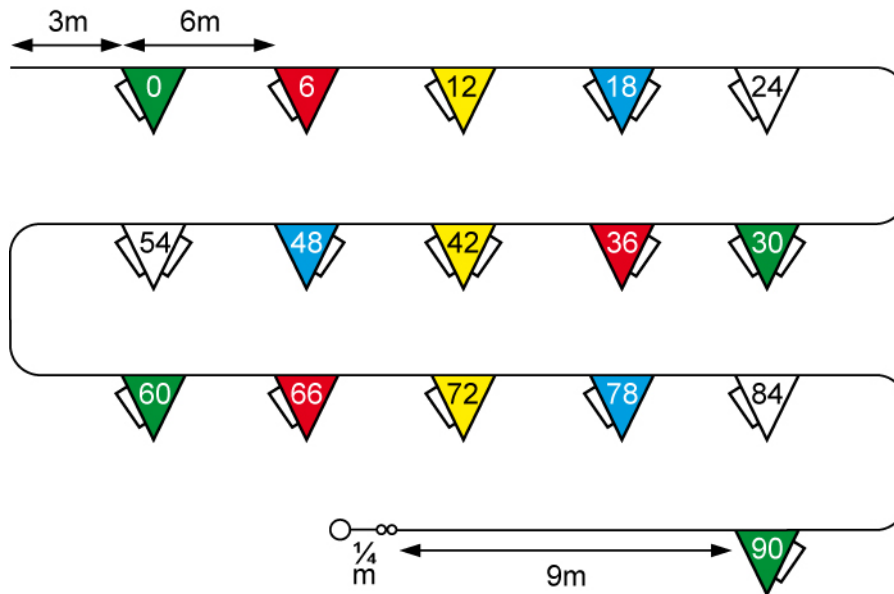
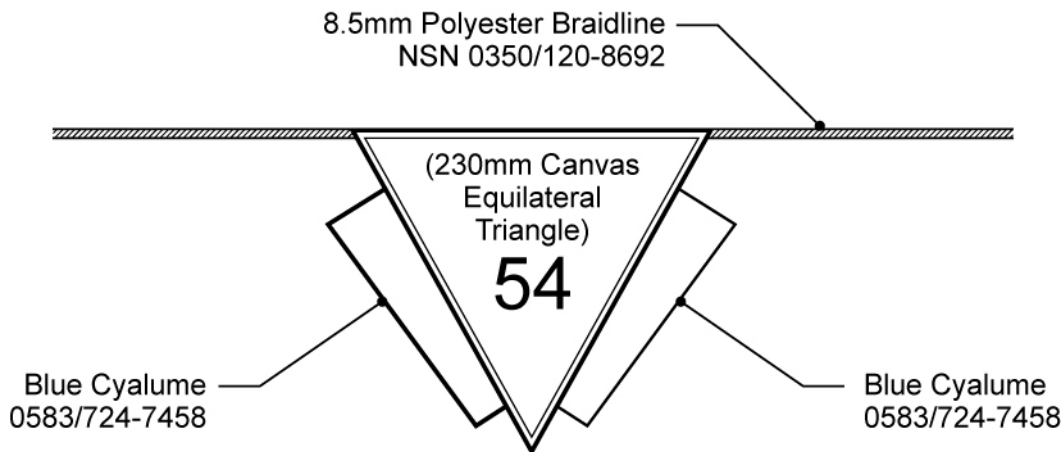


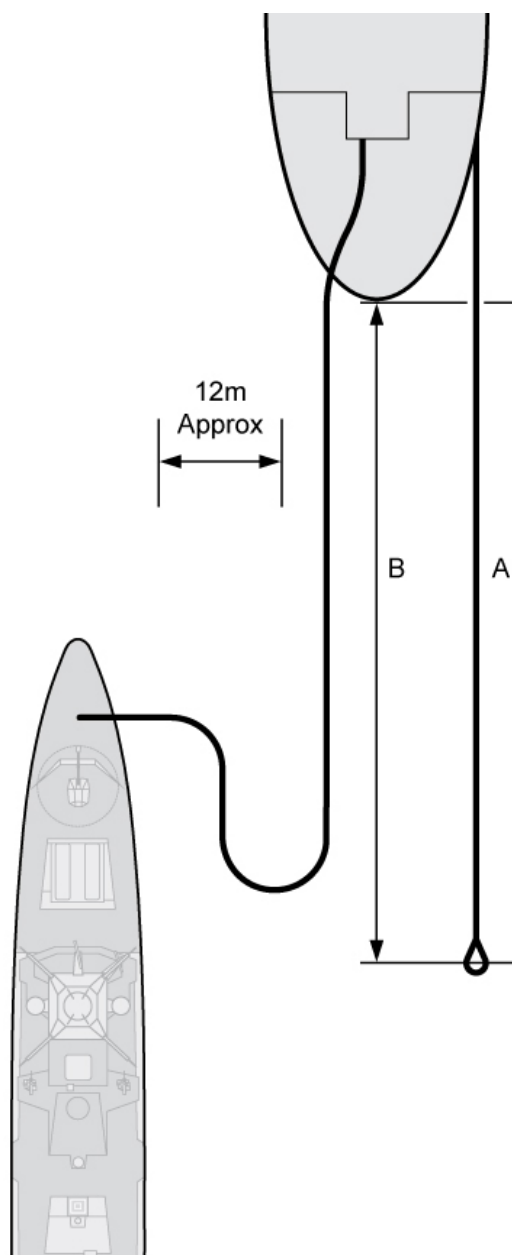
Fig 7-12b. Details of day and night mark fittings on distance line



**07006. Station-keeping – distance astern**

When fuelling astern, the receiving ship keeps station on a **Marker Float/Buoy** streamed by the delivering ship (Fig 7-13). This marker is initially streamed to the same distance astern as the hose end. Once the hose has been connected and is towing in the correct catenary the delivering ship can be requested to adjust the position of the station marker to assist station-keeping.

Fig 7-13. Station-keeping distances for astern fuelling



A = Length of marker buoy line. This marker is initially streamed to the same distance astern as the hose end. Once the hose has been connected and is towing in the correct catenary, the delivering ship can be requested to adjust the position of the station marker to assist station keeping.

B = Length of fully streamed hose. In the case of the Hudson reel astern rig fitted in RFAs, *Fort Victoria*, *Wave Ruler* and *Wave Knight*, the length of the streamed hose is approximately 225m. In all other RFAs fitted with the traditional laid out astern rig the total length including the foul weather fleet, is approximately 190m.

**07007. Communications and signalling**

a. Before a RAS operation can be conducted, information and executive signals must be exchanged between all ships participating in the operation. The operation may range from a full-scale replenishment, to RAS conducted by two ships, or to a simple transfer of mail by helicopter. In every instance, however, command relationships must be understood by all concerned. This aspect of replenishment is covered fully in **ATP-1, Volume 1** and in **ATP-16**. However, the seaman should be aware that the Maritime Tactical Message System for replenishment involves the use of five standard signals. They are as follows:

- |                       |  |
|-----------------------|--|
| (1) OPSTAT RASREQ     | For use by a combatant ship to signal its requirements, either direct to the supplying ship or to the OTC.                 |
| (2) OPTASK RAS        | For use by the OTC to promulgate the replenishment programme.  |
| (3) OPSTAT UNIT       | For use by all ships to promulgate details of transfer stations.   |
| (4) OPSTAT CARGO      | For use by supplying ships to report cargo remaining to the OTC after a RAS operation and on changing operational control. |
| (5) STANDING RAS GOLD | For use by the OTC when requirements of ships and rigs to be used are known in advance.                                    |

**CAUTION**







**When replenishing from US ships the OPSTAT UNIT/OPSTAT RASREQ should state that the maximum rig tension is not to exceed 8 tonnes.**

b. **Flag hoists.** Fig 7-14 gives details of flag hoists used during daylight replenishment operations. By night the morse equivalents of 'R' and 'Prep' may be flashed four times without call or ending, using the following coloured lights, as appropriate:

- |                 |                   |
|-----------------|-------------------|
| (1) WHITE LIGHT | Signal at the DIP |
| (2) RED LIGHT   | Signal CLOSE UP   |

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**Fig 7-14. Flag hoists used during daylight replenishment**

| Signal  | Meaning  |
|---|--|
|  <p>Romeo</p> <p>Displayed on fore yardarm on side rigged</p>  | <p><b>Replenishment Unit Guide (Abeam Method)</b><br/> <b>At the Dip:</b> Am steady on course and speed and am preparing to receive you on side indicated.<br/> <b>Close Up:</b> Ready to receive you on side indicated.<br/> <b>Hauled Down:</b> When messenger is in hand.</p> |
|  <p>Romeo</p> <p>Displayed side hose is being used</p>         | <p><b>Replenishment Unit Guide (Astern Method)</b><br/> <b>At the Dip:</b> Am steady on course and speed and am preparing to stream hose on this quarter.<br/> <b>Close Up:</b> Am ready for your approach.<br/> <b>Hauled Down:</b> Hose is on deck of receiving ship.</p>      |
|  <p>Romeo</p> <p>Displayed on fore yardarm on side rigged</p>  | <p><b>Approach Ship (Abeam Method)</b><br/> <b>At the Dip:</b> Am ready to come abeam.<br/> <b>Close Up:</b> Am commencing approach.<br/> <b>Hauled Down:</b> When messenger is in hand.</p>   |
|  <p>Romeo</p> <p>Displayed on side hose is being received</p> | <p><b>Approach Ship (Astern Method)</b><br/> <b>At the Dip:</b> Am ready to close and take hose.<br/> <b>Close Up:</b> Am commencing approach.<br/> <b>Hauled Down:</b> Hose grappled and in hand on deck.</p>   |
|  <p>PREP</p> <p>Displayed at the outboard yardarm</p>        | <p><b>At the Dip:</b> Expect to disengage in 15 minutes.<br/> <b>Close Up:</b> Am disengaging at final station.<br/> <b>Hauled Down:</b> All lines are clear.</p>  |
|  <p>Bravo</p> <p>Displayed where best seen</p>               | <p><b>Close Up:</b> Transferring fuel or explosives.<br/> <b>At the Dip:</b> Temporarily stopped transfer.<br/> <b>Hauled Down:</b> Transfer completed.</p>  |

**07008. RAS bats, wands and hand signals**

a. **RAS bats and wands.** For all methods of transfer the primary means of communication are hand signals, using red, green or amber bats by day and illuminated wands by night. In addition, commodity bats and wands are used to indicate the commodity to which pumping signals refer. Both signal and commodity bats are back-to-backed to minimise the number of bats required for each replenishment operation. Colours and NSN numbers of bats and wands are as follows:

**Details of bat NSN numbers**

| <b>Description</b>                      | <b>NSN number</b> |
|---|-------------------|
| RAS Signal Bat - Red and Green          | F217/561-4763     |
| RAS Signal Bat - Amber and Green        | F217/700-7240     |
| RAS Commodity Bat - AVCAT/Lub Oil       | F217/956-9007     |
| RAS Commodity Bat - Dieso F76 and Water | F217/212-1437     |

**Details of bat colours**

|                  |   |                                       |
|------------------|---|---------------------------------------|
| Red Signal Bat   | - | Solid red                             |
| Green Signal Bat | - | Green with 25mm diagonal white stripe |
| Amber Signal Bat | - | Solid amber                           |
| AVCAT            | - | Yellow and Blue divided diagonally    |
| Lub Oil          | - | Black and Yellow quarters             |
| Dieso F76        | - | Red and blue divided diagonally       |
| Water            | - | Solid White                           |

**Details of wand NSN numbers**

|  |                  |
|--|------------------|
| Light wand complete with conical baton | 0583-00-926-4331 |
| Conical baton                          | 0583-00-691-1407 |
| Filter Red                             | 0583-00-111-0190 |
| Filter Green                           | 0583-00-504-8341 |
| Filter Amber                           | 0583-00-504-8342 |

**Details of wand colours**

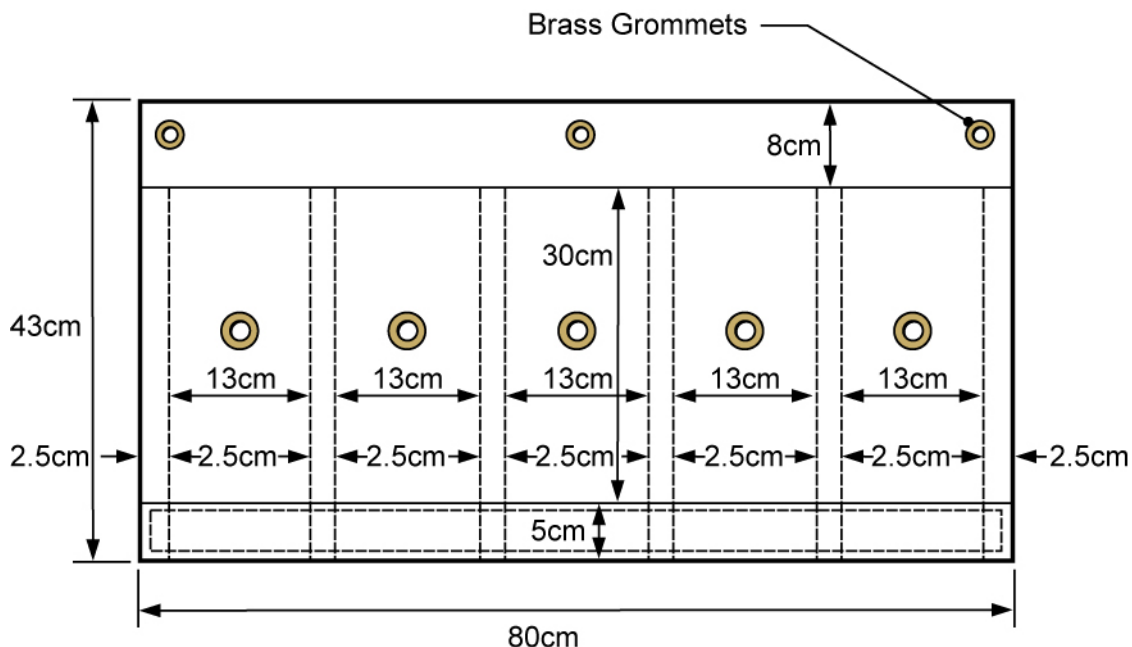
|                   |   |                                   |
|-------------------|---|-----------------------------------|
| Red Signal Wand   | - | Solid red                         |
| Green Signal Wand | - | Solid green                       |
| Amber Signal Wand | - | Solid amber                       |
| AVCAT             | - | Top half yellow, bottom half blue |
| Lub Oil           | - | Amber wand with two black bands   |
| Dieso F76         | - | Top half blue, bottom half red    |
| Water             | - | Solid white                       |

**Note.** *Commodity wands must be produced onboard. The white wand is created by using a wand without a filter and the two black bands for the lub oil wand are achieved with strips of masking tape. Careful painting of the outside of a wand with a thin coat of paint will give the appropriate effect for the Dieso and AVCAT wands.*

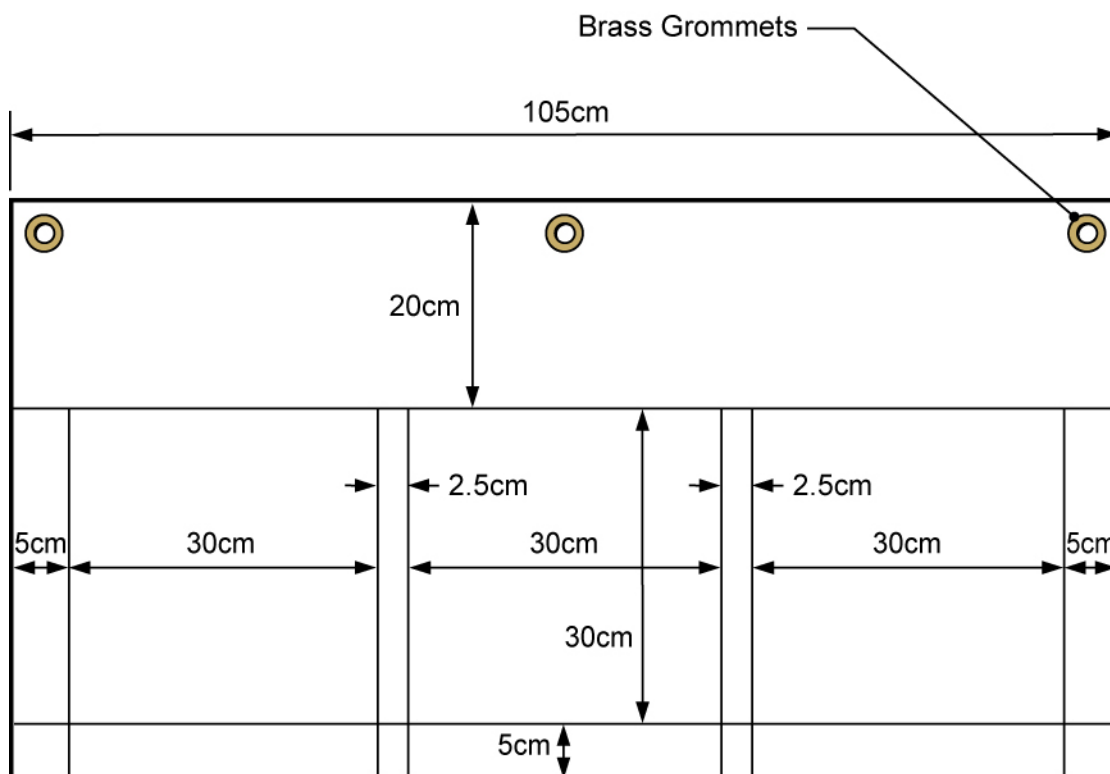
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b. **Bat and wand stowage.** To ensure bats and wands are securely stowed but readily accessible during replenishment, canvas stowage wallets are required; Guidance drawings are shown at Fig 7-15a and Fig 7-15b.

**Fig 7-15a. Drawing of RAS wand stowage**




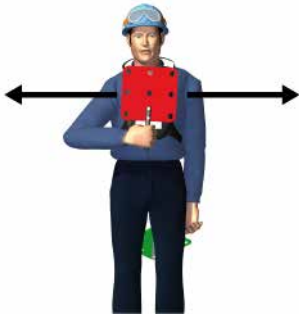
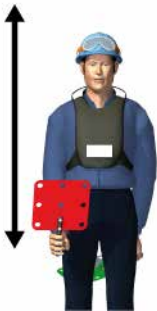
**Fig 7-15b. Drawing of RAS bat stowage**

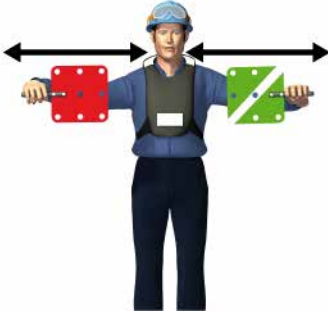







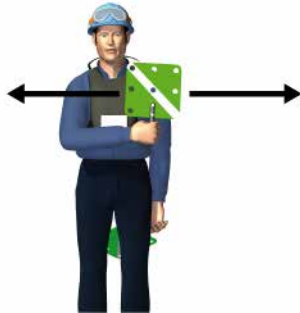

c. **Hand signals used during replenishment.** Hand signals are used in conjunction with sound-powered communications. The fundamental premise in the hand signal method of communication is instant communications between stations. The batman must be sited adjacent to the transfer/reception station where he/she is easily seen by his/her opposite number and can observe replenishment operations affecting his particular rig. The hand signal describes that particular action that one ship requires of the other, or is a response indicating the required action is understood or being carried out. The use of commodity bats/wands is only necessary during multiple commodity replenishment; the appropriate commodity bat/wand is held vertically above the head in one hand while the other hand is used to give the start or stop pumping signal. Standard RAS Bat hand signals are shown at Fig 7-16 below. For an animated demonstration of the RAS Bat Signals, see CD for animated graphic.

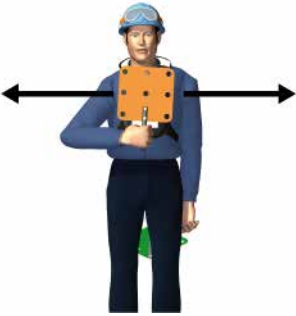

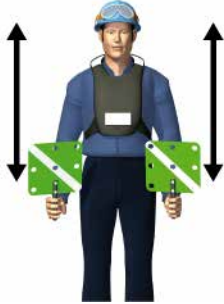
Fig 7-16. Replenishment bat signals  
 (animated graphic – left click on graphic for demonstration)

| Signal   | Remarks  |
|--|--|
|  <p style="text-align: center;"><b>HEAVE ROUND</b></p>              | <p>Signalman moves red signal device in a continuous complete circle in front of the body. When/where appropriate the other ship answers with the 'Check away' signal.</p>           |
|  <p style="text-align: center;"><b>AVAST</b></p>                  | <p>Signalman moves red signal device horizontally in front of the body, meaning for the other ship to avast heaving or checking away as appropriate.</p>                             |
|  <p style="text-align: center;"><b>SLACK OFF (CHECK AWAY)</b></p> | <p>Signalman moves red signal device vertically in front of the body, meaning for the other ship to check away the appropriate line, wire or hose until another signal is given.</p> |

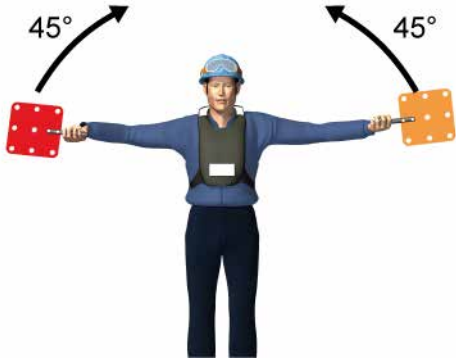
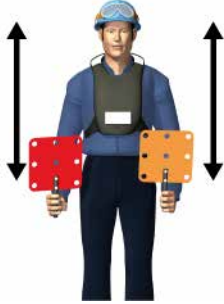

| Signal  | Remarks  |
|---|--|
|  <p>A signalman in a blue uniform and cap holds a red square signal device in his right hand and a green square signal device with a white diagonal stripe in his left hand. Two horizontal arrows point outwards from the devices, indicating they are held horizontally in front of the body.</p> <p><b>HOOKED UP OR CONNECTED</b></p> | <p>Signalman, with red signal device in right hand and green signal device in left hand, touches devices horizontally in front of the body at shoulder height, meaning 'Hooked up or Connected'. Initiated by receiving ship and acknowledged by delivering ship with the same signal.</p>   |
|  <p>A signalman in a blue uniform and cap holds a green square signal device with a white diagonal stripe. A large black circular arrow indicates the device is moved in a continuous complete circle in front of the body.</p> <p><b>START PUMPING OR COMMENCE TRANSFER</b></p>  | <p>Signalman moves green signal device in a continuous complete circle in front of the body. The signal, executed by either ship, indicates 'I am ready to start pumping' or 'I am ready to commence transfer'. It is only used for the beginning of the pumping/transfer operation. When repeated by the other ship, begin transfer and commence signalling with red signal device. If not ready to commence operation, the AVAST signal is used.</p> |
|  <p>A signalman in a blue uniform and cap holds a green square signal device with a white diagonal stripe high above his head with his right hand. A black circular arrow indicates the device is moved in a continuous circle over his head.</p> <p><b>DESIRE INCREASE IN PUMPING PRESSURE</b></p>                                    | <p>Signalman on the receiving ship moves green signal device in a continuous circle over his head to indicate to the delivering ship that an increase in pumping pressure is desired.</p>  |


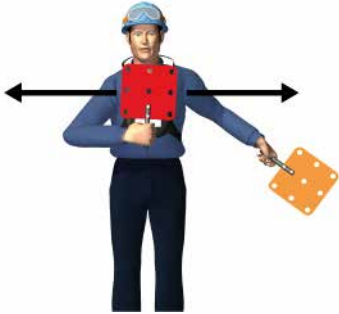
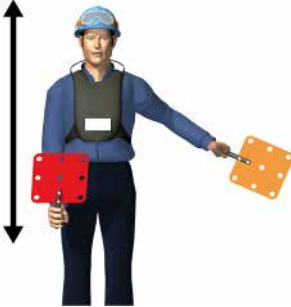
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| Signal  | Remarks   |
|---|---|
|  <p><b>DESIRE DECREASE IN PUMPING PRESSURE</b></p> | <p>Signalman on the receiving ship moves green signal device in an arc on his right side from shoulder to knee level to indicate to the delivering ship that a decrease in pumping pressure is desired.</p>   |
|  <p><b>STOP PUMPING OR CEASE TRANSFER</b></p>     | <p>Signalman moves green signal device horizontally in front of the body. This signal, executed by either ship, indicates 'Stop pumping' or 'Cease transfer'.</p>   |
|  <p><b>START BLOW THROUGH</b></p>                | <p>Signalman moves amber signal device in a continuous circle in front of the body. The signal, meaning 'Start blow through now' is repeated until the delivering ship acknowledges by repeating the signal, indicating that it has commenced blow through.</p> |




| Signal   | Remarks  |
|--|--|
|  <p><b>STOP BLOW THROUGH</b></p>          | <p>Signalman moves amber signal device horizontally in front of the body. The signal, given by the receiving ship to indicate 'Stop blow through' is acknowledged by the 'Stop blow through' signal from the delivering ship, indicating that it has stopped blowing through.</p> |
|  <p><b>TEST S/P PHONE LINE</b></p>     | <p>Signalman raises two green signal devices overhead to form a 'Steeple', meaning 'Test your phone/phone lines'.</p>   |
|  <p><b>REPLACE S/P PHONE LINE</b></p> | <p>Signalman waves two green signal devices vertically in front of the body, meaning 'Replace your phone line'.</p>   |

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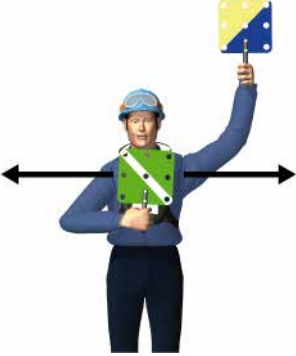


| Signal  | Remarks   |
|---|---|
|  <p style="text-align: center;"><b>TENSION</b></p>   | <p>Signalman holds red signal device in right hand and amber signal device in left hand with arms extended overhead to form a 'V'. This signal, initiated by receiving ship, means 'I am ready to be tensioned,. When initiated by delivering ship it means 'I am tensioning'.</p>  |
|  <p style="text-align: center;"><b>DE-TENSION</b></p>   | <p>Signalman, with red signal device in right hand and amber signal device in left hand, arms extended vertically overhead, waves both signal devices vertically in front of body until acknowledged by other ship. Initiated by receiving ship means 'De-tension'. Answered by delivering ship or initiated by delivering ship, signal means 'I am de-tensioning'.</p> |
|  <p style="text-align: center;"><b>REPLENISHMENT COMPLETED<br/>AT THIS STATION, COMMENCE<br/>UNRIGGING</b></p> | <p>Signalman holds red signal device in right hand and a green signal device in left hand. He crosses both hands and arms over each other above his head.</p>   |

| Signal  | Remarks  |
|---|--|
|  <p><b>HEAVE ROUND ANCILLARY LINE INDICATED</b></p>                | <p>Signalman with red signal device in one hand moves it in a continuous complete circle in front of the body. With amber signal device in the other hand indicate ancillary line, meaning 'Heave round'.</p>                         |
|  <p><b>AVAST HEAVING ANCILLARY LINE INDICATED</b></p>           | <p>Signalman with red signal device in one hand moves it horizontally in front of the body. With amber signal device in the other hand indicate ancillary line, meaning for the other ship to, 'Avast heaving or checking away'.</p> |
|  <p><b>SLACK OFF (CHECK AWAY) ANCILLARY LINE INDICATED</b></p> | <p>Signalman with red signal device in one hand moves it vertically in front of the body. With amber signal device in the other hand indicate ancillary line, meaning for the other ship to 'Slack off / check away'.</p>           |


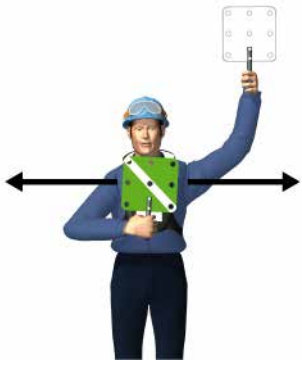
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| Signal  | Remarks   |
|---|---|
|  <p><b>START PUMPING DIESO</b></p>     | <p>Signalman holds red and blue signal device in left hand above the head. With green signal device in right hand moves it in a continuous complete circle in front of the body, meaning 'Start pumping DIESO'.</p>      |
|  <p><b>STOP PUMPING DIESO</b></p>   | <p>Signalman holds red and blue signal device in left hand above the head. With green signal device in right hand moves it horizontally in front of the body. meaning 'Stop pumping DIESO'.</p>                         |
|  <p><b>START PUMPING AVCAT</b></p> | <p>Signalman holds yellow and blue signal device in left hand above the head. With green signal device in right hand moves it in a continuous complete circle in front of the body, meaning 'Start pumping AVCAT'.</p> |



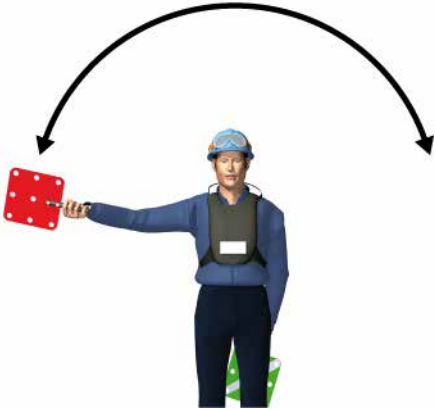


| Signal   | Remarks   |
|--|---|
|  <p><b>STOP PUMPING AVCAT</b></p>       | <p>Signalman holds yellow and blue signal device in left hand above the head. With green signal device in right hand moves it horizontally in front of the body meaning 'Stop pumping AVCAT'.</p>                          |
|  <p><b>START PUMPING LUB OIL</b></p> | <p>Signalman holds yellow and black signal device in left hand above the head. With green signal device in right hand moves it in a continuous complete circle in front of the body, meaning 'Start pumping LUB OIL'.</p> |
|  <p><b>STOP PUMPING LUB OIL</b></p> | <p>Signalman holds yellow and black signal device in left hand above the head. With green signal device in right hand moves it horizontally in front of the body meaning 'Stop pumping LUB OIL'.</p>                     |

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| <b>Signal</b>   | <b>Remarks</b>   |
|---|--|
|  <p><b>START PUMPING WATER</b></p> | <p>Signalman holds white signal device in left hand above the head. With green signal device in right hand moves it in a continuous complete circle in front of the body, meaning 'Start pumping WATER'.</p> |
|  <p><b>STOP PUMPING WATER</b></p> | <p>Signalman holds white signal device in left hand above the head. With green signal device in right hand moves it horizontally in front of the body meaning 'Stop pumping WATER'.</p>                      |

| Signal   | Remarks   |
|--|---|
|  <p style="text-align: center;"><b>PREPARE/PREPARING TO TRIP PELICAN HOOK</b></p> | <p>Signalman holds red signal device in right hand, in the horizontal. In left hand he holds green signal device at a 45° angle from the body. Signal given by the delivering ship indicates 'Prepare to trip pelican hook'. Signal answered by receiving ship indicates 'I am preparing to trip pelican hook'.</p>   |
|  <p style="text-align: center;"><b>READY TO TRIP PELICAN HOOK</b></p>            | <p>Signalman holds red signal device in right hand, at the vertical. In the left hand he holds green signal device at a 45° angle from the body. Signal from both receiving and delivering ship indicates 'I am ready to trip pelican hook'.</p>  |
|  <p style="text-align: center;"><b>TRIP PELICAN HOOK</b></p>                    | <p>Signalman holds red signal device in right hand and green signal device in left hand. He makes chopping motion with right arm on left elbow, which is raised about shoulder height. Signal given by delivering ship indicates 'Trip pelican hook'. Signal answered by receiving ship indicates 'I am tripping pelican hook'. When pelican hook is tripped, receiving ship signals 'Heave round'.</p> |

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| Signal  | Remarks  |
|---|--|
|  <p style="text-align: center;"><b>PREPARE FOR EMERGENCY<br/>BREAKAWAY</b></p> | <p>The delivering ship or receiving ship may initiate an emergency breakaway. Signalman of initiating ship, rapidly waves red signal device in a semi-circular arc overhead, meaning 'Prepare for an emergency breakaway'. Other ship acknowledges by repeating the signal with a red signal device, meaning 'Understood. I am preparing for an emergency breakaway'. Once initiated, the delivering ship assumes control.</p> |
|  <p style="text-align: center;"><b>READY FOR EMERGENCY<br/>BREAKAWAY</b></p>  | <p>Each ship continues making the prepare signal until ready to execute the emergency breakaway. When ready, each signalman holds the red signal device vertically overhead, to indicate 'Ready for emergency breakaway'.</p>  |
|  <p style="text-align: center;"><b>EXECUTE EMERGENCY<br/>BREAKAWAY</b></p>   | <p>The signalman of the delivering ship drops the red signal device straight downwards, meaning 'Execute emergency breakaway <b><u>NOW</u></b>'. The receiving ship acknowledges by repeating the signal.</p>  |

**07009. Making contact by gunline or bolas**

a. Contact between ships is established with a **gunline** or **bolas**. The bolas is heaved by hand and the gunline, which is the more common method, is projected by a line-throwing rifle. The rifle used is a standard operational weapon, which propels a soft-nosed projectile, with considerable velocity, to a distance of approximately 100m, and therefore has the potential to kill or cause considerable injury. **BRd 8988** is the authoritative publication for maintenance, storing and use of the line-throwing rifle and projectile. (These projectiles are to be locally numbered and the number of firings of each projectile is to be noted and recorded on separate pages in the Seamanship Data Book). To minimise the risk of snagging during firing, gunlines should be piled loosely in long cylindrical containers such as empty Schumuly cartridge cases; to prevent the cases overturning, they should be stowed in a locally manufactured portable container (Fig 7-17). Three lines should be made ready at each replenishment point.

**WARNING**

**DRILLS AND PROCEDURES LAID DOWN IN BRd 8988 MUST BE FOLLOWED WHEN USING THE LINE-THROWING RIFLE.**

**Fig 7-17. Example of locally manufactured gunline container stowage**



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b. **Signals by whistle.** Before the line-throwing rifle is fired, the receiving ship must confirm that all personnel have taken cover and that it is, in all respects, safe to fire the projectile. For this reason, the following signals by whistle are to be made by the firing or receiving ship:

|              |  |
|--------------|--|
| One Blast    | <b>By Firing Ship</b><br>Prepare to receive my gunline.  |
| Two Blasts   | <b>By Non Firing Ship</b><br>Ready to receive your gunline, personnel have taken cover.              |
| Three Blasts | <b>By Firing Ship</b><br>All lines have been passed.   |
| Three Blasts | <b>By Non Firing Ship</b><br>Line(s) lost. Pass another line. (Commence cycle again with one blast). |

**Notes:**

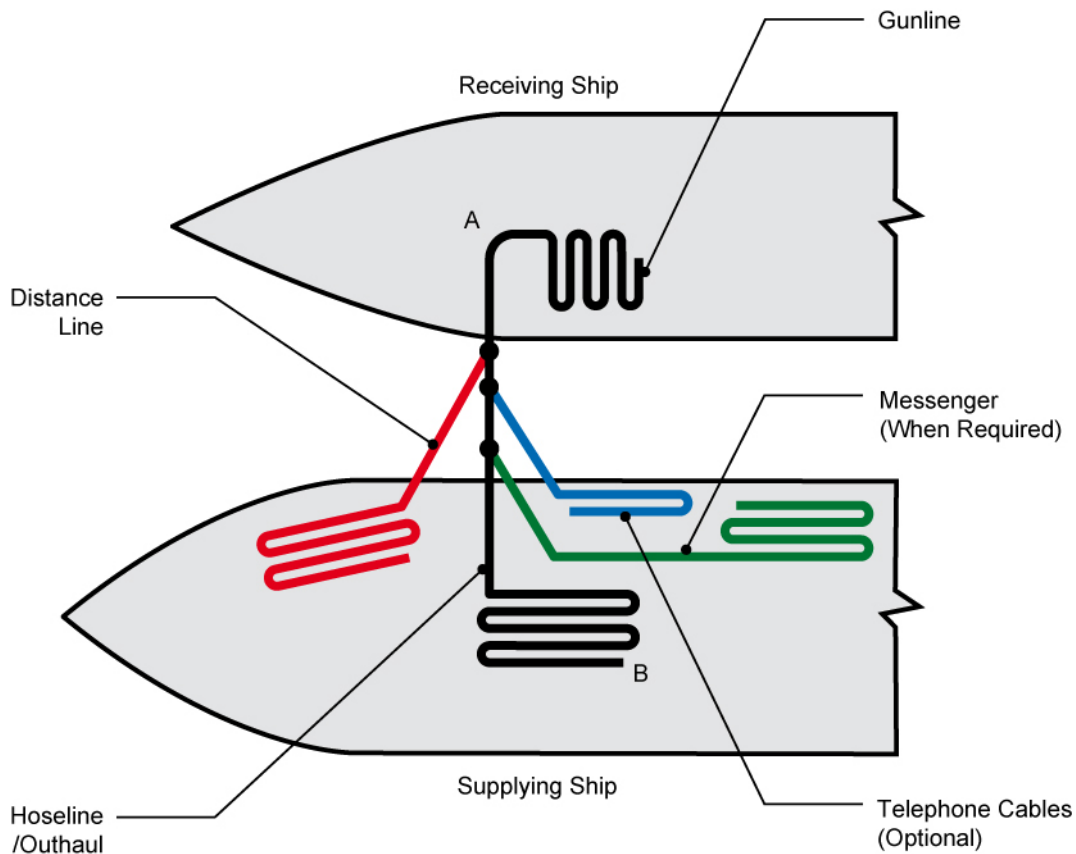
- 1. In order to reduce the danger to personnel on the receiving ship, the line-throwing rifle is to be LOADED, MADE READY AND FIRED after the two whistle blasts have been given from the receiving ship. The order to LOAD is not to be given until the Safety Officer has confirmed that all exposed personnel have taken cover and are clear of the firing team with their backs turned towards the firing position. They are to remain under cover until three whistle blasts are heard.*
- 2. Personnel in the receiving ship should not break cover until three blasts from the firing ship are heard.*
- 3. If the firing is seen as unsuccessful, another line is passed without further whistle signals. Only when three whistle blasts are sounded by the receiving ship should the sequence begin again with one whistle blast.*
- 4. The whistle signals have the same meaning when a heaving line or bolas is to be passed instead of a gunline.*
- 5. Red bats/wands are to be used during replenishment to indicate the dump area in the firing ship and the position the gunline is required in the non-firing ship.*

c. **Firing sequence.** In a replenishment between an RN warship and an RFA the warship is to fire the gunline(s) to avoid the risk of damaging expensive equipment fitted externally in HM ships. An RFA, which is carrying a dangerous or vulnerable cargo on deck, may, however, request the OTC to arrange for the RFA to fire the gunline(s); if this is agreed, and the OTC will detail the firing ship. To avoid possible injury to personnel in a multi-ship replenishment, only the first warship to approach will fire the gunline(s); the unit in the centre of the replenishment is to fire the gunlines to the second ship coming up to replenish. In replenishment between either two RN warships or two RFAs the delivering ship will fire the gunline unless the OTC orders otherwise.

**07010. Methods of establishing rigs between ships**

When the gunline has been passed, the lines required for the transfer can be passed to the receiving ship and these include the Distance Line, Telephone Cables and Messenger. While being passed these lines are secured temporarily by Inglefield clips either to the outhaul tail (for storing rigs) or to the hoseline tail (for fuelling rigs with the exception of astern fuelling). In the case of storing rigs, the outhaul is temporarily secured to the jackstay and for fuelling rigs the hoseline is secured to either the hose or the jackstay which will support the hose troughs. For each rig there are variations to the above arrangements and the method of passing each rig is explained later in this chapter. The basic method is shown at Fig 7-18.

**Fig 7-18. Usual sequence of passing lines for replenishment**



- A. Gunline clipped to hoseline/outhaul
- B. Hoseline/outhaul toggled and gripped to jackstay (toggled to light jackstay) or secured to hose.

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**07011. List of RAS equipment in common use**

a. Replenishment evolutions involve the use of much standard equipment. The following list gives details of such equipment and its application:

b. **Slips and associated shackles:**

(1) *Rigging slip* NSN No 0263/414-9747 with associated *straight screw shackle* NSN No 0263/721-6093. Used for light jackstay attachment, hose-hanging pendant attachment and slip rope attachment.

(2) *Rigging slip* NSN No 0263/414-9835 with associated **straight screw shackle** NSN No 0263/721-6096. Used for heavy jackstay attachment and jackstay fuelling attachment.

c. **Quick release device.** To improve safety and ease of operation, a quick release device (QRD) 4030-99-814-9390 has been introduced as a replacement, in certain replenishment operations, for the 0263/414-9835 slip and shackle. The QRD (Fig 7-19) can be activated from the deck in complete safety even in emergency conditions, whether the jackstay is slack or under tension.

**Notes:**

1. *The safety lanyard is to be colour-coded GREEN and the trigger lanyard to RED.*

2. *The QRD Operation*

(1) *Safety pin.* The release mechanism incorporates a safety pin of the pip-pin type, which prevents inadvertent operation of the QRD. The pin can only be removed when its central spindle is pulled to release the locking balls; this is achieved by pulling on a lanyard attached to the pin. To insert the pin, close the jaw of the QRD to engage the trigger. Insert the pin into the block by pushing on the slotted end of the central spindle. Continue pushing and move the trigger slightly until the pin slides fully into place.

(2) *Preparing the QRD.* Ensure that the QRD is clean, undamaged, and that the jaw is chamfered and trigger can move freely. Charge the grease nipple of the main pivot with XG 286 grease; rotate the jaw several times to ensure thorough greasing. Close the jaw, engage the trigger and insert the safety pin. Splice a 12mm polypropylene lanyard to each of the two operating lanyards. The lanyards should terminate one metre above the deck when the reception point is at its maximum height.

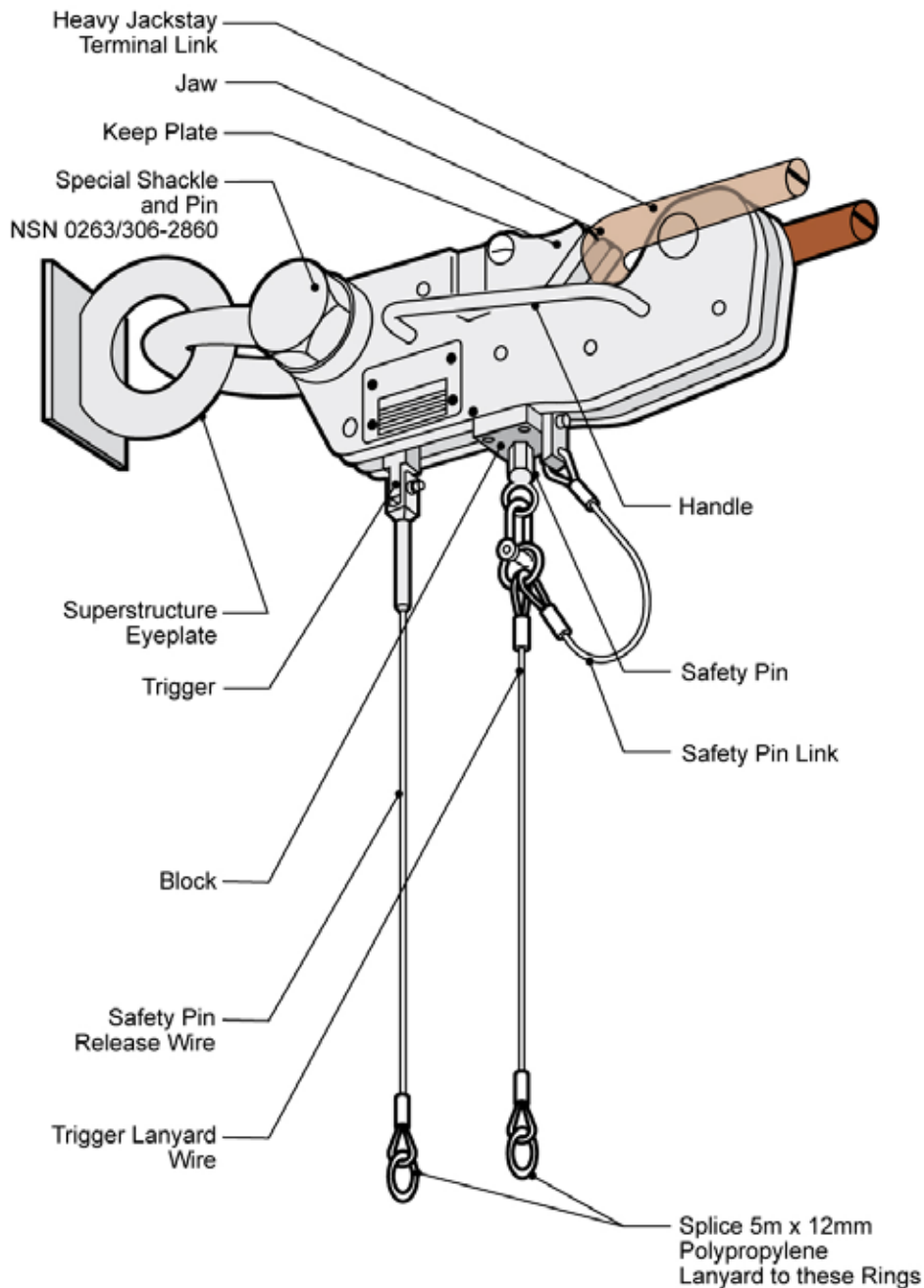
(3) *Rigging the QRD.* Attach the QRD to the RAS highpoint using the special 0263/306-2860 shackle supplied with the device. Ensure the release lanyards are ready to hand, but not in danger of fouling loads or other equipment.

(4) *Connecting the jackstay to the QRD.* Heave the jackstay inboard and engage the jackstay long link past the spring-loaded keep plates and into the jaw. The jackstay load can now be applied once the gripper has been released.

(5) *Releasing the jackstay from the QRD.* Stand slightly forward of the rig. On the order 'slip the jackstay' pull the safety pin lanyard to remove the safety pin, then pull the trigger lanyard to operate the trigger and release the jackstay.



Fig 7-19. Quick release device

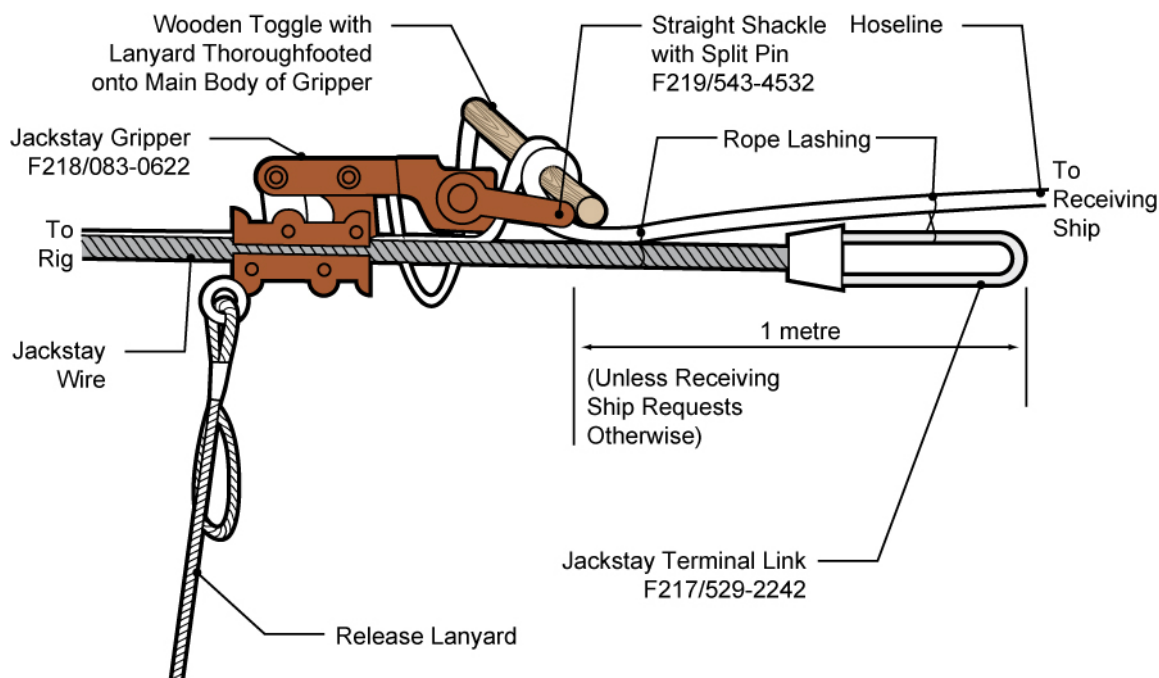


**Note.** If, during replenishment, the release lanyard fouls and the safety pin is pulled out prematurely, the jackstay must be de-tensioned at the first opportunity and the pin re-inserted. During this operation there is a possibility the device will operate and the jackstay will be slipped. For this reason, before attempting to re-insert the pin a 16mm polypropylene retaining line must be hitched to the jackstay outboard of the terminal link, hove taut and secured inboard.

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d. **Jackstay gripper.** The *jackstay gripper* (Fig 7-20) is used for passing the heavy jackstay, probe, and jackstay fuelling rigs. The gripper has a spring-loaded jaw designed to clamp to the jackstay wire. The outhaul/hauling-over line/hoseline is attached to it by passing a bight through the shackle on the leading edge of the gripper and taking a round turn around the toggle as shown below. There are three methods of releasing the gripper when the eye of the jackstay has been connected to the highpoint.

**Fig 7-20. Jackstay gripper**



(1) *First method.* Remove the final stops; take the release lanyard in hand and as the outhaul/hauling over line/hoseline is veered give it a sharp pull inboard in line with the jackstay. Once released from the jackstay hold the gripper close to the body while a bight of the outhaul/hauling-over line/hoseline is taken from outboard and the gripper can then be untoggled. Once the gripper is removed 'Check away' and then 'Light to' (let go) the outhaul/hauling-over line/hoseline.

(2) *Second method.* Remove the final stops; attach the release lanyard to a secure point inboard. As the outhaul/hauling-over line/hoseline is veered the gripper should release from the jackstay. Once released from the jackstay hold the gripper close to the body while a bight of the outhaul/hauling-over line/hoseline is taken from outboard and the gripper can then be untoggled. Once the gripper is removed 'Check away' and then 'Light to' (let go) the outhaul/hauling-over line/hoseline.

(3) *Third method.* Should the gripper not be released by using the first two methods or in the case of the gripper being rigged by a foreign supply vessel with no lanyard, the gripper will have to be opened by hand. Firstly remove any stops around the gripper, veer the outhaul/hauling over line/hoseline and take a bight of the outhaul/hauling over line/hoseline from outboard of the gripper. A member of the dump party then opens the gripper jaws by using a scissor action. It is then untoggled. Once the gripper is removed 'Check away' and then 'Light to' (Let go) the outhaul/hauling-over line/hoseline. There may also be a lashing around the jackstay, which will also need to be removed.

e. **Slipped gripper.** When heaving in a jackstay on an outhaul/hauling-over line/hoseline care must be taken to avoid the gripper sliding down the jackstay, therefore, making it difficult to connect the end link to a slip/pelican hook. Should the gripper need to be repositioned the following sequence is to be followed:

- (1) On retaining pendant.
- (2) Veer to the retaining pendant.
- (3) Take a bight of the outboard part of the outhaul/hauling-over line/hoseline and reposition the gripper. If this is not possible due to insufficient movement in the line, then the stops must be cut, the gripper repositioned and then the line re-stopped to the jackstay.
- (4) Heave in and remove all slack on the outhaul/hauling-over line/hoseline to prevent the gripper slipping again.
- (5) Check away and light to (let go) on the outboard part of the outhaul/hauling-over line/hoseline.
- (6) Heave in on the outhaul/hauling-over line/hoseline sufficiently to remove the retaining pendant.
- (7) Off retaining pendant.
- (8) Continue with the RAS.

**Note.** *Receiving ships must include in their OPSTAT RASREQ the distance between the leading block and the slip/pelican hook so that the RFA can set the gripper at the appropriate distance from the end of the jackstay.*

f. **Blocks and associated shackles**

- (1) *Snatch block* NSN No 0246/521-2794 with associated straight shackle screw 0263/721-6090. Used for light jackstay inhaul and outhaul lead.
- (2) *Snatch block* NSN No F218-190-6915 with associated straight screw shackle 0263/721-6093. Used for hoseline lead for all abeam refuelling rigs and inhaul lead for heavy jackstay.
- (3) *Block* NSN No 0246/521-2799 with associated straight screw shackle 0263/721-6093. Used for light jackstay lead.
- (4) *Roller shackle* NSN No 0263/770-9716. Used as hoseline lead for astern fuelling, float and gunline methods. Associated shackle varies ship to ship. As fitted drawings must be consulted to ascertain precise fit.

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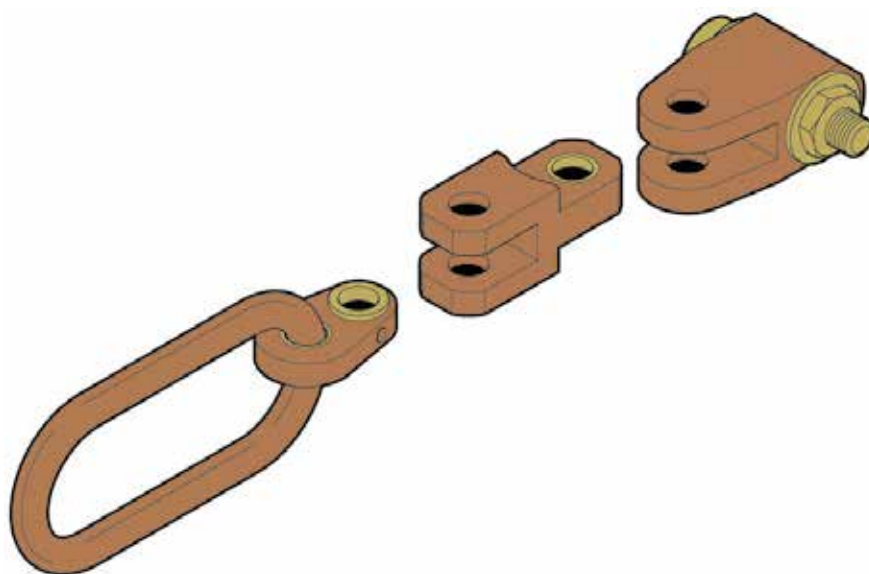
**g. Links**

(1) *Swivel joint link assembly.* NSN No 0249/525-7325 connects to the swivel arm joint NSN No 0249/525-7299, converting the swivel arm joint from probe reception to reception of jackstay fuelling. Both items are illustrated in Fig 7-21.

(2) *NATO standard long link.* NSN No 0263/537-1659 is no longer fitted as an integral part of RAS reception points. The NATO long link is carried by ships as a portable standardized link which may occasionally be required with associated straight screw shackle 0263/721-6096 to permit connection to of replenishment at sea rigs between ships of various NATO nations; in practice it is seldom required. Details of the link and possible applications can be found in **ATP-16 Chapter 7**.

(3) *Swivel joint adaptor.* NSN No F217-514-9334 is used on the swivel arm joint to allow the connection of the QRD to the probe base plate to allow heavy jackstay and jackstay fuelling to be conducted from the sliding pad-eye.

**Fig 7-21. Swivel joint link assembly**



**h. Hose hanging pendants.** The hanging pendants for abeam and astern fuelling are made up as follows:

Steel Wire Rope 20mm (6x36)-  
0235/523-8649

Length to suit.

Thimbles 0263/332-5187

Fitted both ends – ferrules as  
necessary

Link - 0249/458-9487

Fitted at one end

Spring Hook 0263/539-3523

Inserted directly into thimble opposite  
end to the link

i. **Lines used during replenishment**

(1) *Combined hoseline/heavy jackstay outhaul.* This line serves all types of abeam fuelling and the heavy jackstay transfer rig. It is made up of 110m of 21mm polyamide braidline, tailed with 50m of 12mm hawser-laid polypropylene. The opposite end to the tail is finished with a thimble eye incorporating a three-tonne SWL spring hook. Non-swivel Inglefield clips are seized at 40, 41 and 42 metres from the outboard end of the tail for attachment of the distance line, telephone cables and messenger. A clip is fitted at the bitter end of the tail for attachment of the gunline and strayline. Leather chafing pieces are fitted to areas subject to heavy wear such as the hose lashing point's section.

(2) *Remating line.* This line is required during probe fuelling should the probe accidentally disengage (and during heavy jackstay should the RSA accidentally disengage). It is manufactured from 20mm hawser-laid polyester to a length equal to the distance from the reception point to the RAS winch plus 40m. One end is finished with a soft eye into which is fitted a three-tonne SWL Welling spring hook for attachment to the 0263/543-4551 bow screw shackle fitted to the probe trolley block. The opposite end is finished with a 150mm soft eye; this end is for attachment to the probe trolley in NATO ships that are fitted with open remating line hooks. To prepare the remating line for use, fake it down at deck edge on top of a shot-mat and adjacent to the fuelling point, clear of all personnel and the working area. Lead the standing end to the deck-edge and lightly stop it to a suitable deck fitting. Place the end to be attached to the probe trolley ready to hand, then place a shot-mat on top of the fakes. Warn all personnel of the danger arising from the remating line if the probe suddenly disengages.

(3) *Retaining pendant.* This pendant is used in conjunction with the remating line as described below in sub para (b). It locally manufactured from 20mm hawser-laid polyester; one end is finished with a soft eye into which is fitted a three-tonne SWL spring hook, and the opposite finished with a 150mm soft eye. The finished length of the pendant is to be one metre. This length permits connection of the appropriate end to the probe trolley (UK or NATO) and the opposite end to a 0263/721-6093 straight screw shackle attached to the third hole from outboard of the probe swivel arm. As part of the RAS preparations the retaining pendant is to be attached to the probe swivel arm and lightly stopped clear of other equipment.

**Note.** *The retaining pendant should be available at all Jackstay replenishment serials in case it is required if the gripper slips and needs to be repositioned.*

(a) *Procedure.* After the hose has been pressurised, attach the remating line to the probe trolley, then detach the hoseline from the trolley and unsnatch it from the leading blocks. If the probe disengages it must be allowed to run its course down the jackstay. Only then should the remating line be snatched into the leading blocks, brought to the winch/capstan and hove in until the probe remates. When this has been achieved, attach the free end of the retaining pendant to the probe trolley, remove the remating line, fold back the top shot mat, coil down the remating line on the bottom shot-mat, then cover the coil with the top shot mat before re-attaching the spring hook end of the remating line to the probe trolley. Once the remating line has been re-attached remove the retaining pendant. The remating line can be removed at any time up to 'RAS complete' if the conditions no longer justify its use.

*(b) Ships replenishing Dieso and Avcat (or fresh water) simultaneously from a probe rig reception point.* In this situation there is a risk of damaging the Avcat (or water) hose should the probe accidentally disengage. To eliminate this risk the retaining pendant described at sub para (3) is used. The free end of the pendant is to be attached to the probe trolley as soon as the hose is pressurised and before the hoseline is removed; in this situation the remating line is not attached to the trolley. If the probe accidentally disengages it is prevented by the pendant from travelling down the jackstay. The remating line is then connected and the probe hove in and re-mated, when this has been achieved the remating line is removed. When replenishment of Avcat and/or fresh water is complete, disconnect the hoses and make them up for return (as received). Then attach the remating line before removing the retaining pendant.

*(c) Emergency breakaway procedure if retaining pendant and/or ancillary hoses are connected.* In the event of an emergency breakaway in this situation, the 'Ready' signal must only be given by the receiving ship when the Avcat/fresh water hose is disconnected, the retaining pendant has been removed or cut and the probe released. The delivering ship must not heave in on the red runner until the 'Ready' signal is seen.

**Note.** *Ships should be aware that NATO units will not be conversant with the use of a retaining pendant. Therefore should a NATO delivering ship attempt to recover the probe before the 'Ready' signal has been given the retaining pendant must be cut.*

*(4) Jackstay control line.* This line is used to control violent movement in all Jackstay rigs during the connecting up procedure or whilst hooking on/unhooking loads; its use is not mandatory and depends predominantly on prevailing weather conditions and reception point location. When used it is to be passed across the jackstay and tended at a position that gives the most benefit to the deck team in their attempt to cut down violent movement in the jackstay wire. The line consists of 12 metres of 16mm MMFC, one end of which may be fitted with a spring hook. During preparations for jackstay replenishment rigs one end of the line is secured (or hooked) to a deck fitting, and the other end made ready for passing over the jackstay if required.

**Note.** *If a spring hook is fitted for securing the line to the deck, it may be necessary to attach a suitable bow shackle to the deck fitting to provide an eye large enough for the hook.*

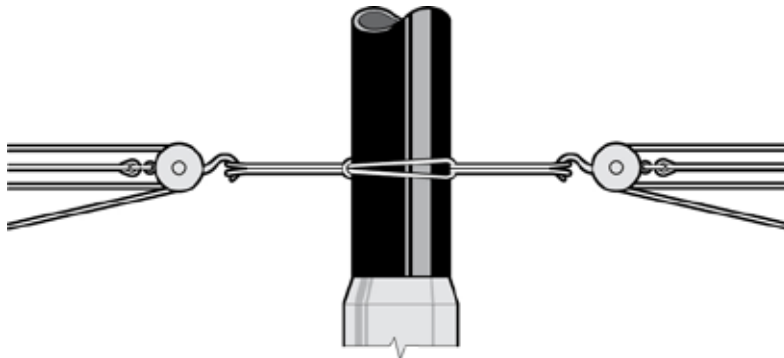
*(5) Strayline.* A strayline consists of a length of 8-12mm MMFC with a non-swivel Inglefield clip fitted to one end. Straylines are rigged as part of replenishment preparations and are used as a means of transferring the lead of an incoming line from one point to another. For example, a strayline is rigged through the leading blocks from the dump area to the winch prior to a fuelling or heavy jackstay transfer. When the end of the hoseline/outhaul comes to hand it is clipped to the strayline, effectively transferring it directly to the winch. Similarly straylines may be rigged and used to transfer the lead of a line under a replenishment rig. The length of a strayline is determined by its use.

(6) *Slip rope*. This is a suitable length of 28mm (20mm MCMV) NFC, with a reduced soft eye and served in one end and the other end whipped. The slip rope is used to take the weight of the rig during the disengaging phase of crane, derrick and jackstay refuelling. The inboard end can either be attached to a 9747 slip or tied off with a round turn and two half hitches and then cut at the appropriate moment.

(7) *Temporary guardrails*. Before guardrails are struck at a transfer point, a temporary guardrail is to be rigged in their place, and secured. A two-legged weighted temporary guardrail is manufactured from 16mm staple spun polypropylene of sufficient length to bridge the opening plus four metres, with a thimble eye fitted one end to enable it to be shackled or hooked to the last-standing guardrail stanchion. The top leg of the temporary guardrail is weighted with either a running shackle or a 25mm length of metal pipe. Drills and procedures for temporary guardrails are described later in this chapter in RAS preparations and procedures.

(8) *Hose securing strops*. (Fig 7-22a). The recommended method of passing the Hose Securing Strops are shown in the attached diagram. If during an emergency breakaway, time does not permit to remove the hooks, then the strops can be removed quickly by cutting either part of either strop. As these tackles are not being used for lifting purposes they should be set aside, marked up, and only used for RAS steadying tackles. This means that the requirement for regular re-testing does not apply. As long as the tackle has the original Certificate of Conformity and passes a visual inspection before and after use, it may continue to be used.

Fig 7-22a. Hose securing strops



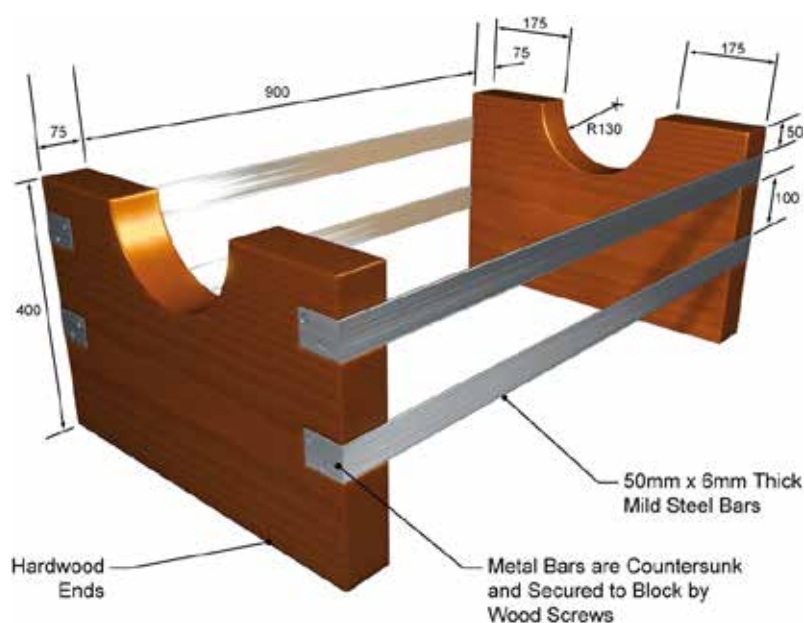
j. **Emergency tools.** Emergency tools, stowed in a box or a bag, are to be readily accessible at each transfer station. Contents are as follows:

- Axe and Maul
- Hammer
- Hatchet, hand
- Pliers
- Marline spikes
- Adjustable wrench/socket set 30mm"
- Wire/bolt croppers
- Eye wash bottle and goggles
- Mousing wire

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k. **Hose support cradle** (Fig 7-22b). The hose support cradle is used to support the QRC or NATO breakable spool coupling during fuelling operations. It prevents damage to equipment and facilitates connecting/disconnecting of the hoses. When used with the NATO breakable spool coupling an additional wooden chock must be inserted beneath the weakened groove of the coupling. See Fig 7-40.

**Fig 7-22b. Hose support cradle**



**Note.** Ships not in possession of a cradle should raise a Form S340 for local manufacture of the cradle in accordance with the Fig 7-22b.

l. **Replenishment at sea posters.** Replenishment at Sea posters are available for RN and RFA vessels from the Navy Command Graphics Centre, Building 159, Whale Island, Portsmouth, Hants PO2 8BY by emailing NPGO-GRAPHICS Mail Box and requesting which poster and how many are required. The number of posters per class of ship is controlled by NAVY SSM-AW SEA WO1 (RN) and NAVY AFSUP-SEA CPO (RFA)

### **A3 laminated prints**

- FGC 10/275/01 – Standard RAS Brief Format
- FGC 10/275/02 – Quick Release Coupling
- FGC 10/275/03 – F44 Coupling
- FGC 10/275/04 – Jackstay Gripper
- FGC 10/275/05 – Lines Passed Abeam Fuelling/Stores
- FGC 10/275/06 – Probe and Receiver
- FGC 10/275/07 – Heavy Jackstay Sliding Pad-eye General Arrangements
- FGC 10/275/08 – Large Derrick/Crane Rig Hoseline/Hanging Pendant

### Arrangements

- FGC 10/275/09 – Large Derrick/Crane Rig
- FGC 10/275/10 – Derrick Fuelling Reception (Sliding Pad-eye)
- FGC 10/275/11 – Jackstay Fuelling Reception
- FGC 10/275/12 – Light Jackstay Traveller with Inhaul and Outhaul Attached
- FGC 10/275/13 – Light Jackstay Toggled to the Outhaul
- FGC 10/275/14 – Light Jackstay Transfer
- FGC 10/275/15 – Hose end Arrangements (Astern Fuelling)



FGC 10/275/16 – Netted Float (Astern Fuelling)  
FGC 10/275/17 – Arrangements of Grapnel Teams  
FGC 10/275/18 – Float Method (Astern Fuelling)  
FGC 10/275/19 – Fo’c’sle Arrangements (Astern Fuelling)  
FGC 10/275/20 – Disengaging the Rig (Astern Fuelling)  
FGC 10/275/21 – Heavy Jackstay Reception (Sliding Pad-eye)  
FGC 10/275/22 – Quick Release Device  
FGC 10/275/23 – Sliding Pad-eye Fuel, Stores, Ammunitions & Personnel  
FGC 10/275/24 – Crane Rig  
FGC 10/275/25 – Large Derrick Rig  
FGC 10/275/26 – Probe Rig  
FGC 10/275/27 – Breakable Spool Coupling  
FGC 10/275/28 – Type 45 RAS Arrangements  
FGC 10/275/29 – Carrier RAS Arrangements  
FGC 10/275/30 – LPD RAS Arrangements  
FGC 10/275/33 – Sandown Class SRMH RAS Arrangements  
FGC 10/275/34 – River Class OPV RAS Arrangements  
FGC 10/275/35 – LPH RAS Arrangements  
FGC 10/275/36 – Type 23 RAS Arrangements  
FGC 10/275/37 – HUNT Class RAS Arrangements  
FGC 10/275/38 – SVHO RAS Arrangements  
FGC 10/275/39 – CLYDE RAS Arrangements

**07012. General preparations for all types of replenishment**

a. These general (Part 2) preparations are common to all types of replenishment and should be made at each transfer station immediately after the Part 1 preparations detailed with the procedures for each type of RAS.

(1) Secure shot mats (0350-99-923/3869) over deck edge and screen projections. For heavy jackstay operations protect vertical surfaces with wooden battens. Provide emergency tools.

(2) Detail one of the seaman specialists in the dump party to act as SOW. Detail one member of the ship’s company to act as lifebuoy sentry to close up adjacent to a lifebuoy stowage before guardrails are struck.

(3) Rig temporary guardrail(s) before permanent guardrails are struck; full body harnesses or restraint belts must be worn by all personnel involved in this task. It is preferable to man the temporary guardrail from forward of the rig, although it is acceptable to man it from aft if this is the only position that provides an escape route for the handler in the event of an emergency.

(4) Provide RAS bats and/or wands (including commodity bats/wands if required). Provide safety harness, hammer, spike and pliers for highpointman (tools must be on a lanyard).

(5) Provide a heaving line and boathook for the recovery of stray gunlines and a bucket into which the fired gunline(s) can be gathered.

(6) Provide a locally manufactured bag at the highpoint for FOD.

(7) Provide loudhailer. Check communications (two methods to be available) to bridge and to winch or capstan. Ensure power is on winch/capstan and Sliding Padeye.

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- (8) Provide MARPOL equipment for all fuelling replenishments.
- (9) For night replenishment, subject to command decision, provide red deck lighting and blue shaded torches. Remainder of the upperdeck should be darkened.
- (10) Find out if two gunlines are required (separate one for distance line); the whistles used with two gunlines should have different tones. Brief line-throwing party(s), check that they are correctly dressed and supplied with three gunlines in cylindrical containers, a rifle and three separate magazines each containing one Ballastite round. (See **ATP-16** regarding the firing ship in a NATO Force and **BRd 8988** for firing procedures).
- (11) Ensure personnel are correctly dressed for the task and the weather. All personnel must wear:
- Hazardous duty lifejackets (HDLJs).
  - Industrial safety helmets, fitted with safety goggles.
  - DMS boots with steel toecaps.
  - Standard rigging set (NSN No F1-5180-99-433-4293 with belt 8440-99-869-3532/3533).
- (12) Immersion/crew suits should be considered for those in particularly exposed positions. A risk assessment is to be carried out by the CBM to establish if full-body harnesses or restraint belts may be appropriate for some or all personnel. For fuelling evolutions, goggles are to be provided for all personnel at risk from fuel spillage or fuel atomisation. Out of date LJ2 battery and light assemblies can be utilised to identify personnel at night. The white lens fitted must be replaced with a red lens (NSN No 0472/234-4370) and the battery must be inscribed unserviceable (US) in bold permanent marker. Assemblies are to be checked by the SE rate before and after use to ensure serviceability.
- (13) Check firefighting equipment has been provided (where necessary).
- (14) Engaged side SOW gantry to be raised and secured back throughout the replenishment.
- (15) Brief all personnel involved.

**Note.** *For certain types of replenishment it is necessary to train specific weapons to a particular bearing or to remove the weapon barrels to ensure the dump area is clear of all obstructions 30° either side of the centre.*

**07013. Light line transfer**

a. The light line transfer rig has evolved from the heaving line transfer and is predominantly for use by ships that do not carry a light jackstay rig. The equipment, which can be used for the transfer of weights up to 14 kilograms, is made up from 150 metres of 16mm hawser-laid polyester rope fitted with non swivel Inglefield clips attached to each end by an 8mm polyester tack line, and additional Inglefield clips whipped to the line 40 metres from either end, for hauling over a distance line. A piece of red bunting worked into the lay marks the centre of the line. A 0246/521-2794 snatch block with associated 0263/721-6090 straight shackle may be used as a leading block for the line if a suitable eyeplate is available. Ships not entitled to the rig may carry out light-line transfers by using the light jackstay inhaul and outhaul clipped together.

**b. Preparations in the delivering ship**

Rig high point (if required).

Rig leading block(s) (if required).

Provide Light Line.

Provide waterproof transfer bag.

Provide distance line (zero end to the guide).

Detail a rating to cut the light line/distance line if the line snags in an emergency.

Complete RAS general preparations (as applicable) given in Para 07011.

**Note.** *There is no requirement to drop guardrails for this evolution.*

**c. Preparations in the receiving ship**

Rig high point (if required).

Rig leading block(s) (if required).

Rig stray lines for distance line and light line.

Detail a rating to cut the light line/distance line if the line snags in an emergency.

Complete RAS general preparations (as applicable) given in Para 07011.

**Note.** *There is no requirement to drop guardrails for this evolution.*

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d. **Light line transfer procedures**

| <b>Order</b>  | <b>Signal</b>  | <b>Action</b>   |
|---|--|---|
|   | Red Bat/Wand   | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                              |
| Prepare the rifle for line throwing' (Safety Officer firing ship).  |  | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
|   | <u>One whistle blast</u><br>(Safety Officer firing ship).        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|   | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship),   |   |
| 'With a magazine of one round, load' (Safety Officer firing ship).<br>'Make ready' (Safety Officer firing ship).<br>'Fire when ready' (Safety Officer firing ship). |  | Load the rifle in accordance with <b>BRd 8988</b> .<br><br>Make the rifle ready in accordance with <b>BRd 8988</b> .<br>Fire the rifle in accordance with <b>BRd 8988</b> . |
|   | <u>Three whistle blasts</u><br>(Safety officer firing ship)      | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a heaving line to recover stray gunlines).  |
|   | <u>Three whistle blasts</u><br>(Safety Officer non firing ship). | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.   |
| (D) <u>Avast</u>  | (R) <u>Avast</u>   | Gunline is retrieved, slack taken down and held between ships.  |
| (D) 'Attach Light line'.  |  | Gunline is attached to light line using an additional loose Inglefield clip.  |
| (D) <u>Heave in</u><br>'Check away light line'.   | (R) <u>Check away</u><br>'Haul away the gunline'.                | Receiving ship hauls in the gunline, clearing the surplus from the deck into a container keeping it clear of personnel.   |
| (R) <u>Avast</u>  | (D) <u>Avast</u>   | Order given when light line in hand.  |
| (R) 'Attach strayline'.   |  | Attach bitter end of the light line to the stray line and check away and light to/let go.   |

D = Delivery  
R = Receiving

| Order  | Signal   | Action  |
|--|--|---|
| (R) <u>Check away</u>  | (D) <u>Heave in</u>  | Delivering ship checks away the light line until next Inglefield clips is approaching the ship's side.  |
| (D) <u>Avast</u><br>'Avast – clip on the distance line'.           | (R) <u>Avast</u><br>'Avast'.   | Distance line is attached to light line.  |
| (D) <u>Heave in</u><br>Check away light line and distance line'.   | (R) <u>Check away</u><br>'Haul away'.                                    | Light line and distance line are passed between units.  |
| (R) <u>Avast</u><br>'Avast - off distance line'.                   | (D) <u>Avast</u><br>'Avast'.   | Signal is given when distance line is within reach of the dump party on the Receiving ship. Distance line is unclipped and taken forward with zero end secured in the guide.    |
| (D) <u>Heave in</u><br>'Check away light line'.                    | (R) <u>Check away</u><br>'Haul away light line'.                         | Receiving ship continues to haul in light line until red bunting centre mark is in the reception area of the delivering ship.   |
| (D) <u>Avast</u>   | (R) <u>Avast</u>   | Hauling is ceased. Transfer bag in the delivering ship is bent to the light line at the centre mark.  |
| (D) <u>Heave in</u><br>'Check away light line'.                    | (R) <u>Check away</u><br>'Haul away light line'.                         | The transfer bag is conveyed between units until all packages have been transferred and the transfer bag is recovered into the delivering ship and removed from the light line. |
| (D) <u>Replenishment complete</u>                                  | (R) <u>Replenishment complete</u>  |   |
| (D) <u>Check away</u><br>'Haul away light line and distance line'. | (R) <u>Heave in</u><br>'Check away light line and return distance line'. | Delivering ship recovers light line and distance line.  |
| (R) <u>Avast</u>   | (D) <u>Avast</u><br>'Avast hauling light line'.                          | Passed when stray line from the light line is in the dump area of the receiving ship.   |
| (R) 'Disconnect light line from strayline'.                        |  | Stray line is disconnected from light line.   |
| (R) <u>Heave in</u>  | (D) <u>Check away</u>  | Light line is paid out to bitter end then cast overboard. Delivering ship recovers all lines.   |

**Note.** During 'Corpen November' manoeuvres, the transfer of stores may continue at the Commanding Officer's discretion.

**BR 67**  
**REPLENISHMENT AT SEA**

e. **Emergency breakaway (see also Para 07027).** Either ship may initiate an emergency breakaway. As soon as the requirement for an emergency breakaway is apparent the order must be passed between bridge and RAS point and ship-to-ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

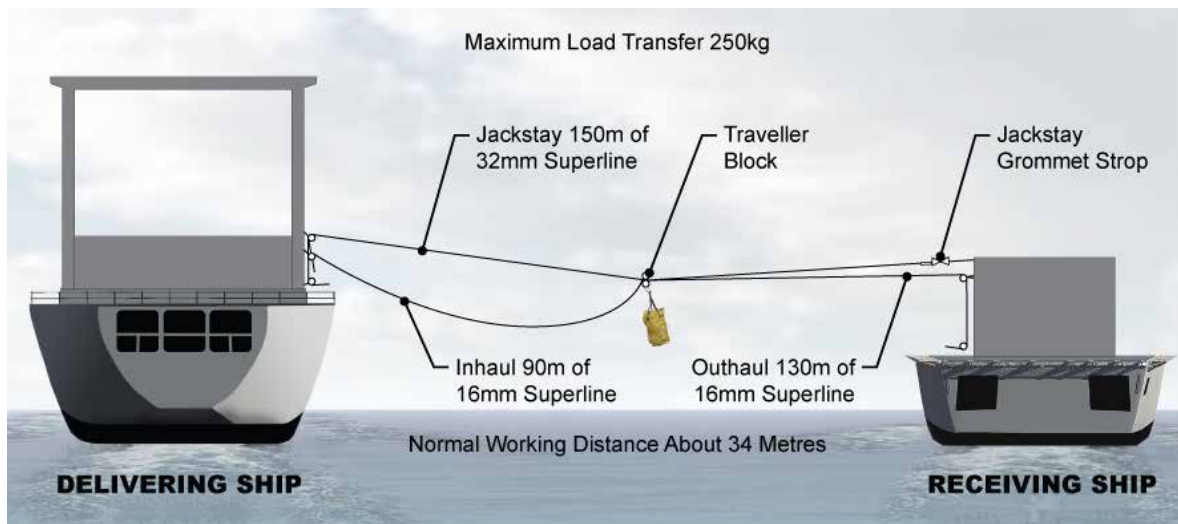
| <b>EMERGENCY BREAKAWAY</b>            |                          |   |   |
|---------------------------------------|--------------------------|---|---|
| <b>Ship</b>                           | <b>Order</b>             | <b>Signal</b>   | <b>Action</b>   |
| Initiating ship (may be either ship). | 'Emergency breakaway.'   | <u>Prepare for Emergency Breakaway</u> (other ship acknowledges with <u>Prepare for Emergency Breakaway</u> ) | Distance line is automatically returned hand over hand.<br><br>The transfer bag is in transit, it is to continue its run, once inboard it is removed from the light line. |
| Delivering ship.                      | 'Ready.'                 | <u>Ready</u>  |   |
| Receiving ship.                       | 'Ready.'                 | <u>Ready</u>  |   |
| Delivering ship.                      | 'Execute.'               | <u>Execute Emergency Breakaway</u>  |   |
| Receiving ship.                       | 'Check away light line.' |   | Roundly pays back light line.   |
| Delivering ship.                      | 'Haul away light line.'  |   | Delivering ship recovers light line.  |

**07014. Light jackstay transfer**

a. The light jackstay (Fig 7-23) is used for transferring personnel, provisions and light stores and has a maximum transfer load of 250 kg. The hauling end of the jackstay is manned by at least 25 men (28 in high sea states) and the other end is secured by a grommet strop to a slip in the receiving ship. The traveller block is hauled back and forth along the jackstay by an outhaul in the receiving ship and by an inhaul in the delivering ship, manned by six men in each ship. Working distance limits for the rig are 24-61m, with a normal working distance of 34m. The standard transfer rate is 35 loads per hour in reasonable weather conditions.

**Note.** When conducting a light jackstay transfer from a sliding pad-eye, the height of the pad-eye can be raised/lowered to facilitate the connecting/disconnecting process, but is to remain at a suitable fixed height during the actual transfer.

**Fig 7-23. Light jackstay transfer**



**Note.** ATP-16 (NATO Replenishment at Sea) states that if personnel are not being transferred, the light jackstay rig (or high-line as it is known in some NATO navies) can be tensioned by taking it to a winch or capstan. Once tensioned in this way the jackstay can never again be used to transfer personnel. For this reason RN and RFA are not to tension the light jackstay using mechanical power unless emergency circumstances deem it necessary.

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**b. Details of light jackstay, inhaul and outhaul**

*Jackstay (3940-776-5755)*

150 metres 32mm  
Superline

With round thimble eye and six-parted wire grommet fitted one end, other end whipped and heat-sealed. No toggle or toggle stowage is provided. (See Note 1).

*Inhaul (3940-776-5756)*

90 metres 16mm  
Superline

Thimble eye fitted one end, to which is attached a 0263/721-6090 straight screw shackle (or 0263/721-6103 bow shackle) to a 0263/539-3519 spring hook. The other end is whipped and heat sealed (see Note 2).

*Outhaul (3940-776-5757)*

130 metres 16mm  
Superline

Thimble eye one end with fittings as for inhaul. Other end tapered and fitted with non-swivel Inglefield clip on a tack line. Inglefield clips are also fitted at 40, 41 and 42 metres from outboard end. Mark the outhaul at a point 10m from the thimble end by working a piece of red bunting into the lay.

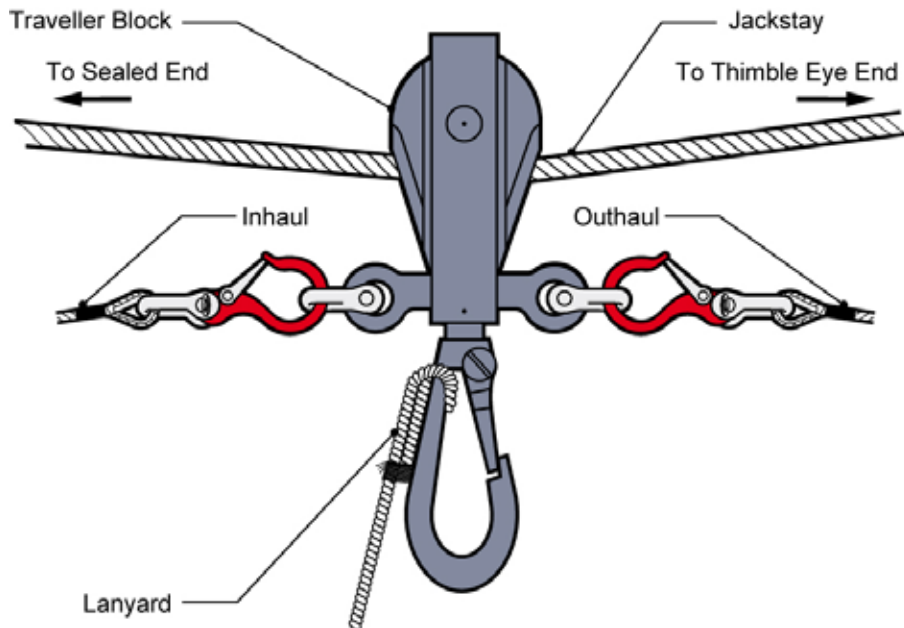
**Notes:**

- 1. A wooden toggle approximately 250mm long and 40mm diameter is to be made up by ship's staff. It is to have a lanyard attached capable of being thorough-footed onto the jackstay. The jackstay has a maximum life of 12 years from the date of its first use. After six years it is end-for-ended for a further maximum life of six years. The date of first use (life start date) and annual inspections are to be recorded on the history card that comes with each new jackstay. The Senior Seaman Specialist Rate, RFA Boatswain or Dockyard Surveyor of Rigging is to carry out these inspections. In addition the jackstay and associated lines are to be carefully examined before and after use, and if there is doubt as to serviceability, the line must be withdrawn from service and the history card annotated. The item should be tallied 'unserviceable', with brief reasons given, and returned to store. The history card must accompany light jackstay equipment that is being transferred between ships or returned to stores.*
- 2. Inhauls and outhauls may be supplied with the spring hook spliced directly into one end. This arrangement is acceptable, but the configuration should be modified to reflect the details listed above when the hooks become due for test.*
- 3. Jackstay and lines should be stowed in a bin. Where this is not possible they should be thoroughly dried before being wound on to a reel.*
- 4. MMF is easily damaged by chafe. It must not be dragged over non-skid decks or similarly mistreated. The jackstay, inhaul and outhaul must be coiled, not faked, to reduce chafing caused by the lines dragging across the deck.*



c. **Traveller block and lanyard.** The traveller block, NSN No 0246/463-3880, is to be fitted with a two-metre long lanyard as shown in Fig 7-24 to assist control whilst loads are being hooked on/unhooked. The spring hooks fitted to the inhaul and outhaul may be hooked directly to the eyes of the traveller; however, with older style travellers it may be necessary to attach 0263/721-6090 straight shackles to the eyes in order to achieve a secure fit.

**Fig 7-24. Light jackstay traveller with inhaul, outhaul and lanyard attached**



d. **Test weight.** Once a light jackstay rig has been set up, it is proved safe and correctly rigged before any stores or personnel are transferred by passing a 135 kilogram test weight (Fig 7-25) from the delivering ship to the receiving ship, lowered to the deck (not unhooked) and passed back again. The weight is manufactured to Service drawing number 003504076 and consists of five removable discs on a central rod. A one-metre, one-tonne SWL round sling and appropriate bow screw shackle is to be used to attach the weight to the traveller.

**Fig 7-25. Light jackstay test weight**



**Fig 7-26. RAS bag**



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e. **RAS bag.** A RAS bag is used for the transfer of light stores (Fig 7-26). These bags are locally manufactured and details of the construction are given in **BR 2176 Sailmaker's Handbook**. A buoyancy aid (polypropylene float or fully inflated General Service Lifejacket) must be secured to the bag before commencing a transfer.

f. **Telephone cables.** It is inter RN/RFA practice to pass the telephone cables secured by Inglefield clips to the outhaul. Two cables marked 'Bridge' and 'Transfer station' are provided by the delivering ship. Each line consists of approximately 100m of cable, NSN No 0561/103-8301. The telephone lines are tended in the delivering ship to keep them clear of the water. Details concerning connecting procedure and arrangements with ships of NATO countries are to be found in **ATP-16**.

g. **Preparations in delivering ship**

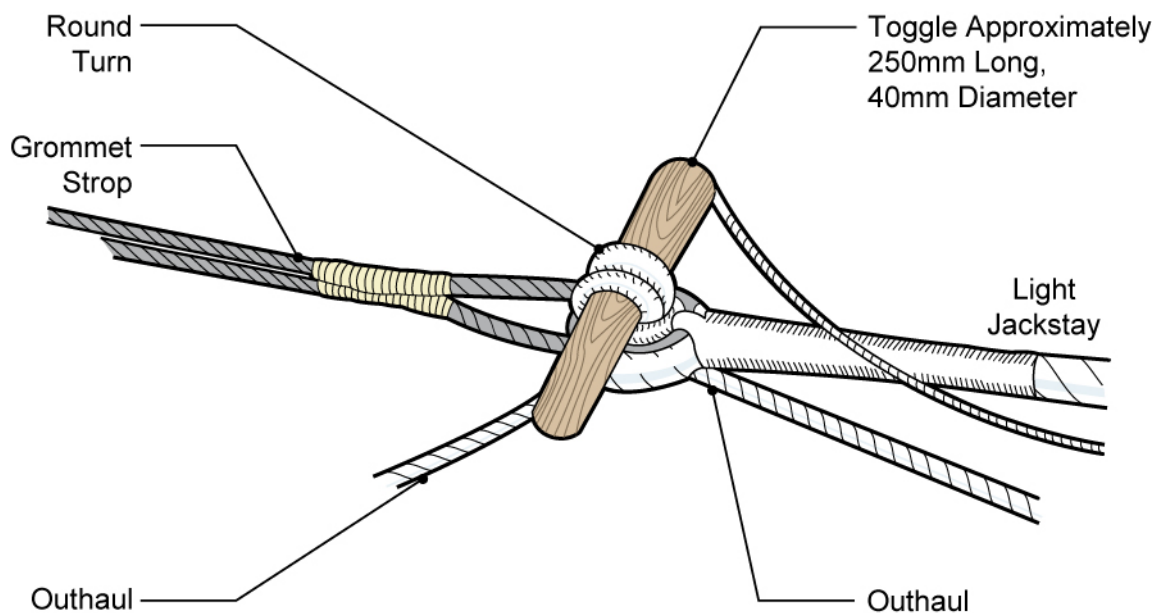
- (1) Rig reception highpoint or stump mast. Tighten bolts; secure locking nuts on rigging screws.
- (2) Provide jackstay with detachable wooden toggle (See Note).
- (3) Provide traveller with control pigtail, and a suitable roundsling to act as a traveller holding down stop.
- (4) Rig 0246/521-2799 jackstay leading blocks.
- (5) Provide inhaul and outhaul. (To assist in the recovery phase of the evolution the outhaul is to be marked at a point ten metre from its shackled end. This is achieved by working a piece of red bunting into the lay of the rope at the appropriate spot).
- (6) Rig 0246/521-2794 inhaul and outhaul leading blocks.
- (7) Provide distance line with an Inglefield clip at each end (zero end to the Guide).
- (8) If required: provide telephone line, end-fitted with Inglefield clips and taped to an 8mm MMF line.
- (9) Provide test weight.
- (10) Provide two marine rescue strops fitted with moused NSN 6103 bow shackles.
- (11) Provide two spare General Service lifejackets complete with lights and batteries, two safety helmets, and immersion suits if conditions dictate.
- (12) Provide RAS bag. A buoyancy aid must be secured to the bag.
- (13) Provide Jackstay team of at least 25 men (28 in adverse weather conditions). See also lifesaving equipment matrix in Chapter 6 Para 06044.
- (14) If required, provide lightweight stretcher, sling fitted with 6103 bow shackle.

(15) Brief passenger handlers and one other rating to cut the inhaul immediately if the jackstay parts. (Personnel must not be transferred during course alterations).

(16) Complete RAS general preparations given in Para 07012.

**Note.** When passing a light jackstay the procedure is simplified and control made easier if the jackstay is passed to the receiving ship 'through the blocks'. As part of preparations the jackstay is fed through the leading blocks, the inboard end is coiled down and the outboard (grommet) end is left ready to hand. After toggling in, the jackstay is taken in hand by the jackstay party and passed hand over hand to the receiving ship.

Fig 7-27. Outhaul toggled to jackstay



h. **Preparations in receiving ship**

- (1) Rig reception highpoint or stump mast. Tighten bolts; secure locking nuts on rigging screws.
- (2) Rig NSN 0263/414-9747 (F905/99/867-8379 MCMV) slip for jackstay.
- (3) Rig 0246/521-2794 inhaul leading blocks. Reeve strayline through blocks from dump to manning position.
- (4) Provide two marine rescue strops fitted with shackles (as delivering ship).
- (5) Provide two safety helmets, two spare general service lifejackets complete with lights and batteries, and immersion suits if conditions dictate.
- (6) Provide RAS bag. A buoyancy aid must be secured to the bag.
- (7) Detail a rating to cut the outhaul immediately if the jackstay parts during transfer.
- (8) Complete RAS general preparations are given in Para 07012.

**BR 67**  
**REPLENISHMENT AT SEA**

**i. Light jackstay transfer procedures**

| <b>Order</b>   | <b>Signal</b>   | <b>Action</b>   |
|--|---|---|
|  | Red Bat/Wand  | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                          |
| Prepare the rifle for line throwing' (Safety Officer firing ship)  |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|  | <u>Two whistle blasts</u> (Safety Officer non-firing ship)      |   |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with <b>BRd 8988</b> .<br>Make the rifle ready in accordance with <b>BRd 8988</b> .<br>Fire the rifle in accordance with <b>BRd 8988</b> . |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)     | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a heaving line to recover stray gunlines).                                      |
|  | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.   |
| (D) <u>Avast</u>   | (R) <u>Avast</u>  | Gunline is retrieved, slack taken down and held between ships.  |
| (D) 'Attach outhaul'   |   | Outhaul is attached to gunline (using additional loose Inglefield clip).  |
| (D) <u>Heave in</u>  | (R) <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a container keeping it clear of personnel.   |
| (R) <u>Avast</u>   | (D) <u>Avast</u>  | Order given when outhaul in hand.   |
| 'Attach strayline'   |   | Attach bitter end of the outhaul to the stray line and check away and light to/let go.  |
| (R) <u>Check away</u>  | (D) <u>Heave in</u>   | Delivering ship checks away the outhaul until Inglefield clips are to hand.   |

D = Delivering  
R = Receiving

| <b>Order</b>  | <b>Signal</b>                                | <b>Action</b>  |
|---|--|--|
| (D) <u>Avast</u><br>'Clip on Distance/telephone lines'          | (R) <u>Avast</u>                             | Hauling is ceased. Distance line is attached to the outhaul via first Inglefield clip, (then telephone line if required).  |
| (D) <u>Heave in</u><br>'Check away outhaul and ancillary lines' | (R) <u>Check away</u><br>'Haul away'         | Outhaul and ancillary lines are passed between units.  |
| (R) <u>Avast</u><br>'Off ancillary lines'                       | (D) <u>Avast</u><br>'Toggle in the jackstay' | Signal is given when ancillary lines are within reach of the dump party on the receiving ship. Distance line is unclipped and taken forward with zero end secured in the guide. Telephone line is unclipped taken clear and manned. Delivering ship attaches outhaul to the jackstay (Fig 7-27). |
| (D) <u>Heave in</u>   | (R) <u>Check away</u>                        | Delivering ship pays out jackstay and outhaul well separated in the form of a V.   |
| (R) <u>Avast</u>  | (D) <u>Avast</u>                             | Hauling is stopped when the Jackstay grommet is close enough to the connection point to allow a safe connection.   |
| (R) 'Connect jackstay'  |  | Ensuring the jackstay is free of outhaul twists, connect grommet strop to the highpoint slip. Check away the outhaul, transfer weight to the grommet and remove the toggle.  |
| (R) <u>Connected</u>  | (D) <u>Connected</u>                         |  |
| (D) <u>Heave in</u><br>'Check away'                             | (R) <u>Check away</u><br>'Haul away outhaul' | Pay out remainder of outhaul until it leads from the Receiving ship directly to the traveller.   |
| (D) <u>Avast</u>  | (R) <u>Avast</u>                             | Receiving ship stops hauling on the outhaul. Delivering ship unhooks traveller from the holding down strop.  |
| (D) <u>Tension</u> (jackstay)<br>'Haul taut jackstay'           | (R) <u>Tension</u> (jackstay)                | Jackstay party takes down all slack hand over hand and tensions the jackstay, to enable the rig to be checked for turns and correct leads.   |
| (D) <u>De-tension</u> (jackstay)<br>'Check away jackstay'       | (R) <u>De-tension</u> (jackstay)             | Jackstay party checks away hand over hand. The jackstay is de-tensioned to enable the test weight to be hooked onto the traveller.   |

**BR 67**  
**REPLENISHMENT AT SEA**

| <b>Order</b>  | <b>Signal</b>                                  | <b>Action</b>   |
|---|--|---|
| (D) 'Hook on the test weight'                         |  | Dump party hooks on the test weight.  |
| (D) 'Down slack inhaul'                               |  | Inhaul party take down all slack to prevent the traveller from running outboard as the jackstay is tensioned.   |
| (D) <u>Tension</u> (jackstay)<br>'Haul taut jackstay' | (R) <u>Tension</u> (jackstay)                  | Jackstay party hauls taught on the jackstay.  |
| (D) <u>Heave in</u><br>'Check away inhaul'            | (R) <u>Check away</u><br>'Haul away outhaul'   | Test weight is transferred between ships.<br>Temporary guardrails are lowered to allow safe transit of loads across deck edges and raised once loads are clear.                                   |
| (R) <u>Avast</u>                                      | (D) <u>Avast</u>                               | Signal is passed when the test weight/load is above the dump area. Tension is kept on the outhaul until the load is lowered to the deck.  |
| (R) <u>De-tension</u> (jackstay)                      | (D) <u>De-tension</u><br>'Check away jackstay' | Jackstay party checks away until the test weight is on deck, (do not unhook).   |
|   | (R) 'Down slack outhaul'                       | Receiving ship takes down slack in outhaul to prevent load movement as jackstay is tensioned.   |
| (R) <u>Tension</u> (jackstay)                         | (D) <u>Tension</u><br>'Haul taut jackstay'     | Jackstay party hauls taught on the jackstay.  |
| (R) <u>Heave in</u><br>'Check away outhaul'           | (D) <u>Check away</u><br>'Haul away inhaul'    | Test weight is transferred between ships.<br>Temporary guardrails are lowered to allow safe transit of loads across deck edges and raised once loads are clear.                                   |
| (D) <u>Avast</u>                                      | (R) <u>Avast</u>                               | Signal is passed when the test weight/load is above the dump area. Tension is kept on the inhaul until the load is lowered to the deck.   |
| (D) <u>De-tension</u><br>'Check away jackstay'        | (R) <u>De-tension</u>                          | Jackstay party checks away until the test weight is on deck. Test weight is unhooked and taken clear.<br>Transfer continues, repeating this drill until all personnel and stores are transferred. |
| (D) <u>Replenishment complete</u>                     | (R) <u>Replenishment complete</u>              | Delivering ship re-attaches traveller hook to the deck holding down strop.  |

| Order  | Signal   | Action  |
|--|--|---|
| (D) <u>Check away</u><br>'Haul away outhaul'       | (R) <u>Heave in</u> 'Check away outhaul'                           | Delivering ship dump party hauls in outhaul to the 10m mark, (This allows for ship movement during re-toggling).  |
| (D) <u>Avast</u><br>'Avast hauling outhaul'        | (R) <u>Avast</u><br>'Avast checking outhaul-toggle in'             | The receiving ship dump party takes the outhaul in hand allowing the high point person to toggle the outhaul to the jackstay (Fig 7-27). When securely toggled, the dump party release the outhaul. |
|  | (R) 'Haul away outhaul'  | Outhaul is hauled until the weight of the jackstay is off the slip.   |
|  | (R) 'Off slip'   | Slip is released from jackstay, and highpoint is cleared.   |
| (R) <u>Heave in</u><br>'Check away outhaul'        | (D) <u>Check away</u><br>' Haul away jackstay – haul away outhaul' | The delivering ship recovers both jackstay and outhaul hand over hand in a manner that does not cause a problem in the receiving ship.  |
| (D/Guide) 'Return Distance line / Telephone cable' | Indicate lines mentioned and signal <u>Check away</u>              | Pay out distance line and telephone cables to their bitter ends and light to / let go. These lines can be returned earlier if approved by the Captain.  |
| (D) 'Avast hauling jackstay'                       |  | Hauling is ceased when jackstay end is in dump area. From outboard of toggle, outhaul continues to be recovered until receiving ships stray line is through the blocks over the dump area.          |
| (R) <u>Avast</u><br>'Avast-remove strayline'       | (D) <u>Avast</u>   | Receiving ship unclips strayline from the outhaul and drops outhaul over ships side.  |
| (D) <u>Check away</u><br>'Haul away'               | (R) Heave in<br>'Check away'.                                      | Delivering ship hauls in the outhaul until fully recovered.   |

**Notes:**

1. *Personnel are not to be transferred during 'Corpen November' manoeuvres. The transfer of stores may continue at the Commanding Officer's discretion.*
2. *Outgoing passengers must be mustered at a convenient point and dressed in a correctly fitting immersion suit, industrial safety helmet and a fully inflated general service lifejacket.*
3. *The fitting of the passenger into rescue strop is to be completed clear of the rig and then only to be brought forward when required for transfer. Any luggage should be transferred in the RAS bag.*
4. *Incoming passengers must be unhooked as soon as they are on deck. Each passenger is then to be taken clear of the dump, to a position where the rescue strop, lifejacket, industrial safety helmet and immersion suit (if immediately required) can be removed, before entry into the ship.*

**BR 67  
REPLENISHMENT AT SEA**

j. **Emergency breakaway (see also Para 07027).** Either ship may initiate an emergency breakaway. As soon as the requirement for an emergency breakaway is apparent the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| <b>Emergency breakaway</b>           |  |   |   |
|--------------------------------------|--|---|---|
| <b>Ship</b>                          | <b>Order</b>                             | <b>Signal</b>   | <b>Action</b>   |
| Initiating ship (may be either ship) | 'Emergency breakaway'                    | <u>Prepare for Emergency Breakaway</u> (other ship acknowledges with <u>Prepare for Emergency Breakaway</u> ) | Ancillary lines are automatically returned hand over hand. The traveller if in transit is to continue its run, once inboard any load is unhooked and the hook is retained.    |
| Delivering ship                      | 'Check away jackstay'                    |   | Jackstay is to be kept fully de-tensioned, but clear of the water.  |
| Delivering ship                      | 'Ready'                                  | <u>Ready</u>  |   |
| Receiving ship                       |  |   | Dump area is cleared. When ordered, highpointman removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin, (See Note 1 below). |
| Receiving ship                       | 'Ready'                                  | <u>Ready</u>  |   |
| Delivering ship                      | 'Execute'                                | <u>Execute Emergency Breakaway</u>  |   |
| Receiving ship                       | 'Slip'                                   | <u>Execute Emergency Breakaway</u>  | Jackstay is slipped.  |
| Delivering ship                      | 'Haul away jackstay – Haul away outhaul' |   | Delivering ship recovers hand over hand jackstay and outhaul, (jackstay has priority). (See Note 2 below).  |
| Receiving ship                       | 'Check away outhaul'                     |   | Pay out outhaul to its end and let go. Cut outhaul if it fouls at any time. Re-rig temporary guardrails.  |

**Notes:**

1. *If the traveller is in the receiving ship, the outhaul must be fully backed-up to prevent snatch loading when the slip is released.*
2. *Care must be taken when executing emergency breakaway with the traveller in the receiving ship, as only six personnel will be controlling the weight of the jackstay, outhaul and traveller during the recovery phase of the EBA.*

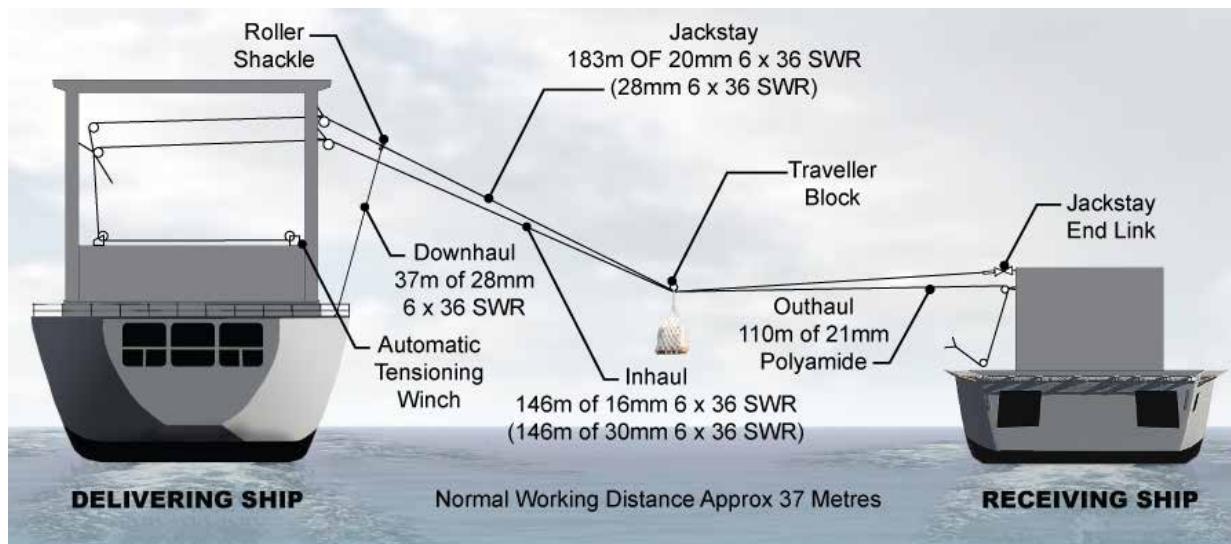


**07015. Heavy jackstay transfer**

a. The heavy jackstay is used for the transfer of heavy loads of stores including ammunition up to a maximum weight per load of two tonnes. The receiving ship arrangements and drills are similar when being supplied from a delivery ship by Fixed Highpoint (Fig 7-28), Moveable Highpoint (Fig 7-29), and GEC Mk 1 and GEC Mk 1A Systems (Fig 7-30). These are referred to as conventional Heavy Jackstay rigs and are described here. Later in this Chapter the Sliding Pad-eye rig is described. In principle the Heavy Jackstay is very similar to the light jackstay rig. The jackstay and the delivering ship's inhaul are worked by winches (the former by an automatic tensioning winch), and the receiving ship's outhaul is worked by the warping drum of a winch. The standard transfer rate per rig is 20 loads per hour in reasonable weather conditions.

**Note.** *It is important to ensure that dump and stores' parties in receiving ships are properly briefed and prepared for load reception, distribution and preparation of loads for return. Where practical this should entail liaising with STO (N) personnel in the delivering ship prior to the RAS to ascertain precise requirements.*

**Fig 7-28. Heavy jackstay fixed highpoint rig**



**Notes:**

1. *When this rig is connected to a sliding pad-eye the load can be lowered or raised on the pad-eye as required.*
2. *Due to the excessive weights involved during this type of replenishment, it is the responsibility of the Safety Officer to keep the bridge informed when weight is about to come on or off the jackstay.*
3. *The test weight is not to be passed during CORPEN November. However, loads may be passed at the Commanding Officer's discretion.*

Fig 7-29. Heavy jackstay – moveable highpoint rig

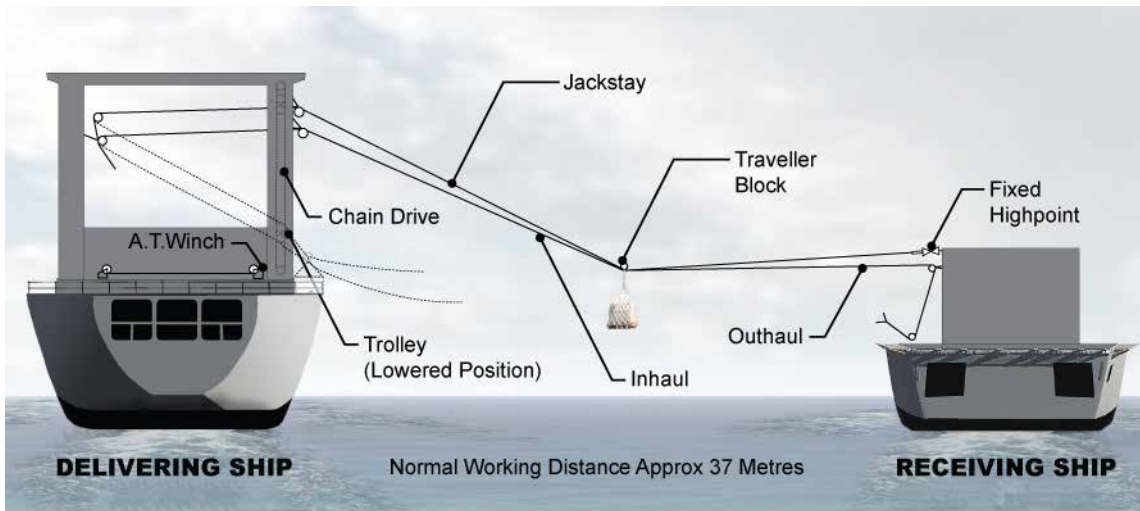
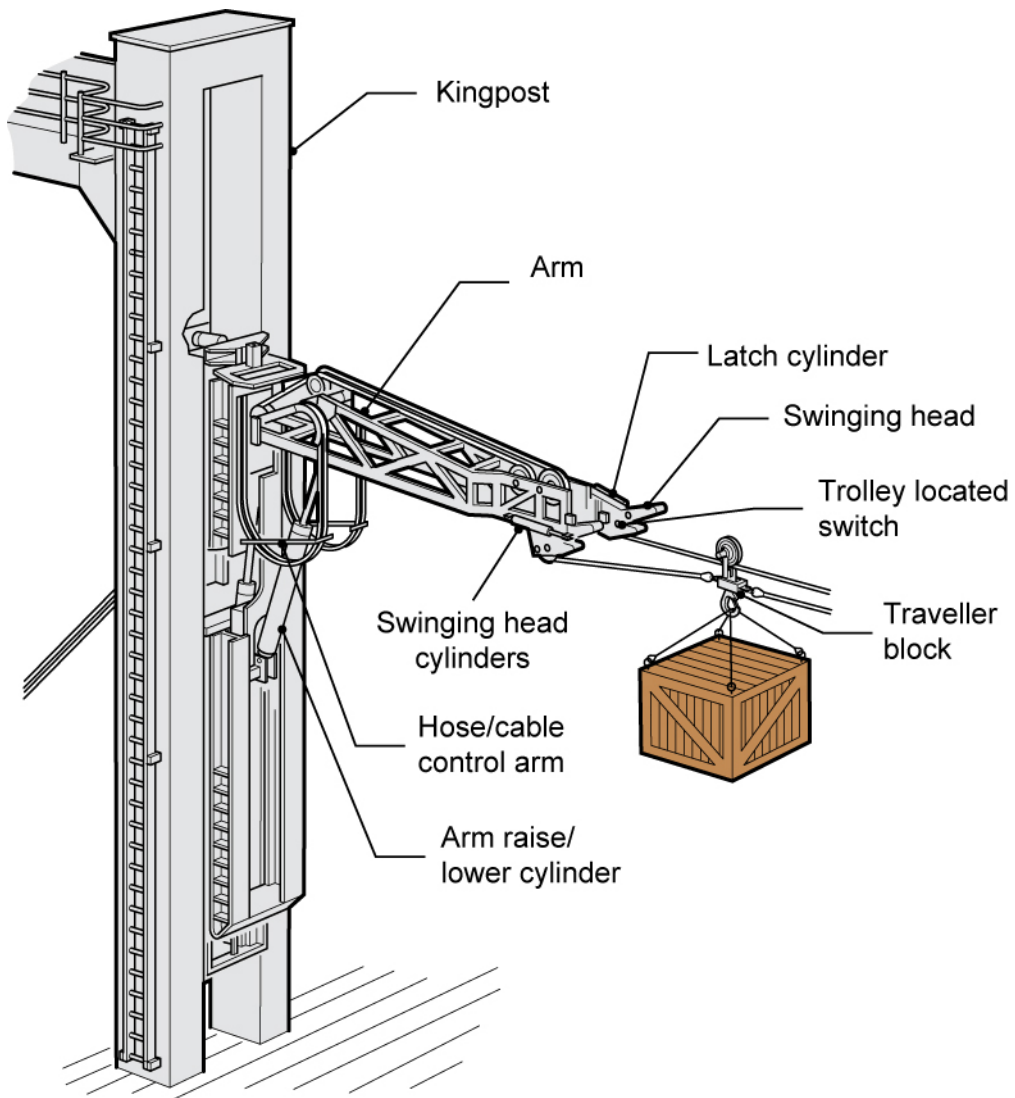


Fig 7-30. Heavy jackstay – GEC Mk 1 and Mk 1A rig



**b. Preparations (part 1) in receiving ship**

- (1) Rig gantry, tripod or stump mast in accordance with 'As-fitted' drawings. Screw up shackles fully and mouse; tighten nuts and bolts; secure rigging screws with locking nuts. Fit NSN 0263/414-9835 slip with NSN 0263/721-6096 straight shackle to the correct eyeplate, or rig QRD and provide 16mm polypropylene line of suitable length (see Note 2 to Para 07011).
- (2) Rig-leading blocks NSN F218-190-6915 with NSN 0263/721-6093 shackles to take outhaul. Reeve strayline from dump area through leading blocks to the winch or capstan.
- (3) Provide retaining pendant (see Para 07011i sub para (3)). In the event of the gripper sliding to the jackstay terminal link, hook the retaining pendant to the jackstay terminal link and secure the free end of the pendant inboard to hold the jackstay whilst the gripper is reset at the appropriate distance.
- (4) Rig straylines for distance line, and telephone cables and messenger if required.
- (5) Provide jackstay control line(s).
- (6) Check power is on the capstan or winch and test for correct operation.
- (7) Detail stores party and plan storing routes.
- (8) Follow immediately with Part 2 Preparations given in Para 07012.

**Notes:**

- 1. In ships with slow capstans or winches it may be preferable to work the outhaul by hand. In such cases it is essential that sufficient hands are detailed for the task.*
- 2. Once the jackstay is tensioned prior to a load being passed from the delivering ship it is permissible to remove the turns of the outhaul from the capstan/warping drum and haul it in by hand if the angle allows. The outhaul must be brought to once the load is inboard and before the de-tension signal is passed to the delivering ship; this is to prevent the load carrying outboard as the jackstay is de-tensioned.*
- 3. When unhooking loads, the outhaul must be adjusted to enable the traveller to be easily unhooked by the dump party.*
- 4. Care must be taken to ensure the load is not supported by excessive tension in the inhaul and outhaul.*
- 5. A messenger will not be passed unless the OPSTAT RAS specifies there is a requirement.*

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**c. Safety**

- (1) Personnel must not stand beneath the load, or between the load and the deck edge or ship's superstructure. Nor must they manhandle the load as it is being lowered.
- (2) Five hands (including the truck driver) are required to control a heavy load being moved by pallet truck.
- (3) Keep all lines free for running and ensure personnel stay clear of bights.
- (4) Do not allow hands to work across the jackstay or lean over the traveller whilst hooking on/unhooking loads.
- (5) On occasions when the jackstay control line is used it should, wherever possible, be passed between the load and the highpoint, never outboard of the load.
- (6) Hands should not stand in the vicinity of stump mast guys longer than is necessary to complete essential tasks.

**d. Heavy jackstay transfer procedures**

| <b>Order</b>   | <b>Signal</b>   | <b>Action</b>   |
|--|---|---|
|  | Red Bat/Wand  | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                                  |
| Prepare the rifle for line throwing' (Safety Officer firing ship)  |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)      | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|  | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship) |   |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with <b>BRd 8988</b> .<br><br>Make the rifle ready in accordance with <b>BRd 8988</b> .<br><br>Fire the rifle in accordance with <b>BRd 8988</b> . |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)   | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a heaving line to recover stray gunlines).  |

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| Order                 | Signal  | Action  |
|-----------------------|---|---|
|                       | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.                                     |
| 'Haul away'           | <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a container keeping it clear of personnel.                                     |
| 'Avast hauling'       | <u>Avast</u>  | Order given when outhaul in hand.   |
| 'Attach strayline'    |   | Attach bitter end of the outhaul to the stray line and check away and light to/let go   |
| 'Haul away'           | <u>Check away</u>   | Continue hauling.   |
| 'Avast hauling'       | <u>Avast</u>  | Order given when ancillary lines are inboard.   |
| 'Off ancillary lines' |   | Ancillary lines are removed and passed to their respective parties, (straylines used if necessary).   |
| 'Haul away'           | <u>Check away</u>   | Haul in the outhaul until the weight of the jackstay is on the outhaul.   |
| 'Avast hauling'       | <u>Avast</u>  | Stop hauling.   |
| 'Bring to'            |   | Bring the outhaul to the winch/capstan with three turns. * (see Notes)  |
| 'Heave in'            | <u>Check away</u>   | Heave in until the jackstay terminal link is within reach of the slip/QRD.  |
| 'Avast heaving'       | <u>Avast</u>  | Heaving is stopped when the terminal link is close enough to the connection point to allow a safe connection.   |
| 'Connect Jackstay'    |   | Ensuring that the jackstay is free from outhaul twists, the terminal link is correctly attached inboard, cut remaining stops and break out gripper lanyard. |
| 'Veer' -'Off Gripper' |   | The outhaul is veered until the weight of the jackstay is taken on the slip/QRD and the gripper is removed from the jackstay.                               |
| 'Avast veering'       |   | Gripper is removed from the outhaul and taken clear of the dump readily available to be passed back on the first available free traveller.                  |
|                       | <u>Connected</u><br>Repeated by DS                              | Informs Delivering ship jackstay is secured to slip/QRD.  |
| 'Heave in'            | <u>Check away</u>   | Heave in the outhaul until sufficient slack is taken down, utilising handspike to prevent riding turns.   |

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| <b>Order</b>   | <b>Signal</b>                       | <b>Action</b>   |
|--|-------------------------------------|---|
|  | <u>Avast (DS)</u>                   |   |
|  | <u>Tension</u><br>Repeated by RS    | Delivering ship tensions jackstay to check for turns and correct leads.   |
|  | <u>De-tension</u><br>Repeated by RS | Delivering ship de-tensions jackstay then hooks on test weight. (Dry hook might initially be deployed without test weight by DS to prove rig).            |
|  | <u>Tension</u><br>Repeated by RS    | Delivering ship tensions jackstay.  |
| 'Heave in'   | <u>Check away</u>                   | Transfer of test weight. As outhaul is hove in it must be coiled down free for running (or into a dustbin).   |
| 'Down temporary guardrail'                           |                                     | Temporary guardrail is lowered and raised to allow test weight to pass inboard.   |
| 'Avast'  | <u>Avast</u>                        | Stop heaving in the outhaul but keep it under tension.  |
|  | <u>De-tension</u><br>Repeated by DS | As jackstay is de-tensioned the test weight is lowered to the shot mat. No attempt should be made to steady or unhook it. (see para 07017 sub para b (2)) |
| 'Tension Jackstay'                                   | <u>Tension</u><br>Repeated by DS    | Ensure all personnel are clear of the dump, delivering ship tensions jackstay.  |
| 'Reduce to one turn on the outhaul' *<br>(see Notes) |                                     | Outhaul is reduced to one turn.<br>* (see Notes)  |
| 'Down temporary guardrail'                           |                                     |   |
| 'Surge the outhaul'                                  | <u>Heave in</u>                     | Delivering ship heaves in on inhaul and recovers test weight. Outhaul is surged around the winch/capstan.   |
| 'Up temporary guardrail'                             |                                     | Temporary guardrail is tensioned when test weight has passed outboard. Remove shot mat from deck, clear dump area on completion.                          |
| 'Avast surging outhaul'                              | <u>Avast</u>                        | Keep outhaul slack but clear of the water.  |

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| Order                                      | Signal  | Action   |
|--|---|--|
|  | <u>De-tension</u><br>Repeated by RS                                 | Delivering ship de-tensions jackstay until test weight is on deck. It is unhooked and the transfer proceeds. Temporary guardrail operators can be detailed to work independently during the process of stores transfers. The first load will be pallet trucks and package notes and the evolution continues until all stores have been transferred and pallets and pallet trucks returned to the delivering ship. (Pallets and pallet trucks must be returned separately). |
| 'Replenishment complete'                   | <u>Replenishment complete</u><br>(Given as last load returns to DS) | Delivering ship removes last load from traveller, then unhooks and recovers the outhaul.   |
|  | <u>De-tension (DS)</u><br><u>Copied by RS</u>                       | Jackstay is de-tensioned.  |
| 'Check away'                               | <u>Heave in</u>   | Check away on the outhaul until the outboard end of the strayline is visible close to hand on the winch.   |
| 'Avast'- 'remove strayline'                | <u>Avast</u>  | Stop checking away on the outhaul, pull stray clear of blocks and disconnect the strayline. The bitter end of the outhaul is held aloft before being cast overboard.   |
| 'Man the highpoint'                        | Prepare to trip Pelican hook (DS)<br>(copied by RS)                 | When ordered, highpointman removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin / take the QRD lanyards in hand.  |
| 'Clear the dump, down temporary guardrail' |   | Dump is cleared then temporary guardrail is lowered.   |
|  | Ready to trip Pelican hook (RS) / (DS)                              | Signal given when ready and safe to do so.   |
|  | Trip Pelican hook (DS)<br>(copied by RS)                            |  |
| 'Slip'                                     |   | Jackstay is slipped.   |
| 'Up temporary guardrail'                   |   | Temporary guardrail is raised immediately after the jackstay has passed outboard.  |
| 'Return distance line / telephone cables'  | Indicate lines mentioned and signal <u>Heave in.</u>                | Pay out distance line and telephone cables to their bitter ends and light to/let go. These lines can be returned earlier if approved by the Captain.   |

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**Notes:**

- 1. Lead blocks strayline is rove onto the winch prior to the replenishment; hence from connection of outhaul tail, the full control of the outhaul is completed by winch operation, (Robust use of a handspike is required throughout this process to prevent excessive build up of lines).*
- 2. Due to the captive nature of the winch, when it is required to pass back the traveller hook/ loads to the consort it has to done by setting the winch to 'free running' and the brake being released when ready.*
- 3. If 'free running' cannot be achieved, the traveller hook/loads are to be returned to the consort by selecting 'veer on the winch'.*



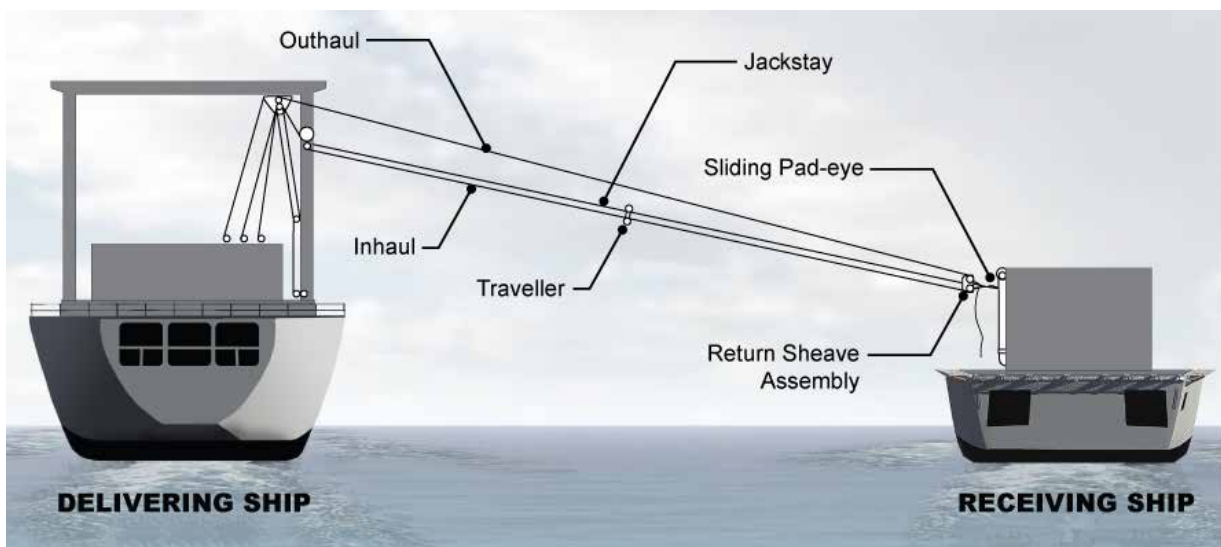
e. **Emergency breakaway (see also Para 07027).** Either ship may initiate an emergency breakaway. As soon as the requirement for an emergency breakaway is apparent, the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| <b>Emergency breakaway</b>           |                          |   |   |
|--------------------------------------|--------------------------|---|---|
| <b>Ship</b>                          | <b>Order</b>             | <b>Signal</b>   | <b>Action</b>   |
| Initiating ship (may be either ship) | 'Emergency breakaway'    | <u>Prepare for emergency breakaway</u> (other ship acknowledges with <u>Prepare for emergency breakaway</u> ) | Ancillary lines are automatically returned. The traveller is returned to the delivering ship by the quickest means; i.e. if load is on receiving deck the jackstay will be initially tensioned. If the traveller is on its way into the receiving ship, the delivering ship is to avast checking away on the inhaul. The receiving ship must avast heaving on the outhaul, remove turns from the winch, then give the Ready signal. |
| Receiving ship                       | 'Ready'                  | <u>Ready</u>  | Given when turns are removed and it is safe for the delivering ship to recover the load.  |
| Delivering ship                      |                          | <u>Ready</u>  | Recovers the load, de-tensions the jackstay then unhooks the load.  |
| Receiving ship                       |                          |   | As jackstay de-tensions, highpointman removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin / takes the QRD lanyards in hand. Dump area is cleared then temporary guardrail is lowered.   |
| Delivering ship                      | 'Execute'                | <u>Execute Emergency Breakaway (both ships).</u>  | Slip the jackstay   |
| Receiving ship                       | 'Up temporary guardrail' |   | The temporary guardrail is immediately set up.  |
| Receiving ship                       | 'Check away outhaul'     |   | Promptly pay back outhaul, keeping it under control.  |

**07016. Sliding pad-eye rig**

a. The Sliding Pad-eye Rig (Fig 7-31(i)) is fitted in RFA FORT VICTORIA. It is designed to operate using a permanently tensioned jackstay between two sliding pad-eye attachment points, with a multi-sheave latched trolley assembly allowing the delivering ship to traverse the traveller back and forth on the wire jackstay. The sequence for connecting-up the rig is shown in Fig 7-31(ii). The rig can be connected to a fixed heavy jackstay reception point, in which case a cargo drop-reel (CDR) is used (see Para 07017). The following drills have been written for a Ship using a sliding pad-eye reception point. The distance line, telephone lines and messenger are passed and dealt with as for the conventional heavy jackstay rig. Notes for the delivering ship are given at the end of these drills.

**Fig 7-31(i). Heavy jackstay sliding pad-eye rig – general arrangements**



**Fig 7-31(ii). Sliding pad-eye rig – connecting-up sequence**

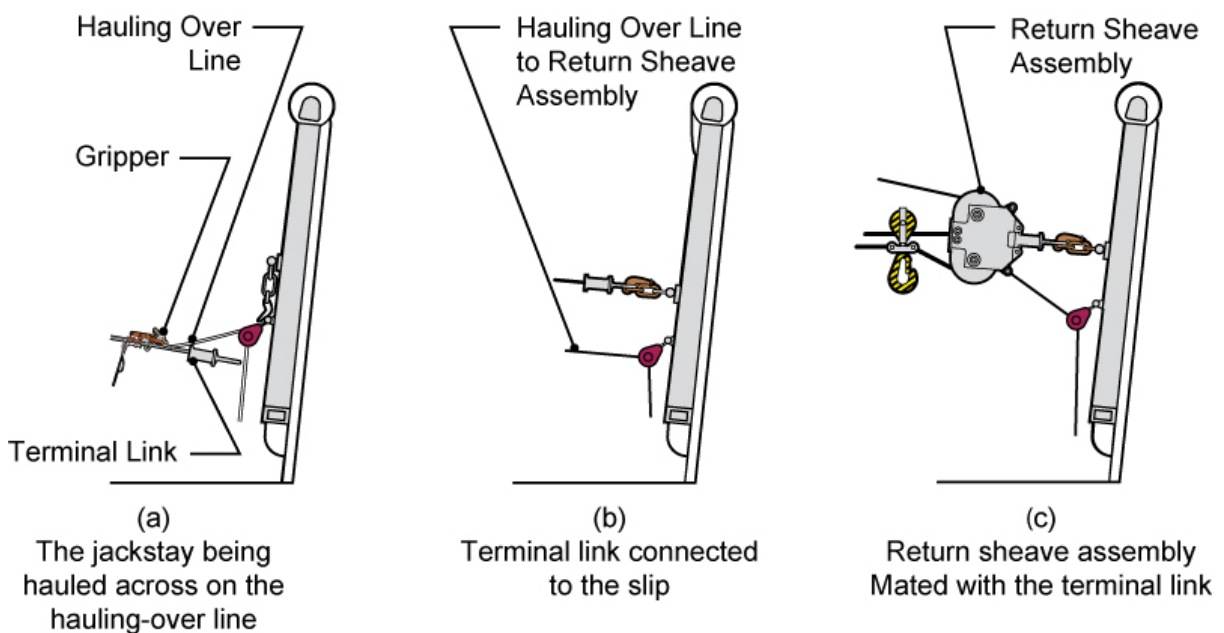


Fig 7-31(iii). RSA connected to the 9835 slip

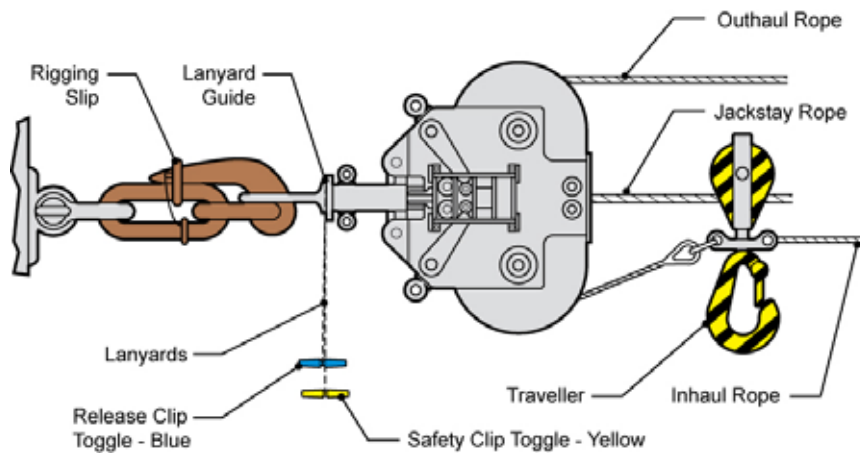
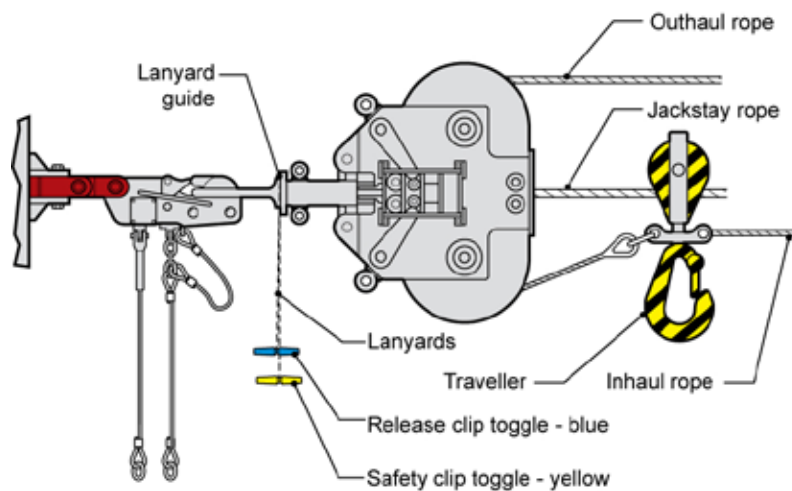


Fig 7-31(iv). RSA connected to the quick release device (QRD)



b. **Preparations (part 1) in receiving ship.** Preparations are similar to those described for the conventional Heavy Jackstay rig. However, once this rig is set up there is no requirement for an inhaul party because the delivering ship controls both the inhaul and outhaul. For the purpose of setting up the rig, a hauling-over line takes the place of an outhaul.

c. Ships operating sliding pad-eyes fitted with the probe base plate to permit probe refuelling are to use the swivel joint adapter (F217-514-9334) attached to the Swivel Arm Joint when rigging the QRD. This allows ships to conduct heavy jackstay and jackstay fuelling from the sliding pad-eye.

**Notes:**

1. A messenger will not be passed unless the OPSTAT RAS specifies there is a requirement.
2. When setting up or disengaging the rig, the pad-eye in the receiving ship should be positioned at a convenient height for handling the equipment. When loads (or the test weight) are being traversed the pad-eye should be in the fully raised position. Operation of the temporary guardrail during the connecting up and transfer phase is as and when required; it is specifically referred to in the disengaging phase. The drill procedures given below are written for the receiving ship (RS). References to the delivering ship are indicated by the suffix (DS).

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d. **Sliding pad-eye transfer procedures**

| Order  | Signal  | Action  |
|--|---|---|
|  | Red Bat/Wand  | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                              |
| Prepare the rifle for line throwing' (Safety Officer firing ship)  |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|  | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship)   |   |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with <b>BRd 8988</b> .<br><br>Make the rifle ready in accordance with <b>BRd 8988</b> .<br>Fire the rifle in accordance with <b>BRd 8988</b> . |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)     | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a heaving line to recover stray gunlines).  |
|  | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.   |
| 'Haul away'  | <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a container keeping it clear of personnel.   |
| 'Avast hauling'  | <u>Avast</u>  | Order given when hauling over line is in hand.  |
| Attach Strayline   |   | Attach bitter end of the hauling over line to the strayline check away and light to/let go.   |
| 'Haul away'  | <u>Check away</u>   | Continue hauling.   |
| 'Avast hauling'  | <u>Avast</u>  | Order given when ancillary lines are inboard.   |
| 'Off ancillary lines'  |   | Ancillary lines are removed and passed to their respective parties, (straylines used if necessary).   |
| 'Haul away'  | <u>Check away</u>   | Haul in the hauling over line until the weight of the jackstay is on the hauling over line.   |
| 'Avast hauling'  | <u>Avast</u>  | Stop hauling.   |
| 'Bring to'   |   | Bring hauling over line to the winch/capstan with three turns. * (see Notes)  |

| <b>Order</b>                       | <b>Signal</b>                      | <b>Action</b>   |
|------------------------------------|------------------------------------|---|
| 'Heave in'                         | <u>Check away</u>                  | Heave in until the jackstay terminal link is within reach of the slip/QRD.  |
| 'Avast heaving'                    | <u>Avast</u>                       | Heaving is stopped when the terminal link is close enough to the connection point to allow a safe connection.   |
| 'Connect Jackstay'                 |                                    | Ensuring that the jackstay is free from twists with the hauling over line, the terminal link is correctly attached inboard, cut remaining stops and break out gripper lanyard.  |
| 'Veer' – 'Off Gripper'             |                                    | The hauling over line is veered until the weight of the jackstay is taken on the slip/QRD and the gripper is removed from the jackstay.   |
| 'Connected'                        | <u>Connected</u><br>Repeated by DS | Informs Delivery ship jackstay is secured to slip.  |
|                                    | <u>Tension</u><br>Repeated by DS   | Delivering ship ensures that the hauling over line and jackstay have no turns round each other then tensions the jackstay and raises her sliding pad-eye.   |
| 'Heave in'                         | <u>Check away</u>                  | Delivering ship checks away on the outhaul, allowing the Return Sheave Assembly (RSA) to ride down the jackstay and mate with the terminal link latching mechanism. The Receiving ship must maintain a steady, but not excessive, pull on the hauling-over line throughout the traversing of the RSA. |
| 'Avast'                            | <u>Avast</u>                       | Signal is given when the OIC judges that the RSA has mated.   |
| 'Off turns hauling over line' *    |                                    | Off turns hauling over line remove from the winch and light to/let go. * (see Notes)  |
|                                    | <u>Tension</u><br>Repeated by DS   | The delivering ship tensions the outhaul to prove the RSA has mated correctly. If the RSA pulls free it is returned to the delivering ship for re-setting prior to been re-deployed, (See Note 1 below).  |
| 'Mating confirmed'                 | <u>Connected</u><br>Repeated by DS | This signal is given to confirm a successful mating between the RSA and the terminal link.  |
| 'Disconnect the hauling over line' |                                    | Disconnect the hauling-over line and prepare it for return on the first available traveller. Ensure the RSA release lanyards are stopped and clear of any snagging hazards.   |
| 'Raise the pad-eye'                |                                    | Receiving ship raises pad-eye to its full height, ready to receive the traveller.   |

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| Order                                 | Signal                         | Action  |
|---------------------------------------|--------------------------------|---|
|                                       | <u>Check away</u>              | Delivering ship traverses traveller block to Receiving ship. The first traveller run is for a winch test only for the delivering ship. The traveller may not come all the way inboard and will return to the delivering ship prior to setting the limits.   |
|                                       | <u>Check away</u>              | The delivering ship traverses the traveller to the receiving ship to enable the subsequent load drop area to be marked.   |
|                                       | <u>Avast</u>                   | This signal is given when the empty traveller block is in its ideal position for subsequent load drops in the dump area. If the traveller stops in the wrong position it must be adjusted by giving the <u>Heave in</u> or <u>Check away</u> signal followed by the <u>Avast</u> signal until an accurate marking has been achieved; the red bat is then held aloft.                  |
| 'Traveller block in correct position' | <u>Red Bat</u><br>(held aloft) | This signal informs the delivering ship that the traveller is correctly positioned. The delivering ship acknowledges this signal, enters the position in the rig computer, then recovers the traveller and engages the automatic distance mode. On completion of this procedure the rig will operate in the automatic mode, and stop the traveller at the correct position each time. |
|                                       | <u>Heave in(DS)</u>            | This signal is given by the delivering ship to indicate that the traveller is being sent over to check that the automatic distance mode is operating correctly. The traveller should stop at the marked position over the dump area of the receiving ship.  |
|                                       | <u>Red Bat</u><br>(held aloft) | Indicates to the delivering ship that the traveller has stopped at the correct position. If further adjustment to the position of the traveller is required the procedure described for initially establishing its position should be followed. When the red bat/wand is held aloft the delivering ship will recover the traveller, hook on the test weight and raise her pad-eye.    |
|                                       | <u>Heave in(DS)</u>            | Given by delivering ship to indicate test weight is traversing. The test weight will automatically stop over the dump area.   |

| Order                                       | Signal  | Action   |
|---|---|--|
| 'Lower pad-eye'                             |   | Lower the pad-eye until test weight rests on the deck. Do not unhook test weight from traveller.   |
| 'Raise pad-eye'                             |   | When pad-eye is raised in the correct position the return of the test weight can proceed.  |
|   | <u>Heave in</u>   | Delivering ship recovers test weight. The test weight will automatically stop over the delivering ship's dump area. Delivering ship lowers the pad-eye and unhooks the test weight. The replenishment then proceeds. Temporary guardrail operator can be detailed to work independently during the process of stores transfers.<br>Hauling over line to be returned with the gripper on the first available traveller. |
| Disengaging                                 |   |  |
|   | <u>RAS Complete</u><br>(Copied by DS)<br>(Given as last load returns to DS) | Delivering ship removes last load from traveller then de-tensions the outhaul.   |
| 'Lower pad-eye'                             |   | Pad-eye is lowered.  |
| 'Release the return sheave assembly'        |   | This order is given when the outhaul is seen to go slack. The release lanyards are to be placed through the terminal link lanyard guide. Pull the yellow lanyard to release the safety 'R' clip.<br>The release 'R' clip (blue) is now ready to be operated. When ready release the RSA by pulling the blue lanyard.   |
|   | <u>Heave in</u>   | The RSA is pulled clear of the terminal link by the Delivering ship. Once the RSA is in the Delivering Ship the jackstay it is then de-tensioned.<br>Coil and stop back the release lanyards to the terminal link.   |
| 'Man the highpoint'                         | <u>Prepare to Trip pelican Hook (DS) / (RS)</u>                             | When ordered, highpoint man removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin / take QRD lanyards in hand.   |
| 'CLEAR THE DUMP', down temporary guardrail' |   | Dump is cleared of personnel and temporary guardrail is lowered.   |

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| Order  | Signal   | Action  |
|--|--|---|
|  | <u>Ready to Trip Pelican Hook (RS)</u><br><u>Trip Pelican Hook(DS)</u><br>(Copied by RS) | Signal given when ready and safe to do so.  |
| 'Slip'   |  | Jackstay is slipped.  |
| 'Up temporary guardrail'   |  | Temporary guardrail is raised.<br>Pay out distance line and telephone cables to their bitter end and light to / let go.<br>(These lines can be returned earlier if required). |
| <p><b>Notes:</b></p> <p>1. Lead blocks strayline is rove onto the winch prior to the replenishment, hence from connection of hauling-over line tail all movements of the hauling-over line is completed by winch operation, (Robust use of a handspike is required throughout this process to prevent and uneven and excessive build up of lines).</p> <p>2. Sufficient slack of the hauling-over line must be available prior to giving the 'Tension' signal to prove the correct mating of the RSA.</p> <p>3 Removal of the hauling-over line in preparation for its return must be completed away from the main dump area of the replenishment.</p> <p>4. Care is to be taken at this stage with the control of the hauling-over line. The receiving ship must ensure that the hauling-over line remains slack but clear of the water at all times.</p> |  |   |



e. **Emergency breakaway procedure (see also Para 07027)** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent the order must be passed from bridge to RAS point and from ship to ship. The aim must be to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the command. The procedure is as follows.

| Order   | Signal  | Action   |
|---|---|--|
| Either ship<br>'Emergency Breakaway'  | Initiating Ship <u>Prepare for Emergency Breakaway</u> .<br>Other ship acknowledges signal with: <u>Prepare for Emergency Breakaway</u> . | Ancillary lines are automatically returned. The initial action is for the delivering ship to recover the traveller, and load if it is hooked on. This may involve stopping the traveller on an outboard run. If the traveller is on the deck in the receiving ship with the load hooked on, the pad-eye must be raised and the <u>Heave in</u> signal given before continuing with the <u>Prepare for Emergency Breakaway</u> signal. Receiving ship prepare lanyards once own dump area is clear (pad-eye to be lowered). |
|   | Both ships continue signalling <u>Prepare for Emergency Breakaway</u>   | Delivering ship recovers the load and/or traveller, and then de-tensions the outhaul. As soon as this is observed the receiving ship releases the RSA as described earlier.  |
|   | Ready for Emergency Breakaway (RS)  | As the delivering ship is recovering the RSA, the dump area is cleared. As the jackstay is de-tensioned, highpoint man removes the mousing, place the hammer against the buckler link and removes the pin/take the QRD lanyards in hand, temporary guardrail is lowered. Dump area is cleared.   |
|   | Ready for emergency breakaway (DS)  | The delivering ship only gives this signal once the above procedures have been carried out.  |
| 'Slip'  | <u>Execute emergency breakaway (DS)</u>   | As soon as both ships are ready.   |
|   | <u>Execute emergency breakaway (RS)</u>   | The receiving ship slips the jackstay, then raises the temporary guardrail.  |
| <p><b>Note.</b> Receiving ships operating this rig from a fixed highpoint have great difficulty retrieving the operating lanyards of the gripper, RSA and cargo drop reel if the lanyards are stopped up in hanks. In such circumstances the delivering ship should ensure that all these lanyards hang free, and are of sufficient length to be easily taken in hand in the dump area of the receiving ship.</p> |   |  |

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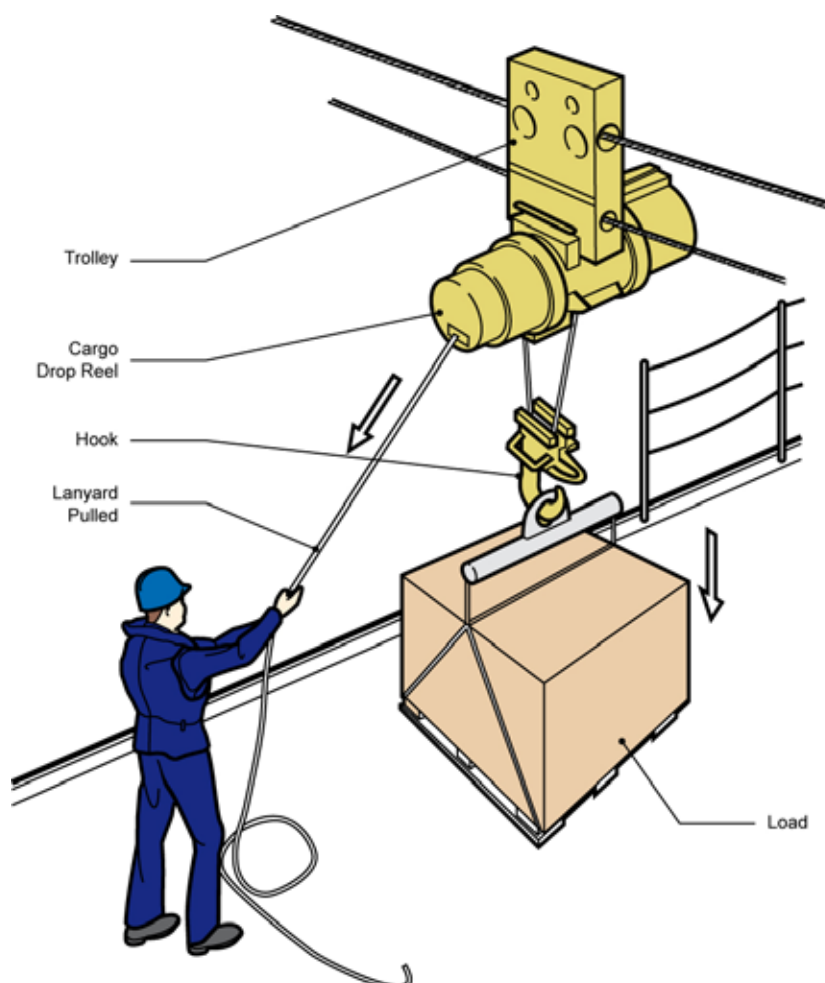
**07017. Cargo drop reel traveller**

a. Cargo drop reel traveller (CDRT) is a self-contained spring-loaded winch used for transferring heavy stores from a delivering ship fitted with a moving highpoint system to a receiving ship fitted only with a fixed highpoint facility. It consists of the main self contained winch attached to the jackstay by way of a gate and rollers with the inhaul and outhaul wires attached to the respective ends of the winch. The hook is held on the underside of the winch by its own wire and has a locking chain which can be passed through the hook (rigged by the delivering ship), and pinned in place. Additionally, the operating lever has a lanyard attached so that the winch can be operated. The CDRT itself weighs 0.5 tonnes, therefore only a 1.5 tonnes test weight or load can be passed. Although heavy loads can be transferred from the delivering ship, the CDRT is restricted to a 68 kilograms back RAS facility.

**CAUTIONS**

- 1. When using a cargo drop reel (CDR) no attempt should be made to lower the test weight to the deck.**
- 2. The CDR weighs 0.5 tonnes. Therefore the transfer load must not exceed 1.5 tonnes.**
- 3. Back-rasing loads over 68 kilogram using the CDR is not possible in certain classes of ship – check with the delivering ship.**

**Fig 7-32. Cargo drop reel traveller**



**b. Operation**

- (1) The rig is set up in the way it would be to a moveable highpoint, up to and including the passing of the test weight. It is recommended that a block be rigged above the slip so that a line can be attached to the terminal link. This will allow personnel on deck to assist the highpoint man in attaching the terminal link to the ship by holding the weight.
- (2) The test weight will be sent, with the operating lever release lanyard wrapped around the winch. Under no circumstances is the test weight to be landed, as the winch will not be able to pick the weight back up.
- (3) When the first load is sent the operating lever release lanyard will be hanging underneath the winch. When the load is above the dump area (in the receiving ship), the dump party are to give one sharp pull on the operating lanyard. This will release the pin in the hook safety chain. The safety chain will fall clear and remain attached to the winch by a shackle.
- (4) The operating lanyard will now be hanging directly underneath the operating lever. Two members of the dump party are to pull down on the release lanyard and maintain the downward pull. This will operate the winch in its first phase and lower the hook.
- (5) When the load is on deck, two personnel are to be sent into the dump area to apply weight to the hook until there is sufficient slack for the load to be removed from the hook.
- (6) At this point the operating lanyard is released. This will operate the winch in its second phase and apply the brake leaving the hook suspended over the load. The load can now be removed from the hook and taken clear of the dump area.
- (7) If there are no back loads for transfer, the operating lanyard is to be pulled down. This will operate the winch in its third phase and retract the hook back into the winch. When the hook hits the base plate on the winch, the operating lanyard is to be released. This will operate the winch in its final phase and apply the brake.
- (8) The winch is then sent back to the delivering ship using the standard bat signals, leaving the operating lanyard hanging below the winch. The safety chain does not have to be rigged by the receiving ship.
- (9) The above procedures are then repeated until the RAS is complete.

**Notes:**

- 1. It is important that personnel are sent into the dump area to pull down on the hook when the load has landed on the deck, to get sufficient slack so that the load can be unhooked. If the lanyard is released before sufficient slack in the wire is obtained, it will operate the winch in its second phase and apply the brake. On pulling the lanyard again it will operate in its third phase and retract the hook with the load still attached.*
- 2. Personnel may be required to enter the dump area and physically assist the hook in retracting the return load to the winch.*

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3. *The delivering ship is to attach a round sling or lanyard to the hook so that the hook can be pulled down in the receiving ship if no load is attached. This applies to return loads and when returning HPTs at the end of the RAS.*

**07018. Vertical replenishment (Vertrep)**

a. In this section a broad outline of the Vertrep method as it affects the seaman is described. The concept, planning, and details of helicopters and equipment are covered in Chapter 9 of **ATP-16**.

b. **Planning a Vertrep.** Prior to a major replenishment operation, representatives from the ships concerned usually meet on board one of the ships. At this meeting the numbers and types of helicopters to be used, radio frequencies, and order, description and type of stores to be transferred are discussed.

c. **Command and control organisation.** This organisation, which covers such aspects of the Vertrep as the duties of the Vertrep control officer, helicopter director and Vertrep supply officer, and the control of helicopters, is fully described in **ATP 16**.

d. **The supplying ship.** Aboard the supplying ship (store ship), preparations for a Vertrep operation may commence several days in advance of the replenishment. Delivery sequences are planned to allow proper breaking-out of stores; this planning is very important because of the diversity of loads: for example, the time that frozen foods can be handled out of refrigeration is strictly limited.

e. **Preparations in the receiving ship.** To ensure a smooth Vertrep operation the receiving ship must make the following preparations and checks:

- (1) The command and control organisation must be fully understood.
- (2) Personnel with key tasks must be fully briefed.
- (3) Sufficient personnel and equipment must be made available to handle the transferred loads (see Note below).
- (4) An organisation must be set up for striking down stores and returning empty pallets.
- (5) Establish the **Vertrep Drop Zone** in accordance with **ATP-16** and ensure that the area is clear of moveable obstructions. Unship ensign staffs and jackstaffs, lower safety nets (if fitted), provide communications (including hand bats or fireball gloves for aircraft marshalling signals) and provide a fire party equipped with the means of making foam.
- (6) Prepare the seaboard as a crash boat.
- (7) Provide an earthing pole (described later).

**Note.** *Personnel engaged in moving stores to or from the drop zone must wear safety helmets, protective goggles, ear defenders and hazardous duty lifejackets, and their arms and legs must be covered.*

f. **Equipment.** RN helicopters normally carry loads in nets or pallets, which may be used in conjunction with an extension strop, suspended from a cargo release unit (cargo hook) beneath the aircraft. The cargo release unit may be an integral part of the airframe or, more commonly, may be suspended on four slings beneath the aircraft. All types of cargo release unit are provided with facilities for:

- (1) Electrically controlled release of the load by the aircrew.
- (2) Hand-operated release of the load by the aircrew in an emergency.
- (3) Hand operation of the release mechanism by the deck handlers.
- (4) *The cargo net (Fig 7-33).* The most common method of transferring loads. The net is constructed of polyamide webbing and is fitted with hooks of the type shown in Fig 7-34 by which it is slung from the cargo release unit. The net has a safe working load of 1,360 kilograms. Each of the four hooks is made from flat steel plate. The hooks can be readily removed from or attached to the stirrup over the waist by operating the safety latch. All hooks must be attached to the stirrup before lifting.
- (5) *The extension strop (2.4m).* This strop is manufactured from doubled polyamide webbing and has a safe working load of 2,724 kilograms. It is fitted with a shackle at its upper end and with a swivel and spring hook at its lower end.
- (6) *Pallets.* The commonly used pallets for Vertrep are the one-tonne and two-tonne types. Full details are given in ATP-16, including the permissible load for each type of pallet when used for Vertrep. The pallet sling has a safe working load of 1,016 kilograms, which is a limiting factor for pallet loading.
- (7) *Earthing pole.* To overcome the dangers of static electricity when hooking on or releasing a load, the helicopter must be earthed to the ship by means of an earthing pole. A patternised version, 26SH/780-2036, is available through naval stores. Fig 7-35 shows an example of a locally produced earthing pole.

g. **Safety.** Loads must not be steadied. Sudden movement of the helicopter may endanger personnel attempting to control a swinging load. Before a load is handled it must be earthed (Fig 7-36). The earthing pole must be hooked to the winch wire or cargo hook each time before a load is hooked on or unhooked.

**WARNING**

**DO NOT STAND UNDER A LOAD, OR BETWEEN A LOAD AND THE SUPERSTRUCTURE OR SHIP'S SIDE.**

Fig 7-33. Cargo net for Vertrep

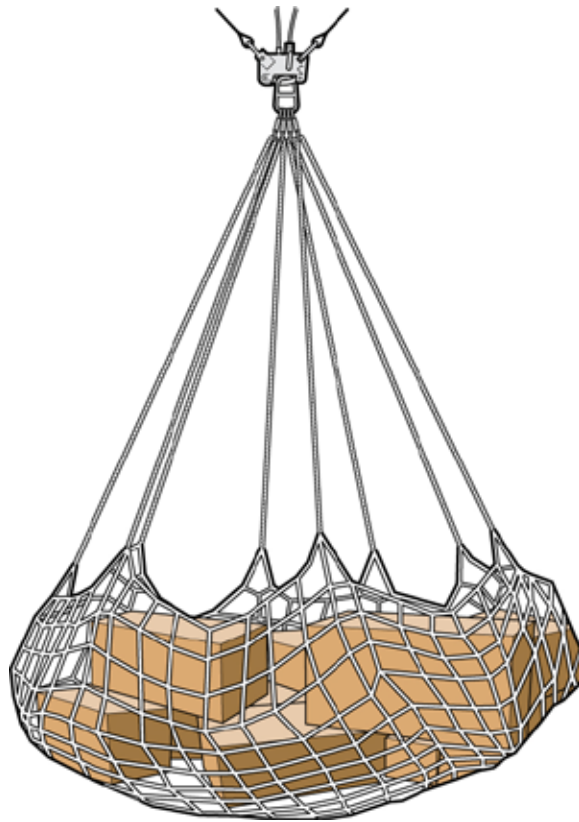


Fig 7-34. Cargo net hooking arrangements

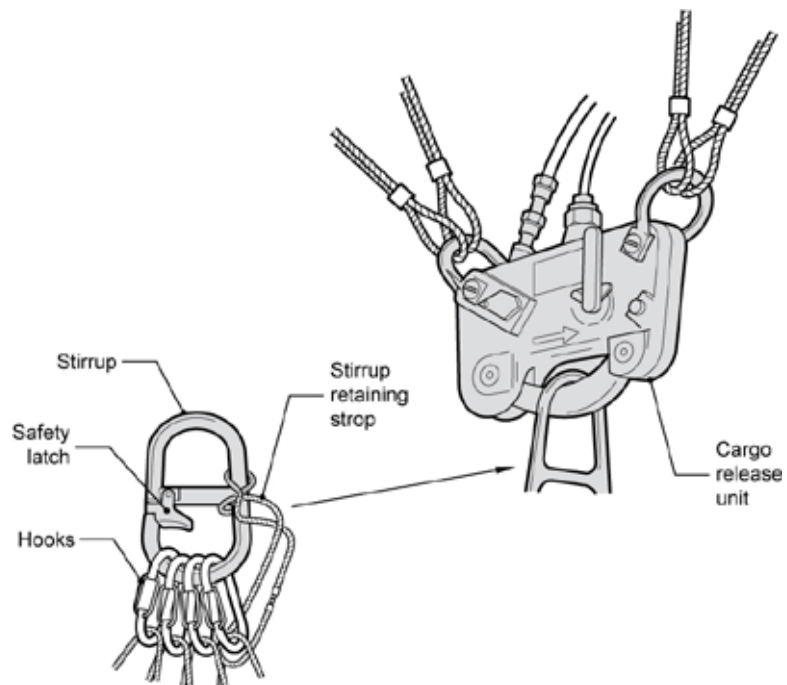


Fig 7-35. A locally manufactured earthing pole

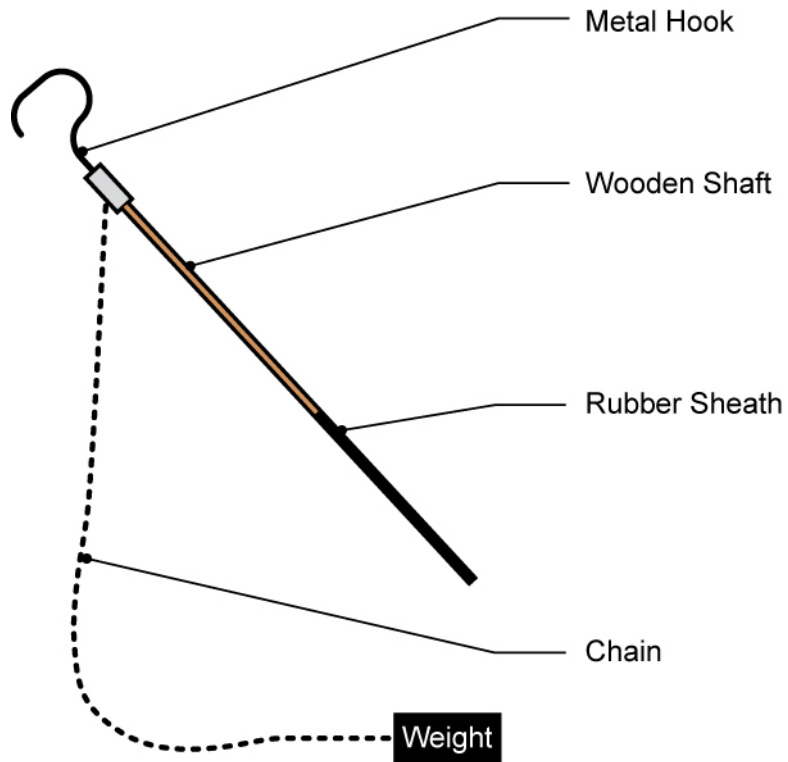
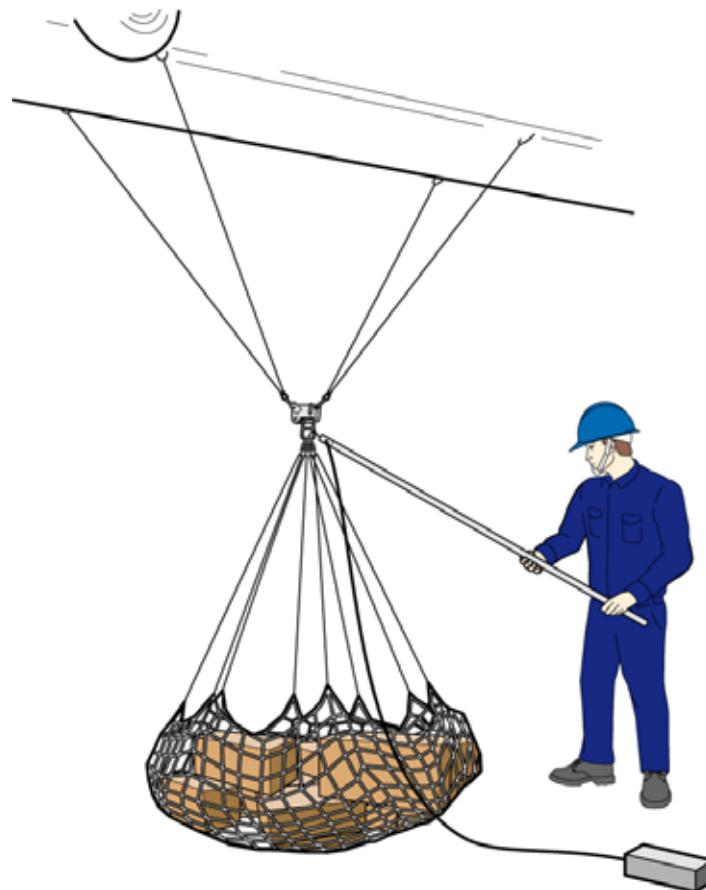


Fig 7-36. Earthing pole in use



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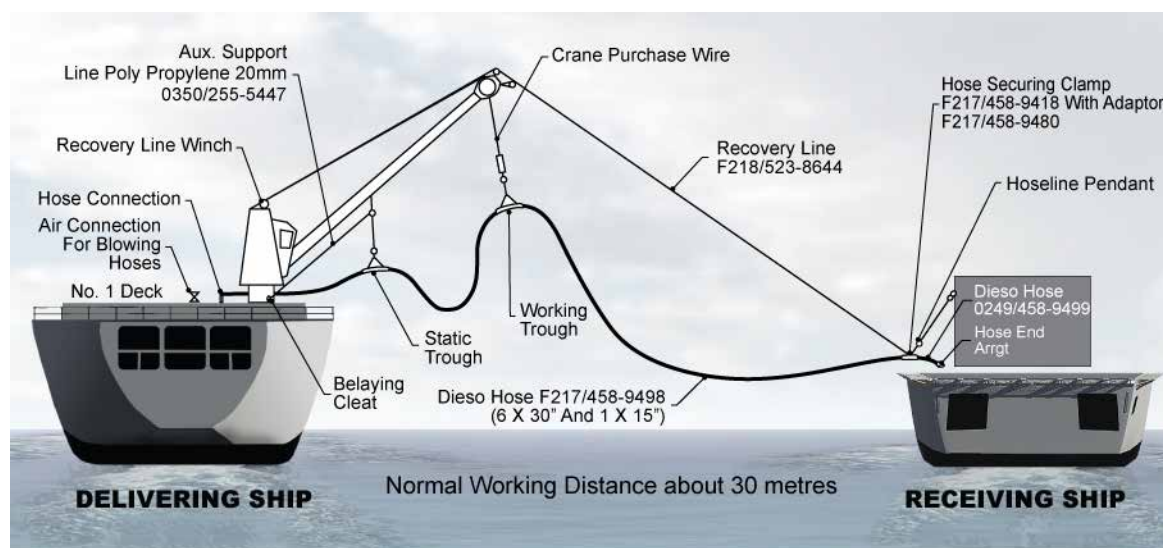
### 07019. Introduction to transferring liquids by the abeam method

Warships can be fuelled from RFA tankers while underway and abreast of each other by the following rigs: probe, large derrick, crane, and jackstay. Although minor variations to these rigs may be encountered, preparations and drills in the receiving ship, described later for each type of rig, vary little. All the methods are described in the following paragraphs.

### 07020. Crane fuelling rig

a. Certain major warships can fuel smaller warships by the crane rig; drills and procedures for receiving this rig are the same as those described for the large derrick rig. Fig 7-37 shows a typical crane fuelling rig. The hose is slung from the delivering ship's crane in two troughs: the working trough is on the crane purchase and the static trough is on the 24mm polypropylene tackle secured half-way along the crane jib, with the hauling part taken through a leading block on the deck where it is manned or taken to a suitable winch. A recovery line, 73 metre of 12mm SWR is shackled to the securing adaptor and clamp, which is positioned 4.5 metre from the outboard end of the hose. The recovery line takes the weight of the end of the hose when it is being offered to the receiving ship and when it is being recovered after fuelling. This line is rove through a block at the head of the crane jib and another on deck care must be taken to ensure all the line will stow on the drum. Working distance limits for the rig are 21-37 metres, with a normal working distance of 30 metres.

**Fig 7-37. Crane fuelling rig**



### b. Rigging for crane fuelling in the delivering ship

(1) Hoses are supplied in 4.5 metres and 9 metres lengths. Five or six nine metres lengths (in accordance with ship's drawings) and a 4.5 metres length are coupled together and connected to the ship's deck fuelling connection. To the outer end are connected the shut-off valve and the male portion of the quick-release coupling. The static and working troughs are placed about nine metres and 24 metres respectively from the deck fuelling connection, leaving approximately 27 metres of hose from the working trough to the adaptor and clamp which is 4.5 metres from the outboard end of the hose. The hose is lashed in the troughs by 16mm polypropylene and protected from chafe by sword matting or canvas. The recovery line and hoseline pendant are shackled to the securing adaptor and clamp, and the end 4.5 metres hose is stopped to the hoseline by lashings passed around the hose and hoseline as dry turns and finished with a reef knot.



The crane purchase is hooked to the slings of the working trough using a short wire grommet seized to the crane hook, and the static trough tackle and recovery line are positioned and rove through their leading blocks. The recovery line and hoseline are tended and the troughs are hoisted into position.

(2) A handling pigtail made up of a four metres length of 16mm polypropylene with a 0263-539-3519 spring hook spliced into one end is hooked into the eye of the hose-end protector cap. A round turn is passed over the hoseline and the remainder of the pigtail is coiled up and taped to the hoseline so it can be easily broken free by the receiving ship as it comes into the dump area (see Fig 7-38).

c. **Passing and working the crane rig.** To avoid the hoses becoming twisted, it is preferable to supply the hoseline from aft of the rig. If this is not possible the hoseline should be stopped to the deck aft of the crane, then led outboard to the position from which it and the ancillary lines are to be supplied from. The relative positions of the ships will be continuously altering and the rig must therefore be tended and adjusted by the delivering ship throughout the transfer. The bights of the hose should not be allowed to trail in the sea, and the crane should be trained in line with the lead of the hose to avoid any sideways stress on the jib-head. When the ships close, the working trough should be raised and the jib topped up; when they open, the working trough and jib are lowered. The static trough requires little adjustment unless the ships open to nearly the full scope of the rig.

d. **Hose end arrangements.** The hose end and securing arrangements in the receiving ship are shown in Fig 7-38. The hoseline is hooked to a ring, which in turn is shackled to the securing adaptor and clamp by a hoseline pendant. The hoseline is secured to the outboard 4.5 metres length of hose by means of cordage lashings, which are cut as the hose comes inboard, allowing the hose end to be carefully lowered to the deck by means of the control pigtail. A shut-off valve is fitted at the end of the hose and the hose is connected to the receiving ship's fuel system by a quick-release coupling (Fig 7-39). The male part, fitted with a protector cap, is sent across on the end of the delivering ship's hose, and the female part, incorporating a non-return valve, is provided by the receiving ship. The hand wheel of the female part operates three dogs, which hold the coupling in engagement, and has two working positions – 'RELEASE' and 'ENGAGE'. When ships of different countries are transferring fuel a breakable-spool coupling (Fig 7-40) may have to be used. Of the two parts, the 'B' section is sent over on the end of the delivering ship's hose and the 'A' section is provided by the receiving ship. The protector cap of the QRC coupling and the end-plate of the breakable-spool coupling should be secured to the alloy hose connection using a short 5mm SWR retaining pendant fitted with a small spring hook in one end and a soft eye in the other. The wire pendant is thorough-footed to the alloy connection then seized in position. The deck elbow connection should be supplied with a pressure gauge and an air-cock to facilitate fuel sampling and the connection of LP air for blow-through. Ships replenishing AVCAT, and MCMVs replenishing Dieso abeam use a 65mm coupling (Fig 7-41). The outboard 4.5m length of 6" hose when replenishing Dieso to MCMVs is to be replaced by a 4.5m length of 65mm hose by using the 6" to 2½" adaptor.

Fig 7-38. Hose end securing arrangements

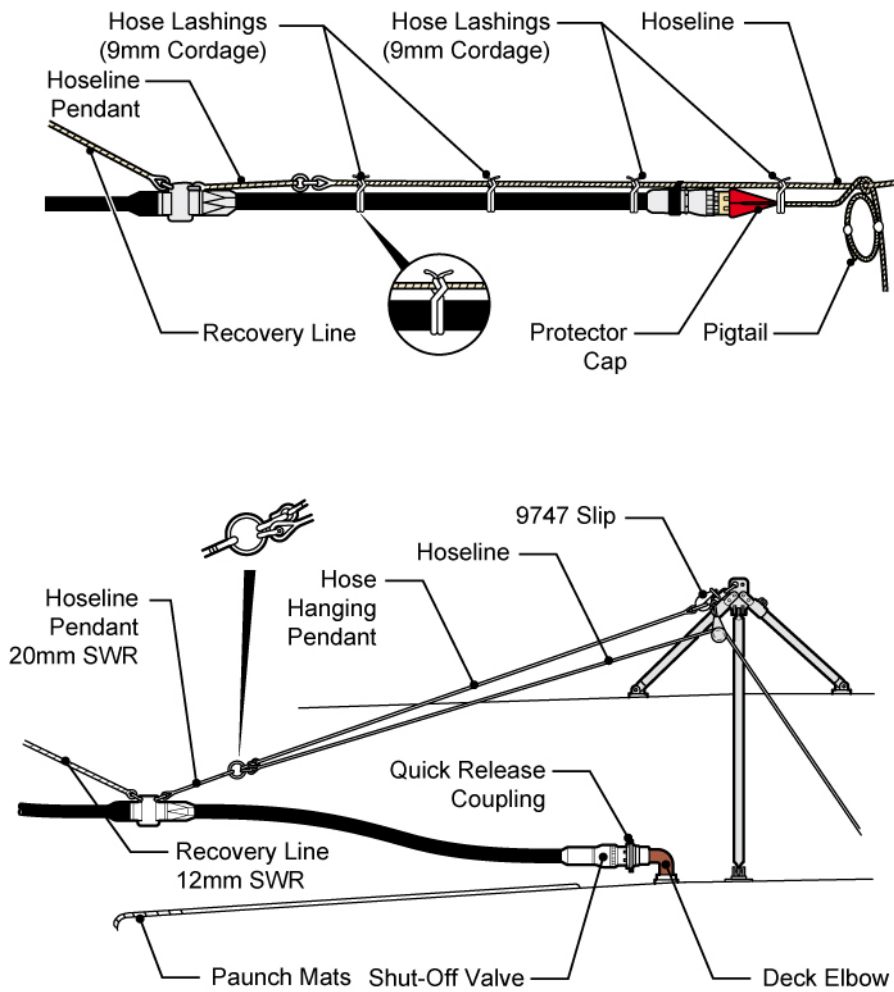
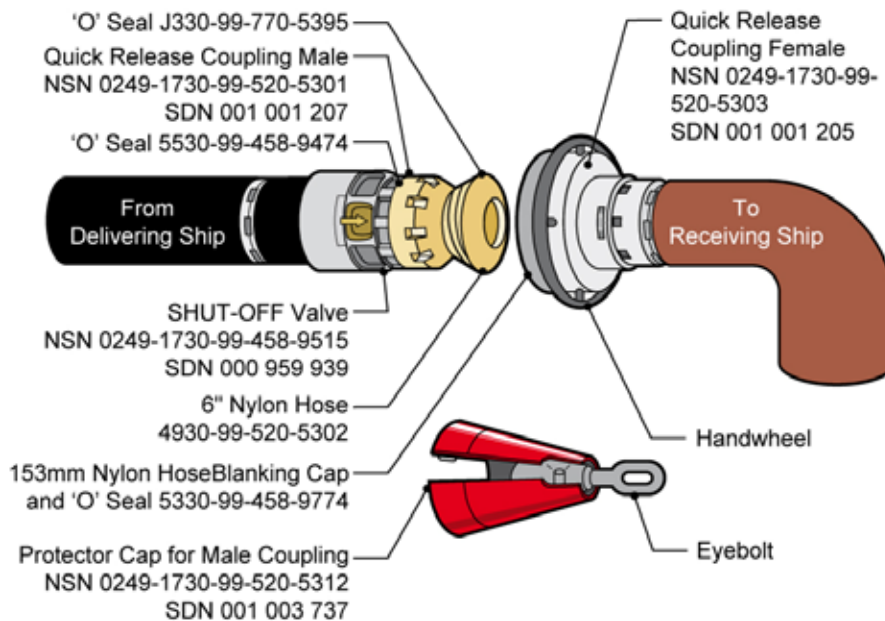
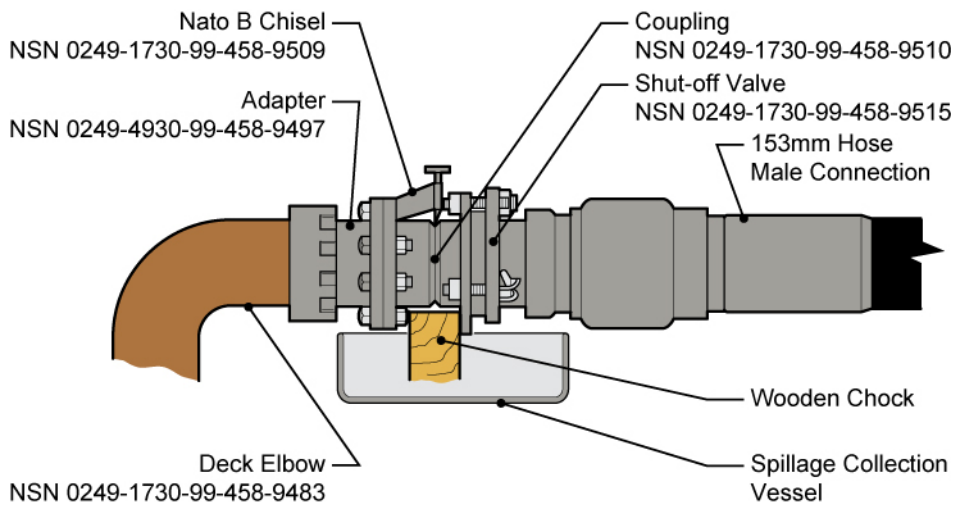


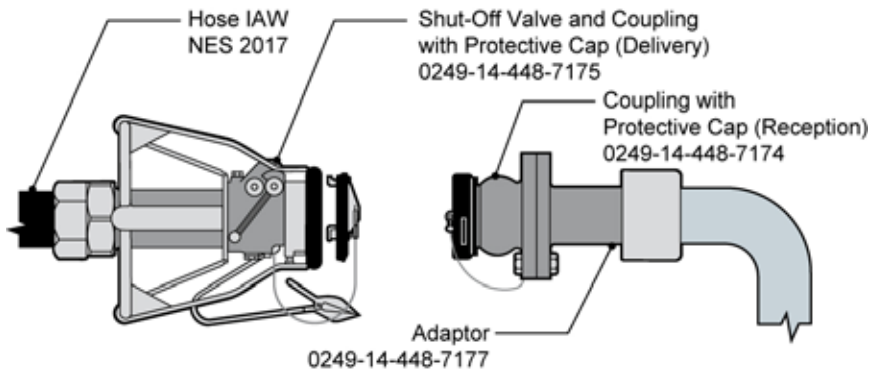
Fig 7-39. Quick-release coupling



**Fig 7-40. Breakable-spool coupling**



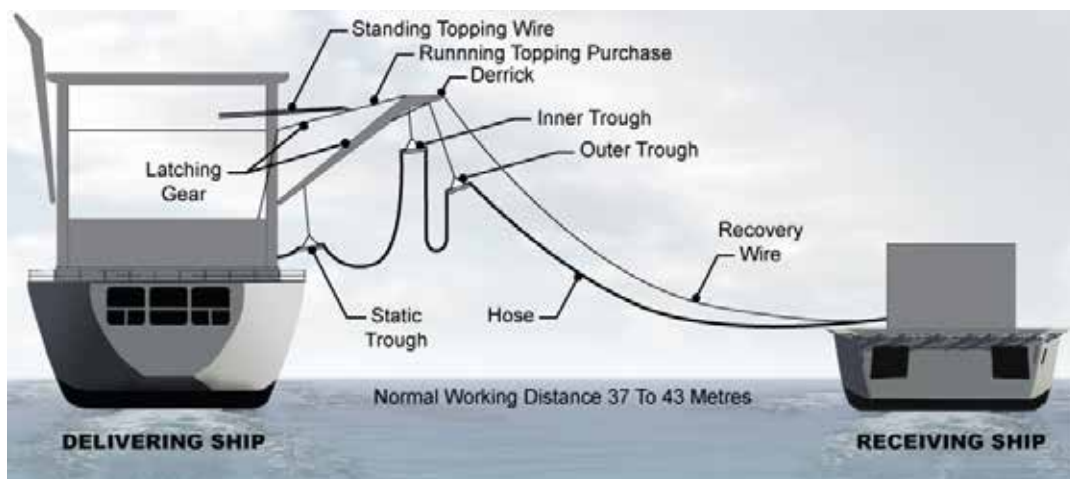
**Fig 7-41. 65mm coupling (for AVCAT and MCMV Dieso replenishment)**



**07021. Large derrick fuelling rig**

a. The derrick, which is longer than a ship's crane, has the fuelling hose slung from it in three troughs: the static, inner and outer troughs (Fig 7-42). A greater length of hose is used and therefore the distance between the two ships can be increased. Working distance limits for the rig are 30m-54m, with a normal working distance of between 37-43 metres.

**Fig 7-42. Large derrick rig**



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**b. Derrick/crane fuelling procedures – preparations (Part 1) in receiving ship**

- (1) Rig gantry, tripod or stump mast. Screw up and mouse shackles; tighten nuts and bolts; secure rigging screws with locking nuts.
- (2) Rig NSN 0263/414-9747 (F905/99/867-8379 (MCMV) slip using NSN 0263/721-6093 shackle for HHP attachment. (Provide a second NSN 9747 slip if it is intended to slip, rather than cut, the slip rope).
- (3) If using NATO breakable spool, provide and fit the EBA chisel (See Fig 7-40).
- (4) Rig NSN 0246/190-6915 blocks using NSN 0263/721-6093 shackles for hose/line lead. Rig hose-hanging pendant.
- (5) Rig fuel riser, required hose lengths, correct coupling, and sampling tap/hose.
- (6) Rig steadying tackles and strops. The strops should be of the bale sling type, long enough to pass around two six inch hoses. Once rigged the tackles may be secured and left unmanned. Ensure they can be easily removed in an emergency.
- (7) Provide slip rope of 28 mm (20mm MCMV) NFC (length to suit), with reduced soft eye in one end.
- (8) Rig strayline through leading blocks to capstan or winch.
- (9) Provide C spanners, ratchet/socket spanners, chocks or saddle block, drip tray, eye wash bottle and emergency tools.
- (10) Provide goggles for all personnel in the vicinity of the dump area.
- (11) Ensure firefighting equipment has been rigged.
- (12) Check power on the capstan or winch and test for correct running.
- (13) Follow immediately with Part 2 Preparations given in Para 07012.

**Note.** *MM/PP using the derrick/crane rig. To prevent the hose-ends causing damage to ship's fittings during the disengaging phase a 12mm x 2m SWR nose cone pendant, end fitted with a shackled spring hook, is incorporated into the rig. Before the rig is passed this pendant is shackled to the bridle ring by the RFA, coiled and lightly stopped. Drill for use of the nose cone pendant on completion of the replenishment is as follows:*

|                          |                               |   |
|--------------------------|-------------------------------|---|
| 'Replenishment complete' | <u>Replenishment complete</u> | Once the signal is acknowledged and the hoses have flattened, close the shut-off valve, disconnect hoses, replace blanking plate/end cap. Cut stop on nose cone pendant and attach spring hook to blanking plate/end cap. Ensure pigtail is attached to nose cone pendant SWR, and clear for return outboard. |
|--------------------------|-------------------------------|---|

c. **Orders and signals.** Orders are shown in quotation marks and signals are underlined.

| Order  | Signal  | Action  |
|--|---|---|
|  | <u>Red Bat/Wand</u>   | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                              |
| Prepare the rifle for line throwing' (Safety Officer firing ship)  |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|  | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship)   |   |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with <b>BRd 8988</b> .<br><br>Make the rifle ready in accordance with <b>BRd 8988</b> .<br>Fire the rifle in accordance with <b>BRd 8988</b> . |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)     | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a bolas/heaving line to recover stray gunlines).                                    |
|  | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.   |
| 'Haul away'  | <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a large container (bucket) to keep it clear of personnel.                                      |
| 'Avast hauling'  | <u>Avast</u>  | Order given when hoseline tail in hand.   |
| 'Attach Strayline'   |   | Attach bitter end of the hoseline to the strayline and check away light to/ let go. * (See Notes).  |
| 'Haul away'  | <u>Check away</u>   | Continue hauling.   |
| 'Avast hauling'  | <u>Avast</u>  | Order given when ancillary lines are inboard.   |
| 'Off ancillary lines'  |   | Ancillary lines are removed and passed to their respective parties, (straylines used if necessary).   |
| 'Haul away'  | <u>Check away</u>   | Haul in the hoseline until the weight is on.  |
| 'Avast hauling'  | <u>Avast</u>  | Stop hauling.   |

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| <b>Order</b>                                | <b>Signal</b>        | <b>Action</b>   |
|---|----------------------|---|
| 'Bring to'                                  |                      | Bring to the hoseline with three turns.<br>* (See Notes).   |
| 'Heave in'                                  | <u>Check away</u>    | Heave in, as the hose end approaches the deck edge lower the temporary guardrail so that it is clear of incoming hoses; pass the second leg of temporary guardrail over the hoses and tend.   |
| Avast heaving'                              | <u>Avast</u>         | Ensuring a dry turn is around the hoseline Break free the pigtail ensuring the bitter end is passed outboard. Cut the stops starting at the hose end and using the pigtail lower the hose end to the deck, clear the pigtail from the hoseline passing the end back outboard. |
| 'Heave in'                                  | <u>Check away</u>    | Heave in and cut each stop as it comes inboard. Using the pigtail walk hoses clear as the stops are being cut, until the bridle ring is within reach of the hose-hanging pendant.   |
| 'Avast heaving – on hose hanging pendant'   | <u>Avast</u>         | Stop heaving on the hoseline. Hook on the hose-hanging pendant with the bill of the hook uppermost.   |
| 'Veer to the hose hanging pendant'          |                      | Veer until the weight is on the pendant. Keep hoseline backed up.   |
| 'Avast veering                              | <u>Connected</u>     | (This signal gives the delivering ship clearance to adjust the hose troughs).   |
| 'On tackles'                                |                      | Attach strops and steadying tackles and haul taut. Tie off the tackles.   |
| 'Connect up' (see Note 1 and Note 2)        |                      | Check hose is not twisted, connect to the fuelling coupling. Open shut off valve.   |
| 'On goggles'                                |                      | All personnel don goggles.  |
| Start pumping'                              | <u>Start pumping</u> | Delivering ship starts pumping.   |
| 'Off Hoseline, (see Note 1 and Note 2)      |                      | Unhook the hoseline from the ring and remove it from the leading blocks, then off turns from the winch.   |
| 'Rig the slip rope' (see Note 1 and Note 2) |                      | Snatch the slip rope into the leading blocks, pass down through the ring and secure to the slip rope slip. Down slack and bring to with two turns to the winch.   |
| 'Heave in'                                  |                      | Heave in until the weight is just off the slip rope, ensuring the weight of the hose remains on the hose hanging pendant.   |

| <b>Order</b>               | <b>Signal</b>  | <b>Action</b>   |
|----------------------------|--|---|
| 'Avast heaving'            |  | The slip rope is to be backed up at all times. Secure temporary guardrail. Clear the area except for men taking fuel samples.   |
| 'Return the hoseline'      | <u>Heave in</u> (Indicating the messenger).                        | Hoseline (hook end first) is returned (via the messenger). If the messenger is still required, return the hoseline using the middle mark. To prevent excessive pull, line should be kept slack but clear of water |
| 'Stop pumping'             | <u>Stop pumping</u>  | Delivering ship stops pumping.  |
| 'Replenishment complete'   | <u>Replenishment complete</u>                                      |   |
| 'Disconnect the Hoses'     |  | Once the hoses have flattened, close the shut off valve, disconnect the hoses, replace hose end fitting, ensure pigtail is attached and clear for return.   |
| 'Off tackles'              |  | Remove tackles and stop(s) and quickly pull clear. Where there is a screen abaft the hose(s) remove the after tackle first.   |
| 'Heave in'                 |  | Heave in on slip rope until the hose-hanging pendant is slack.  |
| Avast.                     |  |   |
| 'Off hose hanging pendant' |  | Unhook the hose hanging pendant and stow clear of the rig. Unrig top temporary guardrail.   |
| 'Surge'                    | <u>Heave in</u>  | Surge the slip rope.* DS will recover the hoses until they are under their derrick head, whilst the RS continues to surge.  |
|                            | <u>Prepare to Trip Pelican Hook(DS)</u><br>(Copied by RS)          |   |
| 'Man the highpoint'        |  | When ordered, highpoint man removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin.  |
|                            | <u>Ready to trip (DS)</u><br><u>Ready to Trip Pelican Hook(RS)</u> |   |
| 'Slip the Slip rope'       | <u>Trip Pelican Hook (DS)</u><br>(Copied by RS)                    | Slip rope is slipped.   |
| 'Recover the slip rope'    |  | Quickly recover the slip rope by hand or power.   |

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| Order   | Signal | Action   |
|---|--------|--|
| 'Up temporary guardrail'  |        | Temporary guardrail is raised and secured. Pay out distance line and telephone cables to their bitter end and light to/let go.(These lines can be returned earlier if required). |
| <p>* It may be necessary initially to veer the slip rope until it has sufficient weight to promote surging. In such circumstances care must be taken to avoid riding turns, and no attempt should be made to veer and surge simultaneously.</p> <p><b>Notes:</b></p> <p>1. <i>During operational sea training and RAS training serials where serial timings are limited, the connection of the fuelling hoses can be deferred until the completion of the rigging of the slip rope and the removal of the hoseline for return.</i></p> <p>2. <i>If teams are worked up and experienced, both the connecting up and rigging of the slip rope may be achieved simultaneously.</i></p> |        |  |

d. **Emergency breakaway (see also Para 07027).** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| Ship             | Order                 | Signal                                  | Action   |
|------------------|-----------------------|---|--|
| Initiating ship. | 'Emergency Breakaway' | <u>Prepare for Emergency Breakaway.</u> | Ancillary lines are automatically returned.<br><u>Receiving ship:</u><br>Close shut off valve, disconnect QRC or break NATO A coupling, remove tackles (Cut strops if necessary).<br>Personnel clear area as tasks are completed.<br><u>Delivering ship:</u> - Stop pumping and prepare for hose return. |
| Delivering ship  |                       | <u>Ready(DS)</u>                        |  |
| Receiving ship   | 'Heave in'            |   | Heave in slip rope until weight is off the hose hanging pendant. (see Note 1).   |



| Ship            | Order              | Signal                                   | Action   |
|-----------------|--------------------|--|--|
| Receiving ship  | 'Off pendant'      |  | Unhook hose-hanging pendant and hold clear of rig, remove top temporary guardrail. (see Note 1). |
| Receiving ship  | 'Ready'            | <u>Ready (RS)</u>                        |  |
| Delivering ship | Execute'           | <u>'Execute Emergency Breakaway (DS)</u> | As soon as both ships are ready.   |
| Receiving ship  | 'Surge'            | <u>'Execute Emergency Breakaway (RS)</u> | Surge slip rope until the hose end is just outboard.   |
| Receiving ship  | Cut the slip rope' |  | Cut the slip rope, recover the slip rope. When clear, up temporary guardrail (see Note 8).       |

**Notes:**

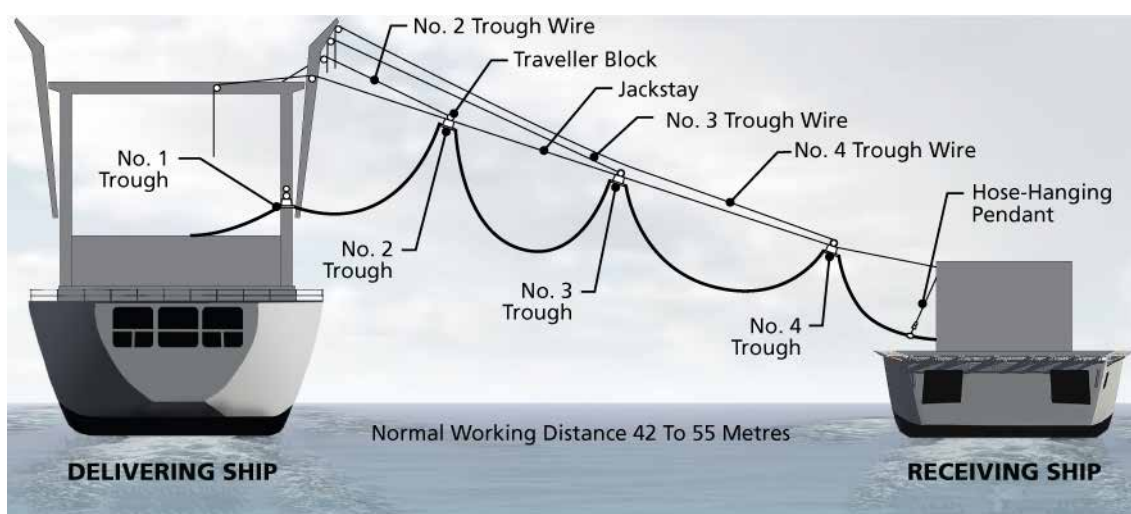
1. *The orders 'Heave in' and 'Off pendant' are not dependent on the delivering ship's Ready signal. The Execute signal is always initiated by the delivering ship.*
2. *If the hoseline is still attached to the messenger the delivering ship can recover the hoseline intact. The receiving ship pays the hoseline back at the 'Prepare' signal.*
3. *If the hoseline has not been removed from the ring then the hoseline itself is used exactly as if it were the slip rope (See EBA drill). This means that when the delivering ship executes the EBA the hoseline is to be cut as soon as the hoses are clear of the ships side.*
4. *If the hoseline has been removed but the slip rope not yet rigged, the hose hanging pendant must be slipped. In this instance the 'Ready' signal is not to be given until the pin of the slip has been removed and the slip is ready for immediate release.*
5. *If the hoseline has been removed and not attached to the messenger, it remains in the receiving ship.*
6. *If the hoseline is in the process of being returned, continue returning.*
7. *If the hoseline or messenger is being returned under the rig: The line must be cut before the main rig is slipped.*
8. *During OST serials, the rig will be returned closer to the derrick head prior to slipping, to avoid constant excessive snatch loading to the station tanker's equipment.*

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**07022. Jackstay fuelling rig**

a. When tankers replenish larger units of the fleet, the jackstay fuelling rig can be used as an alternative to the probe rig which is described later. It gives a greater separation between ships than the large derrick rig. The jackstay fuelling rig is similar to the heavy jackstay rig used for transferring solids except the jackstay carries several travelling blocks to support the hose in troughs (Fig 7-43). The rig consists of a 28mm SWR, 155 metres in length, secured to a slip in the receiving ship. In the delivering ship it is led through blocks at the head and foot of a kingpost and taken to an automatic tensioning winch. The hose is lashed in four troughs; one is shackled to the kingpost and the other three are slung on travellers, which run along the jackstay. Each trough traveller has a recovery wire shackled to it; these wires are led through leading blocks at the head and foot of the kingpost to separate winches.

**Fig 7-43. Jackstay fuelling rig**



b. Initial procedures for passing the rig are identical to those for setting up the heavy jackstay rig. Once the jackstay has been secured and tensioned the hose(s) are hauled across and procedures similar to those for crane/large derrick rig are followed. Details of preparations and drills are as follows.

**c. Jackstay fuelling procedures – preparations (part 1) in the receiving ship**

- (1) Rig gantry, tripod or stump mast. Screw up shackles fully and mouse; tighten nuts and bolts; secure rigging screws with locking nuts.
- (2) Fit NSN 0263/414-9835 slip to the correct eyeplate using NSN 0263/721-6096 shackle (for jackstay), or rig QRD and provide 16mm polypropylene line of suitable length.
- (3) Rig NSN 0263/414-9747 slip using NSN 0263/721-6093 shackle for HHP attachment. (Provide a second NSN 9747 slip if required for slip rope).
- (4) Provide hose hanging pendant.
- (5) Rig NSN 0246/190-6915 blocks using NSN 0263/721-6093 shackles for hoseline lead.
- (6) Provide probe retaining pendant (see Para 07011i sub para (3)). In the event of the gripper sliding to the jackstay terminal link, hook the retaining pendant to the jackstay terminal link and secure the free end of the pendant inboard to hold the jackstay whilst the gripper is reset at the appropriate distance.
- (7) Rig fuel riser, required hose lengths, correct coupling, gauge, and sample tap/hose.
- (8) Rig steadying tackles and strop(s). The strop(s) should be of the bale sling type, long enough to pass around two 6 in hoses. Once rigged the tackles may be secured and left unmanned. Ensure they can be easily removed in an emergency.
- (9) Provide slip rope of 28 mm NFC (length to suit).
- (10) Rig strayline through leading blocks to capstan or winch.
- (11) Provide emergency tools, C spanners, ratchet/socket spanners, chocks or saddle block, drip tray and eye wash bottle at fuelling point.
- (12) Provide jackstay control line.
- (13) Ensure firefighting equipment has been rigged.
- (14) Check power is on the capstan or winch; test for correct running.
- (15) Follow immediately with Part 2 Preparations given in Para 07012.

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d. **Sequence of orders** (in quotation marks) and signals (underlined)

| <b>Order</b>   | <b>Signal</b>   | <b>Action</b>   |
|--|---|---|
|  | Red Bat/Wand  | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.  |
| Prepare the rifle for line throwing' (Safety Officer firing ship)  |   | Prepare the rifle in accordance with BRd 8988.  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|  | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship)   |   |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with BRd 8988.<br>Make the rifle ready in accordance with BRd 8988.<br>Fire the rifle in accordance with BRd 8988. |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)     | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a bolas/heaving line to recover stray gunlines).        |
|  | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.                         |
| 'Haul away'  | <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a large container (bucket) to keep it clear of personnel.          |
| 'Avast hauling'  | <u>Avast</u>  | Order given when hoseline tail in hand.   |
| 'Attach strayline'   |   | Attach bitter end of the hoseline tail to the strayline and check away light to / let go. *   |
| 'Haul away'  | <u>Check away</u>   | Continue hauling.   |
| 'Avast hauling'  | <u>Avast</u>  | Order given when ancillary lines are inboard.   |
| 'Off ancillary lines'  |   | Ancillary lines are removed and passed to their respective parties, (straylines used if necessary).   |
| 'Haul away'  | <u>Check away</u>   | Haul in the hoseline until the weight of the jackstay is on the hoseline.   |

| Order                | Signal                             | Action  |
|----------------------|------------------------------------|---|
| 'Avast hauling'      | <u>Avast</u>                       | Stop hauling.   |
| 'Bring to'           |                                    | Bring the hoseline to the winch/capstan with three turns.   |
| 'Heave in'           | <u>Check away</u>                  | Heave in until the jackstay terminal link is within reach of the slip/QRD.  |
| 'Avast heaving'      | <u>Avast</u>                       | Heaving is stopped when the terminal link is close enough to the connection point to allow a safe connection.   |
| 'Connect Jackstay'   |                                    | Ensuring that the jackstay is free from hoseline twists, the terminal link is correctly attached inboard, cut the remaining stops and break out gripper lanyard.  |
| 'Veer'-'Off Gripper' |                                    | The hoseline is veered until the weight of the jackstay is taken on the slip/QRD and the gripper is removed from the jackstay.  |
| 'Avast veering'      |                                    | Gripper is removed from the hoseline and taken clear of the dump readily available to be passed back on the messenger.  |
|                      | <u>Connected</u><br>Repeated by DS | Informs Delivering ship jackstay is secured to slip/QRD. (This signal gives the Delivering ship clearance to tension the jackstay).   |
| 'Heave in'           | <u>Check away</u>                  | Heave in, as the hose end(s) approaches the deck edge lower the temporary guardrail so it is clear of incoming hoses; pass the second leg of temporary guardrail over the hoses and tend.   |
| 'Avast heaving'      | <u>Avast</u>                       | Ensuring a dry turn is around the hoseline, break free the pigtail ensuring the bitter end is passed outboard. Cut the stops starting at the hose end(s) and using the pigtail lower the hose ends to the deck, clear the pig tail from the hoseline passing the end back outboard. |
| 'Heave in'           | <u>Check away</u>                  | Heave in and cut each stop as it comes inboard. Using the pigtail walk hoses clear as stops are being cut, until the bridle ring is within reach of the hose hanging pendant.   |

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| <b>Order</b>                                  | <b>Signal</b>                              | <b>Action</b>  |
|---|--|--|
| 'Avast heaving'.<br>'On hose hanging pendant' | <u>Avast</u>                               | Stop heaving on the hoseline. Hook on the hose-hanging pendant with the bill of the hook uppermost.  |
| 'Veer to the hose hanging pendant'            |  | Veer until the weight is on the pendant. Keep hoseline backed up.  |
| 'On tackles'                                  |  | Attach strops and steadying tackles and haul taut. Tie off the tackles.  |
| 'Connect up' (see Note 1 and Note 2)          |  | Check hoses are not twisted, connect to the fuelling couplings. Open shut off valves.  |
| 'On goggles'                                  |  | All personnel don goggles.   |
| 'Start pumping'                               | <u>Start pumping</u>                       | Delivering ship starts pumping.  |
| 'Off Hoseline' (see Note 1 and Note 2)        |  | Unhook the hoseline from the ring and remove it from the leading blocks, then off turns from the winch.  |
| 'Rig the slip rope' (see Note 1 and Note 2)   |  | Snatch the slip rope into the leading blocks, pass down through the ring and secure to the high point. Down slack and bring to with two turns on the winch.      |
| 'Heave in'                                    |  | Heave in until the weight is just off the slip rope, ensuring the weight of the hose remains on the hose hanging pendant.  |
| 'Avast heaving'                               |  | The slip rope is to be backed up at all times.   |
| 'Attach hoseline to the messenger'            |  | Given when the messenger is no longer required. Attach the shackle on the gripper to the hook on the hoseline, then the hook onto the soft eye of the messenger. |
| 'Check away Messenger'                        | <u>Heave in</u> (indicating the messenger) | To prevent excessive pull, line should be kept slack but clear of the water. Stop to remove ships stray line before letting go.                                  |
| 'Stop pumping'                                | <u>Stop pumping</u>                        | Delivering ship stops pumping.   |
| 'Replenishment Complete'                      | <u>Replenishment complete</u>              |  |
| 'Disconnect the Hoses'                        |  | Once the hoses have flattened, close the shut off valves, disconnect the hoses, replace hose ends fittings ensuring pigtail is attached and clear for return.    |

| Order                                    | Signal  | Action  |
|--|---|---|
| 'Off tackles'                            |   | Remove tackles and strop(s) and quickly pull clear. Where there is a screen abaft the hose(s) remove the after tackle first.  |
| 'Heave in'                               |   | Heave in on slip rope until the hose hanging pendant is slack.  |
| 'Avast,                                  |   | Avast heaving.  |
| 'Off pendant'                            |   | Unhook the hose hanging pendant and stow clear of the rig. Unrig top temporary guardrail.   |
| 'Surge Slip rope' *                      | <u>Heave in</u>   | Surge the slip rope, until the hose ends are outboard. *  |
|  | <u>Avast</u>  | Signal passed to direct consort to stop recovering hoses.   |
| 'Slip/Cut the Slip rope'                 |   | Slip rope is slipped.   |
| 'Heave in'.                              |   | Heave in and recover slip rope.   |
|  | <u>Heave in</u>   | Delivering ship continues to heave in hoses.  |
| 'Man the highpoint'                      | Prepare to trip Pelican hook (DS)<br>(copied by RS)     | As the jackstay detentions, when ordered, highpointman removes the mousing, places the hammer against the inboard face of the buckler link, removes the pin and takes the QRD lanyards in hand. |
|  | Ready to trip Pelican hook (DS) / (RS)                  | Signal given when ready and safe to do so.  |
|  | Trip Pelican hook (DS)<br>(copied by RS)                |   |
| 'Slip'                                   |   | Jackstay is slipped   |
| 'Up temporary guardrail'                 |   | Temporary guardrail is raised immediately after the jackstay has passed outboard.   |
| 'Return distance line/ telephone cables' | Indicate lines mentioned and signal ' <u>Heave in</u> ' | Pay out distance line and telephone cables to their bitter ends and light to/let go. These lines can be returned earlier if approved by the Captain.  |

\* It may initially be necessary to veer the slip rope until it bears sufficient weight to promote surging. In such circumstances care is to be taken to avoid riding turns, and no attempt should be made to veer and surge simultaneously.

**Notes:**

1. During operational sea training and RAS training serials where serial timings are limited, the connection of the fuelling hoses can be deferred until the completion of the rigging of the Slip rope and the removal of the hoseline for return.

2. If teams are worked up and experienced, both the connecting up and rigging of the slip rope may be achieved simultaneously.

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e. **Emergency breakaway (see also Para 07027).** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the command. The procedure is as follows:

| Ship            | Order                 | Signal                                  | Action   |
|-----------------|-----------------------|---|--|
| Initiating ship | 'Emergency Breakaway' | <u>Prepare for Emergency Breakaway.</u> | Ancillary lines are automatically returned.<br><u>Delivering ship:</u> Automatically stops pumping and prepare to recover hoses and jackstay.<br><u>Receiving ship:</u><br>Close shut off valves, disconnect QRC or break NATO A coupling, remove tackles (Cut strops if necessary).<br>Heave in on slip rope, remove hose hanging pendant stow clear.<br>Clear top guardrail.<br>Surge slip rope until line is slack or hoses are outboard.<br>Cut slip rope, recover slip rope |
| Receiving ship  | 'Ready'               | <u>Ready</u>                            | This signal is <u>ONLY</u> given when the hose is fully ready for safe recovery.   |
| Delivering ship | 'Recover the hose'    |   | When the 'Ready' signal has been given by the RS, and not before, DS recovers the hoses and de-tensions the jackstay.  |
| Delivering ship |                       | <u>Ready</u>                            |  |
| Receiving ship  |                       |   | As the jackstay de-tensions, highpointman removes the mousing, place hammer against the buckler link and removes the pin / takes QRD lanyards in hand.<br>Drop temporary guardrail.<br>Dump area is cleared.   |
| Delivering ship | Execute               | <u>'Execute Emergency Breakaway</u>     | When hoses are recovered and jackstay de-tensioned.  |
| Receiving ship  | 'Slip'                | <u>'Execute Emergency Breakaway</u>     | Slip the jackstay.<br>Re-rig temporary guardrail.  |



**Notes:**

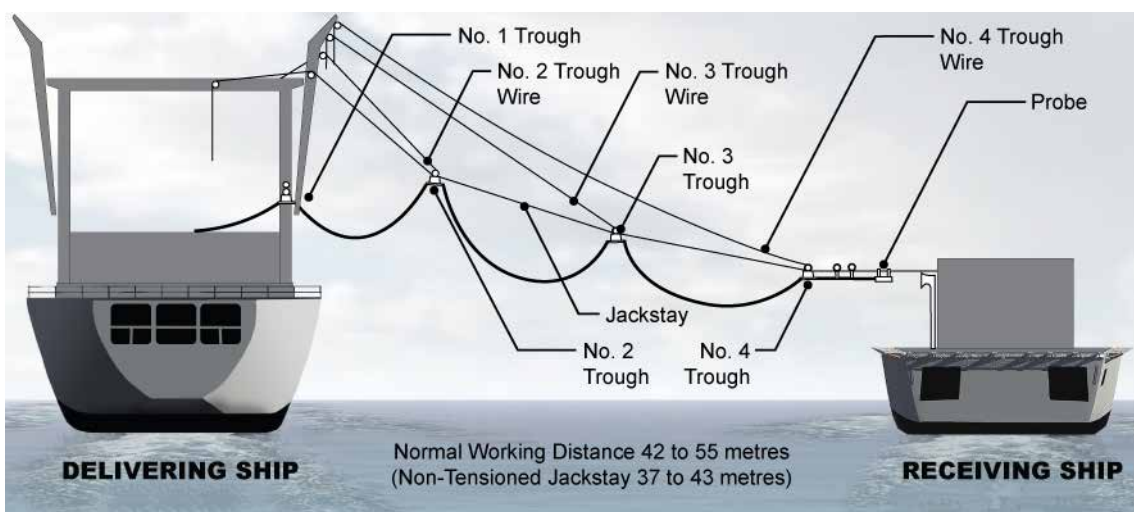
1. *If the messenger is still attached to the hose line the delivering ship can recover the hose line intact. The receiving ship pays the hose line back at the 'Prepare' signal.*
2. *If the hose line has not been removed from the ring then the hose line is used as the slip rope (See EBA drill).*
3. *If the hose line has been removed but the slip rope not yet rigged, the hose hanging pendant must be slipped prior to the 'READY' signal being given.*
4. *If the hose line has been removed and not attached to the messenger it remains in the Receiving ship.*
5. *If the hose line is in the process of being returned, continue returning.*
6. ***If the hose line or messenger is being returned under the rig: The line must be cut before the jackstay is slipped.***

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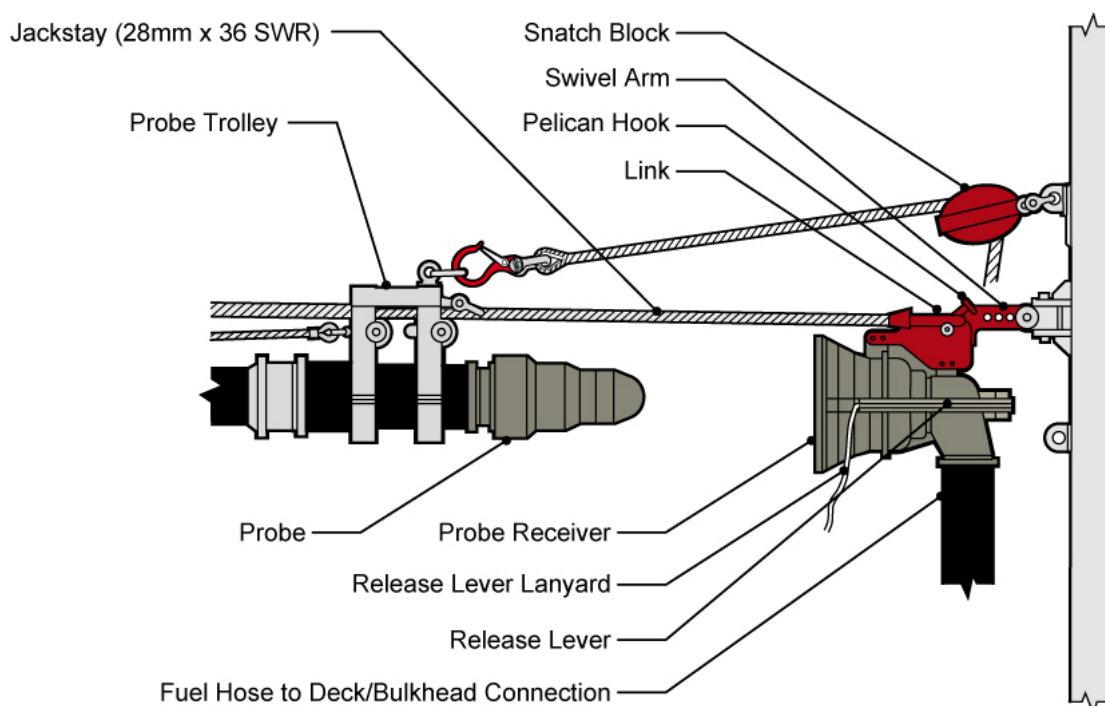
**07023. Probe fuelling rig**

a. The probe rig (Fig 7-44) is almost identical to the jackstay fuelling rig except that the end 4.5 metres length of hose is fitted with a probe which mates into the probe receiver in the receiving ship (Fig 7-45). The system, which allows for speedier replenishment with safer working areas on deck, is now the most commonly used method of fuelling. For this rig the derrick is latched back into the kingpost and not topped out as for the orthodox large derrick rig. The jackstay, distance line, messenger and telephone cables are passed to the receiving ship in the same manner as for the jackstay fuelling rig and the end link of the jackstay is secured to the pelican hook on the probe receiver. When the jackstay has been set up, the probe is hauled across on the jackstay by the receiving ship and engaged into the probe receiver.

**Fig 7-44. The probe rig**



**Fig 7-45. Probe and receiver assembly**



b. **The probe.** The probe is mounted on the outboard end of a probe tube, the other end of which is connected to the outboard end of the 4.5 metres length of hose. The probe tube is mounted on the underside of the probe trolley, which runs on the jackstay. The trolley is hinged so that it can be easily fitted to the jackstay without dismantling. The probe is fitted with latching mechanisms which lock it into the probe receiver, by spring force. A pulling force of approximately one-tonne is required to separate the probe from the receiver should it be necessary to disengage in emergency.

c. **The probe receiver.** The probe receiver consists of an angled bell-mouthed assembly supported by a swivel arm, which permits the receiver to pivot in the vertical and horizontal directions to align with the probe and to allow for movement between the two ships. The receiver is connected to a deck or bulkhead connection on the receiving ship's fuel system by a length of flexible hose. Correct engagement of the probe is shown by small indicator arms (flags), which rise to an angle of 30° and fall to the stowed (horizontal) position when the probe is disengaged.

**Notes.**

1. *The height of the pelican hook above the deck and the length of the swivel arm may make it difficult to work on the pelican hook from the deck or the high point. It is advisable to provide a box or steps for the rating attaching the pelican hook to stand on.*

2. *It is easier to attach the jackstay to the pelican hook if the receiver is held upwards by the dump party or, if practical, a small tackle. This tackle, however, must be removed before the 'Connected' signal is given.*

d. **Preparations (part 1) in the receiving ship**

(1) Rig the gantry or stump mast. Mouse all shackles; tighten nuts; provide locking nuts on rigging screws.

(2) Check that split pins are in the nuts and bolts of the probe receiver; that indicator flags are working correctly and washers are inserted above and below the swivel joint. Check the pelican hook is fitted with an 'R' clip and operates correctly; remove the stowage pendant and cap from the receiver; ensure that hose is correct length and joints are fully tightened.

(3) Rig NSN 0246/190-6915 blocks using NSN 0263/721-6093 shackles for the hoseline lead. Reeve the strayline through the blocks to the capstan or winch.

(4) Provide a remating line and retaining pendant (see Para 07011i sub para (2) and sub para (3)).

(5) Provide goggles for all personnel at risk from fuel spillage or fuel atomisation.

(6) Ensure firefighting equipment has been rigged.

(7) Test power on the capstan or winch, and check correct running.

(8) Provide jackstay control line.

(9) Follow immediately with Part 2 Preparations given in Para 07012.

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e. **Mating.** If mating does not occur at the first attempt there may be an obvious reason for failure such as a turn of hose line round the jackstay or insufficient impetus; or the receiver may be fouled by a bight of hose line. If such is the case, rectify the fault and signal the delivering ship to heave in until the hose is about three metres clear of the receiver. Then signal avast followed by check away and attempt to mate again. If mating still does not occur, consider the following points:

- (1) Are the indicator arms working correctly? Were pre-use checks properly carried out? If the indicator arms are poorly maintained, they may fail to indicate that mating has occurred.
- (2) Is the leading block directly above the probe on the correct eyeplate? If it is attached to the wrong eyeplate the incorrect lead will pull the probe out of line and prevent mating.
- (3) The delivering ship will hold the probe approximately five metres outboard of the receiving ship to allow the slack in the hoseline to be recovered.
- (4) Are the ships the optimum distance apart? Reducing the distance will usually give a better chance of mating because the angle of the jackstay will be steeper.
- (5) With the smaller jackstay used by some foreign tankers, the probe trolley wheels may have to be reversed top for bottom to provide the correct entry angle. This can only be undertaken by the delivering ship.

If there is no apparent reason for failure to mate an attempt should be made by heaving in handsomely on the hoseline.

f. **Gravity probe method.** Some foreign tankers favour a method whereby the probe is mated by force of gravity and the hoseline (inboard end) is retained in the tanker and recovered at 'Start pumping'. This method may be used in RN/RFA fuellings after agreement from the RFA Master provided the angle between the highpoints is deemed sufficient to facilitate easy mating. Details can be found in ATP 16.

g. **Probe conversion to jackstay fuelling.** If problems continue with mating there may be a need to convert the rig to the fall-back facility of jackstay fuelling using the NATO 'B'. If this is the case, then to achieve this, the actions contained in Annex 7E are to be carried out.

h. **Orders and signals.** Orders are shown in quotation marks and signals are underlined.

| Order  | Signal  | Action   |
|--|---|--|
|  | Red Bat/Wand  | During approach, Red bat/wand held aloft in firing ship to indicate dump area and in non-firing ship to indicate position gunline is required.                           |
| Prepare the rifle for line throwing' (Safety Officer firing ship).   |   | Prepare the rifle in accordance with <b>BRd 8988.</b>  |
|  | <u>One whistle blast</u><br>(Safety Officer firing ship)        | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.  |
|  | <u>Two whistle blasts</u><br>(Safety Officer non-firing ship)   |  |
| 'With a magazine of one round, load' (Safety Officer firing ship)<br>'Make ready' (Safety Officer firing ship)<br>'Fire when ready' (Safety Officer firing ship) |   | Load the rifle in accordance with <b>BRd 8988.</b><br><br>Make the rifle ready in accordance with <b>BRd 8988.</b><br>Fire the rifle in accordance with <b>BRd 8988.</b> |
|  | <u>Three whistle blasts</u><br>(Safety officer firing ship)     | Safety Officer in non-firing ship orders men to break cover and retrieve gunline (using a heaving line / bolas to recover stray gunlines).                               |
|  | <u>Three whistle blasts</u><br>(Safety Officer non firing ship) | This signal is only given if gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.  |
| 'Haul away'  | <u>Check away</u>   | Receiving ship hauls in the gunline, clearing the surplus from the deck into a large container (bucket) keeping it clear of personnel.                                   |
| 'Avast hauling'  | <u>Avast</u>  | Order given when hoseline tail in hand.  |
| 'Attach strayline'   |   | Attach bitter end of the hoseline tail to the strayline and check away and light to/let go.  |
| 'Haul away'  | <u>Check away</u>   | Continue hauling.  |
| 'Avast hauling'  | <u>Avast</u>  | Order given when ancillary lines are inboard.  |
| ' Off ancillary lines'   |   | Ancillary lines are removed and passed to their respective parties, (straylines used if necessary).  |
| 'Haul away'  | <u>Check away</u>   | Haul in the hoseline until the weight of the jackstay is on the hoseline.  |

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**REPLENISHMENT AT SEA**

| <b>Order</b>                       | <b>Signal</b>                      | <b>Action</b>   |
|------------------------------------|------------------------------------|---|
| 'Avast hauling'                    | <u>Avast</u>                       | Stop hauling.   |
| 'Bring to'                         |                                    | Bring hoseline to the winch / capstan with three turns. (see Note)  |
| 'Heave in'                         | <u>Check away</u>                  | Heave in until the jackstay terminal link is within reach of the Pelican hook.  |
| Avast heaving'                     | <u>Avast</u>                       | Heaving is stopped when the terminal link is close enough to the pelican hook to allow a safe connection.   |
| 'Connect the jackstay'             |                                    | Ensuring that the jackstay is free from twists with the hoseline, the terminal link is correctly attached inboard, cut remaining stops and break out the gripper lanyard.   |
| 'Veer' – 'Off Gripper'             |                                    | The hoseline is veered until the weight of the jackstay is taken on the pelican hook and the gripper is removed from the jackstay.  |
| 'Avast veering'                    |                                    | Gripper is removed from the hoseline and taken clear of the dump, made up ready for return on the Messenger.  |
|                                    | <u>Connected</u><br>Repeated by DS | Informs Delivering ship that jackstay is secured to the pelican hook. (This signal gives the Delivering ship clearance to tension the jackstay).  |
| 'Heave in'                         | <u>Check away</u>                  | Delivering ship tensions the jackstay and checks away on the recovery line as the Receiving ship heaves in on the hoseline. Continue to heave in on the hoseline until the probe engages in the receiver and the indicator flags rest at 30°. |
| 'Avast'                            | <u>Avast</u>                       | Stop heaving on hose line.  |
| 'Veer hoseline'                    |                                    | The hoseline is veered until all the weight is removed, to confirm the probe has mated correctly.   |
| 'On goggles'                       |                                    | All personnel don goggles.  |
| 'Start pumping'                    | <u>Start pumping</u>               | Delivering ship starts pumping.   |
| 'On remating line, off Hoseline'   |                                    | Once positive pressure is achieved the remating line is rigged, remove the hoseline from the blocks and prepare for return.   |
| 'Attach hoseline to the messenger' |                                    | Given when the messenger is no longer required. Attach the shackle on the gripper to the hook on the hoseline, then the hook on the soft eye of the messenger.  |

| <b>Order</b>                               | <b>Signal</b>  | <b>Action</b>  |
|--|--|--|
| 'Check away the Messenger                  | <u>Heave in</u> (Indicating the messenger)               | To prevent excessive pull, line should be kept slack but clear of the water.   |
| 'Stop pumping'                             | <u>Stop pumping</u>                                      | Delivering ship stops pumping. Remove remating line.   |
| 'Replenishment complete'                   | <u>Replenishment complete</u>                            |  |
| 'Release probe'                            |  | Allow hoses to drain, then remove pin from probe-release lever and operate lever.  |
|  | <u>Heave in</u>  | Delivering ship heaves in on the recovery wire taking the probe back inboard. The probe release lever is reset. The jackstay is then de-tensioned.   |
| 'Man the highpoint'                        | Prepare to trip Pelican hook (DS) (copied by RS)         | When ordered, highpointman places the hammer against the inboard face of the buckle link and removes the 'R' clip.                                   |
| 'Clear the dump, down temporary guardrail' |  | Dump is cleared of all personnel then temporary guardrail is lowered.  |
|  | Ready to trip Pelican hook (RS) / (DS)                   | Signal given when ready.   |
|  | Trip Pelican hook (DS) (copied by RS)                    |  |
| 'Slip'                                     |  | Jackstay is slipped  |
| 'Up temporary guardrail'                   |  | Temporary guardrail is raised immediately after the jackstay has passed outboard.  |
| 'Return distance line / telephone cables'  | Indicate lines mentioned and signal ' <u>Heave in</u> '. | Pay out distance line and telephone cables to their bitter ends and light to/let go. These lines can be returned earlier if approved by the Captain. |

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**REPLENISHMENT AT SEA**

i. **Emergency breakaway (see also Para 07027).** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent, the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; coils are not to be thrown overboard as the snatch loading may cause injury to men recovering lines in the delivering ship; any line that fouls must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| Ship            | Order                 | Signal                                  | Action   |
|-----------------|-----------------------|---|--|
| Initiating ship | 'Emergency Breakaway' | <u>Prepare for Emergency Breakaway.</u> | Ancillary lines are automatically returned.<br><u>Delivering ship:</u> - Stop pumping and prepare to recover hoses and jackstay.<br><u>Receiving ship:</u><br>Remove / cut remating line / hoseline / retaining pendant.<br>Operate probe release lever.<br>Personnel clear area as tasks are completed. |
| Receiving ship  |                       | <u>Ready</u>                            | Delivering ship recovers the hose.   |
| Delivering ship |                       | <u>Ready</u>                            | When probe is recovered and jackstay de-tensioned.   |
| Receiving ship  |                       |   | When jackstay de-tensions, place hammer against the buckler link, out 'R' clip, clear the dump, down temporary guardrail.  |
| Delivering ship | 'Execute'             | Execute emergency Breakaway             | As soon as both ships are ready.   |
| Receiving ship  | 'Slip'                | Execute emergency Breakaway             | Trip pelican hook. Quickly re-rig temporary guardrail when jackstay is clear.  |

**Notes:**

1. ***If the hoseline is being returned:*** Return is to continue and the hoseline is to be paid out to the end and let go.
2. ***If all the hoseline is in receiving ship:*** The messenger is to be paid out to the end and let go; hoseline is to remain in the Receiving ship.
3. ***Remating line/retaining pendant.*** In the event of an emergency breakaway, the remating line/Retaining Pendant should be removed if time permits. If not, it must be cut.
4. ***If the hose line or messenger is being returned under the rig:*** The line must be cut before the main rig is slipped.



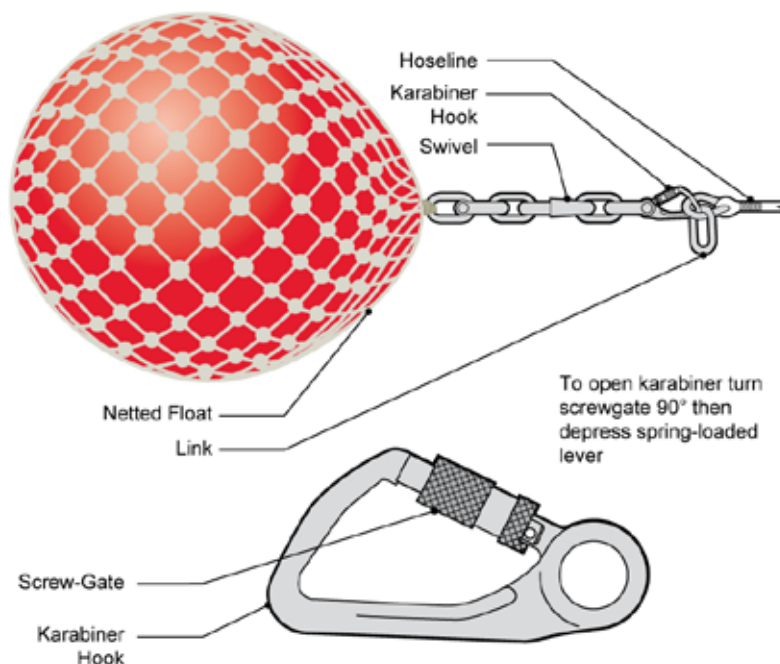
**07024. Additional factors to consider when fuelling abeam**

- a. The distance line and telephones may be returned earlier to suit the requirements of the Command. They are recovered by indicating the line in question with an Amber bat in one hand and signalling 'Heave in' with a Red bat in the other hand.
- b. If it is intended to return the hoseline diagonally under the rig, it is advisable to have a pre-positioned strayline passing under the fuelling point outboard to enable the messenger end to be transferred to the hoseline return position.
- c. A portable telephone connection is required in the receiving ship to enable the connecting point to be taken to the telephone cable without the latter crossing the rig.
- d. If the slip rope is to be cut apply a whipping outboard of the intended cutting point to prevent the end fraying.
- e. When controlling the hose-ends inboard it is important to keep tension on the pigtail to prevent the hose-ends striking the deck and sustaining damage (a fender can be provided if appropriate).
- f. The pigtail is used by the delivering ship to recover the hose-ends safely. It should remain attached to the cone/blanking plate (which in turn is attached to the hose) throughout the replenishment, and be kept clear for running outboard. If it has to be removed to facilitate removal of the cone/blanking plate, it must be reattached before the rig is returned.
- g. For NATO B couplings it is best to introduce the first bolt at the top (12 o'clock) position in the connection. The use of ratchet spanners improves connecting times. The 'weakened groove' in these couplings must be firmly supported by chocks to enable it to be broken easily in the event of an emergency.
- h. Once the hose has pressurised and a sample taken, the pressure should be adjusted by signal to achieve the maximum possible fuelling rate.
- i. In some circumstances it is easier and safer to attach the inboard end of the slip rope to a slip instead of taking a round turn and two half hitches to a strong point. If this option is chosen, an additional 9747 slip should be shackled to a tested eyeplate. The slip securing pins are to be inserted from outside in, thus ensuring easy access for removal. A 20cm reduced soft eye should be spliced at the end of the slip rope and served. This method should not be used with foreign tankers where the hose line remains attached to the bridle ring during return. Slip ropes should always be cut during an emergency breakaway.
- j. In the event of a bat or wand signal being sent and the recipient not being ready then the 'Avast' signal is passed followed by the correct signal when ready to continue. This is particularly relevant during the disengaging phase of the replenishment. This procedure should not be used during an EBA.

07025. Introduction to fuelling by the astern method

a. In the astern method the tanker streams a buoyant hose, which is brought on to the fo'c'sle of the receiving ship. There are two methods of passing the end of the hose from the tanker to the receiving ship: the float method, in which the tanker streams the hoseline and hose, and the receiving ship grapples the float on the end of the hoseline and then hauls in the end of the hose; and the gunline method, in which the tanker streams a bight of hose and the receiving ship approaches close enough to the tanker's quarter to receive a gunline by which the end of the hose is transferred. The float method is easier and safer, and with the introduction of the netted float (Fig 7-46) to replace the traditional metal spout float the likelihood of damage to bow dome-fitted ships carrying out the float method has been eliminated; consequently all RFAs now supply the float rig only. However, it is possible, although unlikely, that the gunline rig may be supplied by tankers of other NATO countries, and drills for this method are laid down in ATP-16; drills and procedures for the float method are explained in Para 07026.

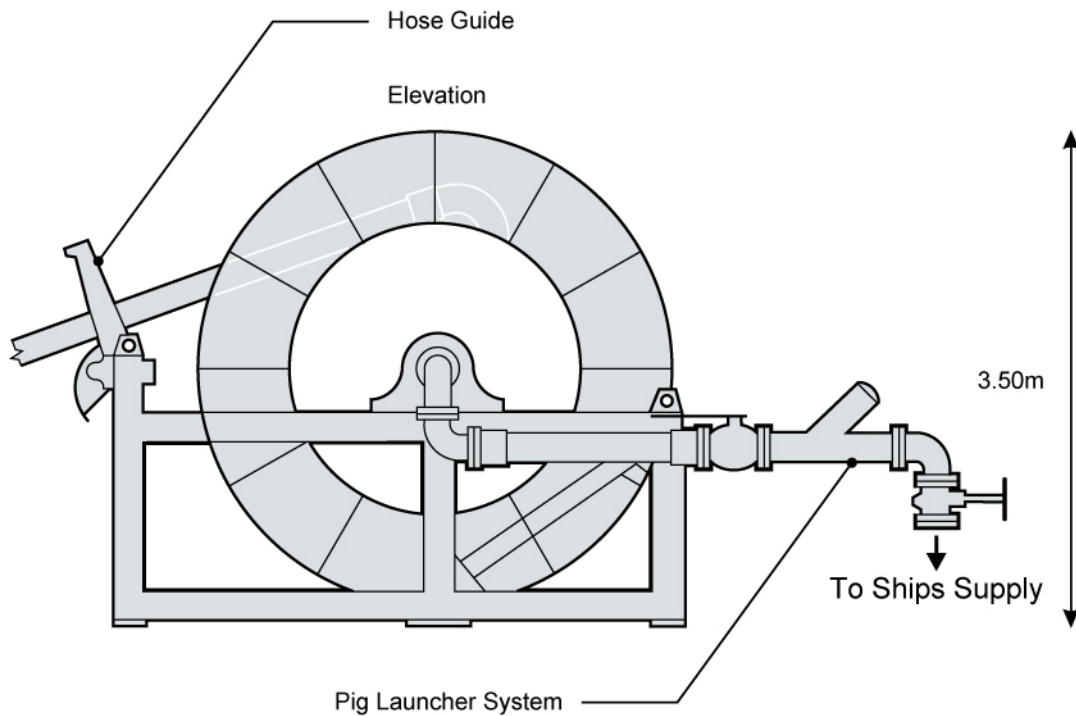
Fig 7-46. Netted float for astern fuelling



b. **NATO reelable astern rig (Hudson reel).** Until recently, all astern fuelling rigs were laid out on the deck of the delivering ship prior to the evolution. Whilst this is still common practice in many tankers, an electrically powered reel capable of stowing and deploying a continuous 'lay flat' 150mm hose of the appropriate length, has been introduced into service and is presently fitted in RFAs FORT VICTORIA, WAVE KNIGHT and WAVE RULER. This rig (Fig 7-47), known as the NATO Reelable Astern Rig, greatly simplifies procedures in the delivering ship and can be used for both float and gunline methods. Procedures in the receiving ship are unchanged with the exception of the requirement to clean through the hose on completion of fuelling with a 'poly-pig'. A description of this procedure is given in Para 07026 sub para e.

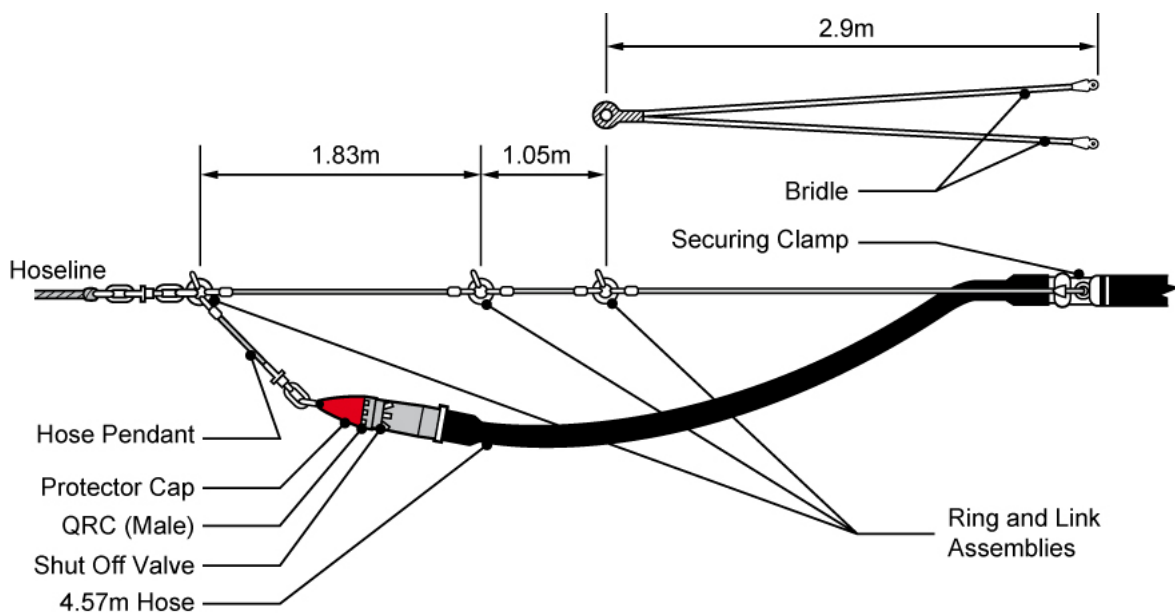
**Note.** Receiving ships should be aware that to facilitate the passing of the 'poly-pig', no shut-off valve is fitted to the end of the Hudson Reel rig.

Fig 7-47. NATO reelable astern rig



c. **Hose-end arrangements for astern fuelling** (Fig 7-48). A securing clamp is fitted at the connection of the outboard 4.5 metres length of hose and a two-legged bridle is shackled to the clamp. Two bridle pendants incorporating three ring-and-link fittings and a swivel connect the bridle to the hoseline. The hose-end is attached to the last ring and link fitting by a hose pendant. (A quick-release coupling is normally used for RFA/RN astern fuelling; however, the breakable spool coupling is supplied by all other NATO tankers).

Fig 7-48. Astern fuelling – hose end arrangements for astern fuelling



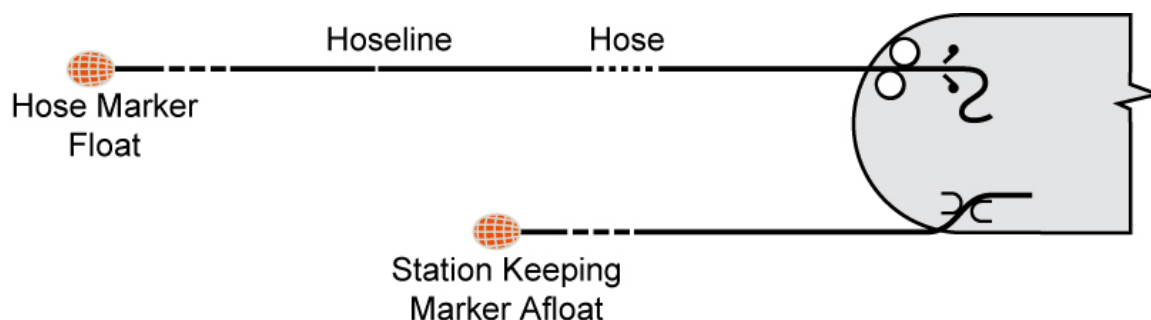
**Note.** A shut-off valve is not fitted to the end of the Hudson Reel Rig.

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**07026. Astern fuelling – float method**

a. The tanker streams from her stern a netted float which identifies the end of the rig and helps keep it near the surface. Attached to the float is a hoseline of 80m of 21mm braidline tailed with 30 metres of 14mm SWR, connected to the bridle ring of the hose. The length of hose streamed by the tanker depends on the type of ship being refuelled, and prevailing weather conditions (See Para 07006). The tanker also streams a marker buoy on which the receiving ship keeps station. The distance to which the marker buoy is veered is adjusted to allow a deep bight in the hose when it is connected in the receiving ship. The bight allows for slight errors in station keeping. Fig 7-49 shows the rig streamed.

**Fig 7-49. Fuelling astern by the float method – rig streamed by tanker**



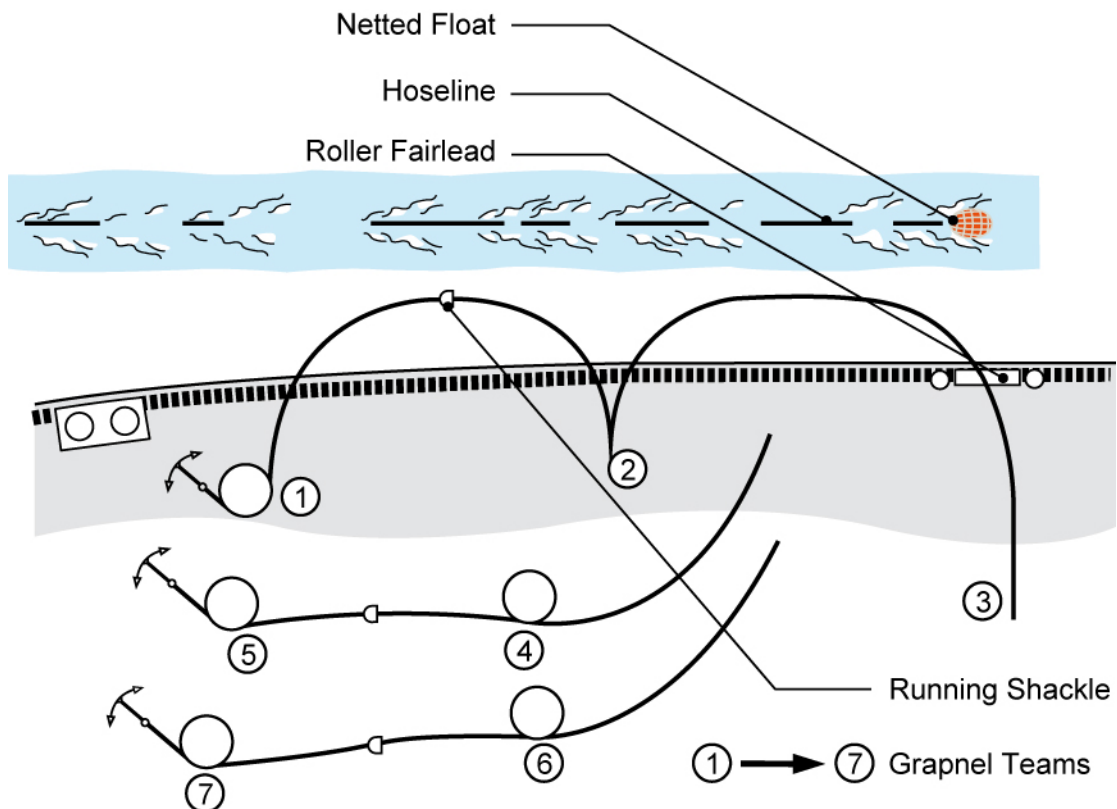
b. **Preparations (part 1) in receiving ship (float method)**

- (1) Attach NSN 0263/414-9747 slip to eyeplate using NSN F217/721-6092 shackle, in accordance with ship's drawings.
- (2) Provide hose securing pendant and attach it to slip. Ensure pendant is of the correct length.
- (3) Rig NSN 0263/770-9716 roller shackle(s) using NSN F217/721-6094 straight screw shackle(s) to secure to eyeplate(s) in accordance with ship's drawings.
- (4) Provide three grapnels (creepers) and three x large bow shackles (0263/721-6113) on 40 metre x 16 mm polypropylene lanyards.
- (5) Rig additional NSN 9747 slip for slip rope (required only if it is intended to slip, not cut, the slip rope).
- (6) Provide slip rope of 28 mm NFC (length to suit), and a suitable length of line to hold the hose-end netted float outboard until the hoseline has been disconnected.
- (7) Rig steadying tackles and strops. The strops should be of the bale sling type. It should be possible to slip the tackles from either side.
- (8) Provide inhaul line, (16 mm polypropylene or 21 mm braidline length to suit) with a hard eye one end, fitted with a NSN 6090 shackle. This line is used to transfer the lead of the hoseline to the winch or capstan.
- (9) Provide a good supply of robust NFC stops for general use and to stop the hoseline outboard ready for return.

- (10) Provide 'sliding' shot mat (0350-99-923/3869) with hauling tails.
- (11) Provide two wooden handspikes. (Used if the hose fouls on the Roller Fairlead).
- (12) Rig fuel riser, correct coupling (check it is operable) and sample tap/hose.
- (13) Provide sledge hammer, axe, C spanners, ratchet/socket set spanners (NATO 'B' only), chocks or saddle block, drip tray and eyewash bottle.
- (14) Ensure firefighting equipment has been rigged.
- (15) Check power on capstan or winch and test for correct running.
- (16) Follow immediately with relevant Part 2 preparations given in Para 07011.

c. **Execution and general comments.** Three grapnel teams should always be provided with gear made up ready to throw. In each team one man holds the grapnel, a second tends the weighted bight and the third passes the disengaged end through the roller fairlead and acts as lead man of the lanyard party. During the approach phase grapnel team No 1 should take up position adjacent to the roller fairlead; the second and third teams should make up their gear, stand directly in rear of team number one and be ready to move up and replace the previous team if they fail to grapple the hoseline (Fig 7-50). Grapnels used for astern fuelling evolutions do not require a SWR chafing piece.

**Fig 7-50. Arrangements of grapnel teams for astern fuelling**



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d. **Shiphandling guidance**

(1) When carrying out a Float (Grapnel) method of astern fuelling, the ship should approach to a point where the hoseline float is 4-6 metres abeam and 20 metres abaft the roller fairlead. When the ship is settled, the float should be closed to within 2-4 metres to allow the hoseline to be grappled

| <b>Order</b>                       | <b>Signal</b> | <b>Action</b>   |
|------------------------------------|---------------|---|
| 'Throw the Grapnel'                |               | Grapnel is deployed to straddle the hoseline, ensuring the weighted running shackle remains between the hoseline and the ship's side.   |
| 'Haul away'                        |               | Haul away grapnel lanyard bringing a bight of the hoseline inboard of roller fairlead.  |
| 'Avast Hauling'                    |               | Hauling is stopped, hoseline is backed up.  |
| 'Off Grapnel'                      |               | The grapnel is to be removed from the hoseline, and taken clear of the dump area.   |
| 'Haul away on the hoseline'        |               | Haul in hoseline until the float is outboard of the roller fairlead.  |
| 'Avast hauling - remove the float' |               | <b>The float must not be brought inboard.</b><br>Hauling of the hoseline is ceased to allow the safe removal of the float from the hoseline. Once un-hooked the float is then brought inboard and clear of the dump area. |

**Notes:**

1. *Good Conditions*

- a. *After successful removal of the float, remove the pre-rigged inhaul and lead the disengaged end of the hoseline through the roller shackle(s).*
- b. *With the ship beginning to come ahead the majority of the hoseline can be hauled in by the deck team working between the roller fairlead and the first lead block.*
- c. *Once the wire hoseline tail is visible however, it is to be brought too (three turns) and heaved in.*

2. *Marginal Conditions*

- a. *In marginal conditions, having pre-rigged the inhaul line, attach shackle direct to delivering ship's hoseline link, take down all slack and bring to.*
- b. *Transfer weight of the rig to inhaul line, take off the float, prepare to heave in.*

(2) Once the hoseline is in hand and the float has been removed the distance between ship and hoseline should be opened between 6-9 metres. Speed is now increased by about 1 knot, maintaining the hoseline at an angle of 90°-120° to the fore-and-aft line of the ship as the hoseline is hove in and the hose brought inboard.

| Order                               | Signal           | Action   |
|-------------------------------------|------------------|--|
| 'Haul away / Heave in'              |                  | Advise the bridge to start moving ahead, commence hauling in/heaving in on the hoseline. An angle of between 90°-120° on the bow is to be maintained whilst the hoseline is being brought inboard. If this is not achieved due to the ship losing position, hauling/heaving is to be ceased until the correct conditions are available.<br>Hoseline might need to be checked away/veered throughout this process.                              |
| 'Heave in'                          |                  | Ensuring that the hose securing clamp remains outboard of the roller fairlead. Heave in the hoseline to bring the hose-end through the roller fairlead. Continue to heave in until the required bridle ring and link assembly is within reach of the hose securing pendant. Handspikes are only to be used to assist the hose end through the roller fairlead. A sliding shot mat is to be used to fleet the hose end to the connection point. |
| 'Avast heaving'                     |                  | Heaving is ceased on the hoseline.   |
| 'On hose securing pendant'          |                  | Connect the hose securing pendant to appropriate elongated link on the bridle ring and link assembly (three link option).  |
| 'Veer to the hose securing pendant' |                  | Veer hoseline until the weight is on the hose securing pendant.  |
| 'Connected'                         | <u>Connected</u> |  |
| 'Rig steadying tackles'             |                  | Rig steadying tackles.<br>(For ship handling purposes the bridge is informed once this is completed).  |

(3) Once the hose is inboard and connected and the steadying tackles secured, the ship should open further to 12 metres from the hose and then adjust the fore and aft position to maintain a shallow (walking stick) bight of hose in the water (approximately 30 metres). If the bight of either the hoseline or hose grows too large, then speed must be reduced as damage to the rig can occur. The marker float provides a relative datum and will therefore not necessarily be in line with the Bridge when the ship is in the correct position for the hose. Once the hose is connected, the delivering ship may be requested to adjust the station marker to assist station keeping.

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| <b>Order</b>   | <b>Signal</b>                                     | <b>Action</b>  |
|--|---|--|
| 'Connect up' (see Note 1 and Note 2)                         |   | Check hose is not twisted, connect to the fuelling coupling, position drip tray, open shut off valve. (Not Hudson reel)  |
| 'On goggles'   |   | All personnel don goggles.   |
| 'Start pumping'  | <u>Start pumping</u>                              | Delivering ship starts pumping.  |
| 'Off Hoseline, rig the slip rope'<br>(see Note 1 and Note 2) |   | Remove the hoseline and rig the slip rope through the hose bridle ring furthest from the clamp. Bring the slip rope too with two turns and heave in until just before it takes the weight. Keep the slip rope manned throughout the fuelling.  |
| 'Rig the hoseline for return'                                |   | Bring the wire end of the hoseline back through the roller fairlead and stop it to a deck fitting adjacent to the hose (do not re-connect at this stage). Stop the hoseline in large bights over the side to suitable deck fittings; working forward to aft, ensuring the first bight will not be fouled when the hose is slipped. Stops must be secured as shown in Fig 7-52. Re-attach the marker to the hoseline then lower the marker over the side. |
| 'Stop pumping'   | <u>Stop pumping</u>                               | Delivering ship stops pumping.   |
| 'Start blow through'   | <u>Start Blow Through (RS)</u>                    | Initiated by Receiving ship and stopped by Delivering ship (allow 5-10 minutes).   |
|  | <u>Stop Blow Through (DS)</u><br>(repeated by RS) | Check hose is clear. (Blow through may be restarted and stopped by RS if hose is not clear).   |
| 'Connect the hoseline'                                       |   | Re-shackle hoseline to bridle ring, leaving elongated link free for use by delivering ship.  |
|  | RAS Complete                                      | RAS Complete is passed by both ships in confirmation that hoses are blown through and the replenishment is complete.   |
| 'Disconnect the Hoses'                                       |   | Where fitted close the shut off valve, disconnect the hoses from the coupling and replace nose cone.   |
| 'Off steadying tackles'                                      |   | Remove tackles and strops and take well Clear.   |
| 'Heave in slip rope'   |   | Heave in slip rope until the weight is off the hose securing pendant.  |
| 'Avast heaving'  |   | Heaving is ceased.   |
| 'Off hose securing pendant'                                  |   | Unhook the hose securing pendant and pull well clear.  |
| 'Surge slip rope' *  |   | Surge the slip rope until the hose is outboard.<br>Use handspikes to encourage hose end through the roller fairlead as necessary.  |
| 'Avast'  |   | Stop surging the slip rope.  |



(4) Once the hose end is outboard, speed is to be reduced by 1-1.5 knots; this is to be done to allow the placement of the hose end back into the water in a controlled manner

| Order                       | Signal | Action  |
|-----------------------------|--------|---|
| 'Surge slip rope'           |        | Continue to surge slip rope until hose end is just clear of the water (See Fig 7-52 (iii)).   |
| 'Cut/slip the slip rope' ** |        | When lead of hose has drawn ahead to about 90° to the fore and aft line, the Slip rope is cut or slipped, thereby effectively laying the hose back into the water. ** |
| 'Heave in on the slip rope' |        | Recover the slip rope inboard.  |

(5) Once the hose ends has been slipped and returned back into the water and the slip rope recovered inboard speed is to continue to be reduced by 1-1.5 knots, to allow the placement of the hoseline and marker float back into the water in a controlled manner.

| Order                | Signal | Action   |
|----------------------|--------|--|
| 'Cut the first stop' |        | Normally done immediately after the slip rope is cut, but dependent on the position of the hose/hoseline at this stage. As subsequent bights of hoseline begin to straighten to 90° to the fore and aft line individual stops are cut. On completion inform bridge when all lines are clear and it is free to manoeuvre. |

\* It may be necessary initially to veer the slip rope until it has sufficient weight on it to promote surging. In such circumstances care is to be taken to avoid riding turns, and no attempt should be made to veer and surge simultaneously.

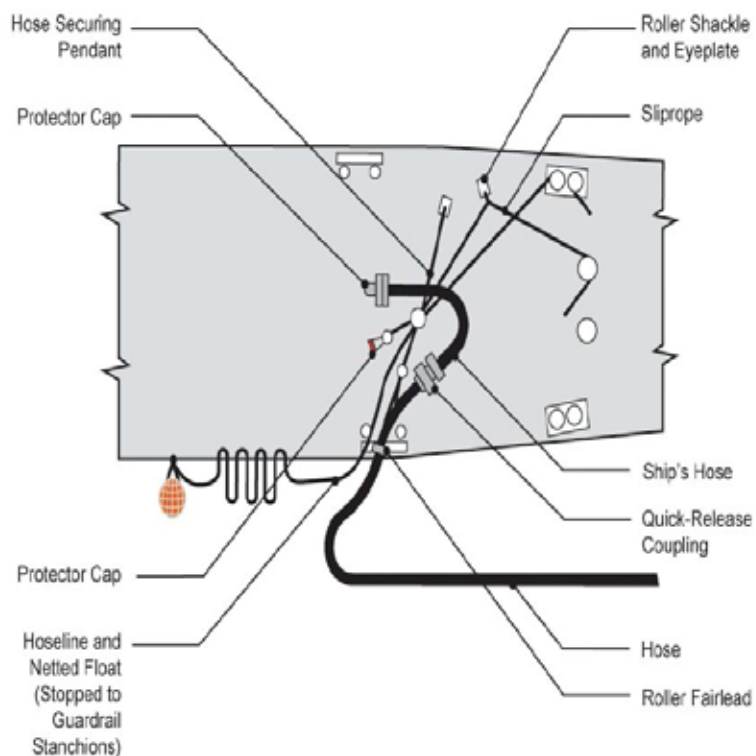
\*\* When refuelling from the Hudson reel rig the slip rope must be cut, this is because the bridle ring is too small to allow a spliced eye to pass through it. As soon as the slip rope has been rigged, place a wooden block beneath it, as near to the splice as possible. When ordered, cut the slip rope with a sharp axe.

**Notes:**

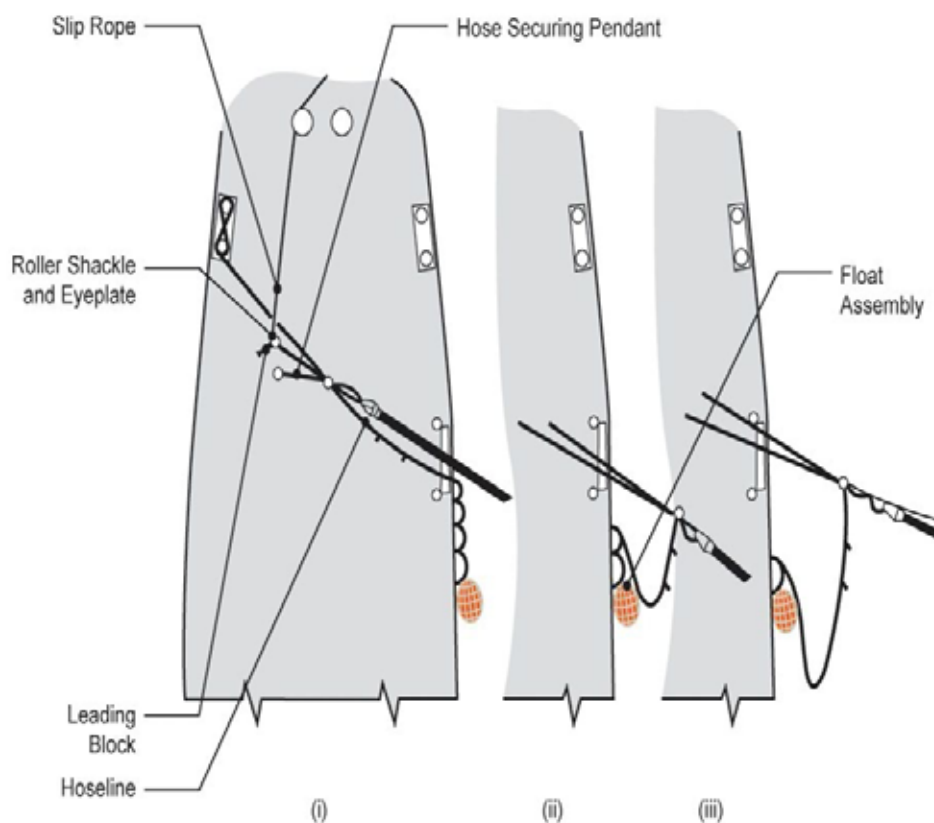
1. *During operational sea training and RAS training serials where serial timings are limited, the connection of the fuelling hoses can be deferred until the completion of the rigging of the slip rope and the removal of the hoseline for return.*

2. *If teams are worked up and experienced, both the connecting up and rigging of the slip rope may be achieved simultaneously.*

**Fig 7-51. Fuelling astern – typical fo’c’sle arrangements**



**Fig 7-52. Fuelling astern – disengaging the rig**



e. **Emergency breakaway (see also Para 07027).** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent, the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| Ship             | Order                       | Signal                                  | Action  |
|------------------|-----------------------------|---|---|
| Initiating ship. | 'Emergency Breakaway'       | <u>Prepare for Emergency Breakaway.</u> | <u>Delivering ship:</u> Stop pumping.<br><u>Receiving ship:</u> Close the fuel shut off valve (not Hudson Reel rig), disconnect QRC or break the NATO 'A' coupling, remove strops and tackles. Clear the area as tasks are completed. |
| Delivering ship  | 'Ready'                     | <u>Ready (DS)</u>                       | The tanker will always be ready once pumping has stopped.   |
| Receiving ship   | 'Heave in'                  |   | Heave in slip rope until weight is off the hose securing pendant.   |
| Receiving ship   | 'Off hose securing pendant' |   | Unhook hose securing pendant and keep well clear of the rig. If the weight cannot be taken off the hose securing pendant, or it is inaccessible, then it must be slipped.   |
| Receiving ship   | 'Ready'                     | <u>Ready (RS)</u>                       | Passed only as information to own bridge and tanker respectively.   |
| Receiving ship   | 'Surge'                     |   | Slip rope is surged until hose is just outboard of the roller fairlead.   |
| Receiving ship   | 'Cut'                       |   | Cut and recover the slip rope.  |
| Receiving ship   | 'Heave in'                  |   | Recover slip rope, (is to be cut if fouls in end bridle ring)   |

**Notes:**

1. *Little action is possible by the tanker in this situation other than to shut off the fuel supply.*
2. *The tanker's hose will not have been blown through and will therefore have to be recovered fully charged. An exercise of this breakaway should only be carried out after the hose has been blown through, or if a different scenario is required, with the tanker's agreement.*
3. *If the hoseline has not been removed, it is utilised as if it were the slip rope, although the float is not re-attached.*
4. *If the hoseline has been removed, but the slip rope has not yet been rigged, the hose securing pendant must be slipped to disengage the rig.*
5. *If the hoseline has not been re-attached, then it remains in the receiving ship.*
6. *If the hoseline has been re-attached, cut the stops in the normal manner.*

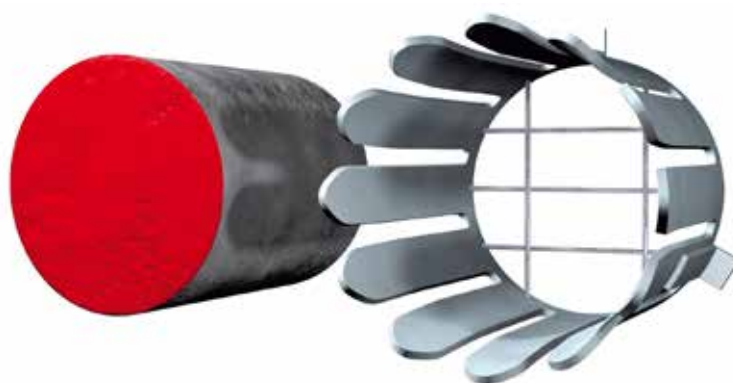
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7. *If the slip rope is to be cut an axe in conjunction with a baulk of timber must be used.* **Blow-through procedure using a 'poly-pig'.** On completion of fuelling astern from the Hudson Reel system, the hose is cleaned out using a 'Poly-pig' (Fig 7-53). This device is a polyurethane foam cylinder whose outside diameter is slightly larger than the inside diameter of the fuel hose. The pig is introduced into the system by the delivering ship, forced through the hose by air pressure, then caught by a pig-receiver (Fig 7-53) that has been fitted into the B end of the NATO coupling by the delivering ship during RAS preparations. Procedures in the receiving ship are as follows:

- (1) Ensure that the pig receiver is present in the NATO coupling before connecting A and B sections of coupling together.
- (2) After fuelling operations are completed, and the 'Stop blow-through' signal has been acknowledged by the delivering ship: disconnect the hose and remove the pig receiver from the end of the hose; remove pig from the receiver and dispose of the pig; replace the pig receiver in the NATO Coupling B end and secure the blanking plate to the coupling.
- (3) Carry out disengaging procedure as described earlier.

**Note.** *Occasionally during the blow-through procedure the Poly-pig has either jammed in the hose between the delivering and receiving ship, or has broken up and passed through the pig receiver. If, on completion of the fuelling and after disconnecting the coupling, it is found that the Poly-pig is not located in the pig receiver, the receiving ship must pass the following message to the delivering ship: 'Poly-pig not located in the pig receiver'. If, after receiving this message and on recovering the hose the delivering ship subsequently finds the Poly-pig in the hose, the following signal must be sent to the receiving ship: 'Poly-pig found in hose'. If this signal is not sent, the receiving ship must assume the Poly-pig has broken up and passed through the pig receiver into the fuelling system and the appropriate action, depending on the receiving ship's fuel system, must be taken.*

**Fig 7-53. Pig receiver (right) and poly-pig (left)**



### **07027. Emergency breakaway**

The emergency breakaway procedures laid down in the drills for each type of replenishment are written for situations in which participating ships are able to maintain station-keeping, and control equipment, until gear is clear of the receiving ship. However, in exceptional circumstances, for example equipment failure, a situation can arise in which the only practical action that can be taken is to clear the replenishment areas of all hands in both ships until the situation has stabilised. It is not possible to provide guidance for every conceivable eventuality and the OIC must exercise judgement at the time. As a general rule no attempt should be made to slip a wire rope under tension.

SECTION 2 – ROYAL FLEET AUXILIARY SPECIFIC

07028. RFA replenishment preparations – introduction

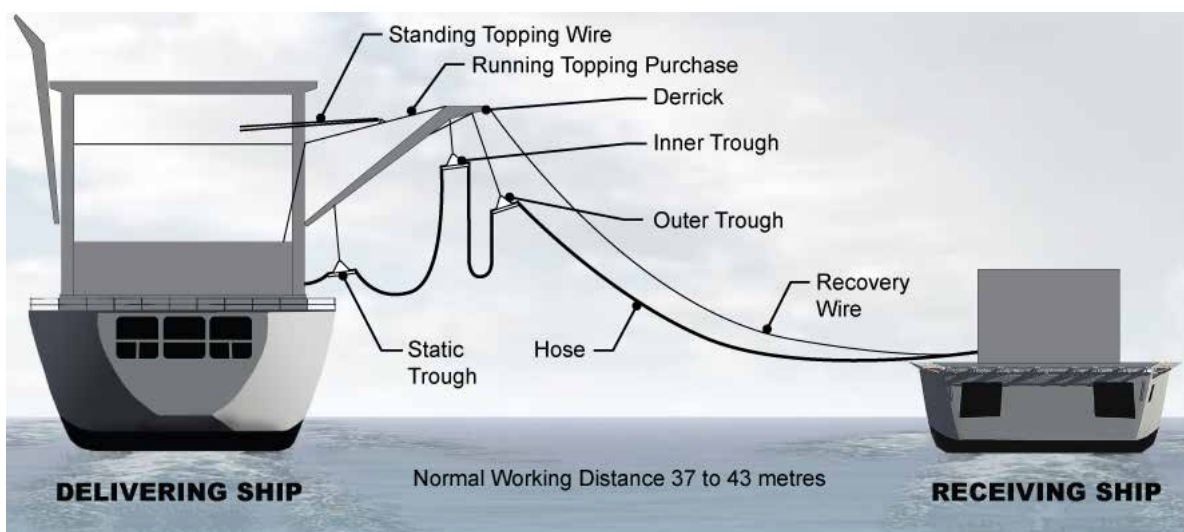
a. This section on replenishment at sea (RAS) is a reference for both the experienced and inexperienced RFA seaman, and deals specifically with the building and operation of replenishment rigs. It must be read in conjunction with *Defence Standard (Def Stan) 07-279, Requirement for Replenishment at Sea – Surface Ships*. In its basic form, RAS is the description given to the transfer of fuels or stores between two (or three) ships steaming on a parallel course, or two ships steaming in line ahead. However, there are variations in the methods of replenishment, in types of rigs used, terminology, and technique. These variations fall within two categories, liquid and solid replenishment. Vertical Replenishment (VERTREP) is the transfer of stores using a helicopter with underslung loads from either the supplying ship, or shore base. Details of this type of replenishment are given in ATP-16 and Section 1 to this chapter.

b. Before any type of replenishment begins, the rig to be used requires ‘laying out’ in a manner which allows all lines to be passed to the receiving ship in a precise order, and without fouling. All rig(s) are to be laid out at the earliest opportunity prior to a RAS. Thirty minutes before the start of a RAS, the pipe ‘Prepare for replenishment, rig...’ is made. On hearing this pipe, personnel involved in the RAS close up at the rig and carry out any final preparations. Fifteen minutes prior to the start of the RAS a final pipe of ‘Hands to RAS stations, close up rig...’ is made. In the event of multiple replenishment operations a rig must be laid out as soon as it is safe to do so after the hose/line/outhaul/hauling-over line has been returned from the previous customer.

07029. Large derrick rig – preparing and deploying the rig

a. The Large Derrick Rig (Fig 7-54) consists of a combination of single, or double, lengths of 153mm and 64mm hoses, suspended from a latticed derrick type structure. See Annex 7E to this chapter, Def Stan 07-279 and ATP-16 for details of equipment.

Fig 7-54. Large derrick rig



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b. The hoses are supported by three troughs commonly known by the colours green, yellow and white. These troughs are sited outboard when the rig is deployed. The 'red runner' or recovery wire is shackled to a clamp on the inboard end of the final 4.5 metres length of hose. The green trough, yellow trough and red runner are each controlled by their own independent winch. The white trough is adjusted by a tackle that is secured in position and remains static throughout the RAS. When not in use, the rig is stowed in the upright position, and the hoses are held secure by three bellybands. The top and centre bands are controlled by winches, the lower band is hand operated. For replenishment, the derrick is lowered outboard to an angle of approximately 45°, and held secure by a monkey plate and chain. The hoses are hauled across by the receiving ship by a hoseline, which is lashed to the outboard 4.5 metres length of hose. When this section of hose is inboard in the receiving ship, it is secured to a SWR hanging-off pendant. The hose end is then connected to the receiving ship's fuelling point. The connection can be either a Quick Release Coupling (QRC) or a NATO 'B' coupling. Both types of connection are fully described in SECTION 1 of this chapter.

(1) *Laying out the rig*

(a) Slack away or remove the top belly band, then lower on the recovery wire until the outboard 4.5 metres of hose is laid flat on the deck, aft of the rig. Fit either the quick release coupling (QRC) or NATO 'B' coupling as required

**Fig 7-55. Laying out the hoses on deck aft of the rig**



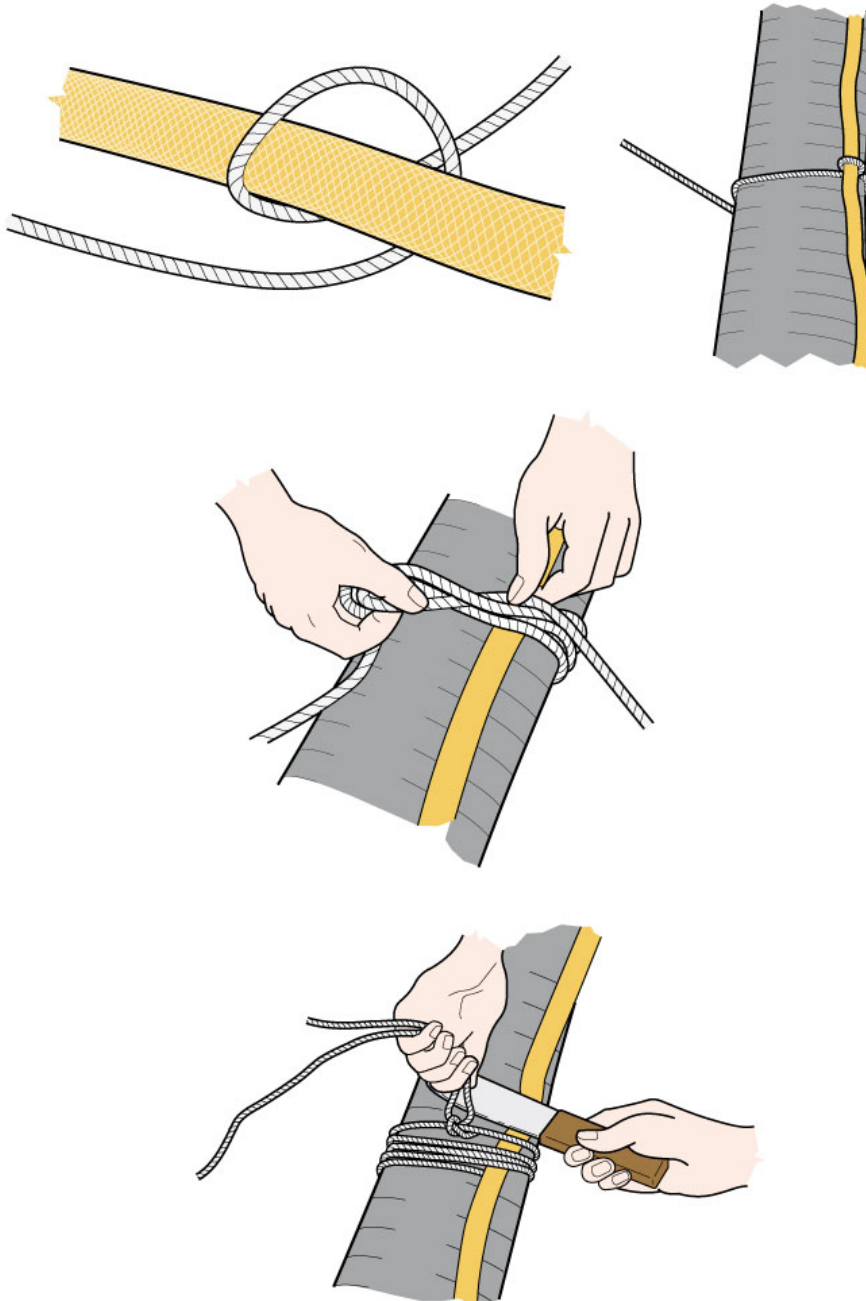
(b) Snap the hoseline spring hook (with the jaw facing up as shown in Fig 7-56) to the SWR pendant ring and secure the hoseline at three or four points along the length of 4.5 metres hose and nose-cone eye-bolt as described below. The pendant or ring must not be lashed. The only time the ring is lashed is when the rig is in the stowed position without the hoseline attached.

**Fig 7-56. Hoseline spring hook hooked to pendant ring**



(c) Using a two-metres length (for single rig) of 8mm Polypropylene form a round turn around the hoseline (Fig 7-57). Pass each end around and under hose(s) (Fig 7-57). Repeat two or three times, then make fast the lashing uppermost, but to one side of, the hoseline (Fig 7-57). Finally, lash the nose cone or NATO 'B' blanking plate to the hoseline. Securing the lashings in this way ensures that when they are cut the complete lashing falls away from the hoseline, thus preventing fouling in the blocks of the receiving ship.

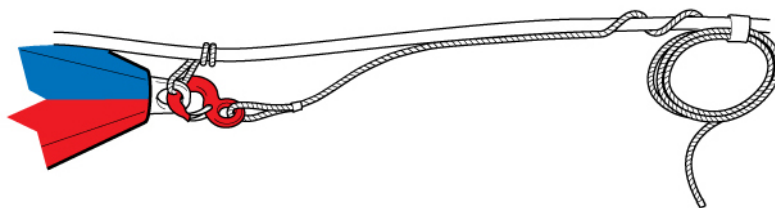
**Fig 7-57. Securing the hoseline to the hoses**



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(d) Hook the pigtail to the hose nose-cone eyebolt, make a full turn around the hoseline, then secure with tape.

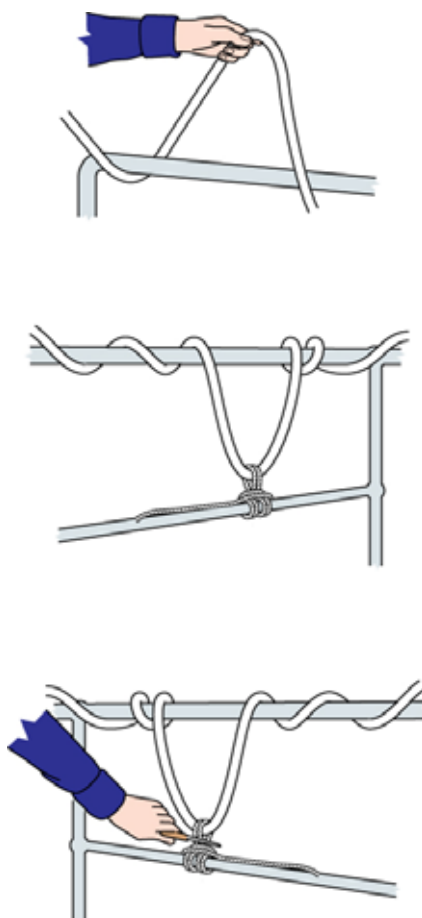
**Fig 7-58. Securing the pigtail**



(e) Take the weight on the recovery wire until the hose end is approximately six metres off the deck. Secure the hoseline to a fixed handrail immediately aft of the rig in the manner shown in Fig 7-59, and then heave in on the recovery wire to prevent the hose end swinging.

**Note.** *Securing the hoseline using this method ensures that when the stop is cut under tension, the bight falls away from the person cutting it.*

**Fig 7-59. Securing the hoseline to a static guardrail**

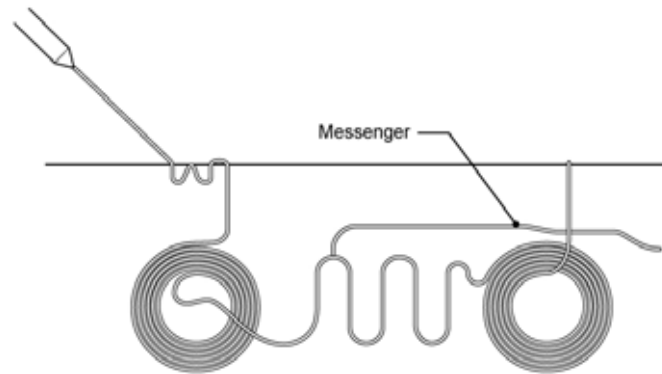




(f) Coil the remainder of the hoseline down, (see Fig 7-60) leaving the three Inglefield clips clear, ready for connecting to the distance line, telephone line and messenger. (This sequence is based upon a Rover Class where the bridge is aft of the rig).

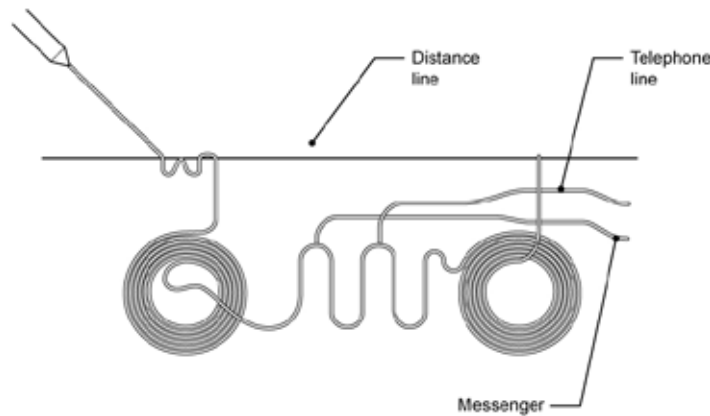
(g) Take the end of the distance line, and after passing it under the hoseline at the handrail, connect it to the outboard Inglefield clip.

**Fig 7-60. Hoseline coiled down – messenger & distance line connected**

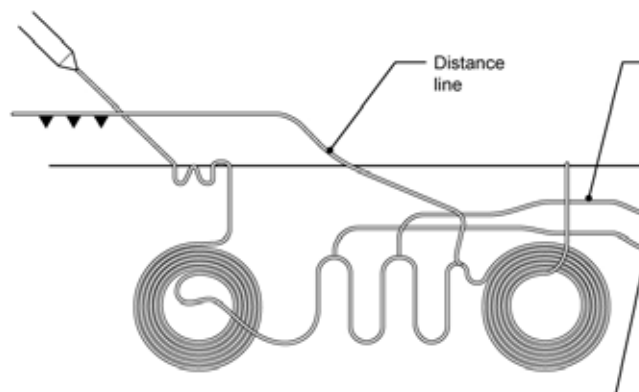


(h) Pass the end of the telephone line(s) under the distance line and connect it to the middle Inglefield clip (Fig 7-61).

**Fig 7-61. Messenger line and telephone line connected**



**Fig 7-62. Messenger line with telephone and distance line connected**



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c. **Lowering the large derrick outboard.** Before lowering the derrick outboard, permission to do so must be sought from either the Officer of the Watch (OOW), or the Executive Officer. A full RAS and safety briefing must also be given if the replenishment is the first of the day, or type. All relevant winches must be checked as being 'in gear', 'brakes off'. Ensure locking pins are in on geared winches, and the remaining bellyband is removed. Ensure that all lashings are removed from the preventer chain and monkey's face prior to lowering the derrick. All personnel are to stand clear of the hoses and derrick structure. When lowering the derrick to the working position the hose bights must be kept clear of the handrails and hose troughs sufficiently below the upper recovery wire blocks to prevent 'two blocking'. The derrick should be lowered until the weight comes on the chain shackled to the deck eyeplate. At the working position hose troughs are to be levelled up and all winch brakes applied, unless replenishment is imminent.

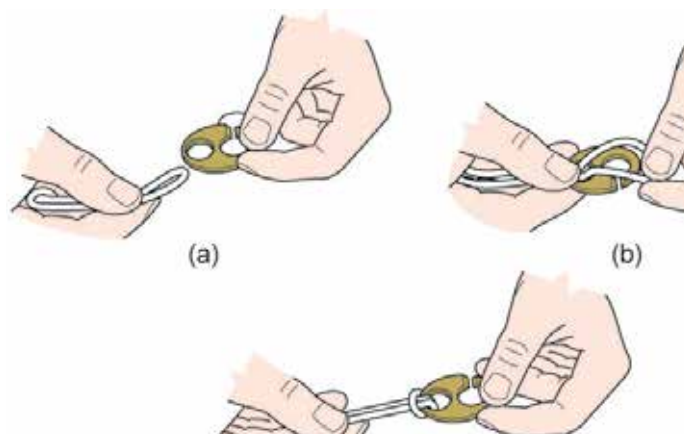
d. **Establishing contact for abeam transfers.** It is usual to establish contact using the 5.62mm SA80 in the line-throwing role. For details see *BRd 8988* and Section 1 of this chapter. The following whistle signals are used:

- 1 blast By firing ship  
Prepare to receive my gunline.
- 2 blasts By non-firing ship  
Ready to receive your gunline, personnel have taken cover.
- 3 blasts By firing ship all lines have been passed.
- 3 blasts By non-firing ship line(s) lost. Pass another line (Commence cycle again with one blast).

e. **Attaching the gunline to the Inglefield clip.** When the gunline has been successfully fired, it is thoroughfooted to an Inglefield clip (Fig 7-63), which in turn is connected to the clip fitted at the terminal end of the outhaul/hoseline/hauling over line.

**Note.** *In order to reduce the danger to personnel on the ship receiving the gunline, the line-throwing rifle is to be loaded, made ready and fired after the two whistle-blasts have been given from the non-firing ship. If the firing is seen as unsuccessful, another line is passed without further whistle signals. Only when three whistle-blasts are sounded by the non-firing ship should the sequence begin again with one whistle-blast.*

Fig 7-63. Thoroughfooting the gunline to the Inglefield clip



f. Connect the Inglefield clip on the gunline to the Inglefield clip on the hoseline (Fig 7-64). The hoseline is now ready to be hauled across by receiving ship.

**Fig 7-64. Gunline connected to outhaul/hoseline/hauling-over line**



g. **Large derrick reception.** See Def Stan 07-279 and ATP-16.

h. **Passing and recovering the rig.** Fig 7-54 shows the rig deployed. The sequence for the receiving ship is laid down in Section 1 of this chapter. The sequence for the delivering ship is as follows:

i. **Passing and recovering the rig (derrick/crane rig)**

| Order   | Signal  | Action  |
|---|---|---|
|   | <u>Red Bat</u>  | During approach, red bat held aloft aft of the rig. In firing ship to indicate dump area and in non-firing ship to indicate position gunline is required. |
| 'Prepare the rifle for line throwing' (Safety Officer firing ship). |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
| <u>One Whistle Blast</u> (Safety Officer firing ship).              |   | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.   |
|   | <u>Two Whistle Blasts</u> (Safety Officer non-firing ship). |   |
| 'With a magazine of one round load' (Safety Officer firing ship).   |   | Load the rifle in accordance with <b>BRd 8988</b> .   |
| 'Make ready' (Safety Officer firing ship).                          |   | Make the rifle ready in accordance with <b>BRd 8988</b> .   |

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| <b>Order</b>  | <b>Signal</b>   | <b>Action</b>   |
|---|---|---|
| 'Fire when ready' (Safety Officer firing ship).           |   | Fire the rifle in accordance with <b><i>BRd 8988</i></b> .  |
| <u>Three Whistle Blasts</u> (Safety Officer firing ship). |   | Safety Officer in non-firing ship orders personnel to break cover and retrieve gunline.   |
|   | <u>Three Whistle Blasts</u> (Safety Officer non-firing ship). | This signal is only given if the gunline is out of reach or lost. Firing ship starts sequence again with one whistle blast.   |
| 'Check Away'  | <u>Haul Away</u>  | Check away gunline and attached hoseline until receiving ship has the distance line, telephone line and messenger in hand.  |
| 'Avast'   | <u>Avast</u>  | Stop checking away. Receiving ship unclip distance line, telephone line and messenger and passes to respective parties.   |
| 'Check away'  | <u>Haul Away</u>  | Check away hoseline until the weight comes on.  |
| 'Cut'.  |   | One man cuts the lashing holding the hoseline to the ship's side rail. Red winch driver takes up slack on the runner, and then pays out as the weight comes on (taking care to keep the rig out of the water).  |
| 'Avast'   | <u>Avast</u>  | Ensuring a dry turn is around the hoseline Break free the pigtail ensuring the bitter end is passed outboard. Cut the stops starting at the hose end and, using the pigtail, lower the hose end to the deck. Clear the pigtail from the hoseline passing the end back outboard. |
| 'Check Away'  | <u>Haul Away</u>  | Receiving ship heaves in, cutting the remaining lashings as they come to hand.  |
| 'Avast'   | <u>Avast</u>  | Receiving ship stops heaving and attaches hose hanging pendant, slacks away until the pendant has the weight, then attaches strops and steadying tackles.   |

| <b>Order</b>  | <b>Signal</b>   | <b>Action</b>   |
|---|---|---|
|   | <u>Connected</u><br>Copied by DS                            | Receiving ship gives the connected signal, red winch driver slacks runner back just clear of the water. Green and yellow winch driver adjust accordingly. Receiving ship rigs slip rope and connects hose(s). |
| 'Start pumping'.  | <u>Start pumping</u><br>(Copied by DS).                     | Delivering ship starts pumping.   |
| 'Heave in messenger' (May be given before pumping commences). | <u>Check away.</u>  | Messenger and hoseline are returned to delivering ship. (Command may require the messenger to remain rigged).   |
| 'Stop pumping'.   | <u>Stop pumping</u><br>(Copied by DS).                      | Delivering ship shuts down pump and/or closes gate valve. RS removes steadying tackles and strops.  |
| 'Replenishment complete'.                                     | <u>Replenishment complete</u> (Copied by DS).               | Once the hose has dropped back, the receiving ship closes the shut off valve, disconnects and prepares the rig for return.  |
| 'Return telephone lines'.                                     | <u>Check away</u><br>(indicating line).                     | Heave in telephone lines.   |
|   |   | Receiving ship heaves in on slip rope and removes the hose hanging pendant. Red winch driver takes up slack on the red runner.  |
| 'Heave in' (Given by receiving ship).                         | <u>Check away.</u>  | Receiving ship surges the slip rope and the winch driver adjusts the rig accordingly ensuring that excessive weight is not put onto the Red Runner until the rig is under the Derrick Head.                   |
|   | <u>Prepare to Trip Pelican Hook (DS)</u><br>(Copied by RS). |   |
| 'Man the highpoint'.  |   | When ordered, highpoint man removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin.  |
|   | <u>Ready</u>  |   |

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| Order                     | Signal                                      | Action  |
|---------------------------|---|---|
| 'Slip/cut the slip rope'. | <u>Trip pelican hook</u><br>(Copied by RS). | Receiving ship slips or cuts the slip rope.   |
| 'Recover distance line'.  | <u>Check away.</u>                          | Heave in distance line.(May be carried out earlier if receiving ship requires).         |
|                           |   | Derrick is hove in and latched, Rig is then secured or re-rigged for the next customer. |

**Notes:** *The following safety points must be adhered to:*

- 1. Excessive heaving should not be applied to the outboard recovery wire when the receiving ship slacks away on the slip rope.*
- 2. When the derrick is being recovered to the stowed position, personnel who are engaged in securing the rig must be aware of swinging hose bights and the outboard hose end.*
- 3. Certain weather conditions can actually prevent the securing of the derrick rig hoses. In those instances the complete rig of hoses should be lowered to the deck and lashed once the derrick is secured in the upright position.*

j. **Emergency breakaway (see also Para 07027).** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent the order must be passed between bridge and RAS point and ship to ship. The aim is to disengage as quickly as possible without endangering life and with minimum damage to equipment; lines that foul must be cut. The quickest way of alerting personnel is to sound six short blasts; however, the executive order to conduct an emergency breakaway must come from the Command. The procedure is as follows:

| Ship                           | Order                  | Signal   | Action  |
|--------------------------------|------------------------|--|---|
| Initiating ship (either ship). | 'Emergency breakaway'. | <u>Prepare for emergency breakaway</u> (other ship acknowledges with <u>Prepare for emergency breakaway</u> ). | <u>Receiving ship:</u><br>Close shut-of valve, disconnect QRC or break the NATO spool, remove tackles. Personnel clear area as tasks are completed. |
|                                |                        |  | <u>Delivering ship:</u><br>Stop pumping and prepare for hose return.  |
|                                |                        |  | <u>Both ships:</u><br>Automatically return/recover distance line, telephone line and messenger.   |
| Delivering ship.               | 'Ready'.               | <u>Ready.</u>  |   |
| Receiving ship.                | 'Heave in'.            |  | Heave in slip rope until weight is off the pendant.   |
| Receiving ship.                | 'Off pendant'.         |  | Unhook hose-hanging pendant and hold clear of rig, remove top temporary guardrail.  |
| Receiving ship.                | 'Ready.                | <u>Ready.</u>  |   |
| Delivering ship.               | 'Execute'.             | <u>Execute Emergency Breakaway.</u>  | As soon as both ships are ready.  |

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| <b>Ship</b>     | <b>Order</b> | <b>Signal</b>                       | <b>Action</b>  |
|-----------------|--------------|-------------------------------------|--|
| Receiving ship. | 'Surge'      | <u>Execute Emergency Breakaway.</u> | Surge the slip rope until the hose end(s) are just outboard.       |
| Receiving ship. | 'Cut'        |                                     | Receiving ship cuts the slip rope (whether slip is fitted or not). |

**Notes:**

1. *The Execute signal is always initiated by the delivering ship.*
2. *If the hoseline is still attached to the messenger the delivering ship can recover the hoseline intact. The receiving ship pays hoseline back at the 'Prepare' signal or on receiving the execute order to conduct EBA.*
3. *If the hoseline is still attached to the ring then it should be used exactly as if it were the slip rope. This means that when the Delivering ship executes the EBA the hoseline is to be cut as soon as the hoses are clear of the shipside.*
4. *If the hoseline has been removed but the slip rope not yet rigged, the hose-hanging pendant must be slipped.*
5. *If the hoseline has been removed and not attached to the messenger it remains in the receiving ship.*
6. *If the hoseline is in the process of being returned, continue returning.*
7. *If the hoseline or messenger is being returned under the rig the line must be cut before the main rig is slipped.*

**07030. Large derrick rig – building the rig**

a. Details of building the rig are laid down in Def Stan 07-279 and ATP-16. Additional advice is given in Annex 7E to this Chapter. If necessary ships drawings should be consulted. For future reference it is advisable to take photographs or produce sketches of the rig building procedure and insert them into the Seamanship Data Book. In addition to the information laid down in the above publications, the following information is relevant when building rigs.

b. **Tray lashings and knuckle lashings for 153mm hoses.** These lashing are to be of 16mm polypropylene, lengths as follows:

- (1) Tray lashing 10m.
- (2) Knuckle lashing 14m.

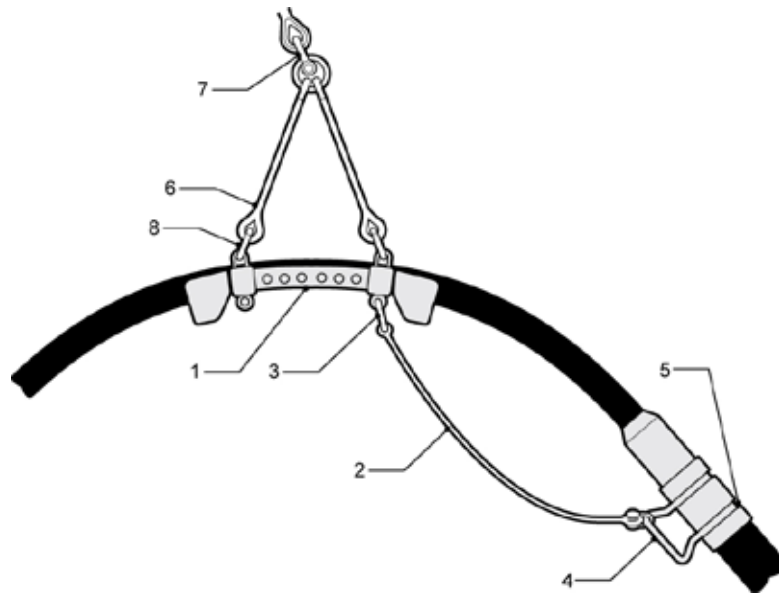


c. **Lashing for 64mm ancillary hoses.** When securing the ancillary hoses to the main 153mm hose(s), 6m x 8mm staplespun polypropylene cordage is to be used.

d. **Hose bights.** When the derrick is in the stowed position all lower bights of the hoses are to be 0.5 metres clear of the deck.

e. **Assembling a trough.** Fig 7-65 shows the parts required to assemble a trough. See also Annex 7E to this chapter.

Fig 7-65. Assembling a trough



|    |   |
|----|---|
| 1. | Trough Single F217/458-9463 (supplied with shackle)<br>Double F217/458-9454<br>(Coir matting for trough 0095/129-2455).   |
| 2. | Preventer wire 4.2m x 16mm SWR F218/523-8646 (Green Trough).<br>Preventer wire 2m x 16mm SWR F218/523-8646 (Red Trough).  |
| 3. | Shackle. Straight to screw. SWL 2.55T F219/721-6091.  |
| 4. | Clamp Single F217/458-9481 or<br>Double F217/796-5836.  |
| 5. | Adaptor F217/458-9480.  |
| 6. | Sling - four legged 20mm SWR. Non-patternised item locally<br>manufactured. A single intermediate link is used to attach each pair of<br>legs to the main ring. |
| 7. | Shackle P&F. SWL 4.6T F219/543-4300.  |
| 8. | Shackle. Straight to screw. SWL 4.6T F219/721-6091.   |

**Note.** When building a rig, always secure the shackle pin from inboard to outboard on the troughs. This is to avoid damaging the eye of the shackle pin when the rig is stowed.

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f. **Large derrick – outboard hose-end configuration.** See Def Stan 07-279, ATP-16 and Section 1 of this chapter.

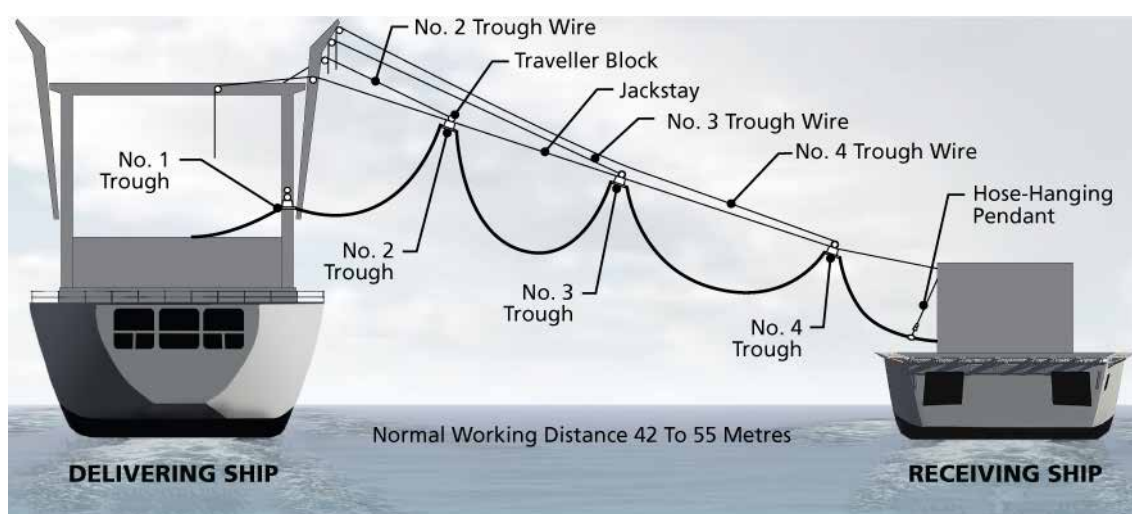
g. **Pendants for /MM/PP.** These pendants are only required for MM/PP. They are made up of 2m x 12mm SWR, fitted with a shackle at one end and a spring hook shackled at the other. When preparing the rig for passing the pendant is shackled to the bridle ring, then coiled and lightly stopped. During the recovery phase of the replenishment the receiving ship cuts the stop from the ring and hooks it to the hose nose cone. Rigged in this manner the hose can be passed outboard without the nose-cone causing damage to the receiving ship's liferafts.

### 07031. The jackstay fuelling rig

a. **Introduction.** When tankers replenish larger units of the Fleet, the jackstay fuelling rig can be used as an alternative to the probe rig. It gives greater separation between ships than the large derrick. The rig is usually made up with 2x153mm hoses suspended from a permanently fixed structure at the rig gantry. The three outboard troughs are each connected to a traveller block, which in turn is connected to a recovery wire, controlled by an independent winch. A 28mm galvanised flexible steel wire rope (GFSWR) jackstay runs through each outboard traveller block, and is connected to an automatic tensioning winch (ATW). The outboard end of the jackstay is fitted with an elongated eye, known as a terminal link. The receiving ship hauls across the jackstay on a hoseline, which is secured to the jackstay by a gripper. When inboard, the jackstay terminal link is secured to a slip, and the gripper removed. The jackstay is then tensioned. The receiving ship heaves on the hoseline to haul the rig down the length of the jackstay. The jackstay automatically maintains tension throughout the replenishment.

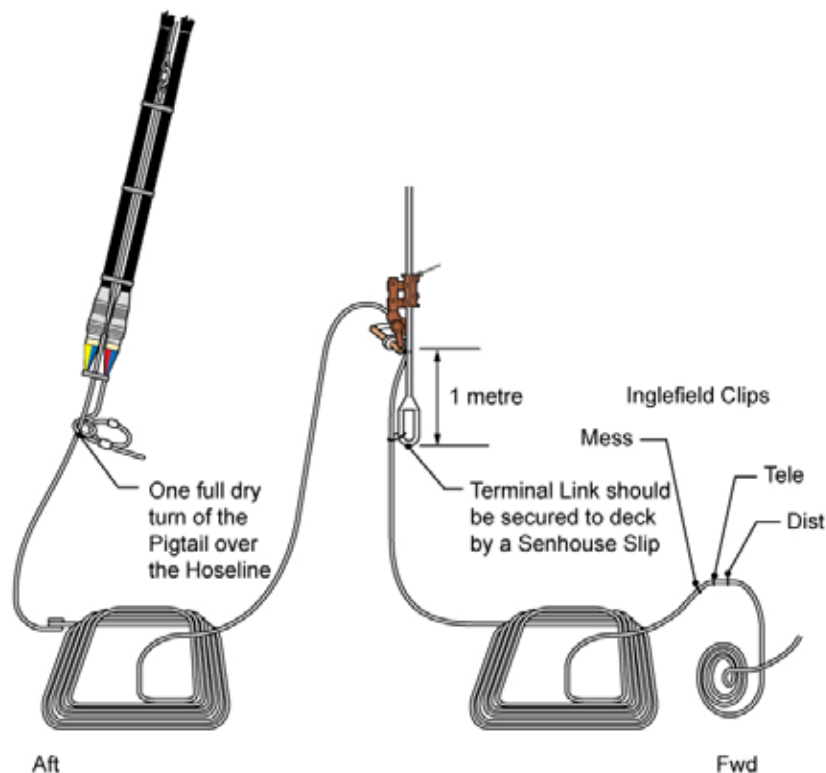
**Note.** When conducting a jackstay refuelling at night, a green cyalume light (0583/531-3076) is to be attached to the terminal link. A cyalume light must also be attached to the bight of the red runner via a spring hook.

Fig 7-66. Jackstay fuelling rig



b. Laying out the rig

Fig 7-67. Preparing the jackstay fuelling rig



(1) Slack away on the outboard recovery wire and lay the 4.5 metres outboard length of hose flat on the deck aft of the rig. Fit either the quick release coupling (QRC) or NATO swing bolt (NATO B) as required.

(2) Snap the hoseline spring hook (with jaw facing up) to the SWR pendant, and secure the hoseline at three or four points along the length of 4.5 metres hose(s) and nose-cone in the same manner as for the large derrick. Similarly fit the pigtail to hose end(s). For a double rig the pigtail should be rigged underneath and not on top of the hoseline.

(3) Take the weight on the recovery wire until the hose end is approximately six metre off the deck. Secure the hoseline to a cleat at the deck edge. Fake the hoseline two or three times (approx eight metres) along the deck in a forward direction before coiling the hoseline aft but adjacent to the secured jackstay. This coil forms the inboard end of the hoseline.

(4) Fit the jackstay gripper to the jackstay approximately one metre from the terminal link (Fig 7-68), then, at the halfway point along the hoseline (indicated by a leather chafing piece), form a small bight in the hoseline through the shackle on the jackstay gripper, take a round turn and insert the wooden toggle (Fig 7-69). See Notes below.

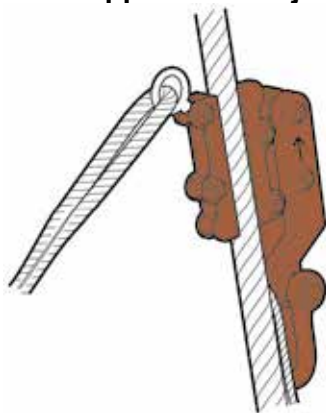
**Notes:**

1. To prevent slipping, the jackstay should be cleaned of grease then bound with several turns of masking tape over the area where the gripper is attached.

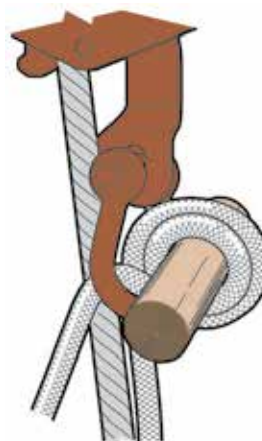
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2. To facilitate connection the receiving ship may specify the distance from the terminal link at which the gripper is to be attached.

**Fig 7-68. Gripper fitted to jackstay**

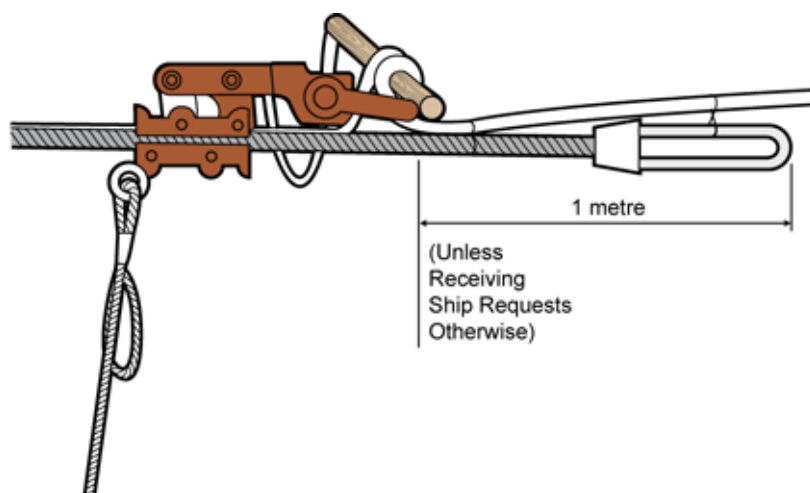


**Fig 7-69. Hoseline toggled to gripper shackle**



(5) Secure the end link to a slip on the deck. Lay the hoseline alongside the jackstay and terminal link, then stop it to the jackstay and terminal link as shown in Fig 7-70.

**Fig 7-70. Hoseline stopped to jackstay and terminal link**



(6) Coil the remainder of the hoseline forward of, but adjacent to the jackstay, and attach the distance, telephone, and messenger lines in the manner described for the large derrick. The rig is now ready to be passed.

**Note.** The position of the gripper in relation to the terminal link may be specified in the OPSTAT RASREQ of the ship being replenished.

- c. **Jackstay fuelling reception arrangements.** See Def Stan 07-279 and ATP-16.
- d. **Passing and recovering the rig.** The sequence for the receiving ship is laid down in Section 1 of this chapter. The sequence for the delivering ship is as follows:
- e. **Orders and signals for (jackstay fuelling rig – delivering ship)**

| Order   | Signal  | Action  |
|---|---|---|
|   | <u>Red Bat</u>  | During approach, Red bat to be held aloft. Firing ship to indicate dump area and non-firing ship to indicate position gunline required. |
| 'Prepare the rifle for line throwing' (Safety Officer firing ship). |   | Prepare the rifle in accordance with <b>BRd 8988</b> .  |
| <u>One whistle blast</u><br>(Safety Officer firing ship)            |   | Safety Officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.                                 |
|   | <u>Two whistle blasts</u> (Safety Officer non-firing ship).   |   |
| 'With a magazine of one round load' (safety Officer firing ship).   |   | Load the rifle in accordance with <b>BRd 8998</b> .   |
| 'Make ready' (Safety Officer firing ship).                          |   | Make the rifle ready in accordance with <b>BRd 8988</b> .   |
| 'Fire when ready' (Safety Officer firing ship).                     |   | Fire the rifle in accordance with <b>BRd 8988</b> .   |
| <u>Three whistle blasts</u><br>(Firing ship).                       |   | Safety officer in non-firing ship orders men to break cover and retrieve gunline.   |
|   | <u>Three whistle blasts</u> (Safety officer non-firing ship). | This signal is given if gunline is out of reach or lost. Firing ship starts again with one whistle blast.                               |
| 'Check away'  | <u>Haul away</u>  | Check away gunline and attached hose/line until the distance line, telephone line(s) and messenger in hand.                             |

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| Order            | Signal           | Action   |
|------------------|------------------|--|
| 'Avast'          | <u>Avast</u>     | Stop checking. Receiving ship unclips distance line, telephone line and messenger and passes to respective parties.  |
| 'Check away'     | <u>Haul away</u> | Receiving ship signals check away then carries on hauling in the hoseline. When the hoseline gets to the midway position on the delivering ship the jackstay is slipped from the deck and held over the rail to ensure it does not snag. The ATW driver slacks away jackstay ensuring it stays clear of the water. The jackstay handler pulls the jackstay off the drum, making sure there are no slack turns. In the event of a problem he must blow his whistle to alert the ATW driver and the rig captain to stop. |
| 'Avast checking' | <u>Avast</u>     | Receiving ship cuts the lashings on the terminal link, then secures and mouses the Slip/QRD to the terminal link. The gripper is then released and untoggled from the hoseline.  |
| 'Connected'      | <u>Connected</u> | Receiving ship informs delivering ship that the jackstay is connected.   |
| 'Check away'     | <u>Haul away</u> | Check away hoseline until all slack is taken up. ATW driver takes up slack on jackstay then switches to auto. When the weight comes on the hoseline the red runner is paid out, the green and yellow runners are adjusted as necessary.  |

| Order  | Signal               | Action   |
|--|----------------------|--|
| 'Avast checking'   | <u>Avast</u>         | Receiving ship removes pigtail coils from the hoseline, and passes the pigtail over the hoseline then inboard to dump party. The receiving ship then cuts the lashings on nose cone and the hose and lowers to the deck.                             |
| 'Check away'   | <u>Haul away</u>     | Receiving ship heaves in, cutting the remaining lashings as they come to hand.   |
| 'Avast checking'   | <u>Avast</u>         | Receiving ship stops heaving and attaches hose hanging pendant, then slacks back to the pendant.   |
|  |                      | Red winch driver slacks back runner just clear of the water. Green and yellow winch drivers adjust accordingly. Receiving ship rigs stops and steadying tackles, connects hose(s), opens shut off valve(s), removes hoseline and rigs the slip rope. |
| 'Start pumping'  | <u>Start pumping</u> | Hose is pressurised and pumping commences.   |
| 'Heave in Messenger' (May be given before pumping commences) | <u>Check away</u>    | Messenger and hoseline are returned to delivering ship. (If the Command requires the messenger to remain rigged the hoseline is to be returned attached to the centre-point of messenger).   |
| 'Stop pumping'   | <u>Stop pumping</u>  | Delivering ship shuts down pump and/or closes the gate valve.  |

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| <b>Order</b>                        | <b>Signal</b>   | <b>Action</b>   |
|-------------------------------------|---|---|
| 'Replenishment complete'            | <u>Replenishment complete</u>                           | Receiving ship closes shut off valve, disconnects the hose(s) and removes steadying tackles and strops.   |
| 'Recover telephone lines'           | <u>Check away</u> (Indicating line)                     | Receiving ships sends back telephone lines. (May be done earlier if telephone is not required). Receiving ship heaves in on slip rope and removes hanging off pendant.              |
| 'Heave in' Given by receiving ship. | <u>Check away</u>                                       | Red winch driver gently heaves in on the runner, receiving ship surges on the slip rope until the hose end(s) are clear of the ship's side.   |
|                                     | <u>Avast</u>  | The slip rope is then slipped or cut. Yellow, green and red winch drivers heave all troughs inboard, ATW driver slacks back on jackstay, ensuring it stays just clear of the water. |
| 'Recover distance line'             | <u>Check away</u> (indicating line)                     | Delivering ship recovers distance line (may be recovered earlier at Command discretion).  |
| 'Prepare to trip Pelican hook'      | <u>Prepare to trip Pelican hook (DS)</u> (Copied by RS) | Highpointman on receiving ship removes mousing and pin from slip.   |
|                                     | <u>Ready to trip pelican hook (DS)</u>                  | Signal given when ready to slip jackstay.   |
|                                     | <u>Ready to trip pelican hook (RS)</u>                  | Signal given when ready.  |
|                                     | <u>Trip Pelican hook</u> (Given by DS copied by RS)     | Jackstay is slipped.  |

The rig is then secured or re-rigged for the next customer.



**WARNING**

**THE POINT SHOULD BE CLEARED OF ALL PERSONNEL AFT OF THE RIG BEFORE THE JACKSTAY IS SLIPPED BECAUSE THE JACKSTAY HAS A TENDENCY TO SWING INBOARD.**

f. Emergency breakaway procedure – jackstay fuelling

| Ship                          | Order                   | Signal  | Action   |
|-------------------------------|-------------------------|---|--|
| Initiating ship (either ship) | 'Emergency breakaway'   | <u>Prepare for emergency breakaway</u> (other ship acknowledges with <u>Prepare for emergency breakaway</u> ) | <u>Receiving ship:</u><br>Close shut-of valve, disconnect QRC or break the spool, remove tackles. Heave in on slip rope, unhook hanging pendant and stow it clear. Down temporary guardrail, surge on slip rope until line is slack or hose-end is outboard. Cut the slip rope. Personnel clear area as tasks are completed. |
|                               |                         |   | <u>Delivering ship:</u><br>Automatically stop pumping and prepare to recover hose and jackstay.  |
|                               |                         |   | <u>Both ships:</u><br>Automatically return/recover distance line, telephone cables and messenger.  |
| Receiving ship                | 'Ready'                 | <u>Ready</u>  |  |
| Delivering ship               | 'Recover the hose'      |   | When the 'Ready' signal has been given by the Receiving ship (and <u>not</u> before), recovers the hose and de-tensions the jackstay.  |
| Receiving ship                | 'Off mousing - out pin' |   | As the jackstay de-tensions, remove mousing, place hammer against the buckler link, out pin from the slip.   |
| Delivering ship               | 'Ready'                 | <u>Ready</u>  |  |
| Delivering ship               | 'Execute'               | <u>Execute emergency breakaway</u>  | When hose is recovered and jackstay de-tensioned.  |
| Receiving ship                | 'Slip'                  | <u>Execute emergency breakaway</u>  | Slip the jackstay. Re-rig temporary guardrail.   |

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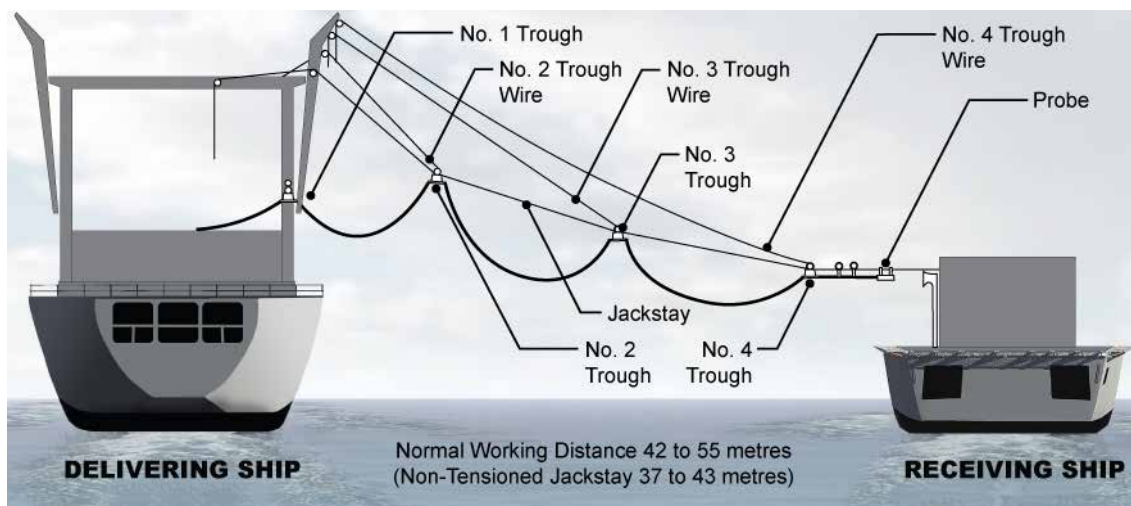
**07032. Jackstay fuelling rig – equipment for building the rig**

Details of building the rig are laid down in Def Stan 07-279 and ATP-16. Additional advice is given in Annex 7E to this chapter. If necessary ships drawings should be consulted. For future reference it is advisable to take photographs or produce sketches of the rig building procedure. The additional advice offered for building the large derrick rig is also relevant to the Jackstay Fuelling Rig.

**07033. Probe fuelling rig**

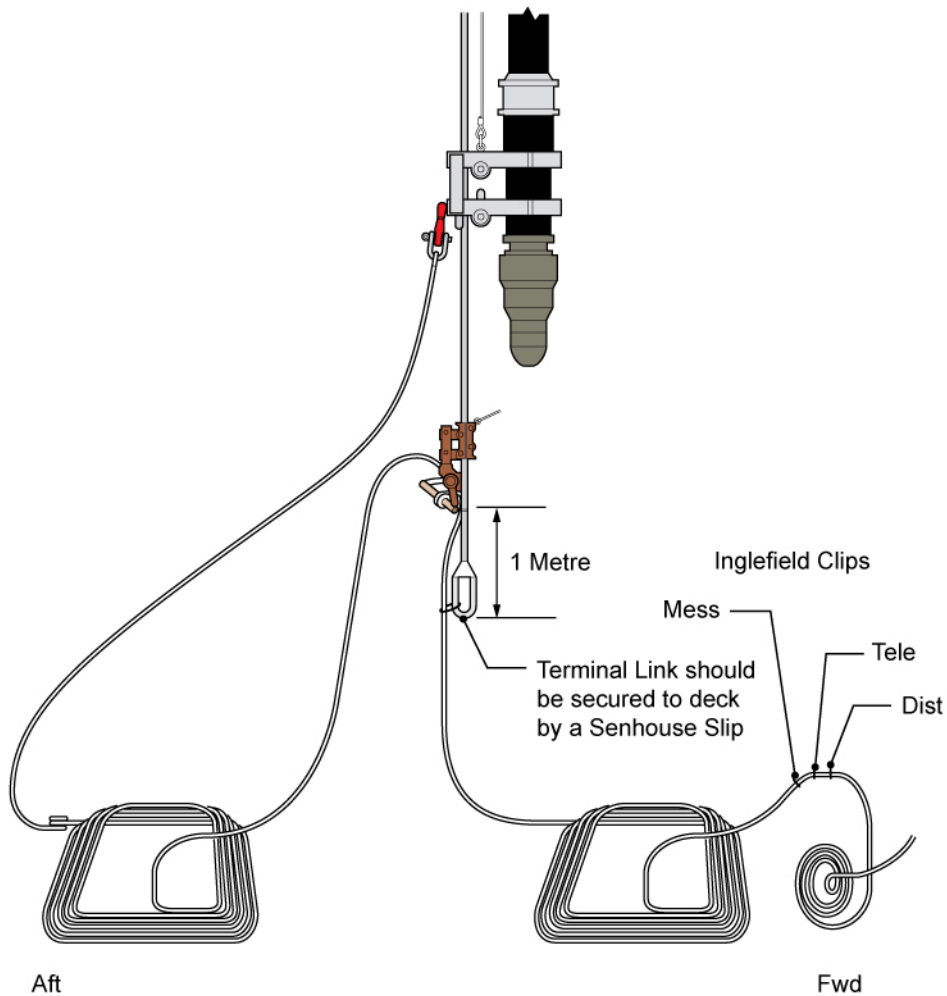
a. This rig (Fig 7-71) is similar to the jackstay rig with the exception of the outboard 4.5m length of hose which is fitted with a probe trolley incorporating a probe that mates into a probe receiver in the receiving ship. The jackstay is passed to the receiving ship in the same manner as for the jackstay rig. The terminal link of the jackstay is secured to the pelican hook on the probe receiver, the gripper is removed, and the jackstay tensioned. The probe is then hauled across on the jackstay and mates with the probe receiver. Details of the rig are given in Def Stan 07-279 and ATP-16. Additional information is given in Annex 7E to this Chapter.

**Fig 7-71. The probe rig**



b. **Laying out the rig** (See also Fig 7-72 Preparing the probe fuelling rig).

Fig 7-72. Preparing the probe fuelling rig



- (1) Lower the probe trolley until the probe head is approximately 1.5 metres from the deck. If fitted, remove the cover and visually inspect the probe head (Fig 7-73) for any signs of damage or leaks.

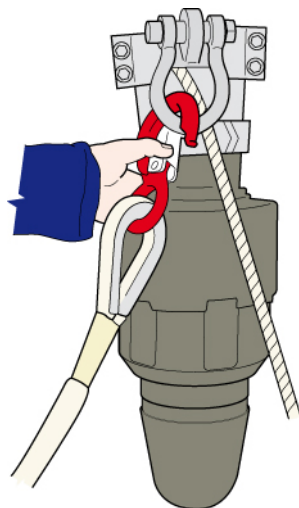
Fig 7-73. Inspecting the probe



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(2) Hook the hoseline spring hook (with the jaw facing up) to the shackle fitted at the outboard end of the probe trolley (Fig 7-74). Heave in on the recovery wire until the probe head is approx six metres above the deck. Secure the hoseline to the outboard deck cleat. Lay out the remainder of the rig in the same manner as described for the jackstay rig.

**Fig 7-74. Attaching the hoseline to the probe trolley**



c. **Operational checks – probe head.** To carry out operational checks on a probe head a probe relatching tool (F217/207-0268) and a sleeve retractor (F217-525-7304) are required. On receipt of a new probe head, it may be necessary re-align the cam rollers. Additionally, during the life of a probe head, there may be occasions when mating with the receiver cannot be achieved due to the cam rollers becoming unlatched. To rectify the problem, carry out the following procedure:

(1) Fit the relatching tool over the probe head and slide it upwards until the protrusions on the base of the tool are above and parallel to the cam rollers (Fig 7-75). Rotate the tool until the protrusions are sited directly over the cam rollers.

**Fig 7-75. Fitting the latching tool**



(2) Screw down on the threaded bolt until the plate locates with the probe nose. Continue screwing, drawing the relatching tool completely over the cam rollers. The probe head is now relatched.

(3) The sleeve retractor is used to remove any fuel, or pressure, remaining in the outboard 4.5m hose, prior to replacing either the probe head or body. To achieve this, fit the sleeve over the probe head until the C shaped handle is resting on and behind head of probe (Fig 7-76). Position a suitable container under probe head.

**Fig 7-76. Fitting the sleeve retractor**



(4) Lift the operating lever (Fig 7-76) until the base of the sleeve locates against the probe neck. Further lifting of the operating handle will retract the sleeve of the probe, thus releasing any fuel.

- d. **Probe fuelling reception arrangements.** See Def Stan 07-279 and ATP-16.
- e. **Passing and recovering the rig.** The sequence for receiving the rig is laid down in Section 1 of this chapter. The procedures for passing and recovering the rig in the delivering ship are as follows:

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f. **Orders and signals probe fuelling – delivering ship**

| <b>Order</b>  | <b>Signal</b>  | <b>Action</b>  |
|---|--|--|
|   | <u>Red bat</u>   | During approach, Red bat is held aloft; in firing ship to indicate dump area and in non-firing ship to indicate position gunline required. |
| 'Prepare the rifle for line throwing' (Safety officer firing ship). |  | Prepare the rifle in accordance with <b>BRd 8988</b> .   |
| <u>One whistle blast</u><br>Safety officer firing ship              |  | Safety officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.                                    |
|   | <u>Two whistle blasts</u> (Safety officer non-firing ship).  |  |
| 'With a magazine of one round load' (Safety officer firing ship).   |  | Load the rifle in accordance with <b>BRd 8988</b> .  |
| 'Make ready' (Safety officer firing ship).                          |  | Make the rifle ready in accordance with <b>BRd 8988</b> .  |
| 'Fire when ready' (Safety officer firing ship)                      |  | Fire the rifle in accordance with <b>BRd 8988</b> .  |
| <u>Three whistle blasts</u><br>(Firing ship)                        |  | Safety officer in non-firing ship orders men to break cover and retrieve gunline.  |
|   | <u>Three whistle blasts</u> (Safety officer non-firing ship) | This signal is given if gunline is out of reach or lost. Firing ship starts again with one whistle blast.                                  |
| 'Check away'  | <u>Haul away</u>   | Check away gunline and attached hose line until receiving ship has the distance line, telephone lines and messenger in hand.               |
| 'Avast'   | <u>Avast</u>   | Stop checking away. Receiving ship unclips distance line, telephone line and messenger and passes to respective parties.                   |

| <b>Order</b>             | <b>Signal</b>  | <b>Action</b>  |
|--------------------------|--|--|
| 'Check away'             | <u>Heave away</u>  | Receiving ship heaves away until all slack is taken up on the forward coil. Delivering ship knocks off the slip securing the jackstay terminal link to the deck, then holds the jackstay over the rail so it does not snag.                            |
| 'Avast '                 | <u>Avast</u>   | Receiving ship cuts the lashings between the hoseline and the terminal link and then connects the terminal link to the Pelican hook/Slip. Receiving ship then veers the hoseline to remove the jackstay gripper and toggle.                            |
| 'Connected'              | <u>Connected</u>   | This signal gives the delivering ship clearance to tension the jackstay  |
| 'Check away'             | <u>Heave away</u>  | Rig Captain to ensure that the turn is removed from the deck cleat. Delivering ship tensions jackstay, red winch driver slacks away on red runner, green and yellow winch drivers follow suit as required until the Probe has mated with the receiver. |
| 'Start pumping'          | <u>Start pumping</u> (Some NATO ships give the <u>connected</u> signal prior to start pumping) | Delivering ship starts pumping; receiving ship rigs remating line then unhooks hoseline.   |
| 'Heave in messenger'     | <u>Check away</u> (Indicating line)  | Receiving ship returns messenger, gripper and hoseline. (If the Command requires it messenger is to remain rigged).  |
| 'Stop pumping'           | <u>Stop pumping</u>  | Receiving ship removes the remating line. Delivering ship shuts down pump and/ or closes the gate valve.   |
| 'Replenishment complete' | <u>Replenishment complete</u>  |  |

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| Order                    | Signal  | Action   |
|--------------------------|---|--|
|                          | <u>Check away</u>   | Receiving ship releases the probe and signals to delivering ship to heave in. Red, green and yellow winch drivers return troughs to the stowed position. ATW Driver slacks back on the jackstay until it is just clear of the water. |
| 'Return telephone line'. | <u>Check _____ away</u><br>(Indicating line).               | Receiving ship sends back telephone line.  |
| 'Return distance line'.  | <u>Check away</u> (Indicating line).                        | Receiving ship sends back distance line.   |
|                          | <u>Prepare to trip Pelican hook</u> (DS)<br>(Copied by RS). | Highpointman on receiving ship removes 'R' clip.   |
|                          | <u>Ready to trip Pelican Hook</u> (DS).                     | Signal given when all clear to slip Jackstay.  |
|                          | <u>Ready to trip Pelican hook</u> (RS).                     | Signal given when ready.   |
|                          | <u>Trip Pelican hook</u> (given by DS copied by RS).        | Receiving ship slips jackstay. Delivering ship recovers jackstay and secures or re-rigs for next customer.   |

**WARNING**

**CARE SHOULD BE TAKEN WHEN THE JACKSTAY IS SLIPPED AS IT HAS A TENDENCY TO SWING INBOARD TO THE RAS POINT.**



g. **Emergency breakaway**

| Ship                          | Order                 | Signal  | Action  |
|-------------------------------|-----------------------|---|---|
| Initiating ship (either ship) | 'Emergency breakaway' | <u>Prepare for emergency breakaway</u> (other ship acknowledges with <u>Prepare for emergency breakaway</u> ) | <u>Receiving ship:</u><br>Remove remating line / retaining pendant if time permits, or cut it, remove or cut retaining pendant if fitted. |
| Receiving ship                | 'Ready'               | <u>Ready</u>  | Operate Probe release handle. Personnel clear area as tasks are completed.  |
|                               |                       |   | <u>Delivering ship:</u><br>Stop pumping, recover the hose. If there is any delay in disconnecting the hose, heave it out.                 |
|                               |                       |   | <u>Both ships:</u><br>Automatically return/recover distance line, telephone line and messenger.   |
| Delivering ship               | 'Ready'               | <u>Ready</u>  | When probe sufficiently recovered and jackstay is de-tensioned.   |
| Receiving ship                | 'Out 'R' clip         |   | Receiving ship removes 'R' clip from the pelican hook.  |
| Delivering ship               | 'Execute'             | <u>Execute Emergency breakaway</u>  | Receiving ship trips pelican hook. Delivering ship recovers and secures rig.  |

**07034. Astern replenishment – lay flat rig**

a. In the astern method of replenishment the delivering ship streams a plastic float and hoseline, connected to a buoyant hose. The receiving ship grapples the hoseline and hauls in the end of the rig. Once secured and connected, pumping can commence. Precise details of the equipment are given in Def Stan 07-279 and ATP-16. Additional advice is given in Annex 7E to this chapter. Drills for receiving the rig are given in Section 1 to this chapter.

b. **Equipment required**

- (1) *Netted float.* Fitted with a swivel link assembly and Karabiner safety hook.
- (2) *Hoseline.* This differs both in length and construction from that used in abeam replenishment. It is made up of 80 metres of 21mm polyamide braidline. The outboard end is finished with two loose links and hard eye; the inboard end is tailed into 30 metres of 14mm dia SWR, which is terminated with a hard eye, and loose link.

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(3) *Bridle assembly.* This consists of six metres of 20mm SWR fitted at three points with ring and link assemblies. The bridle itself is secured to the astern rig by a clamp and adaptor.

(4) *Heaving out/recovery line.* This consists of 30 metres of 21mm braided polyamide, finished at one end with a hard eye and a 2 tonne SWL spring hook. It is stopped to the hose and led to the after capstan as shown in Figs 7-78, Fig 7-79 and Fig 7-80. It is used in the initial phase to heave out the astern rig until sufficient hose is in the water to allow streaming to be controlled by the astern recovery winch. In the recovery phase, it is used to recover the hoseline.

(5) *Streaming/recovery wire.* This 20mm SWR is led from the stern recovery winch at fo'c'sle head, and connected to the final inboard length of hose.

(6) *Marker float and line.* This comprises 225m of 16mm braided polyester 0350/-939-2764 plus whatever length is necessary to allow for the distance from the stern to the capstan/drum end from which the float is being streamed. A netted-float is fitted at the outboard end. The line is marked by rope servings stitched into position from 100m every 20m with 140, 195 and 230 coloured.

### **Notes:**

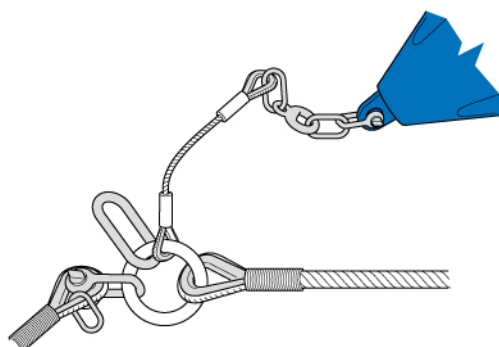
1. *Once the hose has been connected and is towing in the correct catenary the receiving ship may request the delivering ship to adjust the position of the station marker to assist station-keeping.*

2. *In certain instances, for example if supplying to a Leaf Class tanker, it may be necessary to provide an additional length of marker float line to comply with Note 1.*

### **c. Laying out the astern rig**

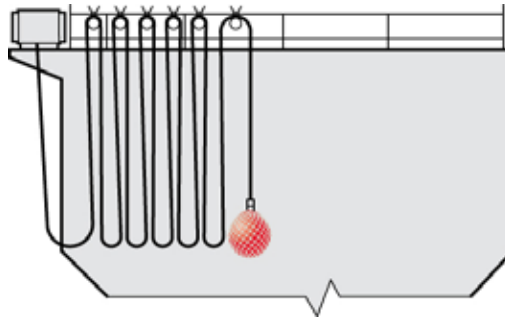
(1) Lead the wire tail of the hoseline over the ship's stern rail and back in through the stern roller lead, then shackle it to the bridle ring (Fig 7-77).

**Fig 7-77. Hoseline shackled to bridle ring**



(2) Working towards the float end, stop the hoseline in bights over the stern. Secure each bight to the top stern handrail, and ensure the lower end of each bight is approximately two metres above the waterline (Fig 7-78).

**Fig 7-78. Hoseline stopped to stern handrail**



(3) Lead the heaving-out rope from the capstan or drum end into the snatch block at the upright astern roller, then lead it forward to the knuckle of the third nine-metre hose, and secure it as shown in Fig 7-79, ensuring that polyester roundsling is tight around the knuckle of the hose.

**Fig 7-79. Heaving-out rope secured to knuckle**

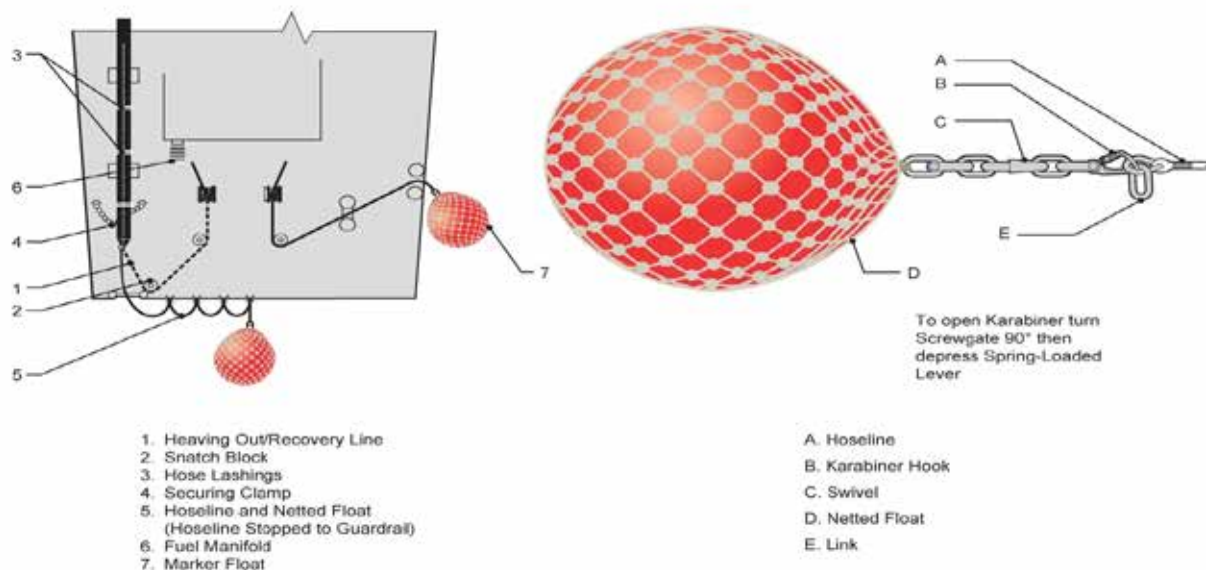


(4) Secure the heaving-out rope at several points along the length of hose (Fig 7-80), working back towards the outboard end of the hose. Include the bridle when lashing the hoseline to the hose. Fig 7-81 shows the rig ready for streaming.

**Fig 7-80. Hoseline stopped to hose**



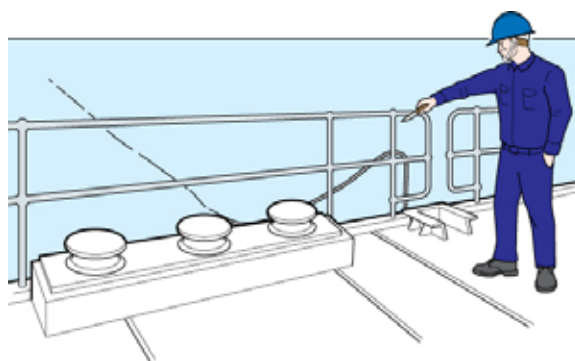
Fig 7-81. Astern rig ready for streaming



d. **Streaming the astern rig – general procedures**

(1) Before streaming commences, ensure that at least two methods of communications between the bridge and fo’c’sle are established. Start streaming from the netted float end of the hoseline. Cut the retaining lashings in sequence (Fig 7-82) ensuring each bight runs clear before cutting the next lashing.

Fig 7-82. Cutting the hoseline stops



(2) When the hoseline is completely streamed, lead the heaving-out rope to the drum end/capstan. Before heaving commences ensure there is sufficient slack on the stern recovery wire and that sufficient men are posted along the main deck to monitor the hose as it is streamed.

(3) Commence heaving on the heaving out/recovery rope whilst simultaneously slacking on the stern recovery wire. As the hose is hauled toward the snatch block and stern roller lead, cut each lashing in sequence ensuring that the bridle is not lashed as it goes outboard. In the initial stages of easing the hose end outboard, it may be necessary to use capstan bars (Fig 7-83).

Fig 7-83. Using a capstan bar to ease the hose end outboard

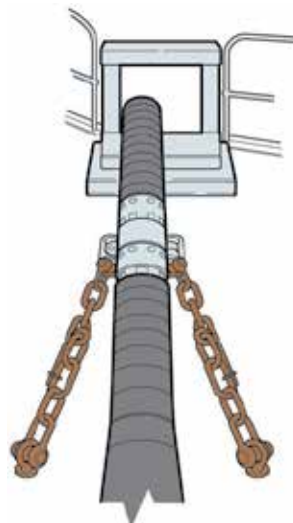


(4) After all lashings have been cut, and dependant upon ship's speed, it may be necessary to re-rig the heaving-out rope to ease out a further section of hose. When it is evident that streaming can be controlled by the stern recovery winch, all personnel are to stand clear of hoses.

e. **Leaf class ships.** Because of the length of the 'Leaf' Class ships the astern rig is streamed in one stage, unless the foul weather fleet is required.

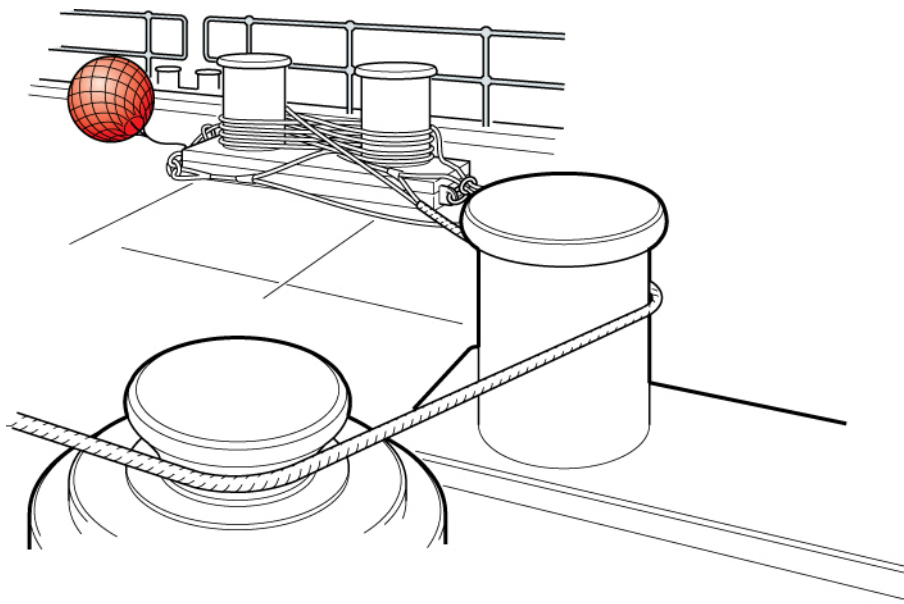
f. **Rover class.** For these ships the astern rig is streamed in two stages. When the first section of hoses has been streamed it is secured to the bridle at the stern, and the extra length of hoses are connected. Whilst this is taking place the stern recovery wire is heaved back up the deck and secured to the final length of hose. Once connection of the second section of hoses is complete the weight is taken on the stern recovery wire, the bridle is removed and the streaming continued. Once fully streamed, the rig is again secured to the stern bridle at the final 4.5 metres length of hose (Fig 7-84), the recovery wire removed, and the hose end connected to the stern manifold. This procedure also applies when fitting the foul weather fleet.

Fig 7-84. Stern bridle secured



g. **Streaming the marker float** (Fig 7-85). The marker float is streamed from the opposite side of the poop to the stern rig, after the rig has been streamed. Before streaming, all the marker float line is run onto the drum end/capstan. When the marker float has been streamed to the appropriate distance, avast veering. Deployed in this way the float can be easily recovered or the length adjusted.

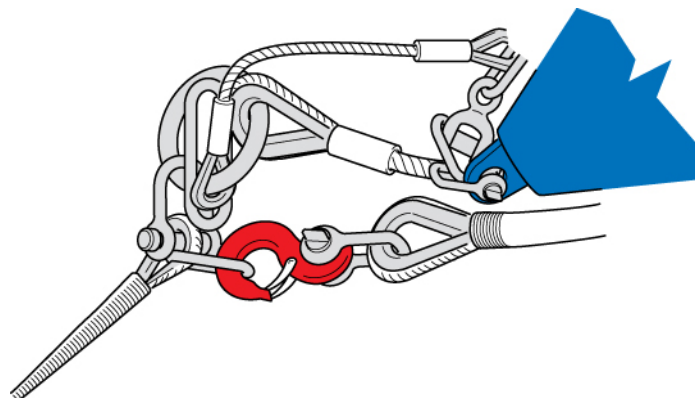
Fig 7-85. Streaming the marker float



h. **Recovering the marker float and astern rig.** When the receiving ship has completed refuelling and has disengaged the stern rig, the recovery is carried out in the reverse order to streaming. Before commencing recovery, remove the heaving-out/recovery line from the snatch block in readiness to recover the hoseline, then proceed as follows:

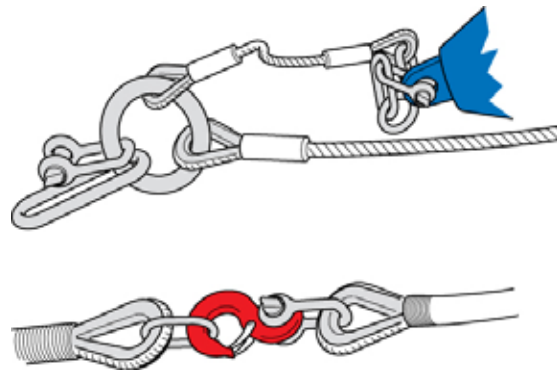
- (1) Recover the marker float to prevent it fouling the streamed rig.
- (2) Disconnect the hose from the stern manifold, reattach the recovery wire, heave in to take the weight on the recovery wire, then disconnect the stern bridle. Continue heaving in until the hose end is inboard.
- (3) Once the hose end is recovered inboard, cease heaving on the recovery winch. Hook the recovery line to the loose link at the hoseline end (Fig 7-86), and lead it to the capstan.

Fig 7-86. Recovery line hooked to loose link on hoseline



(4) Take sufficient weight on the recovery line to allow the hoseline to be unshackled from the hose bridle (Fig 7-87).

**Fig 7-87. Hoseline unshackled from hose bridle**

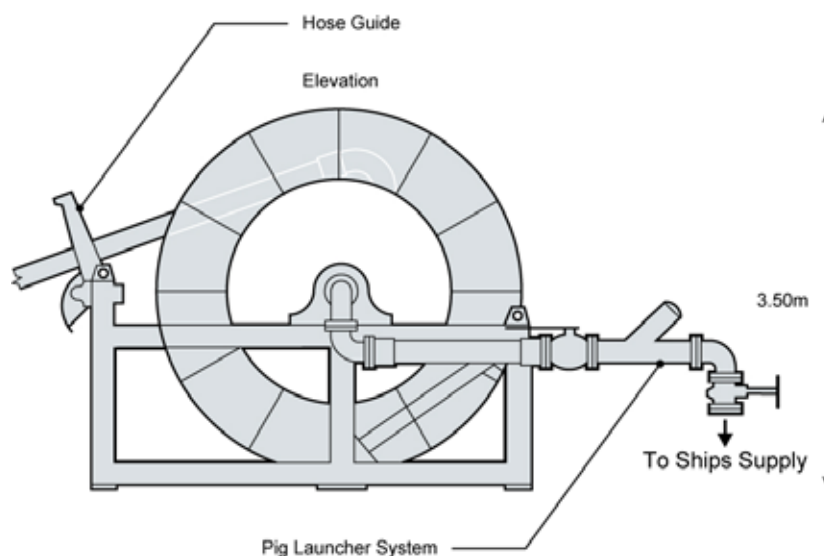


(5) When clear, heave in on the recovery line to haul the hoseline inboard. Cease heaving on the hoseline in good time to allow the netted float to be recovered inboard over the stern roller.

**07035. Astern replenishment – Hudson reel**

a. The Hudson reel (Fig 7-88) is an electrically powered reel capable of stowing and deploying a continuous 750 feet (228.6m) length of hose NSN No J018/628-4894. The complete unit, unique to the AOR and AO Class, is fitted at the after end of the ship. The hose is more flexible than normal replenishment hoses and therefore able to lay flat when fed onto the reel. Precise details of the equipment are given in Def Stan 07-279 and ATP-16.

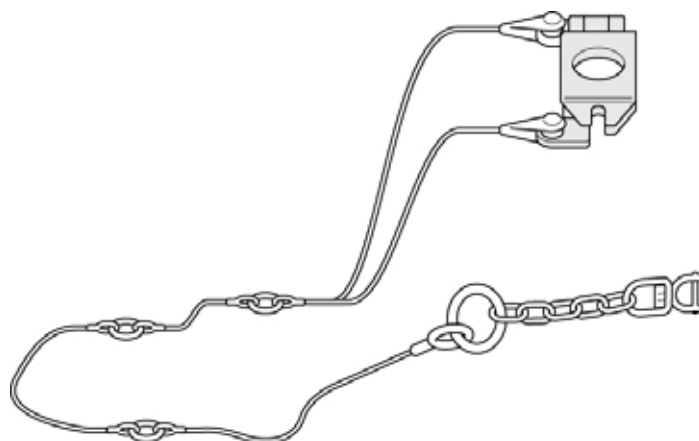
**Fig 7-88. The Hudson reel**



**b. Setting up the Rig**

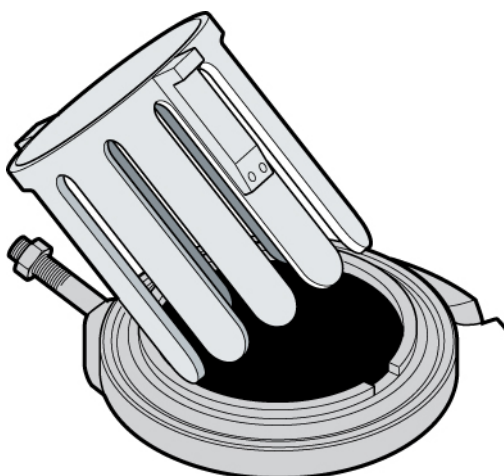
(1) A final 4.5 metres length of hose is connected to an adaptor at the outboard end of the rig by a simple clamp. The plug on the adaptor is removed, the hose fitted and the clamp tightened. The hose bridle (Fig 7-89) is then fitted to the adaptor.

Fig 7-89. The hose bridle



(2) Next, check the pig 'catcher'(Fig 7-90) is inserted into the final 4.5 metres length of hose, then fit the swing bolt cone.

Fig 7-90. The pig catcher



(3) The standard astern fuelling hoseline with netted float is connected to the bridle ring and hung in bights over the stern (See procedure for Astern Fuelling - Lay Flat rig).

**Note.** Because the hose is cleaned through by a poly-pig on completion of fuelling, no shut-off valve is fitted to the outboard end of the hose when preparing the rig. The nose-cone provides a water-tight seal whilst the rig is passed and recovered.



c. **Streaming the rig**

(1) On completion of streaming the hoseline, the rig operator deploys the rig by a simple switch mechanism.

(2) The controls are as follows:

SLOW FWD            SLACK AWAY SPEED 1

FAST FWD            SLACK AWAY SPEED 2

SLOW REV            HEAVE SPEED 1

FAST REV            HEAVE SPEED 2

(3) Once the rig has been fully streamed a mechanism on the reel automatically stops the reel revolving.

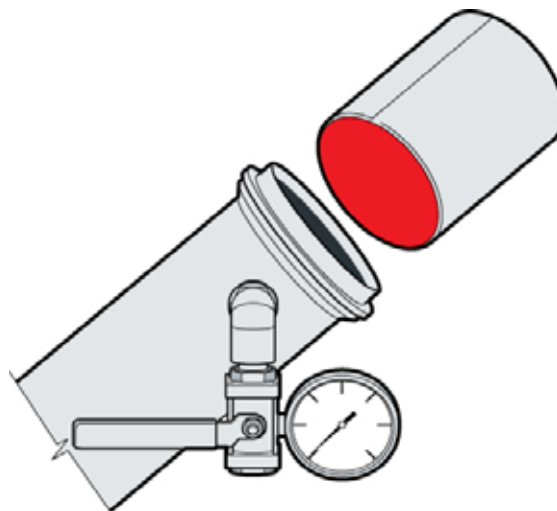
**Note.** *Once streamed the rig does not require 'clamping off.'*

d. **RAS Completed**

(1) On receiving the 'RAS complete' signal and when pumping has stopped, a polyurethane 'pig' is inserted into the rig via a branch pipe (Fig 7-91) located on the Hudson reel.

**Note.** *The polyurethane pig (poly-pig) can only be used once. Therefore it is important to ensure that a plentiful supply is available.*

**Fig 7-91. Inserting the polyurethane pig**



(2) High pressure air is then applied to propel the pig along the length of the deployed hose, forcing the fuel out. A drop in air pressure indicates that the pig has located against the 'catcher'. The pig is then removed by the receiving ship and proven to the delivering ship before disconnection (see also Section 1 to this chapter if the pig is 'lost'). The air is then turned off and the rig disconnected in the receiving ship.

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- e. **Recovering the rig.** On completion of replenishment, the receiving ship streams the rig back into the water in the conventional way. When the receiving ship is clear and the rig is no longer required the hose is recovered by means of the powered reel.

**CAUTION**

**To prevent a back pressure of air building up in the streamed hose the air bleed valve should be left open whilst the rig is being recovered.**

- f. **Recovering the hoseline.** Rig a hook line over the stern to the Hudson reel deck. Once the entire hose has been recovered, use a length of 16mm of polypropylene to take the weight of the hoseline whilst it is unshackled from the stern hose bridle, then hook the hook line into the hoseline loose link. Surge the 16mm polypropylene line until the weight is transferred to the hook line, then recover the hook line/hoseline using the mooring winch on the poop deck.

**07036. Connecting and disconnecting 153mm fuel hoses**

- a. When building rigs, or replacing worn or damaged hoses, a black synthetic seal must always be inserted inside the female coupling. Failure to do this will result in a leak developing between the couplings during replenishment. The seal in cross section has a flat base which fits into the groove of the female coupling. When fitted, the curved section of the seal sits proud of the groove. Once the seal has been inserted a liberal coating of anti-seize grease must be applied to the female coupling thread before screwing the hoses together. Astern rigs are used less frequently than the abeam type. One consequence of this is the drying up of the anti-seize grease, thus preventing the male and female couplings from being unscrewed in the conventional manner. To disconnect a seized hose causing the least damage, carry out the following procedure:
- b. Place an axe along the length of the female coupling and strike it firmly with a maul. Continue striking until the axe head is approximately 1mm from the male coupling thread (Fig 7-92).

**Fig 7-92. Disconnecting a seized hose**



**07037. Solid replenishment – introduction**

a. The heavy jackstay is used for the transfer of stores including ammunition up to a maximum weight per load of two tonnes. A 28mm GFSWR jackstay is passed to the receiving ship, secured to a slip and tensioned. The jackstay wire is controlled by an automatic tensioning winch (ATW). Loads are passed across on a traveller block which runs along the jackstay. Traversing of the traveller block between the ships is controlled by an inhaul wire on the delivering ship, and an outhaul rope on the receiving ship. (With the moving highpoint rig both the inhaul and outhaul is controlled by the delivering ship). Details of Solid Replenishment rigs are given in Def Stan 07-279 and ATP-16 and Section 1 of this chapter. There are three types of solid replenishment rigs:

- (1) Fixed highpoint
- (2) The MK1A
- (3) Moving highpoint

b. The equipment associated with laying out a solid replenishment rig is:

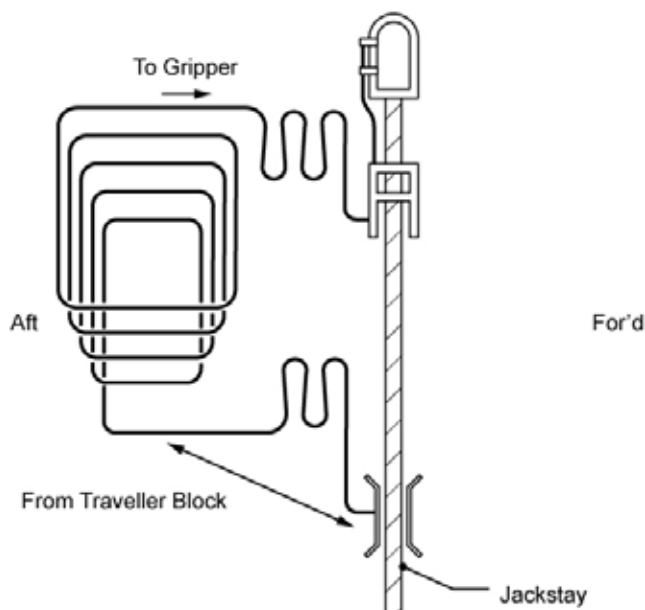
- (1) *Outhaul.* 110m of 21mm polyamide braidline. The inboard end is finished with a hard eye and a three-tonne SWL spring hook. The outboard end is tailed into 50m of 12mm polyester. Non swivel Inglefield clips are seized at 40, 41 and 42 metres from the outboard end. An additional Inglefield clip is seized to the outboard end soft eye, for attaching the gunline and strayline.
- (2) *Inhaul.* 146m x 20mm dia SWR. Permanently fixed to the inboard eye of the traveller block, and led through a series of lead blocks to the inhaul recovery winch. The primary use of the inhaul is to recover the traveller block into the delivering ship's dump area.
- (3) *Downhaul (fixed highpoint Only).* 28mm manila/sisal length to suit tailed into 2 metres x 14mm SWR, with a roller shackle fitted to the end terminal. The roller shackle is fixed to ride along the jackstay inboard of the traveller. The downhaul is used for 'hauling down' and controlling the jackstay to enable the load to be hooked/unhooked in the delivering ship.

**07038. Fixed highpoint rig**

a. **Laying out the rig**

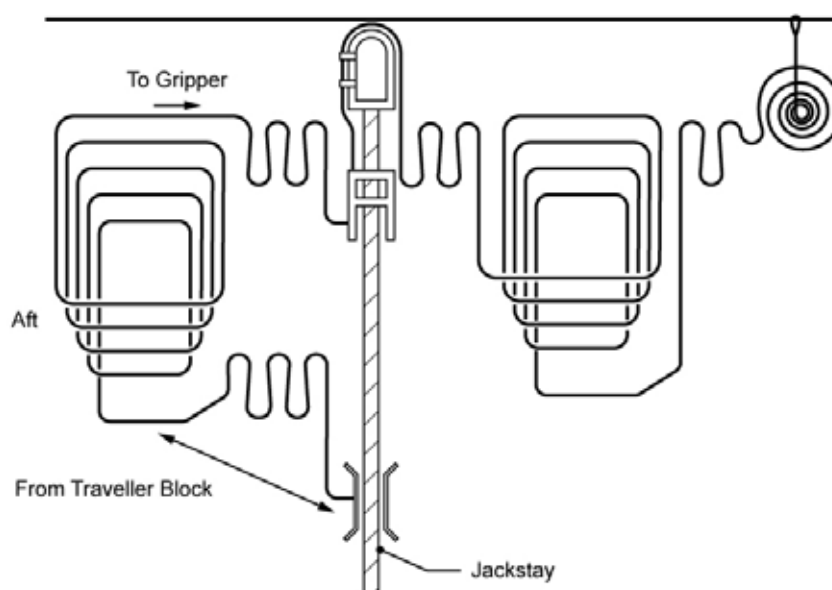
- (1) Hook the outhaul to the outboard eye of the traveller block.
- (2) Coil down the first half of the outhaul aft of the jackstay wire (Fig 7-93). Fake down a few metres alongside the jackstay to prevent the coil being pulled from the bottom if the jackstay moves.

Fig 7-93. First half of the outhaul coiled down



- (3) At the halfway point (indicated by a leather chafing piece) toggle the outhaul to the jackstay gripper.
- (4) Lay the outhaul alongside the jackstay and terminal link, then stop it to the jackstay and terminal link as shown in Fig 7-70.
- (5) Coil the remainder of the outhaul forward of, but adjacent to, the jackstay, then attach the distance and telephone lines in the manner described for the large derrick. The rig is now ready to be passed (Fig 7-94).
- (6) A messenger will only be provided if requested by the receiving ship.

Fig 7-94. Outhaul ready to be passed



b. **Heavy Jackstay Reception.** Details of the reception rig are laid down in Def Stan 07-279 and ATP-16.

c. **Sequence of passing and recovering the rig.** The sequence for receiving the rig is laid down in Section I of this chapter. The sequence for passing and recovering the rig is as follows:

d. **Sequence of orders (in quotation marks) and signals (underlined)**

| Order   | Signal   | Action   |
|---|--|--|
|   | <u>Red bat</u>   | During approach, Red bat held aloft. In firing ship to indicate dump area and in non-firing ship to indicate position gunline required.                                      |
| 'Prepare the rifle for line throwing' (Safety officer firing ship). |  | Prepare the rifle in accordance with <b>BRd 8988</b> .   |
| <u>One whistle blast</u> (Safety Officer firing ship)               |  | Safety officer in non-firing ship ensures all exposed personnel take cover behind ships superstructure.  |
|   | <u>Two whistle blasts</u> (Safety officer non-firing ship)   |  |
| 'With a magazine of one round load' (Safety officer firing ship)    |  | Load the rifle in accordance with <b>BRd 8988</b> .  |
| 'Make ready' (Safety officer firing ship)                           |  | Make the rifle ready in accordance with <b>BRd 8988</b> .  |
| 'Fire when ready' (Safety officer firing ship)                      |  | Fire the rifle in accordance with <b>BRd 8988</b> .  |
| <u>Three whistle blasts</u> (Firing ship)                           |  | Safety officer in non-firing ship orders men to break cover and retrieve gunline.  |
|   | <u>Three whistle blasts</u> (Safety officer non-firing ship) | This signal is given if gunline is out of reach or lost. Firing ship starts again with one whistle blast.  |
| 'Check away'  | <u>Haul away</u>   | Check away gunline and attached outhaul. Receiving ship hauls in gunline and outhaul until distance line, telephone line(s) and messenger are to hand in the receiving ship. |

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| Order            | Signal                           | Action   |
|------------------|----------------------------------|--|
| 'Avast'          | <u>Avast</u>                     | Stop checking away. Receiving ship unclips the distance line and telephone line and passes to the respective parties.  |
| 'Check away'     | <u>Haul away</u>                 | Check away outhaul, at midway point jackstay is slipped from the deck and held over the rail to avoid snagging. ATW driver slacks away jackstay, making sure it stays clear of the water. The jackstay handler pulls the jackstay off the drum making sure there are no slack turns. |
| 'Avast checking' | <u>Avast</u>                     | Receiving ship cuts the lashings on the terminal link, then secures slip/QRD to terminal link and mouses it. The gripper is then released and untoggled from outhaul.  |
| 'Connected'      | <u>Connected</u>                 | Receiving ship informs delivering ship that jackstay is secured.   |
| 'Check away'     | <u>Haul away</u>                 | Check away outhaul until all slack is taken up.  |
| 'Avast'          | <u>Avast</u><br>Repeated by RS   | Order given by delivering ship when outhaul is clear of the deck, but before it becomes taut.  |
|                  | <u>Tension</u><br>Repeated by RS | Delivering ship tensions jackstay to check for turns and correct leads.  |
|                  | <u>De-tension</u>                | Delivering ship de-tensions the jackstay, Repeated by RS. Downhaul is hove in to hold traveller steady. Test weight is then hooked on.   |

| Order                    | Signal  | Action  |
|--------------------------|---|---|
|                          | <u>Tension</u><br>Repeated by RS                                    | Delivering ship tensions jackstay. Downhaul is slacked off.   |
| 'Check away'             | <u>Haul away</u>  | Delivering ship slacks away on the inhaul.  |
| 'Avast checking'         | <u>Avast</u>  | Stop slacking inhaul. Delivering ship to keep inhaul clear of the water   |
| 'De-tension'             | <u>De-tension</u><br>Repeated by DS                                 | ATW driver de-tensions jackstay until test weight is on receiving ship's deck.  |
| 'Return Gripper'         |   | Receiving ship places the gripper on the first available free traveller.  |
| 'Tension jackstay'       | <u>Tension</u><br>Repeated by DS                                    | Delivering ship tensions jackstay.  |
| 'Haul away'              | <u>Check away</u>   | Delivering ship heaves in on inhaul, receiving ship slacks away on outhaul.   |
| 'Avast Hauling'          | <u>Avast</u>  |   |
| 'De-tension'             | <u>De-tension</u><br>Repeated by RS                                 | Delivering ship de-tensions jackstay, downhaul is hove in to assist unhooking, test weight is unhooked. The first load will be pallet trucks and packing notes and the evolution continues until all stores have been transferred and pallets and pallet trucks returned. |
| 'Replenishment complete' | Replenishment complete<br>(May be given as last load returns to DS) | Delivering ship removes last load from traveller, then unhooks and recovers the outhaul.  |
| 'De-tension jackstay'    |   | ATW driver de-tensions jackstay.  |
|                          | <u>Prepare to trip Pelican hook (DS)</u> (Copied by RS)             | On receiving ship, highpoint man removes the mousing and pin from the slip.   |

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| <b>Order</b> | <b>Signal</b>                                   | <b>Action</b>                                      |
|--------------|---|--|
|              | <u>Ready to trip Pelican hook</u><br>(DS)       | Given when all is clear to slip the jackstay.      |
|              | <u>Ready to trip Pelican hook</u><br>(RS)       | Signal given by receiving ship when ready.         |
|              | <u>Trip Pelican hook (DS)</u><br>(Copied by RS) | Receiving ship slips jackstay.                     |
|              |   | Delivering ship recovers jackstay and secures rig. |

**Notes:**

1. *If the RS has a moveable highpoint, there is no requirement to give the signal de-tension the jackstay.*
2. *The EBA procedures are given on the following page.*



e. **Emergency breakaway**

| Ship                                 | Order                 | Signal   | Action  |
|--------------------------------------|-----------------------|--|---|
| Initiating ship (may be either ship) | 'Emergency breakaway' | <u>Prepare for Emergency breakaway</u> (other ship acknowledges with <u>Prepare for emergency breakaway</u> ). | Traveller is returned to the Delivering ship by the quickest possible means. Telephone cables, distance line are automatically returned.      |
| Delivering ship                      |                       |  | Dump Party unhooks load and removes it from the point, unhooks outhaul and starts recovering it. ATW driver slacks back on jackstay.          |
| Delivering ship                      | 'Ready'               |  |   |
| Receiving ship                       |                       |  | As jackstay de-tensions highpointman removes the mousing, places the hammer against the inboard face of the buckler link and removes the pin. |
| Receiving ship                       | 'Ready'               |  |   |
| Delivering ship                      | 'Execute'             | <u>Execute Emergency breakaway</u>   | As soon as both ships are ready:  |
| Receiving ship                       | 'Slip'                | <u>Execute Emergency breakaway</u>   | Slip the jackstay.  |
| Delivering ship                      |                       |  | Recovers the jackstay and lift the safety nets back to the vertical position.   |

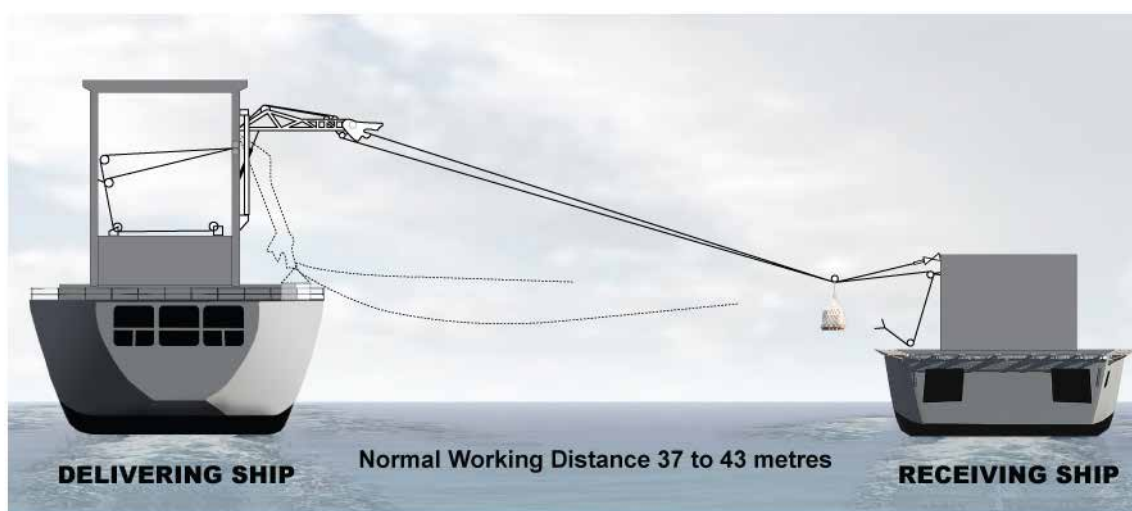
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**07039. The Mk1A replenishment rig**

a. The Mk1A replenishment rig (Fig 7-95) was designed to enable sensitive stores, such as missiles, to be transferred in high sea states. A standard jackstay and inhaul are rove through a hydraulic arm, housed in a king post. The arm is able to travel vertically and horizontally in the king post. A jaw device at the head of the arm holds a specially adapted traveller block. When the load is hooked on in the delivering ship, the arm is raised, thereby lifting the load clear of the deck. The arm is then pivoted out to an angle of approximately 90°, at which point the jaw is opened to allow the load to be heaved across by the receiving ship. The jackstay wire only requires de-tensioning when lowering the load to the deck of the customer ship, unless the receiving ship has a sliding pad-eye reception point. The reverse procedure is carried out when retrieving the traveller block.

b. **Laying out the rig.** The rig is laid out in exactly the same manner as that described for the Fixed Point Heavy Jackstay highpoint rig, with the exception of the downhaul.

**Fig 7-95. The Mk1A replenishment rig**

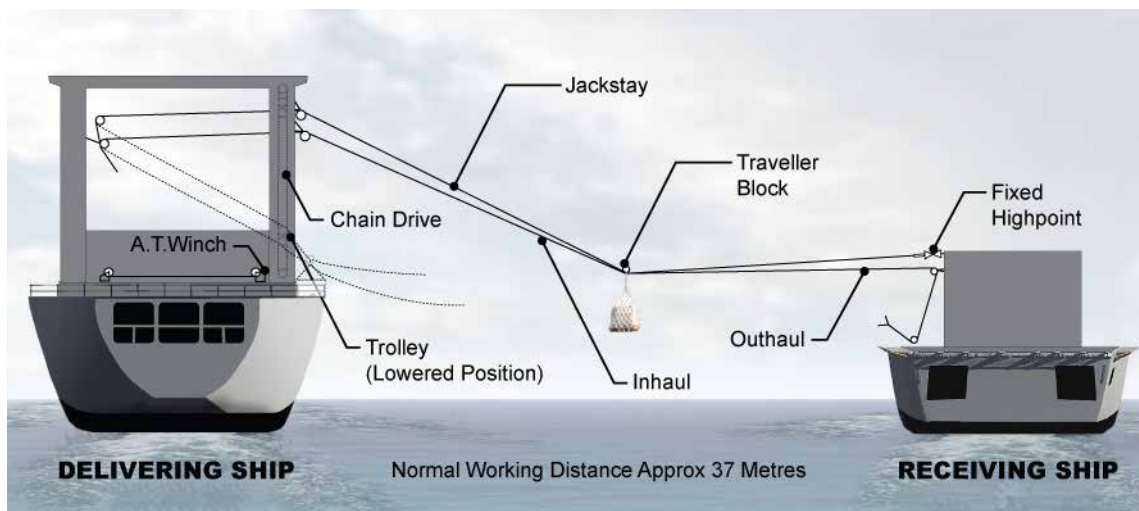


c. **Sequence of passing and recovering the rig.** The sequence for passing and recovering the rig is the same as that laid down for the Fixed Point Heavy Jackstay rig.

**07040. The moving highpoint rig – introduction**

The moving highpoint rig (Fig 7-96) as described in Section 1 to this chapter is capable of both solid and liquid transfer. The solids rig incorporates a sliding pad-eye that controls the height of the load and is driven by a single operator. The load transfer utilises an auto transfer mode; the respective dump positions are preset by the operator and a computer then controls the inhaul and outhaul in order to compensate for relevant ship movement. The speed of transfer is automatically controlled. It includes start, speed up, max speed, speed down and final stop phases. Delivery and recovery of loads is managed solely by the delivery ship. The rig can be connected to a fixed highpoint provided a drop-reel traveller is fitted to the rig.

**Fig 7-96. The moving highpoint rig**

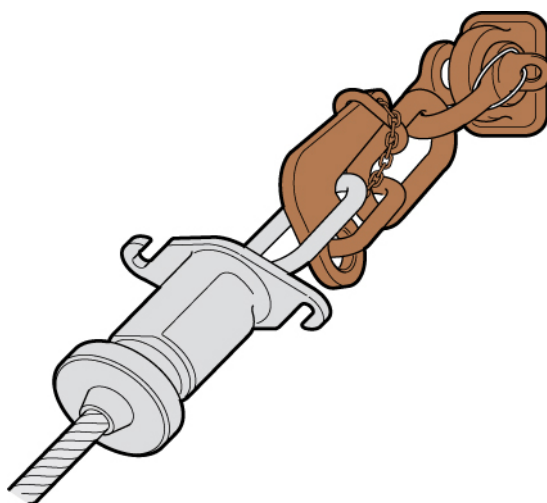


a. **Equipment used in operating the rig.** The following equipment is used in operating the rig.

(1) *Moving highpoint.* Located between the uprights of the rig gantry. It is electrically-powered and chain driven. The jackstay and inhaul are led from the winch, through a compensator and sheaves then led between the cheeks of the pad-eye. The outhaul is led from the winch, through a lead block at the top of the rig, then through the return sheave assembly (RSA) and onto the outboard lug on the traveller block. The pad-eye can be raised or lowered, depending on whether a load is being dispatched, or received. Ships fitted with a reception sliding pad-eye to which the jackstay is connected can also raise and lower the load.

(2) *Jackstay.* 186m x 28mm SWR. The outboard end is fitted with a specially constructed elongated eye which incorporates a male locking device. (Fig 7-97).

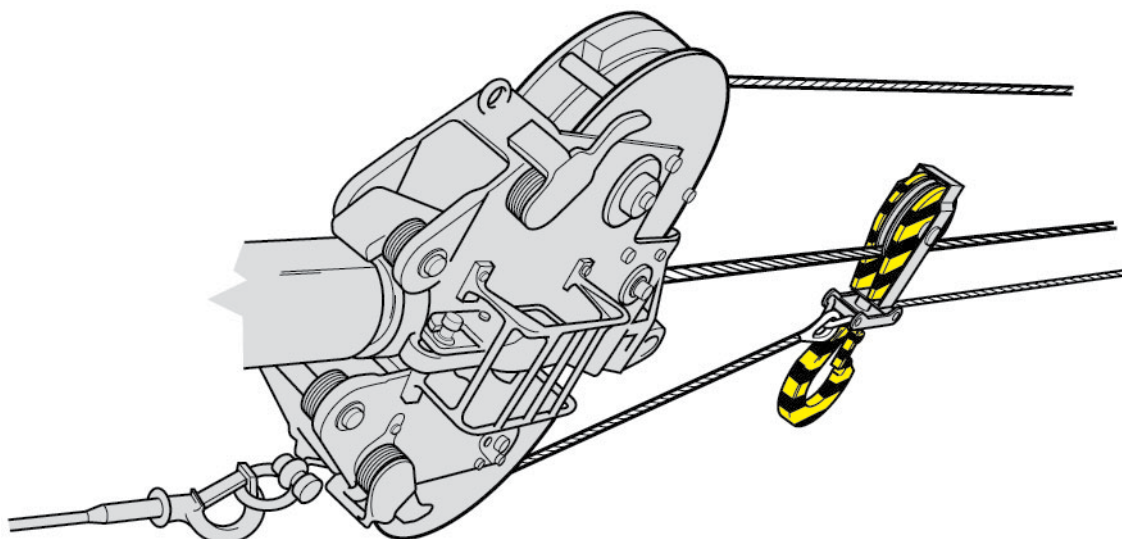
Fig 7-97. Jackstay end fitting



(3) *Return sheave assembly (RSA)*. A purpose-built sheave (Fig 7-98) which rides along the jackstay. The outboard side of the sheave is fitted with the inner levers which mates onto the male fitting of the jackstay terminal fitting once it is hauled across by the receiving ship.

(4) *Outhaul*. The outhaul 53m x 16mm SWR. is led from the winch, through a lead block at the top of the rig, then through the RSA from top to bottom and onto the outboard lug on the traveller block.

Fig 7-98. Outhaul and inhaul rigged



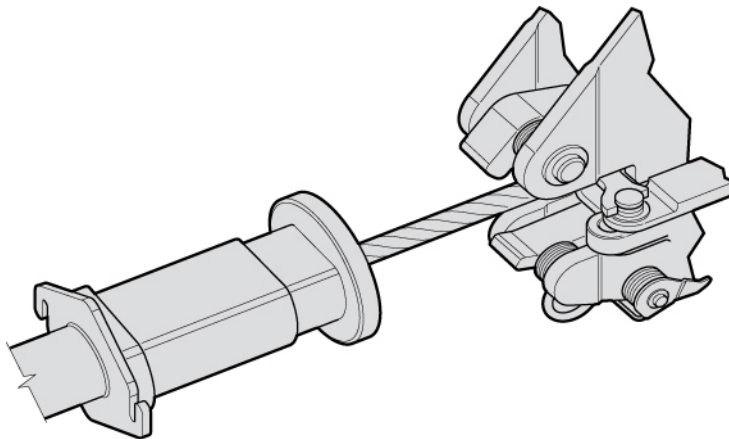
(5) *Inhaul*. 90 metres x 20mm SWR. Led from the inhaul winch through a series of leads and exiting at the jaw of the pad-eye. It is then shackled to the inboard lug of the traveller block.

(6) *Hauling-over line*. The inboard end of a standard jackstay outhaul is hooked into a shackle at the lower outboard end of the return sheave. The line is used to haul the RSA over on the jackstay.

b. **Operating the rig**

(1) The procedures for laying out, passing and connecting the jackstay are similar to those described for the fixed highpoint heavy jackstay. Precise drills are laid down in Section 1 to this chapter. Once the jackstay has been connected and tensioned, the rig operator slacks away on the outhaul as the receiving ship hauls across the return sheave by means of the hauling over line, until the inner levers on the sheave mates with the male fitting on the jackstay (Fig 7-99). Before giving the signal 'Connected' the receiving ship must remove the hauling-over line from the warping drum to allow the hauling-over line to run free if the RSA has not mated correctly. The delivering ship tensions the outhaul to prove the RSA has mated correctly. If the RSA pulls free from the terminal link it is to be recovered and re-cocked in accordance with Annex 7F.

**Fig 7-99. Return sheave about to mate with the jackstay terminal fitting**



(2) The receiving ship removes the hauling-over line. The rig operator then takes up any slack in the outhaul, and 'latches in' when the connected signal is given by the receiving ship. The traveller block is then traversed to the receiving ship by the rig operator slacking away on the inhaul winch, as the latched-in outhaul takes up the slack.

(3) When the traveller block is over the dump area the receiving ship will indicate Avast. This signal is given when the empty traveller block is in its ideal position for subsequent load drops in the dump area. If the traveller stops in the wrong position it must be adjusted by giving the Heave in or Check away signal followed by the Avast signal until an accurate marking has been achieved; the red bat is then held aloft. On this signal the rig operator activates the 'Auto Reset Switch'. The traveller block is then hauled back to the supplying ship's dump area where the same procedure of 'marking the spot' is carried out. Once these procedures have been carried out satisfactorily, the empty hook is sent to check the limits are correctly set. The passing of the test weight, and subsequent delivering of loads can then start.

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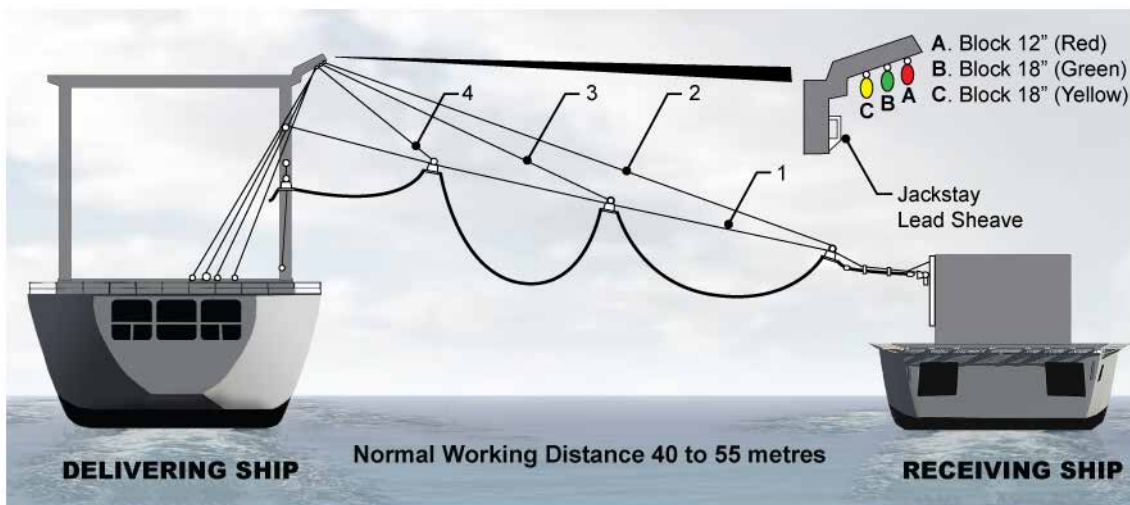
c. **Emergency breakaway drills.** An emergency breakaway may be initiated by either ship. As soon as the requirement for an emergency breakaway is apparent the order must be passed from the Bridge to RAS point and from ship to ship. The aim must be to disengage as quickly as possible without endangering life and minimum damage to equipment. The quickest way of alerting personnel is to sound six or more short blasts on the ship's whistle; however, the execute order to conduct EBA must come from the Command. The procedure is as follows:

| <b>Order</b>                      | <b>Signal</b>   | <b>Action</b>   |
|-----------------------------------|---|---|
| Either ship 'Emergency Breakaway' | Initiating ship: <u>Prepare for Emergency Breakaway</u>               | Delivering ship recovers traveller (and load if hooked on). This may involve stopping the traveller on an outboard run. If the traveller is on deck with the load hooked on in the receiving ship, the pad-eye must be raised and the <u>Heave In</u> signal given before continuing with the EBA signal. |
|                                   | Both ships continue signalling <u>Prepare for Emergency Breakaway</u> | Delivering ship recovers the load and/or the traveller, then de-tensions the outhaul. As soon as this is observed the Receiving ship releases the RSA.  |
|                                   | <u>Ready for EBA</u> (Receiving ship)                                 | This indicates to the Delivering ship that the RSA has been released and the outhaul can be heaved in and the RSA recovered. The jackstay is then de-tensioned.   |
|                                   | <u>Ready for EBA</u> (Delivering ship)                                | The Delivering ship only gives this when all of the above has been carried out.   |
|                                   | <u>Execute EBA</u>  | Receiving ship slips jackstay.  |

**07041. Moving highpoint rig – liquids**

- a. The moving highpoint liquids rig (Fig 7-100) is a basic Jackstay/Probe, with two exceptions in structure.
- b. The three upper recovery blocks are suspended in line abreast, from an aft leading platform.
- c. The jackstay is led through a special lead block, located on the after superstructure of the rig gantry.
- d. **Equipment used in operating the rig**
  - (1) Jackstay 180m of 28mm dia 6 x 36 SWR.
  - (2) Recovery wire (Red) 137 metres x 14mm dia EFSWR.
  - (3) Recovery wire (Green) 100m x 18mm dia EFSWR.
  - (4) Recovery wire (Yellow) 64 metres x 18mm dia EFSWR.

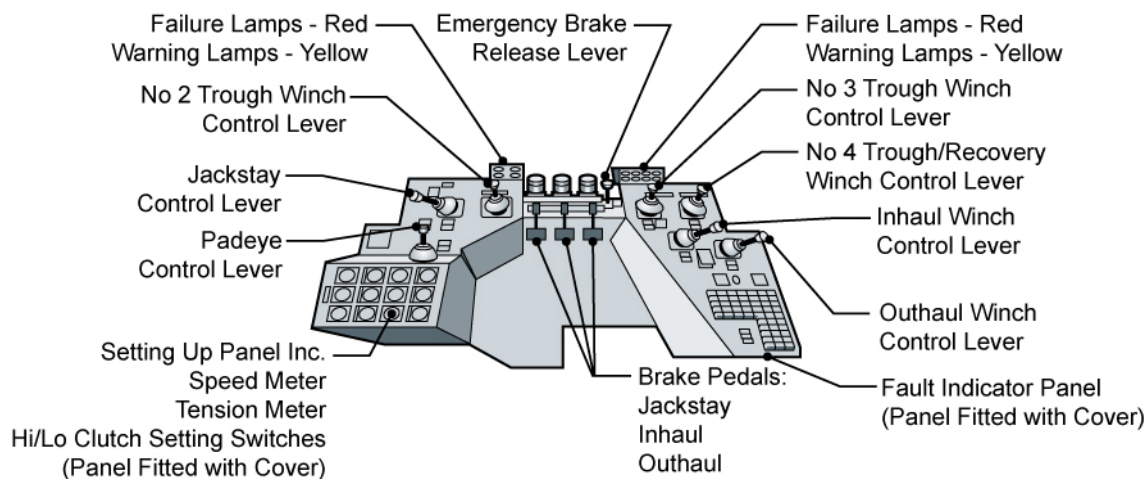
**Fig 7-100. Moving Highpoint Liquids Rig**



07042. Moving highpoint rig – operating procedures

- a. The Operating Controls are shown in Fig 7-101.

Fig 7-101. Moving highpoint rig operating controls



b. **Safety precautions**

- (1) The rig must only be operated by approved personnel who have been certified competent by the Bosun.
- (2) A safe working load (SWL) of 1.5 tonnes must not be exceeded when the Cargo Drop Reel Traveller is being used.
- (3) All checks are to be carried out before the rig is declared ready for use.
- (4) All loads are to be correctly slung by personnel properly trained for the task.
- (5) Whenever a defect occurs it is to be reported immediately and no attempt made to use the rig until the SE maintainer clears it for further use.
- (6) When moving explosives on the rig the following precautions are to be taken:
  - (a) Contour lifting techniques should be employed, ie the load should be lifted to the minimum height required to clear obstacles.
  - (b) Loads are not to be lifted over other explosives on the deck.
  - (c) Loads are not to be left suspended.

**WARNING**

**DURING TRANSFERS BOTH TACHO GENERATORS MUST BE ON IN ORDER TO USE THE SOLIDS RIG IN THE AUTOMATIC MODE. IF ONE OF THE TACHO GENERATORS FAILS DURING THE RAS THE LOAD MUST BE LANDED ON ITS DESTINATION DECK AND THE RIG SWITCHED TO MANUAL. THE RAS MAY THEN CONTINUE IN MANUAL MODE. THE RIG MUST NOT BE OPERATED IN AUTOMATIC MODE IF ONLY ONE TACHO GENERATOR IS FUNCTIONING.**



c. **Operator checks for RAS solids**

(1) *Winch deck*

- (a) Jackstay winch – check the dog clutch is engaged and pinned for solids mode. (Rig Capt).
- (b) Jackstay winch – check fuelling rig dog clutch is disengaged and pinned. (Rig Capt).
- (c) Jackstay winch – check cooling water valves are open. (PO(E)).
- (d) Outhaul winch – check cooling water valves are open. (PO(E)).
- (e) All Wwinches – check barrels for slack turns. (Rig Capt).
- (f) Check winch deck for obstructions. (Rig Capt).
- (g) Check restricted access boards in place. (Rig Capt).

(2) *Winch-driver checks*

- (a) Test communications with the RAS control panel and RAS deck.
- (b) Check inhaul/outhaul and jackstay control levers are in the 'brake on' position.
- (c) Check emergency brake lever is in the upright position.
- (d) Check level of fluid in the foot brake reservoirs.
- (e) Check pad-eye and trough winch control levers are in the neutral position.
- (f) Select solid mode.
- (g) Select creep mode for jackstay.
- (h) Carry out lamp test – report defects to SE maintainer.
- (i) Start pad-eye/jackstay/inhaul winches.
- (j) Start outhaul winch – move control level to neutral and back to brake on position.
- (k) Check all winch control lights are illuminated.
- (l) Report ready to rig Captain.

**BR 67**  
**REPLENISHMENT AT SEA**

**d. Operating instructions**

(1) *Preparing the rig.* Using low speed and creep modes operate the appropriate winches as directed by the Rig Captain to attach the hauling-over line and other gear to prepare the rig for deployment.

(2) *Passing the jackstay*

(a) When instructed by the Rig Captain put the foot brake on jackstay, select tension 7. Move the jackstay control lever to the neutral position, watching the jackstay torque meter, veer on the jackstay until the torque ready indicates. Select tension 2, release the foot brake as required to slip the jackstay from the deck.

(b) Veer the jackstay in creep or normal mode as required by the receiving ship and directed by the Rig Captain.

(c) When the 'Jackstay connected' signal has been given, or as ordered by the Rig Captain, return the jackstay to creep mode (if in normal) and heave on it until it is taut. Then latch in.

(d) Select normal mode. Increase the tension setting to 7 or as directed by the Rig Captain.

(e) Report 'Latched in' to the Rig Captain.

(3) *Passing the return sheave*

(a) Raise the pad-eye as required.

(b) Move the outhaul control lever to the neutral position and then veer as directed by the Rig Captain (Control on the foot brake and watch for slack turns on the drum).

(c) The delivering ship now veers away on the outhaul wire, allowing the Return Sheave Assembly (RSA) to ride down the jackstay and mate with the terminal link latching mechanism. The receiving ship must maintain a steady pull on the hauling-over line throughout the traversing of the RSA. The signal is given to tension when the receiving ship judges the RSA has mated with the terminal link. Before giving the signal the receiving ship must remove the hauling-over line from the drum end to allow the hauling-over line to run free if the RSA has not mated correctly. The delivering ship now tensions the outhaul to prove the RSA has mated correctly. (Be prepared on the footbrake in case the return sheave de-latches). If the RSA pulls free from the terminal link, the delivering ship is to recover the RSA, reset it and start the procedure again.

(d) When latched in report the fact to the Rig Captain.

(e) Check limits on the pad-eye winch.

(f) Apply the footbrake on the inhaul winch and move the control lever to the neutral position.

(g) Monitor the torque meter and veer on the inhaul until the torque meter indicates.

(4) *Engaging auto transfer mode*

(a) Open Auto reset box.

(b) When instructed by the Rig Captain, lower the pad-eye to its lower limits (or enough for the traveller to clear the nets). Veer the inhaul to send the traveller across for the mark position.

(c) When given the mark position, operate reset. (During this operation two hands may be required on the right hand side – one on the control lever and one on the reset switch. Do not use the foot-brake as this may result in the block being pulled into the return sheave as the ships move together). The initial mark can be made as often as is required to get the position right.

(d) Heave on the inhaul and return it into the ship. When in position over the point, and as directed by the Rig Captain, hold the inhaul on the footbrake, release the inhaul control lever to the neutral position, push Auto on switch, then operate the reset. Check the jackstay length meter is indicating (usually between 30-60 metres). If the Auto is not properly engaged and repeat sub para (a) to sub para (d), reporting to the SE maintainer.

(e) Pull the inhaul lever back and ease off the brake. The traveller will jump forward then hold position (if the traveller pulls back towards the rig, release the inhaul control lever and repeat sub para (b) to sub para (e). Auto transfer should now be set.

(f) When instructed by the Rig Captain test Auto Transfer limits. Veer and watch the traveller stop in position over the receiving ship's deck, then heave and watch the traveller stop in position over the RAS point. Auto transfer limits are tested and the rig is ready to pass loads.

(g) The first load must be the test weight and this should be 2 tonnes for normal transfers and 1.5 tonnes if using the cargo drop reel traveller (CDRT).

(5) *Cargo drop reel traveller Ttst* (must be carried out before the replenishment)

(a) Hook the 1.5 tonne test weight to the CDRT.

(b) Raise the pad-eye to the half way position.

(c) Operate the lanyard and lower the test weight. At the half way point release the lanyard and watch the brake operate. If the brake holds, lower the pad-eye, reset the lanyard and send the test weight across. If the brake fails the CDRT must be repaired before further use.

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**REPLENISHMENT AT SEA**

**Notes:**

1. *The receiving ship must be warned not to lower the test weight from the cargo drop reel traveller (CDRT). Coiling the release lanyard around the winch when the test weight is passed will ensure the lanyard is not inadvertently operated.*

2. *Before commencing the transfer of stores a hauling-down lanyard should be attached to the CDRT hook to facilitate overhauling a light (or empty) hook.*

(6) *Transfer in manual mode*

(a) All ammunition and loads requiring steadying lines must be transferred with the rig in the Manual mode. When ordered to use this mode, bring the hook back over the RAS point, raise the pad-eye clear of the deck and operate the inhaul footbrake.

(b) Press the Auto off button to disengage it (if in operation).

(c) Select Creep mode on the inhaul.

(d) Proceed with the replenishment. When using the manual mode, the load must be held over the receiving ship's point by resting the traveller on the RSA, ie by slacking the inhaul. If this is not possible due to the positioning of the load, the RAS can only take place in good conditions with steady station-keeping.

**Note.** *This evolution may cause riding turns on the inhaul winch.*

(7) *Disengaging*

(a) When the RAS Complete signal is given or as instructed by the Rig Captain, raise the pad-eye to an appropriate position, taking into account the height of the reception point in the receiving ship.

(b) Return the traveller block over the RAS point, using the inhaul winch. Move the control lever to the brake on position.

(c) Unlatch and veer the outhaul.

(d) When the heave away signal is given or as instructed by the Rig Captain, heave in on the outhaul to pull the RSA back towards the ship, gently applying the brake and watching the drum for slack turns.

(e) Bring the RSA to a point about one metre clear of the traveller block.

(f) When the de-tension signal is given or as instructed by the Rig Captain bring the tension setting down to 4 and the mode to creep. De-latch and veer the jackstay.

(g) When the Jackstay is slipped, recover as instructed by the Rig Captain.

(8) *Post operation checks*

- (a) Rig Captain confirms the rig is secure.
- (b) Check all levers are in the brake on position or if no brake on, in neutral.
- (c) Check all winches off.
- (d) Silence alarms.
- (e) Check all wipers, heaters and washers are off.
- (f) Check all communications are off and headsets stowed.
- (g) Check console covers are closed.
- (h) Check chair is pinned in position.

**e. Failures**

- (1) Should any failure alarm go off, silence the alarm and call the SE maintainer. Yellow indications are only warnings, the RAS may continue. Red indications are alarms and the RAS may have to be aborted.
- (2) Should an inhaul drive fail, the inhaul brake will come on and this will then have to be reset before the RAS can continue. If one drive is completely U/S, the traveller will have to be recovered with the outhaul de-latched in heave.
- (3) Should Auto transfer fail it must be reset with an empty hook.
- (4) Should the outhaul fail the RSA will have to be recovered using the traveller end of the outhaul to an ancillary winch.
- (5) Should a jackstay drive fail the SE must decide whether to abort the RAS or continue with 50% power?
- (6) Should all power be lost and the ships are moving apart, control the rig on the foot brakes and emergency brake release.
- (7) Remember your car driver's instinct – if in doubt apply the foot brakes. Then return the levers to neutral and consult the OIC/SE Maintainer.

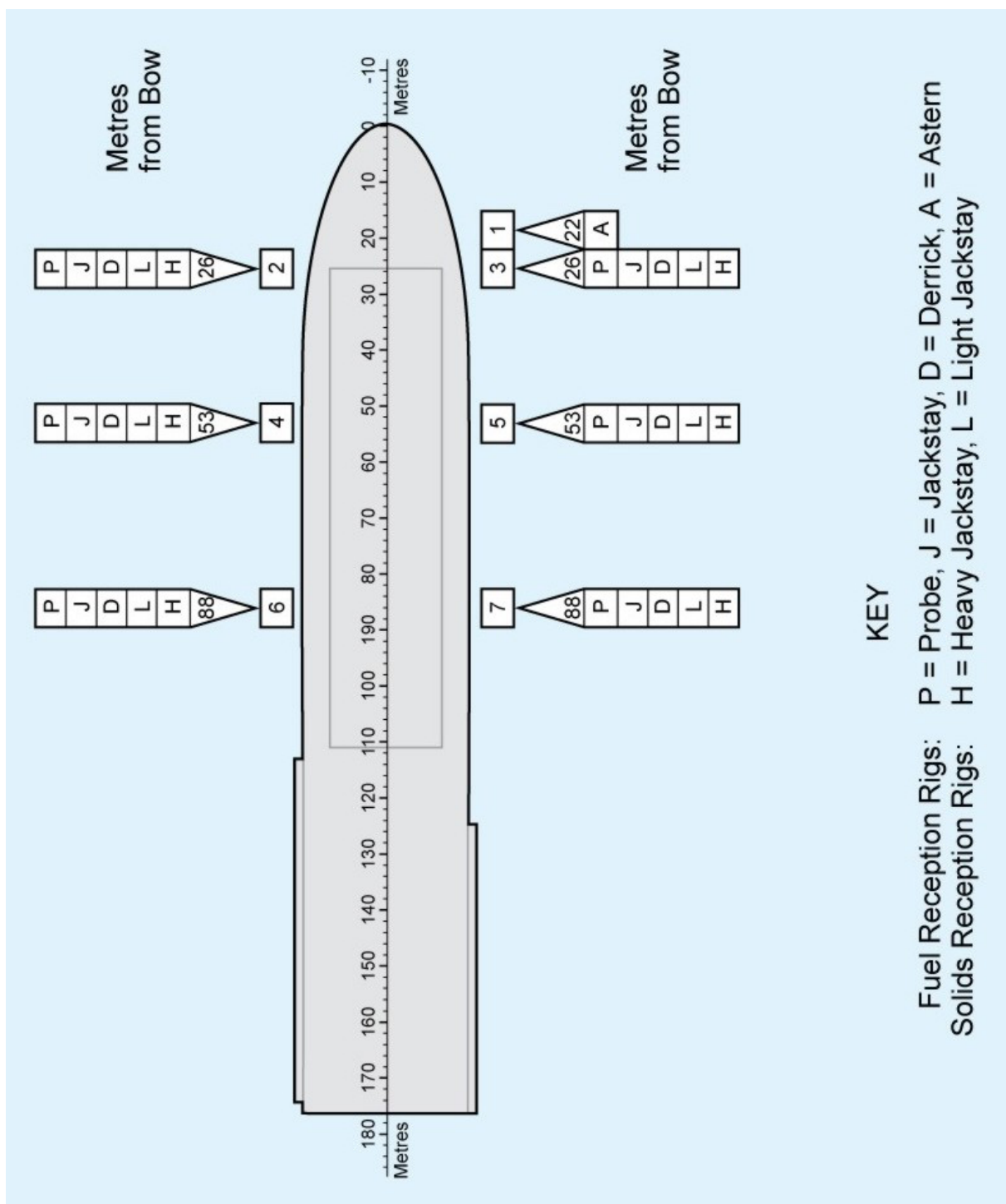
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ANNEX 7A

POSITIONS OF RAS ARRANGEMENTS IN HM SHIPS (LEGEND)

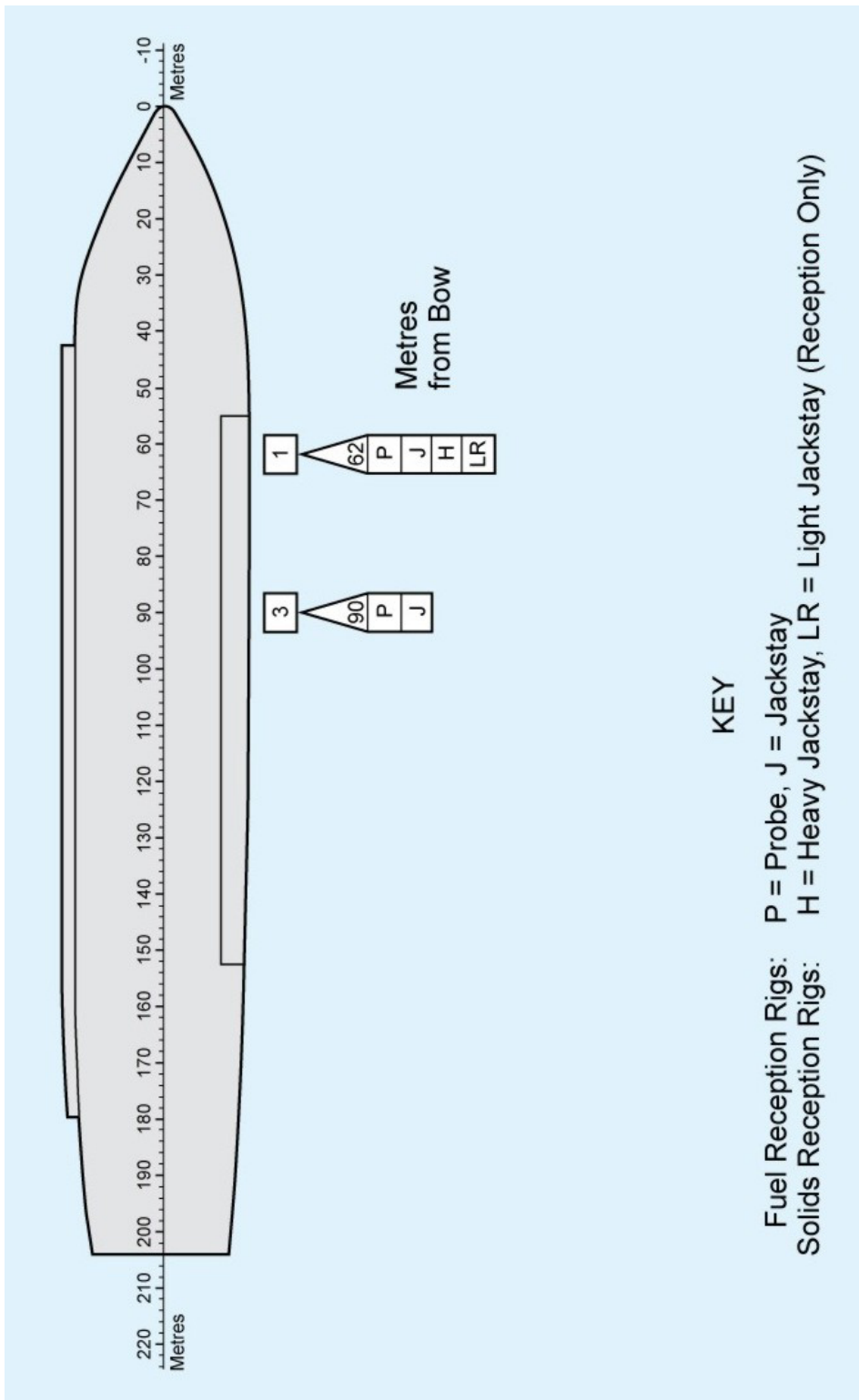
| <b>REPLENISHMENT STATION</b> |                                       |
|------------------------------|---------------------------------------|
| <b>A</b>                     | ASTERN RIG                            |
| <b>P</b>                     | PROBE RIG RECEPTION                   |
| <b>D</b>                     | DERRICK RIG RECEPTION                 |
| <b>J</b>                     | JACKSTAY FUELLING RIG RECEPTION       |
| <b>H</b>                     | HEAVY JACKSTAY RECEPTION              |
| <b>L</b>                     | LIGHT JACKSTAY (RECEPTION & DELIVERY) |
| <b>L(R)</b>                  | LIGHT JACKSTAY (RECEPTION ONLY)       |
| <b>C</b>                     | CRANE RIG                             |
| <b>SM</b>                    | STUMP OR STUMP MAST                   |

LPD – RAS ARRANGEMENTS

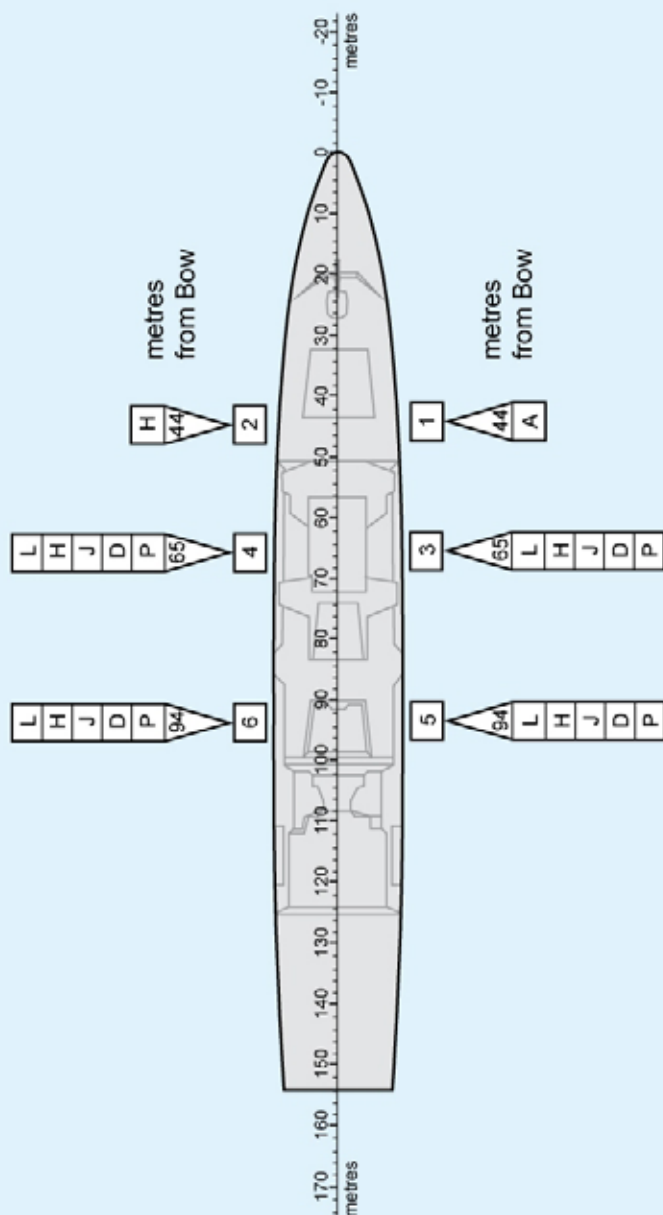




LPH – RAS ARRANGEMENTS



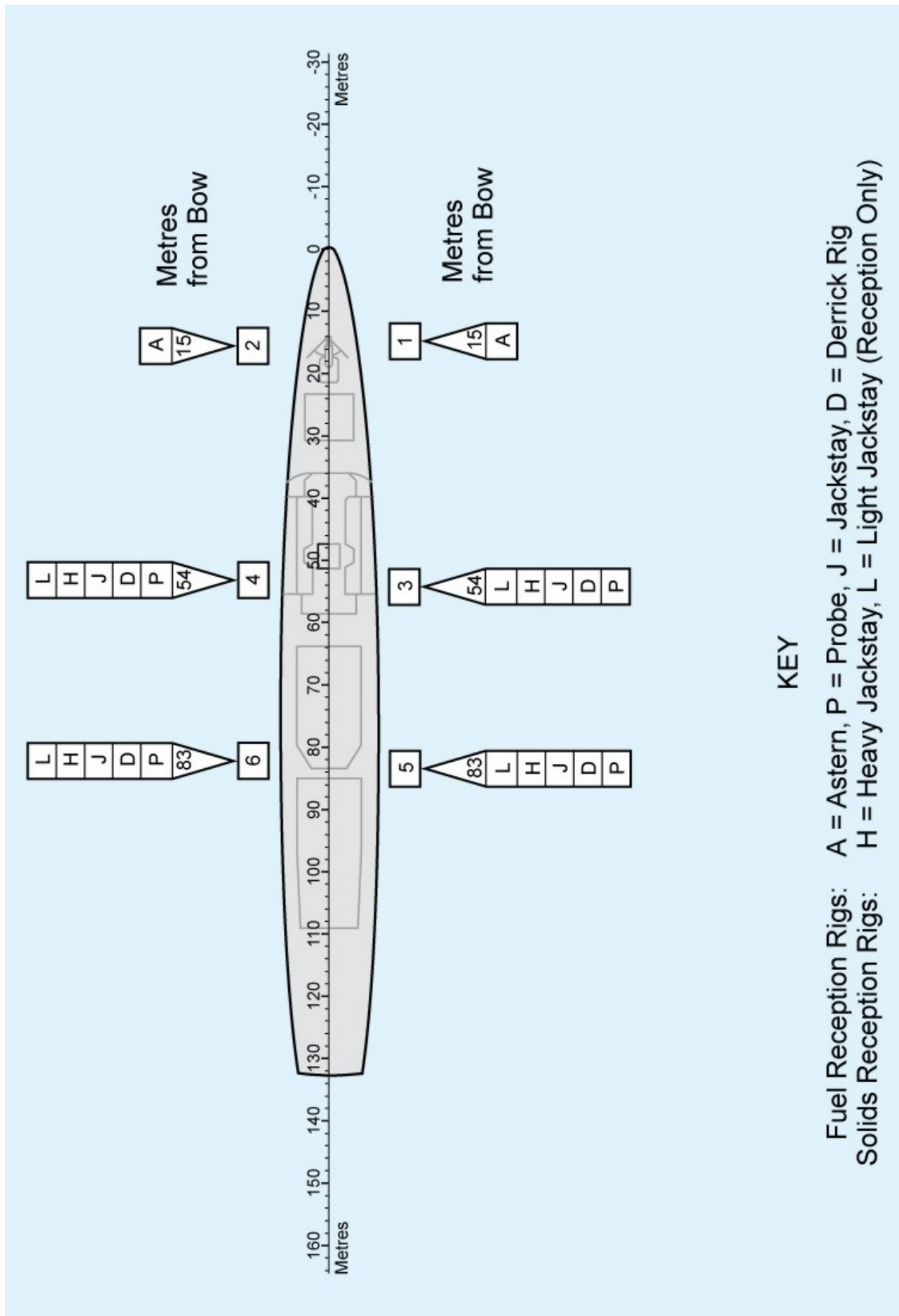
TYPE 45 – RAS ARRANGEMENTS



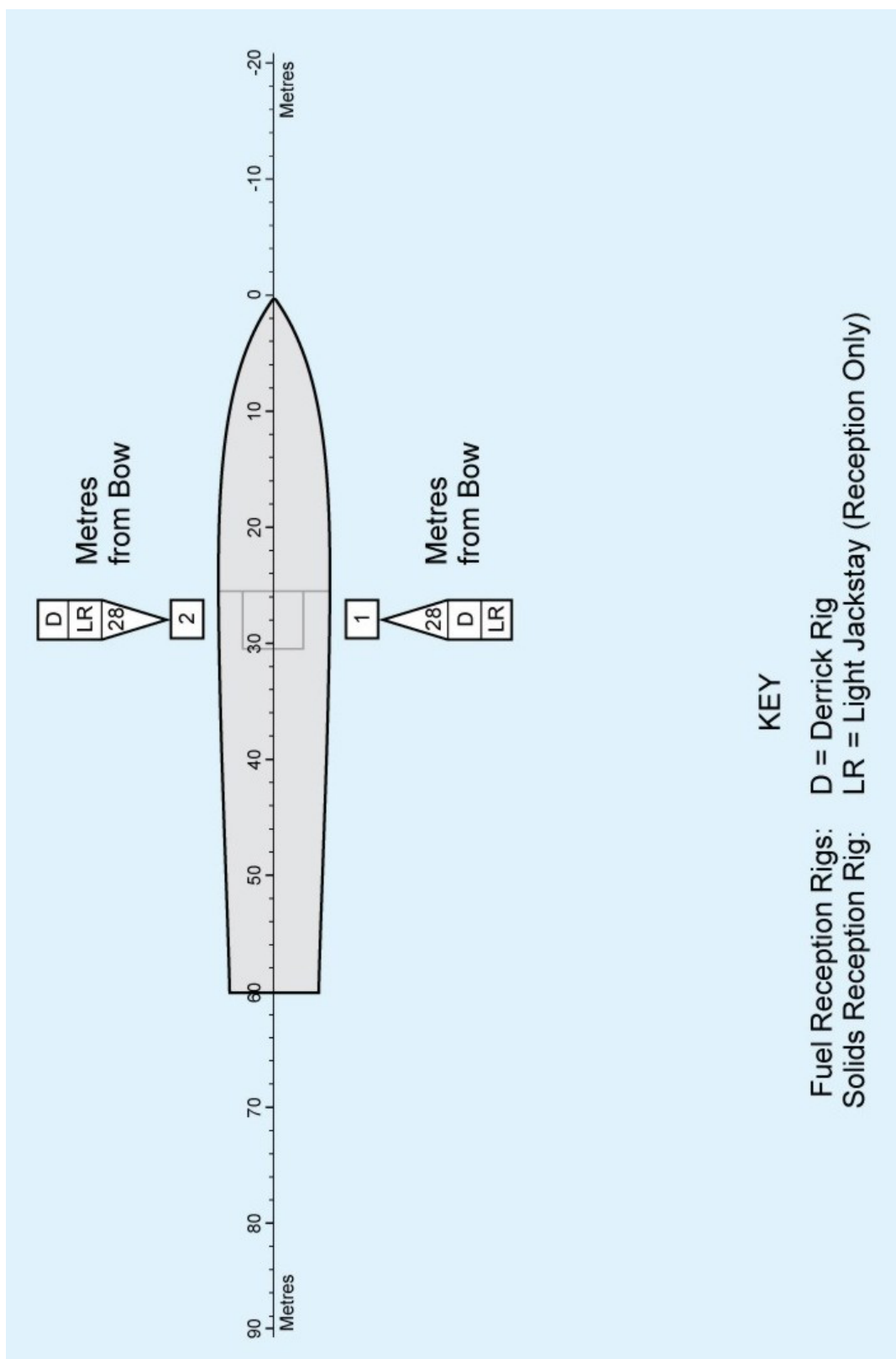
KEY

Fuel Reception Rigs: A = Astern, P = Probe, J = Jackstay, D = Derrick Rig  
 Solids Reception Rigs: H = Heavy Jackstay, L = Light Jackstay (Deliver/Receive)

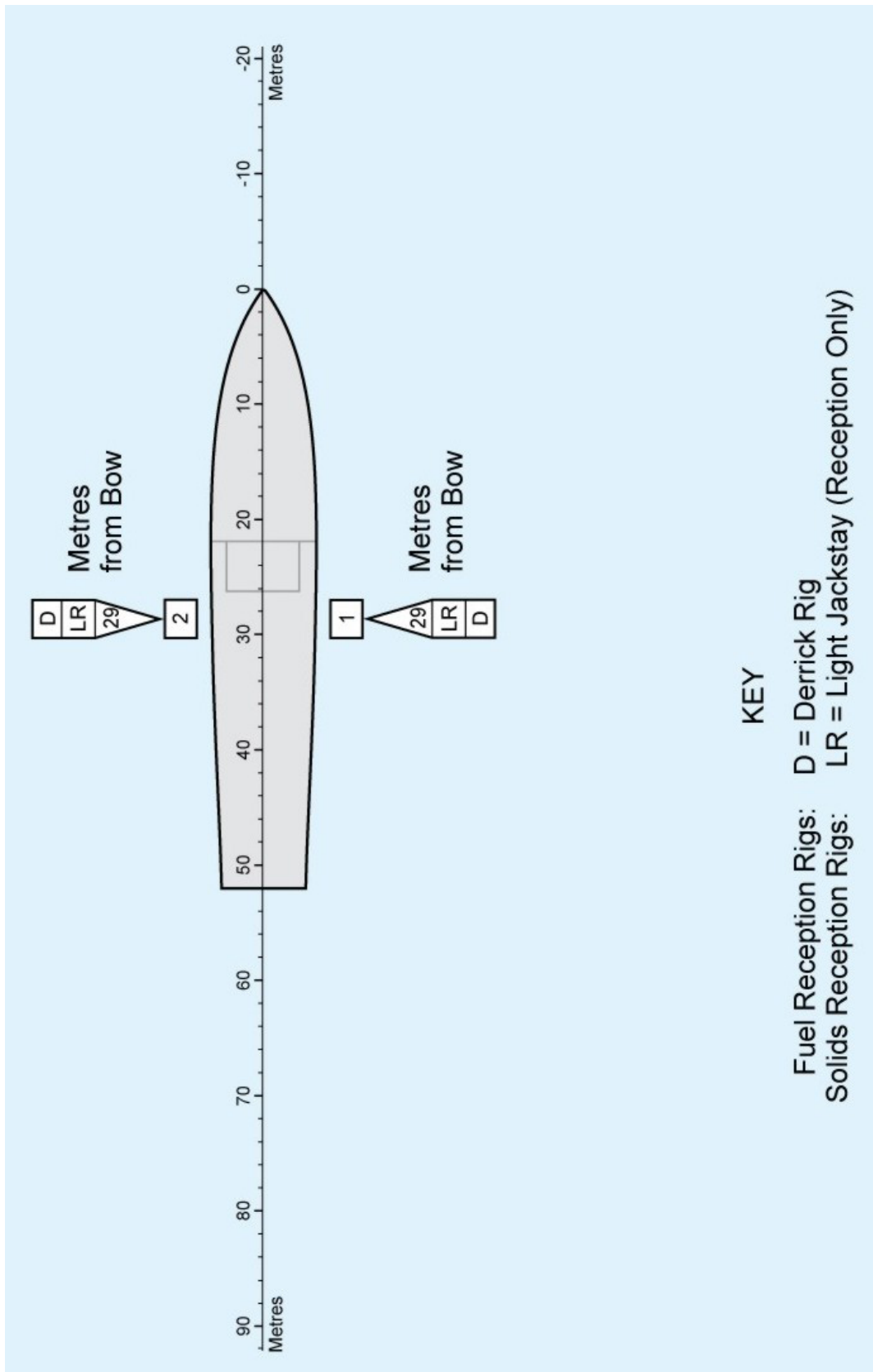
TYPE 23 – RAS ARRANGEMENTS



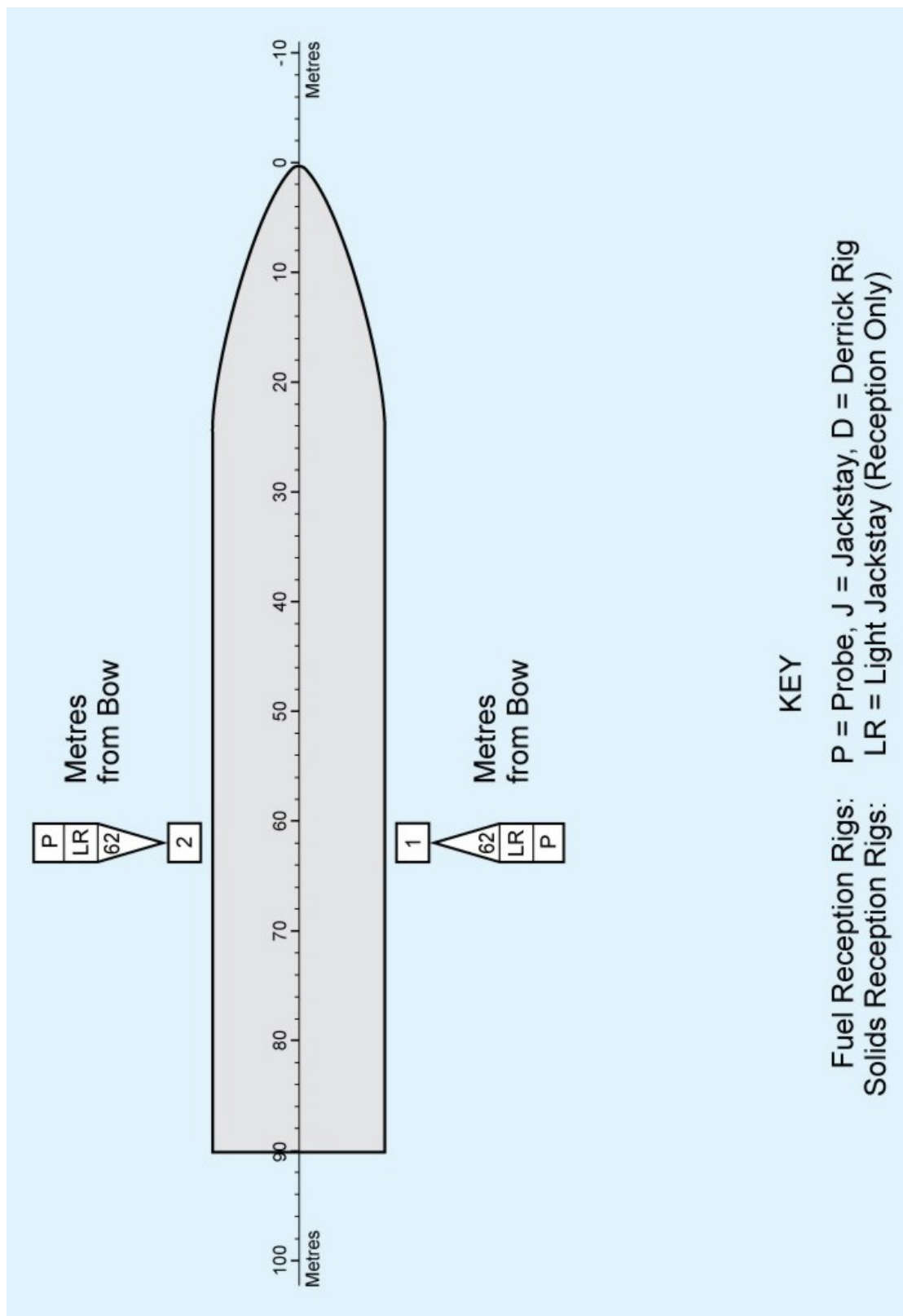
HUNT CLASS MHC – RAS ARRANGEMENTS



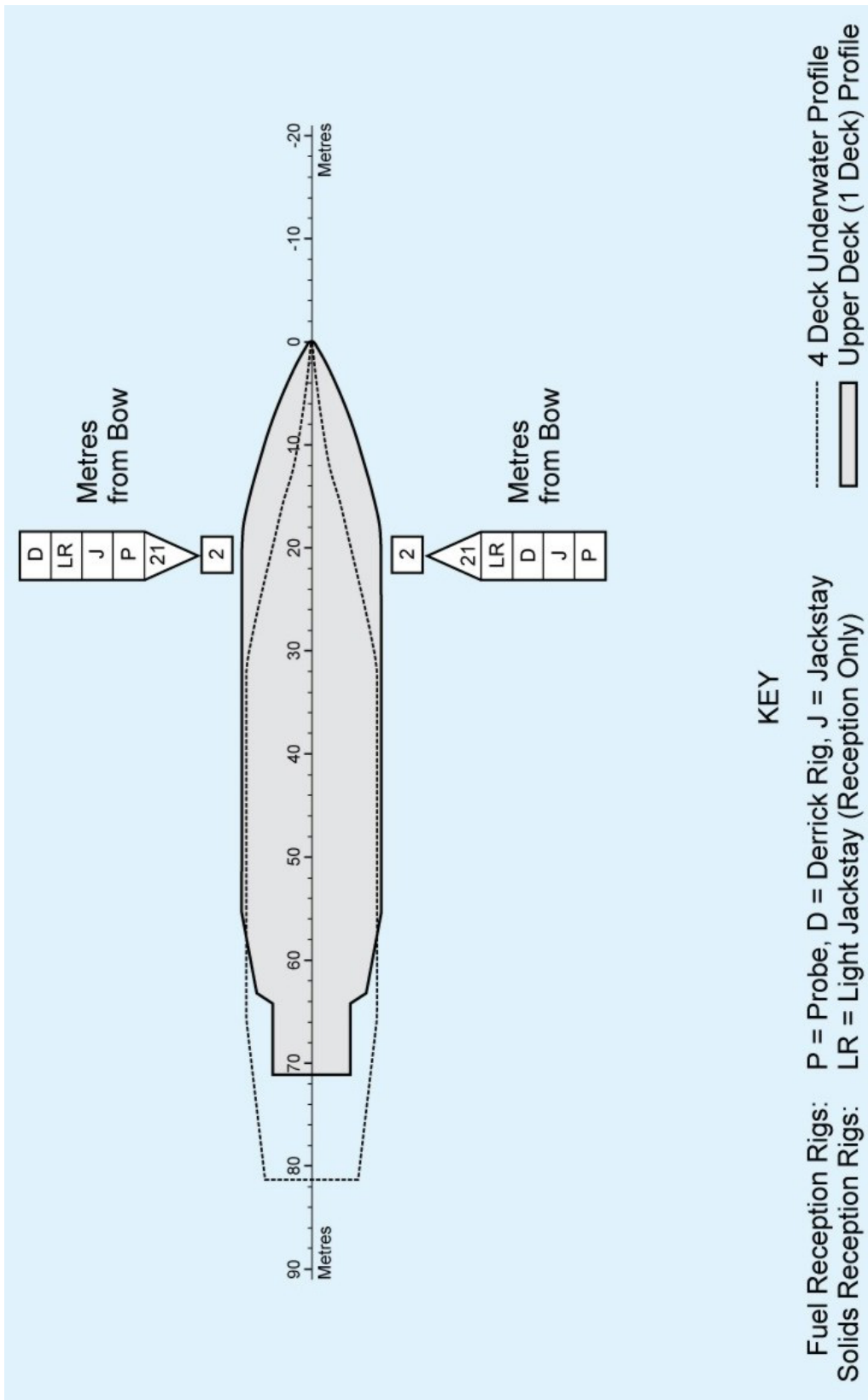
SANDOWN CLASS MHC – RAS ARRANGEMENTS



SVHO – RAS ARRANGEMENTS



CLYDE – RAS ARRANGEMENTS



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**ANNEX 7B**

**STANDARD RN RAS BRIEFING FORMAT**

1. Whenever practicable, RAS teams must be briefed in good time before a replenishment serial is to be carried out. The content and style of the brief is dependant upon the experience of the RAS team. For inexperienced teams the use of RAS videos, on-site briefs at a fully rigged RAS station, diagrams and view-graphs should be considered. The following pages contained a standard briefing format for each type of replenishment; the headings should be used as an aide memoire to enable the full sequence of events to be covered. Formats should be amended as necessary to suit particular RAS rigs or associated equipment.

**PAGE**

|            |   |
|------------|---|
| 7B2        | Standard RN RAS brief Format – All types of RAS |
| 7B3/4      | Probe Fuelling                                  |
| 7B5/6      | Derrick/Crane Refuelling                        |
| 7B7/8/9    | Jackstay Fuelling                               |
| 7B10/11    | Astern Fuelling                                 |
| 7B12/13    | Heavy Jackstay – Conventional                   |
| 7B14/15/16 | Heavy Jackstay – Sliding Pad-eye Rig            |
| 7B17/18    | Light Jackstay – Receiving                      |
| 7B19/20    | Light Jackstay – Delivering Ship                |
| 7B21       | Light Line Transfer – Delivering Ship           |
| 7B22       | Lifebuoy Sentry/Swimmer of the Watch            |
| 7B22       | Safety Equipment Brief                          |
| 7B23       | Safety Officer's Brief                          |

**BR 67  
REPLENISHMENT AT SEA**

**STANDARD RN RAS BRIEF FORMAT**

|  |
|--|
| <b>DAY</b>                                 |
| <b>DATE</b>                                |
| <b>TIME</b>                                |
| <b>RAS STATION</b>                         |
| <b>CONSORT</b>                             |
| <b>TYPE OF RAS</b>                         |
| <b>NO OF LOADS/PASSENGERS/PUMPING TIME</b> |
| <b>CONSTRAINTS (INCLUDING THREATS)</b>     |
| <b>SERIAL TIME/DURATION</b>                |
| <b>CLOSE UP AT</b>                         |

**PROBE FUELLING**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE HOSELINE TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HEAVE IN THE HOSELINE UNTIL THE JACKSTAY TERMINAL LINK IS INBOARD

REMOVE ANY TURNS OF THE HOSELINE FROM THE JACKSTAY

CUT THE FIRST STOP

CONNECT THE JACKSTAY TO THE PELICAN HOOK

CUT THE REMAINING STOPS – BREAK FREE THE GRIPPER LANYARD

TRANSFER THE WEIGHT TO THE JACKSTAY – REMOVE THE GRIPPER AND UNTOGGLE

CONNECTED – THE JACKSTAY IS AUTOMATICALLY TENSIONED

HEAVE IN THE HOSELINE – ENGAGE THE PROBE

VEER ON THE HOSELINE – CONFIRM MATED

DOWN GOGGLES – START PUMPING

RIG THE REMATING LINE – REMOVE THE HOSELINE

RETURN THE HOSELINE AND GRIPPER ON THE MESSENGER

STOP PUMPING – DRAIN DOWN

OFF REMATING LINE/RETAINING PENDANT – RAS COMPLETE

RELEASE THE PROBE

THE HOSES ARE RECOVERED – THE JACKSTAY IS DETENSIONED

PLACE THE HAMMER – OUT 'R' CLIP – **CLEAR THE DUMP** – LOWER THE TEMPORARY GUARDRAIL

SLIP THE JACKSTAY – UP TEMPORARY GUARDRAIL

RETURN THE REMAINING ANCILLARY LINES.

**BR 67**  
**REPLENISHMENT AT SEA**

**PROBE FUELLING – EMERGENCY BREAKAWAY PROCEDURES (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

REMOVE OR CUT THE HOSELINE/REMATING LINE/RETAINING PENDANT

OPERATE THE RELEASE HANDLE – PERSONNEL ARE TO CLEAR THE AREA AS TASKS ARE COMPLETED

PLACE HAMMER – OUT ‘R’ CLIP – **CLEAR THE DUMP** – LOWER THE TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – TRIP THE PELICAN HOOK

UP TEMPORARY GUARDRAIL

**BRIEF THE EMERGENCY BREAKAWAY PROCEDURE FOR ALL STAGES OF THE RAS**

HOSELINE BEING RETURNED – CONTINUE TO THE END AND LET GO

HOSELINE IN RECEIVING SHIP – RETAIN – PAY OUT MESSENGER TO THE END AND LET GO

ANY LINE THAT FOULS OR PASSES UNDER THE RIG SHOULD BE CUT

**DERRICK/CRANE REFUELLING – QRC OR NATO ‘B’ COUPLING**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE HOSELINE TAIL TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HEAVE/HAUL IN THE HOSELINE BY HAND (OR POWER)

HEAVE ACROSS THE HOSE – DOWN TEMPORARY GUARDRAIL – PASS THE TOP LEG OF THE TEMPORARY GUARDRAIL

USE OF THE PIG TAIL

CUT AN ADEQUATE AMOUNT OF STOPS TO ALLOW THE LOWERING OF THE HOSE(S) TO THE DECK

HEAVE IN – CUTTING THE REMAINING STOPS

ON HOSE HANGING PENDANT

VEER THE HOSELINE – TRANSFER THE WEIGHT

CONNECTED

ON STROPS AND TACKLES

REMOVE THE HOSELINE – THE RIGGING OF Slip rope AND CONNECTION OF HOSES IS AT THE COMMANDS DISCRETION – TIGHTEN THE FUEL RISER (GOOSENECK)

DOWN GOGGLES – OPEN THE FUEL SHUT-OFF VALVE

START PUMPING

RETURN THE HOSELINE ON THE MESSENGER

STOP PUMPING – CLOSE THE FUEL SHUT OFF VALVE

RAS COMPLETE

OFF STROPS AND TACKLES

HEAVE IN ON THE Slip rope – OFF HOSE HANGING PENDANT

**CLEAR THE DUMP** – RECOVER THE TOP LEG OF THE TEMPORARY GUARD RAIL

SURGE ON THE Slip rope – CUT/SLIP THE Slip rope AND RECOVER

UP TEMPORARY GUARDRAIL – RETURN THE REMAINING ANCILLARY LINES

**BR 67  
REPLENISHMENT AT SEA**

**DERRICK/CRANE FUELLING – EMERGENCY BREAKAWAY  
PROCEDURE (EBA)**

**THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY  
WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT**

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

CLOSE THE FUEL SHUT OFF VALVE – DISCONNECT QRC/BREAK NATO B SPOOL

REMOVE/CUT THE STROPS AND TACKLES – PERSONNEL ARE TO CLEAR THE AREA  
AS TASKS ARE COMPLETED

HEAVE IN ON THE SLIP ROPE – REMOVE THE HOSE HANGING PENDANT

**CLEAR THE DUMP** – REMOVE THE TOP LEG OF THE TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – CUT THE Slip rope ONCE HOSES ARE OUTBOARD WHETHER SLIP  
FITTED OR NOT

**BRIEF THE EMERGENCY BREAKAWAY PROCEDURE FOR ALL STAGES OF THE  
RAS**

IF THE HOSELINE STILL ATTACHED TO THE RING -USE THE HOSELINE AS A Slip rope

IF THE HOSELINE HAS BEEN REMOVED AND THE Slip rope HAS NOT BEEN RIGGED –  
SLIP THE HOSE HANGING PENDANT AT EXECUTE

IF THE HOSELINE HAS BEEN REMOVED AND IS NOT ATTACHED TO THE MESSENGER  
– RETAIN THE HOSELINE

IF THE HOSELINE IS IN THE PROCESS OF BEING RETURNED – CONTINUE RETURNING  
THE HOSELINE

COILS NOT TO BE THROWN OVERBOARD

ANY LINE THAT FOULS OR PASSES UNDER THE RIG SHOULD BE CUT

## JACKSTAY FUELLING PROCEDURES

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE HOSELINE TAIL TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HEAVE/HAIL IN THE HOSELINE BY HAND (OR POWER)

HEAVE IN HOSELINE UNTIL THE JACKSTAY TERMINAL LINK IS INBOARD

REMOVE ANY TURNS OF THE HOSELINE FROM THE JACKSTAY

CUT THE FIRST STOP

CONNECT THE JACKSTAY TERMINAL LINK TO THE SLIP/QRD – MOUSE PIN

CUT THE REMAINING STOPS – BREAK FREE THE GRIPPER LANYARD

TRANSFER THE WEIGHT TO THE JACKSTAY – REMOVE THE GRIPPER AND UNTOGGLE

CONNECTED – THE JACKSTAY IS AUTOMATICALLY TENSIONED

HEAVE ACROSS THE HOSE – DOWN TEMPORARY GUARDRAIL – PASS THE TOP LEG OF THE TEMPORARY GUARDRAIL

USE OF THE PIG TAIL

CUT AN ADEQUATE AMOUNT OF STOPS TO ALLOW THE HOSES TO BE LOWERED TO THE DECK

HEAVE IN – CUT THE REMAINING STOPS

ON HOSE HANGING PENDANT

VEER THE HOSELINE – TRANSFER THE WEIGHT TO THE HANGING PENDANT

ON STROPS AND TACKLES

REMOVE THE HOSELINE – THE RIGGING OF Slip rope AND CONNECTION OF HOSES IS AT THE COMMANDS DISCRETION – TIGHTEN THE FUEL RISER (GOOSENECK)

DOWN GOGGLES – OPEN THE FUEL SHUT-OFF VALVE

START PUMPING

RETURN THE HOSELINE AND GRIPPER ON THE MESSENGER

STOP PUMPING – CLOSE THE FUEL SHUT OFF VALVE

**BR 67**  
**REPLENISHMENT AT SEA**

RAS COMPLETE

OFF STROPS AND TACKLES

HEAVE IN ON THE Slip rope – OFF HOSE HANGING PENDANT

**CLEAR THE DUMP** – RECOVER THE TOP LEG OF THE TEMPORARY GUARD RAIL

SURGE ON THE Slip rope UNTIL THE HOSES ARE OUTBOARD – AVAST AND SLIP/CUT THE Slip rope

UP TEMPORARY GUARD RAIL – RECOVER THE Slip rope INBOARD

DE-TENSION JACKSTAY

REMOVE THE MOUSING – PLACE THE HAMMER – OUT PIN/TAKE THE QRD LANYARDS IN HAND

**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

SLIP JACKSTAY – UP TEMPORARY GUARDRAIL

RETURN THE REMAINING ANCILLARY LINES.

**JACKSTAY FUELLING PROCEDURES – EMERGENCY BREAKAWAY PROCEDURES (EBA)**  
**THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY**  
**WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT**

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

CLOSE THE FUEL SHUT OFF VALVE – DISCONNECT QRC/BREAK NATO B SPOOL

REMOVE/CUT THE STROPS AND TACKLES – PERSONNEL ARE TO CLEAR THE AREA AS TASKS ARE COMPLETED

HEAVE IN ON THE SLIP ROPE – REMOVE THE HOSE HANGING PENDANT

**CLEAR THE DUMP** – REMOVE THE TOP LEG OF THE TEMPORARY GUARDRAIL

SURGE UNTIL THE Slip rope IS SLACK, OR THE HOSE ENDS ARE OUTBOARD – THEN CUT

UP TEMPORARY GUARDRAIL – RECOVER THE Slip rope INBOARD

**GIVE THE 'READY' SIGNAL ONLY WHEN THE HOSES ARE READY FOR SAFE RECOVERY**

THE DELIVERING SHIP RECOVERS THE HOSES

PLACE HAMMER – OFF MOUSING – OUT PIN/TAKE THE QRD LANYARDS IN HAND



**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – SLIP THE JACKSTAY

UP TEMPORARY GUARDRAIL

**BRIEF THE EMERGENCY BREAKAWAY PROCEDURE FOR ALL STAGES OF THE RAS**

IF THE HOSELINE STILL ATTACHED TO THE RING -USE THE HOSELINE AS A Slip rope

IF THE HOSELINE HAS BEEN REMOVED AND THE Slip rope HAS NOT BEEN RIGGED –  
SLIP THE HOSE HANGING PENDANT AT THE READY SIGNAL

IF THE HOSELINE HAS BEEN REMOVED AND IS NOT ATTACHED TO THE MESSENGER  
– RETAIN THE HOSELINE

IF THE HOSELINE IS IN THE PROCESS OF BEING RETURNED – CONTINUE RETURNING  
THE HOSELINE

COILS NOT TO BE THROWN OVERBOARD

ANY LINE THAT FOULS OR PASSES UNDER THE RIG SHOULD BE CUT

**BR 67**  
**REPLENISHMENT AT SEA**

**ASTERN FUELLING – FLOAT METHOD**

MAKE UP THE CREEPERS (RUNNING SHACKLE)

THROW THE CREEPER

HAUL IN A BIGHT OF THE HOSELINE – REMOVE THE CREEPER

CONTINUE HAULING IN THE HOSE LINE UNTIL THE FLOAT IS AT THE ROLLER FAIRLEAD

ATTACH THE PRE-RIGGED INHAUL LINE AND BRING TO THREE TURNS

REMOVE THE FLOAT – HEAVE IN (INFORM THE BRIDGE FLOAT REMOVED)

BRING THE HOSE END THROUGH THE ROLLER FAIRLEADS ENSURING THE HOSE CLAMP REMAINS OUTBOARD

AVAST – ATTACH HOSE SECURING PENDANT

VEER AND TRANSFER THE WEIGHT TO THE PENDANT

ON STROPS AND TACKLES – INFORM COMMAND

REMOVE THE HOSELINE – RIG THE Slip rope

CONNECT THE HOSE – TIGHTEN UP THE FUEL RISER – DOWN GOGGLES – OPEN THE FUEL SHUT OFF VALVE

CLEAR THE AREA OF NON-ESSENTIAL PERSONNEL – START PUMPING

RE-RIG THE HOSELINE

RE-ATTACH THE FLOAT

STOP PUMPING

CONNECT THE HOSELINE TO THE BRIDLE RING (LEAVE THE ELONGATED LINK FREE FOR THE NEXT SHIP)

BLOW THROUGH – CLOSE THE FUEL SHUT OFF VALVE

RAS COMPLETE

DISCONNECT THE HOSE

REMOVE THE STROPS AND TACKLES

HEAVE IN THE Slip rope

OFF SECURING PENDANT

SURGE Slip rope

CUT THE Slip rope WHEN THE HOSE END IS JUST CLEAR OF THE WATER

COMMENCE CUTTING THE STOPS ON THE HOSELINE – THE LAST STOP IS THE FLOAT

**ASTERN FUELLING – EMERGENCY BREAKAWAY PROCEDURES (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

CLOSE THE FUEL SHUT OFF VALVE (NOT HUDSON REEL – DISCONNECT QRC/BREAK NATO B SPOOL

REMOVE/CUT THE STROPS AND TACKLES – PERSONNEL CLEAR AREA AS TASKS ARE COMPLETED

HEAVE IN ON THE Slip rope – REMOVE HOSE SECURING PENDANT (IF PENDANT CANNOT BE REMOVED IT MUST BE SLIPPED)

SURGE THE Slip rope – WHEN HOSES ARE JUST OUTBOARD – CUT THE Slip rope

**BRIEF THE EMERGENCY BREAKAWAY FOR ALL STAGES OF THE RAS**

HOSELINE REMOVED – Slip rope NOT RIGGED – SLIP SECURING PENDANT

HOSELINE NOT REMOVED – USE AS A Slip rope (DO NOT RE-ATTACH FLOAT)

HOSES WILL BE RETURNED FULLY CHARGED – DO NOT BLOW THROUGH

**BR 67  
REPLENISHMENT AT SEA**

**HEAVY JACKSTAY – CONVENTIONAL**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE OUTHAUL TAIL TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HEAVE/HAUL IN THE OUTHAUL BY HAND (OR POWER)

HEAVE IN THE OUTHAUL UNTIL THE JACKSTAY TERMINAL LINK IS INBOARD

REMOVE ANY TURNS OF THE OUTHAUL FROM THE JACKSTAY

CUT THE FIRST STOP

CONNECT THE JACKSTAY TERMINAL LINK TO THE SLIP/QRD – MOUSE PIN

CUT THE REMAINING STOPS – BREAK FREE THE GRIPPER LANYARD

TRANSFER THE WEIGHT TO THE JACKSTAY – REMOVE THE GRIPPER AND UNTOGGLE

CONNECTED – DOWN SLACK ON THE OUTHAUL

THE DELIVERING SHIP TENSIONS THE JACKSTAY (CHECK FOR TWIST AND TURNS)

THE DELIVERING SHIP DE-TENSIONS THE JACKSTAY AND HOOKS ON THE TEST WEIGHT

THE DELIVERING SHIP TENSIONS THE JACKSTAY – TEST WEIGHT IS THEN PASSED

THE DELIVERING SHIP DE-TENSIONS THE JACKSTAY – LOWERS THE TEST WEIGHT TO THE SHOT MAT IN THE RECEIVING SHIP

THE DELIVERING SHIP TENSIONS THE JACKSTAY

REDUCE TO ONE TURN ON WINCH (OR DECLUTCH THE CAPTIVE DRUM)

PAY BACK THE TEST WEIGHT TO THE DELIVERING SHIP – SURGE ON THE OUTHAUL – REMOVE THE SHOT MAT

COMMENCE PASSING LOADS – LAST LOAD PALLET TRUCKS

RAS COMPLETE

THE DELIVERING SHIP DE-TENSIONS JACKSTAY – THE DELIVERING SHIP RECOVERS OUTHAUL

REMOVE THE MOUSING – PLACE THE HAMMER – OUT PIN/TAKE THE QRD LANYARDS IN HAND

**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

SLIP JACKSTAY – UP TEMPORARY GUARDRAIL

RETURN THE REMAINING ANCILLARY LINES.

**HEAVY JACKSTAY – CONVENTIONAL – EMERGENCY BREAKAWAY  
PROCEDURE (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY  
WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

RETURN TRAVELLER TO THE DELIVERING SHIP **(IF THE LOAD IS ON DECK, 'PASS  
'TENSION' THEN GO BACK TO 'PREPARE FOR EMERGENCY BREAKAWAY')**

THE DELIVERING SHIP UNHOOKS LOAD AND DE-TENSIONS JACKSTAY

REMOVE THE MOUSING – PLACE THE HAMMER – OUT PIN  
**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – SLIP THE JACKSTAY

UP TEMPORARY GUARDRAIL

PAY OUT THE REMAINDER OF THE OUTHAUL

COILS ARE NOT TO BE THROWN OVERBOARD

ANY LINE THAT FOULS OR PASSES UNDER THE RIG SHOULD BE CUT

**BR 67**  
**REPLENISHMENT AT SEA**

**HEAVY JACKSTAY – SLIDING PAD-EYE RIG**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE HAULING OVER LINE TAIL TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HEAVE/HAUL IN THE HAULING OVER LINE BY HAND (OR POWER)

HEAVE IN THE HAULING OVER LINE UNTIL THE JACKSTAY TERMINAL LINK IS INBOARD

REMOVE ANY TURNS OF THE HAULING OVER LINE FROM THE JACKSTAY

CUT THE FIRST STOP

CONNECT THE JACKSTAY TERMINAL LINK TO THE SLIP/QRD – MOUSE PIN

CUT THE REMAINING STOPS – BREAK FREE THE GRIPPER LANYARD

TRANSFER THE WEIGHT TO THE JACKSTAY – REMOVE THE GRIPPER AND UNTOGGLE

CONNECTED – DOWN SLACK ON THE HAULING OVER LINE

TENSION – THE DELIVERING SHIP TENSIONS THE JACKSTAY

HEAVE IN ON THE HAULING OVER LINE – UNTIL THE RETURN SHEAVE ASSEMBLY HAS MATED WITH THE TERMINAL LINK

VEER ON THE HAULING OVER LINE – REMOVE THE HAULING OVER LINE FROM THE WARPING DRUM AND LIGHT TO

TENSION – THE DELIVERING SHIP TENSIONS THE INHAUL/OUTHAUL WIRES

CONNECTED

REMOVE THE HAULING OVER LINE AND RETURN WITH THE GRIPPER ON THE FIRST AVAILABLE TRAVELLER

RAISE THE SLIDING PADEYE

THE DELIVERING SHIP PASSES THE LIGHT TRAVELLER FOR A WINCH TEST

AVAST WHEN THE TRAVELLER IS IN THE REQUIRED POSITION

DELIVERY SHIP THEN RECOVERS THE TRAVELLER

THE DELIVERING SHIP PASSES THE LIGHT TRAVELLER – AVAST WHEN THE TRAVELLER IS IN THE REQUIRED POSITION – RED BAT ALOFT IF THE TRAVELLER IS CORRECTLY POSITIONED

DELIVERY SHIP MARKS THE TRAVELLER POSITION – THE DELIVERING SHIP THEN RECOVERS THE TRAVELLER

THE DELIVERING SHIP PASSES THE LIGHT TRAVELLER TO CHECK MARKED POSITION IS CORRECT – HOLD RED BAT ALOFT IF MARKED POSITION CORRECT

THE DELIVERING SHIP RECOVERS THE TRAVELLER – HOOK ON THE TEST WEIGHT – PASS THE TEST WEIGHT

LOWER THE TEST WEIGHT TO THE SHOT MAT – **DO NOT UNHOOK THE TEST WEIGHT**

RAISE THE SLIDING PADEYE – THE DELIVERING SHIP RECOVERS THE TEST WEIGHT

REMOVE THE SHOT MAT

COMMENCE PASSING LOADS

LAST LOAD PALLET TRUCKS

RAS COMPLETE

THE DELIVERING SHIP DE-TENSIONS THE INHAUL/OUTHAUL

LOWER THE SLIDING PADEYE – RELEASE THE RETURN SHEAVE ASSEMBLY – THE DELIVERING SHIP RECOVERS THE RSA

THE DELIVERING SHIP DE-TENSIONS THE JACKSTAY

REMOVE THE MOUSING – PLACE THE HAMMER – OUT PIN/TAKE THE QRD LANYARDS IN HAND

**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

SLIP THE JACKSTAY – UP TEMPORARY GUARDRAIL

RETURN THE REMAINING ANCILLARY LINES.

**BR 67  
REPLENISHMENT AT SEA**

**HEAVY JACKSTAY – SLIDING PAD-EYE RIG – EMERGENCY BREAKAWAY  
PROCEDURE (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

RETURN THE TRAVELLER TO THE DELIVERING SHIP – THE DELIVERING SHIP RECOVERS TRAVELLER **(IF THE LOAD IS ON DECK RAISE THE PADEYE AND GIVE 'HEAVE IN' THEN CONTINUE WITH DRILL)**

THE DELIVERING SHIP RECOVERS THE TRAVELLER AND DE-TENSIONS THE OUTHAUL

RELEASE THE RETURN SHEAVE ASSEMBLY

THE DELIVERING SHIP DE-TENSIONS THE JACKSTAY

PLACE HAMMER – OFF MOUSING – OUT PIN/TAKE THE QRD LANYARDS IN HAND

**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – SLIP THE JACKSTAY

UP TEMPORARY GUARDRAIL

COILS ARE NOT TO BE THROWN OVERBOARD – ANY LINE THAT FOULS OR PASSES UNDER THE RIG SHOULD BE CUT



**LIGHT JACKSTAY – RECEIVING**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

HAUL IN THE GUNLINE

ATTACH THE OUTHAUL TAIL TO THE STRAYLINE

REMOVE THE ANCILLARY LINES

HAUL ACROSS THE JACKSTAY ON THE OUTHAUL

CONNECT THE JACKSTAY'S SWR GROMMET TO THE 9747 SLIP

TRANSFER THE WEIGHT OF THE JACKSTAY TO THE SLIP – REMOVE THE TOGGLE

CONNECTED – DOWN SLACK ON OUTHAUL

TENSION THE JACKSTAY – CHECK FOR TURNS IN ALL ROPES

DE-TENSION – THE TEST WEIGHT IS HOOKED ON

TENSION THE JACKSTAY – HAUL ACROSS THE TEST WEIGHT

DE-TENSION LOWERING THE TEST WEIGHT ON TO THE SHOT MAT – **DO NOT UNHOOK TEST WEIGHT**

TENSION THE JACKSTAY – RETURN THE TEST WEIGHT – REMOVE THE SHOT MAT (BRIEF RATING TO CUT THE OUTHAUL AUTOMATICALLY IF THE JACKSTAY SHOULD PART)

COMMENCE TRANSFER OF PERSONNEL/LOADS (RAS BAGS)

RAS COMPLETE

THE DELIVERING SHIP RECOVERS 10 METRES OF THE OUTHAUL- TOGGLE IN THE JACKSTAY

SLIP THE JACKSTAY AND RETURN WITH THE OUTHAUL

RETURN THE ANCILLARY LINES

**BR 67  
REPLENISHMENT AT SEA**

**LIGHT JACKSTAY – RECEIVING – EMERGENCY BREAKAWAY  
PROCEDURES (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

TRAVELLER IN TRANSIT – COMPLETE RUN THEN UNHOOK THE LOAD

TRAVELLER IN EITHER SHIP – UNHOOK LOAD AND RETAIN

THE DELIVERING SHIP DE-TENSIONS THE JACKSTAY

PLACE THE HAMMER – REMOVE THE MOUSING – OUT PIN

**CLEAR THE DUMP** – DOWN TEMPORARY GUARDRAIL

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA

ON EXECUTE EBA – SLIP THE JACKSTAY – IF THE TRAVELLER IS IN THE RECEIVING SHIP WHEN

THE JACKSTAY IS SLIPPED THE WEIGHT OF THE JACKSTAY AND TRAVELLER WILL BE ON THE OUTHAUL

UP TEMPORARY GUARDRAIL – PAY OUT THE OUTHAUL

COILS ARE NOT TO BE THROWN OVERBOARD

ANY LINE THAT FOULS SHOULD BE CUT

**LIGHT JACKSTAY – DELIVERING SHIP**

CLOSE UP LBS/SOW REPORT TO OOW – STRIKE GUARDRAILS

GUNLINE FIRING SEQUENCE

ATTACH THE OUTHAUL TO THE GUNLINE – PAY OUT HAND OVER HAND

ATTACH THE DISTANCE LINE (AND TELEPHONE LINE IF REQUIRED) TO THE – PAY OUT

ATTACH THE OUTHAUL TO THE JACKSTAY WITH THE TOGGLE (DOUBLE LOOP) – PAY OUT (JACKSTAY IS PAID OUT THROUGH THE BLOCKS')

CONNECTED – WHEN THE JACKSTAY IS CONNECTED IN THE RECEIVING SHIP PAY OUT REMAINDER OF THE OUTHAUL

TENSION THE JACKSTAY – CHECK THE RIG FOR TURNS AND CORRECT LEADS

DETENSION THE JACKSTAY – HOOK ON THE TEST WEIGHT – DOWN SLACK ON THE INHAUL

TENSION THE JACKSTAY – LOWER THE TEMPORARY GUARDRAIL – PASS THE TEST WEIGHT

DE-TENSION THE JACKSTAY – THE TEST WEIGHT IS LOWERED TO THE SHOT MAT – **NOT UNHOOKED**

TENSION THE JACKSTAY – RECOVER THE TEST WEIGHT

DE-TENSION THE JACKSTAY – UNHOOK THE TEST WEIGHT, TAKE CLEAR OF THE DUMP – BRIEF A RATING TO CUT INHAUL AUTOMATICALLY IF THE JACKSTAY SHOULD PART

CONTINUE TRANSFER

REPLENISHMENT COMPLETE

RECOVER 10 METRES OF THE OUTHAUL

THE OUTHAUL IS TOGGLED INTO THE JACKSTAY – SLIP REMOVED (RECEIVING SHIP)

HAUL IN THE JACKSTAY AND THE OUTHAUL

RECOVER THE REMAINING ANCILLARY LINES

**BR 67**  
**REPLENISHMENT AT SEA**

**LIGHT JACKSTAY – DELIVERING SHIP – EMERGENCY BREAKAWAY  
PROCEDURE (EBA)**

THE AIM OF EMERGENCY BREAKAWAY MUST BE TO DISENGAGE QUICKLY  
WITHOUT ENDANGERING LIFE AND WITH MINIMUM DAMAGE TO EQUIPMENT

EBA MAY BE INITIATED BY EITHER SHIP

CONFIRMATION FROM COMMAND

RETURN THE ANCILLARY LINES

TRAVELLER IN TRANSIT – COMPLETE THE RUN THEN UNHOOK THE LOAD

TRAVELLER IN EITHER SHIP – UNHOOK THE LOAD AND RETAIN

DE-TENSION THE JACKSTAY – KEEP CLEAR OF THE WATER

WHEN BOTH SHIPS ARE READY THE **DELIVERING SHIP** WILL EXECUTE EBA  
RECOVER THE JACKSTAY AND THE OUTHAUL

ANY LINE THAT FOULS SHOULD BE CUT

**LIGHT LINE TRANSFER – DELIVERING SHIP  
RIG DUMP AREA**

GUNLINE FIRING SEQUENCE

ATTACH THE GUNLINE TO THE INGLEFIELD CLIP IN THE END OF THE LIGHT LINE –  
PAY OUT THE LIGHT LINE

WHEN THE SECOND INGLEFIELD CLIP (40M MARK) IS IN THE DUMP ATTACH THE  
DISTANCE LINE

PAY OUT THE LIGHT LINE AND THE DISTANCE LINE

WHEN MID-WAY MARK (RED BUNTING) IS IN THE DUMP AREA – AVAST

ATTACH THE LOAD TO BE TRANSFERRED (MAX 14KG)

CONTINUE TRANSFER OF LOAD(S)

RAS COMPLETE RECOVER THE LIGHT LINE

RECOVER THE DISTANCE LINE

**BR 67**  
**REPLENISHMENT AT SEA**

**LIFEBUOY SENTRY/SWIMMER OF THE WATCH BRIEF**

DRESSED AND READY ON THE ENGAGED SIDE ADJACENT TO A LIFEBUOY IN ALLOCATED STOWAGE

TO BE CLOSED UP PRIOR TO GUARDRAILS BEING STRUCK

NORMAL CLOSING UP PROCEDURE SHOULD BE FOLLOWED

TO REMAIN CLOSED UP UNTIL GUARDRAILS ERECTED ON COMPLETION OF RAS AND STOOD DOWN BY OOW

**SAFETY EQUIPMENT BRIEF** (RECOMMENDED BRIEF GIVEN BY LS SPECIALIST)

HAZARDOUS DUTY LIFEJACKET (INFLATE FOR NEW RAS TEAM)

OTHER APPROPRIATE LIFEJACKET

MULTIFAB SUITS (IF REQUIRED FOR DISTANCE LINE/TEMPORARY GUARDRAIL)

SAFETY HARNESS

DRESS FOR LIGHT JACKSTAY PASSENGERS

LIGHT JACKSTAY PASSENGER CONDUCT AND USE OF RESCUE STROP

SAFETY HELMET – CHECK ISSUE/RETURN DATE – USE OF CHINSTRAP

**SAFETY OFFICER'S BRIEF**

MOVING WEIGHTS DO NOT STAND BETWEEN LOADS AND BULKHEADS

DO NOT STAND BETWEEN RIGS AND BULKHEADS

TENSIONED LINES DO NOT CROSS OVER/UNDER RIGS

DO NOT CROSS/STRADDLE/STAND UNDER LINES

DO NOT STAND OUTBOARD OF LOAD (STORE RAS ONLY)

WINCHES/CAPSTANS STAND 2 METRES CLEAR WHEN TENDING ROPES

DO NOT STAND IN LINE OF RECOIL

BEWARE OF RIDING TURNS

ONLY ENTER DUMP AREA WHEN ORDERED

GUARDRAILS – USE OF SAFETY HARNESS WHEN STRIKING/ERECTING – OOW INFORMED – LBS/SOW TO BE CLOSED UP

ROPES/LINES DO NOT STAND IN BIGHTS

DO NOT TAKE TURNS ROUND THE BODY WITH ROPES

DO PASS ROPES HAND OVER HAND

TEND LINES FROM FOR'D WHEN POSSIBLE

FAKE/COIL LINES WHEN RECEIVED INBOARD

STOP THE WORD “STOP” CAN BE USED AT ANY TIME DURING THE RAS TO INDICATE A SAFETY ISSUE. ON HEARING “STOP” ALL PERSONNEL ARE TO STOP WHAT THEY ARE DOING IMMEDIATELY AND AWAIT FURTHER INSTRUCTIONS.

DRESS DMS BOOTS WITH STEEL TOE CAPS – HDLJ – SHARP KNIFE – INDUSTRIAL SAFETY HELMET – WARM CLOTHING/FOUL WEATHER GEAR/IMMERSION SUITS WHERE APPROPRIATE – GOGGLES AND SAFETY HARNESS/SAFETY BELTS

SCARVES – SWEAT RAGS – OTHER NECK WEAR – LOOSE CLOTHING – FINGER RINGS – JEWELLERY ETC **CAN BE HAZARDOUS** – REMOVE THEM

WEATHER CONDITIONSSEA STATE/PREVAILING WIND/ TEMPERATURE  
RAS COURSE INTO SEA/DOWN SEA/ OTHER

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ANNEX 7C

RN RAS TEAM FORMAT

1. The following information is provided to assist in the planning of RAS teams and to make best use of limited manpower. The example below lists the personnel required for a large derrick fuelling. For other types of replenishment, the manpower requirement should be adjusted as necessary.

2. Breakdown of personnel (one rating unless stated).

|  |                  |
|--|------------------|
| Safety Officer   |                  |
| CBM  |                  |
| Batman   |                  |
| Winch/Capstan Operator   |                  |
| Communications Number  |                  |
| Swimmer of the Watch (as detailed from the AB(SEA) Dump Party) |                  |
| Lifebuoy Sentry  |                  |
| Gunline/I/C Dump/Fuelling Party                                | L/Sea Specialist |
| Gunline/Tackle/Highpoint/Dump/Fuelling Party                   |                  |
| Dump Fuelling Party  | 2 Ratings        |
| Messenger  | 2 Ratings        |
| Steadying Tackles  |                  |
| Hoseline/Slip rope   | 3 Ratings        |
| Distance line  | 2 Ratings        |
| Temporary Guardrail  |                  |
| Total 19   |                  |

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ANNEX 7D

STANDARD RFA RAS BRIEFING FORMAT

Whenever practicable, RAS teams must be briefed in good time before a replenishment serial is to be carried out. The content and style of the brief is dependant upon the experience of the RAS team. For inexperienced teams the use of RAS videos, on-site briefs at a fully rigged RAS station, diagrams and view-graphs should be considered. On page 7D-2 there is a safety brief applicable to all replenishment serials. The following pages contain a standard briefing format for each type of replenishment. Formats should be amended as necessary to suit particular RAS rigs or associated equipment, and the experience of the personnel being briefed.

| <b>Type of Replenishment</b>               | <b>Page Number</b> |
|--|--------------------|
| Safety Brief for all Replenishment Serials | 7D-2               |
| Probe Fuelling (Delivering)                | 7D-3               |
| Probe Fuelling (Receiving)                 | 7D-5               |
| Jackstay Fuelling (Delivering)             | 7D-7               |
| Jackstay Fuelling (Receiving)              | 7D-9               |
| Large Derrick (Delivering)                 | 7D-11              |
| Large Derrick (Receiving)                  | 7D-13              |
| Astern Fuelling (Delivering)               | 7D-15              |
| Astern Fuelling (Receiving)                | 7D-16              |
| Heavy Stores (Delivering)                  | 7D-18              |
| Heavy Stores (Receiving)                   | 7D-20              |

**BR 67  
REPLENISHMENT AT SEA**

**RAS SAFETY BRIEF FOR ALL REPLENISHMENT SERIALS**

ALLOCATION OF JOBS

Allocate jobs to individuals. Ensure all members of the RAS team are present at the RAS brief.

DRESS (Start from the head and work down the body)

1. Safety helmets with chin straps down.
2. HDLJ correctly fitted, belt firmly secured and scarlet thread visible.
3. Rigging sets worn and visible.
4. Rings and watches removed.
5. Foul weather gear/warm clothing as required to suit the conditions.
6. DMS Boots with laces fastened.
7. Safety harness/Safety Belt. (If required)

GENERAL INFORMATION

We will shortly be carrying out a stores/fuel replenishment with:

SHIP.....  
OUR RIG NO.....  
STORES/FUEL.....  
GUIDE.....  
LIFEGUARD.....  
GUNLINES - Which ship will fire, and how many lines

GUNLINE FIRING SEQUENCE (CONSORT SHIP FIRING)\*

On hearing one whistle blast from her dump area: Everyone is to take cover.

Two whistle blasts from our dump area indicates clear to fire: Remain under cover.

Three whistle blasts from her dump area means firing sequence complete. Break cover and retrieve gunline. **Do not** break cover until three whistle blasts are heard. If the lines have missed she will fire again without sounding any more whistle blasts.

Three whistle blasts from our dump area indicates line(s) lost. Whistle sequence will start again.

\*If your ship is firing, brief accordingly.

**Note.** *The gun must not be loaded until two whistle blasts have been sounded by the non-firing ship. The Safety Officer must oversee the loading and firing procedure.*

## **RAS BRIEF – PROBE FUELLING (DELIVERING)**

### **RAS point party line handlers**

Clear the gunline outboard before paying out the lines.

The person taking the weight of any line must face outboard at all times

When paying out or recovering the lines keep them clear of the water, and yourselves out of bights.

Distance line party, the distance line may be attached to a stray line and thrown into the water, you should initially heave in until the line is clear of the water then pay it out as required.

When tending the telephone line do not take any turns around the rail or your hand.

One man (specify) is to be ready to let go the hoseline at the deck cleat.

When the hoseline is clear of the deck stand clear of the dump area.

Do not straddle any connected hoses.

Prepare the bellybands for recovery, DO NOT walk under the rig.

### **Winch drivers**

You will be notified if any course changes are to occur. Course changes will normally be in 5° or 10° steps.

During the RAS keep a good bight in the hoses, but clear of water. Any problems with the winches let me know immediately.

### **ATW tender**

Do you have your gloves ready? Be extremely careful when you pull the wire off the drum end. Use your whistle or shout.

Do not stand too close to the winch. Use your whistle to indicate if there any loose turns.

When the jackstay has been connected stand well clear of the ATW.

### **Recovering the rig**

Pointmen stay clear of the dump area when the jackstay is slipped. It may swing inboard. Also beware of the probe swinging across the point.

### **Emergency breakaway procedure probe (delivering)**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency. A verbal warning of 'Prepare for EBA' will also be given.

The Batman will then give the 'Prepare for EBA' signal (demonstrate) and continue to do so until we are ready to execute the EBA.

Pumping, if taking place, will stop.

The rig and all lines will be recovered as quickly and as safely as possible.

### **RAS point party**

If the hoseline is in the course of being recovered, continue. If it delays the EBA, I will order you to cut it, then prepare at least the bottom bellyband to secure the rig. Beware of the probe swinging across the RAS point.

## **BR 67**

### **REPLENISHMENT AT SEA**

#### **Distance and telephone line handlers**

Recover lines as soon as is possible.

#### **Green and yellow winch driver(s)**

Heave in on the wires, but not excessively. Be alert to the distance between the ships increasing. If this happens slack the wires so that the probe does not pull out.

#### **Red winch and ATW driver**

Once the probe is disengaged, and the 'Ready signal' has been given by the receiving ship, recover the rig. If there is any delay in disengaging the probe, I will order you to heave it out. When the probe trolley has been recovered, de-tension the jackstay.

When the jackstay is detensioned we will give the 'Ready' signal. I will make sure that the point is clear and then order the batman to give the 'Executive EBA' signal. (Demonstrate).

#### **ATW drum tender**

When the jackstay has been slipped stand clear of the winch.

#### **General points for all personnel**

No one is to leave the RAS area.

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

## RAS BRIEF – PROBE FUELLING (RECEIVING)

### RAS point party

Clear gunline from RAS point when heaving in.

The person taking the weight of any line must face outboard at all times

As soon as the hoseline tail has been clipped to the stray line – Stand clear.

Distance line party, the distance line may be attached to a stray line and thrown into the water; this will need to be adjusted accordingly.

Do not unclip distance; telephone or messenger line until heaving has stopped.

Stand well clear of point/stump mast when jackstay is tensioned.

When pumping has started rig the re-mating line, remove the hoseline, then stand clear. Do not straddle any connected hoses.

### Highpoint man

Check your safety harness is in good condition.

Do not approach or climb to the highpoint until instructed to do so.

When you have secured the jackstay, vacate the area. Keep your safety harness on for the duration of the RAS.

### Batman

Only give the connected signal when the highpoint man is clear of the highpoint.

### Winchman and drum end man

Be alert to batman's signals. If there are any problems with the winch, let me know immediately.

### Returning the rig

Stand well clear of the RAS point whilst the jackstay is being de-tensioned and slipped.

When recovering nets/handrail, do so with extreme care.

No one is to walk under the rig. No one is to leave the RAS area without my permission

**Temporary guardrail tender.** I will give the signal 'Lower Guardrail' just before jackstay is slipped. When the jackstay is clear outboard, raise guardrail.

### Emergency breakaway procedure (receiving) – general points

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency. A verbal warning of prepare for EBA will also be given.

The Batman is to give the 'Prepare for EBA' signal (demonstrate). Those people with no specific task are to clear the dump area. The supply ship will stop pumping.

Remove the remating line/hoseline if time permits, if not I will order you to cut it.

One member (specify) of the RAS point party is to position himself ready to operate the probe release handle when ordered. If it does not operate, stand clear, as the delivering ship will then heave the probe out.

When the release handle has been operated the batman will give the 'Ready' signal (demonstrate).

### Highpointman

When the probe is clear place the hammer against the buckler link. When the weight comes off the jackstay remove the 'R' clip from the pelican hook then wait for the order to slip.

**BR 67****REPLENISHMENT AT SEA**

Non essential personnel clear the area, lower the temporary guardrail.

When the delivering ship is Ready they will give the execute EBA signal. I will then give the order to slip the Jackstay.

If the hose line is in the act of being returned it is to continue.

If all the hose line is inboard, the messenger only is to be returned.

Any line, which fouls whilst being paid out, is to be cut.

**Distance and telephone line handlers**

Return your lines as soon as is possible. Take care not to get caught in any bights.

**General points**

Throughout the RAS stand clear of bights.

Do not walk under the rig at any time.

If you see anything hazardous let me know. The safety of personnel is paramount.

Are there any questions – is everyone aware of their tasks?



## RAS BRIEF – JACKSTAY FUELLING (DELIVERING)

### RAS point party

Clear gunline outboard before paying out lines.

The person taking the weight of any line must face outboard at all times

When paying out or recovering lines keep them clear of the water. Stay out of bights.

Distance line party, the distance line may be attached to a stray line and thrown into the water you should initially heave in until the line is clear of the water then pay it out as required.

When tending telephone line do not take turns around rail or your hand.

One man is to be ready to let hoseline go at deck-cleat.

When the hoseline is clear of the deck, stand back from the dump area.

If hose bight has to be eased outboard, do so with extreme care.

### RAS point party – during the RAS

Prepare the bellybands for recovery.

When rig is being recovered stand clear of dump area.

Be aware of hose end swinging across the RAS point.

### ATW tender

Do you have your gloves ready? Be extremely careful when you pull the wire off the drum end. Use your whistle or shout.

Do not stand too close to the winch. Use your whistle to indicate if there are any loose turns.

When the jackstay has been connected stand well clear of the ATW.

### Winch driver(s)

You will be notified if any course changes are to occur. Course changes will be in 5 or 10 degree steps.

During the RAS keep a good bight in the hoses, but clear of the water.

Any problems with the winches let me know immediately.

### Emergency breakaway procedure – general

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency.

A verbal warning 'Prepare for EBA' will also be given.

The Batman is to signal 'Prepare for EBA' (Demonstrate) and continue to do so until we are ready to execute the EBA.

The rig and all lines will be recovered as quickly and as safely as possible.

### RAS point party

If the hoseline is in the course of being recovered, continue. If it delays the EBA, I will order you to cut it. Then prepare at least the bottom bellyband to secure the rig.

Beware of the slipped jackstay, it may swing inboard. Also beware of the hose end(s) swinging across the RAS point.

### Distance and telephone line handlers.

Recover lines as soon as is possible; take care not to stand in bights that form on the deck.

Be prepared for receiving ship throwing all excess line into the water. If any line fouls, cut it.

## **BR 67**

### **REPLENISHMENT AT SEA**

#### **Green and yellow winch driver(s)**

Be prepared to take up slack in hose bights.

Make sure hose bights come inboard clear of handrails but not too high.

#### **Red winch and ATW driver**

Pay particular attention to Batman's signals.

Do not heave excessively on red runner whilst slip rope is being surged.

When the Ready signal has been given recover the rig as quickly as possible.

When hose has been recovered detension the jackstay.

When the jackstay is detensioned, the Batman will give 'Ready for EBA' signal.

I will make sure that the point is clear then give the order to execute the EBA.

#### **ATW tender**

When jackstay has been slipped stand well clear of ATW winch.

#### **General points for all personnel**

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

## **RAS BRIEF – JACKSTAY FUELLING RIG (RECEIVING)**

### **RAS point party**

Clear excess gunline from the RAS point as you heave in the hoseline.  
When the hoseline has been clipped to the strayline stand clear.  
The person taking the weight of any line must face outboard at all times.  
Do not unclip the distance, telephone or messenger lines until heaving has stopped.  
Distance line party, the distance line may be attached to a stray line and thrown into the water; this will need to be adjusted accordingly.  
Stand well clear of the point/stump mast when jackstay is tensioned. When cutting the hoseline lashings, do so carefully. Do not attach the hanging off pendant until heaving has stopped.  
When hooking on the pendant, do so with the jaw of the hook facing up. Do not straddle the hose when fitting the steadying tackles.  
Once fuelling has started, remove the hoseline and rig the slip rope. Then return the hoseline making sure you do not stand in any bights.

### **Winch driver and drum end man**

Be alert to batman's signals.  
If you have any problems with the winch let me know immediately.

### **Distance and telephone line handlers**

You will be handed your lines by the pointmen.

### **Engine room party**

Do not approach the RAS point until ordered to do so.  
Do not straddle the rig when connecting/disconnecting or opening/closing the shut-off valve.  
When complete, stand clear.

### **All personnel**

If not involved in a task stand well clear of the dump area.

### **Returning the rig**

#### **Engine room party**

Once the coupling has been disconnected, make sure the shut off valve is closed down tight, and the cone is secured tightly. On completion stand clear.

#### **RAS point party**

When ER party is clear of the rig remove the steadying tackles. Only approach the hanging off pendant when the weight is off it, and then remove it.

#### **Winch driver and drum end man**

When surging the slip rope make sure the rope does not foul behind you.  
Do not take more than two turns on the drum end.  
We will not slip/cut the slip rope until given the signal by the delivering ship.

## **BR 67 REPLENISHMENT AT SEA**

### **Temporary guardrail tender.**

Only lower the guardrail when equipment is moving in/outboard. I will give the order 'Lower guardrail' just before the jackstay is slipped. When the jackstay is clear outboard, raise the guardrail.

### **Emergency breakaway procedure – jackstay fuelling (receiving)**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency.

A verbal warning of 'Prepare for EBA' will also be given.

The Batman will give the 'Prepare for EBA' signal (Demonstrate).

The delivering ship will stop pumping.

### **Engine room party**

When pumping has stopped, close the shut off valve, disconnect the QRC/break the spool and stand clear.

### **Distance and telephone line handlers**

Return lines as soon as is possible. Take care not to get caught in any bights.

### **RAS point party**

Whilst ER party is disconnecting the coupling, remove the steadying tackles and the hose hanging pendant when ordered, then stand clear.

One man (specify) is to stand by to cut the slip rope once the hose end is outboard.

When the slip rope has been cut the 'Ready' signal will then be given (demonstrate).

Non essential personnel clear the area, lower the temporary guardrail.

When the delivering ship is Ready they will give the Execute signal.

I will make sure that all is clear then order the Jackstay to be slipped.

As soon as the Jackstay is clear raise the temporary guardrail.

### **Winch driver and drum end man**

As soon as the ER party are clear of the RAS point and tackles are off, heave in on the slip rope. When the hanging off pendant has been removed surge the slip rope until the hose is just outboard, or the line goes slack.

### **High point man**

Position yourself on the gantry/stumpmast. When the jackstay has been detensioned, remove the mousing and split pin, but keep the hammer against the bail of the slip. Await the order 'Slip the jackstay'.

### **General points on EBA**

If an EBA occurs and the hoseline is still attached, we will use it as a slip rope.

If we have removed the hoseline but have not started to return it, it remains here.

If the hoseline is in the act of being returned, continue; if it fouls it is to be cut.

If the hoseline has been removed and the slip rope not rigged the rig must be slipped from the HHP slip.

The slip rope is to be cut when the hose ends are outboard or when the weight comes off.

When the slip rope has been cut we will indicate 'Ready'.

The jackstay will only be slipped when the 'Execute' signal has been given by the Delivering Ship.

### **General points for all personnel**

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

## **RAS BRIEF – LARGE DERRICK (DELIVERING)**

### **RAS point party and line handlers**

Clear excess gunline before paying out lines.

The person taking the weight of any line must face outboard at all times

When paying out or recovering lines keep them clear of the water and yourselves out of bights.

Distance line party, the distance line may be attached to a stray line and thrown into the water; you should initially heave in until the line is clear of the water.

When tending the telephone line do not take any turns around the rail or your hand.

One man is to be ready (specify) to cut the hoseline stop on the handrail. When the hoseline is clear of the deck stand clear of dump area.

### **Winch driver(s)**

You will be notified if any course changes are to occur during the RAS. Course changes will normally be in 5° or 10° steps.

During the RAS keep a good bight in the hoses, but clear of the water. Any problems with the winches let me know immediately.

### **Recovery of rig**

At the stop pumping signal the pointmen prepare the bellybands. Beware of hose end swinging as rig comes inboard.

### **Red winchman**

Do not heave excessively on the red runner. Allow the receiving ship time to surge the slip rope.

When recovering the derrick to the stow position do so slowly.

Lower hose bights as the derrick is being recovered.

### **Emergency breakaway procedure – general**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency.

A verbal warning 'Prepare for EBA' will also be given.

The Batman is to signal 'Prepare for EBA' (Demonstrate) and continue to do so until we are ready to execute the EBA

The rig and all lines will be recovered as quickly and as safely as possible.

When the hose bights have been adjusted we will give the 'Ready' signal (demonstrate).

When the receiving ship gives the 'Ready' signal I will give the order to 'Execute' the EBA.

### **RAS point party**

If the hoseline is in the course of being recovered, continue. If it delays the EBA, I will order you to cut it. Then prepare at least the bottom bellyband to secure the rig.

### **Distance and telephone line handlers**

Recover lines as soon as is possible; take care not to stand in bights that form on the deck.

Be prepared for receiving ship throwing all excess line into the water. If any line fouls, cut it.

**BR 67****REPLENISHMENT AT SEA****Green and yellow winch driver(s)**

Be prepared to take up slack in hose bights.

Make sure hose bights come inboard clear of handrails but not too high.

**Red winch driver**

Pay particular attention to Batman's signals.

Do not heave excessively on red runner whilst slip rope is being surged.

As soon as the slip rope has been cut recover the hoses quickly.

**General points for all personnel**

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

## **RAS BRIEF – LARGE DERRICK (RECEIVING)**

### **RAS point party**

Clear excess gunline from the RAS point as you heave in the hoseline.  
The person taking the weight of any line must face outboard at all times  
When the hoseline has been clipped to the strayline stand well clear.  
Once the hose end is inboard and you start to cut the lashings, do so carefully.  
Do not attach the hanging off pendant until heaving has stopped. When hooking on the pendant, do so with the jaw of the hook facing up.  
Do not straddle the hose when fitting the steadying tackles.  
When tackles are fitted, the hoseline may be removed, and slip rope rigged. However, if I consider it safe to do so the hoseline can be removed whilst the tackles are being rigged.  
Distance and Telephone Line Handlers. You will be handed your lines by the pointmen.

### **Temporary guardrail tender**

As the rig comes inboard lower the bottom guardrail and when the rig is inboard pass the top temporary guardrail.

### **Winch driver and drum end man**

Be alert to batman's signals.  
If you have any problems with the winch let me know immediately.

### **Engine room party**

Do not approach the RAS point until ordered to do so.  
Do not straddle rig when connecting/disconnecting hoses. When complete, stand clear.

### **Returning the rig**

#### **Engine room party**

Once the hose has been disconnected, make sure the shut off valve is closed down tight, and that the cone is secured tightly. On completion stand clear.

**RAS point party.** When the ER party is clear of the rig remove the steadying tackles. Only approach the hanging off pendant when the weight is off it, and then remove it. Be aware in case the hose clamp fouls the ship's side.

### **Temporary guardrail tender**

Remove the top temporary guardrail once the hanging off pendant is removed. When the hose end is clear outboard, raise the lower temporary guardrail.

**Winch driver and drum end man.** When surging the slip rope make sure the rope does not foul behind you. Do not take more than two turns on the drum end.  
We will not slip/cut the slip rope until given the signal by the delivering ship.

### **Emergency breakaway procedure – large derrick (receiving)**

Should this occur it will be signaled by six or more short blasts from whichever ship that has the emergency. A verbal warning of 'Prepare for EBA' will also be made.  
The Batman will signal 'Prepare for EBA' (demonstrate).  
The delivering ship will stop pumping.

## **BR 67**

### **REPLENISHMENT AT SEA**

**Engine room party.** When pumping has stopped, close the shut off valve, disconnect the QRC/break the spool and stand clear.

#### **Distance and telephone line handlers**

Return lines as soon as is possible. Take care not to get caught in bights.

**RAS point party.** Whilst ER party are disconnecting the coupling, remove the steadying tackles and prepare to pass the top temporary guardrail. As soon as the weight is off the hanging off pendant, remove it and stand clear.

One man (specify) is then to stand by to cut the slip rope.

#### **Winch driver and drum end man**

When the hoses have been disconnected and the point is clear, heave in on the slip rope, the HHP can then be removed.

Pass the top temporary guardrail, then we will give the 'Ready' signal.

The delivering ship will then give the Execute signal.

The slip rope must then be surged until the hose ends are outboard, then the slip rope will be cut. Heave in on the slip rope.

Raise temporary guardrail.

#### **General points on EBA**

In the event of an EBA, if the hoseline is still attached, we will use it as a slip rope.

If we have removed the hoseline but not started to return it, it remains here.

If the hoseline is in the act of being returned, continue, if it fouls, cut it.

If the hoseline has been removed and the slip rope is not rigged the rig must be slipped from the HHP.

#### **General points for all personnel**

Remember to stand clear of bights.

Do not walk under the rig during the RAS.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?



## RAS BRIEF – ASTERN FUELLING (DELIVERING)

### Heaving-out procedure

Establish communications with the fo'c'sle and confirm what orders are to be used.  
When securing the heaving out line to the hose, ensure the stop is located at the throat of the hose knuckle.

We will cut the stops on the guardrail to stream the hoseline

Do not stand in the bight of the deck lead block.

When the hose is being streamed two men (specify) are to monitor its progress along the main deck. Any snags then call out and signal 'Stop'.

When securing or disconnecting the clamp to the streamed rig do not straddle the hose.

Do not straddle the hose when connecting or disconnecting at the manifold.

On completion of streaming and securing the hose to the manifold, stand well clear.

On Command approval, stream the marker float.

### Recovering the rig

On completion of pumping there will be a five minute blow through, then, with approval from the bridge, we will recover the marker float, then the rig. This can be done simultaneously if sufficient personnel are available.

Winch driver(s) must be alert to any 'Stop' commands.

### Emergency breakaway procedure – general

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency. A verbal warning of 'Prepare for EBA' will also be made.

The batman will immediately give the 'Prepare for EBA' signal (demonstrate).

Pumping if taking place will stop. We will then give the 'Ready' signal.

The Receiving Ship will slip the rig.

The rig should be recovered to be checked prior to being used again.

Beware of fuel spillage when disconnecting hose from manifold.

Remember not to straddle the rig at any time.

Stand well clear of the rig as it comes inboard.

### General points for all personnel

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

**BR 67**  
**REPLENISHMENT AT SEA**

**RAS BRIEF – ASTERN FUELLING (RECEIVING)**

**RAS point party**

Once we have grappled the float, heave in all slack by hand, and then bring to. When the float is at fairlead, remove it, and lay it clear aft. In adverse weather conditions attach inhaul line first).

Whilst the hose is being heaved in stay clear of RAS point.

Do not straddle the hoses when connecting the hanging off pendant/rigging steadying tackles/rigging slip rope.

Once pumping has started, remove the hoseline and rig the slip rope.

Whilst pumping is taking place stand clear of point if you have no specific job.

**Winch driver and drum end man**

When heaving or surging ensure the line is clear behind you.

Keep the hoseline at an angle of between 90° and 100° to the fairlead when you are heaving in the rig. If the ship drops back the hoseline should be veered.

When heaving the hose end through fairlead, do so with caution.

If you have any problems with the winch, let me know immediately.

**Re-rigging the hoseline**

During pumping, we will re-rig the hoseline ready for returning. Do not connect it to the bridle ring until directed to do so.

Do not stand in bights when stopping hoseline to ship side rails.

**Returning the rig**

Once pumping and blow through have been completed, we will return rig.

Make sure the shut-of valve is closed and disconnect the hose. Re-connect the hoseline to the bridle ring.

Remove steadying tackles and heave in on the slip rope.

Remove the Hose securing pendant and take it clear of the rig.

Veer/Surge the slip rope until the rig is outboard of the roller lead (the ship will then slowly reduce speed). Continue to surge the slip rope until the rig is just above the water.

When the angle of the slip rope is 90 degrees to the ship we will slip the slip rope.

As the ship continues to drop back the stops of the hoseline will be cut.

**General points for all personnel**

Are there any questions – is everyone aware of their tasks?

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

**Emergency breakaway procedure – general**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency.

A verbal warning of 'Prepare for EBA' will also be given by the command.

The Batman will then give the 'Prepare for EBA' Signal and follow the drills laid down in BR 67.

**Engine room party**

As soon as pumping has stopped, close the shut-off valve, disconnect the QRC, or break the NATO spool. Beware of fuel spillage, as the delivering ship will not have blown through the hose. Once done, clear the area.

**RAS point party**

As soon as pumping has stopped, remove steadying tackles and stand clear. One man is to stand by ready to remove the hanging off pendant.

**Winch driver and drum end man**

Once the hose has been disconnected and the tackles removed, heave in on the slip rope until the weight is off the hanging off pendant.

When the pendant has been removed, surge on the slip rope.

When the hose end is just outboard of the roller fairlead the slip rope will be cut.

**General points on EBA**

If the hoseline has been removed, but the slip rope has not been rigged, the hanging off pendant is to be slipped.

If the hoseline has not been removed, it is to be used as if it were the slip rope. The float will not be re-attached.

If you see anything hazardous let me know. The safety of personnel is paramount.

Are there any questions – is everyone aware of their tasks?

**RAS BRIEF – HEAVY STORES RIG (DELIVERING)**

**RAS point line handlers**

Clear the gunline outboard before paying out the lines.

The person taking the weight of any line must face outboard at all times

When paying out or recovering the lines keep them clear of the water, and yourselves out of bights.

Distance line party, the distance line may be attached to a stray line and thrown into the water; you should initially heave in until the line is clear of the water.

When tending the telephone line do not take any turns around a rail or your hand.

When the outhaul is clear of the deck stand clear of the dump area.

Stand clear of the RAS point until any load is ready for hooking/unhooking.

Be sure that after hooking/unhooking any loads you stand clear before giving thumbs up.

Do not stand outboard of a load

**Winch drivers**

Pay attention to the batman's signals.

You will be notified if any course changes are to occur. Course changes will normally be in 5° or 10° steps.

Keep a good bight in the jackstay until you receive the 'Connected' signal. Any problems with the winches let me know immediately.

**ATW tender**

Do you have your gloves ready? Be extremely careful when you pull the wire off the drum end.

Do not stand too close to the winch. Use your whistle to indicate if there any loose turns.

When the jackstay has been connected stand well clear of the ATW.

**Recovering the rig**

The outhaul is to be taken to the recovery winch and a turn taken prior to unhooking it from the rig.

Personnel recovering the outhaul are to watch the personnel in the consort.

Point men stay clear of the dump area when the jackstay is slipped.

Take special care when recovering nets to the stow position.

Nobody is to walk under the rig.

**Emergency breakaway procedure – heavy jackstay (delivering)**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency. A verbal warning of 'Prepare for EBA' will also be made.

The Batman will then give the 'Prepare for EBA' signal (Demonstrate) and continue to do so until we are ready to execute the EBA.

When any load has been removed and the point is clear the 'Ready' signal will be given.

**ATW/inhaul winch driver and S.T.O.N personnel**

On hearing the EBA signal the traveller is to be returned to our point as quickly and as safely as possible, any load unhooked, and moved away from the RAS point.

**RAS point party.** As soon as any load has been unhooked, start to recover the outhaul. If it fouls, or is causing a delay, cut it.

Beware of the jackstay when it is slipped. It may swing inboard.

**Distance and telephone line handlers**

Recover lines as soon as is possible; take care not to stand in bights that form on the deck.

If any line fouls, cut it.

**General Points for all personnel**

Remember to stand clear of lights.

Do not walk under the rig during the RAS.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

**BR 67**  
**REPLENISHMENT AT SEA**

**RAS BRIEF – HEAVY STORES RIG (RECEIVING)**

**RAS point party and line handlers**

Clear excess gunline when heaving in. Once the strayline is connected to the outhaul stand clear. The person taking the weight of any line must face outboard at all times Do not remove the distance/telephone lines until told to do so. When hooking/unhooking loads stand well clear before giving the thumbs up sign.

Do not stand outboard of a load

**Highpoint man**

Do not approach/climb highpoint until told to do so. Once the jackstay is secured vacate the area. Keep your safety harness on for the duration of the RAS.

**Batman**

Do not give the 'Connected' signal until the highpoint is clear.

**Winch driver/drum end man**

Pay strict attention to the batman's signals. Do not take more than three turns on the drum end when heaving over the traveller block. Reduce to one turn before giving the 'Heave' signal to the delivering ship. Ensure the outhaul is kept clear behind you. Any problems with the winches let me know immediately.

**Guardrail tender**

Only lower the guardrail when loads are moving in/outboard. When RAS is complete I will give you a 'Lower guardrail' order before the Jackstay is slipped.

**S.T.O.N. personnel (if applicable)**

Do not approach the dump area unless you have a job to do.

**Returning the rig**

Be aware when the outhaul is being recovered as it will be recovered on a winch.

Everyone is to clear the point area before the jackstay is slipped. Point party take care when disconnecting the strayline from the outhaul. When all clear, recover nets/rails with care.

**Emergency breakaway procedure – heavy jackstay (receiving)**

Should this occur it will be signaled by six or more short blasts from whichever ship has the emergency. A verbal order 'Prepare for EBA' will also be given by the command.

The batman will then give the 'Prepare for EBA' signal and follow the drills laid down in BR 67.

**Distance line and telephone line handlers**

Return your lines as quickly as is possible. If any line fouls, cut it. Beware of bights.

**Winch driver/drum end man.** If an EBA occurs, the traveller/load is to be returned to the delivering ship and a good bight kept in the outhaul. When the jackstay is detensioned be prepared to take turns off the drum end.

**Moving highpoint rig.** The Return Sheave Assembly (RSA) must be returned before the jackstay is detensioned.

**Highpoint man**

Position yourself on the gantry/stumpmast. When the jackstay has detensioned, remove the mousing and split pin, keep the hammer against the bail of the slip and wait until both ships' batmen are signalling 'Ready', the order 'Slip the jackstay' will then be given.

**RAS point party**

As soon as the Jackstay has been slipped take the outhaul in hand from the drum end man and pay it back as quick as possible. When all clear recover the nets and guardrails, taking care at the ship's side.

**General points for all personnel**

No one is to leave the RAS area.

No one is to walk under the rig.

Remember to stand clear of bights.

If you see anything hazardous let me know. The safety of all personnel is paramount.

Are there any questions – is everyone aware of their tasks?

**RAS BRIEFS – LIGHT JACKSTAY (DELIVERING AND RECEIVING)**

Pre-RAS checks and briefings for delivering and receiving a light jackstay are fully covered in SECTION 1.

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ANNEX 7E

ADVICE ON RIG BUILDING

Diagrams and information on building fuel rigs are given in this Annex. Page references are as follows:

| Type of Fuel Rig                              | Page Numbers   |
|---|----------------|
| Probe Rig                                     | 7E-2 to 7E-5   |
| Probe conversion to Jackstay fuelling         | 7E-6           |
| Jackstay Fuelling                             | 7E-7 to 7E-10  |
| Passing a Hose Lashing on a Double Hose Rig   | 7E-11          |
| Securing Hoses to a Tray in a Double Hose Rig | 7E-12          |
| Crane Rig                                     | 7E-13 to 7E-15 |
| Trough Arrangements for the Derrick Rig       | 7E-16          |
| Securing Hoses to a Tray in a Single Hose Rig | 7E-17          |
| Astern Fuelling Rig                           | 7E-18 to 7E-20 |
| Jackstay Gripper Arrangements                 | 7E-21          |

**WARNING**

**ALL TRAVELLER BLOCKS USED IN FUELLING RIGS MUST BE FITTED WITH A SAFETY GROMMET. THIS IS A SINGLE STRAND OF 12MM FSWR MADE UP AS A GROMMET THROUGH THE SHACKLE AND ABOVE THE SWIVEL OF THE TRAVELLER BLOCK. RIGGED IN THIS WAY THE GROMMET ACTS AS A PREVENTER SHOULD THE SWIVEL PART.**

Fig 7E-1. General arrangements for probe fuelling

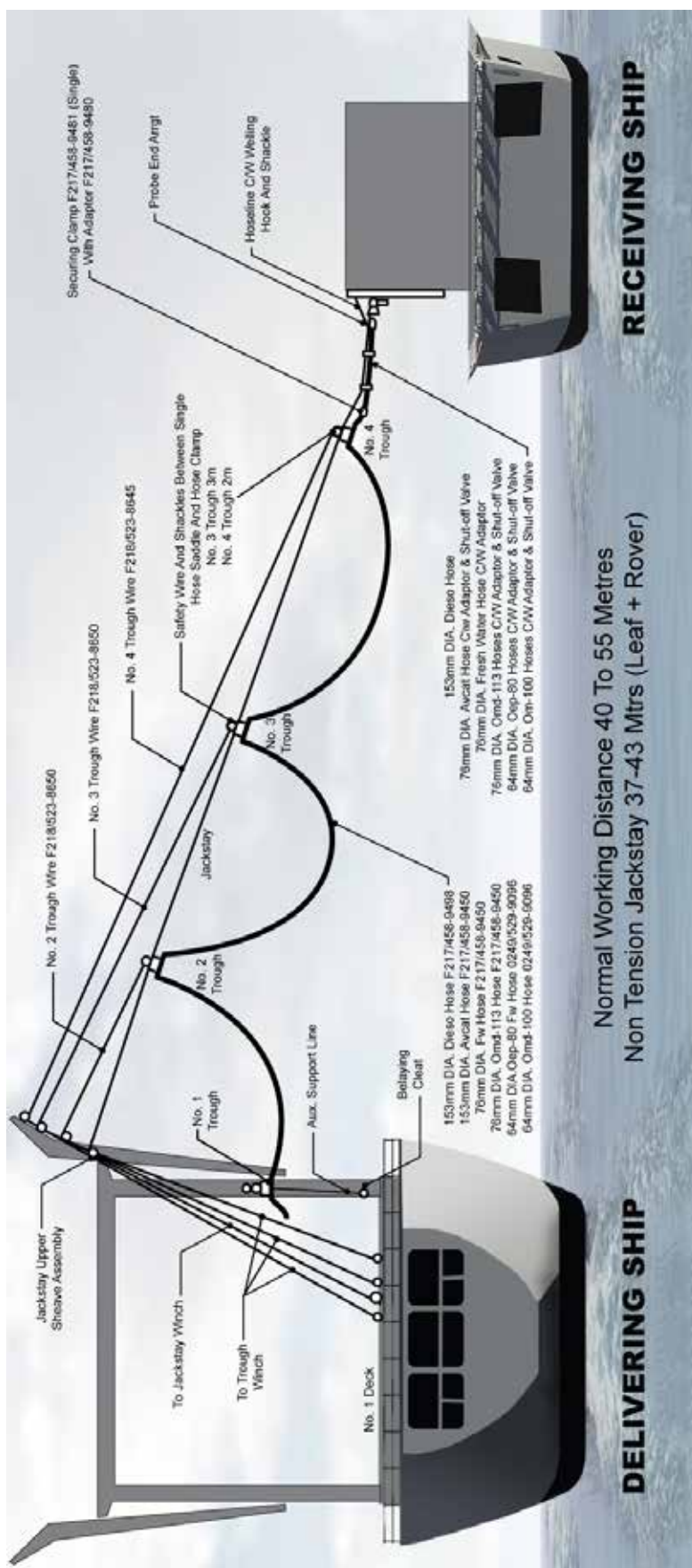


Fig 7E-2. Outboard end of probe rig

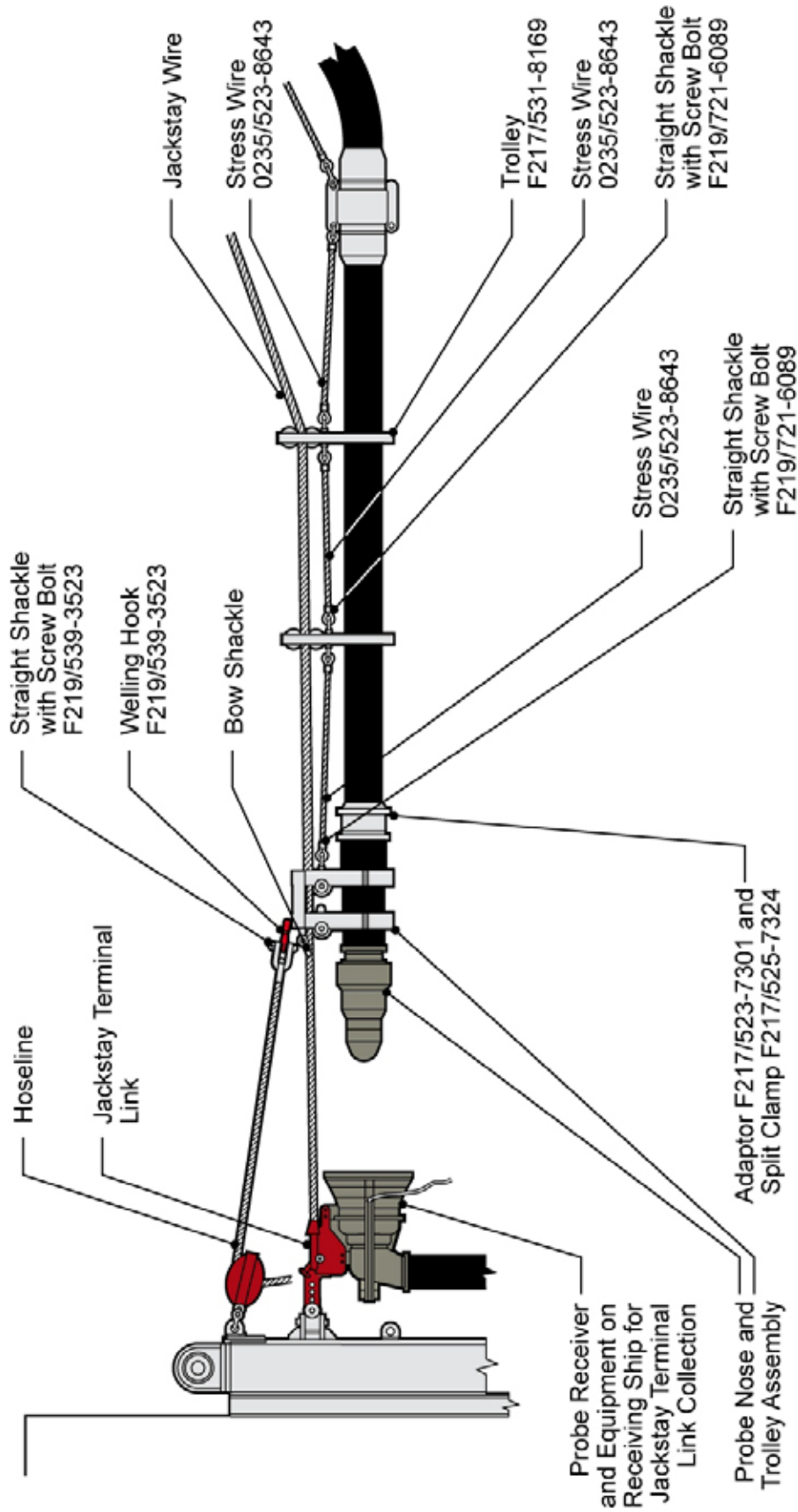


Fig 7E-3. Probe rig number 4 (red) trough

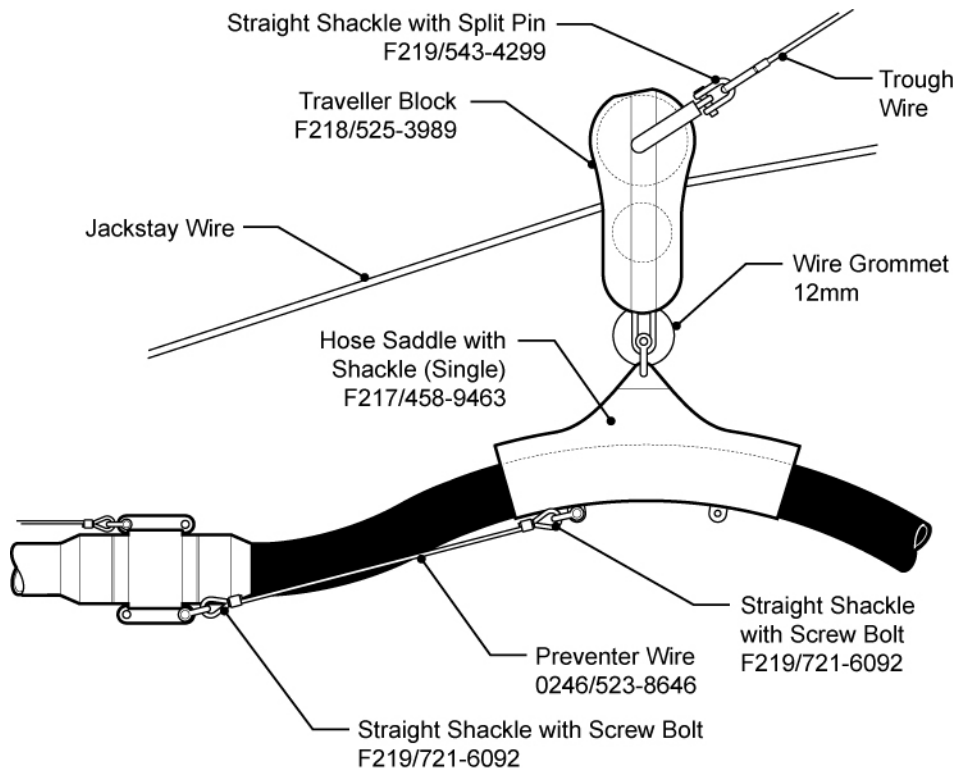
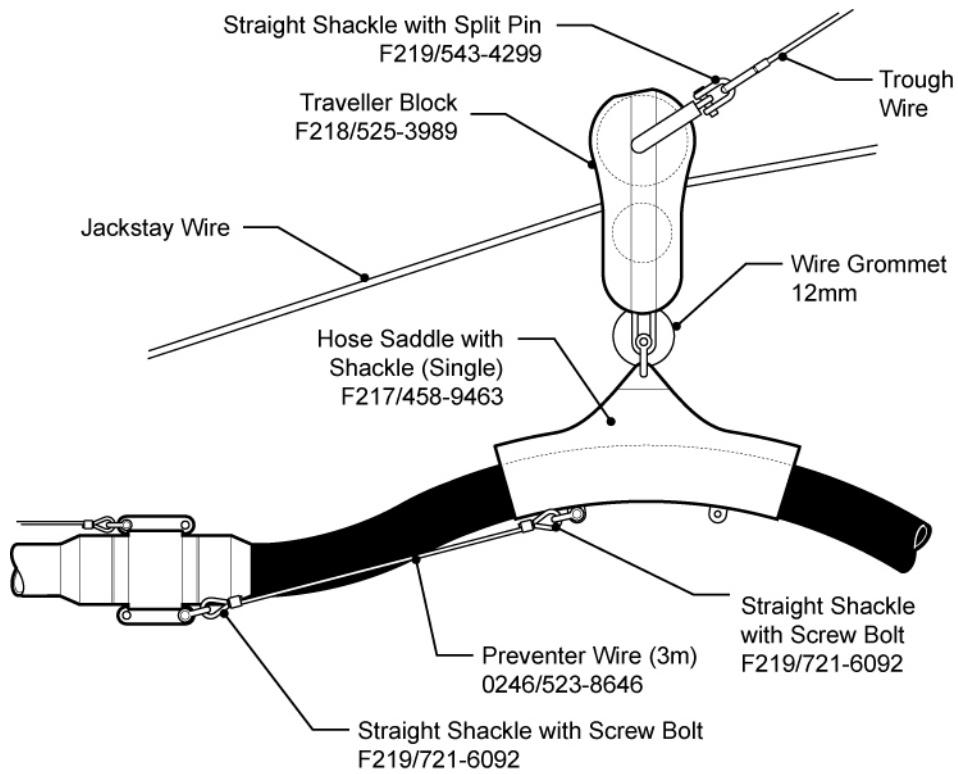
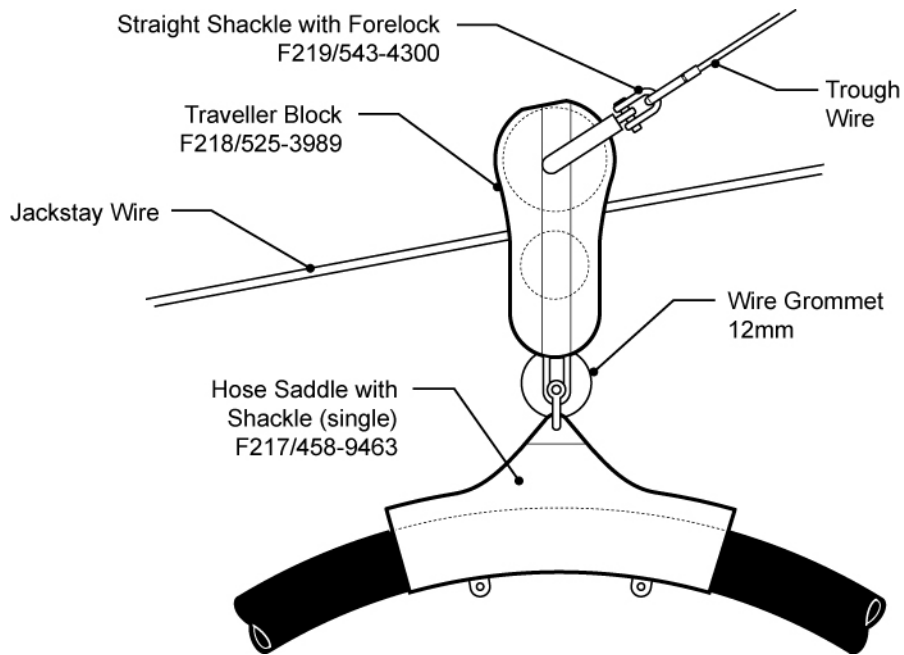


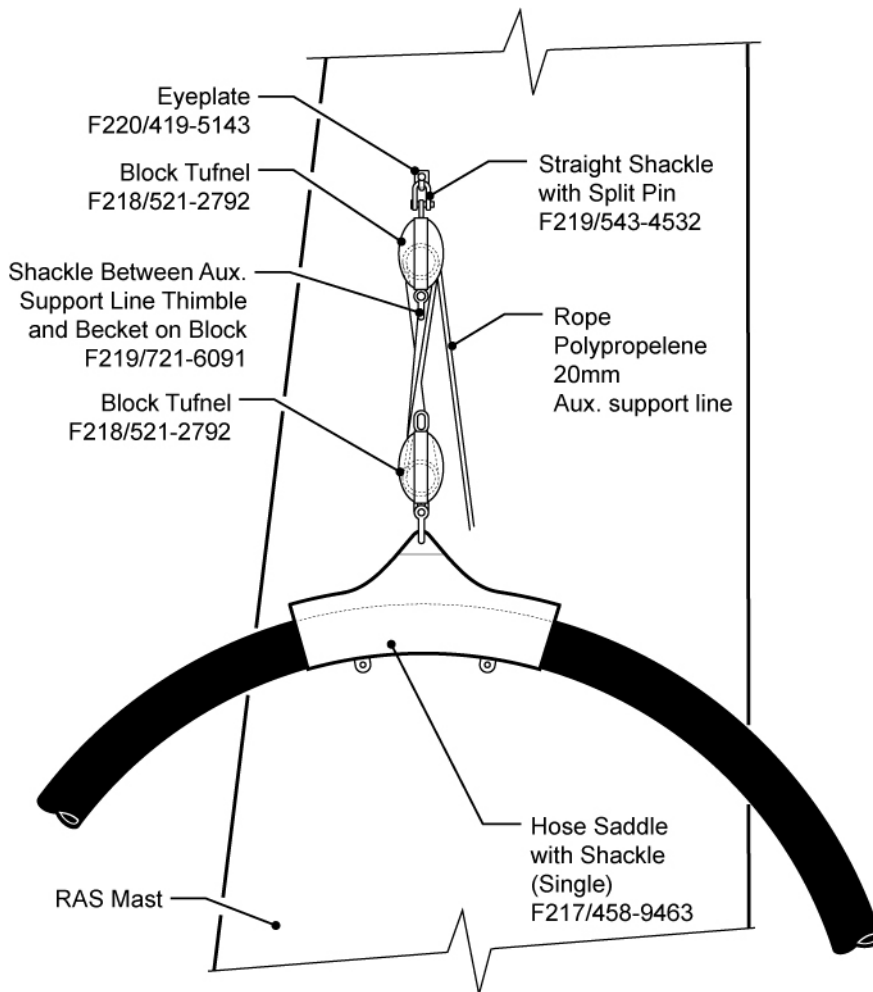
Fig 7E-4. Probe rig number 3 (green) trough



**Fig 7E-5. Probe rig number 2 (yellow) trough**



**Fig 7E-6. Probe rig number 1 (white) trough**



**PROBE CONVERSION TO JACKSTAY FUELLING**

1. **Probe conversion to jackstay fuelling.** If problems are encountered on the receiving ship when connecting the probe to the receiver, there may be a need to convert the rig to the fall back facility of jackstay fuelling using the NATO 'B'. To achieve this, the following actions are to be carried out:

a. **Delivering ship actions**

(1) To carry out the conversion from probe to jackstay fuelling safely the probe rig is to be recovered to the delivering ship completely, including the wire jackstay where it is to be lowered to the deck and the first 15ft hose removed complete with the probe and all the trolley assemblies.

(2) To convert the probe rig to a jackstay fuelling rig a second 15ft hose is supplied with the shut off valve fitted to the outboard end. The NATO B connection is then fitted to the shut off valve and to complete the conversion, the hoseline pendant is attached to the clamp.

(3) The above conversion will take up to 90 minutes to complete.

(4) A new approach by the consort is then required to carry out a jackstay refuelling.

b. **Receiving ship actions**

(1) Once the probe and wire jackstay have been returned to the delivering ship remove the probe receiver, swivel arm and hose to the deck connection. Retain the swivel joint and attach the swivel arm adaptor then the QRD.

(2) Secure a snatch block for the hoseline/outhaul to the eyeplate below the highpoint, or above if none exists below.

(3) Rig hose hanging pendant, prepare slip rope and rig steadying tackles.

(4) Secure the NATO 'B' to the deck connection, supply a drip tray.

**Fig 7E-7. Hose conversion**

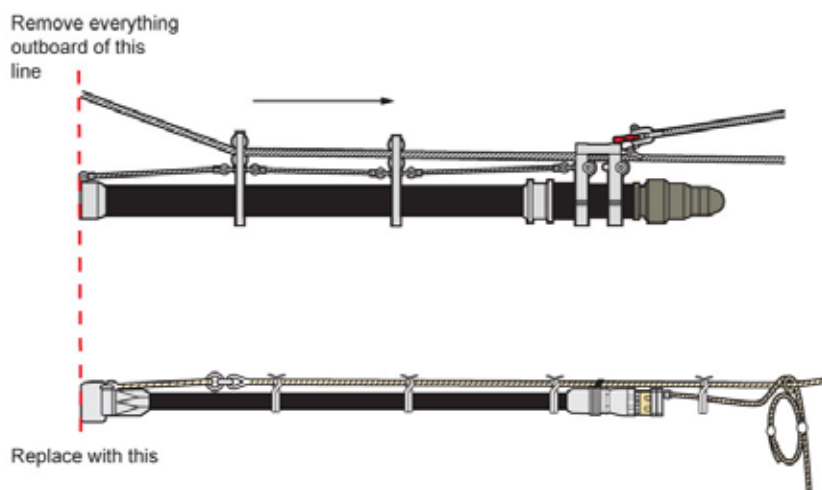


Fig 7E-8. General layout for jackstay fuelling

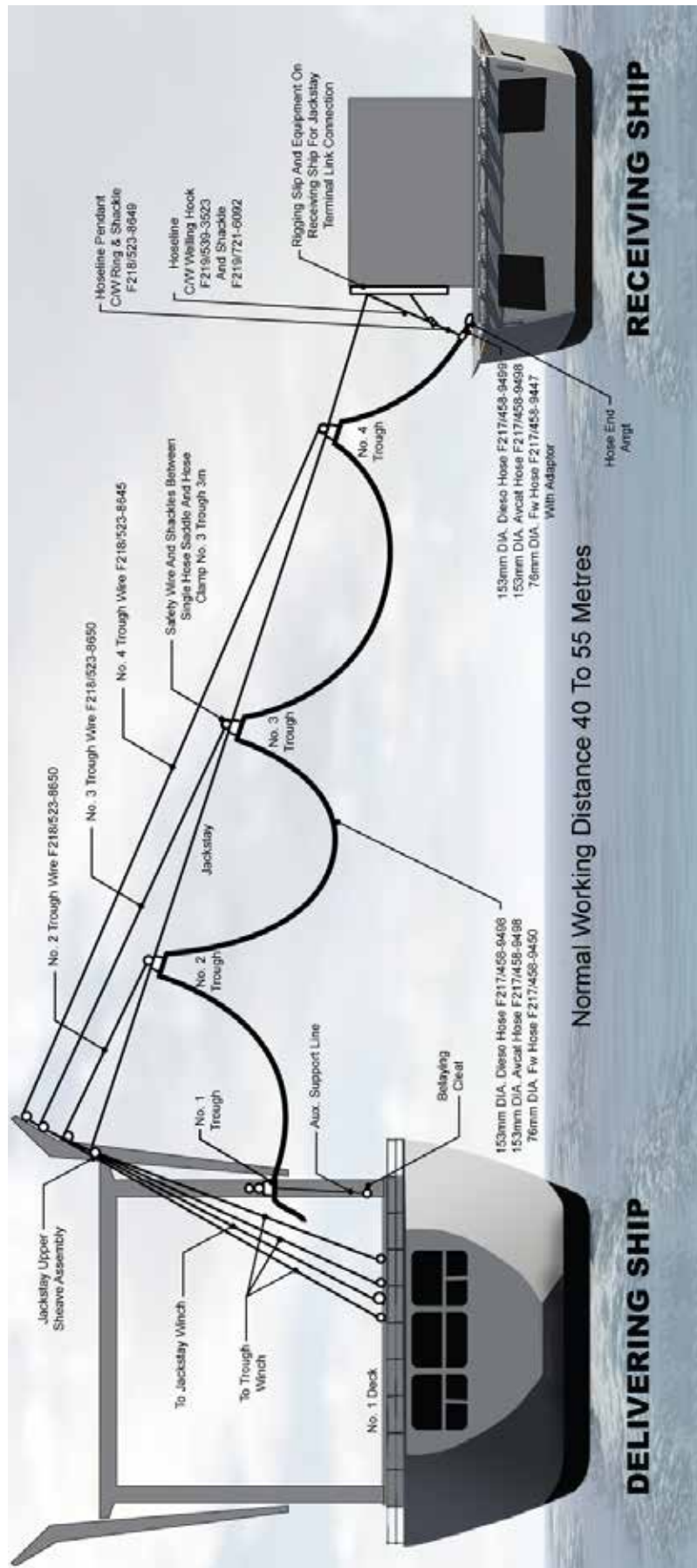
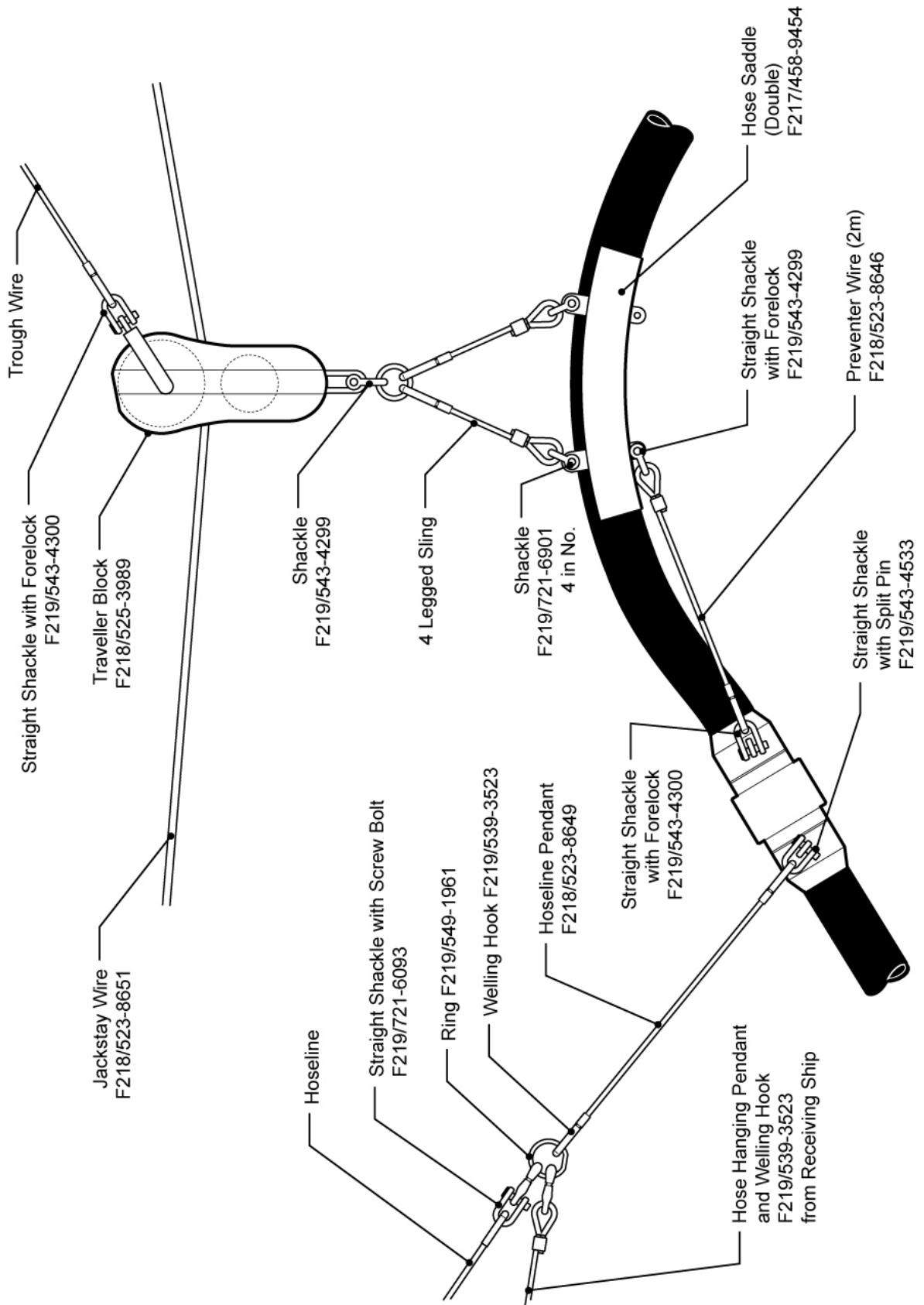
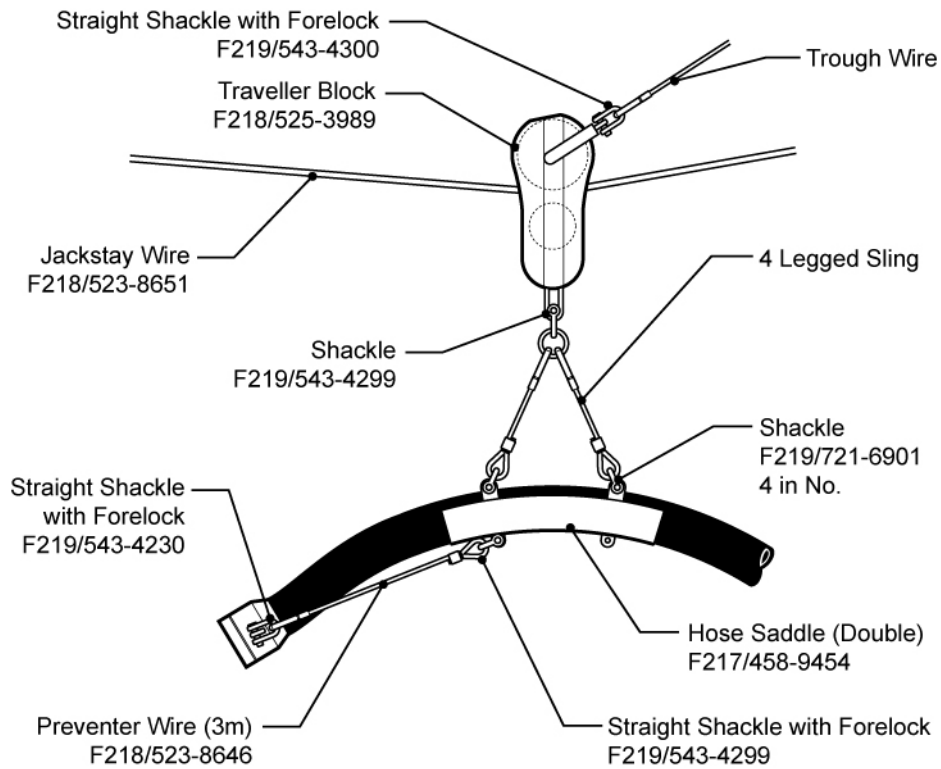


Fig 7E-9. Jackstay fuelling number 1 (red) Tough

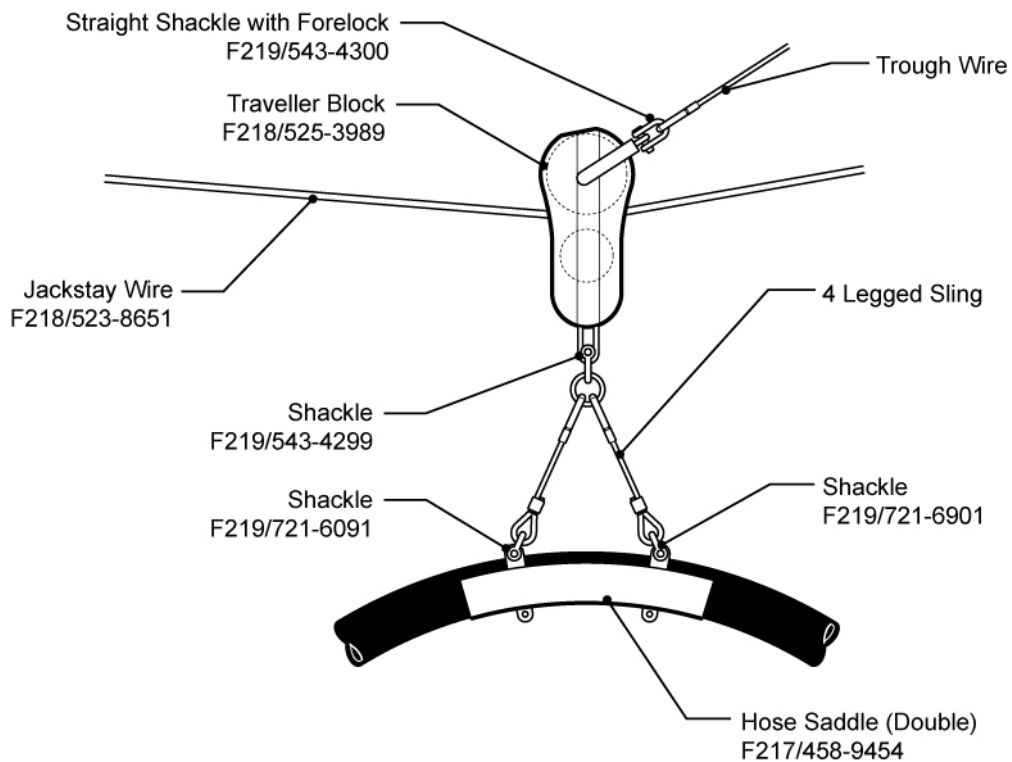




**Fig 7E-10. Jackstay fuelling number 3 (green) trough**

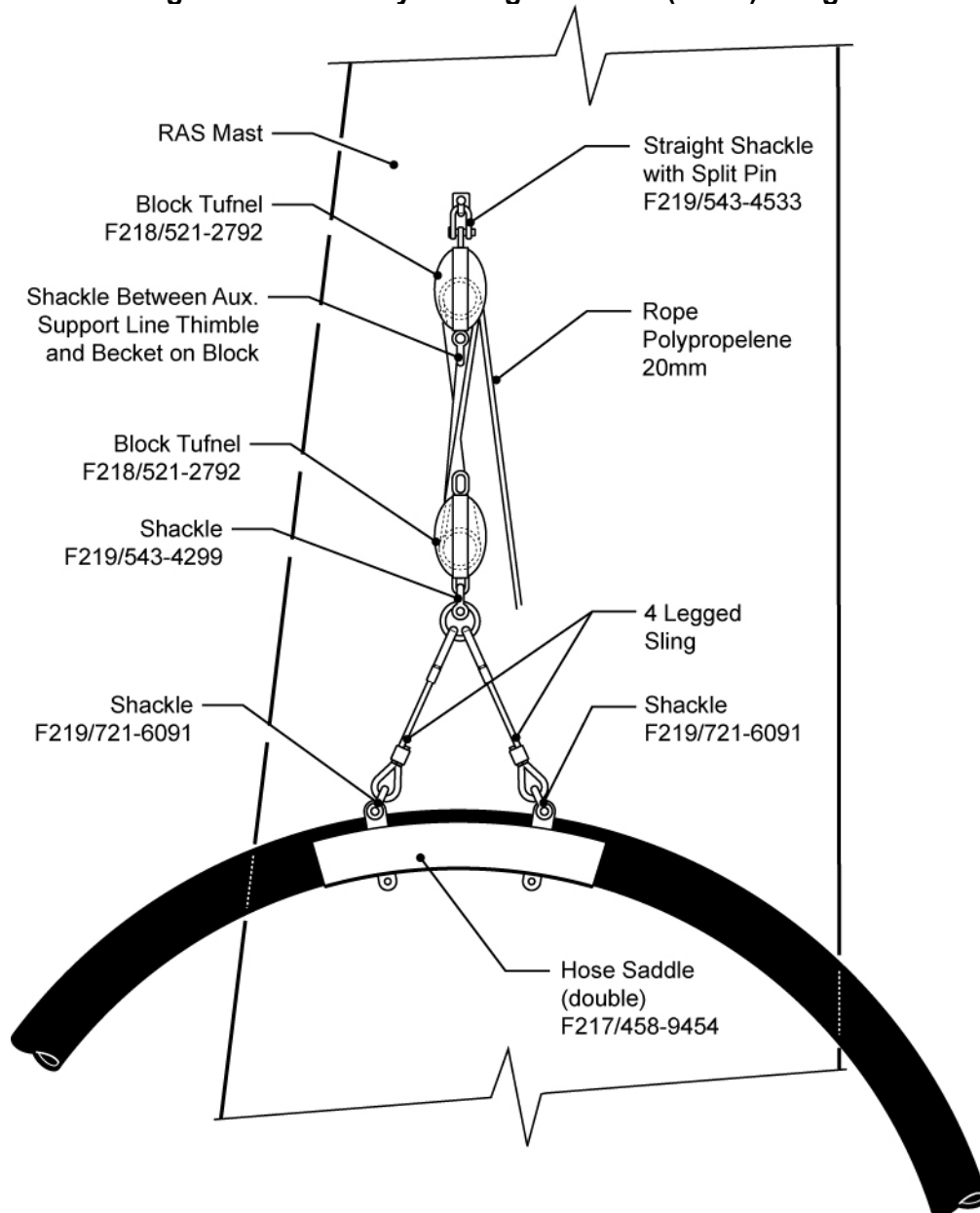


**Fig 7E-11. Jackstay fuelling number 2 (yellow) trough**



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**Fig 7E-12. Jackstay fuelling number 1 (white) trough**

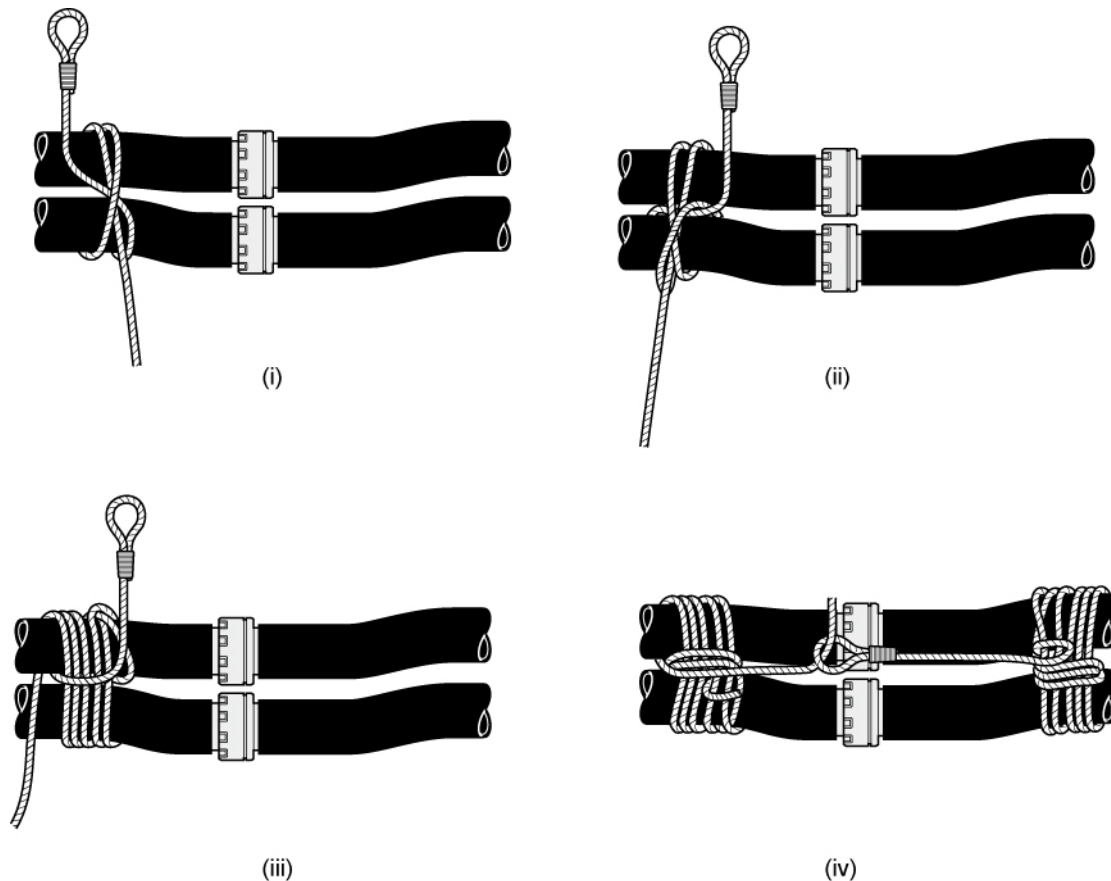


### PASSING A HOSE LASHING ON A DOUBLE HOSE RIG

1. To avoid tangling and snagging, the hoses in double hose rigs must be securely lashed together at each knuckle joint (except the outboard joint where a clamp is used). An effective method is shown in Fig 7E-13 and is described as follows:

2. Starting from inboard and using the eye-spliced end of a 16mm polypropylene hose lashing, tie a clove hitch approximately one metre from the hose knuckles Fig 7E-13(i), followed by a half hitch between the hoses and around the clove hitch Fig 7E-13(ii). Now use the other end of the hose lashing to take three tight turns around the hoses on top of the clove hitch Fig 7E-13(iii) followed by two jamming turns between the hoses and on top of the half hitch. This is the first lashing prepared. Now rig a second lashing as described above on the opposite side of the hose knuckles. To secure the two lashings together pass the whipped end of each lashing through the eye of the other lashing Fig 7E-13(iv). Haul them taut before making them fast using a series of half hitches. Secure the tail ends by whipping them to their own standing part.

Fig 7E-13. Passing a hose lashing on a double hose rig



**SECURING HOSES TO A TRAY IN A DOUBLE HOSE RIG**

1. When securing hoses to a tray in a double hose rig the following method is effective (See Fig 7-14). The equipment required is:

- 1 x 10m length of 12mm polypropylene tray lashing.
- 1 x wooden mallet.

2. At a point approximately 3.5 metres from the end of the lashing, form a bight and cow-hitch the lashing to the hose at the centre point of the tray. Ensure the hitch is sited on the bottom of the hose, and then lead both ends of the lashing out through one of the centre holes. Now, working forward with one end and aft with the other, lace the hose to the tray by passing the lashing through the next hole, around and over the hose, then back through the entry hole (Fig 7E-14(i)).

3. Once the lacing is complete, tighten the lashing as much as possible before tying off the short end to the small lug on the bottom of the tray.

4. Using the long end, proceed back along the outside of the trough, taking a round turn around the rope at each point it emerges from the holes, haul it taut then use a mallet to tap the round turn into the hole. Carry on to the end hole then follow the other tail under the trough and secure the end to the same lug using a round turn and two half hitches (Fig 7E-14(ii)). Whip the tail end to its standing part, then use a mallet to tap the round turns into the tray. Rigged in this manner there are no knots on the outside of the tray.

**Note.** If smaller hoses are required to be passed with the rig they should be lashed on top of the larger hoses using 8mm polypropylene. The lashings should be either side of the knuckles of the large hoses and at the brass knuckle of the small hose. Lashing should be firm, but not so tight as to throttle the small hose.

**Fig 7E-14. Securing hoses to a tray on a double hose rig**

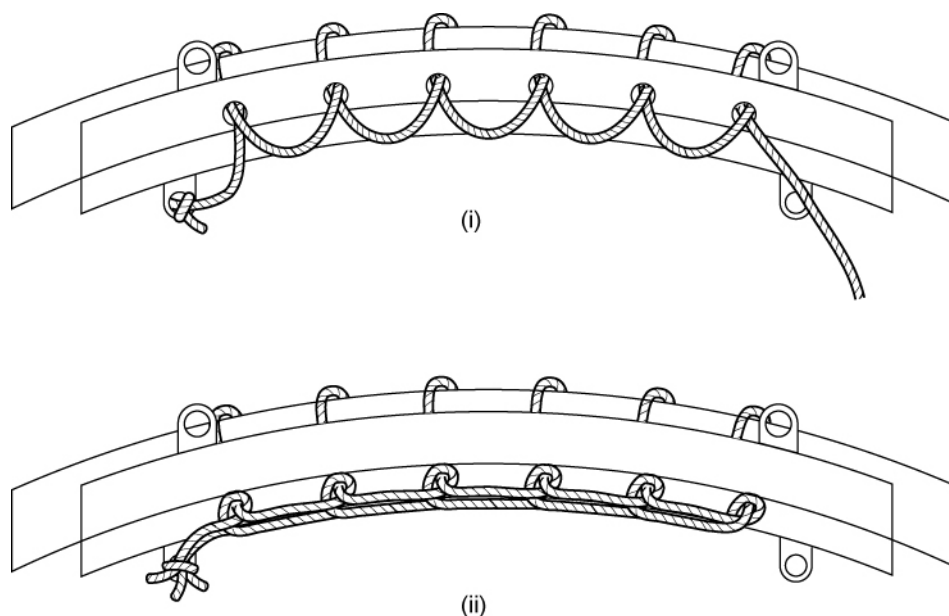


Fig 7E-15. Crane rig general arrangements

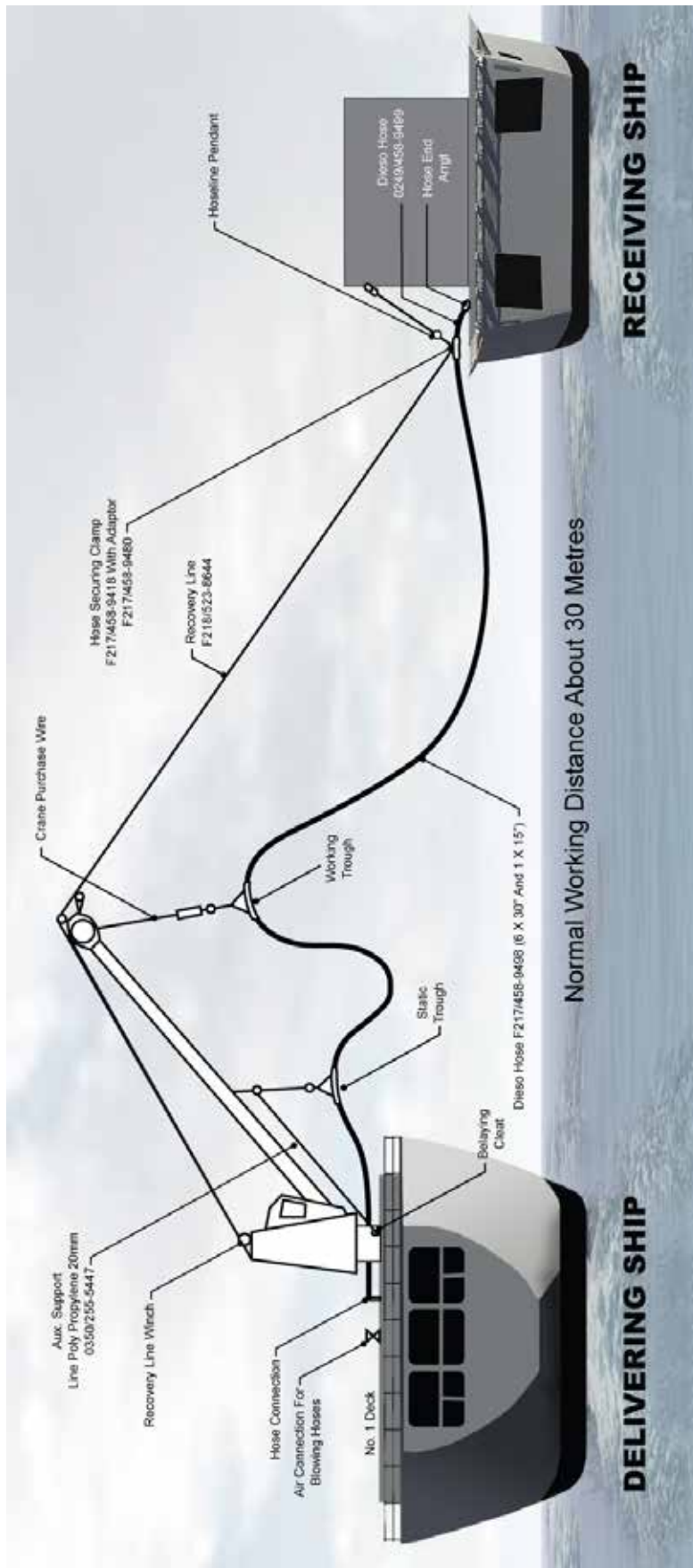


Fig 7E-16. Crane rig recovery (red) wire

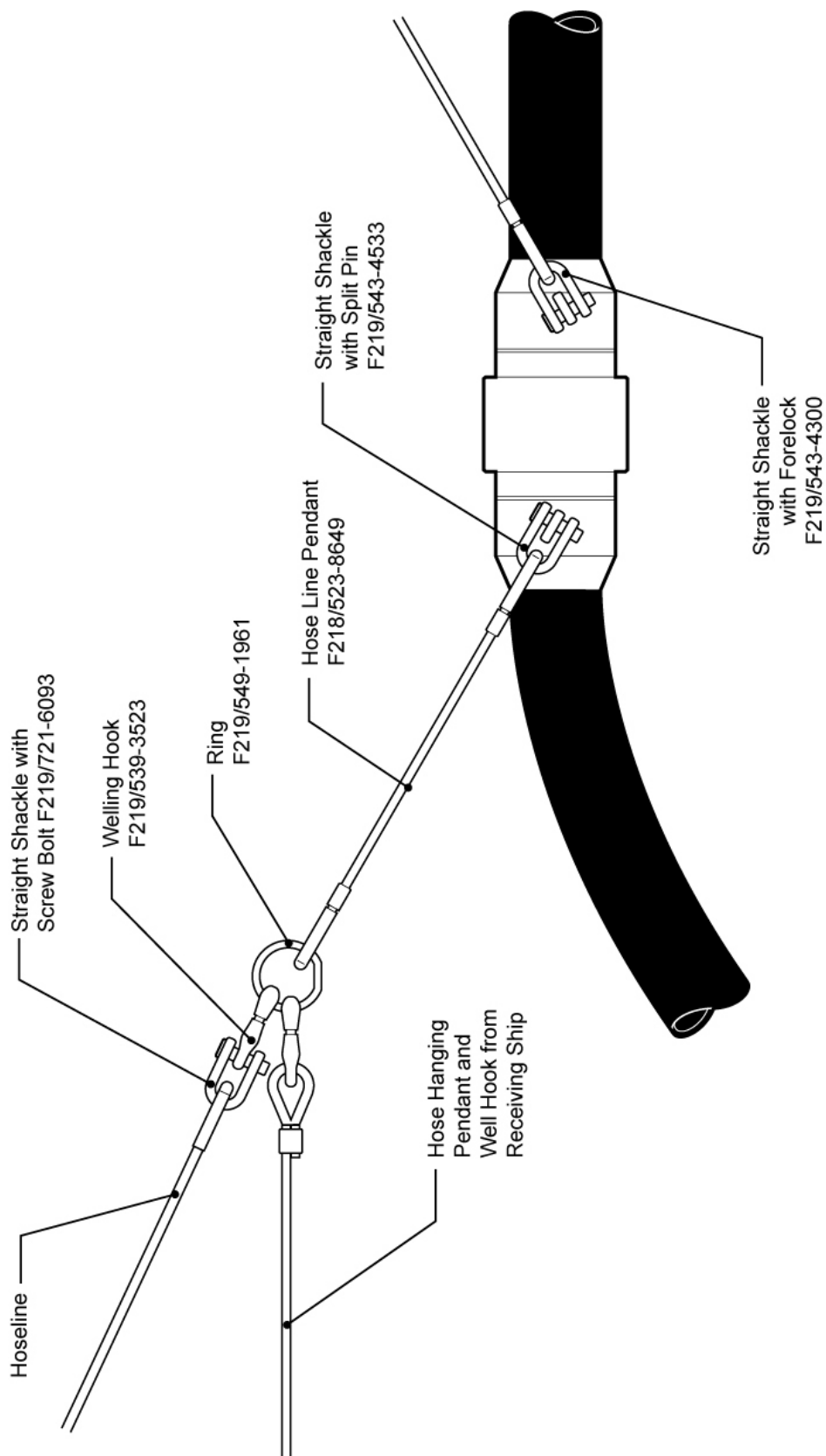


Fig 7E-17. Crane rig working (green) trough

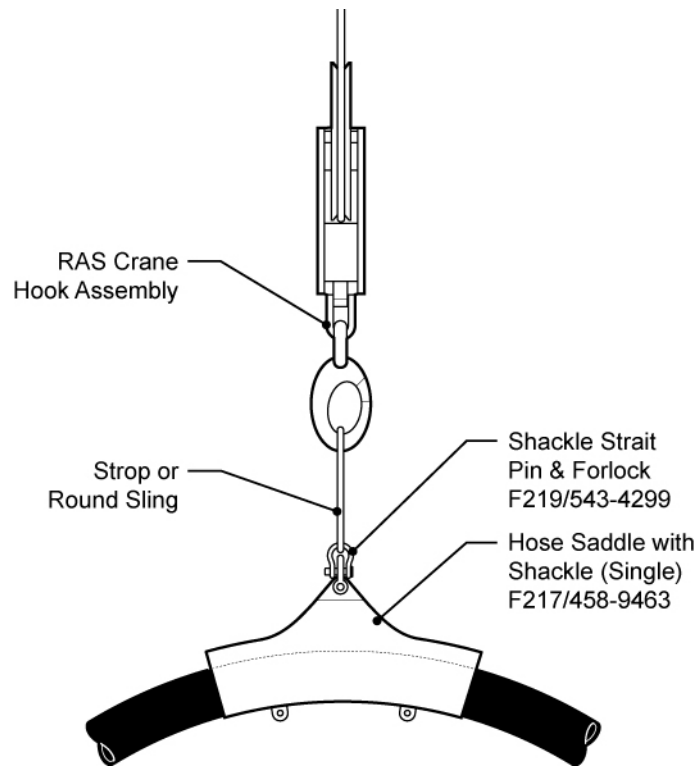
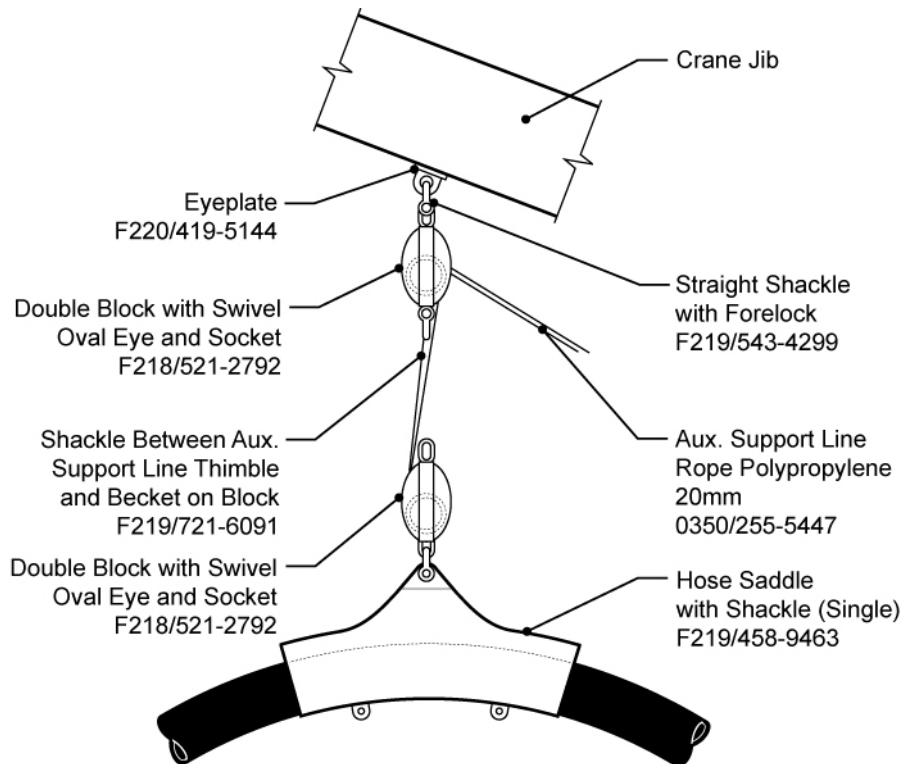
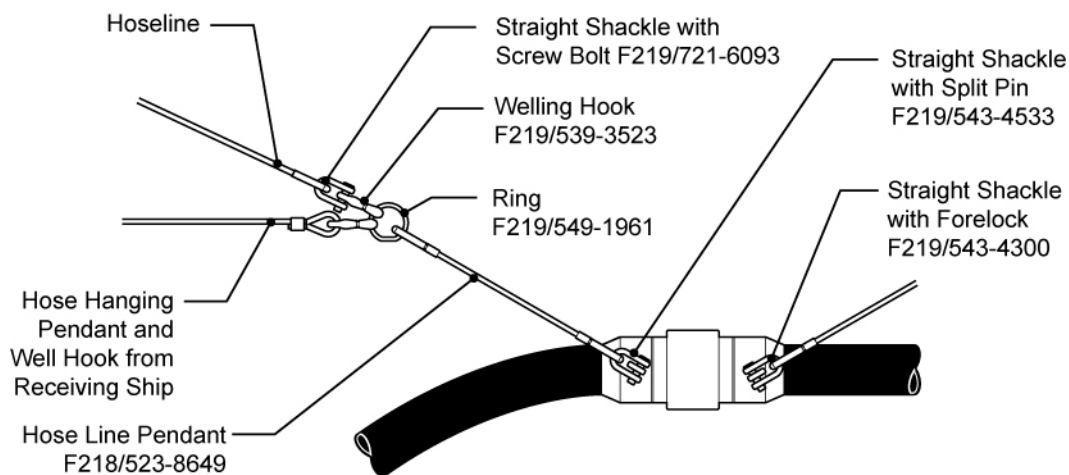


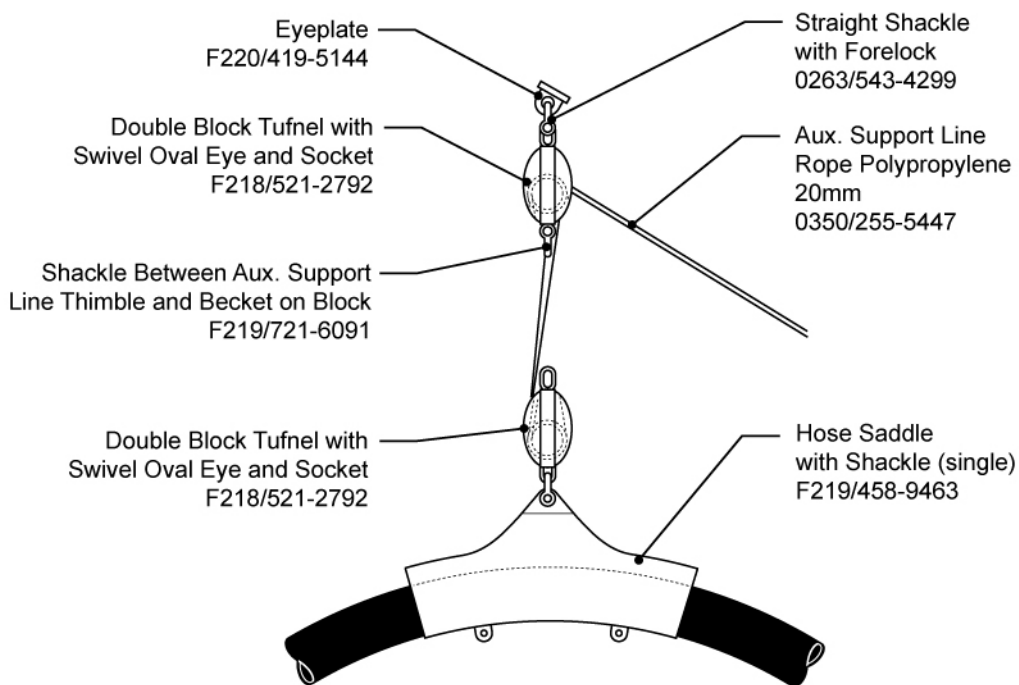
Fig 7E-18. Crane rig static (white) trough



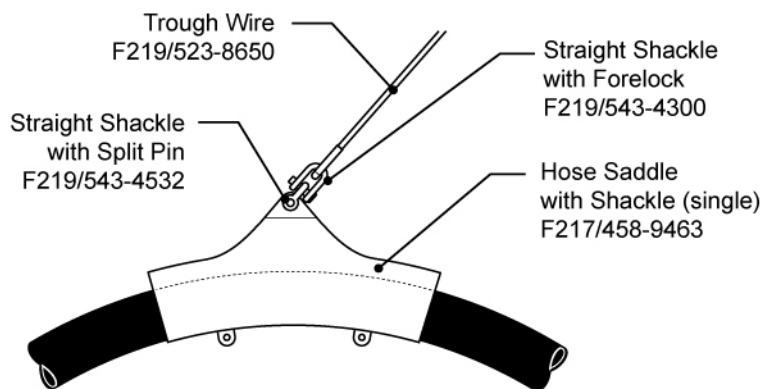
**Fig 7E-19. Trough arrangements for the derrick rig**



**No 1 (Red) Recovery Line**



**Static (White) Trough**



**Green and Yellow Troughs  
(Green has Preventer Wire 3m)**



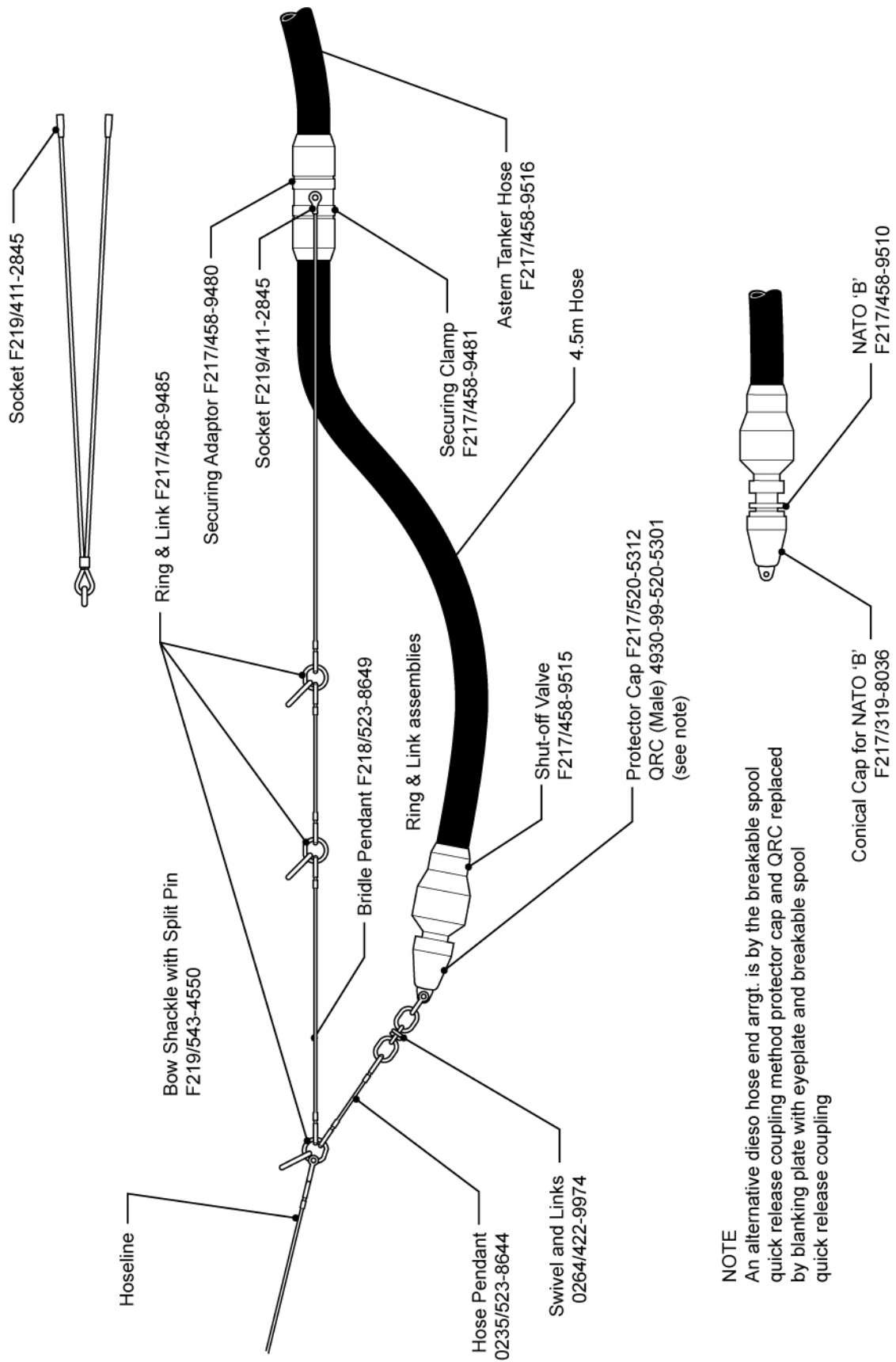
### SECURING HOSES TO A TRAY IN A SINGLE HOSE RIG

To secure the hose to a tray in a single hose rig proceed as follows:

Clove hitch a 10m x 16mm polypropylene tray lashing around the hose just outboard of one end of the tray. Thread the ends of the lashing through the lug(s) on the underside of the tray, then tie off the lashing by securing a rolling hitch outboard of the original clove hitch. Lead the ends back to the tray, through the lug(s) again, then secured the ends by tying a series of half hitches onto the standing part. Whip the tail to the standing part, then place a similar lashing at the other end of the tray.

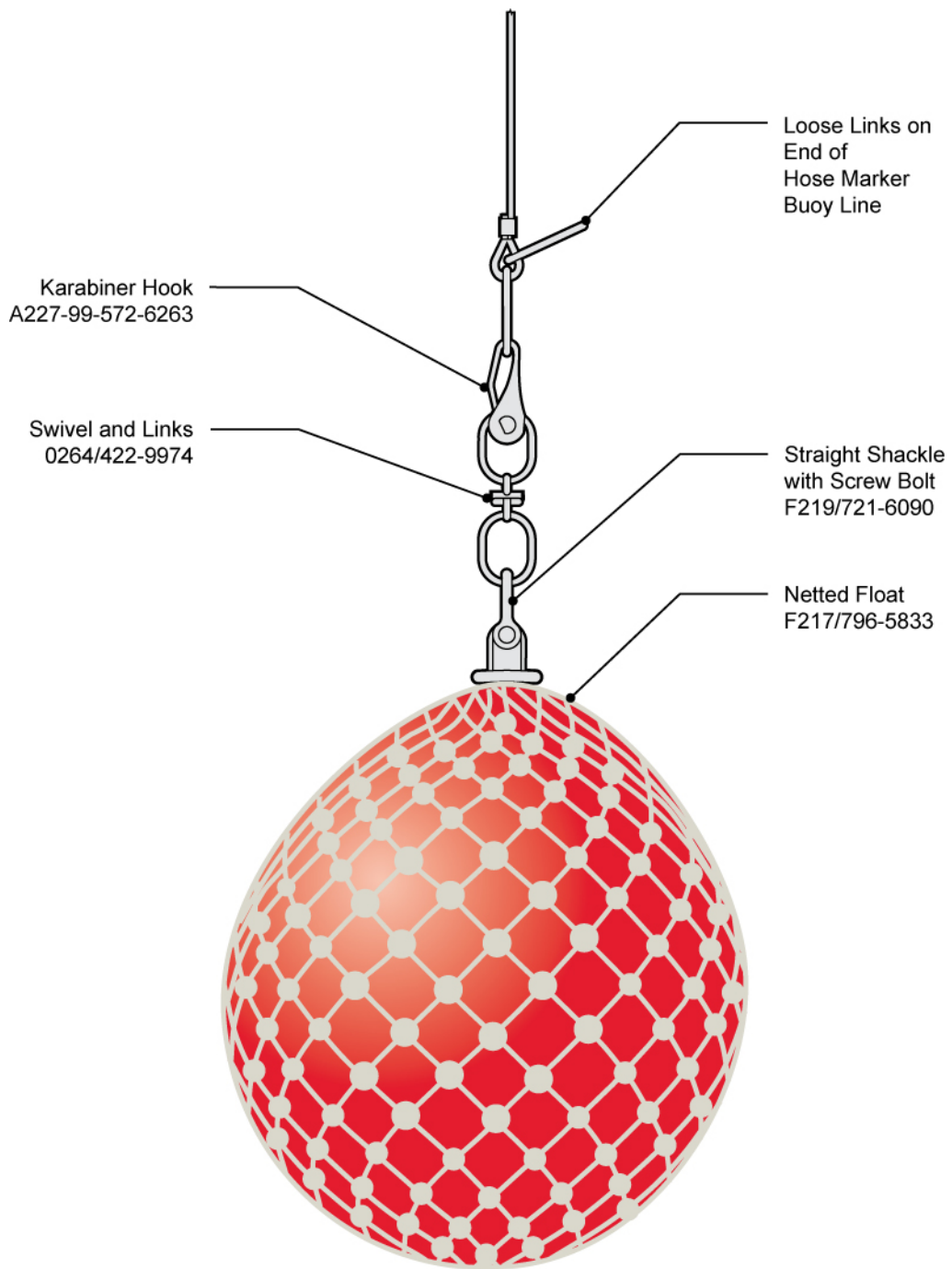
**Note.** *If smaller hoses are required to be passed with the rig, they should be lashed on the side of the large hose. The lashings should be either side of the knuckles of the large hose and at the brass knuckle of the small hose. Lashing should be firm, but not so tight as to throttle the small hose.*

Fig 7E-20. Astern fuelling rig – hose end arrangements



NOTE  
 An alternative dieso hose end arggt. is by the breakable spool quick release coupling method protector cap and QRC replaced by blanking plate with eyeplate and breakable spool quick release coupling

Fig 7E-21. Astern fuelling hoseline float assembly



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**Fig 7E-22. Astern fuelling marker line float assembly**

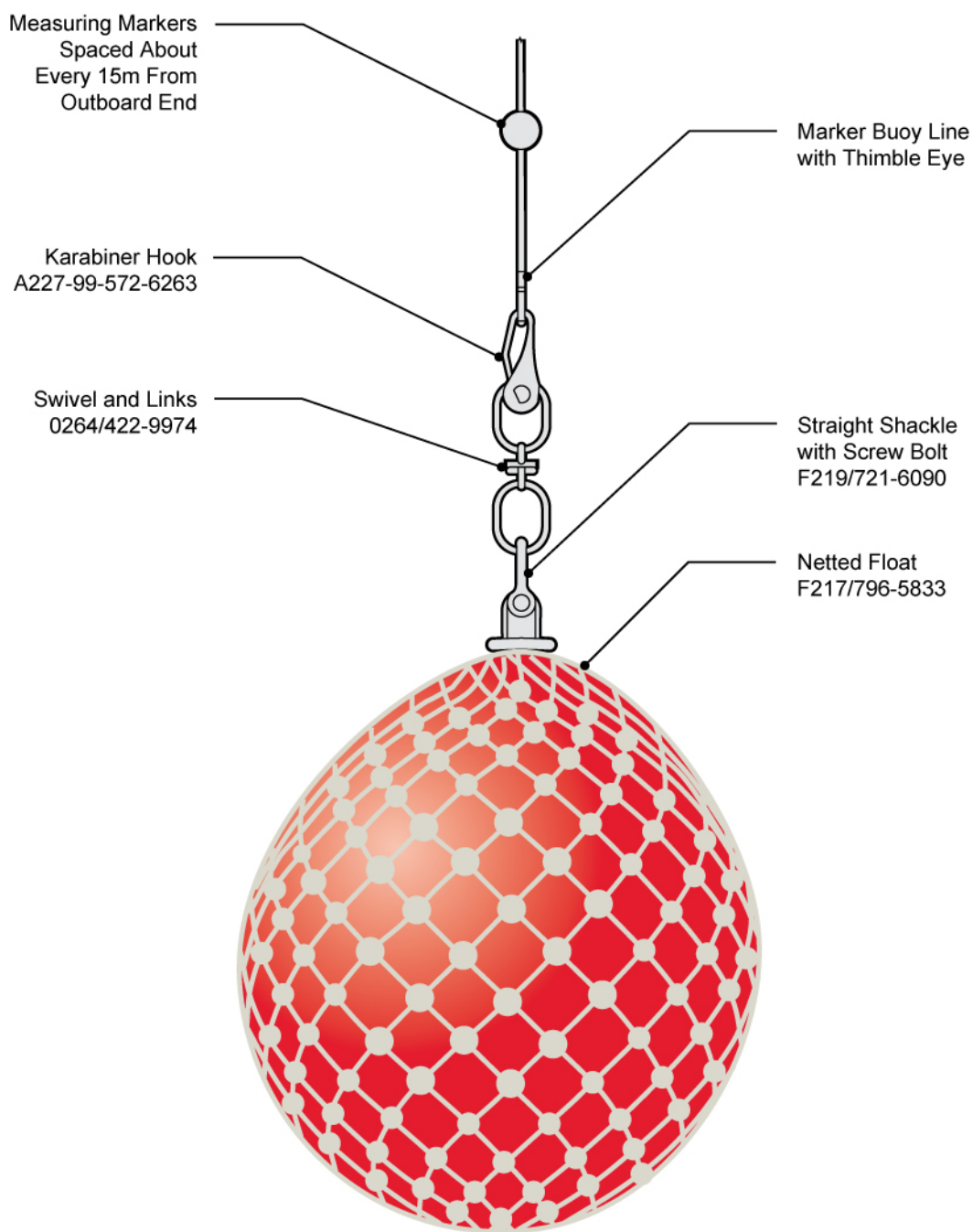
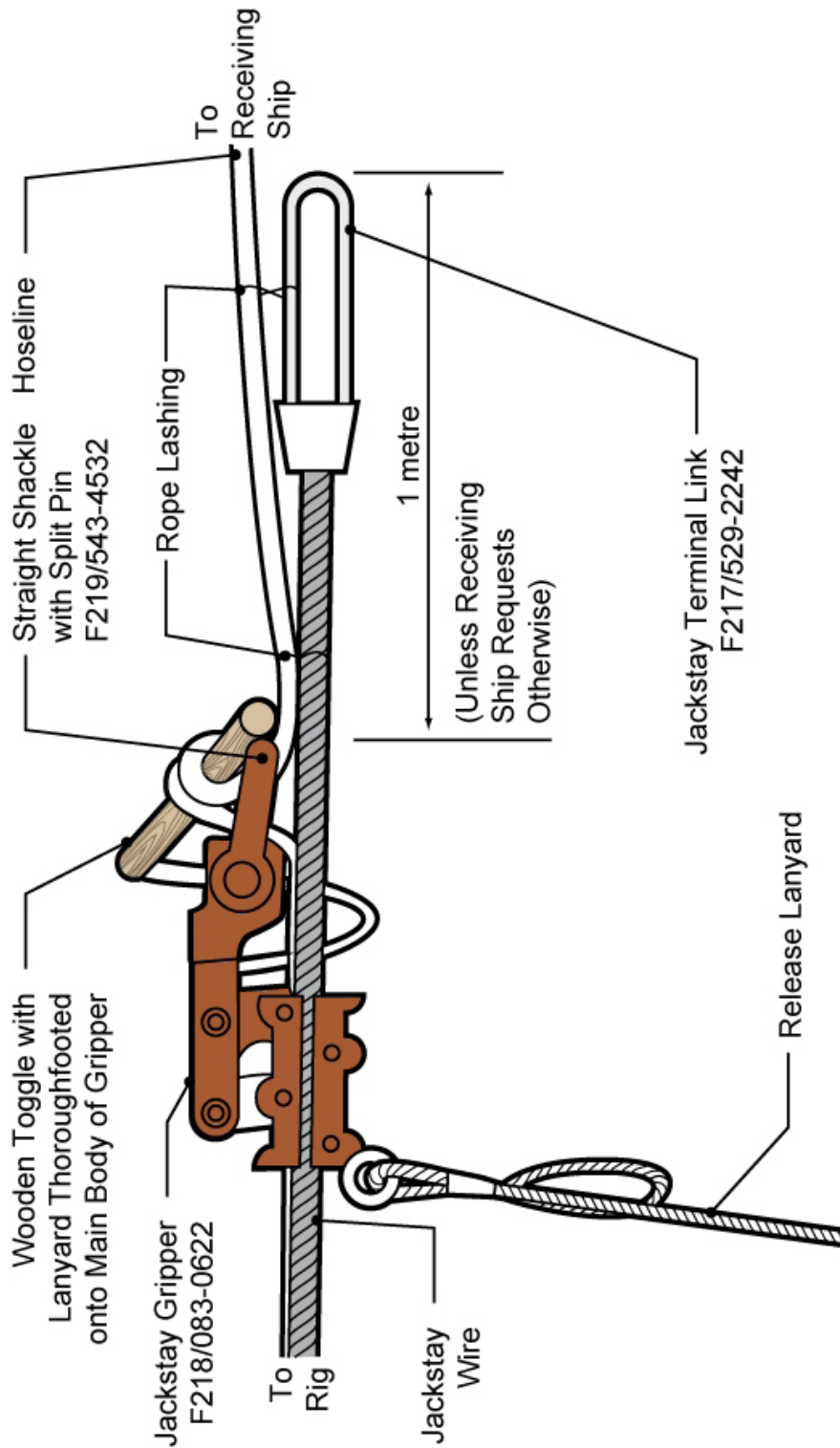


Fig 7E-23. Jackstay gripper arrangements



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ANNEX 7F

**RETURN SHEAVE ASSEMBLY (RSA) COCKING PROCEDURE**

1. The return sheave assembly must be 'cocked' prior to deployment to the receiving vessel. The photographs and text below explain in detail the procedure for cocking the RSA.

It is recommended that two people should be used to cock the RSA.

**Fig 7F-1. Return sheave assembly**



2. The inner levers are rotated against the springs as shown below and held in position.

**Fig 7F-2. Inner levers rotated**



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3. At the same time the Outer Levers are rotated against their springs and held, this holds the inner levers in position.

**Fig 7F-3. Outer levers rotated**



4. The rack shaft is then pushed against the spring and held in position; this holds the outer levers in the correct position to enable the 'R' clip connected to the blue cable to be inserted into the outer hole of the retaining pin.

**Fig 7F-4. "R" clip connected to the blue cable inserted**





5. The 'R' clip connected to the blue cable is then used as a lever to rotate the retaining pin through 90°. When the retaining pin has been rotated through 90° the rack shaft is held in position, thus securing the outer levers in their correct position. The 'R' clip connected to the yellow cable is then inserted into the inner hole. This prevents the 'R' clip connected to the blue cable from releasing accidentally.

**Fig 7F-5. "R" clip connected to the yellow cable being inserted**



**Fig 7F-6. All cables connected**



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6. The RSA should then be deployed to the receiving ship with the “R” clips in position; the lanyards and toggles should be taped together and secured to the steel guard during deployment to prevent them from snagging.

**Fig 7F-7. Cables and toggles secured to steel guard**



**WARNING**

**IF THE COCKING MECHANISM SHOULD ACCIDENTALLY RELEASE BEFORE BEING SET UP IN THE RECEIVING SHIP, IT MUST BE RECOVERED TO THE DELIVERING SHIP TO BE RESET.**

## TARGETS, DECOYS, MARKERS AND RECOVERIES

## CHAPTER 8

## TARGETS, DECOYS, MARKERS AND RECOVERIES

## CONTENTS

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- 08002. Lorne target
- 08003. Maritime realistic surface target (MRST) – sprite target
- 08004. Quick reaction marker buoy (QRMB)
- 08005. Quick reaction and mooring buoy (QRAMB)
- 08006. QRAMB fitted with RASAT
- 08007. QRAMB – dos and don'ts
- 08008. Torpedo recovery
- 08009. Air drop
- 08010. Parachutist recovery by seaboat

CHAPTER 8

TARGETS, DECOYS, MARKERS AND RECOVERIES

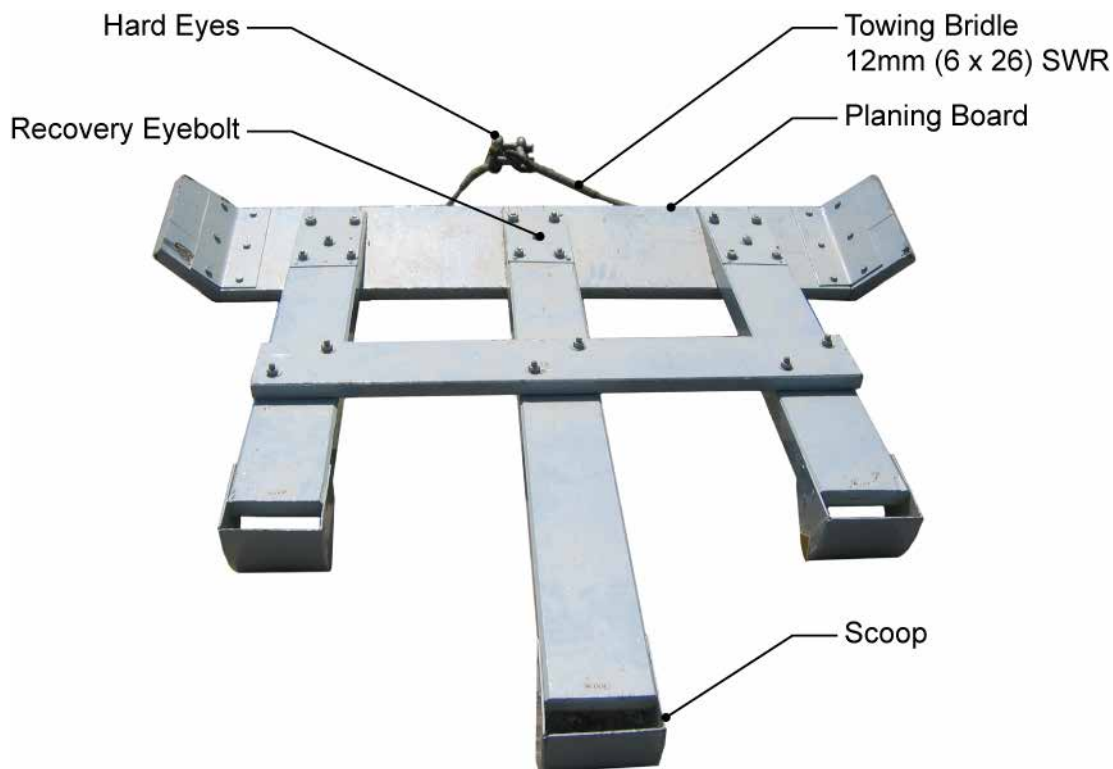
08001. Surface targets – introduction

In recent years the requirement to tow targets for surface or aircraft weapon practice has diminished. Consequently, the only such target the seaman is likely to be required to deploy is the Larne Target, described below. **BRd 1043(General), Gunnery and Guided-Weapon User Instructions** gives details of other types of target which are currently available.

08002. Larne target

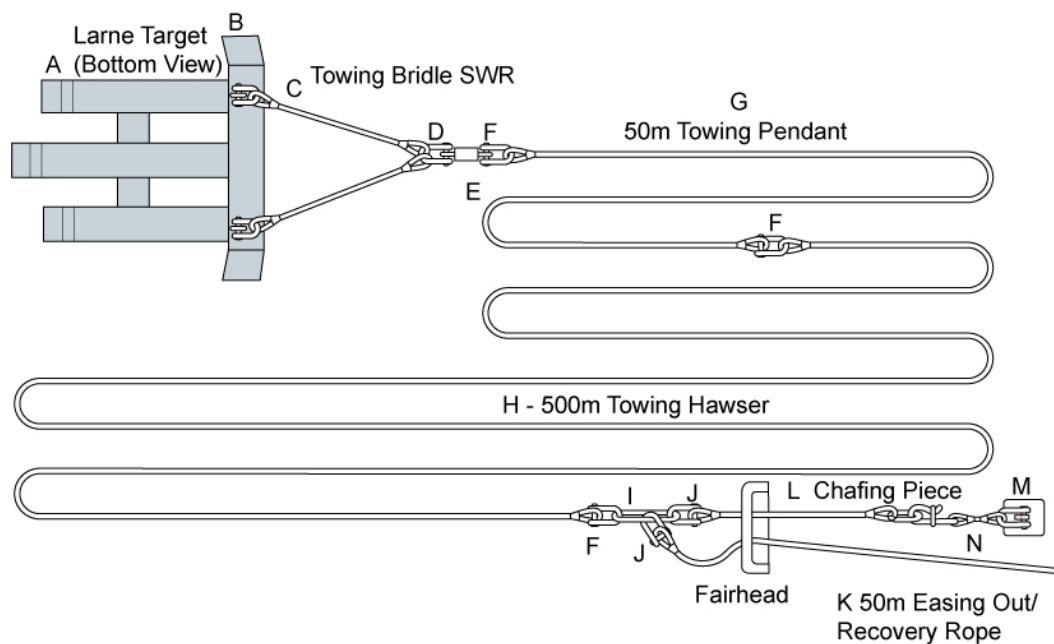
a. **Description.** (Fig 8-1) The Larne Target is a simple raft target measuring 1.5 x 1.3 metres, consisting of a centre and two wing scoop boards, a tie bar and a planing board. The target is very small and is difficult to sight or detect by radar. However, when towed, the scoops produce plumes of water, which are clearly visible and do show on radar.

Fig 8-1. Larne target



b. **Details of the tow.** The make-up of the Larne target is shown in Fig 8-2. It consists of a two-legged SWR bridle shackled to eyebolts on the underside of the target; a swivel piece connects the towing bridle to a 50 metre braided polyester towing pendant, which in turn is shackled to a 500 metre towing hawser. The inboard end of the towing hawser is shackled to a chafing piece, which in turn is connected to a slip. An easing out/recovery rope is used to stream and recover the target.

Fig 8-2. Larne target towing gear



|  |               |
|--|---------------|
| A. Larne target  | 0232/525-9549 |
| B. Straight shackle with split pin                         | 0263/543-4531 |
| C. Towing bridle - 2 x 1 metre legs                        | 0231/523-8644 |
| D. Bow shackle with split pin                              | 0263/453-4551 |
| E. Swivel piece  | 0263/422-9924 |
| F. Straight shackle with split pin                         | 0263/543-4532 |
| G. Towing pendant 50 metres x 16 mm braided polyester      | 0350/587-8367 |
| H. Towing hawser 500 metres x 16 mm braided polyester      | 0350/851-7796 |
| I. Elongated link  | 0249/458-9487 |
| J. Straight screw shackle                                  | 0263/721-6091 |
| K. Easing out/Recovery rope with dimensions as in G. above | 0350/587-8367 |
| L. Chafing piece (Length to suit)                          |               |
| i. 12 mm SWR (Legacy Ships)                                | 0231/523-8644 |
| ii. HPMT Fitted Units                                      |               |
| M. Shackle   | 0263/721-6093 |
| N. Slip  | 0263/414-9747 |

c. **Speed limitations.** The target is designed to be towed at speeds of up to 30 knots in good sea conditions. This speed should be reduced to 24 knots (reducing) in sea states above State 4. During streaming and recovery operations ship's speed should not exceed five knots.

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d. **Preparing the equipment.** The target is to be streamed from an after capstan. Shackle the slip and chafing piece to the deck clench, leaving the outboard end of the chafing piece ready to hand. Now shackle together, via the elongated link, the easing out/recovery rope and towing hawsers with towing pendant attached and coil them down well forward of the capstan. Pass the outboard end of the towing pendant out through the towing fairlead and back inboard over the top of the guardrails. Then shackle it to the target towing bridle. If a capstan is being used, take a bight of the towing hawser to the capstan and bring to with three turns. Now lift the target outboard and hang it on rope hangers ready for deploying. (This last procedure can be delayed until just before the target is streamed, or, alternatively, ships with a low freeboard may dispense with the hangers and manhandle the target into the water when required).

e. **Streaming the target.** When authorised by the bridge, lower (or manhandle) the target into the water. When it enters the water there is a tendency for the target to topple and several attempts may be necessary before it planes correctly. Veer the towing hawser, taking care that the target continues to plane correctly and, if a capstan is being used, riding turns are avoided. Avast veering when the towing hawser has been streamed and the elongated link is on deck, then shackle the outboard end of the chafing piece to the elongated link. Recommence veering until the weight of the tow is transferred from the capstan or winch onto the slip. Unshackle the easing out/recovery rope, or coil it up and stop it adjacent to the towing fairlead. Towing can now commence.

f. **Recovering the target.** When authorised by the bridge, reconnect the easing out/recovery line. Heave in until the weight is off the slip and the slip can be removed, then heave in until the target is just outboard of the towing fairlead. The target can now be manhandled inboard and the rig dismantled and stowed.

**08003. Maritime realistic surface target (MRST) – sprite target**

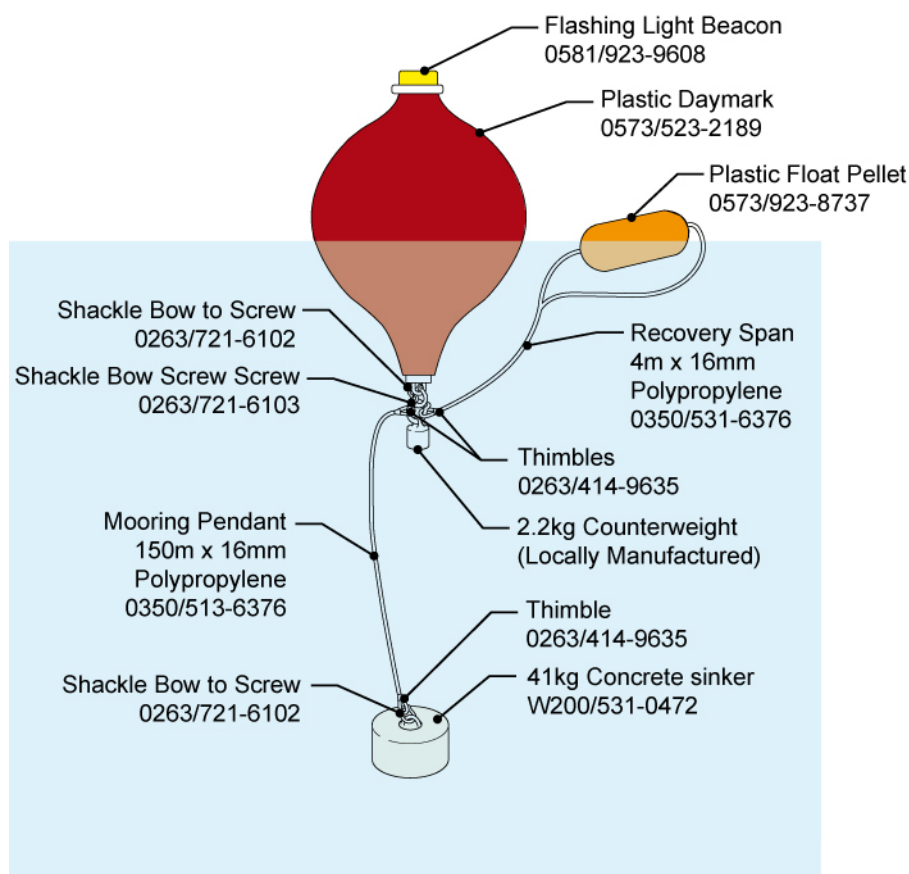
The MRST (SPRITE) as shown in Fig 8-3 is a two-stroke petrol (CIVGAS) powered autonomous target system, designed as a disposable gunnery target. It is a compact lightweight inflatable catamaran that is easily deployed from and recovered on to ships at sea and is capable of operating beyond visual range to provide realistic FIAC representative attack profiles and defence training. For Launching, Recovery and operation of the target refer to Chapter 5 para 05105.

**Fig 8-3. Maritime realistic surface target (MRST) – sprite target**



**08004. Quick reaction marker buoy (QRMB)**

a. **Introduction.** All RFA Ships must have a Quick Reaction Marker Buoy prepared for immediate use when proceeding to sea. The QRMB is to be made up by ship's staff in accordance with Fig 8-4 and is to be rigged in a suitable position on the upper deck. The QRMB is available for laying an immediate, accurate datum on ditched helicopters or other items of lost, valuable equipment.

**Fig 8-4. Quick reaction marker buoy**

**Note.** To simplify the rigging/unrigging procedure, the mooring pendant can be attached to the day mark by a 0263/539-3520-spring hook.

b. **Stowage.** There are a variety of QRMB stowages in use throughout the fleet. Some ships have purpose built stowages, whilst others utilise containers such as dustbins. Whatever the arrangements, the requirement is that the equipment must be secure in all weather, yet quickly and easily deployed when necessary.

c. **Laying the marker.** Drills for individual ships must be devised and proved by ship's staff. Details are to be inserted in to the Seamanship Data Book and Bridge Card, and a tally outlining the operating instructions is to be sited adjacent to the stowage. One simple method of laying the marker is to follow the Danbuoy laying procedure, ie the bight is streamed just prior to the dropping site, then at the appropriate moment the sinker is cast overboard, followed by the float.

d. **Recovering the QRMB.** The QRMB can normally be recovered by grappling the plastic float recovery span. Alternatively, it can be recovered by boat.

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**08005. Quick Reaction And Mooring Buoy (QRAMB)**

a. **Introduction.** The QRAMB (Fig 8-5 through to Fig 8-13) is the replacement for the Danbuoy and eventually the QRMB. It has been designed to facilitate reduced manpower in both deployment and recovery, reduced stowage space and reduced operational deployment and recovery times. The whole system is manufactured from robust, low magnetic signal materials (316 Stainless Steel, GRP, Aluminium and plastics) increasing the use to all theatres of operation. The modular system is significantly less in both weight and size and is extremely quick and easy to link the mooring system to the required length of mooring line. It is designed to be maintenance-free, with no testing of parts being required. The QRAMB can be used in three modes for temporary markings:

- (1) *Temporary Marker.* Replaces the current QRMB.
- (2) *Free-Floating Marker.* A surface marker without a moored system.
- (3) *Semi Permanent Marker.* Replaces the current Mk2 Danbuoy.

b. **QRAMB system parts listing**

- (1) *Telescopic Dan-Float with flag.* (NSN F220-99-582-5939).
- (2) *Solar powered LED light.* (NSN F220-99-958-6592).
- (3) *Radar Reflector.* (NSN F220-99-841-9669).
- (4) *Anchor/Sinker.* (NSN F220-99-668-2067).
- (5) *Anchor Chain.* (NSN F220-99-837-1700).
- (6) *Anchor Release Unit.* (NSN F220-99-572-6650).
- (7) *Mooring Buoy.* (NSN F220-99-152-7374).
- (8) *Mooring Pendant.* (NSN F220-99-856-4514).
- (9) *Recovery Pendant.* (NSN F220-99-471-6125).
- (10) *Mooring Line Bags*
  - 150 m (NSN F220-99-269-3725).
  - 90 m (NSN F220-99-938-2290).
  - 36 m (NSN F220-99-254-8479).
  - 18 m (NSN F220-99-517-5978).
  - 9 m (NSN F220-99-501-0156).
- (11) *Two 12 mm Stainless Steel Bow Shackles.* (NSN F220-99-517-5980).
- (12) *Two 10 mm Stainless Steel Bow Shackles.* (NSN F220-99-344-9152).
- (13) *One Swivel Stainless Steel Snap Shackle.* (NSN F220-99-320-5141).
- (14) *Grapnel.* (NSN F220-99-226-1834).
- (15) *Ready Use Upperdeck Stowage Assembly.* (NSN F220-99-272-3112).

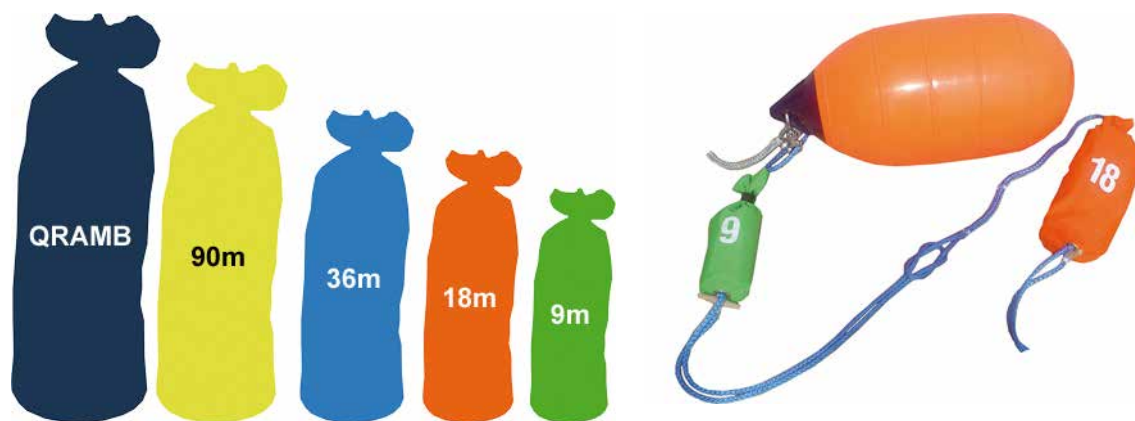


Fig 8-5. QRAMB telescopic danbuoy

|                            |             |
|----------------------------|-------------|
| Total Length Stowed:       | 2.94 metres |
| Total Length Part Scoped:  | 3.10 metres |
| Total Length Fully Scoped: | 3.90 metres |



Fig 8-6. Mooring line bags



c. **Parts required**

- (1) LD3 Mooring Buoy.
- (2) Mooring Shackle, 12 mm Bow (Stainless Steel).
- (3) Mooring Snap Shackle.
- (4) Recovery Pendant 4 metres x 9 mm HMPE Fibre Rope.

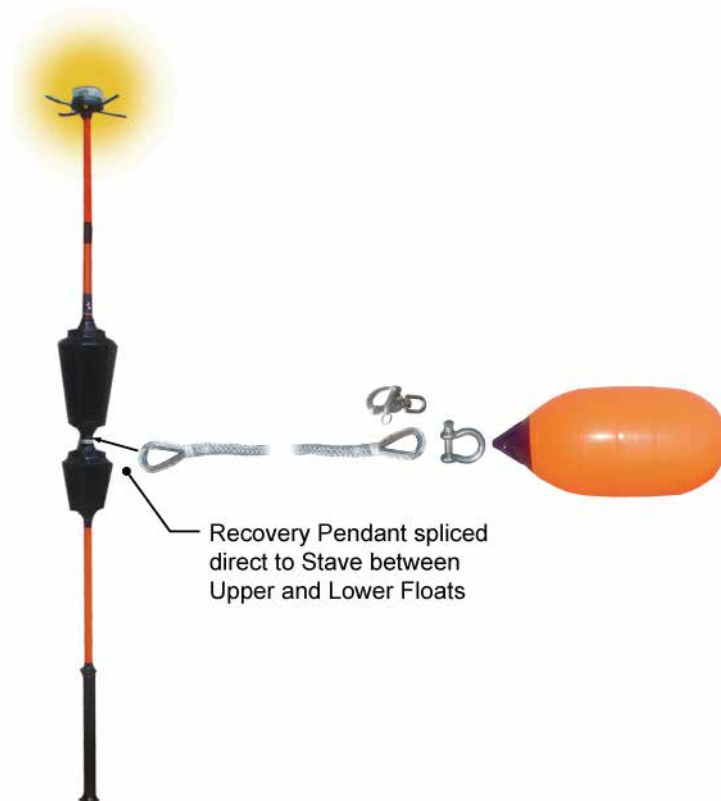
d. **Preparing the LD3**

- (1) The mooring shackle is inserted into the eye of the Mooring Buoy so that the pin of the shackle is outer.
- (2) The Mooring Snap Shackle and the Recovery Pendant's thimble is inserted into the pin of the Mooring Shackle.

Fig 8-7. Preparing the QRAMB



Fig 8-8. QRAMB telescopic danbuoy parts



e. **QRAMB marine light beacon operating instructions**

(1) *Storage*

- (a) The buoy light is shipped with 40% battery charge. This allows a shelf life of up to a year before the internal cells discharge. After a full charge the standby time is 2.5 years.
- (b) The light should be stored with the switch in the OFF position.
- (c) The light should be stored at a temperature use of between 0° – 25°C.
- (d) The light should always have the charge port cap secured when not in use to prevent moisture ingress.

(2) *Charging*

- (a) The light should be charged using the approved adapter before first use.
- (b) A mains supply of between 110 and 250 VAC and 50 to 60Hz should be provided to the charger. (NSN F220-99-503-3989).

**TARGETS, DECOYS, MARKERS AND RECOVERIES**

(c) The charger is connected to the DC supply socket located under the stainless steel/plastic blanking plug on the bottom of the light base unit. The plug is unscrewed in a counter clockwise direction.

(d) On connecting the charger, a green light illuminates on the LED array behind the lens cover. The green light should remain in the steady on state for the whole duration of the charge sequence. If the green charge LED starts to flash then disconnect the light and remove it from service. This indicates a fault with the electronic system, most likely due to water ingress.

(e) During active charging, six of the yellow LED array will pulse approximately every two-to-three seconds.

(f) Full charge will take approximately seven hours or less if the batteries are not fully exhausted.

(g) After active charge completes, the yellow LEDs will stay off. The light then enters trickle charge standby mode.

(h) It is not recommended to leave the light on trickle charge for long periods as this may eventually shorten the rechargeable battery life, nor is it advisable to leave the unit on charge whilst unattended.

(i) The charger should be disconnected at the blanking plug when not in use.

**f. Operation**

(1) The light should be checked before use:

(a) Ensure the blanking plug is fitted and secure.

(b) Ensure the switch rubber cover is in good condition and does not allow water to get inside the light.

(c) Ensure the clear lens cover is secure and shows no sign of damage that would cause water to enter the light.

(2) The toggle switch should be set in the ON position (ON is indicated by switching towards the RED CAP on the protection crown)

(3) The light will self test and show a flash sequence on the LED array. The light is then ready for operation.

(4) If the ambient light level is below preset threshold, the LED array will illuminate. If the ambient light is above preset threshold, the LED array will extinguish.

(5) If the batteries are depleted, the light will use power save mode to extend the run time while the LED array is illuminated. There may be a noticeable high speed modulation to the light in this mode.

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(6) If the light is operated to the point where the batteries are completely exhausted, the LED array will be turned off to safeguard permanent damage to the batteries.

(7) While exposed to daylight, the solar cell will trickle charge the battery.

(8) Maximum runtime of the LED array is ten hours on a full charge with an additional two hours of power-save illumination.

(9) Standby time of the light is six months while the light is in the ON mode but in daylight conditions.

(10) When not in use the light should be charged and stored in the OFF mode.

(11) The user should not attempt to remove the upper lens dome from the base of the unit.

**g. Service**

(1) The light is not user-serviceable.

(2) The light should be retired from service if salt water ingress has occurred.

(3) Dispose of in a responsible manner as per national and local waste management criteria.

**h. QRAMB mooring chain – rigging process****(1) *Parts required***

(a) 16 mm Stainless Steel Short Link Chain of two metres length.

(b) Recovery Pendant.

(c) 12 mm Stainless Steel Eye Swivel.

(d) 10 mm Stainless Steel Bow Shackles.

(e) Anchor Pendant.

(f) 12 kg Anchor, Folding Grapnel Type.

(g) 12 mm Stainless Steel Bow Shackle.

**(2) *Makeup process***

(a) The Anchor Pendant is made up with a Thimble eye each end.

(b) The Chain is made up with the Swivel at one end and attached to the Anchor by the 10 mm Bow Shackle.

(c) The Anchor Retriever is fixed to the shackle on the swivel and then onto the Chain and the Anchor Pendant is fitted to the Anchor Retriever.

Fig 8-9. Mooring chain rigging process

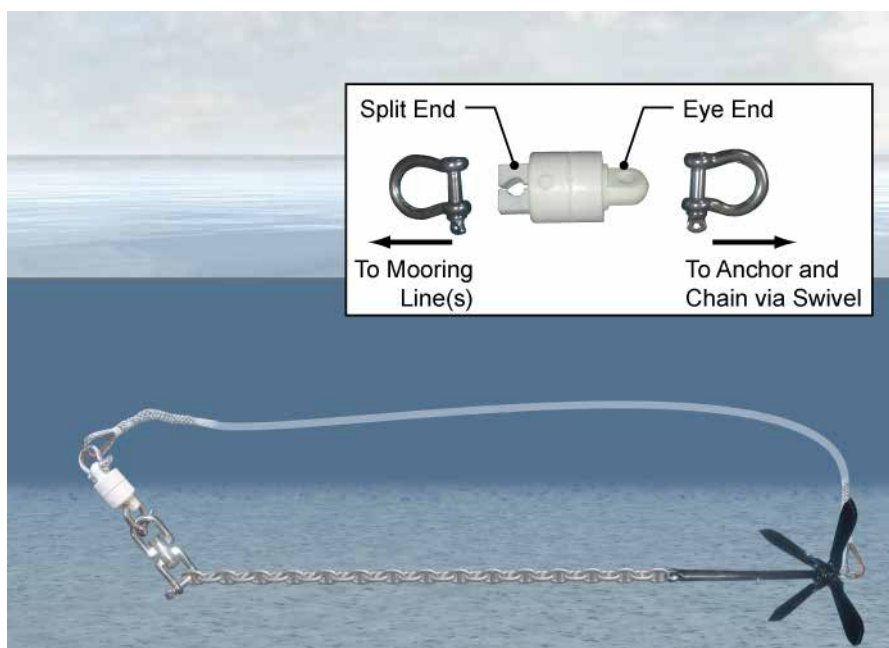


Fig 8-10. QRAMB rigged as for QRMB



The Radar Reflector is Stowed Separately and the Light is in the Off Position

Fig 8-11. QRAMB in upperdeck stowage



i. **QRAMB laying and recovery procedure**

(1) *Laying* (laying time two minutes)

- (a) Check light is in the ON position (Switch to RED).
- (b) Attach Radar Reflector if required.
- (c) Undo VELCRO® brand Tab on Mooring Bag.
- (d) Grasp Stave under lower Float and position outboard of guardrail.
- (e) Grasp Mooring Bag and Sinkers and position outboard of guardrail.
- (f) Stream the bight or release the bags in order with the VELCRO® brand tabs undone.
- (g) Drop the Dan and LD3 Buoy clear of the ship's side.
- (h) When clear of the stern, Anchor and Chain to be dropped clear of the ship's side.
- (i) Report to the bridge '**MARKER BUOY WATCHING**'

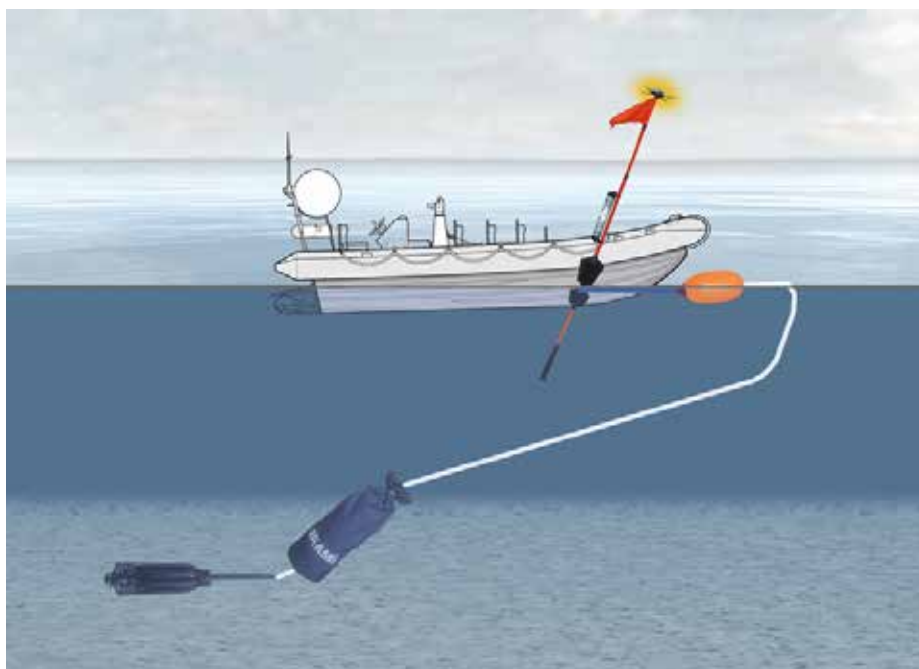
(2) *Recovery*. As for QRMB (recovery time approximately ten minutes)

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j. **QRAMB approach for recovery**

- (1) Always approach the QRAMB from windward to minimise fouling the mooring line(s).
- (2) Always 'grapnel' between the Dan and the LD3 Buoy to recover by the pendant (Ship only).

**Fig 8-12. QRAMB recovery by boat**

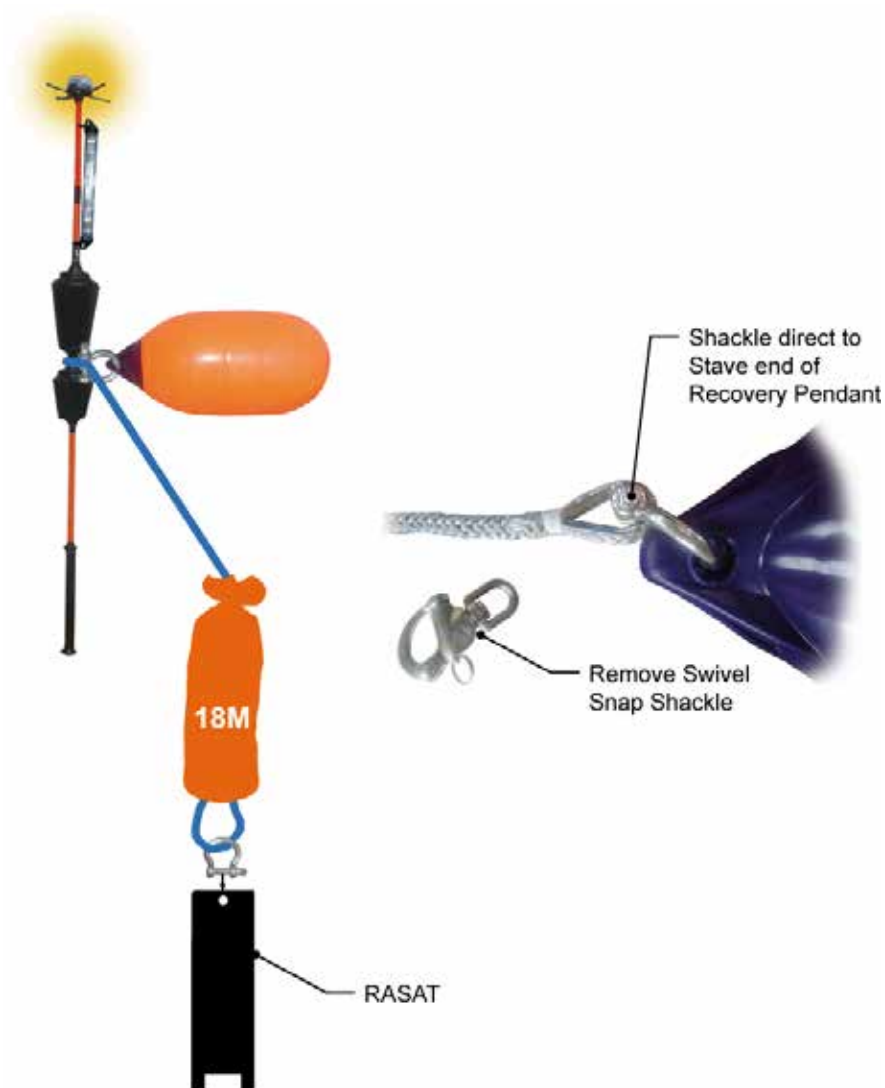


**08006. QRAMB fitted with RASAT**

- a. The new QRAMB is designed to enable the fitting of the Radar And Sonar Alignment Target as explained below:
- b. **Gear required**
  - (1) *QRAMB Stave.*
  - (2) *Radar Reflector.*
  - (3) *Recovery Pendant.*
  - (4) *LD3 Buoy.*
  - (5) *Two 12 mm Bow Shackles.*
  - (6) *18 metre Mooring Bag.*
  - (7) *RASAT.*



Fig 8-13. QRAMB fitted with RASAT



c. **Rigging preparations**

- (1) Remove the QRAMB 150 metre mooring bag, sinker and swivel snap shackle.
- (2) Shackle the LD3 buoy direct to the recovery pendant and the stave end.
- (3) Using the same shackle as above, connect the 18 metre mooring bag (large eye end).
- (4) Shackle the RASAT to the small eye end of the 18 metre mooring bag.
- (5) Scope the stave as required and attach the radar reflector.

*The QRAMB is now fully rigged for RASAT deployment.*

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d. **Deployment – ship**

- (1) Lower RASAT hand over hand into the water.
- (2) Position Stave and LD3 buoy over the guardrails.
- (3) When weight transferred to LD3 buoy, at arm's length, release the LD3 buoy and stave.

*RASAT Launched*

- (4) Report RASAT 'WATCHING'.
- (5) Ship opens from target to conduct alignment.

e. **Deployment – boat**

- (1) Lower RASAT hand over hand into the water.
- (2) Ensure lines, stave and LD3 buoy are not fouled within the boat.
- (3) When weight transferred to LD3 buoy, manoeuvre buoy and stave into position in the water.
- (4) Check 'watching' status and report to the ship.
- (5) Return to the ship or allocated position.
- (6) Ship conducts alignment.

**Notes:**

1. *During foul weather, do not fully scope the stave.*
2. *Always ensure the mooring line bag attached to the RASAT is shackled on to the main LD3 buoy shackle.*

**08007. QRAMB – DOs and DON'Ts**

- a. Use the QRAMB for regular training in all modes of operation.
- b. Use the QRAMB in free-float mode for OOW manoeuvres.
- c. Familiarise your department with a full QRAMB mode of operation.
- d. Look after the whole system with regular fresh water wash-downs and cleaning especially after use.
- e. Follow the light charging instructions.
- f. Incorporate the light testing (daily) into your maintenance and servicing routines.
- g. Ensure that the light unit is in the OFF position and that the charging blanking plug is in place and watertight at all times.
- h. Ensure that the launching instructions are affixed adjacent to the QRAMB ready-use position.
- i. Ensure that regular training of all ship's company personnel is carried out (everyone should be able to launch the QRAMB).
- j. Carry out recovery training by both ship (grapnel) and by boat.
- k. Follow the instructions for use with R.A.S.A.T.
- l. **Do NOT** use the QRAMB for target practice.
- m. **Do NOT** use the QRAMB or any of its component parts for other jobs. (Grapnel excepted).
- n. **Do NOT** paint the QRAMB.
- o. **Do NOT** use any abrasive cleaners on the light unit dome (cloths and soapy water only).
- p. **Do NOT** leave the radar reflector attached when inboard (to be stowed off the upperdeck but close to the QRAMB system).
- q. **Do NOT** leave the light unit on charge whilst unattended and only use the charging unit supplied for this purpose.
- r. **Do NOT** dispose of the stave assembly into communal garbage (contains two weights) but follow your local Waste Management Guidelines for the disposal of hazardous waste.
- s. **Do NOT** deploy the QRAMB from above 20 metres in height.
- t. **Do NOT** fully extend the stave unit in severe weather conditions.

**Note.** *Be aware that the mooring lines with the QRAMB are extremely strong and float. Care is to be taken when approaching for recovery by both ship and boat.*

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**08008. Torpedo Recovery**

a. **Introduction.** The only type of torpedo that warships are normally required to recover is the Sting Ray Torpedo Training Variant (TVT), an inert torpedo. Recovery may be by helicopter or sea boat. Other types of torpedo, such as the Sting Ray Exercise Variant Torpedo (EVT) or torpedoes fired from submarines are normally recovered by specially equipped torpedo recovery vessels, although occasionally they are recovered into a warship by specially trained and equipped personnel who are embarked for the task. The authoritative publication for torpedo recovery is BR 2777, Torpedo Identification and Recovery. Information given in this publication refers only to recovery by sea boat of a Sting Ray TVT torpedo. The principle of this type of recovery is that the torpedo is 'captured' by boat and towed to the ship for hoisting inboard.

b. **On-deck preparations**

(1) *Hoisting equipment.* If the torpedo is to be hoisted by crane, a steadying line should be made fast close to the ponder's ball to check excessive movement caused by the roll of the ship. Whatever lifting device is used it must have a SWL of at least 160 kg, the weight of a Sting Ray (TVT).

(2) *Fenders.* Two fenders should be placed over the ship's side abreast the recovery position to prevent damage to the torpedo against the ship's side during hoisting. Fenders must be tended and worked up the ship's side level with the torpedo.

(3) *Head and sternfast.* A head and sternfast should be rigged ready for passing down to the recovery boat.

(4) *Hook ropes.* Two 16 mm polypropylene hook ropes of sufficient length to reach the water should be placed adjacent to the recovery position.

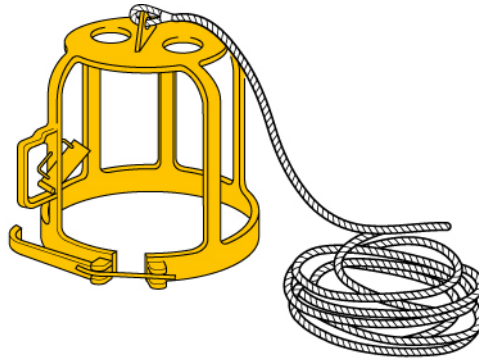
(5) *Torpedo loading trolley.* To be placed adjacent to the recovery position.

(6) *Deck team.* The handling team on deck should consist of a PO or Leading Seaman Specialist, three ratings and an appropriately qualified member of the Warfare branch to provide technical attention to the torpedo.

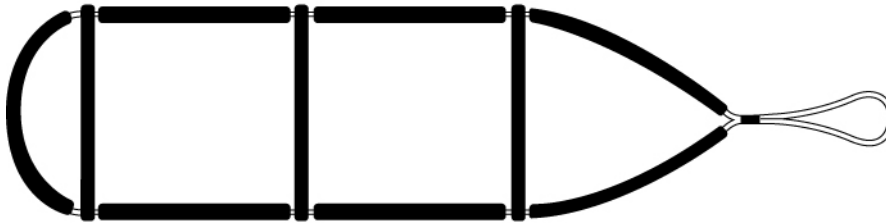
c. **Boat preparations.** A RIB or inflatable craft can be used as the recovery boat. The boat must be adequately fendered for towing a torpedo alongside. The usual method of achieving this is to secure shot mats over the gunwale or buoyancy tube on the towing side of the boat; the mats must be well secured. The boat should be manned by its normal crew, plus two additional hands to handle the torpedo. The equipment shown in Fig 8-14 should be placed in the boat.

**Note.** *The towing side of the recovery boat will be the opposite to the side on which the recovery ship will be hoisting the torpedo, so that, on coming alongside the torpedo is between the ship's side and the recovery boat.*

Fig 8-14. Boat recovery equipment for Sting Ray TVT



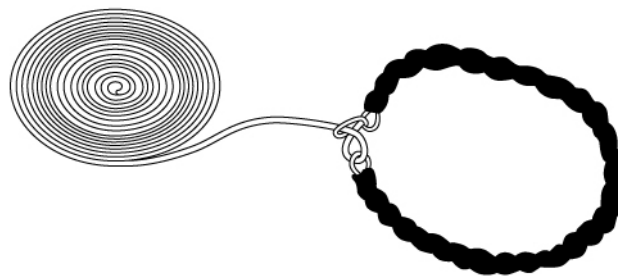
Cage Torpedo Towing 0263/924-7112  
(Splice Soft Eye in Fag End of Rope Tail)



Strop Torpedo Recovery 0263/745-3929  
(Jacobs Ladder)



2.4m Recover Noose 0263/924-7118



Tail Line 0263/924-7114  
(Splice Soft Eye in Fag End of Rope Tail)

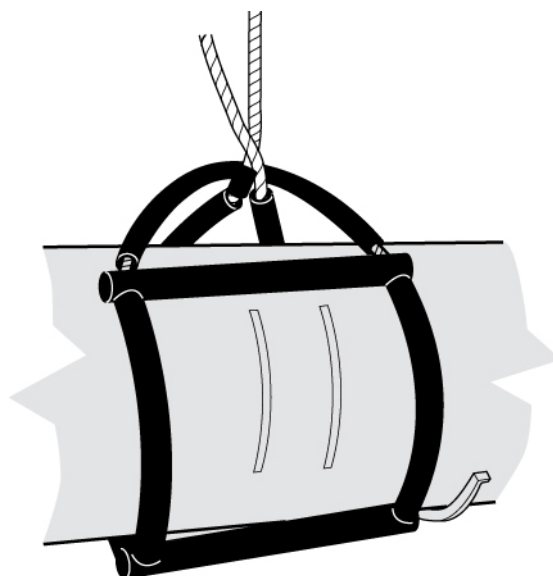
**CAUTIONS**

- 1. If the Torpedo has been launched from a helicopter a parachute will still be attached to the tail of the weapon. This can be a hazard to the boat's propeller.**
- 2. The tail 'T' fins are sharp. Take care that they do not damage the boat.**

d. **Recovery procedure.** The recovery ship approaches, and slips the recovery boat, close to the torpedo. The ship remains in a position to give the recovery boat as short a distance as practicable to tow the torpedo and also to provide a lee for the boat when it returns alongside. The boat's crew carry out the following recovery procedures:

- (1) Approach the weapon and bring it, using the recovery pole, nose facing forward, alongside the boat.
- (2) Remove parachute, if fitted, either by releasing the para-pack releasing pin, or by cutting the parachute lines.
- (3) Loop the eye of the tail line over the tail and haul it ahead of the fins before tightening the noose and securing the line in the stern of the boat.
- (4) Place the 'nose cage' over the nose of the torpedo and lock the clamping band into position. Secure the nose cage line forward in the boat.
- (5) Choke hitch the Strop Torpedo Recovery around the torpedo at the point of the Centre of Gravity (Fig 8-15). The strop must remain in hand while the boat returns to the ship.
- (6) Manoeuvre the boat to the recovery ship's side, abreast the hoisting station.

**Fig 8-15. Recovery strop (Jacob's ladder) choke-hitched to the torpedo**



## TARGETS, DECOYS, MARKERS AND RECOVERIES

e. At this point, the head and sternfast are passed to the boat and secured. These should be tended inboard so the position of the boat can be adjusted as required. The hook ropes are passed to the boat's crew who hook one into the soft eye in the end of the nose cage line and the other to the soft eye in the tail line. Nose cage line and tail line are hauled up on the hook ropes and tended in the recovery vessel. The hoisting whip is now passed to the boat and hooked to the Strop Torpedo Recovery. As soon as the weight of the torpedo is taken, check that the torpedo is horizontal. The recovery boat then clears the ship's side and prepares to be hoisted. As the torpedo is hoisted to deck level the position of the ship's side fenders must be adjusted as necessary to prevent damage to the torpedo against the ship's side. The torpedo is trained inboard, lowered and steadied on to its trolley, then strapped in position. The Warfare branch rating fits nose and tail protectors before the torpedo is transported to a servicing area for a post recovery servicing routine to be carried out.

**08009. Air drop**

a. **Introduction.** Urgent stores affecting operational capability can be air dropped by the RAF. **BRd 9424(1) Fleet Operating Orders** give full details of the procedures to be followed; information given here refers only to the seamanship aspects of the evolution.

b. **Details of the load.** The stores are packed in a buoyant waterproof container. This container, normally siliconed cardboard, is lashed to a wooden pallet, which in turn is placed inside a strong polypropylene net. The four corners of the net are each fitted with a lifting strop that is attached to a net recovery shackle. Secured to the net recovery shackle is a parachute fitted with an automatic parachute release mechanism that operates a few seconds after the load is dropped into the water. A retaining line ensures the parachute remains connected to, but clear of, the load. The maximum weight per load will not exceed one tonne although there will be a slight increase in the overall weight caused by wetting of the container. Helicopter/GP Davit lift capacity should take account of this fact and the ship should report any weight limitation or restriction in the Airdrop request signal. The approximate size of the largest load is 1.3 metres in width, 1.1 metres depth, and 1.8 metres in height. To allow for the length of the slings a deck-edge clearance of approximately 2.3 metres is necessary at the recovery point.

c. **Methods of recovering the loads.** The loads may be recovered from the sea by helicopter or by sea boat and GP davit. Helicopter recovery is quick and effective, but is limited to Sea State 3 or below in order to avoid the risk of snagging or injuring the swimmer during attachment of the lifting hook to the net recovery shackle. Seaboat recovery with a large load alongside is sluggish, and above sea state 4 the boat could be swamped when turning or when alongside the ship for load recovery. The most common method of recovery is to send a sea boat away to secure one end of a 24 mm polypropylene towing messenger to the load; the other end of the messenger is retained in the ship. The load can then be heaved or hauled to the recovery position ready for hoisting.

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d. **Preparations for a sea boat recovery.** Prepare a suitable lifting device, taking into account the weight and dimensions of the load. Provide steadying lines and fenders at the reception point, and wooden rollers (or a pallertron trolley if available) to assist in manhandling the load out of the reception area to clear space for the next load. Coil or fake down the 24 mm towing messenger adjacent to the recovery position. In addition to the sea boat, which should be equipped with two hook ropes, an inflatable craft or second boat should be prepared as the parachute recovery boat.

e. **Drop sequence.** It is preferable that the ship is underway, and steaming with the relative surface wind at Red 45°. The aircraft will drop the stores approximately 50-100 metres on the starboard bow. Ideally, loads will be dispatched singly, allowing sufficient time for recovery between runs. However, if aircraft endurance is limited it may be necessary to continue dropping whilst loads are being recovered.

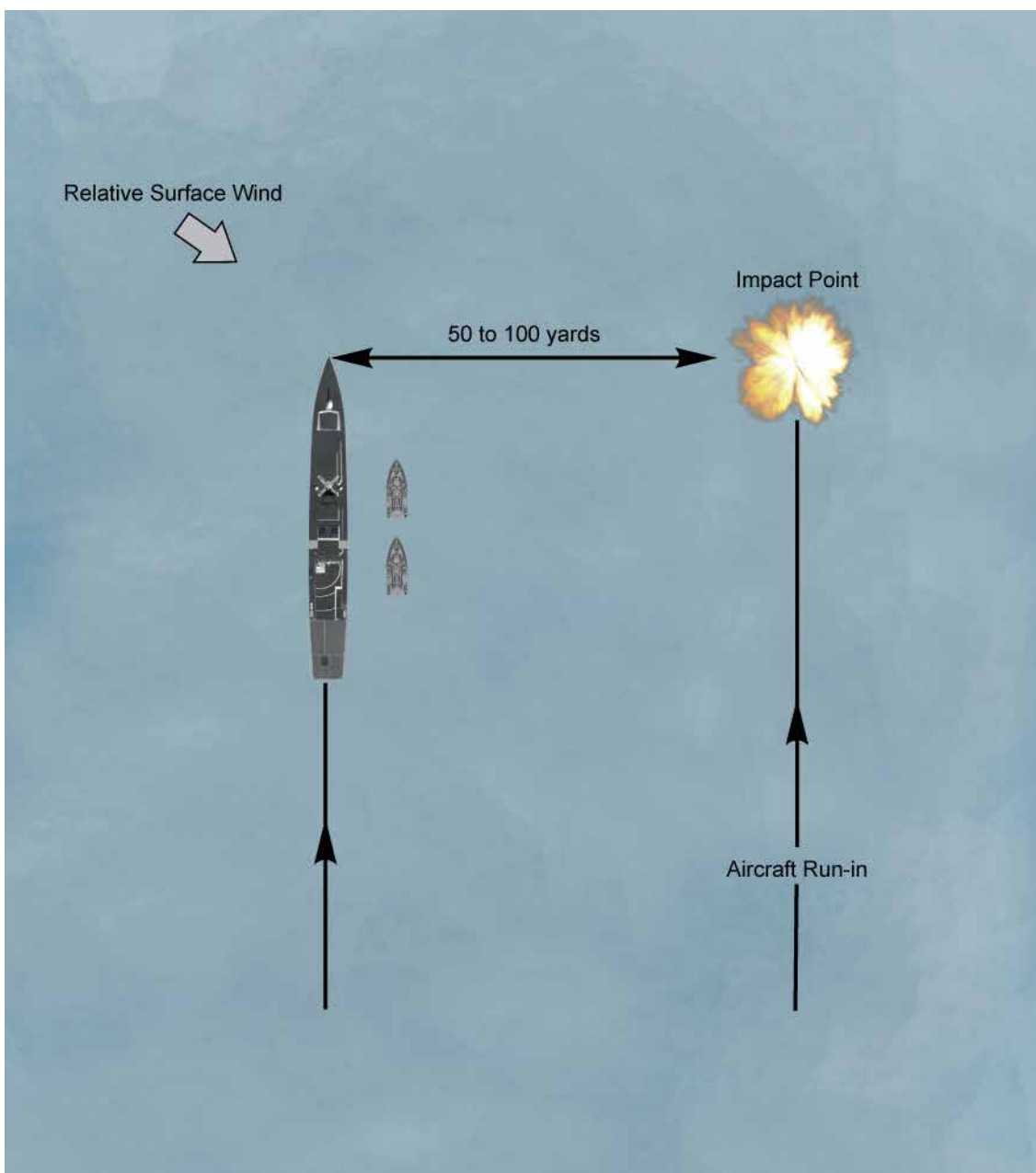
**Note.** *At night, or in poor visibility, loads will be marked with a SARBE beacon and a strobe light. A maximum of four containers will be dropped on each run. Further runs will not be made until the beacons on the loads previously dropped have been de-activated. The ship's recovery party must de-activate SARBE beacons as soon as possible to enable subsequent runs to take place.*

f. **Recovery procedures.** Air drops positions are shown in Fig 8-16. The recommended method of recovery is:

- (1) Ship to Flying Stations. Lower the sea boat and parachute recovery boat.
- (2) Boats take station on the lee side of the ship to await airdrop.
- (3) Aircraft drops stores approximately 50-100 metres on the starboard bow.
- (4) Parachute recovery boat approaches parachute from apex end, gathers parachute and lines inboard, then cuts retaining line as close to the load as possible.
- (5) Parachute recovery boat returns to ship.
- (6) Sea boat takes away one end of the 24 mm towing messenger, approaches load and secures alongside with hook ropes, then hitches the towing messenger to the load before returning to the ship. The load is then hauled or heaved to the recovery position beneath the ship's lifting device.
- (7) The lifting whip and steadying lines are attached to the load and the load is hoisted inboard.



Fig 8-16. Air drop positions



**08010. Parachutist recovery by seaboat**

a. **Introduction.** There are occasions when parachutists need to be recovered by a ship's sea boat. This may be to embark an NGS Liaison Officer or Special Forces personnel. Relevant guidance concerning the recovery of parachute stores is given in Para 08009 sub para f. However, as human life is at risk, further guidance is required to ensure that the safety of all personnel involved is paramount.

b. **Specialist personnel.** The recovery of a parachutist in an exercise environment will only be undertaken if the ship has embarked specialist officers who are able to advise and brief the Command and RIB crews. These officers will have considerable parachute experience and will take the duties of the Water Safety Officer (WSO) and the Drop Zone Safety Officer (DZSO). Simply put, the DZSO is responsible for the safety of the drop and will be in contact with the dropping aircraft, while the WSO is responsible for the safety of the parachutists once they have landed in the water. Full details of the DZSO and WSO responsibilities can be found in Chapter 4 of CBd 9470 (Fleet Special Forces Guidance), held by the Operations Safety Officer.

c. **Boat requirement.** The minimum boat requirement for any water DZ is two catcher craft (ship's boats) and one Water Support Vessel (WSV), which will be provided for all non-operational jumps. The WSV will provide appropriate medical cover.

d. **Parachutist recovery.** A detailed briefing concerning the recovery of parachutists by the catcher craft will be given by the WSO in liaison with the DZSO. This will include the task details, safety and emergencies. For a short notice operational recovery where a DSO/DZSO may not be available, catcher craft crews should be briefed on the following:

(1) *Parachutes in the air.* Canopies that have not collapsed, resulting in the parachutist being dragged – Coxswains should be briefed not to pick up parachutists until all canopies have collapsed. If a parachutist is being dragged by an inflated canopy, the canopy should be dragged down wind by driving the catcher craft into the peripheral hem of the parachute to collapse.

(2) *Night drops.* Coloured Cylumes will be used at night; a parachutist will wave his cylume to indicate that he has a problem.

(3) *Parachutist in difficulty.* Ensure the lifejacket has operated and keep the parachutist's head above water. **DO NOT LEAVE THE PARACHUTIST.** Summon help if required.

(4) *Parachutist entangled in canopy/rigging lines.* Release main and reserve parachutes from harness. Use knife to cut away rigging lines/canopy. Be aware that currents can re-inflate the canopy under water, dragging the parachutist down if prompt action is not taken.

e. **Summary.** The recovery of parachutists from the water is an extremely hazardous operation and a careful risk assessment should be carried out prior to going ahead with a jump. Ships rarely practice this capability and so it is unlikely that a ship will have any experience on board for guidance. For this reason, XOs and CBMs should be familiar with the contents of CBd 9470 Chapter 4 where more detailed guidance is given. If further information is required, questions should be addressed to the Navy Command Seamanship Officer (E Mail: NAVY SSM-AW NAVSEA SO1).

## CHAPTER 9

## SEAMANSHIP ORGANISATION AND UPKEEP

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## CHAPTER 9

## SEAMANSHIP ORGANISATION AND UPKEEP

## SECTION 1 - SEAMANSHIP ORGANISATION IN WARSHIPS

**09001. Introduction**

The following paragraphs give examples of the Terms of Reference, and duties of personnel undertaking seamanship tasks or duties within a ship's seamanship organisation.

**09002. XO's seamanship responsibilities**

a. **Replenishment at sea.** The XO is responsible for the inboard organisation of Replenishment at Sea and the handling of gear where these are *not* the responsibility of the Marine Engineering Officer or the Weapon Engineering Officer.

b. **Inflatable lifesaving equipment.** He/she is to ensure that inflatable lifesaving equipment is correctly maintained, except insofar as this is the responsibility of the Water Safety Equipment Officer.

c. **Seamanship data book.** He/she is to supervise the completion of the Seamanship Data Book. When a ship is paid off for a long refit, and at the end of a ship's service, the book is to be handled in the same manner as the Captain's Ship's Record or Captain's Ship's Book (see BR 2 (QRRNs) para 0820).

d. **Seamanship evolutions.** The XO is responsible for the safe conduct of all seamanship evolutions. He/she is to be satisfied that officers and senior ratings supervising seamanship evolutions have the necessary knowledge and ability required for the task.

e. **Equipment.** The XO is to be satisfied that all items listed in the rigging warrant are held and are in thoroughly serviceable condition. He/she is to ensure that all, seamanship equipment is periodically tested, serviced and inspected in accordance with the appropriate regulations.

f. **Bosun's duties.** When an officer is borne for Bosuns duties, he/she is to be responsible to the XO for the duties laid down in clauses d and e above (see BR2 (QRRNs) para 3401 to para 3407). These responsibilities may be delegated to another suitably qualified officer, when no Bosun is borne, at the Commanding Officer's discretion.

**09003. Bosun (CPO seaman specialist) (CPO (Sea)) – specimen terms of reference**

The following specimen Terms of Reference are generally applicable to the Bosun of a Major Warship:

a. **Accountability.** Accountable to the Executive Officer (or nominated deputy) for:

(1) Management for the delivery of Seamanship and Tactical Communications to the Command.

(2) Departmental work on the upper deck (and in certain cases between decks) co-ordinating whole ship BR 9467 (FLAGO) painting requirements as required.

(3) Safety of all Seamanship evolutions.

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(4) To act as the ship's Safety Officer's Assistant, monitoring all aspects of Health and Safety at work, but with regard to the proper provision of safety equipment and clothing and the correct use of seamanship and lifting equipment.

b. **Authority.** The Bosun has authority over:

(1) The Chief Bosun's Mate (CBM).

(2) The Bosun's Yeoman.

(3) The Leading Seaman Specialist(s).

(4) The A/B Seaman Specialist(s).

(5) Any *ad hoc* parties deemed to be his responsibility by the Executive Officer or nominated deputy.

(6) Senior Ratings of all departments when coordinating upper deck work or activities that could affect other parts of ship (particularly regarding ship's appearance).

(7) Warfare Department senior ratings for the re-allocation of hands working parts of ships to meet unforeseen and unplanned short term requirements.

(8) The Bosun has functional authority over all ratings in the execution of maintenance for sea survival, safety and Seamanship tasks.

c. **Tasks.** To carry out the following tasks:

(1) To take charge of all major or unusual Seamanship evolutions as required by the Executive Officer (or nominated deputy). These evolutions include:

(a) Acting as the Officer in Charge (OIC) of replenishment at sea.

(b) Target and decoy streaming and recovery.

(c) Recovery of personnel and materials from the water.

(d) Marker buoy laying and recovery.

(e) Seamanship aspects of salvage, towing and disaster relief.

(f) Heavy lifting and slinging (by whatever means).

(g) Advanced anchor, cable and mooring work.

(2) To act as the Seamanship Safety Officer.

(3) To oversee all Seamanship operations.

(4) To act as departmental overseer for all contracted husbandry activities.

(5) To be Divisional Officer to maximum of 15 Junior Rate Seaman Specialists in accordance with BR 3.

**09004. Petty officer seaman specialist (as command yeoman ) job description**

a. **Bridge support and tactical communications.** PO(Sea) are to direct and supervise the provision to the Command of Tactical Communications (Radio/Light/Flag) and Fleetwork, providing back-up to the Bridge (through the LS(Sea)) if a higher level of Tactical Communications support is required. The PO(Sea) will be the SME for routine Flag Ceremonial and is to oversee the execution of all Flag Ceremonial evolutions, to include:

- (1) To be divisional senior rate limited to 12 ratings in accordance with BR 3.
- (2) Dress ship.
- (3) Colours/sunset.
- (4) Personal standards/distinguishing flags.
- (5) Flag shifts.
- (6) Half mast colours.
- (7) Flags in boats, cars and aircraft.
- (8) Flag ceremonial when in non-UK ports, harbours and territorial waters.
- (9) Daily harbour routine flags.
- (10) To supervise the ordering and storing of all visual signalling equipment.
- (11) To disseminate information obtained from relevant tasking signals. To include:
  - (a) OPGEN.
  - (b) OPTASK RAS.
  - (c) OPTASK WARFARE.
  - (d) TABORDS.
  - (e) Entry/departure.
- (12) As SDTC, provide a six monthly training plan for the attainment and maintenance of OPS.
- (13) Liaise with the relevant shore authorities for the provision of continuation training.
- (14) Act as the sub-departmental cryptographic material holder.

b. **Tactical command support**

- (1) At action to deliver tactical command support.
- (2) At defence watches on call tactical command support.
- (3) In cruising watches to oversee tactical command support as required.

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c. **Part of ship management.** Warfare Department POS remain the responsibility of the POS Officer and designated PO(WS) who are accountable for the day to day manning, cleanliness, husbandry and defect reporting. A LS(Sea) is detailed to that POS as Seamanship SME to ensure the correct maintenance of all Seamanship deck equipment; he/she may use WS POS hands as required.

**09005. Chief boatswain's mate (CBM) – specimen terms of reference**

The CBM may need to provide support to all departments, this may include ships husbandry, upper deck maintenance management, department slinging manager and seamanship evolutions manning coordinator. The CBM is responsible for a large department of 10 AB(Sea) and 4 LS(Sea) (in an FF/DD) delivering, Seamanship (RAS, boats, etc) and TCS/ Bridge management to the Command. **Bearing this major and important output in mind, the CBM is to attend all DEPCO's meetings as an assistant to the Warfare Departmental co-ordinator.** The following Specimen Terms of Reference are generally applicable to the Chief Bosun's Mate of a Warship.

a. **Accountability.** Accountable to the Executive Officer/Bosun (or nominated deputy) for:

- (1) Being a Divisional Senior Rate limited to 12 ratings in accordance with BR 3.
- (2) Co-ordinating all work on the upper deck (and in certain cases between decks) to minimise conflicts in activity.
- (3) Seamanship, Water Safety and general Safety equipment maintenance standards and training.
- (4) Management for the delivery of seamanship and tactical communications to the command.
- (5) To act as departmental ADLEE.
- (6) To act as departmental risk assessor.

b. **Authority.** The Chief Bosun's Mate has authority over:

- (1) The Leading Seaman Specialist(s).
- (2) The Able Seaman Specialist(s).
- (3) Any 'ad hoc' parties deemed to be his/her responsibility by the Executive Officer or nominated deputy.
- (4) Senior Ratings of all departments when co-ordinating upper deck work or activities that could affect other parts of ship (particularly regarding the ship's appearance).
- (5) Warfare Department Senior Ratings for the re-allocation of hands working parts of ship to meet unforeseen and unplanned short term requirements.
- (6) The Chief Bosun's Mate has functional authority over all ratings in the execution of maintenance for sea survival and safety and Seamanship tasks.



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c. **Tasks.** To carry out the following tasks:

(1) To take charge of all routine or non-routine seamanship evolutions as required by the Executive Officer/Bosun (or nominated Deputy (see Note). These evolutions include:

- (a) Acting as the Officer in Charge (OIC) of replenishment at sea.
- (b) Target streaming and recovery.
- (c) Recovery of personnel and materials from the water.
- (d) Marker buoy laying and recovery.
- (e) Seamanship aspects of salvage, towing and disaster relief.
- (f) Heavy lifting and slinging (by whatever means).
- (g) Advanced anchor, cable and mooring work.

**Note.** *Delegation to the Leading Seaman Specialist should take place at the Executive Officer's or his/her deputy's discretion if considered that the person concerned has the necessary training and experience to correctly and safely carry out the task.*

(2) To act as replenishment at sea Safety Officer (if required).

(3) To advise the Warfare Department on the correct rigging, operation and maintenance of portable lifting equipment, and to take personal charge if deemed necessary.

(4) To supervise the upper deck during Action and Defence Stations taking charge of any evolutions as required by the Command (to include CBRN roving commission in Action).

(5) To oversee all boat operations.

(6) To assume responsibility in ensuring that Shock and Vibration in small craft is reduced to ALARP.

d. **Material and maintenance**

(1) To run the upper deck Seamanship Maintenance Management System (MMS) holding the relevant section logs as provided by the Marine Engineering Department.

(2) To co-ordinate with the hull section the planned husbandry work by all departments on the upper deck to ensure a minimum conflict and a uniform standard of maintenance combined with a smart and seamanlike outward appearance of the ship in accordance with current instructions.

(3) To maintain rigging or issue upkeep instructions to parts of ship providing the MMS Coordinator with collated returns on completion.

(4) To prepare (in liaison with the ETME department) the seamanship, water safety and general safety defect list for refits and other designated maintenance periods.

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(5) To have charge of the replenishment at sea gear and maintain a register of seamanship equipment.

(6) To act as the competent person regarding the periodic survey and inspection of seamanship equipment in accordance with **BR 3027**, which should include all loose gear and also to carry out the duties of the Departmental ADLEE on ships. (Senior Rating Seaman Specialist only).

(7) To supervise the on-board production and replacement of seamanship and rigging equipment (including canvas gear) and arranging, through the ETME department, for localised load testing if necessary.

**e. Water safety and General safety**

(1) To act as the ship's Safety Officer's Assistant monitoring all aspects of health and safety at work, but with particular regard to the proper provision of safety equipment and clothing and the correct use of seamanship and lifting equipment.

(2) Has overall responsibility for the provision of correctly maintained safety and water safety equipment to the command.

(3) To instruct (and exercise) the ship's company on all aspects of water safety and general safety equipment (keeping a training record in the Seamanship Data Book).

(4) To ensure provision of a lifejacket for all visitors to the ship and that they are properly briefed on matters of water safety and general safety as it affects them.

**f. Manpower and training**

(1) To be the Divisional Senior Rating for seaman specialists.

(2) To train personnel to carry out particular seamanship evolutions with special emphasis being placed on:

(a) Seamanship OJT Training Media including OPS checks.

(b) Boat coxswains and crews (Note 1).

(c) Whole Ship Defence Watch RAS Teams (Note 2).

(d) To induct POS hands.

**Notes:**

*1. All AB Seaman Specialists (2) will be trained to act as Bowman. For career progression of the AB Seaman Specialist (1) the rating is to attend HMS RALEIGH (JP) for Coxswain training (platform specific). Also advanced tactical coxswains course as required.*

*2. A Targeted Employment Module (TEM) at HMS RALEIGH RAS Rigs is available for training Ships RAS teams.*

g. **Publications and records**

- (1) To hold (on behalf of the XO/Bosun) the Seamanship Data Book ensuring its timely updating and its safe-keeping during refitting periods.
- (2) To hold the ship's Rigging Warrant.
- (3) To hold the sub department's Permanent Loan Record.
- (4) To hold a central outfit of publications on general seamanship matters and on subjects relevant to the ship.
- (5) To supervise (with the ETME department) the correct and timely entries into the boat's engine running logs.
- (6) To supervise the COSHH logs as required.
- (7) To oversee the Water Safety Equipment Log (WSEL) in accordance with the foreword.

h. **Seamanship evolutions.** PO(Sea) are accountable to the XO (Bosun in capital Ships) to co-ordinate work on the upper deck to minimise conflicts of activity and ensure a uniform and smart appearance of the ship. The PO(Sea) is to:

- (1) Supervise the Watch on Deck organisation during cruising watches.
- (2) Supervise the upper deck during Action and Defence watch states.
- (3) Oversee all boat operations.
- (4) Maintain seamanship and water safety maintenance, standards and training.

**09006. Employment of leading seaman specialists (LS(Sea))**

a. Are to be employed under the direction of the CBM to:

- (1) Supervise/carry out water safety and general safety equipment maintenance.
- (2) Supervise and Maintain the WSEL.
- (3) Rig for all seamanship evolutions, and fulfil key roles in those evolutions.
- (4) Supervise the work of the AB Seaman Specialist in the above fields.
- (5) Carry out inspections of ship's rigging items, and execute ship husbandry tasks allocated by the CBM/Bosun/POS Warfare Specialist Petty Officer.
- (6) To be ADHOOK qualified and to assist with operations involving ship-to-shore slinging.
- (7) Conduct musters of the CBM Permanent Loan List, and order/return naval stores as directed.
- (8) Assist in the conduct of Seamanship OJT Training and also OPS checks.

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(9) To act as I/C at seamanship evolutions.

b. They should be employed:

(1) *In the Action State.* As necessary to meet Quarterbill requirements.

(2) *In the Defence Watch State.* On call for all commitments at sub-paragraph a. as appropriate.

(3) *In Cruising Watches.* Leading Seaman of Watch on Deck, Yeoman to the Command or POS I/C for seamanship evolutions.

(4) *In Harbour.* Duty L/H roster responsible for daily ceremonial (colours/sunset etc).

**Note.** *In order that the LS(Sea) Sea Water Safety Equipment Supervisor remains available to fulfil their primary role they should not be employed:*

1. *On routine communal tasks.*

2. *As watchkeeper in harbour.*

**09007. Leading seaman specialist (LS(Sea)) job description**

a. **Bridge support and tactical communications.** LS(Sea) primary employment is to provide the Command with Tactical Communications (Radio/Light/Flag) and Fleetwork support. During cruising watches a LS(Sea) will be in charge of the Watch on Deck and will be responsible for providing back-up to the Bridge if a higher level of Tactical Communications Support is required.

b. **Seamanship evolutions.** LS(Sea) are to be employed as IC of the Watch on Deck and as such are responsible for the safe and efficient operation of all boats and equipment including reducing exposure to shock and vibration to ALARP. LS(Sea) will be required to take charge of all seamanship evolutions, with the exception of RAS which remains the core responsibility of the CBM. LS(Sea) will act as Water Safety Equipment Log (WSEL) Supervisor. LS(Sea) will be ADHOOK trained and responsible for departmental slinging operations. LS(Sea) will control Maintenance Management System (MMS) schedules for seamanship equipment on POS areas of responsibility under the supervision of the Part Of Ship WS Senior Rate and CBM or Bosun.

c. **Upper deck weapons, chaff/decoys and visual target indication sights.** Manning allocated by UEL position, mix of Warfare and Seaman Specialists. LS(Sea) may be employed as the Weapons Director Visual on Type 23 Frigates.

d. **Divisional responsibilities.** LS(Sea) have an important leadership function as they have the closest knowledge of the ABs in their mess deck and working environment. It is vital that LS(Sea) play a full part in the communication chain, which is at the heart of a good Divisional system. LS(Sea) should contribute to the reporting process and must keep their DSR informed about the changing support needs of members of the Division.

e. **Part of ship.** Within the Watch and Station Bill each LS(Sea) is detailed to a defined WB POS as directed by the CBM.

f. **Communal employment.** The LS(Sea) will not be allocated communal duties.

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g. **Daily employment at sea.** LS(Sea) will be required for duty as required by the Watch and Station Bill. In Defence Watches LS(Sea) will supervise Seaman Specialists in their professional duties and provide TB based instruction. The LS(Sea) will also be employed in WB POS supervising the MMS and non-technical maintenance of these areas by WB Ratings during seamanship evolutions.

h. **Daily employment in harbour.** LS(Sea) will be required for duty as required by the Watch and Station Bill. Generally this will consist of a 24-hour duty period on a roster greater than 1 in 6 (Base Port) or 1 in 4 (Deployed). Whilst duty the LS(Sea) will be a member of the Duty Fire and Emergency Party. They will, whether duty or not, be required to work POS/conduct professional training including preparation for forthcoming serials/exercises and to attend relevant briefings as directed by the WD Co-ordinator, Bosun or CBM. Duty Watch commitments override these secondary duties.

i. The LS(Sea), will be employed as the Rating in Charge of various evolutions.

**Note.** *The Basic Skills Certificate in Adult Literacy and Numeracy at Key Skills Level 2 is a pre-requisite for PO(Sea) and, if not achieved, should be pursued on advancement to LS(Sea).*

**09008. Leading seaman specialist of the watch at sea (LSOW) – specimen duties**

a. **Accountability.** The LSOW is accountable to the OOW.

b. **Tasks**

- (1) To supervise the Watch on Deck, allocating hands to duties as required.
- (2) To ensure that the upper deck is properly secured for sea.
- (3) To ensure the watertight integrity of the upperdeck in State 3.
- (4) To carry out security, TAC, Damage Control and rounds of the ship and weatherdecks once per watch.
- (5) To be I/C of:
  - (a) Lowering and hoisting the seaboat.
  - (b) Swimmer of the Watch operations.
  - (c) Evolutions carried out by the watch on deck.
- (6) To assist the OOW on the Bridge when not carrying out the duties listed above.

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**09009. Leading seaman specialist – bridge tactical yeoman – specimen duties**

a. **Accountability.** The Leading Seaman Bridge Tactical Yeoman is accountable to the Navigating Officer, Officer of the Watch, Bosun's Yeoman or CBM.

b. **Tasks**

- (1) To act as the Command advisor on all aspects of tactical communications and manoeuvring.
- (2) To supervise and manage the Bridge tactical operators.
- (3) To provide the correct level of warfare support to the Command whilst conducting AAW, ASUW and ASW functions and duties.
- (4) To supervise the transmission and reception of visual signals.
- (5) To supervise the tactical voice circuit and tactical voice operators.
- (6) To ensure that all publications and crypto are kept and accounted for in accordance with appropriate regulations.
- (7) To advise the Command on all aspects of flag ceremonial.
- (8) To ensure the efficient running of the Bridge in conjunction with the Navigating Officer.
- (9) To disseminate information obtained from relevant Tasking Signals. To include:
  - (a) OPGEN
  - (b) OPTASK RAS
  - (c) OPTASK WARFARE
  - (d) TABORDS
  - (e) Entry/Departure
- (10) To conduct continuation training as required maintaining fleet standards in all aspects of tactical communications.

**09010. Able seaman specialist (A/B (Sea)) – job description**

a. **Bridge support and tactical command.** The requirement for the Bosun's Mate was removed during cruising watches as a result of Branch Development. However in certain classes of ship, this position requires manning during evolutions such as Replenishment or Entering/Leaving harbour. **Seaman specialists cannot be spared to man these positions and this should be reflected in unit Watch and Quarter bills.**

b. **Bridge employment.** The AB(Sea) main area of employment is on the Bridge providing the Command with Tactical Command support (Radio/Light/Flag) and Fleetwork.

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c. **Tactical command support.** On joining the ship an AB(Sea)2 will have achieved TPS and, ideally will have received TEM training according to their UEL position. They should be able to provide basic Tactical Command Support.

d. The main aim of each AB2(Sea) is the achievement of OPS (Seaman Specialist OJT TB) within 12 months of joining the ship and subsequent advancement to AB(Sea)1 where they should be able to conduct Tactical Command support with minimal supervision.

e. Within six months of being rated AB(Sea)1 the CBRN DC TB should be completed, thereafter the AB(Sea)1 requires to consolidate both Seamanship and Tactical Communication skills, complete the preparation for promotion Task Book and gain a recommendation for LS(Sea).

f. **Seamanship evolutions.** AB(Sea)2 will be employed in all areas of seamanship, including RAS, Berthing, Cable Party, Towing, Swimmer of the Watch Team, Boat Work.

g. **Water safety equipment maintenance.** AB(Sea)2 will be employed as Water Safety Equipment Maintainers assistant. After advancement, the AB(Sea)1 will be expected to work with minimal supervision. A senior AB(Sea)1 will be required to take charge of non-seaman specialists during major seamanship evolutions and fulfil the duty of Water Safety Equipment maintainer.

h. **Upper deck weapons, chaff/decoys and visual target indication sights.** Manning is allocated by UEL position to a mix of Warfare and Seaman Specialists.

i. **Ship protection organisation (SPO).** A required whole ship commitment. AB(Sea) participate in SPO duties including harbour QM/BM roster.

**Note.** *Manning these positions should not be detrimental to seamanship safety on parts of ship during seamanship evolutions*

j. **Communal employment.** When fully complimented Seamanship Department to supply 1 x AB(Sea) as detailed by UEL.

k. **Seamanship employment**

(1) *Part of ship.* Under the direction of the Bosun/Chief Bosun's Mate (CBM), within the Watch and Station Bill each AB(Sea) is to be allocated a POS to work under appropriate Supervision. POS responsibilities include cleanliness, husbandry and defect reporting.

(2) *At sea.* AB(Sea) will be required for duty as required by the Watch and Station Bill. AB(Sea) will watch-keep either 1 in 4 (Cruising) or Enhanced watches dictated by serials and also 1 in 2 (Defence). Cruising watches will consist of both professional duties and TB based instruction to ensure the rating achieves or maintains OPS. Ratings will also be employed on a WB POS working again under the supervision of the CBM and LS(Sea). This will consist of Maintenance Management System (MMS) tasks, cleaning and painting and non-technical maintenance tasks. During seamanship evolutions AB(Sea), will work under the supervision of PO(Sea)/LS(Sea). On a rotational basis AB(Sea) will be detailed for communal duties.

(3) *In Harbour.* AB(Sea) will be required for duty as required by the Watch and Station Bill/Daily Orders. Generally this will consist of a 24-hour duty period on a roster of 1 in 6 (Base Port) or 1 in 4 (Deployed). Whilst duty the rating will be a member of the Duty Fire & Emergency Party and will also be expected to conduct the duties of QM, BM, and Colours/Sunset party. The rating, whether duty or not, will be required to work POS/conduct professional training, including preparation for forthcoming serials/exercises and to attend relevant briefings as directed by the WD Co-ordinator, Bosun or CBM. Duty watch commitments will override these secondary duties. Consideration should be given to have one AB(Sea) available in each duty watch for seamanship/flag ceremonial out of hours cover.

#### 09011. Able seaman specialist (AB(Sea)) – specimen duties

- a. **Accountability.** The AB(Sea) is accountable to the Bosun/CBM.
- b. **Tasks:**
  - (1) To conduct the maintenance of seamanship and Water Safety equipment.
  - (2) To carry out Part of Ship work requirements.
  - (3) WSE maintenance in accordance with Para 09009 Note above.
  - (4) To act as POS locker man.
  - (5) To be the Swimmer of the Watch.
  - (6) To be the Bowman/Coxswain of the sea boat.
  - (7) To be the Bridge Tactical Operator (includes Tactical Voice and V/S).
  - (8) To be ADHOOK.
  - (9) To oversee non seaman specialists during seamanship evolutions (AB(Sea)1).
- c. **Employment of seamanship specialist during seamanship serials.** Seaman Specialists are the only ratings trained to safely and competently conduct Seamanship serials. All other branch ratings are trained to a 'Safe Deck Hand' standard to be able to assist with Seamanship evolutions, albeit under close supervision. To ensure safe deck hands are competent to safely undertake the roles assigned to them, they must undergo Parts of Ship (POS) induction training. Seaman Specialists are to be allocated to POS during entering/leaving harbour. If Force Protection is to be manned outside of State 2 manning. Positions should be filled by appropriately trained Warfare Specialists or other branches. Bridge commitments which can be trained locally are not to be filled by the Seaman Specialist department ie, **Telegraphs, Echo Sounder, and Bosun's Mate**. This will ensure that safety is maintained during seamanship evolutions, with correct SME's in position on the Part of Ship.



**09012. Able seaman specialist (1) of the watch at sea – specimen duties**

- a. **Accountability.** The AB(Sea)1 is accountable to the Leading Seaman of the Watch (LSOW), but subject to the functional authority of the OOW for the sea boat.
- b. **Tasks.** As coxswain of the sea boat they are to:
- (1) Ensure the sea boat is correct, properly secured and engine tested in accordance with current policy.
  - (2) Carry out a functional check and ensure that the Automatic Release Hook is set to 'Safe'.
  - (3) Ensure that the crew is briefed.
  - (4) Report the status of the sea boat to the OOW/EOOW at the start of their watch.
  - (5) Coxswain the sea boat when ordered.
  - (6) To assume responsibility in ensuring that Shock and Vibration in small craft is reduced to ALARP.
  - (7) To undertake those duties ordered by the LSOW.

**09013. Able seaman specialist bridge tactical watch keeper – specimen duties**

- a. **Accountability.** The Bridge Tactical Watch Keeper is accountable to the Unit Yeoman but is under functional authority of the OOW.
- b. **Tasks**
- (1) To conduct voice and visual communications in accordance with current procedures as directed by the Command.
  - (2) To conduct hand-over procedures as detailed in standing orders.
  - (3) To act as a bridge and V/S lookout.
  - (4) To provide a service to the Command, reporting on tactical manoeuvring and information signals in the absence of the Yeoman.

**09014. Lifebuoy sentry and stern lookout (LBS) – specimen duties**

Unless otherwise ordered by the Command, ships do not require to post a lifebuoy sentry for normal operations. A lifebuoy sentry must be posted on those occasions when hazardous evolutions are being carried out (eg RAS) or when prudence dictates there is a need for a stern look-out.

- a. **Accountability.** The LBS is accountable to the LSOW/OOW.
- b. **Tasks**
- (1) To stand watch within earshot of the telephone and alarm, and where there is an unobstructed view astern.
  - (2) To check lifebuoys and telephone communications on closing up and then to report to the Bridge.

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- (3) If specified in ship's general orders, to test the lifebuoy alarm and inform the OOW if it is correct or not.
- (4) If a person is seen to go over the side the Lifebuoy Sentry is to:
  - (a) Release the nearest lifebuoy.
  - (b) Press the lifebuoy alarm.
  - (c) Release second lifebuoy.
  - (d) Continue watching and reporting.
- (5) If the Lifebuoy Sentry hears the alarm, they are to drop both lifebuoys and report to the Bridge by telephone.
- (6) To act as stern look-out and report all objects sighted between green 120° and red 120°.
- (7) During replenishment they are to close up abaft the replenishment point as detailed, adjacent to a lifebuoy and marker.

**09015. Swimmer of the watch (SOW) able seaman specialist – specimen duties**

- a. **Accountability.** The SOW is accountable to the LSOW.
- b. **Tasks**
  - (1) To be ready for the recovery of personnel from the water throughout their watch, as laid down in ship's orders.
  - (2) To ensure the SOW equipment is complete and in good working order, informing the LSOW if it is not correct.
  - (3) The SOW during RAS evolutions will be a Seaman Specialist detailed from the dump party.

**09016. Parts-of-ship organisation**

For the purposes of routine maintenance and cleanliness, and the conduct of certain seamanship evolutions, a warship's upper deck is divided into a number of areas known as parts-of-ship. There can be three seaman parts-of-ship; Forecastle (FX), Top (T) which may include the boats, and Quarterdeck (AX). A number of Warfare Specialist ratings, overseen by a Warfare Specialist Petty Officer, are allocated to each part-of-ship; these personnel are then known as forecastle part-of-ship, top-part-of-ship, etc. Each part-of-ship has a part-of-ship officer who is in overall charge. Day to day management of maintenance and cleanliness is undertaken by the part-of-ship PO. Precise arrangements for the allocation of manpower differ from ship to ship, but with the trend towards smaller ship's companies it is important that whatever system is employed should be as simple and flexible as possible. The LS(Sea) detailed to the POS will be responsible for all seamanship equipment contained within the POS locker. The LS(Sea) is also responsible for all POS planned maintenance of seamanship equipment and **is to be I/C of all seamanship evolutions**. Whenever possible an AB(Sea) should be detailed as POS locker man.

**Note.** *Under no circumstances should locally produced seamanship task books be issued to non seaman specialists.*

**09017. Side party**

A party of ratings may be formed occasionally from parts of ship for cleaning and painting the ship's side. The party normally works under the direction of a Petty Officer or Leading Hand who is referred to as the Captain of the Side.

**09018. Cable party** (See also Chapter 2 Para 02018 sub para a)

The cable party is detailed from the Seaman Specialist department supported by Warfare Specialists when the ship comes to anchor, weighs or makes fast to or slips from a buoy. The cable party also includes the appropriate ratings of the Marine Engineering (ET) Department dependent upon the ship's capstan arrangements. Whenever possible on the watch seamanship evolutions should be conducted by the Seaman Specialist Department.

**09019. Anchor watch**

In heavy weather, or when the ship is anchored in an exposed roadstead or in a strong tideway, an anchor watch is set. They are detailed to watch the cable, veer or heave it in, let go a second anchor, slip the cable, or weigh anchor as may be necessary. An anchor watch includes an officer on the bridge, Seamen Specialists under the charge of the LS(Sea) of the watch and the appropriate ratings of the Engineering branches. A Quartermaster and Bosun's Mate are also detailed if main engines are required at short notice; ships at anchor use the Seaman Specialists currently on watch.

**09020. Seamanship cover within duty watches**

To ensure seamanship expertise is available alongside, the duty watch should include an AB(Sea)1 or above. Seamanship cover for duty watches includes flag ceremonial such as Dress Ship, Colours/Sunset which is a duty watch responsibility directed by the duty Seaman Specialist. Gangway Ceremonial, including piping, remains the responsibility of the Chief Harbour Quartermaster responsible to the XO.

**09021. Seamanship evolutions – planning and training**

In addition to her normal tasks, a ship must be prepared to deal with any emergency or contingency which may arise. It would not be possible to issue detailed orders to meet every situation, but it is possible to issue orders for some duties or emergencies which it is known, from past experience, are likely to be encountered. These are known generally as evolutions. Each evolution requires a certain number of personnel for its efficient execution. It is usual to make out stations on the watch and station bill for certain tasks such as berthing and unberthing the ship, replenishment at sea, landing parties and boarding parties. This provides a sound basis to work from, but will require regular amendment to meet routine requirements such as job changes. The manpower requirements for minor evolutions such as streaming or recovering marker buoys and targets can also be included on the watch and station bill, or can, depending on the type of ship and the manpower available, be met as required from the Seamanship Department. As part of the planning process the Bosun/CBM should provide the Warfare Branch Coordinator with written details of the manpower requirements for each seamanship evolution that the ship may be required to perform, whether in Action, Defence or Cruising watches. Additionally, training time must be allocated to enable personnel involved in the evolutions to receive appropriate instruction. The importance of planning and training cannot be over-emphasised if best use is to be made of the manpower available.

**09022. OPS check guidance**

- a. Seaman Specialist OPS Checks are to be conducted in accordance with the instructions contained within BR 1984d and specific guidance contained within the Seamanship OJT TBs.

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b. Detailed OPS's are held on behalf of Navy Command by the HRTSG. Each OPS covers the complete range of duties and responsibilities of each rank/rate and is endorsed by Navy Command. The main purpose of the OPS is to identify the 'Job' in order that the appropriate training can be provided and any training shortfall identified and addressed by the OJT TB. As new tasks are identified the OPS is updated and training adjusted as required.

c. Because each OPS is a large, spreadsheet based document intended primarily for use by Lead School Training Design Sections, it is not given widespread dissemination.

**09023. Seamanship evolutions – safety officer**

A Safety Officer is to be nominated to oversee the safe conduct of all seamanship evolutions. It is essential that whoever is nominated has the necessary experience and training to carry out this important role competently. Prior to the evolution, the Safety Officer, who is to be identified to all participating personnel, must ensure that all personnel are briefed on the aim and conduct of the evolution, any significant risks and hazards, and details of individual tasks. They must ensure that appropriate control measures are taken to remove or reduce risks as much as possible. For the duration of the evolution the Safety Officer must take up a position that provides an overall view of the proceedings. They should avoid becoming actively involved but must be ready to interrupt or halt the evolution if a dangerous situation is or may be developing. On completion of the evolution the Safety Officer is to ensure that the area is safely restored as necessary and all personnel are properly debriefed.

**09024. Standard seamanship safety brief**

A seamanship safety brief is to be given to all hands prior to commencing a seamanship evolution. The safety brief is to cover the following:

- a. Do not cross, straddle cable/lines, or stand under lines.
- b. When tending ropes on winches/capstans – stand at least 2 metres clear and beware of riding turns.
- c. Do not stand in line of recoil and keep all non essential personnel well clear.
- d. Do not stand in bights.
- e. Do not take turns around the body with ropes.
- f. Only pass ropes hand over hand.
- g. Fake or coil all lines when received inboard.
- h. Dress for safety. Wear DMS boots and carry a sharp knife. Does the evolution require the wearing of other PPE, such as Safety Helmet, Hazardous Duty Lifejacket, Goggles, Safety Harness, etc? Finger rings, jewellery and loose clothing etc can be hazardous – remove them if possible prior to taking part in the evolution. Rings may be taped over.
- i. The word "STOP" can be used at any time during the evolution. **ANYBODY** seeing a dangerous situation unfolding or any safety issue is to shout "**STOP**". On hearing "STOP" all personnel involved in the evolution are to stop what they are doing immediately and await further instructions.

## SECTION 2 - SEAMANSHIP EQUIPMENT UPKEEP AND ACCIDENT/INCIDENT REPORTING IN WARSHIPS

### 09025. Introduction

Upkeep is defined as 'The use of any or all the resources required to assure or restore a specified material condition or level of performance'. In the broadest terms, when applied to a ship, this means the whole range of activities required to maintain the designed performance of the ship and her equipment throughout her useful life. Every ship needs upkeep; the requirement can either be met in a planned and organised manner or it will be imposed as a result of a breakdown. The practical implementation of preventive maintenance and planned upkeep involves the provision to ships of a standard documentation system titled the Maintenance Management System (MMS). The essential features of the system are given below; full details of the system are contained in **BR 1313, Maintenance Management in Ships**.

### 09026. Maintenance management system

a. The work involved in the upkeep of a ship falls into five categories:

- (1) Condition Monitoring.
- (2) Preventive Maintenance.
- (3) Corrective Maintenance.
- (4) Modifications.
- (5) Alterations and Additions.

b. The Maintenance Management System (MMS), run by the Engineering department, is a shipborne bring-up system primarily intended for planning, requisitioning, controlling, recording and reporting those parts of this work which are the responsibility of Ship's Staff or Base Maintenance staff. Provision is also made for bringing up, recording and reporting upkeep work in those categories done by a Contractor or other repair agency. An integral part of the system is a comprehensive set of ship equipment files for storing important facts about the ship and her equipment and information of lasting relevance about performance and upkeep. It is usual for the CBM to manage the MMS with regard to seamanship equipment.

### 09027. Part of ship management

Warfare Department POS remain the responsibility of the POS Officer and designated PO(WS) who are accountable for the day to day manning, cleanliness, husbandry and defect reporting. A LS(Sea) is detailed to that POS to ensure the correct maintenance of all Seamanship deck equipment; they may use Warfare Specialist POS hands as required.

### 09028. Types of maintenance period

Certain maintenance can only be carried out alongside or in dry dock, with support from shore based staff. The various types of maintenance period, (listed below), depend on the type of ship and the nature of the work involved. Further details are given in **The Annual Confidential Upkeep DIN**:

- a. Fleet Time Support Period (FTSP)
- b. Maintenance Period (MP)

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- c. Limited Support Period/Ship's Support Period (LSP/SSP)
- d. Ship's Support Period (Docking) (SSP(D)) (Minor War Vessels)
- e. Docking Period (DP)
- f. Refit Period (RP)

**09029. Preparations for upkeep periods**

This subject is fully covered in **BR 1313**. Suffice to say here that the Engineering Department has the responsibility for processing the documentation for all upkeep or maintenance periods; consequently close liaison with those departments is important. See also the following Paragraph.

**09030. Seamanship equipment checks and inspections**

The various Seamanship equipment checks associated with maintenance periods and upkeep periods are as follows:

- a. **Pre-refit assessment.** Carried out between six and nine months prior to upkeep, this assessment forms the basis of the upkeep work package. On notification from the ship's platform IPT of the impending refit, a Seamanship check-off list is sent to the ship to assist with compilation of the Defect List. The assessment is normally carried out by ship's staff, although ships not complemented with a senior rate Seaman Specialist as Bosun/CBM can request assistance from the Waterfront Seamanship Staff.
- b. **Harbour acceptance trial (HAT) (seamanship/tactical command support).** This formal inspection by Waterfront Seamanship staff is part of the Ready for Sea Date (RFSD) carried out on completion of an upkeep period. The inspection covers all Seamanship/Tactical communications equipment and documentation. It is recommended that provisional dates are agreed prior to a formal application. Ships should ratify dates with the relevant Integrated Project Team in the upkeep/period plan. Duration of this inspection is as follows: LPH/LPD five days, DD/FF three days, Minor War Vessels two days. Due to the difficulties of conducting HAT seamanship during SARC process and regeneration of the unit towards RFSD, it is of paramount importance that shore authorities are kept up-to-date with progress towards the inspection. A member of the contractor's organisation should be present at all HAT take-on meetings. For ships completing Upkeep Periods, Volume zero of the contract specification should detail the contractor's level of responsibility for HAT seamanship. Where the ship is responsible for presentation of the HAT, individual departments should scrutinise outstanding work list items from volume 1-8 of the contract specification to ensure that, in addition to their own preparations, all contractual work, which could impact on the success of the HAT has been completed and accepted prior to the inspection. A full HAT Seamanship must be conducted before a ship can proceed to sea following an Upkeep Period. Completion of the starred items in the Seamanship/Tactical communications HAT document is mandatory. Approximately six weeks prior to a HAT, ships are to request a pre-HAT from Waterfront-WOSEA by telephone or email. Contact points are given at Para 09031. It is the responsibility of the refitting contractor to formally call HAT Seamanship/Tactical communications in liaison with ship's staff.

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c. **Escape and evaluation Naval authority (EENA).** A Material State Verification Inspection (MSVI) has been amalgamated with the HAT(Sea) inspection and is conducted concurrently following a refit or docking period. EENA MSVIs incorporate all aspects of Life Saving Appliances (LSA) and these areas have been included within the Class specific HAT(Sea) document that will be forwarded to the ships Commanding Officer, prior to the inspection date. EENA certification, like the Naval Authority for Structural Strength certification is part of the Naval Ship Safety Certificate (NSSC) that, once issued, ships must hold prior to proceeding to sea. Failure to pass an EENA MSVI will result in the NSSC being invalidated. Further guidance on the requirements for an EENA MSVI can be found the Naval Ship Code, ANEP 77, Chapter VII. Ships that do not currently have EENA certification are mandated to hold this certification according to a timetable agreed with Duty Holders, and after initial certification Ships must hold a valid certification at all times. Routine annual EENA inspections between full HAT (Sea) inspections will be conducted in accordance with the FOST MASC and ASSC inspections.

d. **Annual seamanship safety check (ASSC) – introduction.** The Annual Seamanship Safety Check was introduced to ensure that seamanship standards and equipment are maintained to a safe level and covers both mandatory seamanship and sea survival equipment.

(1) *Additional content to the ASSC.* The ASSC will also include an audit of departmental training and employment of Seaman Specialist's onboard in accordance with current policy.

(2) *Requesting an ASSC.* The ASSC database for units will be held by individual Flotilla WO (SEA), FPS (CPOSEA), 1 PBS (CPOSEA) and MCM 1&2 LS (SEA) each acting as database managers for the units in their Flotillas or Squadrons. Initial requests for an ASSC are therefore to be made by e mail to the relevant database manager. Ships are encouraged to conduct the ASSC when required pre deployment so reducing in theatre visits.

(3) *Notice for inspection.* Ships that will be going out of date for annual check will be informed by e-mail that an ASSC is required and will be given 2 months notice if deploying and 1 month notice if not deploying.

(4) *Inclusions.* HAT (SEA), MASC and PRIMA (MCMV) will count as an ASSC inspection.

(5) *Conduct of inspections.* Inspection documentation will be issued to the ship prior to the visit and is to be complete and presented to the inspecting officer on arrival. The inspection will include (but not be limited to) the HAT seamanship red-stared items, the mandatory annual audit of the WSEL, water safety equipment and an audit of training and employment. ASSC's may be conducted by prior arrangement as part of an assurance visit. The inspections can be conducted by one of the following for Major Warships, Flotilla WO1 (Sea) or FOST (D), with FOST (MPV), FPS (CPOSEA), 1 PBS (CPOSEA) and MCM 1&2 LS (SEA) covering MCM and Minor Patrol Vessels, coordinated by the Database manager.

(6) *WSEL inspections.* The WSEL is subject to a mandatory annual inspection which is conducted as part of the ASSC. Ships or units that only require a WSEL inspection are to contact their inspecting authority or Flotilla WO (Sea) as appropriate; WSEL's may also be spot checked at any time.

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(7) A unit may also request a routine page for page inspection (which will assist, in particular, ships emerging from refit or FTSP) to bring their logs up to date. This check can be arranged by e-mailing or telephoning one of the inspecting authorities or Flotilla WO (Sea) as appropriate.

(8) *Final Reports.* Inspections that result in critical points being identified will require the Ship to provide assurance by e mail to the parent Flotilla or Squadron that the points have been rectified by a specified date. If an inspection uncovers serious shortfalls a re-visit by the inspecting officer may be required.

(9) The final letter and report will be sent by the inspecting officer to the unit with copies to Flotilla, NCHQ and FOST.

e. **Departmental handover.** To ensure confidence in equipment controlled by the CBM on handing over the Seamanship department to their nominated relief a formalised handover routine is to be conducted.

(1) One month prior to relief joining, a departmental handover document is to be requested from Waterfront Seamanship Staff.

(2) The document is to be fully completed at departmental handover and used to ensure a thorough audit takes place.

(3) A copy of the completed document is to be returned to Porflot/Devflot WO1 SEA.

(4) A follow-up visit should be arranged with Waterfront Seamanship staff approximately one month after handover has been completed.



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**09031. Points of contact for Navy command seamanship staff**

| Title                                       | Rank           | Responsibilities, e-mail and postal address   |
|---|----------------|---|
| Navy Command Navigating/ Seamanship Officer | Cdr            | Responsible for Navigation and Seamanship Policy. NAVY SSM-AW NAVSEA SO1, Navy Command Headquarters, Mail point 2-4, Leach Building, Whale Island, Portsmouth, Hants, PO2 8BY Telephone: 93832-5870   |
| Navy Command Seamanship Officer             | Lt Cdr         | Seamanship Policy. NAVY SSM-AW NAVSURF SO2. Telephone: 93832-5347. Address as above.  |
| Deputy Navy Command Seamanship Officer      | WO1(Sea)       | Seamanship Policy NAVY SSM-AW SEA WO1. Telephone: 93832-5113. Address as above.   |
| Assistant Navy Command Seamanship Officer   | CPO(Sea)       | Seamanship Policy (including Submarines) NAVY SSM-AW SEA CPO. Telephone: 93832-5326. Address as above.  |
| NAVY OP-TRG FOST Seamanship Staff           | Lt Cdr & Staff | Planning and Conducting Seamanship Sea Training. NAVY OP-TRG-FOST S S1. Telephone: 9375-65963. Address: Flag Officer Sea Training, Raleigh Block, HMS Drake, Devonport, Devon PL2 PGB (FAO SXO2).   |
| NAVY PORFLOT WOSEA                          | WO1(Sea)       | Planning, Coordinating and Conducting HATs. NAVY PORFLOT WOSEA. Telephone: 938020627. Address: Rm F2, Lancelot Bdg, PP 71, HM Naval Base, Portsmouth PO1 3NH.   |
| NAVY DEVFLOT FseaWO                         | WO1(Sea)       | Maximise Sea OC to DEVFLOT Surface Ships. NAVY DEVFLOT-FSEAWO . Telephone 9375-67033. Address: FWO Devonport, Defiance Building, HM Naval Base, Plymouth, PL2 2BG.  |
| DES-AC-GSE6A1                               | WO1(Sea)       | Support Authority of all 23C/4240-99 items. Working at Height Personal Protection Equipment (WAHPPE), advice on working at height issues. Telephone: Civ: 030679 82382 Mil 967982382. Address, #1334, Walnut 3C, MOD Abbey Wood, Bristol, BS34 8JH. |
| YEOMAN Of The ADMIRALTY                     | CPO(Sea)       | Flag Ceremonial Fleetwork Champion. NAVY SSM-AW SEA CPO. Telephone: 93832-5326. Address as above  |
| NPGO – NA14                                 | SO2            | Seamanship, Water Safety , RM Landing Craft & Small Boat Operation Publications. Telephone: 93825-2564. Address, Navy Publications and Graphics Organisation, Pepys Building, HMS COLLINGWOOD, Fareham, Hants, PO14 1AS.                            |

**09032. Seamanship publications and records**

The following list of publications and records pertain to seamanship matters or contain information of use to the seaman:

- a. **Rigging warrant (D6F).** All in-service HM Ships are provided with a D6F Rigging Warrant. This is a true statement at build, of all supplied Seamanship rigging equipment pertaining to the vessel and is used as an aid when producing WRF (Work Requisition Form) for the replacement of individual items of rigging.

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b. **Seamanship data book (S2676).** The Seamanship Data Book is designed to ensure continuity of knowledge of seamanship affairs affecting the ship during its lifetime and is valuable as a ready reference. It is supplied on first commissioning to all warships and submarines. The book is divided into sections, each section initially having blank pages which are progressively completed by the ship's staff, typed or in manuscript, with sketches and photographs as appropriate. The information for inclusion in the book is gleaned from various sources such as, 'As fitted' drawings, RNTMs, DINs and experience gained when rigging for or conducting evolutions. Lists of qualified coxswains with a record of boat use, crane drivers, crane controllers, slingers and POS ratings inductions should also be included in the book.

*Note.* D6F (Rigging Warrant) and the Seamanship Data Book (Form 2676) is required to be available for inspection by Flotilla and FOST Staff.

c. **Water Safety Equipment Log.** This log is part of, but maintained separately from, the MMS system. It provides details of the maintenance and routines for Water Safety and Survival, and is also used to record details of maintenance carried out.

d. **ATP-16 Replenishment at Sea.** The authoritative publication for replenishment between NATO ships.

e. **ATP-43(D)/MTP-43(D). Ship-to-Ship Towing.** The authoritative publication for towing between NATO Ships

f. **Other publications**

|          |   |
|----------|---|
| BRd 2    | QRRNs   |
| BR 20    | Flags of all Nations World Wide Web   |
| BR 69    | International Code of Signals   |
| BRd 167  | Safety, Health and Environment Manual for HM Ships and Submarines   |
| BR 367   | Manual of Anchors, Chain Cables and Associated Equipment.   |
| BRd 1043 | Gunnery and Guided Weapon User Instruction  |
| BR 1313  | Maintenance Management in Ships   |
| BR 1329  | Handbook for Survivors  |
| BR 1754  | Safety Regulations for Storing and Handling Petroleum Oils, Lubricants and Certain other Hazardous Stores in HM Ships |
| BR 2176  | Sailmakers' Handbook  |
| BR 2203  | Ships Husbandry Manual  |
| BR 2777  | Torpedo Identification and Recovery   |
| BR 3027  | Manual of Safe Use, Examination and Testing of Lifting Appliances   |

|              |   |
|--------------|---|
| BR 3939      | Hull Preservation Processes                                 |
| BRd 4023     | Ship Guide to Underwater Warfare (see also BR 214(4))       |
| BR 6003      | Instructions for Crane Drivers and Crane Pilots             |
| BR 6004      | A Safety Handbook for RN Slings                             |
| BR 6583(001) | Replenishment at Sea Probe Receiver Fuel Coupling           |
| BR 6595(800) | 25-Man Liferaft in GRP Container                            |
| BR 8837      | Radar and Sonar Alignment Target (RASAT) MOD 11             |
| BRd 8988     | RN Manual of Military Training, Operations and Tactics      |
| BRd 9275(1)  | Operational Sea Training Guide (OSTG)                       |
| BR 9275(2)   | Operational Sea Training Guide (MPVOSTG)                    |
| ATP1 Vol I   | Allied Maritime Tactical Instructions and Procedures        |
| ATP Vol II   | Allied Maritime Tactical Signal and Manoeuvring Book        |
| ATP 3        | Antisubmarine Evasive Steering                              |
| ATP-17       | Naval Arctic Manual   |
| ACP 113      | Callsigns   |
| ACP 125      | Tactical Voice Procedures                                   |
| ACP 130      | Visual Signalling Procedures                                |
| JSP 375      | MOD Health & Safety Handbook Volume 2                       |
| JSP 569      | Working at Height Personal Protective Equipment             |
| JSP 848      | MOD Boat Manual   |
| MTP 1D Vol 1 | Multinational Maritime Tactical Instructions and Procedures |

**09033. Form S2022**

Form S2022 is a report of shortcoming/changes in material, design support or documentation. Details of how to complete and submit the form are laid down in **fleet engineering orders**. However, to ensure that the relevant authorities are kept informed and are able to undertake, where appropriate, the necessary investigative action, a photocopy of all S2022s raised concerning Seamanship and Survival Equipment is to be sent to the relevant authorities at the addresses below:

- a. Seamanship and Water Safety Equipment:

Deputy Fleet Seamanship Officer (See Para 09031 for Address)

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- b. Water Safety Equipment:

The Captain HMS SULTAN,  
fao AESD(SEG)  
Military Road  
Gosport PO12 3BY

- c. Working at Height Personal Protective Equipment.

GSE6A1 (See Para 09031 for Address)

**09034. Form 760**

Form 760 is a defect reporting form for Working At Height Personal Protective Equipment. Forms are to be filled in and forwarded to the DES-AC-GSE6A1 address in Para 09031. A copy of the form is also to be forwarded to Navy Command Seamanship Office.

**09035. Seamanship incident reporting**

It is important that all seamanship incidents are reported, not just those involving injury to personnel. It is also important that near miss events are reported so that lessons can be identified and more serious situations avoided. A Navy Lessons and Incident Management System (NLIMS) has now been developed under the Navy Safety Improvement Programme (NSIP) as the application to manage all incidents across all Navy Command Operating Domains. The procedure to be followed when reporting incidents is laid down in 2013DIN 06-023.

## SECTION 3 - SEAMANSHIP ORGANISATION IN SUBMARINES

**09036. Department structure**

The responsibility for Seamanship within the submarine flotilla lies with the Executive and Warfare Departments. The Head of the Seamanship Department is the Executive Officer with the Casing Officer as his deputy.

Executive Officer (XO) (HOD)

Casing Officer (CASO) (DHOD)

Second Coxswain (Scratcher)

Second Coxswain's Assistant (Scratcher's Dickie)

Second Coxswain's Party (Four Able Rates)

Casing Party

**09037. Executive officer**

The Executive Officer (XO), as the senior Seaman Officer, is the Head of the Seamanship Department.

**09038. Casing officer**

The Casing Officer (CASO) is responsible to the XO for the day-to-day operation and administration of the department. His specific terms of reference will be determined by Commanding Officers of individual submarines, but are to include:

- a. The provision of suitably trained and equipped personnel to meet all department tasking.
- b. Taking overall charge of casing evolutions.
- c. Conducting briefings to personnel undertaking transfers to and from the submarine.
- d. Ensuring that departmental documentation is correct, e.g. WSEL, Rigging Warrant and Seamanship Data Book.
- e. Ensuring that the exterior appearance of the submarine is of the highest standard possible.

**09039. Second coxswain**

a. The rate that the Second Coxswain (Scratcher) holds is dependant on the class of submarine. Currently SSBN's are complemented with a Petty Officer; SSNs are complemented with a Leading Hand. The Second Coxswain is the subject matter expert for all seamanship matters. He will have undertaken Seamanship Training throughout his career.

Level One Seamanship

Level Two Seamanship

Level Three Seamanship-(Administration)

Phase One Training

Phase Two Training

Leading Rates

Qualifying Course

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- b. Other desirable qualifications would be

ME 418A 2 day Adhook Course  
Small Craft  
Risk Assessors Course  
COSHH Assessors Course  
Accident Investigators Course  
WSE Supervisors Course

- c. He is responsible to the CASO for the day-to-day running of the department. As the Second Coxswain he is responsible for the following areas within the Seamanship Department:

- (1) The correct planning and safe execution of all seamanship evolutions.
- (2) The planning and execution of Ship Husbandry and maintenance of the External Pressure Hull; Ballast Tanks; Casing; Fin and associated fittings.
- (3) Responsible for the replacement as necessary of all berthing hawsers and associated rigging work in accordance with the Rigging Warrant Section 2.
- (4) The upkeep of all seamanship publications.
- (5) Senior supervisor for the maintenance of Water Safety Equipment within the WSEL system.
- (6) Training all Warfare Department personnel, both Warfare and Source branches, in seamanship matters.

**09040. Water safety equipment – administration and maintenance**

The seamanship department is responsible for the administration and maintenance of all items of water safety equipment held on board. Detailed instructions on how this equipment is to be stored; issued; used and maintained is contained in the Water Safety Equipment Log held by the Second Coxswain.

**09041. The casing sentry**

A Casing Sentry is required 24 hours a day when the submarine is alongside. The Casing sentry is to be qualified in accordance with SSO. Dress for the Casing Sentry will normally be daily working rig, unless otherwise specified by the Senior Officer present. Except when making casing rounds, the Casing Sentry is to stand his watch at the Main Access Hatch. When at anchor, the watch is to be kept on the bridge.

- a. **The casing sentry's responsibilities are:**

- (1) The safety of the ship's berthing arrangements whether alongside or at anchor.
- (2) The safety of the casing and personnel on it.
- (3) The security of the gangway and the safety of its guardrails.
- (4) The neat appearance of the outside of the submarine, ensuring all ceremonial jewellery and warning signs are correct, in particular the Jack and Ensign.
- (5) The paying of marks of respect, and any ceremonial requirements.

- (6) Challenging approaching/passing vessels.
- (7) Preventing unsteady liberty men from crossing the gangway unaided, or proceeding below until the Duty Senior Rate is on the casing.
- (8) Checking the identity of all visitors coming on board and informing the OOD.
- (9) To inform the Lower Deck Sentry of the draught marks every hour.

**b. The casing sentry is to call the OOD for:**

- (1) Any marked deterioration in the weather.
- (2) Any boats or ships that pass close or are approaching.
- (3) The Captain or any Senior Officer coming on board.
- (4) Any visitors not accompanied by a member of ship's staff.
- (5) Changes of +/- 5cm in the draught marks within one hour.
- (6) If in any doubt about anything.

**c. The casing sentry is to have the following available:**

|   |                           |
|---|---------------------------|
| Communications Box                      | VHF Radio                 |
| Upper Deck Trot Pack                    | Daily Orders              |
| Daily Movements Signal                  | Expected Visitors' List   |
| Expected Contractors List               | Specimen Passes           |
| Flag Bravo on a pole                    | Fire Fighting Guideline   |
| Rescue Sling and Line (x2)              | Marine Rescue Strop       |
| Knotted Recovery Line                   | Casing Screwdriver        |
| Capstan Key                             | Bollard Key               |
| Hatch Key (2 in No.) <b>PAINTED RED</b> | Axe and Chopping Block    |
| Crewman's Suit                          | Watch Coat / Cape         |
| Torch                                   | Bosun's Call & Chain      |
| Name Boards                             | Ship's Bell and Bell Rope |
| Ship's Crest                            |                           |

**09042. Casing in harbour**

- a. **Guardrails.** Should normally be rigged on arrival alongside. Both sides are to be rigged from Aft of the Fin.
- b. **Hatches and casing plates.** Hatches should only be left open if they are fulfilling a useful purpose; hatches not in use are to be shut outside of working hours. Casing plates are not to be removed unless for a specific task (eg. Casing Crawls), all casing plates are to be replaced as soon as work is complete. Where a casing access is to be left open, **WARNING SIGNS** are to be in place at either end of the appropriate area, where planks of wood or similar are to be placed over the open hatchway to prevent accidents. Those hatches that need to be left open should be well lit. Hatches should always be shut and clipped when not in use.
- c. **Weapon embarkation hatch (WEH) and rails.** The weapon embarkation hatch is normally to be shut and clipped. Loading rails may be left rigged inboard and outboard of the hatch, the intermediate rails that run through the WEH and 29 bulkhead must remain when weapon loading/unloading is not taking place, the intermediate rails are to unrigged as soon as the last weapon lift of that load is complete.
- d. **Rescue sling and line and lifejackets.** In harbour a rescue sling and line is to be kept at each end of the casing at all times. The inboard end is to be attached to the submarine. The casing party and any working hands working on any part of the casing other than the Non-Skid section are to wear Hazardous Duty Lifejackets.
- e. **Working under the casing.** Before proceeding under the casing, carry out the following procedure:
- (1) Obtain permission from the OOD/CPOOD.
  - (2) Ensure the casing sentry places **men under casing** boards at the Main Access hatch and point of entry.
  - (3) Ensure **men under casing** boards are placed in the Control Room and Manoeuvring Room.
  - (4) On completion of any work, ensure that the relevant personnel are informed and remove all warning boards.
- f. **Ship's safety**
- (1) The Casing sentry is to check the safety of the submarine's berthing arrangements, whether alongside, at anchor or at a buoy.
  - (2) *The Safety of the Casing.* Gangways from the brow to the main access hatch are to be clear of obstructions at all times. Walk boards are to be placed when indicator buoys are removed, guard rails when rigged, are secure and taut. All hoses and ropes not in use are coiled down.
  - (3) The security of the brow, its guard rails and that all brow lights are working (if fitted).
  - (4) The external watertight integrity of the submarine, being aware of the state of hatches and if hoses or electrical cables foul them.



- (5) Carry out casing rounds at half hourly intervals (see Ship's Safety Guide).
- (6) The Casing Sentry is to pass the draught marks to the lower deck sentry hourly.
- (7) Checking the fin area is clear of personnel and overhead obstructions before masts are raised or lowered.
- (8) Being aware of any men working in or on the fin, on or under the casing, or over the side painting.
- (9) Ensuring that correct precautions are in force when divers are operating from the submarine, i.e. Flag Alfa flying from the bridge, preventing boats from coming alongside, blowing or pumping of tanks and informing any vessels alongside as laid down in Ships Standing Orders.

#### **09043. Rigging warrant (D6F)/LARR – submarines**

a. **Introduction.** All H M Ships and Submarines are provided with a Rigging Warrant. It is a statement of all rigging equipment pertaining to the vessel, including those laid apart and is an authority for demanding replacement items of such equipment. The D6F/LARR is compiled by the shipbuilder; who produce three copies;

- Copy No. 1 Held by the Submarine (Master Copy).
- Copy No. 2 Held by the Master Rigger Devonport.
- Copy No. 3 Held by the Class Design Authority (DES SM IC).

b. The Commanding Officer is responsible for ensuring that the warrant is kept up-to-date and that the items of equipment listed are complete and within test/survey date. A senior officer (e.g. MEO/WEO) should have custody of the warrant. Information for each equipment item must be entered on a separate page of the Rigging Warrant/LARR. Information should be included for each component part of an item. Where the information requested is not an applicable part, N/A must be entered to show that it has been considered.

c. **Safety categorisation.** The Rigging Equipment index for each section gives the 'Safety Category' for the existing items. The following categories apply:

- (1) Submarine Safety.
- (2) Personnel Safety.
- (3) Nil Safety Case.

d. Advice should be sought from the Class Design Authority (DES SM IC) on the Safety Category of all equipment.

e. **Identification of equipment.** The items and parts of equipment listed in Section 2 are to be described as unambiguously as possible. However, they can be identified in the rigging warrant by:

- (1) The Section Number (eg. Section 2).
- (2) The item Number as allocated to each item data sheet within a section (eg. Section 2, item 4).

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- (3) The part number, each part of an item will be allocated a part number (eg. Section 2, item 2, part 5).
- f. This numbering convention is to be used in all communications with the DES SM IC and the Master Rigger concerning rigging equipment.
- g. **Issue.** The Sub IPT is formally responsible for the issue, control and amendment of all Rigging Warrants. Three controlled copies of each Rigging Warrant are issued.
- h. **Amendments to the rigging warrant.** The Rigging Warrant is a 'live' document by nature. Periodic amendment of the survey/test information is required to reflect the current status of rigging equipment. The following procedures are to be followed:
- (1) In-service ship's staff are responsible for amending test / survey dates for equipment within the Rigging Warrant. Any special comments following an item's periodic test or survey must be entered in the 'Remarks' section of the relevant page in the Rigging Warrant as well as reporting any design or material deficiencies encountered in the course of normal use on Form S2022. The installation of replacement items should also be reported in the 'Remarks' section. Between major maintenance periods, this upkeep of the Rigging Warrant should be performed manually by ship's staff.
  - (2) Amendments to the specification of equipment contained in the Rigging Warrant may be proposed by ship's staff, the appropriate Administration authority, Equipment Project Managers or the Master Rigger by application to DES SM IC. Individual equipment sponsors will inform DES SM IC of any changes that are the consequence of DCIs, A&As or other authorisations/ instructions. Ship's staff and the Master Rigger should communicate these proposed amendments to DES SM IC using the report form at the back of the D6F/LARR.
  - (3) SM511 is responsible for the authorisation of amendments to the Rigging Warrant. On approval, the Master Rigger will issue amended pages to the controlled copies of the document. The date of amendment will be recorded in the 'Date Amended' Section of the relevant item data sheet.
  - (4) At major upkeep periods (e.g. DAMPs, RUPs etc), copies of all pages from the Rigging Warrant which have been manually amended as a result of the test, survey or replacement of items during current maintenance period, or since the previous maintenance period, must be passed to SM511 as part of the Submarine Safety Certification Process, together with any Test Certificates for the new/revalidated items. The result of any test or survey must be recorded by placing a Pass (P) or Fail (F) marker in the appropriate column on the Data Sheet. The reason for an items failure and justification for its retention must be reported in the 'Remarks' section. A proposed replacement date must be recorded there.
  - (5) At refits, the Rigging Warrant is deliverable in accordance with the appropriate Refit Design Authority Requirement (DAR). Ship's staff are to liaise with the appropriate Repair Authority to have all held Rigging Items mustered, surveyed, repaired and tested in accordance with **BR 367 and BR 3027**.

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(6) Items which fail test / survey or are missing at muster are to be replaced. Test Certificates must be supplied with new/revalidated items. This is in accordance with PMS E601/01.

(7) The submarine's copy of D6F is to be amended to reflect all changes to Rigging Equipment, and is to be submitted for scrutiny by SM511 as part of the Submarine Safety Certification Process. On their approval the Master Rigger will issue amended copies to the controlled copies of the document.

i. **Responsibility for the periodic amendment of survey and test information.**

To ensure that the Rigging Warrant remains a true record of Rigging Equipment held on board, the senior officer who is custodian of the Rigging Warrant is to propose periodic formal amendments to the document by the Master rigger, as advised by the officers responsible. Maintenance Base Staff are responsible for the Survey/Test information of equipment listed in Section 2 of the Rigging Warrant. These items are not held on board under normal circumstances.

j. **Rigging warrant sponsor.** As part of the Submarine Safety Certification Process, the Sub IPT is responsible for the inspection of each vessel's D6F and supporting documentation at refit and at other major maintenance and upkeep periods. However, it should be emphasized that it is the Commanding Officer's ultimate responsibility to ensure that the Rigging Warrant is an accurate record of all Rigging items and that all items are within test/survey date.

k. **Repairs, replacement and upkeep of rigging.** Repairs and replacement of all equipment included in the Rigging Warrant are to comply with the latest equipment specification. The responsibility for maintenance and emergency repair should normally be that of the submarine staff unless this is beyond their capability, when dockyard/contractor assistance may be requested. The Rigging Warrant is to be amended to reflect the resulting information. For refits, major maintenance and upkeep periods, the Work Package is to contain an itemised list equipment specification. The list is to include the Rigging Warrant Part Number, date of last test/survey and the Safe Working Load where applicable. Items should be tested and surveyed in accordance with **BR367; BR 3027**, Test Forms; Fleet Engineering Orders and other relevant BRs. On completion of all work, the Rigging Warrant is to be amended to reflect the resulting information.

l. **Additions.** All proposed additions must be communicated to the Master Rigger Devonport and DES SM IC using the 'Report Form for Proposed Amendment to Rigging Warrant as shown on page i of the Rigging Warrant. This must be accompanied by a completed Item Page, copies of which are held in the back of the Rigging Warrant. All authorised additions will be issued as amendments by the Master Rigger, Devonport.

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CHAPTER 10

HELMSMANSHIP

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**CHAPTER 10**

**HELMSMANSHIP**

**10001. Conning and steering – introduction**

A ship is manoeuvred by the combined use of her engines and rudder(s). When underway and going ahead the ship's speed is determined by the speed at which her propellers rotate, in revolutions per minute, or, in the case of controllable pitch (CP) propellers, by maintaining constant revolutions and altering the pitch of the propeller blades. The ship's course is either maintained or altered by her rudder. Most modern warships are fitted with twin rudders, which are linked and work in unison. In a warship the Captain or Officer of the Watch conns the ship by giving wheel or engine orders from the compass platform on the bridge. The wheel orders are applied by the helmsman and engine orders are either applied directly or passed to the ship control centre or engine rooms to be applied. In modern warships the helmsman is stationed on the bridge and steers the ship either by a miniature wheel or by a handlebar similar to an aircraft joystick. Engine speed and propeller pitch controls are also sited on the bridge and together with the steering control they form part of an integrated ship control system. Fig 10-1 shows an example of a quartermaster's console on the bridge of a ship, from where the helmsman steers the ship and controls the main engines under the direct supervision of the Officer of the Watch. The console also includes facilities for automatic steering (auto-pilot) controlled by one of the ship's gyro compasses.

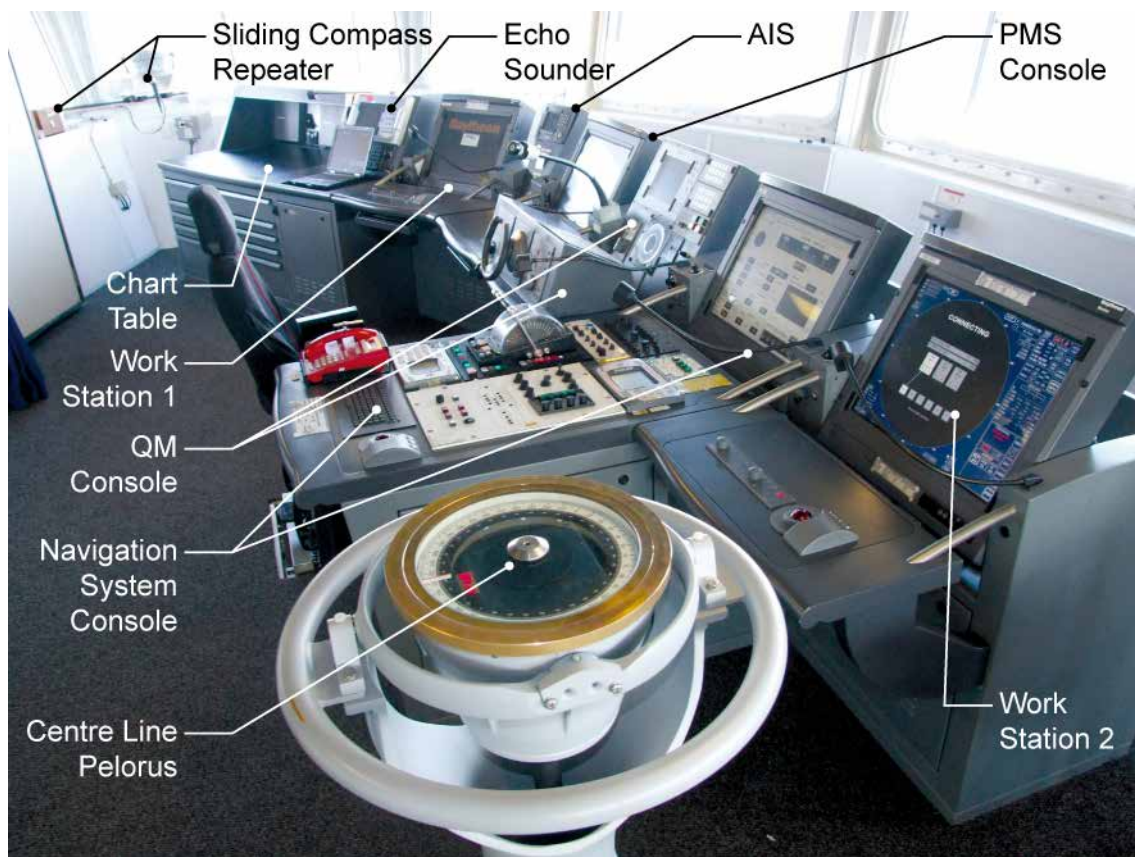
**10002. How a ship is steered**

The movement of the steering wheel or handlebar sets in motion the steering mechanism which turns the rudder(s). When the ship is moving ahead, the rudder turns the ship by swinging her stern away from, and her bows towards, the direction desired; it has the opposite effect when the ship is moving astern. When going ahead the ship's head always pays off in the same direction as the top spokes of the wheel or the top of the handgrips of the handlebar. If you wish the ship's head to go to port, then the top spokes of the wheel or the top of the handgrips must be moved to the left. When moving astern the direction in which the stern pays off is the same as that in which the top spokes or top of the handgrips are moved. As ships are fitted with either a wheel or handlebar, the term wheel in the remainder of the chapter means either wheel or handlebar as appropriate.

a. **Rudder angle.** Within the limits of the movement of the rudder, the greater the angle between the rudder and the fore-and-aft line of the ship the quicker she will swing and the smaller will be her turning circle. A ship is usually designed to allow for a maximum rudder angle of 35° each side of the midships position; although in some larger ships this angle may be increased up to 45°.

b. **Putting on or taking off rudder.** Movement of the wheel is indicated by a pointer which moves over a scale graduated either side of midships to the maximum rudder angle. The control should be moved steadily until the required rudder angle has been put on. Any desired rudder angle can be put on, up to the maximum when the wheel or handlebar, and rudder, are said to be hard over. It is usual to limit the normal maximum rudder angle to 5° less than the maximum either way.

Fig 10-1. Steering and conning instruments on the bridge – type 45 destroyer



### 10003. Types of propeller

Conventional propellers are of two main types: Fixed-pitch (FP) and Controllable-pitch (CP). There are also some more specialised types of propellers, of which the Vertical Axis or Cycloidal propeller, the Bow Thruster and the Active Rudder are those which concern the Royal Navy. Conventional propellers rotate in the vertical or nearly vertical plane and the ship handler describes the direction of rotation as right-handed or left-handed. A right-handed propeller turns in a clockwise direction when viewed from aft, and a left-handed propeller turns counter-clockwise.

- a. **Fixed-pitch (FP) propellers** (Fig 10-2). The blades and the boss of a fixed pitch propeller are manufactured as one solid unit. The designer sets the blades at a fixed angle in order to generate thrust efficiently at economical speed. As it is not possible to alter the pitch of the blades, a fixed-pitch propeller must rotate in the opposite direction when astern thrust is required. So ships fitted with fixed pitch propellers must have the means of reversing the direction of shaft rotation. This, in the days of steam-turbines required a separate astern turbine; but nowadays, warships fitted with fixed-pitch propellers have either reverse gearing to change the direction of rotation or, if powered by diesel-electric, have electric motors that can be put into reverse. The only way of increasing or decreasing the thrust of a fixed-pitch propeller is by altering the speed of rotation. Single fixed-pitch propellers fitted to HM ships are all right-handed. Twin fixed-pitch propellers in HM ships are always arranged to turn outwards when going ahead, the port turning to the left and the starboard turning to the right. This ensures maximum lateral turning forces when turning at rest.

Fig 10-2. Typical fixed-pitch (FP) propellers



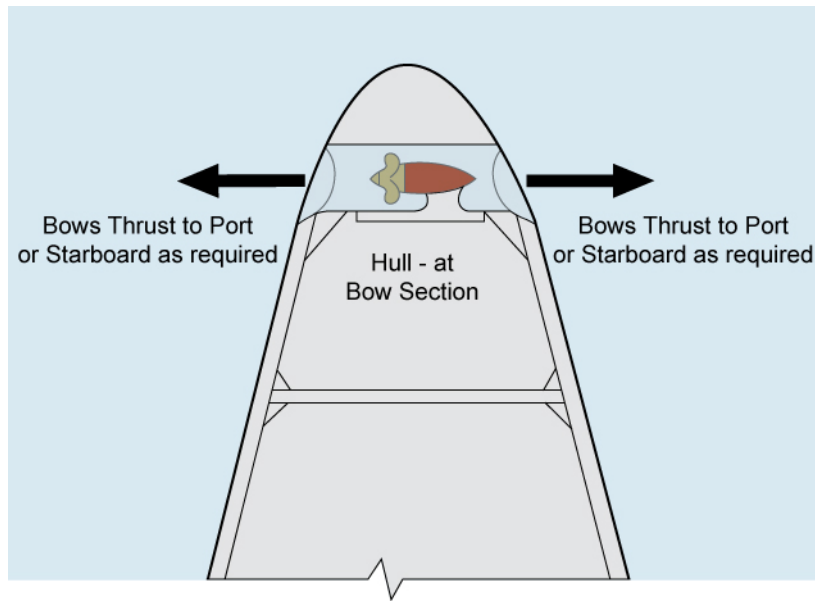
b. **Controllable-pitch (CP) propellers.** Fitting Controllable-pitch propellers avoids having complex reversing gear for high-speed engines such as gas turbines. To change a controllable-pitch propeller from propulsion ahead to propulsion astern, the blades are rotated in the hub from ahead-pitch to astern-pitch while the propeller continues to revolve in the same direction. This is done hydraulically. Once the blades are set at maximum pitch, more thrust is obtained by increasing shaft revolutions with more engine power. The twin CP propellers fitted in HM ships are inward turning, ahead and astern: that is to say, the port propeller is right-handed and rotates clockwise and the starboard propeller is left-handed and rotates counter-clockwise. This has the advantage of focusing the wake and increases the effectiveness of the rudders. The important point to remember is that each propeller always rotates in the same direction, irrespective of whether ahead, astern or zero-pitch has been selected. The only way of stopping the propeller is to apply the shaft brake.

**10004. Bow thrusters (Fig 10-3)**

A bow thruster is fitted to enable precise manoeuvring, and consists of one or more impellers mounted in a tunnel that runs from side to side of the ship near the bow. The impeller generates a flow of water to push the bow in the required direction. Some bow thrusters are fitted with a controllable-pitch impeller to allow the direction of flow to be altered by reversing the pitch; others have two separately driven impellers, one to produce flow to starboard and the other a flow to port. A bow thruster exerts more sideways force when a ship is stopped than when she is under way. Since this force decreases when the ship's speed is above four knots and becomes negligible at seven knots, they are not used to assist altering course at any speed.



**Fig 10-3. Bow thruster arrangement**



**10005. Voith-Schneider propulsion (VSP) units**

A Voith-Schneider Propulsion (VSP) unit is a vertically-mounted paddle wheel with blades projecting from a Carousel (circular rotor casing housing the pivots/control linkage for each blade) (see Fig 10-4). The Carousel is fitted flush with the hull and rotates at a constant speed. The angle of attack of each blade changes while the Carousel rotates and depending how the controls are set, the unit will develop thrust in any direction. Vessels with VSP units are highly manoeuvrable and can thrust in any direction, irrespective of their heading. A full description of the system is given in **BR 45(6) Admiralty Manual of Navigation**.

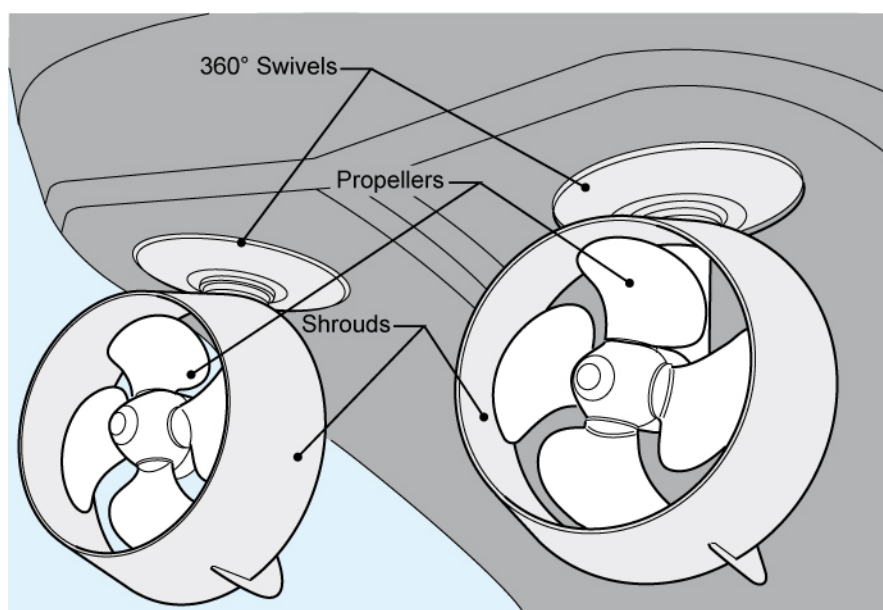
**Fig 10-4. A Voith-Schneider propulsion unit**



**10006. Azimuth thrusters (Z Drive, C Drive or L Drive)**

An azimuth thruster (see Fig 10-5) (widely known as Z Drive, C Drive or L Drive) consists of a conventional propeller, often surrounded by a cylindrical shroud, mounted on a swivel, which allows the whole unit to be rotated over 360° of azimuth. This flexible and powerful propulsion system is ideal for vessels which need a high degree of manoeuvrability and power. The terms Z Drive and C Drive are often used for azimuth thrusters to describe the orientation of the Z bend or C bend drive shafts between a horizontally mounted engine/motor and the propeller. The term L Drive is used when the engine/motor is mounted vertically, thus simplifying the drive shaft linkage. A full description of the system is given in **BR 45(6) Admiralty Manual of Navigation**.

**Fig 10-5. Typical configuration of twin azimuth thrusters**



**10007. Azipods**

Azipod (see Fig 10-6) is a trademark but is now used as a generic name for one or more permanently mounted, fixed or azimuthing 'pods', each containing an electric motor and propeller. Electrical power to the Azipods is supplied from inboard generators. A full description of the system is given in **BR 45(6) Admiralty Manual of Navigation**.

- a. **Advantages and disadvantages.** The advantages and disadvantages of Azipods/azimuth thrusters over conventional machinery are:

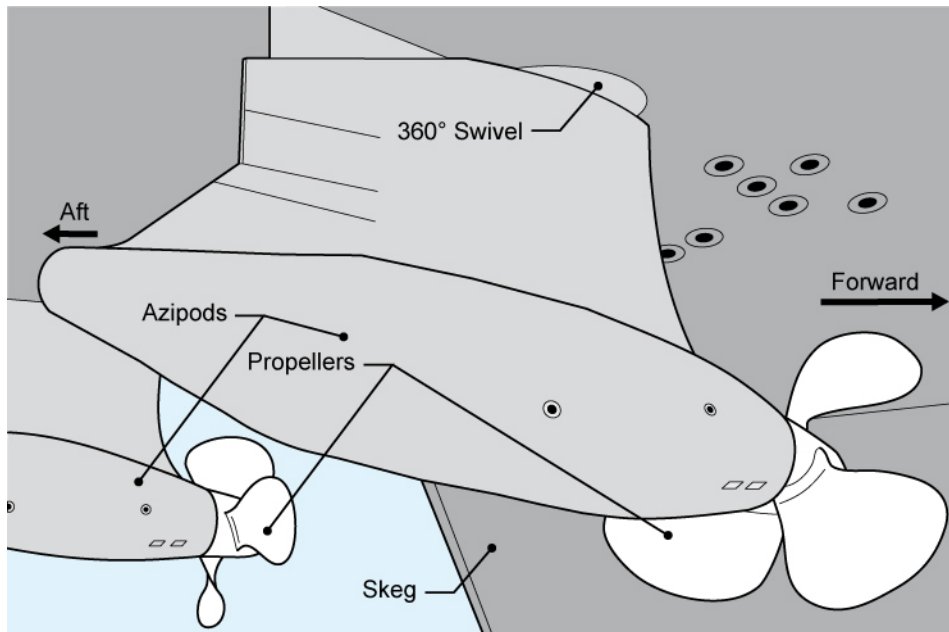
**Advantages**

- (1) Greatly enhanced ship manoeuvrability over conventional propellers.
- (2) Reduction in machinery needed (eg. no large reduction/reversing gearboxes, long propeller shafts or rudders).
- (3) Ideal for use with integrated electric propulsion (IEP).
- (4) Large icebreakers or ice-strengthened ships (typically 6,000 to 100,000 tonnes) fitted with an Azipod aft and designed to run stern-first into ice, are highly efficient and require only a tiny fraction of the power required by a conventional bows-first ship to cut through the same thickness of ice. The Azipod either operates in clear water below surface ice or, rotated through 180°, is used to drill into and break up thick ice.

### Disadvantages

- (1) Due to the lack of rudders aft, Azipod/azimuth thruster ships can become directionally unstable when in adverse RAS Pressure Zones, especially at speeds above ten knots.
- (2) Increased vulnerability of the electric motor, bearings etc.

**Fig 10-6. Typical configuration of a twin Azipod fit**



### 10008. Submarine propulsion systems

a. **Large submarines.** Large submarines, which are usually nuclear-powered, have particular constraints in the characteristics of the propulsion system and steering arrangements. A single (main) propulsor is normally fitted which comprises fixed stator blades with a moving rotor; the stator and rotor are encased within a circular outer duct. The rudders are usually fitted **forward** of the propulsor and do not benefit from the slipstream of accelerated water which would otherwise increase their effectiveness, as in most surface ships. To assist in creating an enhanced flow of water over the lower rudder, a small external secondary propulsion motor is often fitted but is only capable of a limited effect. Astern power is normally very limited. Full details concerning RN submarines are contained in **BR 45(6) Admiralty Manual of Navigation**.

b. **Small submarines.** A number of navies operate small diesel-electric submarines capable of surfaced transit on diesel engines and submerged transit on battery powered electric motors. When surfaced, these vessels usually have very limited facilities available for manoeuvring and turning, and by nature of their design, have limited surface surveillance and navigation arrangements from the bridge (conning tower).

c. **Capabilities, limitations and additional caution required.** Although very effective at depth, the propulsion and steering characteristics of any submarine on the surface are extremely limited.

**10009. Water jet propulsion systems**

a. **System description.** A Water Jet propulsion system comprises a large water intake, which supplies a powerful pump, which in turn directs a high-pressure jet of water out of a nozzle to provide directional thrust. Directional control of this thrust is provided in some cases by a nozzle, which may be physically rotated in azimuth, or in others, via internal ducting, which directs the jet of water out of a selection of fixed outlets to provide a similar effect of variable azimuth thrust. Some larger vessels fitted with water jet propulsion also have a bow thruster and so can move directly sideways at relatively slow speed.

b. **Advantages.** The major advantage of water jet propulsion systems is that there is no rotating propeller in the water. This factor makes water jets extremely useful for a range of small craft and vessels where there may be a risk injury to personnel in the water, or damage to propellers when operating in shallow water. For these reasons water jet propulsion is used in the very popular 'personal water craft' (jet skis), in boats towing water-skiers, in other recreational craft, and in working vessels or boats, which normally operate close inshore or near bathers.

c. **Use in Royal Navy.** For the above reasons, water jet propulsion has been introduced in PACIFIC Mk 2 Class sea boats and is fitted to the LCU Mk 9S and Mk 10. Water jet propulsion is also fitted as the bow thruster system in HUNT Class MCHs. It is likely that the fitting of water jet propulsion will be extended to a variety of other RN ships, craft and boats in the future.

**10010. Principles of rudder design**

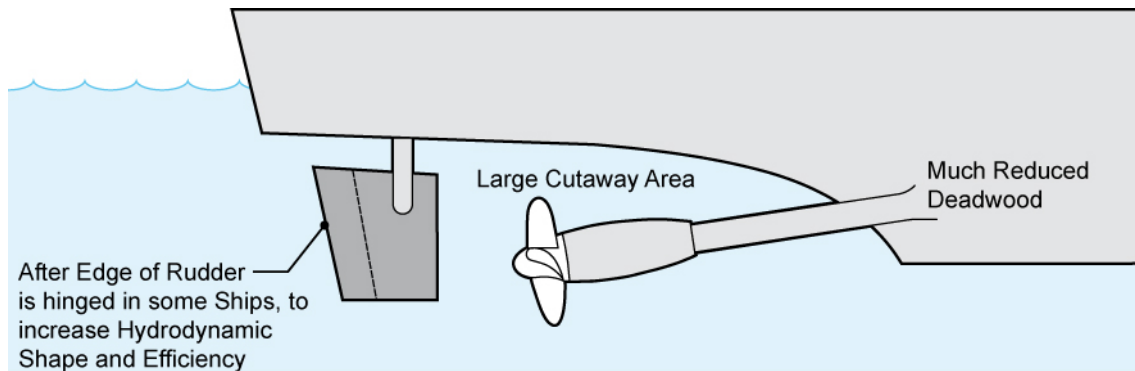
a. **Function and operation.** The function of the rudder is to use the hydrodynamic force of 'lift' to produce the turning moment to (1) start a ship turning, (2) keep it turning, (3) stop it turning, and (4) maintain a steady course. When stopping a turn, rudder is applied in the opposite direction and the rudder is centred. Small rudder movements will then maintain a steady course, assisted by the effect of the Deadwood.

b. **Description and positioning of rudders.** The rudder is a vertical blade, usually with a curved section. When at an angle to a flow of water, it is subject to the hydrodynamic forces of lift and drag. The rudder is thus a 'passive control device', only creating a turning moment when in a flow of water. Partly for this reason, rudders are normally fitted aft in a position where they benefit from lying the flow of the propeller slipstream when the ship is going ahead. In addition, in a ship with headway, the pivot point is normally well forward and so rudders are fitted aft to provide the greatest possible turning moment about the pivot point.

c. **Lift and stalling.** If the angle of attack of the rudder to the water flow is increased, the lift and drag forces also increase, until the flow on the rear side of the rudder becomes increasingly turbulent and finally breaks up altogether. This causes the lift force to be suddenly and dramatically reduced, which in turn causes a proportionate loss of rudder effectiveness; this is known as stalling. For this reason the rudder is limited to 35° in most ships. Rudder design, including the curved section shape, has to take into account the lift force required and efficiency through the range of rudder angles.

d. **RN ships.** Most RN ships are fitted with fully balanced Spade Rudders. Full details concerning rudders are contained **BR 45(6) Admiralty Manual of Navigation.**

**Fig 10-7. Typical semi balance spade rudder design**



**10011. Types of propulsion system**

As shown in Table 10-1, gas turbines, diesel engines and diesel-electric units form the main propulsion systems in the surface fleet and the steam turbine has been largely replaced. Officers of the Watch, quartermasters and helmsmen must be thoroughly familiar with the arrangements in their ships and the methods by which they are controlled.

**Table 10-1. Propulsion systems fitted in HM ships**

| Ship Class        | Engine   | Propellers  | Rudders |
|-------------------|--|---|---------|
| LPD               | 2 x 6.25MW Diesel Electric<br>1 x 5.6 MW Diesel Generator<br>Bow Thruster  | 2 FP outward  | 2       |
| LPH               | 2 Diesel<br>Bow Thruster   | 2 FP outward  | 2       |
| Type 45           | 2 x Diesel Generators<br>2x Gas Turbine Alternators                        | 2 FP  | 2       |
| Type 23           | 2 Diesel Electric<br>2 Spey CODLAG   | 2 FP outward  | 2       |
| Hunt Class MHC    | 2 Diesel<br>1 Diesel Slow Speed Drive<br>Bow Thruster                      | 2 FP outward  | 2       |
| Sandown Class MHC | 2 Diesel through fluid couplings<br>1 Diesel Electric for Slow Speed Drive | Voith-Schneider cycloidal propeller units. Bow-thruster with electric pumps |         |
| River Class OPV   | 2 Diesel   | 2 CP inward<br>Bow Thruster   | 2       |
| SVHO              | Diesel electric<br>3 main Generators                                       | Azimuthing Thrusters<br>Bow Thrusters                                       |         |
| Archer Class      | 2 Diesel   | 2 FP outward  | 2       |

**10012. Gas turbine propulsion**

Gas turbines are now the most widely fitted main propulsion machinery in the Royal Navy. They respond well to control by automated remote control systems which save significantly on operating manpower. Their maintenance is straightforward, which again reduces the manpower required, and the engines themselves produce a high power output for their weight. Another significant advantage of gas turbine engines is that they can be quickly started, so the notice required to obtain propulsion power is much less than that for steam plant. This improves safety considerably when at anchor. The marine gas turbines now in service in HM Ships are derived from their aero engine counterparts.

**10013. Arrangements of gas turbines in HM ships**

There are two arrangements of engines to be found in gas turbine powered ships. The first arrangement is *Combined Gas OR Gas (COGOG)*. Only one type of engine at a time can be clutched to each propeller shaft, (explaining the OR in COGOG). The engines drive through synchronous self-shifting (SSS) clutches, which give a smooth changeover from one engine to the other to drive the propeller shaft. The other arrangement is *Combined Gas AND Gas (COGAG)*.

**10014. Combined diesel electric and gas turbine arrangement (CODLAG)**

The requirements for a low noise signature and high endurance have led to the adoption of a new type of propulsion system by the Royal Navy. This is a Combined Diesel Electric and Gas Turbine arrangement (CODLAG). The Type 23 frigate has two shafts with fixed pitch propellers. Each shaft can be driven by an electric motor wound directly on to it and by a Spey gas turbine through a double reduction gearbox and SSS clutch. The ship has four 1.3 MW electric generators to supply power for propulsion and for the ship's electrical requirements. Under normal circumstances, the electric motors will produce up to 1.5 MW on each shaft at 90 rpm, which is equivalent to about 14 knots. The Spey gas turbines can then provide another 12.75 MW of power on each shaft to bring the ship up to full speed at 180 rpm. CODLAG ships, such as the Type 23, do not have arrangements for 'Bridge Control' and are, therefore, always handled in SCC Control with orders transmitted to the SCC by Power/ Revolution and Engine telegraphs.

**10015. Integrated electric propulsion**

The Type 45 Destroyer (and the future Type 26 Frigates and QE Class Carriers) are fitted with *Integrated Electric Propulsion (IEP)*, driving through a conventional twin screw shaft line. Diesel generators (DGs) and Gas Turbine Alternators (GTAs) are fitted. The system is an RPM-based closed-loop system. Unlike previous classes of ship, the control system adjusts power to maintain the ordered RPM.

**10016. The electro-hydraulic steering system**

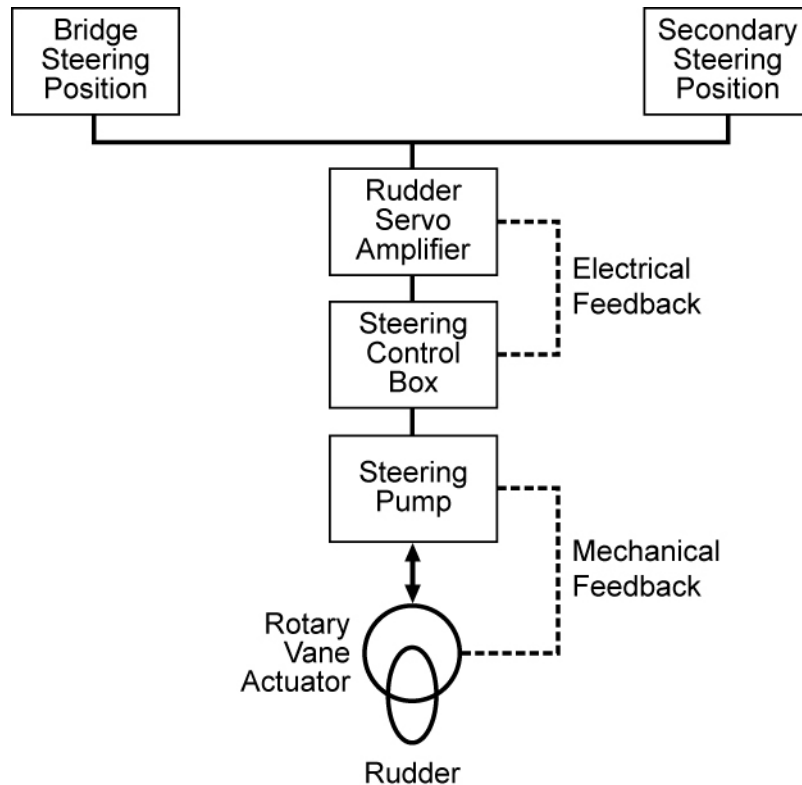
The steering system in major warships is electro-hydraulic. Steering control instruments generate electrical signals to control hydraulic pumps to turn the rudder; a feedback signal from the rudder head then stops the rudder at the required angle. To reduce the chances of total steering failure, ships are fitted with duplicate systems, one to port and the other to starboard, and arrangements are made that, if one system breaks down, the other automatically takes over. The quartermaster's console contains the following three instruments: the *hand steering unit* for steering by hand, and the *set course* and *auto-steering* units for steering a course automatically.

**10017. Operation of the electro-hydraulic steering system**

A simplified diagram of a steering system is shown in Fig 10-8. The components are situated in three compartments: the bridge, the secondary steering position (SSP) and the steering gear compartment. The signal generated by movement of the handlebar is routed through the hand steering unit in the SSP to the steering gear compartment. There it is fed to the rudder servo amplifier to produce power for the rudder servo gearbox to operate the Steering control box mechanically.

The function of the steering control box is to control the hydraulic output from a continuously running VSG pump. The hydraulic pressure from the VSG pump moves the rudders through a rotary vane actuator. In order to stop the rudders at the required angle, there is a mechanical link from the rudder heads to a reset mechanism in the steering control box. This centres the control levers of the VSG pumps and so stops the delivery of hydraulic pressure.

**Fig 10-8. Electro-hydraulic steering system**



**10018. Hand steering unit (Fig 10-9)**

This unit is fitted with a handlebar for steering the ship by hand and has the various selection and alarm buttons that are described below.

- a. **Handlebar steering.** The helmsman steers by rotating the handlebar to the required rudder angle up to a limit of  $35^\circ$  as shown by the pointer. There are two methods of hand steering: *self centring* where the handlebar returns to amidships when released; *ratchet* where the rudder is offset in  $1^\circ$  steps to port or to starboard if, say, weather helm is required, but the handlebar does not automatically re-centre when switched to 'ratchet'.
- b. **Mode selection.** There are buttons on the hand steering unit for changing from hand to automatic steering. The appropriate button lights up to show which mode is in use.
- c. The system selection switch switches to either the port or starboard steering control circuit. An indicator lamp shows when there is a fault in the steering control system in use.
- d. **Weather helm trim control.** The helmsmen use this control to set rudder trim to an angle of up to  $10^\circ$  to port or starboard.

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- e. The off-course alarm warns if there is any deviation from the set course when in automatic steering.
- f. The compass follow alarm illuminates when there is a gyro compass error of more than 2°. It is then necessary to change to hand steering.

**Fig 10-9. Typical hand steering unit**



**10019. Automatic steering**

The quartermaster's console contains the *Set Course Unit* and the *Auto-steering Unit*, both of which are used for automatic steering.

- a. **Auto pilot course setter unit type 23 frigate.** The helmsman sets the course to the nearest 10° on the 'ship outline' control (Fig 10-10) and then to the nearest degree on the inner, fine control. The unit compares the ordered course with the compass course and generates an error signal to operate the rudder.

**Fig 10-10. Set course unit type 23 frigate**





b. **Auto pilot course setter type 45 destroyer.**

(1) *Autopilot type 45.* The advanced-design commercial autopilot (Raytheon 235) is connected directly to the navigation system. Detailed guidance can be found in ship's technical documentation. The autopilot is very effective in all conditions, using minimum wheel to achieve the desired course. The settings below are recommended.

| Setting             | Value      |
|---------------------|------------|
| Rudder Limit        | Max        |
| Turn Radius         | 0.1nm      |
| Rayte of Turn (RoT) | 40° permin |
| Off heading         | 5°         |

(2) *Autopilot – reversionary mode type 45.* When in autopilot control, NFU becomes the direct reversionary mode; FU control is inactive and even applying maximum wheel will not activate it. If NFU is used, control will automatically revert from autopilot to NFU. An alarm will sound.

**Fig 10-11. Course setter type 45 destroyer**



c. **Auto-steering unit.** This allows the rudder control signal to be modified to allow for *rudder limits, yaw, ship's speed* and *weather helm*. Ship's speed is fed from the ship's log; if the log fails, however, there is a switch for setting the ship's speed manually. Weather helm, which is monitored continuously when in hand steering, is stored in the unit's memory and becomes immediately available on changing over to automatic steering.

**10020. Selection of steering control**

In an emergency, the helmsman can change from automatic steering to hand steering by rotating the handlebar fully in either direction. This overrides the automatic mode of steering and immediately puts on full port or starboard rudder. The helmsman must ease the wheel as soon as the indicator lamp lights to show that the steering is in the hand mode.

a. **Changing to the secondary steering position** is controlled by a changeover switch on the Hand Steering Unit in the SSP. The procedure for doing so will be laid down in ship's Standing Orders. Automatic steering is not available in most warships at the SSP.

b. **Emergency steering.** Should damage or an electrical fault in either control system make it impossible to steer from the bridge or the SSP, the ship can be steered under local control from the steering gear compartment. Provided one of the two steering motors is running to produce hydraulic power, the *local handwheel* will control rudder movement. But, if there is no electrical power, resort must be made to the hand pump to centralise the rudder or set it to a given angle.

c. **Steering positions.** All major warships can be steered either automatically or by hand from the Quartermaster's console. If the bridge is damaged, the *secondary steering position* has facilities for steering by hand and for transmitting propulsion orders to the SCC/MCR. As a last resort, warships have an emergency steering position in the steering gear compartment.

#### **10021. Conning orders**

The term *conning the ship* means controlling the ship by giving steering or propulsion orders to the helmsman. Other than the Captain, only the Officer of the Watch may give conning orders. The helmsman always acknowledges a conning order by repeating it before taking action. When a conning order is not repeated correctly, the Officer of the Watch should give the order again firmly and clearly. The OOW should always check the rudder indicator to see if the rudder has moved in the right direction. If the helmsman puts on wheel in the wrong direction, the OOW should correct it by ordering 'MIDSHIPS' and then giving the wheel order again.

#### **10022. Manual steering conning orders**

a. **Wheel orders.** These are conning orders to put the rudder over in a given direction to a particular angle, e.g: '*STARBOARD TWENTY*'. Wheel orders are given by the Captain or OOW when they wish either to start altering to a given course, or to control the heading of a ship when no course has been ordered. On receiving a wheel order, the helmsman repeats the order and turns the handlebar or wheel in the required direction to the angle shown on the wheel indicator on the Quartermaster's Console. The OOW checks the rudder indicator. When this has been done, the helmsman reports that the amount of wheel ordered is on, e.g: '*TWENTY OF STARBOARD, WHEEL ON*'.

b. **Altering course.** To alter course by more than 20°, the Officer of the Watch starts by giving a wheel order, and follows this by telling the helmsman the new course to which the ship is turning, e.g: '*STARBOARD TWENTY, ALTERING 340°*'. The helmsman acknowledges by repeating the order, and reports the rudder angle set, eg: '*TWENTY OF STARBOARD WHEEL, ON*'. As the lubbers line passes through a heading 15° before the new course, the helmsman reports to the OOW, eg: '*PASSING 325*'. From this point, the Officer of the Watch cons the ship on to the new course, first by easing the helm as she approaches it, eg: '*EASE TO TEN*', and then by taking the swing off with opposite wheel, eg: '*PORT TEN*'. Finally, when on or near the new course, the Officer of the Watch will order '*MIDSHIPS, STEADY*'; the helmsman will steer the heading shown by the lubbers line when the order '*STEADY*' is given unless the Officer of the Watch gives him a another course close to it to steer, eg: '*STEER 342°*'.

c. **Small alterations of course.** When making a small alteration of course of up to 10°, the OOW will give a wheel order followed by the course required to steer, e.g: '*STARBOARD FIFTEEN, STEER 312°*'. The helmsman repeats this, brings the ship to the course ordered and, when steady on the new course, reports: eg: '*COURSE 312°*'.

**10023. Automatic steering conning orders**

a. When ordered, the helmsman changes from *hand* to *automatic steering* by pressing the mode selection button on the hand steering unit; the helmsman then steers by setting courses on the set course unit. To alter course, the Officer of the Watch gives the order 'Set course ....' e.g: '*SET COURSE 053°*'. The helmsman then rotates the outer ship-shaped knob to the approximate course and adjusts to the exact course with the inner, fine control knob (Fig 10-7). Automatic steering brings a ship the short way round to a new course; so, if the Officer of the Watch wishes to make an alteration of course of more than 180°, he must order the alteration in two steps.

b. To change the rudder limits, reduce yaw, apply weather helm or to set ship's speed if the log breaks down, the Officer of the Watch orders the helmsman to make settings on the Auto-steering Unit, eg: '*SET RUDDER LIMITS TO 20°*'.

**10024. Propulsion control**

Propulsion control varies with the propulsion machinery fitted and whether the ship has Fixed Pitch or Controllable Pitch propellers. Most warships, except for the Type 23 Frigate, have the choice of altering the direction and power of propulsion thrust either directly from the bridge (*Bridge Control*) or by transmitting telegraph (and sometimes telephone) orders to the MCR/SCC (*MCR/SCC Control*). The conning orders to be given depend on which method of control is being used and what propulsion control instruments are fitted. The instruments used in different classes of ship for Bridge Control and MCR/SCC Control are shown in Table 10-2 and Table 10-3 below.

**Table 10-2. Instruments for 'bridge control'**

| <b>Class of ship</b> | <b>Direction of thrust</b> | <b>Propulsion power</b>                 |
|----------------------|----------------------------|---|
| LPH                  | Engine telegraphs          | Power demand lever (PDL) for each shaft |
| LPD                  | Engine telegraphs          | Power demand lever (PDL) for each shaft |
| TYPE 45              | Engine telegraphs          | Power demand lever (PDL) for each shaft |
| TYPE 23              | Engine telegraphs          | Revolution order indicators             |

**Table 10-3. Instruments for 'MCR.SCC control**

| <b>Class of Ship</b> | <b>Engine/direction of thrust orders</b> | <b>Propulsion power orders</b>                |
|----------------------|--|---|
| LPH                  | 2 engine telegraphs                      | 2 revolution telegraphs (1 for each shaft)    |
| LPD                  | 2 engine telegraphs                      | 2 revolution telegraphs (1 for each shaft)    |
| TYPE 45              | 2 engine telegraphs                      | 2 revolution telegraphs (1 for each shaft)    |
| TYPE 23              | 2 engine telegraphs                      | 2 digital power telegraphs (1 for each shaft) |

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### Notes:

1. *The type 23 frigate does not have arrangements for Bridge Control. Engine orders are transmitted to the SCC by engine telegraphs and power orders as a percentage by Digital Power Telegraphs. In order to standardise conning orders between different classes of ship, a power order in a Type 23 is given as a lever percentage.*
2. *Minor war vessels are equipped with the various types of propulsion control arrangements described in **BRd 45(6) Admiralty Manual of Navigation**.*

### 10025. Propulsion conning orders

These come under three headings:

- a. **Engine orders** to order the direction and overall amount of propulsion thrust: *Ahead, Astern and Stop, Slow, Half, Full.*
- b. **Power orders** to order the propulsion power by lever percentage or shaft revolutions.
- c. **Shaft brake orders** to stop a shaft from rotating by applying the brake, or to release the brake.

### 10026. Propulsion conning orders when in bridge control

These are preceded by the order 'Set', followed by which lever or levers are to be used, then the direction of thrust and the power required, eg: '*SET: PORT LEVER - ASTERN - FIVE ZERO*'. This is repeated by the helmsman. In the CVS, the helmsman first transmits 'Astern' on the port engine telegraph and then sets the port Power Demand Lever to 50. When using Power Pitch Control Levers, '*LEVER ZERO*' replaces the engine order 'Stop', and the orders 'Slow Ahead/Astern' and 'Half Ahead/Astern' are not used. When the order '*FULL AHEAD*' or '*FULL ASTERN*' is given, MCR/SCC control is adopted immediately.

### 10027. Propulsion conning orders when in MCR/SCC control

- a. The engine telegraph order precedes the lever percentage order or, when being used, the revolution order. Engine orders take the following form:

STOP/SLOW/HALF/FULL

AHEAD/ASTERN

PORT/STARBOARD/BOTH ENGINES

- b. In ships fitted with two lever order instruments, the order 'Set' precedes the shaft and lever power required, e.g.

'SET - PORT/STARBOARD LEVER - FOUR ZERO'

- c. In ships fitted with one lever order instrument, the order 'Set' precedes the lever power required on both shafts, e.g:

'SET - LEVER - FIVE FOUR'.

**Note.** *Both propulsion units will then produce the same power if both engine telegraphs are at half, although one engine may be Ahead and the other Astern. If different power settings are required on each shaft, orders for this are given to the MCR/SCC by telephone.*

- d. Revolution orders are given as follows:

‘SET - (PORT/STARBOARD) REVOLUTIONS FIVE FOUR’

**10028. Emergency slow procedure**

If an emergency develops requiring the MCR to reduce power, EMERGENCY SLOW procedure will be initiated by the MCR. It should be noted that the MCR will misalign the telegraphs to **SLOW in the direction propelling at the time of the emergency**. Hence, if propelling ahead, SLOW AHEAD will be used but if propelling astern, telegraphs will be misaligned to SLOW ASTERN. Standard class emergency procedures for Type 23 Frigates should then be followed from BRd 45(6) Annex 14B and for Type 45 Destroyers BRd 45(6) Annex 16B.

**10029. Shaft brake orders**

- a. Before ordering a shaft brake to be operated, the ship's speed and the shaft revolutions should be brought below the operating limits required, and the bridge should warn the MCR/SCC. In MCR/SCC control, the bridge will order the MCR/SCC to operate the shaft brakes by telephone. The Officer of the Watch gives the conning order:

‘APPLY/RELEASE - PORT/STARBOARD/BOTH - SHAFT BRAKE (S)’.

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CHAPTER 11

TACTICAL COMMUNICATIONS

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**Annex 11E** Provision of tactical command support (TCS) – surface flotillas



CHAPTER 11

TACTICAL COMMUNICATIONS

SECTION 1 - COMMUNICATION MANAGEMENT

**11001. Inspections and trials – general**

- a. Maritime commissioning trials and assessment (MCTA) is the conducting authority for trials that involve visual signalling (VS) equipment (see BR 9463). The ship/submarine's WEO is responsible for acceptance of all equipment.
- b. The normal formal inspection and trials programme sequence for radio and VS is:
  - (1) Harbour acceptance trials (HATs)
  - (2) Sea acceptance trials (SATs)
- c. The MCTA staff will normally coordinate/conduct the above trials.

**11002. Harbour acceptance trial (HAT)**

HATs are carried out to confirm that equipment is ready for service, free from defects and working correctly. Orders for the conduct of HATs are contained in BR 9463 – Instructions for the Conduct of Naval Weapons Inspections and Trials.

**11003. Sea acceptance trial (SAT)**

SATs are an extension of HATs, covering those parts which cannot be done in harbour, and confirm that equipment does not suffer from internal interference, vibration etc. The interval between the two trials should be long enough for defects found during HATs to be remedied, but not longer than 12 weeks, otherwise a partial repeat HAT will be required. BR 4050 contains the orders for the conduct of SATs.

**11004. Specifications and standards**

Installation specifications or Defence Standards DEF STANs are produced for all equipment, and the relevant ones are normally held by the WE sub-department. Specifications of interest to a ship's Seamanship Specialist are shown in DEF STAN 08-130 Visual/Sound Signalling Equipment.

**11005. Notice boards and stateboards**

- a. The requirements for information to be displayed tend to change fairly regularly, particularly operational information. Guidance on the latest recommendations can be obtained from FOST Staff.
- b. A recommended EMCON board for Bridge use is at Annex 11A.
- c. The portable stateboards listed below are recommended for use on the Bridge:
  - (1) Manoeuvring form (form s.376).
  - (2) Standard ras planning sheet (annex 11b).
  - (3) Call sign and exercise serial as required.

**11006. Publications and their stowage**

- a. Maintain a good liaison with the BR Coordinator and CB Officer giving ample notice of requirements and when items are required.
- b. Keep books in the correct stowage and order when not in use; local numbers and boxes for smaller items help to keep things in the right place. Muster boards should identify the contents of each safe and follow the sequence of material therein, clearly showing the different requirements for watch and daily musters.

**11007. Naval Stores**

- a. Naval Stores are divided into two categories as follows:
  - (1) *Permanent/Limited* – items of a valuable or lasting nature eg binoculars, watches, clothing.
  - (2) *Consumable* – items of little value or which are expendable eg cleaning gear, stationery.
- b. **Stores record.** The Departmental Stores Demand Book S.3015 is used to list items required through Naval Stores. This provides a record of all transactions, whether items are supplied from stock or demanded specially, and gives cross reference to other paper work involved. S.156 is also required for the transfer of permanent items to PLR.
- c. The S. Forms relevant to Naval Stores are:
  - (1) S.156 – Demand Note for Naval Stores from the Logistics Department.
  - (2) S.1091 – Return Note for Naval Stores to the Logistics Department.
  - (3) S.1092 – Temporary Loan Book (used when drawing items for a short period).
  - (4) S.3015 – Departmental Stores Demand Book.
- d. Ensure that good liaison is maintained with the Logistics department for the replenishment of items in regular use.
- e. Stationary demands are normally three or six monthly; therefore, re-order when the previous demand is received. Confirm the exact arrangements required with the stationery co-ordinator.
- f. Signal flags are not carried by the Logistics department; a stock should be held by the Seamanship sub-department. Ensure that adequate notice is given of replenishment requirements.
- g. An early decision must be made on the general stowage of stores taking into consideration the material, weight and size of items, their potential as fire or safety hazards, and when access to them is likely to be required. When possible, keep a stock of ready use items adjacent to user positions.

h. List of forms and stationery used:

**Logs**

B/Sigs/1                      Radio Operators Log (available from NCHQ/STE)

**Miscellaneous**

S.376                          Manoeuvring Form

**Training**

S.1321                        Standard FRX Exercise Form. (Annex 11C & Annex 11D))

**11008. Procedures for handling protectively marked material in emergencies**

a. In the event of fire, preservation of security is of prime importance. When possible therefore, in addition to the normal fire drill, protectively marked material must be locked in its normal safe and the combination scrambled to lock the safe. In the event of fire in an adjacent compartment protectively marked material may need to be moved to allow boundary cooling or to prevent the spread of fire. Before being moved to a secure area all material should be placed in sacks to reduce the danger of loss en-route. These details should be covered in the Fire Preparedness Plan.

b. The Emergency Destruction Orders for the ship or submarine are usually written by the CBO or Unit Security Officer who will probably need assistance in interpreting the sequence of destruction of cryptographic material from SDIP 293, BRN/0009/0002 and JSP 440, and in preparing the recommended Emergency Destruction Cards.

**11009. Entering and leaving harbour**

a. Signal letters/International Callsign are not to be hoisted when entering and leaving HM Naval Bases.

b. ACP 130 Art 819 only applies when entering non-naval ports unless otherwise directed in local port regulations.

c. Visual call signs are not to be hoisted unless ordered.

d. Berth numbers are to be hoisted in accordance with ATP 1(F) Vol 1 Art 2134.

e. Attention is drawn to BRd 9467 (FLAGOs) Chapter 2.

**SECTION 2 - CARE AND DISPOSAL OF VISUAL SIGNALLING (VS) STORES**

**11010. Flags and pennants**

a. Flags and pennants used for signalling purposes, and dressing Lines should be kept clean and in good repair. Never leave them lying about (especially when wet), or use them in such a manner that they will become unnecessarily dirty. Owing to the lack of between-decks drying facilities, and the potential fire and obstruction hazards when draping wet dressing lines between decks, always consult the Officer of the Day when dressing lines are taken down damp or wet. Keep flags and bunting in store in a warm, dry place and take precautions against moths. Dirty or torn flags make the reading of flag signals more difficult, spoil the appearance of a ship when Dressed Overall, reflect discredit on the ship using them, and the Royal Navy in general.

b. **Supply.** Bunting is supplied in 1 metre widths. Shades and pattern numbers are shown in BR 20 flags of all nations. Naval Stores in ships do not hold stocks of signal flags. Therefore adequate notice of replenishment requirements must be given.

c. **Loan.** Serviceable signalling flags are not to be loaned for decorative or private purposes. As a rule, all applications for loans should be refused, however see Para 11011 sub para c.

d. **Laundering**

(1) For economy reasons, launder White Ensigns and Union Flags in a good state of repair at public expense using ships' laundries, or civilian laundries where service facilities are not available.

(2) Take great care when washing White Ensigns and Union Flags. Ships' laundries can achieve satisfactory results by using soap and not detergents.

(3) Wash flags and pennants made of nylon worsted bunting (sewn and/or printed) in warm water not exceeding 40° C). Thoroughly rinse them in cold water after washing. Do not dry-clean or use detergent for washing nylon worsted flags.

**11011. Disposal of flags and pennants**

a. Dispose of flags and pennants no longer suitable for their original purpose, and those no longer required, as follows:

(1) Return to Naval Stores standards, ensigns and national flags supplied on permanent loan, and obtain replacements if required.

(2) Take other flags and pennants on charge as Patt. 0330/8156 (Bunting decorative) and account for these by weight. Destroy, not return, Patt. 0330/8156 bunting no longer suitable for decorative purposes.

- b. Remove the fittings from all discarded flags and, unless of scrap value (Class Group 0285), take on charge under Class Group 0251 in accordance with their pattern numbers.
- c. When decorative bunting (Patt. 0330/8156) is issued on loan, show the number (in addition to the weight), on the issue voucher. Full details are contained in BR 96 – Stores Accounting and Store keeping Manual.

**11012. Boats ensigns and pennants**

Ensigns, flags or pennants flown in boats must be clean, in good repair and stopped neatly to the staffs. Boat ensigns (Size 2 NSN 8345/571-3296) are to be worn by all RN and RM boats and tenders (power and sail), unless operational circumstances dictate otherwise. They should be demanded and held by the Boats Officer. Full details of flags in boats are contained in BRd 2 QRRN Chapter 91 Section III.

**11013. Polyester signal halyard**

Polyester plaited cord signal halyard is supplied under Patt. 0350-120-8692 size 9mm x 220m 8 braid core. The high cost of this halyard is justified only by its greater wearing qualities and the longer life expected in consequence. It is therefore important to keep demands to a minimum, and to use the rope only for its proper purpose.

**11014. Blocks**

Signal blocks are supplied under Patt. 0251-411-9644 (you must specify swivel or non swivel, double or single when ordering). The proper care of blocks is important. Keep blocks clean and well lubricated with graphite and tallow, to increase the life of the blocks and to minimise the amount of effort necessary to hoist flags.

**11015. Optical instruments – care and maintenance**

- a. Optical instruments are delicate, expensive and easily damaged; therefore take great care of the binoculars issued to the department, since the efficiency of visual communications may depend on them.
- b. Binoculars are attractive and expensive items. Keep them locked away when not required, and check them at the turnover of the watch when in use. When required for use place binoculars in ready-use stowages or wear them around the neck. Never leave them loose on desk tops where they may fall or be knocked off.
- c. When not in use, do not expose binoculars to extremes of temperature or to direct sunlight. Keep them in their cases in a warm, dry stowage.
- d. The proper material for cleaning lenses is a well washed handkerchief or lense cloth/soft paper and methylated spirit. Fold the material into a small pad and moisten with methylated spirit. Rub the glass surfaces gently, changing the cleaning area of the material at frequent intervals until the spirit has dried off and the lense is bright and clean. Clean small blemishes on external lenses by breathing on the glass and polishing gently with a clean handkerchief or lense cloth/soft paper.
- e. Moisture is the chief cause of filming and breakdown. This can be removed to some extent by placing silica gel in the cases with the instruments or in their stowage.
- f. If binoculars become unserviceable due to moisture or film on the glass, or because optical parts are loose or displaced, exchange them through Naval Stores.

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**11016. Use of binoculars**

a. Fit a safety lanyard to binoculars in addition to the leather strap. Wear both around the neck when using the binoculars.

b. To provide the best performance, keep the lenses clean and focus the eyepieces properly for each user. Scales are engraved on the eyepiece and centre pivot to enable quick focussing once the individual settings have been found as follows:

(1) Bend the hinged body wide open, so that when looking through the binoculars two overlapping circles are seen, then bend inwards until the two circles coincide and the eyes feel comfortable.

(2) Look at a fine object a mile or more away, eg a whip aerial, a ship's pennant numbers or a star. Screw one eyepiece out (generally left-handed) until the object is completely out of focus then, keeping both eyes open and concentrating on the object, screw inwards until the detail is sharp. If difficulty is found with both eyes open, blank off the other lens with the palm of the hand rather than close one eye. Repeat the procedure for the other eyepiece.

(3) Note the eyepiece and hinge readings for future use.

**11017. Scales of allowance of visual signalling equipment**

The following scales of allowance are as shown in DEF STAN 08-130.

**Table 11-1. Scales of allowance**

| Type of ship  | 380mm SP | 250mm SP    | 2½" ISL | 127mm HSL        | Black balls | Black diamond |
|---|----------|-------------|---------|------------------|-------------|---------------|
| HM Ships of Frigate size and above and Support RFAs | 2        | 2<br>Note 1 |         | 5<br>Notes 3 & 4 | 3           | 2             |
| Survey Ships  | -        | 2           |         | 3<br>Note 3      | 3           | 2             |
| Ice Patrol Ship                                     | 2        | 2           |         | 2<br>Note 3      | 3           | 2             |
| OPVs/MCMV   | -        | 2<br>Note 2 |         | 3<br>Note 3      | 3<br>Note 3 | 2             |
| Small Patrol Vessels                                | -        | -           |         | 1                | 3           | 2             |
| Submarines  | -        | -           | 1       | 2                | 3           | 2             |

**Notes:**

1. *Plus two additional in ships where the Signal Deck is on a different deck to the bridge, or where upper deck fittings may make the bridge wing 250mm SP inaccessible.*

2. *If 380mm SP already fitted in lieu, replacement action not required.*

3. *Plus one for each power boat, displacement boats and landing craft..*

4. *One lamp to be permanently positioned at the ECP.*

5. *Plus two additional for mine clearance operations.*

### SECTION 3 - ENSIGNS, FLAGS AND PENNANTS

#### 11018. Ensigns and distinguishing flags

a. The sizes of British Ensigns, Standards and Union Flags are expressed in terms of breadths – a breadth being 23 cm (traditionally and approximately 9 inches). In Union Flags, Standards and White, Blue and Red Ensigns, the length is twice the breadth. In Admiral’s Flags and Commodore’s Broad Pennants the length is one and a half times the breadth. For example, a 12 breadth White Ensign is approximately 9 feet (12 x 9 inches) wide and 18 feet long (twice its width). A 6 breadth Admiral’s Flag is 4 feet 6 inches (6 x 9 inches) wide and 6 feet 9 inches long (one and a half times its width).

b. Details of flags and badges of Commonwealth and foreign countries, Diplomatic and Consular Officers etc, are contained in BR 20 Flags of All Nations and ATP (1F).

#### 11019. Sizes of colours

The sizes of colours to be worn by HM ships are as follows:

**Table 11-2. Sizes of colours**

| Class of ship                              | Harbour ensign | Sea ensign | Union flag | Distinguishing flags | Dress ship masthead ensign |
|--|----------------|------------|------------|----------------------|----------------------------|
| LPH  | 12             | 4          | 10         | 6                    | 6                          |
| LPD  | 10             | 4          | 8          | 6                    | 6                          |
| All Frigates, Destroyers, Protector, Scott | 8              | 4          | 6          | 6                    | 6                          |
| Echo Class, River Class                    | 8              | 4          | 6          | 4                    | 4                          |
| Hunt, Sandown Class                        | 6              | 4          | 4          | 4                    | 4                          |
| All Submarines                             | 4              | 2          | 4          | 3                    | 3                          |
| P2000                                      | 4              | 2          | 3          | 2                    | 2                          |
| Shore Establishments                       | 8              |            | 6          | 6                    | 6                          |

#### 11020. Signal flags and flag lockers

a. Signal flags are available as Naval Stores items and are supplied in three sizes (sizes 4, 5 and 6) either fitted with Inglefield clips (for signalling purposes), or unfitted, without Inglefield clips, (for dressing lines). Full details of pattern numbers and dimensions are given in BRF 320 - Catalogue of Naval Stores Class Group 0340 but, for convenience, an extract of catalogue numbers is given at Para11029.

b. **Fitted flags.** The sizes to be used by ships and submarines are as follows:

| Size 4             | Size 5                  | Size 6  |
|--------------------|-------------------------|---|
| Frigates and above | Echo Class, River Class | Submarines, Hunt and Sandown Class, other small craft |

c. **Unfitted flags.** See Para11026.

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d. **Flag sets.** A complete set of Signal Flags consists of 26 alphabetical flags, 10 numeral flags, 10 numeral pennants, 12 special flags and 11 special pennants – a total of 69 flags/pennants. The following special flags do not form part of the set but are supplied separately as follows:

- Fishery Flag - Allowed only to Fishery Protection Vessels
- Large Red Flag - For gunnery firing purposes.

e. **Flag lockers.** Flag Lockers are specially made items, not Naval Stores. Details for the construction of the lockers, Type C for Size 4 flags, E for Size 5 flags and F for Size 6 flags, are contained in DEF STAN 08-130. Pigeon hole markings are shown below. The size and colour of markings is 25mm black lettering on a 75mm white band except EMERG which is white lettered on a red band.

**Fig 11-1. Flag locker markings**

|        |      |          |         |        |        |       |      |     |         |
|--------|------|----------|---------|--------|--------|-------|------|-----|---------|
| p1     | p2   | p3       | p4      | p5     | p6     | p7    | p8   | p9  | p0      |
| A      | B    | C        | D       | E      | F      | G     | H    | I   | J       |
| K      | L    | M        | N       | O      | P      | Q     | R    | S   | T       |
| U      | V    | W        | X       | Y      | Z      | 1st   | 2nd  | 3rd | 4th     |
| 1      | 2    | 3        | 4       | 5      | 6      | 7     | 8    | 9   | 0       |
| Corpen | Turn | Form     | Station | Speed  | Screen | Squad | Flot | Div | Sub-div |
| Ans    | Int  | Prep     | Negat   | Port   | Stbd   | Desig |      |     | Emerg   |
|        |      | Red Flag |         | Church |        |       |      |     |         |
|        |      |          |         |        |        |       |      |     |         |



**11021. Signal flags and pennants to be carried in submarines**

The following size 6 signal flags and pennants are to be carried by submarines at all times:

**Flags**

|           |   |          |          |
|-----------|---|----------|----------|
| Alfa      | – | 8345-99- | 125/0674 |
| Bravo     | – |          | 125/0664 |
| Quebec    | – |          | 571/5703 |
| Romeo     | – |          | 125/0776 |
| Yankee    | – |          | 125/0783 |
| First Sub | – |          | 571/6119 |

**Pennants**

|      |   |          |          |
|------|---|----------|----------|
| Code | – | 8345-99- | 571/5959 |
| 1    | – |          | 571/6031 |
| 2    | – |          | 571/6034 |
| 3    | – |          | 571/6037 |
| 4    | – |          | 571/6040 |
| 5    | – |          | 571/6043 |
| 6    | – |          | 571/6046 |
| 7    | – |          | 571/6049 |

**11022. Squadron command pennant**

The Squadron Command Pennant, a short white swallow-tailed pennant with a red border along the top and bottom edges, is to be worn in accordance with BRd 2 Chapter 9 para 9116. Ships with insufficient halyards may introduce another starboard inner halyard for this pennant.

**11023. Paying-off pennant**

a. **Practice.** HM Ships and Submarines are only to fly this pennant when leaving harbour for the final passage to their paying off port, and again on entering harbour for the final time before paying off. It is customary for a paying off pennant to be approximately the same length as the ship/submarine in which it is flown. BRd 2 QRRN Chapter 91 article 9121 refers.

b. **Procurement.** Paying off pennants are to be locally purchased by individual ships/submarines from the RN approved supplier. Contact the Yeoman of the Admiralty for the approved supplier details

**11024. Vehicle flags**

The following flags are available on demand for display on vehicles: (to be displayed on the bonnet of vehicles where it can best be seen

| Pattern number | Description and sizes (inches)           |
|----------------|--|
| 0330/571-4507  | White Ensign (12 x 6)                    |
| 8345/125-1337  | Union Flag (12 x 6) (Prefix NSN with 4B) |
| 0330/571-4510  | Admiral (9 x 6)                          |
| -4511          | Vice Admiral (9 x 6)                     |
| -4512          | Rear Admiral (9 x 6)                     |
| -4514          | Commodore (9 x 6)                        |
| -4515          | Commodore, Royal Fleet Auxiliary (9 x 6) |

**BR 67  
TACTICAL COMMUNICATIONS**

**11025. Dressing ship – ships fitted to dress overall**

The flying of flags to celebrate an occasion or an event is one of the oldest customs of the Royal Navy. At one period our ships on occasions of celebration used to display flags and trophies captured from the enemy. Nowadays flags and pennants of the signal codes, disposed in as variegated and symmetrical a manner as possible, are used. Except for the masthead ensigns, national flags and ensigns are not included, because the order in which they were flown might possibly give offence. The foremost dressing line is called the **fore-down**, the amidships line is called the **fore-to-main**, and the after one the **main-down**; Fig 11-3 shows a typical example of a ship dressed overall. Ships with a single mast are fitted with a fore-down and a main-down only. Dressing lines must be rigged in accordance with ships' "As fitted" drawings and there must be an organisation for manning the dressing lines and downhauls and for stationing men at positions where the dressing lines may snag in upperworks. Consideration must be given to radio precautions and the necessary Radhaz precautions must be observed. The Chief Bosun's Mate is responsible for arranging the test and survey of the equipment in accordance with the Maintenance Management System.

- a. A list of HM ships, ship classes in commission and RFAs supplied with the necessary material for dressing ship overall in accordance with BRd 2 Chapter 91 is given below. Ships in commission not included in this list may dress with masthead flags only.

|                             |             |
|-----------------------------|-------------|
| All Destroyers and Frigates | Fort Class  |
| Argus                       | LSD(A)      |
| River/Echo Class            | LPD         |
| Protector/Scott             | LPH         |
| Hunt/Sandown Class          | Rover Class |
|                             | Wave Class  |

- b. For dress ship purposes, a ship is deemed to be a two masted vessel if it has the facility to fly an additional ensign or special flag from the mainmast (gaff or permanent spur) positioned not less than 3 metres above the dressing line for LPDs and larger ships, and not less than 2 metres in other ships. Ship Classes are masted as follows:

| <b>One masted</b> |         | <b>Two masted</b>   |  |
|-------------------|---------|---------------------|--|
| Hunt Class        | LPH     |                     |  |
| Scott             | Type 23 |                     |  |
| River Class       |         |                     |  |
| Echo Class        | Type 45 |                     |  |
| Sandown Class     |         |                     |  |
|                   |         | <b>Three masted</b> |  |
|                   |         | Victory             |  |
|                   |         | LPD                 |  |

**11026. Dressing lines**

a. Dressing lines are now made from 10mm diameter Kevlar (Aramid Fibre) rope. This has a polyester outer covering, is light and easy to handle, and requires less manpower to rig and unrig. Naval Stores details of Kevlar and polyester rope are given at Para11030.

b. It should be noted that Kevlar is very susceptible to damage if passed around a sheave, dragged over non-skid decks or otherwise mistreated. 12mm diameter pre-stretched polyester rope is to be used for dressing line downhauls.

c. Kevlar is subject to stretching and dressing lines may subsequently have to be shortened and respliced after use.

d. Ships listed in Para 11025 sub para a above are provided with Dressing Lines which are identified as follows:

|  |   |              |
|--|---|--------------|
| Jackstaff to foremast                                      | – | foredown     |
| Foremast to mainmast                                       | – | fore to main |
| Mainmast (or in one-masted ships foremast) to Ensign Staff | – | maindown     |

e. The run of dressing lines and the position of the associated blocks is indicated on the ship's aerial and visual signalling rig drawing. One masted ships use foredown and maindown only.

f. The sizes of unfitted flags to be used for dressing lines are:

| <b>Size 4</b>               | <b>Size 5</b> |
|-----------------------------|---------------|
| All Destroyers and Frigates | Hunt Class    |
| All RFAs                    | Echo Class    |
| Protector                   | Sandown Class |
| Scott                       | River Class   |
| LPD                         |               |
| LPH                         |               |

g. To provide uniformity in HM ships, dressing lines are to be made up as described below. Ships of a class are normally to conform to the same pattern, but different equipment fits or superstructure may result in some degree of non-conformity. The normal distance between flags should be 75cm, but, to prevent gaps at the end of the lines, this may be increased or decreased to spread the flags evenly over the whole length.

h. To make up the dressing lines, sew unfitted flags to the lines as follows:

(1) *Foredown*. Start at the jackstaff end and make adjustments as necessary to end with a rectangular flag and the Sub-Div flag next to the foremast. Sequence of flags with heads nearest the foremast is:

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E, Q, Desig, G, p3, Z, Negat, W, p9, 7, p6, R, p8, P, p4, I, p1, T, p7, 6, Corpen, 8, p2, X, Prep, H, Answer, 5, Stbd, X, p0, F, Church, Div, Form, O, p5, R, p9, X, p8, D, p3, 8, Prep, H.

(2) *Fore to main.* Start at the foremast end and make adjustments as necessary to end with a triangular flag next to the mainmast. Sequence of flags with heads nearest the foremast is:

Station, Y, 3rd, U, 1st, D, 4th, 3, Emerg, 1, 3rd, L, Emerg, 7, 2nd.

Additional flags, if required by ships with a longer fore to main, should be added in the following sequence:

Squad, 1st, C, 3rd, Port, Station, 8, Emerg, 5, 3rd, K, Station, I, 4th, V, 1st, O, 3rd, 3, Emerg

(3) *Maindown.* Start at the Ensign Staff end and make adjustments as necessary to end with a rectangular flag and the speed flag next to the mainmast. Sequence of flags with heads nearest the mainmast is:

3, L, p2, 4, p7, X, Church, 0, Int, B, p5, V, p4, K, p0, N, Answer, J, Form, R, Turn, M, Corpen, P, p7, 3, p3, 2, Desig, 5, p8, 9, Stbd, P, Negat, 1, p6, T, Int, E, p2, I, p7, 0, p1, L, Stbd, R, p3, G, p5, V.

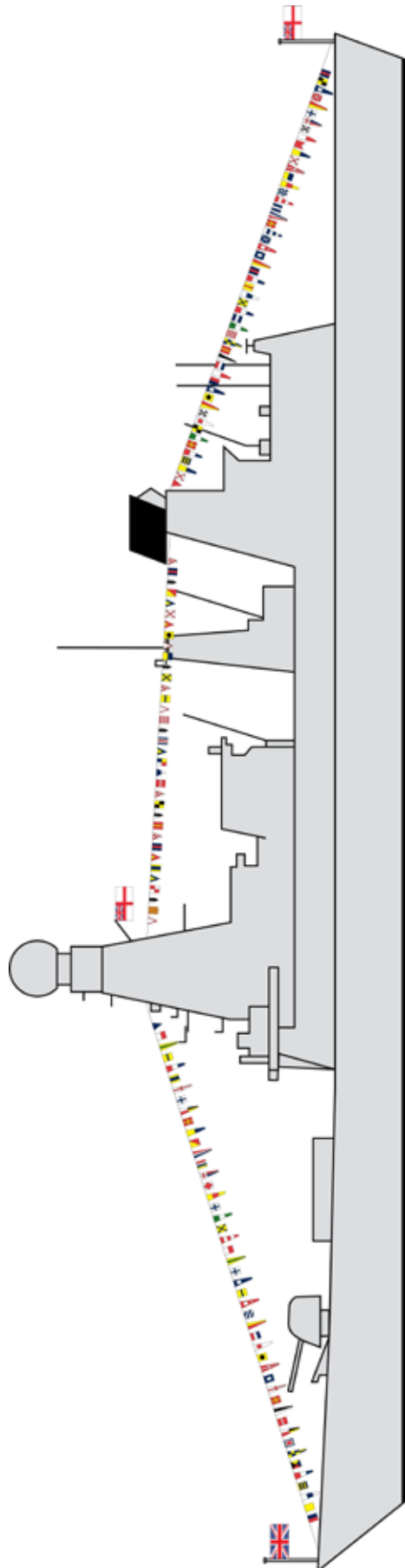
i. A coloured illustration of the dressing lines based on the Invincible Class is shown at Fig 11-2. This also shows the additional flags listed above for use by ships with a longer fore to main. Naval Stores Catalogue Numbers of unfitted flags are given in Para 11029

**11027. Admiralty board/Navy board flags**

a. Admiralty Board/Navy Board flags are held by the Flag Lieutenant to the Admiralty/Navy Board (FLAB), whose office can be contacted on MoD Main Building extension 9621-87121.

b. Naval Stores Numbers for flags of all nations are contained in BR 20.


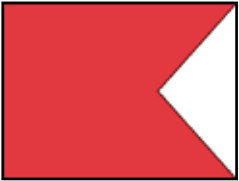



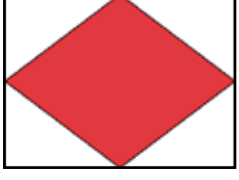
Fig 11-2. Type 45 destroyer dressing line layout


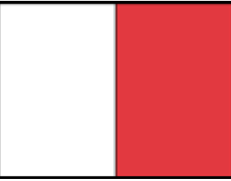






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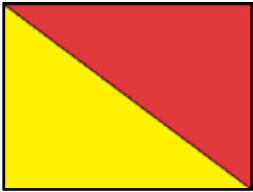

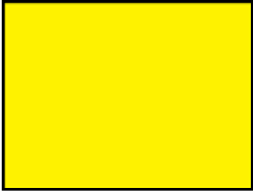

**11028. Naval and international codes and alphabetical flags**

a. Naval and international codes and alphabetical flags








| FLAG  | NAVAL MEANING   | INTERNATIONAL MEANING  |
|---|---|--|
| <p><b>A ALFA</b></p>       | <p>DIVERS OR FRIENDLY<br/>EXPLOSIVE ORDNANCE<br/>DISPOSAL PERSONNEL<br/>DOWN</p>  | <p>I HAVE A DIVER DOWN KEEP<br/>WELL CLEAR AT SLOW<br/>SPEED</p>             |
| <p><b>B BRAVO</b></p>      | <p>WEAPON PRACTICES</p> <p>FUELLING OR<br/>TRANSFERRING<br/>EXPLOSIVES OR<br/>INFLAMMABLE MATERIAL<br/>BY SHIP AND BOAT</p> | <p>I AM TAKING IN OR<br/>DISCHARGING OR<br/>CARRYING DANGEROUS<br/>GOODS</p> |
| <p><b>C CHARLIE</b></p>   | <p>YES (AFFIRMATIVE)</p>  | <p>YES (AFFIRMATIVE)</p>   |
| <p><b>D DELTA</b></p>    | <p>DEGAUSSING</p>   | <p>KEEP CLEAR OF ME - I<br/>AM MANOEUVRING WITH<br/>DIFFICULTY</p>           |
| <p><b>E ECHO</b></p>     | <p>NO RADIO FREQUENCY<br/>DANGER</p>  | <p>I AM ALTERING MY COURSE<br/>TO STARBOARD</p>                              |
| <p><b>F FOXTROT</b></p>  | <p>FLIGHT OPERATIONS<br/>(flag hoist only)</p>  | <p>I AM DISABLED -<br/>COMMUNICATE WITH ME</p>                               |

| FLAG   | NAVAL MEANING                                       | INTERNATIONAL MEANING  |
|--|---|--|
| <b>G</b><br><div style="display: flex; justify-content: space-between;"> <span><b>GOLF</b></span>  </div>     | <b>GUIDE FLAG</b>                                   | <b>I REQUIRE A PILOT FISHING VESSEL:</b><br>(operating in close proximity on the fishing ground – I am hauling nets) |
| <b>H</b><br><div style="display: flex; justify-content: space-between;"> <span><b>HOTEL</b></span>  </div>    | <b>HELICOPTER OPERATIONS</b>                        | <b>I HAVE A PILOT ONBOARD</b>  |
| <b>I</b><br><div style="display: flex; justify-content: space-between;"> <span><b>INDIA</b></span>  </div>    | <b>GOING ALONG SIDE (in port or at anchor)</b>      | <b>I AM ALTERING MY COURSE TO PORT</b>   |
| <b>J</b><br><div style="display: flex; justify-content: space-between;"> <span><b>JULIET</b></span>  </div> |   | <b>KEEP WELL CLEAR OF ME I AM ON FIRE AND HAVE DANGEROUS CARGO ONBOARD OR I AM LEAKING DANGEROUS CARGO</b>           |
| <b>K</b><br><div style="display: flex; justify-content: space-between;"> <span><b>KILO</b></span>  </div>   | <b>PERSONNEL WORKING ALOFT AND/OR OVER THE SIDE</b> | <b>I WISH TO COMMUNICATE WITH YOU</b>  |
| <b>L</b><br><div style="display: flex; justify-content: space-between;"> <span><b>LIMA</b></span>  </div>   | <b>RADHAZ/HERO WARNING</b>                          | <b>YOU SHOULD STOP YOUR VESSEL INSTANTLY</b>   |



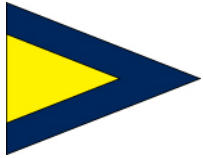
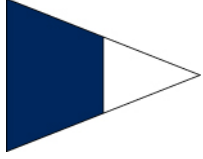
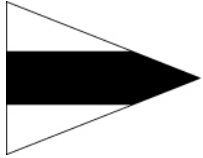
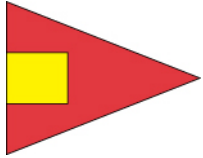
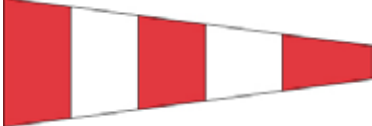
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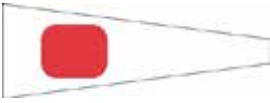




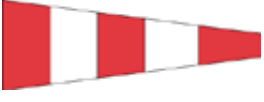








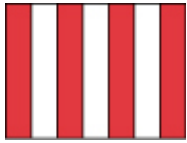










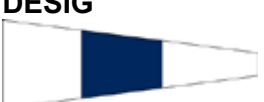









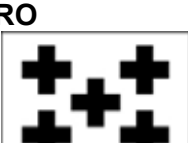



| FLAG  | NAVAL MEANING  | INTERNATIONAL MEANING   |
|---|--|---|
| <p><b>M</b> <b>MIKE</b></p>      | <p><b>MEDICAL DUTY SHIP</b><br/>(Underway I have medical / dental guard)</p> <p><b>MOVEMENTS</b><br/>(Underway - while flying: disregard my movements)</p> | <p><b>MY VESSEL IS STOPPED AND MAKING NO WAY THROUGH THE WATER</b></p>  |
| <p><b>N</b> <b>NOVEMBER</b></p>  | <p><b>YOUR MOVEMENTS NOT UNDERSTOOD</b></p> <p><b>VISUAL WATCH</b> (not underway - ship not keeping visual watch)</p>                                      | <p><b>NO (NEGATIVE)</b></p>   |
| <p><b>O</b> <b>OSCAR</b></p>    | <p><b>MAN OVERBOARD</b></p>  | <p><b>MAN OVERBOARD</b></p>   |
| <p><b>P</b> <b>PAPA</b></p>    | <p><b>GENERAL RECALL</b></p> <p><b>POSITION INDICATOR</b></p>  | <p><b>In harbour: ALL PERSONS SHOULD REPORT ONBOARD AS THE VESSEL IS ABOUT TO PROCEED TO SEA</b></p> <p><b>At sea: I REQUIRE A PILOT or FISHING VESSEL (my nets have come fast upon an obstruction)</b></p> |
| <p><b>Q</b> <b>QUEBEC</b></p>  | <p><b>BOAT RECALL</b></p>  | <p><b>MY VESSEL IS HEALTHY. AND I REQUEST FREE PRATIQUE</b></p>   |
| <p><b>R</b> <b>ROMEIO</b></p>  | <p><b>REPLENISHMENT OR TRANSFERRING ABEAM/ ASTERN METHOD</b></p> <p><b>READY DUTY SHIP</b></p> <p><b>MCM OPERATIONS</b></p>                                |   |



| FLAG  | NAVAL MEANING  | INTERNATIONAL MEANING   |
|---|--|---|
| <p><b>S</b>                      <b>SIERRA</b></p>     | <p style="text-align: center;">DRILL SIGNAL</p>  | <p style="text-align: center;">I AM OPERATING ASTERN<br/>PROPULSION</p>                               |
| <p><b>T</b>                      <b>TANGO</b></p>      | <p style="text-align: center;">TIME INDICATOR</p>  | <p style="text-align: center;">KEEP CLEAR OF ME, I<br/>AM ENGAGED IN PAIR<br/>TRAWLING</p>            |
| <p><b>U</b>                      <b>UNIFORM</b></p>    | <p style="text-align: center;">ANCHORING<br/>MOORING<br/>WEIGHING</p>  | <p style="text-align: center;">YOU ARE RUNNING INTO<br/>DANGER</p>                                    |
| <p><b>V</b>                      <b>VICTOR</b></p>    | <p style="text-align: center;">STREAMING OR<br/>RECOVERING TOWED<br/>ACOUSTIC DEVICES NOT<br/>INCLUDING MINESWEEPING<br/>EQUIPMENT</p> | <p style="text-align: center;">I REQUIRE ASSISTANCE</p>   |
| <p><b>W</b>                      <b>WHISKEY</b></p>  | <p style="text-align: center;">INFORMATION ADDRESSEE</p>   | <p style="text-align: center;">I REQUIRE MEDICAL<br/>ASSISTANCE</p>                                   |
| <p><b>X</b>                      <b>XRAY</b></p>     | <p style="text-align: center;">EXERCISE</p>  | <p style="text-align: center;">STOP CARRYING OUT YOUR<br/>INTENTIONS AND WATCH<br/>FOR MY SIGNALS</p> |
| <p><b>Y</b>                      <b>YANKEE</b></p>   | <p style="text-align: center;">ACKNOWLEDGE</p>   | <p style="text-align: center;">I AM DRAGGING MY<br/>ANCHOR</p>  |

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| FLAG   | NAVAL MEANING  | INTERNATIONAL MEANING   |
|--|--|---|
| <p><b>Z</b> <span style="float: right;"><b>ZULU</b></span></p>  | <p><b>COMMUNICATION GUARD</b></p>  | <p><b>I REQUIRE A TUG</b></p> <p><b>FISHING VESSEL:</b><br/>(operating in close proximity on the fishing ground – I am shooting nets)</p> |
| <p><b>RED FLAG</b></p>    |  | <p><b>CAN BE USED FOR DANGEROUS ACTIVITIES AND IN CONJUNCTION WITH FLAG BRAVO</b></p>   |
| <p><b>1<sup>st</sup> SUBSTITUTE</b></p>                         | <p><b>USED TO REPEAT THE FIRST FLAG OR PENNANT IN THE SAME HOIST</b></p>   |   |
| <p><b>2<sup>nd</sup> SUBSTITUTE</b></p>                       | <p><b>USED TO REPEAT THE SECOND FLAG OR PENNANT IN THE SAME HOIST</b></p>  |   |
| <p><b>3<sup>rd</sup> SUBSTITUTE</b></p>                       | <p><b>USED TO REPEAT THE THIRD FLAG OR PENNANT IN THE SAME HOIST</b></p>   |   |
| <p><b>4<sup>th</sup> SUBSTITUTE</b></p>                       | <p><b>USED TO REPEAT THE FOURTH FLAG OR PENNANT IN THE SAME HOIST</b></p>  |   |
| <p><b>CODE AND ANSWER</b></p>                                 | <p><b>USED TO ACKNOWLEDGE A SIGNAL. ALSO FLOWN WHEN MAKING A FLAG SIGNAL FROM THE INTERNATIONAL CODE TO DISTINGUISH IT FROM THE NAVAL CODE</b></p> |   |

| NUMERAL FLAGS   | NUMERAL PENNANTS  | PENNANTS   | OTHER FLAGS AND PENNANTS  |
|---|---|--|---|
| <b>ONE</b><br>     | <b>ONE</b><br>     | <b>INTERROGATIVE</b><br>     | <b>SQUADRON</b><br>        |
| <b>TWO</b><br>     | <b>TWO</b><br>     | <b>ANSWER &amp; CODE</b><br> | <b>FLOTILLA</b><br>        |
| <b>THREE</b><br>   | <b>THREE</b><br>   | <b>CORPEN</b><br>            | <b>DIVISION</b><br>        |
| <b>FOUR</b><br>    | <b>FOUR</b><br>    | <b>CHURCH</b><br>            | <b>PORT</b><br>            |
| <b>FIVE</b><br>  | <b>FIVE</b><br>  | <b>FORMATION</b><br>       | <b>SPEED</b><br>         |
| <b>SIX</b><br>   | <b>SIX</b><br>   | <b>PREPARATIVE</b><br>     | <b>STATION</b><br>       |
| <b>SEVEN</b><br> | <b>SEVEN</b><br> | <b>DESIG</b><br>           | <b>GROUP</b><br>         |
| <b>EIGHT</b><br> | <b>EIGHT</b><br> | <b>NEGATIVE</b><br>        | <b>SQUADRON COMD</b><br> |
| <b>NINE</b><br>  | <b>NINE</b><br>  | <b>STARBOARD</b><br>       | <b>SUB-DIVISION</b><br>  |
| <b>ZERO</b><br>  | <b>ZERO</b><br>  | <b>TURN</b><br>            | <b>EMERGENCY</b><br>     |

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b. **Naval and international codes and alphabetical flags.** Posters are available from the Navy Graphics Centre, Building 159, Whale Island. Portsmouth Hants PO2 8BY by emailing NPGO-GRAPHICS MAIL BOX, quoting poster 11/092 and requesting within reason how many are required.

**11029. Catalogue numbers of Signal Flags, Ensigns, Union Flags and shapes**

| Flag/<br>pennant | Size | NS catalogue No      |                      | Flag/<br>pennant | Size | NS catalogue No.     |                      |
|------------------|------|----------------------|----------------------|------------------|------|----------------------|----------------------|
|                  |      | Fitted               | Unfitted             |                  |      | Fitted               | Unfitted             |
| <b>A</b>         | 4    | 8345-99<br>-571-5942 | 8345-99<br>-571-5950 | <b>N</b>         | 4    | 8345-99<br>-125-0726 | 8345-99<br>-571-5724 |
|                  | 5    | -125-0644            | -571-5951            |                  | 5    | -571-5693            | -571-5725            |
|                  | 6    | -125-0674            |                      |                  | 6    | -125-0663            |                      |
| <b>B</b>         | 4    | -571-5946            | -571-5953            | <b>O</b>         | 4    | -125-0727            | -571-5727            |
|                  | 5    | -125-0756            | -571-5954            |                  | 5    | -125-0744            | -571-572             |
|                  | 6    | -125-0664            |                      |                  | 6    | -125-0675            |                      |
| <b>C</b>         | 4    | -125-0737            | -571-5659            | <b>P</b>         | 4    | -125-0725            | -571-5730            |
|                  | 5    | -125-0755            | -571-5660            |                  | 5    | -125-0745            | -571-5731            |
|                  | 6    | -125-0652            |                      |                  | 6    | -571-5700            |                      |
| <b>D</b>         | 4    | -125-0738            | -571-5662            | <b>Q</b>         | 4    | -125-0820            | -571-5733            |
|                  | 5    | -125-0754            | -571-5663            |                  | 5    | -125-0747            | -571-5734            |
|                  | 6    | -125-0653            |                      |                  | 6    | -571-5703            |                      |
| <b>E</b>         | 4    | -125-0739            | -571-5665            | <b>R</b>         | 4    | -125-0772            | -571-5736            |
|                  | 5    | -125-0753            | -571-5666            |                  | 5    | -571-5705            | -571-5737            |
|                  | 6    | -125-0654            |                      |                  | 6    | -125-0776            |                      |
| <b>F</b>         | 4    | -125-0760            | -571-5668            | <b>S</b>         | 4    | -125-0773            | -571-5739            |
|                  | 5    | -125-0752            | -571-5669            |                  | 5    | -125-0757            | -571-5740            |
|                  | 6    | -125-0655            |                      |                  | 6    | -125-0777            |                      |
| <b>G</b>         | 4    | -571-5638            | -571-5671            | <b>T</b>         | 4    | -125-0774            | -571-5742            |
|                  | 5    | -125-0751            | -571-5672            |                  | 5    | -125-0761            | -571-5743            |
|                  | 6    | -125-0656            |                      |                  | 6    | -125-0778            |                      |
| <b>H</b>         | 4    | -571-5641            | -571-5674            | <b>U</b>         | 4    | -125-0771            | -571-5745            |
|                  | 5    | -125-0750            | -571-5675            |                  | 5    | -125-0762            | -571-5746            |
|                  | 6    | -125-0657            |                      |                  | 6    | -125-0779            |                      |
| <b>I</b>         | 4    | -571-5644            | -571-5677            | <b>V</b>         | 4    | -125-0770            | -571-5748            |
|                  | 5    | -125-0749            | -571-5678            |                  | 5    | -125-0763            | -571-5749            |
|                  | 6    | -125-0658            |                      |                  | 6    | -125-0780            |                      |
| <b>J</b>         | 4    | -571-5647            | -571-5680            | <b>W</b>         | 4    | -125-0601            | -571-5751            |
|                  | 5    | -125-0667            | -571-5681            |                  | 5    | -125-0799            | -571-5752            |
|                  | 6    | -125-0659            |                      |                  | 6    | -125-0781            |                      |
| <b>K</b>         | 4    | -571-5650            | -571-5683            | <b>X</b>         | 4    | -571-5722            | -571-5754            |
|                  | 5    | -125-0740            | -571-5684            |                  | 5    | -571-5755            | -571-5763            |
|                  | 6    | -125-0660            |                      |                  | 6    | -125-0782            |                      |
| <b>L</b>         | 4    | -571-5653            | -571-5686            | <b>Y</b>         | 4    | -125-0680            | -571-5765            |
|                  | 5    | -125-0741            | -571-5687            |                  | 5    | -125-0801            | -571-5766            |
|                  | 6    | -125-0661            |                      |                  | 6    | -125-0783            |                      |
| <b>M</b>         | 4    | -571-5656            | -571-5689            | <b>Z</b>         | 4    | -571-5760            | -571-5768            |
|                  | 5    | -125-0742            | -571-5690            |                  | 5    | -571-5761            | -571-5769            |
|                  | 6    | -125-0662            |                      |                  | 6    | -125-0784            |                      |

| Flag/<br>pennant | Size | NS catalogue No      |                      |
|------------------|------|----------------------|----------------------|
|                  |      | Fitted               | Unfitted             |
| <b>1</b>         | 4    | 8345-99<br>-571-5831 | 8345-99<br>-571-5847 |
|                  | 5    | -571-5832            | -571-5848            |
|                  | 6    | -571-5833            |                      |
| <b>2</b>         | 4    | -571-5834            | -571-5850            |
|                  | 5    | -571-5835            | -571-5851            |
|                  | 6    | -571-5836            |                      |
| <b>3</b>         | 4    | -571-5837            | -571-5853            |
|                  | 5    | -571-5838            | -571-5854            |
|                  | 6    | -571-5839            |                      |
| <b>4</b>         | 4    | -571-5840            | -571-5856            |
|                  | 5    | -571-5841            | -571-5857            |
|                  | 6    | -571-5842            |                      |
| <b>5</b>         | 4    | -571-5843            | -571-5859            |
|                  | 5    | -571-5844            | -571-5860            |
|                  | 6    | -571-5845            |                      |
| <b>6</b>         | 4    | -571-5861            | -571-5874            |
|                  | 5    | -571-5862            | -571-5875            |
|                  | 6    | -571-5863            |                      |
| <b>7</b>         | 4    | -571-5864            | -571-5877            |
|                  | 5    | -571-5865            | -571-5878            |
|                  | 6    | -571-5866            |                      |
| <b>8</b>         | 4    | -571-5867            | -571-5880            |
|                  | 5    | -571-5868            | -523-6549            |
|                  | 6    | -571-5869            |                      |
| <b>9</b>         | 4    | -571-5870            | -571-5883            |
|                  | 5    | -571-5871            | -571-5884            |
|                  | 6    | -571-5872            |                      |
| <b>0</b>         | 4    | -571-5934            | -571-5938            |
|                  | 5    | -571-5935            | -571-5939            |
|                  | 6    | -571-5936            |                      |

| Flag/<br>pennant | Size | NS catalogue No.     |                      |
|------------------|------|----------------------|----------------------|
|                  |      | Fitted               | Unfitted             |
| <b>p1</b>        | 4    | 8345-99<br>-125-0687 | 8345-99<br>-571-6057 |
|                  | 5    | -571-6030            | -571-6058            |
|                  | 6    | -571-6031            |                      |
| <b>p2</b>        | 4    | -125-0688            | -571-6060            |
|                  | 5    | -571-6033            | -571-6061            |
|                  | 6    | -571-6034            |                      |
| <b>p3</b>        | 4    | -125-0689            | -571-6063            |
|                  | 5    | -571-6036            | -571-6064            |
|                  | 6    | -571-6037            |                      |
| <b>p4</b>        | 4    | -125-0690            | -571-6066            |
|                  | 5    | -571-6039            | -571-6067            |
|                  | 6    | -571-6040            |                      |
| <b>p5</b>        | 4    | -125-0691            | -571-6069            |
|                  | 5    | -571-6042            | -571-6070            |
|                  | 6    | -571-6043            |                      |
| <b>p6</b>        | 4    | -125-0693            | -571-6072            |
|                  | 5    | -571-6045            | -571-6073            |
|                  | 6    | -571-6046            |                      |
| <b>p7</b>        | 4    | -125-0692            | -571-6075            |
|                  | 5    | -571-6048            | -571-6076            |
|                  | 6    | -571-6049            |                      |
| <b>p8</b>        | 4    | -125-0694            | -571-6078            |
|                  | 5    | -571-6051            | -571-6079            |
|                  | 6    | -571-6052            |                      |
| <b>p9</b>        | 4    | -125-0695            | -571-6081            |
|                  | 5    | -571-6054            | -571-6082            |
|                  | 6    | -571-6055            |                      |
| <b>p0</b>        | 4    | -125-0686            | -571-6152            |
|                  | 5    | -571-6149            | -571-6153            |
|                  | 6    | -571-6150            |                      |

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| Flag/<br>pennant           | Size | NS catalogue No       |                       |
|----------------------------|------|-----------------------|-----------------------|
|                            |      | Fitted                | Unfitted              |
| <b>Division</b>            | 4    | 8345-99-<br>-571-5823 | 8345-99-<br>-571-5827 |
|                            | 5    | -571-5824             | -571-5828             |
|                            | 6    | -571-5825             |                       |
| <b>Emerg</b>               | 4    | -571-5991             | -571-5995             |
|                            | 5    | -571-5992             | -571-5996             |
|                            | 6    | -571-5993             |                       |
| <b>Flotilla</b>            | 4    | -571-6002             | -571-6006             |
|                            | 5    | -571-6003             | -571-6007             |
|                            | 6    | -571-6004             |                       |
| <b>Port</b>                | 4    | -571-5909             | -571-5913             |
|                            | 5    | -571-5910             | -571-5914             |
|                            | 6    | -571-5911             |                       |
| <b>Speed</b>               | 4    | -571-6090             | -571-6094             |
|                            | 5    | -571-6091             | -571-6095             |
|                            | 6    | -571-6092             |                       |
| <b>Squadron</b>            | 4    | -571-5927             | -571-5931             |
|                            | 5    | -571-5928             | -571-5932             |
|                            | 6    | -571-5929             |                       |
| <b>Code/<br/>Answer</b>    | 4    | -571-5957             | -571-5961             |
|                            | 5    | -571-5958             | -571-5962             |
|                            | 6    | -571-5959             |                       |
| <b>Church</b>              | 4    | -571-5966             | -571-5970             |
|                            | 5    | -571-5967             | -571-5971             |
|                            | 6    | -571-5968             |                       |
| <b>Corpen</b>              | 4    | -571-5973             | -571-5977             |
|                            | 5    | -571-5974             | -571-5978             |
|                            | 6    | -571-5975             |                       |
| <b>Desig</b>               | 4    | -571-5979             | -571-5983             |
|                            | 5    | -571-5980             | -571-5984             |
|                            | 6    | -571-5981             |                       |
| <b>Formation</b>           | 4    | -571-6009             | -571-6013             |
|                            | 5    | -571-6010             | -571-6014             |
|                            | 6    | -571-6011             |                       |
| <b>Interrog-<br/>ative</b> | 4    | -571-6015             | -571-6019             |
|                            | 5    | -571-6016             | -571-6020             |
|                            | 6    | -571-6017             |                       |
| <b>Fishery</b>             | 4    | -571-5999             |                       |
|                            | 5    | -571-6000             |                       |
|                            | 6    | -571-6001             |                       |

| Flag/<br>pennant            | Size | NS catalogue No.      |                       |
|-----------------------------|------|-----------------------|-----------------------|
|                             |      | Fitted                | Unfitted              |
| <b>Station</b>              | 4    | 8345-99-<br>-571-6104 | 8345-99-<br>-571-6108 |
|                             | 5    | -571-6105             | -571-6109             |
|                             | 6    | -571-6106             |                       |
| <b>Sub-Div</b>              | 4    | -571-6110             | -571-6114             |
|                             | 5    | -571-6111             | -571-6115             |
|                             | 6    | -571-6112             |                       |
| <b>1st Sub</b>              | 4    | -571-6117             | -571-6129             |
|                             | 5    | -571-6118             | -571-6130             |
|                             | 6    | -571-6119             |                       |
| <b>2nd Sub</b>              | 4    | -571-6120             | -571-6132             |
|                             | 5    | -571-6121             | -571-6133             |
|                             | 6    | -125-0786             |                       |
| <b>3rd Sub</b>              | 4    | -571-6122             | -571-6135             |
|                             | 5    | -571-6123             | -571-6136             |
|                             | 6    | -571-6124             |                       |
| <b>4th Sub</b>              | 4    | -571-6125             | -571-6138             |
|                             | 5    | -571-6126             | -571-6139             |
|                             | 6    | -571-6127             |                       |
| <b>Negat</b>                | 4    | -571-6022             | -571-6026             |
|                             | 5    | -571-6023             | -571-6027             |
|                             | 6    | -571-6024             |                       |
| <b>Prep</b>                 | 4    | -571-6083             | -571-6087             |
|                             | 5    | -571-6084             | -571-6088             |
|                             | 6    | -571-6085             |                       |
| <b>Screen/<br/>Black Pt</b> | 4    | -525-5180             |                       |
|                             | 5    | -525-5181             |                       |
|                             | 6    | -525-5182             |                       |
| <b>Stbd</b>                 | 4    | -571-6097             | -571-6101             |
|                             | 5    | -571-6098             | -571-6102             |
|                             | 6    | -571-6099             |                       |
| <b>Turn</b>                 | 4    | -571-6142             | -571-6146             |
|                             | 5    | -571-6143             | -571-6147             |
|                             | 6    | -571-6144             |                       |
| <b>Pilot<br/>Jack</b>       | 4    | -571-5905             |                       |
|                             | 5    | -571-5906             |                       |
|                             | 6    | -571-5907             |                       |
|                             |      |                       |                       |

| Flag                    | Size | NS catalogue No.     |                        |
|-------------------------|------|----------------------|------------------------|
|                         |      | Slides/<br>Headstick | Grommets/<br>Headstick |
| <b>Ensign<br/>White</b> | 4    | 8345-99<br>-571-3290 | 8345-99                |
|                         | 6    | -571-3291            | -571-3229              |
|                         | 8    | -571-3292            | -571-4000              |
|                         | 10   | -571-3293            | -571-4001              |
|                         | 12   | -571-3294            | -571-4002              |

| Flag                            | Size | NS catalogue No. |           |
|---------------------------------|------|------------------|-----------|
|                                 |      | Slides           | Grommets  |
| <b>Naval Jack<br/>Ratio 1-2</b> | 2    | 8345-99          | 8345-99   |
|                                 | 3    |                  | -571-4526 |
|                                 | 4    | -571-4519        | -571-4527 |
|                                 | 6    | -571-4520        | -571-4528 |
|                                 | 8    | -571-4521        | -571-4529 |
|                                 | 10   | -571-4522        | -571-4530 |

| Flag/<br>pennant | Size           | NS catalogue<br>No.    |
|------------------|----------------|------------------------|
| <b>Black</b>     | 10ft Square    | 8345-99                |
|                  | 4ft Square     | -571-5773<br>-571-5774 |
| <b>Red</b>       | 11ft x 9ft     | 8345-99                |
|                  | 9ft x 7ft 6ins | -571-5916              |
|                  | 7ft 6ins x 6ft | -571-5917              |
|                  | 12ft x 15ft    | -571-5918              |
|                  | 6ft x 4ft 6ins | -571-5919<br>-571-5920 |

| Flag/<br>pennant            | Size                 | NS catalogue<br>No.  |
|-----------------------------|----------------------|----------------------|
| <b>Bravo</b>                | 11ft 6ins x 8ft 7ins | 8345-99<br>-571-6089 |
| <b>Masthead<br/>Pennant</b> | 1 yd                 | 8345-99              |
|                             | 2 yd                 | -541-9969            |
|                             | 3 yd                 |                      |
|                             | 4 yd                 |                      |
|                             | 6 yd                 |                      |

| Item                         | Size    | NS catalogue<br>No.  |
|------------------------------|---------|----------------------|
| <b>Black<br/>Balls</b>       | 12 inch | 0330-529             |
|                              | 18 inch | -9740                |
|                              | 24 inch | -9744                |
|                              |         | -9741                |
| <b>Fleet Formation Board</b> |         | 0550-99-527-<br>6270 |

| Item  | Size        | NS catalogue No. |
|---|-------------|------------------|
| <b>Black<br/>Diamonds</b>                     | 45cm x 30cm | 0330-529         |
|   | 90cm x 60cm | -9742            |
|   |             | -9743            |
| <b>Fleet Disposition Board<br/>(Portable)</b> |             | 0550-99-531-3834 |

| Flag           | Size | NS catalogue<br>No.    |
|----------------|------|------------------------|
| <b>Admiral</b> | 2    | 8345-99                |
|                | 3    | -541-9753              |
|                | 4    | -541-9754              |
|                | 6    | -541-9755              |
|                | 8    | -541-9756              |
|                | 10   | -541-9757<br>-541-9758 |

| Flag                | Size | NS catalogue No. |
|---------------------|------|------------------|
| <b>Vice Admiral</b> | 3    | 8345-99          |
|                     | 4    | -571-5813        |
|                     | 6    | -571-5814        |
|                     | 8    | -571-5815        |
|                     | 10   | -571-5816        |
|                     |      | -571-5817        |

| Flag                | Size | NS catalogue<br>No.    |
|---------------------|------|------------------------|
| <b>Rear Admiral</b> | 2    | 8345-99                |
|                     | 3    | -571-5805              |
|                     | 4    | -571-5806              |
|                     | 6    | -571-5807              |
|                     | 8    | -571-5808              |
|                     | 10   | -571-5809<br>-571-5810 |

| Flag             | Size | NS catalogue No.       |
|------------------|------|------------------------|
| <b>Commodore</b> | 2    | 8345-99                |
|                  | 3    | -571-5793              |
|                  | 4    | -571-5794              |
|                  | 6    | -571-5795              |
|                  | 8    | -571-5796              |
|                  | 10   | -571-5797<br>-571-5798 |

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| <b>Associated equipment</b>  | <b>NS catalogue No</b> |
|------------------------------|------------------------|
| <b>Black Cylinder</b>        | 0330-99-212-6684       |
| <b>Jack/Ensign Flag Bags</b> | 0845-99-923-6267       |
| <b>Signal Lamp Covers</b>    | N701/780-0859          |

**11030. Naval Stores details of Kevlar and pre-stretched polyester rope**

| <b>RNSTS management code</b> | <b>NATO stock number</b> | <b>Description</b>   | <b>D of Q</b> | <b>Accounting status</b> |
|------------------------------|--------------------------|--|---------------|--------------------------|
| 0350                         | -99-801-0503             | Kevlar - Rope Aramid Fibre 10 mm Diameter (nominal) minimum Breaking Load 2500 kg, 500 m Coils                       | MR            | C                        |
| 0350                         | -99-923-7143             | Rope Pre-stretched Polyester 3 Strand Hawserlaid, 12 mm Diameter Minimum Break Load 2270 kg to Spec SC1670 220 Coils | MR            | C                        |



## SECTION 4 - SIGNALLING PROJECTORS AND SIGNAL LIGHTS

### 11031. General

- a. The term Signalling Projector (SP) is used when referring to a light which can be used as a searchlight as well as for signalling purposes, and the term Signal Light (SL) is used for the remaining lights used for signalling purposes.
- b. All SPs and the majority of SLs are directional, and use a reflector to concentrate the light into a narrow beam: the narrower the beam the brighter the light from a given source. However, for signalling purposes, when it is difficult to maintain absolute accuracy of aim, a beam width of about 6° is used in SPs, and this also provides a reasonable beam for search/illumination purposes. SLs, intended mainly for night-time use, have a greater beam width.
- c. For greater efficiency, lamps, reflectors and front glasses must be spotlessly clean, shutters and sights properly adjusted, and, when in use, the projector must be correctly trained on the receiving operator. Particular care must be taken in rough weather or when manoeuvring to allow for roll. An SP more than 3° off aim is virtually unreadable.

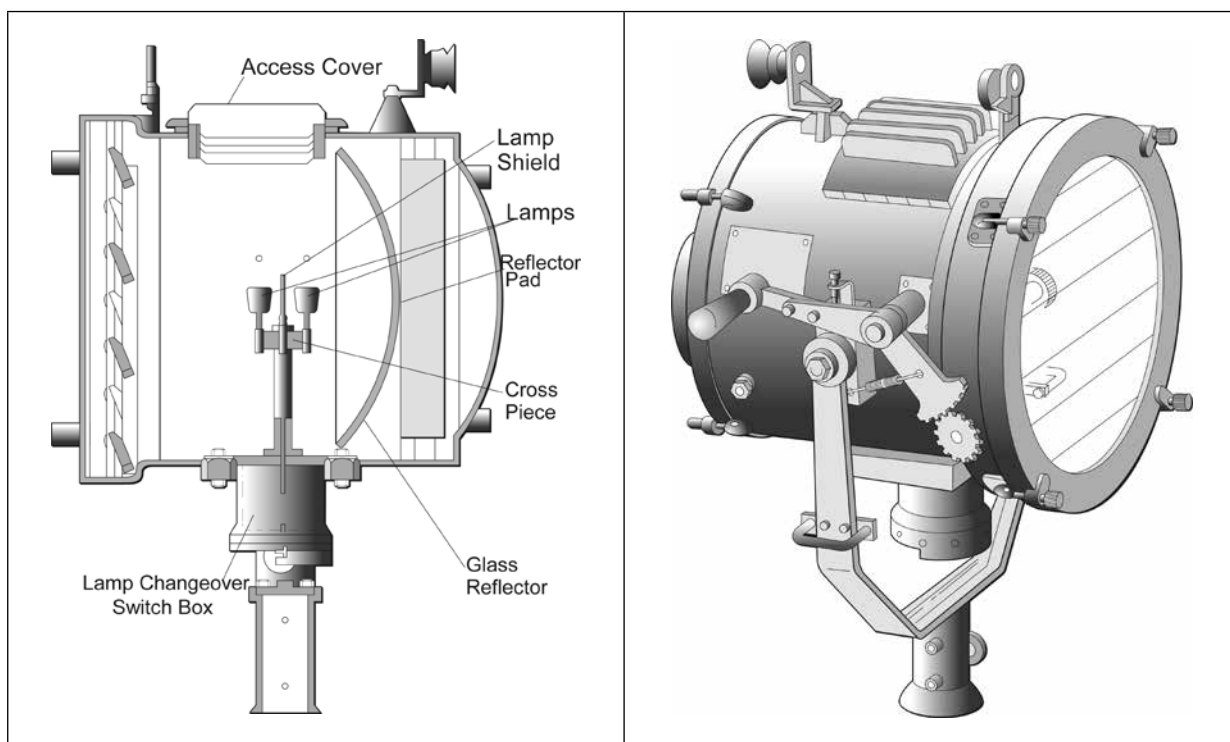
### 11032. Maintenance

- a. The WE department is responsible for routine maintenance (not the cleaning) of SPs and SLs, and will normally carry out internal mechanical repairs should the need be. WE maintenance schedules are detailed in UMMS.
- b. User maintenance should concentrate on good husbandry such as internal and external cleanliness, upkeep of paintwork, lubrication and protection of external moving parts, replacement of lamps, checking alignment of sights and realignment as necessary, and the correct operation of lights.
- c. Reflectors and front glasses should be wiped with a damp chamois leather, dried off with a lense cloth or tissue, and occasionally polished with a lense cloth and silver metal polish. Moving parts and grease nipples must be kept free from paint, and bearings lubricated with XG-274 grease. Scott shutters, levers, pinions and finger nuts must be regularly oiled. If repainting is required, an epoxy based black paint is to be used. The appearance of dull paintwork can be improved by rubbing over with a lightly oiled rag.

### 11033. 380mm dual purpose signalling projector - Mod 5 (5850-99-523-9810)

- a. **General Description.** The 380mm SP (Fig 11-3) is provided for long and medium range daylight signalling and search purposes. Its light source is a 400W iodide lamp (6240-99-766-3716) which produces a 6° beam at 7 million candle power. Lamp life is approximately 100 hours and a changeover switch enables selection of an alternative lamp when required. Signalling ranges up to horizon range are possible. Full details on the lamp are contained in BRF 6522(501).

Fig 11-3. 380mm signal projector

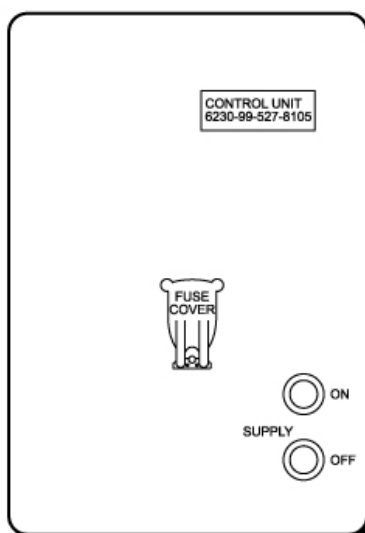


b. **Power supply.** The power control arrangements fitted with the 380mm SP are fed from an isolating switch on the ship's main distribution system. The Control Unit 6230-99-527-8105 is shown in Fig 11-4. This control unit has push-button control and the Off button is the isolating switch.

**WARNING**

**THE 440V SUPPLY USED IN THIS EQUIPMENT IS HIGH ENOUGH TO ENDANGER LIFE. THE POWER SUPPLY MUST BE SWITCHED OFF AT THE ISOLATING SWITCH BEFORE ANY COVER IS REMOVED OR ANY WORK IS CARRIED OUT ON THE EQUIPMENT.**

Fig 11-4. 380mm signal projector control unit



**c. Operating instructions**

(1) *With Control Unit 6230-99-527-8105.*

- (a) Check that all apertures on the projector are closed.
- (b) Check that the lamp changeover control is either fully clockwise or anti-clockwise.
- (c) Free the tilting and training locking bolts as necessary.
- (d) Press the **ON** button. See Note.
- (e) To switch Off, press the **OFF** (isolating) button and tighten up the locking bolts.

**Note.** *When power to the lamp is switched on, a trembler used in striking the lamp buzzes. The lamp should strike and the buzzing cease within 10 seconds, signalling may then commence. Maximum light output is reached 30 seconds after striking.*

**d. Failure to strike**

| Symptom                     | Cause  | Action   |
|-----------------------------|--|--|
| No buzzing or illumination  | No power supply or fuse blown                                    | Check by remaking all switches. If no change inform the maintainer.  |
| Buzzing but no illumination | 1. Lamp too hot or defective.<br>2. Defective pulse transformer. | 1. Switch off, rotate lamps, try again.<br>2. Inform the maintainer. |

**Note.** *Because it is too hot, the lamp may not strike if switched on within three minutes of switching off.*

**e. Lamp deterioration.** A new lamp should strike immediately the power switch is made but, as it ages, the striking time progressively increases. When the delay is about 10 seconds the lamp should be renewed. Should the lamp continue in use it is likely to fail by exploding. This should cause no damage to the projector but the barrel must be cleaned out and the lamp replaced at the earliest opportunity.

**f. Lamp changeover and renewal.** If the lamp fails to strike or fails in operation, switch off power, swivel the changeover control through 180 degrees to its alternative position, and switch on. Failure to observe this sequence can damage the changeover switch. Renew lamps using the following steps:

- (1) Switch off power at the isolating switch.
- (2) Lock the projector at maximum elevation.
- (3) Release and open the top access door.
- (4) Remove the defective lamp taking care not to touch the other lamp.
- (5) Holding the new lamp at the quartz end within its plastic container, cut the plastic at the pin end and, holding the pins, withdraw the lamp until the pins are clear.
- (6) Insert the lamp into its socket and push home then remove the container.

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- (7) Close and secure the access door and bring the projector to normal elevation.
- (8) Switch on and check that the lamp strikes correctly.

**CAUTION**

**Touching the Quartz Envelope with the hand will result in contamination which will shorten the life of the lamp unless it is cleaned immediately**

g. **Lamp cleaning and protection.** Take every care to prevent contamination of the quartz envelope. Retain plastic containers to protect the lamps when working inside the barrel. If necessary, the lamp can be carefully wiped clean with a clean cloth moistened with water or grease solvent (methylated spirits), and polished with a soft cloth or cotton wool. Although watertight, cover the projector in bad weather. Drain moisture inside the barrel through the two drain holes in its bottom. Ensure drain plugs are reinserted.

h. **Reliability and testing.** Modification 5 to the 380mm SP incorporated major design improvements over earlier versions. However, the following procedure should improve reliability and availability:

- (1) Test each SP only once per day (excluding alternative lamp).
- (2) Test each alternative lamp once per week.
- (3) Remove drain plugs once per week.
- (4) Do not over tighten barrel cover screws as this results in barrel distortion.
- (5) Do not leave lamps switched on except when operationally necessary.
- (6) Keep projectors covered at appropriate times when not in use.

i. **380mm SP spares.** The following spares are available:

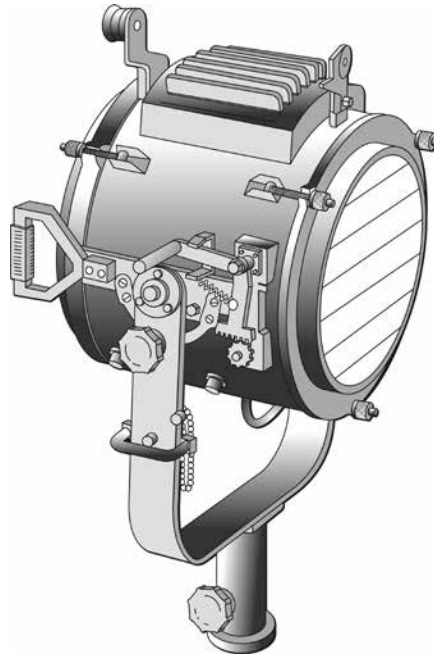
| <b>Description</b>    | <b>NSN or NS Cat. No</b> | <b>Class group</b> |
|-----------------------|--------------------------|--------------------|
| Lamp CSI 400W         | 6240-99-766-3716         | 0584               |
| Lamp Holder           | 6250-99-780-0833         | 0558               |
| Lamp Switch           | 5930-99-525-9454         | 0567               |
| Reflector             | 6230-99-525-2775         | 0583               |
| Front Glass           | 5850-99-525-2774         | 0558               |
| Eye Piece             | 1240-99-924-3495         | 0413               |
| Shutter Stop          |                          |                    |
| Shutter Spring        | 5360-99-462-4128         | 0558               |
| Cable Plug            | 6145-99-521-8356         | 0561               |
| Heat and Light Shield | 5850-99-254-5836         | 0558               |

**Note.** A full list is available in BR 4604(1).

**11034. 250mm signal projector - Mod 0 (5850-99-799-7340)**

a. The 250mm SP (Fig 11-5) is an improved version of the 10 inch SP. It has retained the Scott shutter mechanism but has a more compact barrel with wider use of brass, modified ventilators to reduce water penetration and light emission, and improved sealing arrangements. It is provided for medium range daylight signalling purposes and can also be used as a short range searchlight. It uses a 1.3 kW Tungsten Halogen lamp with an approximate life of 300 hours.

**Fig 11-5. 250mm signal projector**



b. The following spares are available:

| Description              | NSN or NS Cat. No | Class group |
|--------------------------|-------------------|-------------|
| Lamp 115V, 1.3 kW        | 6240-99-776-4364  | 0584        |
| Lamp 230V, 1.3 kW        | 6240-99-776-4365  | 0584        |
| Glass reflector          | 5850-99-773-2154  | 0584        |
| Lamp Holder              | 6250-99-462-4144  | 0558        |
| Lens                     | 5850-99-924-2540  | 0558        |
| Eye piece                | 1240-99-924-3495  | 0413        |
| Rubber seal, Front Glass | 5330-99-923-9665  | 0413        |
| Pedestal                 |                   |             |
| Shutter Assembly         | 5858-99-800-7384  | 0580        |

**Note.** A full list is available in BR 4604(1).

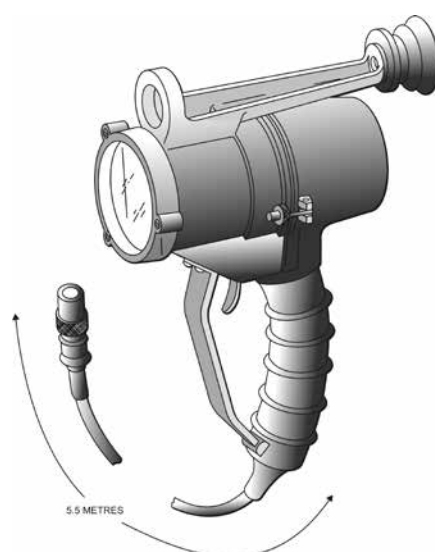
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c. **Lamp replacement.** Isolate the SP by removing the plug from its socket. Loosen the three rear finger nuts and lower the back on its bottom bolt which acts as a hinge. Release the lamp locking arm and ease the lamp out. Clean the lamp holder and, holding the new lamp by its metal base, fit it into the holder. Do not touch the lamp envelope with the bare hand. If it is necessary to hold the glass, use the plastic glove provided or a clean cloth. Replace and tighten the locking arm and close the lamp's rear cover.

d. **Lamp cleanliness.** Contamination of the glass (quartz) envelope by salt spray or by touching with the hand will affect lamp life. Clean the lamp regularly, but take care not to touch the envelope when fitting or cleaning the lamp.

**11035. 2½” intermediate signal light (ISL) - Mod 2 (6230-99-462-4417)**

**Fig 11-6. Intermediate signal lamp (ISL)**



a. **Range.** The readable range of the ISL varies according to visibility and brilliance, but 5 miles is possible at night. Although the brilliance is continuously variable, there are six marked switch positions with output and relative ranges as follows:

| Switch positions | Candle power | Relative range |
|------------------|--------------|----------------|
| Max              | 2000         | Maximum        |
| 5                | 500          | 50% max        |
| 4                | 120          | 25% max        |
| 3                | 30           | 12% max        |
| 2                | 8            | 6% max         |
| 1                | 2            | 3% max.        |

b. **Power supply.** The stowage box contains a suitable socket. Alternative power sources are a Battery Power Supply Belt or transformer (as for the HSL) but the standard plug is not suitable (see Para 11037 below).

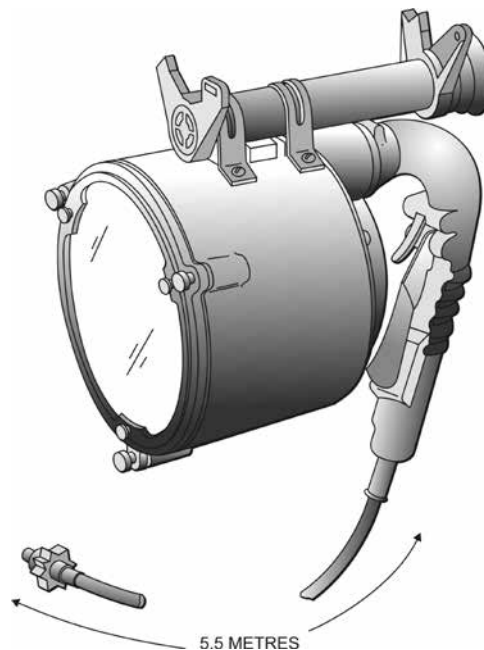
c. **Maintenance/spares.** User maintenance is similar to that for the HSL. The following spares are available:

| Description              | NSN or NS Cat. No | Class group |
|--------------------------|-------------------|-------------|
| Eyepiece for sight       | 0413-99-924-3495  | 0558        |
| Front glass              | 0558-99-462-4511  | 0558        |
| Reflector, glass         | 0558-99-198375    | 0558        |
| Trigger gaiter           | 0558-99-462-4515  | 0558        |
| Plug, 2-way (as for HSL) | 5935-99-427-7272  | 0558        |
| Lamp (Cap Type) 12V 12W  | 0240-99-995-2287  | 0584        |
| Lamp Assembly            | 0581-99-011-9194  | 0581        |

**11036. 127mm hand signal light (HSL) (5858-99-527-7235 Mod 0)**

a. **General description.** The 127mm HSL (Fig 11-7) is provided for medium range day and long range night time use. It can be fitted with a red filter to reduce glare at night. It uses a pre-focus 60W lamp which gives 150,000 candle power with a 6 degree beam width. A sleeve shutter is operated by a trigger key; a second trigger actuates the lamp and is kept pressed whilst signalling. Each HSL is supplied with a 5.5 metre length of cable and a plug in a transport box (0558-462-4201). A range of 5 miles in sunlight and horizon range at night is possible in good conditions.

**Fig 11-7. 127mm hand signal light (HSL) (5858-99-527-7235 Mod 0)**



b. **Stowage boxes and power supplies.** A stowage box (0558-462-4204) is supplied for permanent stowage of the HSL. This contains a 2 pin socket fed from a 24V supply through a resistance unit to give 12 volts at 5.5 amps at the socket. Alternative sources of power are a Belt Battery Power Supply (0564-602-0881) or a Transformer unit (0627-520-3041) with switch and socket.

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c. **Lamps.** A 12V 60W lamp is normally used. However, for vessels such as patrol boats where weight and space considerations preclude use of a resistance, a 24V 60W lamp is required. The lamp embodies a pre-focus cap and must be inserted in the light by mating the small cut-away portion on the outer edge on the lamp holder.

d. **Sighting arrangements.** A sight tube comprising a circular graticule, peep and vee sight is provided. The signal light is designed so that when correctly assembled, the lamp, reflector and sights are accurately aligned. Alignment may be checked by directing the light beam at a bulkhead 3m away. The centre of the patch of light projected onto the bulkhead should be seen 95cm below the graticule aiming point.

e. **Maintenance.** User maintenance should cover cleanliness of reflector and front and filter glasses, trigger adjustment, protection of external surfaces by wiping occasionally with a lightly oiled rag, and replacement of lamps as necessary.

f. **Adjustment of signalling trigger and shutter stroke.** Two adjusting screws for the trigger and shutter stroke are provided within the handle. To obtain the correct adjustment:

(1) Press the signalling trigger and set the front adjusting screw in the handle to give maximum retraction of the shutter. The screw must make contact with the trigger at this position to avoid the possibility of straining the shutter linkage mechanism. Lock the adjusting screw.

(2) Release the trigger and set the rear adjusting screw so that the image of the clear portion of the lamp envelope seen in the reflector is just obscured. Lock the adjusting screw.

g. **127mm hand signal lamp spares.** The following consumable spares are available:

| <b>Description</b>      | <b>NSN or NS Cat. No</b> | <b>Class group</b> |
|-------------------------|--------------------------|--------------------|
| Eyepiece for Sight      | 0413-99-924-3495         | 0558               |
| Red Shade               | 5850-99-527-1297         | 0558               |
| Lamp holder Assembly    | 0558-99-521-8540         | 0558               |
| Shutter Assembly        | 0558-99-462-4202         | 0558               |
| Reflector, Aluminium    | 0558-99-521-8546         | 0558               |
| Sight Tube              | 0558-99-462-4239         | 0567               |
| Switch Trigger Assembly |                          |                    |
| Switch                  |                          |                    |
| Lamp (Cap Type) 12V 60W | 6240-99-995-2513         | 0584               |
| Lamp (Cap Type) 24V 60W | 6240-99-995-2515         | 0584               |
| Connector Plug          | 5935-99-427-7272         | 0568               |

**Note.** A full list is available in BR 4604(1).



**11037. Battery power supply belt**

a. **General.** A Battery Power Supply Belt provided for use with the 127 mm HSL contains 10 batteries, it weighs 4.6 Kg and has an optional shoulder harness. And is fitted with quick release buckles.

b. **Power.** Power is provided by 10 Super 'F' nickel-cadmium sealed-cell batteries. Each battery is sealed in a stainless-steel case with a safety vent. The capacity when fully charged is 12V for five hours at 10 amp/hour, but this may vary depending on the climate, temperature and rate of discharge. The belt will become warm if it is discharged at high output and must be allowed to cool before recharging.

c. **Charging.** A cable assembly is provided for battery charging. Charging to full capacity takes approximately 14 hours.

d. **Precautions.** The belt must be dry, cool and earthed before recharging commences and no equipment is to be connected to it during recharging.

e. **Care and maintenance**

(1) The battery belt should be kept in a fully charged state and should be recharged if it is not used for more than two weeks.

(2) If possible, avoid completely discharging the batteries and, to maintain maximum cell life, do not discharge below 10V. Occasional slow charging for 24 hours is beneficial and removes any cell imbalance.

(3) The leather belt is impregnated to resist water absorption during normal use. It should be cleaned or treated with a colourless wax polish. If it is accidentally immersed or badly contaminated with sea water, it should be rinsed with fresh water and allowed to dry naturally.

f. **Spares.** The following spares are available:

| <b>Description</b>             | <b>NSN or NS Cat. No</b> | <b>Class group</b> |
|--------------------------------|--------------------------|--------------------|
| Belt, Battery Power Supply     | 6130-99-602-0881         | 0584               |
| Buckle (Quick Release)         | 0265-99-788-8301         | –                  |
| Harness, Battery Belt (Braces) | 0888-99-327-7412         | –                  |
| Eye-piece for Sight            | 0413-99-924-3495         | –                  |
| Lamp (Cap Type) 12V 12W        | 0584-99-995-2287         | 0584               |
| Fuse Electrical (PAG N2821)    | 5920-99-441-9457         | 0559               |
| Cable (for recharging)         | 0562-99-192-1497         | -                  |

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**11038. Onboard Training**

a. **Coordination.** The CBM is to nominate a Leading Seaman Specialist as training coordinator. The nominated Leading Seaman is responsible for the conduct and coordination of all seamanship training including practical exercises as laid down in BR 1984 Chapter 10.

b. **Practical flashing light exercises**

(1) Commanding Officers are responsible for ensuring that Seaman Specialists maintain practical skill standards in the reception and transmission of Flashing Light. The following exercises provide a realistic means to practice and assess basic skills. These exercises are to be carried out at least weekly unless stated otherwise.

(2) At the discretion of the Senior Seaman Specialist, a rating that consistently achieves a high standard in any exercise may read exercises monthly. This is to be recorded in the relevant Training Records.

c. **Flashing reception exercise (FRX)**

(1) *Purpose.* This exercise is designed to assess accuracy in reading Flashing Light. The minimum standards required are:

| <u>Rate</u>     | <u>TPS/OPS minimum standard</u> |
|-----------------|---------------------------------|
| AB(Sea)/LS(Sea) | 8/4                             |

(2) *Conduct.* Exercises are to be produced locally using the pro-forma at Annex 11D.

*Part 1:* A Test Message of 52 random letters and 28 random figures, ending with BT AR.

*Part 2:* Coded Signals to the value of 30 marks. Words, numbers and tacklines are to be transmitted as Morse characters.

*Part 3:* A Drill Signal to the value of 30 marks ending with BT AR.

(3) *Assessing the accuracy*

*Part 1:* Half mark deducted for each character read incorrectly.

*Part 2:* 1 mark deducted for each word read incorrectly. ½ mark deducted for each prosign read incorrectly.

*Part 3:* 1 mark deducted for each word or Date Time Group read incorrectly. Half mark deducted for each prosign read incorrectly.

**d Flashing transmission exercise (FTX)**

(1) *Purpose.* This exercise is designed to assess accuracy and style of transmitting by flashing light.

(2) *Conduct.* Exercises are to be produced locally and are to consist of a short sentence, or phrase, containing letters and figures. It is to be transmitted using a standard Morse Flashing Key or Aldis Lamp.

(3) *Assessment.* Assessment is not expressed formally but should cover speed and accuracy, quality of Morse, and readability. Corrective action is to be determined by the Leading Seaman Specialist.

**e. Remedial Exercises.** The minimum number of remedial exercises required to be carried out during the following week is dependent on the average result achieved the previous week. Whenever possible a rating that does not achieve the required standard should carry out one exercise each day until proficient.

(1) *FRX.* Minimum standard for rate achieved. One exercise required in the following week.

(2) *FRX.* Minimum standard for rate not achieved. Two exercises required in the following week.

(3) *FTX.* As determined by Leading Seaman Specialist.

**f. Training returns.** The Training Coordinator is to submit monthly training returns to MWS-WS-SSTEDOIC detailing all training undertaken during that period. This is to include returns from MCM1 and 2's training Leading Rate inputs.

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**ANNEX 11A**

**COMMUNICATIONS EMCON BOARD**

**OFFICIAL-SENSITIVE (when completed)**

|                              |                   |  |  |  |  |  |
|------------------------------|-------------------|--|--|--|--|--|
| AUTHENTICATION POLICY        |                   |  |  |  |  |  |
| E M C O N P L A N            |                   |  |  |  |  |  |
| AUTHORITY/REFERENCE          |                   |  |  |  |  |  |
| PLAN IN FORCE                |                   |  |  |  |  |  |
| INDEX LETTER                 |                   |  |  |  |  |  |
| INDEX LETTER USAGE           |                   |  |  |  |  |  |
| 80                           | ALL UHF COMMS     |  |  |  |  |  |
| 81                           | LINK UHF          |  |  |  |  |  |
| 82                           | UHF SHIP/SHIP     |  |  |  |  |  |
| 83                           | UHF SHIP/AIR      |  |  |  |  |  |
| 84                           | ALL VHF           |  |  |  |  |  |
| 85                           | ALL HF/MF COMMS   |  |  |  |  |  |
| 86                           | HF/MF SHIP/SHIP   |  |  |  |  |  |
| 87                           | HF/MF SHIP/SHORE  |  |  |  |  |  |
| 88                           | HF/MF SHIP/AIR    |  |  |  |  |  |
| 89                           | LINK HF/MF        |  |  |  |  |  |
| 90                           | VISUAL (DIR)      |  |  |  |  |  |
| 91                           | VISUAL (OMNI)     |  |  |  |  |  |
| 180                          | EHF SATCOM        |  |  |  |  |  |
| 181                          | SHF SATCOM        |  |  |  |  |  |
| 182                          | UHF SATCOM        |  |  |  |  |  |
| 183                          | COMMERCIAL SATCOM |  |  |  |  |  |
| 184                          | CELLPHONE         |  |  |  |  |  |
| OTC'S DEFINITION OF RSI XRAY |                   |  |  |  |  |  |

**OFFICIAL-SENSITIVE (when completed)**

ANNEX 11B

STANDARD RAS PLANNING SHEET

| A1 REF                   |                | A2 PERIOD       |          |               |        |              |          |        |        |
|--------------------------|----------------|-----------------|----------|---------------|--------|--------------|----------|--------|--------|
| B1 R/V TIME R/V POSITION |                | C1 COURSE SPEED |          | D1 SUPPL FROM |        |              |          |        |        |
| E1/F1                    |                | SUPPORT SHIP    |          |               |        | SUPPORT SHIP |          |        |        |
| E2/F1 DESIGNATOR         | TIME/          | A PORT          | B ASTERN | C HELO        | D STBD | E PORT       | F ASTERN | G HELO | H STBD |
| 0 MIN                    | 1<br>2<br>3    |                 |          |               |        |              |          |        |        |
| 1 hr 0                   | 4<br>5<br>6    |                 |          |               |        |              |          |        |        |
| 2 hr 0                   | 7<br>8<br>9    |                 |          |               |        |              |          |        |        |
| 3 hr 0                   | 10<br>11<br>12 |                 |          |               |        |              |          |        |        |
| F2 BRAVINST METHOD BRAVO |                |                 |          |               |        |              |          |        |        |
| G1 VERT INST             |                |                 |          |               |        |              |          |        |        |
| H1 FUELEST               |                | J1 MAIL         |          |               |        |              |          |        |        |
| K1 LIFEGUARD             |                |                 |          |               |        |              |          |        |        |
| L1 SCREEN CDR            |                | M1 EM BREAK     |          |               |        |              |          |        |        |
| N1 RELIEVE               |                | P1 HEAVY STN    |          |               |        |              |          |        |        |
| X1 REP INST              |                |                 |          |               |        |              |          |        |        |
| Y1 SPEC INST             |                | Y2 SPEC INFO    |          |               |        |              |          |        |        |

**ANNEX 11C**

**S 1321 EXAMPLE OF A STANDARD FLASHING RECEPTION EXERCISE (FRX)**

| <b>STANDARD FLASHING RECEPTION EXERCISE.</b>                          |   |  |   |  |  |  |
|---|---|--|---|--|--|--|
| Name and Rating of Reader.....  |   |  |   |  |  |  |
| <b>TEST MESSAGE</b><br>52 letters and 28 figures<br>(½ mark for each) |   | <b>CODED SIGNALS</b><br>Consisting of five coded signals<br>Each word = 1 Marks IX/K-// =<br>Half Mark |   | <b>DRILL SIGNAL</b><br>Consisting of address and<br>plain language drill message<br>Each work = 1 Mark |  |  |
| T   | W | 2  | 8 | U  | - P – R – 100811Z JUL 98<br>FM HMS RAMSEY<br>TO HMS PEMBROKE<br>INFO HMS BANGOR<br>BT<br>DRILL<br>THIS AFTERNOONS MINE<br>EXPLOSION<br>DEMONSTRATION<br>HAS BEEN CANCELLED<br>DUE<br>TO THE INCLEMENT<br>WEATHER DRILL |  |
| 3   | T | 5  | A | S  |  |  |
| V   | 0 | S  | E | 8  |  |  |
| A   | N | R  | I | X  |  |  |
| 3   | B | 2  | D | V  |  |  |
| Y   | M | C  | L | 6  |  |  |
| U   | 1 | W  | 4 | Q  |  |  |
| O   | X | F  | 7 | R  |  |  |
| 4   | G | 3  | B | P  |  |  |
| Z   | Y | H  | 5 | 2  |  |  |
| 4   | 1 | C  | 7 | J  | //TA 89 – TA – 88 – 3 //1356Z K  |  |
| 7   | D | 6  | I | K  |  |  |
| E   | 5 | J  | 8 | O  |  |  |
| I   | K | 9  | L | Q  |  |  |
| F   | 9 | G  | 6 | N  |  |  |
| P   | M | H  | Z | 0  |  |  |
| MAXIMUM MARKS....40<br>Time allowed 3 mins 5 secs                     |   |  |   |  |  | MAXIMUM MARKS....30<br>Time allowed 6 mins |
| MAXIMUM MARKS....30<br>Time allowed 3 mins                            |   |  |   |  |  |  |

**ANNEX 11D**

**S1321 BLANK FRX PROFORMA**

**STANDARD FLASHING RECEPTION EXERCISE.**

Name and Rating of Reader.....

| <b>STANDARD FLASHING RECEPTION EXERCISE.</b>                          |  |  |  |  |  |  |  |  |  |   |  |  |  |
|---|--|--|--|--|--|--|--|--|--|---|--|--|--|
| Name and Rating of Reader.....  |  |  |  |  |  |  |  |  |  |   |  |  |  |
| <b>TEST MESSAGE</b><br>52 letters and 28 figures<br>(½ mark for each) |  |  |  |  | <b>CODED SIGNALS</b><br>Consisting of five coded signals<br>Each word = 1 Marks IX/K-// =<br>Half Mark |  |  |  |  | <b>DRILL SIGNAL</b><br>Consisting of address<br>and plain language drill<br>message<br>Each work = 1 Mark |  |  |  |
|   |  |  |  |  |  |  |  |  |  |   |  |  |  |
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|   |  |  |  |  |  |  |  |  |  |   |  |  |  |
| MAXIMUM MARKS....40<br>Time allowed 3 mins 5 secs                     |  |  |  |  | MAXIMUM MARKS....30<br>Time allowed 6 mins   |  |  |  |  | MAXIMUM MARKS....30<br>Time allowed 3 mins  |  |  |  |
|   |  |  |  |  |  |  |  |  |  |   |  |  |  |

**ANNEX 11E**

**PROVISION of TACTICAL COMMAND SUPPORT (TCS) – SURFACE FLOTILLAS**

1. The provision of Tactical Command Support (TCS) in the Surface Flotillas is outlined in this Annex. The Seaman Specialists sub branch remains responsible for the provision of all aspects of Tactical Command Support.

**2. Delivery of TCS**

Tactical Command Support will be delivered from the Bridge in CBRNDC states 1, 2 and 3.

3. Consort Management is the primary output however; greater emphasis on Warfare Support functions is required when units are operating within a TF/TG where UHF TG Tactical is the Command and Control circuit for all Screen Design/Disposition and Force Manoeuvre. It remains the responsibility of the PWO/NO to provide clear and accurate directives to facilitate the dissemination of Force Manoeuvring information.

4. In DD/FF, Consort Management is delivered at the LH level, with the LS(SEA) carrying out the function of “Unit Yeoman” and the CPO or PO(SEA) undertaking a supervisory role. In Capital Ships, the function of Unit Yeoman will rest with the designated PO(SEA). For Minor War Vessels and Survey Ships, TCS delivery will be at the AB or LH level as appropriate.

*Note. Whilst not a recognised position on the UEL, the term Unit Yeoman is used to describe the lead TCS role in Capital Ships/FF/DD and Minor War Vessels.*

5. The operating standard for flashing light is 8 words per minute (WPM).

6. A full set of flags, pennants and shapes is to be maintained at readiness for signalling purposes, with all Seaman Specialists expected to have a basic understanding of their use for Tactical Signalling and as required in order to comply with the International Code of Signals.

7. NAVY SSM-AW SEA CPO holds the position as Yeoman of the Admiralty (YOTA), for all Flag Ceremonial policy and procedures.

8. NAVY SSM-AW NAV/SEA SO1 assisted by NAVY SSM-AW SEA CPO holds the responsibility as sponsor for Fleet Tactical Communications Publications.

9. NAVY OP TRG-MWS WS STEDOIC and NAVY OP TRG-FOST S S2 retain responsibility for all TCS training matters.

10. TCS will continue to meet the required outputs in accordance with National, NATO and PfP doctrine.

**11. Provision of warfare information**

When an Auxiliary RFA, NATO Support Tankers and Ships are taken up from Trade (STUFT) or TF/TG unit is unable to monitor the fighting circuits, OTC/PWC units are to provide environmental and warfare information groups, including Brevity Codeword’s on the TF/TG Tactical Circuit. TG Tactical will remain as the primary Command and Control Circuit and the Unit Yeoman, through liaison with the PWO or EW Manager, should be prepared to pass the following iaw ATP 1 Volume 1 Chapter 1 Function Tables:



a. **OTC consort management**

(1) *Function 126.* Designating position and intended movement (PIM) and Manoeuvring of the Force.

b. **Air warfare**

(1) *When holding Function 850.* Opintel – Transmitted to the force by EWC utilising the group AA8.

(2) *When holding Function 260.* Threat Warnings – AAWC to update Air Threat Warning.

(3) *OTC retaining 266b.* ASMD Course – Recommended by AAWC and validated by OTC, having considered the wider Tactical picture.

(4) *Zippo C.* Called by AAWC or OTC if function 266 retained (APP-1 article 941 B7 refers).

(5) *When holding function 266.* On completion of Raid AAWC/OTC cancel Zippos, downgrade threat if required.

c. **Anti-submarine warfare**

(1) *OTC retaining 450.* Force Evasion/Evasive Steering – Recommended by ASWC and validated by OTC, having considered the wider Tactical picture.

(2) *Function 460 delegated to ASWC.* Update Submarine Threat Warning.

(3) *Function 464 delegated to ASWC.* Form/Detach SAU as appropriate. (Transmitted on TF/TG Tactical).

(4) *Function 458 delegated to ASWC.* Provide regular ASW Sitrep to the force.

(5) *Function 460 delegated to ASWC.* Downgrade Submarine Threat Warning.

d. **Screening operations/force disposition.** TCS1/2 are to have sufficient understanding of Sector screen design/promulgation and Force dispositions.

(1) *Function 547 delegated to SC.* Promulgating the screen and screening stations to units assigned.

(2) *Function 548 delegated to SC.* Exercising tactical control, including stationing and manoeuvring, of units assigned within the AOR.

e. **Environmental reports.** Holders of the Principle Warfare Duties are required to pass regular sitreps to the force. Information pertinent to the duty held should be extracted from regular Command environmental reports by the Unit Yeoman for onward transmission via TF/TG Tactical. The following essential information should be passed:

(1) Air Threat warning and Zippos in force. (AAWC)

(2) Surface Threat warning and last known position of threat. (ASUWC)

(3) Submarine Threat warning, Current/Last known position of submarine with supporting contact classification. Tadpole criteria. (ASWC)

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(4) Main Body’s course and speed. (OTC/OCE)

(5) Force ASMD Course. (OTC/OCE)

f. **TCS1/TCS2 divisions of responsibility.** When providing Tactical Command Support from the Bridge, the following list, whilst not exhaustive, is provided as a framework for TCS1 Unit Yeoman and TCS2 (Warfare Liaison) to operate:

|                              |  |
|------------------------------|--|
| TCS1 – Bridge                | TCS2 – Operations Room Link<br>(Bridge Posn)                 |
|                              |  |
| Bridge Command Support       | Warfare Command Support                                      |
| Liaise with the NO           | Liaise with the PWO  |
| Bridge Reporting             | Monitor Voice Procedures                                     |
| Stateboard Updates           | Group Line Supervisor  |
| Departure Procedure          | External Information Coordination                            |
| Lead through Procedure       | Provide the Force with Environmental Sitreps                 |
| I/C Mine reporting procedure | Extracting Warfare Information                               |
| Signal Deck Adviser          | Screen Info advisor  |
| ‘FAMISHED’ Coordination      | Liaise with PWO/DSO to obtain Initial Battle damage reports. |
| Replenishment Plan Adviser   | Whereabouts co-ordination                                    |
| Whereabouts co-ordination    |  |
| Interpret Zig Zag Plans      |  |

**Note.** Information such as Bathythermographic reading, Weapons State Reports and Comprehensive secondary Battle Damage Reports will continue to be passed via other Networks (TG Bcst/CSS V Chat)/Fighting Circuits or Tacsig.

g. **Onboard training coordination.** The CBM/Bosun is to nominate a LS/PO(SEA) as TCS Training Coordinator. The nominated Leading Seaman/PO(SEA) is responsible for the conduct and coordination of all TCS training, including practical exercises as laid down in BR1984 Chapter 10. All units are to implement the FOST six monthly training plan.

**12. Summary**

As technology advances it is vital that the ability to deliver TCS through effective Command and Control is maintained. The TCS element of the Seamanship Branch provide a baseline standard for the provision of Consort Management.