CHAPTER FIVE

SEAMANSHIP

GENERAL

5.01 The term 'seamanship' is a broad one. It covers many topics and would be defined in different ways by different people. For Flood Rescue Boat Crews it should be considered to cover such areas as:

a knowledge of the Flood Rescue Boat:

b. nautical terms;

c. rope work,

d. anchors, anchoring; and

e. rowing/paddling.

5.02 KNOWING THE BOAT

Boat handling in adverse conditions is a flexible and individual matter, since no two boats are exactly the same in the same water conditions. When the going is difficult, each hull design reacts differently, as do individual boats of the same type, because of factors such as trim, load etc. Coxswains must know their boat. Training is a help but the real Coxswain only emerges after being out in fast debris strewn flood waters. FRB training can only teach the basic principles.

5.03 TIDINESS

The FRB must be maintained in first class working order, Particular attention should be paid to ropes and lines which should be neatly coiled for instant use. A tangled line is dangerous and could lead to accidents and the loss of boat or crew.

5.04 TERMINOLOGY

a. **Terms Applied to the Hull**

(1) BENCHES - Seats that run fore and aft. These may also provide floatation.

(2) BILGE - The inside bottom of the boat adjacent to the keel. The Bilge is also the foul water that collects inside a boat's bilges. (see Fig 5:1)

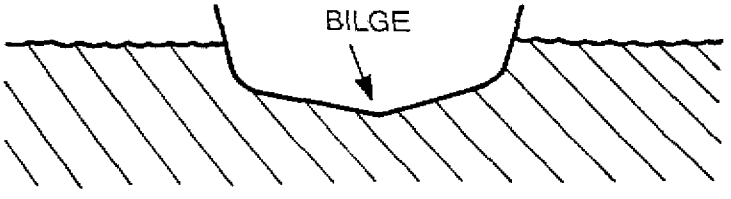

Figure 5:1

(3) BUNG - The drain plug in the transom.

(4) CHINE - The turn of the hull where the hull sides join the bottom of the hull

(5) DRAUGHT - Depth below water line of the lowest portion of the boat and motor (see Fig 5.2)

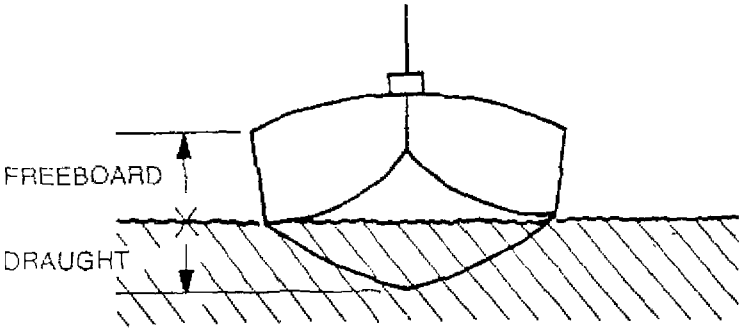

Figure 5:2

(6) FOREDECK - A small deck at the front of the hull.

(7) FREEBOARD - Height between water line and the gunwale. (see Fig 5:2)

(8) GUNWALE - (pronounced gunnel) The continuous strip around the top of the hull.

(9) HULL - The main body or shell of the boat.

(10) KEEL - The member joining the two halves of the hull bottom usually along the hull centre line.

(11) KEELSON - A reinforcing member to protect the keel and assist in directional stability.

(12) ROWLOCKS - The brackets which are used as pivot points between the hull and the oars.

(13) STEM - The rising or vertical section at the front of the boat where the hull sides meet to form the bow.

(14) THWARTS - The seats built into the hull. Originally those that run across the hull. These often provide floatation and hull structural integrity.

(15) TRANSOM - The flat back section of the boat joining the two hull sides to form the stern upon which an outboard motor may be mounted.

(16) TUCK - The plywood section attached to the centre of the transom where the motor is clamped to the hull. It reduces slippage and wear when the motor is fitted.

(5) AWEIGH - When the anchor is broken out of the ground.

(6) BEARING - A direction or in a direction.

(7) BELAY - To secure a rope to a cleat or belaying pin. (Also stop what you are doing).

(8) BROACHING - When a boat yaws too widely and swings broadside on to a wave.

(9) BY THE HEAD - When a boat is loaded too heavily forward or the bow lies low down in the water, it is said to be 'Down by the Head' (see Fig 5.6).

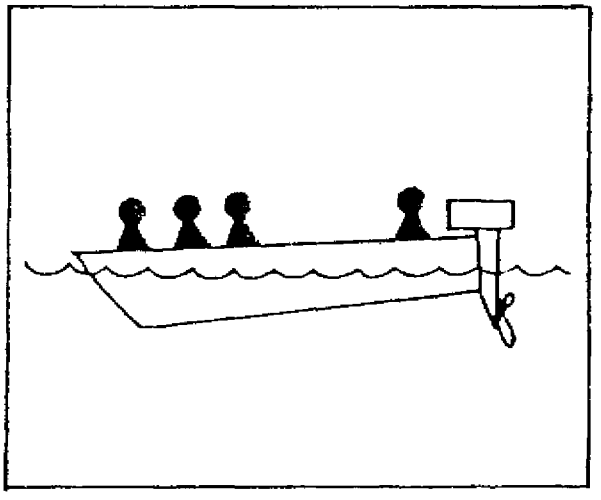

Figure 5:6

(10) BY THE STERN - When a boat is loaded too heavily aft, or the stern lies lower than usual, it is said to be 'Down by the Stern' (see Fig 5:7)

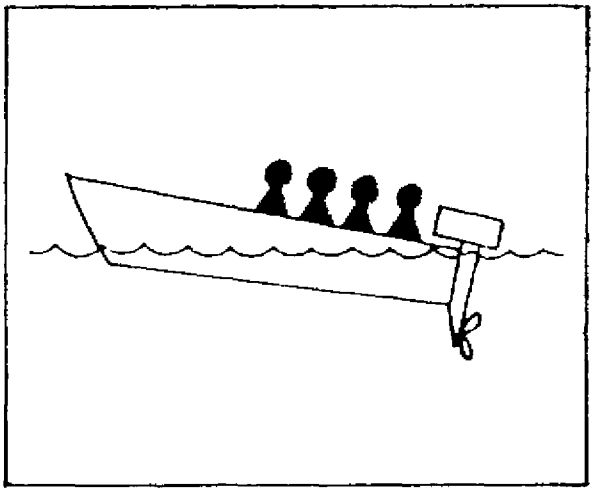

Figure 5:7

(11) CAVITATION - Cavitation is the aeration of the water causing loss of propellor drive and efficiency and is often caused by the motor being fitted so that the propellor operates too close to the surface.

(12) CLEATS - Fittings to which lines are made fast. Some boats may be fitted with bollards which perform a similar function. (see Fig 5:8)

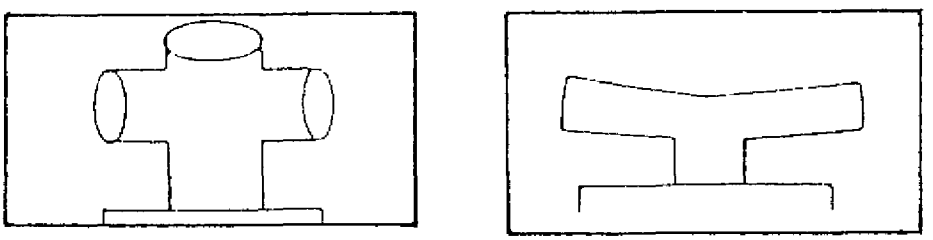

Figure 5:8

(13) DRAG - A boat is said to be 'dragging' when the anchor/s are not holding.

(14) ELECTROLYSIS - A chemical process which occurs when aluminium is placed in contact with another metal and immersed in salt water.

(15) HEEL - When a boat lists (or leans) to port or starboard. (see Fig 5.9).

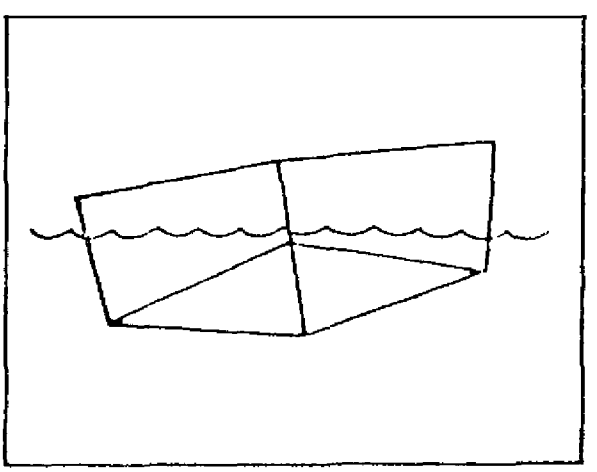

Figure 5:9

The main parts of a typical boat hull are shown in Fig 5·3.

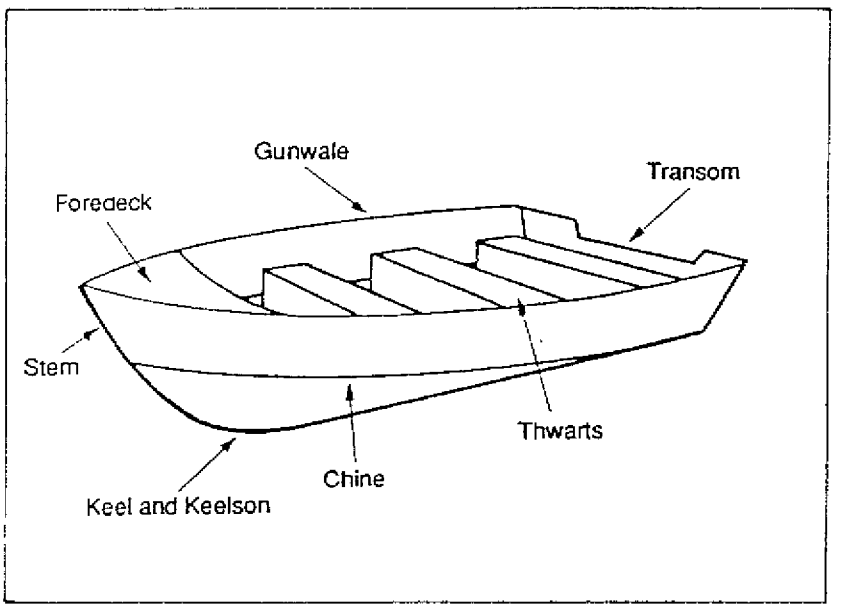

Figure 5·3

b. **Terms Defining Movement of a Boat**

(1) BROADSIDE - Moving sideways.

(2) GIVE WAY - Alter course, stop or go astern to avoid a collision.

(3) HEADWAY - Moving ahead.

(4) MAKE WAY - Beginning to move through the water

(5) MAKING LEEWAY - Underway and being blown sideways by the wind.

(6) STEERAGE WAY - Sufficient speed for steering to be effective.

(7) STERNWAY - Moving astern (backwards through the water)

(8) UNDERWAY - When not at anchor or made fast.

c. **Terms of Direction/Location**

(1) ABEAM - At right angles to the fore and aft line of a vessel.

(2) ABREAST - Level with.

(3) ALONGSIDE - Side by side.

(4) BOW - The front of the vessel (see Fig 5:4).

(5) PORT - The left hand side of a vessel looking towards the bow (see Fig 5:4).

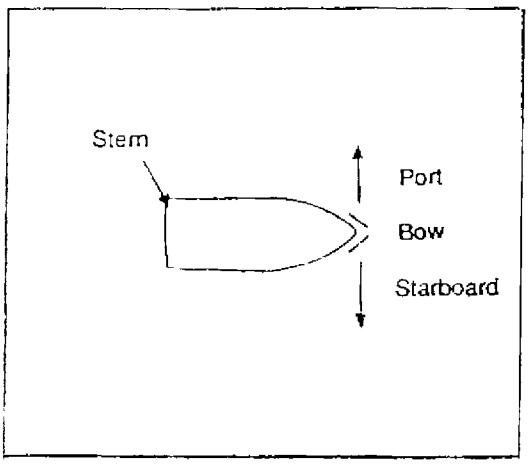

Figure 5:4

(6) QUARTER - The area between abeam and astern (see Fig 5:5)

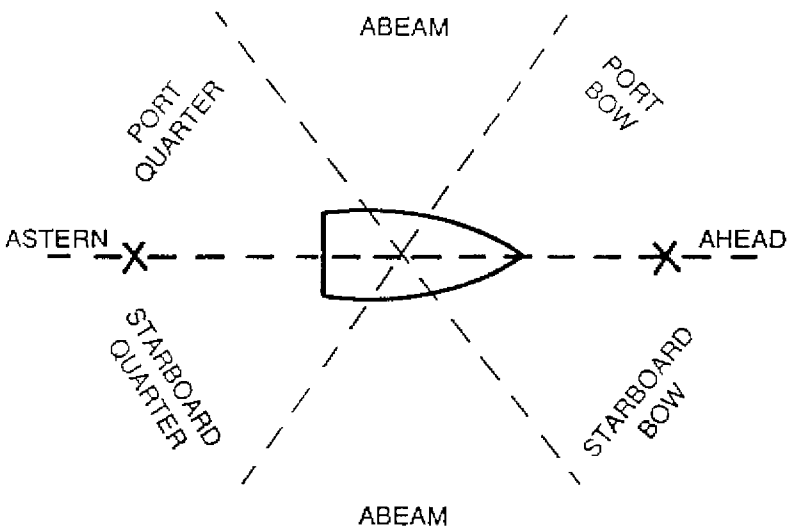

Figure 5:5

(7) STARBOARD - The right hand side of a vessel looking towards the bow (see Fig 5:4).

(8) STERN - The rear or back end of a vessel (see Fig 5.4).

d. **Other Terms**

(1) ABOARD - Inside or on a boat.

(2) ADRIFT - Broken from mooring, at the mercy of wind and tide.

(3) AMIDSHIPS - Is the centre of the vessel either with reference to her breadth or length.

(4) AWASH - Level with the water surface.

(16) LEE SIDE - Sheltered side of a boat.

(17) LIST - A vessel is said to have a list if it leans to one side.

(18) OVERHAUL - To overtake another vessel. Also means to examine.

(19) PAINTER - A line at the bow of a boat used for making fast.

(20) RIDING - A vessel is held in position by an anchor or a buoy and is free to move 360 degrees due to the effect of wind or water.

(21) SOUND - To find the depth of water.

(22) STEM THE TIDE OR CURRENT - Using power to hold position against a tide or current

(23) TRIM - The way a boat sits in the water.

(24) WAKE - Track or disturbance a boat leaves in the water as a result of its movement.

(25) WARP - An anchor line.

(26) WASH - A wave created by the boat moving through the water.

(27) WEATHER SIDE - The side of the boat facing the wind.

(28) YAWING - To run off course. especially in a following sea.

ROPEWORK

5.05 Rope is in common use in FRBs and a knowledge of ropes and knots is essential for boat crew. Details of rope construction, care and maintenance and various knots are given in the Australian Emergency Manual- Disaster Rescue Some of the rope work skills specific to FRB operation follow.

5.06 BELAYING

When a rope is cast off while still under strain it cannot be secured with a bend or a hitch, except perhaps a slipping one. It is therefore belayed to a fitting made for the purpose, such as a cleat or bollard. The action of belaying consists of taking sufficient turns round the fitting to hold the rope by friction existing between rope and fitting. A wet and slippery rope or bollard, or a smooth cleat and a well worn rope, may require extra turns.

5.07 BELAYING TO A CLEAT OR BOLLARD

To belay a rope to a cleat or bollard, take initial turns as shown in Figs 5:10 and 5:11 then continue with figure-of-eight turns round the horn of the cleat or bollard as many times as required. When the figure-of-eight turns are removed the rope is ready for casting off at a moments notice; therefore the turns should not be completed with a half hitch, because this may jam them. Cleats are not suitable for belaying wire rope.

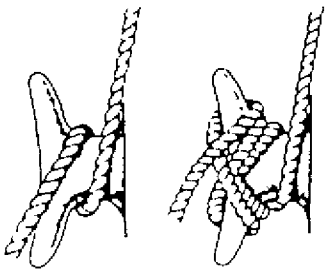

Figure 5.10
Belaying a Rope to a Cleat

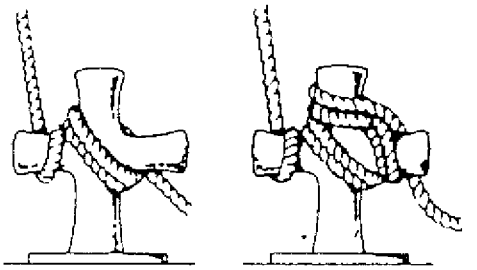

Figure 5:11
Belaying a Rope to a Bollard

5.08 ROPE STOWAGE

Whenever possible rope should be stowed so as to keep the deck clear and the rope dry.

5 09 QUICK-RELEASE KNOTS

The Sheet Bend, Bowline and Clove Hitch are three main knots which can be released quickly by using a bight instead of an end in the last phase of tying them. Such knots will hold a steady strain. These quick-release knots must not be used for life rescue situations.

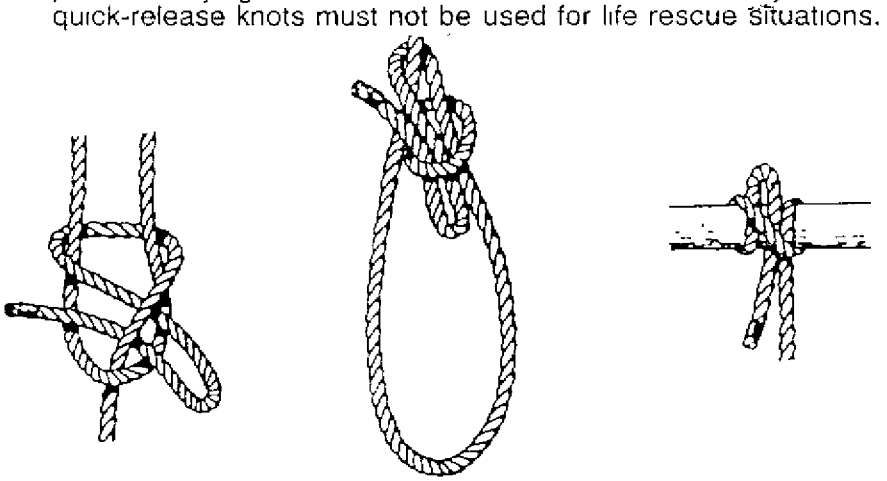

Figure 5:12
Quick-Release Knots.

5.10 MONKEY'S FIST

This is used to weight the end of a heaving-line so that it will carry when thrown against the wind. It takes from 2 to 3 metres of line and is made as follows:

a wind three turns round the hand;

b pass a second set of three turns across and round the first three, in the direction indicated by the arrows;

c pass a third set of three turns across the second set, but inside the first set and in the direction shown by the arrows so that the end comes out alongside the standing part; and

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 complete it by tucking it inside the 'Monkey's Fist', then work all parts taut as before (see Figure 5:13).

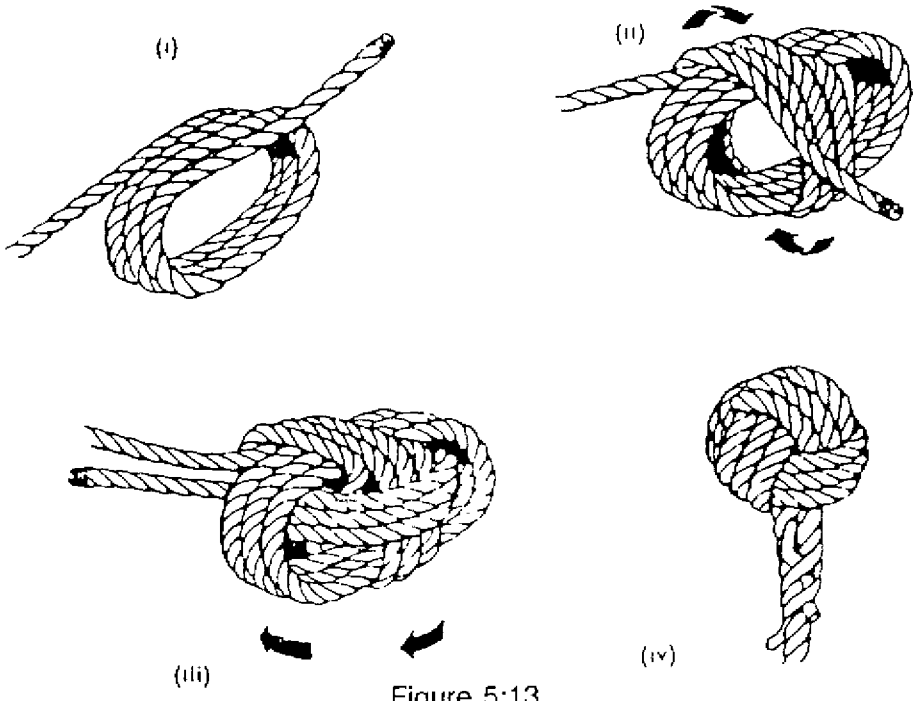

Figure 5:13
Monkey's Fist

5.11 HEAVING-LINE KNOT

This knot is used as an alternative to the Monkeys Fist and is quickly and easily made Form a bight about 1.5m long at the end of the line. Start frapping the end round both parts of the bight at about 20 cm from the actual bend of the bight, and continue until it is all but used up. Then pass the end through the small loop left and haul on the standing part (see Fig 5.14).

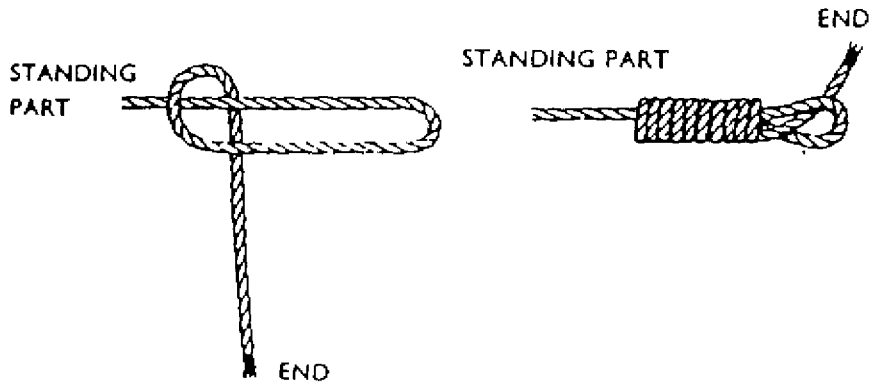

Figure 5.14
Heaving-Line Knot

5.12 HEAVING-LINES

As its name implies, a heaving-line is a light flexible line that can be thrown. It is used as a messenger to pass heavier lines from boat to shore, or vice versa and boat to boat (see Fig 5:15).

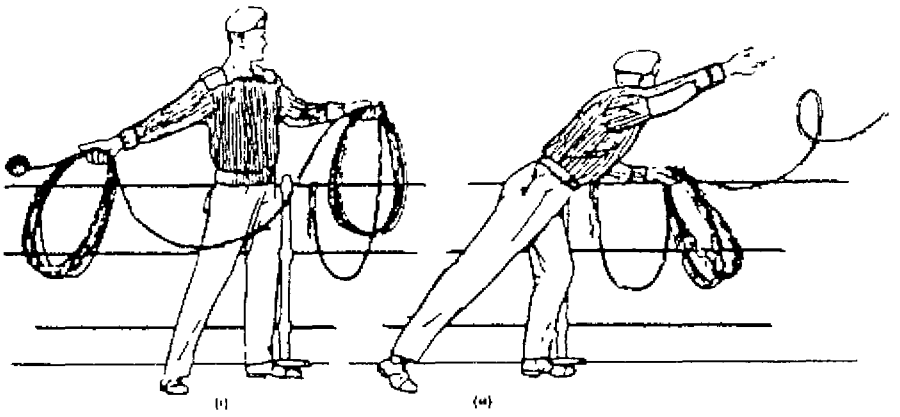

Figure 5:15
Throwing a Heaving-Line

5.13 THROWING A HEAVING-LINE

A heaving-line consists of approximately 30 metres of 10mm cordage. To prepare a line for throwing, 22 to 24 metres should be coiled carefully in the left (non-throwing) hand, using small coils. One third of the line is taken in the right (throwing) hand; the line is then thrown with right arm straight, and it must be allowed to run out freely from the coil in the left hand. The most frequent cause of bad casts is failure to have this coil properly clear for running (see Fig 5:15).

ANCHORS AND ANCHORING

5.14 The ability to anchor a boat effectively is of great importance to FRB crews. Apart from using the anchor to tie the boat to a beach or river bank, crews may have to anchor in a current in order to avoid being swept into a hazardous area. Therefore, it is **essential** that the anchor holds.

5.15 SAFETY AT ANCHOR

The following points are to be adhered to when using anchors:

a. Do not anchor in busy boating or shipping lanes or channels.

b. Do not anchor in prohibited areas shown on charts, in line with cable markers, or too close to another boat.

c. Do not anchor in shallow water without having first checked the state of the tide. If the tide is low, one has to allow for the rise when deciding how much warp to let out. If the tide is high, check to make sure that the boat wont be aground at low water.

5.16 OTHER POINTS ON ANCHORING

See that shackles on the anchor and chain are well secured and preferably wired. Withdraw the pin periodically to check the state of the thread. If it shows signs of stripping or corroding, then it is ready for replacement. Also observe the following:

a See that the boat end of the warp is secured on board before letting the anchor go.

b. Lay the anchor so that the warp pulls the anchor in to the river bottom

c. The shorter or steeper the angle of the warp the lesser the holding power of the anchor. The longer the warp and the flatter the angle, the greater the holding power.

d. The minimum length of anchor rope to be let out is at least four time the depth of the water at high water (see Fig 5:16).

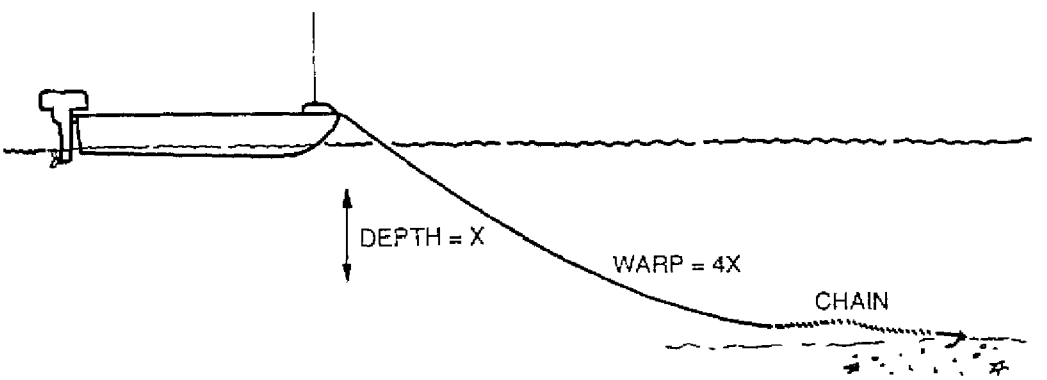

Figure 5:16

5.17 DROPPING ANCHOR

a. First choose a spot carefully, giving due attention to the wind, the depth of water under the keel, state of the tide, type of bottom, the positions of other boats. Come head to wind or current and stop where the anchor is to lie, allowing room to lay back the required distance.

b. When in position lower the anchor over the bow and go astern when the anchor is on the bottom. Continue to lay out warp, laying it out as the boat goes slowly astern. The rope should never be laid out so fast that it piles up on top of the anchor. When the required amount of warp is out, take a turn around the bollard. The weight of the boat will settle the anchor into the river bed. It will be apparent that the anchor is holding if the boat stops.

c. A dragging anchor can sometimes be felt bumping along the bottom by holding the rope lightly in the hand. In the event that the anchor does not grip and there is plenty of warp out, raise the anchor and try again.

d. A line buoyed to the crown of the anchor will permit it to be pulled up in the event of it becoming fouled under a rock (see Figure 5 17). This line should be long enough to prevent the buoy pulling the anchor out if the water level should rise.

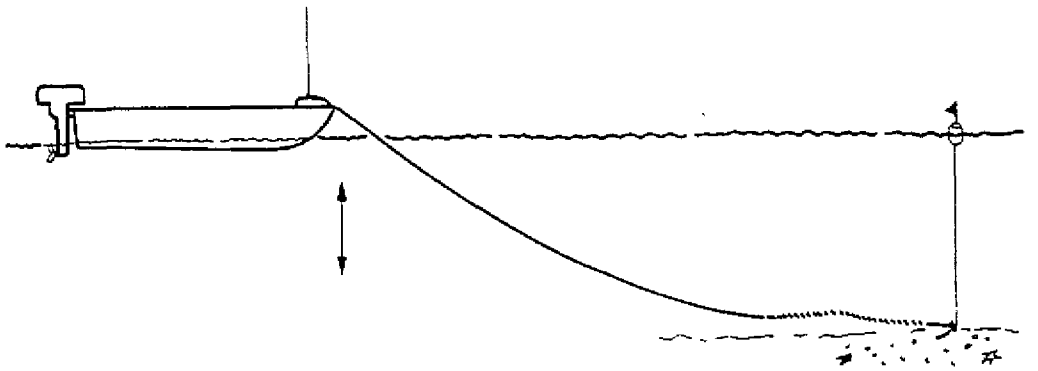

Figure 5:17

e. It is advisable to have a second anchor where it is known that your boat will be operating in flood waters or fast currents. If an anchor begins to drag, give it more warp if there is time and room. If there is neither, then lower the second anchor over the side and adjust the two warps so that the weight is taken evenly by both anchors. This will usually happen automatically if one anchor has been dragging (see Figure 5.18).

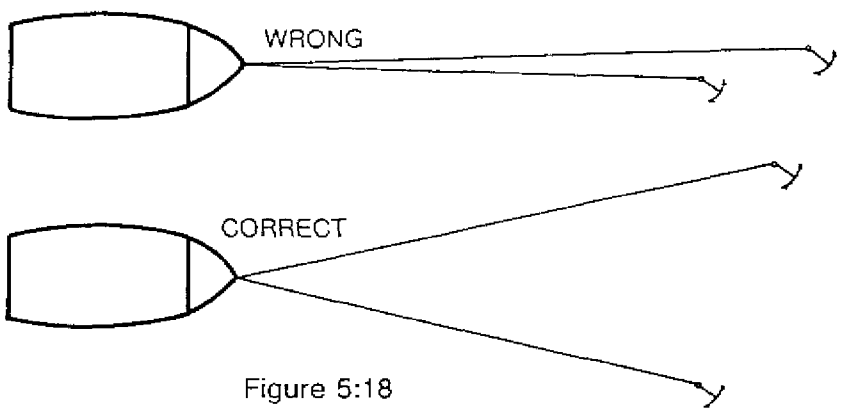

Figure 5:18

f. If the second anchor holds, it is wise to bring up the first to see if there is any cause for dragging that could be cleared. Once securely at anchor check your position against objects ashore to ensure that the boat is not dragging.

g. Make sure room has been allowed for the boat to swing freely through 360 degrees without contacting other boats or obstacles. This may happen as winds and currents change

5.18 KEDGING

Kedging is a method of controlling the approach of a boat to a beach, bank or hazardous landing area where the wind, waves or current are astern of the boat (see Figure 5.19). It is also a method of refloating the boat from a beach, bank or landing area

5.19 When Kedging, the anchor is lowered over the stern of the boat as it approaches the shore. The forward movement of the boat can be controlled by paying out anchor line under control as required.

5.20 In extreme circumstances it may be necessary to lower a kedge anchor over the bow, raise the motor out of the water, control the boat with oars and proceed to shore stern first whilst paying out anchor line under control. This method is required when waves are large enough to swamp the boat if they were to come in over the stern.

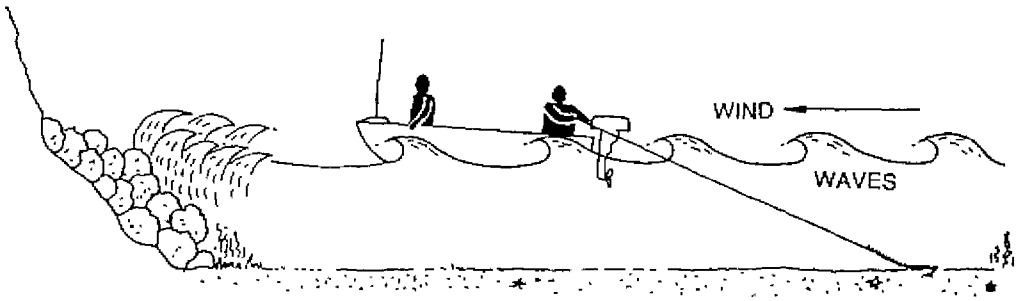

Figure 5:19
Kedging

5.21 DANFORTH ANCHOR

While there are a number of types of anchor, the type of anchor most commonly used in FRBs is the Danforth Anchor (see Figure 5:20). The Danforth anchor is a burying anchor where any dragging force on the shank causes the flukes to bury deeper into the bottom.

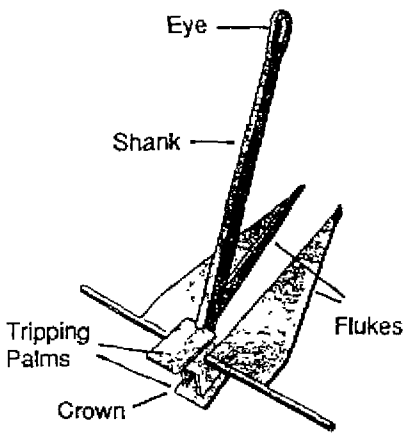

Figure 5.20

5.22 HOW AN ANCHOR HOLDS

Figure 5:21 shows how an anchor beds itself in the bottom after it has been let go and the strain comes on the anchor rope. The anchor lies flat on the bottom until the pull of the boat on the rope drags the anchor along the bottom. The tripping palms then tilt the flukes, which dig themselves in After a further amount of dragging the anchor imbeds itself completely until it holds. For the anchor to maintain its hold, the pull of the rope must always be horizontal where the anchor chain emerges from the bed.

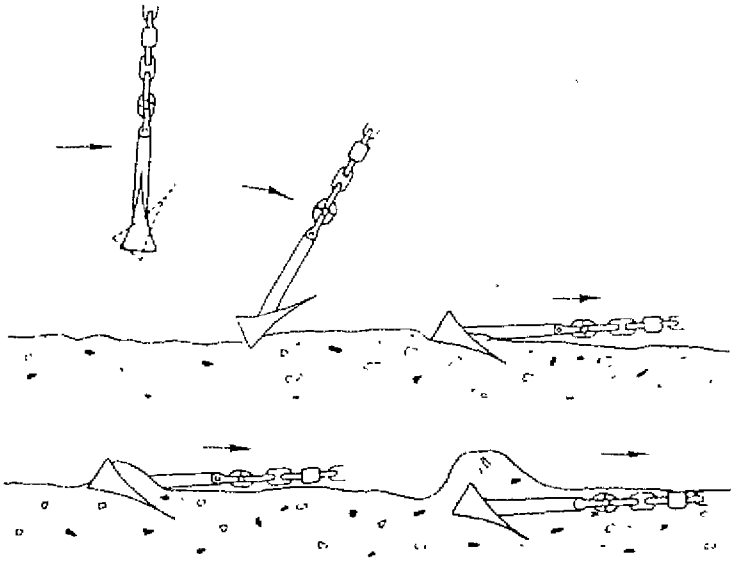

Figure 5.21

5.23 ANCHOR CHAIN

The anchor line should not be attached directly to the anchor but to a chain at least 2 metres in length by 6mm in diameter The purpose of this chain is twofold : it minimizes chafe on the anchor line, and it acts as a shock absorber when the boat surges, preventing the anchor from being lifted out of the bottom. The shock absorbing feature of the chain also reduces strain on the bollard.

5.24 RECOVERY

The Danforth anchor is readily removed by moving the boat forward under power while taking up the slack and hauling the anchor rope in a vertical direction ensuring that the rope does not foul the propellor Should the anchor become snagged the buoyed line to the crown of the anchor can be used to recover the anchor.

CHAPTER SIX
BOAT TRAILERS

GENERAL

6.01 The most common method of carrying boats on land is by means of specially constructed boat trailers. All FRBs should come equipped with a trailer of suitable size and construction for that boat.

6.02 **PARTS OF A TRAILER**

A typical trailer consists of a galvanised box form chassis and a draw bar with a tow coupling. Mounted on the draw bar is the stem post attached to which is a hand winch. The boat when on the trailer rests on rollers which support the keel and either rollers or bilge strakes which steady the hull near the chines (see Figure 6:1).

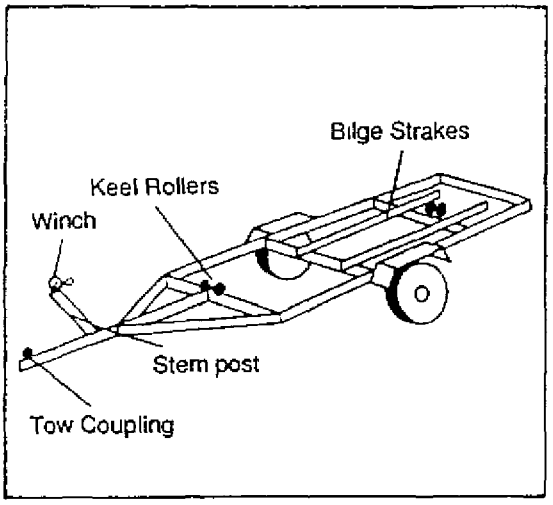

Figure 6:1

The trailer is fitted with lights, a spring-mounted axle and may be fitted with brakes. Most FRB trailers tilt so as to assist when launching and recovering.

TRAILER ADJUSTMENT

6.03 The trailer will have to be adjusted to fit the boat and to ensure the balance of the trailer is correct. The position of the stem post can be adjusted to ensure that the boat is correctly positioned on the trailer.

6.04 A well balanced trailer should be easily lifted by one person at the tow coupling. If the trailer is heavy to lift at the coupling this indicates the weight is too far forward. If there is no weight on the coupling this indicates the weight is too far back.

6.05 Balance adjustment is carried out as follows:

a. hook the trailer loaded with the boat and motor to a towing vehicle;

b. park on a flat surface and chock the trailer wheels to stop forward and backward movement;

c. undo the axle-chassis bolts and move the boat and chassis backward or forward as required by moving the towing vehicle;

d. re-tighten the bolts when the chassis is adjusted to the required position,

e check balance by lifting the coupling off the tow ball, and

f. repeat sequence 'c' to 'e' if required.

The trailer should exert sufficient downward weight and pressure on the towbar, so that should the vehicle brake heavily, the pressure continues downward. This downward pressure helps the towing vehicles brakes by increasing traction on the rear wheels of the towing vehicle.

6.06 A boat being carried on a trailer needs to be supported along its keel. All keel rollers must be adjusted to allow the boat load to be distributed evenly. When this has been achieved the bilge strakes are adjusted to brace the boat against lateral movement. A properly adjusted trailer will carry its boat on an even keel with the bow winched firmly against the stem post and the transom supported by the rear roller (see Figure 6:2).

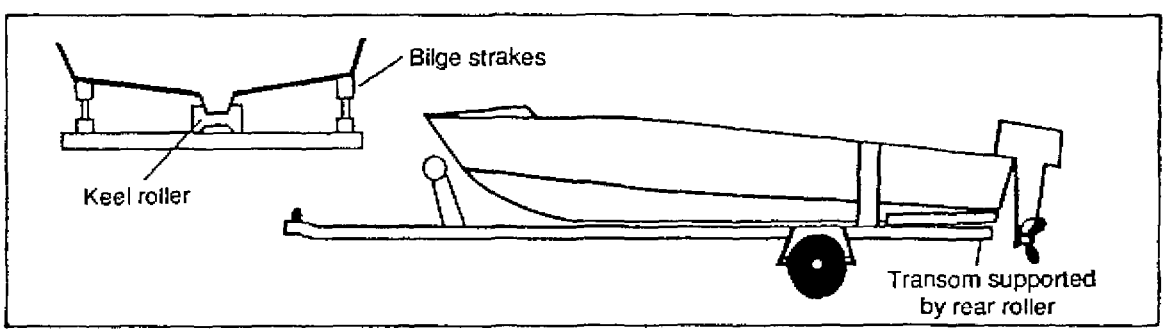

Figure 6:2

TRAILER TOWING

6.07 CHECKLIST

It is the responsibility of the driver of the towing vehicle to check the condition of the trailer and its load before towing. The check should ensure that:

a. the trailer is properly connected to the towing vehicle and the safety chain is attached;

b all lights, brakes and other trailer fittings are operating;

c the boat is securely attached to the trailer by the winch wire and safety chain, stern hold-downs and all items of equipment in the boat are safely secured or stowed;

d the motor is secured in the tilt position and supported by a motor support bracket as he weight and leverage of a motor supported only by the tilt lock can cause damage to the lock mechanism and transom during transport,

e. the trailer is properly balanced; and

f tyres are roadworthy and air pressure is correct.

6.08 Where possible, avoid carrying equipment in a boat while towing. Anchors, fuel tanks and other bulky objects can wear holes in aluminium hulls through vibration and movement over long distances.

6.09 Where equipment must be carried in the boat while being towed, any item likely to cause wear or damage should be padded to minimise damage

6.10 When towing over long distances allow regular stops in order to inspect the security of the boat, boat trailer and towing vehicle

TRAILER SERVICING

6.11 Trailers should be serviced every two or three months or more often if use dictates. Trailers that are used on rough roads and long distance towing will often require inspection and servicing after each use. Servicing should include

a. **Tow Couplings** - Grease the coupling, release and work it several times to ensure complete lubrication. If the trailer is fitted with a brake override system, grease any grease nipples and check brake fluid level in the hydraulic reservoir. Check the trailer safety chain for security. Always use correct size tow balls.

b. **Frame and Chassis** - Check the security and tightness of all nuts and bolts. Ensure all trailer sections are secure, check any welds for cracks and inspect frame for sagging or distortion.

c. **Wheels and Tyres** - Check the tyres for tread and any cuts or damage, ensure tyre pressure is correct. Inspect the wheel bearings for side movement by pulling sideways on the wheel by hand. If the movement is excessive, wheel bearings may require adjustment or replacement. When in use, listen for unusual noises from the wheel bearings (these may often be heard while backing down a boat ramp) and check for hot wheel centres after use. Wheels should be removed and wheel bearings thoroughly cleaned and inspected at regular intervals (about every six months). When reassembling, use new wheel bearing grease and replace the bearing seals. A simple, inexpensive means of increasing wheel bearing life and trailer reliability is by means of a device which packs the bearings in grease and allows them to be readily regreased. These devices, which are fitted with a grease nipple, take the place of the wheel bearing dust cap. A common name for this device is a Bearing Buddy. These do not reduce the need for constant inspections and maintenance.

d. **Springs** - Inspect springs for broken or fatigued leaves, check the retaining shackles attaching the springs to the frame for worn bushes. Painting spring assemblies with oil regularly will increase spring life.

e. **Wiring** - Ensure the electrical wiring is in good condition, inspect any joins, look out for deterioration in the insulation or cracks in fittings.

f. **Lights** - Remove light lenses and clean. Clean bulbs and contacts and lightly coat with petroleum jelly. If there is evidence of moisture inside the lens, replace the lens seal

g. **Brakes** - Grease any grease nipples on the system. Check that the brakes are not frozen and the brake pads.discs are in good condition. A spray of 50/50 mixture turps and light machine oil applied regularly should ensure brakes are free. Operate the handbrake to ensure satisfactory performance.

h. **Rollers** - The rollers take the weight of the boat along its keel line. When not loaded they should turn freely by hand. The side braces do not take the weight of the boat and are meant only for balancing. Oil the rollers frequently, using only a light oil. Avoid the use of heavy oils or greases as these tend to attract dirt and eventually can cause rollers to jam If rollers are jammed they should be removed, taken apart and washed in kerosene, reassembled, replaced and oiled. Check roller alignment.

i. **Winch Post** - Check the condition of the winch post, ensure the post retaining bolts are tight. Adjust the winch post; and align to the correct height for the boat. The boat bow safety chain should be inspected.

j. **Winches** - Oil the winch ratchet and pawl regularly. Check the winch wire for excessive fraying by running out the wire. Replace the wire if necessary Check the winch wire attachment to the winch drum. Ensure the winch handle, if fitted to the winch, is secure.

STORAGE

6.12 Before storage the trailer should be fully inspected, serviced and repaired. As with a boat the trailer is best stored under cover. Clean and inspect the trailer regularly.

6.13 In storage do not leave the trailer handbrake locked on for long periods as brake shoes may freeze onto disks or drums.