Section 2: Anchoring

Introduction

In this section, you will learn about anchoring. In particular:

- how to bring a vessel to anchor
- types of anchors
- how an anchor holds.

Learning outcome 2

The knowledge and skills you will learn in this section will help you act as a member of the deck crew to assist in anchor work on board a small vessel.

Using an anchor

You will have seen vessels riding at anchor. This occurs for different reasons. The skipper will use an anchor to:

- keep the vessel in one place
- berth alongside a wharf
- make fast to a mooring buoy
- help the skipper manoeuvre the vessel.

You would normally expect that anchoring involves only a temporary stay.

If the weather, tidal or current conditions are good, a vessel can stay safely at anchor. However, because conditions change, the vessel needs to be checked regularly.
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Bringing a vessel to anchor

Before anchoring, help to get the gear ready and inform the skipper. The skipper will brief the anchoring crew.

Figure 12: Badly stowed gear, virtually unusable in a hurry (Neil & Young, p 1)

During anchoring

From the wheelhouse, the skipper probably cannot see over the bow near the anchor. You’ll be asked to watch and signal what you can see. You’ll need to recognise when the anchor is holding or aweigh and tell your skipper.

Activity 1

1 Ask the skipper or senior deckhand to show you the anchorage procedure on board your vessel. Make a list of the tasks in order of importance.
2 Sketch and name parts of the windlass on board your vessel.

3 With the help of a senior deckhand or the skipper, work with the windlass.
   - Get power to it.
   - Connect it up.
   - Operate the windlass under guidance.
   - Ensure that you get practice time to develop your skills.
Types of anchors

There are several common types of anchors regularly used in small vessels. As well as the names used below, note that there are some other common names for some anchors.

<table>
<thead>
<tr>
<th>Anchor type</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Admiralty pattern anchor</strong></td>
<td>• very old pattern</td>
</tr>
<tr>
<td></td>
<td>• very reliable</td>
</tr>
<tr>
<td></td>
<td>• awkward to handle and to stow on board</td>
</tr>
<tr>
<td><strong>CQR or plough anchor</strong></td>
<td>• very popular in small vessels</td>
</tr>
<tr>
<td></td>
<td>• very good holding power</td>
</tr>
<tr>
<td></td>
<td>• difficult to stow in a hawse pipe</td>
</tr>
<tr>
<td></td>
<td>• if picked up when vessel is moving about in a swell, the point of the 'plough' could puncture the vessel.</td>
</tr>
<tr>
<td></td>
<td>• normally stowed against a specially designed protrus on near the bow called a cathead</td>
</tr>
<tr>
<td><strong>Danforth or sand anchor</strong></td>
<td>• very good holding power</td>
</tr>
<tr>
<td></td>
<td>• suitable to use as a general purpose anchor</td>
</tr>
<tr>
<td></td>
<td>• in any size vessel</td>
</tr>
<tr>
<td></td>
<td>• similar in operation to stockless or Dreadnought anchor</td>
</tr>
<tr>
<td><strong>Reef or grapnel or rock-pick anchor</strong></td>
<td>• easy to stow in a hawse pipe</td>
</tr>
<tr>
<td></td>
<td>• often found in open boats</td>
</tr>
<tr>
<td></td>
<td>• common in all small vessels</td>
</tr>
<tr>
<td></td>
<td>• tends to be small and is reasonably easy to stow</td>
</tr>
<tr>
<td></td>
<td>• sometimes used for anchoring for a very short period</td>
</tr>
<tr>
<td></td>
<td>• flukes not particularly strong</td>
</tr>
<tr>
<td></td>
<td>• flukes can be a danger if poorly stowed</td>
</tr>
<tr>
<td><strong>Stockless or Dreadnought anchor</strong></td>
<td>• tends to be found on larger vessels</td>
</tr>
<tr>
<td></td>
<td>• good holding power</td>
</tr>
<tr>
<td></td>
<td>• easy stowage</td>
</tr>
<tr>
<td></td>
<td>• stows in a hawse pipe</td>
</tr>
<tr>
<td></td>
<td>• flukes pivot through 45 degrees and thus bite in when the shank is lying on the bottom</td>
</tr>
</tbody>
</table>
Figure 13: Types of anchors (SSM p 160, 162)
The flukes of a reef, grapnel or rock pick anchor are not particularly strong. So, if the flukes become stuck in rock, the reef anchor can be broken out by heaving on the cable or warp and straightening the flukes. This tends to release a snagged reef anchor.

**Activity 2**

1. A vessel’s anchor is a vital part of her safety equipment. Briefly describe the type of anchor aboard your vessel:

   2. Name four types of anchors you have read about.

     1. 
     2. 
     3. 
     4. 

**How an anchor holds**

**Steps**

Anchor should bite into sea bottom.

For security some chain cable is attached to the anchor (even if the rest of the anchor is fibre rope).

**Other information**

The cable or chain attached to the anchor does two things:

- keeps the anchor shank horizontal
- ensures the pull from the vessel above comes onto the anchor from a horizontal direction (gives a better chance of holding)

Heavy chain helps to get a good horizontal pull.

The fibre rope part of an anchor rig is referred to as a ‘warp’.

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Figure 14 shows a stockless anchor falling to the bottom and then tipping over due to the horizontal component of the cable's pull on it.

**Figure 14:** How an anchor holds (SSM p 164)

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**Figure 15:** Typical anchoring
Figure 16 recommends lengths of chain and rope to use.

<table>
<thead>
<tr>
<th>Anchor rope requirements for coastal and sea-going craft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bcat</td>
</tr>
<tr>
<td>Length</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Up to 5 m</td>
</tr>
<tr>
<td>5-8 m</td>
</tr>
<tr>
<td>8-12 m</td>
</tr>
</tbody>
</table>

**Figure 16:** Recommended lengths of rope and chain (Neil & Young p 51)

**Dropping the anchor**

It’s easy to let too much cable run out and stack up on the anchor. This risks tangling the cable and prevents the necessary horizontal component in the cable at the bottom nearest the anchor.

**Depth of water**

Know the depth of water before you anchor.

**Amount of chain**

For a chain anchor cable, typically the amount of chain let out will be about 4 to 6 times the depth of water, depending on conditions.

**A typical anchoring exercise**

The table below shows steps in a typical anchoring exercise.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skipper decides on the location and amount of cable to lay out.</td>
<td>Skipper will probably bring the vessel head to wind and steam into the wind at slow speed.</td>
</tr>
<tr>
<td>Skipper gives the order to let go of the anchor.</td>
<td>When the bows are over the place where the anchor is to be placed.</td>
</tr>
<tr>
<td>Run cable until the anchor reaches the bottom. Then check the run of cable. The skipper puts the vessel into astern and allows it to start moving slowly.</td>
<td>More cable is laid out.</td>
</tr>
</tbody>
</table>

The skipper will usually attempt to manoeuvre in a straight line.

The skipper manoeuvres the vessel astern to lay out the cable along the bottom until the mark for the agreed length of cable is still left on deck.
Activity 3

1. An anchor must be strong enough and heavy enough to bury itself in the seabed. Ask your skipper about the advantages and disadvantages of various seabeds. Write in the table below.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mud</td>
<td></td>
</tr>
<tr>
<td>Shingle</td>
<td></td>
</tr>
<tr>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td></td>
</tr>
</tbody>
</table>

2. You are weighing anchor and it comes on board covered in mud. How do you clean it?

3. How much anchor cable does your vessel carry?

   How is it marked?

   In what lengths is it marked?

4. How many anchors are there?

   What types are they?

   Where are they stored?
The deckhand’s job in anchoring

To anchor well you need to know the main processes and terms used. These are listed below. Preparation for anchoring and anchoring itself is also described below. Different vessels may have different arrangements and it is important that you know the arrangements on your vessel.

<table>
<thead>
<tr>
<th>Useful terms</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spurling pipe</td>
<td>The pipe that leads the cable up out of the chain locker and onto the gipsy on deck.</td>
</tr>
<tr>
<td>Gipsy</td>
<td>A special caged wheel designed to control the chain cable into and out of the cable locker via the spurling pipe. The gipsy wheel is part of the capstan or windlass and can be connected to turn with the windlass or run free under the control of a brake.</td>
</tr>
<tr>
<td>Strops</td>
<td>Strops or other fitted devices prevent the anchor accidentally running out the hawse pipes. On some vessels, these may be called 'devil claws'.</td>
</tr>
<tr>
<td>Hawse pipe</td>
<td>Short pipe that leads from the deck through the ship’s structure to the bows—for anchor cable to run through. Stockless and Danforth anchors are stowed in the hawse pipes.</td>
</tr>
<tr>
<td>Cathead</td>
<td>Structure at bows to house usually a CQR or Danforth anchor in small vessels.</td>
</tr>
</tbody>
</table>

**Preparation for anchoring**

Before anchoring you should:

- Ensure you are completely familiar with the operation of the windlass.
- Know how to put the winch in and out of gear.
- Know how to use the brake.
- Know how to lower the anchor in the water, in gear and then hold on brake only.
- Know how to read the cable/chain marks.

Prior to dropping the anchor the skipper will tell you how much cable to put out. As a general rule, this is about 4 to 6 times the depth of water.

**Anchoring**

1. **Use anchoring gear**
   Make sure you know how to use it!

2. **Remove covers from the spurling pipe**
   The spurling pipe leads the cable up out of the chain locker and onto the gipsy on deck. It is generally covered at sea to prevent water entering the cable locker.

3. **Make sure the brake**
   The gipsy wheel is part of the capstan or...
4 Clear away anchor  Clear away fittings (similar to strops) that may be used to secure the anchor to stop it moving about at sea.

5 Anchoring-letting go  The brake is released on the skipper’s orders.

6 ‘Letting go’  When told to ‘let go’, release the brake sufficiently to allow the anchor to go and let the agreed amount of cable to run out. To stop the run of cable, apply a brake on the windlass or capstan.

7 Indicate what cable is doing  When applying the brake on the windlass or capstan, use gloves and glasses if necessary.

Look over the side at the cable and indicate to the skipper the direction in which the cable is leading and the approximate angle of the cable. Use agreed hand and arm signals.

This helps the skipper to manoeuvre the vessel to lay out the cable.

8 If cable is ‘steep to’  Anchor may be on the bottom, but not biting in. Pay out more cable, or ‘scope’ to get necessary lead onto the anchor.

9 Put the brake fully on the cable  Watch carefully what happens to the cable.

10 If vessel drags the anchor  Look over the bow and watch the cable. One of two things will happen:

(a) the anchor cable will become tight and then gradually become slack. Inform the skipper that the anchor is now holding.

(b) the anchor cable becomes tight and then suddenly slack. Inform the skipper that you think the anchor is dragging. Ask if you should pay out more cable.

- Don’t let too much cable out initially, or you will get a big pile on the bottom. You can then easily end up getting a knot in the cable.
- Ask the skipper how deep the water is.
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Weighing anchor

1. Weigh anchor
   Check with the skipper. Rig wash deckhose and start pump.
   Start to heave up the cable by putting the capstan or windlass in gear and under power, connect the gypsy and release the brake.

2. Clew up
   Report when the anchor is clear of the water. House the anchor appropriately. Heave the anchor fully home.

3. Secure for sea
   Secure all equipment as directed.

Hand signals while anchoring

<table>
<thead>
<tr>
<th>Signal</th>
<th>What is means</th>
<th>Other tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical motion of forearm</td>
<td>Indicates the cable is 'up and down'.</td>
<td></td>
</tr>
<tr>
<td>Repeat or match the angle and direction of the cable with forearm</td>
<td>Cable is leading away at an angle.</td>
<td>The anchor is probably not on the bottom—in which case lay out more cable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tells skipper what is going on.</td>
</tr>
</tbody>
</table>

When the anchor is ‘aweigh’, you will see a change in the cable as it becomes vertical. This is the point when the anchor is clear of the bottom. Watch for rocking movements and slack movement of anchor cable. Report ‘clear anchor’ to the skipper.

After the anchor is clewed up, you may be involved in washing down the cable or anchor. Check to see the type of cable locker or housing your ship or boat has.
Activity 4

Describe the techniques used for anchoring your own vessel.

1. Describe the anchor you used.

2. Where were you anchored too or at?

3. How far from your vessel was the anchor?

4. What was the approach and pitch of the anchor?
Check your progress 2

Answer the following questions after reading section 2 and observing anchoring operations on a variety of vessels.

1. Name the various parts of the anchor.

2. When does a vessel go to anchor?

3. How do you bring a vessel to anchor?

4. What seabed conditions are best for anchoring?

5. What information do you require from the skipper before anchorage?

6. What holds the vessel at anchor?
Summary

Now you should be able to perform the following tasks:

- making reports and visual signals to the skipper associated with clearing away an anchor ready for letting go, anchoring and weighing anchor.
- letting go anchor and laying out cable, until ‘brought-up’
- weighing anchor and securing for sea
- knowing how to assess when an anchor is ‘aweigh’ when weighing anchor
- knowing how to assess how much cable is in the water.

Answers to Check your progress 2

1 Name the various parts of the anchor.
   ring, shank, crown, arm, fluke

2 When does a vessel go to anchor?
   When the vessel needs to be held in one place.

3 How do you bring a vessel to anchor?
   Prepare the anchor gear, clear away the anchor, let go, observe the anchor cable movement and then put the final brake on.

4 What seabed conditions are best for anchoring?
   Mud, sand and clay; avoid rock and shingle.

5 What information do you require from the skipper before anchorage?
   Depth of the water; amount of cable to be put out.

6 What holds the vessel at anchor?
   The flukes of the anchor, forced into the seabed.