Water Awareness and Charge Certificate Manual

Module 55: Anchors and Anchoring

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Module Contents

Module Title	Comments	Rev No	Revision Date
Module 55: Anchors and Anchoring	Split out from module 13	1.0	25 Mar 2010
Module 55: Anchors and Anchoring	Expanded to cover Special Inland Waters Charge	1.1	20 Jan 2013
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Outcomes

After completing this module, the certificate holder will:

- Be able to identify different types of anchors
- Be able to set the anchor safely and securely.
- Be able to recover the anchor

1 Types of Anchors

1.1 Admiralty Anchor

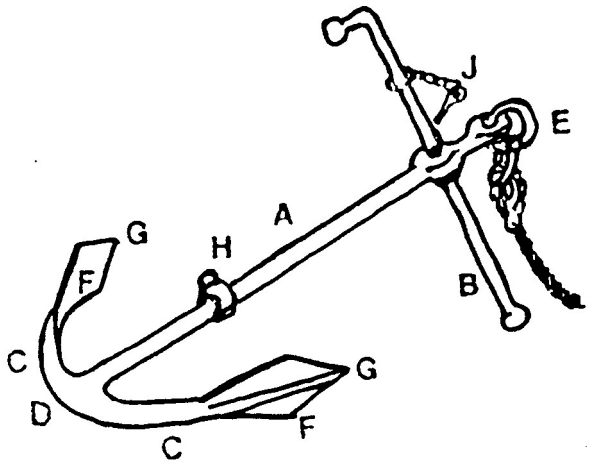


Fig. 1 – Admiralty Pattern Anchor

A Shank	**D Crown**	**G Pea or Bill**
B Stock	**E Ring**	**H Gravity Band**
C Arms	**F Flukes**	**J Stock Pin**

The Admiralty or Fisherman's anchor is rarely seen today but is sometimes used on smaller craft and in places where holding power is of the prime importance.

It consists of a shank which carries two arms. On these arms are two flat broad parts called the flukes, which terminate in points called the pea or bill. Near the top of the shank and at right angles to the arms a bar passes through the shank – this is the stock which makes the anchor fall in such a position that the fluke must dig into the sea bed. Approximately about the middle of the stock there is a raised metal ring or stop which positions the stock centrally against the shank and a stock pin that goes through the stock on the other side of the shank to lock the stock in position.

The top of the shank is terminated in a shackle or ring to which the cable is attached.

The gravity band is fitted at a point at which the anchor balances and a purchase tackle is attached to this point when the anchor is being hoisted inboard.

The Admiralty Pattern Anchor is difficult to stow and requires a special bed. By removing the stock pin, the stock can be folded for stowage.

1.2 Stockless Anchor

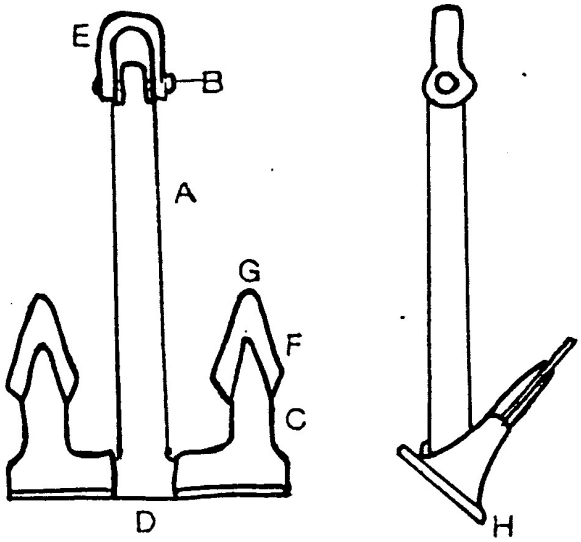


Fig. 2 – Stockless Anchor

A Shank B Shackle Pin C Arms D Crown
E Ring F Flukes G Pea or Bill H Tripping Palms

The Stockless Anchor has mainly taken the place of the older Admiralty pattern and consists mainly of a shank and ring with the arms hinged at the lower end of the shank.

These arms are fitted with tripping palms which when the anchor is dragged across the ocean bed tripping the arms and cause the flukes to dig in.

These anchors have a mass of from 3 to many tons. Used as the main anchor on large ships, it is similar to the Danforth anchor but relies on its weight to fall flat and dig in to the sea floor

1.3 Folding Grapnel Anchors

Figure 3: Folding Grapnel Anchor

Folding grapnel anchors are typically used for smaller vessels, such as gigs and recreational power boats.

They are compact and easy to stow, but do not provide a large amount of holding power in sand or mud beds. It is important to use an appropriate amount of chain with this anchor

1.4 Chatham Quick Release (CQR) or Plough Anchor

The CQR anchor was developed in the UK and is now standard on most yachts and small craft. It can hold up to 30 times its own weight, sets quickly, rarely fouls and is easy to recover

Figure 4: CQR Anchor

The only con with this type of anchor is that it is not easy to stow

1.5 Danforth Anchor

The Danforth is amongst the best of small boat anchors and was developed by R S Danforth in 1939. It produces strong holding power of up to 30 times its own weight because of the thin large flukes and when under a heavy strain the flukes bury themselves very deeply.

Instead of a stock through the head of the anchor, the Danforth as a round rod through the crown that prevents the anchor from rolling. One of its qualities is that it can be adapted to large and small vessels.

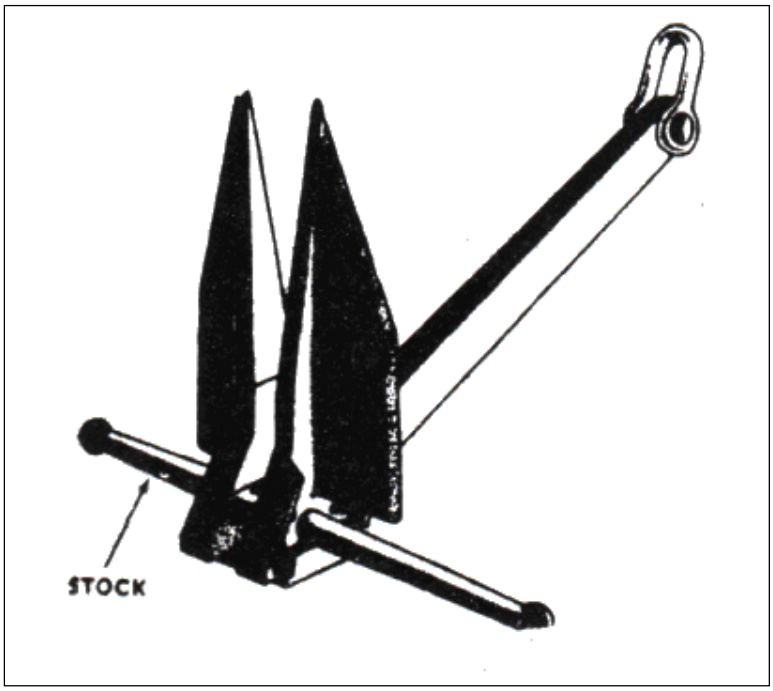


Figure 5: Danforth Anchor

This anchor folds basically flat so it is easy to handle and stow

1.6 Other Anchor Styles

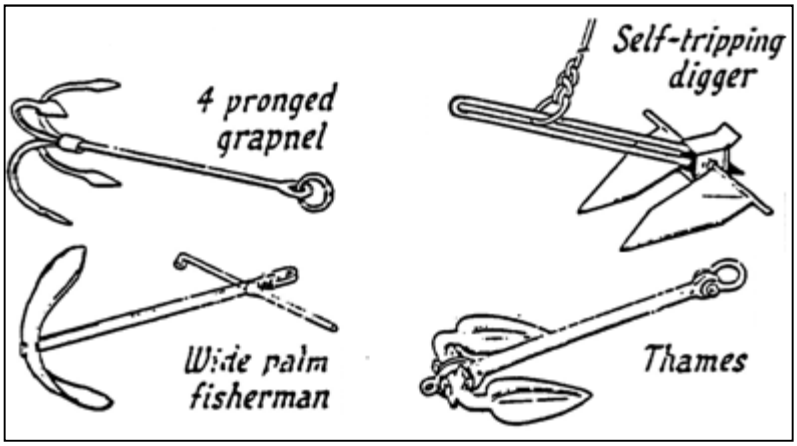


Figure 6: Other Anchor Styles

2 How to Select an Appropriate Anchor

Type	Sandy bed requires a Broad fluke Rocky bed requires a narrow fluke.
Weight	Sheltered waters, i.e. slow moving river or lake 1 kg. Anchor weight for every 20 kg. of boat weight. Therefore, Sea Scout Gig of weight approx. 150 kg. Requires anchor 7,5 kg.
Anchor Chain	Fitted to shackle at head of anchor to hold anchor flat on bed. Size to suit anchor and length should be a minimum of twice the length of the anchor shank.
Anchor Rope	Called the Rode. Attached to opposite end of anchor chain so anchor should be of size and breaking strain to suit boat. Length of rope should be at least three times the maximum depth of the water in which the boat may be required to anchor. (Note: In Tidal Waters it is necessary to know state of tide and amount of rise and fall). Therefore, on lake 3 metres deep, the rope should be 3m x 3 = 9 metres.
Release Line	The release or trip line is attached to the anchor at the crown or low down on the shank and is used to release the anchor if it should become fouled. This line must be longer than the anchor rope

3 Anchoring

3.1 Attaching Your Anchor

- Make sure that your anchor is big enough to hold your boat.
- Make sure that the anchor is suitable for use on the lake bottom you expect to encounter.
- Make sure that it is properly tied on, both at the anchor and at the boat. The type of cable and its length will greatly affect the holding power of your anchor. Chain is usually recommended because it is resistant to chafe and because its own weight creates a curve between the anchor and the boat. This helps absorb the shock of the boat jerking (snubbing) on the anchor. It also helps keep the pull on the anchor near horizontal, which provides the best hold. However, the weight of a chain cable can be a problem.

  Nylon rope used for the anchor cable solves the problem of weight, but it is subject to chafe and it is buoyant, so does not assume a natural curve between the boat and the anchor. Its stretch properties do, however, help prevent the anchor from being pulled free.

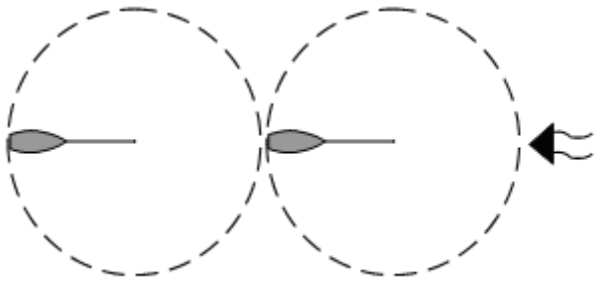
A compromise is to use a section of chain to attach the anchor to the nylon rope. The overall length of the cable is important as you will need to let out a minimum of three times the water depth. In rough conditions you may need up to ten times the depth. The more cable a vessel has out the less likely she is to drag. Accordingly the amount of cable used by a large ship when anchoring is normally at least four times the depth of water.

3.2 Choosing an Anchorage

When planning on lying to an anchor, it is important to choose the site with care if you are to have a trouble free stay. There are several considerations to take into account before the anchor can be dropped.

It is important to know what the holding ground is like. If the ground is not suitable for your anchor, you should look for another spot.

The water must be shallow enough for you to be able to lay the correct amount of cable. In tidal waters, you must make sure that the anchorage will be deep enough at low tide to keep you afloat. If you anchor at any time other than high tide, you must calculate what the depth will be at high water and allow sufficient cable for that depth.



Ensure that swinging circles do not intersect

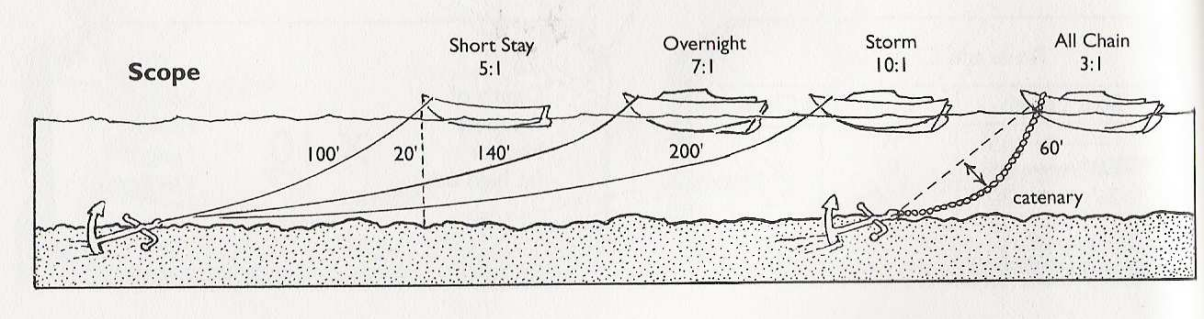
If the anchorage is a crowded one, you must ensure that the boat has room to swing a full circle without colliding with other boats or obstructions (see diagram). Should you find that you are in danger of fouling another boat, it is up to you to move. Do not anchor in the fairway where boats are entering or exiting the anchorage area.

It is usually best to anchor in the lee of the land, to reduce the pressure of the wind on the anchored boat, and therefore the likely hood of the anchor dragging. Bear in mind that the wind direction can alter dramatically (particularly inland) in a short space of time and what was previously a calm spot in the lee of the land may quickly become a dangerous lee shore. Therefore if you are anchoring for any length of time a regular check of weather conditions needs to be done, and checking of anchor bearings of land features to confirm that the anchor is not dragging.

3.3 Dropping Anchor

When approaching the anchoring spot, you should do so head into wind or tide whichever is the strongest. The "STAND BY TO DROP ANCHOR" is given. The Bowman stands by. The boat should be allowed to come to rest and then the skipper will give the order "DROP ANCHOR". When ordered, lower the anchor into the water under control and measure out the cable until you feel the anchor hit the seabed. The anchor must never be thrown. Then slowly let out an appropriate amount of cable as the boat drifts astern. You will feel the strain on the anchor as it bites into the seabed.

The skipper must then decide if he wants to let out more cable. Once the correct amount has been let out, make fast the on board end. If for any reason, the anchor does not set straight away, try letting out more cable. If this doesn't work, you may need to weigh anchor and move to another spot.



3.4 Weighing Anchor

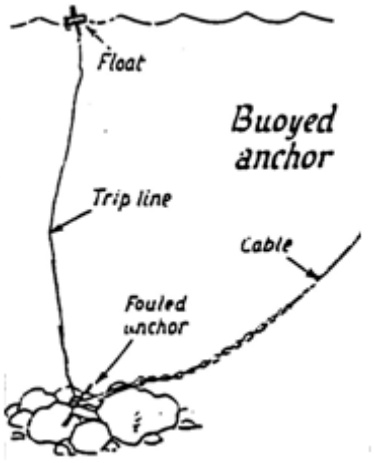
The first stage of retrieval is to bring the boat over the anchor by sailing or motoring to the right position, as the crew takes in the cable.

As soon as the angle of the cable from the boat to the anchor is vertical, the crew must signal to the skipper ("Cable up and down") so that he knows that he must take way off the boat and that the anchor will soon break out. The crew continues hauling in the cable until they feel the anchor break out of the seabed and they signal to the skipper that they have taken the weight of the anchor. The anchor is then hauled to the surface but care must be taken to prevent it swinging against the hull.

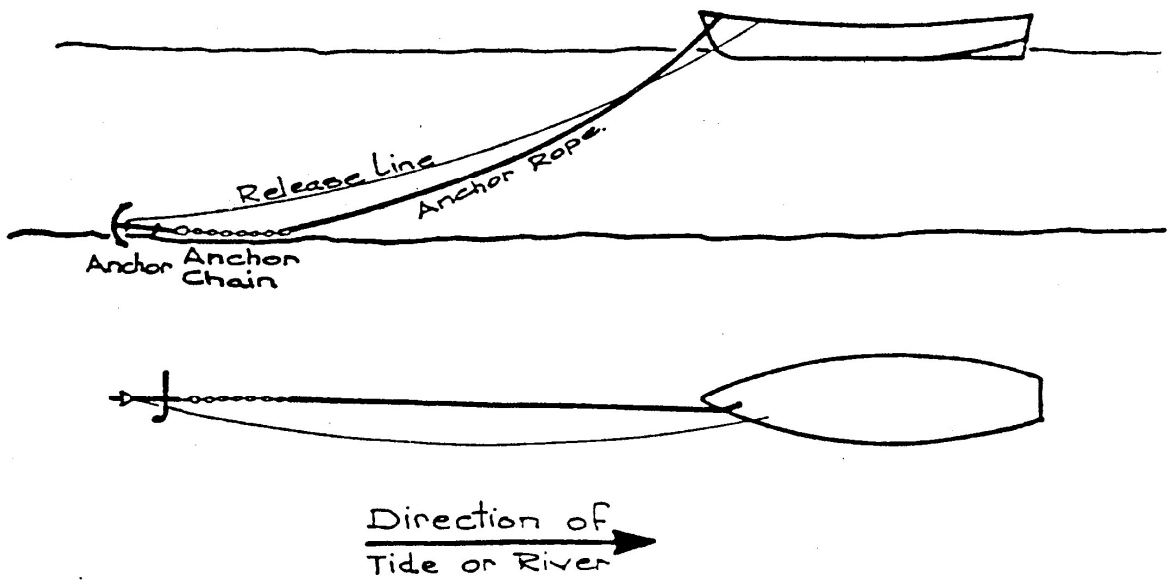
If there is time, the anchor should be cleaned off before bringing it on deck. Once on board, the anchor and rode should be stowed as soon as possible.

3.5 Fouled Anchor

There is always the danger that the anchor may become fouled (stuck) in the seabed and it may be impossible to free it in the normal way. It is best to avoid the problem by securing a release line to the anchor so the anchor can be released by pulling on the line.



The release or trip line needs to be attached as close to the crown of the anchor as possible



If your anchor does become fouled, move the boat into the wind or current until the boat is slightly up wind / current of the anchor point. Using the trip line, release the anchor, then recover it using the main anchor line. Care must be taken when using a release to ensure that the line does not foul the anchor rope and that neither line fouls the anchor.

4 Sea Anchors

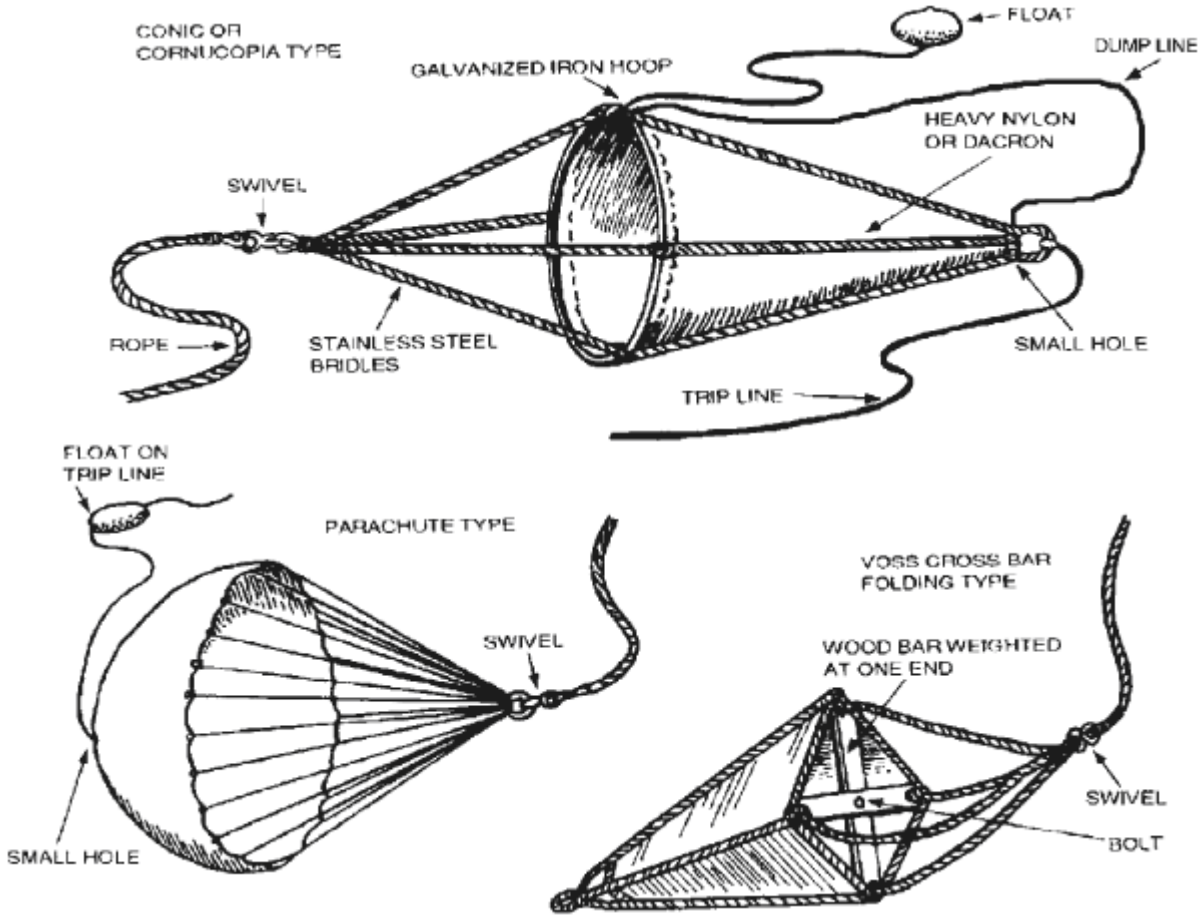
A sea-anchor or drogue is used to slow down a boat and give it greater directional stability in emergency circumstances. In general terns it is called a sea anchor when streamed from the bow of a boat and a drogue when streamed from the stern of a boat (to slow it down and prevent broaching). Sea anchors are generally bigger than drogues relative to the size of boat for which they are suitable.

A typical sea-anchor is a conical canvas bag with a small hole at the point of the cone. The mouth of this bag is held open by a metal hoop and a harness of ropes is attached from around this opening to a metal ring. This is then fastened to a line and streamed over the bow.

The open mouth scoops up the water as it is dragged along thus acting as a brake and slowing a boat down to give it stability in rough seas. A temporary or emergency sea-anchor can be constructed by lashing together two oars or available spars with a harness to make them drag at right-angles to the direction of drift and act much like a canvas bag as described above. Some weight such as a small anchor usually needs to be added to this rig so that it is only just buoyant, other wise it can too easily slide over the top of the water to be effective.

Almost completely full 20 litre containers also make effective sea anchors in an emergency.

The length of anchor rode paid out should be a minimum of at least the fetch of the passing waves, but preferably double the fetch of the waves. This is to prevent the anchor or drogue being pulled out of the face of the wave.


CONIC OR
CORNUCOPIA TYPE
FLOAT
DUMP LINE
GALVANIZED IRON HOOP
HEAVY NYLON
OR DACRON
SWIVEL
ROPE
STAINLESS STEEL
BRIDLES
SMALL HOLE
TRIP LINE
FLOAT ON
TRIP LINE
PARACHUTE TYPE
SWIVEL
SMALL HOLE
VOSS CROSS BAR
FOLDING TYPE
WOOD BAR WEIGHTED
AT ONE END
SWIVEL
BOLT