National Defence / Défense nationale

A-CR-CCP-004/PT-002

ROYAL CANADIAN SEA CADETS MANUAL

VOLUME 2

(This publication supersedes A-CR-CCP-003/PT-003 dated 79-10-26)

Issued on Authority of the Chief of the Defence Staff
Publiée avec l'autorisation du Chef de l'état-major de la Défense

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PREFACE

1. A-CR-CCP-004/PT-002 is intended to be used as a textbook for study and reference by Royal Canadian Sea Cadets in training at their local unit.

2. A-CR-CCP-004/PT-002 is based on the Petty Officer Second Class and Petty Officer First Class training materiel incorporated in A-CR-CCP-003/PT-002 and -003, Instructor's Manual for Mandatory Subjects, RCSCC Programme, Volumes 1 and 2, and is intended for use by Cadets in the third and fourth years of the Sea Cadet programme.

3. A-CR-CCP-004/PT-002 contains all the information and pictorial materiel of the original texts, but omits lesson guides and other teaching materiel.

4. It should prove particularly valuable to late-starting or ambitious cadets who have the desire to advance through the levels of the programme at their own speed.

5. A-CR-CCP-004/PT-002 has been compiled by the Directorate of Cadets in collaboration with the Navy League of Canada.

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CHAPTER 1

(NOT ALLOCATED)

CHAPTER 2

(NOT ALLOCATED)

CHAPTER 3

DRILL

CHAPTER 3

DRILL

1. **Drill** — The various drill movements are covered in detail in CFP 201, Manual of Drill and Ceremonial. Those taught in the third and fourth years of the Sea Cadet syllabus are listed below, with reference to the applicable articles in the Manual.

NOTE

Training Periods 1-24 are covered in Volume 1 of this manual.

PERIOD	COURSE MATERIAL THIRD YEAR (4C-P2)	REFERENCES
(25-28)	**ADVANCED RIFLE DRILL** (Four periods)	(Supp 1)
	Fix Bayonets;*	Art. 416
	Unfix bayonets;*	Art. 417
	Examine arms from the order;	Art. 419
	Order arms from the examine;	Art. 420
	Port arms from the order;	Art. 422
	Order arms from the port;	Art. 423
	Port arms from the shoulder;	Art. 424
	Shoulder arms from the port;	Art. 425
	Recover arms from the shoulder;	Art. 440
	Shoulder arms from the recover;	Art. 441
	Rest on your arms reversed from the present;	Art. 442
	Present arms from rest on your arms reversed;	Art. 443
	Firing cartridges from shoulder (sim); and	Art. 444
	Paying of compliments formed military groups.	Art. 602
	*Optional if corps is equipped with bayonets.	
(29-32)	**COMMAND TRAINING** (Four periods) Supervised instruction of first-year cadets in basic squad drill on the march. Cadets should have the opportunity to give commands and to instruct in technique, and their performance be reviewed and corrected.	
(33-36)	**ADVANCED SQUAD DRILL II** (Four periods)	(Supp 1)
	Forming two ranks from three;	Art. 230

Figure 3-3 (Sheet 1 of 4) Third and Fourth Year (LC to P1)

PERIOD	COURSE MATERIAL	REFERENCES
	Reforming three ranks from two;	Art. 231
	Forming six ranks from three;	Art. 232
	Reforming three ranks from six;	Art. 233
	Marching and halting in slow time;	Art. 301
	Marking time, forward and halt in slow time;	Art. 305
	Turning and inclining on the march in slow time;	Art. 313
	Turning about on the march in slow time;	Art. 315
	Changing to quick time from slow time;	Art. 317
	Changing to slow time from quick time;	Art. 320
	Open order on the march in slow time; and	Art. 333
	Close order on the march in slow time;	Art. 334
	FOURTH YEAR (P2-P1)	
(37-40)	**CEREMONIAL DRILL** (Four periods)	
	Guards of Honour	(CFP201)
	Composition;	Art. 1402
	Guard formations;	Art. 1403
	Guard mounting;	Art. 1404
	Reception of personages; and	Art. 1405
	Inspection.	Art. 1406
	Parading with Colours	
	General information;	Art. 1601-1603
	Composition for one and two colours;	Art. 1610, 1611
	Dress and arms	Art. 1612
	Position of the order;	Art. 1621
	Stand at ease from the order;	Art. 1622
	The carry;	Art. 1625, 1626
	The slope;	Art. 1627-1629
	Let fly from the carry;	Art. 1632
	Catching the colour from the let fly;	Art. 1633
	Dip at the halt;	Art. 1634, 1635

Figure 3-3 (Sheet 2 of 4) Third and Fourth Year (LC to P1)

PERIOD	COURSE MATERIAL	REFERENCES
	Dip on the march; and	Art. 1636, 1637
	Position of the colour in a guard of honour.	Art. 1656 (See also P. 14-2)
	Cutlass Drill (If a cutlass is not available, a wooden or metal replica should be used.) Cutlass sheathed: positions of attention; stand at ease; on the quick or double march.	
	Draw swords;	(CFP201) Art. 1312
	The recover;	Art. 1310
	The carry;	Art. 1311
	Stand at ease and stand easy with cutlass drawn;	Art. 1313, 1314
	Return swords from the carry;	Art. 1316
	Saluting with the cutlass;	Art. 1317
	Rest on your arms reversed from the salute;	Art. 1320
	Salute in conjunction with armed parties;	Art. 1319
	Salute on the march in quick time; and	Art. 1326
	Salute on the march in slow time;	Art. 1327
(41-44)	**COMMAND TRAINING** (Four periods) Supervised instruction of second-year cadets in advanced squad drill. Cadets should have the opportunity to give commands and to instruct in technique, and their performances be reviewed and corrected.	
(45-48)	**PLATOON DRILL** (Four periods) Introduction;	(CFP201) Art. 701
	Platoon in line, column of threes and column of route;	Art. 702-704
	Dressing a platoon;	Art. 705
	Ordering a platoon on parade;	Art. 706
	Platoon in line advancing and retiring;	Art. 707

Figure 3-3 (Sheet 3 of 4) Third and Fourth Year (LC to P1)

PERIOD	COURSE MATERIAL	REFERENCES
	Platoon moving to the right or left in column of threes or column of route;	Art. 708, 709
	Advancing or retiring in column of threes from the right;	Art. 710
	Advancing or retiring in column of route from the right;	Art. 711
	Platoon advancing and retiring in column of threes from the left; and	Art. 712
	Platoon advancing and retiring in column of route from the left.	Art. 713

Figure 3-3 (Sheet 4 of 4) Third and Fourth Year (LC to P1)

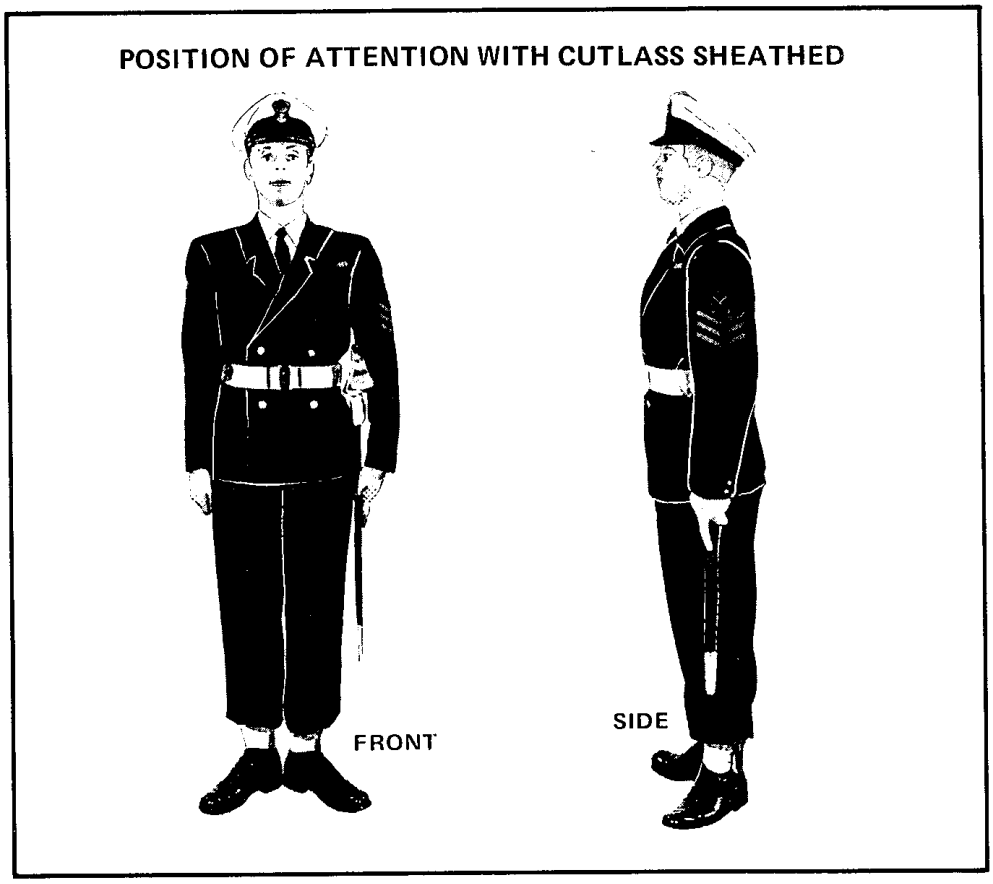


Figure 3-4 Position of Attention with Cutlass Sheathed

2. **Position of Attention with Cutlass Sheathed** — At the command "Atten - tion", the scabbard is to be gripped by the left hand, with the first finger extended down the outside. The cutlass is to be vertical and close in to the left leg.

Figure 3-5 Stand at Ease with the Cutlass Sheathed

3. **Stand at Ease with Cutlass Sheathed** — At the command, "Stand at - ease", both legs are to be kept straight. Carry the left foot about twelve inches to the left. The hands remain as in the position of **attention**.

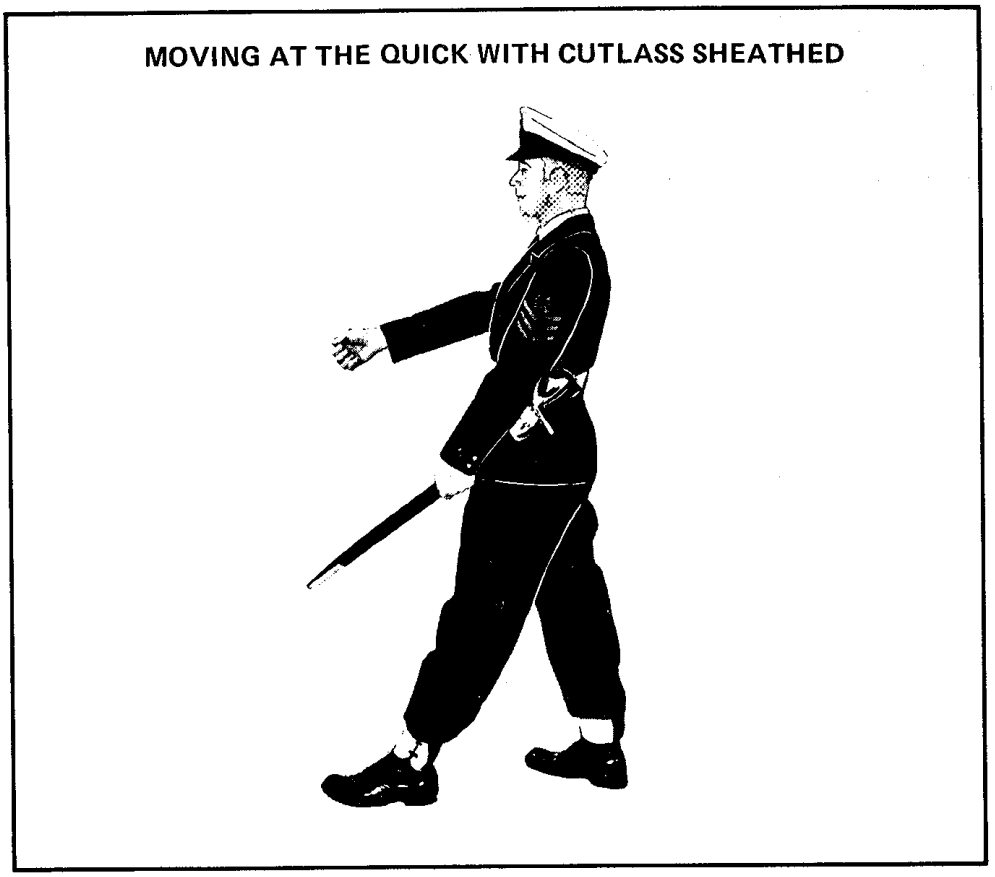


Figure 3-6 Moving at the Quick with Cutlass Sheathed

4. **Moving at the Quick or Double with Cutlass Sheathed** — When moving at the quick or at the double, grasp the scabbard in the left hand and cant forward to an angle of 45 degrees.

5. **Ceremonial** — On ceremonial parade, petty officers and men armed with cutlasses do not draw them, except the chief petty officer of the colour party.

6. **Funerals** — If a petty officer is in charge of a funeral firing party he draws his cutlass and proceeds as laid down under "Sword Drill."

CHAPTER 4

PRACTICAL SEAMANSHIP

CHAPTER 4

PRACTICAL SEAMANSHIP

TRAINING PERIODS 1-16 — SEE VOLUME 1

TRAINING PERIOD 17 — MONKEY'S FIST, HEAVING LINE

1. **Monkey's Fist** — This is used to weight the end of a heaving line so that it will carry when thrown against the wind. In appearance it is very similar to a Turk's head, and takes from 9 to 60 feet of line. It is made as follows:

a. wind three turns round the hand, as in Figure 4-53(i);

b. pass a second set of three turns across and around the first three, in the direction indicated by the arrows in Figure 4-53(ii); and

c. pass a third three turns round and across the second three, but inside the first set and in the direction shown by the arrows in Figure 4-53(iii); if the knot is correctly made the end will come out alongside the standing part.

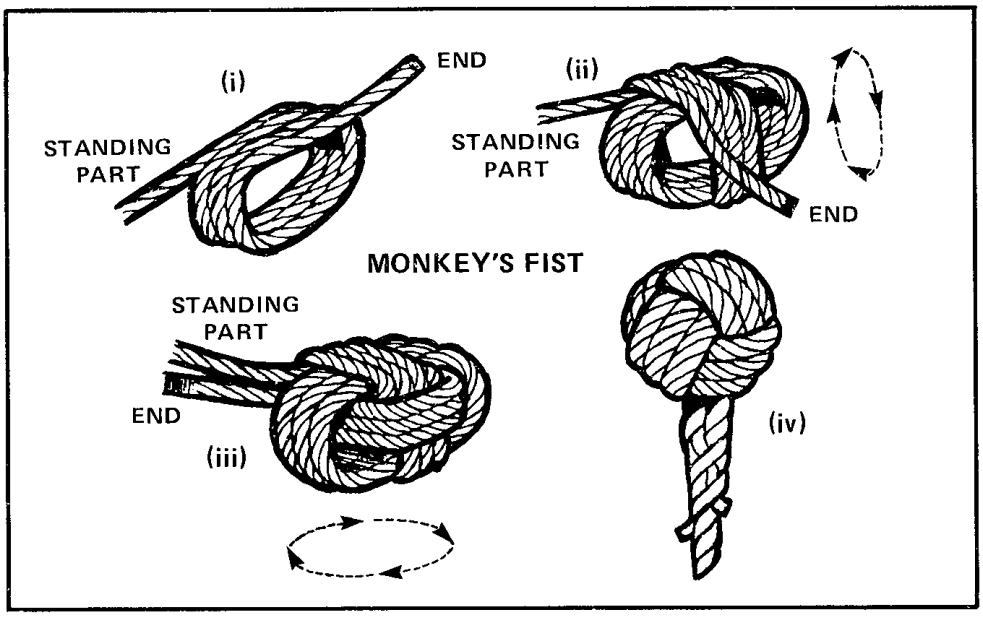


Figure 4-53 Monkey's Fist

d. To finish the knot, work all parts taut and splice the end into the standing part. Alternatively, tie an overhand knot in the end and expend it by tucking it inside the monkey fist, then work all parts taut as before.

2. **Heaving Line Knot** — (See Figures 4-54.) This knot is used as an alternative to the monkey's fist, and is quickly and easily made.

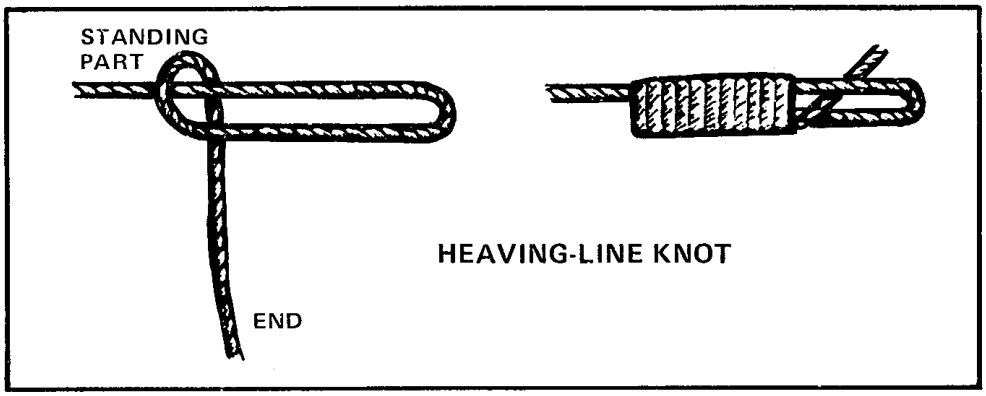


Figure 4-54 Heaving-Line Knot

3. **Making the Knot** — Form a bight about 5 feet long at the end of the line. Start frapping the end around both parts of the bight at about 8 inches from the actual bend of the bight, and continue until it is all but expended. Then pass the end through the small loop remaining and haul on the standing part.

4. **Heaving a Line** — To throw a heaving line, the line is first coiled into the hand in bights about 3 to 4 feet in circumference. Next separate this coil in half keeping the half with the monkey's fist in your heaving hand, allow about 5 feet of line to hang between your two hands; turn the body sideways to the target, heaving arm extended and hold the other half palm open facing the target. Heave the weighted end, coil and all towards the target and allow as much of the unweighted end to go out as necessary. You should normally retain the inner end in your hand, or you may secure it to the guard rail. See Figure 4-55.

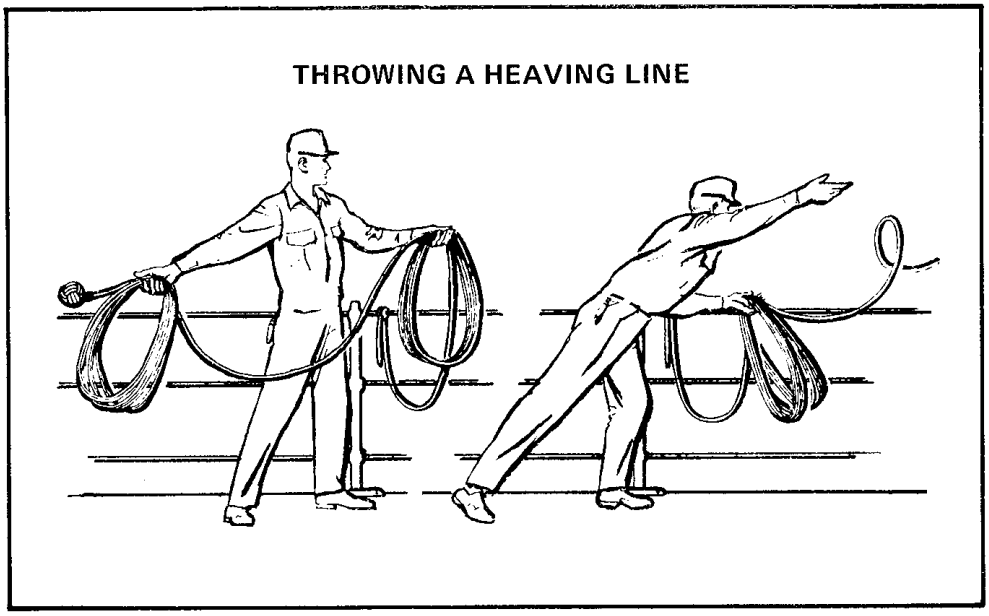


Figure 4-55 Throwing a Heaving Line

When your line lands where you aimed it, secure the inboard end to your heavy hawser or line using a bowline. Cadets should be practised in heaving a line to a target, ie, trying to put the knot into a gash bucket.

TRAINING PERIOD 18 — ADVANCED BOWLINES AND HITCHES

5. **Bowline on the Bight** — (See Figure 4-56.) As its name implies, this bowline is made on the bight, the first two operations in its formations being the same as for a simple bowline. **It is used for lowering a man from aloft** or over the ship's side, the short bight being placed under his arms and the long one under his buttocks.

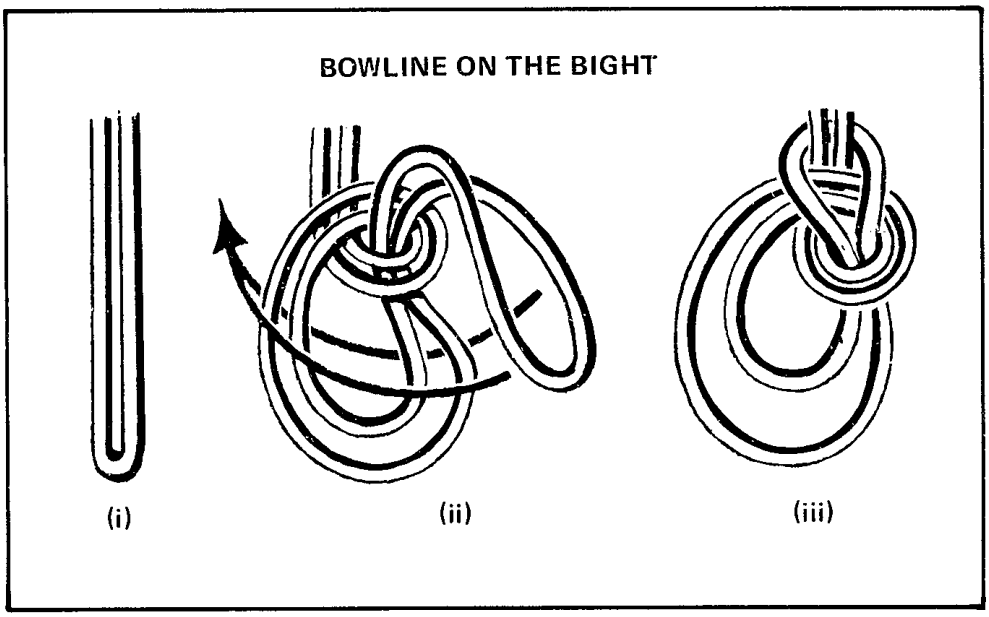


Figure 4-56 Bowline on the Bight

6. **French Bowline** — (See Figure 4-57.) An alternative to the bowline on the bight, and usually more suitable, is the French bowline. It is made in a similar manner to a bowline, except that after the gooseneck has been formed and the end passed up through it the end is brought round and up through it again, so as to form a large bight which is passed under a man's armpits. The knot is then completed as for a simple bowline.

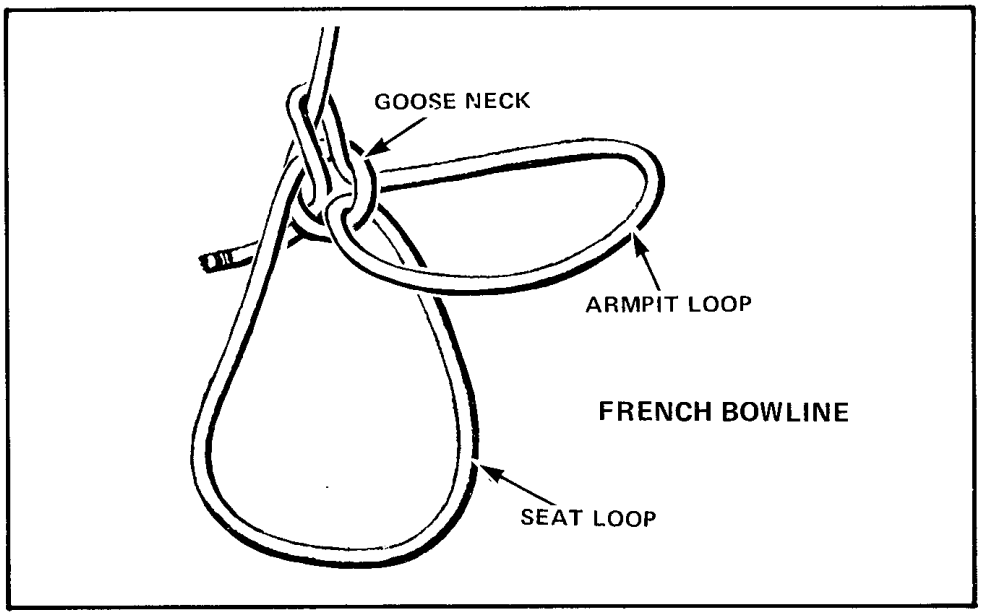


Figure 4-57 French Bowline

7. **Slip Knots** — (See Figure 4-58.) The bowline and the clove hitch can be made into knots which can be released quickly by using a bight instead of an end in the last phase of making them. Such slip knots will hold a steady strain fairly well, but cannot be trusted to stand a jerking pull.

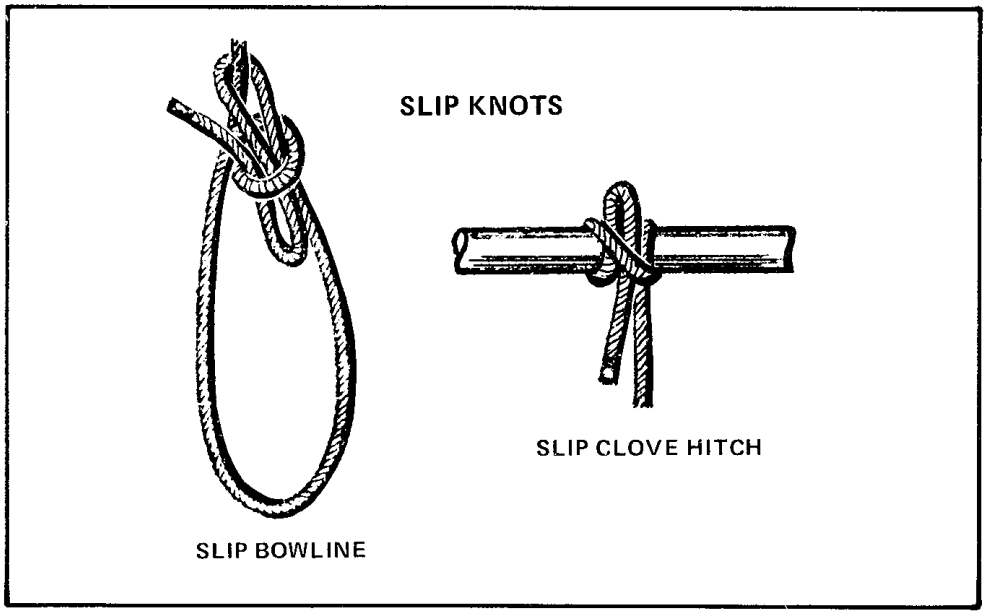


Figure 4-58 Slip Knots

8. **Running Bowline** — (See Figure 4-59.) The running bowline is never used to make a running eye in the end of a rope. It must never be placed around a man's body. It is made very simply by passing a bight around the standing part before tying a bowline in the end of the rope.

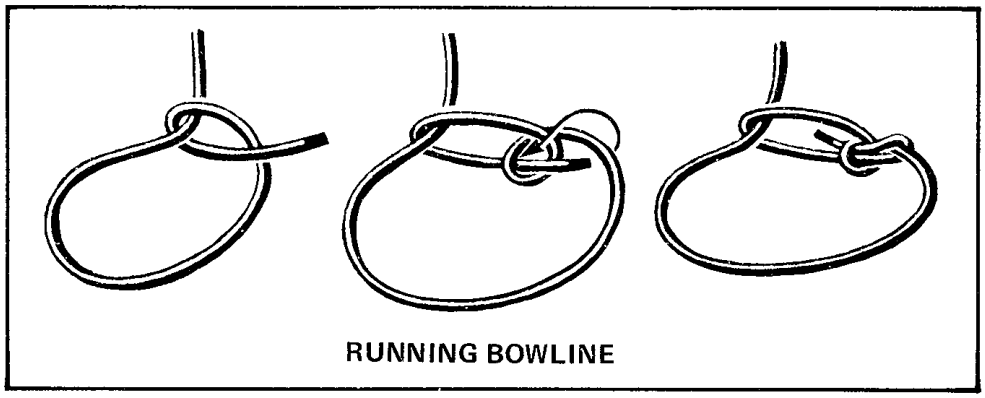


Figure 4-59 Running Bowline

TRAINING PERIOD 19 — CHAIN SHORTENING AND PORTUGUESE SENNIT

9. **Chain Shorting** — (See Figure 4-60.) This series of hitches is for shortening the end of a rope; it looks very neat, and is useful when only a short length of rope can be handled at a time. Using light line, it can be used to make a belt or for decorative purposes.

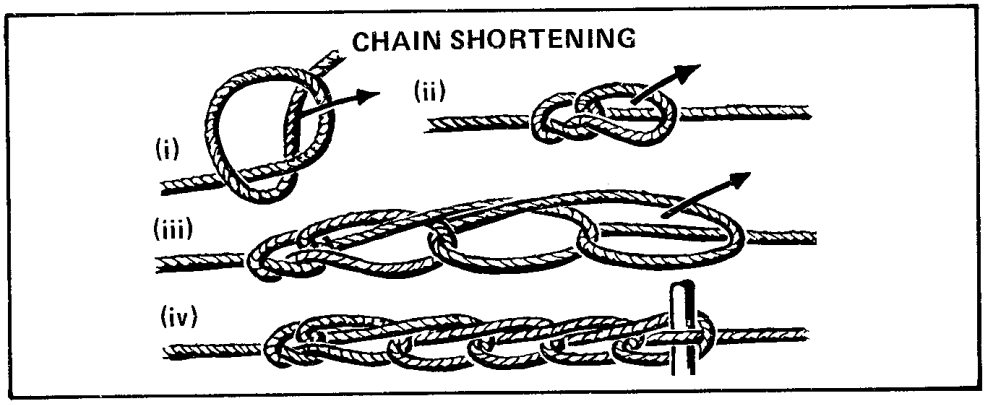


Figure 4-60 Chain Shortening

10. **Flat Portuguese Sennit** — Figure 4-61 shows the **Flat Portuguese Sennit**. Middle the working part through the heart at X (or use two strands of a rope and leave the third as a heart). Lead one strand a. under the heart c. Lead the other strand b. under a., over c. and through the bight of a. Haul tight. Repeat but work b. under c., and a. under b. over c. and through the bight of b. Continue this process using each strand alternately. If the process is continued using the strand from the same side to go under the core each time, the sennit will spiral.

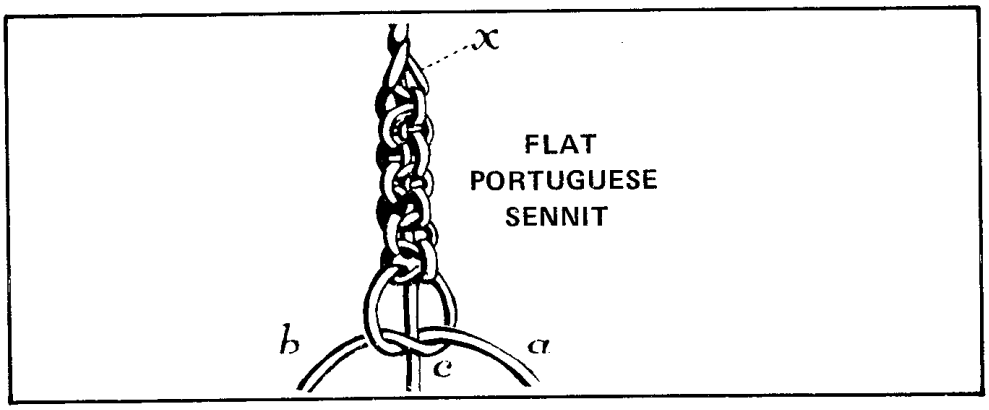


Figure 4-61 Flat Portuguese Sennit

11. **Uses of the Sennit** — Once the cadets have mastered the basic principle of the sennit (consisting of two simple operations repeated alternatively) they should be

encouraged to use it to make rigging-kit belts for use in their summer boat-work training. Any small line, such as cod-line, is suitable for the purpose.

TRAINING PERIOD 20 — STROPS AND SLINGS

12. **Strop** — First of all, an object which is to be lifted must be rigged so that it can be lifted without damage or danger of dropping. For this purpose, you may be provided with a **strop,** which is a piece of rope with the ends spliced together. See Figure 4-62.

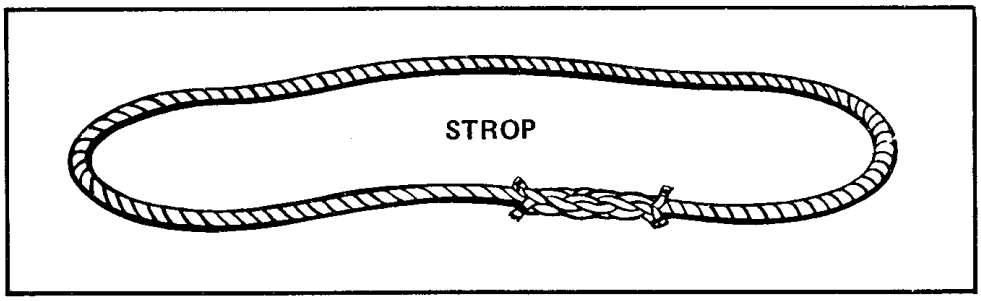


Figure 4-62 Strop

13. **Uses for a Strop** — The best uses for strops are on crates with handles, on a group of light cases (arranged as shown in Figure 4-63 (ii)), on a group of sacks (if they are sturdy ones), or on casks. If a group of heavy cases is lifted or if the cases are arranged differently from Figure 4-63 (ii), the strops will crush or damage the load.

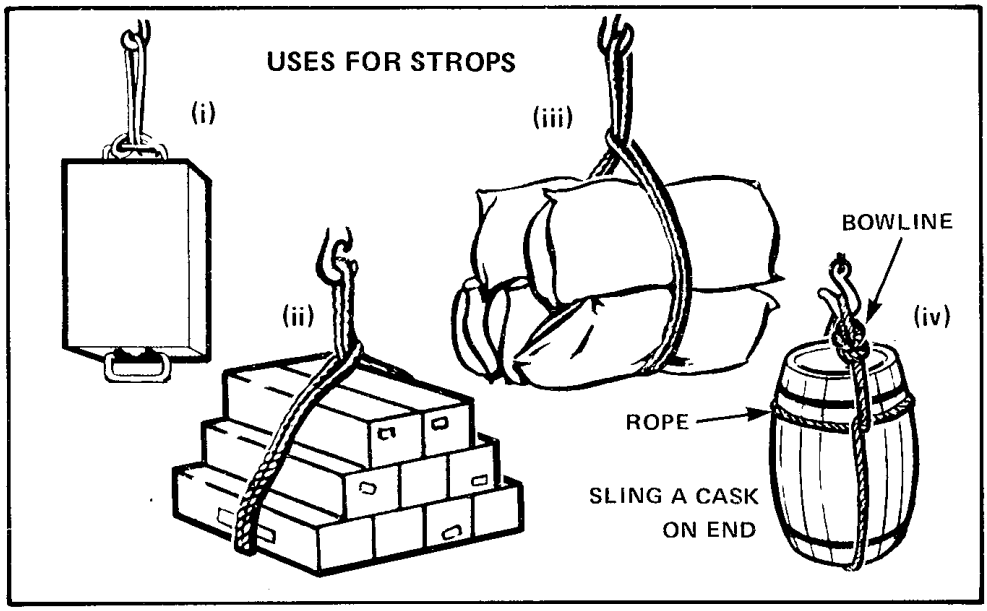


Figure 4-63 Uses for Strops

14. **Cruppers** — A heavy case without handles may be lifted using two strops of equal length, but you will sometimes need to fit a **crupper**, as shown in Figure 4-64 so that the strops are kept apart, and the case does not slip out.

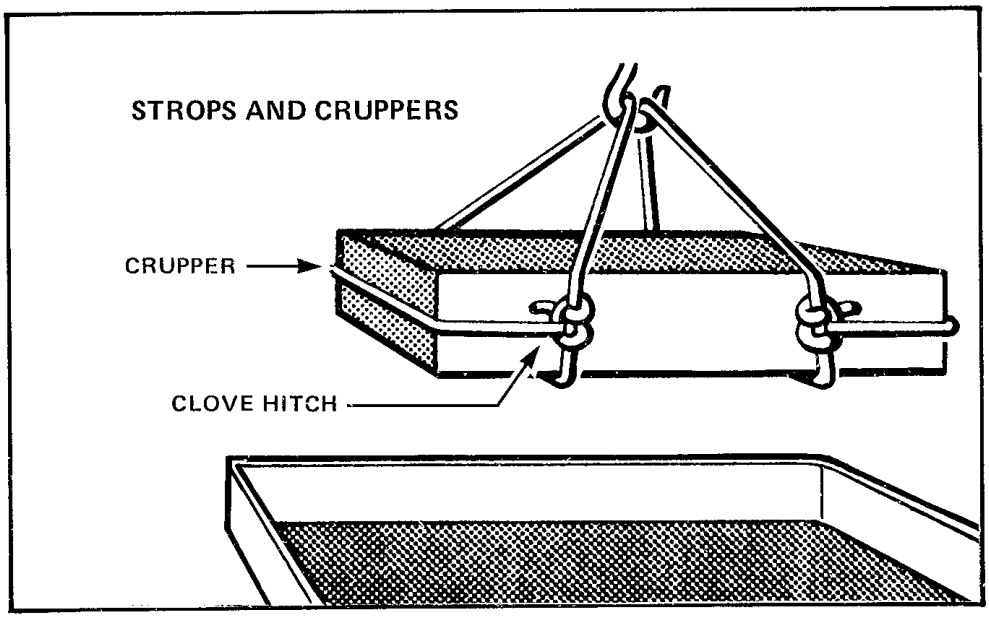


Figure 4-64 Strops and Cruppers

15. **Snotters** — For dealing with sacks of vegetables, sugar, etc, a single sling with an eye at either end is most convenient. This is called a **snotter**. See Figure 4-65. Snotters may be made up in pairs or used singly.

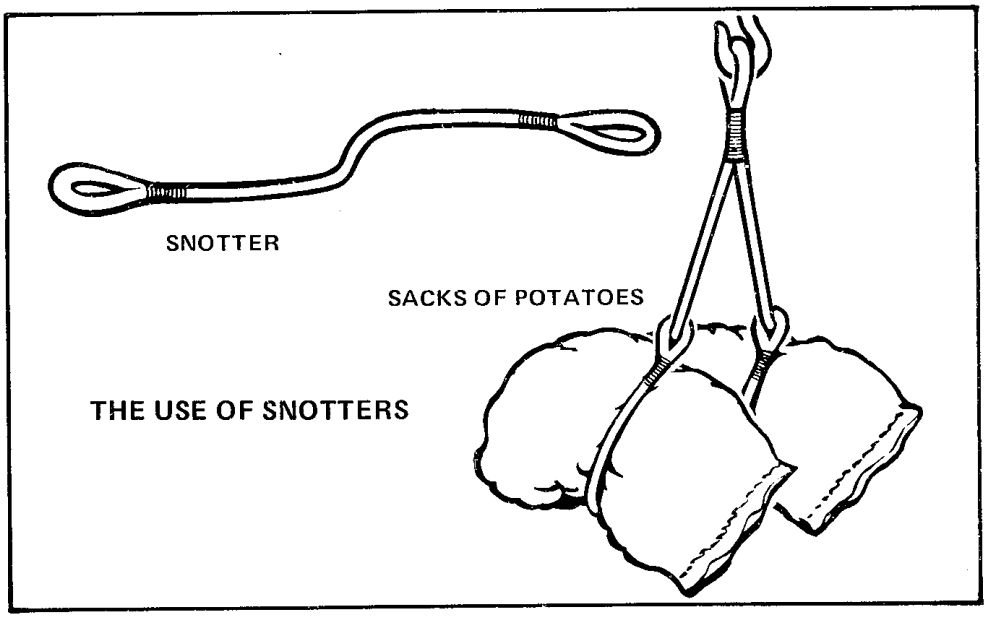


Figure 4-65 The Use of Snotters

16. **Logwires** – Along these same lines, a single sling with an eye at one end and a hook at the other is called a **logwire**. See Figure 4-66. Its purpose is to hoist timber. Logwires may be used singly or in parts.

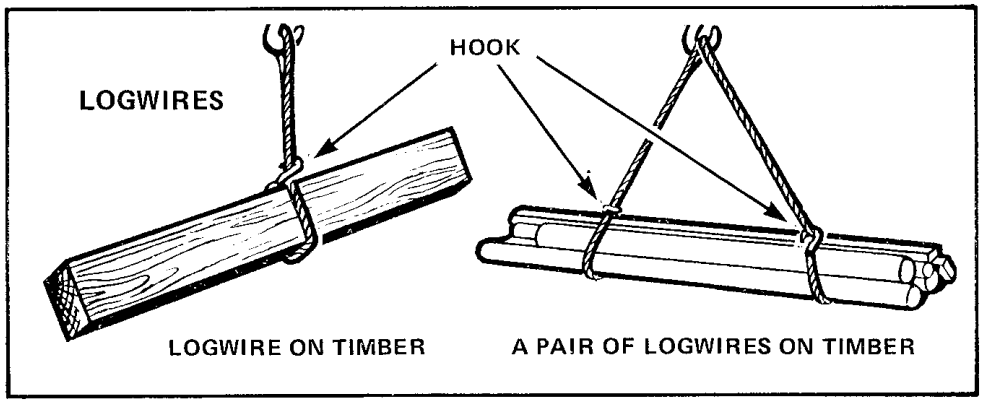


Figure 4-66 Logwires

17. **Cargo Nets** — Probably the most useful of all methods of slinging is the **cargo net**. It may be loaded flat on the deck and the slings placed quite easily on a hook. Cargo nets should not be used for fragile or very heavy objects. See Figure 4-67.

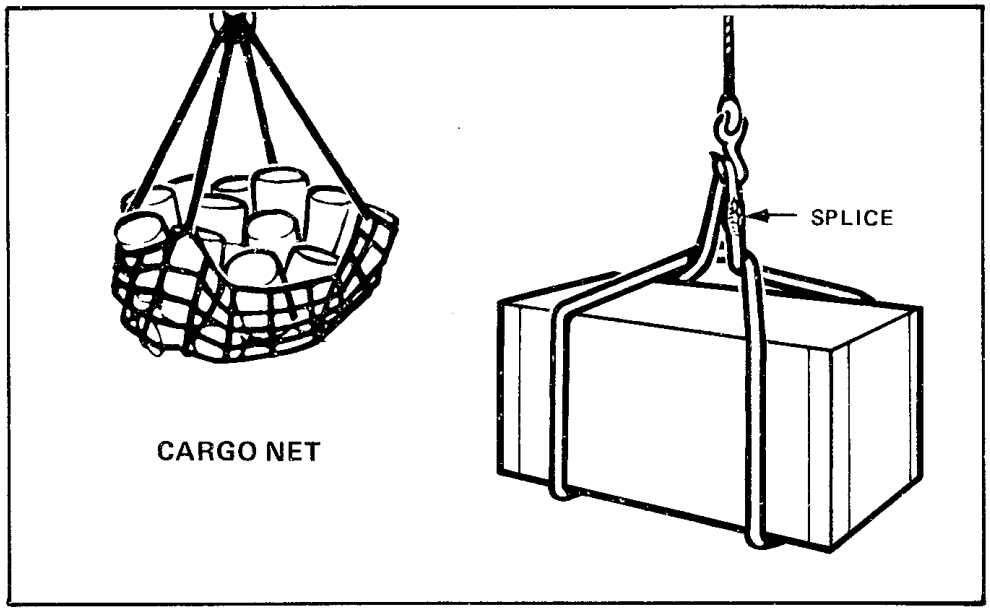


Figure 4-67 Cargo Nets

18. **Care with Slings** — One point to remember when using slings is that **if there is a splice anywhere in the sling,** it should **not be allowed to touch either the object being lifted or the hook.**

19. **Stress on Slings** — When anything is to be hoisted, whether it is a single item or a collection of packages of stores, it is attached to the hook of the hoisting rope by means of a **sling,** which may be formed by a strop or consist of special fittings. Care must always be taken when using slings as their misuse or overloading is a frequent cause of accidents.

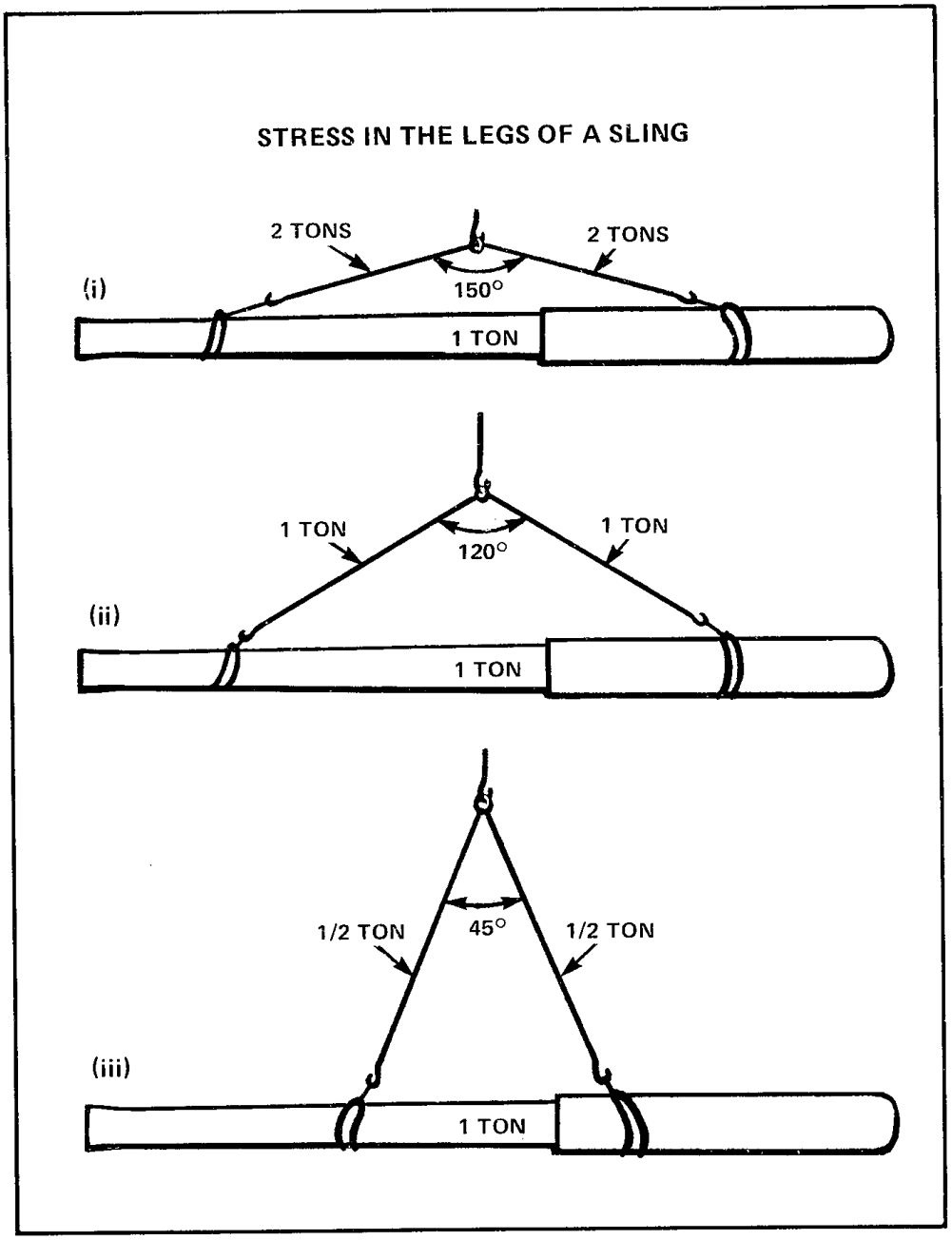


Figure 4-68 Stress in the Legs of a Sling

20. **Stress in the Legs of a Sling** — An important principle in slinging is illustrated in the three diagrams in Figure 4-68. These show an object weighing one ton slung in three different ways, with the tension in each leg of the slings marked in each method. It will be seen that **the greater the angle between the legs of the slings, the greater is the tension they have to bear.** For two-legged slings used in commercial practice the working load is laid down for various angles between 0 degrees and 120 degrees. These slings are seldom, if ever, permitted to be used with the legs beyond this limiting angle of 120 degrees. However, there are occasions when an unavoidably large angle has to be accepted, and the seaman must then take care that his sling is strong enough to take the extra strain.

21. **Stress Using a Strop** — The same principle applies also to simple strops, as illustrated in the two sketches (i) and (ii) in Figure 4-69. In (i) the angles between the four legs of the strop are wide and each leg bears about 1-1/2 times the weight of the case; in (ii) the angles between the four legs of the strop are small and each leg bears about half the weight of the case.

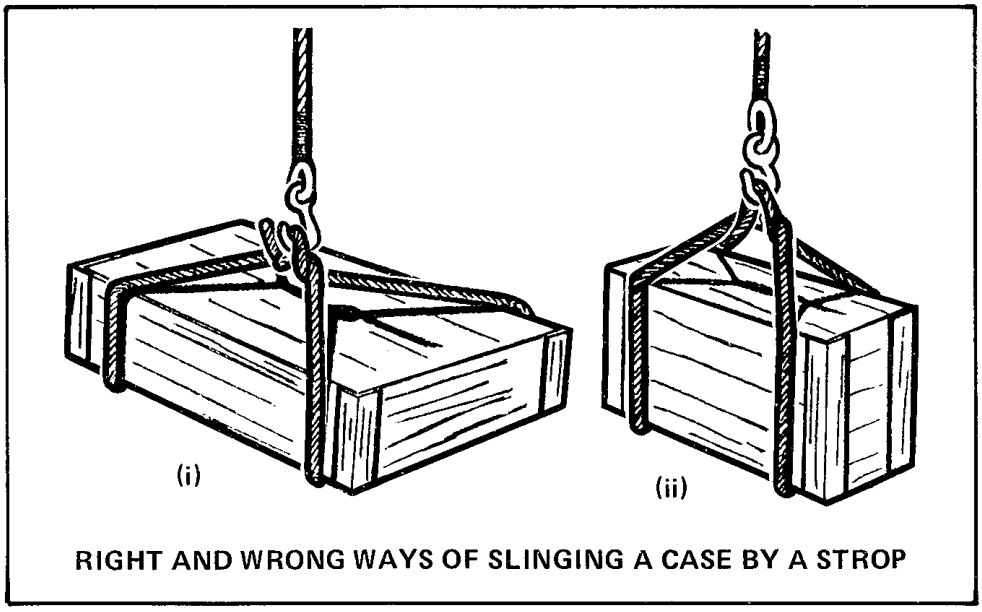


Figure 4-69 Right and Wrong Ways of Slinging a Case by a Strop

22. **Slinging Weights** — Weights should always be slung so that their centre of gravity is as low as possible; and the places where the slings are liable to be chafed, such as the sharp edges of packing cases, should be padded.

23. **Care with Lifting Gear** — It is emphasized that lifting gear of any kind should never be used in a casual manner. Any lifting gear such as a sling should be examined before use to see if it is in a fit condition and of sufficient strength for the job required of it.

24. **To Sling a Cask** — There are two ways to sling a cask successfully. These are:

    a. **Horizontally** - A butt sling or a bale sling can be used for slinging a cask. Place the cask on its bilge with its bung up. If using a butt-sling, pass it round one end of the cask and through its own eye; then pass the tail round the other end of the cask, in the same direction as the standing part from the eye, and finish by clove-hitching the end of its own part (see Figure 4-70 (i)). If using a bale, sling middle it under the cask and dip one bight through the other (see Figure 4-70 (ii)).

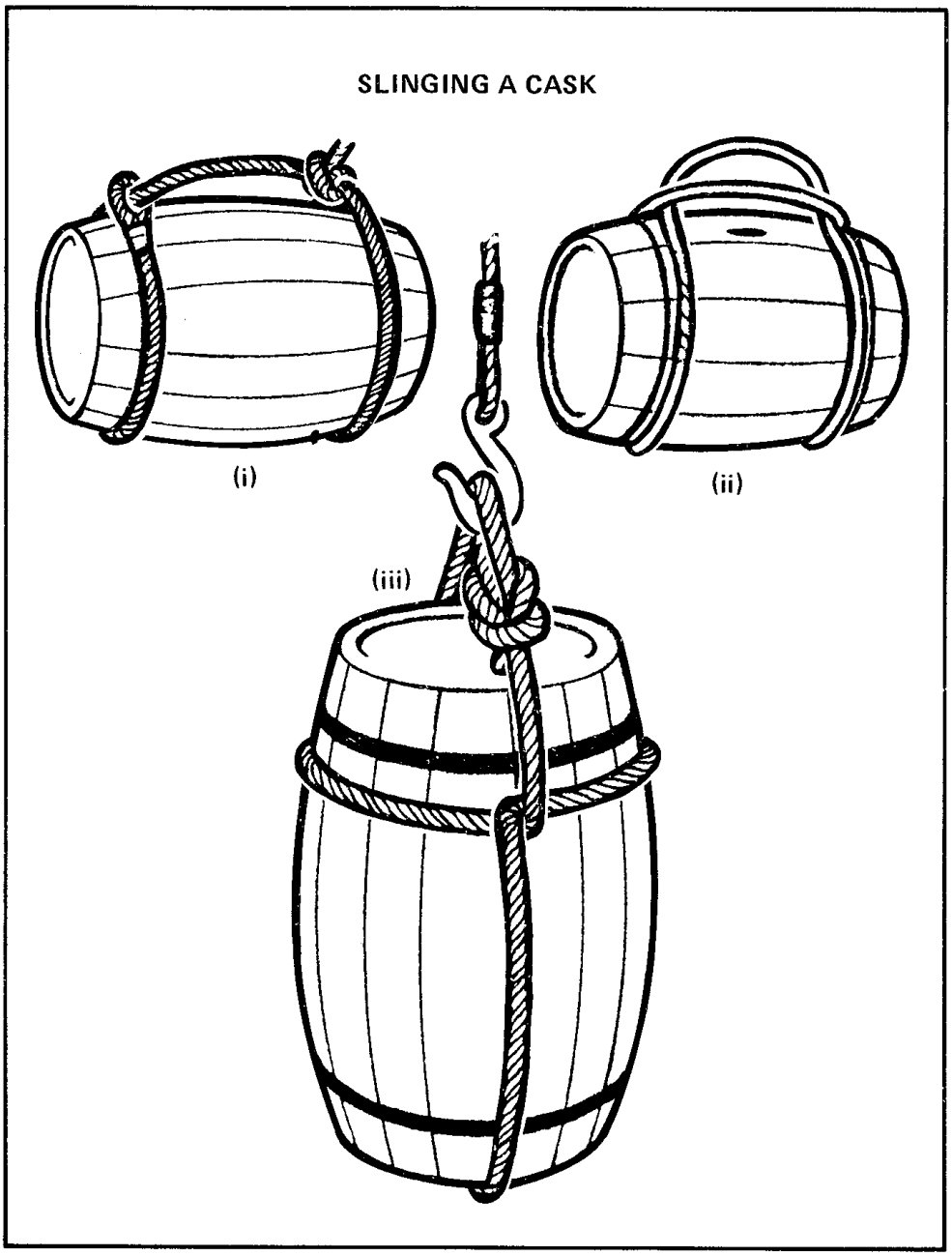


Figure 4-70 Slinging a Cask

b. **Head Up** — (See Figure 4-70 (iii).) — This method is used if the head of a cask is missing or damaged. Place the cask on its end, pass a rope under the cask, and with the ends make an overhand knot on the top of it; then open out the knot and slide the two haves down the sides to a quarters of the way down the cask; haul taut and finish off with a reef knot on the top.

TRAINING PERIODS 21 AND 22 — THE STANDING DERRICK

25. **Purpose** — The standing derrick belongs to a class of rigs known as **extempore rigs**. These are rigs used for lifting operations in situations where regular power-driven derricks, etc, are not available. These rigs clearly illustrate the ingenuity of the seaman in achieving his objective by the use of the simplest possible materiels. The only materiels required are spars, blocks and rope, which until relatively modern times were universally available in all ships. The extempore rigs are included primarily as exercises in practical seamanship, permitting cadets to put into practice, for a definite purpose, the skills learned in the earlier part of the course.

26. **The Standing Derrick** — This is the simplest of the extempore rigs, requiring only a single spar. It will permit the lifting of relatively light objects from a point about two-thirds of the length of the spar away from its foot (eg, from a jetty to the deck of a vessel). It will permit back-and-forth movement of the spar and a very limited side-to-side movement. Its main disadvantage is its relative weakness, since the single spar is subjected to buckling stress.

27. **Parts of the Rig** — These items make up the standing derrick:

a. one spar with thumb pieces at top and bottom;

b. one topping lift — twofold purchase;

c. one main purchase — twofold purchases;

d. guy — length of rope clove-hitched at its mid-point to the head of the spar. May be provided with tackles;

e. two guy tackles — single or double whips;

f. three heel tackles — short, light luffs or twofold purchases;

g. one leading block for fall of the main purchase;

h. one wooden shoe; and

j. six cordage strops.

28. **Rigging a Standing Derrick** — To rig a standing derrick proceed as follows:

a. **Stops** for attaching the purchase and topping lift are first placed over the derrick head. They are prevented from slipping down either by wooden projections called **thumb pieces** (Figure 4-72 (ii)) screwed or nailed in place, or by a rope **collar** (Figure 4-72 (i)) put on the spar like a whipping. These strops should lie close together so as to avoid a bending stress on the spar.

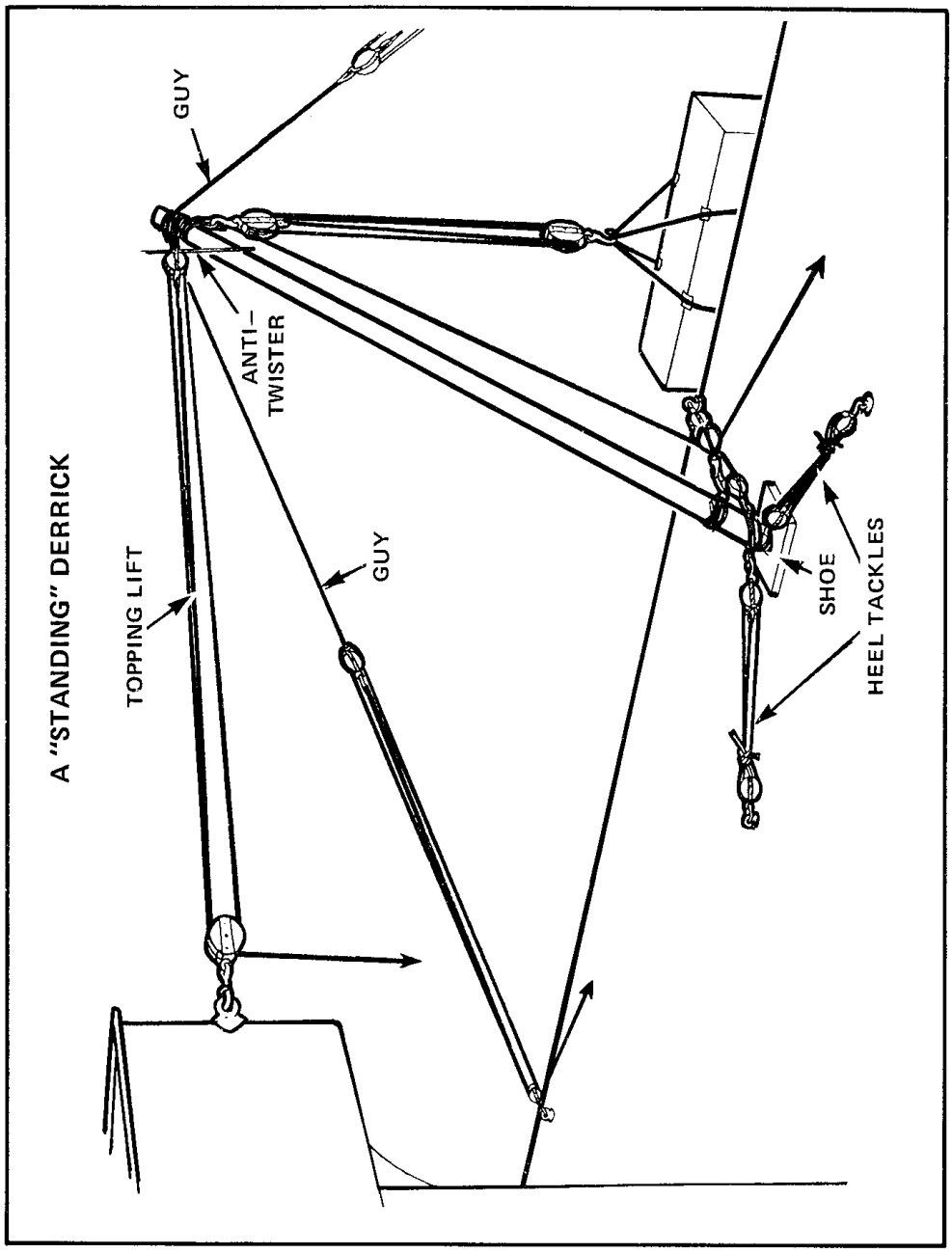


Figure 4-71 A Standing Derrick

b. The **upper block of the purchase** and the **outer block of the topping lift** should now be hooked to the strops, and the hooks securely moused. The **inner block of the topping lift** may be secured to its point of attachment, and the tackle let out to its full extent. The best lead for the topping lift is at right angles to the derrick and towards a point vertically above the head, but these conditions may not always be possible.

c. **The guys,** which consist of single parts of cordage or wire rope, are then **middled and clove-hitched over the head of the spar,** above the strops, tackles should be attached if required.

d. **The shoe** should be hollowed out to fit the foot of the derrick so as to distribute the thrust fairly, but where this is not possible a useful alternative is to step the foot of the derrick on a sandbag laid on the top of the shoe. The distance from the foot of the derrick to the point of attachment of the purchase and topping lift is known as the **effective length** of the derrick.

e. The **heel of the derrick** is kept in place by **tackles,** which must be led so that they will support it in every direction, and in particular from that in which the derrick will be raised and lowered. The **strops for the heel tackles** must be kept as low down as possible, otherwise tackles will be heavily stressed, as the derrick is raised. If hooks are used on the blocks of the heel tackles, they should be moved.

f. **The fall of the purchase** is rove through a **leading block** secured to a strop round the heel of the derrick, the strop being prevented from slipping up by thumb-pieces or a rope collar.

g. The derrick is now raised by hand, ensuring that the lower block of the purchase is kept within reach. The **heel tackles** are hauled taut and secured. The guys and topping lift are hauled sufficiently taut to steady the head of the derrick, and manned. The derrick is now ready for operation.

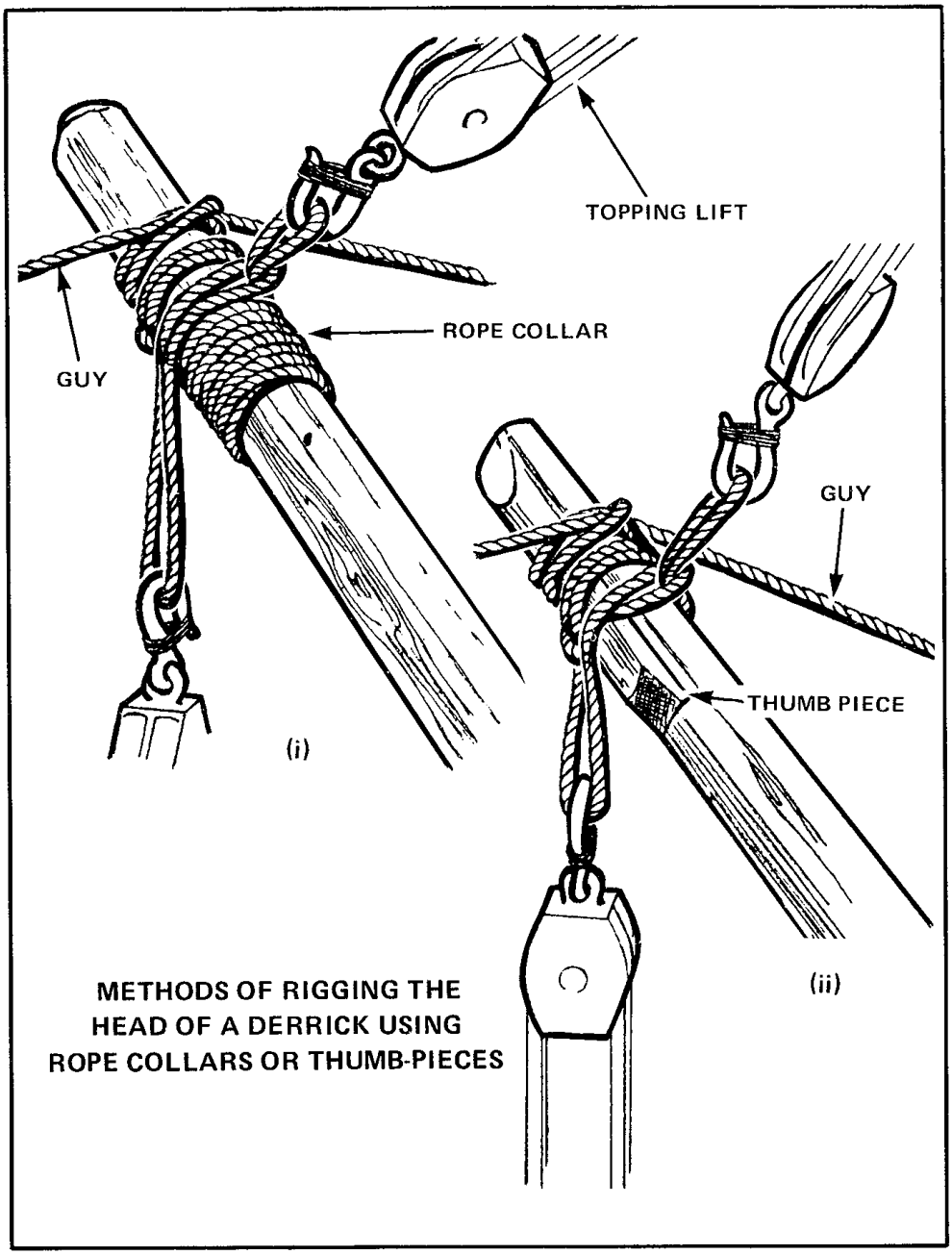


Figure 4-72 Methods of Rigging the Head of a Derrick Using Rope Collars or Thumb-Pieces

TRAINING PERIODS 23 AND 24 — RIGGING SHEERS

29. **Use of Sheers** — Sheers may be used for purposes similar to those of derricks, but do not provide any side-to-side movement. They are thus less flexible than a derrick but can lift a greater load because the stress is distributed over two spars.

30. **Parts of the Rig** — These items make up the Sheer Rig:

a. two spars;

b. one topping lift — twofold purchase;

c. one main purchase — twofold purchase;

d. one martingale (optional) — double whip;

e. head lashing;

f. four heel tackles — short, light luffs or twofold purchases; (may substitute simple strops if points of attachment are evenly distributed);

g. one splay tackle — short, light luff or twofold purchase;

h. one leading block for fall of main purchase;

j. two wooden shoes; and

k. ten cordage strops.

31. **To Rig Sheers** — (See Figures 4-73, 4-74 and 4-75.) The **spars** for the legs are laid side by side with their heels together and their heads supported conveniently clear of the ground or deck. The heads are then lashed together as described below and illustrated in Figure 4-73.

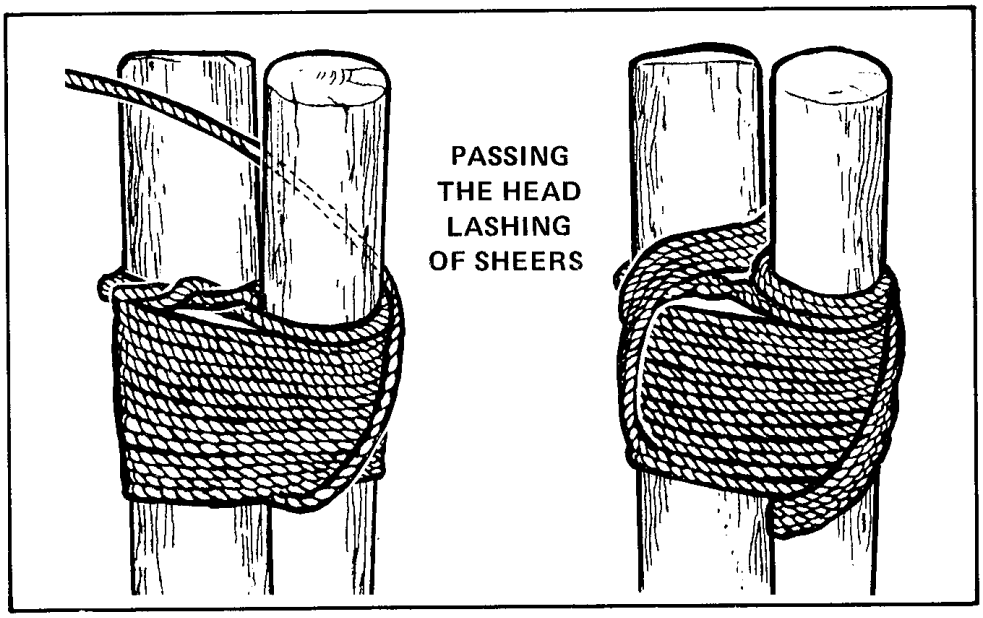


Figure 4-73 Passing the Head Lashing of Sheers

32. **Making Fast the Legs** — The legs are first crossed and the **lashing** made fast to one of them **by a timber hitch,** either above or below the cross, and then a **sufficient number of round turns** (usually 14 or more) to cover the cross are taken round both legs. The end is then brought up between the legs, passed down between them on the opposite side of the cross, and brought up again as before, so as to form a **frapping turn,** binding the whole lashing together. Four or five of these frapping turns should be taken round the opposite leg to the one to which it was originally attached; it is important that the frapping turns are correctly put on, close to each other, and hauled taut. Note that the frapping turns cross the spars as well as the lashing.

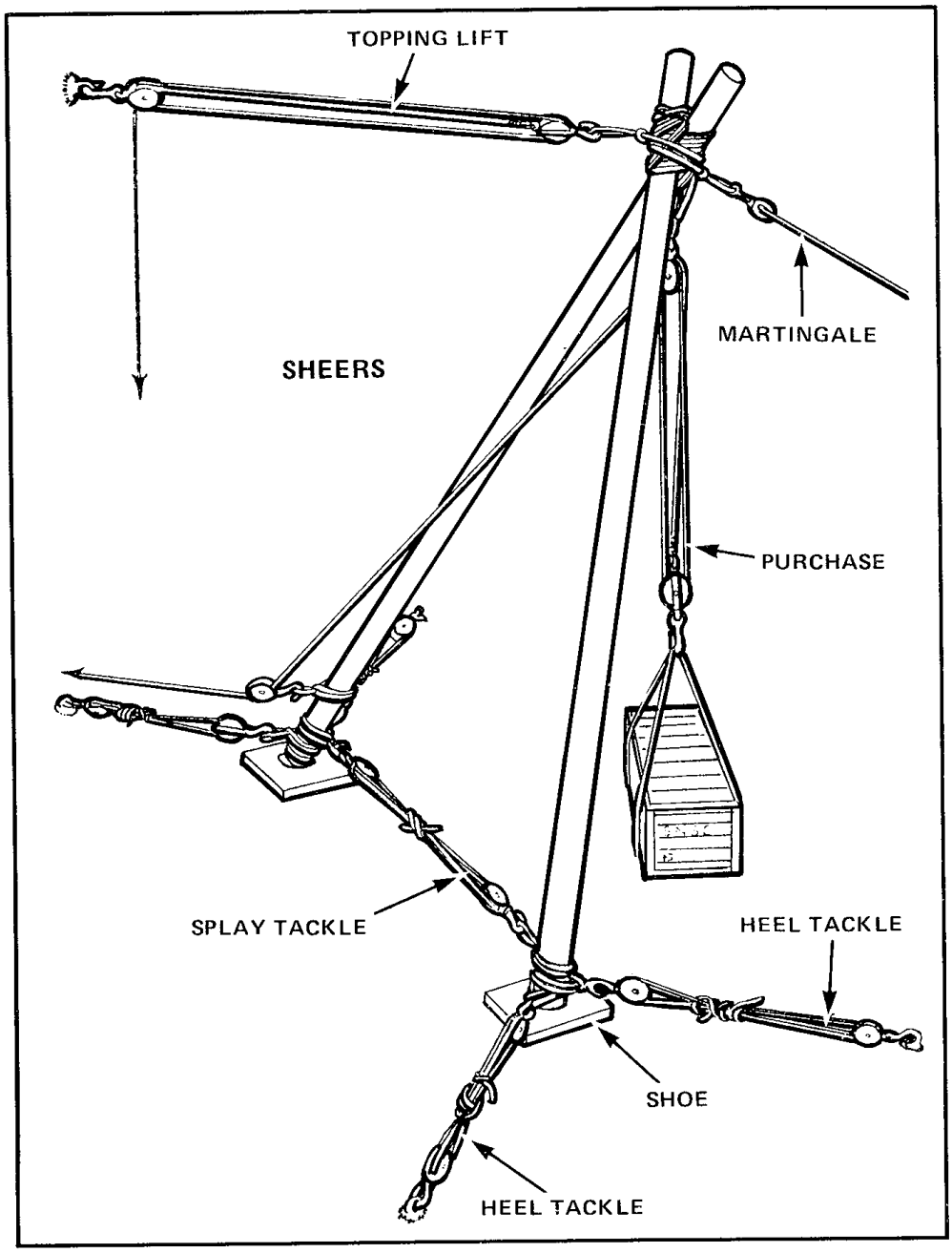


Figure 4-74 Sheers

33. **Attaching the Strop** — When the head lashing has been completed, the **heels of the legs** are opened out to the required distance; thus opening them out sets up the head lashing so taut that it binds the legs securely together where they cross. The **strop for the purchase** is now put on and must be long enough to enable the block to swing clear between the legs; it is put on by slipping it up the top leg and passing it down over the head of the lower leg so that it will bind the two together when under

load (Figure 4-75). The upper block of the purchase is hooked to this strop (as shown), and the hook is securely moused.

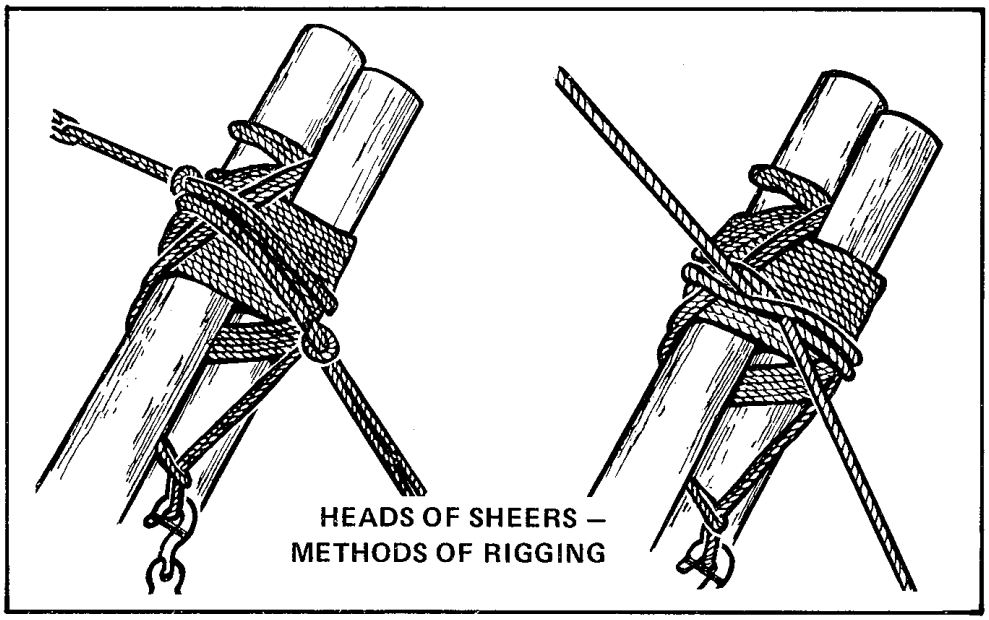


Figure 4-75 Heads of Sheers — Methods of Rigging

34. **Attaching the Guys** — The **topping lift** and **martingale,** or fore and back guys, are then secured to the head of the sheers. There are several equally good ways of doing this, two of which are illustrated in Figure 4-75, and in each of which the principle is that the pull of the guys should assist in binding the sheers together, and that the purchase strop should be free to take up its natural position as the weight comes onto it. Hooks on topping lift and upper purchase block should be moused.

35. **Positioning the Sheers** — The sheers are then placed roughly in position ready for raising, the heels pointing to the shoes prepared for them and supported laterally by **splay** and **heel tackles.** The distance between the shoes should be one-third of that from the foot of the sheers to the crutch, and this latter distance is the effective length of the sheers.

36. **Splay and Heel Tackles** — As its name implies, the **splay tackle** leads from the heel of one spare to the heel of the other, being secured to each by a strop. The **heel tackles** guy the heels laterally and, as for a derrick, their strops should be kept as low down as possible.

37. **Attaching the Leading Block** — The **leading block for the fall of the purchase** is then attached to one leg, and, after fitting thumb-pieces or rope collars to prevent all the strops at the feet of the legs from slipping upwards, the sheers are now rigged and ready for raising.

38. **Raising the Sheers** — To raise the sheers, the heels of the spars are placed on the shoes and the splay tackle heaved taut and secured. The heel tackles are also hauled taut to retain the heels of the sheers in position. The topping left is manned and kept taut while the head of the sheers are raised by hand. When the sheers are at an angle of approximately 45 degrees, the strain may be taken by the topping left and the sheers raised to the working position.

39. **Use of Heel Strops** — If the points of anchorage for the heels of the sheers can be placed symmetrically, it is possible to use strops instead of tackles for the purpose, using the splay tackle alone to set up the necessary tension in the system. This results in a considerable economy in blocks and tackle. Such a method may be employed where the sheers are set up outdoors, using symmetrically-placed anchor-pegs as points of attachment for the heel-strops. Such an arrangement is illustrated in Figure 4-76. It is important that the distances between the anchor-pegs and the length of the heel-strops be appropriate. The figures shown in the diagram are suitable for 14-foot sheers. For other sizes, these dimensions will have to be worked out by trial and error. Bear in mind that the length of the strop must take into consideration the portion that passes around the leg of the sheers.

NOTE

If a vertical surface, (such as a building, tree or pole) is available for attachment of the topping-lift **at the level of the head-lashing,** the topping-lift may be of any convenient length.

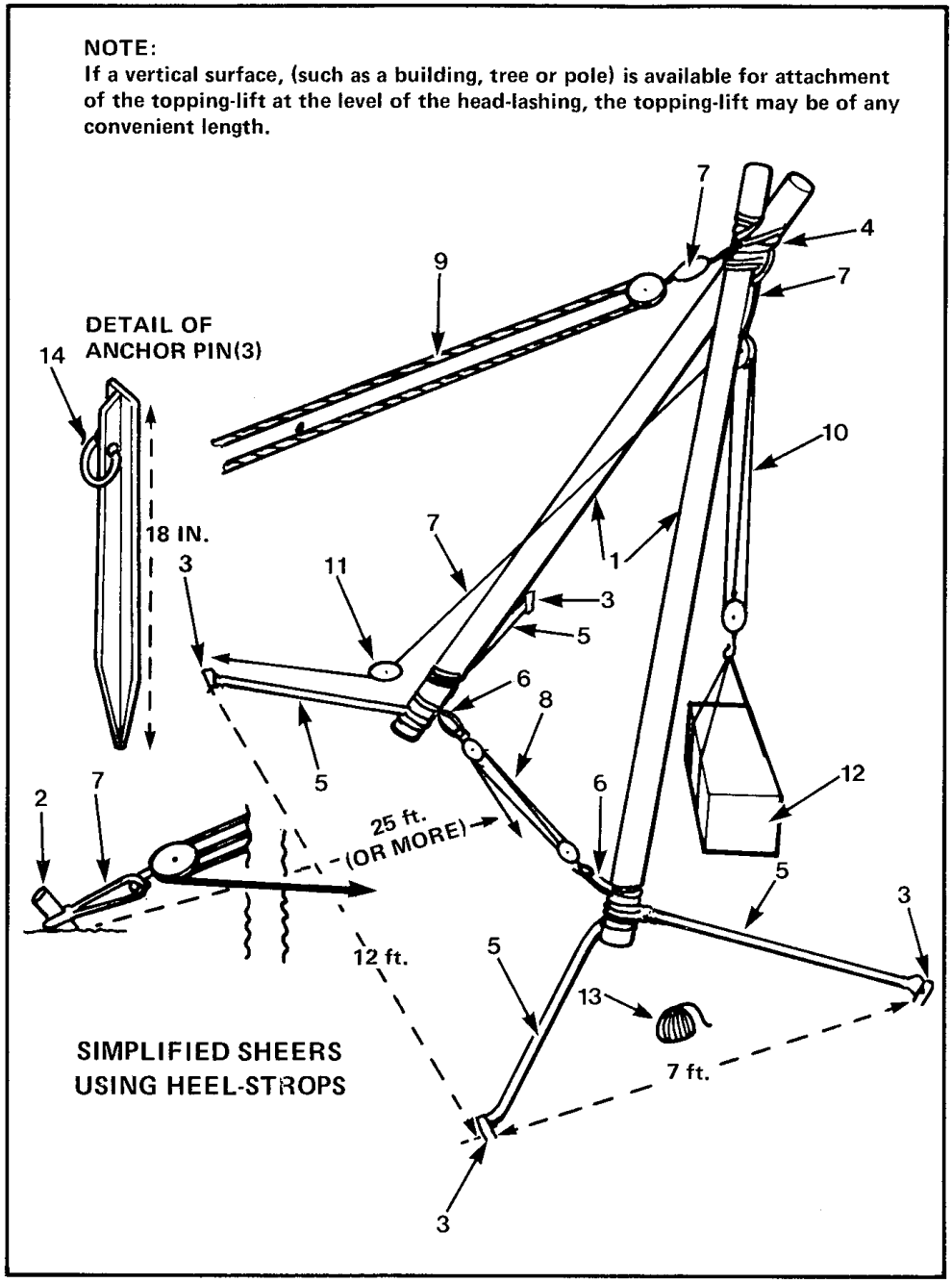


Figure 4-76 Simplified Sheers Using Heel-Strops

40. **Parts List** — The list below is a recommended parts list for the simplified sheers illustrated in Figure 4-76. The numbers correspond to those in the diagram. Note that the anchor pins illustrated are for the heel-strops, not for the topping lift, which requires more secure anchorage. The dimensions given are for the 14- to 16-foot sheers illustrated and will require alteration for different sizes. Once the various strops and the

head-lashing have been measured, made up and tried for correctness, they should be set aside and used only for sheers and the other extempore rigs.

a. (1) **Sheers** — Two 14- to 16-foot poles (regular cedar clothes-line poles, available at most lumber yards, stripped and varnished).

b. (2) **Topping-Lift anchor** — 4 feet of 2- to 3-inch steel pipe, driven into the ground at a 45 degree angle.

c. (3) **Anchor-pins** — Four 18-inch pieces of T-Bar fencepost, sharpened at one end and drilled for a shackle at the other.

d. (4) **Head-lashing**[d] — 1/2-inch diameter manila. Measured for each pair of sheers.

e. (5) **Heel-strops** — Four 1/2-inch manila strops, 72 inches long.

f. (6) **Splay-tackle strops** — Two 1/2-inch manila strops, 30 inches long.

g. (7) **Topping-lift and Purchase Strops** — Four 3/4-inch manila strops (two 60 inches, and two 30 inches long).

h. (8) **Splay tackle** — Luff or two-fold purchase, 3- to 4-inch blocks, 72 inches long when extended.

j. (9) **Topping-life** — Two-fold purchase, 4- to 6-inch blocks, 35 feet long when extended (but see note, paragraph 10).

k. (10) **Purchase** — Two-fold purchase, 4- to 6-inch blocks, 12 feet long when extended.

m. (11) **Leading-block** — Single-Sheave, 4- to 6-inch IB or snatch block.

n. (12) **Load** — Any suitable object, 30 - 50 lb in weight.

p. (13) Twine for mousing hooks.

q. (14) Four shackles, 3/8-inch to 1/2-inch diameter pins.

TRAINING PERIODS 25 AND 26 — RIGGING AN EXTEMPORE GYN

41. **Using the Gyn** — The gyn uses three spars and is a relatively strong, rigid structure. It does not permit any movement of the upper purchase block and thus can only be used where the load is to be raised from a point directly below the junction of the spars. However, it does not require outside points of attachment for a topping lift or heel tackles, and can be erected virtually anywhere.

42. **Parts of the Rig** — These items make up the gyn rig:

a. three spars;

b. one main purchase — twofold purchase;

c. three splay tackles — light luffs or twofold purchases;

d. one leading block for fall of the main purchase;

e. one head lashing;

f. eight cordage strops;

g. three wooden shoes.

43. **To Rig an Extempore Gyn** — (See Figures 4-77 and 4-78.) The position for the heading lashing is first marked on all three spars which are to be used for the legs. These legs are then laid parallel with each other, an inch or two apart and **with the heel of the centre leg pointing in the opposite direction to those of the other two.** The marks must be in line and the heads of the legs should be supported clear of the deck.

44. **Lashing** — **The lashing** is then put on at the marks. It is begun with a **timber hitch round one leg,** then from six to eight figure-of-eight turns are taken, as shown in Figure 4-77, and the lashing is completed with a **clove hitch round one leg**. The lashing **must be applied loosely**; it cannot slip down once the gyn is erected, and if it is too taut great difficulty will be experienced in raising the gyn; it is usual, however, to place a rope collar round the odd leg below the lashing to prevent it slipping down during the process of raising.

45. **Attaching the Tackles and Strop** — The heels of the two legs which are lying close together are now opened out, and the **splay tackles** are rigged between the feet of each pair. The gyn is then raised by lifting its head and hauling the heel of the odd leg towards the other two by means of the splay tackles. When the head reaches a convenient height **the strop for the upper block of the purchase** is put on and **the block itself secured to it**. Placement of this strop must be as shown in Figure 4-78. Note that it goes under the centre spar and over the outside spars. This is done by holding the strop under the centre spar and slipping the bight on each side over the end of the outer spars. Purchase strops must never hang on the lashing. Then tackles are rigged as required to haul the feet into place on their shoes. When thus correctly placed the feet are secured by lashing, or heel tackles led so as to give the necessary lateral support, and **the hauling part of the purchase** is **led through a block** secured to the heel of one leg. All hooks used in the above operations should be securely moused.

46. **Small Gyns** — As with derricks and sheers, thumb pieces or rope collars are required to prevent the strops at the heels from slipping up the legs. With very small gyns splay tackles are not necessary, and their feet can be manhandled into place and then secured, either by lashing or by short spars lashed across them.

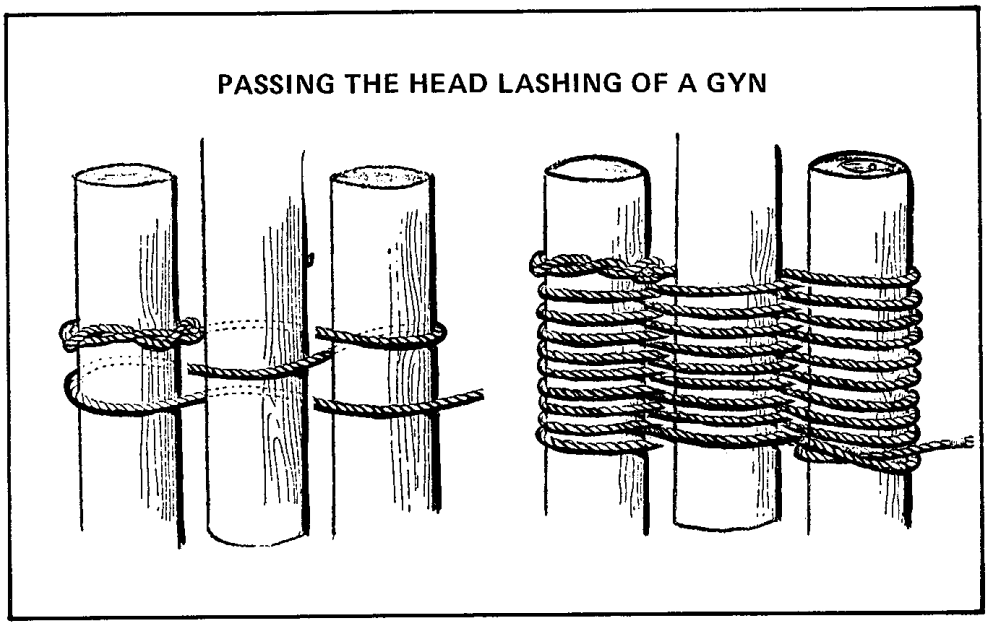


Figure 4-77 Passing the Head Lashing of a Gyn

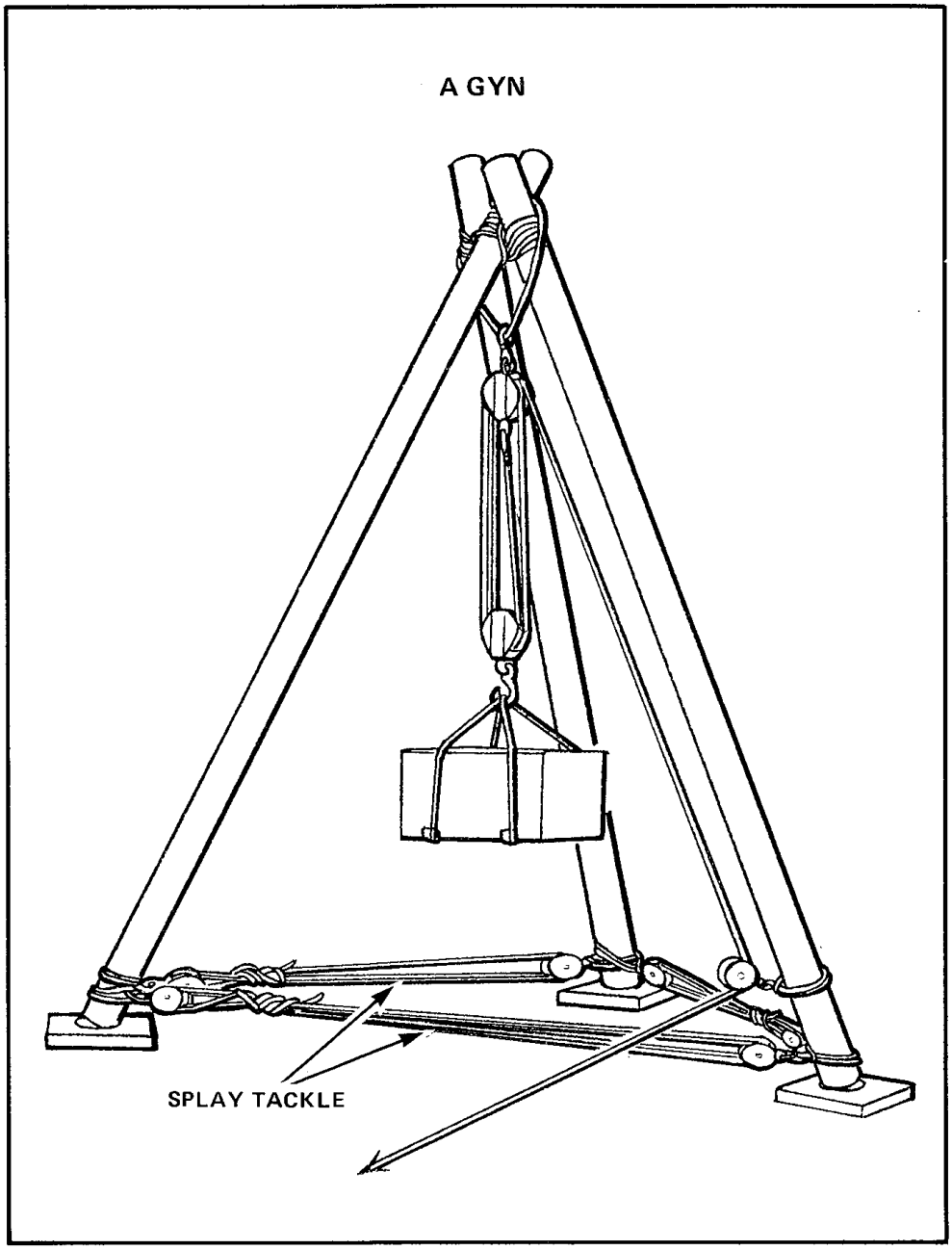


Figure 4-78 A Gyn

TRAINING PERIOD 27 — RIGS OF A BOATSWAIN'S CHAIR/APPLICATION OF STROPS

47. **Boatswain's Chair** — A thimble is seized into the bights of both strops and the gantline shackled to it, or secured by a double sheet bend. The gantline must be tended by an experienced cadet and properly belayed. When it is necessary for the

person to control his own positioning, an **experienced** person is raised to the required height and he holds the standing and hauling gantline parts together, above the thimble; the bight of the hauling part is brought through the sling of the chair held to the standing part of the hantline; and other hand can then be released. The bight is then lengthened by hauling more up and when long enough, is passed under his fett and brought up around the chair and himself to form a hitch and secure the chair. The chair can be lowered by hauling up some of the slack and rendering the turns (Figure 4-79).

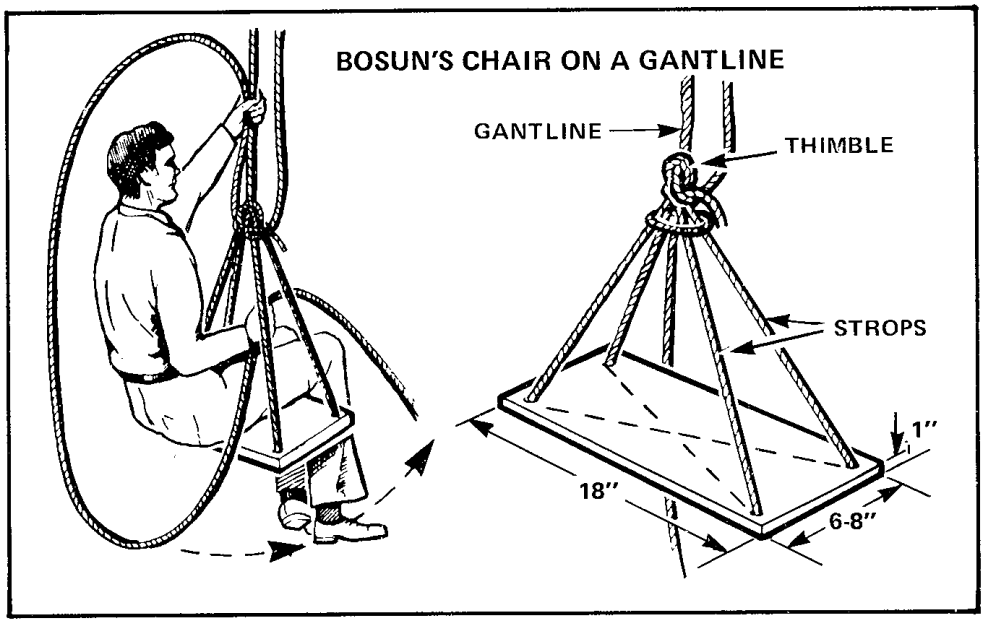


Figure 4-79 Bosun's Chair on a Gantline

48. **To Put a Strop on a Spar** — Use a common strop, as shown in Figure 4-80. If the pull is from one side, so that a strong grip is required, use a selvagee strop in a similar manner.

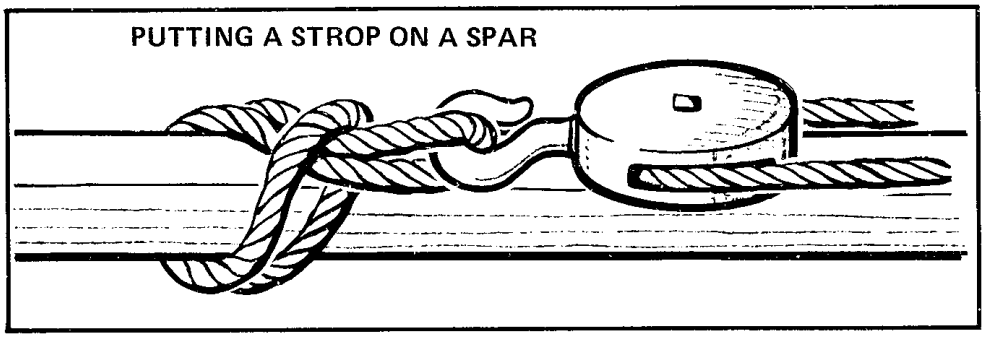


Figure 4-80 Putting a Strop on a Spar

49. **To Put a Strop on a Rope** — Middle a common or selvagee strop on the rope. Dog the bights opposite ways and hook the tackle onto both bights, as shown in Figure 4-81.

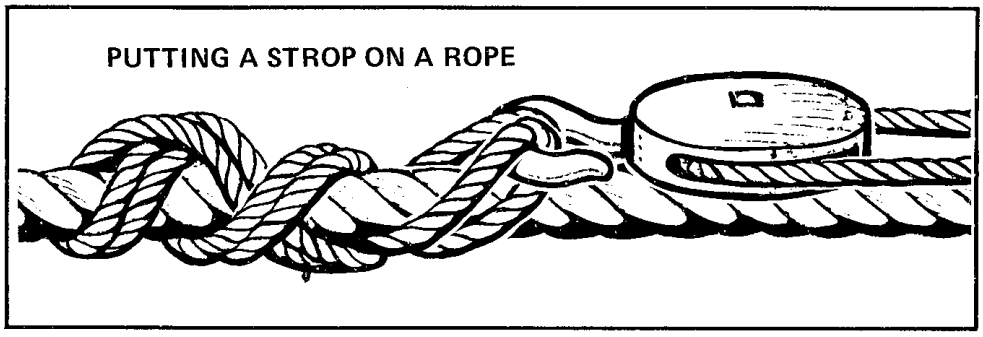


Figure 4-81 Putting a Strop on a Rope

TRAINING PERIOD 28 — THE LIGHT JACKSTAY

50. **Uses of a Jackstay** — A typical rig for transferring men and light stores by jackstay is shown in Figure 4-81. The **hauling end** of the jackstay is manned by at least 20 men in the ship supplying the gear, and the other end is secured by its strop to a **rigging** slip in the other ship. The **traveller** is hauled back and forth along the jackstay by an **inhaul** in each ship, manned by two or more men.

51. **Transferring Men and Stores** — Small miscellaneous stores are best transferred in a **canvas container**, details of which are shown in Figure 4-81. Other stores may be slung from the traveller, or transferred in provision nets. Men are usually transferred by a **stirrup**, but a **chair**, rigged as shown in Figure 4-81 may also be used; whenever a man is transferred he should wear a life-jacket. The traveller, with its hook, is a naval store article, but if one is not available an 8-inch clump block, or a 12-inch single block fitted with a spring moused swivel hook, may be used instead; if slings or provision nets are used the hook should be wide enough in the clear to take the bights of the slings or the beckets of the nets.

52. **Strength of the Rig** — When setting up any rig of the jackstay type it should be borne in mind that the stresses imposed on certain parts of it depend on how taut the jackstay is kept, and that they may greatly exceed the weight of the load being transferred. The tauter the jackstay the greater the tension will be in it due to the load slung from it; and conversely, the slacker the jackstay the less this tension will be. When the angle made in the bight of the jackstay is 120 degrees, the tension in it will be equal to the weight of the load slung, but if the jackstay becomes bar taut the tension will rise to infinity.

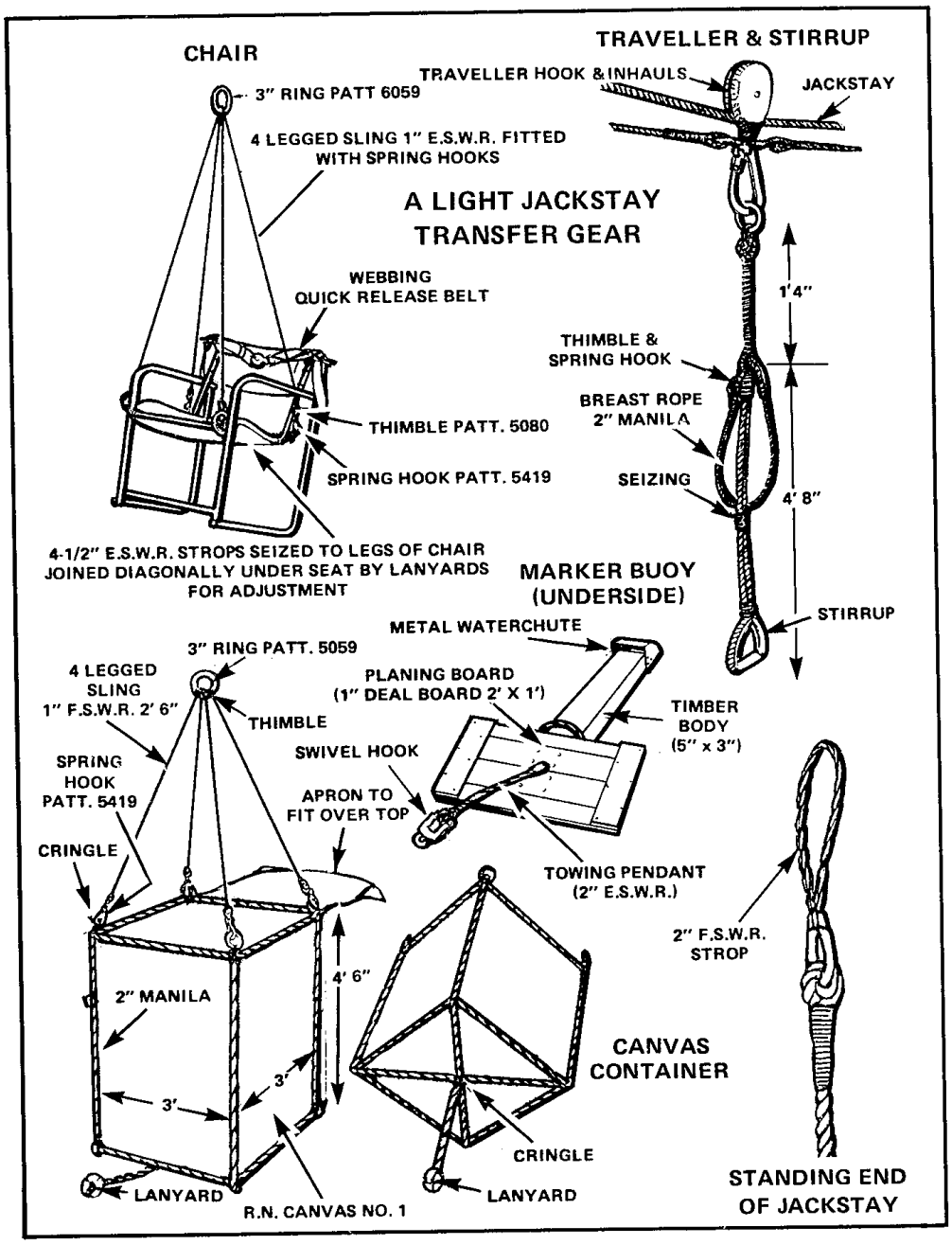


Figure 4-82 A Light Jackstay

53. **Stress on the Jackstay** — The tauter the jackstay, however, the easier it is to haul the traveller back and forth. In practice, the degree of tautness in the jackstay is dependent upon the pull exerted by the men manning it, which will seldom exceed the safe working load of the rope; but the stress on the leading blocks and their shackles and eyeplates will be much greater than any tension in the jackstay, and at these points it is prudent to allow for stresses of ten times the weight of the load to be transferred.

54. **Maximum Load** — Applying this rule to the rig illustrated in Figure 4-82, the maximum load which can be transferred by this rig is 500 lb and then only if the gear is in first class condition.

55. **Selection of Positions for the Rig** — If the ship is not fitted for jackstay transfer, the following should be borne in mind when selecting positions for setting up the rig:

a. the jackstay should be led at a height of at least 15 feet above the upper deck to enable the load slung from the traveller to clear the guardrails, and it should be led to a point at least 12 feet inboard to allow the traveller to plumb the dump;

b. the area of the **dump** should be large enough to accommodate an accumulation of stores and their handling party of six men, about 12 feet by 12 feet if available;

c. there should be clear runs of at least 60 feet for the men manning the jackstay and for those manning the inhauls;

d. there should be a clear run for the supply or removal of stores to and from the dump; and

e. the rig should be as simple as possible, and as few leading blocks as possible should be used for the jackstay and inhaul because each causes loss of hauling power due to friction.

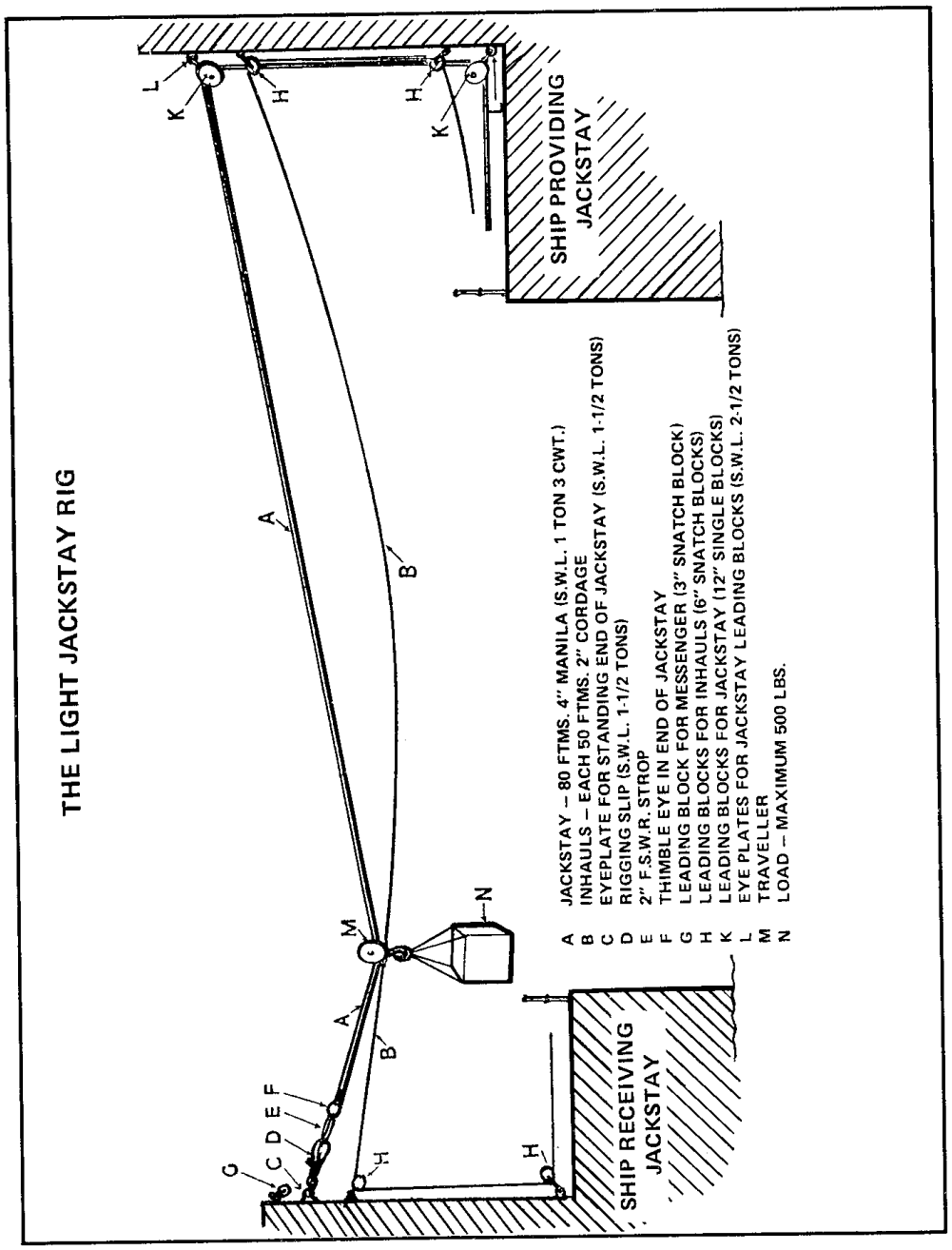


Figure 4-83 The Light Jackstay Rig

56. **Passing and Rigging the Gear** — (See Figures 4-84 and 4-85.) The procedure is as follows:

a. **By the Ship supplying the Gear — The distance line, bridge telephone cable** and **dump telephone cable** (if used), and the **inhaul** and **jackstay** (each tended by one or two men) are led outboard **in that order** from forward

aft at intervals of about 10 feet. The distance line and telephone cables are led aft to the position from which the gun-line is to be projected. As soon as the gunline is passed (assuming it to be a lightline) it is bent to the messenger, which is then hauled across. When the messenger is in hand on board the other ship the lines are bent to it in their correct order, about one fathom apart, and paid out handsomely as the messenger is hauled in on board the other ship. When the jackstay is secured to its slip on board the other ship the slack is taken down and the first load is slung on the traveller ready to be hauled across.

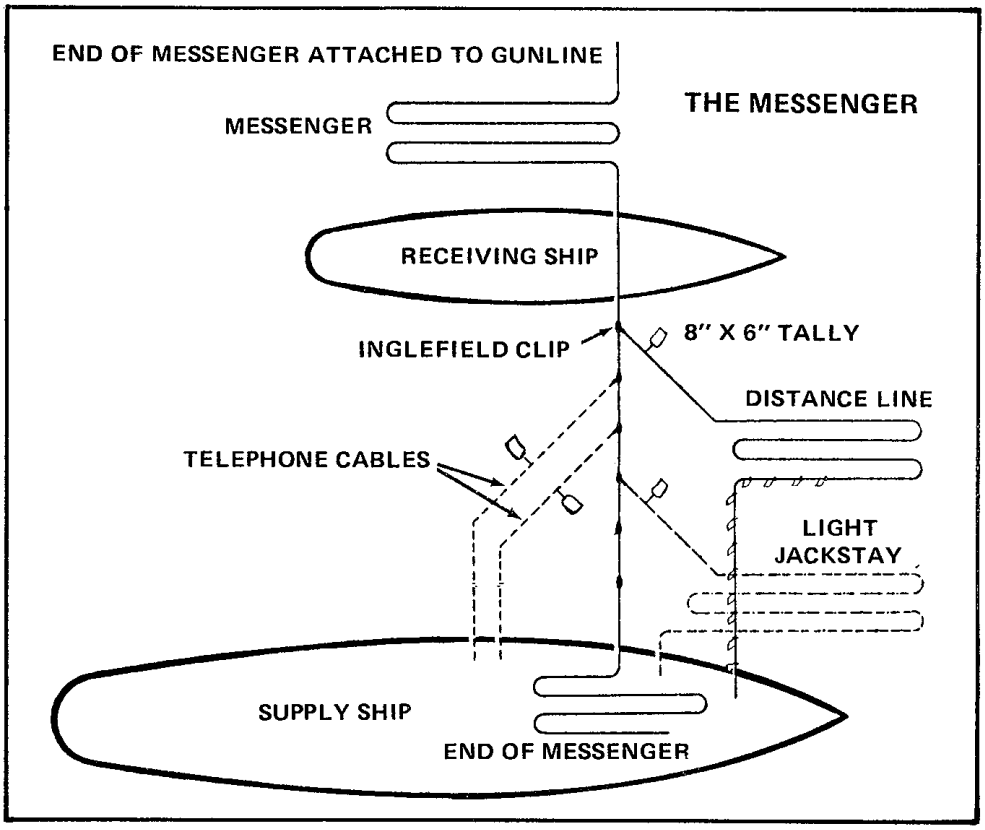
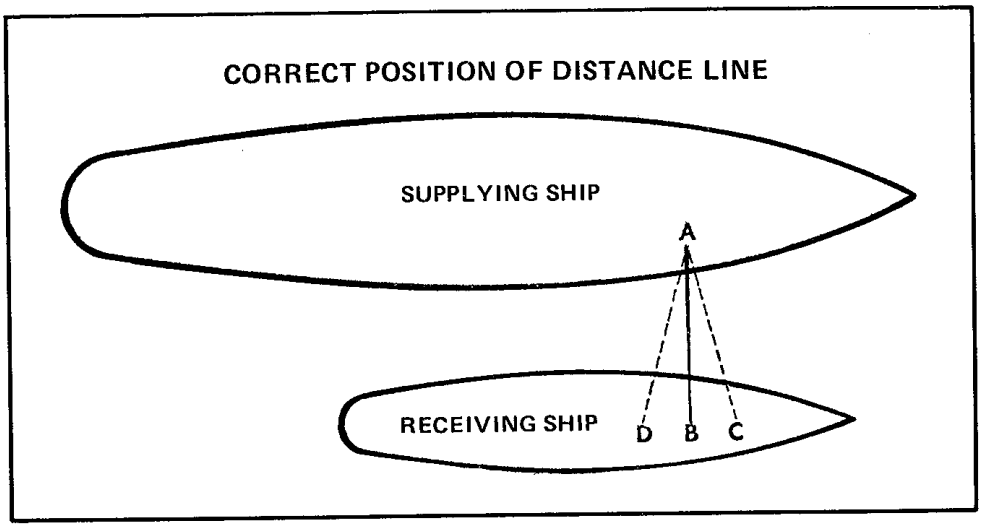


Figure 4-84 The Messenger



If A is the zero point of the line then B is the correct position of the line tender. If he were at D or C, the distance line would show a distance greater than that which truly separates the ships. Thus, if the line is not carefully tended it may indicate a safe distance when the ships are actually too close to one another for safety.

Figure 4-85 Correct Position of Distance Line

b. **By the Ship Receiving the Gear** — The **messenger** is hauled over by the **gun-line** and snatched into a leading block secured just above the jackstay slip, and then the **remainder of the lines** are hauled across by the messenger; each line is unhitched as soon as it comes to hand and taken forward clear of the wake of the jackstay. The **inhaul** is **snatched into its leading blocks** and manned, and the **strop of the jackstay** is **secured to the slip**. The messenger is then flaked down ready for passing back the gear, and the gun-line is coiled up. One hand should be detailed to slip the jackstay in an emergency.

57. **Working the Rig** — The time taken to complete a transfer depends chiefly on the time taken in hooking on each load, hauling it across, and then unhooking it.

58. **Walking Back the Jackstay** — Before a load is hooked on, the jackstay should be **walked back** to provide enough slack for the traveller to be handled on deck. As soon as the load is hooked on, the jackstay should be **hauled taut**, thus lifting the load clear of the dump. The order is then given in the other ship to run away with the inhaul and the load is hauled across. As soon as the load is fleeted home in the other ship the jackstay should be walked back smartly to lower the load on to the dump, where it is unhooked and hauled clear.

59. **Working in Rough Weather** — On no account should the bight of the jackstay be allowed to trail in the sea. In rough weather, obstructions in the vicinity of the dump

should be well protected with fenders to prevent damage to the loads as they are hauled aboard. Two hands should be detailed for handling the traveller and hooking on and unhooking the loads. Between loads the traveller should be clipped to the top guardrail. If the guardrails are slipped and down, all hands working at the dump should wear lifejackets.

60. **Returning the Gear** — The **messenger** is **rove through its block and its end is bent to the eye of the jackstay**; the **weight of the jackstay** is then **taken on the messenger** and the **jackstay is slipped.** The inhaul is **unsnatched from its leading blocks** and its **end hitched to the strop of the jackstay**, to which is **also hitched the coiled gun-line.** The telephone cables and distance line are hitched to the messenger, about a **fathom apart**, and the **jackstay is paid back to the other slip** on the messenger. When all lines have been recovered in the other ship the messenger is unrove and the end cast overboard.

61. **Notes on the Light Jackstay** — These are some points to be noted:

a. Initial contact between ships is by either a **bolo** line or gun-line. See Figure 4-82. The supplying ship will normally provide this except when the receiving ship is an aircraft carrier, or a DDH with the helicopter on deck. However, the receiving ship should have gun or bolo lines ready.

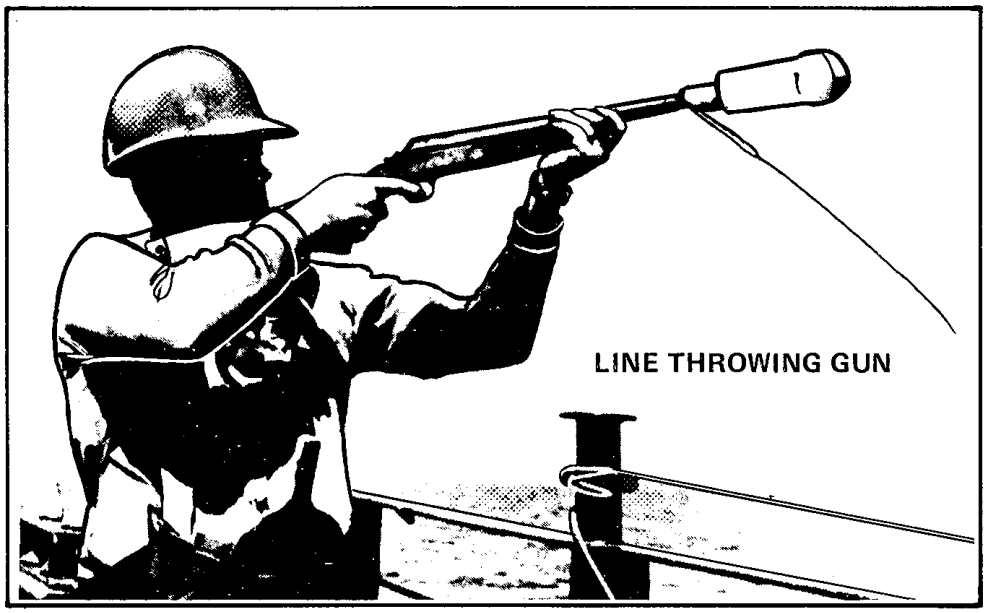


Figure 4-86 Line Throwing Gun

b. The gun line or bolo man will wear a red vest and safety helmet, and before firing the signal to take cover, one blast on a whistle is given by the officer in charge of the station. When all are under cover, the receiving ship position replies with two whistle blasts and the line is fired.

c. Having established contact by gun line (or bolo) between one or more positions in each ship, a light messenger will then be passed. To this will be attached the distance line, sound powered telephone lines, and if applicable, a heavy messenger.

d. This distance is measured by a **distance line** which is used for every abeam method of transfer (with the exception of a light line transfer). The distance line consists of 50 fathoms of 1-1/2-inch manilla rope marked with rectangular strips of coloured canvas at 20 foot intervals. The **O** end is marked in black, and subsequent 20 foot markings are coloured red, yellow, blue, white, and green in sequence up to 240 feet. The **0 (zero)** end of the line is secured to **guide** ship and the other end is kept taut by hand on the other ship. At night, the distance line is marked with lights — the optimum distance with a green light, and with red lights at 20 foot intervals for 40 feet on either side of the optimum light. The distance line is normally rigged well forward in the ship, where the bow begins to narrow, but in bad weather it may be rigged between bridges.

e. Regardless of your trade, you will be called upon to man the jackstay. It is particularly important that you pay strict attention, follow all the safety rules, and understand and obey precisely all orders —

(1) **"Haul Taut Jackstay"** — Men manning the jackstay haul taut and keep taut.

(2) **"Walk Back Jackstay"** — Men manning the jackstay walk slowly toward the heel block. (The jackstay is kept **in hand** and the tension taken up or eased by walking forward or aft.)

(3) **"Well"** — Stop hauling, walking back, or checking away. Applies to both the jackstay or outhaul.

(4) **"Haul Away Inhaul/Outhaul"** — Heave in on the inhaul/outhaul, hand over hand.

(5) **"Check Away Inhaul/Outhaul"** — Ease out the inhaul/outhaul hand over hand.

f. Transfers are possible between ships of any class, but replenishment (called RAS for **Replenishment At Sea** or UNREP for **Underway Replenishment**) of fuel, ammunition, and provisions will normally take place from only the specially built replenishment ships.

CHAPTER 5

(NOT ALLOCATED)

(See Volume 1)

CHAPTER 6

(NOT ALLOCATED)

(See Volume 1)

CHAPTER 7

PILOTAGE

CHAPTER 7

PILOTAGE

TRAINING PERIOD 1 — THE COMPASS

1. **Magnetism** — The operation of a magnetic compass depends upon the principles of magnetism. Certain minerals such as iron ores and lodestones have the property of attracting and repelling one another. This property is known as magnetism, and these substances are called **natural magnets**. A magnet also possesses the power of attracting certain minerals such as iron or steel, and it may be attracted by them, and such substances are know as **magnetic substances**; magnetism can also be introduced into them, and they are then known as **artificial magnets**. The nearer one magnet is to another, or to a magnetic substance, the greater is their magnetic influence on one another. Magnetism cannot be introduced into wood or other vegetable substances, or into glass, brass, and copper; neither can these exert any magnetic influences or be influenced by magnetic forces, and they are therefore known as **non-magnetic substances**.

2. **Poles** — Anything possessing magnetic properties is said to have a **red** and a **blue pole**. These are situated one at each of its two extremities, and around them the attractive and repellant forces of magnetism are particularly evident. If two magnets are brought together within the area of each other's magnetic influence, with the red poles or the blue poles of each adjacent, they will repel each other, but if the red pole of one is brought near the blue pole of the other they will attract each other.

3. **Magnetic Fields and Magnetic Force** — Anything with magnetic properties will exert a magnetic influence over an area immediately around it. This area is known as its **magnetic field**, and consists of curved **lines of magnetic force** which run between the two poles (Figure 7-1). Any comparatively small magnetic article, such as a needle, when placed within a magnetic field will tend to align itself along these lines of magnetic force.

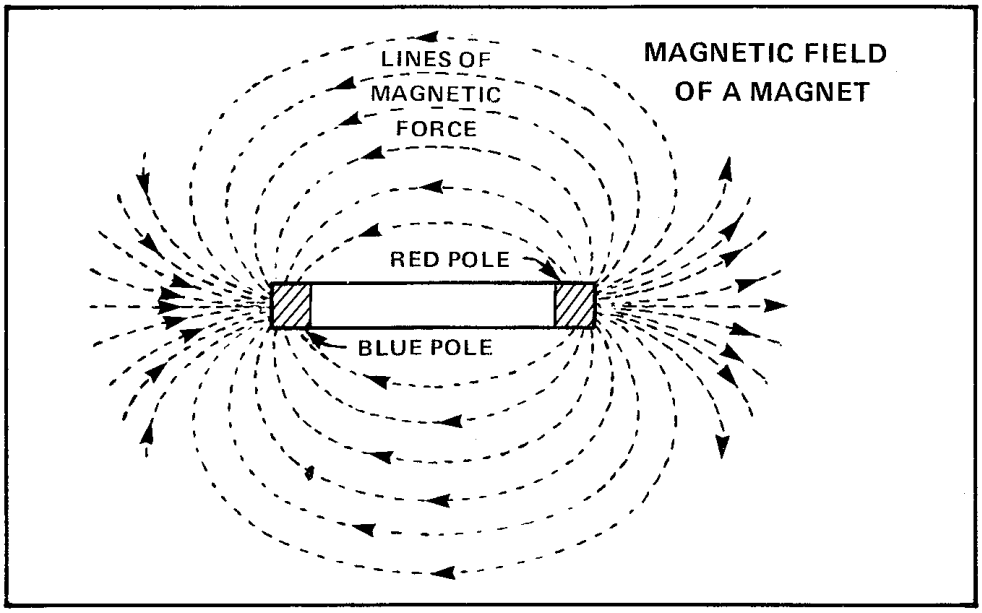


Figure 7-1 Magnetic Field of a Magnet

4. **Introducing Magnetism into a Magnetic Substance** — Magnetism can be introduced into a magnetic substance by several different methods, of which the following are examples:

a. by rubbing the substance with a magnet;

b. by hammering it;

c. by passing an electric current around it; and

d. by allowing it to remain for a time in the field of a powerfully magnetised object (the magnetism it acquires is then known as **induced magnetism**).

Magnetism is introduced into soft iron more easily than into steel, but steel will retain its magnetism much longer than soft iron.

5. **Terrestrial Magnetism** — The earth can be regarded as an enormous lodestone with its magnetic poles situated near the extremities of the imaginary axis around which it revolves; these poles are known respectively as the **North Magnetic Pole** and **South Magnetic Pole**. Some of the lines of magnetic force of the Earth's magnetic field run **approximately** northward and southward along the Earth's surface, from one magnetic pole to the other. A magnetised needle freely suspended or pivoted at its centre will come to rest pointing **along the particular line of magnetic force which passes through its position**, and with its north-seeking end pointing in a direction known as **north magnetic**. The **angular difference** between the directions of **north magnetic** and **true north at any place** is known as the **variation**.

6. **Variation** — Unfortunately, the positions of the magnetic poles **do not coincide with those of the geographical poles**; in fact the North Magnetic Pole is at present (1952) in the extreme north-east of Canada. Furthermore, the lines of magnetic force, known as **magnetic meridians**, run very erratically instead of running directly between the magnetic poles, and the **amount of variation at any place** is **governed by the vagaries of terrestrial magnetism** and not by the difference in longitude between the place and the North Magnetic Pole. Also, the position of the North Magnetic Pole, and consequently the directions of the magnetic meridians, change slowly but progressively from year to year.

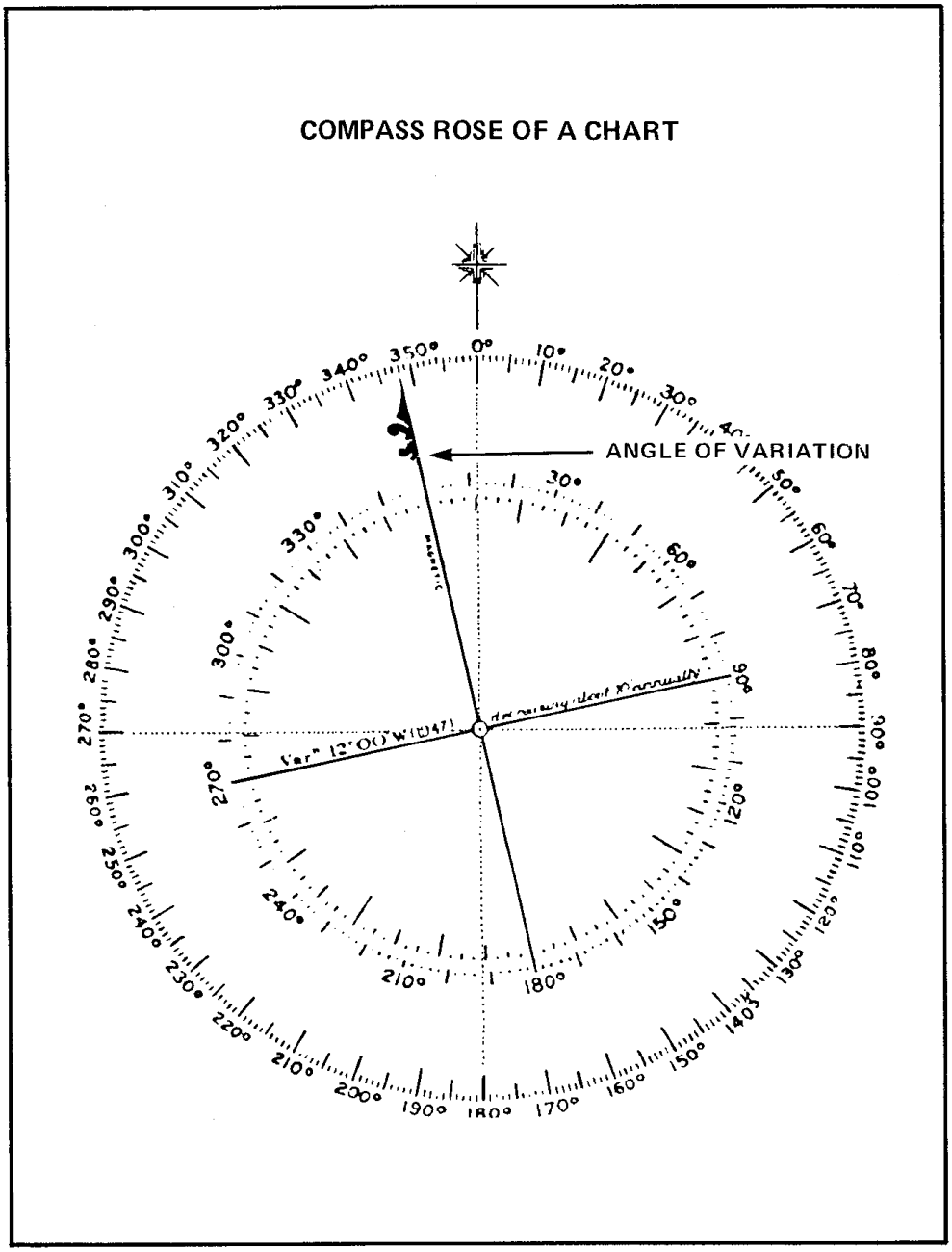


Figure 7-2 Compass Rose of a Chart

7. **Compass Roses of Charts** — The directions in which the magnetic meridians run, and their annual change, are accurately known, however, and the amount of variation at any place can be calculated with sufficient accuracy for most purposes of navigation. The variation at any place, together with its annual change, is indicated on the **compass roses of charts** (see Figure 7-2), so that a magnetic direction can be converted to a true direction, or vice versa, by simple addition or subtraction.

8. **Easterly and Westerly** — If the direction of magnetic north from any place lies **westward of true north** the **variation is said to be westerly**, and if it lies **eastward of true north** the **variation is said to be easterly**. To convert a magnetic direction to a true direction, **easterly variation** is given a **plus sign** and **westerly variation** a **minus sign**; and to convert a true direction to a magnetic direction the signs are reversed. The following couplet provides a useful reminder for converting a true to a magnetic direction, and vice versa:

Variation east, magnetic least;
Variation west, magnetic best.

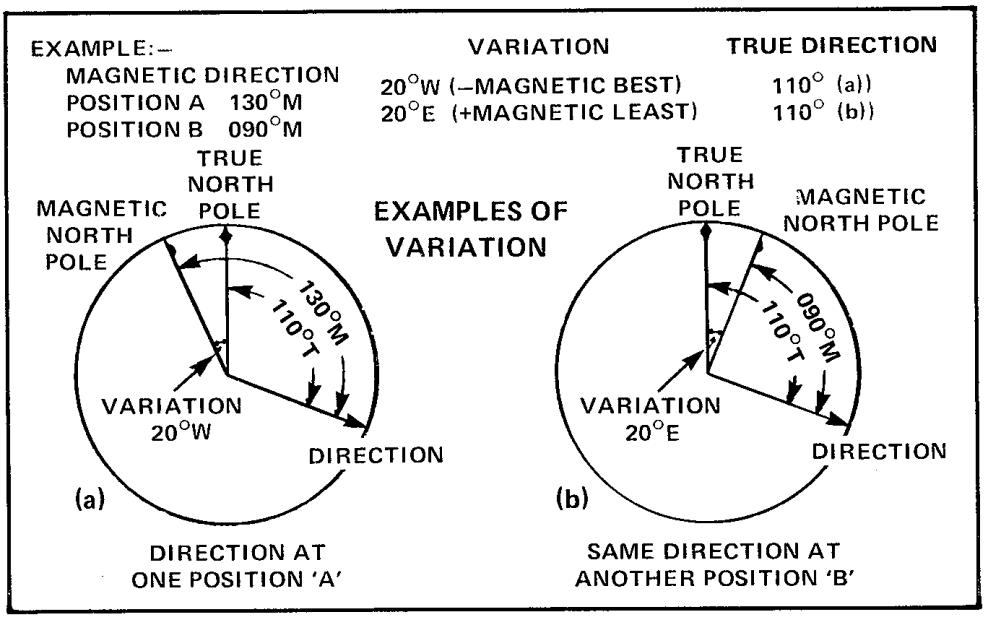


Figure 7-3 Examples of Variation

9. **Permanent and Induced Magnetism** — While an iron or steel ship is being built she acquires magnetic properties from the hammering to which she is subjected during her construction. These properties are known as the ship's **permanent magnetism**. Subsequently, the extent and strength of this magnetism may be changed considerably by large alterations or additions to her structure, or by large refits. A certain amount of magnetism will also be induced into a ship by the earth's magnetic field if she lies pointing in one direction for any length of time. This is known as the ship's **induced magnetism**. Both the permanent and induced magnetisms will alter when a ship passes from northern to southern latitudes or vice versa. No two ships, even if they are of the same class and built alongside each other in the same port, will possess the same degree of magnetism.

10. **Deviation** — The magnetic properties of a ship have a great influence on any magnetic compass placed in her, and their effect causes the compass to indicate a

direction other than that of magnetic north. This error is known as **deviation**, and its amount will vary with any changes in the magnetic properties of the ship.

11. **Correcting Deviation** — Because of various peculiarities in the effects of a ship's permanent and induced magnetisms, the **deviation of a magnetic compass** will be **different for different directions of the ship's head**, and these differences may be considerable. Fortunately, although these effects cannot be entirely eliminated, they can be sufficiently reduced for the purposes of accurate navigation by means of **corrector magnets, soft iron spheres**, and the **Flinders' bar**.

12. **The Gyro-Compass** — The gyro-compass functions on the principle that the axis of a perfectly balanced wheel, spinning at high speed and suspended in gimbals so that it is free to turn or tilt, will remain pointing in a fixed direction in space. Such a wheel can be made to seek the direction of true north and remain pointing in that direction by mechanical means. If a compass card is mounted on the gimbals of the wheel so that its north and south line is in line with the axis of the wheel, the result will be a gyro-compass from which any direction can be ascertained.

13. **Situation of a Gyro-Compass** — A ship's gyro-compass is a delicate and electrically operated mechanism which is very susceptible to shock and vibration, and is more bulky than a magnetic compass. Therefore, it is usually centrally situated in the hull of a ship and below the waterline, where it is afforded the best protection from the shock of gunfire and enemy action. When a gyro-compass has been started, some time must be allowed for it to settle down; therefore a ship's gyro-compass should be started about five hours before it is required for use. Modern warships of cruiser size and above are equipped with three gyro-compasses; less modern or smaller ships may be equipped with only one or two.

14. **Repeaters** — By means of a system of electrical circuits and mechanisms, a gyro-compass can operate several **repeaters** which are situated in various parts of the ship as required for navigational or other purposes. These repeaters consist of a compass card mounted in a bowl containing their operative mechanisms, and, with certain limitations, they will indicate the same direction as the gyro-compass by which they are operated. Each repeater is fitted with a switch by which it can be electrically connected to one or other of the gyro-compasses, and each is fitted with a mechanical device by means of which its compass card can be rotated for the purpose of adjusting its reading to that of its gyro-compass.

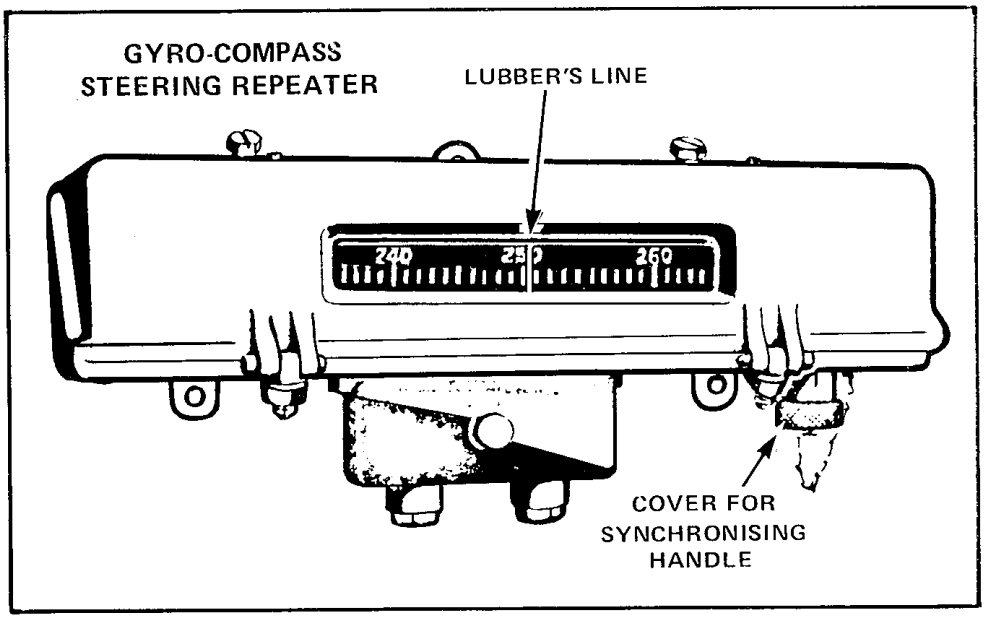


Figure 7-4 Gyro-Compass Steering Repeater

15. **Correcting Compasses to True North** — All charts are mapped in relation to **true north** and **south**, and therefore all courses are laid off, and all bearings plotted as **true directions**. Directions **obtained by magnetic compass** therefore have to be corrected, **first for deviation** and **then for variation**, before they are marked on charts. Conversely, all true directions taken **from a chart** have to be converted, **first to magnetic directions** and **then to compass directions**, before they are applied **to a magnetic compass**. To avoid confusion between these different directions they are always recorded thus:

a. true directions, by three figures **without a suffix**, eg, 210°;

b. magnetic directions, **by three figures** with the suffixes **Magnetic** or **M**, eg, 042°M; and

c. magnetic compass directions, **by three figures** with the suffixes **Compass** or **C**, eg, 223°C.

16. **Converting Compass to True** — The following examples show the method of converting compass to true directions and vice versa.

— EXAMPLE —

A ship is ordered to steer a course of 358°. What is the **compass** course to steer if the variation is 20° W?

True course . . . = 358°
Variation . . . = 20°W (Magnetic best — add)

Magnetic course . . . = 018°M (378-360)

Deviation for course NNE (022-1/2°) = 3°E (Compass least — subtract)

Course to steer 015°C

— EXAMPLE —

The bearing of a lighthouse taken from a ship **steering 160°C** is 002°C. What is the **true bearing** of the lighthouse if the variation is 7°E?

Compass bearing = 002°C
Deviation for course SSE (157-1/2°) = 3°W (Compass best — subtract)

Magnetic bearing = 359°M (362-3)
Variation = 7°E (Magnetic least — add)

True bearing of lighthouse = 006° (366-360)

TRAINING PERIOD 2 — THE BOAT'S COMPASS AND POSITION

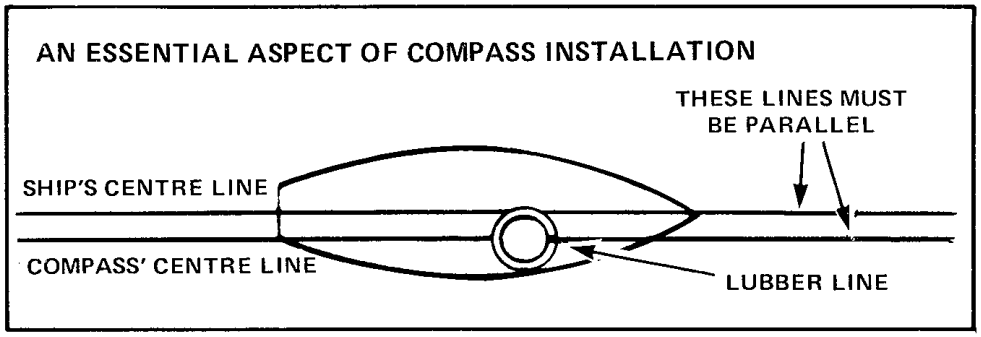


Figure 7-5 An Essential Aspect of Compass Installation

17. **Choosing a Compass** — No fortune need be spent on a small boat compass intended only to provide a reasonably accurate indication of direction. Bulkhead (dashboard) mounting is simple, and a wide range of styles, sizes, and prices is available. Many small compasses have a **card built like a drum**, with the graduations on the side. The hemispherical cover, of glass or plastic, may have the **lubber line on the aft side**. Others have a **flat card**, read through the cover and liquid, against **the lubber line on the forward side.** This arrangement provides magnification. All types have some form of **gimbals** (pivots) which allow the compass to remain horizontal as the boat rolls and pitches. (See Figure 7-6.)

18. **Mariner's Compass** — Larger vessels usually carry a type called the **Mariner's Compass**, a reasonably standardized combination of card, bowl, gimbal rings, and gimbals, designed for flat mounting. A good range of quality and size can be considered. A high-grade **spherical** compass of reasonable dimensions, internally gimballed, is considered by many to be the acme of compass installations abroad smaller vessels.

19. **Mounting a Compass** — The correct mounting of a compass (Figure 7-5) requires that a line drawn through the axis of the compass, through the lubber line and the pivot, be parallel to the fore-and-aft axis of the vessel. If this condition is not met the lubber line will not indicate the direction of the ship's head. A reasonably precise job of installation involves establishing the line of the ship's keel (for-and-aft axis) on deck, probably using cord or wire, doing the same thing for the compass axis, and by measurement making the lines parallel. A cruder method, which disregards difficulties to be discussed later, is to head the small boat directly for an object whose direction is known from the chart and mount the compass to read that heading. It should not be surprising to learn that in most small boats the compass is mounted simply by being screwed to the bulkhead with no further fuss and probably with accuracy adequate for the purpose. It is necessary to observe, however, that crude methods of installation, and cheap compasses are completely inadequate when accurate piloting or navigation is required.

20. **Location of a Compass** — As to location, the compass must be **clearly and comfortably seen** from the steering position. Because it is influenced by magnetic fields, it should be **as far as possible from any iron or steel** and **remote from electric wiring**; particularly windshield wiper if possible. Any wiring which must come within less than about six feet **should have the pairs twisted**, not because of the wires, which are non-ferrous and non-magnetic, but because of the direct electric current they carry. The compass should also be protected from weather and sunlight.

21. **Other Influences on a Compass** — In service the compass must be spared the influence of stray magnetic fields. Ferrous metal — **tools, knives, and so on — should be kept away**. Portable radios will affect a compass, and a photographic light meter, built into a camera or not, causes a compass to swing far off its orientation when placed in close proximity.

22. **General Comments** — This over-simplified discussion of installation and use will generally suffice for small boats, but is by no means adequate for larger vessels, particularly where masses of iron are present. Later chapters are devoted to the matter. However, it is always better that a small boat carry an inexpensive compass, crudely installed and of mediocre accuracy, than none at all.

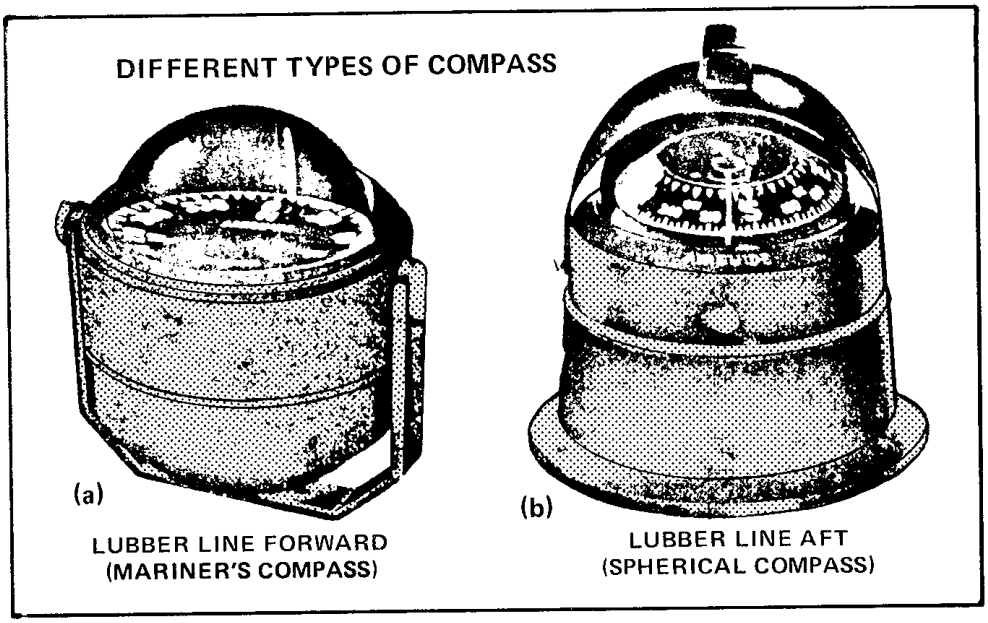


Figure 7-6 Different Types of Compass

23. **Describing a Position** — (See Figure 7-7.) A vessel in trouble, having a radio, must be able to say where she is if help is to reach her. Similarly, a rendezvous cannot be arranged unless a position is described. The chart permits us to do these things. **In proximity to land** we may be able to use **place names**, as "two miles south of Danger Reef," "three **cables** (600 yards) east of Portlock Point," "from Turn Point, 390 degrees magnetic, one mile," "mid-channel in Grief Passage," or similar brief phrases. **In open water**, with no landmarks available, positions must be described by **latitude and longitude**. Using dividers or parallel rule we **transfer our position first horizontally** to the **nearest vertical edge of the chart** where we read, for example, 44 degrees 31.3 minutes (44° 31.3'), obviously north **latitude**. Similarly we **move our position** vertically to the **top or bottom edge** of the chart and read, say, 63° 18.6', obviously west **longitude**. Our position is then: 44° 31.3' North; 63° 18.6' West. Latitude is stated first and both latitude and longitude should be qualified as to direction from the equator, north or south; from Greenwich, east or west. Local usage generally omits the qualification. Reversing the process must be able to pinpoint a spot on the chart having been given the latitude and longitude. A complex subject? No, not really, but the use of charts is a fascinating subject when put into practice. Nothing adds more to the job of boating then doing it properly, with chart and compass.

24. **Compass of Directions** — For the balance of the period, cadets should have additional practice in converting magnetic bearing to true bearings and vice versa, as in Period 1.

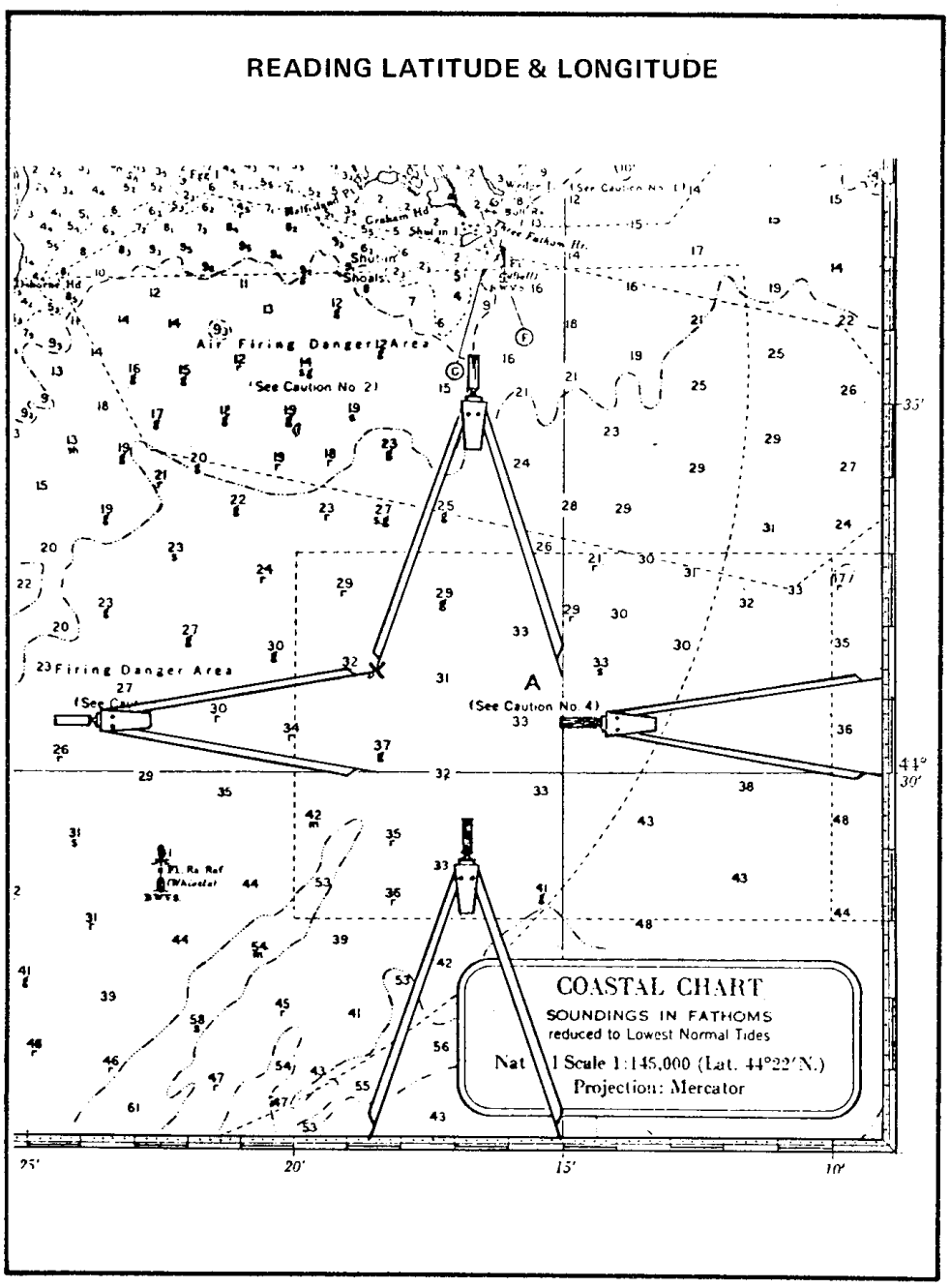


Figure 7-7 Using Latitude and Longitude

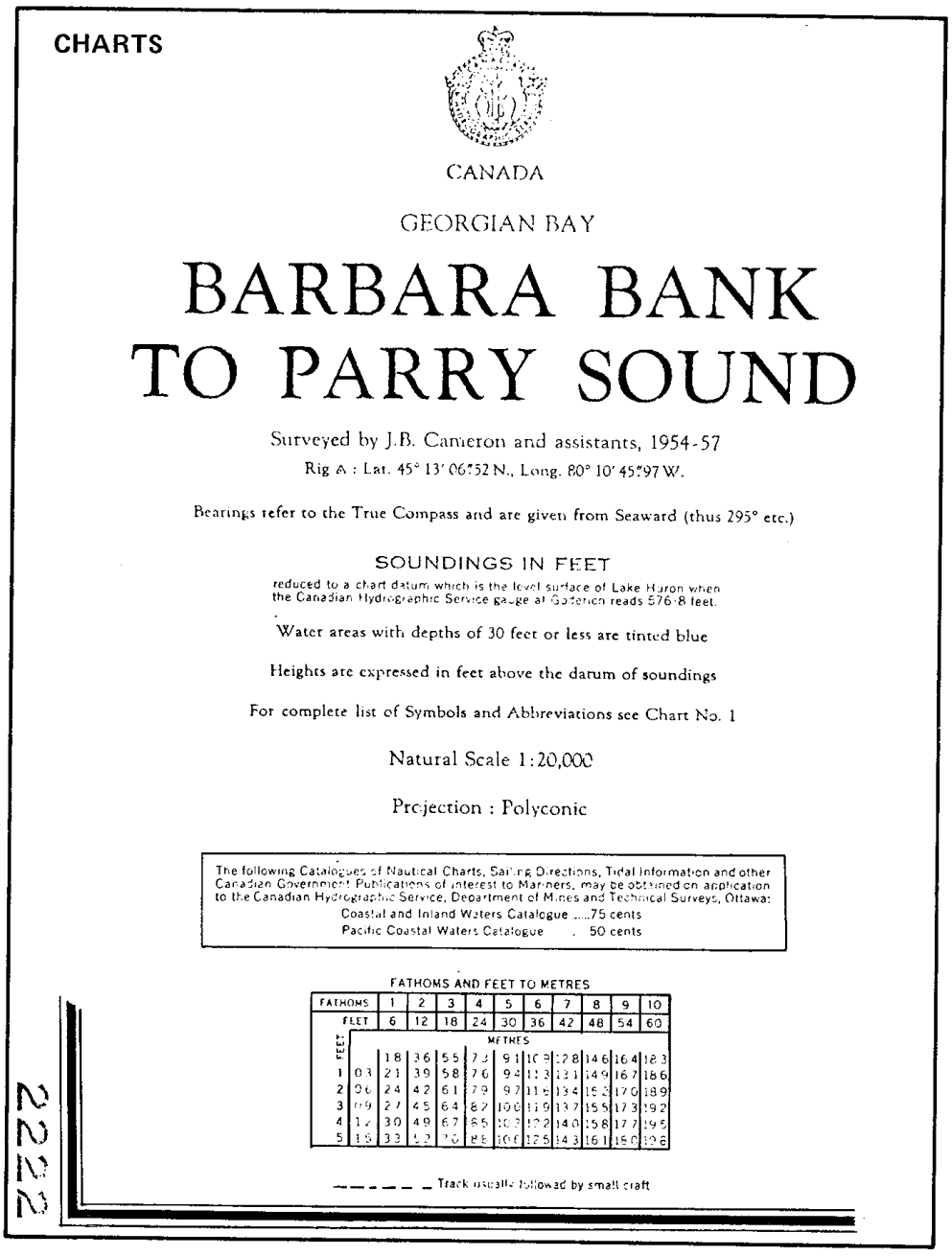
TRAINING PERIOD 3 — CHARTS

25. **Scales** — In selecting his charts a seaman will examine those available with a view to choosing the largest **scale**, which is the ratio of a distance on the chart to distance on the earth. Thus 1:80,000 means that one inch on the chart equals 80,000 inches on the earth: one inch of paper represents roughly one and one-tenth (1.1) nautical

miles of earth. The larger the scale, the greater will be the available detail. **The scale becomes larger as the numbers become smaller**: 1:800 is larger than 1:80,000.

26. **Dates** — The seaman will also look for the **date** on the chart, which usually appears in the lower margin, and he will observe the entries, made by hand, which bring the chart completely up-to-date. He will not be satisfied with an old edition.

27. **Canadian Chart No. 1** — Charts are known by number and can be selected from a key which shows the area covered by each number. The keen student will obtain Canadian Chart No. 1 which shows all the **conventions** and abbreviations used on Canadian charts.



CHARTS

CANADA

GEORGIAN BAY

BARBARA BANK TO PARRY SOUND

Surveyed by J.B. Cameron and assistants, 1954-57

Rig A : Lat. 45° 13' 06·52 N., Long. 80° 10' 45·97 W.

Bearings refer to the True Compass and are given from Seaward (thus 295° etc.)

SOUNDINGS IN FEET

reduced to a chart datum which is the level surface of Lake Huron when the Canadian Hydrographic Service gauge at Goderich reads 576·8 feet.

Water areas with depths of 30 feet or less are tinted blue

Heights are expressed in feet above the datum of soundings

For complete list of Symbols and Abbreviations see Chart No. 1

Natural Scale 1:20,000

Projection : Polyconic

The following Catalogues of Nautical Charts, Sailing Directions, Tidal Information and other Canadian Government Publications of interest to Mariners, may be obtained on application to the Canadian Hydrographic Service, Department of Mines and Technical Surveys, Ottawa:

Coastal and Inland Waters Catalogue .....75 cents

Pacific Coastal Waters Catalogue . 50 cents

FATHOMS AND FEET TO METRES

FATHOMS	1	2	3	4	5	6	7	8	9	10
FEET	6	12	18	24	30	36	42	48	54	60
FEET	METRES									
		1·8	3·6	5·5	7·3	9·1	10·9	12·8	14·6	16·4	18·3
1	0·3	2·1	3·9	5·8	7·6	9·4	11·3	13·1	14·9	16·7	18·6
2	0·6	2·4	4·2	6·1	7·9	9·7	11·6	13·4	15·2	17·0	18·9
3	0·9	2·7	4·5	6·4	8·2	10·0	11·9	13·7	15·5	17·3	19·2
4	1·2	3·0	4·9	6·7	8·5	10·3	12·2	14·0	15·8	17·7	19·5
5	1·5	3·3	5·2	7·0	8·8	10·6	12·5	14·3	16·1	18·0	19·8

Track usually followed by small craft

2222

Figure 7-8 Charts

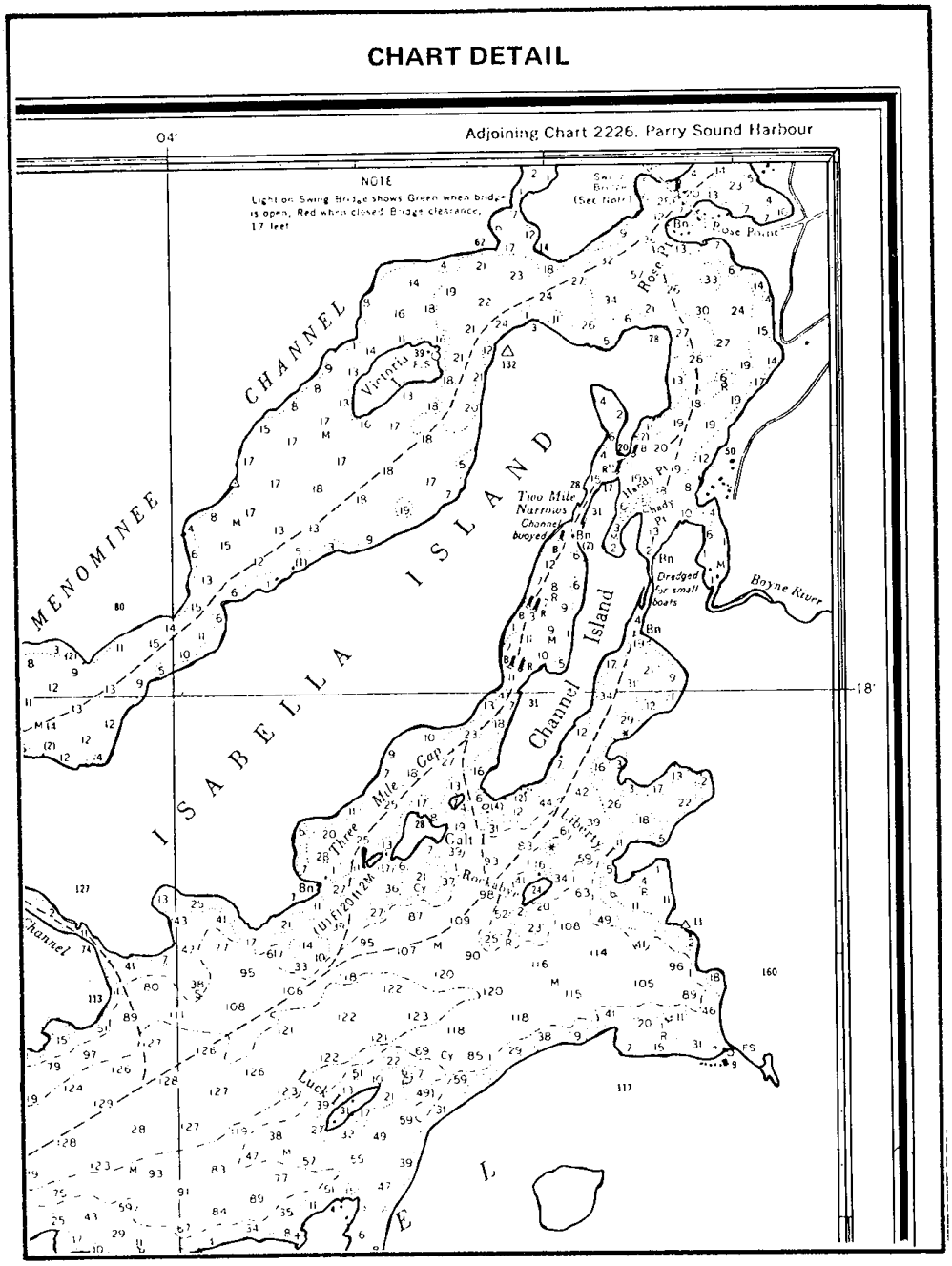


Figure 7-9 Chart Detail

28. **Chart Features** — (See Figures 7-8 and 7-9.) Upon laying out a chart, we immediately notice that land and water areas are displayed, usually in contrasting colours. Place names appear, though not as boldly as on road maps. **Contours**, the thin wavy lines on land masses, show the vertical shape of the land, and high points have their **elevation** shown in feet above high water. Scattered over the water areas are numbers which show the **depth** of the water **below low water (below the datum of**

soundings). Depths may be shown **in feet** or **in FATHOMS**, a fathom being six feet. Here, clearly, is a rather significant difference and the title block should be consulted: it will read either **soundings in fathoms** or **soundings in feet**. Here and there can be seen letters adjacent to the soundings; these describe the bottom: **m** for mud, **g** for gravel, and so on. The shallower waters, both adjacent to the shoreline and isolated as **shoals** and **banks**, are usually tinted a darker blue than the deeper waters. Passes, headlands, islands, reefs, channels, straits, bays, inlets, banks, bluffs are all named, and their distinguishing features may be read from the chart.

29. **Chart Symbols and Abbreviations** — Refer to the Canadian Hydrographic Service Chart No. 1, which contains illustrations of all chart symbols and abbreviations used in Canadian Charts. Cadets should be provided with copies of this chart for home study. During the present period, the instructor should go over the main categories of chart symbols, with the exception of the symbols for aids to navigation, which will be covered later.

TRAINING PERIOD 4 — DISTANCE AND DIRECTION

30. **Latitude as Related to Distance** — (See Figure 7-11.) Running laterally across the chart, and parallel to each other, are black lines representing the **parallels of Latitude**, imaginary lines on the earth's surface which enable a position to be described. These are numbered north and south from the equator, (0° lat.) to the poles (90° north lat, 90° south lat). In the **right and left margins** of the chart can be read the degrees and minutes of the parallels, thus: 49° 00′, forty-nine degrees and zero zero minutes. There are **60 minutes to a degree. One minute of latitude** is, by definition, **one nautical mile** or nearly 6080 feet. Recalling that a statute mile is 5280 feet we observe that a nautical mile is 800 feet longer; work on most charts is done **using nautical miles**, as are speed and time calculations.

31. **Scales of Distance** — (See Figure 7-10.) Because one minute of latitude equals one nautical mile, the latitude scales on the vertical edges of the chart are also **scales of distance**. The separation, on the chart, of two points can be marked on a strip of paper and transferred to the **latitude scale**, where it can be read off in **miles and tenths of miles**. Should the chart construction be such that this is not so, a distance scale will appear on chart.

32. **Scaling Distances** — The seaman will provide himself with a pair of **dividers** for scaling distances. They are held in the right hand, almost flat on the paper, adjusted to the separation required, and then transferred to the scale. Longer distances, or courses which include more than one straight line, are measured by **walking** the dividers, pre-set to one or more miles. A word of caution is justified: the scales along the **top and bottom of the charts**, which are degrees and minutes of longitude, are not nautical miles or any other kind of miles (except at the equator) and **can never be used as a distance scale**.

33. **Longitude** — Running vertically on the chart are black lines representing **Meridians of Longitude**, another set of imaginary lines on the earth's surface, used with latitude to describe a position. These are numbered **east and west of Greenwich**, England, 0° to 180°, so that in Canada we are between longitudes 52° West and 141° West. Lines of longitude all pass through the poles and therefore cannot be parallel because they converge and meet. The chart is so constructed, however, that the meridians are parallel on the paper. This method of chart construction, called a **Mercator Projection**, is particularly useful for nautical purposes because:

a. distances can be scaled accurately using the latitude scale;

b. **all the parallels of latitude are true east and west**;

c. **all the meridians of longitude are true north and south**; and

d. directions can be taken off accurately by reference to the parallels of meridian.

The would-be seaman should know how to use a chart to take off distance and direction.

34. **Taking off Direction** — (See Figure 7-13.) Prominently displayed at several places on each chart is a **compass rose**. It consists of two circles, one within the other, each marked clockwise in degrees from 0° at the top (north) around through 180° (south) to 360° or 0°. The **outer circle** has its north-south axis (0°-180°) lying parallel to the meridians: **it is oriented to true north**. The **inner circle** appears rotated so its 0° is off to one side. This circle **is oriented to magnetic north**, which is not the same as true north. By reference to one circle or the other it is possible to determine the direction of any line placed on the chart either as a true direction or a magnetic direction. In modern practice all such directions are expressed in degrees of a circle, clockwise from north. Older systems referred to the **cardinal points** — N, E, S, W — the **inter-cardinal** points — SE, SW, NW, NE — and further subdivisions to the total of 32, hence the points of the compass, each of which is 11-1/4 degrees.

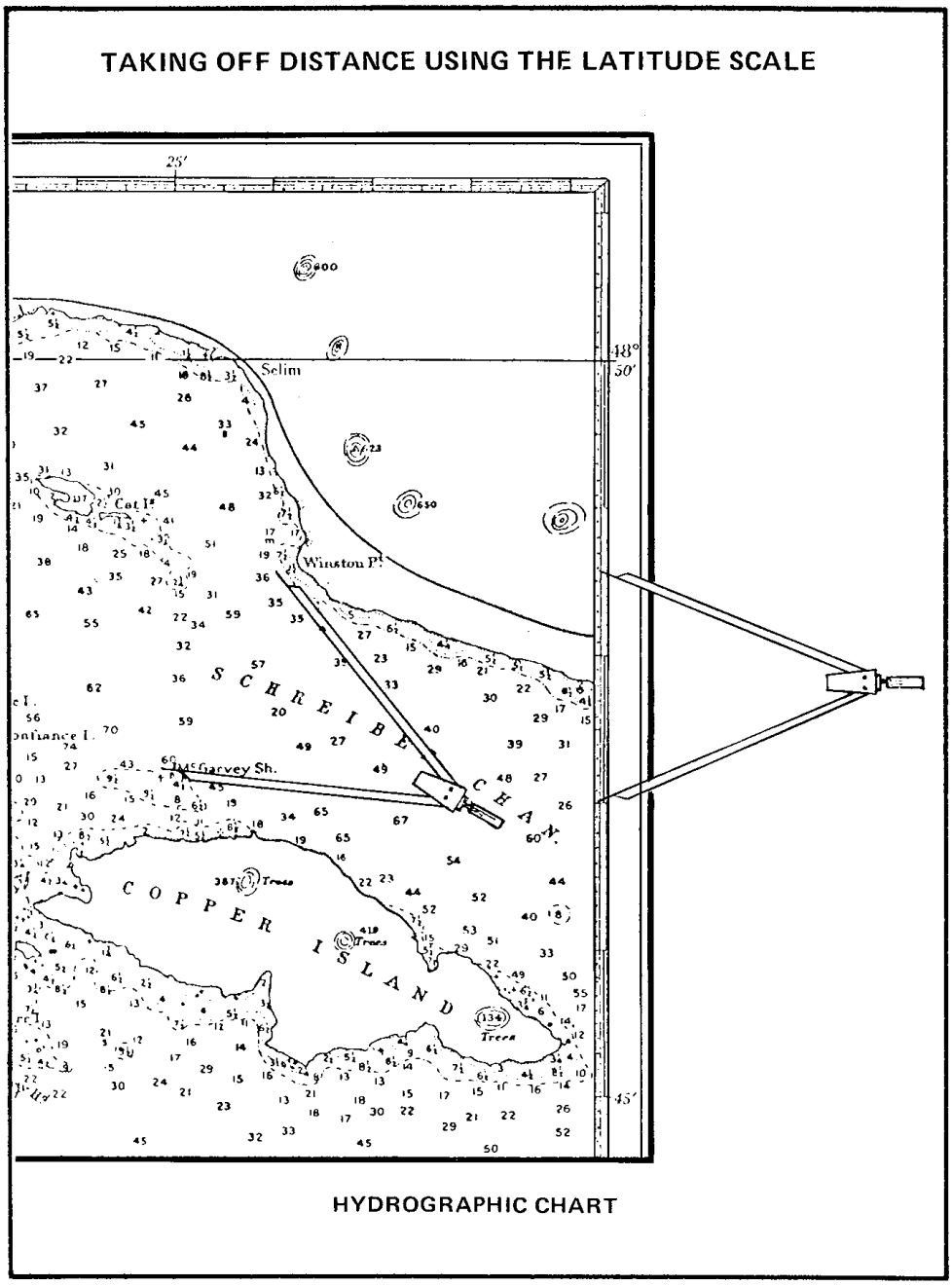


Figure 7-10 Taking Off Distance Using the Latitude Scale

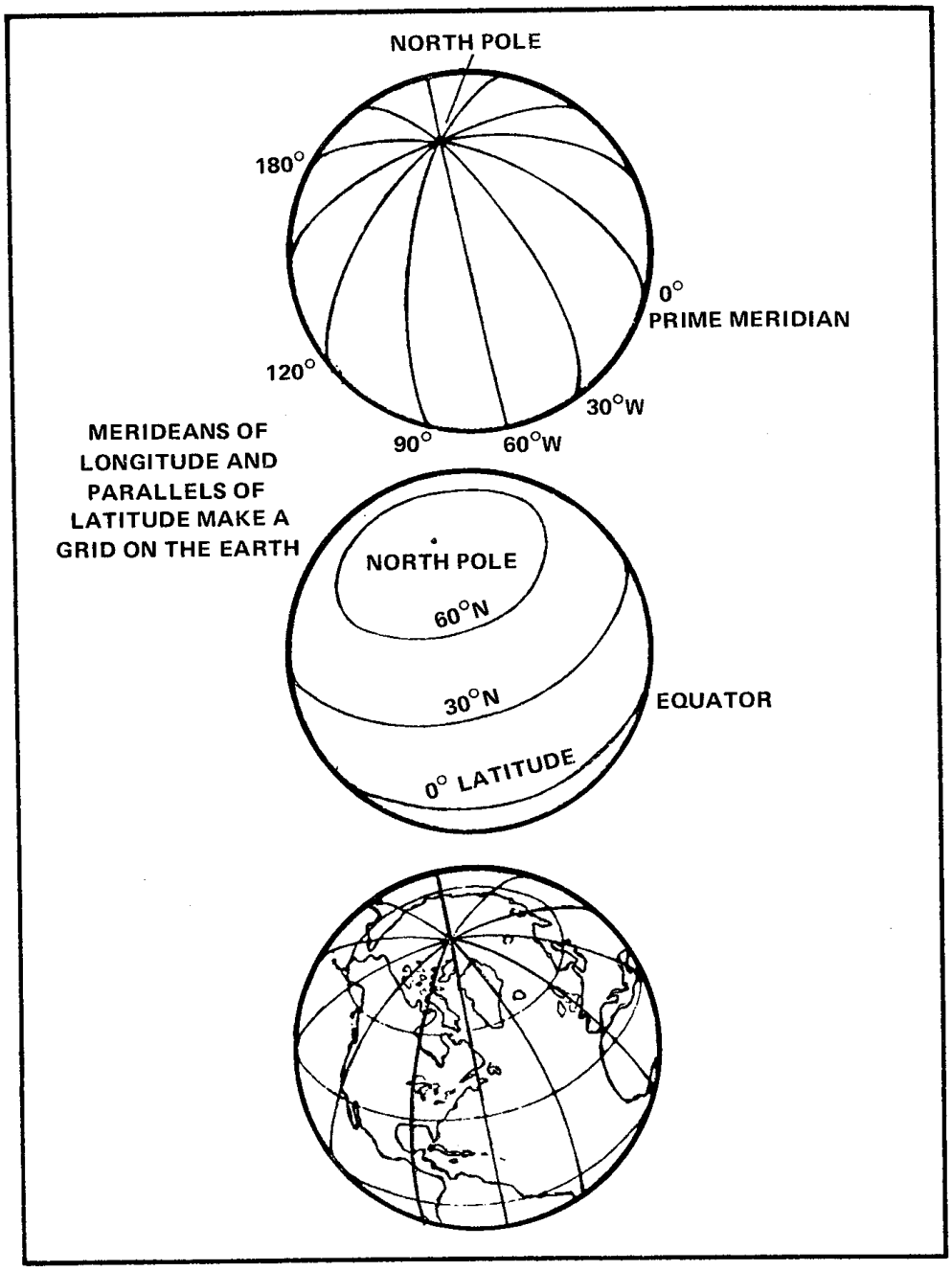


Figure 7-11 Meridians of Longitude and Parallels of Latitude Make a Grid of the Earth

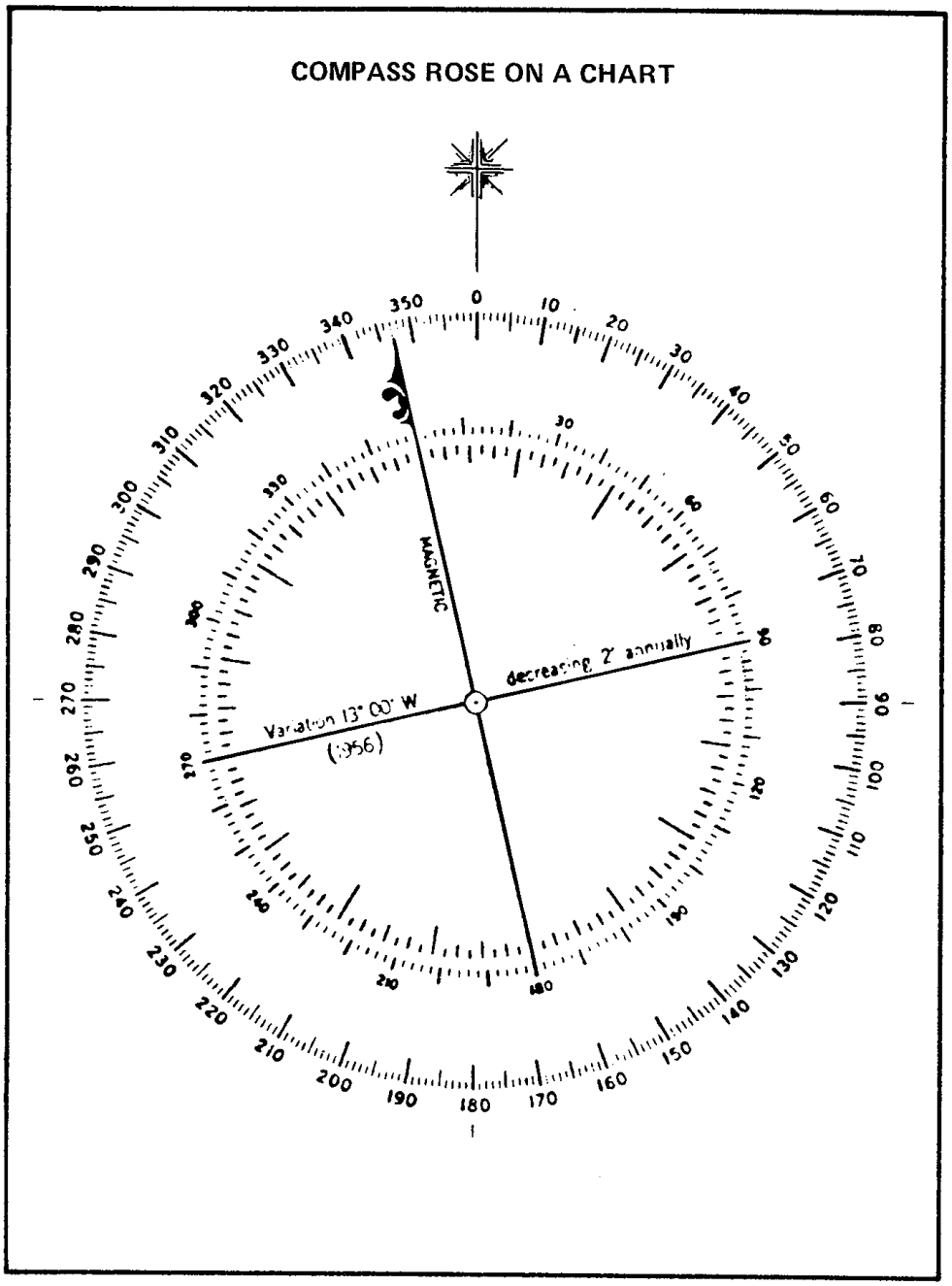


Figure 7-12 Compass Rose as it Appears on a Chart

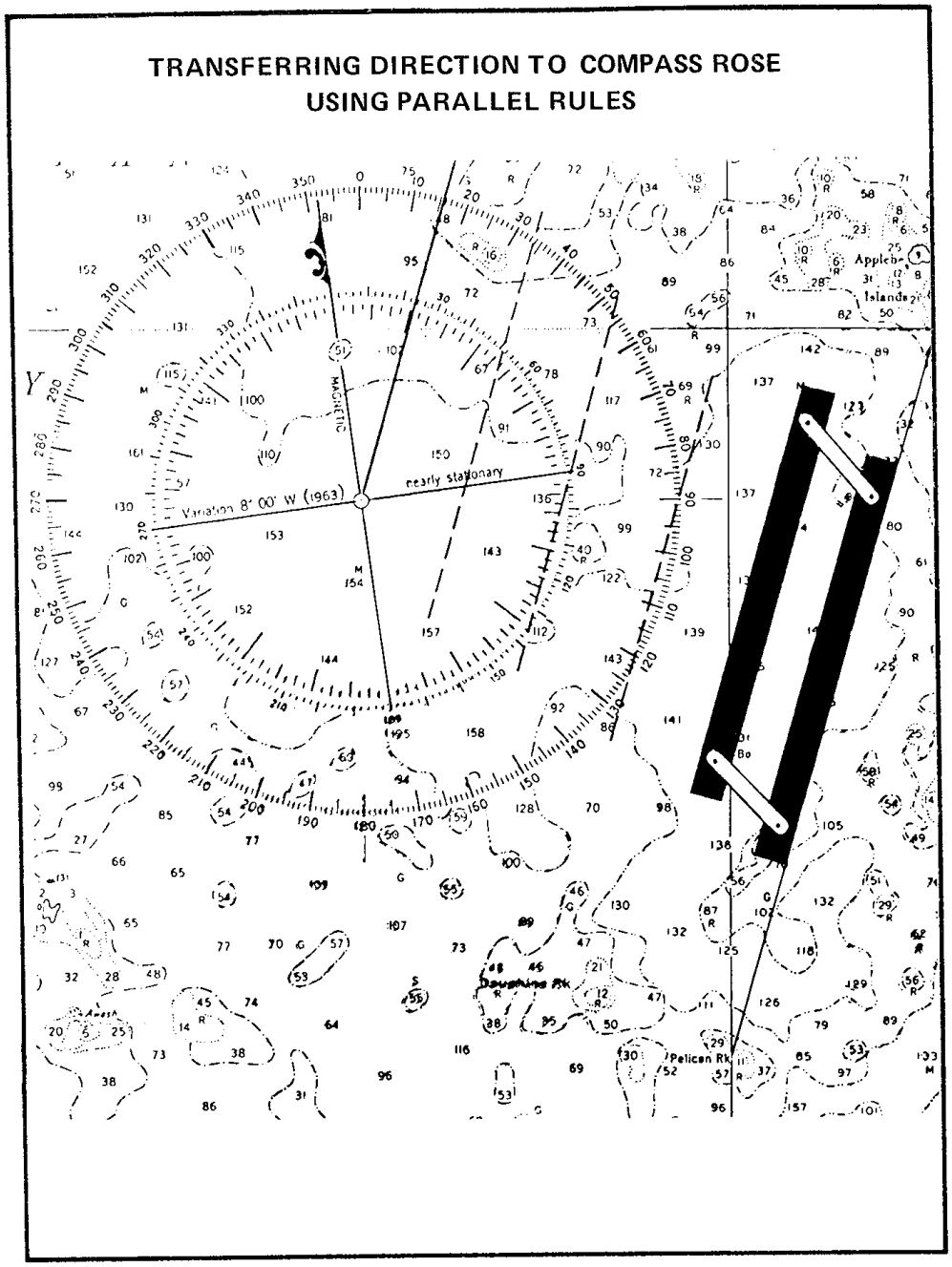


Figure 7-13 Transferring a Direction to a Compass Rose Using Parallel Rules

35. **Determining Magnetic Direction** — Aboard a small boat we rely entirely on a **magnetic compass** which points towards magnetic north for determining direction. For the present let us consider only **magnetic directions** which we can obtain by reference to the inner (magnetic) compass rose. To determine the direction of a line on the chart, we transfer that line, direction unaltered, **to the nearest compass rose.**

The transferred line is passed **through the centre of the rose** and the **magnetic direction** is read off the circumference of the inner rose. The instrument used to transfer the line is called a **parallel rule**. It may **walk** or it may **roll**, but either way it moves to the rose without changing its direction. Conversely, using the parallel rule we can take a direction off the rose and transfer it elsewhere on the chart. Patented devices are available for measuring angles off the chart which, depending on circumstances, may be more convenient than the standard parallel rule.

36. **Summary** — To summarize our requirements at this stage, we must be able to:

a. determine a **distance** by use of **dividers** and the **latitude scale**, reading in nautical miles and tenths; and

b. determine a **direction** by use of **parallel rules** and the **inner compass rose**, reading nearest magnetic degrees, without fractions.

Using this information a seaman can, if he knows where he is, determine the direction to his next destination and the distance involved. Looking carefully at the route on the chart he can also learn the water depths to be encountered and can see any hazards such as rocks, shoals, wrecks, or kelp. When he has decided upon a route, drawn it on the chart and determined its direction, he has **set a course** which is always described by three digits, thus: **zero nine zero magnetic** (090°M — which is magnetic east). Now his problem is to steer the course.

TRAINING PERIOD 5 — DISTANCE AND DIRECTION (PRACTICAL EXERCISE)

37. **Practising True Direction** — During this period, cadets should be given the opportunity to practise on hydrographic charts, what they have learned in theory during the previous period. If sufficient equipment is available, they should work in pairs. One cadet should lay out a straight-line course between the true directions and distance of the course, and have it checked by the instructor. The cadets then reverse roles.

38. **Practising Magnetic Direction** — They should then be given a point on the chart, and a magnetic course and distance from that point. They should lay out the course, mark off the distance, and determine the new point on the chart they have obtained. This should be checked for accuracy by the instructor.

TRAINING PERIOD 6 — DAYTIME AIDS TO NAVIGATION

39. **Vertical and Horizontal Views** — The average local chart, scale about 1:80,000, presents a bird's eye view of approximately 1000 square miles of terrain. From a vantage point of several thousand feet of elevation, the earth's surface is represented in **plan**, ie, as seen **vertically**. Everything looks elegantly simple and clear; channels

between islands are obvious, entrances to sounds cannot be mistaken, and headlands appear boldly. Looking at the scenery **horizontally**, from a eye-height of a few feet in a small boat is, however, a different story. From there a sky-line can be seen which is not easy to identify on the chart. The clearly defined channels and headlands merge with the background and are not readily apparent. The pilot must learn to translate what topography he sees on the chart into terms of its different appearance from the water. Contours and peak elevations assist in identifying the skyline. Judgement counsels as to whether a point will stand out or, because its background is close, will merge. Inspection shows when a gap will be **open** and can be seen through. Any conditions of haze contribute further to a general merging of the distant shore into a featureless continuity. Such salient features as bluffs, cliffs, prominent peaks, isolated headlands, and lone islands are more readily picked up from the surface and should be singled out, from the chart, as features to be observed. (See Figure 7-14.)

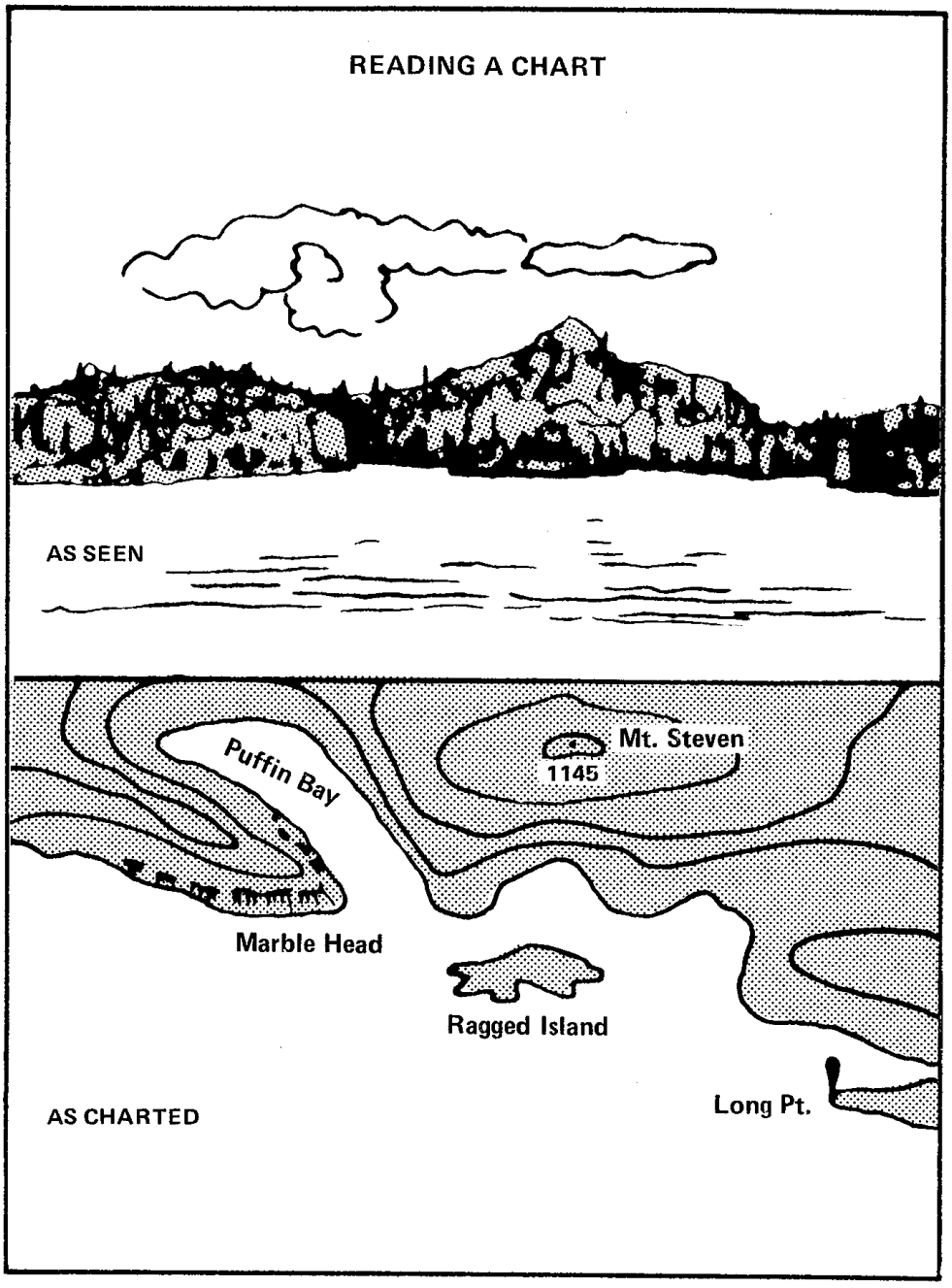


Figure 7-14 Reading a Chart

40. **Nature's Aids to Navigation** — Hydrographers, with years of experience in these matters, seek out and show on charts all the more **conspicuous features of the land and sea** — those which will be readily apparent from the surface. Lone trees, grassy patches, large rocks, steep cliffs, sand dunes, heavy woods, and similar

noticeable landmarks are shown. Rocks, islets, sand banks, and even patches of kelp appear on the water areas. Any of these, if shown on a chart and identifiable from the water, is an aid to navigation.

41. **Man-Made Aids — Structures erected for purposes other than navigation** provide useful aids and appear on charts. In this category are isolated houses, prominent buildings, towers, chimneys and spires, cupolas, water, oil and gas tanks, flagpoles, radio antennae, aero beacons, bridges, wharves, and in some instances even roads.

42. **Installed Aids to Navigation** — Where natural aids or man-made structures do not provide adequate identification and where aids are needed during darkness or limited visibility, the Department of Transport installs and maintains **specific aids to navigation**, which are **plotted precisely on the charts**. If **fixed to the earth**, as a **lighthouse** or **beacon**, the aid is certain to be in the charted position. If **floating and moored**, as a **buoy**, it can be expected to move about a little and may break entirely free. If **unlighted**, the aid is a **daymarker**. Some aids are designed to produce light, sound, sonic echoes, radar echoes, radio signals, or a combination of these.

43. **Characteristics of Aids to Navigation** — Each aid has characteristics which simplify its identification and cause it to stand out from other aids or adjacent objects. **Unlighted aids** depend for identity on **shape** and **colour**. They may, additionally, bear a **number**. **Lights** are identified by **colour, height, intensity**, and the **sequence in which the light appears. Sound-producing aids** have their own **frequency** and timbre, for example, **bell, gong, whistle, horn, and diaphone**. The characteristics of each aid are presented in comprehensive detail in the Government Publications **Lists of Lights** and **Fog Signals**, but can also be identified from the chart through the use of well-established conventions and abbreviations, all of which are illustrated and described on Chart No. 1. Listed in Figure 7-16 are the symbols for the **floating** aids most usually encountered, together with the United States equivalent.

44. **Running in Daylight** — The average amateur seaman usually limits his running to daylight hours, probably wisely, though it is to be hoped that as his proficiency develops he will not completely deny himself the exhilaration of running at night. This aspect of boating holds joys and satisfactions of its own. But let us reserve discussion of the details of lighted aids of night use and now consider **daymarkers**.

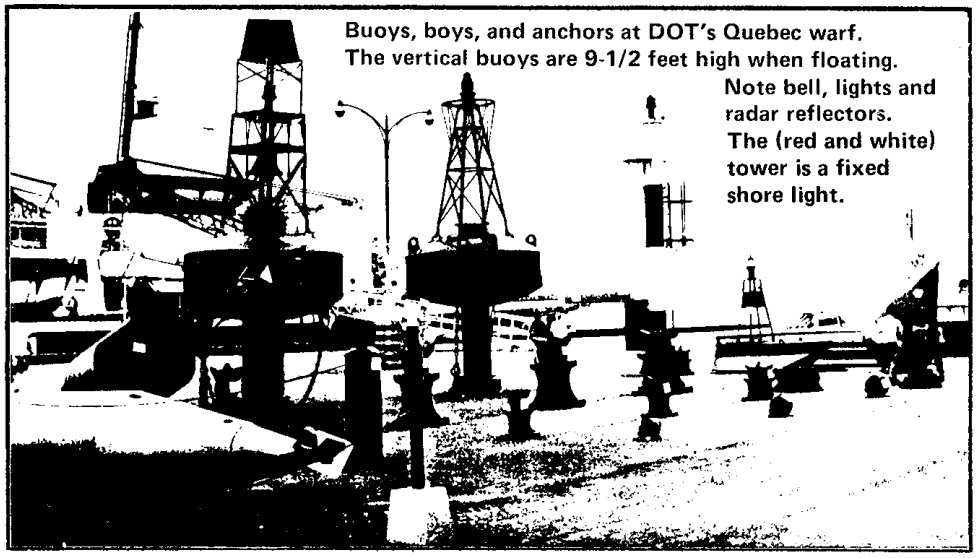


Figure 7-15 Description of Different Buoys

APPEARANCE AND SYMBOLS OF COMMON FLOATING AIDS
THE SMALL CIRCLE MARKS THE POSITION OF THE BUOY.

AID	SYMBOL	
	CANADA	UNITED STATES
black can buoy	B	C
red spar buoy	R	R S
black spar buoy	B	B S
red conical buoy	R	N
red nun buoy	not used	N "12"
lighted buoy flashing red	FIR	FIR
bell buoy with radar reflector	Bell	Bell
whistle buoy	Whistle	WHIS

Figure 7-16 Symbols for Floating Aids

45. **Daymarkers** — All **lighthouses** serve well as daymarkers. They are usually tall, situated on prominences, with buildings attached or associated and may be painted in distinctive stripes, bands, or spirals. Their positions are firmly fixed and they are plotted precisely on the chart. The **smaller lights**, usually **Unwatched** (having no resident lightkeeper), are less easy to pick up but are equally reliable as daymarkers if they can be identified. Descriptions of the appearance of lights are given in the List of

Lights and Fog Signals for the area. The exact position of the aid is shown by the dot on the chart.

46. **Beacons** — These serve only as daymarkers. The white slatted wooden structures, familiar for many years on the Canadian waters, are being replaced, as they become wasted or are demolished, by **daybeacons**. They are flat signboards, with retro-reflective paint which returns light to its source, so the beacon can be picked up at night by the beam of a searchlight.

47. **Types of Beacons** — The new **daybeacons** are as shown in Figure 7-16. On a returning course a vessel keeps the **triangular, red** beacons on her **starboard** hand. The **square, green** beacons are kept on her **port** hand. **Junction beacons** are **diamond-shaped** and indicate the **preferred channel**, as shown in the illustration. Daybeacons may be placed in channels, to guide a vessel through the navigable portion, in conjunction with floating aids (buoys, lighted or unlighted), and shore-based lights. Basically, **red** (colour or light) **is left to starboard when returning** and **green light to port**.

48. **Range Markers** — If range markers are unlighted they are used as daylight aids. Many such marks do carry lights, however, and are equally useful at night. Usually constructed of slats and mounted on pedestals, or on shore, range markers are so situated that when they appear **in line** or **in transit** they delineate a safe channel. The **imaginary line** which the markers project is called a **range** or **transit**. By staying on the range a boat keeps clear of hazards. The black marker or light is always the higher, a fact which must be remembered when deciding which way to turn to bring them in line. If range markers are lighted, the lights are usually **fixed** (ie, they do not flash) and are frequently red in colour. Home-made range markers are often seen in tiny coves, placed there by community-minded seamen to guide small craft to safe anchorage.

49. **The New Canadian Buoyage System** — (See Figure 7-17.) In 1983, the Canadian Coast Guard introduced a new buoyage system in Canadian waters, which has been adopted for use world-wide. This system includes both **lateral** buoys (to be passed on a required **side**) and **cardinal** buoys (to be passed on a required **direction** — North, South, East or West). The features and uses of the various buoys are described in a booklet, **The New Canadian Buoyage System**, issued by Transport Canada. This booklet should also be used to update the section on navigation lights in Training Period 7.

TRAINING PERIOD 7 — LIGHTS AND SOUNDINGS

50. **Aids in Darkness and Low Visibility** — For two thousand years lights have been used to guide mariners to safety. The Pharos of Alexandria, one of the seven wonders of the ancient world, was a tower built about 250 BC at the mouth of the Nile, atop of which a beacon fire was maintained. It is the earliest lighted aid recorded in history. Many of the older modern lights have lengthy and romantic histories, stories

of triumphs and tragedies, of heroes and heroines. Electricity and bottled gas, combined with a modern mechanical devices, make it possible today to construct lights up to 30 million candlepower, with a luminous range of 100 miles, and to be reasonably assured of a season's service from a small unwatched light, visited only rarely by a service vessel called a lighthouse **tender**.

51. **Lighted Aids on Charts — Lighted aids** are shown on **Canadian** charts by an **elongated pear-shaped symbol** and on **US** charts by a **circle**, in both instances coloured **magenta**, a shade which apparently is most easily seen in the dim red light of a wheel-house or chart-room at night. The light's position is **at the dot** on the pear shape or in the circle. (See Figure 7-18.) The direction of the pear shape has no significance, nor does it describe in any way the light's characteristics, which are always shown alongside the symbol in the form of standard abbreviations. It is usually necessary that a lighted aid have some identifying features lest it be lost amongst other background lights, or, perhaps worse, an unrelated light be mistakenly identified as the aid — a favourite trick, if fables can be believed, of shore-based pirates who lured ships to destruction by false beacon fires.

52. **Mounting a Light** — Lights are mounted on several different types of structure: the wave-swept tower, difficult and costly to construct, the shore based tower with its out-buildings; small shore-based lights on concrete pedestals, standing only a few feet above the pedestal; lightships, which are manned floating lighthouses; small unattended wave-swept structures, and floating lights mounted on **structural** buoys.

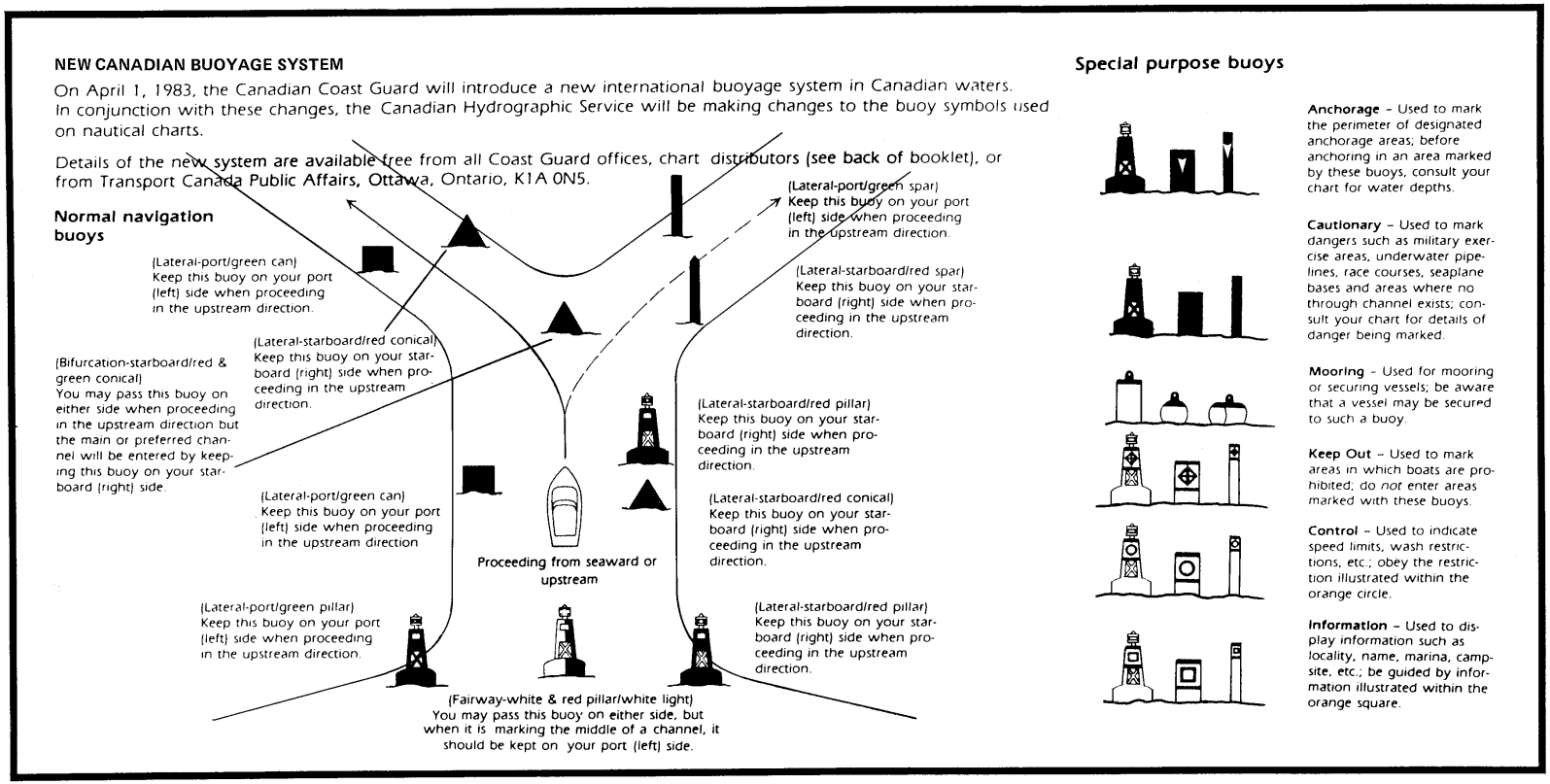


Figure 7-17 The New Canadian Buoyage System

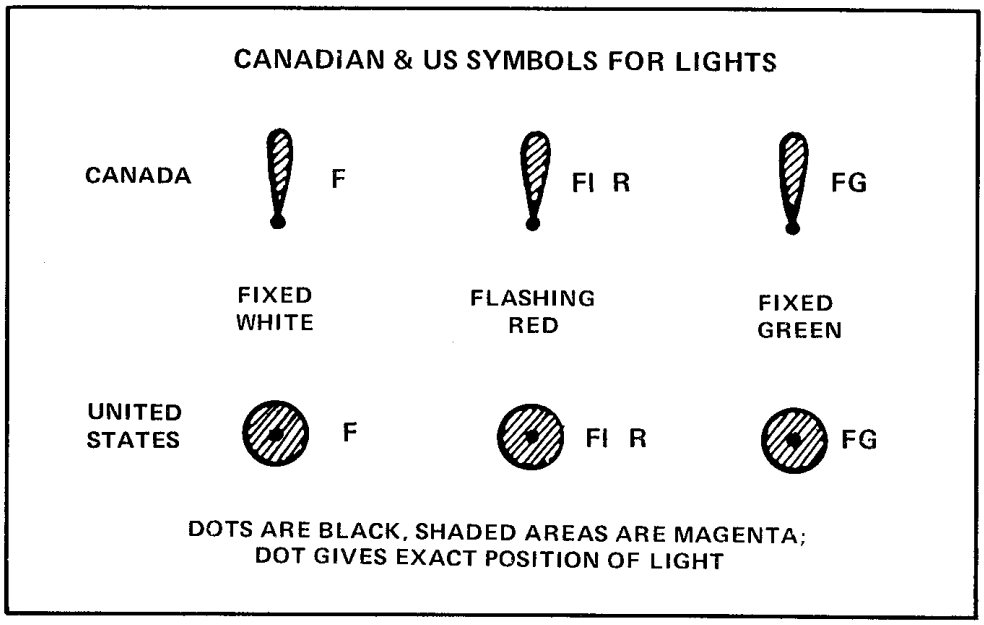


Figure 7-18 Canadian and US Symbols for Lights: Dots are Black, Shaded Areas are Magenta; Dot Always Gives Exact Position of Light

CHARACTERISTICS OF LIGHTS		
F	STEADY LIGHT, NO ECLIPSING	FIXED
Fl	FLASHES, WELL SPACED: "Fl 10 SEC"	FLASHING
Gp Fl	GROUPS OF FLASHES: "Gp Fl (2) 10 SEC"	GROUP FLASHING
FFl	STEADY LIGHT WITH FLASH SUPERIMPOSED: "FFl 10 SEC"	FIXED AND FLASHING
F Gp Fl	STEADY LIGHT WITH FLASHES SUPERIMPOSED: "F Gp Fl (2) 10 SEC"	FIXED AND GROUP FLASHING
Qk Fl	STEADY FLASHES, MORE THAN 50 PER MINUTE (60 IN US)	QUICK FLASHING
Int Qk Fl	GROUPS OF QUICK FLASHES (US: I QK Fl)	INTERRUPTED QUICK FLASHING
Fl (S-L)	SHORT AND LONG FLASHES IN GROUPS (US: S-L Fl)	FLASHING (SHORT-LONG)
Occ	STEADY LIGHT WITH ECLIPSES: BRIGHT LONGER THAN DARK	OCCULTING
Gp Occ	GROUPS OF STEADY LIGHT WITH ECLIPSES	GROUP OCCULTING
E Int	EQUAL INTERVALS OF LIGHT AND DARKNESS	EQUAL INTERVALS

Figure 7-19 Characteristics of Lights

53. **Characteristics of Lights** — **Colour** provides one means of identification; **white** has the widest application because it gives the greatest luminous range for equal power input. **Red** and **green** are also in general use. If a light **is white, no colour abbreviation is shown.** If **coloured, a letter appears alongside it**, for example, **R** or **G**. The other major means of identification is provided by a mechanism

which causes the light **to flash** or **to be obscured** in a repetitive, timed pattern. Here are some of the more usual patterns and their abbreviations.

54. **Fixed Lights** — Fixed lights are the simplest, requiring no flashing mechanism. They are installed where confusion with other lights is unlikely. A fixed light burns steadily with no interruptions and is shown on the charts as **F**.

55. **Flashing Lights** — These emit short bursts of light, the period of darkness being of greater duration than the flash. These are marked **Fl** and may also show the periodicity, as **Fl 20 sec** meaning "flashing (once) every 20 seconds." There is, however, quite a family of flashing lights; (Figure 7-26)

a. **Qk Fl — quick flashing**; not fewer than 50 flashes every minute (US: not fewer than 60) (used for sharp turns in a course);

b. **Int QK Fl — interrupted quick flashing**: a burst of quick flashes followed by a period of darkness (US: I Qk Fl);

c. **Gp Fl — groups of flashes**, as "2" or "3", with dark periods between groups;

d. **Alt Gp Fl — groups of flashes** of **different colours** as **WRR** or **RRG**; and

e. **Fl (S-L)** — a combination of a **short flash** and a **longer flash** (US: S-L Fl).

The periodicity of the groups is usually stated in abbreviated form; thus "Gp Fl (3) 10 sec" means a groups of three flashes, followed by darkness, then repeated, the complete cycle taking ten seconds ("ev" on older charts stands for "every"). To add to the confusion of the beginner there is the abbreviation **FFl**, meaning fixed and flashing: a steady light is brightened periodically by a superimposed flash, or, **FGpFl**, by a group of flashes.

56. **Occulting Lights** — An **occulting light** — from "occult", hidden — is a light which appears for a comparatively long time and is darkened for a shorter time **ie, there is more light than darkness.** It is abbreviated to "Occ", and sometimes the periodicity is stated as "Occ 20 sec". In this family is **Gp Occ**, a group of two or three long periods of light, followed by a short period of darkness. A less usually characteristic is identified by **E Int** which means **equal interval** — equal durations of light and darkness.

57. **Unwatched Lights** — The abbreviation **(U)** alongside a light symbol on a chart means that the light is **unwatched**. There is therefore no assurance from hour to hour or day to day that it has not failed.

58. **Determining Periodicity** — The periodicity of a light can be determined without a timepiece by counting seconds thus: "one thousand one, one thousand two,

one thousand three. . ." at a reasonably deliberate pace, which can be made more accurate by practice. From any position several lighted aids may be visible and it is necessary to identify each by observing its characteristic.

59. **Range** — Appearing in abbreviations, together with the characteristic, is the height of the light above high water and the distance it can be seen, thus: "Gp Fl (2) 10 sec 87 ft 15M", which translates into "a group of two flashes repeated every ten seconds, the **lantern** being 87 feet above high water and the light being visible, from an eye height of fifteen feet, for fifteen miles in good visibility." There will be more on **geographic range** later; it has to do with the curvature of the earth's surface. A standard eye height of fifteen feet has been established to express geographic range. It is thus apparent that if the eye height is less than fifteen feet, the light will be seen for a lesser distance.

60. **Arc of Visibility** — If the light is **obscured from vision by intervening topography**, two dotted lines will appear on the chart, labelled **"arc of visibility"**. Outside that arc the light cannot be seen. (See Figure 7-20.)

61. **Sectored Lights** — It is not uncommon to encounter a **sectored light**, which shows one colour, say white, around part of the arc of visibility, and a different colour, say red, in the remainder of the arc. The **coloured sector shines out over an area where hazards exist**. If the pilot sees the light change from white to red he knows he is on the margin of a dangerous area. The chart will tell him whether the hazards lie close in, offshore, or both. The older sectored lights do not always produce sharp colour division and the colour change cannot be fully relied upon. Some recent installations show three narrow and accurate sectors similar to range lights to provide direction in a narrow passage. The dotted sector lines may be marked, as to their bearing, in degrees from seaward, not from the light. (See Figure 7-21.)

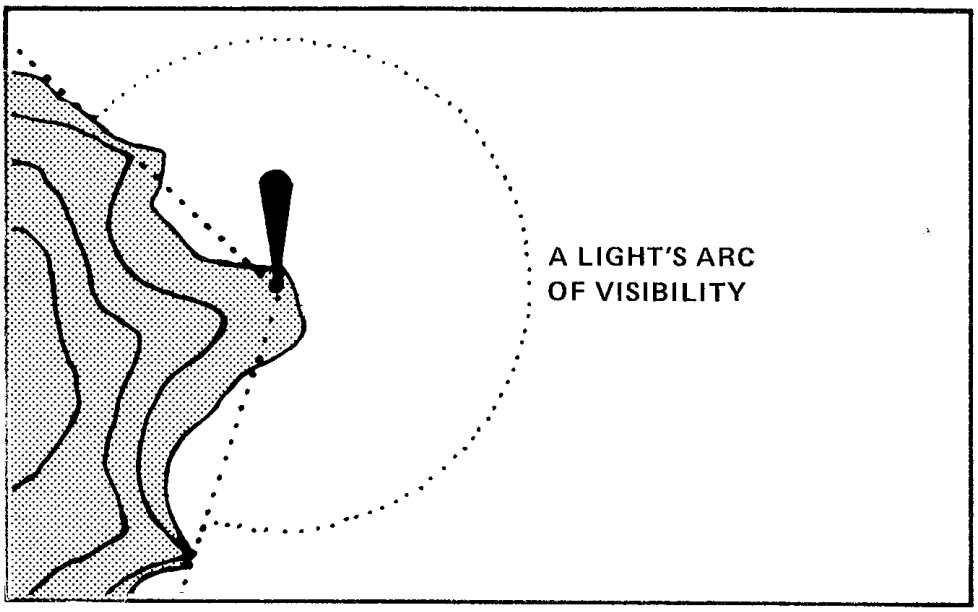


Figure 7-20 Arc of Visibility

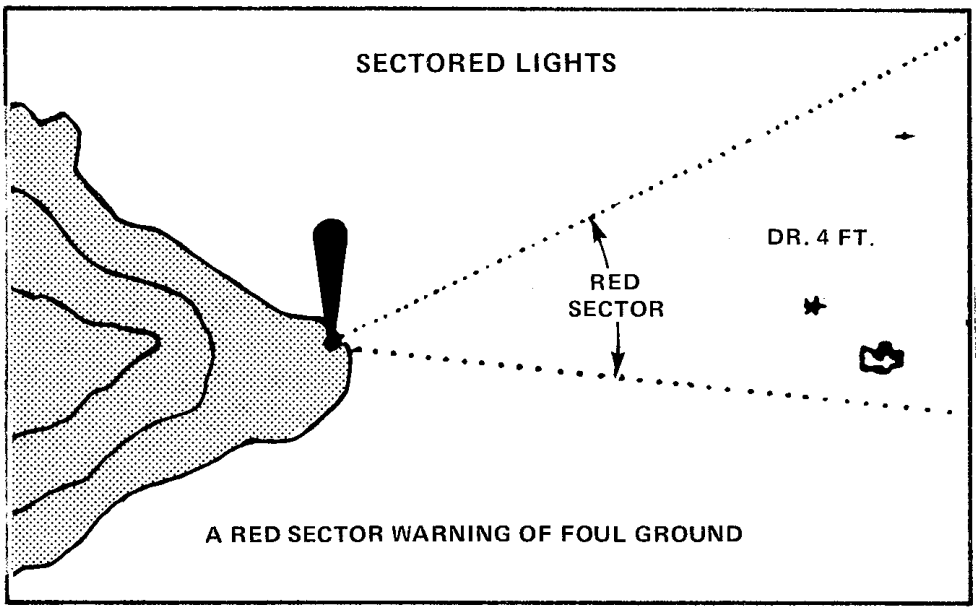


Figure 7-21 Sectored Light

62. **Range Lights — Two lights, frequently red, may be so established that,** when they appear in line, they mark a **safe passage** in the same manner as the day-markers. **Range lights** appearing on a chart usually have a fine line emanating from them through the **fairway**, which, if marked, is degrees from seaward. The more distant light (at the shore end of the range) is higher than the near one.

63. **Sound-Producing Aids — Aids which produce sound** are placed to serve the mariner during periods of reduced visibility, and are sensed by ear. The direction in which they lie cannot be determined as accurately as can the direction of a visible aid. Sound-producing aids at attended stations can be turned on and off as conditions dictate. Unwatched aids, unless remotely controlled, either operate steadily or, more usually, produce sound intermittently by the motion of the water. The devices at watched stations are usually large and powerful, using compressed air from shore-side electric power or the station's diesel generators to **blow horns** or to drive power-actuated hammers to **ring bells**. Reed horns, air whistles, diaphones, and bells are the aids most frequently installed and the charts show their characteristics, thus: "diaphone (2) 60 sec" which means a group of two blasts of the diaphone, sounded once every minute. The diaphone, a Canadian invention, is characterized by its change of pitch known as the **"grunt" — "Blaaaaa-UMPH."** Charts may show a **tyfon** — a patented fog-signalling device in which sound is produced by compressed air or steam being forced against a bronze diaphragm.

64. **Floating Sound Aids** — Floating aids with sound-producing apparatus are generally structural buoys with bells, gongs, or whistles mounted on them. Bells and gongs are struck by a set of hammers which are free to swing as the buoy rolls, and strike the beel which is mounted in the centre of the cluster of hammers. Gongs, using several different tones, have their own characteristic sound. Whistles, or **groaners**, produce a mournful moan as water rises and falls, because of wave action, within a chamber. A severe limitation in the usefulness of floating aids is imposed by their dependance on wave motion: low visibility that could prevent us from seeing a light is often accompanied by calm water.

65. **Radio Aids** — These modern electronic aids call for radio receivers and special knowledge to be of use. The most usual installation is a simple **radio beacon** which emits an omni-directional signal, with its own characteristic, at stated intervals. It appears on the chart as **Ro Bn**, or **RBn** in the US, and if its frequency is kilocycles and its characteristics are not shown they can be found in **Radio Aids to Marine Navigation**, a publication of the Department of Transport. The direction of a radio beacon is determined by the use of a directional antenna and a **distance finding station** simultaneously. A **Radar Reflector** is marked by a symbol or **Ra Ref**. Some coastal stations transmit on request in order that vessels can use them for direction finding.

66. **Depths: Rocks and Shoals** — To conclude the preliminary discussion of charts and their use a few thoughts on depths of water may be useful. A general concept of the detail of the hydrographic survey may be gathered from the number of **soundings** shown on the chart. In frequented waters such as harbours, soundings appear closely spaced, whereas elsewhere they may be far apart. Smaller-scale charts, however, are intended for the guidance of larger vessels and it is unreasonable to expect precise detail in every small inlet or bay. Caution is in order when exploring the more remote yet enticing shorelines. Unchartered pinnacles still exist. And remember: soundings may be **in feet or fathoms**, so be sure to know which is used.

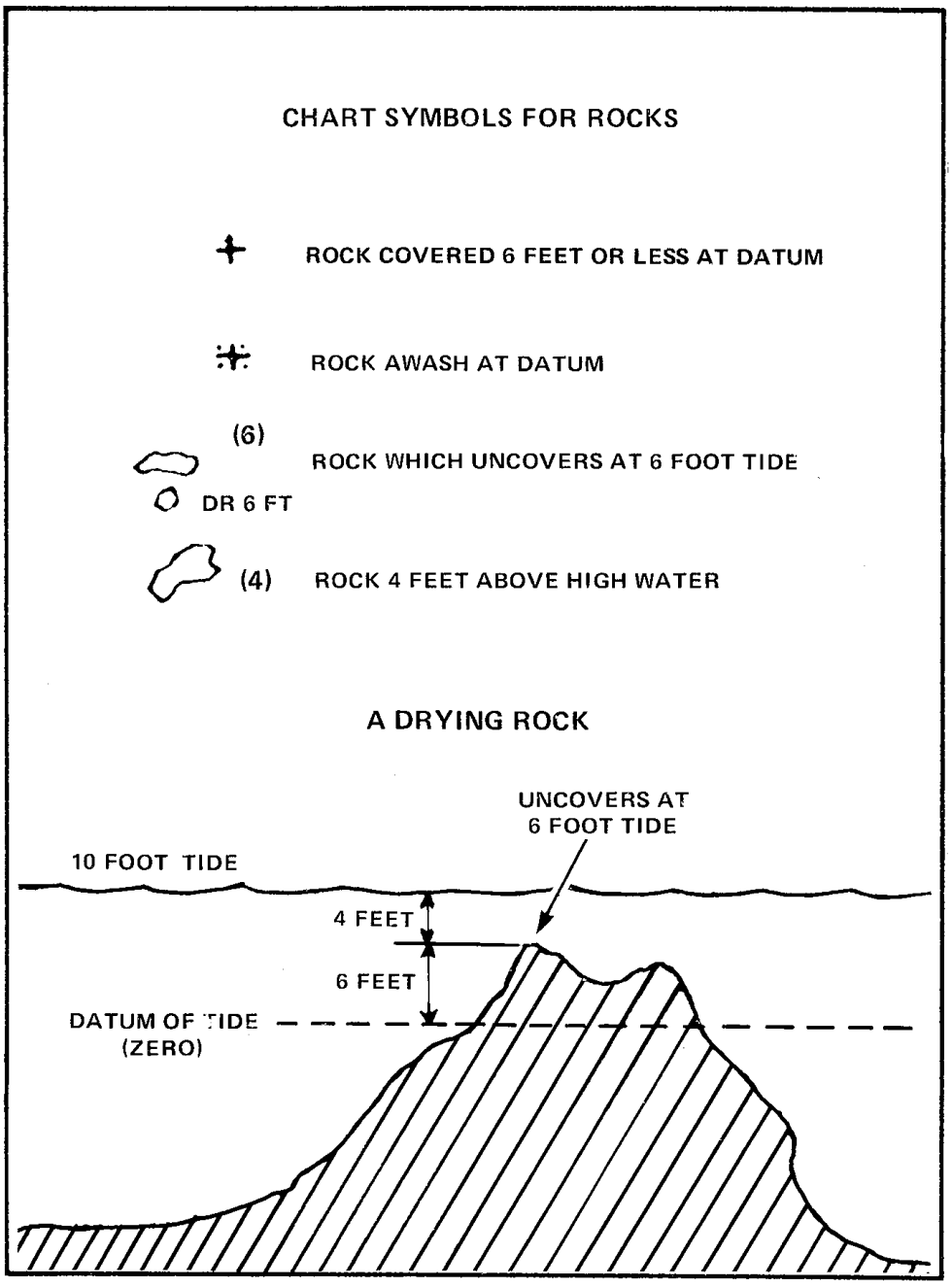


Figure 7-22 Chart Symbols for Rocks

67. **Rocks** — Rocks are marked by crosses as shown in Figure 7-22. Here **datum** refers to the datum of soundings, which appears in the title block of the chart but can be taken roughly as **low water**, the level reached when the tide is out. The expression **dries**, abbreviated to **dr**, may be confusing. It means that the rock just breaks the surface of the water when the tide is at the height indicated. Thus a rock marked "dr 6 ft" will appear at the surface when the tide falls to 6 feet above datum of soundings. When

the tide is at datum, the rock will show 6 feet out of the water. If the tide rises to 10 feet there will be 4 feet of water over the rock. Obviously considerable caution is needed near a drying rock: only small boats should approach it, and the skipper should know about the tides.

68. **Shoals** — Shoals are **highlighted** on the chart by the **deeper blue tint** used for shallow water. The depths shown are below datum (low tide) and there will be additional water over the shoal at higher tides. If a shoal dries it will be so marked.

TRAINING PERIOD 8 — REVIEW AND TEST

69. A brief review of the course to date should be made, indicating the various areas that require emphasis and explaining any points which appear to be causing difficulty.

70. Cadets shall write a short test on Pilotage. With the exception of any question on magnetism or compasses, all questions or problems should be based on actual hydrographic charts or diagrams of chart features. The cadet should be faced, in the test, with the sort of problems that he might encounter in a small vessel, armed only with a compass, chart, dividers and parallel rulers.

TRAINING PERIOD 9 — TIME, SPEED AND DISTANCE

71. **General** — Calculations relating to any form of travel from a simple week-end hike or even a walk around the block to a non-stop jet trip halfway around the world involve the three factors of **time, speed,** and **distance**. If any two factors are known, the third can be determined; considering the simplicity of the problem it is somewhat surprising that it can give difficulty. Possibly, trouble arises because the problems encountered at sea use somewhat different units of measurement from those on the road. Few people find it difficult to calculate the distance their car will go in three hours at 50 miles per hour or how long it will take to make a 100-mile run at an average of 40 miles per hour. At the end of a day on the road, say 8 hours' driving time, tourists are proud to say they have covered 400 miles, which clearly gives an average speed of 50 miles per hour.

72. **Measurements at Sea** — At sea the distances which are taken from the chart are in **nautical miles** of 6080 feet, or 800 feet more than a statute mile. Usually the distances include fractions, for example 15.3 miles. Rarely do distances come out even. Time, measured in hours and minutes has to be converted to minutes before calculations commence. Speeds made good are almost certain to involve fractions, such as 9.7 knots rather than an even 10 knots. These matters, however, do not complicate the problem; they merely make the arithmetic somewhat more laborious.

73. **Speed at Sea** — This is usually stated in **knots** by seamen, and rarely in miles per hour. A knot is **one nautical mile per hour** and is abbreviated to **kn**. Hence, the phrase "knots per hour," while it could express a rate of acceleration, cannot express

speed. The first thing to learn about the speed of boats is that it is stated in knots — nautical miles per hour — and therefore co-ordinates perfectly with the nautical miles measured on the chart. Because of the relationship between nautical miles and statute miles, 6080:5280 or 1.15:1.0, or 8 to 7, a speed of one knot is faster than one statute mile per hour. A boat advertised as capable of 30 miles per hour (mph) may be expected to make 26 knots (30 divided by 1.15).

74. **Units Used at Sea** — In the problems of time, speed, and distance, the units used at sea are:

a. minutes (and sometimes decimals of minutes);

b. knots (nautical miles per hour, usually to one decimal place); and

c. nautical miles (usually to one decimal place).

A simple formula can readily be developed:

distance = speed x time.

Thus on land:

statute miles travelled = miles per hour x hours;

and at sea:

nautical miles travelled = knots x hours.

Multiply both sides of the equation by 60 to convert hours into minutes:

60 x nautical miles travelled = knots x hours x 60
60 x miles = knots x minutes.

This formula is easily learned as:

60d = st

where
d is in nautical miles (distance),
s is in knots (speed), and
t is in minutes (time).

A "jingle" to assist the memory: "**50 D Street**" (in the form of a street address).

The simple formula can be set out in four ways:

60d = st (the form to remember)
d = st/60 (to determine distance)
s = 60d/t (to determine speed)
t = 60d/s (to determine time).

75. **Determining Estimated Time of Arrival** — The problem most frequently encountered by a seaman is the calculation of the time his vessel will take to run a known distance, as determined from the chart, at a known speed. This question arises whenever the seaman needs to know his **Estimated Time of Arrival** (ETA) at a destination. He may be concerned with the height of tide at that time, whether or not it will still be daylight, or even such a mundane consideration as whether or not the stores will be open. To determine his ETA he calculates the duration of the run, using distance and speed, in the formula:

t = 60d/s, with t in minutes,
d in nautical miles, and
s in knots.

Thus if the distance is 30 miles and speed is 10 kn:

t = 60(30)/10 = 180 minutes = 3 hours.

Or, using a little more arithmetic, if the distance is 14.8 miles and speed is 8.5 kn.:

t = 60(14.8)/8.5 = 888/8.5 = 104.5 minutes
= 1 hour 44.5 minutes.

76. Here is a simple problem by way of example: Let us assume that my 16-foot boat, "Echo III," carried no lights (though, of course, she should!). It is 1730 (5:30 p.m.) and sunset is at 2005 (8:05 p.m.). Port Hopeful is 33 miles away. At 10 kn., can I make it?

NOTE

Time of day is stated in the 24-hour system, always using four digits without punctuation and without the addition of the word "hours".

Here is the solution:

t = 60d/s = 60(33)/10	=	198 minutes
	=	3 hr 18 minutes
It is now:		17 hr 30 minutes
ETA (by addition):		20 hr 48 minutes

If ETA is 2048, and sunset is 2005 I shall still have 43 minutes to run after sunset and so cannot make it without lights.

77. **Boat Speeds** — The foregoing should suggest that a seaman must know the speed of his boat. Speedometers, working on dynamic water pressure and usually **calibrated in miles per hour** (mph), are commonly installed in small fast boats. These give a reasonably good indication of speed through the water but are rarely accurate enough for precise piloting. Larger vessels use the **Patent (Cherub) Log** which is basically a small propeller trailed on a special line well aft of the ship, beyond the turbulence of the screws. It measures distance travelled using a revolution counter. In most pleasure boats the pilot sets his speed by the **tachometer** which indicates the revolutions per minute (rpm) of the engine. The speed of the boat through the water is related to the engine rpm and is determined by trial.

78. **Speed Through the Water** — The speed through the water, which is all that can be readily determined from on board, may not be the same as the **speed made good**, which is the speed over the bottom. What follows here assumes that the water is still; there are no currents to aid or hinder the boat nor push her off course. **Flat water** speed is under discussion.

79. **Flat Water Speed** — Most boats have a comfortable speed called **cruising speed** which gives a reasonable rate of travel combined with fuel economy. This is the speed or rpm setting the seaman will use while cruising. Here is a method of determining a boat's cruising speed.

a. Run her for a while at various throttle settings and then decide which rpm gives the most comfortable ride and the quietest and best performance. The engine manual discusses **continuous duty** ratings. Assume that 2200 rpm feels like a good cruising speed.

b. In an area of calm water and clear of traffic, take from the chart a clearly defined distance of about one mile. If there is a measured mile in the area, it can be used. If not, two distinct marks, such as daymarkers, will serve. **Take off the distance exactly**. Let it be 1.2 miles.

c. At cruising speed, in this instance 2200 rpm, run a straight course from mark to mark, timing preferably with a stop watch; call this the **run out**.

d. Turn and at the same rpm cover the return trip, timing it; call this the **run back**.

e. Tabulate and calculate:

Distance:	1.2 miles rpm: 2200
Time out:	7 minutes 35 sec = 7.58 minutes
	(35 sec = 35/60-minute = 0.58 minutes)
Time back:	7 minutes 07 sec = 7.12 minutes
	(07 sec = 7/60-minute = 0.12 minutes)

Speed out:	9.5 kn
Speed back:	10.1 kn
Average speed:	19.6/2 = 9.8 kn

Hence at a cruising throttle setting of 2200 rpm, in flat water, the vessel makes 9.8 knots. The process of averaging the speed out and the speed back eliminates the effect of any movement of the water and gives that speed made good in flat water is the same as speed through the water. It will not suffice and in face may give an incorrect result if times rather than speeds are average. So long as the propeller is not changed, the trim and loading are not altered, wind and sea not calm, and the condition of the bottom of the boat is not impaired by weeds or barnacles, this boat, at 2200 rpm, will make 9.8 knots through the water, which is her cruising speed, and cruising calculations will be made at that speed. If speeds at other throttle settings are required they can be determined in the same manner.

80. **Average Speed Made Good** — The same process can be used, without the feature of the run back to determine the **average speed make good** on a run of any length, thus:

distance run:	36.7 miles
time of arrival:	1237
time of departure:	0900
elapsed time:	0337 = 217 minutes
speed made good:	60d/t = 60(36.7)/217 = 10.1 kn

It is unnecessary to take calculations to more than one decimal place as the accuracy of the data does not usually warrant it.

81. **Determining Distance** — The remaining aspect of the problem is simple: how far will a boat go in a certain time at a certain speed? For example, at her cruising speed of 9.8 knots, how far will a boat travel, on flat water, in 6 hours and 30 minutes?

$$d = st/60 = 9.8(390)/60 = 63.7 \text{ miles}$$

82. **Dead Reckoning** — An understanding of the relationship between time, speed, and distance is essential to the solution of **dead reckoning** problems to be discussed later. These problems arise in the situation where, usually because of limited visibility, no aids to navigation are available. The relationship can also be applied to problems of **fuel consumption**. Gallons of fuel, at certain engine revolutions, can be translated into running time and thus into distance. Conversely, distance can be translated into fuel consumption.

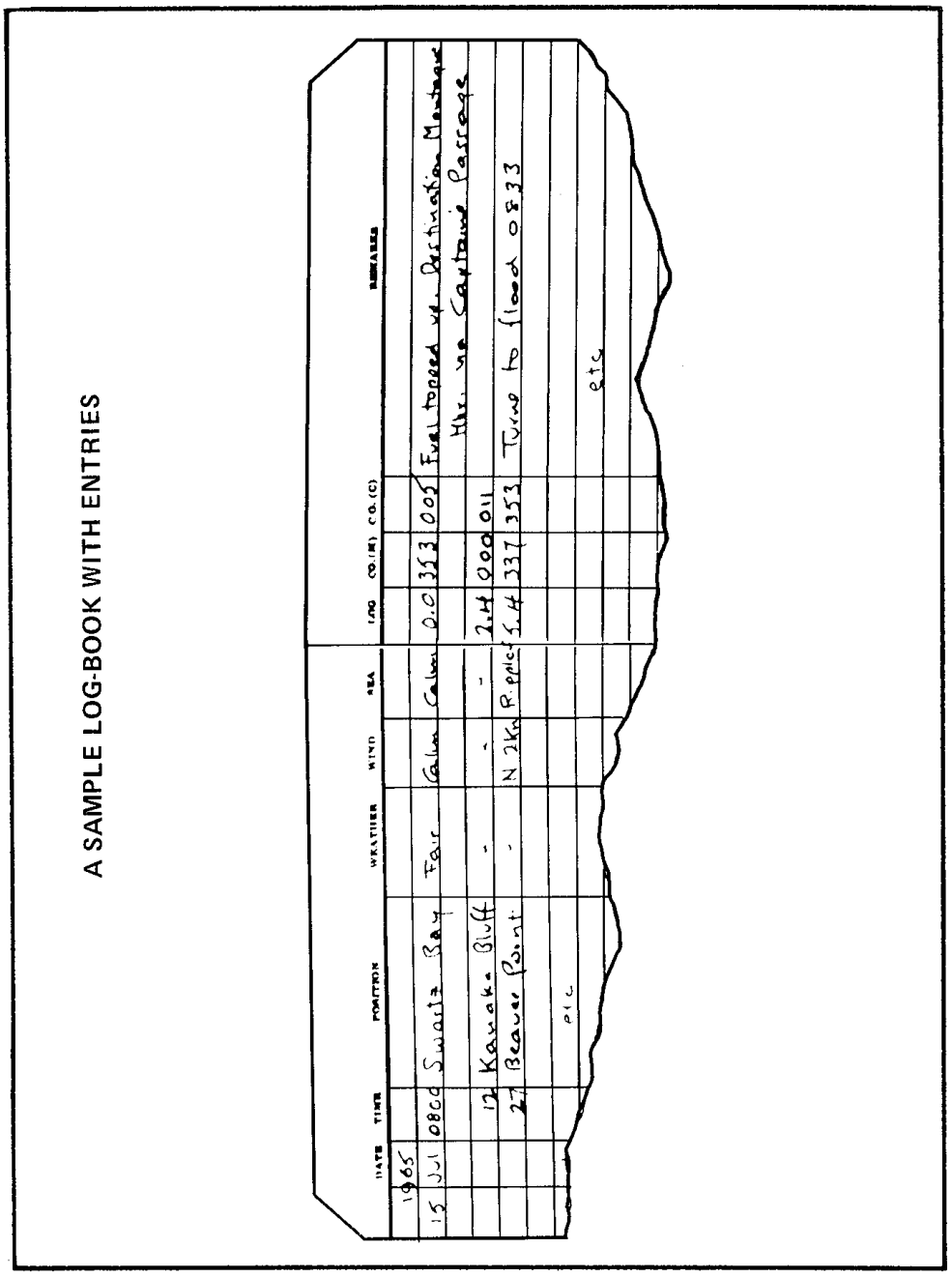


Figure 7-23 A Sample Log-Book with Entries

83. **Using a Log** — A log-book is a continuous record of events aboard ship. Its maintenance can be regarded as a time-consuming chore or an interesting labour of love. Inasmuch as boating expeditions usually provide for long hours of sweet idleness, apart from maintaining a sharp look-out, the keeping of a log should surely be an interesting part of the daily routine. The record not only makes good reading and possibly valuable reference later on, but can be of considerable worth in the event of legal

trouble. Seasonal activities such as haul-outs and lay-ups can be recorded; place, nature, and cost of repairs noted; a running record of fuel and lube consumption together with engine hours can be maintained; and from day to day courses run, elapsed times, wind and weather, plus a guest list, a seamanlike record made. Records of course and running time which may prove useful on future runs in different and perhaps less favourable conditions are particularly valuable.

84. **Keeping a Log** — A log-book need not be expensive. Pre-printed and bound books can be purchased reasonably, or a seaman can rule up an ordinary note-book. The columns generally include data, time of day, location of position, compass course to next position, speed or rpm, remarks on weather, wind and sea, and general remarks. The book also provides a safe repository for the vessel's documents. Maintaining the ship's log should be a pleasant task and an integral part of good seamanship.

TRAINING PERIOD 10 — DEAD RECKONING AND LINES OF POSITION

85. **Plotting the Course** — (See Figure 7-24.) Examination of the appropriate chart, together with any available **local knowledge** will suggest the most suitable route from A to C — say via B. **Course lines** are draw lightly, so they may later be erased, with a sharp, reasonably hard pencil. These mark the route which the vessel is intending to take. By transferring each line to the compass rose, its **direction**, with reference to magnetic north, is determined and is **labelled** as shown against the course line, thus: "Co 095 (M)" which means a course of zero nine five degrees magnetic. Also labelled is the **speed** at which the course will run, as "6 kn" meaning six knots through the water. For the present the water will be considered as flat, so speed through the water is also speed made good. Now if the time of departure from A is entered in the log and if the course is carefully steered, it is possible to calculate, at any particular time, how far the vessel should have advanced along her course line.

86. **Dead Reckoning** — If departure from A was taken at 1000 (10:00 a.m.), at 1100 the vessel should be six miles along the course line. This position is plotted as shown, "1100 DR," with a cross, meaning dead reckoning position at 11:00 a.m. Similarly she should be at point B, the distance from A being 15 miles, at 1230. This position would be labelled "1230 DR" — dead reckoning position at 12:30 p.m. It thus appears that with knowledge of course and speed, and with some intelligence and care, a **dead reckoning** position (DR) can be established at any time. Such is the practice followed by piloting and, with reservations as to the compass (to be discussed later), the problem of dead reckoning in still or flat water is no more complex than described. The word "dead" in this sense is either a corruption of "deduced" or relates to . . . the meaning of dead as "absolute". In any event, a DR position is one which is calculated and is based on certain assumptions as to speed and course made good. Some commercial publications, used in the way road maps would be by a motorist, show the courses between popular points pre-plotted, labelled, and with the miles marked off. All the amateur has to do, if he wishes to use these crutches, is to steer

the course as labelled and calculate his time. This is one activity, however, where do-it-yourself makes sense and provides satisfaction. A skipper who can lay a course, take off its direction, calculate times and distance, and steer by compass is likely to make his run directly and safely, subject to winds, currents, and compass complexities. He is on his way to becoming a pilot.

87. **Check Dead Reckoning Positions** — Factors enter the problem however, such as tidal currents, weather, inaccuracies in speed determination, and ordinary human error, which make it desirable **to check the dead reckoning positions** whenever opportunity offers. The process of piloting is predicated on frequent and accurate determination of position, called **fixes**, made by observation of geographic features. In fact, a reliable fix provides a fresh point of departure; all past errors have been corrected and intelligent, appropriate action can be planned for the future. The course plot can be amended as necessary and timing can be revised. How are such fixes obtained?

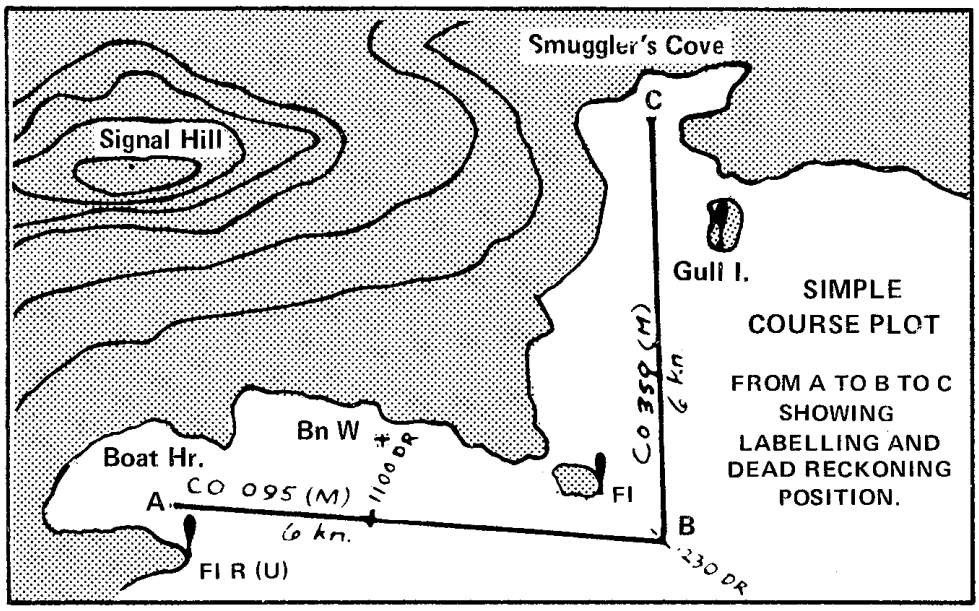


Figure 7-24 Simple Course Plot from A to B to C Showing Labelling and Dead Reckoning Position

88. **Line of Position** — All fixes obtained at sea depend on the establishment of a **line of position**. This is a term which will be used frequently and is abbreviated to LOP. Such lines may be straight, or curved and are established by observation of the sun, planets, or stars, by use of electronic aids, or by visual or sound observation of geographic features and aids to navigation. For present purposes an LOP will be a straight line, or in some instances a circle, established by sighting on either a natural or man-made aid.

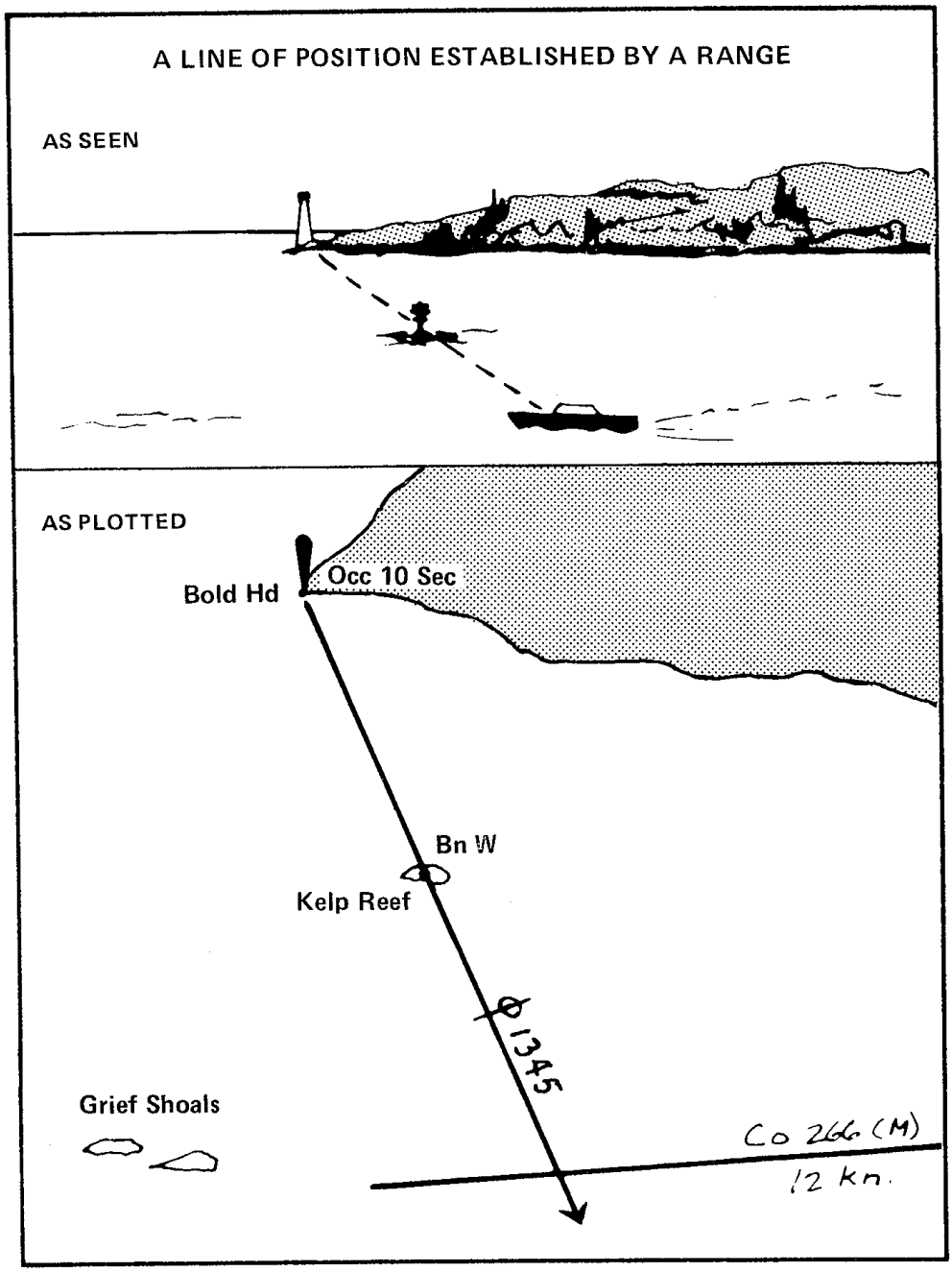


Figure 7-25 A Line of Position Established by a Range

89. **Ranges or Transits** — If a pilot, sighting an identifiable aid, can tell the direction in which it lies as seen from his location, he can draw a line on the chart in the appropriate direction, to pass through the aid. He has then established an LOP. His vessel must be somewhere on that line. The simplest and most reliable LOP is one, strangely enough, that needs no instruments to establish and can be used by anyone, even aboard the smallest of boats, whenever opportunity offers. It is the **range** or

transit. These words are synonymous in piloting and simply mean that **two objects are seen to be in line.** If, in Figure 7-25, the pilot observes the daymarker and the lighthouse to be in line he knows his vessel is on the range or transit established by a straight line drawn through the two aids. He draws the line, labels it as shown with a **Greek phi** (Φ) and the time, as say 1345. This establishes an LOP and he can say with certainty, now or later, "at 1345 my vessel was somewhere on the range Bold Head Light Φ Kelp Reef." Anyone can make such an observation, and using only a straightedge and pencil can plot it. If the aids have been correctly identified a transit establishes a completely reliable LOP.

90. **Value of a Transit** — Observation of a transit establishes a **line** rather than a spot position; the boat may be anywhere on the line. This in itself, however, may be valuable information. If hazards lie to the west of the line in Figure 7-25, shown as "Grief Shoals," observation of the transit means proximity to the shoals and need for caution. Conversely, if the transit has not been crossed, on the westerly course illustrated, the shoals do not yet cause concern.

91. **Observing Transits** — Transits may be observed on available natural aids as well as man-made aids. In Figure 7-26 two transits are illustrated: one **when the gap between the islands opens** and one **when it closes.** In Figure 7-34 two more ranges appear, formed by the **headland** and **each end of the island.** The alert pilot is continually watching for ranges which are easily and definitely identified. Radio towers in line, a point and a mountain peak, a jetty and a spire — all provide him with valuable information.

92. **More than One LOP** — A single observation produces a single line of position. If **simultaneous observations can be made on two aids**, two LOPs result and **these must cross somewhere. Their intersection is the position of the observer**. Hence, useful though the observation of the single transit may be, another LOP is needed to establish a position, or **fix**.

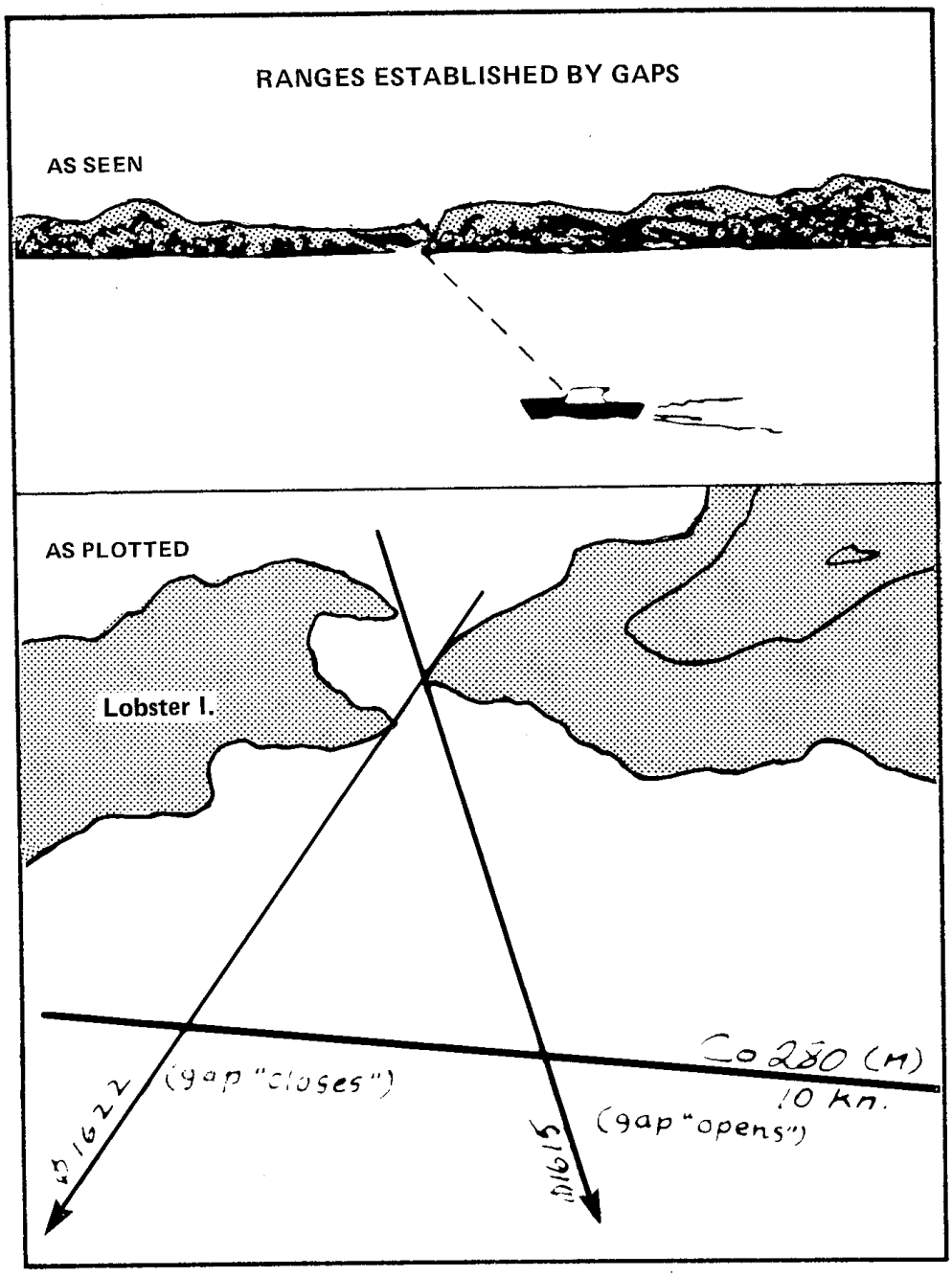


Figure 7-26 Ranges Established by Gaps

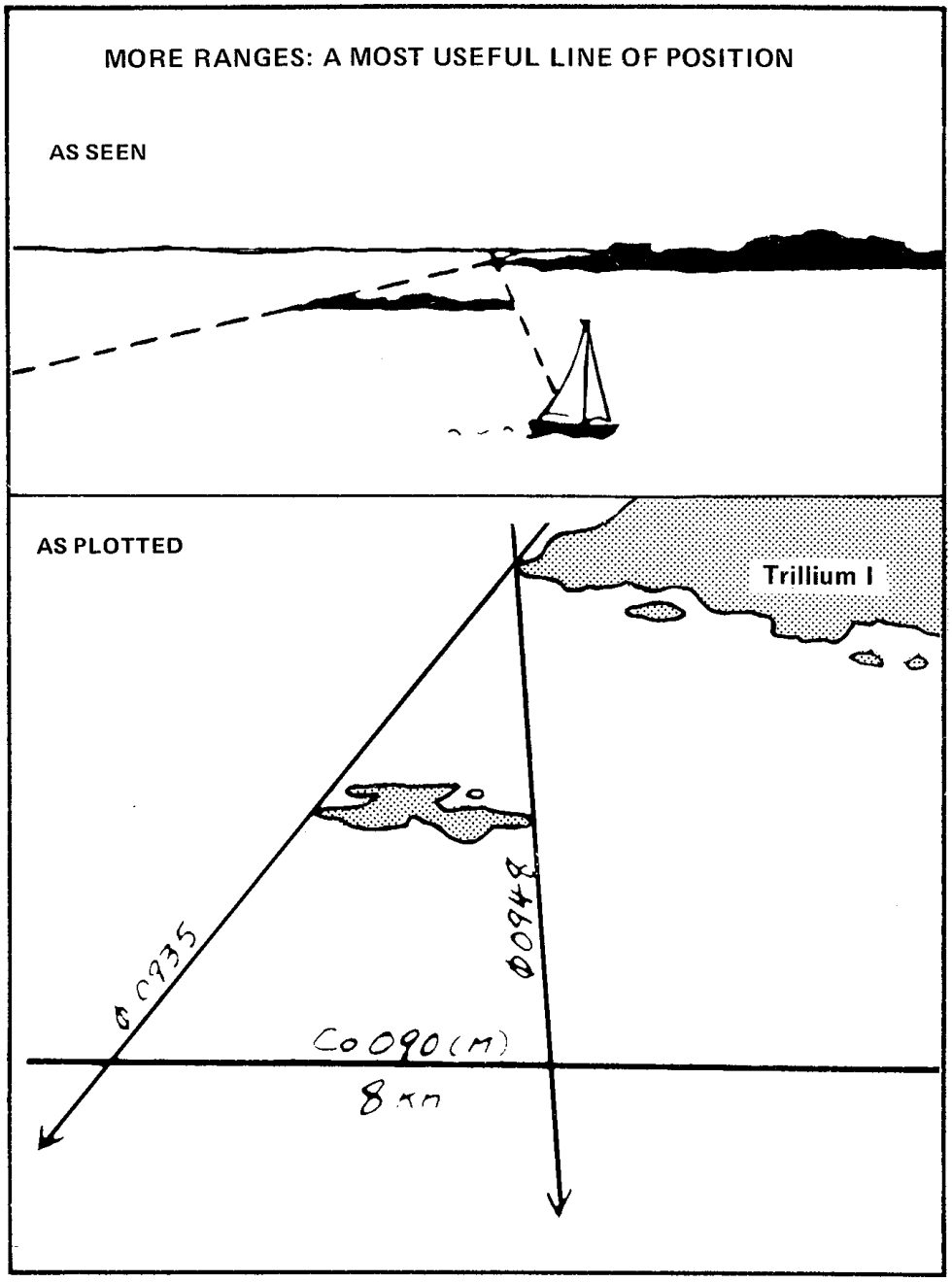


Figure 7-27 More Ranges: a Most Useful Line of Position

TRAINING PERIOD 11 — BEARINGS AND SIMPLE FIXES

93. **Bearings** — A bearing, abbreviated to **bg**, is the horizontal direction of one terrestrial point from another. For present purposes it is the angle, measured clockwise, from magnetic north (000°) to the line of sight on the object being observed. In Figure 7-35, the reference direction is magnetic north, as established by the compass.

From the ship's position the lighthouse is observed to the east of north. Measurement of this angle, using the compass, gives 040°. The lighthouse thus bears 040° (M) from the ship's position. Hence a line drawn in the direction 040° (M) from seaward, to pass through the lighthouse, must also pass through the vessel's position and is thus an LOP. It is necessary to re-emphasize the fact that, particularly in larger boats, the compass, unless adjusted, may not point to magnetic north. The possible differences are being set aside for later examination.

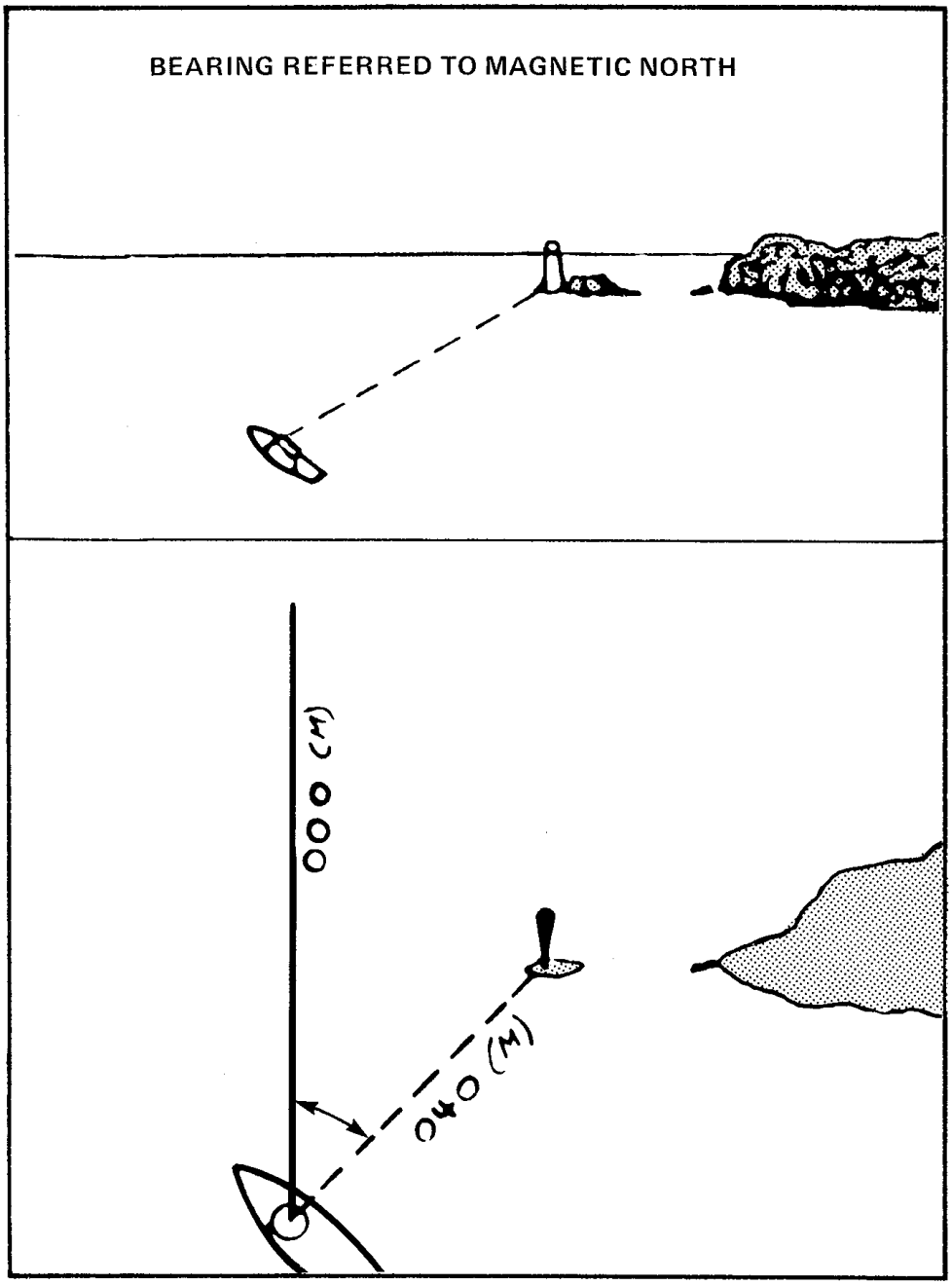


Figure 7-28 A Bearing Referred to Magnetic North

94. **Mounting an Azimuth Circle** — The most convenient way to obtain a compass bearing, which for now is considered to be a **magnetic bearing**, is to mount an **Azimuth Circle** on the compass. This device is placed on top of the compass and is fitted with **sighting vanes**, so constructed that the apparatus can be rotated to bring the line of sight onto the observed object, at which time the compass direction of the line can be read off the compass card which is always oriented to compass north.

95. **Azimuth Circles on Small Boats** — It is frequently impossible to mount an azimuth circle on a small boat compass. Even where possible, it may prove unworkable because bulkheads and stanchions get in the way of both the line of sight and the observer. Further, the owner may not consider the expense warranted. There are other ways of obtaining bearings, the most common being by the use of an instrument called the **pelorus.**

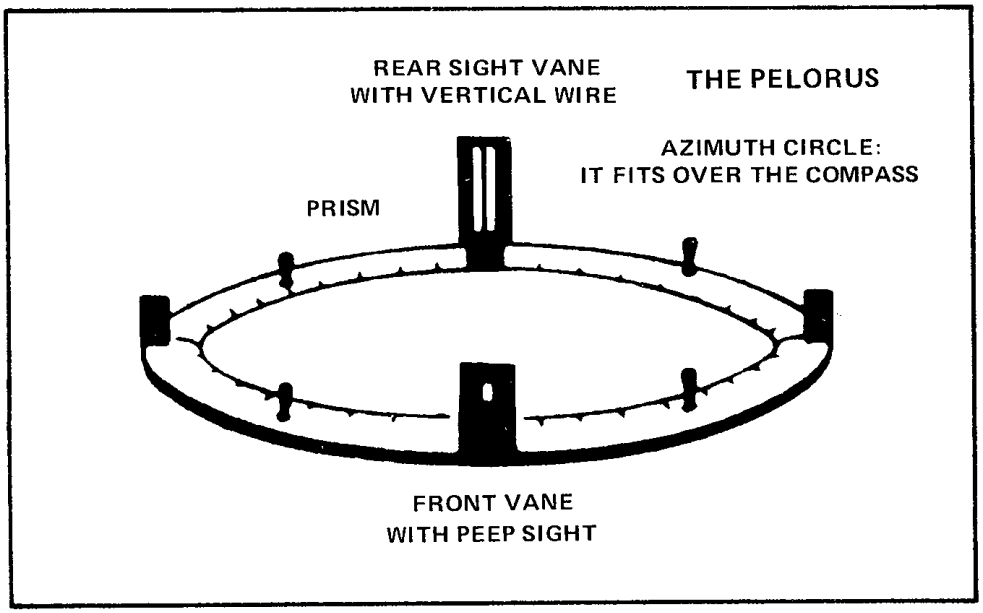


Figure 7-29 The Pelorus

96. **The Pelorus** — (See Figure 7-29.) Any boat-owner can afford a **pelorus**, which he can build if he cannot buy it. It is a portable device consisting of a **pair of sightings vanes** mounted over **a dummy compass card**. Both vanes and card can rotate independently. The pelorus is mounted, usually so it can readily be removed, in such a position as to permit easy all-round observation. In use, the pelorus card is set, against its lubber line (**its axis having been made parallel to the vessel's keel**), **to read the ship's compass heading** at the time of observation. Thus the pelorus is oriented to the compass card at the moment of sighting and **readings taken on the line of sight are the same as though they had been taken over the compass**. In effect the pelorus provides a means of transporting the ship's compass to a useful vantage point. Care must be taken that the pelorus's axis is properly established parallel to the ship's axis, that the vessel is steady on course when the observation is made and that the course is properly set on the pelorus card. If she is yawing the helmsman calls "on" or "mark" only when she is in fact on the course that has been set.

97. **Reading the Head off a Compass** — Lacking an azimuth circle or a pelorus what can the pilot of a small boat do? Simply, he can take a few minutes from his run, reduce speed to dead slow, **and head his craft directly for the aid he wishes to**

observe. With the boat aimed dead on the aid, he reads the ship's head off the compass. He had placed the boat on the line of sight, with the result that **her compass head** is the **compass bearing of the aid**. He can now plot the bearing and obtain a line of position. No one need be defeated by lack of the more specialized tools.

98. **A Fix by Two Lines of Position** — **Two intersecting lines of position**, the result of observations taken simultaneously, as near as may be, **constitute a fix**. The lines may be **two ranges**; an improbable situation because only rarely would a ship be at the intersection of clearly defined ranges. A **range and a bearing** is a useful combination; preparations can be made in advance and the observation taken at the precise time the vessel crosses the range.

99. **Taking a Fix** — In Figure 7-30 the vessel, on course 310° (M), was on **the range**, as plotted, at 1435 (2:35 p.m.). At the same time the **flashing red light was bearing 344° (M)**, as observed by the pelorus. A line is plotted on this bearing, from the area of the ship's position, to pass through the FIX chart symbol. This line is labelled with an arrowhead, the time and the bearing, as shown, which identifies it as a plotted observation. The fix itself, at the intersection of the two LOPs, is marked by a small circle, labelled, with the time, thus: "1435 Fix."

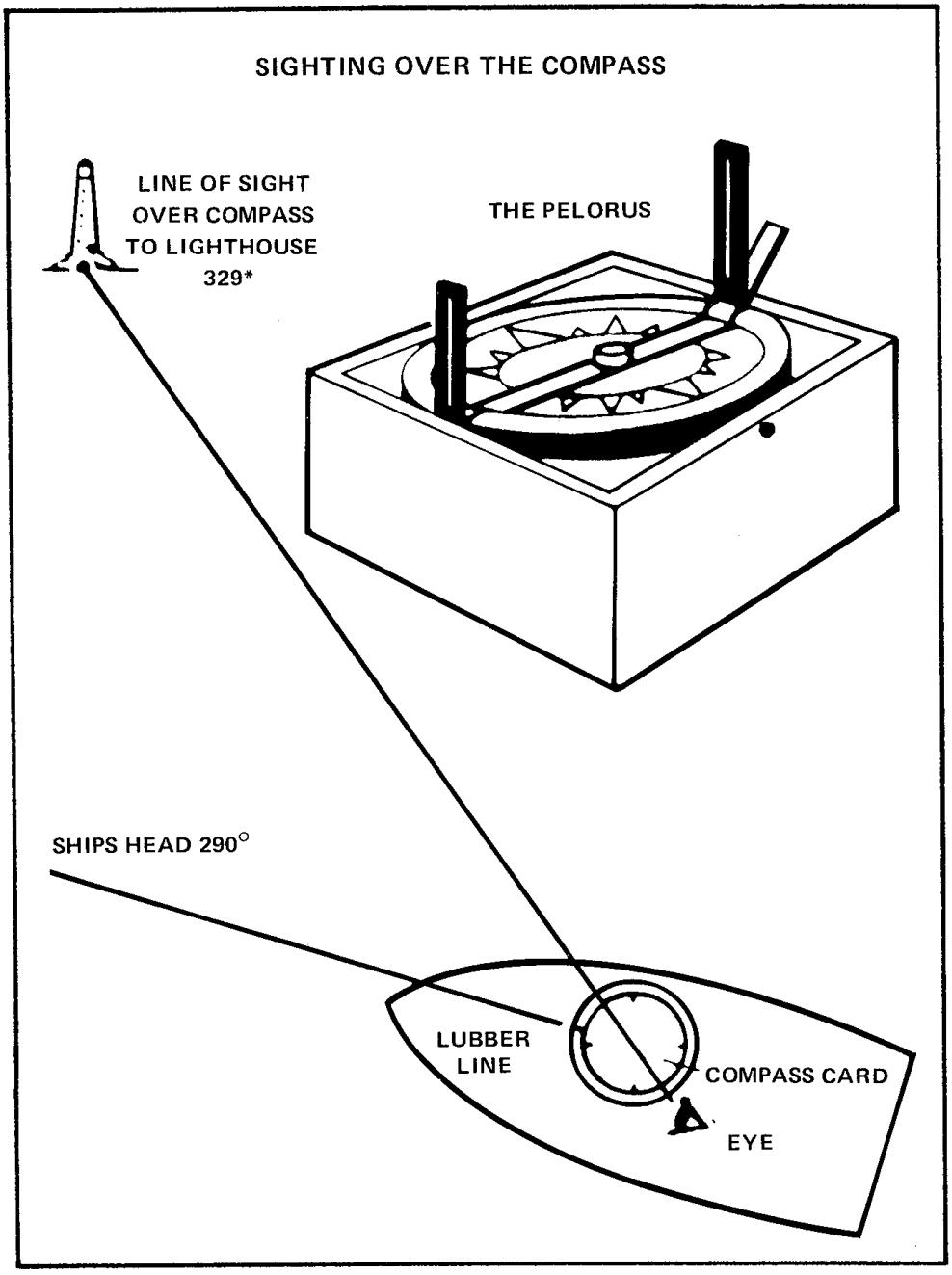


Figure 7-30 Sighting Over the Compass

100. **A Two-Bearing Fix — Two bearings** also provide a fix. The two observations must be taken quickly so as to minimize the ship's travel between sights, and the plot is labelled as shown (Figure 7-32). These methods, properly executed, provide a new starting point for planning the conduct of the vessel. Rarely does a fix coincide exactly with the DR position. If it is close to the DR it serves as assurance that all is going well; the DR calculations are then either substantiated or corrected and, most important, the

pilot knows where he is. Figure 7-33 illustrates a fix obtained during the run shown previously: observation on Signal Hill and Gull Island light establishes a position at 1330 which differs from the DR position suggesting the vessel is off course to the east.

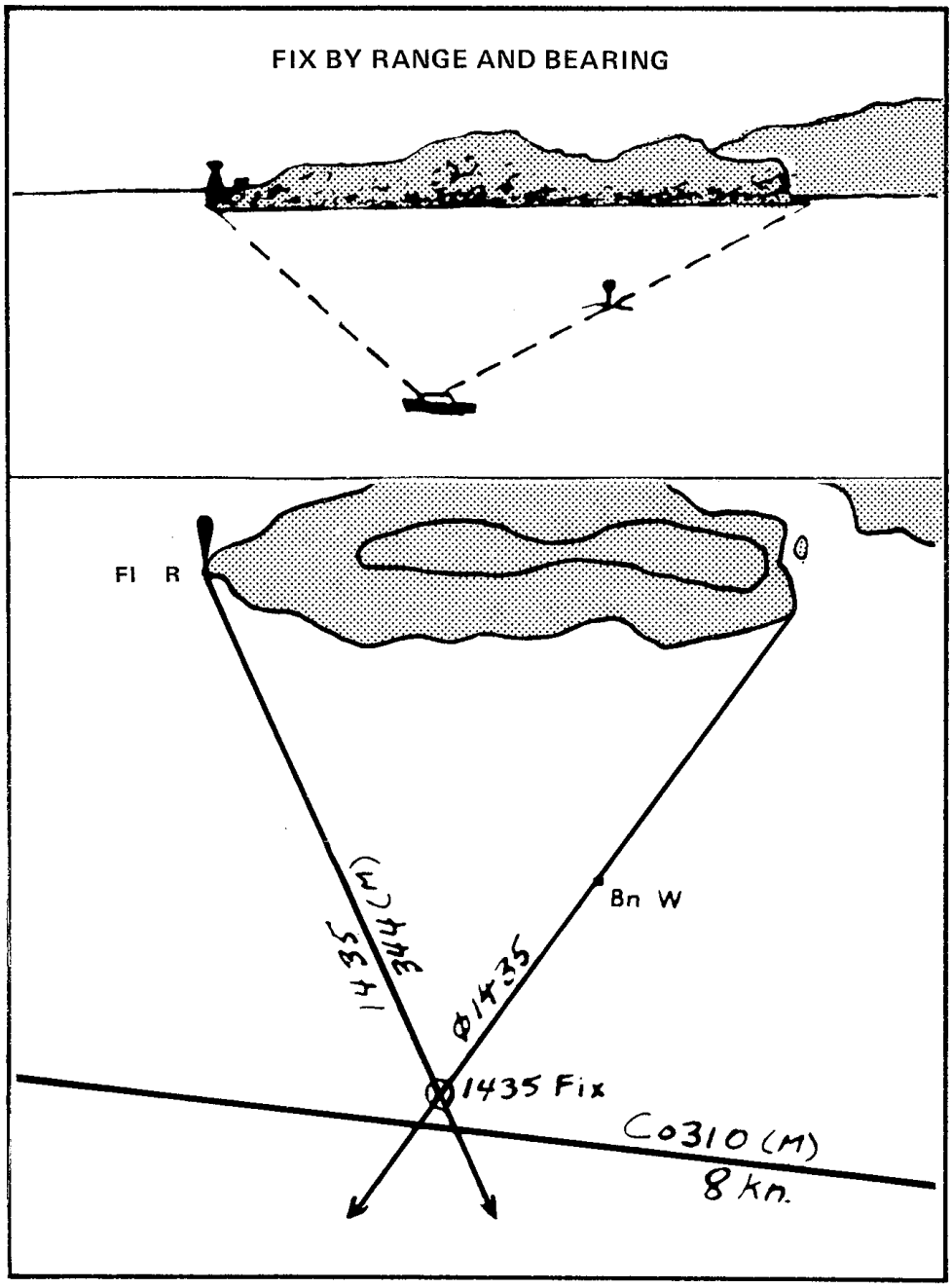


Figure 7-31 A Fix by a Range and a Bearing

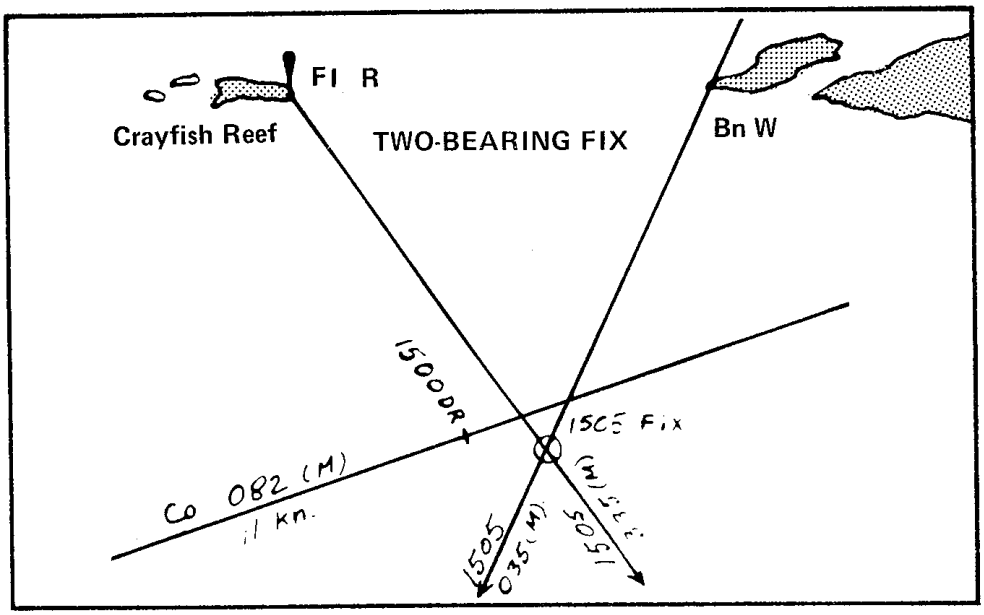


Figure 7-32 A Two-Bearing Fix

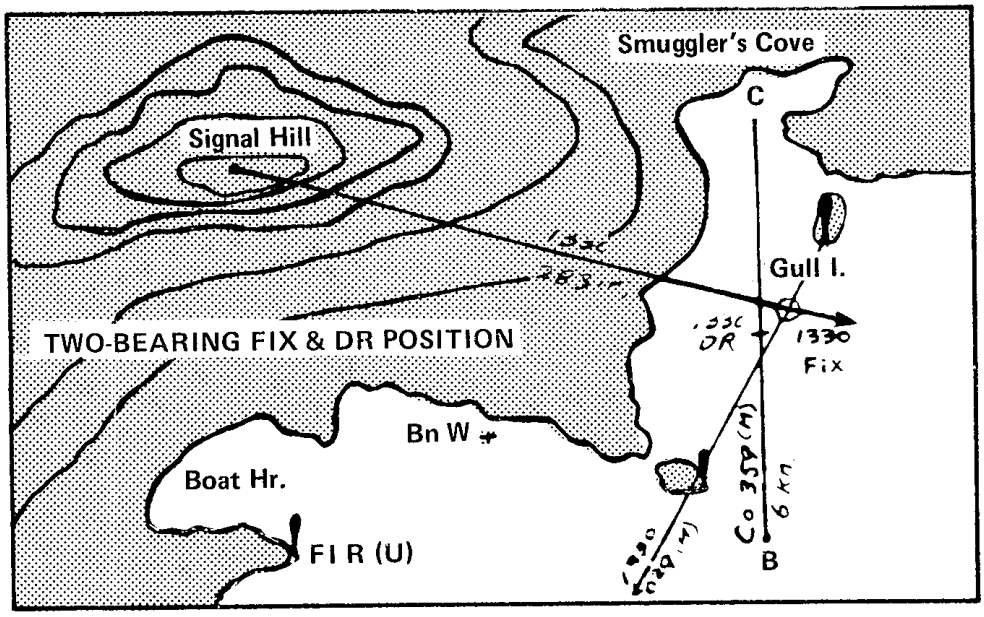


Figure 7-33 A Two-Bearing Fix and a DR Position

TRAINING PERIOD 12 — THE RUNNING FIX

101. **A Running Fix** — There are a number of ways of obtaining a **running fix**, abbreviated to **RF**, all of which depend for their accuracy on the precision with which a course can be held, and a distance determined between two observations which take

place at different times. The simplest of the running fixes is the **Bow and Beam Bearing** or the **Four-Point fix**, so called because observations, with the time, are taken on the same object, first when it bears 045° relative, or is **broad on the bow** and second when it is abeam — **when its bearing has changed by "four points" of the compass of 45°**. The point system having become obsolete, this fix is better called the **bow and beam bearing**. Even a small boat can have marks laid out on her deck to define the direction "broad on the bow" which is 45 degrees abaft of dead ahead, and "abeam", 90 degrees to the ship's keel. Using these marks, or the pelorus the procedure is as follows. (See Figure 7-34.)

102. **Taking a Running Fix** — Approaching a prominent aid such as a headland, on a steady course and known speed, the pilot observes **the time** when the aid is **broad on the bow** (Figure 7.35(a)). Holding course and speed he waits until the object **comes abeam** (b) and again **notes the time**. The combined sequence appears in (c). Knowing his vessel's speed, the pilot calculates the distance run between observations — a simple matter using the formula d = st/60. The **distance run between sights** is the **distance off at the time of the second sight**. The geometrical construction is a right-angled isosceles triangle, 45° and 90°: hence side AC in Figure 7-36 equals side BC, ie, distance off equals distance run. Setting his dividers at "distance off", the pilot swings an arc, with centre on the aid. This arc defines his **distance off** and his position must lie thereon. As he knows that **the aid is abeam**, a straight line **through the aid** and **at right angles to his course must also be a position line**. He therefore draws that line, and **where it intersects the arc is where he must be** (Figure 7-37). Alternatively he moves his course line, using the parallel rule, to become tangent to the arc.

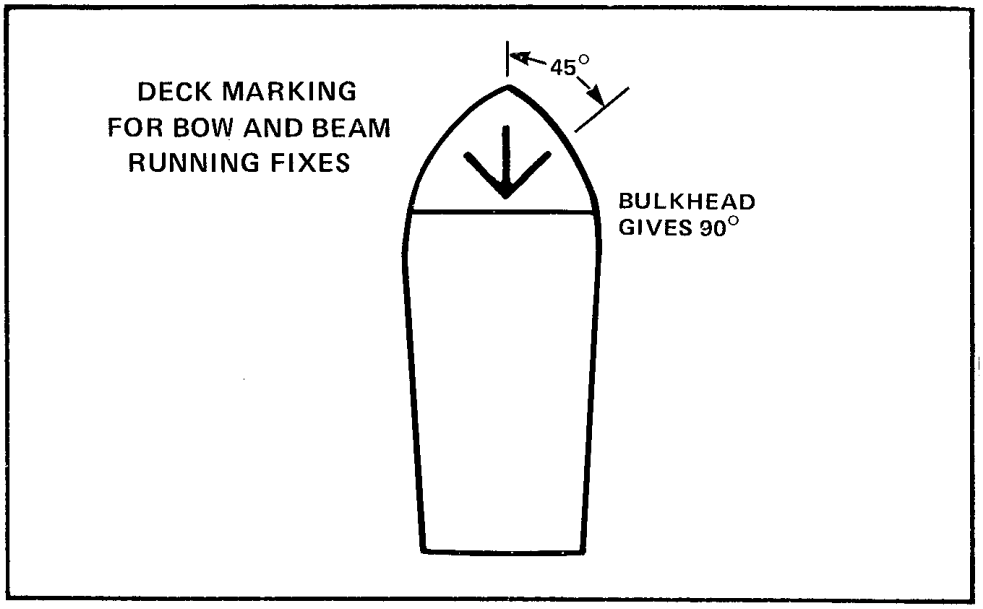


Figure 7-34 Deck Marking for Bow and Running Fixes

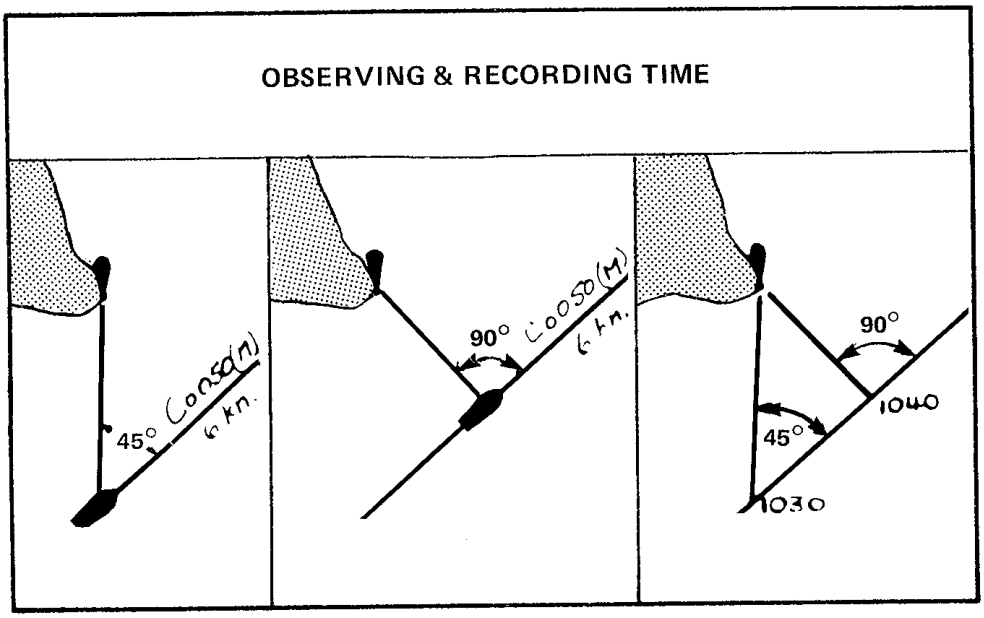


Figure 7-35 Observing and Recording Time

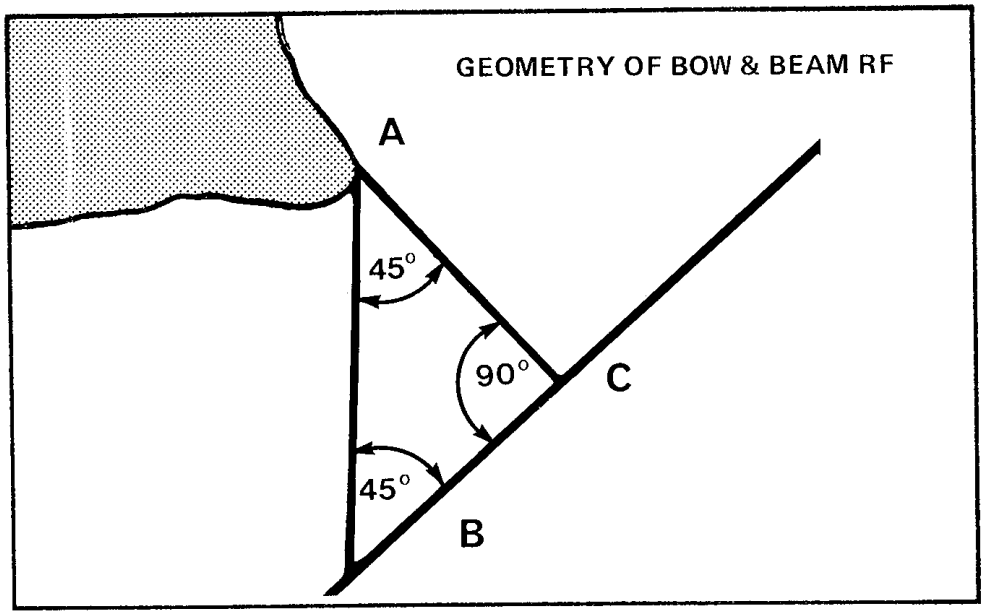


Figure 7-36 The Geometry of a Bow and Beam RF

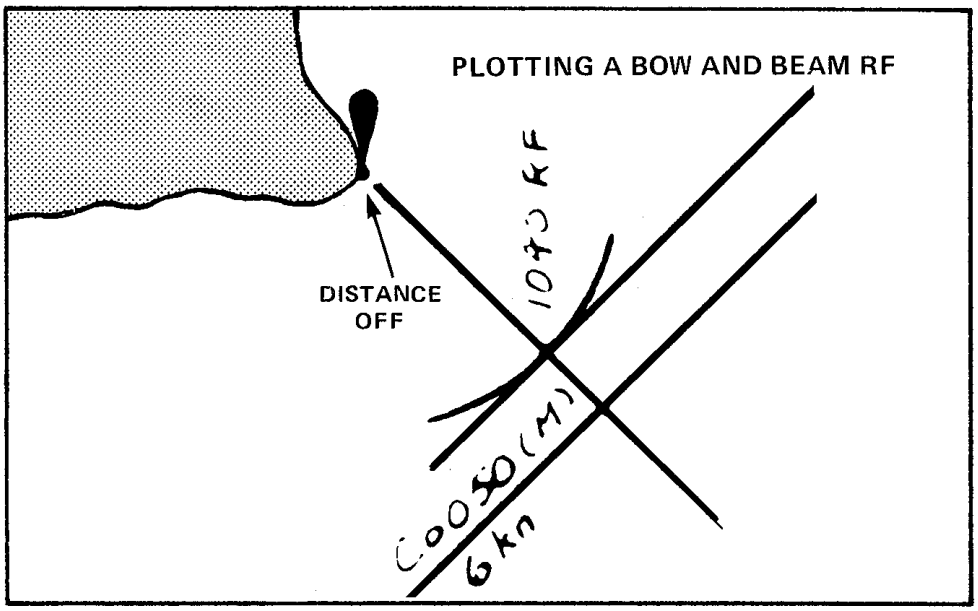


Figure 7-37 Plotting a Bow and Beam RF

103. **Accuracy of Fixes** — An RF is labelled to distinguish it from a fix because it is not as accurate. Manifestly the accuracy of the bow and beam fix depends on the computation of the distance run between sights and on the course maintained, both of which may have been affected by unknown currents or weather.

104. **Bow and Beam Running Fixes** — Bow and beam running fixes are a matter of routine to a large vessel pilot whenever he approaches a salient aid; they can readily be taken in small boats without instruments, and both are interesting as exercises, and informative as piloting information.

105. **Fixing in Small Boats** — The small-boat seaman who possibly has no particular interest in, or need for fixing positions may nevertheless enjoy laying his course, calculating his DR positions, and observing transits, with the times that he reaches them. All this can be achieved with only the chart, compass, rule, and timepiece.

TRAINING PERIODS 13 AND 14 — PRACTICAL CHARTWORK

106. **Practical Chartwork** — Cadets should be provided with hydrographic charts, dividers, parallel rulers and pencils, and a suitable flat area on which to work. (If nothing else is available, the deck may have to suffice.)

107. **Period 13** — In Period 13, cadets should be given, and assisted with, problems in:

a. laying out course;

b. taking off direction;

c. taking off distance;

d. calculation of distance run, knowing time and speed;

e. calculation of time, knowing distance and speed.

108. **Period 14** — In Period 14, cadets should be given, and assisted with, problems in:

a. lines of position using ranges;

b. lines of position using bearings;

c. simple fixes using two bearings or bearing and range;

d. running fixes.

TRAINING PERIOD 15 — RULES OF THE ROAD

109. **Stand-On and Give-Way** — Except in end-on meetings, when **both** must alter course, in all situations where two boats of any type or size encounter one another so as to involve some risk of collision, one of the two has the **right of way**, and the other **must keep clear**. The rules establish which is which. The boat having the right of way is the **stand-on** vessel, which means that she is **obliged to keep steadily on her course** and **maintain her speed unaltered**; in brief she holds her course and speed. Thus her action is predictable; she will not alter her intention and the other vessel can reckon thereon. The boat which **is required to keep clear**, not having the right of way is the **give-way** vessel. To **give way** means to **reduce speed, stop, reverse engines**, or **alter course** so as to **keep clear of the stand-on vessel**. Thus obligations rest with each of the boats. The stand-on vessel is required to hold course and speed; the give-way vessel must keep clear. Obligations common to **both** vessels are: **the maintenance of a sharp look-out**; the **exercise of every precaution dictated by the practice of seamanship**; and, should a collision seem imminent, the taking by **either or both** boats of **any action necessary**.

110. **Courtesy** — In the eyes of the law all powerboats from the Queen Mary to the smallest runabout are equal, except, as noted below, in narrow channels; and the same rules apply to the largest and the smallest. However, some common sense and courtesy can be used, provided intent is made clear, and made clear in good time. Small-boat operators must appreciate the lesser manoeuvrability of large vessels. They are slow to turn and slow to stop. Once committed to a course of action, particularly in confined waters, they cannot turn back or alter plans. If, then, a small boat, being the stand-on vessel, decides to be courteous and keep clear, even though she is not required to do so, she must clearly signal her intent early in the encounter. It would be inconsiderate and discourteous for a small powerboat to insist upon her right of way over a busy ferry with schedules to keep and hundreds of lives in the master's hands.

The officer on watch, however, knows his business and the rules. He will be alert for any early indication of intent. A late decision to give way may conflict with his plans to meet his obligations. The small-boat skipper must learn to assess circumstances in which the large vessel would, in fact, have difficulty in giving way. He must also note and abide by a 1965 revision of the Regulations designed to prevent his being a nuisance: "**In a narrow channel** a power-driven vessel of **less than 65 feet in length** shall not **hamper the safe passage of a vessel which can navigate only inside such a channel.**" Small-boat skippers brought this regulation on themselves.

111. **Rules** — Which is the stand-on vessel and which the give-way vessel? Here in simpler language are some of the rules:

a. **Overtaking Situations** — The **overtaking boat** is required to **keep clear**; she is the **give-way vessel**. The **overtaken boat** is the **stand-on vessel**; she is required to hold her course and speed. A vessel is overtaking another when she approaches from astern, anywhere in the arc shown in Figure 7-38 which will be precisely described later. The right of way established at the start of the overtaking situation is maintained, the overtaken vessel is the stand-on vessel, until all danger of collision has passed. The overtaking rule applies universally to all types of boat, including sail, with the provision that small vessels shall not hamper large ones in narrow passages.

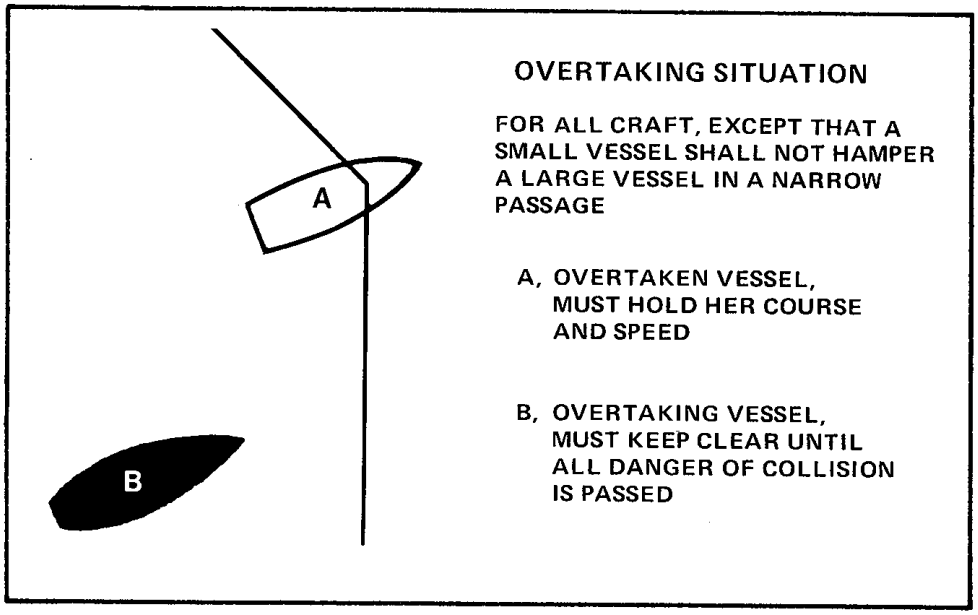


Figure 7-38 Overtaking Situation

b. **Power Encountering Sail and Oars** — Except in the overtaking situation and in narrow channels, "**Power-driven vessels** shall **keep out of the way of sailing vessels** and vessels **propelled by oars or paddles.**" **Sail**

stands on and **power gives way**. This is a common-sense arrangement which recognizes relative manoeuvrability. This rule does not give a sailing vessel the right to hamper a power-driven vessel involved in the negotiation of a narrow channel. Otherwise, a sailboat need keep clear of a powerboat **only in overtaking it** or, in international waters, if it is a **powered fishing vessel**. A **sailboat under power**, with her sails either set or furled, becomes a powerboat and **so signifies by displaying a black cone-shaped object** in the forward triangle of sail area.

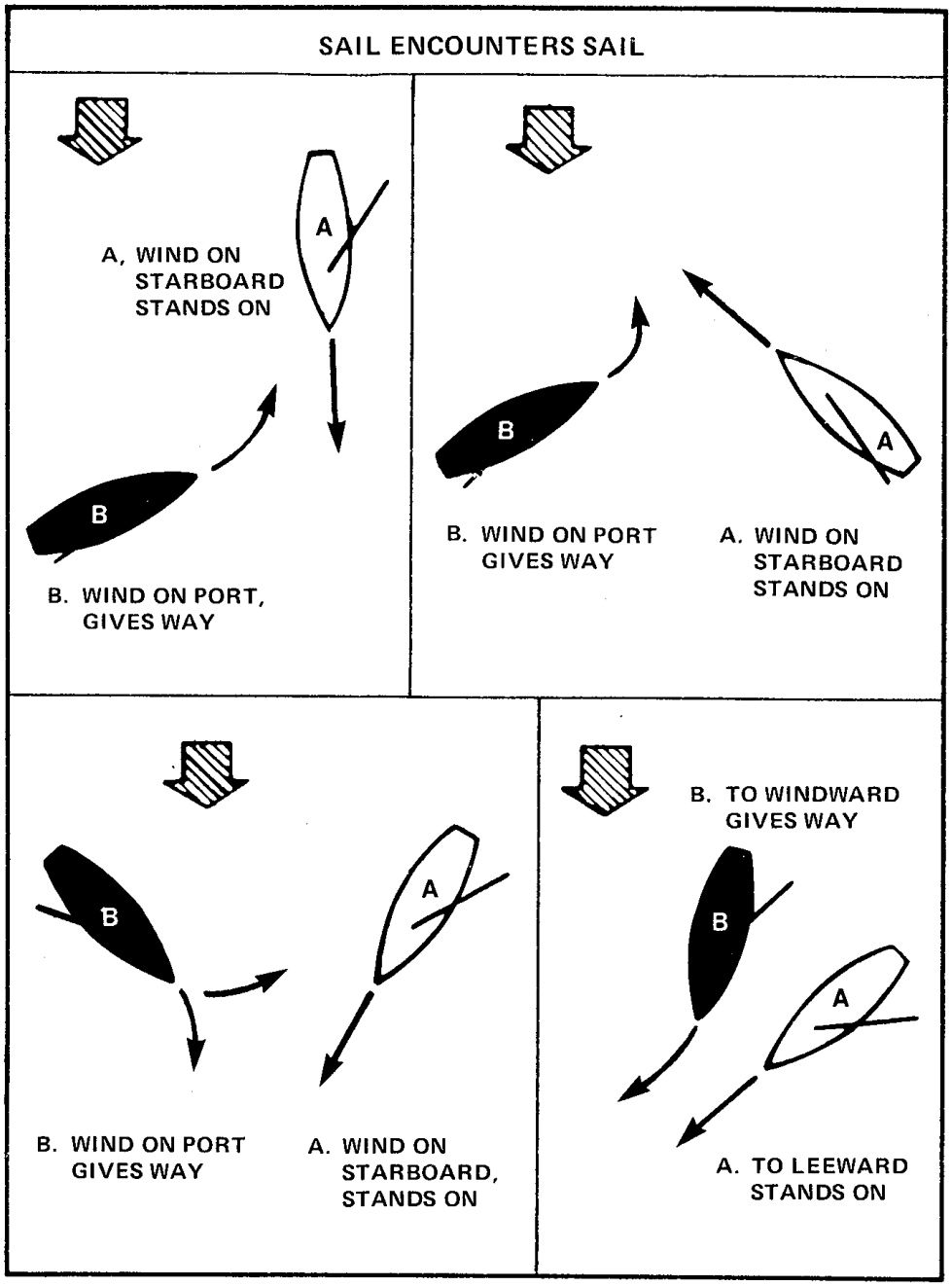


Figure 7-39 Sail Encounters Sail

c. **Sail Encountering Sail** — (See Figure 7-39.) The right of way between two sailing vessels was formerly a rather complex matter (and still is on the Great Lakes), but the International Regulations have been simplified:

(1) When each has the wind **on a different side**, the vessel which has the wind **on the port side** shall **keep out of the way** of the other.

(2) When both have the wind on the **same side**, the vessel **which is to windward** shall **keep out of the way** of the vessel **which is to leeward**. (The windward side is the side opposite to that on which the mainsail is carried.)

Special rules may be set up by clubs or associations to apply to boats participating in **races**, and such racing rules replace the standard rules during the race.

d. **Power Meets Power Head-On** — As on the highway, the general rule is **keep to the right**. In **narrow channels** boats keep over **toward the starboard** side and in meeting situations, where **collision is possible, each boat alters course to starboard**. The rule reads: "When two power-driven vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other. . ." This results in a **red-to-red** meeting (each vessel has the other on her port hand. As will appear later, each shows the other her red light). The following are three possible situations —

(1) Figure 7-40(a) illustrates boats in a meeting situation involving **no risk of collision**. If **each stands on with caution** no trouble will develop. Here we have an obvious red-to-red meeting, where each leaves the other on her port hand and there is no need for course alteration or signals.

(2) Figure 7-40(b) shows two boats on **head-on collision courses**. This calls for action: **each alters to starboard**, as shown in the diagram. The alteration in course should be decisive and readily apparent to the other boat even to the extent of exaggerated alteration. If equipped with sound, and within sight of each other, each boat gives one short blast meaning, "I am altering my course to starboard". If **under 26 feet** the boat **is not required to signal**, but she must so manoeuvre as to prevent any misunderstanding.

(3) Figure 7-40(c) illustrates a meeting situation where, **if each stands on, no risk is involved**. A **green-to-green** meeting results, each having the other on her starboard hand and each showing the other her green light. If either alters course to starboard she cuts across the other's bow and a serious situation immediately results.

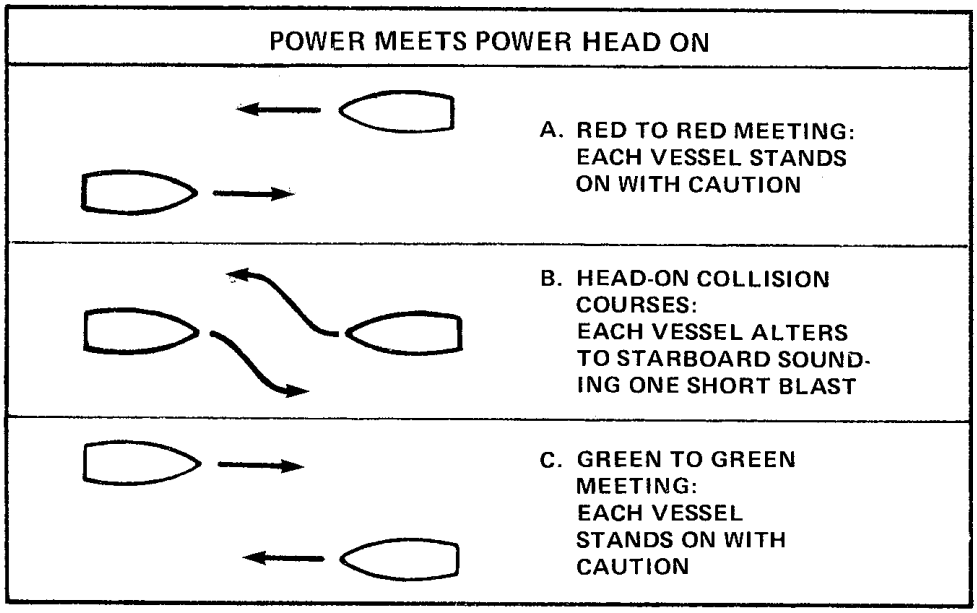


Figure 7-40 Power Meets Power Head-On

Hence meetings may be **red-to-red** or **green-to-green** with equal safety **provided each vessel stands on. Head-on meetings** call for **alteration to starboard by each boat**, the action being signalled by one blast of the whistle or by an exaggerated alteration of course, to prevent misunderstanding.

e. **The Danger Signal** — Whether or not a vessel has, or is required to have, sound apparatus, her operator must know and recognize the danger signal — **not less than five short blasts**. This means in effect, "lookout," "watch what you're doing." "I don't understand your intentions," or "I don't think you're taking sufficient action to avoid collision." If risk of collision is involved, both boats must take off speed, stop, or reverse if necessary, to ensure a safe resolution of the situation.

f. **Powerboats in Crossing Situations** — Vessels are on **crossing courses** when they are approaching each other at **right angles** or **obliquely** other than when one vessel is overtaking another. Figure 7-41 describes the several situations, both boats being powered. At (a) is an **overtaking** situation. At (b) is a **meeting** situation and at (c) and (d) are **crossing** situations. There are different crossing rules in different waters.

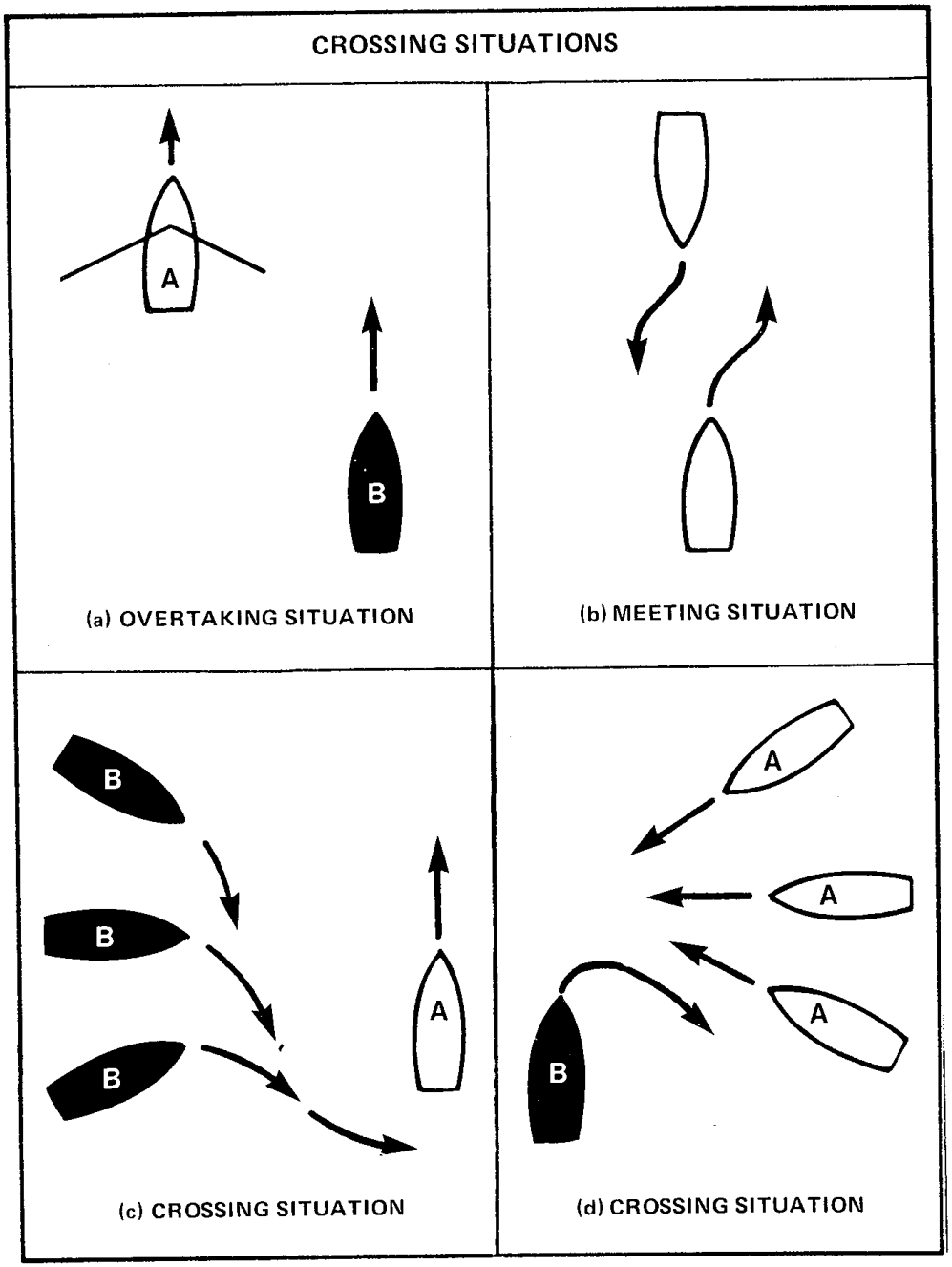


Figure 7-41 Crossing Situations

112. **Great Lakes Waters and Other than Great Lakes Waters** — A definition of the Great Lakes is necessary. Great Lakes waters are the waters of: "Lakes Ontario, Erie, Huron (including Georgian Bay) and Superior, their connecting tributary waters, and the Ottawa and St. Lawrence Rivers and their tributaries as far east as the lower exit of the Lachine Canal and the Victoria Bridge at Montreal." Waters other than Great Lakes waters are "all navigable waters within the jurisdiction of the Parliament of

Canada except the waters of Lakes Ontario. . ." etc. Hereafter we shall refer to "Great Lakes Rules" and "International Regulations", respectively. (The full title of "International Regulations" is **Revised Regulations for Preventing Collision at Sea (1960)**.)

113. **Power Vessel Regulations** — While the wording differs slightly in the Great Lakes and International rules, the meaning is identical:

> When two power-driven vessels are crossing, so as to involve risk of collision, the vessel which has the other on her starboard side shall keep out of the way of the other.

In other words, the vessel with the other on her starboard side is the **give-way** vessel. The other vessel is the **stand-on** vessel and maintains her course and speed. Figure 7-41 (c) and (d) illustrate various crossing situations where this rule applies. There **are** differences in the Great Lakes and International rules, but these apply to the **sound signals** required of vessels when crossing, which will be discussed in paragraph 114, below.

114. **The Danger Zone** — It will be seen from the foregoing rules on crossing situations, both Great Lakes and International, that the **vessel on the starboard hand generally has the right of way**, as on the highway. This gives rise to the expression, **Danger Zone**. Your danger zone is that arc from **dead ahead to slightly abaft your starboard beam**. As noted in Training Period 3, your starboard light shows green through the arc known as the danger zone and any vessel in that arc will stand-on whereas you will give-way. She **has your green light**, and you **have her red light**. (See Figure 7-42.)

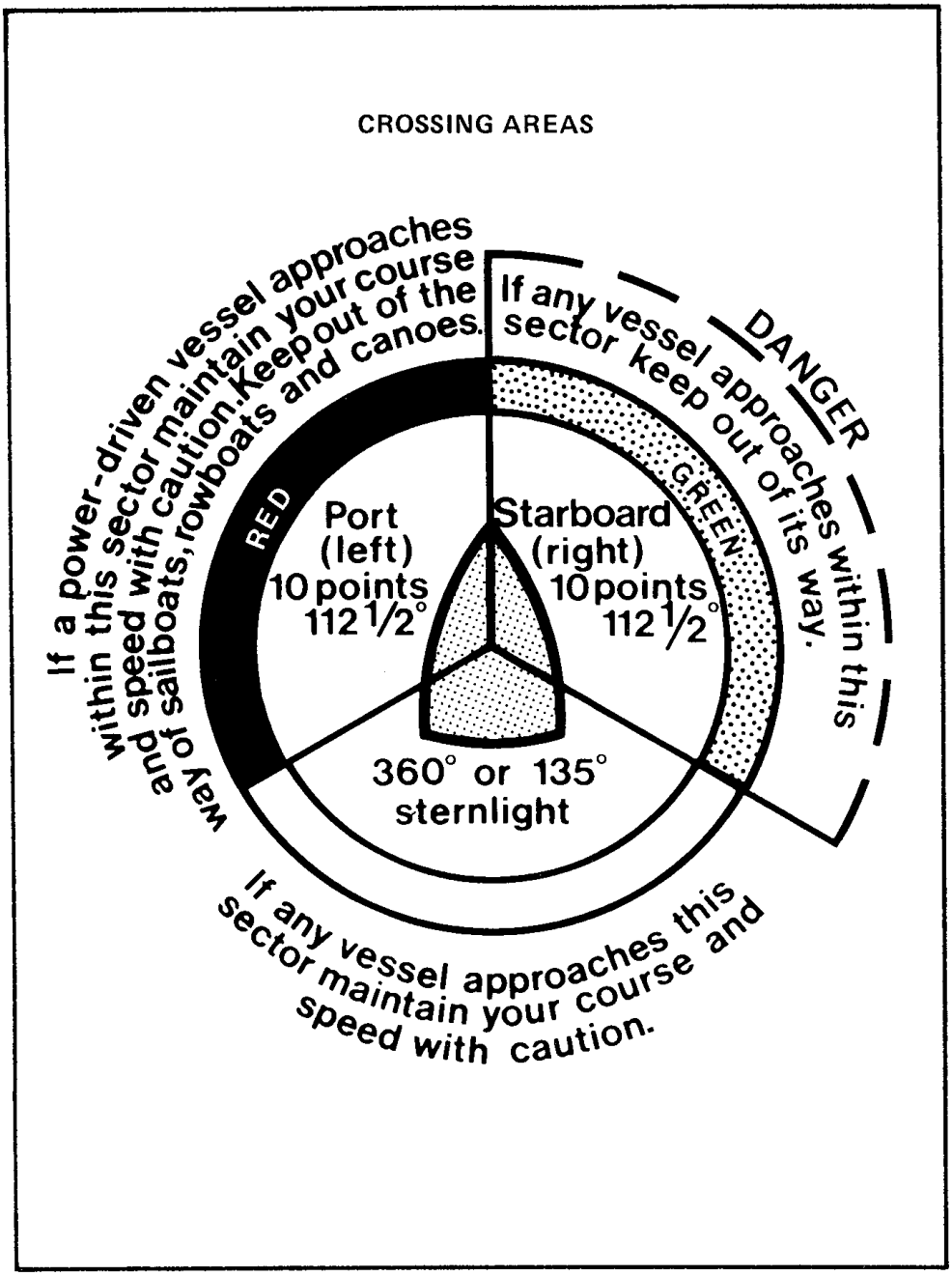


Figure 7-42 Crossing Areas

115. **Sound Signals** — The sound signals required of vessels in meeting or crossing situations are similar but not identical under Great Lakes and International regulations. They are summarized in the table below:

WHISTLE SIGNALS FOR MEETING AND CROSSING SITUATIONS

A. GREAT LAKES RULES

1. Meeting head-on or nearly so: each vessel: alter to starboard:	1 short blast
2. Crossing involving risk of collision:	
(a) stand-on vessel stands on:	1 distinct blast
(b) give-way vessel alters:	1 distinct blast
3. Altering course to keep clear *(all weathers)*:	
(a) (i) vessel altering to starboard:	1 blast
(ii) vessel receiving signal:	1 blast
or if in doubt:	5 short blasts
(b) (i) vessel altering to port:	2 blasts
(ii) vessel receiving signal:	2 blasts
or if in doubt:	5 short blasts
4. Danger, doubt, or misunderstanding	5 short blasts

B. INTERNATIONAL REGULATIONS

Signals given only when vessels are in sight (visually) of each other.

1. Meeting head-on or nearly so: each vessel: alter to starboard:	1 short blast
2. Altering to keep clear:	
(a) vessel altering to starboard:	1 short blast
(b) vessel altering to port:	2 short blasts
(c) vessel reversing engines:	3 short blasts
3. Danger, doubt, or misunderstanding	5 or more short blasts

Figure 7-43 Sound Signal Regulations

It will be noted that the three most important signals (**altering to starboard, altering to port** and **danger**) are the same, and that a fourth signal, three blasts for **going astern**, is used only under International rules. There are other differences as illustrated in Figure 7-44.

GREAT LAKES:

a. Crossing signals indicate **intent** (ie, they are given **before the action**);

b. Crossing signals are **answered** (if understood) by identical signal; and

c. Signals are made in **any weather** (ie, whether or not vessels are in sight of one another).

INTERNATIONAL:

a. Crossing Signals indicate **action** (ie, they are given **with** the action);

b. Crossing signals are **not answered**; and

c. Signals are only made when vessels are **in sight** of one another.

Figure 7-44 Sound Signal Differences

TRAINING PERIOD 16 — REVIEW AND TEST

116. A brief review of the course (Training Periods 9-15) should be made, indicating the areas that require emphasis and explaining any points which appear to be causing difficulty.

117. Cadets shall write a short test on Pilotage. Where appropriate, problems should be based on actual hydrographic charts or diagrams of charts. The cadet should be faced, in the test, with the sorts of problems that he might encounter in a small vessel, armed only with a compass, chart, dividers, parallel rules and his knowledge of the rules of boating.

CHAPTER 8

SHIPWORK

CHAPTER 8

SHIPWORK

TRAINING PERIODS 1 TO 8 – SEE VOLUME 1

TRAINING PERIOD 9 – CANADA AS A MARITIME NATION

1. **Canada as a Maritime Nation** – Canada is very much a maritime nation, and this is determined by geographical factors as much as by the nature of Canada's commercial needs.

a. **Geographical Factors** – The following are those geographical factors which make Canada a maritime nation –

(1) with the exception of the United States, Canada is in contact with no other country, except by sea.

(2) Canada has a coast line of some 45,000 miles, plus an additional 100,000 if the coasts of Canadian islands are included.

(3) all Canadian Provinces except two (Saskatchewan and Alberta) have salt-water boundaries. The most central Province, Manitoba, has one of our major ports, at Churchill, on Hudson's Bay. (See map, Figure 8-53.)

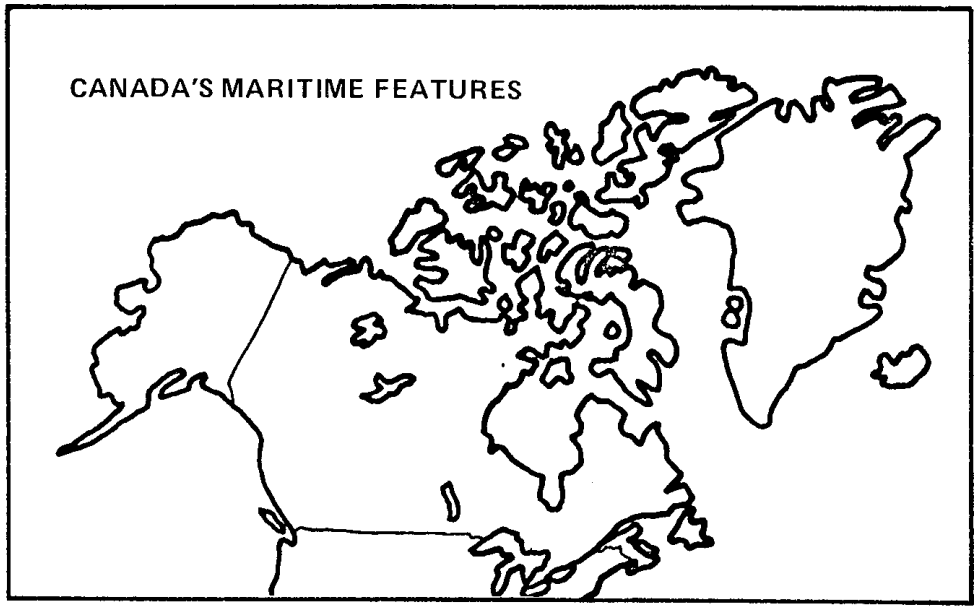


Figure 8-53 Canada's Maritime Features

(4) Canada shares with the United States a water system which is unique in the world in the form of the St. Lawrence/Great Lakes Seaway System. North America is the only continent in which ocean-going vessels can penetrate to the heart of the land mass, for example to major seaports like Thunder Bay, fifteen hundred miles from the Atlantic Ocean.

b. **Commercial Factors** — The following are the commercial factors which make Canada a maritime nation —

(1) **Import and Export Trade** — Canada ranks sixth among the non-Soviet bloc trading nations of the world. It is a major exporter of both agricultural and manufactured products and a major importer of other countries' products. This export-import trade, except to the US (and even a portion of that) must travel by sea.

(2) **Fishing** — Canada is a major **fishing nation**, requiring vessels to catch and (sometimes) to process the fish.

(3) **Island Land Masses** — A sizeable part of Canada's land mass is in the form of islands. **Four of these (Newfoundland, Cape Breton, Prince Edward and Vancouver Islands) contain major cities and population centres. Others, in the Arctic, are becoming increasingly important as sources of raw materials. All require shipping for supply and the movement of people.**

(4) **Off-Shore Seabeds** — Canada's **off-shore seabeds** are also becoming increasingly important **as sources of minerals**, especially **oil and natural gas.**

2. **Types of Shipping Required to Meet Canada's Needs** — There are a number of distinct types of shipping required to meet Canada's geographical and commercial needs (naval shipping will be covered in a later part of the course and will not be discussed here).

a. **Great Lakes Shipping** — The long water border with the United States creates a need for a special form of shipping designed for moving materials between Canadian and US inland ports, as well as between Canadian cities. This is the Great Lakes (or Inland Waters) shipping. Included are vessels designed to carry various bulk cargoes (grain, ore, coal, oil) as well as those carrying containers and other general cargo. The greatest proportion of the material carried by the **lakers** is in the form of bulk: iron ore and coal upbound to supply the steel mills and electrical generators of the Great Lakes cities; wheat and other grains down-bound from the huge lakehead elevators. The majority of the latter is destined for export and is trans-shipped to ocean-going vessels at Montreal. A small amount of bulk cargo and a larger

amount of the **break-bulk** or general cargo on the Great Lakes is in fact carried by ocean-going vessels working the lakes during the summer. These are not included, however, in the category of lakers.

b. **Coastal Shipping** — This category includes vessels on the east and west coasts whose routes lie between Canadian ports or between Canadian and US ports. It also includes tug, barge and ferry traffic on the coasts and Mackenzie River routes. It is an economical way to move cargoes to the coastal United States, and is the **only** way to service many remote communities.

c. **Arctic Shipping** — Other than Russia, among major nations, only Canada has such a large part of its territory in arctic waters. Servicing and exploiting these territories requires a highly specialized form of shipping, ie, the ice vessel or icebreaker.

d. **Fishing Vessels** — Canada's east and west coast fisheries require a variety of vessels, both for inshore work and for long-range offshore fishing. The recent extension of Canada's fishery management jurisdiction to 200 miles off-shore increases Canadian control of the industry, but will present a challenge in the development of new ships, increased automation and improved catching and storage facilities. Present export value of Canadian fisheries exceeds $600 million.

e. **Maritime Support and Protection Shipping** — Government support of our maritime interests requires a number of different types of vessel, operated by different departments. These vessels include the Coast Guard and Fisheries Protection fleets, hydrographic and oceanographic ships, special vessels for harbour maintenance and a small number of police vessels operated by the RCMP.

f. **Deep Sea Shipping** — Economically, the most important form of shipping is the deep-sea or ocean-going category. This includes supertankers and other vessels too large to travel the St. Lawrence system, down to the smaller "salties" picking up their cargoes of grain at the Lakehead. Canada's overseas trade to and from virtually every country in the world travels in this category of shipping.

3. **Canada's Contribution to its Shipping Needs** — In all these categories but the last, Canadian participation can be called good to excellent. Most Canadian cargoes in the Great Lakes and coastal trades are carried in Canadian ships. Arctic and Maritime support shipping is all Canadian. Canadian vessels in the fishing industry suffer to some extent from obsolete technology, as compared to some of the major fishing nations, but this situation is improving. It will likely do so more rapidly as the new national control of fishing waters improves catches and economic conditions.

4. **Ocean-Going Shipping** — Canada's great lack in this respect is in ocean-going shipping. At present, there are only three Canadian-registered ships **operating exclusively in the deep sea trade. Less than 1 percent of our foreign trade is carried in Canadian-registered vessels**. The main reasons for this regrettable state of affairs are:

a. the relatively high Canadian wage rates; and

b. the lower standards in regard to safety and accommodation requirements permitted by "flag of convenience" countries such as Liberia and Panama.

This situation may be changing for the better, as other countries' operating costs rise at a more rapid rate than our own. Automation may also be a partial answer, since it reduced the size of crews.

5. **Problems Arising from Lack of Canadian Ocean-Going Shipping** — They are as follows:

a. **Direct Loss of Money** — The use of foreign flag ships to carry our export and import trade is estimated to drain $2-3 billion a year from the Canadian economy.

b. **Loss of Jobs** — Use of foreign ships means a direct loss of jobs for Canadian seamen and an indirect loss of jobs in the shipbuilding, ship maintenance and related industries.

c. **Lack of Support for the Canadian Shipbuilding and Related Industries** — This leads to an indirect loss of money to the national economy.

d. **Uncertainty of Shipping Needs** — In time of war or other international crisis, Canada could find the shipping needed for her economic health controlled by unfriendly powers or used by its owners for their own national priorities.

6. **Canada's Potential** — At the present time, there is a strong feeling in many quarters that Canada could operate competitively in ocean shipping, particularly in certain cargo trades, and the government is continually studying the matter. Canada has the industrial, shipbuilding and management capacities, and an officer and crew training organization is being established. It is at least possible that Canada can reach the position where a portion, at least, of our overseas shipping needs can be met by ships flying the Canadian Flag.

TRAINING PERIOD 10 — MERCHANT SHIPS

7. Merchant ships fall into a number of different categories according to the cargo that they carry and whether they are designed for the deep-sea routes (**salties**), the

inshore or coastal trade (**Coasters**) or for inland waters (**lakers**). In order to get some idea of their general features, we will first consider the "typical merchant ship". For this purpose we will select a general-cargo vessel since these are in general use and include a number of features common to other types.

8. **A Typical Merchant Ship** – This is illustrated in Figure 8-54.

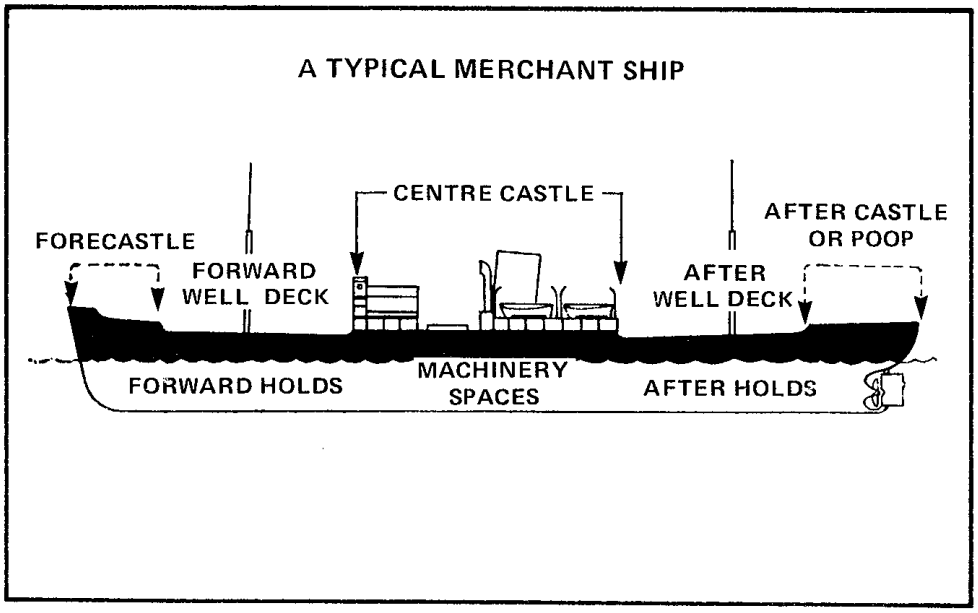


Figure 8-54 A Typical Merchant Ship

9. **Terms Applicable to Merchant Ships** – The following are terms applicable to merchant ships:

a. **Hull Form** – The type and shape of the hull.

b. **Forecastle** – The raised part of the hull at the fore end of the merchant ship. (See Figure 8-54.)

c. **Aftercastle or Poop** – A raised part of the hull at the after end of a merchant ship. (See Figure 8-54.)

d. **Centrecastle** – A raised part of the hull in the centre of a merchant ship. (See Figure 8-54.)

e. **Well Deck** – That part of a merchant ship's upper deck between the forecastle and centrecastle, or the poop and centrecastal. (See Figure 8-54.)

f. **Hatches** – Openings in the decks above the holds through which cargo is hoisted or lowered. When at sea they are covered with hatchboards

supported on steel beams, and covered with tarpaulins (sheets of tarred canvas). Steel hatch covers are usually fitted in modern ships. (See Figure 8-58.)

g. **Cargo** — Any goods that a ship carries in her holds or tanks. Cargoes of loose grain, coal, coke, oil, and mineral ores are called **bulk cargo**. Miscellaneous goods are called **general cargo**. General cargo not carried in containers is often referred to as **break-bulk** cargo. Cargo occasionally carried on deck is called **deck cargo**.

h. **Ballast** — Water, sand, etc, carried in the bottom of a ship to make her seaworthy when carrying little or no cargo. The majority of vessels carry water ballast in tanks constructed under the flooring of the holds.

j. **In Ballast** — Term applied to a ship which has little or no cargo in her hold and is ballasted with water to give a reasonable draught and trim.

k. **Laden** — A ship is laden when she has cargo on board.

m. **Superstructure or Upperworks** — Structures or deck houses built above the main hull of the ship. (See Figure 8-57.)

n. **Promenade Deck** — An upper deck used mainly by passengers in the larger passenger liners. (See Figure 8-55.)

p. **Boat Deck** — The deck on which the lifeboats of a merchant ship are stowed, usually the highest deck. (See Figure 8-55.)

q. **Lifeboats** — Boats carried by all merchant ships for saving life. They are slung from davits. (See Figure 8-55.)

r. **Goal-Post Mast** — Two vertical tubular structures joined athwartships by a platform (so that they resemble goal-posts when seen from ahead or astern). The topmast is stepped into the centre of the platform (See Figure 8-60.)

s. **Kingpost** — A vertical tubular structure placed in the vicinity of a hatchway. Such posts erected in pairs athwartships are described as twin king-posts. (See Figures 8-55 and 8-56.)

t. **Derrick** — A long spar (usually of tubular steel) hinged to the foot of a mast or kingpost and used like the jib of a crane to load and discharge cargo from the hold beneath it. (See Figure 8-58.)

u. **Heavy or Jumbo Derrick** — Larger and heavier type of derrick which is usually clamped against its mast at sea. (See Figures 8-56 and 8-57.)

v. **Navigating Bridge** — The raised structure from which a vessel is steered and navigated. All navigating instruments, controls, radar, signal flags and lamps are situated here. (See Figure 8-60.)

w. **Fore-and-Aft Bridge or Catwalk** — A raised gangway running fore-and-aft in a low freeboard ship, for the safety of personnel. (See Figure 8-60.)

x. **Motor Vessel (M.V.)** — A vessel driven by internal combustion engines, usually diesel.

y. **Steamship** — A vessel in which the propelling machinery is driven by steam.

z. **Coal-Burning** — Descriptive of vessels in which the fuel for boiler furnaces is coal.

aa. **Oil-Burning** — Descriptive of vessels in which oil fuel is used for the boiler furnaces.

ab. **Liner** — Any ship which sails on a regular route with fixed ports of call. (See Figures 8-55 and 8-56.)

10. **Types of Merchant Ships** — Merchant ships are more difficult to classify by type than warships because one type of ship may often be used for many different purposes. Generally speaking, however, they belong to one of the following main types:

a. **Passenger Liner** — (See Figure 8-55.) Passenger liners were originally designed for carrying passengers between the major ports of the world. They vary in size from about 10,000 tons gross to 84,000 tons gross, and carry comparatively little cargo because most of their capacity is devoted to the accommodation for passengers and their baggage, food, stores and a large crew. Their speed varies from about 14 to 30 knots or more, and for this reason they usually carry mails. They can be distinguished by their **size** and **long, high upperworks**, and, at night in peacetime, by the **blaze of lights from their hulls and superstructures**. The most general use of passenger liners nowadays is as cruise ships.

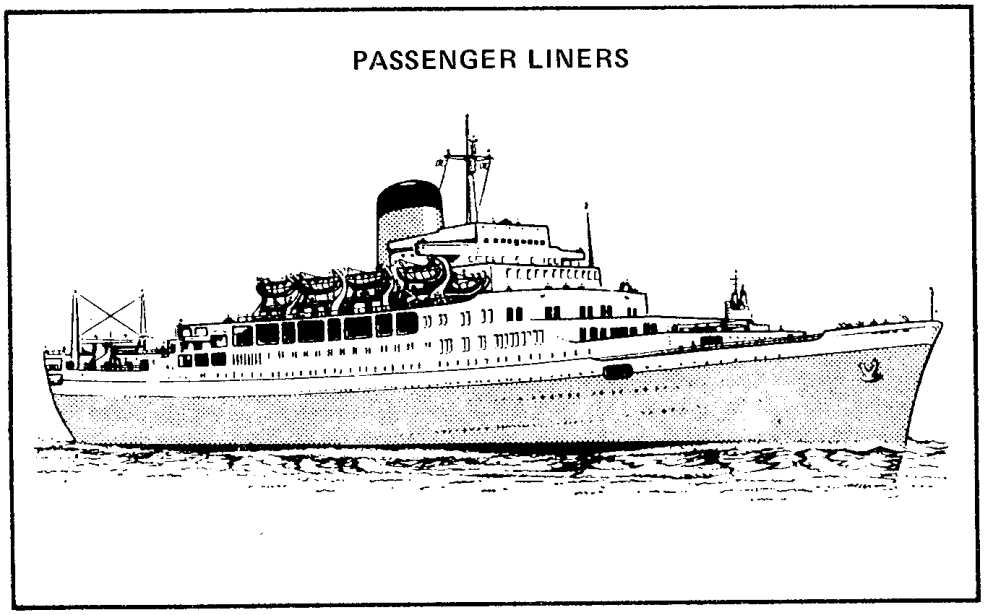


Figure 8-55 Passenger Liners

b. **Cargo Liner** — (See Figures 8-56 and 8-57.) Cargo liners are designed chiefly for carrying cargo, but they have accommodation for a small number of passengers. They vary in size from about 5,000 to 15,000 tons gross, with speeds from 12 to 19 knots. They can be distinguished by the number of derricks for working cargo, by the **superstructure**, which is larger than that of the normal cargo vessel, and by the **number of lifeboats**.

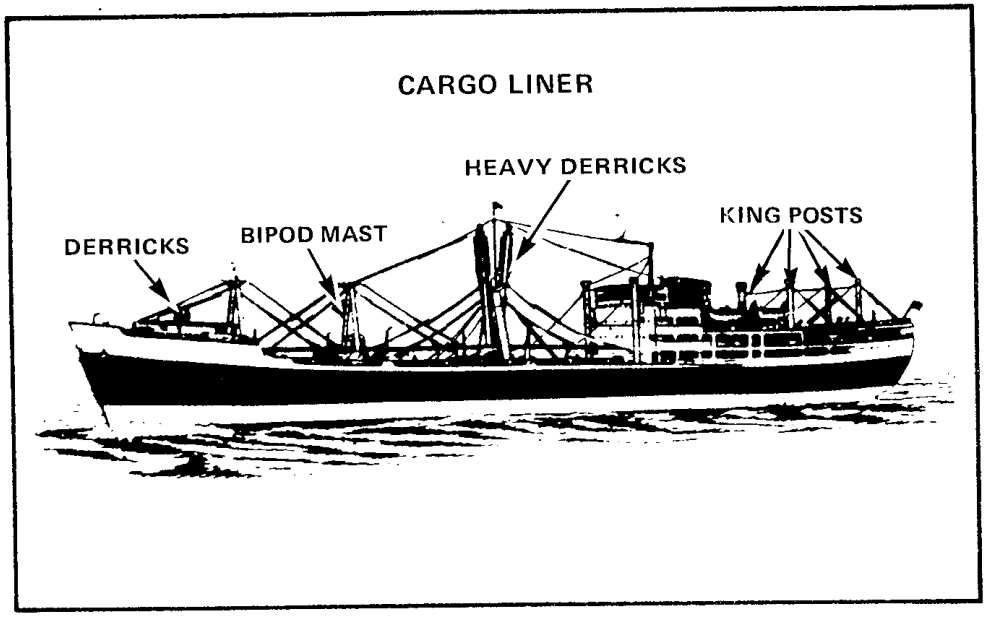
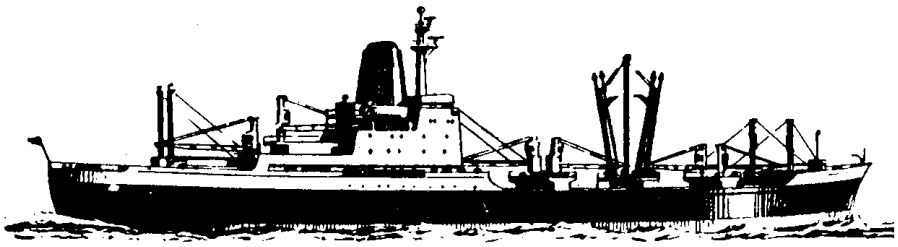


Figure 8-56 Cargo Liner

CARGO LINER

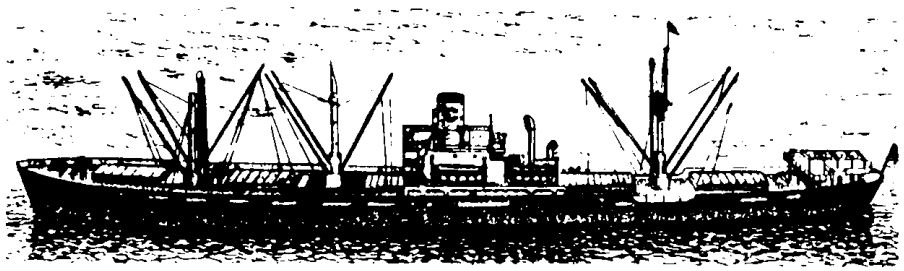


Priam – Gt. Britain 1966. One of Britain's finest cargo liners and name-ship of a class of eight built in Britain and Japan. Four are owned by Blue Funnel Line and four by its subsidiary, the Glen Line. Length 564 ft. 12,094 tons gross, 11,150 tons deadweight. Single screw, diesel. Service speed: 21-1/2 knots plus.

Figure 8-57 Cargo Liner

c. **Cargo Ship** – (See Figures 8-58 and 8-60.) These vessels are of many classes and varieties; their gross tonnage varies from about 2,000 to 15,000 and their speed from about 10 to 15 knots. They are designed to carry all types of general cargo. They ply between all ports of the world, and as they do not follow a regular route they are often known as **tramps**. They can usually be distinguished by their **small upperworks** and their **numerous masts, posts and derricks**. They constitute the largest class of ocean-going vessels.

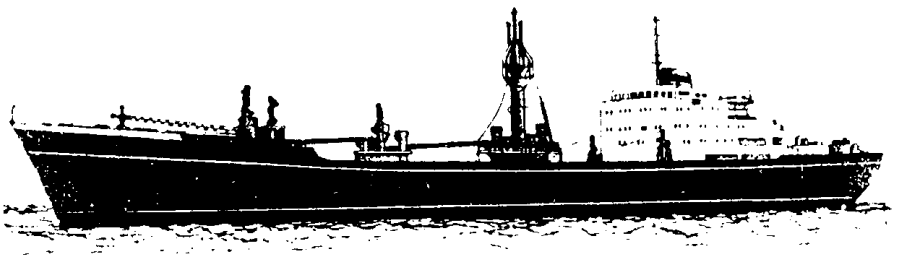
OLDER TYPE OF GENERAL CARGO SHIP



Enrico C – Italy 1943. One of some 2,650 pre-fabricated "Liberty" ships built in the U.S. during the latter part of the Second World War. She bore the name Frank H. Evers until 1946 when she was sold to Giacomo Costs of Genoa. She traded as the Enrico C until 1963, when she became the Liberian registered Nicolas A. 7, 160 tons gross. Length: 422 ft. Speed: 10-1/2 knots.

Figure 8-58 Older Type of General Cargo Ship

MODERN GENERAL CARGO SHIP (Self Unloading)



Beloretsk – U.S.S.R. 1962. Sister ship Belovodsk. One of the more modern Soviet merchant ships. She was built, with three others, in Denmark. She is a classifical cargo vessel with a dead weight (cargo) capacity of 14,485 tons. The Soviet Union has an extremely large number of cargo ships, tankers and trawlers on order, nearly all of them from other countries. Gross measurement 10,651 tons gross. Length: 526 ft. Engines: Diesel. Speed: 18.5 knots. Crew: 38.

Figure 8-59 Modern General Cargo Ship

d. **Tanker** – (See Figures 8-60 and 8-61.) **Tankers**, as their name implies, are built to carry liquids such as petrol, crude oil, refined oil or molasses. Their gross tonnage varies from 2,000 to over 400,000 and their speed from 10 to 20 knots. They can be easily recognized because they have **few or no derricks** and **their machinery is right aft**. The **bridge structure may be amidships or aft**.

TANKER

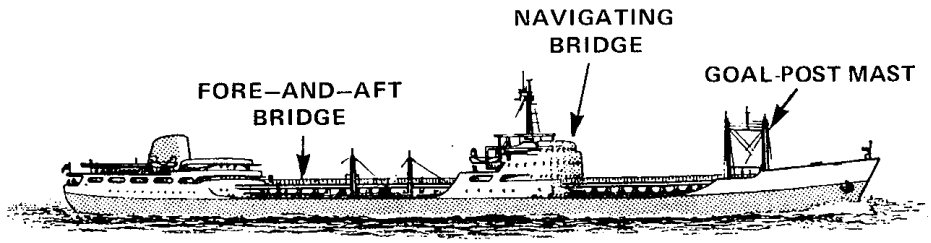


Figure 8-60 Tanker

e. **Supertanker** — The supertanker is rapidly coming into its own. They are enormous in size, and due to their deep draught can only enter certain ports. Some displace in excess of 300,000 tons.

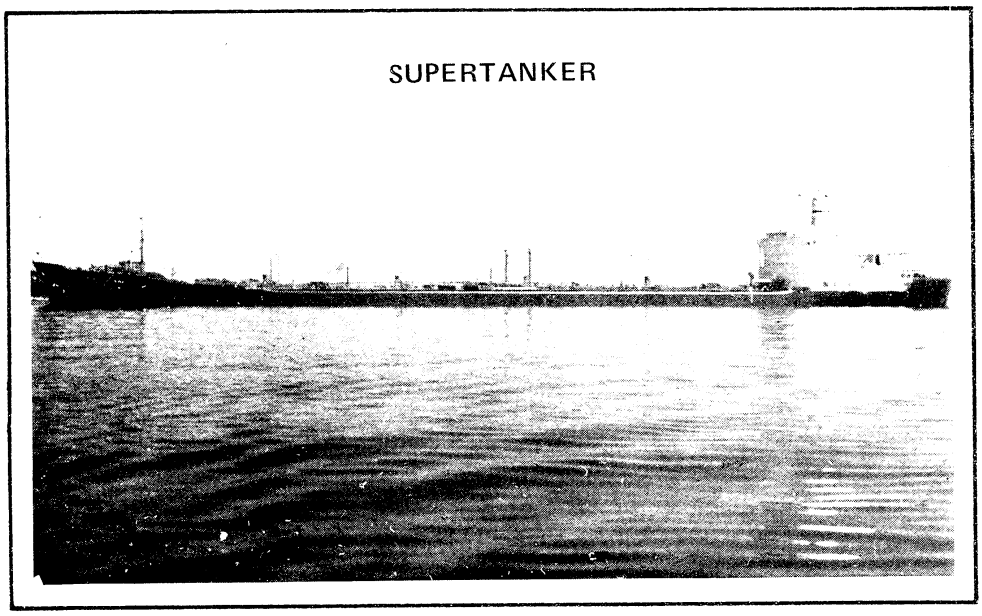


Figure 8-61 Supertanker

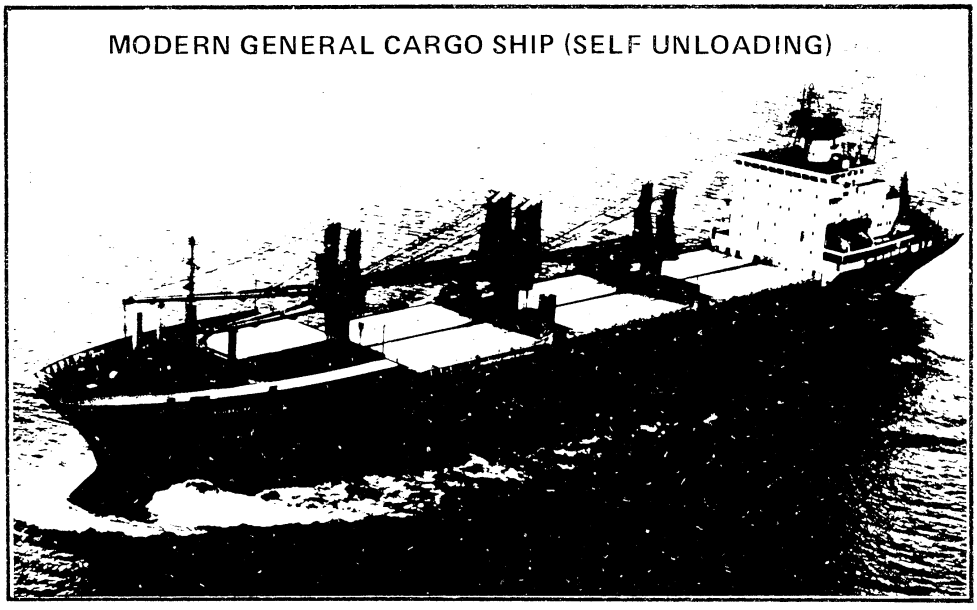


Figure 8-62 Modern General Cargo Ship (Self-Unloading)

TRAINING PERIOD 11 — MERCHANT SHIPS (CONTINUED)

11. **Merchant Ships** — The following section continues the description and recognition of the features of various merchant vessels, started in the previous Training Period.

a. **Bulk Freighter** — (See Figures 8-63 and 8-64.) These freighters are designed to carry cargoes such as coal, ore and grain in bulk. Like the tankers, which they sometimes resemble, they are a specialized type of ship usually trading only between certain ports. Their speed varies from 10 to 15 knots. The dry bulk carrier is normally a **large vessel** with **superstructure aft, clear cargo deck** with a **light boom rig forward**. See Figures 8-64 and 8-65.

This type of vessel is very commonly seen on the St. Lawrence Seaway and Great Lakes. These Lakers are very large and of deep draught, but are not generally suitable for deep-water trade (see Figure 8-64). Most modern bulk carriers have high booms lying fore-and-aft. These contain conveyor-belts connected to their cargo holds, and are swung outboard when in use. These vessels require no dockside equipment to unload them and are known as **self-unloaders**.

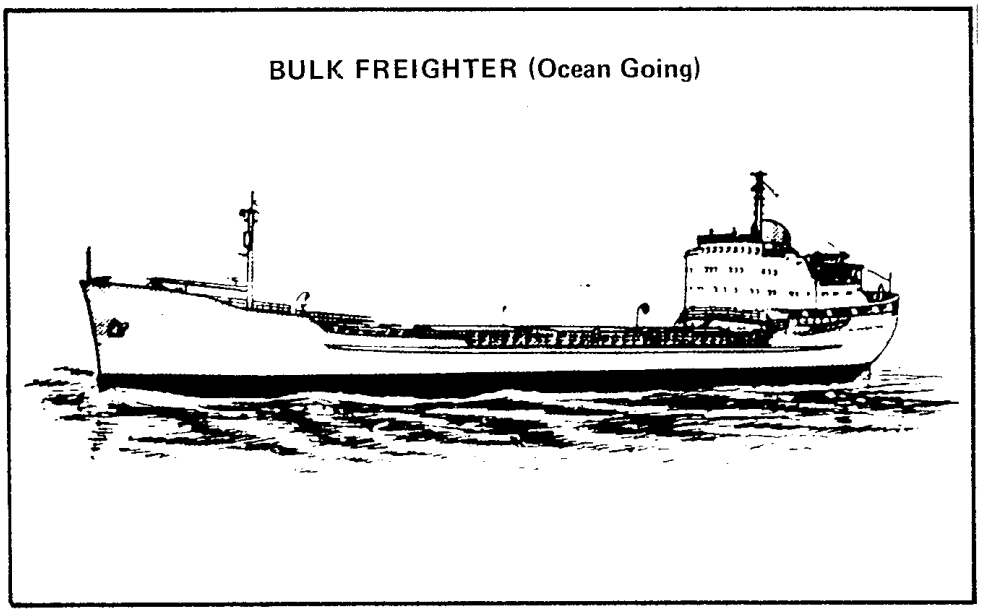


Figure 8-63 Bulk Freighter (Ocean-Going)

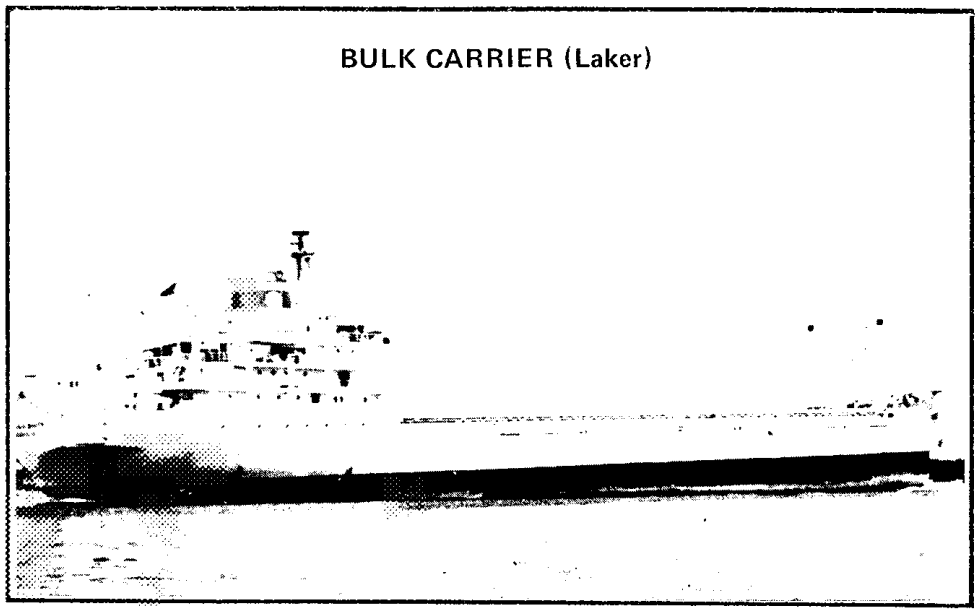


Figure 8-64 Bulk Carrier (Laker)

b. **Container Ships** — The modern merchant marine is rapidly developing the **container ship**. This will ensure rapid loading and unloading, and virtually no pilferage. The best recognition features of the container ship are:

(1) superstructure aft,

(2) lack of derricks,

(3) flat, clear midship and forepart, usually with no rise to the bows, and

(4) the presence of containers, which are, in effect, the cargo compartments tractor-trailer trucks or railway flatbeds. (See Figure 8-65.)

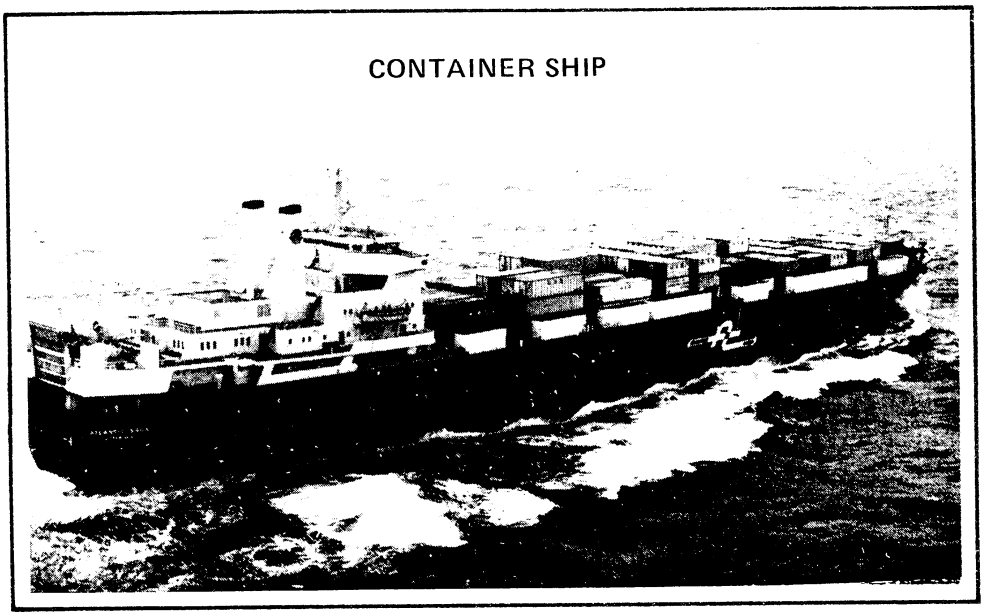


Figure 8-65 Container Ship

c. **Refrigerator Ships** — (See Figures 8-66 and 8-67.) Refrigerator ships are specialized cargo ships designed for carrying fruit (especially bananas) and other perishable cargo such as meat. They are variable in design and difficult to identify as such, but tend to have speedy lines and often a fairly large mid-ships superstructure.

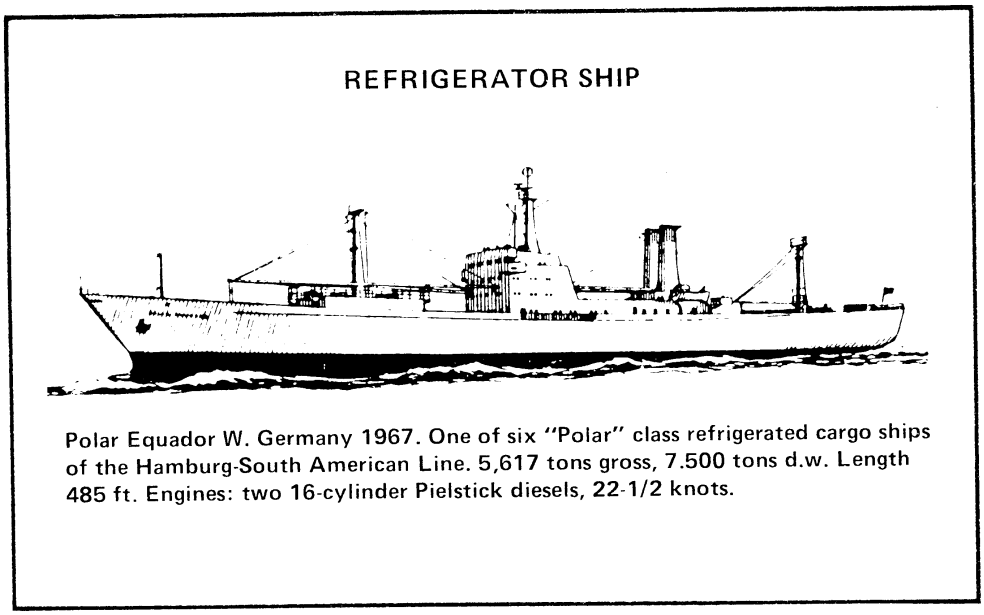


Figure 8-66 Refrigerator Ship

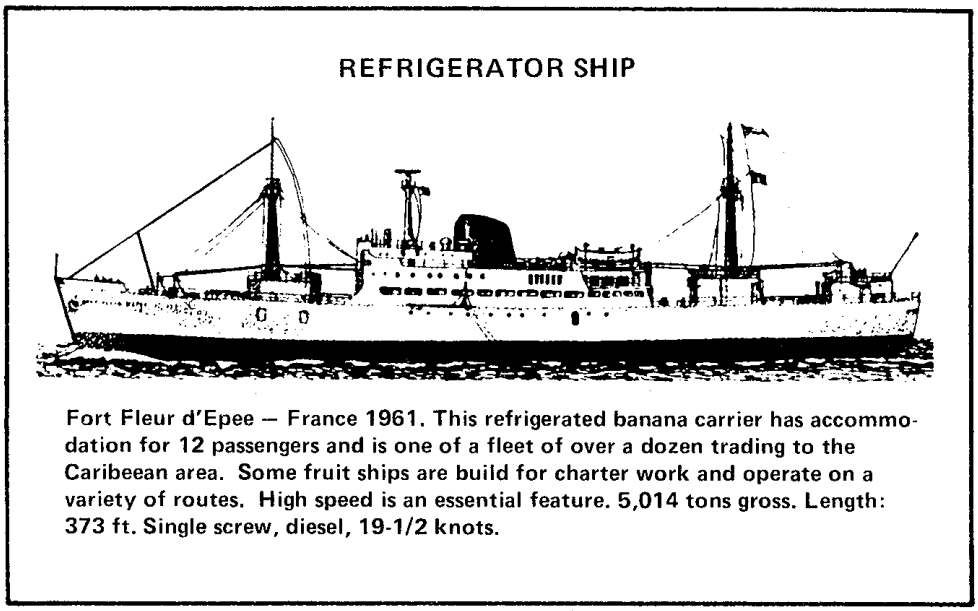


Figure 8-67 Refrigerator Ship

d. **Coasters** — (See Figures 8-68 and 8-69.) Coasters are small cargo vessels, usually under 2,000 tons gross and of slow speed, employed on coastal trade. They are not built for ocean trade and have a limited radius of action. They have similar features to their larger sisters, and often can only be distinguished from them by their size. They may be classed according to their cargoes; as coastal bulk carriers (Figure 8-68(i)), coastal cargo vessels (Figure 8-68(ii)) or coastal tankers (Figure 8-69), etc.

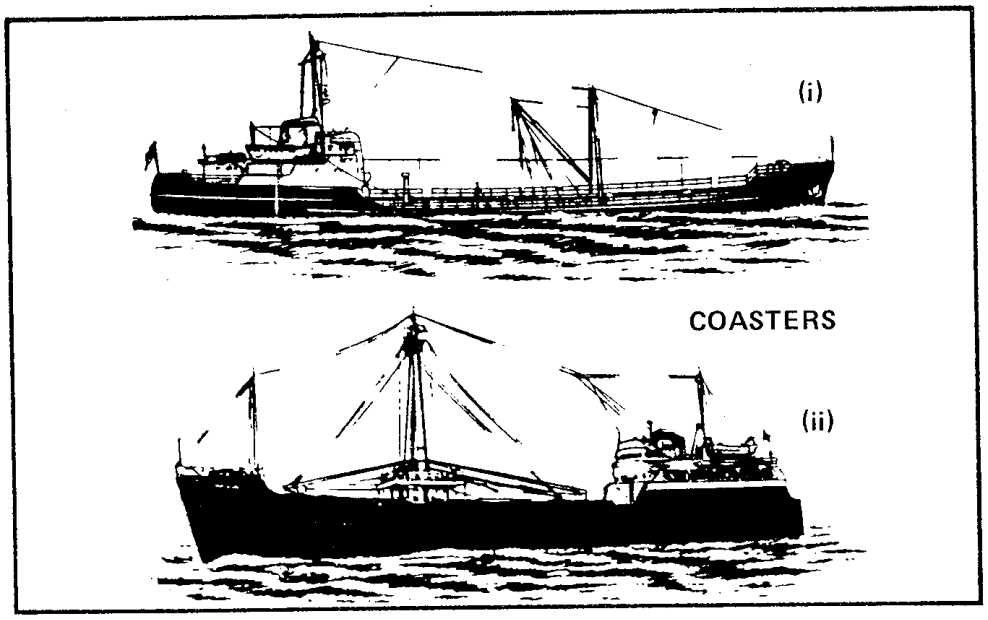


Figure 8-68 Coasters

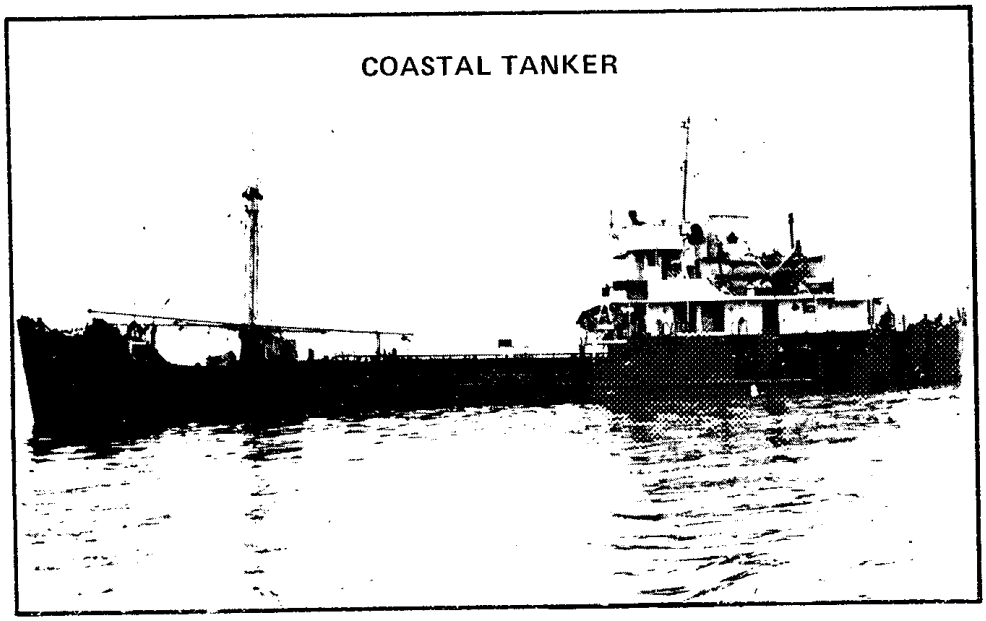


Figure 8-69 Coastal Tanker

e. **Icebreakers** – (See Figure 8-70.) The icebreaker is an important vessel in Canada, which has a large arctic territory and where rivers and lakes freeze up in the winter. They are heavily built, wide-beamed vessels, usually with a midships superstructure, and almost always with a high structural mast for radar and electronic gear.

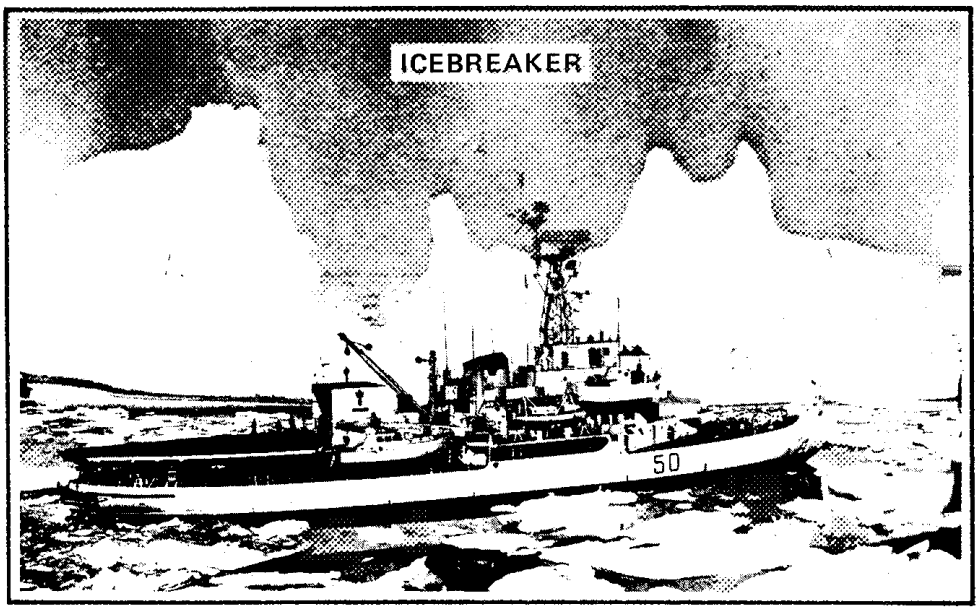


Figure 8-70 Icebreaker

f. **Icebreaking Bulk Carrier** — A recent development is the **ice-breaking cargo vessel,** specifically-built to carry raw materials from the rich deposits of the arctic. These have been relatively untapped up to the present because of the difficulty of getting the product out to the southern markets. A Canadian-built bulk carriers, the M.V. **Arctic**, is already in service (Figure 8-71) and a Canadian liquified natural gas (LNG) carrier is being designed. The Soviet Union has already made considerable progress in this field, which is obviously of vital importance to Canada.

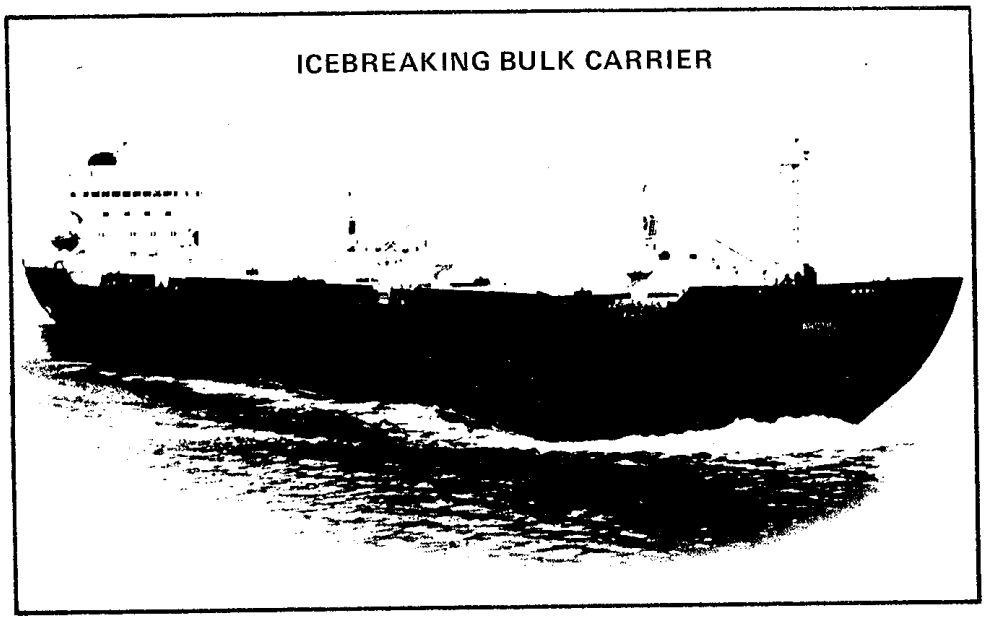


Figure 8-71 Icebreaking Bulk Carriers

g. **Tugs** — (See Figures 8-72 and 8-73.) Tugs are designed to tow or push other vessels. They must be used to assist other vessels in crowded harbours (harbour tugs), to tow barges in rivers, canals and coastal waters (tow-boats), or to rescue deep-sea vessels damaged by storm or mechanical breakdown (ocean salvage tugs). They are distinguished by powerful, stubby lines, by marked sheer with high bows and a low stern, and often by the presence of heavy matting in the bows.

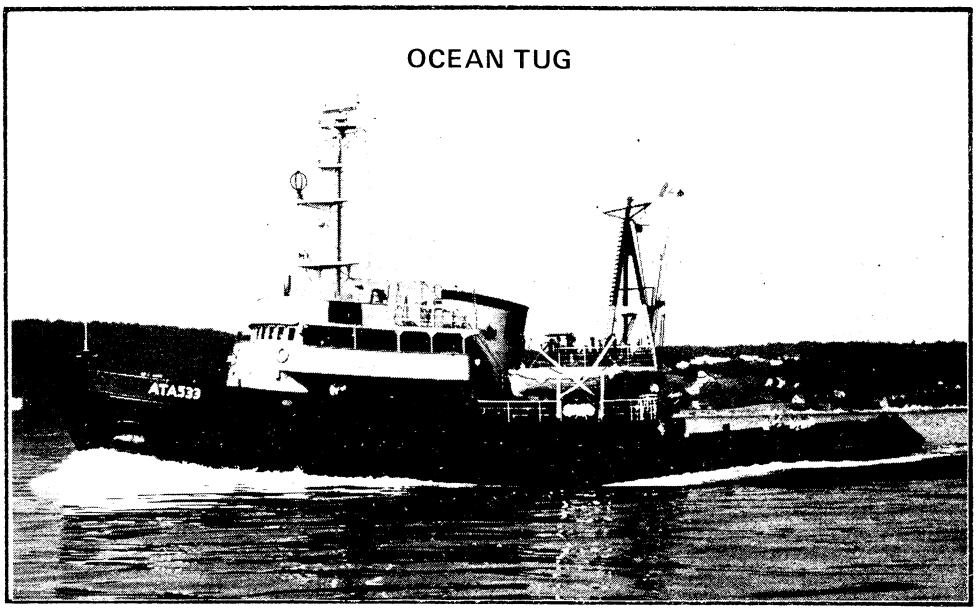
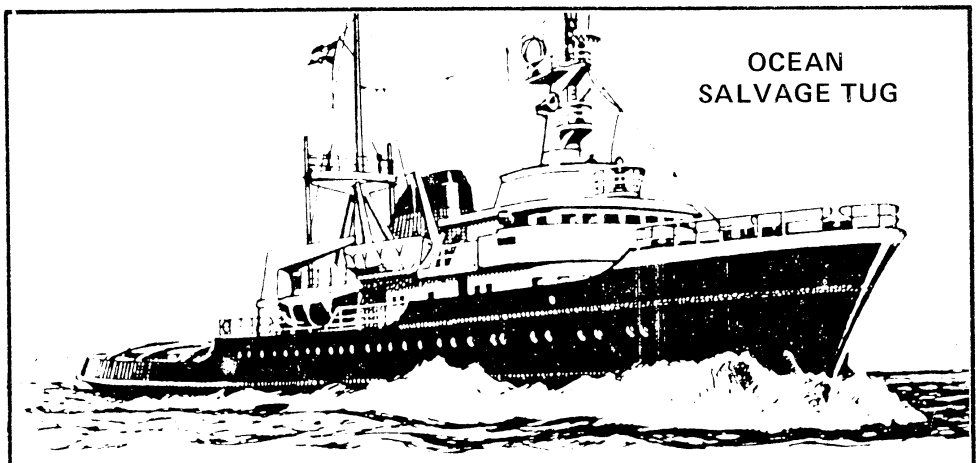


Figure 8-72 Ocean Tug



Zwarte Zee – Holland (Netherlands) 1963. When built at Kinderdijk for L. Smit & Co., Rotterdam, was the world's largest, most powerful dieseldriven salvage tug. 1,539 tons gross. Length 254 ft. Two M.A.N. type diesels of 9,000 b.h.p. drive a single shaft. 20 knots. Crew 31, plus 20 salvage men.

Figure 8-73 Ocean Salvage Tug

h. **Fishing Vessels** – (See Figures 8-74 to 8-78.) Fishing vessels come in a variety of types and sizes, depending on the type of fish sought and the area of operations (offshore or deep-sea). Many vessels are designed to use several fishing methods, depending on the availability of species. Several types are illustrated, for information and interest.

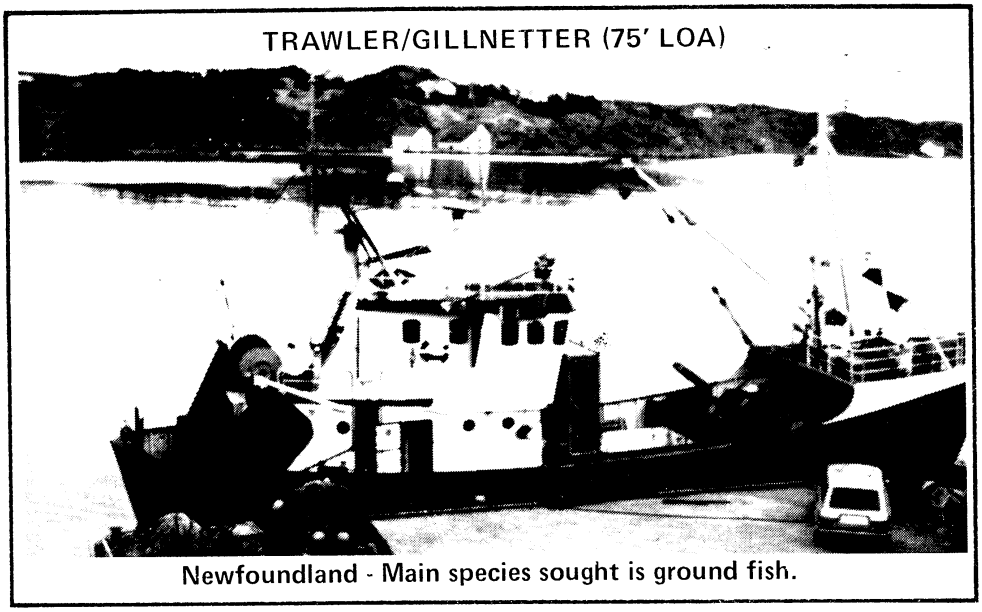


Figure 8-74 Trawler/Gillnetter (75 feet LOA) — Newfoundland — Main Species Sought — Ground Fish

This type of vessel is fast becoming obsolete and being replaced by modern stern trawlers.

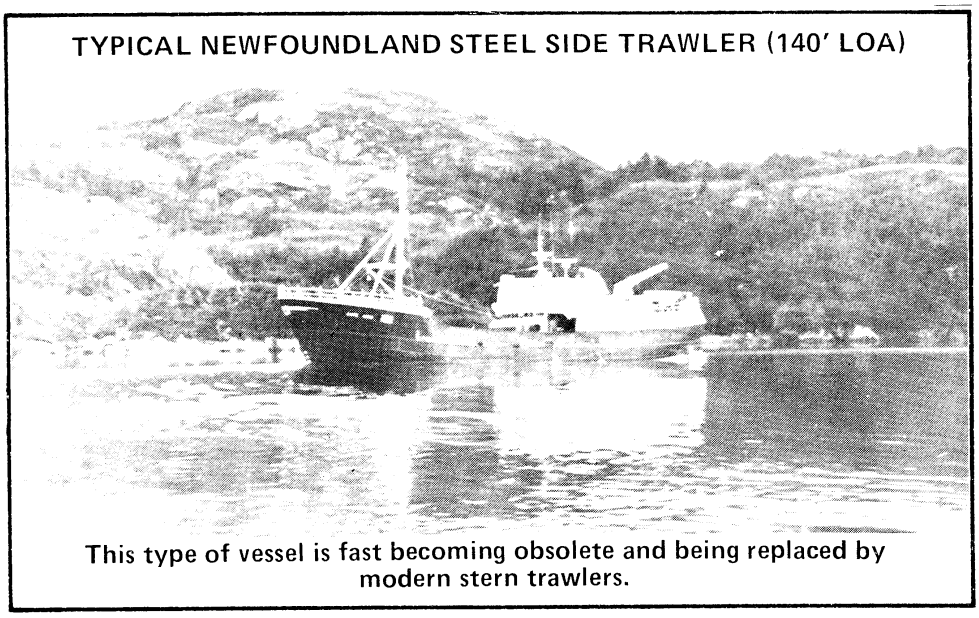
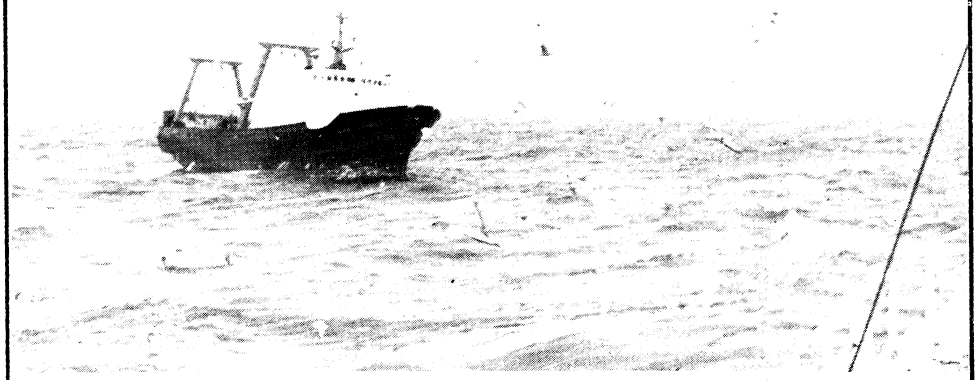


Figure 8-75 Typical Newfoundland Steel Side Trawler (140 feet LOA)

This vessel normally fishes for demersal (bottom-feeding) species off Labrador and the Eastern seaboard. A vessel of this type and class is designed to operate in ice infested waters.

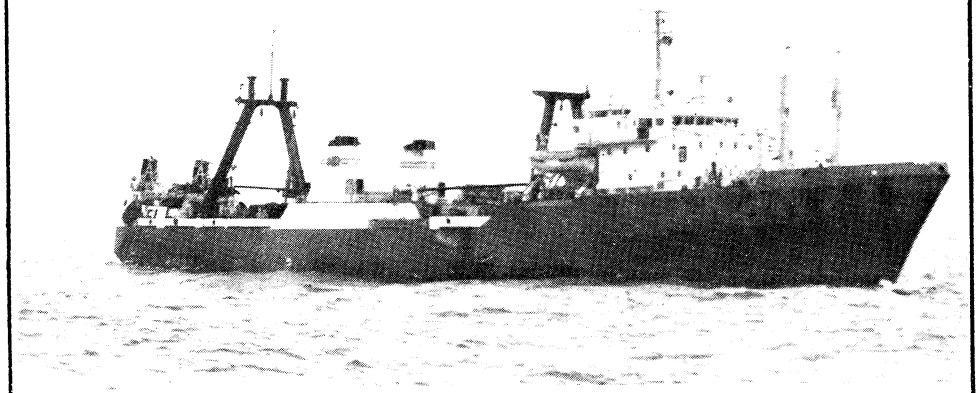
STERN TRAWLER – ST. FINBARR OFF HAMILTON INLET



This vessel normally fishes for demersal (bottom-feeding) species off Labrador and the Eastern seaboard. A vessel of this type and class is designed to operate in ice infested waters.

Figure 8-76 Stern Trawler – St. Finbarr off Hamilton Inlet

STERN TRAWLER



(Roumanian Atlantic Class Super Trawler CERNA)

Figure 8-77 Stern Trawler (Roumanian Atlantic Class Super Trawler CERNA)

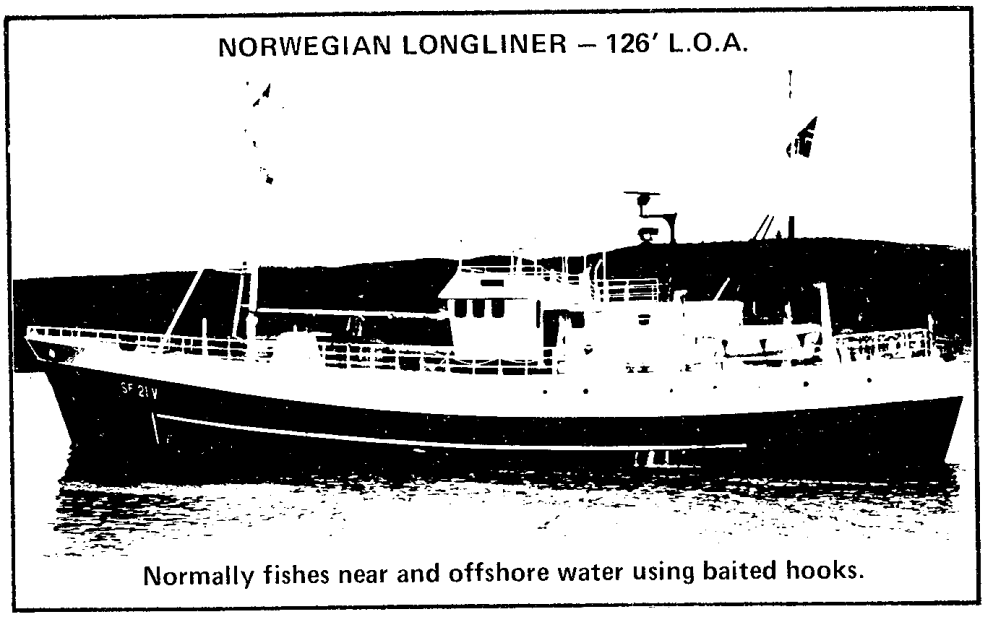


Figure 8-78 Norwegian Long Liner

TRAINING PERIOD 12 – THE TYPICAL WARSHIP/LARGER WARSHIP TYPES

12. **Definition of a Warship** – A ship is basically a vessel or container which is designed to carry something from place to place. The primary purpose of a warship is to carry weapons to the scene of an action. The ship itself is nothing more or less than a floating platform on which can be mounted various types of weapons and the equipment for using them. Thus, the characteristics of a ship are dictated mainly by the types of weapons it carries and by their methods of use. For example, the aircraft carrier uses aircraft as its weapons; it must be large, fast and have a flat upper deck. The submarine uses torpedoes under water; it must be capable of withstanding underwater pressures and have special tubes for launching torpedoes. A simple definition of a warship, then, is **floating weapon platform**.

13. **Basic Characteristics of a Warship** – Despite their considerable differences, there are certain qualities which all warships share in common. Listed below are the basic characteristics of the typical warship:

a. **Weapons Delivery** – It must be capable of bringing its weapons within range of an enemy and launching or firing them with accuracy.

b. **Speed and Manoeuvrability** – It must have sufficient speed to catch up with an enemy and get into action quickly.

c. **Endurance** – It must carry sufficient fuel and supplies to be able to operate for a considerable time and at a considerable distance from base.

d. **Seaworthiness** — It must be seaworthy, so that it will be able to operate efficiently in bad weather and rough seas.

e. **Damage Control** — It must be able to accept a fair degree of damage from an enemy and still be able to carry on fighting.

f. **Detection** — It must have the means of detecting an enemy at a distance, whether underwater, on the surface or in the air.

g. **Communication** — It must have the means of communicating rapidly and efficiently with its base and with other friendly ships.

h. **Crew Accommodation** — The warship requires a much larger crew than the merchant ship, since there must be people to fight the ship as well as operate her. There must be adequate space to accommodate the expanded crew.

14. **Negative Features** — For purposes of recognition, there are a number of negative features shared by most warships in comparison with commercial vessels. Most warships do not require the large size of many commercial vessels. They do not require the access to cargo holds or tanks which dictates the flat midships silhouette of many bulk carriers and tankers. They do not need the complex system of masts, booms and other loading and unloading gear common to many merchant ships.

15. **Summary** — In summary, the "typical" warship (apart from highly specialized types such as carriers and submarines) will be something like this:

a. It will be somewhat smaller than a major merchant vessel, sleaker and more streamlined in shape (for **speed** and **manoeuvrability**).

b. Instead of the aftercastle/forecastle configuration of the bulk carrier, it will have a relatively high superstructure, centered roughly amidships. This will carry a large amount of radio, radar and weapon control equipment (**communication, detection and weapon delivery**).

c. Fore and aft (usually of the superstructure will be found the main and secondary armament itself, which will vary with the type of warship. There may also be pad and hangars for helicopters, which are increasingly in use for enlarging the "vision" of a warship.

d. The cranes and booms of a merchant ship will be conspicuously absent.

e. Within the ship, the numerous watertight compartments (for **damage control**) will be crammed with equipment, stores, fuel and ammunition (for **endurance**).

f. The engine will be large and powerful (for **speed**) and almost always driving more than one screw (for **manoeuvrability**).

The result of the utilization of the available space, plus the relatively large crew, is that **crew sleeping and living-space** will of necessity be limited. Every possible bit of space must be used to best advantage and kept in spotless order to maintain a high degree of efficiency. When you study the various types of warship, it is instructive to consider the basic qualities noted above and ask yourself to what extent each of these applies to the ship in question.

16. **The Typical Warship** — This is illustrated in Figure 8-79 below.

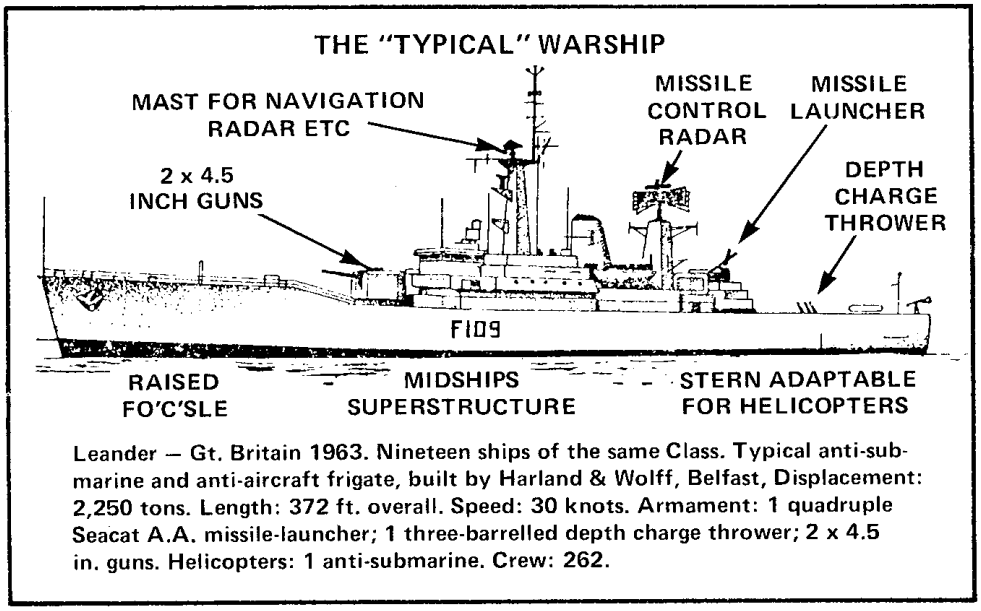


Figure 8-79 A Typical Warship

There is, of course, no such thing as a typical warship. However, the above illustration (of a "Leander" Class frigate of the Royal Navy), is sufficiently typical to illustrate many of the features outlined above. In this and the following Training Period, we will take a look at a number of the more important types of warships. These will include aircraft carriers, helicopter carriers, amphibious dock transport ships, cruisers, destroyers, frigates, corvettes, fast attack and patrol crafts, submarines, minesweepers and fleet auxiliaries. Even this rather long list does not exhaust the variety of warships in use around the world. For interest only, a complete classification of warship types is included at Figure 8-80.

SHIP DESIGNATIONS

In an effort to standardise the type designations in the various navies, despite somewhat idiosyncratic listing in some fleets, a regular formula has been used wherever possible in the majority of sections. This has caused some queries and comments, therefore a list is given below.

TYPE DESIGNATIONS

AIRCRAFT CARRIERS	
Attack Carriers (Large)	Over 50,000 tons (all US ships)
Attack Carriers (Medium and Light)	Essex, Ark Royal, two French et al
Helicopter Carriers/ Cruisers	Kiev and Moskva
MAJOR SURFACE SHIPS	
A/S Cruisers	"Invincible" class
Cruisers	Pre 1960 cruisers, including missile conversions
Light Cruisers	Above 5,000 tons
Destroyers	3,000 tons and over, plus original conventional destroyers
Frigates	1,100 to 3,000 tons
Corvettes	500 to 1,100 tons
LIGHT FORCES	
Fast Attack Craft	FAC (Missile)
25 and above 25 knots	FAC (Gun)
	FAC (Torpedo)
	FAC (Patrol)
Patrol Craft	Large Patrol Craft (100 to 500 tons)
Below 25 knots	Coastal Patrol Craft (below 100 tons)
SUBMARINES	
Strategic Missile	Nuclear propelled and conventionally propelled
Fleet Submarines	Nuclear propelled
Patrol Submarines	Conventionally propelled
AMPHIBIOUS FORCES	
Command Ships	
Assault Ships	
Landing Ships	
Landing Craft	
Transports	
MINE WARFARE FORCES	
Mine Layers	
MCM Support Ships	
Mine Sweepers (Ocean)	
Mine Hunters	
Mine Sweepers (Coastal)	
Mine Sweepers (Inshore)	
Mine Sweeping Boats	
SURVEYING VESSELS	
Surveying Ships	
Coastal Surveying Craft	
Inshore Surveying Craft	

Figure 8-80 Jane's Classification of Warships

17. **Aircraft Carrier** — (See Figure 8-81.) Aircraft carriers provide offensive power at very long ranges by using their aircraft to attack with guided weapons, bombs, rockets, torpedoes and mines. Their aircraft also intercept and destroy enemy attacking and reconnaissance aircraft, and provide long-range reconnaissance for their own Fleet. Carriers have defensive armament, but rely on other types of ship and anti-submarine (A/S) helicopters for close protection against submarines. They are easily recognized by the flat top flight deck. They displace between 20,000 and 95,000 tons and are from 700 to 1,100 feet in length.

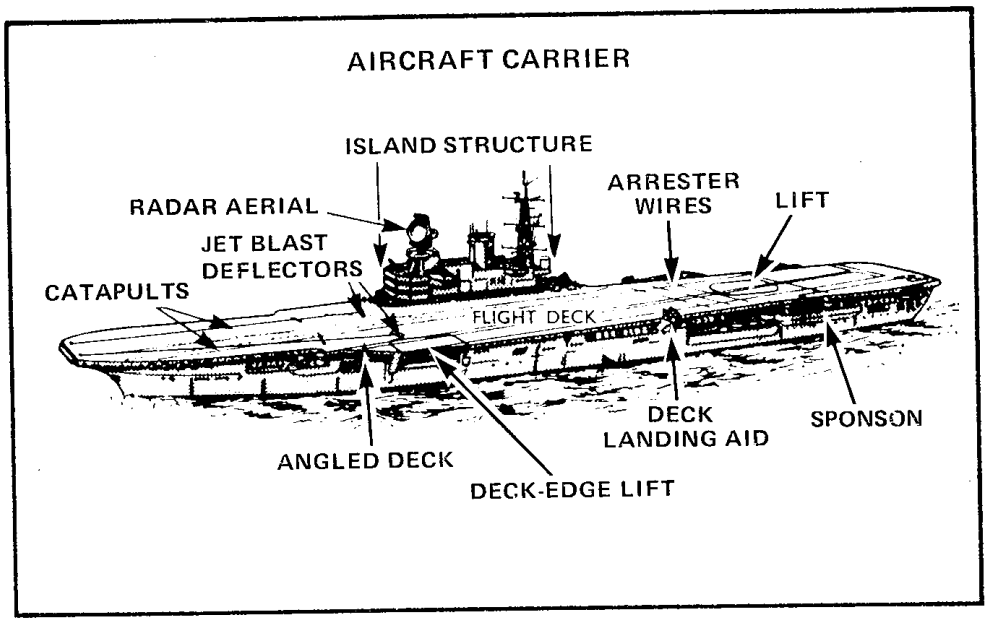


Figure 8-81 Aircraft Carrier

18. **Tactical Function of an Aircraft Carrier** — Today, despite the development of nuclear-powered missile-carrying submarines, the tactical function of the aircraft carrier remains valid. It has completely taken the place of the battleship, with its ability to deliver vastly superior explosives on the enemy at a much greater distance by means of its aircraft. It also guarantees a mobile air force which is ready to intervene even at the other end of the world from its departure base. Thus it is of great tactical value in limited or "brush-fire" wars. In an allout nuclear war, the carrier suffers from vulnerability to missile attack. All the **heavy attack carriers** (over 50,000 tons) at present are US ships. A few other major nations have **medium or light attack carriers** and a number have smaller carriers which have been converted into **assault troop carriers**.

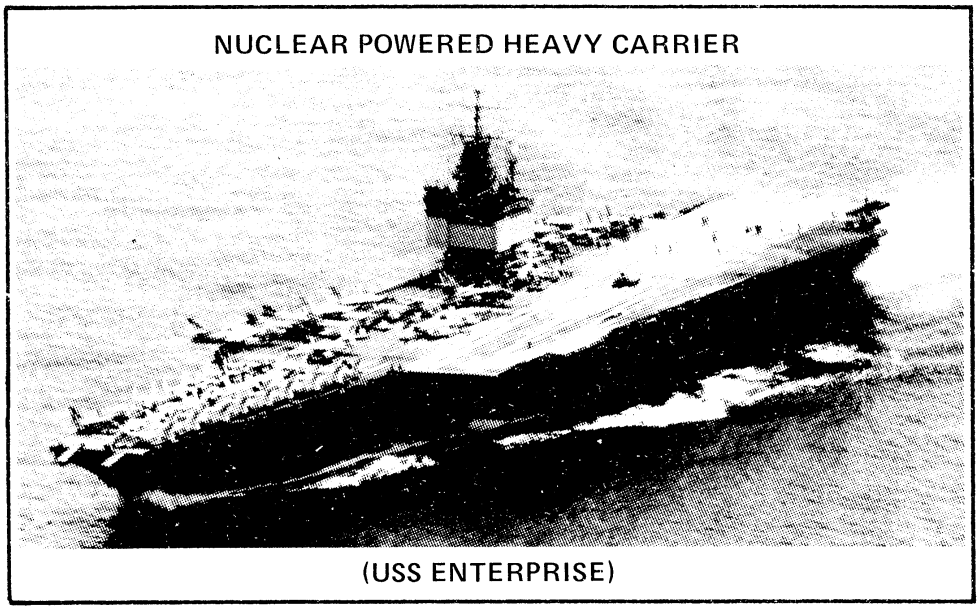


Figure 8-82 Nuclear Powered Heavy Carrier (USS Enterprise)

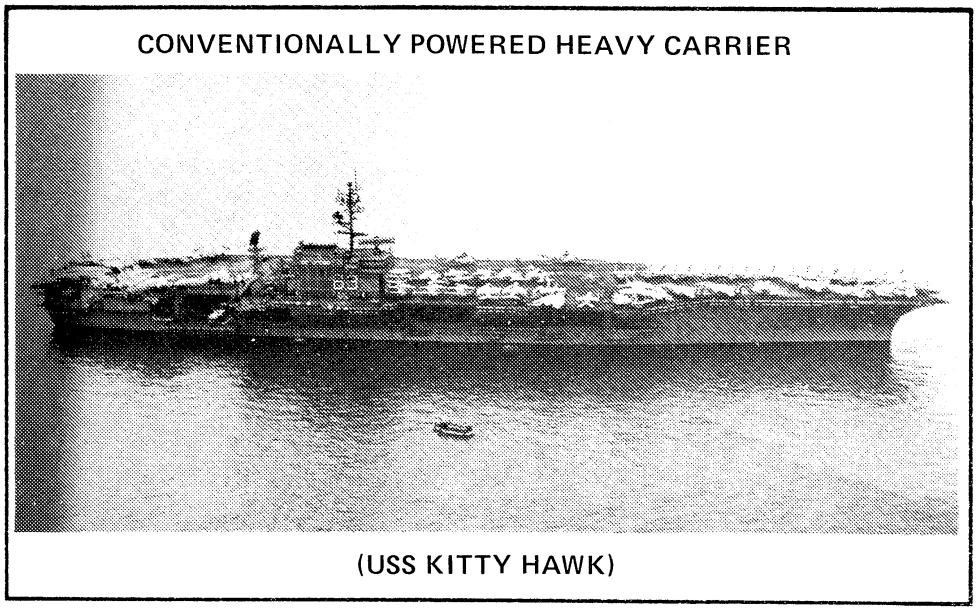
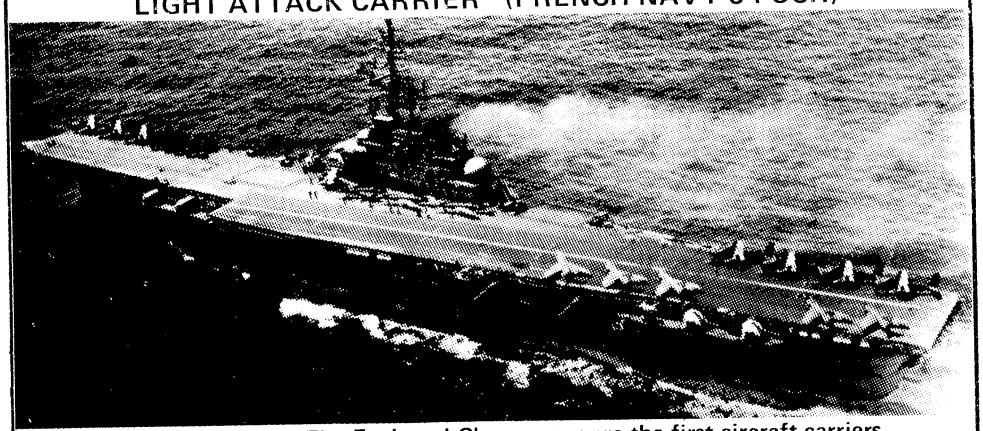


Figure 8-83 Conventionally Powered Heavy Carrier (USS Kitty Hawk)

LIGHT ATTACK CARRIER (FRENCH NAVY'S FOCH)



Foch – Franch 1963. The Foch and Clemenceau are the first aircraft-carriers designed and built entirely in France. They are examples of the light, attack type. Displacement: 22,000 tons. Length: 845 ft. overall. Speed: 32 knots. Max. fuel range: 7,500 miles (at 18 knots). Aircraft: 30. Armament: 8 x 39 in. guns: catapults: 2. Crew: 2,700.

Figure 8-84 Light Attack Carrier (Foch — France)

19. **Carrier Terms** — (See Figure 8-81.) These terms are commonly used in describing the parts of an Aircraft Carrier:

a. **Flight Deck** — Long, flush, uppermost deck used by aircraft for assembly, take-off (usually by catapult), and landing. Modern carrier flight decks are angled so that landing operations are safer and do not interfere with the ranging of serviced aircraft and their catapult take-off.

b. **Island Superstructure** — Compact structure, which includes funnel, radar masts and aerials, bridges and operations rooms, built on the starboard side of the flight deck.

c. **Sponson** — A platform projecting from the ship's side on which guns and other equipment are mounted.

d. **Catapults** — Most modern aircraft require a greater length of deck for take-off than can conveniently be provided afloat, therefore steam-operated catapults are fitted at the fore end of the flight deck for short, boosted take-off.

e. **Arrester Gear** — Modern aircraft require a greater length of deck for landing than can conveniently be provided afloat. This is overcome by fitting arrester wires athwart the flight deck which, when hooked by the landing aircraft, bring it to rest in a short distance.

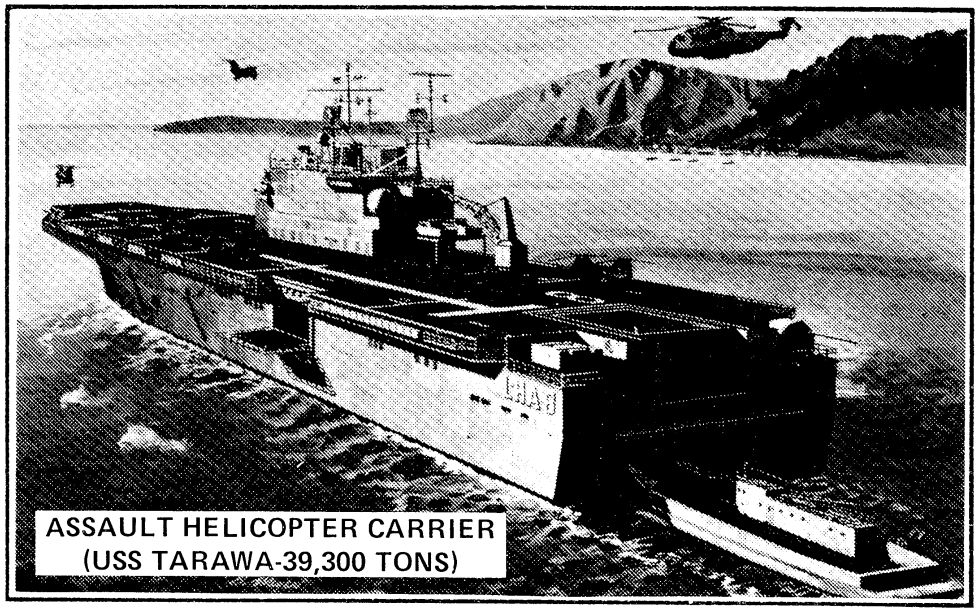


Figure 8-85 Assault Helicopter Carrier (USS Tarawa — 39,300 Tons)

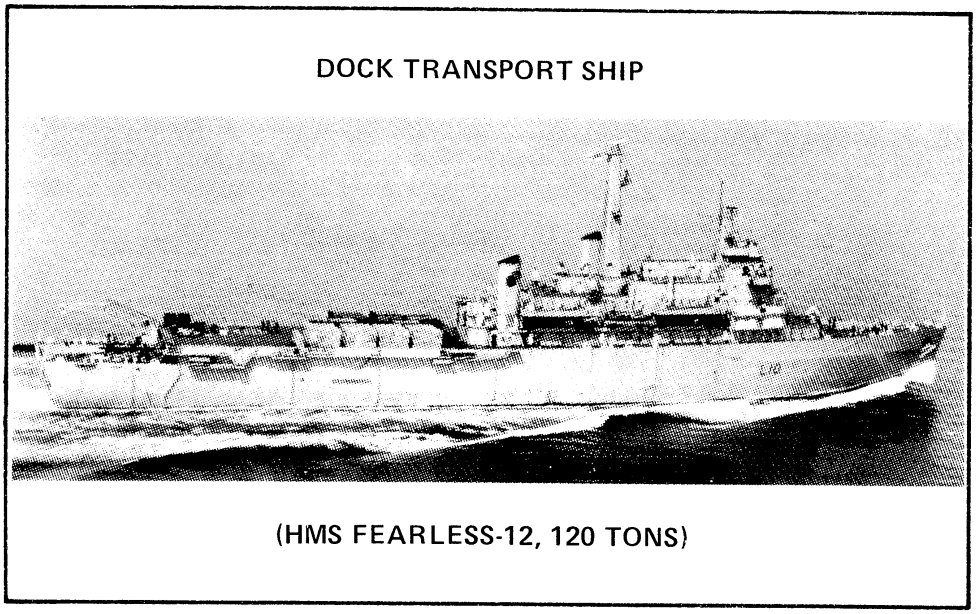


Figure 8-86 Dock Transport Ship (HMS Fearless — 12, 120 Tons)

20. **Assault Troop Carriers** — Two new types of ships have emerged in recent years, first in the United States naval forces and then in the British and French. These are the **amphibious assault troop helicopter-carrier** and the **amphibious dock assault troop-carrier**.

21. **The Amphibious Assault Troop Helicopter-Carrier** — This new type of ship is either a carrier or a ship which has been specifically designed to carry out a new duty, that of **transporting large numbers of Marines or assault troops** to wherever they may be needed, as well as their armament, equipment and heavy guns; all being off-loaded from ship to land by means of **big transport helicopters**. These ships are equipped to offer to the parachute troops, and others to be transported by air, much greater comfort than the old vessels and, above all, are capable of effecting the landing of both men and materiel in the minimum of time, even when denied normal port facilities.

22. **The Amphibious Dock Transport Ship** — This vessel performs a combined role. It is usually a conventional ship modified to carry and launch a limited number of troop-carrying helicopters. It is also equipped for landing troops in the traditional way of the Second World War, but with the landing craft **stowed in the ship's internal dock**, protected from possible enemy fire and from bad weather at sea. The United States' ships of the Raleigh class and those of the British Fearless class are of this second type. The former are equipped with six heavy helicopters and six landing-craft for 900, including the crew.

23. **Summary** — In this section we have linked up the helicopter-carriers with the amphibious dock transport ships because they have both been produced for the same ends, the transportation and well-timed landing of a force to intervene promptly wherever necessity demands it. The centres of localized war that smoulder in different corners of the world have taught the advisability of adopting these new types of ships, which, perhaps, were suggested by the bitter experiences of the Korean War.

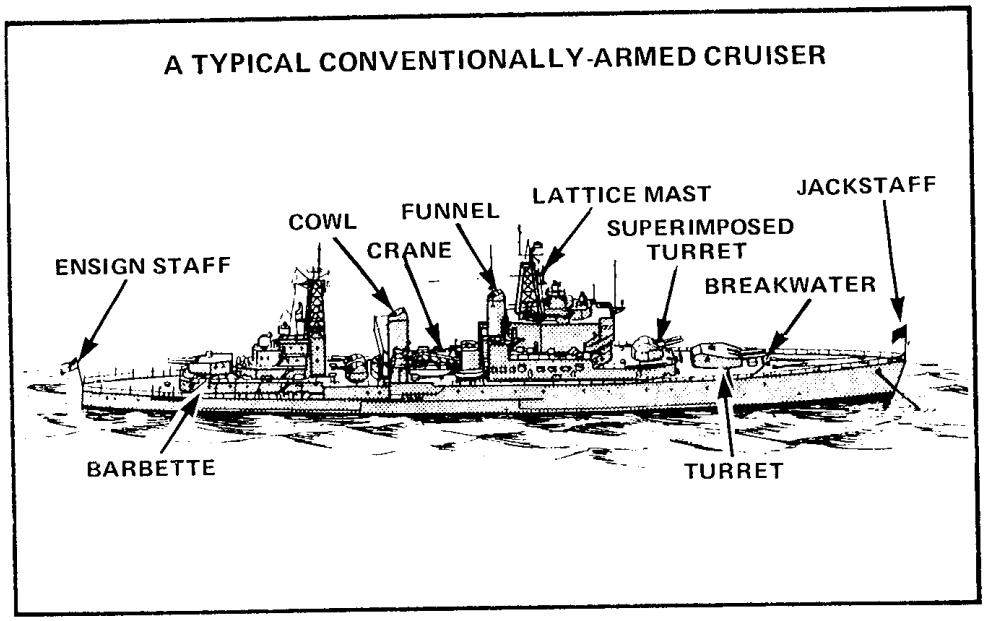


Figure 8-87 A Typical Conventionally-Armed Cruiser

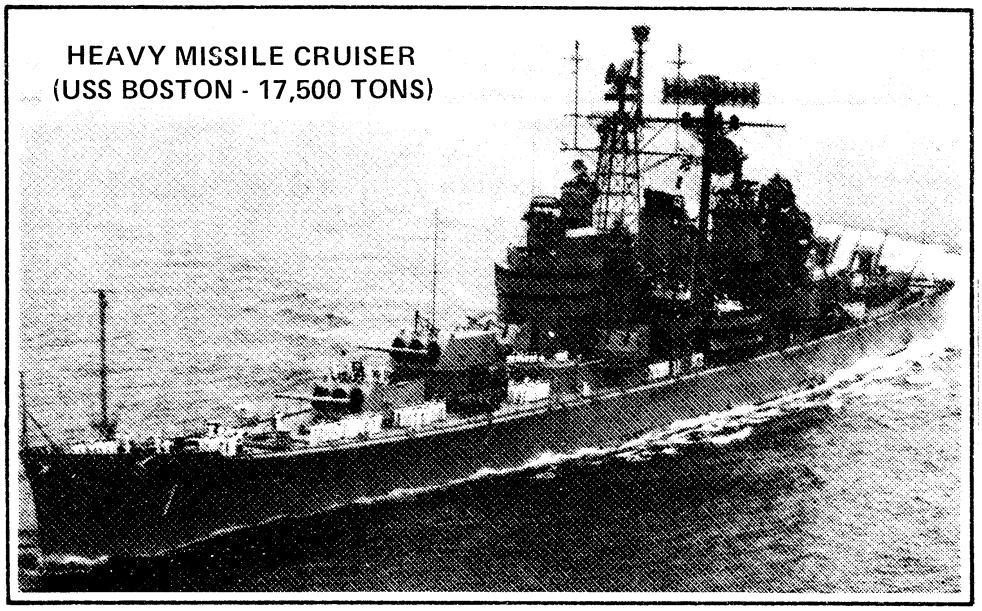


Figure 8-88 A Heavy Missile Cruiser (USS Boston — 17,500 Tons)

24. **Cruisers** — These are general-purpose fighting ships whose main function is to provide close cover and anti-aircraft support to convoys or carrier task groups. They combine hitting power with speed and manoeuvrability. With modern developments in weapons, general-purpose ships are being classified as cruisers more on the basis of size (over 5,000 tons) and endurance than on any special features. They can be recognized by their large size and extensive superstructure. They displace from 5,000 to 18,000 tons and have an overall length of between 450 to 750 feet.

25. **Cruiser Armament** — Modern cruisers carry as their main armament a great variety of surface-to-surface and surface-to-air missiles, together with medium-calibre guns (75-200 mm). Because of their large size they can carry very extensive radar and communications equipment and therefore often act as control or command ships for fleets of destroyers.

26. **Terminology** — (See Figure 8-87.) These terms are used in describing a Cruiser:

a. **Breakwater** — A low raked barrier built across the forecastle to stop heavy seas from sweeping aft.

b. **Turret** — A revolving box-like armoured structure housing guns (usually two or three) and known as a twin or triple turret. A turret is superimposed when it is mounted above and behind another over which it can fire.

c. **Barbette** — A cylindrical armoured structure protecting the circular roller path and turret-turning gear beneath a turret.

d. **Funnel** — A streamlined casing containing the cylindrical duct built to carry the exhaust gases from boilers or diesel engines above the superstructure. Generally fitted with a cowl top to help lift the gases clear of the ship.

e. **Lattice Mast** — Steel pylons built to carry rotating radar aerials, fixed radio aerials and visual signalling arrangements. They are generally fitted with aerial spurs and pole topmasts.

f. **Raked** — Inclined to the vertical. The stem is usually raked, and occasionally the funnels and masts.

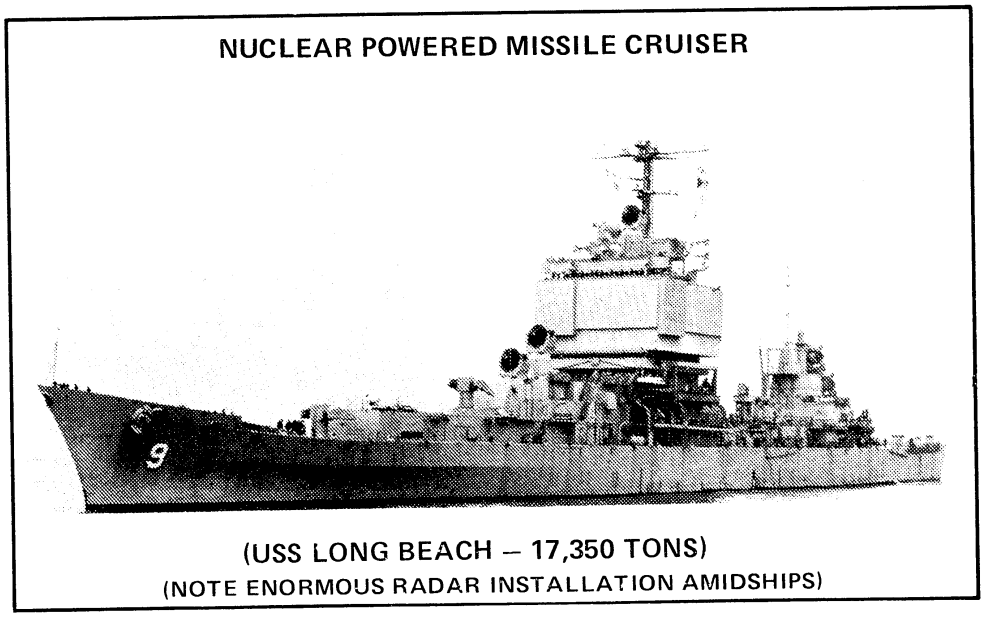


Figure 8-89 Nuclear Powered Missile Cruiser (USS Long Beach — 17,350 Tons)

Note enormous radar installation amidships

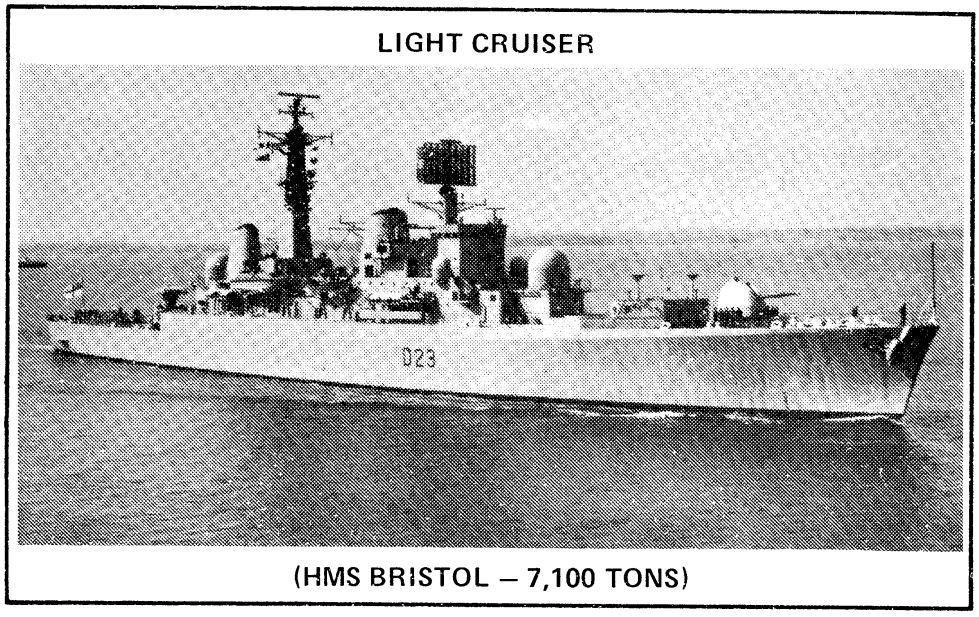


Figure 8-90 Light Cruiser (HMS Bristol – 7,100 Tons)

TRAINING PERIOD 13 – SMALLER WARSHIP TYPES AND AUXILIARIES

27. **Smaller Warships – Classification** – Because there is a good deal of confusion about the designations of the smaller major-warship types (and because often there are few important differences between them, other than size), in this section we will use the classification of Jane's Fighting Ships, which is the generally accepted authority on naval vessels. This classification is as follows:

a. Cruiser – over 5,000 tons

b. Destroyer – 3,000 to 5,000 tons

c. Frigate – 1,100 to 3,000 tons

d. Corvette – 500 to 1,100 tons

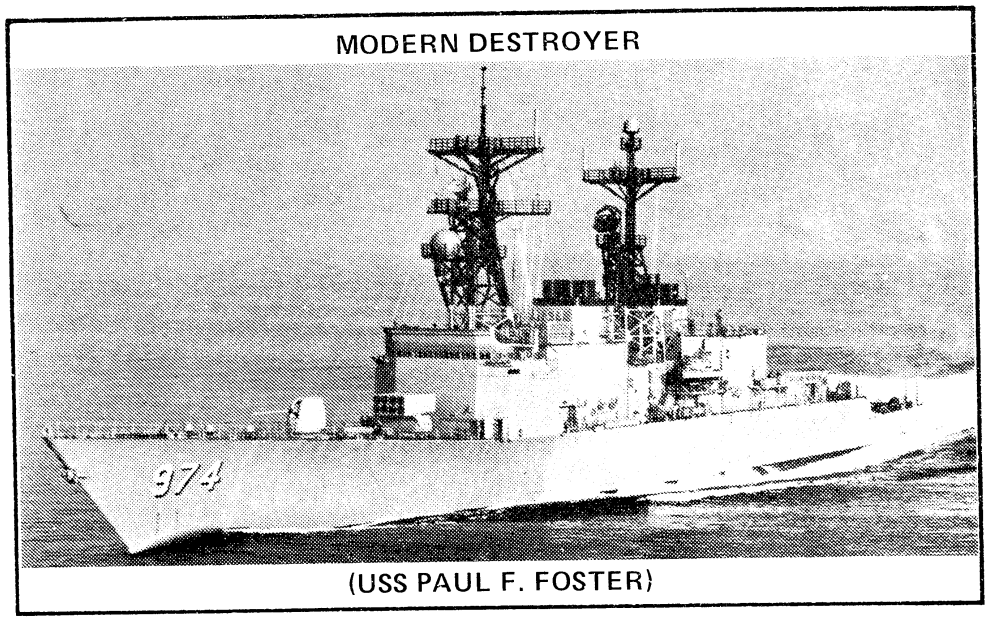


Figure 8-91 Modern Destroyer (USS Paul F. Foster)

Figure 8-92 Destroyer (Almirante Riveros — Chile)

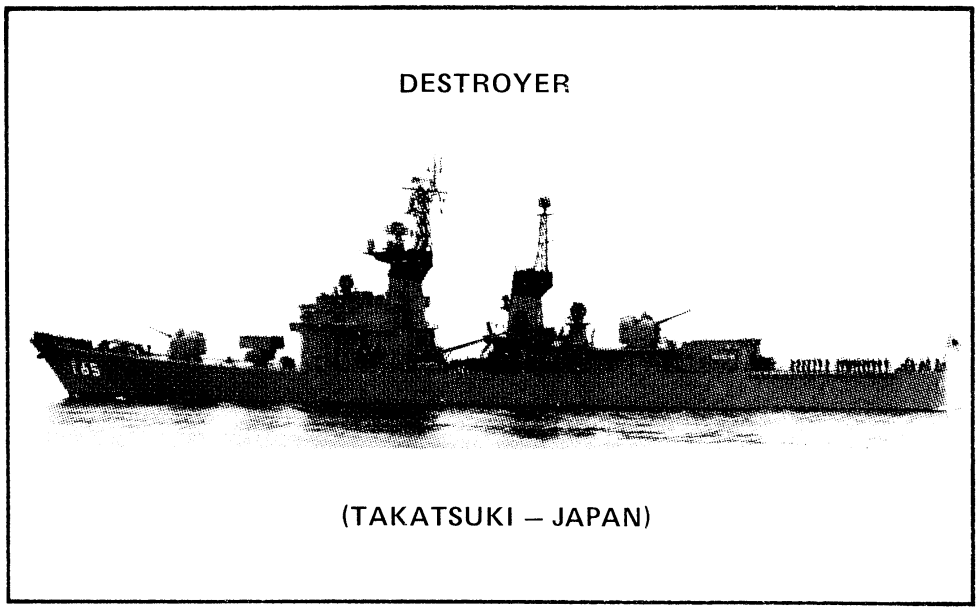


Figure 8-93 Destroyer (Takatsuki – Japan)

28. **Destroyers and Destroyer Escorts** – Modern destroyers range in size from 3,000 to 5,000 tons and are between 370 to 450 feet in length. Some have been specialized as anti-submarine vessels and are known as **destroyer escorts** (although all destroyers have some A/S capability). Where, as in some smaller navies, they constitute the main strength of the fleet, they are in effect general-purpose warships.

29. **Armament** – This includes light guns (35-150 mm), surface-to-air and surface-to-surface missiles, and anti-submarine weapons of various types (rockets and homing torpedoes).

30. **Endurance** – Their endurance is limited by their size and they usually operate in the company of larger vessels.

31. **Use of Helicopters** – A development pioneered by the Royal Canadian Navy was the use of large helicopters from destroyer-sized vessels. This greatly extends the ship's anti-submarine capability, since the helicopter can both detect and attack a submarine many miles away from the destroyer's location. Similar systems have been adopted by most of the world's major navies.

32. **Frigates and Corvettes** – These terms are generally used to describe the warship types smaller than the destroyer. In most navies, the classification, noted in paragraph 1 is followed (Frigates 1,100-3,000 tons, Corvettes 500-1,100 tons), although there are a number of national variations. In the USN, the term frigate is used to describe vessels of cruiser size. All the Canadian destroyer escorts (with the exception of the Tribal Class) would strictly be classified as large frigates. This confusion has

been recognized in Canada, and the recently-ordered Canadian warships (similar in size to the existing DE's) will be referred to as Patrol Frigates.

33. **Frigates** — In capability, **frigates** are similar to destroyers, with their effectiveness reduced proportionately by their smaller size. With modern weapons, however, smaller ships can provide very effective fire power (a modern frigate has the firepower of a World War II light cruiser!). They can (and frequently do) **carry helicopters** or have provision for landing them. Due to their smaller size and capacity, these vessels are more frequently specialized than destroyers.

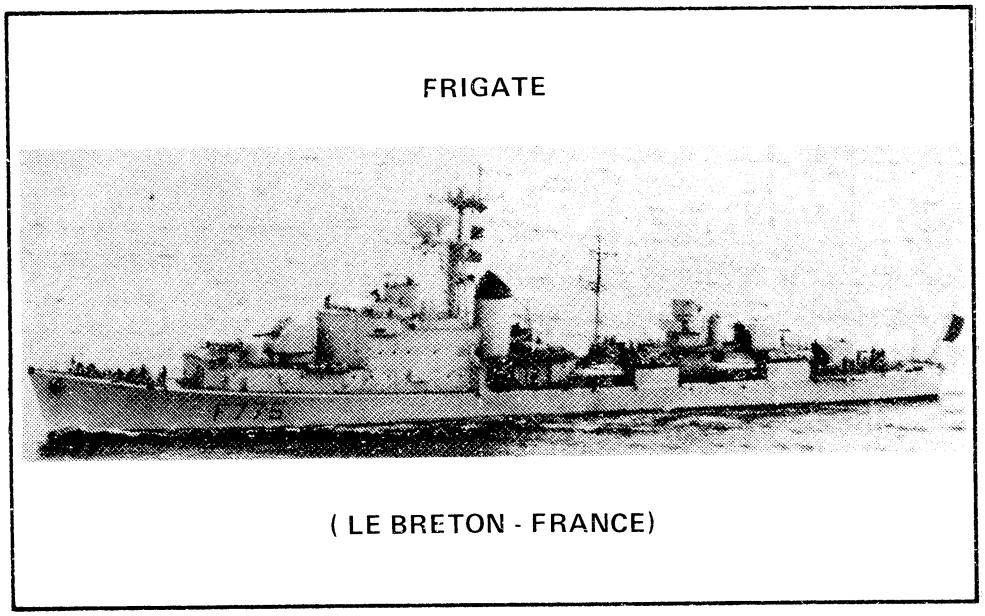


Figure 8-94 Frigate (Le Breton — France)

34. **Corvettes** — Corvettes are also similar in concept to destroyers but are much smaller, and are suited to coastal escort work. In both frigates and corvettes, the torpedo tubes are mainly for anti-submarine work, that is, they are suitable for launching homing torpedoes; a really awe-inspiring offensive weapon against submarines.

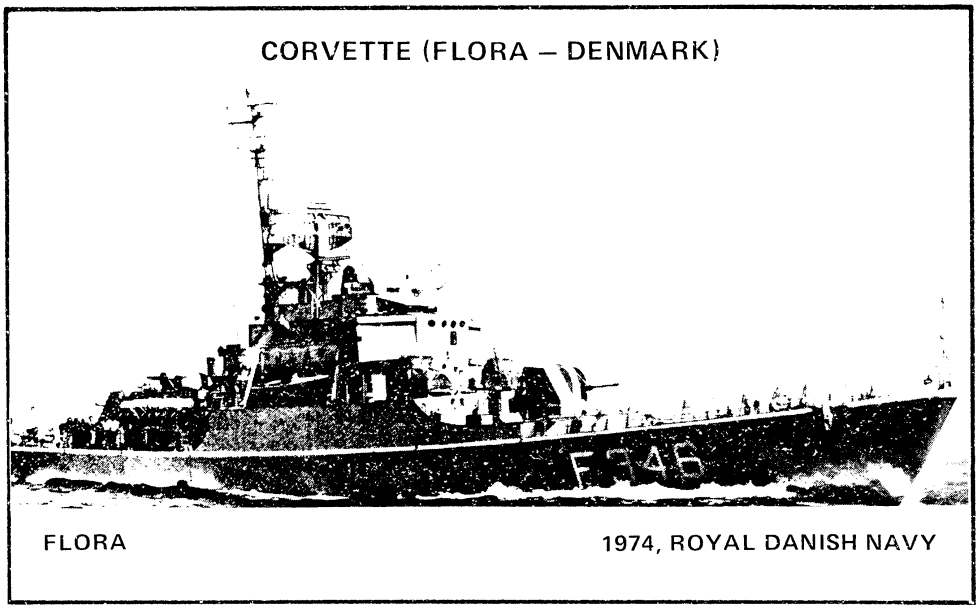


Figure 8-95 Corvette (Flora — Denmark)

35. **Light Forces — Fast Attack Craft** (over 25 knots) — FAC vessels armed with missiles have taken over as the major striking weapon in many smaller navies. Cheap and rapidly built, equipped with modern long-range missiles, they have provided an alternative to expensive larger vessels. Their use and capabilities have been demonstrated in Middle East conflicts. Generally, they run from 90 to 150 feet in length, with missile launchers mounted aft and one or two light guns forward.

36. **Patrol Craft** (below 25 knots) — These may be of any size up to 500 tons and are usually lightly armed. They are used for coastal surveillance and for customs and fisheries patrols.

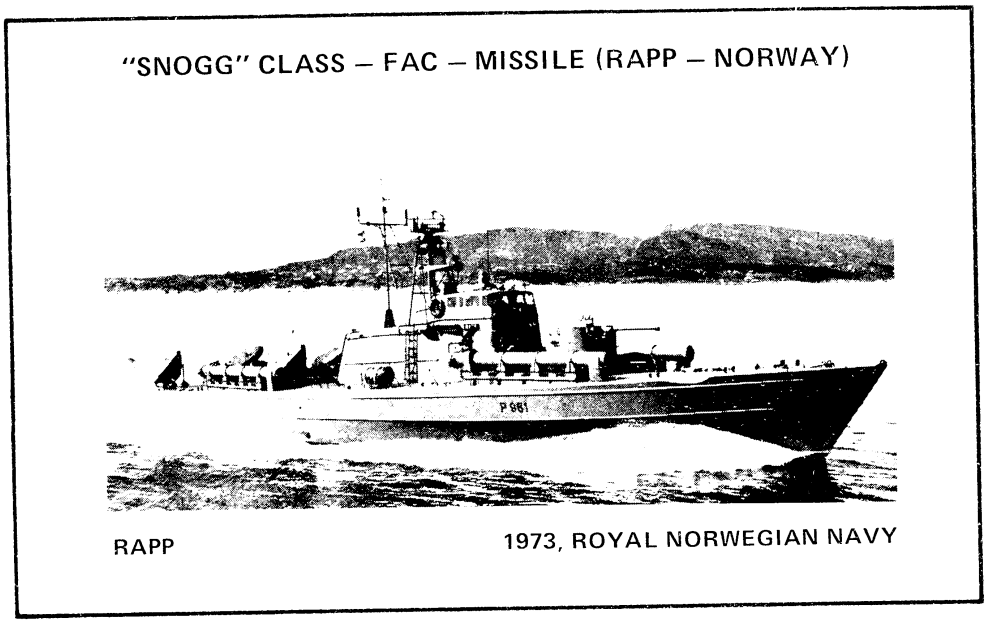


Figure 8-96 "Snogg" Class – FAC – Missile (Rapp – Norway)

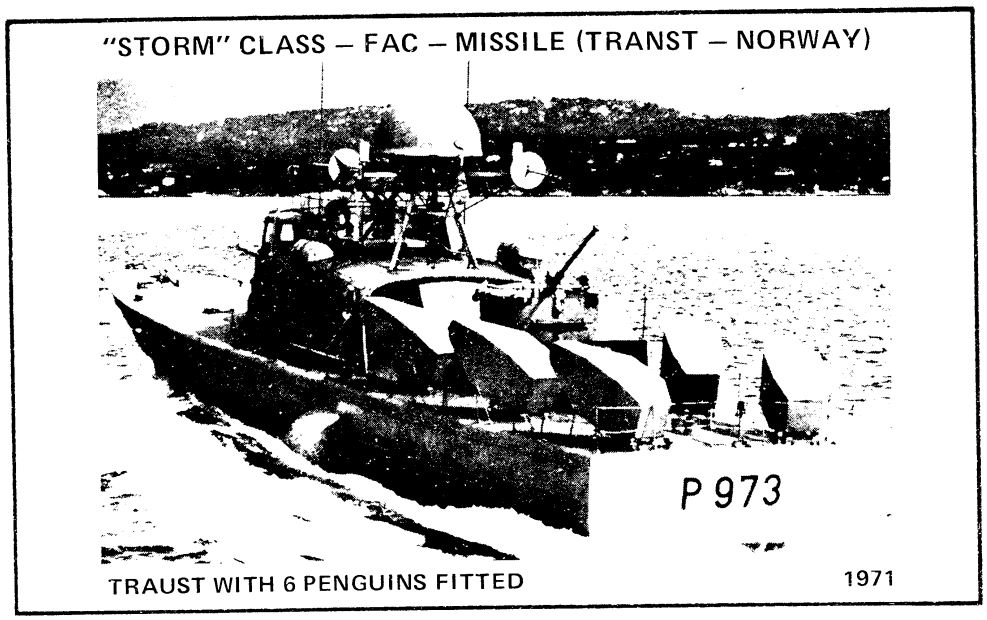


Figure 8-97 "Storm" Class – FAC – Missile (Traust – Norway)

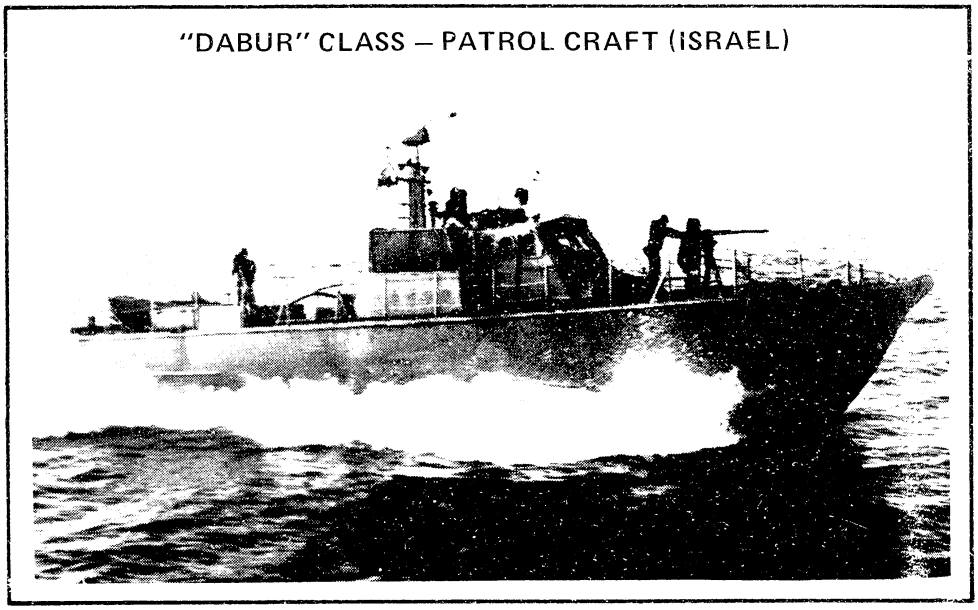


Figure 8-98 "Dabur" Class – Patrol Craft (Israel)

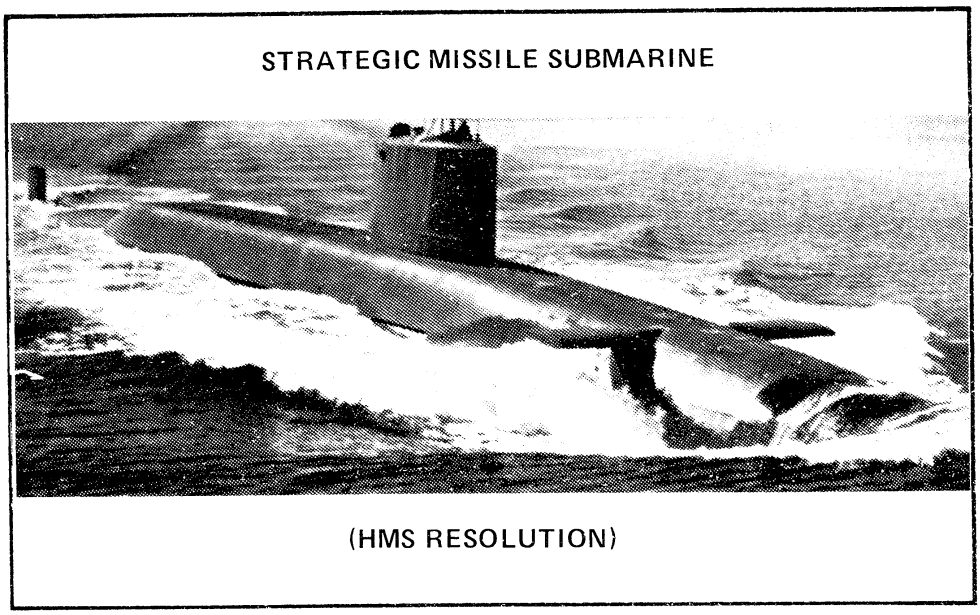


Figure 8-99 Strategic Missile Submarine (HMS Resolution)

37. **Strategic Missile Submarines** – Very large submarines, up to 600 feet long, usually nuclear powered. They carry up to twenty Intercontinental Ballistic Missiles (ICBM's) with nuclear warheads. Strategically, they are the most powerful weapons at sea. Each boat carries the destructive power of all the bombs, shells and bullets fired in both World Wars, and they could destroy half a continent without leaving port.

38. **Fleet Submarines** — Nuclear powered submarines used for underwater escort of surface task groups. They carry anti-ship and anti-submarine missiles and torpedoes. They usually have a high underwater speed, upwards of 40 knots.

39. **Conventionally Powered** — These are usually slower than fleet submarines, but are capable of carrying essentially the same armament. They are used for anti-merchant shipping and anti-submarine warfare and for training anti-submarine forces. Canada's "O" class submarines belong in this category.

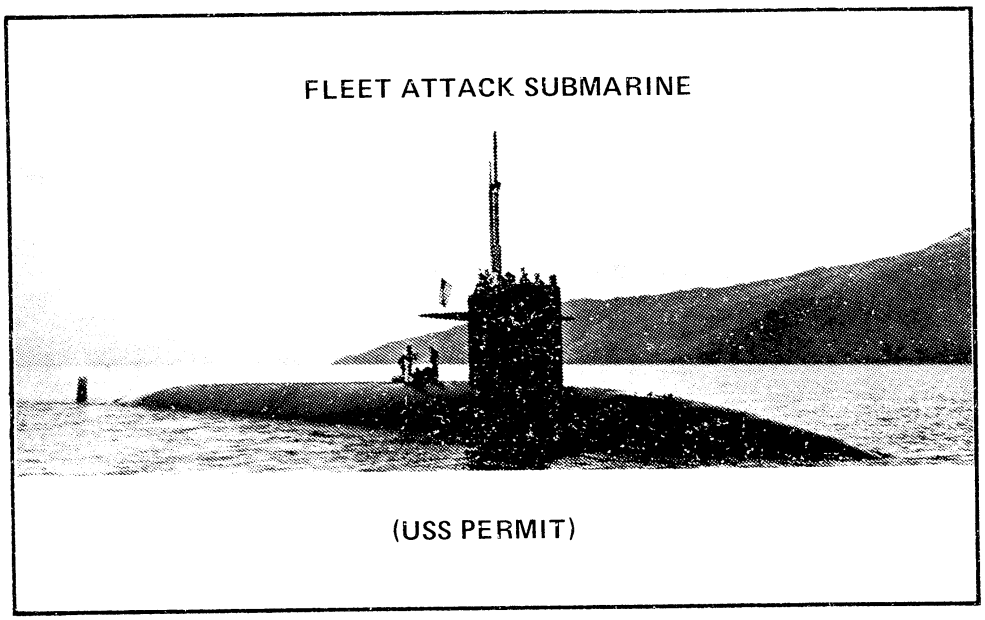


Figure 8-100 Fleet Attack Submarine (USS Permit)

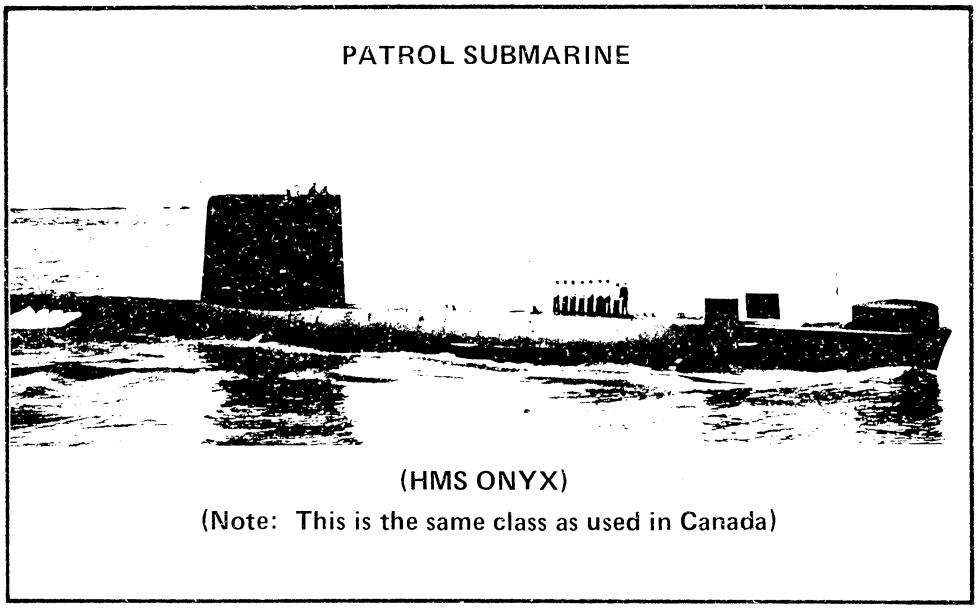


Figure 8-101 Patrol Submarine (HMS Onyx)

NOTE

This is the same class as used in Canada.

40. **Mine Warfare Vessels** — In World War II, mines sank more shipping than did submarines and aircraft put together. In the event of a conventional war it is probable that mines will play an important part in the maritime defences of the belligerents. For this reason, most navies are equipped for both minelaying and minesweeping.

41. **Minelayers** — There are still a few in use; most are of frigate or destroyer size with light armament and high speed. Special equipment for handling and laying mines is usually concealed within the hull, with just stern hatches being visible. They are now largely replaced by aircraft.

42. **Minesweepers** — Usually built of non-magnetic materials, their size depends on the area where they will be used — ocean, coastal or inshore. They are usually very lightly armed or unarmed, and may be recognized by the derricks, booms and other equipment used to lift the minesweeping gear in and out. A modern innovation in the use of minesweeping equipment towed by large helicopters.

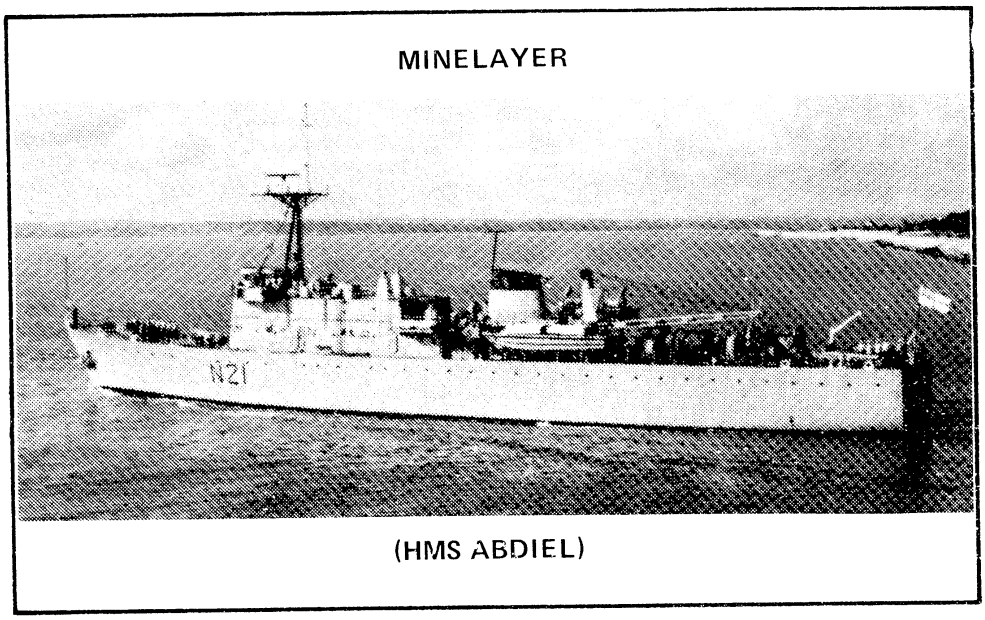


Figure 8-102 Minelayer (HMS Abdiel)

Figure 8-103 Minesweeper/Minehunter (HMS Wilton) (The World's First Fibreglass Warship)

43. **Fleet Auxiliaries** — All navies require a number of support vessels to increase the endurance of their ships at sea. These fall into three categories:

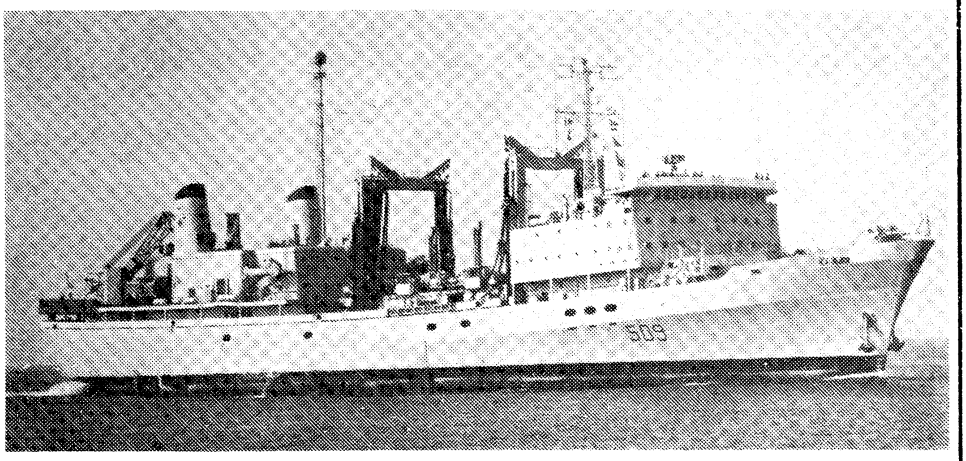
a. **Supply Vessels** — vessels equipped to carry and transfer basic necessities — fuel, ammunition and general stores. Some carry only one class of supply

while others are combination vessels (Canada's fleet auxiliaries fall into the latter category). These ships generally travel with the ships they supply.

b. **Repair and Maintenance Vessels** — These ships are capable of doing major repairs to ships up to the level requiring a major dockyard.

c. **Depot Ships** — Depot ships are attached to submarines or small-vessel flotillas to serve as command vessels and to provide full logistical support and service facilities.

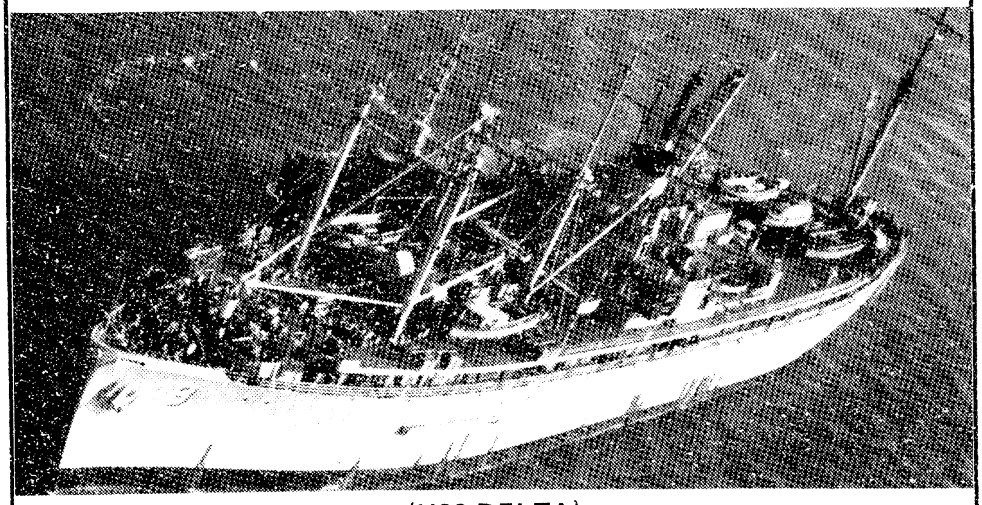
SUPPLY VESSEL



(HMCS PROTECTEUR)

Figure 8-104 Supply Vessel (HMCS Protecteur)

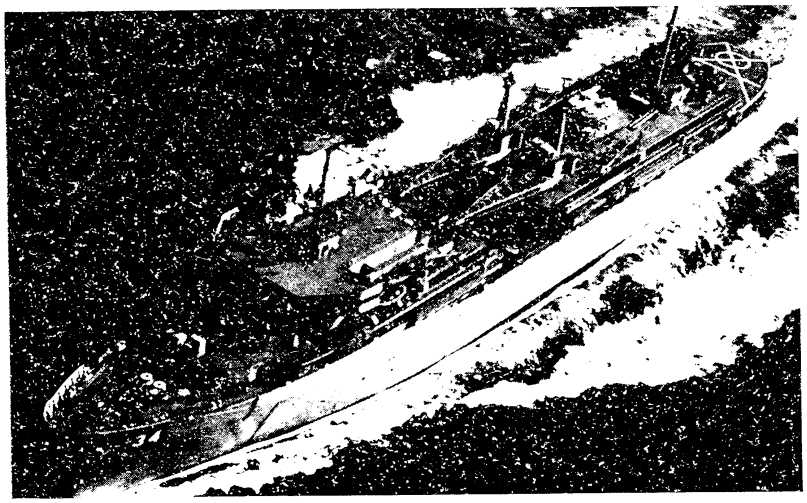
REPAIR AND MAINTENANCE VESSEL



(USS DELTA)

Figure 8-105 Repair and Maintenance Vessel (USS Delta)

DEPOT SHIP



(USS CANOPUS) 1966, USN

Figure 8-106 Depot Ship (USS Canopus)

TRAINING PERIOD 14 — ROLE OF CANADA'S NAVY

44. **Roles and Objectives of the Minister of National Defence** — These are laid out in Figure 8-107 below.

DND ROLES	DND OBJECTIVES
Sovreignity (1 and 2)	1. To ensure an adequate overall capability for **surveillance** of Canadian territory, airspace and sea approaches.
	2. To reinforce, through military involvement, respect for and compliance with **Canadian territorial and jurisdictional authority**.
Internal Security (3)	3. To provide **aid to civil law enforcement agencies** on request in the execution of their constitutional responsibilities.
National Development (4 to 6)	4. To **promote Canadian unity** and identity.
	5. To support **emergency relief** and **Search and Rescue** (SAR).
	6. To foster economic growth, social justice, the quality of life and the preservation of an harmonious natural environment.
Defence of North America (7 to 9)	7. To **deny the advantage of surprise in armed attack** on North America.
	8. To contribute to **the protection of the land-based US retaliatory capability** against neutralization.
	9. To provide response to **other military threats to North America**.
NATO (10 to 12)	10. To **prevent or contain armed attack against the NATO area** (Europe, North Atlantic, North America).
	11. **To sustain the confidence of the US and other allies**.
	12. To ensure that **allied policies include provision for Canada's security interests**.
Peacekeeping (13 to 15)	13. To **avoid great power confrontation in local conflict.**

Figure 8-107 (Sheet 1 of 2) Roles and Objectives of the Minister of National Defence

DND ROLES	DND OBJECTIVES
Peacekeeping (13 to 15) (cont'd)	14. To **prevent the outbreak or spread of hostilities in areas of tension.** 15. To contribute to the **promotion of internal stability** in selected non-NATO countries.

Figure 8-107 (Sheet 2 of 2) Roles and Objectives of the Minister of National Defence

45. **The Roles and Missions of Maritime Command** — In order to carry out the objectives listed above, the Department of National Defence has, in effect, divided the job between its three Commands (Maritime, Mobile and Air). To each Command it has assigned a **role** and a number of specific **missions**, which are suitable to the **function** of the Command (ie, sea, land or air) and to its **geographical location**. We are concerned here with the roles and missions of Maritime Command. They are rather more detailed than is necessary for cadet training and will be presented in summarized form below.

46. **Maritime Command** — It must be understood that Maritime Command is split into two geographical areas, with the main Maritime Command (MARCOM) Headquarters located at Halifax, NS, and a subsidiary Maritime Forces Pacific (MARPAC) Headquarters at Esquimalt, BC. Thus it has headquarters in two military **Regions** — Atlantic Region (comprising the three Maritime Provinces and Newfoundland) and Pacific Region (British Columbia).

47. **Roles** — There are two basic roles assigned to Maritime Command. As the naval element of the Canadian Forces, its **functional role** is a naval one:

> **To provide, on a world-wide basis, the maritime forces required to meet Canada's defence commitments.**

Because of its geographical location, the Command's **regional role** is:

> **To meet regional requirements within the Atlantic and Pacific Regions.**

48. **Functional (Naval) Missions** — Since these are on a world-wide basis, they may involve forces from either division of the Command.

a. **Operations** — to carry out and control maritime operations;

b. **Plans** — to develop operational plans;

c. **Operational Readiness** — to ensure the operational readiness of naval forces earmarked for emergency duties (eg, NATO emergencies, peace-keeping);

d. **Training** — to provide operational training and exercises for maritime forces;

e. **Support Services** — to provide immediate support services for its own units, and for lodger units of other Commands; and

f. **Naval Reserve** — to command the Naval Reserve. (This mission involves control of the various Naval Reserve Divisions across the country.)

49. **Regional Missions** — These missions involve both the Atlantic and Pacific, and for these purposes are divided administratively between MARCOM and MARPAC.

a. **Aid to Civil Power** — to prepare and execute plans in aid of the Civil Power (ie, civilian authorities) and for civil defence and survival operations;

b. **Search and Rescue** — to plan, coordinate and direct search and rescue operations in the Atlantic and Pacific SAR regions;

c. **Canadian Rangers** — to command the Canadian Rangers within assigned geographical areas;

d. **Cadets** — to direct the training and administration of Sea, Army and Air Cadets within the two Regions;

e. **Provincial Representation** — to provide Canadian Forces representation to the five Provincial governments concerned;

f. **Support Services** — to provide regional support services to its own bases and units and to lodger units of other Commands. These services include:

(1) logistical support,

(2) administration,

(3) medical and dental services,

(4) social welfare services, and

(5) administration of civilian personnel.

To perform these missions, Maritime Command maintains two major naval dockyards (Halifax and Esquimalt), and the ships and facilities listed in Figure 8-108, on two coasts.

Facilities	**East Coast**
2 Canadian Forces Bases	— Halifax — Moncton
4 CF Stations	— Mill Cove — St John's — Shelburne — Newport Corner
1 Fleet Diving Unit	
1 Fleet School	
Ships	
Destroyer Squadron (Desron) One	— 6 DDH's
Destroyer Squadron (Desron) Five	— 6 DDH's
Submarine Squadron (Subron) One	— 3 "O" Class Submarines
Auxiliar Oiler Replenishment (AOR)	— X 2 (Protecteur and Preserver)
Reserve and Cadet Training Unit	— 2 Gate Vessels, 1 Patrol vessel
1 Diving Ship.	
1 Canadian Forces Base	— Esquimalt
1 CF Station	— Aldergrove
1 Fleet Diving Unit	
1 Fleet School	
Ships	
Destroyer Squadron (Destron) Two	— 4 DDE's
Training Squadron (Trainron) One	— 4 DDE's 6 PFL's (Bay Class minesweepers), 3 Gate Vessels, 1 training vessel (Oriole), 4 YFP's
Auxiliary Oiler Replenishment (AOR)	— X 1 (Provider)

Figure 8-108 Facilities and Ships Maintained by Maritime Command

50. **Air Bases** — There are also three air bases (Shearwater, Greenwood and Summerside) in the MARCOM area (East Coast) in which MARCOM has control of the aircraft for operational purposes, while the bases and the aircraft themselves are owned by Air Command. CFB Comox on the West Coast is of similar status.

TRAINING PERIOD 15 — WARSHIPS OF CANADA

51. **The Canadian Destroyers** — The wide range of the duties imposed upon Maritime Command by the objectives of the Department of National Defence, ranging from sovereignty protection through civil law enforcement to the defence of North America, calls for an equally wide range of capabilities. To have this range, Canada would require either a large fleet of highly specialized ships or a smaller fleet of general-purpose ones. With our relatively small population and limited resources it is obvious that the latter course is the only practical one, and the Canadian Destroyer Escorts are in effect general-purpose warships. Having said this, however, it is clear that, in time of war, Canada's main contribution to North American or NATO defence would be an anti-submarine one. Our Destroyer Escorts are therefore particularly specialized in this capability and Canada has pioneered a number of developments in this field, especially the use of large helicopters both to locate and destroy enemy submarines.

52. **Constitution of Canada's Fleet** — This is as illustrated in Figure 8-109 below.

Type of Vessel	Class	East	West	Total
Destroyer Escort (DDE and DDH)	Tribal (DDH)	4	)	
	Mod Restigouche (IRE)		4)	
	Annapolis (DDH)	2	)	20
	Mackenzie (DDE)		4)	
	St. Laurent (DDH)	6	)	
Submarine	"O" Class	3		3
Minesweeper	Bay Class		6	6
Fleet Replenishment	AOR	2	1	3
Gate Vessel	Porte	2	3	5
TOTALS		19	18	37

(Not including minor vessels or those laid up in reserve.)

Figure 8-109 The Constitution of Canada's Fleet

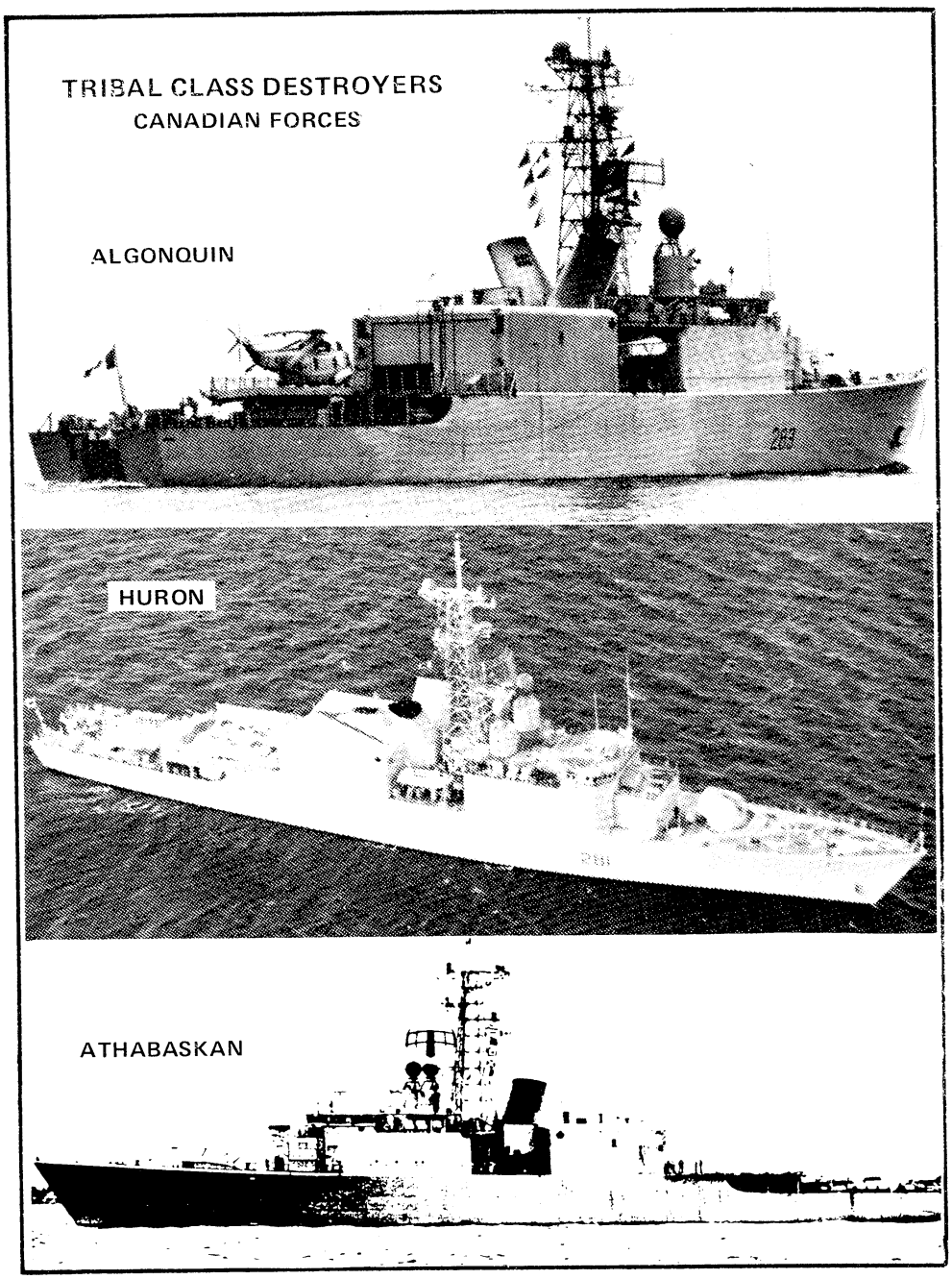


Figure 8-110 Tribal Class Destroyers

53. **Tribal Class Helicopter Destroyers (280 Class)** — These vessels, at present the newest of the Canadian fleet, are also the largest Canadian destroyers, being some 45 feet longer than the Modified Restigouche class and 60 feet longer than the remainder of the destroyer fleet. At 4200 tons, they are also the only Canadian warships that fall into the Jane's classification as destroyers (300 tons and over). Designed as anti-submarine ships, they are fitted with variable depth and hull sonar, two Sea King

helicopters, enclosed citadel, fallout washdown system and bridge control of engines. They are the first large Canadian ships to be driven by gas turbine engines and the first to carry missiles. They are highly computerized. A breakdown of these vessels is provided in Figure 8-111.

NUMBER	NAME	COMMISSIONED
DDH 280	HMCS Iroquois	July 1972
DDH 281	HMCS Huron	December 1972
DDH 282	HMCS Athabascan	November 1972
DDH 283	HMCS Algonquin	September 1973

Displacement:	4200 tons (full load).
Dimensions:	Length 426 feet; beam 50 feet; draught 14.5 feet.
Machinery:	Two 3,700 hp gas turbines (cruising); Two 25,000 hp gas turbines driving two variable-pitch propellors; speed 29+ knots.
Aircraft:	Two Sea King helicopters.
Armament:	One 5-inch, 54 calibre automatic gun; one triple-barrel anti-submarine mortar; two quadruple surface-to-air missile launchers; six tubes for homing torpedoes.
Complement:	245 (20 officers, 225 men), plus air unit (7 officers, 33 men).
Base (1979):	East Coast (Halifax).
Recognition:	Length; very long fo'c'sle deck; angled side-by-side funnels; tall lattice mast; twin **golf-ball** radars; full-width hangars.

Figure 8-111 Breakdown of a Tribal Class Helicopter Destroyer (280 Class)

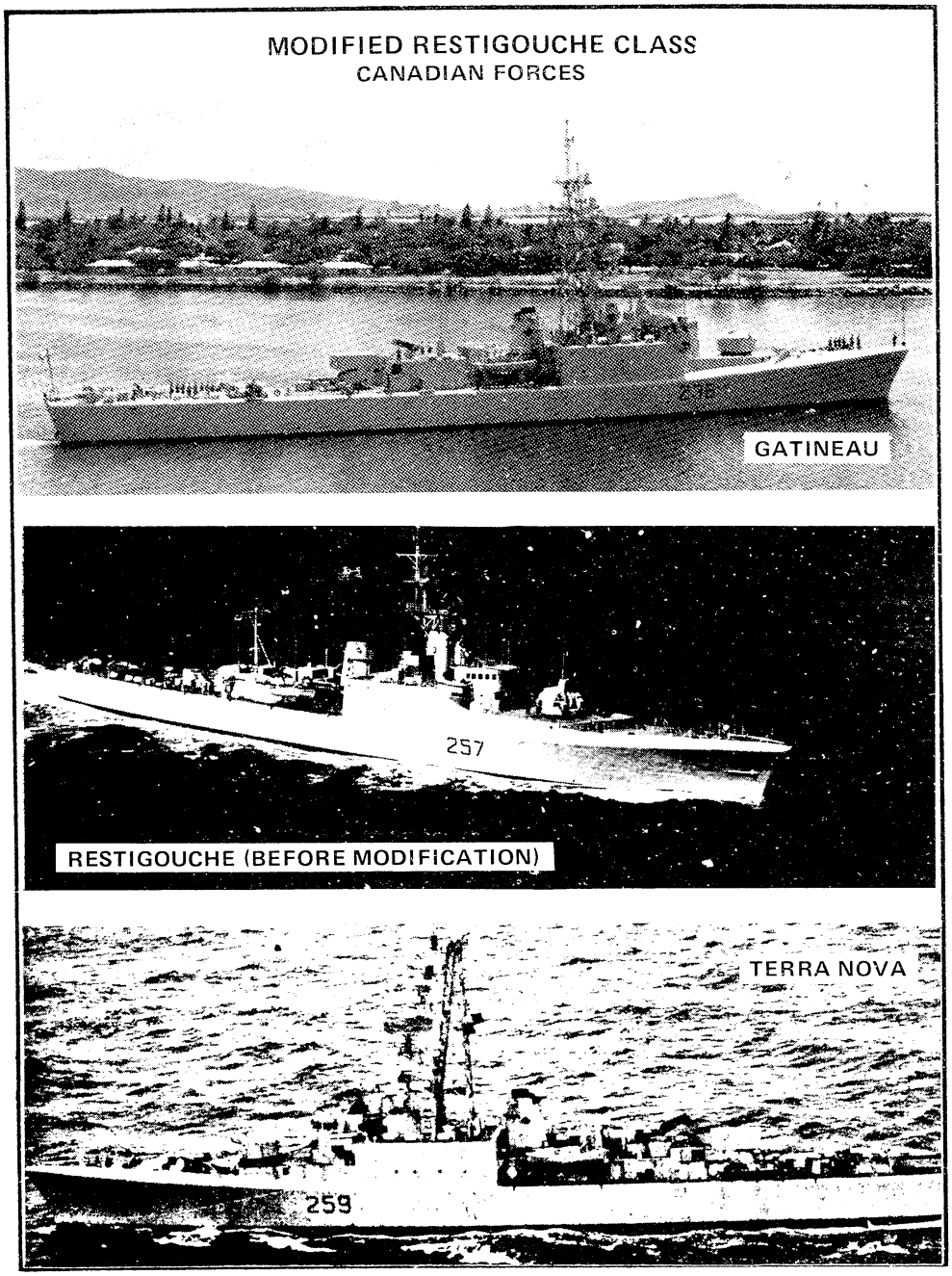


Figure 8-112 Modified Restigouche Class

54. **Modified Restigouche Class Destroyer Escorts** — These ships, originally built on similar lines to the Mackenzie class, were extensively modified between 1968 and 1972. They were given the ASROC anti-submarine Warfare System, variable depth sonar (VDS) and much improved electronic gear, requiring new masts. The hulls were extended 15 feet (from 366 to 381 feet) to accommodate the VDS. Their breakdown is illustrated in Figure 8-113 below.

NUMBER	NAME	COMMISSIONED
IRE 236	HMCS Gatineau	1959 (1972)
IRE 257	HMCS Restigouche	1958 (1973)
IRE 258	HMCS Kootenay	1959 (1973)
IRE 259	HMCS Terra Nova	1959 (1968)

Displacement: 2900 tons (full load).

Dimensions: Length 381 feet; beam 42 feet; draught 13.5 feet.

Machinery: Two 15,000 hp steam turbines — 28 knots.

Armament: Twin 3-inch, 70 calibre guns; one triple-barrel anti-submarine mortar; one ASROC 8-barrel missile launcher; homing torpedoes with underwater control system.

Complement: 214 (13 officers, 201 men).

Base (1979): West Coast (Esquimalt).

Recognition: Extra long quarterdeck; transom angled outwards with slot for VDS; very high lattice mast; box-like ASROC launcher aft of superstructure; single funnel; no helicopter pad, no hangar.

Figure 8-113 Breakdown of a Modified Restigouche Class Destroyer Escort

ANNAPOLIS CLASS

HMCS ANNAPOLIS

Figure 8-114 Annapolis Class (HMCS Annapolis)

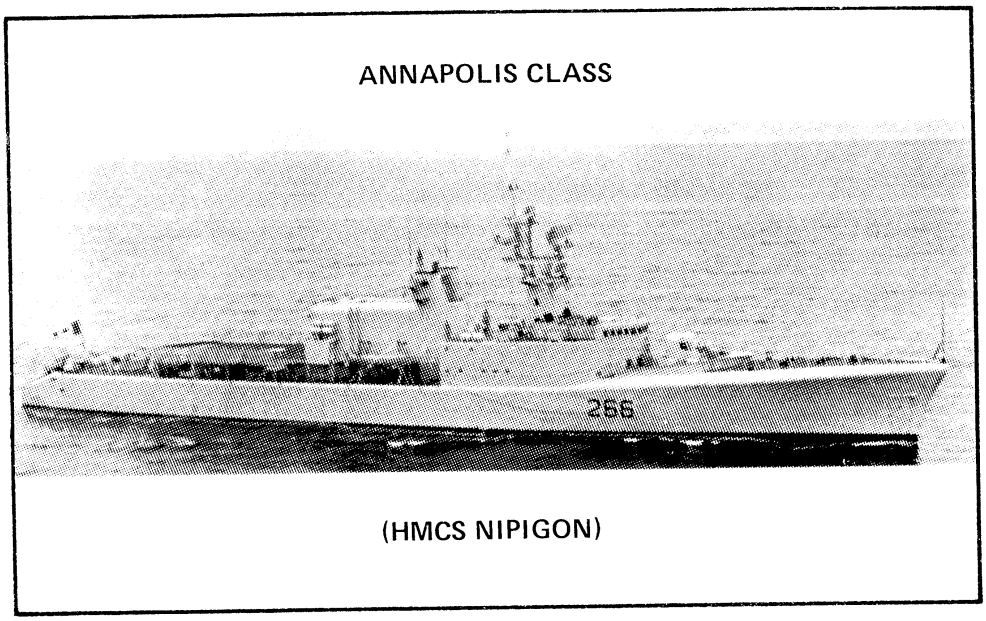


Figure 8-115 Annapolis Class (HMCS Nipigon)

55. **Annapolis Class Helicopter Destroyers** — Originally the last two ships of the Mackenzie class, they were completed with helicopter hangar and flight deck and incorporated variable-depth sonar. A breakdown is provided in Figure 8-116.

NUMBER	NAME	COMMISSIONED
DDH 265	HMCS Annapolis	1963
DDH 266	HMCS Nipigon	1964

Displacement: 2,925 tons (full load).

Dimensions: Length 366 feet; beam 52 feet; draught 13 feet, 8 inches.

Machinery: Two 15,000 hp steam turbines — 28 knots.

Aircraft: One Sea King Helicopter.

Armaments: Twin three-inch 50 calibre guns; one triple-barrel anti-submarine mortar; homing torpedoes.

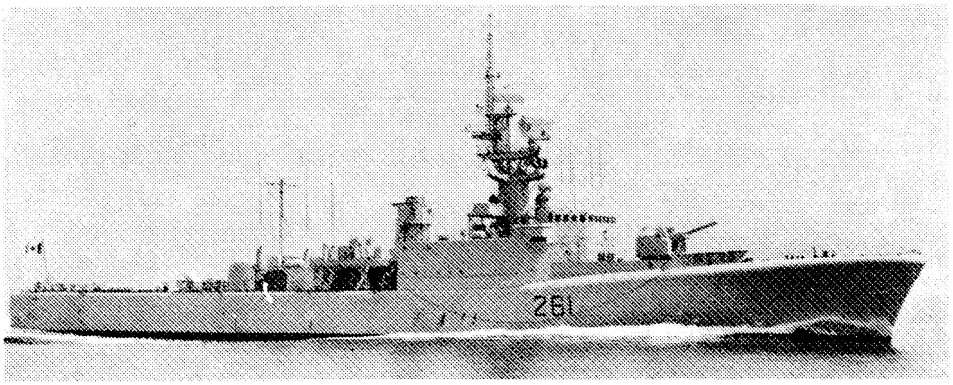
Complement: 243 (18 officers, 225 men).

Figure 8-116 (Sheet 1 of 2) Breakdown of an Annapolis Class Helicopter Destroyer

Base (1979):	East Coast (Halifax).
Recognition:	Transom angled sharply inwards and cut away for VDS; tubular lower fore mast; twin upright funnels at forward end of hangar structure; flight deck for helicopter; hangar wide enough for one helicopter.

Figure 8-116 (Sheet 2 of 2) Breakdown of an Annapolis Class Helicopter Destroyer

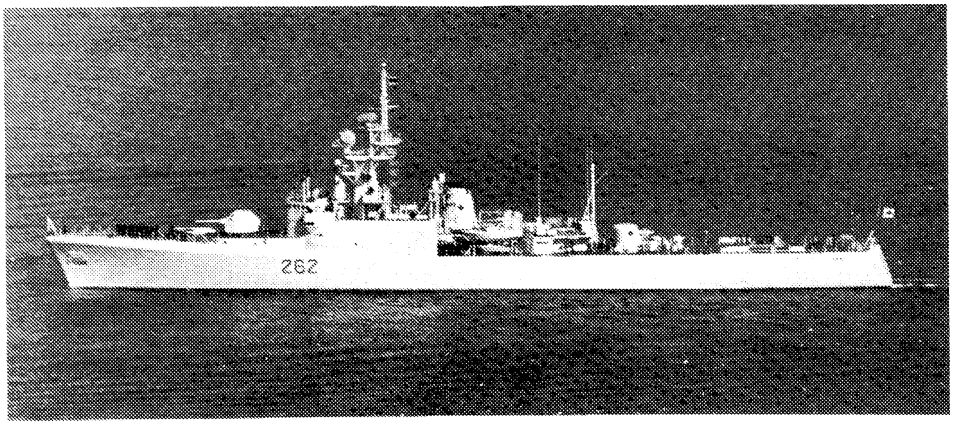
MACKENZIE CLASS



HMCS MACKENZIE

Figure 8-117 Mackenzie Class (HMCS Mackenzie)

MACKENZIE CLASS



HMCS SASKATCHEWAN

Figure 8-118 HMCS Mackenzie Showing Stern and Quarterdeck

56. **Mackenzie Class Destroyer Escorts** — Repeats of the original Restigouche class, these ships retain the same general hull configuration as the preceding two classes, with improved equipment. All four are used for West Coast training. A breakdown is provided in Figure 8-119.

NUMBER	NAME	COMMISSIONED
DDE 261	HMCS Mackenzie	1962
DDE 262	HMCS Saskatchewan	1963
DDE 263	HMCS Yukon	1963
DDE 264	HMCS Qu'appelle	1963

Displacement: 2,900 tons (full load).

Dimensions: Length 366 feet; beam 42 feet; draught 13.5 feet.

Machinery: Two 15,000 hp steam turbines — 28 knots.

Armament: Twin 3-inch 70 calibre guns; twin 3-inch 50 calibre guns; two triple anti-submarine mortars; homing torpedoes.

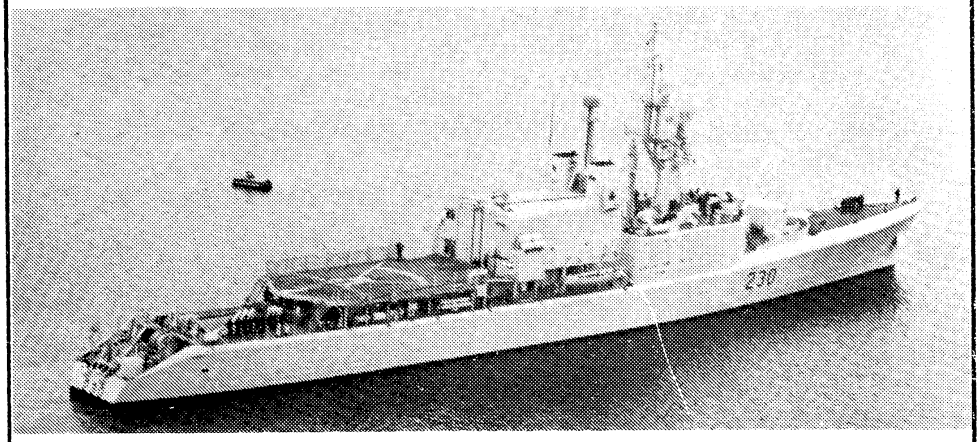
Complement: 209 (11 officers, 198 men).

Figure 8-119 (Sheet 1 of 2) Breakdown of a Mackenzie Class Destroyer Escort

Base (1979):	West Coast (Esquimalt).
Recognition:	Transom angled inwards slightly; no VDS gear; tubular lower fore mast; single funnel; two turrets, forward and aft (only active class with this feature); small main mast on after superstructure; no helicopter facilities.

Figure 8-119 (Sheet 2 of 2) Breakdown of a Mackenzie Class Destroyer Escort

ST. LAURENT CLASS



HMCS MARGAREE

Figure 8-120 St. Laurent Class (HMCS Skeena)

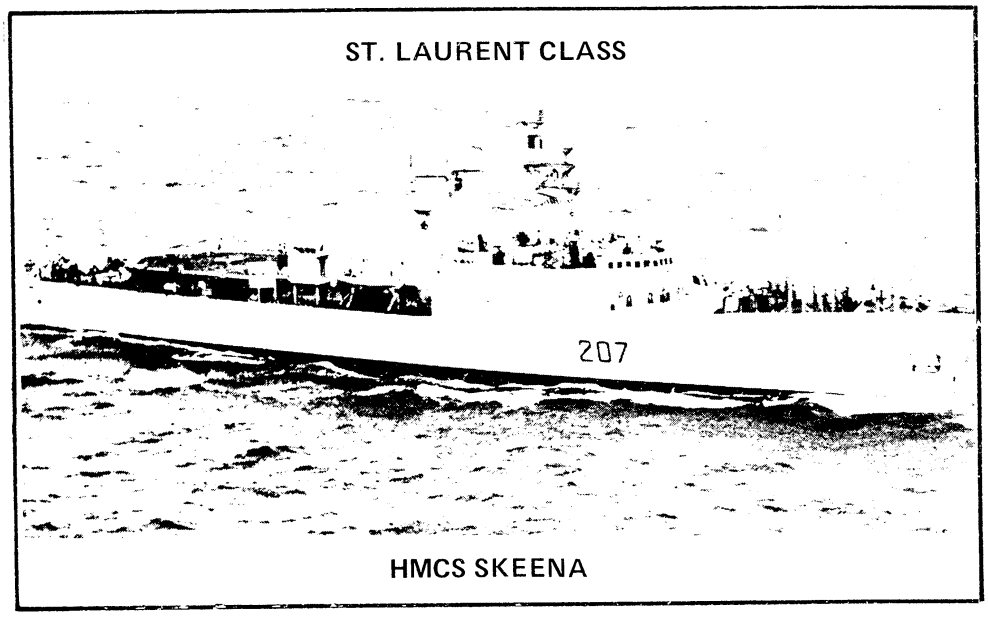


Figure 8-121 St. Laurent Class (HMCS Skeena)

57. **St. Laurent Class Helicopter Destroyers** — The St. Laurent class destroyers were the first warships designed and built solely in Canada. Originally similar to the (later) MacKenzie class, they were rebuilt with landing decks to carry helicopters and equipped with variable-depth sonar. The ships are gradually being retired; those still in service are based in Halifax. A breakdown is provided in Figure 8-122.

NUMBER	NAME	COMMISSIONED
DDH 206	HMCS Saguenay	1956
DDH 207	HMCS Skeena	1957
DDH 229	HMCS Ottawa	1956
DDH 230	HMCS Margaree	1957
DDH 233	HMCS Fraser	1957
DDH 234	HMCS Assiniboine	1956

Displacement: 2,800 tons (full load).

Dimensions: Length 366 feet; beam 42 feet; draught 13.5 feet.

Machinery: Two 15,000 hp steam turbines — 28 knots.

Aircraft: One Sea King helicopter.

Figure 8-122 (Sheet 1 of 2) Breakdown of a St. Laurent Class Helicopter Destroyer

Armament:	Twin 3-inch 50 calibre guns; one triple-barrel anti-submarine mortar; homing torpedoes.
Complement:	208 (11 officers, 197 men) plus air unit (7 officers, 13 men).
Base (1979):	East Coast (Halifax).
(DDH 205, HMCS St. Laurent, was scrapped in 1976).	
Recognition:	Very similar to Annapolis class; slightly lower bridge; funnels more upright. All ships of this class have different aerial arrangements. Fraser has an **oil derrick** type mast atop the hangar.

Figure 8-122 (Sheet 2 of 2) Breakdown of a St. Laurent Class Helicopter Destroyer

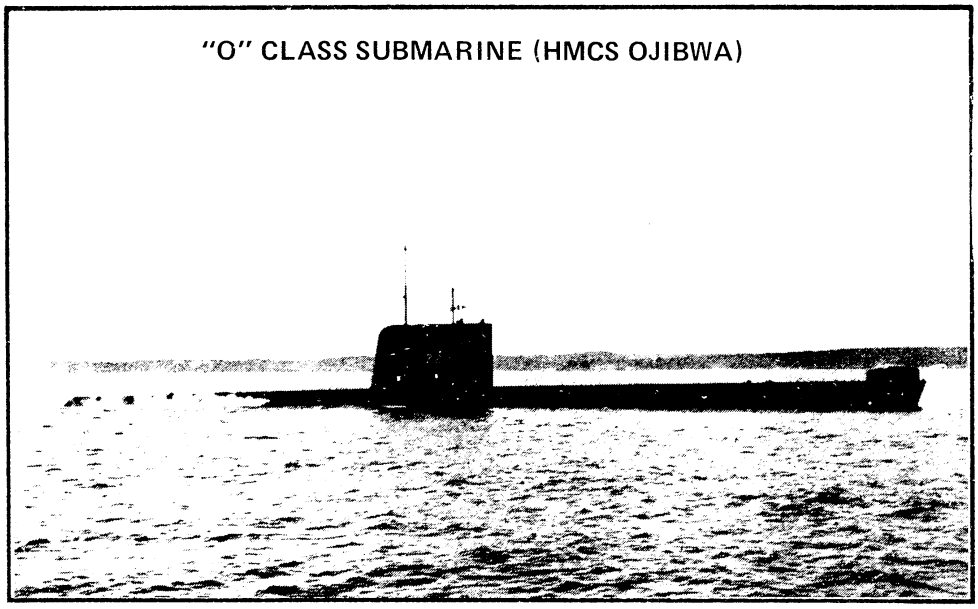


Figure 8-123 "O" Class Submarines (HMCS Ojibwa)

58. **"O" Class Submarines** — These British designed conventional submarines are among the most advanced non-nuclear submarines in the world and are especially noted for their quiet running underwater, an asset in A/S warfare. They are used mainly to train the surface vessels. A breakdown is provided in Figure 8-124.

NUMBER	NAME	COMMISSIONED
SS72	HMCS Ojibwa	1965
SS73	HMCS Onandaga	1967
SS74	HMCS Okanagan	1968

Displacement: 1,610 tons (standard); 2,410 (submerged); 2,030 (surfaced).

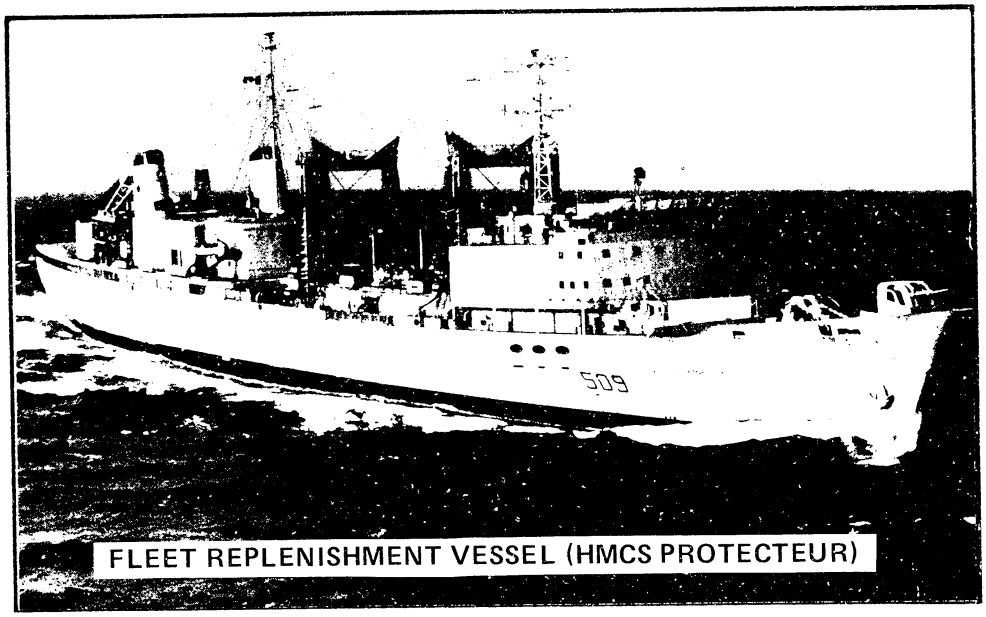
Dimensions: Length 295.5 feet; beam 26.5 feet; draught 18 ft.

Machinery: Admiralty standard-range electric drive diesels.

Complement: 6 officers, 62 men.

Base (1979): East Coast (Halifax).

Figure 8-124 Breakdown of an "O" Class Submarine



FLEET REPLENISHMENT VESSEL (HMCS PROTECTEUR)

Figure 8-125 Fleet Replenishment Vessel (HMCS Protecteur)

59. **Auxiliary, Oiler, Replenishment (AOR)** — Replenishment vessels permit units of the fleet to operate for extended periods of time. A breakdown is provided in Figure 8-126.

NUMBER	NAME	COMMISSIONED
AOR 508	HMCS Provider	1963
AOR 509	HMCS Protecteur	1970
AOR 510	HMCS Preserver	1970

Displacement: 22,000 tons.

Dimensions: Length 560 feet; beam 76 feet; draught 30 feet. (Provider is slightly smaller.)

Machinery: Single steam turbine — 20 knots.

Aircraft: 2 (Provider) or 3 Sea King helicopters. Flight deck can land any existing CF helicopters.

Armament: Twin 3-inch, 50 calibre guns, mounted in bows. (Preserver and Protecteur have mounts for Sparrow AA missiles).

Complement: 338, including passengers.

Base (1979): Preserver and Protecteur, Halifax; Provider, Esquimalt.

Figure 8-126 A Breakdown of an AOR

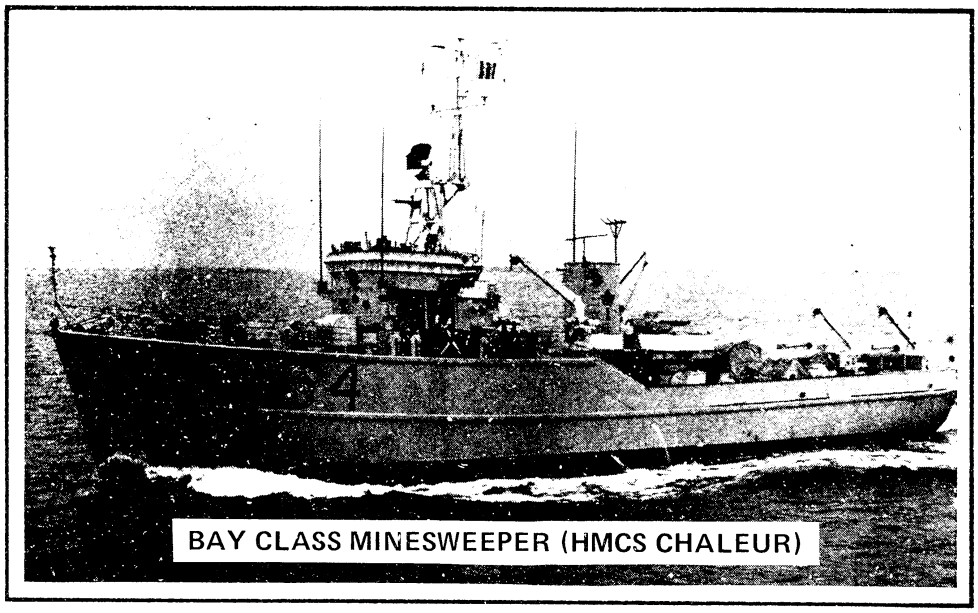


Figure 8-127 Bay Class Minesweeper (HMCS Chaleur)

60. **Bay Class Patrol Vessels (Minesweepers)** — These vessels are now used for training on the West Coast. They were developed from the British **Ton** class coastal minesweepers and are built of wood planking on aluminum frames. A breakdown is provided in Figure 8-128.

	NUMBER	NAME
	PFL 159	HMCS Fundy
	PFL 160	HMCS Chignecto
	PFL 161	HMCS Thunder
	PFL 162	HMCS Cowichan
	PFL 163	HMCS Mirimachi
	PFL 164	HMCS Chaleur
Displacement:	390 tons.	
Dimensions:	Length 152 feet; beam 28 feet.	
Machinery:	Two GM V-12 diesels (locomotive engines).	
Speed:	16 knots.	
Complement:	42 officers and men.	
Base (1979):	West Coast (Esquimalt).	

Figure 8-128 A Breakdown of a Bay Class Patrol Vessel (Minesweeper)

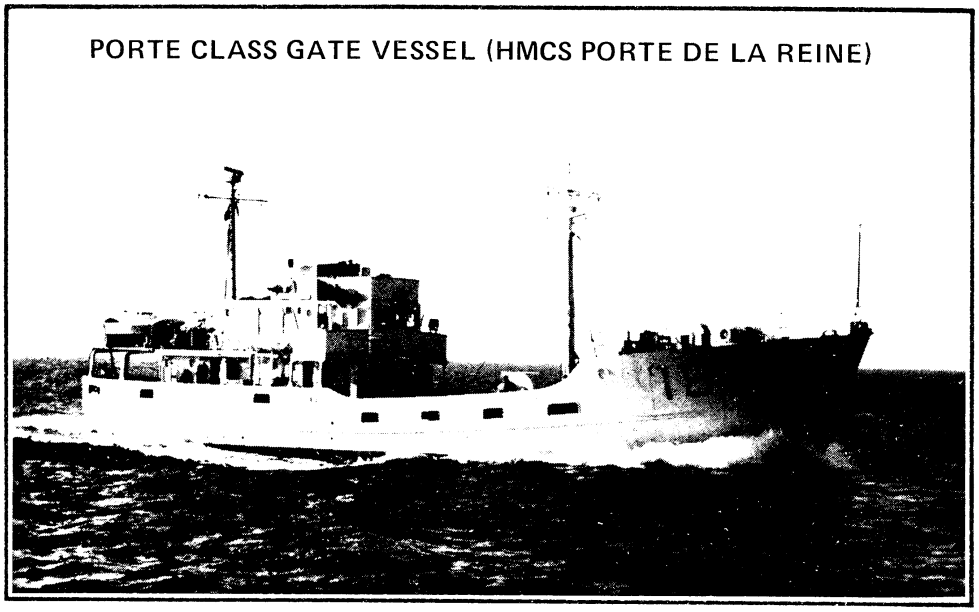


Figure 8-129 Porte Class Gate Vessel (HMCS Porte de la Reine)

61. **Gate Vessels** — The Porte class gate vessels are multi-purpose vessels which are designed for operating gates in anti-submarine booms at harbour entrances, as fleet auxiliaries and as anti-submarine net layers for entrances to defended harbours. They are now used to train Reserves and Sea Cadets. The minesweeping and net gear has been removed and the accommodation increased. A breakdown is provided in Figure 8-130.

NUMBER	NAME
YMG 180	HMCS Porte St-Jean
YMG 183	HMCS Porte St-Louis
YMG 184	HMCS Porte de la Reine
YMG 185	HMCS Porte Quebec
YMG 186	HMCS Porte Dauphine

Displacement: 435 tons.

Dimensions: Length 125.5 feet, beam 28 feet; draught 18 feet.

Machinery: Diesel 600 bhp, single shaft — speed 11 knots.

Complement: 3 officers, 30 men.

Base (1979): 2 East Coast (Halifax), 3 West Coast (Esquimalt).

Figure 8-130 A Breakdown of a Gate Vessel

62. **Other Vessels** — In 1976, seven fast patrol vessels previously used by the RCMP for coastal patrol work were transferred to Maritime Command. These vary in length from 75 to 118 feet. They continue to be used for the same purposes, manned mainly by members of the Naval Reserve.

a. PFL 140 Fort Steele

b. PBL 191 Adversus

c. PBL 192 Detector

d. PBL 193 Captor

e. PBL 194 Acadian

f. PBL 195 Sydney

g. PBL 196 Nicholson

63. **Smaller Craft** — Maritime Command also operates a large number of smaller craft such as tugs, harbour work boats, diving tenders, and yard craft. These are used mainly for their primary functions, although some are used for training.

TRAINING PERIOD 16 — REVIEW AND TEST

64. A brief review of Training Periods 9-15 of the Shipwork course should be made, indicating the various areas which require emphasis and explaining any points which appear to be causing difficulty.

65. Cadets shall write a short test, with a minimum of one question referring to the subject matter of each Training Period. Emphasis in testing should be on an understanding of ships, their functions and roles.

CHAPTER 9

PERSONNEL AND ORGANIZATION

CHAPTER 9

PERSONNEL AND ORGANIZATION

TRAINING PERIOD 1 — NAVAL CUSTOMS AND TRADITIONS

1. **Language** — One of the most pervasive of naval customs is the use of a special language. If a cadet is fortunate enough to be selected for a cruise in one of HMC Ships, he will be faced with a great many strange terms. The purpose of this section is to acquaint cadets with some of the more common naval terms and expressions. Some of these terms have already been encountered in the Shipwork course under the heading **The Barracks as a Ship**. These are listed below to serve as a refresher:

Deck	Out Pipes
Galley	A Pipe
Gash-Can	Colours
Stand Easy	Liberty Men
Secure	Bulkhead
Divisions	Gangway
Duty Watch	Boatswain's Stores
Deckhead	Pipe Down
Heads	Ship's Company
Scran Locker	Evening Quarters

2. **Terminology** — The following are terms and expressions likely to be encountered on board. Some of these are slang and some are good seamanlike terminology. The slang terms are marked with an asterisk (*); they should only be used in informal conversation:

a. **Places and Things** — The following are terms for places and things —

(1) **Berth** — Where you sleep (or where a ship is secured).

(2) **Between Decks** — Any space below the upper deck.

(3) **Brow** — A gangway between two ships or from ship to shore.

(4) **Fiddle** — A fitting on the table to keep mess utensils from sliding about in bad weather.

(5) **Forepeak** — That compartment farthest forward in a ship.

(6) **Kye** — Hot chocolate.

(7) **Stanchion** — A supporting post.

(8) **Sick Bay** — Ship's hospital.

(9) **Boatswain's Stores** — Storeroom for cleaning.

(10) **Irish Pennants** — Rope yarns or stray rope ends hanging untidily.

(11) ***Mess Traps** — Eating utensils.

b. **People** — The following terms refer to different people —

(1) **Coxwain** — Senior petty officer in a ship. Takes the wheel for all important manoeuvres; responsible for discipline in smaller ships.

(2) **Chief Boatswain or *Buffer** — Senior petty officer in charge of the upper deck and of cleaning and painting ship.

(3) **Yeoman** — Senior signalman on board.

(4) **Captain of the Heads** — Rating responsible for cleaning toilet areas.

(5) ***Tiffy** — Short for artificer; usually used for the sick bay attendant — "Sick bay tiffy".

c. **Miscellaneous** — These are some miscellaneous terms —

(1) **Bear a Hand** — An order to assist.

(2) **Belay** — To make fast a rope; **or** to cancel an order, as in "Belay that".

(3) **Clean** — To change from one type of dress to another.

(4) **Make and Mend or *Menders** — A half-holiday; originally, an afternoon when normal routine was waived and the time was allocated to the making and mending of clothes.

(5) ***Pusser** — Anything that is Service issue — a corruption of "purser", originally a warrant-officer in charge of a ship's supplies, thus "pusser's issue".

(6) ***Sculling About** — Lying about or unattended; of a person, idling.

(7) **Secure** — To stop work.

(8) **Silent Hours** — Hours between "pipe down" and "call the hands", when the ship's bell is not struck, and only emergency pipes made.

(9) ***Swing the Lead** — To avoid work, often by feigning illness.

(10) **Taut** — Tight; as in "haul taut".

(11) ***Tiddley** — Neat or smart.

(12) **Trick** — A short spell of duty; as in "a trick at the wheel".

(13) You serve **in** a ship, not **on** one.

(14) **Aye Aye, Sir** — Response to any order.

3. **Glossary** — A more comprehensive glossary of Naval terms and expressions is included as Annex A to this chapter. Cadets selected for cruises in HMC Ships are advised to be familiar with this Annex.

TRAINING PERIOD 2 — NAVAL CUSTOMS AND TRADITIONS

4. **The Boatswain's Call** — The boatswain's call, see Figure 9-1, dates back to the days when Greece and Rome used galley slaves. In the early days of the Royal Navy it was a badge of rank as well as a means of passing an order. The Lord High Admiral wore a golden **whistle of honour** from a chain around his neck, and he also carried a **whistle of command** which he used for passing orders and for saluting certain people.

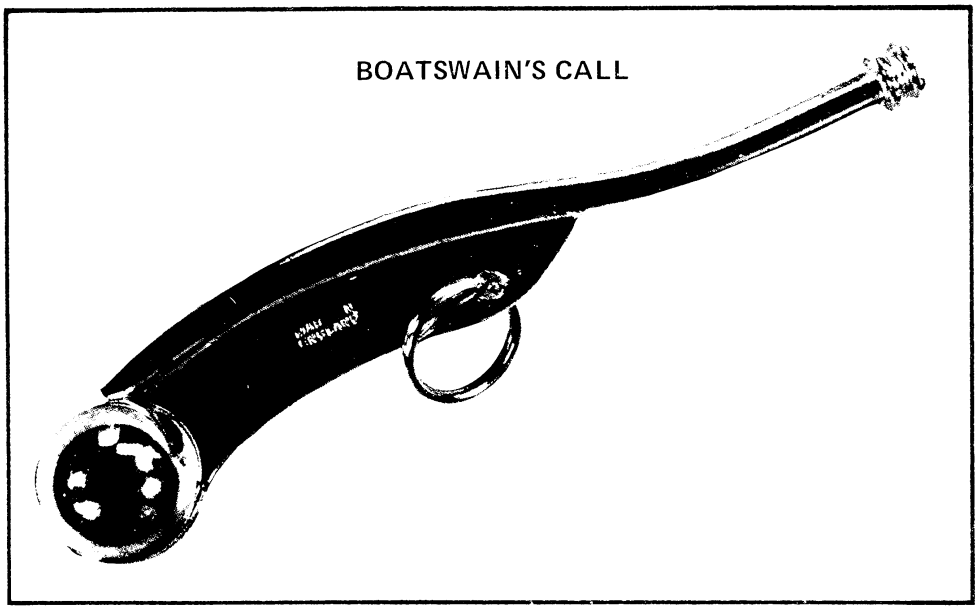


Figure 9-1 Boatswain's Call

5. **Use of the Boatswain's Call** — To sound the call, hold it between your thumb and index finger so that your thumb is on or near the shackle. The buoy will then rest comfortably in the hollow of your hand. By blowing into the gun and closing and opening with your last three fingers, you will be able to vary the note by throttling the air as it comes out of the hole. Don't let your fingers touch the ends of the hole or the end of the gun; that would stop the sound completely. See Figure 9-2.

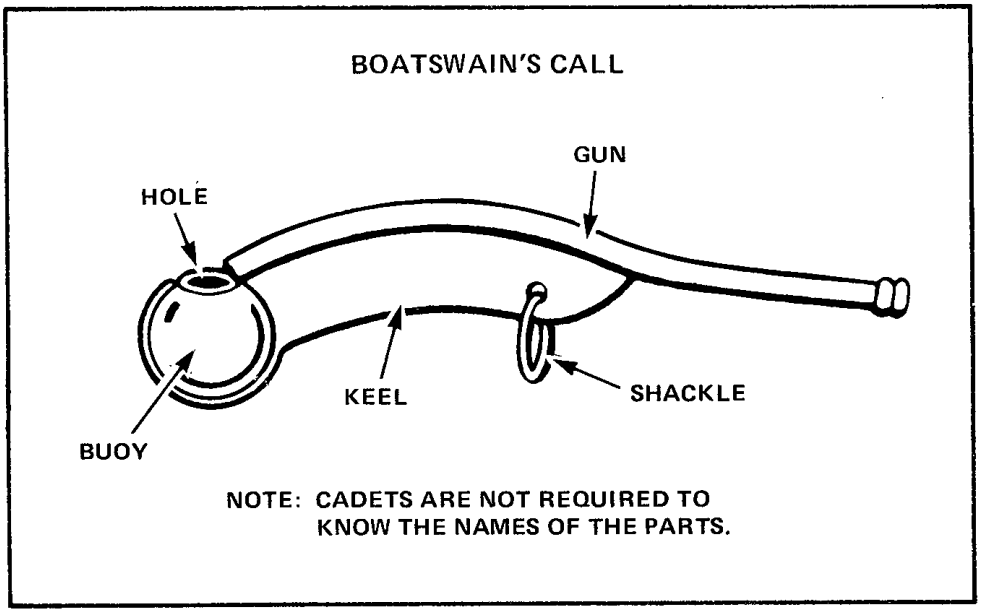


Figure 9-2 The Boatswain's Call

NOTE

Cadets are not required to know the names of the parts

6. **Notes and Tones** — Although a variety of notes and tones may be sounded on the call, only two notes and three tones are used to make pipes in ships.

7. **Low Note** — The low note is sounded by blowing into the gun with the fingers clear of the hole. See Figure 9-3.

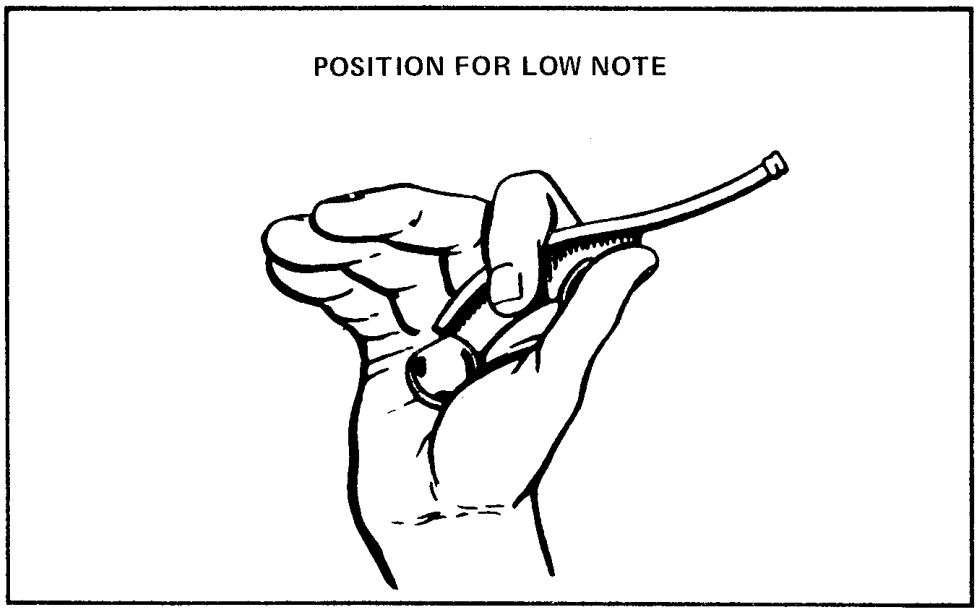


Figure 9-3 Position for Low Note

8. **High Note** — The high note is sounded by blowing into the gun, and throttling the hole by closing the fingers. See Figure 9-4.

9. **Plain Note** — The plain tone, either low note or high note, is sounded by blowing steadily into the gun.

10. **Warble** — The warble is made by rapidly opening and closing the fingers as you blow into the gun.

11. **Trill** — The trill is made by vibrating the tongue against the roof of the mouth, as if you were rolling the letter R, while blowing steadily into the gun.

12. **Limited Use** — At one time these notes and tones were used to make a great variety of pipes. Many evolutions at sea could be carried out with hardly a spoken word being passed to the crew, all orders being relayed by sounding the appropriate pipe on the boatswain's call. Nowadays, however, only very few special pipes are used, and these are illustrated in Figure 9-5. Learn to sound these pipes properly.

13. **General Call** — The general call is used to gain the attention of the ship's company before passing an order.

14. **Side** — The side is piped when the commanding officer of a ship, in uniform, an officer of the naval environment of the rank of Commodore and above, a foreign naval officer in uniform, or, a member of the Royal Family is coming alongside in a boat and when coming on board or going ashore.

15. **Funeral** — The side is also piped when a corpse is taken aboard or ashore and when the body is committed to the sea in a funeral at sea.

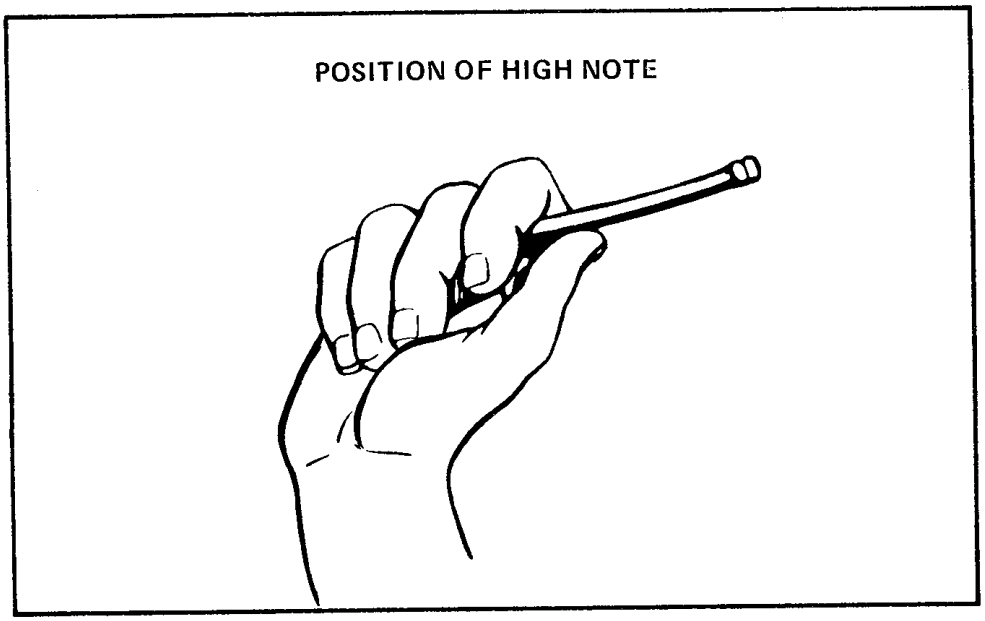


Figure 9-4 Position of High Note

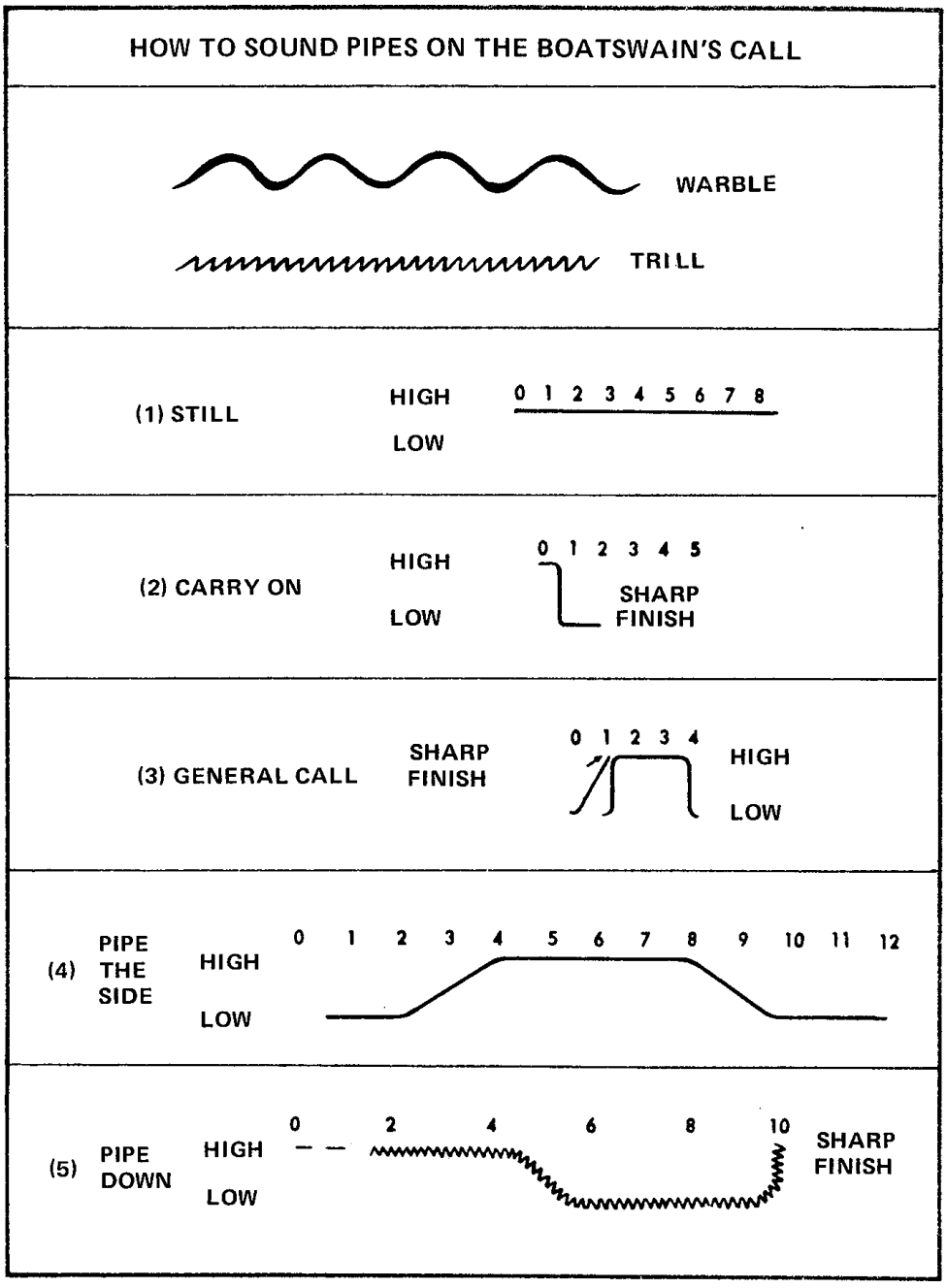


Figure 9-5 How to Sound Pipes on the Boatswain's Call

16. **Still** — The still is piped to call personnel to attention for rounds, colours, and sunset, and saluting another warship or senior officer's barge passing your ship.

17. **Carry On** — The carry on is piped after the reason for the **still** is completed.

18. **Pipe Down** —The pipe down is used when quietness is to be maintained throughout the living spaces, ie, only at sea after 2200, in harbour after 2300, and usually Saturday afternoon and Sundays after church service and prayers. When the ship is **piped down**, pipes are only to be made for emergencies until such time as the pipe down is completed.

19. **Learning the Calls** — Cadets should be instructed in the proper way to make the five indicated calls, with particular reference to the timing of the parts of the call (the **side** is frequently made incorrectly in this respect). It is not expected that a large class of cadets can become proficient at piping during a single training period. Once having been instructed, cadets should be expected to practice in their own time, obtaining guidance as required from senior cadets. One way to reinforce the skill is to assign cadets from this class to make routine pipes from time to time.

TRAINING PERIOD 3 — THE DIVISIONAL SYSTEM

20. **A History of the Divisional System** — The divisional system developed as a result of a very definite need. This need was made obvious by discontent and mutiny within the Royal Navy in the latter half of the 18th century. Although the causes of the disorders were various: pitifully inadequate pay, deplorable living conditions and food, and nonexistent shore leave, they all reflected one basic need; someone to be interested in and responsible for the men. Once the divisional system was recognized as the answer to this need, it was introduced first by individual Commanders (Vice Admiral Smith in 1755); finally becoming mandatory in 1806. Today it is the system upon which shipboard organization of all navies is based.

21. **Significance of the Title "Division"** — The title "**division**" was happily chosen. It signifies the division of the ship's company into manageable groups; the fair and logical division of work; the division, among the ship's officers of responsibility for the men; division of the work of personnel administration; and so on. The system is so well suited to its job that it is hardly possible to imagine the navy of today without it, or to devise a practical substitute.

22. **Object of the Division** — The object of the organization is **to ensure that officers, chief petty officers, and petty officers are enabled to develop to the fullest extent of their powers of command and leadership** and to **keep in close and constant contact with those under their command**. This last statement emphasizes the two vital principles of the divisional system: **leadership** and **human understanding**.

23. **Aims of the Divisional System** — There are many thousands of men in the sea environment, each with his own basic rights, his own particular qualifications, his own ambitions, his own problems, and his own desire for the maximum personal freedom within the limits of service discipline. The divisional system seeks to respect the rights, improve the qualifications, encourage and direct the ambitions, and correct the

problems of the men in each division while organizing and directing them in the performance of their duties for the highest good of the service.

24. **Officers in Charge** — To guide this group of men, or division, and sometimes, but not always, to supervise its work, there is a chief petty officer and an officer. These people are the links between the men in their division and the other authorities in the ship.

25. **Chief Petty Officer** — The Division Chief Petty Officer (CPO) is a well experienced man. If a member of his division has a problem or needs guidance, he goes first to the Divisional CPO, and most times he will be satisfied. On the other hand, if a man is being a problem to the division or to the ship, the Divisional CPO is the first man to try to correct him.

26. **Divisional Officer** — However, certain requests or problems a man may have are beyond the powers or knowledge of the Divisional CPO. In these cases the man is brought before his Divisional Officer. Again, if the Divisional CPO finds he cannot correct a "problem-sailor", he brings the man before the Divisional Officer. The problems or requests that may be brought to the Divisional Officer are many and varied. It may be a simple request for leave, a personal problem, a service matter concerning rank or rating, a desire to be released, or a request for guidance or help.

27. **Following the Proper Channels** — If the Divisional Officer cannot solve a problem or grant a request, he may bring a man before the Executive Officer, who, in turn, may bring the man before the Commanding Officer. The Commanding Officer, if he sees fit, may pass the matter on to the Squadron Commander and if necessary to the Commander, Maritime Command and the Chief of the Defence Staff. This routine is known as following the proper channels. If he so desires, every man is entitled to see his Commanding Officer, provided he goes through the proper divisional channels. See Figure 9-6.

28. **Generally** — Any man has the right to take a matter to the highest authority if it is necessary to its solution. The only stipulation is that the proper service channels be adhered to. All matters must start with the Divisional Chief Petty Officer or Petty Officer. You may virtually request anything and it will receive the attention it deserves.

29. **Complaints of Unfair Treatment** — There is one type of request that deserves special attention: this is a request to state a complaint or a **grievance**. Queen's Regulations and Orders (QR&O) lays down the following procedures:

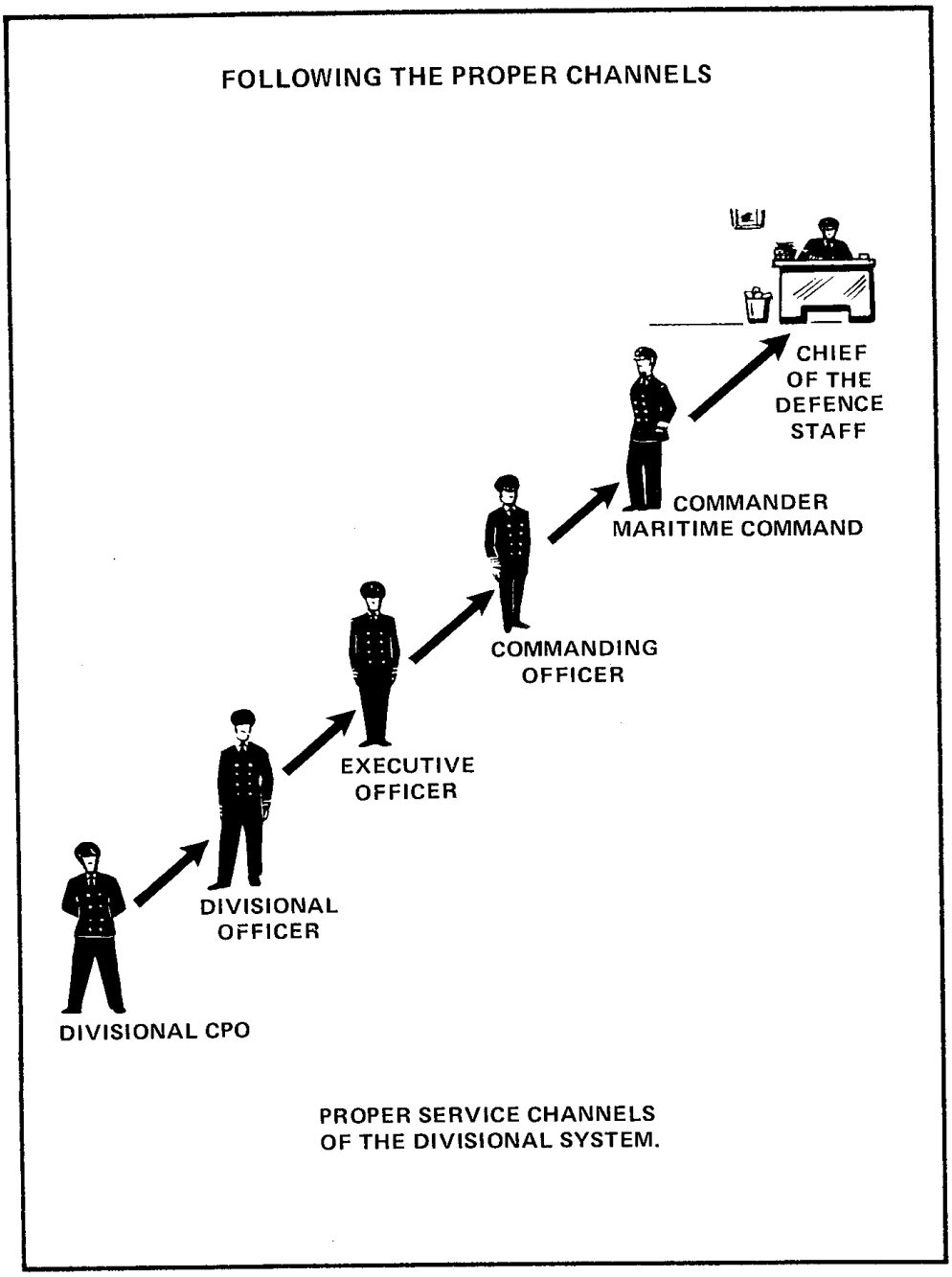


Figure 9-6 Following the Proper Channels

a. Any man that feels that he has been unfairly or unjustly treated in any way, may, after seeing his Divisional Officer, make a complaint in the following manner:

(1) The complainant shall make a request in the ordinary way to see the Commanding Officer "in order to state a complaint".

(2) If the complainant requests assistance in the presentation of his case, an officer (of his choosing when possible) shall be detailed to assist him.

(3) When he sees the Commanding Officer, the complainant shall state his complaint verbally as he would any other request.

(4) In making his statement the complainant shall do no more than state the facts complained of and explain wherein the alleged injustice or unfairness to him lies.

(5) The complaint shall be made in respectful language, and shall contain nothing which is insubordinate or contrary to discipline, except insofar as is necessary to state the facts.

(6) **Each person shall make his own complaint. Joint complaints by two or more persons or anonymous complaints are not permissable.**

b. If the complainant is not satisfied with the decision of the Commanding Officer, the rules provide for the making of a written complaint, which shall, if he desires it, be passed upward to each superior authority until satisfaction is obtained or it reaches the Minister of National Defence. The decision of the Minister is final.

c. No one shall be penalized for making a complaint provided this procedure is followed.

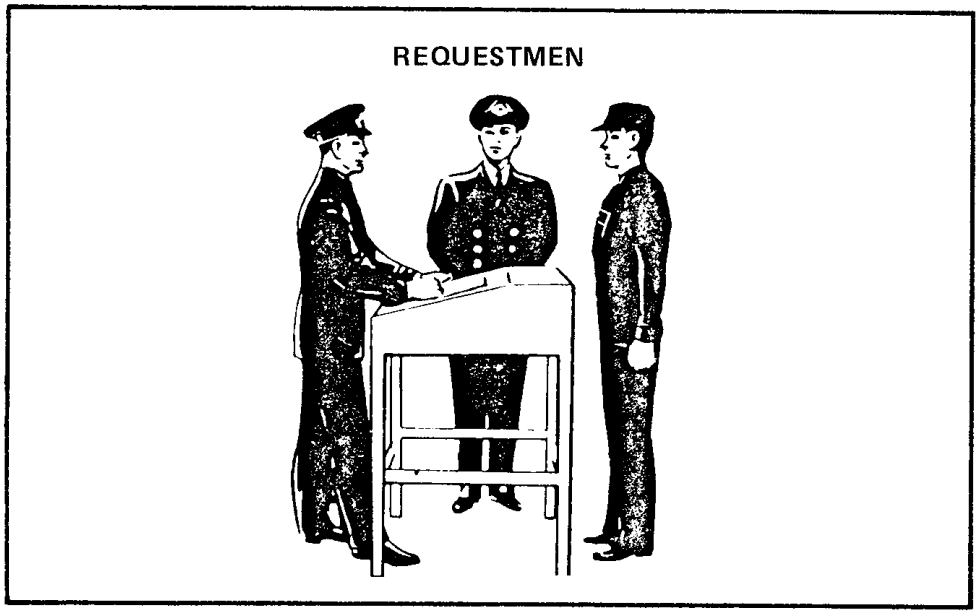


Figure 9-7 Requestmen

REQUEST FORM

(All requests shall be passed to your Divisional Officer through your Divisional Chief Petty Officer or Petty Officer.)

(Christian names) ← PRINT → (Surname)

JOHN PETER DOE

Rank A. B. Official No. 106-000-106

Rate BN 2 Badges ONE

Mess 8 Watch 1st PORT

Duty MAILMAN Division DECK

Request: (If request is for leave state address whilst on leave)

TO BE PROMOTED TO LEADING SEAMAN TO DATE

1 JUNE 1969.

Place your Signature here.....

Remarks of Divisional Officer:

Signature of Div. Off. .....

C.N.S. 2421 (REVISED FEB. 1962)

Rank .....

Figure 9-8 Request Form

30. **Defaulters** — Routine at **defaulters** is quite simple. When the defaulter is called by the Chief Petty Officer or Petty Officer who is bringing up the case, he marches to a point just in front of the table. The Petty Officer will then order "Remove headdress", and the charge or charges will be read. Then the delegated officer examines the case by questioning the defaulter and any witnesses. On completion of the investigation, the officer may do one of four things.

a. He may dismiss the case.

b. He may award a punishment.

c. He may pass the case on to the appropriate senior officer.

d. He may stand the case over to collect more evidence.

Whatever the decision is, it will be repeated by the Petty Officer who will then order, "Replace headdress; left (or right) turn; quick march".

31. **Requesting Written Answers** — If the case is of a serious nature, the delegated officer may wish the answers to his questions to be written down so that they may be used as evidence later on. In this case he will order the man to be cautioned, and the petty officer will say to the defaulter:

> You are not obliged to say anything. You have nothing to fear from any threat and you have nothing to hope from any promise whether or not you do say anything, but anything you say may be taken down in writing and used as evidence. Do you fully understand this warning?

If it seems necessary, the delegated officer may require the defaulter or the witnesses to take an oath that everything they are saying is true.

32. **Witnesses** — The procedure outlined above is the same for a witness except that he keeps his cap on and salutes on arrival at the table.

33. **Procedure to Aid Defaulters** — If you are ever a defaulter, there are some things which you can do which will help you:

a. Appear smartly dressed, and execute all orders smartly; a good first impression means a great deal.

b. Speak only when you are asked a question or when the investigating officer indicates that you may. Do not get excited and speak out of turn.

c. When you do speak, speak clearly, make yourself heard, and say what you have to say in as few words as possible.

Remember that the defaulter's table is a court of law in the same way as the Magistrate's Court in civilian life. The National Defence Act has been passed through parliament as a law of Canada. Remember also that the officer dealing with your case is well experienced in dealing with sailors. There are very few new stories to be told at the defaulters table, and there are very few loop-holes in the Articles of War which have been perfected over some six hundred years.

34. **Requestmen** — The procedure for **requestmen**, see Figure 9-7, is similar to that of defaulters except that you do not remove your cap. You are called to the table in the same way, you salute, and the request, see Figure 9-8, is read by the Coxswain. The Officer then considers the matter and either gives a decision or refers the matter to the appropriate authority.

TRAINING PERIOD 4 — ADMINISTRATIVE ORGANIZATION AND WATCHKEEPING

35. **The Internal Organization of a Ship** — A modern warship is very complicated and crowded, with no room for passengers. Everyone on board must have a job to do and jobs must not overlap.

36. **Jacks-of-All-Trades** — By tradition and by necessity, sailors are "jacks-of-all-trades". Everyone who serves in HMC ships must have a general knowledge of the sea and seamanship, in addition to the knowledge required of their trade. There will be frequent occasions when a job requires doing and you will be the only one on the spot.

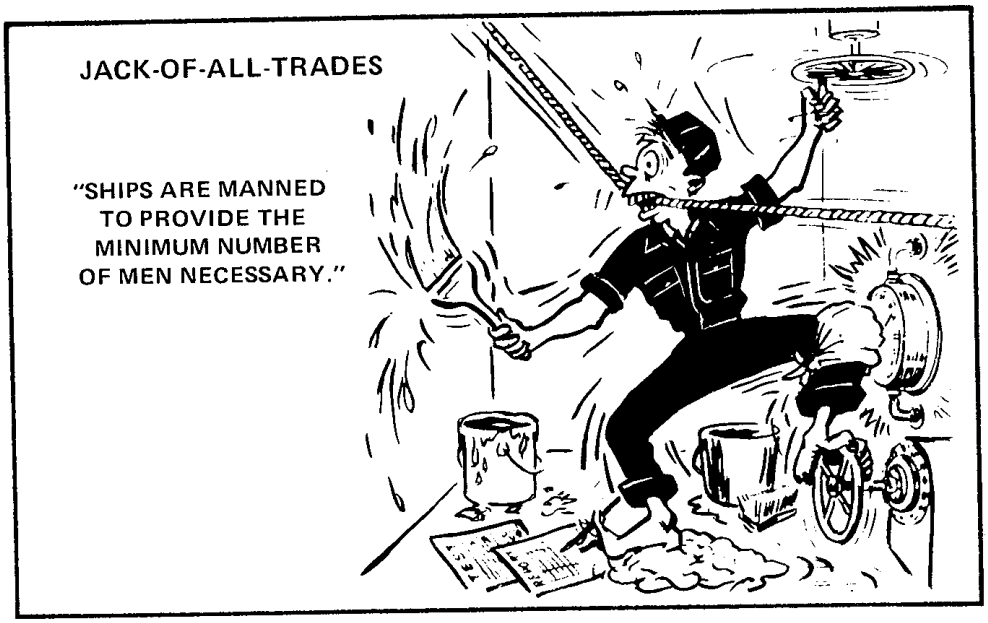


Figure 9-9 Jacks-of-All-Trades

37. **All Jobs are Essential** — Apart from doing your share of the domestic duties, such as scrubbing paintwork or decks, or being a member of the cafeteria or storing party, you will be called upon to perform various other duties which are really not connected with your trade. You may be a lookout, a boatswain's mate standing a brow watch, a member of a boarding or decontamination party, or a night roundsman. Whatever your employment, be it within or outside your trade, it is essential to the operation of your ship.

38. **Organizations Within a Ship** — There are two separate but closely associated organizations in every HMC Ship. One is the **Administrative Organization** and the other the **Action Organization**. You must become thoroughly familiar with both. First, we will look at the Administrative Organization.

39. **Administrative Organization** — A ship is organized into a number of **departments**, which in turn are broken down into **sub-departments** of different **trades**. Each department is given a group of related jobs as its particular responsibility in the ship, and each department is manned by a group of men of the appropriate trades to do these jobs. A specialist officer heads each department and is responsible for his department to the **Commanding Officer** through the **Executive Officer**. The Commanding Officer is responsible for everything that happens in his ship.

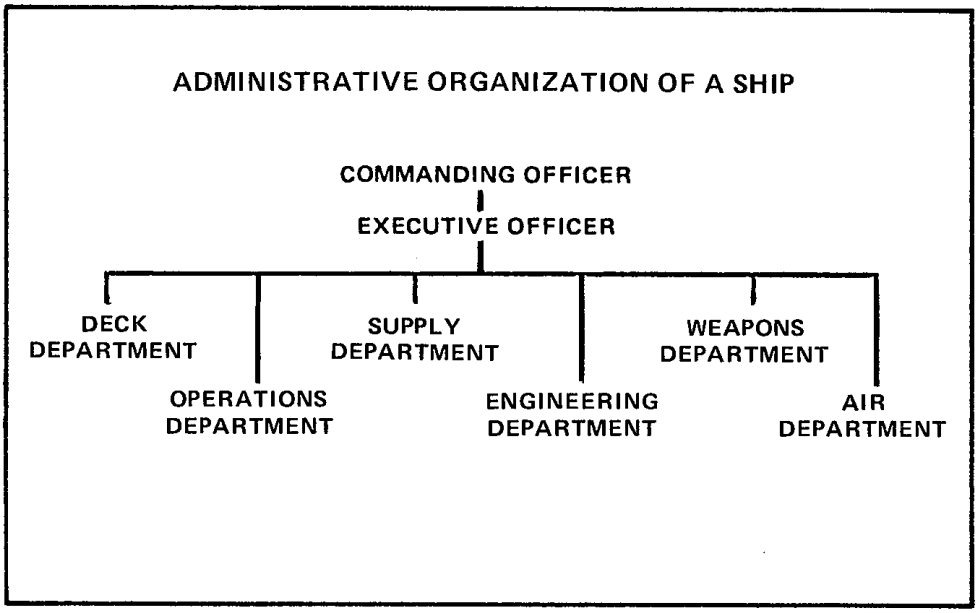


Figure 9-10 Administrative Organization of a Ship

NOTE

Details of the various trades likely to be found in a Canadian warship at sea, and their distribution in the various departments, will be found at Annex B to this Chapter, "Administrative Organization of a Ship". Cadets selected for cruises on HMC Ships are advised to be familiar with this material.

40. **Executive Officer** — The Executive Officer is second in command of the ship. He is responsible directly to the Commanding Officer for the ship's organization, cleanliness, and discipline. Should anything happen to prevent the Captain commanding his ship, the Executive Officer would automatically assume command.

41. **Arranging Working Hours** — A most important requirement in ship's organization is the arrangement of working hours for maximum efficiency. It is obvious that while a ship is at sea there must be men awake and working at all times. Similarly, in harbour, some men must be awake to keep auxiliary machinery running and to cope with any emergency which may arise. Also, during the day at sea or in harbour, there is cleaning to be done and machinery to maintain, so that in addition to the men actually running the ship, there must be others carrying on the routine chores.

42. **Watchkeeping** — This requirement is worked out very easily by dividing the day into time periods called **watches**. The ship's company is divided into groups of sufficient size to keep these watches; that is, run the ship during the period of the watch. Each of these groups of men is similarly called a **watch**. It must be realized that, even if a man is **off watch** he is not necessarily off duty. If the off-watch period occurs during the ship's working day (usually 0700-1600) he still has his regular job to do, or he may be detailed for ship-maintenance chores. Bearing in mind that he will probably have to stand another watch during the night, a smart seaman will take every opportunity to **get his head down** and get his sleep when he can.

43. **Division of Watches** — There are two systems of dividing a ship's company into watches (see Figure 9-10). One is **Port and Starboard** and the other is **Red, White, and Blue**. The Port and Starboard system is further split into two parts, namely **First of Port** and **Second of Port, First of Starboard** and **Second of Starboard**. Normally only one part of a watch is actually keeping a watch at any given time. Thus a ship is so organized through the watch and station bill that the ship's company may be divided into two, three, or four watches at sea, and more in harbour. That is, the number of men required on watch at any one time is adjusted to the circumstances. For example, under normal peacetime cruising or exercising, the ship will be in three watches.

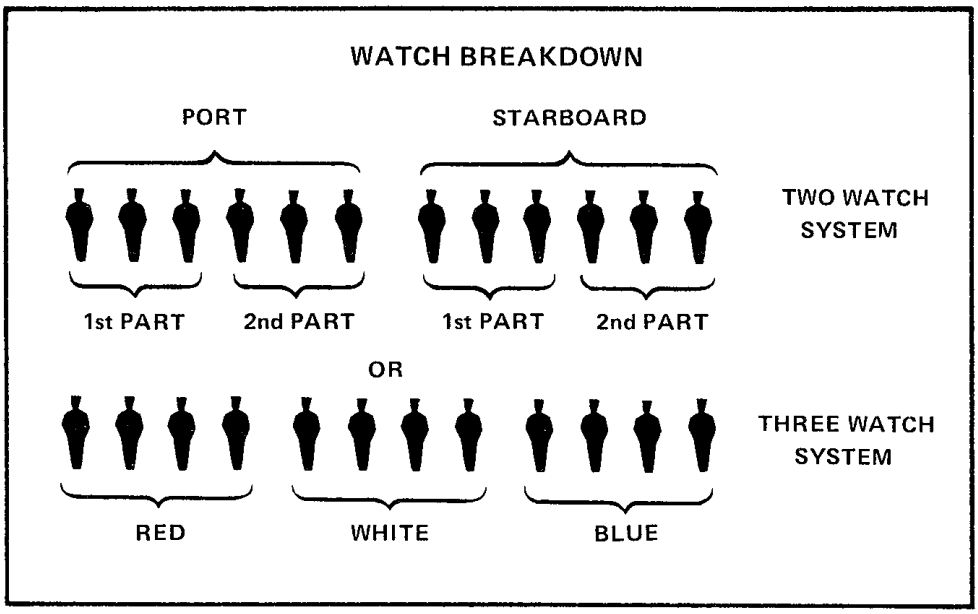


Figure 9-11 Watch Breakdown

44. **Division of the Day** — In a ship, the day is divided into watches, and the watches are divided into half-hour periods. At the end of each half-hour period the ship's bell is struck.

45. **Timekeeping** — The 24-hour clock is used instead of the 12-hour clock. For example, 1 pm is 1300, 2 pm is 1400 and so on. See Figure 9-12. Note that to avoid confusion as to what day is involved, midnight is never called 2400 or 0000, but is always referred to as "2359".

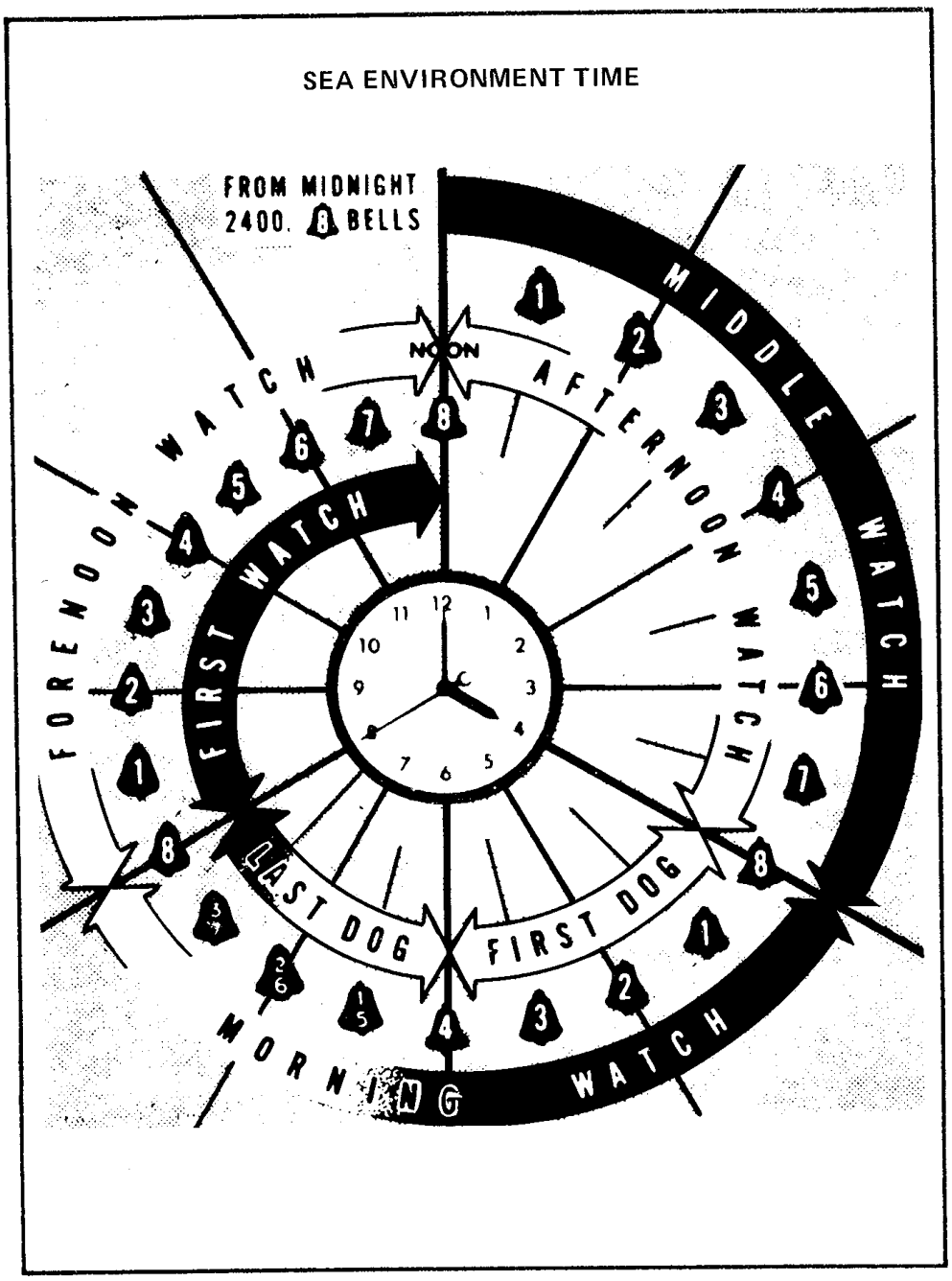


Figure 9-12 Sea Environment Time

46. **Division of the Watches** — Watches are as follows:

a. 2359 to 0400 middle watch;

b. 0400 to 0800 morning watch;

c. 0800 to 1200 forenoon watch;

d. 1200 to 1600 afternoon watch;

e. 1600 to 1800 first dog watch;

f. 1800 to 2000 last dog watch; and

g. 2000 to 2359 first watch.

If 1600 to 2000 were all one watch, and if a ship's company was in two or three watches, each watch would stand the same watch each day. Therefore, this time is split into two watches called the **dog watches**. This produces seven watch-periods, an uneven number. This means that each watchkeeper stands a different watch each day.

47. **Bells** — Each of the 4-hour watches begins and ends with eight bells. At the end of the first half hour of the watch one bell is struck; at the end of the second half hour two bells; the third half hour, three bells; and so on until at the end of the eighth half hour, or the end of the watch, eight bells are struck.

48. **History of Bells** — The custom of striking the ship's bell to mark the time dates back to the 13th century, when "half-hour glasses" (similar to large kitchen egg-timers) were in use. Each time the glass was turned a bell was struck, starting with one bell for the first turn and ending with eight bells for the last.

49. **Bells for the Dog Watch** — It is easy to see that the first dog watch ends with four bells. But at 1830, instead of five bells there is one bell, and then the last dog watch ends not with four bells but eight bells.

50. **Sound of Bells** — Bells are struck in twos; that is, five bells will sound "ding-ding", pause, "ding-ding", pause, "ding". This is done to make it easier to count the number.

51. **Watch-and-Watch System** — In some Canadian naval vessels at sea, a **watch-and-watch** system is employed when they are short-handed. This is known as the "7-5-5-7 system", in which each man stands watch for seven hours, is off watch for five hours, stands a watch of five hours, then is off watch for seven hours. The times of the watches are:

2359 - 0700, 0700 - 1200, 1200 - 1700, 1700 -2359

It should be remembered that if an off-watch period occurs during the ship's working day, the individual still has duties to perform. This system also places individuals on the same watch each day. Thus it is a very tough schedule to maintain and is only used when absolutely necessary.

TRAINING PERIOD 5 — SHIP'S ROUTINE

52. **Routines** — You have seen that all seamen who are not actually on watch, work with their department or on housekeeping duties during the normal **daily working hours**. In the forenoon, hands fall in either for divisions or to be detailed off for work. Department officers and chief and petty officers outline the day's work at this time and the hands are given their jobs. Persons who have stood the morning watch fall in later when they have finished breakfast and those with the afternoon watch secure early enough to have their lunch.

53. **Standing Orders — Daily sea routines** are always laid down in the **Executive Officer's standing orders** and a copy of these routines is always on the notice board. This routine should be learned perfectly. It will vary slightly from ship to ship but in general it follows the same pattern. An example starting with the morning watch at sea might be:

0645 call the hands.

0700 hands to breakfast and clean; dress of the day ---.

0750 forenoon watchmen, out pipes and muster.

0755 outpipes, hands fall in.

0800 hands to divisions and prayers, morning watchmen to breakfast.

0830 morning watchmen out pipes and muster for cleaning stations; clean messes.

0915 secure cleaning stations.

1030 stand easy.

1040 out pipes, hands carry on with your work.

1100 up spirits, afternoon watchmen to dinner.

1150 secure; clear up decks, afternoon watchmen out pipes and muster.

1200 hands to dinner.

1230 men under punishment to muster.

1310 out pipes.

1315 hands fall in.

1430 stand easy.

1440 out pipes.

1545 clear up deck, return gear.

1550 first dog watch to muster.

1600 secure; hands to night clothing.

1700 hands to supper.

1750 last dog watch to muster.

1800 first dog watch to supper.

1830 first dog watch and men under punishment muster and clean up for rounds.

1950 first watch to muster.

2000 first dog watch and men under punishment muster for rounds.

2130 pipe down.

54. **Know the Standing Orders** — The Executive Officer is responsible for making this routine, the **Coxswain** is responsible for seeing that it is carried out, and every person is responsible for knowing it and for being at the right place at the right time. The **boatswain's mate** pipes the routine with his boatswain's call, but not having heard a pipe is never an excuse for not being where you should be.

55. **Routine Orders** — The ship's daily routine is specified in Routine Orders, which are published each day. They contain such other details as dress of the day, the names of men of the various sections of the duty watch in harbour, times of sailing, leave, and many other important items. You must get into the habit of reading Routine Orders each day. It is inexcusable that you should miss some important instructions because you forgot to read Routine Orders.

56. **Parts of Ship** — In addition to being divided into watches, a ship's company of parts of it, is divided into **parts of ship** mainly for the purposes of cleaning and maintenance of the **upper deck**. The three parts of ship are forecastle, top and quarterdeck. (See Figure 9-13).

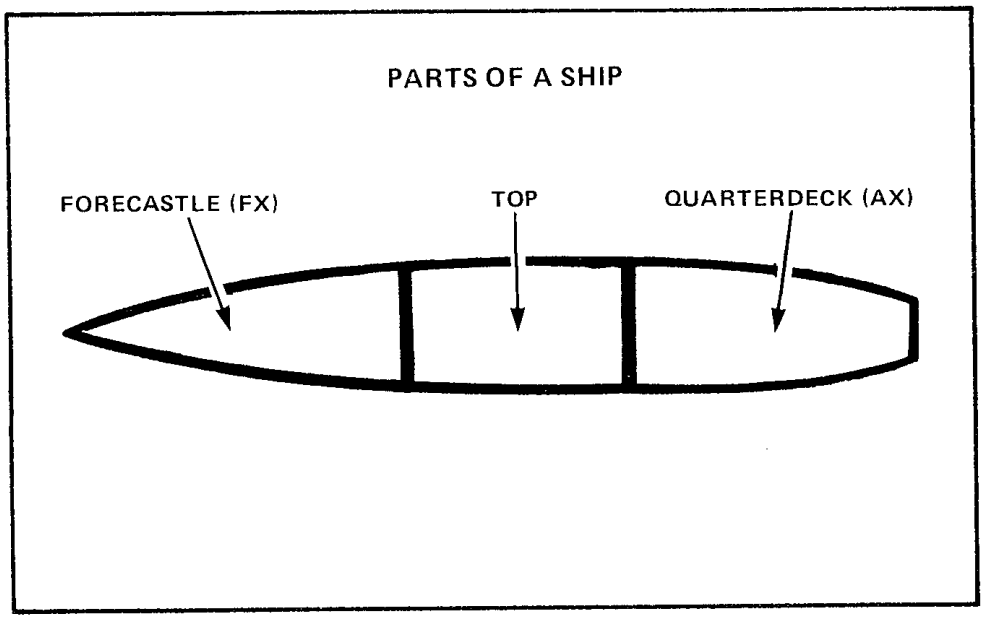


Figure 9-13 Parts of Ship

57. **Mustering Hands** — Certain exercises or evolutions, and certain operations such as **entering and leaving harbour** require the maximum number of hands available on the upper deck. At these times hands muster by parts of ship. For example, a weaponman surface, whose special duty may be maintaining and operating a gun mounting, may muster with the forecastle part of the ship for entering harbour or just as a working hand when he is not employed in his trade. A Petty Officer is normally in charge of each part of ship and he is responsible for its cleanliness and efficient functioning.

58. **Exercise for Cadets** — It is not intended that cadets memorize the details of the ship's routine above, which may in any case vary somewhat from ship to ship. They should, however, be familiar with the general outline. It may be instructive to appoint individual cadets to theoretical jobs and watches (eg, radar plotter in the second part of the starboard watch) and ask them to indicate where they would be and what they would be doing at a certain time of day, with reference to the sample ship's routine (it will be necessary to state which watch was on duty during the coming watch of the day in question). This sort of game is a good way to find out what the cadets do **not** understand and to reinforce what they do.

59. **The Ship in Harbour** — The routine changes in harbour in that a part of the ship's company, consisting of men from each department, is on duty for twenty-four hours. This part of the ship's company changes daily. They are detailed off by the Petty Officer of the Watch (POOW) for various jobs, (ie, Boatswain's Mate, Roundman, fire stations, cleaning station, etc). These jobs may be of a two, three, or four hour duration. There are also men detailed to watchkeep on machinery which may be kept

running in harbour. Similarly, cooks and stewards, since their jobs keep them closed up on duty at odd hours during the day and night, will run a special routine.

60. **Emergency Party** — Each man of the watch in harbour is a member of the **Emergency Party**. As such he is given a particular duty to perform for any crisis the Emergency Party may be called upon to encounter, such as fire, flood, or heavy weather.

61. **Harbour Defence Stations** — When your ship is in a harbour where an attack by underwater swimmers is possible, there are various degrees of defence which involve your own ship's divers, sentries, boat's crews, and the use of demolition (scare) charges. These defensive measures may be implemented in a number of different ways.

TRAINING PERIOD 6 — ACTION ORGANIZATION

62. **The Ship at Sea** — In a ship at sea, the organization is very simple. The Captain delegates his authority to the Officer of the Watch (OOW) to be the "driver", as it were, and to be responsible for the ship's efficient passage and safety. The Captain, of course, is always available to advise the OOW and he may spend a good deal of time on the bridge with that officer.

63. **Watch on Deck** — The **watch on deck** in a ship at sea is a group of men of seaman trades, together with men available from other trades. The administration of the watch on deck is done by the POOW. He sees that lookouts, helmsmen, and the lifebuoy sentry are relieved often enough to keep them at their best efficiency. The POOW also details off the sea boat's crew. He may delegate the Leading Seaman of the Watch to look after the sea boat.

64. **Equipment Watches** — Also, under the control of the OOW, a watch of **radar plotters** is closed up at their sets and the **sonarman** may be closed up on theirs. These watches may be supervised by either a leading seaman or a petty officer of the appropriate trade. They report any detections directly to the bridge. A watch of **radiomen** will be closed up at their sets, and a duty **signalman** will be available on the bridge to advise the OOW and to perform any visual communications work necessary.

65. **Engine Room** — In the engine room, the watch is closed up under a Petty Officer or Chief Petty Officer Marine Engineering Technician. The Engineer Officer is always available to offer advice, and will spend a good deal of time in the engine room and boiler room. The man in charge of the engine room watch is responsible to the OOW to see that all orders from the bridge are carried out perfectly and that the engines are run efficiently. The engine room watch is responsible for running the auxiliary machinery about the ship.

66. **Day Men** — Certain men, like cooks and stewards, do not keep a watch in the normal sense. Their work is done at about the same time every day and during the rest

of the day there is no need for most of them to be on watch. These men, who include most of the supply trades, are called **Day Men**. They are however, divided into watches for special circumstances such as Rescue Stations.

67. **Summary** — It should be clear by now that at sea **each department** has a **watch of men** closed up to do its part in the running of the ship (see Figure 9-14). Since the OOW is directly responsible to the Commanding Officer for the running of the ship, it is necessary that all these watches work closely with him and keep him informed about what is happening in the ship. Unless this is done the whole system breaks down.

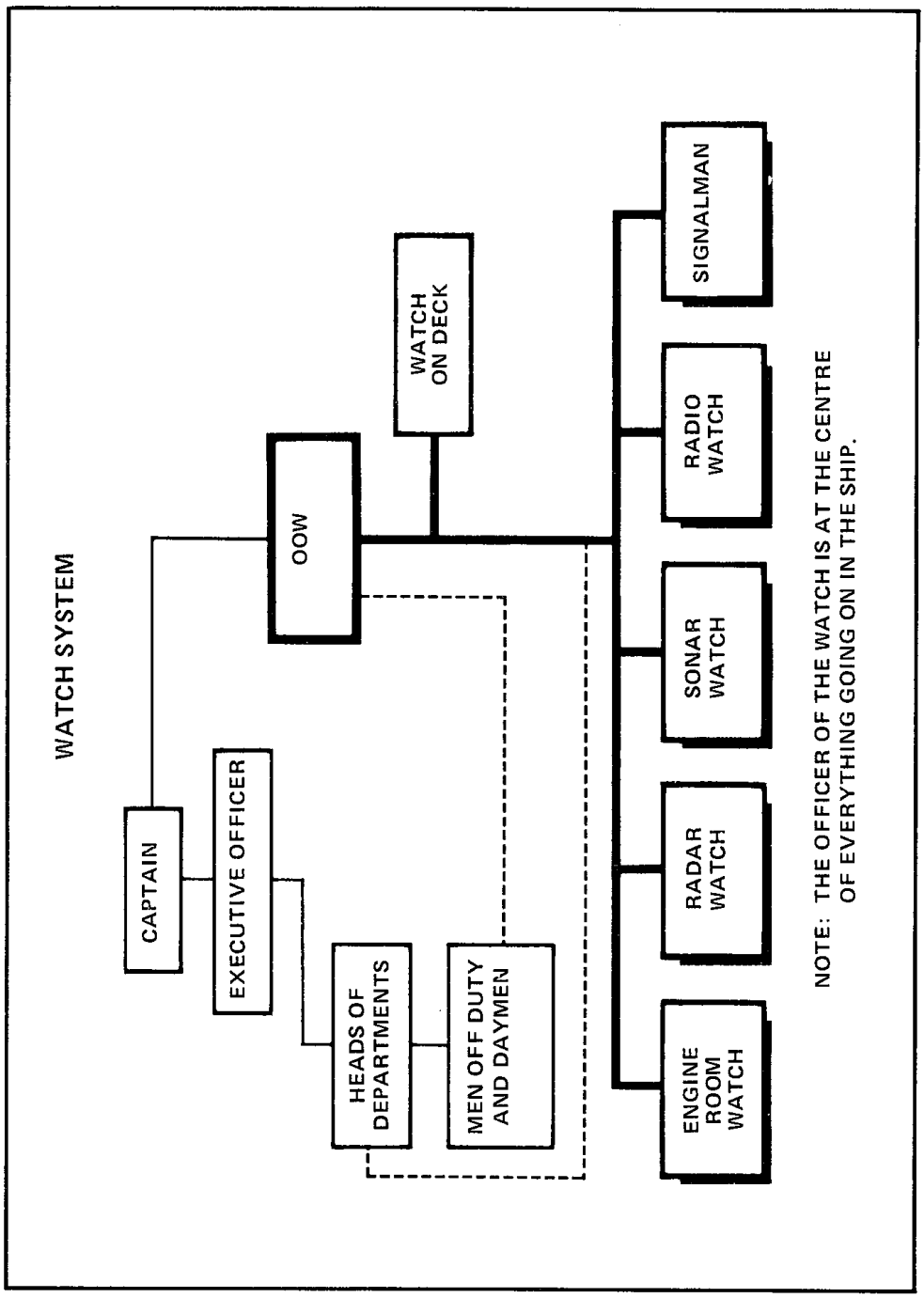


Figure 9-14 Watch System

68. **Watch and Station Bill** — A **Watch and Station Bill** is published by the Executive Officer and kept up to date **by the Coxswain**, so that everyone knows his part in the organization of a ship. This master Watch and Station Bill is really a combination of the individual departmental watch and station bills. Figure 9-15 illustrates a

section of the watch and station bill that applies to the Weapons, Deck, and Operations Departments. The section for Engineering and Supply Departments is slightly different in that, in place of "Degrees of Readiness", the columns are designated "NBCD Conditions". This is to enable differences in detail to be included for those who are involved in fighting the ship from those who are steaming the ship and preparing to counter any damage.

69. **Check the Watch and Station Bill** — If you are assigned to a ship, one of the first things you must do is to check for your own name on the watch and station bill. This will tell you where you bunk, where you should go in each state of readiness, and what your special stations are.

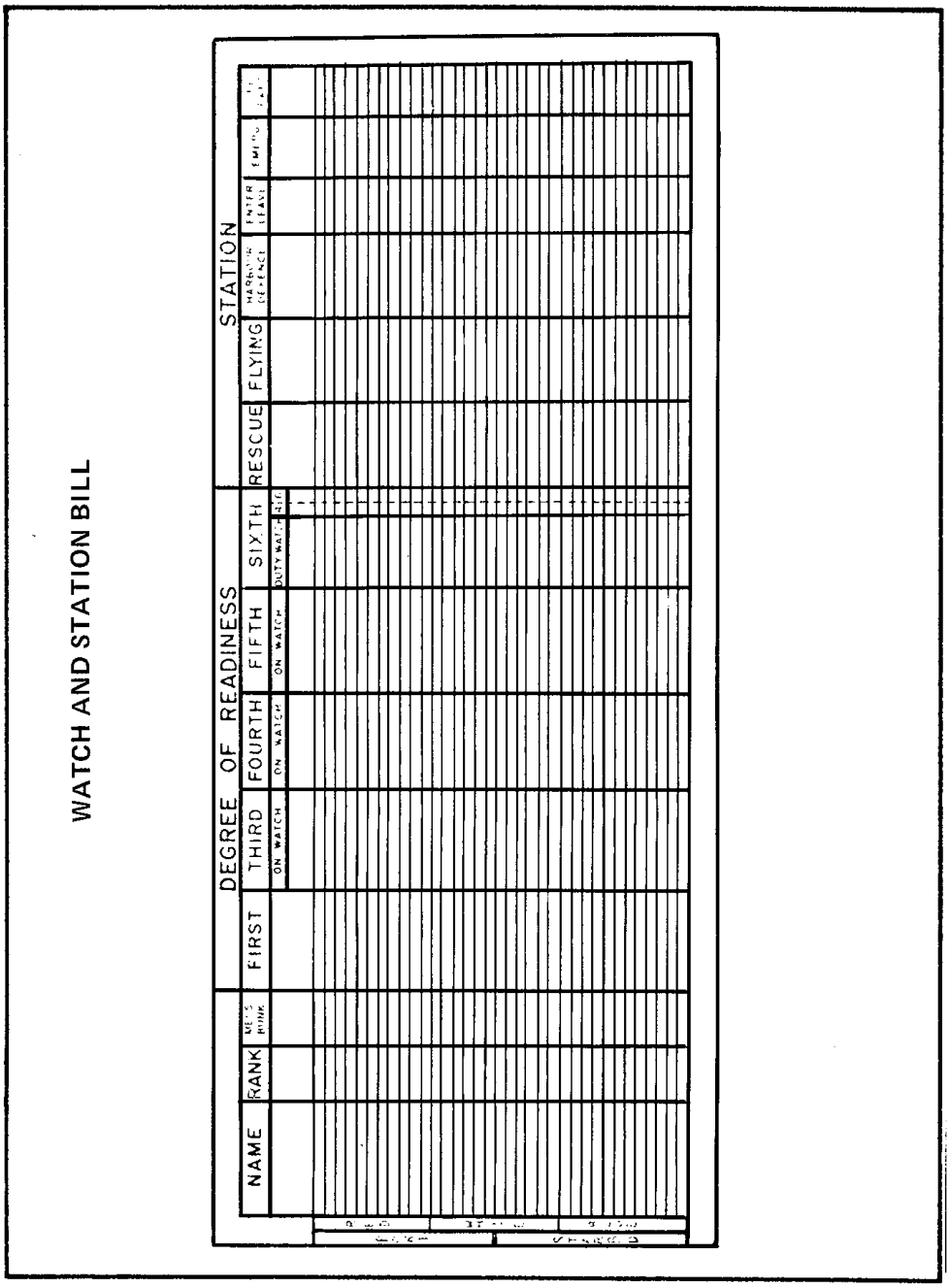


Figure 9-15 Watch and Station Bill

70. **Degrees of Readiness** — To **fight the ship** every essential service and weapon must be manned and ready for use. This is called the **First Degree of Readiness** or **Action Stations**. To achieve this state, every man in a ship has an **action station**. The duties each man is required to perform in action may or may not be appropriate to his trade. For example, a cook or steward may be a member of a first aid or decontamination party at his action station, and an administration writer may be part of the wheel-house crew.

71. **Manning of the Armament** — Actual degrees of readiness are concerned essentially with the **manning of the armament**, but of course there must be other considerations also. You will see later how water tight and gastight **Conditions of Readiness** (note the different word) contribute to the readiness of the ship to fight.

72. **Second Degree of Readiness — When the threat of attack has temporarily lessened**, a small proportion of personnel may be permitted to leave their action station for meals, personal hygiene, or brief periods of relaxation. This is called the **Second Degree of Readiness**.

73. **Degrees of Readiness** — Quite obviously a ship cannot stay in the first or second degree of readiness indefinitely, and so we have other degrees which are used **dependant upon the threat of attack**. In these degrees, the armament must be able to initiate **defensive action** while the ship closes up to a higher degree. They are:

a. **Third Degree** or **Defence Stations** — the armament is manned on a two watch basis;

b. **Fourth Degree** or **Cruising Stations** — the armament is manned on a three watch basis;

c. **Fifth Degree** — Armament unmanned, **peacetime cruising**; and

d. **Sixth Degree** — Armament unmanned, **peacetime harbour**.

74. **States of Preparedness** — Whatever degree of armament is in, it is also governed by a **State of Preparedness**. These are:

a. **Standing To** — Ready for immediate action.

b. **Relaxed** — Communications and lookout numbers manned and the remainder of the crew relaxed.

c. **Secured** — Equipment is secured, communications remain manned, and crews remain in the vicinity of their weapons unless otherwise ordered.

75. **Action Alarm** — To bring the ship's company to **action stations**, or to a state brought about by an **emergency** (rescue stations, or emergency stations), the pipe is always preceded by the ringing of the **action alarm**. For each situation the alarm and pipe is always repeated three times.

76. **Traffic Rules** — Once the action alarm is sounded, you must move, properly dressed and equipped, **at the double** to your station. To avoid congestion with many men rushing to their action stations, the following **traffic rules** must be followed:

a. **always keep to the right**; and

b. **personnel coming up ladders have the right of way over those going down.**

Action ladders are clearly marked "**Acting Up**", etc. These rules apply in all situations where the alarm is sounded.

TRAINING PERIOD 7 – SPECIAL STATIONS

77. **Special Sea Dutymen (SSD)** – Whenever your ship **enters narrow waters** or is engaged in any **close quarters situations** such as replenishment at sea, towing, or rescue operations, key positions in machinery and ship control are manned by **selected, experienced personnel**. These are called **Special Sea Dutymen**. These positions include bridge, wheelhouse, tiller flat, engine room, and boiler room. If you are a member of the SSD party, you will find by the watch and station bill that this duty **will usually apply through the higher degrees of readiness**, and the various other stations outlined in this section.

78. **Flying Stations** – If you are posted to a DDH, you will become very familiar with the pipe **hands of flying stations**. This pipe, which will be made every 15 minutes until Flying Stations are secured, initiates changes in the organization to enable your ship **to launch or recover aircraft**. Certain **damage control** and **fire fighting** parties close up, flight deck safety nets and ladder tops are lowered, and fire fighting equipment is brought to immediate readiness. **Rescue swimmers** with rescue equipment shall be standing by the seaboat. **Parts of the upper deck** will be **placed out of bounds** and **smoking restrictions** will be in force. Key personnel in the operations and flight deck teams will be closed up. Flying Stations personnel automatically close up for Action Stations, Emergency Stations, Emergency Flying Stations, and of course for normal flying operations.

79. **Rescue Stations** – There will be further organization within your ship to provide assistance in emergencies outside your ship. These include **rescuing the crew of a downed aircraft, man overboard** from your own or another ship, **rescue of survivors** from rafts, open boats, or a derelict, **transfer of sick or injured persons**, and a variety of other situations where you may be required **to use the sea boat**. The **rescue organization** is a flexible one that can provide assistance by the ship itself, rescue swimmers, or the sea boat, or if a DDH, with its own helicopter.

80. **Rescue Watch** – To provide a quick reaction to any rescue situation, your ship will (in the three watch system) use **one of the watches off watch** as **the rescue watch**. This eliminates the delay of personnel relieving those on watch to free them for their rescue station. As a member of the rescue watch, **you must always wear your life-jacket**.

81. **Emergency Stations** — For any **emergency situation not involving enemy action**, there is an organization within your ship to keep the ship afloat and under control. The three main emergency situations that may be encountered are **fire, collision**, and **grounding**.

82. **Aim** — The aim of the organization of Emergency Stations is to provide sufficient men and equipment to **neutralize the emergency without delay**, and to **remove all personnel to a place of safety**, clear of the parties fighting the emergency.

83. **Fire** — A fire can, of course, happen at sea or in harbour, but we are concerned here with what happens at sea. You will see later how the organization copes with a fire in harbour. When the **fire** is detected, the alarm be raised and **Damage Control Headquarters**, called **HQ1**, informed (there is always a watch-keeper closed up in HQ1 when the ship is underway). The OOW is also informed. For a fire at sea, there is only one action the OOW can take (unless the fire is extinguished by first aid action). He will sound the action alarm and have **Hands to Emergency Stations** piped. He may change the **watertight** or **gastight conditions**, but this is entirely dependant upon the location and intensity of the fire. By imposing a high watertight condition, the firefighters will be impeded in trying to get at the fire. With the pipe of Emergency Stations all damage control parties automatically close up. Those not on watch, or members of the Damage Control parties muster at their liferaft stations on the upper deck where they will not interfere with the work of the firefighting parties. For all Emergency Stations, **all members of the ship's company wear their life jackets**.

84. **Collision or Grounding** — **Collision** or **grounding** will be self-evident but in conjunction with going to Emergency Stations, the Command will undoubtedly raise the **watertight conditions**. Thereafter, you must follow the routine for Emergency Stations as described in the fire situation.

85. **Damage Control Headquarters** — You will hear a good deal more about Damage Control Headquarters (HQ1) when you learn, later in the course, about Watertight and Gastight Integrity.

86. **Emergency Flying Stations** — This is a modification of Emergency Stations that is applicable to DDH class ships. These ships may experience **a helicopter crash on deck**, or a **helicopter landing in an emergency**. It must be appreciated that the Sea King helicopter carries over 600 gallons of JP5 fuel. The fire hazards of any potential helicopter accident can be readily appreciated. To implement normal Emergency Stations would expose all **spare personnel** to the hazard of fire on the upper deck. So, instead of mustering at their liferaft stations, they muster **below the upper deck**, usually in the **forward end**. The afterpart of the deck should be left clear, since this is where any firefighting action would most likely be required.

87. **Liferaft Stations** — The details of Emergency Stations have already been outlined. Should a ship be so seriously damaged as to be **in immediate danger of**

sinking, preparations will be made to **abandon ship**. The emphasis here is on preparations; the final step before abandoning ship is for the ship's company to go to **Liferaft Stations**. Liferafts are allocated on the watch station bill, and the location of your raft will generally be that nearest your action station. **Wear your lifejacket** and **warm clothing** and proceed to your station quickly and quietly. Always fall in on the same position and note who falls in on either side of you; this way you can assist the senior man in charge of your raft to more quickly discover anyone missing. The term **abandon ship** is used only when the order is given by the Commanding Officer to abandon ship.

TRAINING PERIOD 8 — REVIEW AND TEST

88. A brief review of Training Periods 1-7 of the Personnel and Organization course should be made, indicating the various areas which require emphasis and explaining any points which appear to be causing difficulty.

89. Cadets shall write a short test, with a minimum of one question relating to the subject matter of each Training Period. The question on the use of the boatswain's call shall be a practical test of the ability to make one or more calls. Pass mark for the test shall be 60 percent.

TRAINING PERIOD 9 — DUTIES OF A LOOKOUT

90. **Duties of a Cadet** — As a cadet serving in one of the HMC Ships, you will be called upon to perform a number of duties as part of the watch on deck. Four of the duties commonly assigned to cadets are those of lookout, member of the wheelhouse crew, member of the gangway staff in harbour, and life-buoy sentry. The following four periods are devoted to these duties.

91. **Duties of a Lookout** — The duties and responsibilities of a lookout remain, in spite of the efficiency of radar, of the utmost importance. Quite frequently radar will fail to detect very small objects such as a submarine periscope, or aircraft that are very low over the water, until sometime after they are in sight. The safety of the ship will frequently depend on the alertness and integrity of the lookout. Concentrate on what you are doing and make it a personal aim to sight objects before any other bridge personnel.

92. **Posting the Lookout** — The lookout may be posted in any one of several places in the ship, depending on the circumstances. If fog is encountered, a lookout is posted at the bow (or eye of the ship) to warn of approaching shipping. If an air attack is expected, a lookout will be given an arc of the sky to guard. Wherever he is stationed or whatever duty he may be given, the lookout must know:

a. what he is looking for;

b. how to report; and

c. how to use his binoculars effectively.

93. **General Rule for a Lookout** — The lookout will be briefed by the OOW or POOW before assuming his specific duty. He must be appropriately dressed. If he is not comfortable he will be more concerned over cold ears, for example, than with listening for fog signals. If binoculars are supplies, the lookout must know how to work the shades. At night it will take at least five minutes for lookouts to change and for the relief to acquire his night vision. Under wartime conditions the period to adjust to night conditions will be considerably longer.

94. **Reporting a Sighting** — Report to the OOW clearly and concisely when a ship or strange object is sighted. This must not vary in format and must contain the following details:

a. **bearing** relative to the ship's head;

b. **what it is**; and

c. whether it is **near or far**.

If the object sighted is a ship, always report it, ie, "Bearing red four five — ship". If it is identified as a raft, lift buoy, aircraft, etc, then it is reported as such: "Bearing green one three zero — life buoy". Should identification of a strange object be impossible, the lookout must use the word "object". If the object cannot be identified the lookout should not delay the report. Its presence must always be brought to the attention of the OOW, who will in turn undertake to find out what the strange object is. An example of the lookout's report in such a sighting is "Bearing green two zero — strange object".

95. **Near and Far** — The lookout will not normally have at his disposal means by which he can give the distance of the object he has sighted. Therefore the words "Near" or "Far" are added to his report; ie: "Bearing green one six five — two ships — far". If a receipt of this sighting is not heard then the lookout **must continue reporting** until the OOW signifies that he too has seen the two ships.

96. **Reporting Aircraft** — When reporting aircraft the **angle of sight relative to the horizon** and **direction of the flight** also must be reported. It must also be noted that the word "Aircraft" precedes the report, ie, "Aircraft, bearing red nine zero, angle of sight two zero, crossing from left to right".

97. **Red and Green** — All bearings reported by lookouts are preceded by the words **red** or **green** to indicate **port** or **starboard** respectively. This is followed by the number of degrees from 0 (right ahead) to 180 (right astern). In Figure 9-16, the ship on the port bow is bearing "Red four five". The ship on the starboard beam is bearing "Green

nine zero". The degrees are always spoken as separate words, ie, 90 degrees will be spoken as "Nine zero", and 165 degrees will be spoken as, "One six five". The word "degrees" is omitted.

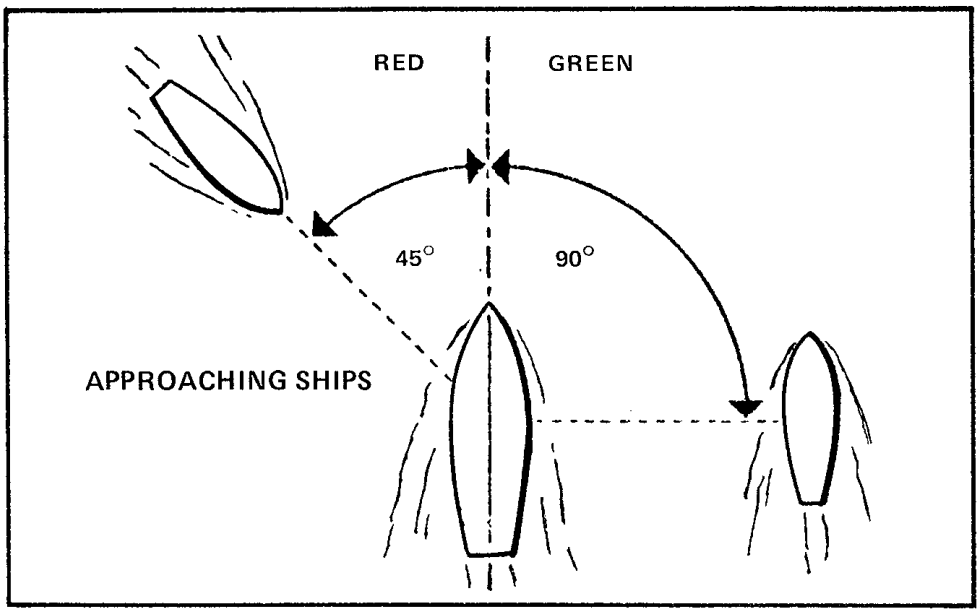


Figure 9-16 Approaching Ships

98. **Estimating Figures and Approximating Distances** — Although **lookout sights** are fitted to enable you to read off the **relative bearing** and **elevation** when your binoculars are trained on an object, you must have some idea of estimating these figures and approximating distances.

a. **Relative Bearing** — Stand, facing abeam and stretch out your arms so that they lie in the fore and aft line. Looking directly ahead of you the bearing is red or green nine zero, now you know that between where you are looking and the bow is 90 degrees. It is very simple to give a quite accurate bearing of the mid-way point of red or green 45. A little practice and you will be able to give quick and accurate relative bearings with little trouble.

b. **Elevation** — Estimation of elevation is very simple: **overhead** is **90 degrees** and **halfway** between overhead and the **sea horizon** is **45 degrees. The clenched fist of your extended arm** measures an arc of approximately **eight degrees.**

c. **Distance** — The estimation of distance at sea is something at which you can only become adept with practice and experience. There are, however, some ground rules that will assist you. Your average height of eye on a

destroyer's bridge is 38 feet. For this height **the distance of the sea horizon is seven miles**. This means that you can see, assuming calm and clear weather, an object that is low in the water such as a ship's boat, at no distance greater than seven miles. Of course, if the other object is higher, then you will be able to see it at a greater distance. For example, something of your own height of eye, another destroyer's bridge, you will theoretically be able to see at 14 miles.

99. **Checking Lights** — An additional responsibility of the lookout at night is to make a **periodic check of the masthead and steaming light** on **your side of the ship. On being relieved** you report to the OOW informing him additionally of the condition of your binoculars and state of the navigation lights, ie, "Port lookout relieved by Able Seaman Jones, Sir, all objects in sight reported, binoculars correct, port and masthead steaming lights burning brightly."

100. **Comparing Radio Reports** — When you are a lookout listen to reports of bearing and distance of other ships passed from the operations room to the bridge and compare them with your estimates.

101. **Practising** — Cadets should be practised in giving lookout reports in the proper form. For this purpose a heavy cardboard or plywood shape in the form of a ship may be employed. This is placed on the deck or a large table-top, with a small object placed at various locations relative to it. Individual cadets should be required to report the relative bearing of the object in the proper form. If binoculars can be obtained, it will facilitate the description of **lookout sights**.

TRAINING PERIOD 10 — WHEELHOUSE DUTIES

102. **Learning to Steer** — One of the most important duties of a seaman is to be able to steer well. This ability can only be acquired by experience.

103. **Movement of the Helm** — The movement of the **helm** (steering wheel) sets the **steering motors** in motion, which turn the **rudder**. When the ship is moving ahead, the rudder turns the ship by swinging her stern away from, and her bows towards, the direction in which the helm is turned; it has the opposite effect when the ship is moving astern. The greater the angle between the rudder and the fore-and-aft line of the ship, the quicker she will turn. The helm should be turned steadily by its spokes, without using undue speed or force.

104. **Giving Orders** — It is important that all **steering orders** should be given clearly and in a standard form. It is equally important that they be acknowledged in a standard form and obeyed correctly and in an orderly fashion.

105. **Altering Course** — Orders for an alteration of course always start with the **direction** and are immediately followed by the **rudder angle**, eg, "Starboard twenty".

This is repeated by the helmsman, who puts the helm over until the desired rudder angle is obtained, when he reports "twenty of starboard wheel on, Sir" (see Figure 9-19). As the ship's head approaches the new course the rate of swing may need to be reduced, in which case an order to ease the helm may be given, eg, "Ease to ten". The helmsman repeats the order and moves the wheel back until his helm indicator shows 10 degrees of starboard wheel and reports, "ten of starboard wheel on, Sir". When the ship's head is near her new course and this wheel must be taken off, the order "Midships" is given and is repeated and obeyed as in previous orders, bringing the wheel back until the indicator shows midships. The wheel may now be ordered to port to stop the swing and then back to midship position, so that the ship is steadied on or very close to the desired course. The helmsman is then ordered to steer that course. The correct sequence and form for such orders are:

a. Order "Midships"
Repeat "Midships"
Report "Wheels 'a' midships, Sir".

b. Order "Port ten"
Repeat "Port ten"
Report "Ten of port wheel on, Sir".

c. Order "Midships"
Repeat "Midships"
Report "Wheels 'a' midships, Sir".

d. Order "Steer zero nine zero"
Repeat "Steer zero nine zero"
Report "Course zero nine zero, Sir".

NOTE

Unauthorized orders and expressions such as "meet her" or "Roger wilco" are not to be used for conning.

106. **Using the Lubbers Line** — The ship is steered by **gyro compass**. There are normally two of these compasses, one forward and one aft. Both will have a tape **repeater** in the wheelhouse to steer by. You stay on course by keeping the **Lubbers line** on the desired course. The Lubbers line represents the ship's head and it must be remembered that to stay on course the Lubbers line must be moved in the direction required. Therefore if the course to steer is to the right of the Lubbers line, you must turn your helm to the right to bring the ship over to the proper course.

107. **Steady** — When conning to a new course, the officer conning the ship may find it distracting to watch the gyro compass repeat constantly. In such circumstances use of the order "Steady" is convenient and appropriate. The order **Steady** means

"helmsman repeat the ship's head at the present instant and in the absence of further orders steer that course". The following is an example of the use of the order "Steady". Assume the ship to be turning to the approach course for an alongside berth:

a. Order "Starboard ten"
Repeat "Starboard ten"
Report "Ten of starboard wheel on, Sir".

As ship approaches desired heading:

b. Order "Midships"
Repeat "Midships"
Report "Wheels 'a' midships, Sir".

Ship continues to swing slowly towards the desired heading:

c. Order "Steady"
Repeat "Steady, one three seven, Sir".

Helmsman steadies the ship on that course:

Reports "Course one three seven, Sir".

The helmsman now steers the above course until a change is made from the command.

108. **Small Alterations** — For a small alteration of course the order may come as "Steer zero two six", this order is repeated and the helmsman brings his Lubbers line over the zero two six, he then reports to the command "Course steady zero two six, Sir".

NOTE

Acknowledgement for all repeats must be received by the helmsman otherwise he is to continue repeating until it is received. The acknowledgement from the conning officer will be "Very Good".

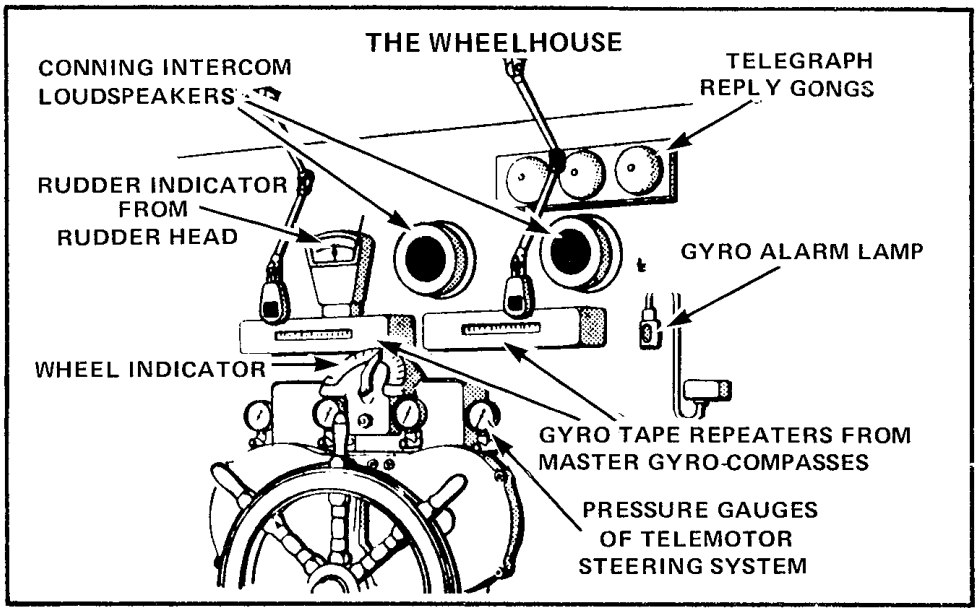


Figure 9-17 The Wheelhouse

109. **Engine Orders** — Engine orders are normally passed through the wheelhouse, the wheelhouse being fitted with engine speed and revolution transmitters. (See Figure 9-18.)

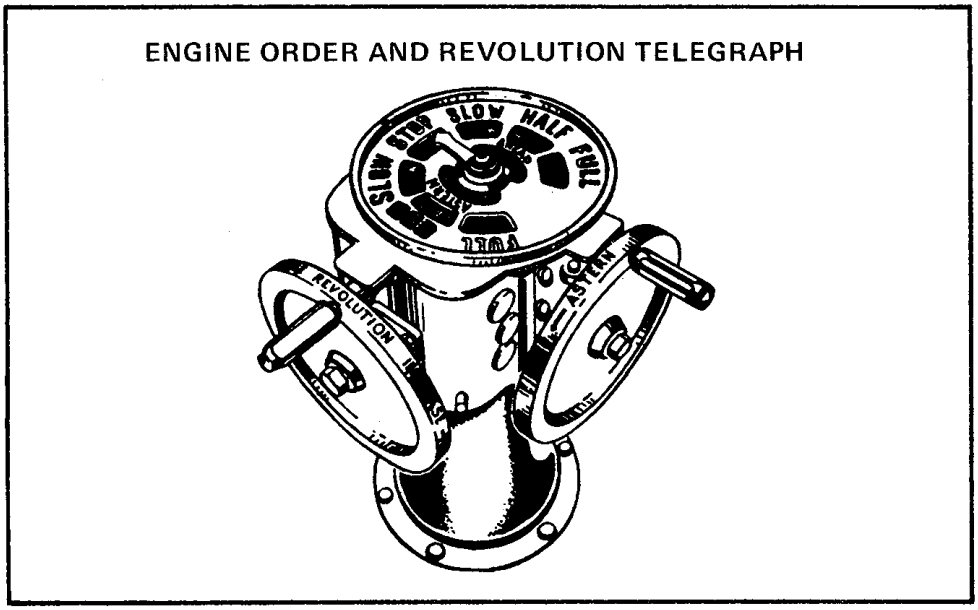


Figure 9-18 Engine Order and Revolution Telegraph

110. **Wording Engine Orders** — The wording of engine orders from the command to the wheelhouse has been standardized for the sake of uniformity and the avoidance of phonetic errors, such as confusion between the words "Port" and "Both". The underlying principle is that **the word "engines" is always used in conjunction with the word "both"** but on **no other occasion. The word "speed" is used in conjunction with the word "full"** and on **no other occasion**.

111. **Carrying Out Engine Orders** — Engine orders are **repeated** like helm orders, **carried out** and, when a reply is received from the engine room, **reported** complete to the command. For example:

a. Order "Slow ahead both engines"
Repeat "Slow ahead both engines"
Report "Both telegraphs at slow ahead, Sir".

b. Order "Stop starboard"
Repeat "Stop starboard"
Report "Starboard telegraph at stop, Sir".

112. **Bells and Gongs** — As each telegraph order is transmitted, a bell incorporated in the receiver rings in the engine room to draw attention to the order. The tones of the bells are different in the port and starboard repeater. The engine room acknowledges telegraph orders by means of gongs which ring in the wheelhouse. The gongs for port and starboard have different tones. The code is as follows:

a. **Slow** ahead or astern — **one stroke** of the gong;

b. **Half** ahead or astern — **two strokes** of the gong;

c. **Full** speed ahead or astern — **three strokes** of the gong;

d. **Stop** — **four strokes** of the gong **in two groups of two strokes each**; and

e. **Emergency** — **five or more strokes** of the gong. In any emergency from the **bridge**, the telegraph lever is swung back and forth repeatedly (five or more times) ending up at the speed desired or at "stop". This tells the engineroom that the order must be carried out as rapidly as possible. In an emergency from the **engineroom**, the handle of the telegraph in the engine-room is swung back and forth repeatedly (five or more times) ending up at "stop". This tells the bridge that there is a problem in the engineroom or that they cannot respond to bridge orders.

113. **Controlling the Engines** — The speed of the engines is controlled as follows:

a. Slow — a **predetermined number** of rpm sufficient to give steerage way.

b. Half — the number of rpm **indicated on the revolution order telegraph. (May** be less rpm than slow.)

c. Full speed — **Emergency, Maximum rpm possible** with power available.

114. **Changes in RPM** — These are given and replied to in the following manner:

From Command:	"Revolutions nine zero".
Repeat:	"Revolutions nine zero, Sir".
Report:	"Nine zero revolutions repeats, Sir".

The **repeat signal** from the engine room for revolution changes is **two rings** on the revolution reply gong (ie, same as for half speed).

115. **Acknowledging a Telegraph Order** — When an engine telegraph order is **not acknowledged by the reply gong** or is **acknowledged incorrectly**, the telegraph man in the wheelhouse is immediately to **move his telegraph to the "stop" position** and **return it at once to the position ordered**. At the same time, he is to **report** to the compass platform "port/starboard or both engines no/wrong reply". If, after carrying out the above procedure, the correct reply is received, the telegraph man will then report his telegraph at the position ordered in the normal manner.

116. **Quartermaster** — The **quartermaster** in the wheelhouse is responsible for seeing that all helm and engine orders are carried out properly and a good course is steered by the helmsman.

117. **Changing Watches** — When **changing watches** in the wheelhouse, permission is always required from the OOW before the change is made. The helmsman **coming off** must inform the one **coming on** of his **course, speed** of the engines, **revolutions showing** on the counter, and the **amount of helm** the ship may be carrying. The **new helmsman** must then **report** all of this to the command as soon as he has taken over the wheel.

118. **Emergency Steering Position** — The ship may also be steered in an emergency **by the main engines** or from the **emergency steering position** in the tiller flats. Procedures for changing positions in the event of steering gear breakdown will be prominently displayed in the wheelhouse.

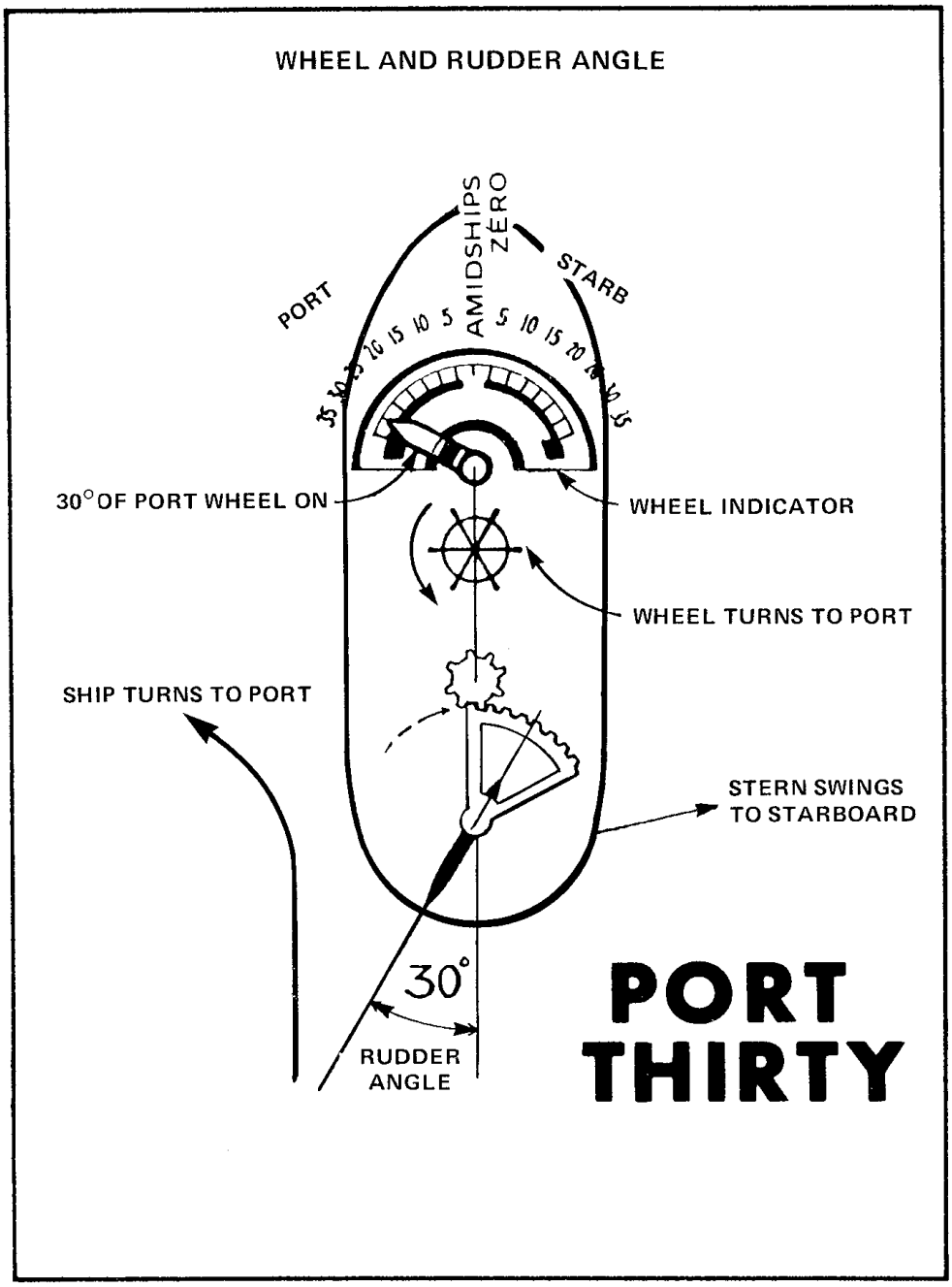


Figure 9-19 Wheel and Rudder Angle

TRAINING PERIOD 11 — WHEELHOUSE DUTIES; PRACTICAL EXERCISE

119. **Practising without Equipment** — Cadets should be practised in accepting, repeating and reporting wheelhouse and engineroom orders. Although desirable, equipment is not necessary. The desired objective may be attained by giving the appropriate order and having the cadet reply with the corresponding responses, simulating the actions.

120. **Practising with Equipment** — If wheelhouse equipment is available, however, it greatly enhances the effectiveness of the exercise and makes it more interesting for the cadets. A fair number of corps have been fortunate enough to obtained ship's wheels, binnacles, telegraphs, etc, and these items often perform a purely decorative function on the quarterdeck or elsewhere. This is an opportunity to use them to real advantage, either in the classroom, if they can be moved, or in situ if they cannot. Cadet corps also have a record of considerable ingenuity in the construction of models and mock-ups. Here is a situation where this ingenuity can be invaluable.

TRAINING PERIOD 12 — THE GANGWAY STAFF AND LIFEBUOY SENTRY

121. **The Gangway Staff** — The gangway staff is headed by the OOW or OOD. As most official books and documents refer to him as the OOW, this manual will do the same. If you find **the duty officer** in your ship **in harbour** is called **the OOD**, don't worry. He does the same job but is not required to spend the whole twenty-four hours on the quarter-deck standing watch-and-watch. Watch-and-watch means that two officers or men share the watches between them, one standing forenoon, dogs, and middle and the other standing afternoon, first and morning.

122. **Officer of the Watch** — The **Officer of the Watch** (OOW) is in charge. He is, in fact, the representative of the Captain. The OOW is responsible for:

a. the safety of the ship;

b. the appearance of the ship;

c. the conduct of all on board;

d. the safety and appearance of the boats;

e. marks of respect being paid to visiting officers and passing ships; and

f. the ship's routine.

123. **Gangway Staff** — The composition of the **gangway staff** assigned to assist the OOW may vary from ship to ship. Circumstances may necessitate a larger gangway staff than usual, but in general there will be, in addition to the OOW, the **Corporal of the Gangway** and the **Boatswain's Mate of the Watch**. The duties of the Corporal of the Gangway will include:

a. **checking visitors** to the ship and keeping the **Gangway Visitor's Book**;

b. **checking men leaving the ship on duty** and keeping the **Duty Ashore Book**;

c. **checking the dress** of personnel proceeding ashore;

d. regulating the **ship's routine**;

e. ensuring the **safety of ship's boats** at the booms;

f. **supervising the Boatswain's mate and roundsman**;

g. **identification** of persons entering the ship;

h. **keeping the OOW informed** of all activities in the Gangway area; and

j. **paying marks of respect** (Gangway Ceremonial).

The duties of the **Boatswain's Mate of the Watch** include:

a. making **routine pipes and announcements** over the ship's broadcast;

b. **piping the side**;

c. **reading thermometers and barometers**; and

d. **answering the gangway telephone**.

The list of duties is not intended to be complete. It is only included to illustrate the types of duties that the various members of the gangway staff perform. All members should **assist the OOW in the performance of his duties**, upon which the safety and good name of the ship depend. For example:

a. **check the lines** and make sure that they are taking an even strain;

b. glance aloft from time to time and make sure the **masthead pennant** is clear;

c. **look along the guard rails** and see that no Irish pennants are dangling from them; and

d. **check the boats** to see that they are properly secured, and they are dry and generally shipshape.

124. **Helpful Hints** — Here are some hints which will make you a more effective member of the gangway staff:

a. **Check your appearance** — You may be the first man a visitor sees when he comes onboard your ship. Create a good first impression. In addition, the sight of a sloppy gangway staff in the morning can ruin the Executive Officer's disposition for the whole day.

b. **Be courteous** — Strangers to your ship will ask you for help. Give it cheerfully. Suppose you had come aboard a ship for the first time and the first man you met said, "Whadda you want?" The ship will get a bad name if you are not courteous to visitors.

125. **Life Buoy Sentry** — Whenever your ship is at sea, a **life buoy sentry** will be closed up, **usually on the quarterdeck**. His duty is to **respond to any man overboard situation** by **throwing both kisbie floats over the side**, calling out "**man overboard**", and by **pressing the life buoy alarm** (a continuous ring). He also acts as the **after lookout** (particularly important in a DDH where you cannot see aft from the bridge), and can gain contact with the bridge through the quarterdeck phone. Although you may belong to a trade that does not normally stand duty as life buoy sentry, you must know the location of the life buoy alarm and kisbie floats and the action required should you see someone fall over the side, or if you hear the alarm ring.

126. **Other Duties of a Life Buoy Sentry** — In a DDS during Flying Stations, the life buoy sentry and the HQ1 roundsman close down vents on the quarterdeck (to prevent aviation fuel vapours from entering the ship's ventilation system) and open flood and spray valves (in case of fire). The life buoy sentry stands by the valves.

127. **Kisbie Floats and Aqualights** — An **aqualite** is a sea cell operated, floating light for use with a kisbie float to show its position at night. The light itself is a small float, attached to the kisbie float by a synthetic lanyard. See Figure 9-20. Incorporated into the lanyard is a large pin used to hold closed the aqualite container. Two small plugs fitted into the activating holes in the bottom of the light are connected to the container so that they are automatically removed when the light is pulled out of the container. See Figure 9-21. The containers are fitted to the ship in such a manner that when the kisbie float is thrown over the side, the aqualite goes with it automatically. A few seconds after entering the water the sea cell activates the light. Once a light has been used it must be surveyed and replaced.

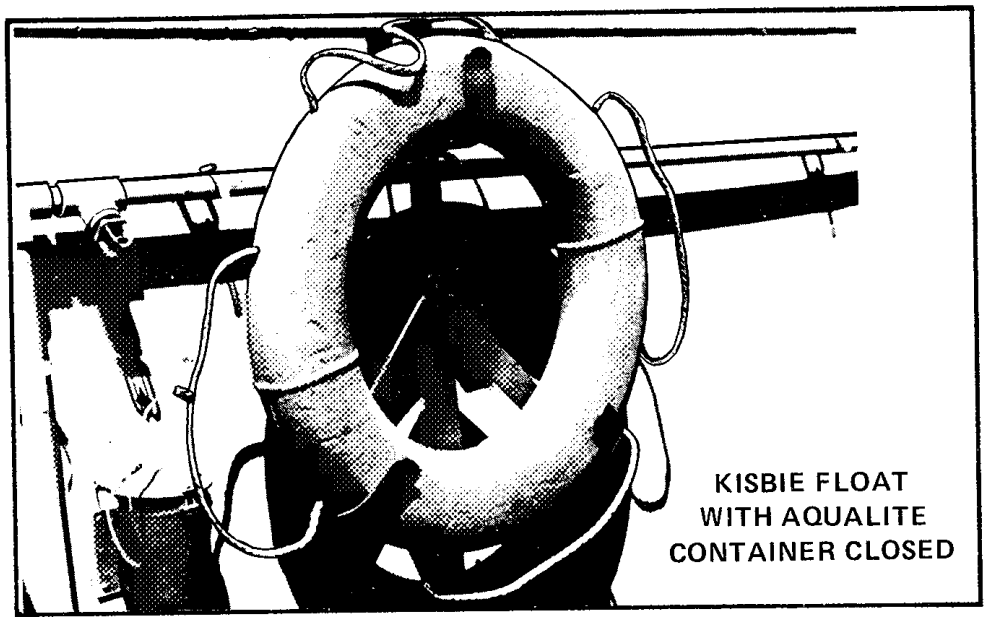


Figure 9-20 Kisbie Float with Aqualite Container Closed

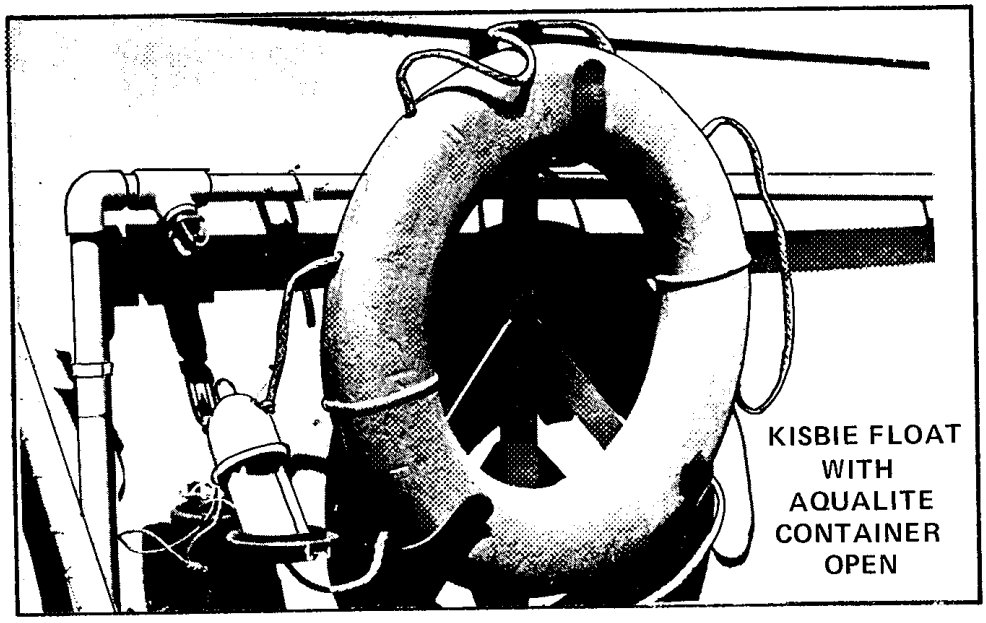


Figure 9-21 Kisbie Bloat with Aqualite Container Open

128. **Rescue — Ship Recovery** — In Training Period 7 it is explained how Rescue Stations are so organized to provide assistance outside the ship to any situation by the ship itself, the seaboat, rescue swimmers, or the ship's helicopter. We are here mainly concerned with the recovery of men in the water. The equipment required for the operation is basic to all ships and you should become familiar with it.

129. **Rescue Davit** — A **rescue davit** position is rigged on either side of the Ship, Figure 9-22. From this position the buoyant rescue sling (attached to the safety line) may be lowered to anyone alongside in the water, or it may be towed to the victim by a rescue swimmer, provided the ship is in reasonable proximity. Entry into the rescue sling is by raising the bight over the back of your head and down and under your arms (you will fall out if you do the reverse). The man is then hauled to the ship's side and inboard.

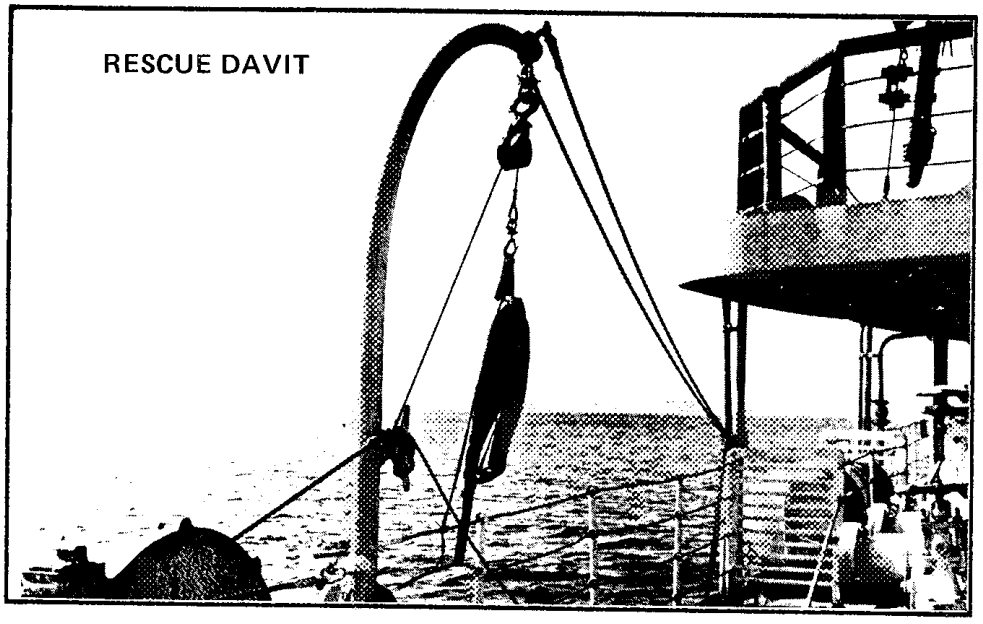


Figure 9-22 Rescue Davit

TRAINING PERIOD 13 — DAMAGE CONTROL/WATERTIGHT INTEGRITY

130. **Damage Control** — **Damage Control** is particularly concerned with keeping ships in efficient fighting condition in spite of damage. The first priority is to prevent the ship from sinking and to limit the damage. After that, the ship must be kept as upright and steady as possible to enable the weapons to be used to the best effect, and if possible the ship must be got under way so that she may continue the fight. The most important aspect of damage control is **ship stability**.

131. **Watertightness** — If a ship didn't have **compartments**, and it was holed in the side, it would soon fill up and sink. (See Figure 9-23.)

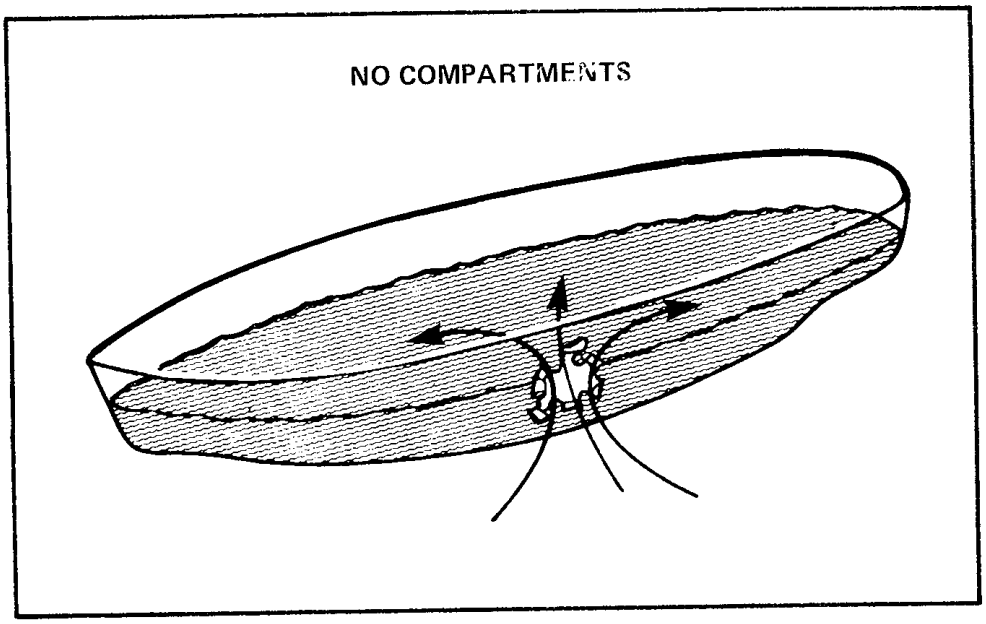


Figure 9-23 No Compartments

132. **Bulkheads** — If it does have compartments, the flooding is restricted to the holded compartments, and the ship doesn't sink. This is why the ship is divided up into compartments by **watertight bulkheads**. (See Figure 9-24.) Since it is necessary to get in and out of all the compartments in a ship, there must be a door or hatch into each compartment. It is often necessary for men to be in these compartments with the door or hatch shut, and therefore there must also be some sort of **ventilation**.

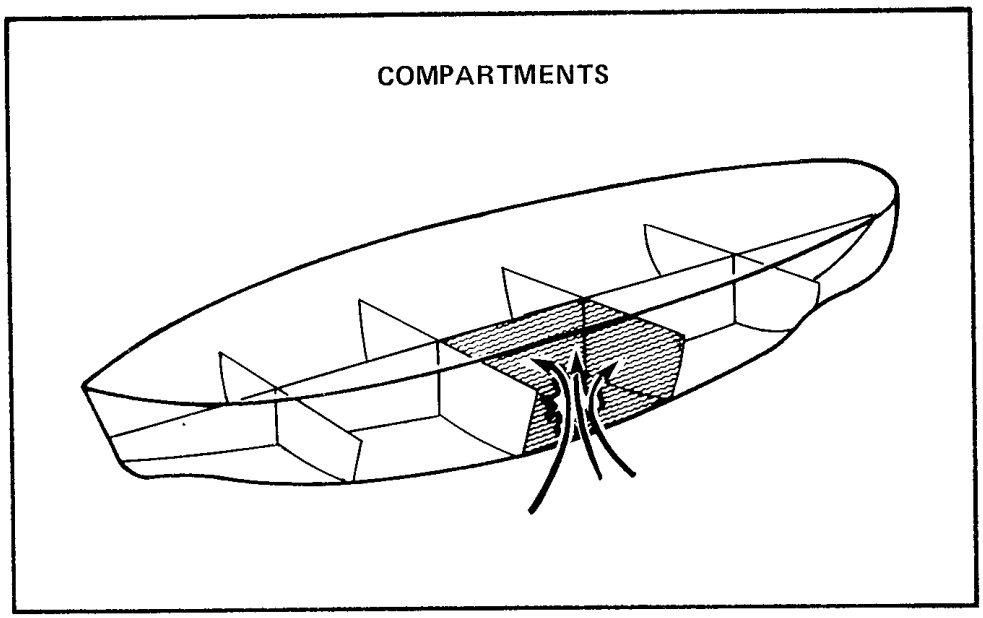


Figure 9-24 Compartments

133. **Watertight Discipline** — You can easily see that if all the doors, hatches, and ventilation openings to the various compartments were left open, an holded ship would fill up just as readily as if there were no watertight bulkheads. There must, therefore, be some control of the opening and shutting of doors in a ship. This is called **watertight discipline.** It is effected by **marking all doors and hatches in a ship** according to the danger of leaving them open if the ship were damaged and flooding.

134. **Red Zone** — That part of the ship which is **below and just above the waterline** presents a major threat to buoyancy and stability in the event of flooding and is known as the **Red Zone**. Every door, hatch and ventilation opening in the red zone is marked with a **red control letter** indicating that there would be immediate risk to flooding if the ship were damaged in that area. **All other control letters are black**.

135. **Control System** — But when there is no emergency it is still dangerous to allow doors and hatches to be opened at random, so there is a **control system** used all the time. In this system, doors, hatches, and ventilation openings are lettered to indicate when they may be opened. The operation of the control system is the responsibility of **Damage Control Headquarters**, or **HQ1** which you heard about briefly earlier, in the section on Emergency Stations. This may also be referred to as **NBCD Headquarters** (for "Nuclear, Biological and Chemical Warfare Defence and Damage Control").

136. **Emergency Pipe** — When there is an emergency you will hear the pipe "Emergency Stations, close all red openings". All hands will close red openings in their vicinity and then proceed to their emergency stations. In some ships, the form of the pipe will indicate the nature of the emergency (eg, "Fire, Fire, Fire. . ." or "Flood, Flood, Flood. . ." and the required Condition of Readiness (see below), such as ". . .assume control state Zulu").

137. **X-Ray** — The following **watertight control** markings will be found on doors and hatches throughout the ship. **X (X-ray)** in **red** means that **you must ask permission from the OOW** or **NBCD Headquarters** (HQ1) before you open the door. A sentry must be standing by ready to close it all the time it is open.

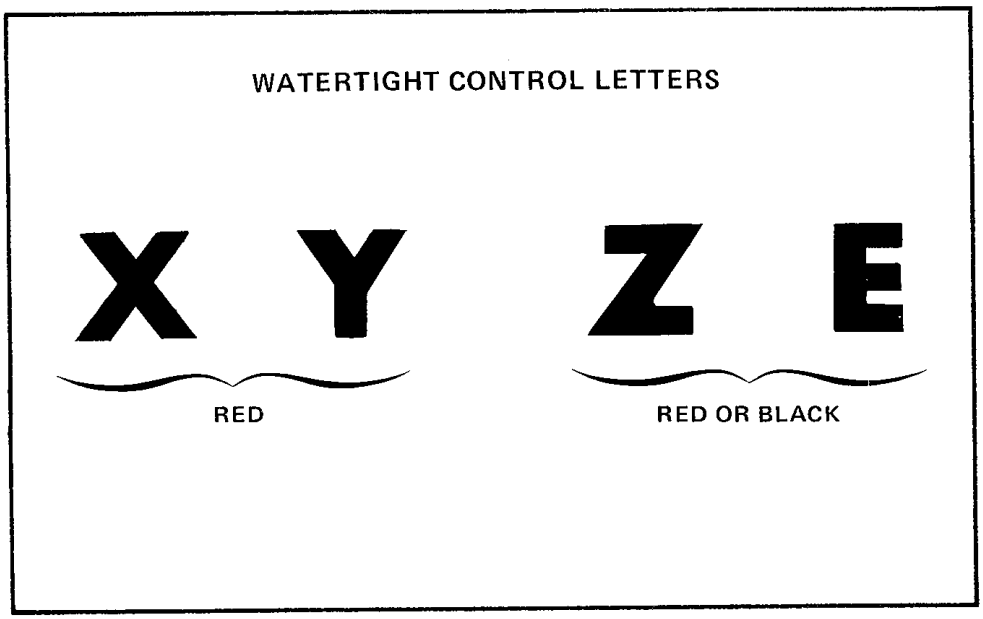


Figure 9-25 Watertight Control Letters

138. **Yankee — Y (Yankee)** in **red** means that you may open the door to pass through but **you must reclose it at once**. If you need to keep it open for any length of time, you must get permission from the OOD or HQ1 who will give you a **May Be Left Open** tag to place on the door.

139. **Zulu — Z (Zulu)** in **black (rarely in red)** is placed on doors, almost always above the red zone, which are necessary for the free passage of personnel about the ship. In Conditions X-ray or Yankee (see below) these doors may be left open. In Condition Zulu, Zulu doors are closed, but may be opened **and reclosed** to permit essential passage, as for Yankee doors.

140. **Echo — E (Echo)** is **red** or **black** is found only on **watertight valves** and **flaps in the essential ventilation system**. Normally open, they are **closed only in an emergency endangering watertight integrity**. The order "Close all red openings" includes **red** E valves and flaps. The order "Close Echo openings" applies to **all** openings marked E. (For the reason, see Figure 9-28.)

141. **Control Markings** — These control markings **also apply to hatches and ventilation openings** and if the control markings are observed, make a ship ready for almost any damage it may sustain; but when the damage does come, it must be discovered quickly and something must be done about it. For this reason, there is an organization in the ship to cope with damage, to keep the ship from sinking and keep her upright.

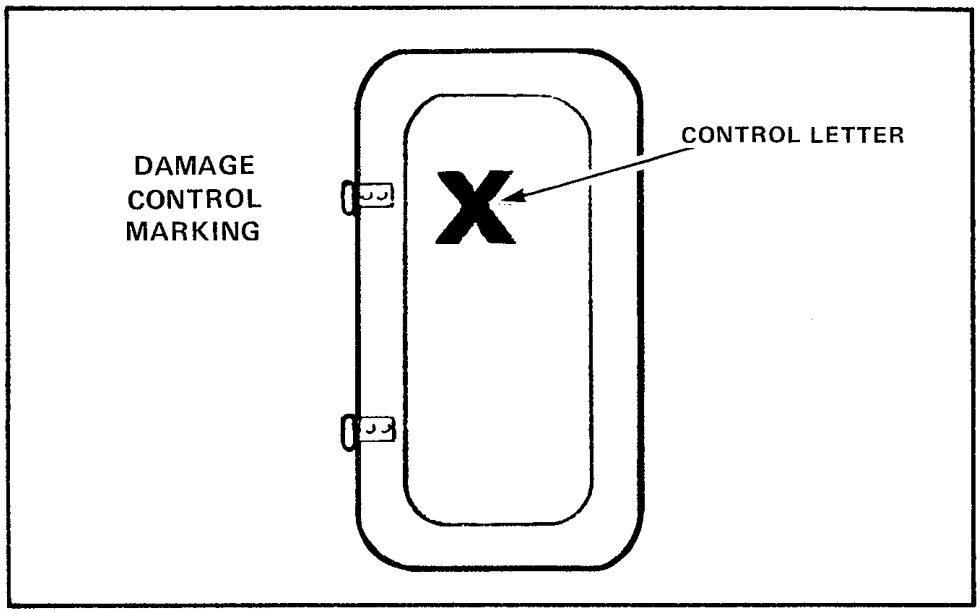


Figure 9-26 Damage Control Marking

142. **NBCD Organization** — The **NBCD Organization** (or Damage Control Organization) consists of a team of men which, as you will see later, is also responsible for the nuclear, biological and chemical warfare defence of the ship. Naturally, the Captain is ultimately responsible for the safety of the ship, but he delegates the responsibility for NBCD organization, coordination and training to the Executive Officer. In an action, however, the **Engineer Officer takes over the coordination of the team**, for the Executive Officer must be ready to take command of the ship should the Captain become a casualty.

143. **Job of the NBCD Team** — The job of the NBCD team is to **find damage quickly**, take immediate steps to **prevent it spreading** and, if possible, **improvise repairs. The nerve centre of the team is HQ1**. From here the various teams are controlled, and a record is kept of what they are doing. The condition of the ship must be known at all times, so that necessary measures may be ordered quickly. HQ1 keeps the Captain informed of the general situation and advised him on NBCD matters.

144. **Section Bases** — In addition to the main nerve centre, HQ1, there are minor nerve centres throughout the ship called **Section Bases**. It is from these section bases that parts of the team operate. Destroyers (DDE/DDH) have two or three section bases and larger ships may have more. By dividing the teams up in this way, the chance of all of them becoming casualties at once is greatly reduced.

145. **Know the Ship** — Every seaman may have to take part in the duties of the NBCD team. These duties may include firefighting, pumping and flooding, strengthening the bulkheads of flooded compartments, stopping leaks, and other jobs vital to the

safety of the ship. Therefore, it is essential that **every man knows his ship perfectly**. It is not enough just to know the places in which you live and work. You will probably be required to get quickly to an entirely different part of the ship, and the success of your job when you get there will depend upon your knowledge of that compartment and its fittings. The actual survival of the whole ship may depend upon how well you do your job on the NBCD team.

146. **Conditions of Readiness** – It is not practical to keep the whole NBCD team at the highest condition of readiness at all times, nor is it necessary. It is easy to see that a ship must be in a better condition of readiness for damage if it is steaming through submarine-infested waters in wartime than if it is just making a passage on the open sea in peacetime. Therefore, the NBCB organization must be capable of keeping different conditions of readiness.

147. **Three Conditions** – There are normally **three conditions of NBCD readiness** to cover all the circumstances in which a ship may find herself. These conditions are shown in the following table. Basically they are the same throughout the sea environment.

Condition	Circumstances	Signification
Z (Zulu)	You know that an attack is coming and you may sustain some damage.	The **complete organization** is closed up and ready for action. Duplicate systems are in use in case the normal systems are damaged. **All openings marked X, Y, and Z are closed.**
Y (Yankee)	It is possible that you may be attacked or damaged by you have no definite knowledge of an attack coming.	The organization is only **partially manned** by watchkeepers, but **watertight discipline is strictly controlled. All openings marked X and Y** are closed and a patrol is active.
X (X-Ray)	You are at sea or in harbour during peacetime when threat of damage is normal.	**Sea** – A watch is kept in HQ1 and a patrol is active. **All openings marked X are closed.**

Figure 9-27 (Sheet 1 of 2) Conditions of Watertight Readiness

Condition	Circumstances	Signification
		Harbour — In a small ship the OOD and staff keep a **Watertight Integrity Log**. In large ships, a watch is kept in HQ1 and a patrol is active. **All openings marked X are closed.**

Figure 9-27 (Sheet 2 of 2) Conditions of Watertight Readiness

Condition X-ray is the one most used in peacetime, except during exercises or when danger exists such as when entering or leaving harbour or passing through fog.

148. **Peacetime Conditions** — The relaxation of watertight discipline does not mean you may ignore the control markings on a door or hatch. It means that the danger to the ship is less and more doors and hatches may be left open. Remember, **at all times** openings marked **X**, should remain closed unless permission to open them is given by HQ1 or the OOW.

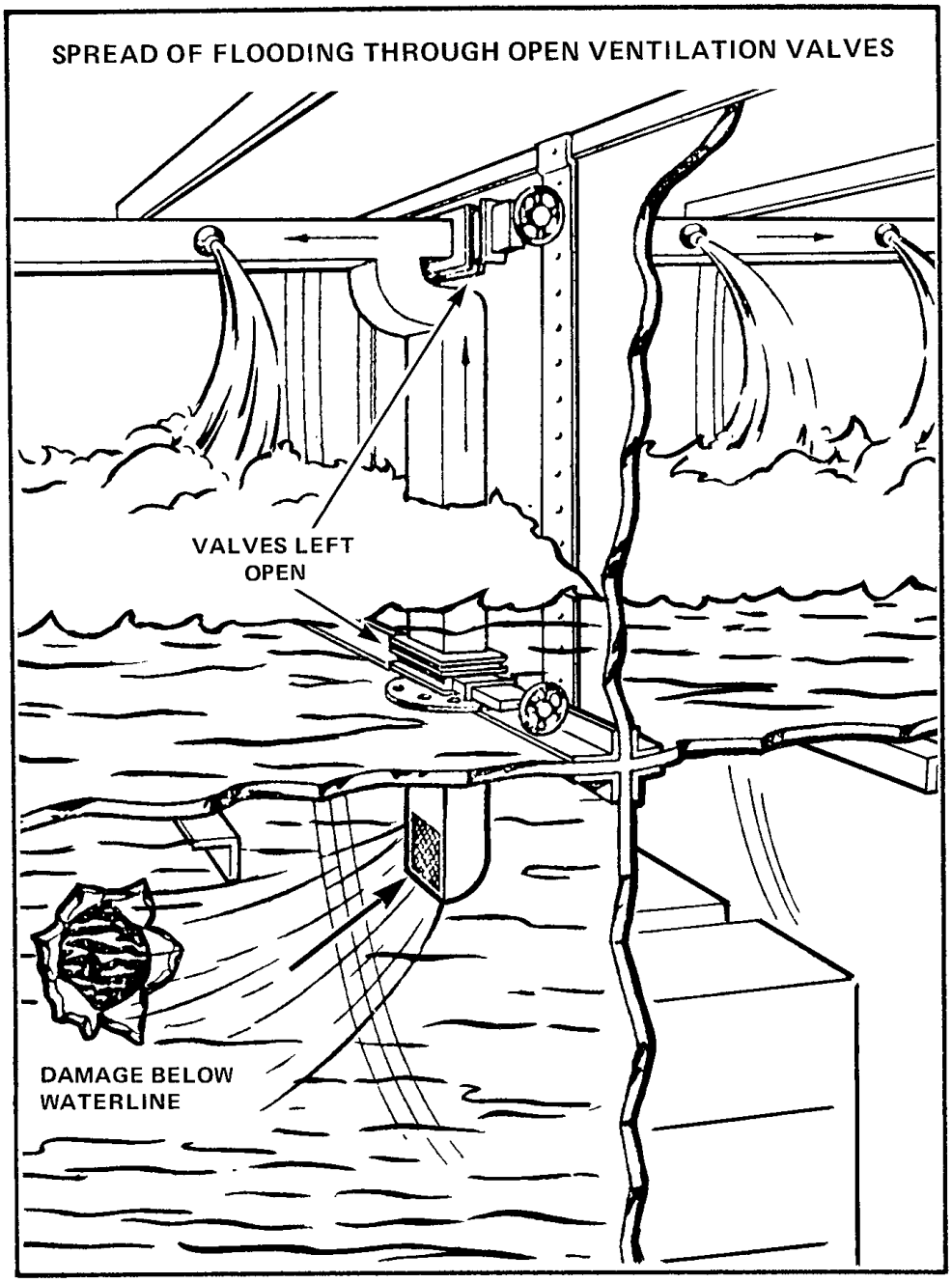


Figure 9-28 Spread of Flooding Through Ventilation System

TRAINING PERIOD 14 — DAMAGE CONTROL/GASTIGHT INTEGRITY

149. **Gastight Integrity** — Just as a ship is made watertight to keep water out, it is made as airtight as possible to keep out **gas** or **radioactive contamination**. Much of the external shell of the ship, including bridges and superstructures, can be made gastight. All interconnecting compartments which can be grouped together with unbroken

gastight boundaries form what is called the **citadel**. Other spaces can be made gastight, but for geographical or other reasons cannot be included in the citadel; these are called **gas-free spaces**. When the ship is closed down, air in the citadel is recirculated through **cannisters** containing chemicals which remove carbon dioxide and other waste gases, and is supplemented by air drawn into the ship through special **filters**. Openings in the boundaries of citadels and gas-free spaces must be controlled in a similar way to watertight openings. Some openings must fulfill **both functions, watertightness having prior claim on some occasions and gastightness on others.**

150. **Control Markings** — Just as watertight discipline has its control markings, **X, Y, Z** and **E** gastight discipline has it control markings **A, B, C** and **M**. These are marked **in black** on **gastight valves** and **flaps.**

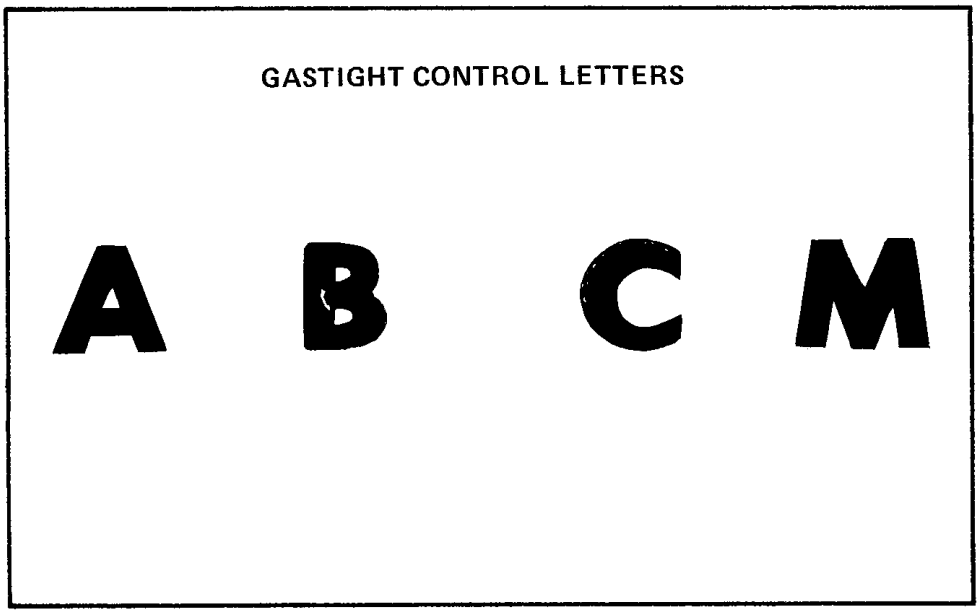


Figure 9-29 Gastight Control Letters

151. **Closing Down** — Now, where a ship is watertight, it follows that it is also airtight. **Where there is an X, Y, Z, E there is no need for an A, B, C or M.** These latter markings are put on **ventilation openings** which **pose no threat to watertightness, but do affect gastightness.** They help in the task of **closing down** the ship. "Closing down" means to make a ship as gastight as possible.

152. **Charlie — Openings marked C (Charlies)** are **closed first**. These are openings which, by being shut, do not bring too much discomfort to the ship's company. C is for **caution.**

153. **Bravo — Openings marked B (Bravo)** are **closed down second.** These are openings which provide air for **those spaces which are cleared of men** when the ship's company goes to action stations. B openings are closed down **when an attack is likely.** B is for **beware.**

154. **Alpha — Openings marked A (Alpha)** are closed down **last.** These are openings which, when closed, result in actual discomfort to the ship's company at action stations, so they are always left until the last moment. The list of A openings is kept as short as possible so that they may be closed down quickly. A openings are shut **when a contaminated cloud is actually approaching the ship.** A is for **alarm.**

155. **Mike** — There are some openings which simply cannot be closed down if the ship is to operate. For example, the first is the boiler room where air is needed. If a ship's engines are running, you cannot shut off the air supply to the boiler room. The rule for these openings is that they are to be shut down **only when it is possible to do so**; they are marked with an **M (Mike)** which means that they are under **the control of the operators of the equipment.** (These are similar to Echo openings, but pose no threat to watertight integrity. They are closed only in the most stringent gastight situations.)

156. **Combining Gastight and Watertight Conditions** — Just as there are various **conditions of readiness** in damage control depending on the circumstances, so there are various conditions of readiness in NBC defence. Normally, a gastight condition is **not used alone**; if required, it is **superimposed on a watertight condition.** It should also be noted that a high gastight condition requires the assumption of **at least as high** a watertight condition. The following table shows how these conditions may be combined and the circumstances in which they are likely to apply.

Condition	Circumstances	Signification
X (X-ray)	**Peace** — harbour normal cruisings. **War** — defended harbour, when refitting, etc.	X openings closed. Watch kept in HQ1.
Y (Yankee)	**Peace** — dangerous circumstances, eg, fog or mines. **War** — Undefended harbour, normal cruising.	X and Y openings closed; HQ1 partially manned by watchkeepers; patrol active.
YB (Yankee Bravo)	**Peace** — as required for exercises. **War** — Cruising or undefended harbour, but prepared for NBC attack.	X and Y openings, B and C vents closed. (Remainder as for Y).

Figure 9-30 (Sheet 1 of 2) Conditions of Gastight Readiness

Condition	Circumstances	Signification
Z (Zulu)	**Peace** — as required for exercises. **War** — action or expected action.	X, Y and Z openings closed; Complete Damage Control Organization closed up. Duplicate systems in use in case normal systems are damaged; E vents under **user** control.
ZB (Zulu Bravo)	**Peace** — as required for exercises. **War** — as for Zulu, but prepared for NBC attack.	X, Y and Z openings closed; B and C vents closed; remainder as for Zulu.
ZA (Zulu Alpha)	**Peace** — as required for exercises. **War** — as for Zulu, but NBC attack imminent.	X, Y and Z openings closed; A, B and C vents closed; E and M vents under **user** control; remainder as for Zulu.

Figure 9-30 (Sheet 2 of 2) Conditions of Gastight Readiness

157. **Conditions of Readiness and Degrees of Readiness** — You have learned, in your lecture on a ship's action organization, about the **degrees of readiness** which control the manning of the ship's **armament**. These should not be confused with the **conditions of readiness** of the damage control organization, which are discussed in this section. These situations **may** coincide. (In a case of imminent attack, the highest **degree** of readiness, Action Stations, will coincide with the highest condition of readiness, condition Z; but they may not. In a peacetime situation where a ship has been damaged by, say, a collision, condition Zulu would be imposed, but the manning of the ship's armament would be the last thing in anyone's mind.)

158. **Damage Control Patrols** — When large ships are in harbour or at sea, HQ1 is manned at all times and damage control patrols inspect all watertight compartments, hatches, doors, and damage control fittings to ensure they are in the condition of readiness ordered. Patrols look for leaks in the firemain, fresh water, and other liquid systems. However, fire and flooding hazards are the patrolman's primary concern.

159. **Manning of HQ1** — In destroyer escorts, HQ1 is manned **only at sea** with a Petty Officer and at least one damage control patrolman. In **harbour**, HQ1 is not manned, but patrolmen are selected **from the Emergency Party** and are known as

roundsmen. They make hourly rounds of the ship and report to the Corporal of the Gangway at the brow. When patrolmen or roundsmen notice any unusual condition, a report must be made at once to HQ1 or the OOD.

TRAINING PERIOD 15 — KNOWING YOUR SHIP

160. **Knowing Your Ship** — There are many rules and regulations in the navy which are merely good for discipline, or are designed only to make life more comfortable. The rule **know your ship** is not one of these. Far from being smart, it is the height of stupidity to ignore this rule because it can be a matter of life or death, not only for yourself, but for everyone else in the ship. Under certain circumstances (which are almost bound to arise in wartime) the rule "know your ship" is even more important than arriving back off leave when the ship is under sailing orders. It is certain that many ships have been lost both in war and peace because someone — it only takes one — did not know his ship.

161. **Reasons** — Every seaman may have to take part in the duties of the NBCD team. These duties may include firefighting, pumping and flooding, strengthening the bulkheads of flooded compartments, stopping leaks, and other jobs vital to the safety of the ship. Therefore, **it is essential** that every man knows his ship perfectly. **It is not enough just to know the places in which you live and work**. You will probably be required to get quickly to an entirely different part of the ship, and the success of your job when you get there will depend upon your knowledge of that compartment and its fittings. The actual survival of the whole ship may depend upon how well you do your job on the NBCD team.

162. **Standard System of Marking** — If you are fortunate enough to be selected for a cruise in a naval vessel, you will probably be given or shown a diagram indicating the watertight subdivisions of the ship and the means of access to these compartments. It is very important that you make yourself familiar with this diagram so that you can find your way about the ship, especially in time of emergency when other people are too busy to answer questions. It will also help you to report accurately the locations of any damage or other problem which you may witness. No two ships are exactly the same, but to make the identification of compartments simpler, they are all numbered, and the numbering follows the same system in every ship, regardless of size or type. This is called the Standard System of Marking.

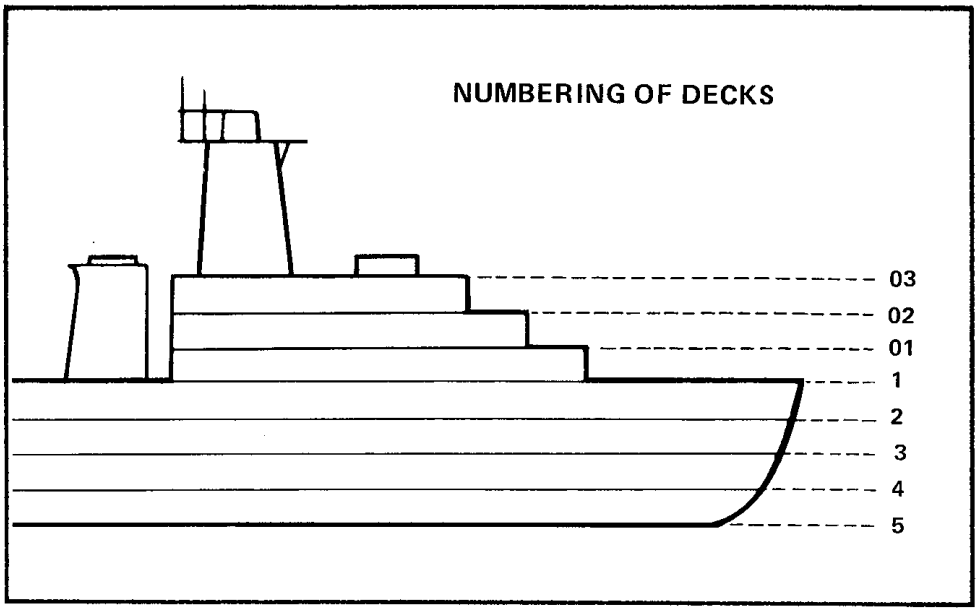


Figure 9-31 Numbering of Decks

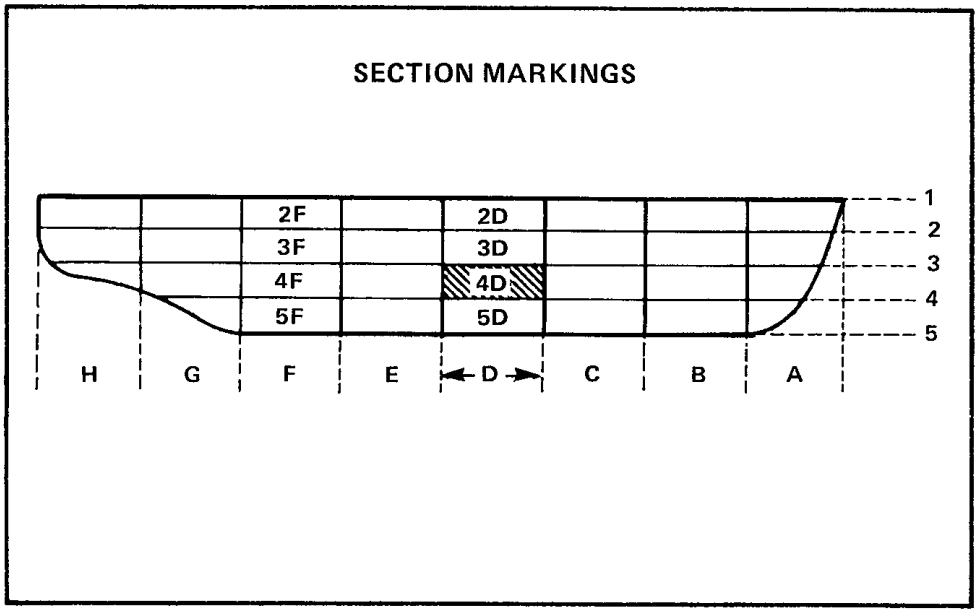


Figure 9-32 Section Markings

163. **Numbering Sections — Starting at the weather deck**, decks are numbered up and down as in Figure 9-31. Each section between watertight bulkheads is marked by a letter **starting forward** as is shown in Figure 9-32. So, thus, the space on deck number 4 in section D is called 4D.

164. **Numbering Subsections** — Now there may be more than one watertight compartment within a section, so these are designated from **forward and aft toward the halfway point** with **small letters** as shown, starting at the forward end with A and at the after end with Z. You can now say that the second subsection of the D section of number 4 deck is compartment 4DB. See Figure 9-33.

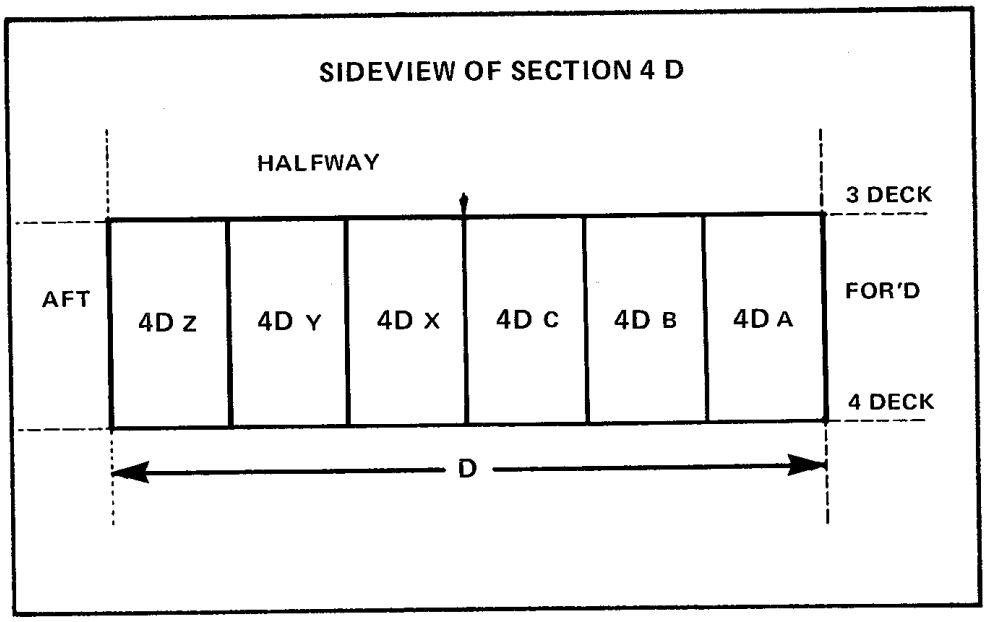


Figure 9-33 Sideview of Section 4D

165. **Numbering Athwartships** — But suppose this subsection 4DB is divided **athwartships** into compartments. Then starting at the centreline and working outwards you number the **starboard** compartments with small **odd** numbers, and the **port** side compartments with small **even** numbers, as shown in Figure 9-34, (loading down upon subsection 4DB).

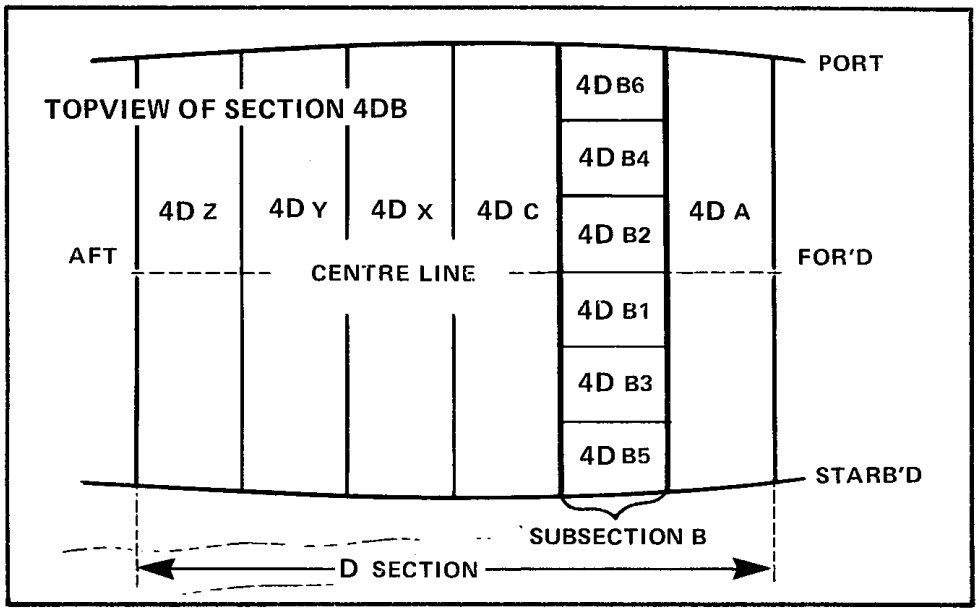


Figure 9-34 Topview of Section 4DB

166. **Practise the System** — This is the basis of the system. It may seem complicated at first glance, but further study will show how easy it really is. Practice identifying the various spaces in your ship until you can do it quickly and without effort. Once you have this system firmly in your mind, you will be ready to learn and understand the more complicated exceptions to the rules which you will encounter in a ship. If you do not take the trouble to learn this system well, you will be hopelessly lost in a ship, and you will be a menace to all your shipmates.

167. **Form a Mental Picture** — An easy way to remember the system is to form the following picture in your mind:

Deck	**Section**	**Fore and Aft Subsection**	**Athwartships Subsection**
from the weather deck	from forward	from fore or aft	from the centre

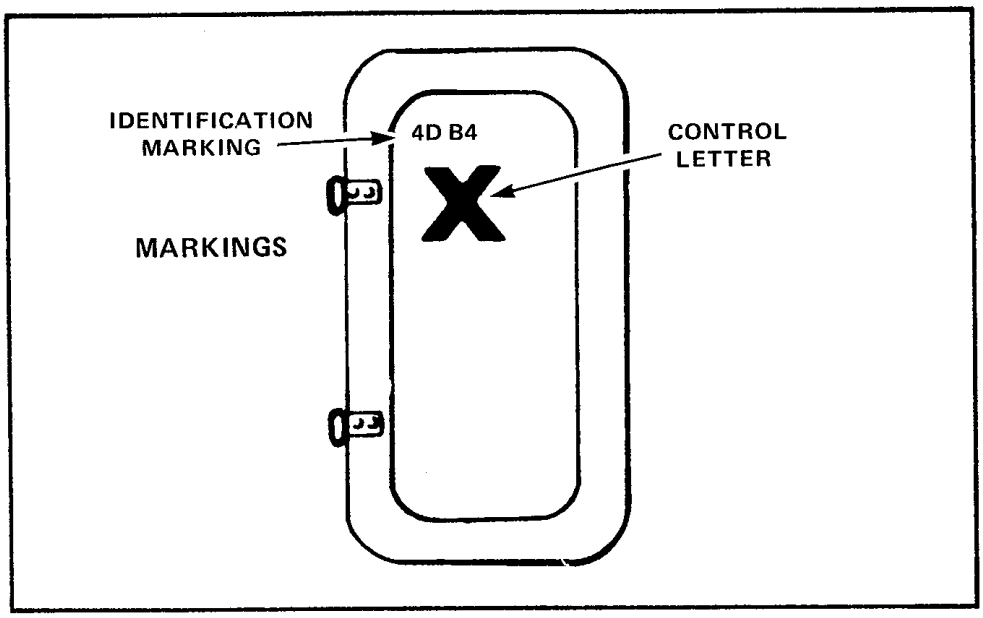


Figure 9-35 Markings

168. **Markings on Doors and Hatches** — Doors and hatches are marked with the number of the compartments into which they give access. Thus the door to compartment 4DB4 would appear as in Figure 9-35.

169. **Bulkhead Markings** — Doors in the **main watertight bulkheads** are marked with **both** the sections which the bulkhead separates. Thus the door on number 4 deck between section D and E would be marked 4D/E.

TRAINING PERIOD 16 — REVIEW AND TEST

170. A brief review of Training Periods 9-15 of the Personnel and Organization course should be made, indicating the various areas that require emphasis and explaining any points which appear to be causing difficulty.

171. Cadets shall write a short test, with a minimum of one question referring to the subject matter of each Training Period. Pass mark for the test shall be 60 percent.

GLOSSARY OF TERMS

The following are some of the common terms used by seamen. Some are slang and some are good seamanlike terminology. The slang terms are marked with an asterisk (*); they should only be used in informal conversation.

Abaft
Further aft than; never use the term "Aft of".

Aft
In the direction of the stern.

Ahoy!
A seaman's way of attracting attention.

All Standing
To bring to a sudden or unexpected halt.

Aloft
Above.

A & A
An alteration or addition to a ship.

Athwart
Running from side to side.

Avast
An order to stop.

Awash
Level with the surface of the sea.

Back up
To assist in holding.

***Barrack Stanchion**
A person who has spent much time ashore.

Barge
A flag officer's boat.

Batten Down
To secure closed or shut.

Beach
Shore or ashore.

Beam Ends
When a ship is completely on her sides; confusion.

Bear a Hand
An order to assist.

Belay
To make fast a rope; also to cancel an order.

Below
Down.

Berth
A place to sleep or to secure a ship.

Between Decks
Any space below the upper deck.

Bilge
The very bottom of a ship's hull; also nonsense.

Board
The old name for the side of a ship. To board means to go alongside. To board and enter means to enter a ship (forcibly) **Inboard** means inside the ship, **Outboard** outside the ship.

Boot Topping
The black band around the waterline.

Brightwork
Polished metal fittings.

Broach To
To unintentially swing around broadside to a wave.

Brow
A gangway between two ships or from ship to shore.

***Bubbly**
Slang for rum.

***Buffer**
Chief Boatswain.

Bullring
The large fairlead at the bows used to pass out hawsers or cable.

Bumboat
A civilian boat that comes alongside to sell merchandise.

***Burma Road**
Main passageway in a Canadian destroyer.

Butt End
The largest end.

***Buzz**
A rumour.

Cant
To incline away from the upright position.

Capsize
To overturn.

Carry Away
Removed or lost due to sea or wind.

Cast Off
To let go.

Check Away
To ease out a rope or wire under control.

Chock-a-Block
Full up.

Chuck
The sea.

Clean
To change from one type of dress to another.

Clear
Free; unobstructed; to make free.

Cleat
A piece of metal or wood with two horns around which ropes are made fast.

***Crashed**
Slang for a sailor sleeping.

Crest
The highest point of a wave.

***Dead Marine**
An empty beverage bottle or can.

***Dead Men**
Rope ends hanging from aloft.

***Deep Six**
The ocean or, to throw overboard.

Derelict
A ship, abandoned by her crew, but still afloat.

Dip
To lower temporarily; to pass under.

***Dipped**
To be reverted in rank.

***Ditch**
To throw away.

Dowse
To put out a light or fire.

Drag
To pull along the seabed to recover something.

***Drip**
To complain.

Drown
To drench or saturate.

***Duff**
Dessert.

Easy
Carefully or slowly.

End for End
The reverse position.

Eyes of the Ship
The extreme forward end.

Fair
Favourable or unobstructed.

Fake Out
To lay a wire or rope on the deck so that it is free running.

Fathom
Nautical measure, 6 feet.

Fiddle
Fitting on a table to keep mess utensils in place in bad weather.

***Flaked Out**
Slang for a sleeping sailor.

Fleet
A general term meaning the ships of a navy.

Flotsam
Any floating cargo, stores, or damaged equipment which have floated off a wrecked or damaged vessel.

Forepeak
That compartment farthest forward in a ship.

Foul
To entangle or obstruct.

Founder
To sink.

Freshen the Nip
To shift the point where a bight of wire or rope makes contact.

Galley
Ship's kitchen.

Gangway
Any recognized entrance to, passageway, or traffic route within a ship.

***Gash**
Extras, leftovers, and garbage.

Grapnel
A pronged hook for retrieving gear over the side or for dragging the bottom.

Green Sea
An unbroken wave.

Grog
Rum mixed with two parts water.

Handsomely
Slowly, carefully.

Hanging Judas
A fall, whip, or halyard hanging loose from aloft.

Haul Taut
To pull tight.

Hawse Pipe
The pipe where the anchor cable runs out from the ship.

Heads
Toilets.

Holiday
A gap or space; area missed when painting.

Hulk
A vessel in use but condemned for sea service.

Irish Pennants
Rope yarns or stray rope ends hanging.

Jetsam
Stores or equipment deliberately thrown over the side to lighten ship.

Jettison
To cast overboard.

***Jimmy**
The Executive Officer.

***Jonah**
A bringer of bad luck.

***Jungle Deck**
Tank deck on replenishment ship.

Junk
Old rope.

Jury
Temporary, make shift.

Kye
Hot chocolate drink.

Labour
A ship labours when she pitches and rolls heavily.

Landfall
First sight of land after a sea passage.

Lay Up
To take a ship out of service; (storage).

Lee
Opposite side to that upon which the wind is blowing.

Lie To
To be as stationary as possible in a gale with the wind and sea ahead.

Make and Mend
Half day during working week that was originally set aside to repair and replace kit, it is now an opportunity for recreation.

***Matie**
Dockyard worker.

***Mess Traps**
Food utensils.

Neat
Undiluted rum, (not mixed).

***Number One**
The Executive Officer.

Overhaul
To overtake; to examine and repair; to haul apart the blocks of a tackle.

***Pier Head Jump**
Posting to a ship just prior to ship sailing.

***Pigeon**
Airman.

Pipe Down
An order meaning keep silence; a pipe down at sea means a free afternoon to catch up on lost sleep.

***Pongo**
Soldier.

Port
A hold in the ships side.

Proud
Sticking out.

***Pusser**
Anything that is service issue.

***Rabbit**
Government property taken or converted for private use.

Rake
To lean or incline from the upright.

Range
To layout rope or cable.

***Rattle**
To be in trouble.

Refit
To repair.

***Rogue's Salute**
A single gun fired at colours on the day of a court martial.

Roundly
Rapidly or fast.

Run Down
To ram, by accident or purposely.

Scotchman
Material used to prevent chafe.

***Scran**
Food.

Scran Locker
Stowage for kit left lying about.

Skulk
To shirk work of loaf.

Sculling
To leave lying about or unattended.

Scuttle
A round port hole.

***Sea Legs**
The ability to maintain balance when ship is rolling.

Secure
To make fast; to stop work.

***Shepherds Hook**
Stave with a large hook for recovering boats, falls and lifelines.

Ship's Company
The complement of a ship or base.

Shipshape
Neat and tidy.

Silent Hours
Hours between pipe down and calling the hands; only emergency pipes are made.

***Sin Bos'n**
Chaplain or Padre.

Sister Ships
Ships of the same class.

***Skate**
A no good; a man frequently in trouble.

Snug
Properly secured; tight.

Spell
Period of time.

Spindrift
Spray blown from the crests of waves.

Spurn-Water
A low metal or wooden coaming around the outboard edge of decks to prevent dirty water running down a ships sides.

Stanchion
A supporting post.

Stevedore
A man employed to stow cargo in a ship.

Stove In
Smashed in.

Stow
To put away.

Strike
To haul down.

Sullage
Wet garbage.

Surge
To handle a rope on a turning drum so that it remains stationary.

Sweeper
Man responsible for cleaning an area.

***Swing the Lead**
To avoid work.

Taut
Tight; to haul taut.

Take Charge
To get out of control.

Tell Off
Detail for work.

***Tiddley**
Neat; smart.

***Tiffy**
Originally an artificer; mostly the medical man on board a ship now, eg, "the sick bay tiffy."

***Tight**
Watertight.

Tot
Rum ration.

Trick
A short spell of duty on a particular job.

Two Blocks
When the blocks of a tackle meet.

Veer
To pay out a line, wire, or cable.

Walk Back
To pay out keeping the line in hand by walking.

Weep
To leak slightly.

***Wet**
Stupid.

Work Up
To exercise the officers and men of a ship in all their duties.

Yeoman
The senior signalman on board.

THE ADMINISTRATIVE ORGANIZATION OF A SHIP

1. **Departments and Subdivisions** — A ship is organized into a number of **departments**, which in turn are broken down into **sub-departments** of different **trades.** Each department is given a group of related jobs as its particular responsibility in the ship and each department is manned by a group of men of the appropriate trades to do these jobs. A specialist officer heads each department and is responsible for his department to the Commanding Officer through the Executive Officer. The Commanding Officer is responsible for everything that happens in his ship.

2. **Executive Officer** — The Executive Officer is second in command of the ship. He is responsible directly to the Commanding Officer for the ship's organization, cleanliness, and discipline. Should anything happen to prevent the Captain commanding his ship, the Executive Officer would automatically assume command.

3. The distribution of trades to departments within the administrative organization is as follows:

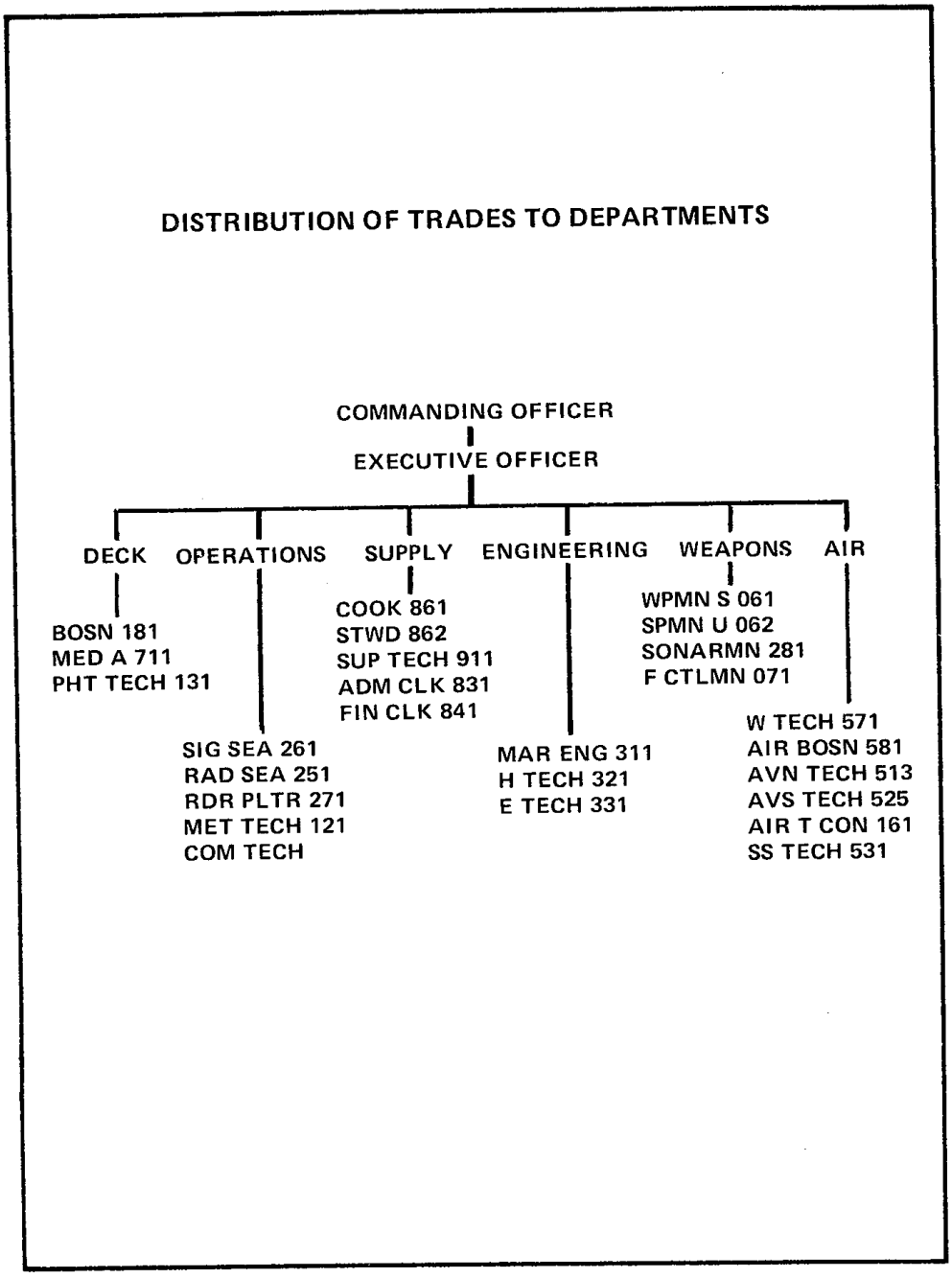


Figure 9-36 Distribution of Trades to Departments

4. **Trade Duties** — To understand more of what the other trades do, we will list some of the duties of the different trades:

a. **Boatswain (Bosn 181)** — The seaman specialist, responsible for small arms maintenance and custody; all paints and associated equipment, their

application, stowage, and issue; ship's boats and replenishment-at-sea gear; anchors and cables, hawsers and fenders, liferafts, demolitions, parade training, and small-arms training.

b. **Medical Assistant (Med A 711)** — The jack of all trades in the medical branch. He must be able to administer medicine, apply first aid, provide minor surgery under emergency conditions, recognize illnesses, and advise the Commanding Officer if a doctor's care is required. He acts as a male nurse, looks after the hygiene requirements of the ship, and keeps all medical records.

c. **Photographic Technician (Pht Tech 131)** — He maintains and operates a great variety of cameras and other photographic equipment. He must produce press photographs of a professional quality and be qualified in high speed motion picture analysis, aerial photography, etc.

d. **Signalman (Sea) (Sig Sea 261)** — The signalman is responsible for making all visual signals, interpreting those received, and advising the command of their meaning; and also, the care and maintenance of the equipment.

e. **Radioman (Sea) (Rad Sea 251)** — The radioman is responsible for the operation and maintenance of the ship's radio equipment; transmitting and receiving messages; and operating and maintaining the equipment used in electronic warfare.

f. **Radar Plotter (Sea) (Rdr Pltr 271)** — The radar plotter operates and maintains the ship's radar and plotting equipment, plots ship's and target's courses and speeds, and informs the command of what they are doing. He also operates a voice radio network between ships.

g. **Meteorological Technician (Met Tech 121)** — The meteorologist is employed to give accurate weather reports for flying and other ship's operations. He is also employed to assist the navigator with charts, publications and instruments.

h. **Communications Technician (Com Tech)** — The communications technician is a highly skilled man who maintains, and assists operators to maintain, all electronic equipment.

j. **Cook (Cook 861)** — The ship's cook is comparable to the chef in a large restaurant. He must be able to prepare excellent meals for a great number of men often under trying conditions. On occasion, he will cater for official and state functions.

k. **Steward (Stwd 862)** — The steward is responsible for the Commanding Officer and Officers' quarters and the wardroom. He serves meals and caters for official functions.

m. **Supply Technician (Sup Tech 911)** — He is responsible for the ordering, accounting, custody, and issue of all stores, ammunition, food, and materiel, and for ensuring that sufficient supplies are always on board for the extended periods at sea.

n. **Administrative Clerk (Adm Clk 831)** — The ship's secretary; responsible for all correspondence passing in and out of the ship and for the custody of personnel records.

p. **Accounting and Financial Clerk (Fin Clk 841)** — He is responsible for all financial transactions aboard, including the ship's payroll, and travelling and moving expense claims, exchange of foreign currency, etc.

q. **Marine Engineering Technician (Mar Eng 311)** — He requires a knowledge of all main propulsion and auxiliary machinery. He will assist in the maintenance and repair of this equipment and also be capable of operating it. He must also be able to manufacture parts for the machinery if necessary.

r. **Hull Technician (H Tech 321)** — The hull technician is responsible primarily for the maintenance and repair of the ship's structure, fire mains, plumbing, and heating, but also for damage control.

s. **Electrical Technician (Sea) (E Tech 331)** — He is responsible for the efficient operation, maintenance and repair of all electrical power systems, machinery and lighting.

t. **Fire Fighter (FF 651)** — He is responsible for the efficient operation, maintenance and repair of all ships' fire fighting and damage control systems.

u. **Weaponman Surface (Wpmn S 061)** — He operates and maintains all the surface-to-surface and surface-to-air weapons, and is responsible for the safe stowage of all associated ammunition.

v. **Weaponman Underwater (Wpmn U 062)** — He operates and maintains all underwater weapons and the variable depth sonar handling equipment. He is also responsible for the safe stowage of associated ammunition.

w. **Sonarman (Sea) (Sonarmn 281)** — He operates and maintains all the underwater detection equipment and interprets the information received by this equipment.

x. **Fire Controlman (F Ctlmn 071)** — The fire controlman operates and maintains all the fire control equipment used to acquire targets and aim surface-to-surface and surface-to-air weapons.

y. **Air Traffic Controller (Air T Con 161)** — He provides control instructions to aircraft; operates and aligns radar equipment; and operates and monitors air traffic control communication systems.

z. **Air Boatswain (Air Bosn 581)** — He provides aircraft handling, directing, fire fighting and crash removal; maintains arrestor barriers, safety nets, fire fighting equipment, helicopter hauldown equipment, etc.

aa. **Aviation Technician (Avn Tech 513)** — The aviation technician is employed in the maintenance and repair of aero engines and airframes, and associated systems.

ab. **Avionics Technician (Avs Tech 525)** — The avionics technician is employed in the maintenance of all aircraft electronic systems, including radar, navigational aids, and radios.

ac. **Safety Systems Technician (SS Tech 531)** — The safety systems technician is employed in the maintenance and repair of all aircraft safety systems including parachutes, liferafts, oxygen, and escape equipment.

ad. **Weapons Technician (Air) (W Tech A 571)** — The weapons technician (Air) loads and unloads airborne weapons on ship-borne aircraft. He repairs and maintains aircraft depth bombs, and torpedo weapons and weapon systems, sonobuoy launchers, etc.

CHAPTER 10

LEADERSHIP AND INSTRUCTIONAL TECHNIQUES

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LEADERSHIP AND INSTRUCTIONAL TECHNIQUES

1. **Aim** — This course is divided into two sections. The first section, **Leadership**, is intended for cadets at the junior NCO level (Leading Cadet to Petty Officer Second Class) who are just emerging into leadership roles in the corps. Its aim is to give them the confidence and techniques to fill those roles effectively. The second section, **Instructional Techniques**, is intended for senior NCO cadets (those aiming for Petty Officer First Class) who will be expected upon qualification to serve as instructors.

2. **Instructional Approach** — This subject, more than any other, requires careful preparation by the instructor. He is, for the cadets, the example of leadership he is trying to teach. Before each period, the instructor should read over the subject carefully. He should then organize the material in the form of a lesson plan, allowing sufficient time for questions and feedback from the cadets. Each section of the course provides three periods for practical testing and group evaluation of the individual's performance. These periods should be fully utilized. Remember: it is probable that the way in which the course is taught will have as much effect on the cadets as the course itself.

3. **Trainee Assessment** — Since the objective of leadership and instructional training is the achievement of skills rather than knowledge of facts, no formal tests are assigned to these sections. Testing as a means of reinforcement of learned skills is incorporated into the "evaluation" periods at the end of each section.

4. **Materials Required** — These are some samples of various types of training aids:

   a. The real article (eg, a rifle);

   b. Models;

   c. Charts and training posters;

   d. Projection equipment, if available;

   e. Tape recorder, if available; and

   f. Samples of prepared hand-outs.

TRAINING PERIOD 1 — PRINCIPLES OF LEADERSHIP

5. **Characteristics of the Leader** — Every effective leader possesses the following characteristics to a greater or lesser extent:

a. **Competence** — A thorough and comprehensive knowledge of his job, and skill in any physical components of it.

b. **Self-Confidence** — Confidence in his own capacity both as a doer and a leader (often a result of attaining competence).

c. **Self-Control** — The ability to keep his temper under exasperating circumstances, and to keep his head in an emergency.

d. **Patience** — The ability to understand that some people learn more slowly than others.

e. **Enthusiasm** — Enthusiasm for what he is doing and the ability to transmit that enthusiasm to others.

f. **Decisiveness** — The ability to come to a prompt, intelligent decision and then stick to it without wavering.

g. **Responsibility** — The willingness to accept responsibility for his decisions and actions.

The latter two characteristics are so important that they will be dealt with more fully in paragraphs 3 and 4 below.

6. **Ten Commandments of Leadership** — Above we have dealt with what a leader **is**. Now we will deal with what he **does**. The following are the ten commandments of leadership:

a. Lead by example.

b. Know your men — their capabilities, their weaknesses, what makes them tick.

c. Be a friend to your men, but never a pal.

d. Never lie to your men.

e. Respect your men.

f. Be loyal both to superiors and subordinates.

g. Give praise where praise is due.

h. Never be insulting or sarcastic.

j. Never promise what you cannot perform.

k. Never threaten what you do not intend to enforce.

7. **Decisiveness** — Decisiveness is one of the most characteristic attributes of the leader: the ability to look at a problem, sort out the possible solutions and then **to make up your mind and get on with the job**. Many people can do the first part, recognize that there are two or more solutions, each with its own advantages and drawbacks. But often they can't decide which is the best solution, so they do nothing, or wait for someone else to decide for them. These people are not leaders. They do not realize that, in their indecisiveness, they are in fact making an important decision: **the decision to do nothing**; and that will often be the most dangerous or harmful decision of all. The leader recognizes that he may make mistakes will almost always be better than indecisiveness. He is also willing to stand by his decisions and take responsibility for them.

8. **Responsibility** — Responsibility is the other side of the coin. Why do weak people have trouble making decisions? Often because a decision on their part will mean taking responsibility for the results of that decision. No decision means that responsibility will fall on someone else's shoulders. The leader, on the other hand, welcomes responsibility and eagerly seeks it out. He knows the risks involved but feels that they are more than compensated for by the reward of accomplishment; and accomplishment can seldom be attained without the freedom gained by accepting responsibility.

9. **An Example** — Let us look at an example in the Sea Cadet context. A Petty Officer is returning to the barracks with a small detail of cadets when he observes that a corps boat is improperly secured to the jetty and a storm is blowing up. There is no officer available for advice, and no rope available except that which belongs to a privately-owned boat in the vicinity. He recognizes two solutions:

a. to borrow the rope without the owner's consent, and secure the boat properly; or

b. to haul the boat up on shore, which might damage the neatly-trimmed lawn.

If the Petty Officer is a **leader**, he will decide to do either a. or b., and will immediately get his detail to assist him with the necessary action. He will take responsibility for his own action, recognizing that the wrath of the rope's owner or that of the marina proprietor will be mitigated by the prevailing conditions and by the fact that he acted to prevent a much greater disaster — the destruction of the boat. If the Petty Officer is a "non-leader", he will say to himself, "I'm not in charge of the boathouse; that's not my responsibility. Suppose I haul up the boat and the marina people complain; I might be blamed. If I use the rope, I might also be blamed. In any event, it's not my responsibility, and when he sees the wreckage of the boat, he can smugly say, "It wasn't **my** fault".

10. **Class Discussion** — Using the parable above as a starting point, encourage a class discussion of the characteristics and commandments of leadership.

TRAINING PERIOD 2 — LEADERSHIP STYLES

11. **Leadership Styles** — There are many approaches to leadership ranging from Authoritative through Participative to Permissive. Permitting individuals to express their personalities exactly as they please may have some merit in certain service settings but is dismissed as both dangerous and unlikely at the Junior Leader level. We will concern ourselves with the authoritative, personified by **the Boss** and the persuasive and participative by **the Persuader** and **the Educator**.

12. **Choosing a Style** — No leader will fall entirely into any one of the categories. There will be times when a leader will need to be the Boss. On other occasions he will be the Persuader; and on many more occasions he will be the Educator. The effective leader will choose his approach in accordance with **his own personality**, the characteristics and needs of **his followers**, and the demands of the **situation**. Certain advantages and disadvantages of each leadership approach will become apparent during the discussion of followers and the situation.

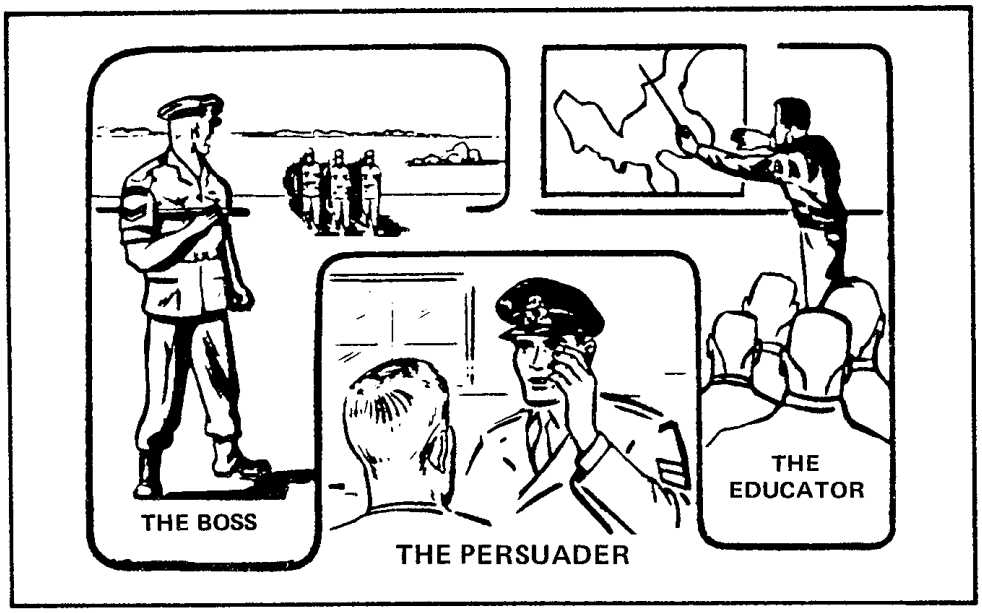

Figure 10-1 The Persuader

13. **The Leader** — Each leader has a different personality. One such personality will be most comfortable with the character of the Boss. He will have to school himself to be the Persuader or the Educator when the situation demands it. Similarly, other leaders may fall naturally into the roles of the Persuader or the Educator, and will have

to learn the other roles. Nevertheless, each leader will tend to use more frequently those types of leadership with which he feels most persuasion in the same circumstances, where another leader might do his best as the Boss. The important thing is that each leader, whatever his preference, must be proficient in the use of the three techniques, so that he can tailor his approach to the nature of the followers and the situation.

14. **The Followers** — The following points describe that group best described as Followers:

a. The leader does not operate in a vacuum; he mingles continually with his followers and he mingles most of all at the Junior Leader level. It is obvious therefore, that the complex social interaction between the leader and followers, and interactions among the followers are vital components of the leadership setting.

b. Since every leader is also a follower you might expect that every leader would know how best to deal with his followers. You might expect that he could deal with his own followers as he wishes and expects his superiors to deal with him. Unfortunately, perhaps because all eyes have been focused on the leader for so long, the **follower** is often completely out of focus.

c. Let us consider the likely composition of a group of ten cadets. First, there will be one of two cadets who are recognizable by the group as **potential leaders**. Last, there will be one or two who are **passengers** going along for the ride, with no intention of contributing anything more than a bare minimum of performance towards the achievement of group goals. **In the middle** will be six or eight cadets who are prepared to contribute their full effort towards the achievement of group goals. This very large and important group is made up of the true **Followers**.

d. Often it may appear that passengers are the nuisance for which the vast bulk of cadet and service regulations have been designed. Since they cause more trouble that they are worth, why do we bother with them? This is not an easy question. Perhaps it is best answered by the biblical parable of the Shepherd and lost Sheep (Matthew 18:12-14). Every once in a while a passenger is persuaded by a first class leader to become a true Follower. Such a conversion does a lot for the Passenger and for the group as a whole; and in addition it gives the leader an inspiring sense of accomplishment. **The conversion of Passengers to Followers is one of your most difficult but most satisfying jobs.** As a Junior Leader you must take care, however, that you don't spend all of your time on one or two passengers at the expense of six or eight true followers.

Having dealt with the Leader and the Followers it is now time to complete the Leader/Follower/Situation concept by discussing briefly the effect of the **Situation** on Leadership.

15. **The Situation** — "It all depends on the situation" — how often have you heard this explanation. First off it doesn't sound very helpful. But it is true and to learn it now will save the Junior Leader a barrel of trouble, particularly during his first command. The following points discuss the importance of the situation:

a. No two situations are ever exactly the same and each must be faced as a new and separate problem. Sometimes a sharp order by the **Boss** is far more effective than the most stirring appeal of the **Educator**.

b. What makes a situation? The components will include —

(1) the type of organization,

(2) the culture of the group,

(3) personalities, and

(4) the job to be accomplished.

c. Types of organization, even within the cadet movement, vary greatly. Cultural characteristics differ as a result of differing needs for skills and levels of intelligence. There are regional, social and economic variations. The various situations which will confront you as a Junior Leader in the cadets require a very substantial adaptability on your part.

d. In some situations **you will need to be the Boss**, motivating your followers by applying sanctions and restrictions, rewards and punishments. The following situations often require such authoritative leadership —

(1) when there is little time,

(2) when large numbers of followers are involved, and

(3) when it is necessary to cultivate mental alertness and immediate obedience, eg, specific phases of basic training such as Foot and Arms Drill.

e. In some situations **you will need to be the Persuader**, developing a warm relationship with the follower in order to inspire him to achieve the aim of promises, recognition and gratification of his needs. Appropriate occasions for the use of persuasion are —

(1) when there is a rapid turn-over of personnel,

(2) the brief, single-purpose situation where it is unlikely that leader and follower will meet again on the same term,

(3) when dealing with the particularly naive or ambitious follower,

(4) under hardship and personal difficulty, and

(5) interviewing and counselling.

f. In many situations the best leadership approach to adopt is that of the **Educator**. Here the motivation will be through the presentation and discussion of material to be learned. The leader will employ skillful question technique, encourage the maximum response from his followers, requiring them to interact in problem-solving situations. He encourages them to accept responsibility and to assume the leadership role themselves at every opportunity. Appropriate occasions for the use of this educator type of leadership are —

(1) when the group is reasonably small,

(2) when time is available for the learning process,

(3) problem solving, and

(4) when the aims of the followers are not too different from the aims of the organization and the leaders.

16. **Summary** — In summary, the Leader/Follower/Situation concept can be stated briefly as follows:

a. Leadership is affected by three basic elements the **leader**, the **followers** and the **situation**.

b. There is no recipe for making a leader, and no two leaders ever get results in the same way. Each leader, in analysing the various components of a leadership problem will be affected in a different way by his personality, the personalities of his followers and the components of the situation that confronts him. These variables make the use of a standardized solution quite impossible.

c. Any reasonable, intelligent person, no matter how inexperienced, can study, practice, cultivate and apply the techniques of leadership. Each leader must arrive at his own solution for each problem based upon his analysis of

these three basic elements in the leadership environment, the **leader**, the **follower** and the **situation**.

TRAINING PERIOD 3 — SUPERVISION

17. **General** — However clearly you brief your cadets with specific instructions, you cannot assume that the assigned task will be properly carried out unless you follow with close supervision. Some cadets will forget what you told them to do; others will try to get away with doing as little as possible; still others will become confused about what is expected of them. Often the situation will change, and the orders you gave originally will no longer be appropriate.

18. **Purpose of Supervision** — The purpose of supervision is to ensure that your cadets carry out your orders promptly and properly. Your supervision shows them that the job is important; it enables you to change your orders to meet changes in the situation; it permits you to encourage and motivate the cadets if the going gets hard; and it makes it possible for you to detect and correct errors in their work immediately. Supervision is an important continuing function of leadership. It is **not** the same as inspecting, although inspection is, at times, a necessary substitute for continuous supervision.

19. **Operations of Supervision** — Supervision is a complex responsibility made up of the following four separate operations, all of which must normally be performed if your supervision is to be effective:

a. **Observing** your cadets as they work;

b. **Giving orders** in reaction to changes in the situation;

c. **Examining** the completed work (inspection); and

d. **Reacting** to the quality of the work.

20. **Move Around** — In order to observe your cadets as they work you should take up a position which gives you a good view of the general situation and from which you can see and communicate. If your cadets are scattered you should move from person to person or from group to group. Your position should be inconspicuous but should allow them to see you without giving the impression that you are spying on them.

21. **Giving Orders** — In the course of observing your cadets' performance, it is frequently necessary to issue additional orders or instructions as the demands of the situation change. The basic methods used to give orders when supervising are face-to-face talking, and hand signals. Giving orders when supervising is difficult because the cadets are often spread over a large area. You must therefore take additional precautions to ensure that they hear or see, and understand your orders. You should give examples, encouragement and motivation to them by issuing your orders in a calm, cool and self-confident manner.

22. **Praise** — If your cadets have done a good job, **praise them**.

23. **Correction** — If they have made mistakes, **correct them**. Without insulting the cadet, correcting should be done in the following manner and sequence:

a. Stop the cadet;

b. Explain what is wrong and why it is wrong;

c. Show him how;

d. Have him re-do; and

e. Follow up.

24. **Inspecting** — Your supervising job does not necessarily end when your cadets have finished working. Often it is necessary to check, to examine or **to inspect** their **completed work**. During inspections it is necessary to bear in mind the following considerations:

a. **See what you inspect.** Do not take a cadet's word for it unless his past record clearly indicates that he does as he is told.

b. **Use a Check List for any complicated inspection.**

c. **Inspect personal belongings** in the presence of the owner, or in the presence of a witness if the owner is absent.

d. **Handle certain objects when observation alone is not an adequate measure of satisfactory work.**

Supervising also requires that you react to the quality of the work. This will be covered in a later part of the course.

25. **Multi-Task Supervising** — One of the most demanding tasks you may be given from time to time is that of supervising a work-party responsible for a variety of jobs; for example a corps "paint-up and clean-up" party, or a group preparing seating and displays for an Annual Inspection. A job of this type requires a fair number of cadets, with varying skills and motivations. It also involves a number of tasks of different durations and degrees of difficulty. To compound the problem, some of the tasks can only be done after others are completed, or compete for the use of a single set of tools. Without adequate leadership, such an exercise can easily degenerate into mass confusion and frustration, with very little work accomplished. How should you cope with it?

26. **Organization** — The key is organization. A few minutes spent with a pencil and paper at the beginning will save untold time on the job. **First**, determine the tasks to be done. **Second**, determine their order, bearing in mind such jobs need ladders and you only have one ladder. **Third**, bearing in mind the number of available workers, determine how many cadets should work on each task. **Fourth**, determine the tools and/or equipment required for each task.

27. **Checklist** — Having made the above decisions, make yourself up a **checklist**, listing the tasks in order, approximately how many people are needed for each, and any special tools required. This will permit you to keep a check on how the work is progressing, help in the process of reassignment, and prevent you from forgetting some important task through being fatigued or harried. It also helps your subordinates to know that you are on top of the job.

28. **Assignment of Assistants** — For every task requiring more than one or two people, assign one cadet to be responsible for carrying it out and for reporting the group for reassignment when the job is done. This should be the senior cadet, if there is one. If not, select the one that you consider most reliable.

29. **Assignment of Workers** — Now assign cadets to the tasks that are to be completed first. As much as possible, assign the more mature and skillful ones to the more demanding jobs. Instruct each group in the task to be done, making sure that they know **precisely** what is required of them.

30. **Reassignment** — Some jobs will be finished before others. If no arrangements are made for re-assignment, the cadets whose jobs are completed will either vanish into thin air, or hang about chatting and interfering with those still employed. Each group or individual assigned a job should be clearly instructed to report back to a specific **reassignment area** as soon as the job is done, and to remain there until reassigned. As soon as enough are available for the next job on your checklist, you should reassign them to that job with the same stipulation. This way, you get the most work out of the people available and avoid having non-workers sculling about in everybody's way.

31. **Supervision** — During the course of the work, you should move from job to job, checking, encouraging, demonstrating and, when necessary, assisting.

32. **Stand-easy** — Do not forget that people work better with an occasional break. Call a **short** stand-easy approximately once an hour.

33. **End of Job** — As the tasks are completed, cadets will start to return for whom there are no jobs left for reassignment. It is better to let these people go home as their tasks are completed, rather than holding them until the whole job is done, since they will otherwise tend to become bored and get into mischief. Don't forget, however, that they are all volunteers, just as you are. A word of thanks to each cadet is appropriate.

TRAINING PERIOD 4 — DISCIPLINE AND CORRECTION

34. **Discipline** — The word discipline derives from the same root as the word disciple, which means "a willing follower". The essence of discipline, especially in a voluntary organization like a Sea Cadet corps, lies in the willingness of individuals to follow the rules of the organization. But to follow rules usually means giving up a little bit of freedom; so people must be convinced that discipline provides a benefit which is worth a degree of sacrifice.

35. **Benefits of Discipline** — Discipline provides a number of conditions necessary for any group activity:

a. **Community Living** — In a group without discipline it is every man for himself and devil take the hindmost. With discipline, each person gets his share of the benefits and does his share of the work. The rights of the younger or weaker members of the group are protected, and disputes can be settled fairly and peaceably.

b. **Conditions of Learning** — Learning is an integral part of the cadet business. But learning can only take place in a reasonably peaceful atmosphere where the instructor can be heard and when everybody is not talking at once. Discipline provides these conditions.

c. **Team Work and Team Spirit** — A Sea Cadet corps, no less than a hockey team, needs discipline so that the cadets can work together in a cooperative fashion. Drill, sailing, pulling, rigging sheers: they all require close teamwork that only discipline can provide. And from teamwork comes the most important product of Sea Cadet training, team spirit or esprit de corps.

36. **Correction of Faults** — One of your most important duties as a Petty Officer will be the maintenance of discipline. To do so effectively involves the correction of a lot of little faults. This does not mean becoming a nag and a scold, but it does mean keeping your eyes open for the small infractions that can build into bigger ones, and quietly correcting them before they turn into habits. The cadet who uses bad language or habitually fools in class may not be a bad cadet, but he can cause untold trouble if he is permitted to get away with it for long.

37. **Who Should Correct?** — It is sometimes a difficult decision as to who should do the correcting, the PO who witnessed the infraction, or the cadet's own Divisional Petty Officer. A good rule of thumb is that if the offence calls for immediate, direct action (eg, a cadet smoking in the paint-locker; a cadet fooling in your class), take action yourself. If the offence is an on-going one and the correction can be delayed (eg, a cadet with chronically dirty boots or a bad attitude), report the matter to his DPO and let the latter look after it.

38. **Methods of Correction** — How you take corrective action will depend on the offence, the offender, and the circumstances:

a. **The Corrective Word** — This is probably the most common disciplinary action you will take, since it is all that is necessary in most cases. It is appropriate for minor, non-habitual infractions such as talking in class, littering or profanity. It may take many forms, depending on the circumstance, eg, "Pay attention, Smith. . .", "That's enough, White. . .", "You can do better work than that, Brown. . .". There are a few simple rules, however —

(1) the criticism should be aimed at the offence, not at the offender,

(2) avoid sarcasm, humiliation and profanity,

(3) avoid an angry or exasperated tone,

(4) keep your voice even and quiet, and

(5) keep it short and to the point.

b. **The Admonishment** — This form of corrective action is appropriate in a number of situations —

(1) when infractions are repeated or habitual,

(2) when the infraction requires more than a corrective word but does not call for a formal charge, or

(3) when there is a problem of attitude or morale.

The admonishment should always be given in private, out of the hearing of other cadets. The nature of the offence should be carefully outlined and the offender given an opportunity to present an explanation. If there are mitigating circumstances (such as home problems; bullying by other cadets) you should do your best to find them out. The cadet should be made to understand that, while you will take no nonsense, you are genuinely interested in him as a person. Having elicited the background, point out to the offender why the behaviour in question is unacceptable and end with a warning that it must not continue. Sometimes, especially where liquor or drugs are involved, **counselling** is needed in addition. This will often be more effective in your hands (as a fellow cadet) than from an officer (as an adult). An admonishment should take the form of a "word to the wise". There is no place for anger, sarcasm or humiliation, since the aim is not to convince the cadet that he is no good but to convince him that he can do better.

c. **The Formal Charge** — This is the most drastic action you can take in the correction of an offence, and one that should not be taken too lightly. It is to some extent an admission that you have not been able to straighten out the individual yourself, and are in need of help. It is reasonable to state that the best junior leader is not necessarily the one that lays the most charges. On the other hand, it is possible to overstate this position to the point where a petty officer is literally ashamed to seek help from his superiors or to lay charges at all. This results in a tendency for the junior leader to be unduly lenient or to become hopelessly frustrated at his seeming powerlessness to discipline the junior cadets. The answer is for the junior leader to develop sufficient rapport with his superiors that he can go to them for advice when he has a problem; also for a well-organized procedure for handling charges to be developed in the corps so that charges, when laid, are meaningful. In this way the junior leader will feel that the hierarchy of the corps is backing him up. This added confidence will likely result in **fewer** charges being laid, rather than more.

(1) **How to lay a charge** — All charges in cadet matters are laid under Article 5.42 or QR Cadets. This article states that when a cadet is alleged to have committed a breech of discipline, he or she shall be brought before the Commanding Officer of the Cadet Corps. In practice, for obvious reasons, most commanding officers delegate the authority for the initial handling of charges to one or more subordinate officers. In a small corps, this may be the Executive Officer. In a larger corps, it is often the Officer of the Day, followed in sequence (and if necessary) by the Executive Officer. The purpose of this delegation is to avoid taking up the Commanding Officer's time with charges of a minor nature. Usually, the subordinate officer(s) are required to hear the charge and evidence and make final specified charges; those of a more serious nature must be passed on to the next highest level (where again some sifting may be done), with only the really important charges being heard in person by the Commanding Officer. The precise details of how this process works are left to the discretion of the Commanding Officer and may vary from corps to corps. Leadership course cadets should be made familiar with how the system works in **their** corps.

(2) **What Charge?** — It is essential that the person laying the charge be specific, both as to the charge itself and the circumstances which occasioned it. It is not sufficient to state that the cadet involved was "insubordinate". It should be stated, for example, that he was ". . .insubordinate in that, being a member of the duty watch, he refused a direct order to sweep the deck". QR Cadets, Article 5.42, does not lay down specific charges or penalties, leaving these to the discretion of the Commanding Officer. Some corps use Article 19 10/01 of the now-obsolete BRCN 105 for guidance. This is appended as Annex A to this chapter.

(3) **Conduct at a Hearing** — When you present a charge at a hearing, bear in mind that you are serving, in a sense, both as prosecutor and chief prosecution witness. Present your case and evidence plainly, fairly and without rancour. Remember, it is not your job to see that the offender is convicted and punished. You are there only to present the facts; it is up to the officer to decide the outcome and the penalty, if any. If his decision does not agree with your thinking, accept it nonetheless and **do not comment on it**. If you agree with the decision, do not consider it a victory on your part. Punishment of a cadet is never a victory.

d. **Informing Your Superiors** — This form of corrective action falls midway between the last two. It should be used in one of the three situations —

(1) when you are not sure whether or not to lay a charge, or

(2) when you feel that admonishment or counselling would be more effective from an officer, or

(3) when you believe that your superior should be informed about the offence or the offender, for future guidance.

39. **Consistency** — Be consistent in your disciplinary actions. Nothing will create a greater sense of injustice in the junior cadets than a Petty Officer who takes corrective action today for the identical offence that he failed to correct yesterday.

40. **Remember the Aim** — Whenever you take disciplinary action, remember the aim of that action: to encourage the offending cadet to learn from the experience and do better in the future.

TRAINING PERIOD 5 — SETTING THE EXAMPLE

41. **Deliberate and Unconscious Examples** — The examples you show the junior cadets may be of two types: deliberate and unconscious. If you make a particular point of dressing smartly to impress the cadets with the need for smartness, that is a **deliberate** example and is to be commended. But remember that everything you do, deliberate or otherwise, sets an example to others. If the next day you dress carelessly, you set a very negative **unconscious** example to the junior cadets. The trick is to set out **deliberately** to be a positive example in all aspects of your cadet life (in other words, you have to think about it consciously). If you do this for a little while, it will become a habit. You will then find that you no longer have to be quite so deliberate about it, since you will now set a good example **unconsciously**. This is the aim of good leadership.

42. **Examples to Set — Dress and Appearance** — The importance of your appearance cannot be overemphasized, since it is the first thing that others notice

about you. From Petty Officers, nothing but a policy of perfection can be accepted. For an NCO to show up for parade out of uniform is an appalling example of poor leadership. To show up in a scruffy uniform is equally bad. Your hair should be neatly trimmed, your cap and lanyard snowly white, your uniform should conform to the Dress Manual in all respects. It is not enough for your boots to be clean; they should gleam like mirrors. Nothing engenders respect as quickly as a first-rate turn-out. On the other hand, nothing will turn a cadet off more quickly than being criticized for a dirty lanyard by a Petty Officer with dirty boots!

43. **Deportment** — Your juniors will look up to you and expect of you a degree of dignity. This does not mean you must be pompous or that you cannot have fun at the proper time and place; it does mean that you cannot act like a follower and expect to be treated like a leader. A junior cadet can afford to "jack around"; a Petty Officer cannot, even at stand-easy. Harmless skylarking by younger cadets is no problem to control, providing the seniors have stayed out of it. When seniors are involved in or encouraging it, it can easily get out of hand.

44. **Voice and Language** — These are some tips:

a. Avoid loud talking or laughing among your equals, it sounds arrogant.

b. Avoid shouting to convey an order or correct a problem; these matters can normally be handled best in a quiet voice.

c. Avoid an harassing or an exasperated tone; it turns people off.

d. Avoid bad language or profanity; it lowers respect for a leader.

e. Practice courtesy among yourselves and with subordinates; you will be surprised at the results you get.

45. **Sharing the Work** — "Never ask a subordinate to do what you wouldn't do yourself". Some Petty Officers feel that certain jobs are beneath their dignity and that they would lose respect if they did them. This is nonsense. Junior cadets will respect a PO who turns to and helps out with menial chores when there is a need. It need not be every time or for the whole time, but this sort of example is tremendously valuable in building respect for the leader.

46. **Loyalty** — The leader needs the loyalty of his subordinates. It is in turn this joint loyalty that builds corps pride. But loyalty does not come without a price; it must be purchased by loyalty to others.

a. **Loyalty to the Corps** — The best way to develop corps loyalty in the junior ranks is for it to be shown by the senior cadets. Take every opportunity to "talk up" the corps among the cadets and among yourselves. That sort of

talk is contagious. On the other hand, a chance remark to a fellow Petty Officer, downgrading the corps, can have the most unfortunate results if overheard. Always look for the things your corps does best and emphasize them in your conversation. Make sure the junior cadets get the message: **Your** corps is the tops!

b. **Loyalty to Superiors** — You expect loyalty; give it in turn to those above you —

(1) never discuss the problems or activities of superiors with junior cadets,

(2) identify with your superiors' orders. Pass along each order without complaining, as if it were your own,

(3) if you feel it is your duty to express disagreement with what a superior has said or done, do it in private, and do not discuss it publicly afterwards,

(4) let the junior cadets know that you have confidence in and respect for your officers.

c. **Loyalty to Your Fellow NCO's** — Demonstrate to the junior cadets that the Petty Officers can and do work as a team —

(1) never criticize another NCO in the hearing of junior cadets,

(2) if you have to correct a subordinate NCO, do so in private,

(3) do not discuss other PO's private affairs in public,

(4) back up your fellow PO's in any way you can,

(5) there are bound to be interpersonal problems from time to time. Solve them among yourselves and do not let the junior cadets even suspect they exist.

d. **Loyalty to Subordinates** — You expect it of them; give it to them in return —

(1) make sure that a problem, request or complaint from a member of your division is passed along to the proper person as soon as you can (and with your endorsement, when possible),

(2) if one of your divisional cadets gets into trouble with a higher authority, make sure that you pass along any mitigating factors or any points in his favour,

(3) encourage and assist your cadets in any sports or competitive endeavour,

(4) let the cadets of your division or crew know that they are **your** cadets, and that you consider them to be superior to all others (even when you sometimes have doubts on that score!) Not infrequently, the belief may create the fact.

47. **Respect for Subordinates** — A leader cannot expect respect from his followers **unless he first treats them with respect**. This point is critical to leadership. A Petty Officer who calls his junior cadets "twits" or "dummies" or who treats them as **inferiors** rather than **subordinates** (note the different words) is likely to get much respect from them. A considerate, firm but friendly PO who never loses his temper, never humiliates, and who treats his juniors as intelligent and enthusiastic people (even sometimes when they are not) is likely to be remarkably successful.

48. **Avoid Familiarity** — The other side of the coin of friendliness is familiarity. By all means be a friend to your cadets, but never a pal. You cannot be a leader and "one of the boys" at the same time. This may be one of the most difficult lessons to learn, since your age and school grade may not be much different from that of some of the junior cadets. It is essential, however, not to let that fact breed undue familiarity or the taking of liberties. Avoid using first names or nicknames with your juniors, and do not permit their use with you. Remember, you cannot be one of the boys one minute and expect the same boys to obey you the next. The true leader will accept that a temporary unpopularity and loneliness are the price one pays for leadership.

49. **Show Initiative** — One of the best examples you can give is that of initiative. Demonstrating to your cadets that **their** Petty Officer is a prime mover in corps affairs will give them a feeling of personal involvement in the organization, and a greater respect for you as a person.

a. Volunteer for special duties and work parties;

b. put forward ideas for new divisional or corps activities;

c. originate suggestions for recruiting or other efforts to improve the corps;

d. encourage and pass on ideas and suggestions originating with your crew or division. Constantly make them feel that it is **their** corps and that **they** can make it even better.

TRAINING PERIODS 6, 7 AND 8 — PROBLEM SOLVING

50. **Problem Solving** — At the end of the preceding Training Period two topics should be selected from the list in paragraph 3 below (or ones of similar type). One of

these should be assigned to half the class, one to the other half. Each cadet should be instructed to think carefully about his problem and be prepared to offer solutions at the next period. During the period, all cadets should be given five minutes to write down their solutions, with particular reference to the priorities of the various actions. Then the topics should be discussed in turn by the whole class, with the instructor serving as chairman and secretary, noting the important items on the board. At the end, each cadet should be invited to compare **his** solutions and priorities with those of the class as a whole.

51. **Importance of the Exercise** — Bear in mind that there are no right or wrong solutions to these problems. The solutions will of necessity vary with the size of the corps. The people involved, and the circumstances. The purpose of the exercise is to make the leadership course cadets take a good look at themselves, their corps and their responsibilities. We are not concerned here with the ability of cadets to parrot back rules from the course, but with their ability to cope with real-life problems. What is important is not that they know leadership theory, but that they become leaders.

52. **Problems** — In each of the following problems, the leadership cadet should consider how he, personally, would act in the circumstances. The solution should be a practical one, involving the actual location, equipment and personnel of the corps involved.

a. How would you cope with —

(1) a fellow petty officer who constantly sets a bad example of dress?

(2) a fellow petty officer who is a bully?

(3) a fellow petty officer whom you believe to be a drug addict?

(4) a chief petty officer who is incompetent?

(5) a cadet who is depressed and has been talking about suicide?

(6) a cadet you suspect to be on alcohol or drugs?

(7) an over-enthusiastic but "jacky" cadet?

(8) a physically handicapped cadet?

(9) a cadet with a bad home life?

(10) a cadet with a surly attitude which is affecting others?

(11) a normally keen cadet who suddenly turns surly?

(12) a cadet that habitually commits minor infractions?

(13) a very shy cadet who does not participate well?

(14) a super-bright cadet who is constantly in trouble?

(15) a cadet whose attendance is poor?

b. How would you organize —

(1) an inter-divisional sports competition?

(2) a corps dance for cadets?

(3) sleeping, feeding and other arrangements for a weekend visit by 15 cadets from another corps?

(4) a weekend work-party to do repairs on three corps boats? You have 10 volunteers.

(5) a series of displays for your annual inspection? You have 20 volunteers.

(6) a clean-up party the day after annual inspection and a dance? You have four volunteers.

(7) a weekend "camp" at the barracks for your division of 12 cadets? This would include feeding and sleeping arrangements.

(8) an afternoon's sailing exercise? You have 4 dinghies, 1 safety boat and 10 cadets.

(9) a meeting of the Petty Officers' mess to discuss raising money for a gift for a retiring CO?

(10) a work party to clean up the grounds? You get the request between parades and start out not knowing how many volunteers are available.

(11) a cadet-initiated recruiting campaign?

(12) a car-wash to raise money for the committee?

(13) a raffle to raise money?

(14) an overnight hike and camp-out for 12 cadets?

(15) a corps newspaper?

(16) an orienteering exercise for 15 cadets? You have four hours to run the competition, a suitable area and the use of a bus. The driver requires two days notice.

c. How would you cope with the following situations? —

(1) you are in charge of a group of eight cadets on a hike through the wilderness country and become totally lost.

NOTE

This situation may be varied almost infinitely by varying the time (daylight or darkness); the weather (warm, cold, rain, snow); the possession or otherwise of equipment (compass, map, flashlight, knife, hatchet, ponchos, twine, food); and the distance from civilization.

(2) You are teaching a class when you notice smoke coming from a metal waste-paper basket.

(3) You are teaching a class in an upper deck classroom when a cadet reports heavy smoke coming up the stairwell. There is a fire-extinguisher in the classroom.

(4) A cadet in your class suddenly lets out a cry and goes into an epileptic seizure.

(5) You are faced with a "mini-mutiny" — a group of cadets who jointly refuse to obey a reasonable order.

(6) A cadet, one of a group on a weekend on board, reports the loss of his wallet, including a twenty-dollar bill and his identification.

(7) You arrive at the corps building and find that there has been a flood, one foot of water and mud over the main deck, which has now receded. There are six other cadets at the building, but no officer. What do you do before an officer arrives?

(8) You are in a safety-boat in charge of six dinghies half a mile from shore. Four of them capsize in a sudden squall.

(9) You are coxswain of a whaler half a mile off shore, with a crew of five junior cadets. The whaler capsizes in a like squall.

(10) You are camping with eight cadets on a small island, half a mile from the nearest shore. You awake in the morning and find your boat has drifted away.

53. **Summary** — The problems listed above should be considered only as examples. Most of them can be made more interesting and specific by the addition of greater detail, eg, time of day, ages and ranks of cadets, equipment or facilities available, and so forth. Leadership course cadets should be encouraged to come up with their own problems, based on actual corps facts.

TRAINING PERIOD 9 — PRINCIPLES OF INSTRUCTION

54. **General** — Learning is a universal experience. Everyone is always learning, at every stage of life. Infants must learn to talk, to dress and feed themselves. Adolescents must learn social habits acceptable to the community. Adults must learn how to perform their jobs and how to meet the responsibilities of life. Daily life is a succession of major and minor problems that have to be solved by learning. Now let us have a look at some of the ways we can conduct lessons in and out of the classroom so that all of the principles of learning are satisfied. As an instructor, your prime responsibility is to make the learning process as effective as possible for your students. Make your lessons worthwhile, presenting them in such a way that the subject matter will be as easily understood as possible and will be meaningful to the class.

55. **Student-Centred Approach** — You will notice that although we will look at instruction from the instructor's point of view, we are not as concerned with making teaching easy for the instructor as we are with **making learning as easy as possible for the student**. We call this a **"student-centred" approach**. Basically, all this means is that we should begin at a level where the student is able to understand, develop new ideas from the student's background knowledge, and lead the student to a point from which he can proceed on his own. The basic objective, therefore, is to develop student ability to the point where he can solve his own problems. As you gain instructional experience, you will find that this "student-centred" philosophy comes to you more naturally. You will also realize that it satisfies all the principles of learning. However, there are seven fundamental rules which you can employ to satisfy this philosophy. They might be called the Principles of Instruction, although they do not exactly conform to your idea of principles. It is recommended that you use them to help you present successful lessons. Some techniques will be suggested as a means of implementing the principles. Not all of the techniques can be employed at all times but remember that you should endeavour to employ these recommended techniques as often as possible.

56. **First — "Lessons must start at a level of student understanding and proceed at a rate of student comprehension".** This rather pompous statement contains

two very simple but important ideas. It might be paraphrased, "start with something that the students are familiar with or can easily understand; then regulate the pace of your lesson by how quickly they are able to grasp things". There are a number of things that you can do to carry out this principle: in the preparation of the lesson; during the lesson; and after the lesson.

a. **Preparing the Lesson** — Proceed as follows —

(1) If you are starting at the beginning of a subject or training years, check to see what the cadets have taken previously in the subject (or a related one) that can be used as a bridge to the new material.

(2) In the course of the lessons on a given subject, start each period by briefly reviewing where you left off at the end of the previous period.

(3) If, as sometimes happens, the new material is not directly related to that previously taken, introduce a related idea from every-day life that the students can relate to.

(4) Organize your lesson material in logical stages, so that one stage can be completed (and understood) before the next is begun. Proceed from easy to difficult, and from known to unknown.

b. **During the Lesson** — Proceed as follows —

(1) At the beginning of the lesson the instructor can ask **review questions** to ensure that students are in fact at the required level. There should be a **continuous flow of questions** from the instructor to the students and also from the students to the instructor. This feedback will aid student understanding and will help the instructor to gauge how thoroughly the class is grasping the lesson.

(2) In determining the overall level at which to teach the subject, it's advisable to **cater to the majority** of the class. Slower students may need individual coaching after class, faster students can be given additional work so that the lesson is worthwhile to them.

(3) Keep a constant **watch for unusual expressions** on your students' faces. A raised eyebrow or blank expression often indicates that something's wrong.

(4) **If you feel the cadets are not grasping the material or the ideas (as determined by your or their questions)**, slow down. Better to leave the lesson unfinished than not understood.

c. **After the Lesson** — Proceed as follows —

(1) If there are skills involved which require practice, have the cadets practise at home with the incentive of demonstrating their proficiency at the next class.

(2) If you feel you are not getting good results with a particular class or subject, consult with the training officer. He will be able to advise you or assign you some assistance.

57. **Second — "Emphasize the key points".** Every lesson contains a number of key points or "teaching points" which must be grasped if the student is to understand what is being taught. These points often form the headings of your own notes or the manual, or are underlined in your lesson guide. It is vitally important for these points to be emphasized **by you** — remember, the students cannot see the size of the type or the underlines in your notes. Useful ways of giving emphasis are:

a. your tone of voice;

b. repetition of the point;

c. simply saying "this is important — remember it". They probably will;

d. writing key points on the blackboard;

e. use of training aids; an appeal to as many of the five senses as possible will help to drive home a point;

f. step-by-step teaching, re-capping each area as you go, will help stress important points;

g. use of notes or hand-outs; have students take notes of the key points or (better) provide prepared hand-outs; and

h. questioning: have the students review the key points with you.

58. **Third — "Create and Maintain Interest".** Probably the most vital principle of all, and essential to good teaching. Here are some useful pointers:

a. **Get out of the classroom** — If it is possible to teach under realistic conditions, do so. Teaching boat parts is much more effective in a boathouse than a classroom.

b. **Arouse their curiosity** — Use your imagination. Ask questions as to what a piece of equipment, say, is used for, but leave the answer until later in the lesson.

c. **Use humour** — Use humour where possible to keep and hold interest, especially if the subject itself is dry.

d. **Use actual equipment** — Use equipment to the greatest extent possible, and let students touch, handle and use any objects you are demonstrating.

e. **Use individual student skills or experience** — If you have a student in the class that you know is an enthusiast about engines, let **him** tell the class how an outboard motor works.

f. **Use competitions** — When skills are involved, **use competitions** between students to create interest.

g. **Find a point of interest** — Even the dryest, most theoretical subject has one or more genuinely interesting points, points to which the cadets can relate themselves or their corps. Find those points and emphasize them.

h. **Show enthusiasm** — Your own enthusiasm for the subject will enthuse the cadets. Let it show. Some young instructors apparently feel that a bored, blasé attitude is "cool". Experienced instructors don't.

59. **Fourth — "Provide for Student Success".** Cadets will only learn if they feel they are achieving something. It's your job to see that they do so.

a. Organize your material into **logical segments** so that the students can realize when they have achieved each unit of the course;

b. Let them know **what you want them to achieve** and **how you plan to go about it**;

c. **Keep them informed of their progress** and give them praise for good work. Everybody likes a pat on the back;

d. **Spend extra time with slow learners** or those who have fallen behind. Don't let them feel they have failed because you have gone too fast for them;

e. **Emphasize the positive**. While you must correct people from time to time, do not let this be your constant mode. Every student has good points and little triumphs. **Emphasize and reinforce these as much as possible.**

60. **Fifth — "Provide maximum Student Participation".** Nothing turns cadets off as much as being lectured to. They want to **learn**, not to be **taught**; and the way to ensure this is by encouraging **participation**.

a. **Use and encourage questions** — It is often better to ask a question than to state a fact, and the questioning technique is a vital part of teaching. This will be covered later in the course.

b. **Reason and discuss** — With your class as much as possible.

c. **Encourage movement** — Within reason, keep students involved by movement, coming up to the front to demonstrate a skill, or to the blackboard to write out a key point or draw a diagram.

d. **Use feedback** — State a fact or demonstrate a technique and have students explain what it means or give examples of how it can be applied.

e. **Use student participation** — Where a skill is involved, plan to have **as many students working as possible**. If equipment is required for practice, try to obtain one set per student. In any case, plan to **spend more time with students performing the skill than you spend demonstrating it.**

f. **Encourage the more retiring students to participate.**

61. **Sixth — "Confirm Student Learning"**. There is little point in teaching a subject if you have no way of knowing if the students have learned anything! Some ways to check this are:

a. **Ask them questions or have them do it** — Present the lesson in easy stages, and question the students on material just covered before proceeding on to new material.

b. **Ask review questions or review skills** — Review a previous period before starting the period proper. It may sometimes be necessary to review the highlights of a previous lesson; students' answers to your questions will reveal this need.

c. **Analyze students' questions** — You may be able to identify weak areas which need to be retaught. You may also be guided to **adjust the speed of your presentation** to the speed at which your students are absorbing the material.

d. **Check-up questions at the end of the period** — This will help you to assess how well your students (particularly the slower students) are learning.

e. **Use final examinations** — At the end of each course these will tell you how well you have done. But remember that exams are as much for **reinforcing** learning as for confirming it.

62. **Seventh — "Know Your Subject".** Even an inexperienced instructor can provide a reasonably effective lesson if he is enthusiastic and knows the details of his subject; but the world's greatest teacher will fail if he doesn't know what he is teaching about! It is not sufficient merely to produce a lesson plan. You must be sure you can answer any reasonable question on the subject and demonstrate your familiarity with it. If there is any doubt in your mind on this score, spend a little time reading up on the topic, not just what you plan to teach, but the background as well. If a skill is involved, practise it beforehand so as to get it perfect. Nothing looks so foolish as an instructor who has to keep referring to the manual, or one who "goofs" a demonstration. Nothing builds confidence and enthusiasm in the students so much as an enthusiastic instructor who is obviously on top of his subject.

TRAINING PERIOD 10 — INSTRUCTIONAL TECHNIQUES (1)

63. **General** — Instruction is an art; teaching methods will vary according to changing circumstances. **Know the subject** to be taught thoroughly and have **sound preparation**. The principles of instruction are not rules, but are guides to be thoroughly understood and applied. The principles are:

a. clarify and maintain the **aim**;

b. create and maintain interest;

c. use the senses correctly;

d. maintain maximum purposeful activity;

e. simplify;

f. observe the human factor; and

g. confirm.

64. **Clarify the Aim** — The aim of training is reached by capturing a series of limited objectives.

a. **Generalized and vague (wrong way)** — As follows —

(1) "To give them a few general ideas about fire fighting techniques".

(2) "To do some revision on the rifle".

(3) "To review some of the things they've been taught on map using".

b. **Limited and clear (right way)** — As follows —

(1) "To teach the principles of fighting an oil fire with high velocity spray".

(2) "To practise loading, aiming, and sight setting to bring them up to standard".

(3) "To practise contour reading and the use of four and six figure grid references".

65. **Create and Maintain Interest** — Interest and attention are basic to learning, ie, motivation. Some subjects in training are striking enough to catch the attention of the whole class, others will only interest a few. It is important that the instructor use his art to motivate and maintain interest by using and exploiting all the means available to him. Different mechanisms for maintaining interest are:

a. **Enthusiasm** — This is the driving force of instruction; without it a lesson is dead. In the course of training, the average instructor must handle some subjects which he finds uninteresting or even distasteful. If the instructor shows this lack of interest, irreparable damage will be done to the students. Also instructors who are very enthusiastic are apt to over-emphasize their subject's importance in relationship to the overall training program. This must be guarded against. Too much time in any one area will cause lack of time in another, just as important.

b. **Curiosity** — This keeps classes alive. A class will make their brains work feverishly to find the answer to a puzzle.

— **EXAMPLE** —

An instructor holds up a curious piece of mechanism. "Can anyone tell me how this works?" No, they cannot but they will enjoy puzzling it out step by step; they would have been bored by a straight explanation.

c. **Realism** — This is another way of holding interest and attention. Do not repeat anything to the class if you can let them **see or hear the real thing**. If at all possible, bring students to the subject matter, so that "on the job training" can be done with both theory and practical application.

d. **Purpose** — One of the basic motives which make a student want to learn a thing is a clear realization of the personal importance to himself of learning it. If ever the instructor senses that the class is saying to itself, "What good is all this stuff to me?" He must first pause and ask himself whether or not it is in fact any good to them, and if he convinces himself that it is, he must then convince the class as well before they will be in a mood to learn.

e. **Reward and Punishment** — A student can be motivated through reward and punishment but each student requires individual treatment. Praise is

more effective than blame. A student must know when he is wrong, but the explanation of why he is wrong should be related to him with consideration and understanding of the fact that he is learning and will make mistakes. A good instructor does not relay on force as a means of motivation.

f. **Competition** — In group form this is the most successful for cadets because this has the additional advantage of raising the Esprit de Corps and group morale. Setpiece competitions (more than one competition) should be carefully organized, scrupulously fair, and built up into something of an event, ie, sports day and sailing Regatta, etc. Competition between individuals must be handled more carefully. Bright students will usually surpass and tend towards complacency while slow students tend to become depressed. Rivalry soon evaporates if the range of performance is too great, and to avoid this it is often advisable to grade classes by ability, putting all the bright students into one squad, average students in the second and slow learners in the third squad. The instructor should encourage the bright students to help the slow learners so that a high degree of Esprit de Corps is maintained. This system of grading by ability can only be applied of course, in the early stages of training.

g. **Progress and Achievement** — Instead of competing against others, a man competes against some fixed goal or standard. When you can tie learning up with the idea of success or failure, you will have hitched it to a motive of universal appeal. Achievement in itself, however, is not enough. As soon as a student has reached one goal he must strive to attain another goal just out of his reach, and as he passes these successive objectives he will feel a sense of progress. It is most important to stress the progress achieved in each period. Go out of your way to point out any little advance the class has made; show their performance in the best possible light.

66. **Use the Senses Correctly** — All learning is dependent upon the use of one or more of the five senses: touch; sight; hearing; smell; taste. The important thing is for the instructor to teach using as many of the senses as he possibly can at that same time. This will probably involve the use of various forms of **training aids** (to be discussed later). Training Aids must be used intelligently, however; first of all, the instructor must be certain whether he is teaching a **skill, knowledge**, or a **technique**:

a. **Skill** — a skill is a physical act, such as riding a bicycle or pressing a trigger on a weapon. Skills are acquired through practice; no one ever learned to ride a bicycle by listening to a lecture.

b. **Knowledge** — knowledge is a matter of understanding and remembering facts. Knowledge can be learned in many ways, eg, by experience, by trial and error, by studying a book, by listening to lectures and tapes, or by seeing a film.

c. **Technique** — this is a way of thinking and behaving based on the knowledge and skill. They must be **studied first**, then practised to gain the experience necessary to become effective.

67. **Maintain Maximum Purposeful Activity** — The surest way of learning is by doing something yourself and thinking about it. No explanation or demonstration, however, will teach as much as good, closely supervised practice in which the class will have to think. At the earliest opportunity, in every form of instruction, make the class "Do it" and "Think about it".

68. **Simplify** — The instructor's task is to simplify the learning of subject matter contained in manuals and so speed up as much as possible the process of learning.

a. **Simple Language** — it is true that every form of specialized training has its own terminology which must be used by the instructor and class, but difficult words should be introduced gently at first, and always avoided when a simpler word will serve. Do not use difficult words just to impress the class; they will respect you more for clarity and simplicity.

b. **Key Words and Phrases** — These should only be used with discretion when no real sense can be given to fix facts in the memory, eg, Grit; (Group, Range, Indication, and Type of Fire).

c. **Correct Sequence** — Each item of knowledge and/or skill must be so arranged that the period progresses in a logical sequence towards its goal, ie, the attainment of the aim.

d. **Repetition** — The instructor must devise as many easy approaches as he can think of or repeat his explanation in different ways until everyone has understood the instruction.

69. **Observe the Human Factor** — Motivation is affected by many outside conditions and is linked closely with the general morale of the class. Class morale is affected by: the physical conditions under which learning is to take place; and the relationship between the instructor and his students.

a. **Physical conditions to be aware of** — Body functions, temperature, sitting for a long time, lighting (good or bad), proper breaks for refreshments etc, and clothing (outdoor classes).

b. **Instructor/Student Relationship** — Attitude and manner, loyalty, dignity, sarcasm and bluffing, personal attention, dress, bearing, praise and blame.

70. **Confirm** — The ultimate aim of training is reached by capturing a series of **limited objectives, each well-consolidated and secure before the next is attempted.**

Within each period the instructor must provide as much repetition, or practice, as he possibly can and must also test at the end of each stage so that the class can digest the teaching; and that he himself can be sure that each stage has been mastered before proceeding to the next. The confirmation must be related to the type of subject matter. Knowledge of facts can be confirmed by questions, problems, quizzes, written tests, etc. The ability to perform skills must be tested by practical means. The student may be able to tell the instructor how to perform a skill but be quite unable to perform it correctly himself.

TRAINING PERIOD 11 — INSTRUCTIONAL TECHNIQUES (2)

71. **The Questioning Technique** — The instructor must know how the process of learning is going on inside the minds of his class. The instructor's probes to indicate the state of each man's assimilation are his **questions**.

72. **Types of Questions** — The following are examples of types of questions:

a. **The Fact Question** — As follows —

(1) "How many rounds does the magazine hold?"

(2) "What is the vertical interval between contours?"

(3) "What do you use to haul up a sail?"

b. **The Thought Question** — This type of question might be designed to arouse interest or to require the reasoning out of some logical process —

(1) To arouse interest — "How do you think we might use this tackle in the boathouse?"

(2) To reason out a process — "What happens when you pull on the hauling part?"

73. **Rules of Questioning — Rule 1 — Ask your question and then pause**. No one knows who will be called upon to answer, so every brain is busy working out the answer. When you think the answer is on every one's lips, name your man.

74. **Rule 2 — Make sure that your meaning is clear**. You know what you mean when you ask the class a question, but sometimes you may get the most unusual replies. This usually means that your question has been badly framed.

75. **Rule 3 — Do not test powers of expression**. You must remember that the fact question tests **knowledge**. Skills and techniques are best tested by **doing them**. Sometimes, in order to save time, it may be necessary to ask a cadet how he would do

something. If so, let him answer in his own words, and remember that the fact that he cannot explain does not mean that he cannot do it.

76. **Rule 4 — Do not ask 50/50 questions (Yes or No).** It is literally an even chance whether or not the student gets the answer right.

77. **Rule 5 — Use common sense.** Although so very useful for testing assimilation, for arousing interest and for guiding the reasoning process, questions should not be peppered indiscriminately over the whole period. A few well thought out and well timed fact questions are invaluable: too many will break continuity and irritate the class. Do not ask a cadet a question when he is engaged in any form of practice; though you may usefully question the remainder of the class who are watching him. If you want to put him right, stop his practice before you put your question; he can then give you his whole attention.

78. **Rule 6 — Distribute your questions evenly over the whole class.**

79. **Rule 7 — Keep your question to the point.** Do not waste time on irrelevant questions.

80. **Handling Answers** — Discourage group answers; give credit for a good answer, especially from a poorer student; do not repeat the answer given by a student. If not loud or clear, have **him** repeat it and if incorrect, ask another student.

81. **Handling Student Questions** — Never discourage a genuine question, however stupid it may seem to you. Encourage questions. Whenever possible say "That's a good point" or "I'm glad you raised that question". Repeat the question to the whole class; pass the question to another student; confirm the answer yourself; if the question is not connected with the period but seems sincere give it a short answer; if the answer is obviously designed to draw you away from the subject, discourage further such questions; if you do not know the answer to a question, then say so, but be sure to find it and let the class know later. Never bluff the class.

82. **Control of Nervousness** — Almost every beginning instructor experiences a nervousness which is serious enough to have effect upon the quality of his instruction. Until the instructor can learn to control himself well before his class he cannot expect to become master of the instructional situation.

83. **Breathing** — A deep breath or two taken immediately before you start to speak will help you relax and dispel a part of the tenseness.

84. **Starting** — Get into the classroom to **check the physical setup** before the class arrives. At exactly the time for starting the class step to the place from which you are to speak; pause briefly; survey the situation. All noise will normally cease; then start to speak slowly. Rushing and rapid talking will increase nervousness.

85. **Routine Activities** — There are usually a few routine matters, such as: checking the roll; passing out instructional materials; reading announcements; checking to make sure that students can see and hear you; etc, which require the attention of both the instructor and the students. By taking care of these in a business-like manner at the beginning of the class you may be able to overcome much of your nervousness.

86. **Physical Activity** — Many instructors plan deliberately to engage in some type of physical activity, over and above that absolutely necessary for conducting a class, in order to help them overcome nervousness. Some instructors find that nervousness is decreased if they hold a pencil, pointer, or a note pad in their hands. Make sure that activities deliberately planned to help you overcome nervousness fit in with the presentation and do not become distracting mannerisms.

87. **Attitude** — Do not apologize or reflect an apologetic attitude. On the other hand, the instructor must not appear arrogant and over-confident.

88. **Contact and Interest** — Students do not automatically become alive with interest and enthusiasm when they are assembled for instruction. Each student must feel that the instructor is speaking directly to him. There must be a strong sense of communication when giving verbal instruction. Talk to the students. Do not reflect an impersonal, indifferent attitude. Do not orate or declaim. Address your remarks to the students and not the training aids or the distant landscape. Look directly at one specific student for an instant, then look at another individual, then another. Do not neglect anyone or any section of the class. Let everyone know that you are genuinely and sincerely interested in the class and in the achievement of each individual member of that class. Show enthusiasm for your subject; some of it will be transferred to the students.

89. **Look and Be Alert** — Be attentive to, and assess responses. Look for and directly at inattentive students and ask them questions. Make sure they are following and understand the instruction.

90. **Posture and Movement** — Posture, body movements, and gestures can make the difference between an excellent, enthusiastic presentation which stimulates students to effective learning, and a dull, uninteresting lesson to which students make a very weak response. Take a position from which all students can see you and from which you can see all of them. Stand erect with weight evenly balanced on both feet. If you simply cannot let your hands hang freely at your side until you are ready to use them, clasp them in front or in back of you, or let one hand rest on the speaker's stand. Do not wring or twist them. Make all movements brisk, decisive, and purposeful. Avoid the extremes of standing perfectly still or continuous movement.

91. **Gestures** — These are motions of the body or limb intended to express an idea, or to enforce or emphasize an argument, assertation, or opinion. Do not try to emphasize every statement with a gesture. To do so will defeat the purpose of gestures.

92. **The Voice** — The instructor must make himself heard by every student in the class without difficulty. In order to increase your volume, breathe deeply and slowly. Relax the muscles of the throat, neck, and chest. Watch the reaction of your students to determine if they are having difficulty hearing. When in doubt, ask students at the back of the class if they can hear you.

93. **Pitch** — For each normal person, there is a range of tones which can be made without straining the voice. Determine the pitch at which you can speak with the greatest ease and clarity. Plan to keep this as your average pitch from which you will vary between the limits of an easy range.

94. **Rate** — An average of approximately 100 to 150 words per minutes is considered satisfactory for verbal instruction. The instructor should remember to vary the rate of speaking to suit the training situation; present simple materials at a fairly fast rate; speak slowly when presenting difficult matter; pause frequently, giving your students a chance to comprehend your remark; plan the lesson to suit the time available. **Don't talk too fast.**

95. **Enunciation** — Strive for clarity of expression each time you address the class. Pronounce each syllable more forcefully and deliberately when instructing a large group than when carrying on a conversation. Do not slur or run your words together. Express each word in a clear-cut manner.

96. **Selection of Words** — Use terms which are common to the vocabularies of your students. Consider the educational level of the group. It is better to oversimplify your instruction than to run the risk of talking over the heads of your students. Certain complex technical terms are essential. **Define each new term the first time it is used.** Use strong, meaningful, descriptive words and verbs which will leave vivid impressions.

97. **Forming Sentences** — Use short sentences; do not run them together; **eliminate unnecessary words and phrases**; delete the "er's", "ah's", and "ahem's" and other meaningless sounds which detract from an instructor's delivery; vary sentence construction and maintain continuity.

98. **Teaching Physical Skills** — This is a specialized form of instruction, although it uses the same basic principles as for all teaching.

99. **The four step plan for skill teaching** — Proceed as follows:

a. The instructor tells, then performs each action slowly and clearly.

b. The instructor repeats the skill, having the trainees tell each action before doing it.

c. The instructor has an average trainee come forward and do the skill, telling and then performing each action.

d. All trainees practise under supervision.

100. **Memory-Aid for Skills Teaching** — Remember the following:

a. **Preparation** — Prepare your material.

b. **Explanation** — Tell students what you are going to do.

c. **Demonstration** — Show students how to do it.

d. **Imitation** — Have students copy your actions.

e. **Practice** — Provide time for students to practice the skill.

TRAINING PERIOD 12 — USE OF TRAINING AIDS

101. **Characteristics of a Good Aid** — It must be clearly understood that training aids are a means to an end, not an end in themselves. Training aids must simplify the learning of the subject matter; they must emphasize the vital points of the subject matter; they must be easy for both the instructor and the student to use.

102. **Types of Training Aids** — The various types of aids can be grouped into six main classifications:

a. the actual article;

b. models;

c. non-projected visual aids;

d. projected visual aids;

e. aural aids; and

f. prepared hand-outs.

103. **The Actual Article and Realism** — The instructor must examine his subject matter to see if it is possible to use the **actual article** in his instruction. If the boat, anchor, shackle or article of uniform clothing, etc, is before the class the students will show greater interest than they will if the instructor merely talks about it or attempts to describe it.

104. **Models** — These are usually used when it is not possible or desirable to use the actual article or when they can better serve the instructor's purpose. There are three main types of model:

a. **Cutaway Models** — These are useful for demonstrating the internal construction and workings of actual equipment.

b. **Reduced Size Models** — Symbolic models of vessels, buoys, etc, which can be cut from wood, cardboard, or plastic can be easily produced and are quite adequate for illustrating things like navigation and rigging.

c. **Enlarged Size Models** — This type can be used to illustrate the operating principles of mechanical units which might otherwise be difficult or impossible for the class to see either on or within the actual article. They can be used to show enlarged replicas of gears, pistons, valves, or parts of weapons.

d. **Use of Models** — Next to the actual article, a model is usually the best training aid. When models are not provided (the usual situation) they should be made of whatever materials are available. The making of models is an excellent participation project for cadets, often more instructive than the lesson itself.

105. **Chalkboards** — The chalkboard is extremely useful for listing main divisions or stages of an operation or of your lesson, and for developing situations from class discussion. The student learns more readily when his is able to see as well as hear.

a. **Preparation** — You might find it expedient to prepare a series of teaching points or diagrams on the board beforehand; if so you must consider the advisability of masking them with strips of paper which can easily be removed at the right moment. As you remove each mask you must dispose of it out of sight as quickly and unobtrusively as possible.

b. **Rules of Use for Chalkboards** — The following —

(1) If you are right handed, have the chalkboard on your left hand side and vice versa;

(2) When you are going to write or draft you must stop talking;

(3) Stand facing the board squarely and move along the board as you write;

(4) When you have finished, stand clear of the board.

106. **Peg Boards** — Can be used for display purposes or for building up a diagram or situation. Pegs or hooks can be attached easily to display cards, or symbols, for insertion into the holes, or the actual articles can be suspended from the hooks.

107. **Charts** — There are two types of chart, each of which has an entirely different function and demands a different style of treatment.

a. **Wall Charts** — These may be designed in any way so long as they succeed in persuading the student to remember what they set out to teach. Both art work and lettering can well follow the style of the best commercial advertisement. The chart should be displayed in a prominent place. It should be changed regularly or it will become boring.

b. **Instructional Charts** — This type of chart must conform to certain definite rules if it is to do its job. It must not be too big or it will be unwieldy for the instructor. It must not be too small or it will be invisible to the class. Types of instructional charts are:

(1) **Pictorial Charts** — In teaching some principle, or axiom, the pictorial chart can be used to give the student a symbolic picture which, at the same time, crystallizes the meaning of the point being taught and impresses it vividly upon his visual memory. (See Figure 10-2.)

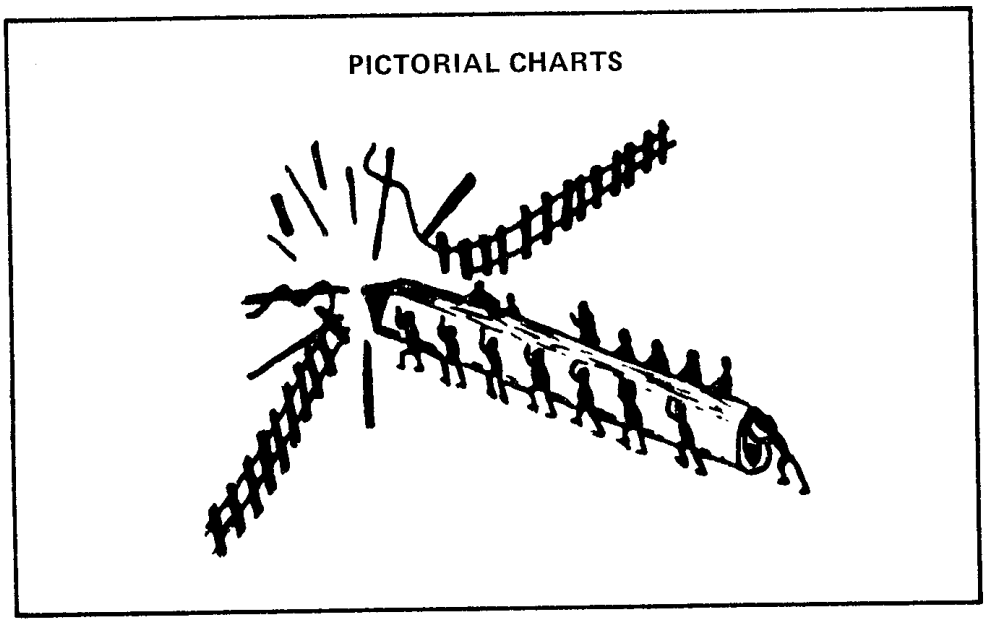

Figure 10-2 Pictorial Charts

(2) **Diagrammatic Charts** — In using a chart such as this the instructor must contrive to draw down the chart as he would a window-blind,

revealing one point at a time so that each will get full attention from the class.

(3) **Lettered Charts** — (See Figure 10-3.) Should not contain more than from 12 to 20 words:

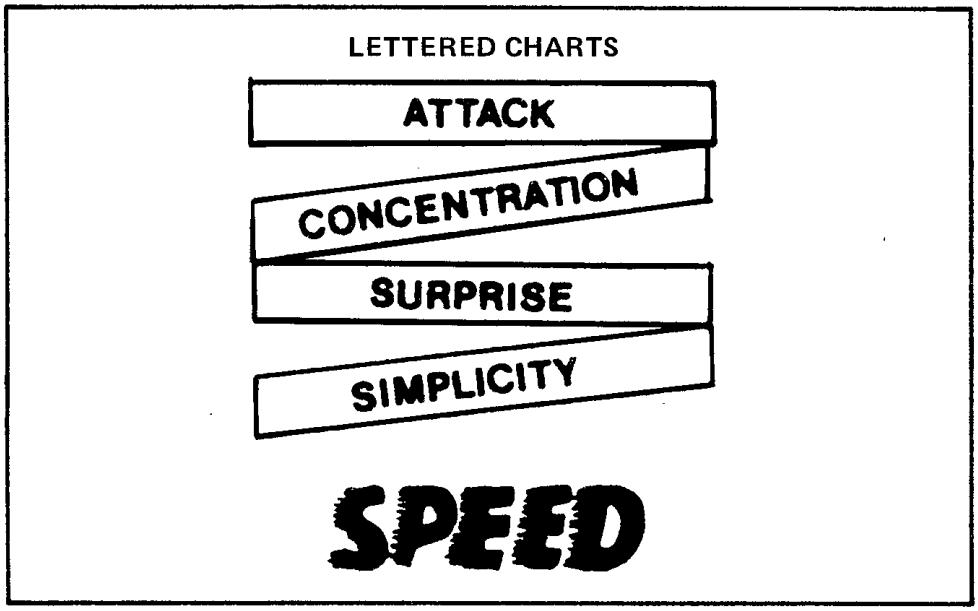

Figure 10-3 Lettered Charts

108. **Projected Visual Aids** — These are often very effective training aids since they can show many aspects of a subject in visually attractive ways. Various types are:

a. **The 35mm Projector** — Useful for showing colour photographs (often locally produced) of objects or activities which could not be brought into the classroom (eg, types of naval vessels, shelters constructed in a survival exercise, etc).

b. **The Overhead Projector** — This uses transparencies which can be prepared locally. Ideal for live diagrams and for projecting prepared lists, headings and summaries of course material.

c. **Opaque Projectors** — These tend to be expensive, since they require powerful light sources. Very convenient, however, since they can directly project pages from books, illustrations, etc, without the need for preparing transparencies.

d. **The Movie Projector** — This is often a very useful aid if an appropriate film is available (eg, from the CF Film Library). It combines visual and aural information as well as showing action.

109. **The Tape Recording** — This has a somewhat limited application to cadet training, but may be of great value in band training or teaching the use of the boatswain's call. Use of phonograph or tape recordings of marches may be useful in drill practice where no band is available.

110. **Prepared Hand-outs** — These have a definite place in a cadet training. They are particularly useful in two situations:

a. where diagrams or pictures are required but not provided in the cadet manual; and

b. where lists of parts, rules, etc, are an essential part of the training. It is unreasonable to expect cadets to memorize lists of this type during the period. Provision of a hand-out will permit him to concentrate more on the instructor and less on hastily scribbling notes. Do not let the hand-out become an excuse for inattention, however. Encourage cadets to underline key points with pencil or stress them with a clear yellow marker pen.

TRAINING PERIOD 13 — LESSON PLANNING

111. **Introduction** — Rarely is an impromptu lesson a successful one. Thorough advance planning will ensure that your lesson possesses the characteristics of a successful lesson. If a lesson plan is prepared and used properly, it is of inestimable value to all concerned. However, it does not release the instructor from the obligation of knowing his background material thoroughly and presenting it in a manner acceptable to the students.

112. **Organization** — An elderly and experienced teacher from a backwoods area was once asked how he organized his very effective lessons. He answered, "It's really very simple. I just tell 'em what I've told 'em!" While it may not be quite as simple as that, this story has a good deal of truth in it. Every effective lesson contains an introduction, the presentation itself, and a summary of the points covered. Add to these a section of the beginning for the instructor's personal guidance and you have the skeleton of a lesson plan

113. **Parts of a Lesson Plan** — A lesson plan is divided into four main parts. These are:

a. **Preamble** — This area is designed for the instructor's guidance only. It gives direction and is not used while in the classroom.

b. **Introduction** — This area introduces the presentation and contains four divisions, namely, **aim, motivation, outline** and **link** (**AMOL**). These four points may appear in any order. A well-planned introduction sets up the rapport, as the **aim** gives the class the "target" for the period; the **motivation**

gives the class "the why" the material must be learned and develops class interest. The **outline** tells the group "how you will reach your target" or the route you will take to cover the topic. The **link** lets the class know "where and how the material fits" with past experiences or future instruction. Thus, the class has a complete understanding of the overall picture before the body of the lesson is commenced.

c. **Presentation** — This is the **body** of the lesson. The "must know" material is given here.

d. **Application** — This is the driving home of the body of the lesson. Here the students answer oral or written questions. They work problems. They perform a skill. They ask questions. The student activity will be determined by the nature of the lesson. Finally, the instructor summarizes the main points.

114. **In Practice** — After it has been drawn up, the lesson plan must be looked over before the period starts and not pigeon-holed until the very minute it has to be taken into the classroom. Such a review refreshes the instructor's memory and ensure a smooth, lively presentation. Awkward pauses will thus be avoided.

a. No two situations are identical. Before re-using a plan, particularly one not originally prepared by himself, a good instructor studies it carefully, prepared to vary the materiel and its method of presentation according to the light of experience gained from its previous use and according to the ability of the class.

b. During class the instructor must remember that the lesson plan is only a guide, and as such its purpose is to keep the pertinent material before him; it thus serves to keep them from getting away from the subject or being sidetracked. Moreover, it is neither a crutch nor a substitute for thinking. It is to be used for quick reference and **not read** to the class. The instructor must be able to fill in the details from memory once the plan has supplied him with the headlines.

115. **Advantages of Planning** — There are many, but the more pertinent ones are:

a. planning results in an **orderly** arrangement of material;

b. planning ensures thorough **coverage** of the material;

c. planning helps to guarantee **better use of time**;

d. planning keeps the instructor **on track**; and

e. planning adds to an instructor's **confidence**.

116. **Points to Note** — Note as follows:

a. The plan must show the time to be spent on each of the three stages of the lesson.

b. The training aids and references (author, title pages) should be listed in the appropriate sections.

c. When drawing up the plan the instructor must remember that students learn best when the lesson proceeds from the **known** to the **unknown**, from the easy to the difficult.

d. The plan need **not be limited** to one sheet of paper.

117. **Details of the Four Parts** — The following subparagraphs detail the contents of the four parts of a lesson plan.

a. **Preamble** — It is composed of the following —

(1) **Topic** — Name the topic of the Lesson.

(2) **Objectives** — State what the student must —

(a) know,

(b) understand, and

(c) do.

(3) **Training Aids** — A list of the aids you will use.

(4) **Reference(s)** — The name of a book(s) the student may go to for further information.

b. **Comments on the Preamble** — The following are comments on the importance of the preamble —

(1) Objectives are expressed in terms of what the student is to learn rather than what the instructor is to teach.

(2) Each objective is expressed in terms of **knowledge**, or **understanding**, or **skill**.

(a) **knowledge** is an intimate acquaintance with facts. It is information necessary for efficient performance,

(b) **understanding** is the ability to comprehend the **reason why** of things and to interpret situations, and

(c) **skill** is the ability in action, and involves using knowledge effectively.

(3) Training aids are entered after the lesson plan is completed.

c. **Introduction** — The following points should be included in the Introduction —

(1) **Aim** — This is —

(a) A broad statement of topic.

(b) May be a restatement in your own words of lesson objectives.

(c) Put on top left blackboard.

(2) **Motivation** — This is —

(a) Reasons why student will benefit from this learning.

(b) An appeal to:

(i) curiosity,

(ii) prestige,

(iii) pocket book,

(iv) patriotism, and

(v) promotion.

(c) The most important factor in learning is **desire to learn**. Here we try to stimulate this desire.

(3) **Outline**

(a) A preview of your organization of this lesson.

(b) Component — purpose, parts, operation, servicing.

(c) Listed on left hand board under **Aim**.

(4) **Link**

(a) Show how this lesson is related to previous lessons.

(b) Review previous lessons by questioning to determine whether students have background for new learning.

(c) If no previous lesson, tie in with students' past experience (eg, as a car driver, a citizen, a family man).

d. **Comments on Introduction** — These are some comments on the introduction —

(1) Normally the Introduction is not prepared until the Preamble, Presentation and Application stages have been completed.

(2) Purpose of the Introduction is to get students ready for learning new material.

(3) Combine aim/motivation/outline/line (AMOL), into a smoother integrated Introduction.

(4) Don't present the Introduction in a mechanical fashion, eg, My aims are .....; My motivation is ....., etc.

(5) Use your imagination. If you can start the lesson with an appropriate story, joke, gimmick or demonstration, you will immediately get the students' attention.

e. **Presentation** — This should include the following —

(1) **Organization** — As follows —

(a) Divide the subject matter into natural divisions (**pockets**).

(b) Arrange the pockets into a logical sequence, for example —

Component	**Skill**	**Principle**
a. Purpose	1. Explanation	1. Experiment
b. Parts	2. Demonstration	2. Analyse Results
c. Operation	3. Imitation	3. Deduce Principle
d. Servicing	4. Correction of Errors	4. Apply Principle

(2) **Method of Teaching** — Follow these steps —

(a) Determination of teaching method will depend on —

(i) objective,

(ii) time available,

(iii) equipment available,

(iv) knowledge of students, and

(v) size of class.

(b) The ideal is to plan your activities to obtain as much as possible, therefore:

(i) never tell the students anything they can tell you,

(ii) develop the lesson by questioning the students,

(iii) whenever possible support ideas and concepts with training aids, examples, comparisons, or statistics, and

(iv) give special emphasis to important points.

(3) **Consolidation by States (Pauses)** — Before proceeding from one pocket to another —

(a) ask for questions so difficulties may be clarified,

(b) ask questions to check understanding if necessary,

(c) summarize if necessary, and

(d) re-establish a relationship between this pocket and the next.

f. **Comments on Presentation** — These are some important comments on the presentation of the lesson —

(1) The presentation is the stage of the lesson where new materiel is taught.

(2) Begin the new materiel at a point where the student can understand it.

(3) Keep the presentation student-centered.

(4) Estimate the time it will take to teach each pocket.

(5) The rate of teaching will depend on the rate at which your students can assimilate subject matter.

(6) If questions during a pause reveal that the students do not understand, don't proceed; go back and reteach.

g. **Application** — These are some methods you can use to apply what you have just taught —

(a) ask for question so that difficulties may be clarified,

(b) ask questions, give written exercises or have students perform skills to determine whether objectives have been achieved.

(c) summarize your main points, and

(d) conclude.

h. **Comments on Application** —

(1) Never omit application as this stage of the lesson enables you to determine whether you have achieved your objectives.

(2) If you are running short of time it is preferable to omit the last pocket of your presentation rather than the application.

(3) All objectives should be checked.

(4) If your objectives require understanding, ask questions which check understanding as well as memory.

(5) Questions should be written in full in your lesson plan.

(6) Include additional questions for greater flexibility.

(7) If your check-up at the end of each pocket in the presentation was thorough, it is not necessary to be as thorough in your application.

(8) Don't summarize the entire lesson, emphasize the most important facts or ideas, eg, safety precautions or any weaknesses revealed during questioning.

118. **Assigning Topics to Students** — At the end of this training period, each student should be assigned a topic (based on the O/C — A/C syllabus) which can be covered in outline in 5-10 minutes. (eg, Officer rank insignia, the sheet bend, types and parts of blocks, the parts of a sail, types of marine fuel, etc, etc). It will be supposed that the lesson is part of a series taught to junior cadets, and that the student-teacher has taught and will teach the preceding and succeeding parts of the course. The instructor should prepare a list of suitable topics and permit the students to select their own, provided that no topic is assigned to more than one student.

119. **Homework** — Each student should be required, as a homework project, to prepare a lesson-plan for the selected topic. The format should be that outlined in this period and as illustrated below in Figure 10-4.

LESSON PLAN

COURSE: (eg, O/C — A/C) TIME:

SUBJECT:

TRAINING PERIOD NO:

TOPIC:

PREPARED BY:

DATE:

TRAINING AIDS REFERENCES

INTRODUCTION: TIME:_____

AIM:

MOTIVATION:

OUTLINE:

LINK:

PRESENTATION: Time:_____

APPLICATION: Time:_____

Figure 10-4 Lesson Plan

NOTE

The format illustrated above should not be taken to indicate the amount of space required to outline the various parts of the lesson. For example, the "Presentation" section might require three-quarters of a page, the "Application" section only a line or two. On the other hand, the Application section, although short in the lesson plan, might easily take half of the time allotted to the lesson.

TRAINING PERIODS 14 TO 16 — TEACHING PRACTICE

120. **Mini-Lessons** — During these periods, the instructor should call upon individual students to present 5-10 minute mini-lessons to the remainder of the class, based in each case on the student's prepared lesson plan. After each lesson, a short discussion-period should be permitted to encourage constructive criticism of the lesson and its presentation by the class.

121. **Grading** — After the class, the lesson plans used so far should be collected by the instructor and graded according to the check list appended at Annex B to this chapter. The corrected lesson plans should be returned to the students as soon as possible, with pencilled comments to indicate the areas in which they might be improved.

122. **Dividing Up the Mini-Lessons** — The number and length of the mini-lessons will depend on the number of students in the class (eg, if there are six students, there may be two mini-lessons in each of the three periods, so that each student gets his chance). The instructor should announce in advance which students will be called upon the following week, so that they will all be prepared.

DISCIPLINARY PROCEDURES INFORMATION

The following material is reproduced from the now-obsolete manual, **Regulations and Orders for the Royal Canadian Sea Cadets**, BRCN 105 (64), Article 19.10/01. It is provided because a number of commanding officers continue to use it as a guide in the disciplinary procedures of their corps, which under Article 5.42 of QR Cadets are left entirely to their discretion. It is intended for information only and is in no way to be taken as mandatory.

19.10/01 Investigation of Offence —

1. When a cadet is alleged to have misconducted himself, he shall be brought before the Officer-of-the-Day, and if the Officer-of-the-Day considers the misconduct to be of a minor nature for which, if proved, action under clause 3 (d) or (e) would be appropriate, he may take the necessary action himself. If the misconduct is such that the Officer-of-the-Day does not consider that he should deal with it, he shall refer the case to the Executive Officer who, if he considers that action under clause 3 (d), (e), (f) or (g) would be appropriate, may deal with the case himself. If the misconduct is such that the Executive Officer considers it should be dealt with by the Commanding Officer, he shall refer the case to the Commanding Officer.

2. The Officer who takes action under this article is referred to as the investigating officer.

3. Where as a result of the investigation mentioned in 1 of the article, the investigating officer is of the opinion that the misconduct has actually occurred, he may take the following action, depending upon the nature of the act and the circumstances in which it occurred:

a. recommend that the cadet be released; or

b. direct that the cadet be reverted to any rating lower than that which he holds; or

c. recommend that the cadet be deprived of the privilege of attendance at a summer training establishment for one season; or

d. require that cadet to perform one-half hour extra drill or work on the conclusion of one drill; or

e. require the cadet to perform one-half hour extra physical training at the conclusion of one drill; or

f. direct that the cadet be deprived of the privilege of using the rifle range or comparable corps facility for one month;

g. reprimand the cadet.

4. In determining the action to be taken in respect of misconduct under this article, the investigating officer shall be guided by the directions contained in Table 1 and 2 of this article.

ARTICLE 19.10/01 (TABLE 1)

No.	Action	Whether applicable to			Authority Required
		Chief's and PO's	Leading Rating	Cadets below Leading Rating	
1	Release	yes	yes	yes	CO
2	Reversion	yes	yes	yes	CO
3	Loss of privilege of attending summer training	yes	yes	yes	CO
4	One-half hour extra work	no	no	yes	CO up to 4 days or XO up to 2 days, or OOD for one day.
5	One-half hour extra PT	no	no	yes	CO up to 4 days or XO up to 2 days, or OOD for one day.
6	Loss of privilege of using rifle range, or comparable corps facility, for one month	yes	yes	yes	CO or XO
7	Reprimand by CO	yes	yes	yes	CO

Figure 10-5 Article 19.10/01 (Table 1)

ARTICLE 19.10/01 (TABLE 2)	
Misconduct	**Most Severe Action Appropriate**
a. Absence and breaking out of ship:	
Absence from drill (repeated or prolonged)	1
Breaking out of ship	3
Being late for drill	4
b. Deception:	
(i) Making false charges	1
(ii) Giving false evidence or lying	1
(iii) Answering call for another man with intent to deceive	4
(iv) Obtaining leave under false pretensions	4
c. Dirtiness and Untidiness:	
(i) Committing a nuisance	4
(ii) Not being properly dressed or being dirty or slovenly in person or dress	5
d. Alcoholic Beverages:	
(i) Carrying or drinking alcoholic beverages	1
e. Duties, Neglect or Avoidance of:	
(i) Slackness or improper performance of command duties	5
(ii) Not answering muster	5
(iii) Inattention at drills or exercises	5
f. Good Order, Offences Against:	
(i) Gambling	2
(ii) Making a noise or talking in ranks	5
(iii) Spitting about the decks	4
(iv) Contributing towards an untidy ship	4
(v) Cursing, swearing or making use of obscene language	2

Figure 10-6 (Sheet 1 of 2) Article 19.10/01 (Table 2)

ARTICLE 19.10/01 (TABLE 2)	
Misconduct	**Most Severe Action Appropriate**
g. Insubordination, quarrelling or fighting:	
(i) Wilful disobedience	1
(ii) Disrespect towards superiors	2
(iii) Inattention to, or neglect in carrying out orders	4
(iv) Fighting or quarrelling	2
(v) Tending to create bad feelings	1
h. Miscellaneous:	
(i) Theft	1
(ii) Wilfully destroying or breaking equipment or gear	1
(iii) Repeated misconduct	1
(iv) Carelessness with respect to arms	2
j. Fires:	
(i) Negligently using fire or lights	2
k. Uniform, Improper use of:	
(i) Wearing without authority	1
(ii) Any act which brings disgrace or discredit upon the uniform	1
m. Life-Saving Equipment, Improper use of:	
(i) Tampering with or wilfully damaging	1
(ii) Disregard of regulations regarding wearing	2

Figure 10-6 (Sheet 2 of 2) Article 19.10/01 (Table 2)

CHECK LIST FOR ANALYSING A LESSON PLAN

1. **In the Directive have you included:**

   a. Topic and length of lesson?

   b. Specific lesson objectives?

   c. List of tools, equipment and aids?

   d. References?

2. Does the **Introduction**:

   a. Tie this lesson in with previous lesson(s) or previous student experience?

   b. Provide for review when desirable?

   c. Show value of learning this materiel?

   d. Arouse interest?

   e. Contain a clear, precise aim for the lesson?

   f. Give the outline?

3. Does the **Presentation** provide:

   a. Pockets of new materiel arranged in logical order?

   b. For recaps, between pockets?

   c. For development from known to unknown; from simple to complex?

   d. Complete outline for demonstrations and performances, if any?

   e. Examples, illustrations, and devices for clarification of difficult areas?

   f. Linking, where possible, with other training?

   g. Directions for use of aids?

   h. Sketches for the chalkboard work, if board is to be used?

   j. Key questions and desired answers?

4. Does the **Application**:

   a. Provide for student practice?

   b. Contain pre-arranged questions?

   c. Link this lesson with one(s) to follow?

   d. Summarize important points and state conclusions reached?

CHAPTER 11

NAVAL CUSTOMS AND TRADITIONS

CHAPTER 11

NAVAL CUSTOMS AND TRADITIONS

1. **Aim** — This chapter incorporates those items of naval customs and traditions applicable to the Sea Cadet movement not included elsewhere in the manual.

2. **Content** — Included are the following:

   a. Sea Cadet Bugle Calls;

   b. The Naval Hymn;

   c. The Naval Grace;

   d. The Naval Prayer;

   e. Prayer for the Forces of the Queen;

   f. Toast of the Day;

   g. Laws of the Navy;

   h. Customs at Dinner in Naval Messes; and

   j. Slinging and Lashing up a Hammock.

3. **Sea Cadet Bugle Calls** — The following naval bugle calls are applicable to Sea Cadet operations. **The first 15 of those included below are those required for the Sea Cadet bugler's badge**. The remainder are included for information and interest.

   a. **Reveille**

   b. **Still** (To halt all activity, for announcements or orders.)

   c. **Alert** (Precedes all salutes.)

   d. **Markers**

   e. **Divisions**

   f. **General Salute**

   g. **Carry On**

h. **Hands to Classes**

j. **Duty Watch**

k. **Stand Easy**

m. **Secure** (To cease work.)

n. **Liberty Men**

p. **Lights Out**

q. **Sunset**

r. **Last Post**

s. **Rouse** (May be used to rouse officers and warrant officers.)

t. **Clear Lower Deck** (Used to announce a general muster.)

u. **Officers** (Used to call officers to take posts.)

v. **Attention** (To call the ship's company to attention on the approach of commanding or inspecting officer.)

w. **Guard** (To march on the guard.)

x. **Bands** (To march on the band.)

y. **Saluting Guns' Crews** (To march on the gun's crew.)

z. **Duty Hands** (Used to call a work party other than duty watch.)

aa. **Cooks** (Used to call hands to a meal.)

ab. **Out Pipes** (Used at the end of stand easy.)

ac. **Grog** (Now used for Kye.)

ad. **Commodore's Salute**

ae. **Officers' Dinner** (Used to call officers to a mess dinner.)

af. **Commence** (To order the commencement of an exercise or evolution.)

ag. **Halt** (To stop an exercise or evolution; also to cancel the immediately preceding call or pipe.)

ah. **One "G"** (Used alone or in a series to qualify another call — see individual calls. Also see below.)

aj. **Defaulters**

4. **The Naval Hymn** — This is as follows:

Tune: Melita

Eternal Father, strong to save,
Whose arm doth bind the restless wave,
Who bidd'st the might ocean deep
Its own appointed limits keep

O hear us when we cry to Thee
For those in peril on the sea.

O Saviour, Whose almighty word
The winds and waves submissive heard,
Who walkedst on the foaming deep,
And calm amidst its rage didst sleep;

O hear us when we cry to Thee
For those in peril on the sea.

O Sacred Spirit, Who didst brood
Upon the chaos dark and rude,
Who bad'st its angry tumult cease,
And gavest light, and life, and peace;

O hear us when we cry to Thee
For those in peril on the sea.

O Trinity of love and power,
Our brethren shield in danger's hour;
From rock and tempest, fire and foe,
Protect them wheresoe'er they go;

And ever let there rise to Thee
Glad hymns of praise from land
and sea.

Amen.

5. **The Naval Grace** – This is as follows:

   a. Before Meals – "For what we are about to receive, thank God."

   b. After Meal – "For what we have received, thank God."

6. **The Naval Prayer** – This is as follows –

NAVAL PRAYER

O Eternal Lord God, who alone spreadest out the heavens, and rulest the raging of the sea; who has compassed the waters with bounds until day and night come to an end: Be pleased to receive into thy Almighty and most gracious protection the persons of us thy servants, and the Fleet in which we serve. Preserve us from the dangers of the sea, and from the violence of the enemy; that we may be a safeguard unto our most gracious Sovereign Lady, Queen Elizabeth, and a security for such as pass on the seas upon their lawful occasions; that the inhabitants of our Commonwealth may in peace and quietness serve thee our God; and that we may return in safety to enjoy the blessings of the land, with the fruits of our labours; and with a thankful remembrance of thy mercies to praise and glorify thy holy Name; through Jesus Christ our Lord. Amen.

7. **Prayer for the Forces of the Queen** – This is as follows:

A PRAYER FOR THE FORCES OF THE QUEEN

O Lord God of Hosts; Stretch forth, we pray thee, thine Almighty arm to strengthen and protect the forces of our Queen in every peril of sea, and land, and air: be with them in the day of battle, and in time of training keep them safe from all evil; endue them ever with loyalty and courage; and grant that in all things as they serve their Country they may serve thee; through Jesus Christ our Lord. Amen.

8. **Toast of the Day** – These are:

   a. **Sunday** – To Absent Friends;

   b. **Monday** – To Our Ships;

   c. **Tuesday** – To Our Men;

   d. **Wednesday** – To Ourselves;

   e. **Thursday** – To a Bloody War or a Sickly Season;*

f. **Friday** — To a Willing Foe and Sea-room;

g. **Saturday** — To our Wives and Sweethearts.

* The facetious reason for this rather gory toast was to kill off as many senior officers as possible, so as to leave room for the promotion of those below!

9. **The Laws of the Navy** — This is a poem.

Ronald A. Hopgood

THE LAWS OF THE NAVY

1. Now these are the Laws of the Navy,
   Unwritten and varied they be,
   And he that is wise will observe them,
   Going down in his ship to the sea.

2. As naught may outrun the destroyer,
   Even so with the law and its grip,
   For the strength of the ship is the Service,
   And the strength of the Service, the ship.

3. Take heed what ye say of thy rulers,
   Be thy words spoken softly or plain,
   Lest a bird of the air tell the matter
   And so ye shall hear it again.

4. If ye labour from morn until even
   And meet with reproof for they toil,
   It is well, — that the gun may be humbled,
   The compressor must check the recoil.

5. On the strength of one link in the cable
   Dependeth the might of the chain.
   Who knows when thou mayest be tested?
   So live that thou bearest the strain!

6. When the ship that is tired returneth
   With the signs of the sea showing plain,
   Men place her in dock for a season
   And her speed she reneweth again.

7. So shalt thou, lest, perchance thou grow weary
In the uttermost parts of the sea,
Pray for leave, for the good of the Service,
As much and as oft as may be.

8. Count not upon certain promotion,
But rather to gain it aspire,
Through the sight-line shall end on the target,
There cometh, perchance, a misfire.

9. Can'st follow the track of the dolphin
Or tell where the sea swallows roam?
Where Leviathan taketh his pastime?
What ocean he calleth his home?

10. Even so with the words of thy rulers
And the orders those words shall convey.
Every law is as naught beside this one —
"Thou shalt not criticize, but obey!"

11. Saith the wise "How shall I know their purpose?"
Then acts without wherefore or why;
Stays the fool but one moment to question,
And the chance of his life passeth by.

12. If ye win through an African jungle,
Unmentioned at home in the Press,
Heed it not, no man seeith the piston
But it driveth the ship none the less.

13. Do they growl? It is well: be thou silent,
So the work goeth forward amain,
Lo, the gun throws her shot to a hair's breadth
And shouteth, yet none shall complain.

14. Do they growl, and the work be retarded?
It is ill, speak whatever their rank,
The half-loaded gun also shouteth,
But can she pierce armour with blank?

15. Doth the paintwork make war with the funnels?
Do the decks to the cannon complain?
Nay, they know that some soap or a scraper
Unites them as brothers again.

16. So ye, being Heads of Departments,
Do ye growl with a smile on thy lips,
Lest ye strive, and in anger be parted
And lessen the might of thy ship.

17. Dost deem that thy vessel needs gliding
And the Dockyard forbear to supply?
Place thy hand in thy pocket and gild her,
There be those who have risen thereby.

18. Dost think in a moment of anger,
'Tis well with thy seniors to fight?
They prosper, who burn in the morning,
The letters they wrote overnight;

19. For some there be, shelved and forgotten,
With nothing to thank for their fate
Save that on a half-sheet of foolscap,
Which a fool "had the honour to state. . ."

20. If the fairways be crowded with shipping,
Beating homeward the harbour to win,
It is meet that, lest any should suffer,
The steamers pass cautiously in.

21. So thou, when thou nearest promotion
And the peak that is gilded is nigh,
Give heed to thy words and thine actions,
Lest others be wearied thereby.

22. It is ill for the winners to worry,
Take thy fate as it comes with a smile,
And thou art safe in the harbour
They will envy, but may not revile.

23. Uncharted the rocks that surround thee,
Take heed that the channels thou learn,
Lest thy name serve to buoy for another
That shoal, the Courts-Martial Return.

24. Though Armour the belt that protects her,
The ship bears the scar on her side.
It is well if the Court shall acquit thee,
It were best hadst thou never been tried.

25. Now these are the laws of the Navy,
Unwritten and varied they be;
And he that is wise will observe them,
Going down in his ship to the sea.

26. As the wave rises clear to the hawse pipe,
Washes aft, and is lost in the wake,
So shall ye drop astern, all unheeded,
Such time as these laws ye forsake.

10. **Customs at Dinner in Naval Messes** — This has been excerpted from the Steward's Manual, BRCN 3124, included as Annex A to this Chapter.

11. **Slinging a Hammock** — Proceed as follows:

a. **Hammock** — The canvas part, having 16 holes in each end, usually fitted with eyelets.

b. **Clews** — A set of clews consists of two lanyards, each spliced to its metal ring, each ring carrying eight nettles (six foot lengths of 3-stranded white hemp 5/8-inch in circumference), for slinging the two ends of the hammock.

c. **Nettles** — The nettles are first middled, with the eye so formed as to be secured with a racking seizing; the eye is passed through the ring and secured by passing the two ends through the eye. As each nettle has two ends, sixteen ends are thus provided, one for each eyelet hole in the end of the hammock.

d. **Lashing** — This is a length of sisal long enough to allow the seven turns to be taken round the hammock and secured to its own part. The lashing has an eye-splice at one end and may be **pointed** at the other.

e. **Using One Hammock Bar** — To sling the hammock secure one lanyard to the hammock bar overhead so that the ends of the nettles hang at the corner of the chest. Pass the outer nettles through the outer corner eyelet holes at one end of the hammock and secure by a half-hitch, leaving about six inches of the ends hanging down. Then take the two nettles nearest the centre and secure them to their corresponding eyelet holes in the centre of the hammock-end, leaving about four inches hanging down. Then secure the remaining nettles in like manner from the centre outwards, leaving increasing lengths of end hanging. Repeat with the other end of the hammock and the other clews. Plait the ends of the nettles up in threes, leaving them inside the hammock.

f. **Using Two Hammock Bars** — Sling the hammock between two hammock bars by passing the lanyard over the bar, back up through its own ring and

form a sheet bend over the nettles. Then distribute the bedding evenly over the length of the hammock and tauten up the slack nettles if necessary.

g. **A Stretcher** — To keep the head of the hammock apart a stretcher can be used, but this is optional. It consists of a length of wood about two feet in length with a V cut at both ends. These V's take over the top two nettles on each side.

12. **To Lash up a Hammock** — Proceed as follows:

a. **Placing the Bedding** — Distribute the bedding evenly over the length of the hammock leaving about six inches clear at each end to prevent bunches of bedding and blankets oozing out of the ends when it is lashed.

b. **First Turn** — Lower the hammock until it is breast high, and stand on the left side facing the head. Pass the lashing over the hammock and reeve the end through the eye and draw taut; this is the first turn. The succeeding turns are taken as follows.

c. **Succeeding Turns** — Coil the lashing up and pass it up and over the hammock with the right hand and bring it under the hammock into the left hand, then over its own standing part and haul taut by swinging back on it. This hitch is called a marline hitch.

d. **Final Turn** — The final turn is taken around the neck of the hammock at the foot and is secured on its own part by a half-hitch. The end is then passed neatly along the hammock under each turn.

e. **Stowing the Clews** — The clews are stowed by twisting the nettles around righthanded and tucking them under the turns of lashing along the hammock.

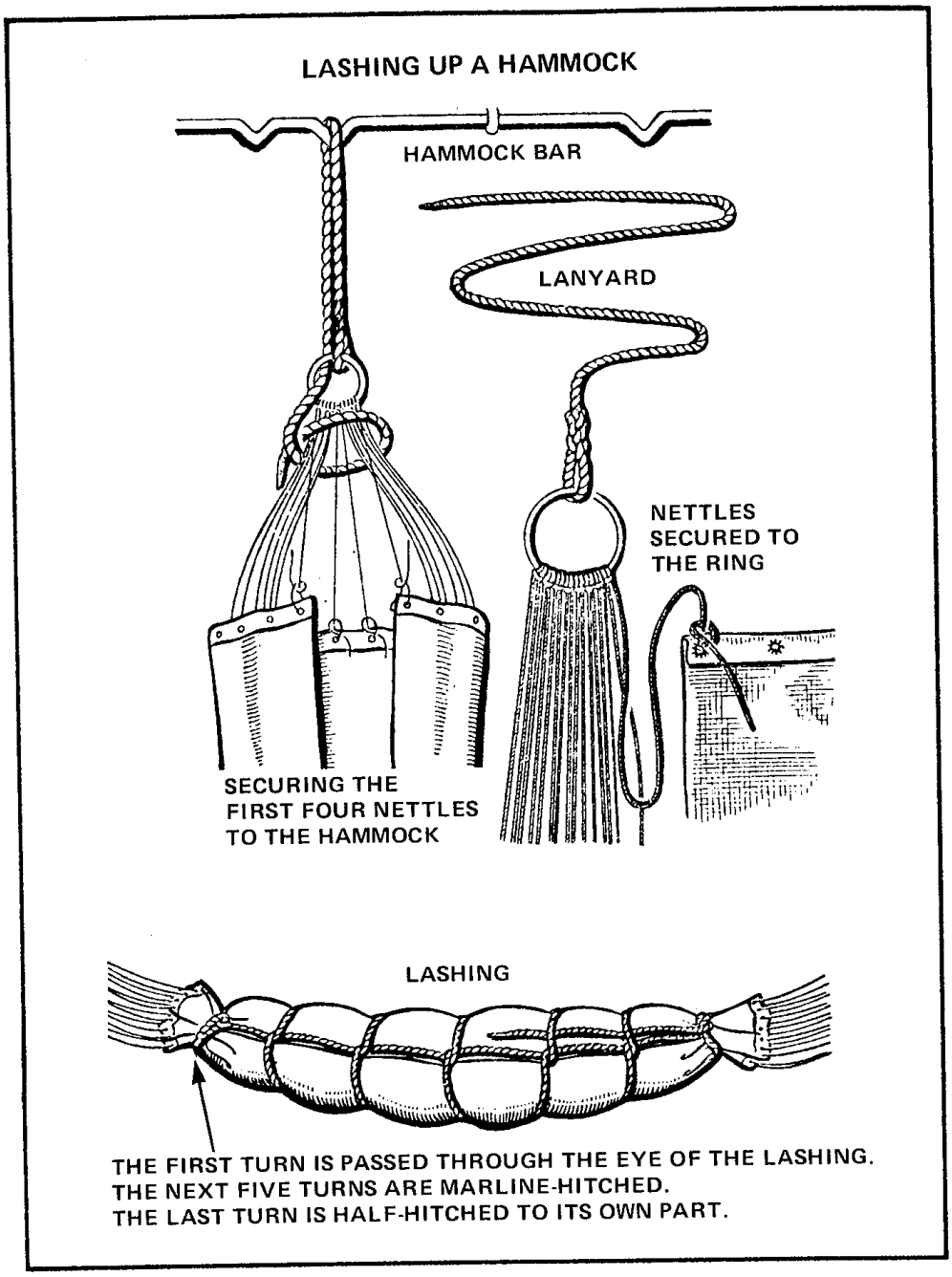

Figure 11-1 Lashing Up a Hammock

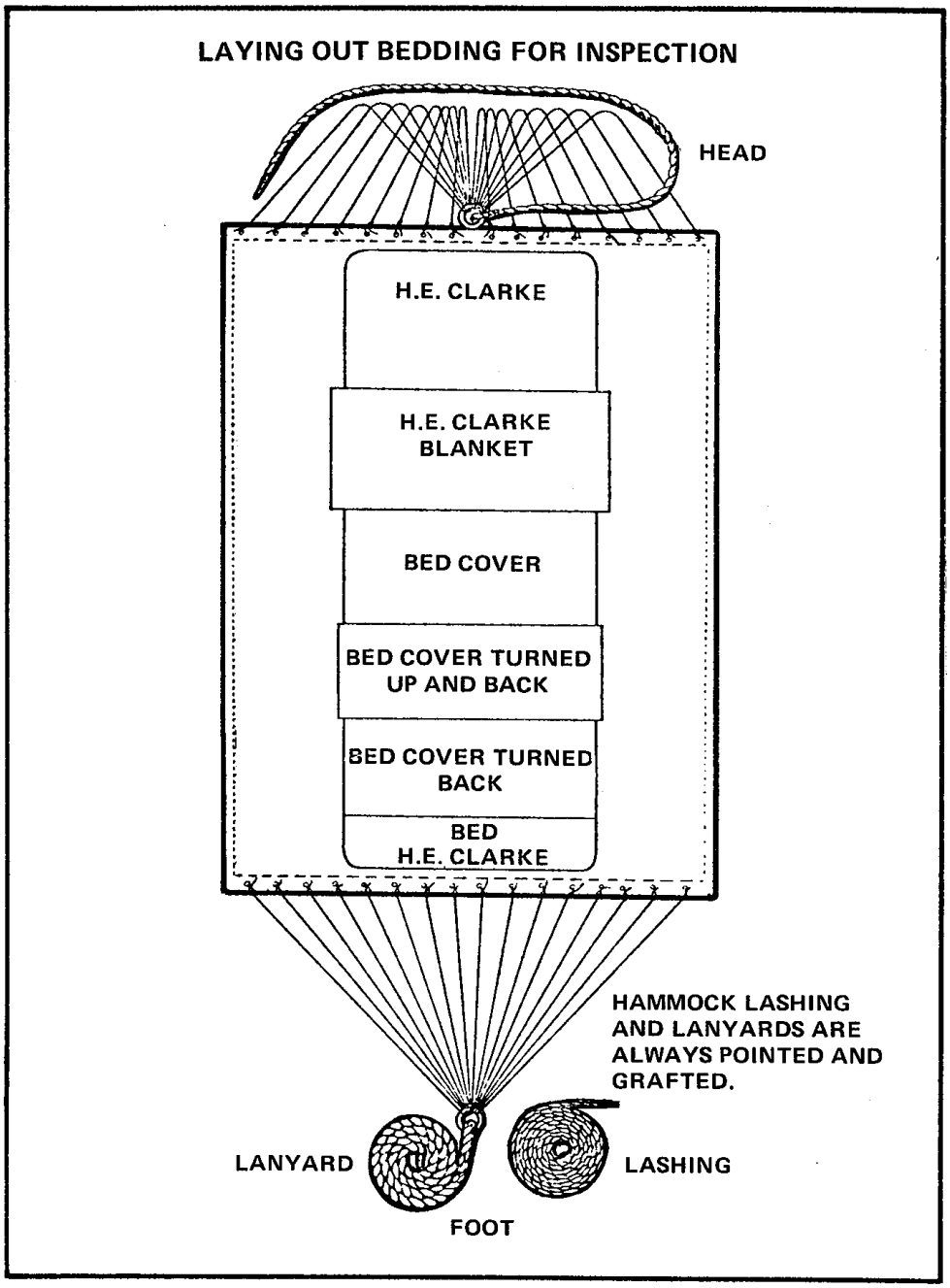

Figure 11-2 Laying Out Bedding for Inspection

CUSTOMS AT DINNER IN NAVAL MESSES

The following is an excerpt from the Stewards' Manual, BRCN 3124.

General

1. Tradition remains to this day one of the prime ingredients in Esprit-de-corps of the navy. The Royal Navy has, in the course of centuries, acquired numerous customs and usages, of which many have become integrated with the Royal Canadian Navy.

2. There is a definite obligation in a ship for officers to attend dinner unless so excused either through duty or illness. Should he not attend, his dinner is not to be served in his cabin privately.

Wearing Apparel

3. Naval officers normally wear mess un-dress at dinner, but mess dress may be ordered, and an officer going later to an affair at which mess dress is required is quite correct to dine in it.

4. They may, with the presidents permission, dine in dinner jacket or tails, if they have an engagement ashore immediately after dinner.

5. Officer of other services wear their equivalent to mess dinner or mess un-dress when dining in a Naval mess.

6. Civilians should wear tails, or a dinner jacket, with miniatures.

7. Officers do not wear a ready-made bow tie.

8. In large messes where room permits the duty officers who cannot dress for dinner or who are likely to be called away during it, eat at a separate table or have supper in their cabins. If these arrangements cannot be made, officers improperly dressed may ask the president to "excuse their rig".

President

9. In large messes each officer in turn presides as mess president at dinner.

10. On guest nights and other important occasions the president of the mess performs this duty.

11. In small messes the president of the mess normally acts as president at dinner.

12. The president is in absolute charge of the table, regardless of rank, branch or seniority. He may levy fines (in drink) or take any other action he deems necessary to maintain discipline and no comment should or can be made, however senior the offending officer may be.

13. Should the officer whose turn it is to be president or vice-president be unable to attend dinner it is his responsibility to find a substitute and it is absolutely necessary that he do so.

Hour of Serving

14. Dinner is normally served at 1945.

Entry

15. At 1945 the senior steward reports to the president. "Dinner is service, Sir", and the president leads the way into the mess, the other diners following him. It is incorrect for anyone to precede the president into the mess.

16. The president assumes his place, the remainder taking their places without regard to rank. No one should sit before the president is seated.

17. If an officer has an unfinished drink when going to the table, he may ask the president's permission to bring it with him. If the request is not granted, he must drink it quickly or abandon it.

Seating

18. The president sits at the head of the table. At a large table this is in the centre; at a small one it is the end nearest the door.

19. The vice-president sits opposite the president, or when at a small table, is farthest away from him.

20. Guests sit on the right of their hosts. If the host has two guests, they sit on either side of him.

21. A host with three or more guests should have his guests disposed on either side of him in two groups. Avoid placing guests immediately next to each other.

22. Should there be mess guests, that is, guests who have been invited by the mess as a whole, the guest of honour sits on the president's right, the next in importance sits on his left.

23. Any other mess guests should be seated, in so far as is possible, with a member of the mess on either side.

24. As well, the vice-president should attend to mess guests present and seat those not with the president on either side of him when possible.

25. There should never be a vacant seat between two diners. If too many places have been laid, the diners should close in towards the president and vice-president, keeping the numbers on each side of them and of the table as even as possible.

Commencement

26. When everyone is seated the senior steward reports to the president, "Officers seated, Sir", and states whether or not a chaplain is present.

27. The president taps the table for silence.

28. If there is a chaplain present he says grace.

29. If there is no chaplain present the president says grace. Normal prayer used by presidents: "For what we are about to receive, thank God".

Rules of Order

30. As soon as the president has tapped the table for grace, the following rules are rigidly in force:

a. Without the president's permission no one may —

(1) enter and seat themselves at the table,

(2) leave the table,

(3) return to the table,

(4) read (except the menu and musical programme),

(5) write,

(6) have a second helping of any course, or

(7) speak to anyone not dining.

b. If a diner is near enough to the president to ask his permission personally, he does so; if he is too far away, he sends a steward to the president with the request.

c. No diner may do the following —

(1) commence a course before the president,

(2) smoke,

(3) utter an oath or use foul language,

(4) place a bet or wager,

(5) discuss political or other controversial subjects,

(6) talk "shop",

(7) speak a foreign language,

(8) tell "smutty" stories,

(9) mention a woman's name unless she is a celebrity,

(10) mention a specific sum of money,

(11) propose a toast.

d. If a diner has been granted permission to sit down late, or to return to the table, he continues with the course then being eaten or served, unless the president gives him permission to eat the course which he missed.

e. Whenever the president or vice-president summons attention, there must be silence until he has finished speaking.

Order of Serving

31. Naturally, the president is always served first, and no dish is ever removed until the last diner has finished eating the course then served.

32. Mess guest are served before the president, and other guests before their respective hosts.

33. When the last course has been eaten, the stewards clear the table of everything except the table decorations, and sweep up all crumbs.

Passing the Wine

34. When the table is cleared the senior steward reports to the president, "Table cleared, Sir".

35. The president taps the table for silence and grace is said as before, the customary one being: "For what we have received, thank God".

36. The port and other relevant wines are then placed on the table. In a small mess they are all placed before the president; in larger ones the vice-president and, possibly, other officers, have decanters placed in front of them as well.

37. If dessert is to be served, dessert plates, knives, forks, and finger-bowls are also placed on the table. Dessert generally consists of fruits and nuts.

38. When the decanters are all placed on the table, the senior steward reports to the president. "The wine is ready to pass, Sir".

39. The president then orders "Out stoppers" and unstoppers the decanters in front of him. Other officers with decanters before them follow suit.

40. The president passes the decanters one at a time to his left, the other officers doing likewise. Remember, the president and other officers in charge of decanters do not pour their own before passing the decanters.

41. The decanters should be at least one place apart during their trip around the table. They should never be allowed to pile up beside a diner.

42. If, due to shortage of diners, there is a gap at the end of the table, the stewards in that area should move the decanters across it.

43. The stewards move the stoppers on from one officer to the other, so that they remain with the particular decanter to which they belong.

44. No one may touch his wine until the Loyal Toast has been proposed.

45. When the wine has been passed and all decanters have reached their destination, the senior steward reports to the president, "The wine has been passed, Sir".

46. The president then order "In stoppers" and stoppers the decanters in front of him. The other officers follow suit.

Toasts

47. The president taps the table for silence and says, "Mr. Vice, the Queen" (or King, whichever the case may be).

48. If there is a band in attendance, it then plays the National Anthem, after which the vice-president responds, "Gentlemen, the Queen".

49. All diners raise their glasses and repeat, "The Queen", and those with wine drink the toast.

The Loyal Toast

50. The health of Her Majesty the Queen should be honoured, seated, in all Naval messes, whether on board ship or on shore, on all occasions except:

a. when the National Anthem is played, the toast should be drunk standing; and

b. when toasts to foreign heads of States are included, they and that of "The Queen" should be drunk standing whether National Anthems are played or not.

Toast of the Day

51. There is no official record of the original toasts of the day, however, these have been given (by an old Naval Officer) as being in vogue in Nelsons' day.

a. Monday — Our ships at sea.

b. Tuesday — Our men.

c. Wednesday — Ourselves — since no one is likely to think of us.

d. Thursday — A bloody war or a sickly season.

e. Friday — A willing foe and sea room.

f. Saturday — Wives and sweethearts — may they never meet.

g. Sunday — Absent friends.

Smoking

52. After the toast have been drunk the president declares, "Gentlemen, you may smoke".

53. One must not, however light up before the president has done so, or has given permission to smoke.

54. Pipes may not be smoked without the president's permission.

Wine Guardians

55. Anyone who wishes to, may now leave the table, with the exception of officers in charge of wines. If they wish to leave, they must pass the decanters on to the officer on the left. If an officer in charge of wine, whether the president himself or another, leaves the table without finding a new guardian, the wine may be passed at the offender's expense until the decanters which he has deserted are empty.

President's Wine for Loyal Toast

56. If no one takes wine in which to drink the loyal toast, the president does so at the mess's expense.

57. Except in the case of guests, this is the only occasion on which diner may accept a glass of wine to drink this toast, it being a point of honour for each diner to pay for his wine.

Removal of Wine

58. The president may order the wine removed after the toasts are drunk, but it is the custom to sit over it and pass the decanters at least once more.

59. After the decanters are passed the second time, the stoppers are left off until the wine is finally removed upon the president's order.

60. Incidentally, the president or other officers guarding wine, who desire to refill their glass, are not at liberty to pick up the decanter in front of them and do so; they must wait until the wine is again passed.

Discipline

61. During dinner the president may discipline any diner for misbehaviour.

62. He has three alternatives:

a. order the culprit to leave the mess; or

b. fine him an appropriate number of drinks, or

c. warn him.

63. An officer coming to dinner late may:

a. have his excuse accepted; or

b. be refused permission to dine; or

c. be fined.

Fines

64. Fines may vary from a single drink to drinks for all present.

65. The president may award the drinks to any diner or diners he chooses to name, including himself.

66. The vice-president may warn or fine the president.

67. Fines imposed upon a guest must be paid for by the host.

68. Fines are nearly always paid in port or another wine in which toasts are drunk.

69. They are never paid until after toasts have been drunk.

70. No diner who has not drunk the toasts in wine may accept payment of a fine.

71. Toasts may never be drunk in wine that is served in payment of a fine.

72. Fines are sometimes paid in liqueurs, in which case these rules do not apply; but this is seldom done, and such a fine is generally imposed only for a flagrant breach of good manners committed after the toasts have been drunk.

Bandmaster

73. If the band is in attendance at dinner, it is a custom of the Service for the president to invite the bandmaster to join him in a glass of port after the toasts have been drunk. A chair is placed beside the president for the bandmaster when the invitation is issued.

Popular Misconceptions

74. **Passing the Wine** — There is a popular misconception that, in passing the wine, the decanter must never leave the table, and that drinks must be poured in this awkward fashion. Such a rule does exist in some Army mess traditions, but it has never been a Naval custom.

75. **The Loyal Toast** — The privilege of toasting the Sovereign while seated is a restricted one. It applies to Naval or Sea Cadet mess dinners held in Commonwealth

countries only. It does not apply to Naval or Sea Cadet Officers attending mess dinners of other elements, nor attending Naval dinners in foreign countries. To use the privilege in these circumstances is not only incorrect, but in the worst possible taste.

76. **Foreign Mess Guests** — When a Mess Guest is from a foreign country, it is customary to toast the Head of State of his country. This is done immediately after the loyal toast. Such toast should be made standing and in this case the loyal toast is also made standing. (See paragraph 50b.)

77. **Other Toasts** — With the exception of the above, all other toasts are drunk seated (so as not to give them precedence over that to the Sovereign), although the proposer of the toast may stand.