



Chapter 10: Trailering, Launching, Retrieving, Anchoring, and Securing a Vessel a to a Dock

Introduction

This chapter discusses trailering Division vessels, launching them properly and safely and how to retrieve a Division vessel back onto the trailer. It also discusses anchoring as a boat crewmember.

In This Chapter

In this chapter we discuss trailering a Division vessel. This includes trailer inspection, proper hitching and towing. It also covers the basics of launching and retrieving Division vessels from a trailer at a launch ramp. It will also discuss how to properly rig, anchor, and retrieve an anchor as a boat crewmember as well as securing a vessel to a dock as a boat crewmember.

In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Trailer a Vessel	1
B	Launching a Vessel	9
C	Retrieving a Vessel	12
D	Anchoring a Vessel	15
E	Securing a Vessel to a Dock	25

Section A. Trailer a Vessel

Introduction

Proper knowledge and skills in trailering are essential for a Boat Crewmember. Each Boat Crewmember should be able to properly distribute trailer load, inspect the vessel and trailer prior to moving a trailer with a vehicle. They should know how to properly connect the trailer to the tow vehicle and all the safety and legal components of trailering.

NOTE: Only Volunteer Boat Crewmembers who have completed the requirements of Parks Volunteer Authorization to Drive Attachment D of the State Parks Guidelines are authorized to drive a Division vehicle.

A.1. Boat Trailer - Components

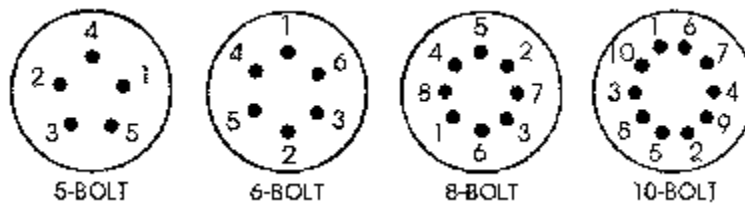
Each Division vessel will have its own unique trailer. You should not attempt to use a trailer not designed for that vessel as it could damage the vessel and/or trailer and can create a very dangerous situation.

A.1.a Bunks

Each trailer will have rollers and/or bunks that the boat rests on while on the trailer. Make sure that all rollers spin freely and their pins and brackets are in good working order. Make sure all bunks are aligned properly so that the vessel will properly sit on the flat surface of the bunks. Make sure all brackets and mounting hardware for the bunks are in good serviceable condition. Bunks carpet should be replaced when worn.

A.1.b Wheels and Tires

Most Division vessel trailers are of twin axle design with four wheels and tires. Wheels and tires should only be the proper size for the trailer and the load they will carry. Wheels should be inspected on a regular basis and before each trip to make sure they are good condition as well as having all lug nuts properly tightened. Remember that trailer tires do not steer, and wheels are subject to high twisting side loads in tight, slow turns. This can cause the wheel to flex which tends to loosen wheel lugs nuts over time. Check lug nuts before each trip.



Torquing order for various lug nut patterns as suggested by a trailer manufacturer in their owner's manual.

Tires should be in good shape with no sidewall cracks, missing or bald treads. Tires should be kept properly inflated as per the recommended pressure stamped on the sidewall of the tire. Check tire pressure before each trip and inflate when necessary. A flat tire can go unnoticed on multiple axle trailers while being towed. Running on a flat tire can cause it to catch fire and burn up the rig.

Most Division vessel trailers have serviceable wheel bearing buddies. These bearing buddies should be checked and greased on a regular basis. They are greased by attaching a grease gun to the zirc fitting of the bearing buddy and squirting grease in them until the grease just barely squirts out the relief hole.

A.1.c Couplers

Division vessel trailers have a coupler attached (bolted or welded) to the frame of the trailer. This is a ball-mount style coupler designed to go over the ball hitch of the towing vehicle. Couplers come in different sizes for the receiving ball. These sizes are 1 7/8", 2" and 2 5/16". Smaller Division vessel trailers (single axle) will usually be the 2" coupler while all the double-axle vessel trailers will be the 2 5/16". Make sure use the right ball hitch on the towing vehicle. Hooking up a coupler designed for a 2 5/16" ball on a ball that is smaller can result in damage and/or injury.

Couplers have a lever or screw on the top that engages a latch that encloses the ball. Once the screw or lever is engaged it prevents the coupler from bouncing off the ball on the hitch of the towing vehicle but still allows the trailer to pivot from side to side when towing. Couplers can work loose and should be checked frequently.

A.1.d Hitches

The hitch is attached to the towing vehicle and comprises the receiver mounted to the tow vehicle, the shank and the ball mounted to the shank. The right class hitch must be mounted to the tow vehicle for the weight being towed (trailer, vessel, vessel equipment combined weight). Using the wrong class hitch for the load could result in serious damage, injury and/or death.

NOTE: In reading below about hitches remember that all weights are discussed as GTW or Gross Trailer Weight.

Class I hitches are standard fixed ball bumper hitches and are designed for light-duty loads of up to 2,000 pounds with no more than 200 pounds tongue weight (amount of trailer weight measured at the tongue). Some Class I hitches have frame attachment points.

Class II hitches are weight-carrying hitches (fixed ball or receiver type), designed to tow up to 3,500 pounds and have no more than 300 pounds tongue weight.

Class III hitches are weight-carrying or weight distributing receiving hitches. They are designed to tow up to 5000-7000 pounds, depending on the size and structure of the tow vehicle. Some of these hitches use spring bars mounted between the trailer and the hitch and transfer some of the tongue weight to the front wheels of the tow vehicle.

Class IV hitches are weight-carrying or weight-distributing hitches designed to tow up to 7,500 to 10,000 pounds depending on the size and structure of the tow vehicle.

NOTE: It is absolutely important that the shank sliding into the receiver and the ball are rated for the weight being towed (GTW).

A.1.e Trailer Lighting and Connection

As required by law all Division vessel trailers have lights mounted to the back of the trailer. These lights are red and yellow depending on their purpose. Red lights are nighttime lights, brake lights, and turn signal lights. Yellow lights are clearance lights. Many Division trailers have sealed lights now allowing you to keep the trailer plugged into the towing vehicle (a necessity with trailers equipped with electronic brakes – discussed later in this chapter). But other Division trailers do not have sealed lights. This will make it necessary to unplug the trailer from the tow vehicle before backing into the water. [This is especially the case At Great Salt Lake](#). Not unplugging a trailer from a tow vehicle may cause a fuse to blow in the tow vehicle once an unsealed trailer light is backed into the water.

NOTE: [The Trailers for Rescue One and Rescue Four located at the Great Salt Lake Marina do not need to be unplugged from the tow vehicle as both trailers have sealed lights.](#)

NOTE: It will likely not be possible to back a trailer down the ramp or in the parking lot if the trailer is equipped with electronic brakes. Unplugging the trailer will cause the trailer brakes to activate in reverse.

Make sure the trailer plug is in good shape and that all prongs are clean and free of corrosion on both the male and female ends. Corrosion will prevent the lights from working properly.

All your lights must work to be legal and safe. The weakest link is the connector. They corrode easily and need constant attention to keep the system working. Have an observer confirm your brake lights, blinkers and running lights are working before departing on the road. See **Figure 10-1**

NOTE: Be careful when cleaning connectors not to short them out.

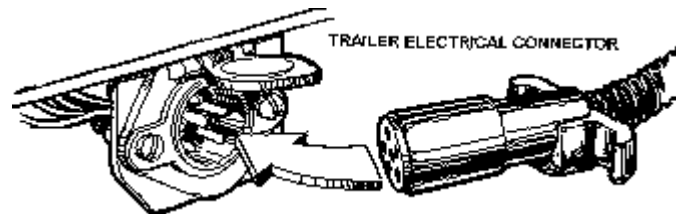


Figure 10-1
Trailer Plug Connection

A.1.f. Brakes

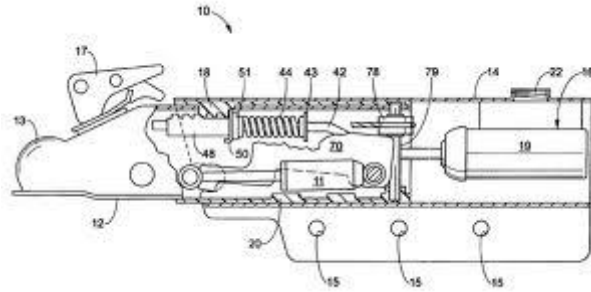
Most Division vessel trailers are equipped with brakes, either electronic or surge. This is required on the trailers designed for medium sized and larger sized Division vessels due to the load of the vessel. The brakes of the tow vehicle will not be enough to slow or stop the tow vehicle adequately and in-time.

Electronic Brakes: Electronic brakes are activated in tandem with the tow vehicle's hydraulic braking system or manually via a dashboard or steering column control. This system works well on the road, permitting independent braking of the trailer to either slow or stop the whole rig. But this system can be unreliable in reverse. Brakes can lock up if connections aren't kept clean. To prevent brake lock-up in reverse it may be necessary to keep the trailer plugged into the tow vehicle while backing.

The wiring system for electronic brakes are incorporated into the lighting system plug for the trailer.

NOTE: The tow vehicle must be wired for electronic brakes for brakes on the trailer to function. Most Division vehicles set up for towing are wired for electronic brakes. But you must confirm this prior to hauling a trailer with electronic brakes.

Surge Brakes: Hydraulically operated, this trailer braking system is independent of the towing vehicle. Brakes are activated by a pressure-sensitive master cylinder in a special coupler mounted on the trailer tongue. These brakes are activated when the tow vehicle slows down; as the trailer surges forward, the trailer brakes come on. The harder the load pushes, the harder the brakes are applied. The brakes are released as the trailer slows and the lead on the coupler is relieved.



**Figure 10-2
Surge Brake Coupler**

It is not recommended to use low gear in a tow vehicle when proceeding down a hill as this could activate the trailer brakes causing them to overheat. It is better to approach a hill slowly, then brake repeatedly while heading down a hill, giving the brakes time to cool between applications.

Some surge break couplers attached to Division trailers will need to be deactivated before you will be able to back up the trailer. This should not be a problem backing down a slope of the ramp as the coupler should not be able to activate due to the weight of the trailer load. Newer surge brake couplers are now arranged to tolerate backing up without the need to deactivate them unless you are backing up a gradient or steep hill.

Surge brakes mounted on Division trailers will have a breakaway connection which activates the surge breaks should the trailer become disconnected with the tow vehicle. It is imperative that the cable attached to the breakaway bar be attached to the back of the tow vehicle at the same attachment spot as the safety chains (discussed later in this chapter). See **Figure 10-3**



**Figure 10-3
Surge Brake Breakaway Cable**

A.1.g Safety Chains

All Division trailers are equipped with safety chains that are attached to the tongue of the trailer. These chains are required to be attached to the tow vehicle anytime the trailer is attached to the tow vehicle. See **Figure 10-4**. Inspect safety chains regularly for broken or ground down links as well as mounting hardware to the trailer. These chains, when in good working order, should be strong enough to control the trailer if the hitch or coupling breaks. The chains should be crossed. As in the diagram.

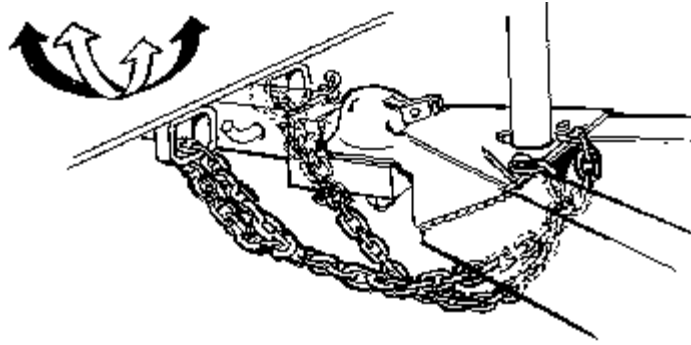


Figure 10-4
Safety Chains

A.1.h. Winch

Most Division vessel trailers come equipped with a winch to assist in pulling the vessel onto the trailer and securing the vessel to the trailer by means of the bow eye on the vessel. Winches should be inspected and winch straps checked for integrity. UV from the sun as well as sharp objects can deteriorate winch straps. Straps should be replaced when they become worn, cut or faded.

Winch straps should not be the only means of securing a Division vessel to the trailer. Most Division trailers are also equipped with a cable mounted to the bow support of the trailer. This should be used in addition to the strap to secure the vessel before trailering. See **Figure 10-5**



Figure 10-5
Securing the Bow of the Boat to the Trailer

A.2. Tow Vehicle

You should only use a tow vehicle rated for the load you will be pulling. Is your tow vehicle big enough to have the brakes and suspension it takes to safely tow the vessel? A half ton truck can carry about 1000 pounds in the bed of the truck but will likely not support 1000 pounds of tongue weight (see this chapter for tongue weight information) on the hitch. Make sure your vehicle is rated for the task at hand. This information can be found in the owner's manual. The tow vehicle and hitch must be capable

of safely handling at least 15% of the gross weight of the trailer load (trailer, vessel and all the contents in the vessel).

A.3. Tongue Weight

Tongue weight should be between 5 and 10 percent of the GTW. With a small rig tongue weight can be measured with a bathroom scale. But this will not be possible with standard to larger Division vessels. Too little tongue weight can cause the rig to “fishtail” down the road. Too much tongue weight pushes down on the back of the tow vehicle, forcing it to “squat” as well as putting undue strain on the tow vehicles suspension.

A.4. Secure and Inspect the Load

Just securing the bow of the boat is not enough on most Division vessels. Lighter vessels can shift on the trailer when traveling down the road. The back of the vessel should be secured on each side to the trailer by straps or lines.

A.5. The Boat Mast

Many Division vessels have a mast on the top of the cabin top. These masts may contain radar domes and/or spotlights. Vessels may also have anchor lights and radio antennae’s that sit too high for trailering underneath bridges or power lines. These must be lowered before trailering. Make sure the mast of any vessel is stowed in the “down” position as well as antennae’s and anchor light masts are dropped and secured.

A.6 The Trailer Jack

The trailer jack supports the tongue of the trailer while not attached to a towing vehicle. This jack must be serviced regularly to maintain proper function. [This is particularly true at Great Salt Lake where the heavy salt content can corrode the inner gears, tubes and components. Grease the tongue jack on a regular basis to minimize corrosion.](#) After connecting the trailer to a tow vehicle and before moving the rig, the jack must be stored and secured in the horizontal position to prevent damage to the jack.

A.7. Driving in Windy Conditions

Wind can create havoc when towing a Division vessel. The vessel sits higher up on the trailer than most tow vehicles. This gives it a large “Sail Area” for crosswinds. Winds can cause oscillations or sudden pulling to one side. A thirty mile an hour crosswind can blow you off the road if there is a sudden gust. If a hard gust of wind hits your rig from the left your rig will pitch to the right and move towards the right. You may be tempted to turn to the left. With the rig leaning to the right, the centrifugal force generated by the left turn can be the added ingredient that puts you on your side. The only way to help lower the risk of traveling in strong crosswinds is to slow down. This will eliminate the centrifugal force that happens when you correct. The safest choice would be to not drive in extremely windy conditions.

A.8. Wind from Passing Trucks

Large vehicles, such as 18 wheelers and buses, develop a high pressure wave of air in front of them and low pressure area to the rear as they go down the highway. This is a variable and is dependent on the shape of the truck and the existing wind conditions. As you pass a large rig or it passes you your trailer and tow vehicle will be pushed away from the truck by the truck’s “bow wave”. This is not particularly dangerous, but it does keep you on your toes.

A.9.. Handling Trailer Sway

If swaying or “fishtailing” occurs, steer as little as possible while you slow down. Because of your natural lag in reaction time, quick steering movements will actually make things worse and cause the oscillation to increase. Application of the TRAILER brakes usually will tend to help keep the vehicle and trailer aligned, while heavy braking with the trailer brakes may reduce trailer stability. Until the problem is identified and addressed, travel at reduced speeds.

A.10. Turning the Rig

Watch your trailer when turning, especially in parking lots and intersections. You will not be able to turn as tight with the whole rig as you do with just the tow vehicle. Leave plenty of room on the inside of your turn. The longer the trailer, the wider you must swing in a turn to make sure the trailer wheels clear the inside curb. See **Figure 10-6**

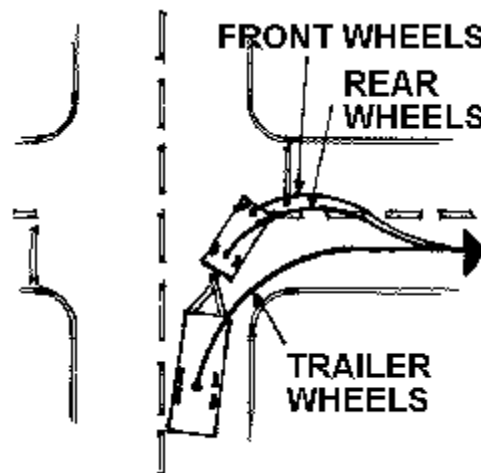


Figure 10-6
Turning the Rig

A.11. Chocking the Wheels

Whenever the trailer is detached from the tow vehicle, block the wheels so it is impossible for the trailer to roll off on its own. Strong wind can also cause a trailer to swing around and roll away.

A.12. Moving Backward

Driving a trailer backwards is tricky and takes a lot of practice to become proficient at. Remember that in backing up, the vehicle is pushing the trailer rather than pulling. That means, if you want the trailer to back straight, you have to keep the tow vehicle running exactly straight. If you are new to trailering, it is suggested you practice backing in a large vacant parking lot until you feel comfortable doing it on a regular basis to avoid an accident or embarrassment. The trick to backing up is to maneuver the trailer into the direction in which you want to move it, then follow it, driving either in a wide arc or straight back. When moving straight back, use a series of shallow S-shaped turns for corrections, to keep the rig moving straight

A.13. More Towing Basics

Here are some more towing basics to keep in mind when towing a Division vessel on a trailer:

- Learn to accelerate, slow down and stop with smooth, steady motions.
- When driving at highway speeds, allow more room between yourself and the vehicle in front than you normally would. This will give you plenty of time to slow down if the vehicle in front of you hits the breaks.
- On multi-lane roads, signal well before you need to turn. Be sure the drivers in the other lanes, who may be moving faster, have slowed down and are expecting your move.
- When passing, delay returning to your lane to allow space for the trailer. Passing should be minimalized.
- Be wary of parking lots or driveways that don't give you enough space to maneuver.
- On long trips, pull over periodically to check the rig, tires and bearings.

Section B. Launching a Vessel

Introduction

Launching a Division vessel isn't just a matter of launching. There are several evolutions involved in a successful launch. Have you ever been around a busy launch ramp on a Saturday afternoon? It can be quite entertaining. We do not want Boat Crewmembers to be part of that entertainment. As a Boat Crewmember it is expected of you that you can launch the vessel with another experienced Boat Crewmember or by yourself professionally without mishap.

B.1. Using the Launch Ramp

Most launch ramps in Utah are concrete construction. Many are wide and can accommodate several launch vehicles at a time. Others are narrow and can only accommodate one launch at a time. Because of this it is necessary to do all pre-launch prep in the parking lot prior to backing down a ramp as to avoid congestion at the ramp. Remember you are the professional. Lead by example.

NOTE: Launch ramps, by their nature, can be wet and slick. You may need to put the tow vehicle in four wheel drive in order to get back up the ramp. Exercise caution as the ramp may be very slick for humans also. It is not uncommon for people to slip on a wet or mossy ramp and sustain an injury. Use caution.

B.2. Preparing to Launch

There are many things to consider at this time prior to launching in order to have a successful launch and to avoid being today's entertainment at the launch ramp.

B.2.a. Fuel and Oil

Have you fueled the boat? Make sure there is enough fuel for the day's mission. Leave yourself a comfortable safety net of fuel. It should be noted that the Division highly recommends the use of premium fuel in the outboard motors.

Have you checked the oil levels? On the two stroke motors you will be using two cycle outboard oil. And remember you will burn oil at a faster rate than you will fuel. In other words, if you have a full tank

of fuel and full tank(s) of oil, you will run out of oil before you run out of fuel. It is a good idea to carry spare oil on board. [This is essential at Great Salt Lake. Even a moderately long mission or SAR ops on Great Salt Lake will require more oil than what is stored in the tanks.](#)

B.2.b. Dock Lines

It is likely that you will be tying up to a dock just after launching. As your prepping the vessel secure the docklines to the vessels mooring cleats. Also rig fenders at this time.

B.2.c. Loading Equipment

Load and stow equipment at this time. Equipment should be loaded and stowed so that the vessel will maintain a proper trim while underway.

B.2.d. Batteries

Check the batteries. Make sure terminals are clean and free of corrosion. Batteries should be strapped down. At minimum, the positive terminal of the battery should be covered. Check to make sure the batteries are charged.

B.2.e. Drain Plug

Many people have launched without checking to make sure that the drain plug is in and properly sealed and seated. This, of course, leads to a very embarrassing situation and can also be very dangerous. Make sure the drain plug is in and gives a good seal around the housing.

B.2.f. Disconnect Tie Downs

Disconnect any tie downs at this time EXCEPT the winch line. You will keep the winch line attached until the vessel has been backed into the water.

B.2.g. Preview the Launch

Once you are ready to back down the launch ramp preview the launch and the launch area. Study the ramp and surrounding water area for any hazards, such as a slippery or too-short surface. Estimate the wind and current effects. Check the courtesy dock. Is there a clear spot for your vessel? Now check the drain plug again.

B.3. Launching

You are now ready to launch the vessel. Line up the tow vehicle and trailer so that the backing process will be as straight and as short as possible. On a wide ramp, leave enough room for others to be able to launch or retrieve their vessels without being obstructed by you. If you do not have sealed trailer lights it will be necessary to unplug the trailer lights at this time. Make sure the plug and cord do not drag on the ramp as you back the trailer. If you have electronic brakes it may be necessary to keep the trailer plugged in so as not to automatically activate the brakes while backing. If the trailer has sealed lights it will not be necessary to unplug them.

WARNING: When single person launching, it will be necessary to leave the vehicle while on a sloped ramp in order to tend to the vessel or launch the vessel. For safety it is necessary to make sure that the proper gear of the vehicle is engaged and that the parking brake is engaged. If a manual transmission the vehicle should be in first gear, the engine shut off and the parking brake engaged. If an automatic transmission, the vehicle should be in park and the parking brake engaged.

B.3.a Outboard Tilt Lock

The outboards most likely are tilted up and secured in that position with a locking mechanism. Turn the batteries on and then tilt the outboard(s) up so that the lock can be rotated out of place. Then tilt the motors down but not all the way. You will want the outboards tilted slightly up so that the prop or skeg will not dig into any silt on the ramp while backing.

B.3.b. Starting the Vessel

Back the trailer into the water just short of the boat floating off the trailer. Now start the outboard motor(s). Make sure each motor is running smoothly and is spitting out water properly. [This is especially critical at the Great Salt Lake as the salt can crystalize at the water exhaust nipple. The Division vessels on Great Salt Lake carry paper clips that can be used to insert in the nipple to clear salt crystals from the.](#)

B.3.c. Backing the Trailer the Rest of the Way in the Water

At this point you can back the trailer into the water just so the stern of the vessel wants to start floating off the trailer. If single person launching, apply the parking brake and block the tow vehicle's wheels so the vehicle cannot accidentally roll into the water. This would be quite embarrassing and potentially expensive. Board the boat at this time (single person launch), disconnect the winch from the bow eye and then put the outboard(s) in reverse idle. The boat should pull off the trailer.

B.3.d. Docking at Courtesy Dock

Motor the vessel over to the courtesy dock. Make sure fenders are adjusted to the proper height before making contact with the dock. Once alongside the dock secure the vessel to the dock at the bow and the stern. If single person launch, you will now need to remove the tow vehicle and trailer from the launch ramp and park in a designated parking stall. Otherwise the other Boat Crewmember should have already moved the tow rig to the designated parking stall.

B.4. Docking

There are several approaches possible for properly docking a Division vessel at a courtesy dock. This section discusses only one. For more information on how to properly approach, dock, and secure a Division vessel consult the National Safe Boating Council *Essentials of Close-Quarters Boat Control*.

B.4.a. Approach

Approach in forward gear at idle speed. Approaching at a slight angle, nearly parallel. With the boat going straight, aim for a spot along the dock (like a piling or cleat). Shift into neutral. Coast in neutral aiming at the target spot, steering with rudder effect only.

B.4.b. Docking

When the bow is close to the dock and headway nearly stopped, shift the outside engine (the one furthest from the dock if twin screw boat) into reverse and set the wheel a turn or so toward the dock. The stern will swing towards the dock as headway slows.

When stopped, and the vessel is parallel to the dock, shift into neutral. The vessel should now be stopped. Secure the vessel to the dock using the proper dock lines.

NOTE: One of the prerequisites of helming a Division vessel is to successfully complete the Close Quarters course instructed by the Division.

Section C. Retrieving a Vessel

Introduction

As discussed on Section A of this chapter, there is more to retrieving a vessel than just simply putting it on a trailer. This section discusses, in detail, the proper evolution of retrieving and securing a Division vessel. It is assumed that the vessel is already tied to the dock at this point as discussed in B.4.b. Docking.

C.1. Preview the Launch

Once you are ready to back the tow vehicle down the launch ramp preview the launch and the launch area. Study the ramp and surrounding water area for any hazards, such as a slippery or too-short surface. Estimate the wind and current effects. Check the courtesy dock. Is there a clear spot for your vessel?

C.2. Backing Down the Launch Ramp

Line up the tow vehicle and trailer so that the backing process will be as straight and as short as possible. On a wide ramp, leave enough room for others to be able to launch or retrieve their vessels without being obstructed by you. If you do not have sealed trailer lights it will be necessary to unplug the trailer lights at this time. Make sure the plug and cord do not drag on the ramp as you back the trailer. If you have electronic brakes it may be necessary to keep the trailer plugged in so as not to automatically activate the brakes while backing. If the trailer has sealed lights it will not be necessary to unplug them. Back the trailer sufficiently down into the water so that the boat can be floated on the trailer with little effort.

If single person retrieval, it will be necessary to put the tow vehicle in park (1st gear for manual), set the parking brake and turn off the vehicle. It is also good practice to block one set of wheels.

If retrieving the vessel with two people, the driver may remain in the car while the helmsman floats the vessel onto the trailer.

C.3. Floating Vessel onto Trailer

The boat operator, after untying the vessel will then helm the boat onto the trailer. The best method for doing this is to approach the trailer from some distance away and from straight behind the trailer. Tilt the outboard(s) up partway so as to keep them from sucking in silt or hitting submerged objects near the ramp. Keep the center of the trailer aligned with the bow of the boat. Proceed towards the trailer in forward idle speed. Just before the bow reaches the trailer switch into neutral gear and steer straight using the rudder effect. As the vessel floats onto the trailer it might be necessary to apply forward idle gear to get the bow seated in the bow chock. If you are helming a twin screw division vessel and the vessel's bow is slightly off center on the trailer, it is possible to split the screws in order to center the bow. If the vessel is single screw you may use the helm to achieve the same goal. (See *The Essentials of Close-Quarters Boat Control* for tips on splitting the screws). The bow of the vessel MUST be centered in the bow chock before pulling the vessel from the water.

C.4. Securing the Bow

You will now need to secure the bow. If the bow is not seated all the way in the bow chock it will be necessary to do so now. This can usually be done by attaching the winch strap to the bow eye and winching the bow the rest of the way into the chock. Make sure the winch strap is in good and serviceable condition before doing so. Once the bow is seated in the chock secure the bow with the safety chain or cable through the bow eye.

C.5. Securing the Vessel

Pull up the ramp and proceed to the preparation area of the parking lot so as to free up the ramp. Pull the drain plug from the vessel and let it drain. Once the vessel is drained either put the plug back in the transom drain housing or secure the drain plug in its proper place. Tilt the outboard(s) the rest of the way up and secure them with the tilt lock lever. Then lower the outboard(s) slightly until the tilt lock lever sets against the motor mount securing the outboard in the up position for trailering. Turn the house battery and the engine battery(s) off. Put all instrument covers on and close any compartments that may house electronic equipment. Strap down the stern of the vessel on each side.

NOTE: Great Salt Lake is very dense water and the stainless props seem to scour. Props need to be inspected monthly and after each long mission. Look for scouring or the starting of a crack on the blade. If a blade has begun to crack the prop must be replaced before the next launch to avoid losing a blade. The loss of a blade can lead to engine damage. Cracked blades can be welded saving the Division the cost of a new stainless prop.

C.6. Inspecting the Outboards

This is a good time to inspect the outboards. Three items to inspect every trip are the props, struts, and zincs. Make sure all are in good and serviceable order. If there are any issues with these items make sure to report it to your supervisor or to the boat shop. These issues must be addressed before the vessel is used again. A cracked or broken prop can damage the outboard. Deteriorating zincs can limit corrosion protection of the vessel and outboards.

C.7. Secure Gear

Secure all gear in vessel. PFD's, lines, boat hooks and all personal gear needs to be secure at this time. The vessel should be made ready for safe road travel or for proper storage at the facility. Make sure the vessel is clean and ship-shape for the next Division operator.

C.8. Rinsing the Tow Rig

If operating in Great Salt Lake it will be absolutely necessary to thoroughly rinse the vessel, trailer and tow rig after retrieving a vessel from the launch ramp. If this is not done serious damage may occur to wheels, brakes and the trailer. The Great Salt Lake Marina has a rinse station located in the north parking lot. Antelope Island has a hose and freeze-less faucet located at the top of the ramp. If operating on the north half of Great Salt Lake out of Little Valley Harbor, it will be necessary to trailer the vessel down to a facility where fresh water is available for rinsing.

The Division vessels located at Great Salt Lake are equipped with Yamaha outboard motors. These motors have a built in flush system so that the interior cooling system of the outboards can be flushed. It is good practice to connect the hose to the flushing system and thoroughly flush the outboards to eliminate any salt buildup that can harden causing reduced cooling water flow through the outboard. It

is good practice to flush each outboard for at least two minutes. Consult the Yamaha Motor Owner's Manual for more instructions on how to flush the outboards.

C.9. Ensuring the Vessel is Ready for the Next Mission

Division vessels are Search & Rescue units. As such they must be maintained and kept in a constant state of readiness. For this reason it is essential to make sure fuel is checked and topped off. Only premium fuel is to be used in Division vessels. Also, if operating a two stroke outboard it is imperative that you check oil levels and top off if necessary. Do not leave the next operator short of fuel and oil as he may be called out on a SAR and will not have time to fuel and oil the vessel. [This is an absolute requirement at the Great Salt Lake. Due to the lake's size and the potential size of a SAR operating area, rescue vessels must always be topped off with fuel and oil.](#)

Also, it is a requirement at the Great Salt Lake Marina to ensure you report the amount of fuel filled into a Division vessel, from the marina fuel tank, to the Harbor Master. This is imperative for the purposes of fuel tank level tracking and recording fuel consumption for reimbursement from the Division Boating Program. Without properly recording fuel filling numbers the Great Salt Lake Marina will not be reimbursed for fuel used as well as the marina fuel tank may well run out of fuel without the Harbor Master knowing it.

C.10. Servicing the Wheel Bearings and Tongue Jack

Most Division vessels have serviceable bearing buddies on the axles. These must be serviced on a regular basis by squirting grease into them by using a grease gun attached to the bearing buddy zirc fitting. [After operating in Great Salt Lake it is imperative that fresh grease is inserted into the bearing buddy to minimize corrosion. It is also imperative to insert grease into the zirc fitting of the tongue jack to minimize corrosion.](#) See A.1.b. of this chapter for more information.

C.11. Final Inspection before Trailering

Before leaving the parking lot to trailer the vehicle on the open road or to park the trailer and vessel at a facility it is good practice to do one last final walk-around inspection. Check the trailer hitch. Is it properly latched and secured? Check the trailer plug. Check the trailer lights by turning on the tow vehicle lights and then inspecting to make sure the trailer lights work properly. Turn on the hazard switch of the tow vehicle and make sure the flashers on the trailer lights work properly. Make sure all marker lights work properly. Check to make sure outboards are secured and that the vessel is strapped down. Make sure the vessel's mast and antennae are down and secured properly. Check to make sure the bow is properly seated in the bow chock and the winch strap as well as the safety chain/cable are attached to the bow eye.

NOTE: It is not necessary to drop the mast or the antenna if the vessel will remain outside at the facility and will not be trailered on the open road. If the vessel is to be stored inside or trailered then both the mast and antenna must be dropped to prevent them from snagging low power lines or being crushed from impact on low bridges.

NOTE: for trailering instructions on the open road see section A of this chapter.

NOTE: This is also a good time to check the zincs on outboards and hulls to make sure they are still in good and serviceable condition. If they are heavily corroded it is time to replace them.

C.12 Securing the Trailer at a Facility

Once you have reached your destination with the vessel and trailer you will want to disconnect it from the Division tow vehicle. Back the trailer into a parking stall or building. Check rear view mirrors to confirm side clearance. If you have a spotter let them tell you when you have backed far enough into the stall or building. At that point get out of the vehicle and confirm you have allowed enough clearance behind the vessel and to each side of the vessel for people to walk by or other vehicles to clear you. Make sure the tongue of the trailer is far enough back to not be an obstruction or hazard.

Chock both the front and back of the trailer wheels. Lower the trailer jack so that it is on the ground. Disconnect safety chains and trailer lights. Make sure chains and lights are stored on the tongue of the trailer instead of on the ground. Now you can disconnect the tongue coupler. Keep lowering the jack until the tongue pops off the trailer ball of the tow vehicle. You are now ready to move the tow vehicle away from the trailer. [If storing a Division vessel outside at the Great Salt Lake it may be necessary to secure the tongue so that the trailer cannot be blown sideways in the strong winds that the south end of the lake can experience.](#)

Section D. Anchoring a Vessel

Introduction

A properly anchored boat can withstand heavy seas and protect the boat and crew members from harm. A power boat with engine failure is subject to any wave or passing storm. An anchored boat will face directly into the wind. Typically the bow of the boat is the portion of the boat best able to take oncoming waves due to the bow typically being the highest part of the hull. Thus, a boat should always be anchored from the bow.

Never anchor a boat by the stern, unless in very protected waters. The stern of the boat is the portion with the least freeboard. A strong series of waves could quickly flow over the transom and fill the boat causing a serious threat of sinking.

Anchors and Rode

D.1. Anchor Types

There are several styles and types of anchors. Some do certain jobs better than others. And some are just more economical. An anchor should be chosen for its job and the boat it will anchor. This manual does not attempt to list all the anchor types out there. But it does list the most common as well as the anchors commonly used on Division vessels.

D.1.a Plow Anchor

The plow-style anchor looks much like a field plow. It has a plow blade that usually articulates on the shaft. The plow anchor is good for most boats and gets its holding power by plowing into the bottom sediments. It works well in sand, rocks, weeds and mud. See **Figure 10-7**



Figure 10-7
Plow Anchor

D.1.b. Fluke or Danforth Anchor

The fluke-style anchor (commonly referred to as Danforth) is similar to the plow-style but is more lightweight and economical. It is also good for most boats and gets its holding power from its pointed flukes digging into bottom sediments. It is good in sand and mud bottoms but is less effective on rocky, grassy, or clay bottoms. See **Figure 10-8**



Figure 10-8
Fluke Anchor

D.1.c. Mushroom Anchor

The mushroom anchor gets its holding power by sinking into bottom sediments. It should not be used to anchor boats larger than a small canoe, rowboat, or small sailboat since the holding power is weak. It can be a great anchor for buoys where the bottom is muddy. See **Figure 10-9**

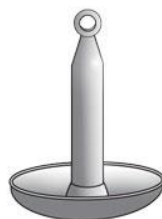


Figure 10-9
Mushroom Anchor

D.1.d. Claw Anchor

Claw anchors have the best all-round holding ability in varying bottom conditions. They generally reset themselves easily if wind or current changes direction and hold more effectively in grass, mud and sand. Stowing them can be more awkward though. See **Figure 10-10**



Figure 10-10
Claw Anchor

D.1.e. Folding Grapnel Anchor

The Grapnel anchor is an anchor that folds and unfolds in seconds and stores compactly. They are made of galvanized steel. They are good in most bottom types. But the anchor is designed for small boats in non-safety-critical situations. They are not appropriate for extreme holding requirements. See **Figure 10-11**



Figure 10-11
Folding Grapnel Anchor

D.2. Anchor Rode

No anchor is complete without being attached to its rode. This “rode”, as it is called, secures the anchor to the vessel. It is typically a combination of line, chain and a shackle, although some very small boats will only have line.

D.2.a. Anchor Line

Nylon in three strand or double-braid is the most common anchor line on Division vessels. Nylon's greatest asset is its elasticity. It stretches a third more under load and has a working elasticity of 15 to 35 percent, which is of particular value when a boat surges at anchor in step seas. It is important to choose the right diameter line to use though. If a line smaller than needed is chosen the line will be subject to failure. If a line larger than needed is chosen elasticity will be diminished or lost. As the size of the vessel increases, so does the line diameter required. Refer to **Table 10-1** for recommended diameter of line to be used as part of the anchor rode.

D.2.b. Anchor Chain

Chain is an indispensable part of the anchor rode. It does two critical jobs; it protects the anchor line from sharp rocks on the lake bed, and it acts as to cushion shock loads due to surging. Three kinds of chain most used as anchor rode are BBB, Proof Coil, and High Test.

Chain is designated by the diameter of material in the link, but the links of various types differ slightly in length. If using a windlass it is necessary to match the chain to the windlass otherwise jamming or jumping may occur. Refer to **Table 10-1** for proper diameter and length of chain to be used in the anchor rode based on the size of the vessel it will be used on.

D.2.c. Shackles

The anchor chain must be attached to the anchor by means of a shackle. Anchor shackles can be stainless but are usually galvanized due to the cost difference. In selecting a shackle, use one size larger than the chain. *Example: ¼" chain would use a 5/16" shackle.* Shackles should be seized to keep them from backing out. See *Chapter 7, Marlinspike Seamanship.*

Boat Size	Line Diameter	Chain	Chain Length
21' to 27'	3/8"	3/16" PC	7' to 10'
28' to 32'	7/16"	¼" PC	10'
33' to 36'	½"	¼" PC	15'

Table 10-1
Anchor Rode Line and Chain Size

D.2.d. Completing the Rode

The anchor line can be attached to the chain by two standard methods. The first method is to splice the line into the chain. The second method is to tie the line directly to the chain using an anchor bend knot. If the line is too thick to fit through the links of the chain a shackle can be attached to the chain and then the line is tied to the shackle using an anchor bend. Make sure to seize the shackle to keep the pin from backing out.

The chain is attached to the anchor as mentioned earlier with the use of a shackle. This completes the anchor and rode. See **Figure 10-12**

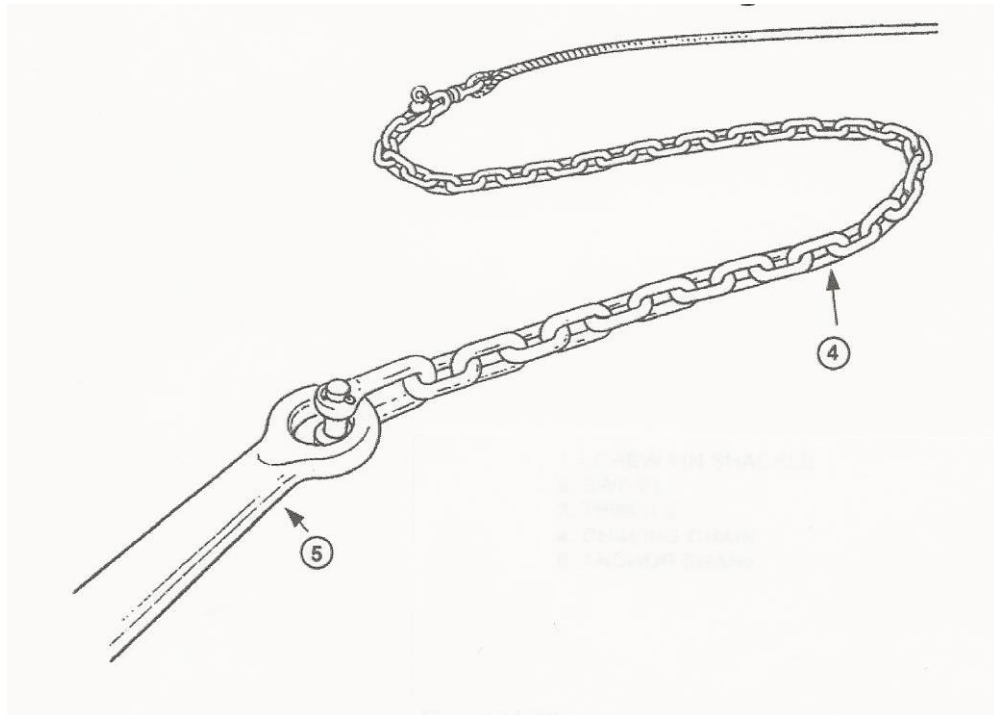


Figure 10-12
Anchor and Rode

D.2.d. Scope

Scope is ratio of the length of the anchor rode to the vertical distance from the bow chocks to the bottom (depth plus height of bow chocks above the water). Generally the following rules apply. The longer you plan to stay “on the hook” at a particular location the more scope you should have. Anchoring for a short time in calm waters a scope of 3:1 ration may be adequate. If you will be anchored for a longer period of time or seas and wind are present then a scope of 7:1 should be considered. (See **Figure 10-13**)

The VO will inform the boat crew of the depth of water being anchored in and the desired scope ratio. The boat crewmember should then be able to pay out the proper amount of scope once instructed by the VO to drop anchor.

Considering a scope ration of 7:1, if you are in 15 feet of water and the vessel has 3 feet of freeboard on the bow, then 126 feet of scope will have to be paid out. The formula for calculating scope is (Depth of water + freeboard) * scope ratio.

[In heavy sea states on Great Salt Lake where the waves are dense a scope of 10:1 may be required.](#)

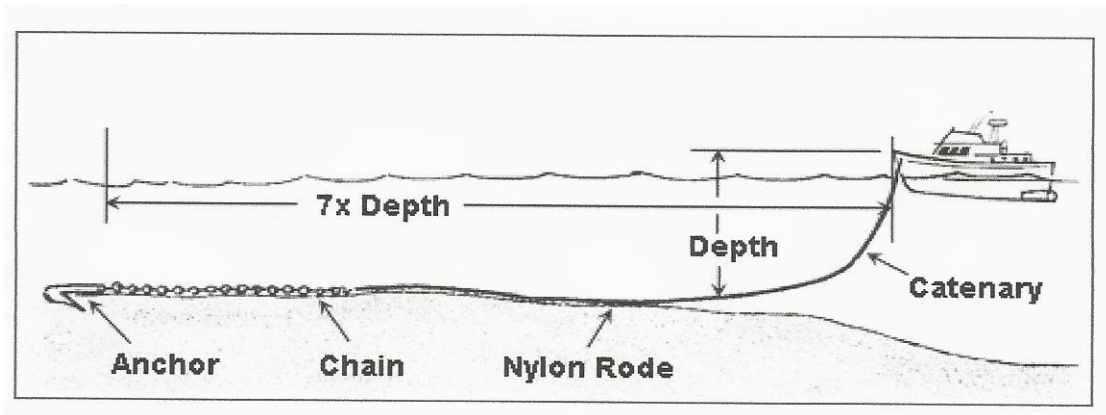


Figure 10-13
Scope

Anchoring

D.3. Procedure

Before the need arises, the VO should brief the crewmembers on procedures for anchoring.

Anchoring involves good communication between the VO and the crew. With noise from the engine(s) and the wind, it is difficult to hear voice communication. The VO should ensure a pre-arranged set of hand signals that the crew understands. Keep the signals as simple as possible.

D.4 Setting the Anchor

In normal operating conditions where the vessel is not in casualty control mode (engine failure, steering failure) the VO will select the area to anchor. This may be based on several factors:

- Mission
- Approach
- Bottom composition
- Wind and current factors
- Swinging room

The VO will approach most anchoring locations from downwind with the bow of the vessel pointed into the wind. Boat crewmembers should prepare the anchor prior to the VO putting the vessel into the final approach of the anchorage.

D.4.a. Lowering the Anchor

As the anchor is lowered into the water it is important to know how much rode is paid out when the anchor hits the bottom. It is advisable to take a working turn on the forward bitt or cleat to maintain control of the rode. If anchoring in strong wind or current, the anchor rode may not be held with hands alone.

An anchor should not be lowered until the vessel is no longer making headway. The vessel should be at full stop or slightly moving backward. Just as the boat begins backing the boat crewmember begins lowering the anchor easily over the side until it hits bottom crown first. The anchor and chain should be lowered so that the chain and line are in the anchor roller. If there is no anchor roller the boat crewmember must make sure that the anchor and chain do not make contact with the side of the vessel.

NOTE: Never stand on the coils of the line on deck. This may lead to serious injury or a boat crewmember being pulled over the side by the weight of the anchor.

NOTE: Do not attempt to “heave” the anchor by casting it as far as possible from the side of the boat. Control of the scope and anchor angle in the water as it is lowered will be lost.

Step	Procedure
1	Station two persons on the forward deck (if available).
2	Haul out enough line from the locker and fake it on deck so as to run freely without kinking or fouling.
3	On the VO’s command, take a working turn on the forward bitt to control how fast and how much anchor rode is released.
4	Once the anchor is on the bottom, take a working turn on the forward bitt to control how fast and how much anchor rode is released.
5	Once the desired length is paid out, make up the anchor rode to the forward bitt or bow cleat.

D.4.b. Setting the Anchor

An anchor must be set properly in order to yield its full holding power. The best techniques for setting an anchor will vary from type of anchor being used. Only general guidelines are presented here. Boat crewmembers and VO’s should experiment with vessels in their charge.

Step	Procedure
1	With the anchor on the bottom and the boat backing down slowly, pay out line as the boat takes it with a turn around the bitt or cleat. A very slight tension should be kept on the line at this stage in order to keep the anchors angle at the most efficient with the bottom of the lake.
2	When the predetermined scope has been paid out, snub the line quickly and the anchor will probably get a quick bite into the bottom.
3	If the anchor becomes fouled with mud or bottom grass preventing it from setting, lift it, wash it off by dunking at the surface, and try again.

After the anchor is set, you can pay out or take in rode to the proper length for the anchorage, and for the prevailing and expected weather conditions. Scope must be adequate for holding. Make sure to also check for swing room so as not to swing into shore or other vessels. See **Figure 10-14**. Once the anchor has been satisfactorily set the anchor line can be made fast to the bow cleat or bitt.

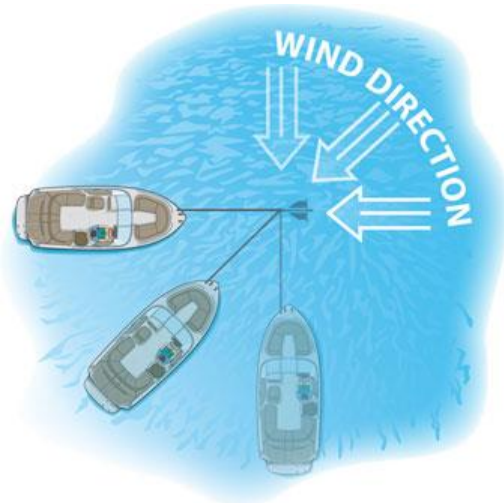


Figure 10-14
Allowing for Swing Room

D.4.c. Checking the Anchor Holding

Sometimes the anchor may start dragging on the bottom. Usually this is caused because the anchor didn't fully set but can also be caused from forces on the boat being too great for the anchor size or scope paid out. Check to ensure the anchor is holding, and not dragging.

- If the water is clear enough to see the bottom, movement may be detected easily.
- If the anchor rode is jerking, or vibrating, the anchor is most likely not holding.
- Monitor bearings taken on at least two landmarks (if available) that are a minimum of 45° apart, or use radar ranges and bearings. Small changes usually mean that the wind or current has caused the boat to swing around the anchor. If the compass heading is constant, but the bearings change, the anchor is dragging.
- Some electronic navigation units (GPS) have anchoring features that will warn if the vessel has drifted out of its swing circle. These can be used, but should not replace visual and radar methods.

D.4.d. Making Fast

After the anchor has gotten a good bite and the proper scope has been paid out, the line should be made fast to the connection fitting (bitt, cleat, etc.). A check should be made to ensure the vessel is not dragging anchor before shutting off the motor. The fundamental idea in making fast is to secure in such a manner that the line can neither slip nor jam.

D.4.e. Anchor Watch

Maintain a live watch whenever anchored to monitor the conditions and equipment. This to watch for are:

- Dragging anchor.
- Changes in the weather.
- Other vessels dragging their anchor or anchoring near your vessel.
- Connection of the anchor rode to the fitting.

See *Chapter 1, Section C, Watchstanding Responsibilities* for a complete description of the anchor watch.

Getting Underway

D.5. Weighing Anchor

When it is time to retrieve the anchor the VO will begin running up on the anchor very slowly with throttles at forward idle. This will make hauling the line much easier without the boat crewmember having to strain in pulling up the anchor. As the VO is motoring forward the boat crewmember will want to be on the forward deck in a position where he can see the anchor rode but in a position not to obscure the VO's view. The boat crewmember should point to the direction the scope is coming off the bow as the vessel moves forward so the VO can keep the proper bow alignment keeping the scope forward on the bow.

D.6. Pulling up Anchor

When the line starts to become slack the boat crewmember should start pulling the line onto the deck making sure to keep feet free and clear of any coils in the line. A good practice is to never let your feet leave the deck but to rather shuffle your feet so as to push coils out of the way.

The boat crewmember should watch closely for the chain to break the surface of the water. As it does it is important to make sure the anchor chain is in the anchor roller or that the chain is held clear of the boat so that the chain and the anchor will not damage the vessel as it is pulled aboard. As the anchor frees the surface of the water it should be cleaned of any mud or grass.

D.7. Clearing a Fouled Anchor

If an anchor cannot be pulled from the bottom, secure the anchor rode to the anchor cleat or bit with all slack taken out of it. The VO will follow boat handling skills by using the motors to gently free the anchor. As this happens the bow of the boat is likely to drop and the vessel tilt to one side slightly. The vessel will immediately spring back to a level position as the anchor becomes free of the bottom. The anchor can then be retrieved.

If the anchor still remains snagged on the bottom it may be necessary for the boat operator to run in a wide circle, slowly, to change the angle of pull. Take extreme care to ensure the anchor line does not tangle in the screws during this operation. (See **Figure 10-15**)

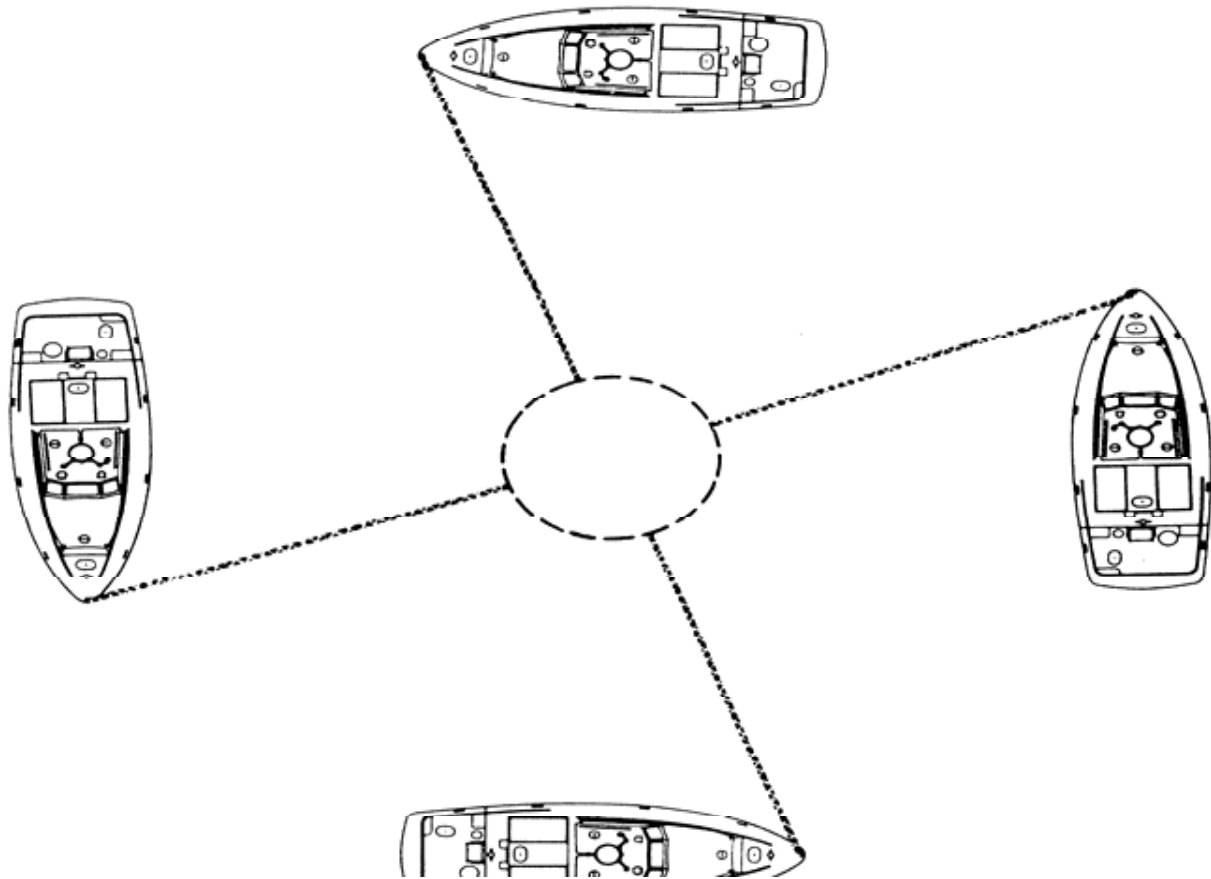


Figure 10-15
Freeing a Fouled Anchor

D.8. Stowing the Anchor

The anchor should be properly stowed before the vessel gets underway. An anchor that has not been stowed or has not been properly stowed can be very dangerous leading to vessel damage and injury to crew members.

D.8.a. Stowing an Anchor and Rode for a Vessel Equipped with a Hawse-Pipe and Anchor Chocks

For vessels that stow their anchor on deck using the anchor chocks, the rode must be fed down the hawse-pipe so that it does not kink or knot keeping in mind that the line must feed freely the next time the anchor is paid out. Once all line and chain have been feed into the hawse-pipe the anchor should be carefully placed into the anchor chocks and secured (pinned). If the anchor is allowed to become loose while underway serious damage or injury may occur.

D.8.b. Stowing an Anchor and Rode for a Vessel Equipped with an Anchor Locker

For vessels that are equipped with an anchor locker, the scope should be placed in the locker first in a coiled or flaked manner so that it will feed out cleanly and properly the next time the anchor is needed. The anchor is then placed in the anchor hanger in the locker or allowed to sit loose on top of the rode. Secure the anchor locker.

D.9. Maintenance

After anchoring in salt water, ground tackle should be rinsed off with fresh water before stowing it, if possible. Nylon rode dries quickly and can be stowed wet.

Section E. Securing a Vessel to a Dock

Introduction

There are two aspects on securing a vessel to a dock. The first aspect is approaching a dock. This is covered in a separate manual called *The Division Boat Operator Manual* and will not be discussed here. The second aspect is meant to assist the boat crewmember on how a vessel is physically secured to a dock, knowing the names of lines and their purpose.

E.1 Mooring Line Names

Each mooring (or dock) line has a proper name and function. The list of names and functions is quite large. On Division vessels there are only five types of dock lines used:

- Bow Line
- Stern Line
- Forward Quarter Spring Line
- After Bow Spring Line
- Breast Line

E.1.a. Bow Line

The bow line runs from the bow cleat on one side of the vessel or the anchor cleat on the bow of the vessel forward to a cleat on the dock.

E.1.b. Stern Line

The stern line runs from the stern cleat on one side of the vessel aft to a cleat on the dock.

E.1.c. After Bow Spring

The After Bow Spring, also known as the After Spring, runs from the bow cleat or a cleat forward of amidships on one side of the vessel and runs aft to a cleat on the dock.

E.1.d. Forward Quarter Spring

The Forward Quarter Spring, also known as the Forward Spring, runs from the stern cleat on one side of the vessel forward to a cleat on the dock.

E.1.f. Breast Line

A Breast Line is used on larger vessels, especially those with curved sides, to pull either the bow or the stern closer to the dock in order to make it easier to board the vessel.

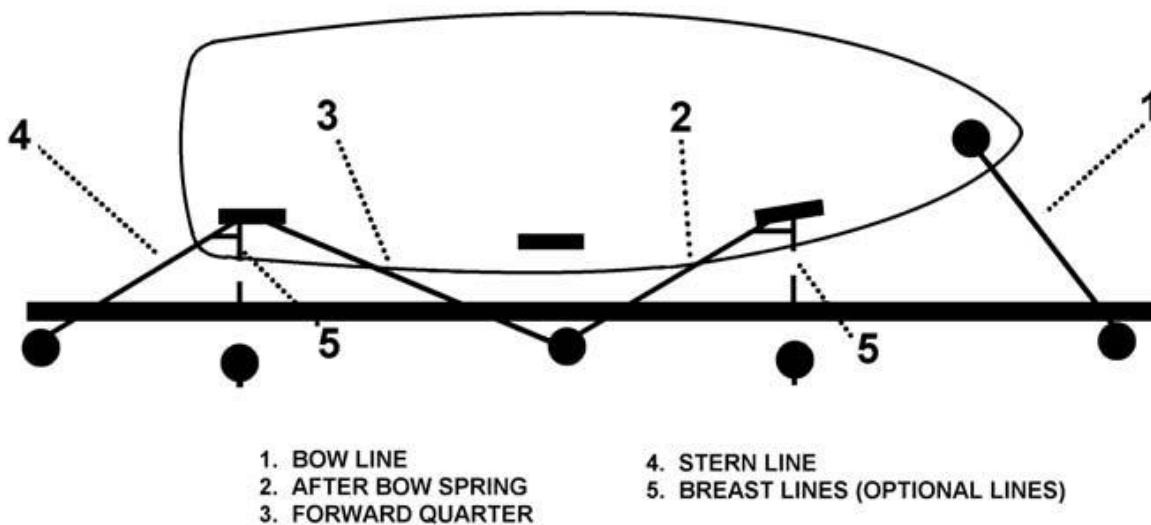


Figure 10-16
Mooring Lines

E.2. Rope Type

The preferred material for mooring lines is nylon due to its elasticity. Just as in anchoring, elasticity is desired to absorb shock from a vessel shifting in its slip due to waves or wind. The line can be double-braided or three strand.

E.3. Line Size

Choosing the proper diameter line for the length and size of the vessel is important. Choose too small of a line and the line may fail under shock from wind, waves or impact. Refer to **Table 10-2** in choosing the correct diameter line. Understand this is a general guideline for most Division vessels. It may be necessary to move up one size of line for vessels with high profile or “sail area.”

Boat Length	Up to 18'	19-27'	27-31'	32-36'	37-45'
Line Size	1/4"	3/8"	7/16"	5/8"	7/8"

Table 10-2
Dock Line Size for Vessel

E.4. Line Length

As a general rule your bow and stern lines should be about 2/3rds of the length of the boat. A 30' vessel should be using a 20' line for bow and stern lines. The spring lines should be the length of the boat.

E.5. Placement of Fenders

Fenders should be tied to the side of the boat for the purpose of protecting and holding the vessel off the dock. Adjust the height of the fender so that half of the fender will be below the deck of the dock. Adjust the spacing of the fenders so that the whole side of the vessel is protected and being held evenly off the dock from bow to stern. Spacing of fenders is quite simple on vessels with flat sides. Vessels with more rounded sides will require a tighter spacing on the beam or belly of the boat.

NOTE: Fenders should be secured in position prior to the vessel approaching the dock.

E.6. Securing the Vessel

Mooring lines should be made ready prior to approaching the dock. On the command of the VO boat crew members should attach the combination of lines requested. The most common combination is bow and stern lines rigged with spring lines in wait but weather conditions or approach may dictate a different combination. The combination of lines initially rigged will be determined by the VO.

E.7. Completing the Securing of the Vessel

Once the vessel is alongside the dock and secured with the initial two mooring lines, boat crewmembers should complete securing the vessel by attaching the rest of the mooring lines. This may be to just one side of the vessel, or if in a slip, to both sides of the vessel. Fenders should be checked for appropriate height and adjustment. Lines on the dock should be dressed up to prevent a trip hazard.

Last updated August 2014