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Chapter 5

BEFORE HEADING OUT

The best way to keep out of trouble on the water is to be prepared. This means having at least the minimum required safety equipment on board, keeping your vessel and equipment properly maintained, possessing required safety knowledge, and completing a pre-departure checklist before heading out on the water.

The seven chapters of this study guide contain the information that you must know to pass a Transport Canada Boating Safety Test in order to obtain your Pleasure Craft Operator Card (PCOC).

This chapter contains the following sections:

5.1 PRE-SEASON MAINTENANCE

You can avoid mechanical breakdowns by planning ahead and by ensuring that your vessel receives regular maintenance.

The following pre-season maintenance is recommended for vessels that operate less than 25 hours per week (vessels that operate for longer periods will require more maintenance):

- Ensure that the vessel's drain plug is installed before launching.
- Ensure that the battery is charged and that it holds a charge for more than 24 hours;
- Top up fluid levels;
- On outboard and inboard/outboard engines: replace the lower unit oil (if not already done during the previous season's post-season service);
- Check the fuel filter and water separation filter and replace if necessary;
- Check all boat systems: electrical, fuel, propulsion, and cooling;
- Check wire and cable terminals for tightness, dirt, and corrosion;
- Check that throttle connections are secure;
- Check all hoses and lines for leaks or cracks and replace if necessary; and
- (On gasoline inboard engines only): inspect and clean the flame arrestor with soap and water.

The above list of items as well as the list of items provided in Section 5.3 should be checked each time that you take your boat out on the water.

Maintenance of Navigation Lights

Navigation lights should be maintained in good condition. Always confirm that lights are in good working order before every boating trip. Be sure to carry spare bulbs of the proper size and power so that you can replace burnt out bulbs immediately.

It is a good idea to include navigation lights as part of your regular maintenance program. Most lights use a rubber or foam gasket to seal against moisture. If you see condensation inside the lens, it means that the gasket leaks.

Inspect the gasket for proper placement, splits, or cracks and replace as necessary. Spray gaskets with silicone and electrical connections with a corrosion protector to extend fixture life. Be sure to polish the light, reflector, and lens to a shine.

Pursuant to Rule 22 of the *Collision Regulations*, lights must have sufficient intensity to be visible at the following minimum ranges:

- Vessels less than 12 m in length
  - Masthead light, 2 miles
  - Sidelight, 1 mile
  - Stern light, 2 miles
  - Towing light:, 2 miles
  - All-round lights (white, red, green or yellow), 2 miles
- Vessels 12-50 m in length
  - Masthead light, 5 miles; unless vessel is less than 20m, then 2 miles
  - Sidelight, 2 miles
  - Stern light, 2 miles
  - Towing light, 2 miles
  - All-round lights (white, red, green or yellow), 2 miles
- Partly submerged vessels or objects being towed
  - All-round white light, 3 miles
- Vessels exhibiting:
  - Special flashing light, 2 miles
  - Blue flashing light, 2 miles

5.2 LOADING A SMALL VESSEL

To avoid impeding the operation of a pleasure craft, and thus increase the risk of causing injuries or loss of life to persons on board, the operator of a pleasure craft should:

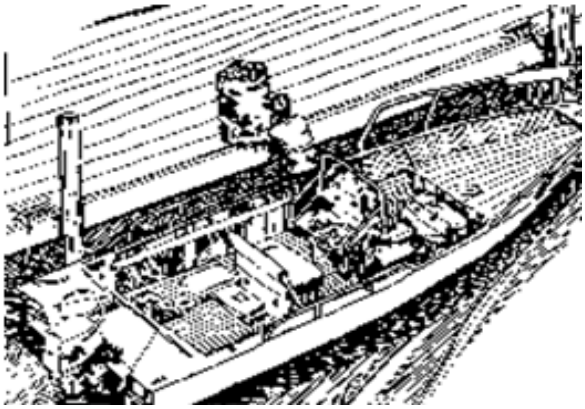
1. **Not overload the craft in excess of the recommended safe load capacity or the equivalent maximum allowable number of adult persons;**
2. **Position persons and gear on board so as to evenly distribute the weight;**
3. **Keep the load's centre of gravity as low as possible on board the craft; and**
4. **Lash gear down or stow it in lockers or under seats to prevent uncontrolled movement of the gear**.

You must obey the loading limits indicated on your vessel's Compliance Notice. Remember, **the maximum load indicated on the Compliance Notice is calculated for fair weather conditions**. If you are operating in strong winds and large waves, then your vessel *cannot* carry nearly as much weight as indicated on its Compliance Notice.

Always remember that a pleasure craft that is overpowered (equipped with an outboard motor that is too large) or overloaded, will sit lower in the water than normal and as a result it will be much more prone to swamping and sinking.

In addition, a vessel is less stable and more likely to capsize when it is overloaded or overpowered. Overloading is dangerous; know and respect the limitations of your vessel. **Always remember to keep the load's centre of gravity as low as possible and to secure it to keep it from shifting**. Keeping the centre of gravity of your vessel low is your primary consideration. Next, you need to ensure that gear on board is lashed down and stored out of the way (not underfoot, creating a tripping hazard).

Do not carry bulky items onto a docked boat. When you carry bulky items in your arms, your view in front is restricted. In addition, if your arms are full, it is difficult to maintain your balance while boarding small craft. Thus, never carry bulky or heavy gear when boarding a small vessel.



The safest way to load heavy or bulky supplies or equipment onto a small vessel is from the shore or from a dock. To do this, before getting aboard lay the gear out where you can reach it easily from the boat or place it where someone can hand it to you after you are in the boat.

Here are a few tips that one should keep in mind when boarding a vessel:

- The vessel must be kept tied up or held firmly in place until everyone is onboard.
- When boarding a pleasure craft, grab onto something solid (such as the gunwale or a stanchion) to steady yourself as you board.

If boarding a small, unstable vessel such as a dinghy or canoe, crouch to keep your centre of gravity low and stretch to step into the bottom of the boat. Board near the bow and then move to your seat along the centre line of the hull. **Never step onto the gunwale as this may cause the boat to capsize**.

Once you and your supplies and equipment are on board, stow them so that they are out of the way (but readily accessible in the case of safety equipment). **Remember to distribute the weight of the gear evenly so that your vessel remains balanced; most boating fatalities are the result of capsizing or falls overboard**.

5.3 PRE-DEPARTURE CHECKLIST

Even if you are simply borrowing a boat for a few hours, you become the operator and you are responsible to ensure that it is in seaworthy condition. You should go through a pre-departure checklist every time you take any boat onto the water. Being sure to go through a thorough pre-departure checklist may mean delaying departure by a few minutes but it can also prevent hours of delay in an uncomfortable or even dangerous situation in the event of a breakdown or an accident.

Here is a good pre-departure checklist:

- **Ask yourself if you the operator have the experience and skill set required for the planned trip/boating activity and the type of boat you will be operating?**
- **Ensure that you have your Pleasure Craft Operator Card** - Failure to carry your PCOC while operating a powered pleasure craft risks a fine of $250 (take an in-class course or study our free online course at www.freecourse.ca, then write the test and get your PCOC).
- **Verify that manual propelling devices are intact and strong enough for their intended use.**
- **Check the hull for splits, cracks, bulges, or other signs of damage.**
- **Check the battery's charge and fluid levels**.
- **Verify that all hoses, clamps, and belts are secure and in good condition. Ensure that the engine throttle mechanism does not stick or bind**. **Verify that the steering operates smoothly**.
- **Confirm that navigation lights are in good working order. Replace burnt-out bulbs.**
- Be aware of the weather; **check the weather forecast before departure**.
- Ensure that you have current **marine charts** or maps for the area in which you will be boating.
- **Are there enough approved PFDs and lifejackets of appropriate type and size for everyone on board?**
- **Is all required safety equipment on board, in good working order, and readily accessible?**
- Check oil levels.
- Check the fuel. **Is there ample fuel for the trip or will you need to refuel along the way? A good rule of thumb for fuel is that you require one-third for the trip out, one-third for the return trip, and one-third as a reserve**.

- Verify that your **VHF radio** is functioning properly.

- If you do not have a VHF radio (or it is not working), then be sure to bring an alternative communication device (such as a cellular telephone) to call for help in an emergency (be sure to verify that your cellular telephone will function in the area where you operate.

Relying on a Cellular Telephone in a Marine Emergency
Some cellular providers offer the *16 service to reach the Canadian Coast Guard. If you find yourself in need of assistance on waters not serviced by the Coast Guard, then you should call the local police by dialling 911.

- Check for any **local water hazards** or **boating restrictions** along the planned route of travel.
- **If travelling in US waters, have you obtained the latest update of Homeland Security requirements?** Updates can be obtained at: http://www.cbp.gov/travel/us-citizens/western-hemisphere-travel-initiative
- **Have you checked navigational references for water levels, times of low, slack, and high tides; and the direction of water flow?**
  Tip: To obtain nautical charts and tide tables, visit the Canadian Hydrographic Service's (CHS's) website (http://www.charts.gc.ca/index-eng.asp) or contact the CHS by telephone at 613-998-4931. Additional information on water levels is also available through the CHS's web site (at http://tides.gc.ca/eng) or by telephone at 1-877-775-0790.

- **Check your navigational references (nautical charts) for places to take shelter in the event of foul weather.**
  Tip: For information on cruising directions and sailing directions, visit the Canadian Hydrographic Service website http://www.charts.gc.ca/index-eng.asp or contact them by phone at 613-998-4931.If you are in an area that is not covered by nautical charts, then contact knowledgeable local residents.
- Ensure that you have a **first aid kit** on board.
- Verify that you have a **repair kit** with basic tools and spare parts.
- Ensure that the weight of gear and passengers is evenly distributed in your craft.
- File a **sail plan** or let a responsible person know where you are going, when you expect to return, and what your vessel looks like.
- Give your passengers a pre-departure safety briefing to provide safety information and describe emergency procedures.
- Lastly (and most importantly) ensure that the drain plug is properly secured before launching your boat.

Note: If you are planning a longer excursion of several days, you may wish to consider obtaining a satellite phone or an **Emergency Position Indicating Radio Beacon** (EPIRB), which transmits a coded signal used only in times of distress. On activation of the EPIRB signal, Canadian search and rescue resources are deployed to your rescue.

To function properly, the Emergency Position Indicating Radio Beacon must be registered with the Canadian Beacon Registry.
Phone: 1-877-406-7671.
E-mail: cbr@sarnet.dnd.ca
Web site: https://www.cbr-rcb.ca/cbr/presentation/other_autre/index.php

5.4 MARINE WEATHER FORECASTS

The operator of a pleasure craft should check the weather forecast before making the decision to head out so as not to put the craft or its passengers at risk. Thus, boaters need to know how to obtain current weather information before they head out as well as how to obtain updates while out on the water, which requires the knowledge and skill to use a marine radio. Alternatively, a receiver for receiving continuous marine weather forecasts is also available through marine supply outlets.

Weather forecasts can be obtained from a number of sources, including:

- **Your own personal observations;**
- **Newspapers;**
- **Radiotelephones;**
- **Environment Canada information lines;**
- **Radio channels 21B, 25B, and 83B (Atlantic Coast and the Great Lakes);**
- **Radio channels 21B, WX1, WX2, and WX3 on the Pacific Coast;**
- **In Vancouver, Toronto, Montreal, and Halifax VHF broadcasts from Weather Radio Canada (a service of Environment Canada);**
- **Via the Internet at:** http://weather.gc.ca/mainmenu/weather_menu_e.html**;**
- **Regular AM and FM radio weather forecasts; and**
- **Television weather channels and telephone weather services**.

Environment Canada uses special terminology in its marine weather forecasts. Thus, be sure that you understand the following terms:

- **Light winds –** Light winds are winds that are less than 10 knots (19 km/h).
- **Moderate winds –** Moderate winds are winds that are in the range of 10 to 20 knots (19 to 37 km/h).
- **Strong winds –** Strong winds are winds with sustained speeds in the range of 21-33 knots (37 to 61 km/h).
- **Gale-force winds –** Gale-force winds are winds with sustained speeds in the range of 34-47 knots (61 to 87 km/h).
- **Storm-force winds –** Storm-force winds are winds with sustained speeds in the range of 48-63 knots (89 to 117 km/h).
- **Hurricane-force winds –** Hurricane-force winds are winds with sustained speeds higher than 64 knots (119 km/h).

Heed Marine Weather Warnings

Poor weather conditions with high winds and large waves increase the risk of passengers falling overboard or of a pleasure craft swamping or capsizing.

When marine weather conditions are expected to deteriorate to the point where high winds and large waves will render boating activities unsafe, Environment Canada's weather service issues a warning to keep boaters off the water during unsafe weather. **Environment Canada's weather service has three types of weather warnings for boaters:**

- **Strong winds warning**
- **Gale Warning**
- **Storm warning**

Strong Winds Warning – A strong winds warning is a warning to small vessels (vessels that are under 6 metres in length) to stay off the water. This type of warning is issued by Environment Canada when winds are expected to be strong [i.e.: winds with sustained speeds in the range of 20 to 33 knots (37 to 61 km/h)] or when waves 3 to 6 metres in height are expected.

Gale Warning – A gale warning is issued when sustained winds in the range of 34 to 47 knots (61 to 87 km/h) are expected or waves 6 to 9 metres in height are expected.

Storm Warning – A storm warning is issued when sustained winds in the range of 48 to 63 knots (89 to 117 km/h) are expected or waves 9 to 16 metres in height are expected.

It is crucial to always check the marine weather forecast before venturing out on the water to ensure that you are not on the water during a weather warning, thus placing your vessel and its passengers at risk.

5.5 PREPARING AND FILING A SAIL PLAN

A sail plan (also often referred to as a float plan or a trip plan) is a voyage itinerary that should include the departure time, route of travel, duration of the trip, and basic details about you, your passengers, your vessel, and onboard equipment. These details will assist search and rescue personnel in the event of an emergency. Whether your planned outing is to last only a few hours or several days, filing a sail plan with a responsible individual remains one of your most important lifesaving tools.

Before heading out, all operators, especially of vessels not equipped with a VHF radio, should file a sail plan with a responsible, trusted person familiar with the instructions to follow in case of an emergency. If this is not possible, it can be filed with any Canadian Coast Guard Marine Communications and Traffic Services Centre by telephone, radio, or in person.

Be sure to close (deactivate) your sail plan by reporting to the sail plan holder that you have returned from your trip. This will prevent launching an unnecessary search and rescue mission.

A good sail plan (trip plan) should include the following information:

- Name and license number of your vessel;
- Your vessel's type (i.e. whether it is a sailboat or motorboat)
- Name, address, and telephone number of the operator;
- Number of persons on board;
- Size, type, and colour of the craft;
- Type of engine;
- Distinguishing features of the vessel;
- Type of radiotelephone, if any, and channel being monitored;
- List of safety equipment being carried onboard, including flares, lifejackets, and life rafts;
- Description of the trip, including time of departure, time of return, and the proposed route, and;
- Instructions (for the plan holder) in case of emergency. The person holding your sail plan should be instructed to contact the nearest Rescue Co-ordination Centre if you are overdue. Include the phone number of the rescue co-ordination centre in your instructions to the plan holder. The telephone number of the nearest centre can be found at the front of most telephone books.

A sample sail plan (trip plan) is provided on the next page.

SAMPLE SAIL PLAN

Owner's Name: _____

Address: _____

Telephone Number(s): _____ or _____

Vessel's Name and License Number: _____

Sail __ Power __ Type and Size: _____

Colour: Hull: _____ Deck: _____ Cabin: _____

Type of Engine: _____

Other Distinguishing Features: _____

Radio channel(s) monitored: HF _____ VHF _____ MF _____

Safety Equipment on board: _____

Raft, dinghy, or small boat on board (include colour): _____

Flares (include number and type): _____

Number of PFDs or lifejackets on board: _____

Date of departure: _____ Time of departure: _____

Leaving from: _____ Destination: _____

Proposed route: _____

Estimated time and date of return: _____

Stop-over point _____ Number of persons on board _____

Instructions to plan holder:
If we are more than two (2) hours late of our estimated time of return, please contact the local rescue co-ordination centre.

Telephone number of Rescue Co-ordination Centre: ( ) _____ - _____

5.6 BRIEFING ALL PERSONS ON BOARD

Before taking passengers out on the water, the operator of a pleasure craft should inform all persons on board about the following safety points:

1. **The location of personal flotation devices (PFDs and/or lifejackets);**
2. **The technique for putting on a PFD or lifejacket;**
3. **A technique for putting on a flotation device when one is in the water**;
4. **The importance of wearing a personal flotation device or lifejacket at all times (i.e.: insist that all on board wear their flotation devices). In addition, the operator and each guest should test their flotation device to ensure that they are familiar with the characteristics of the devices and that it will keep them afloat.**
5. **The location of all required safety equipment on board;**
6. **The location of the emergency first aid kit;**
7. **The importance of keeping oneself low in the boat, on the boat's centreline, and holding onto a rigid part of the boat while moving around on board;**
8. **The importance of keeping one's hands, arms, and legs inside the pleasure craft when approaching or leaving a dock or another vessel;**
9. **The effects of the motion of the pleasure craft, sunlight, waves, wind, sound, and alcohol on a person's reflexes, co-ordination, and senses;**
10. **The roles of all on board in the event of an emergency**; **and;**
11. **How to signal for help in the event of an emergency (e.g.: mobile phone, VHF radio, distress signals).**

A large number of boaters die each year simply because they either neglected to wear their flotation devices or wore them improperly. More alarming still is the fact that the majority of those who drown each year had flotation devices on board their craft but failed to wear them.

To prevent loss of life the operator of a pleasure craft should encourage all passengers to always wear a flotation device while onboard. **And if conditions deteriorate or an emergency situation develops, then the operator of the pleasure craft should insist that all on board should don flotation devices.**

5.7 USING REQUIRED SAFETY EQUIPMENT

The importance of having all required lifesaving equipment on board (and knowing how to use it) cannot be overemphasized. Thus, operators should demonstrate lifesaving equipment and provide safety instructions to their guests.

Both operators and guests should check the manufacturer's instructions on how to use lifesaving equipment so that they can respond rapidly and effectively in the event of an emergency.

All of a vessel's required safety equipment should be in good working order and located in readily accessible places on board the vessel.

Flotation Devices

The operator of a pleasure craft and all passengers should always wear their approved personal flotation devices or lifejackets to prevent drowning. A PFD or lifejacket should fit snugly (not tightly) and allow freedom of movement of arms and legs. **Lifejackets should be fitted slightly loose so that water can get under and lift the front of the lifejacket so that it can operate as designed to keep an unconscious person face-up in the water).**

The operator should also instruct passengers that PFDs and lifejackets should never be used as seat cushions, or as boat fenders, or in any other way that might damage them. Any damage to PFDs or lifejackets (such as a broken zipper, a rip, or puncture) voids their approved status (i.e. a damaged, repaired, or modified PFD is not an approved PFD).

The operator of a pleasure craft should take the following points into consideration when selecting PFDs or lifejackets:

1. **PFDs or lifejackets should fit snugly (not tightly) and allow freedom of movement for arms and legs;**

2. **A PFD or lifejacket should be appropriate to the size of the person who will wear it; that is, adult-sized flotation devices for adults and child-sized flotation devices for children;**

3. **The PFD or lifejacket selected should be appropriate for the type of water activity in which it will be used (specially designed PFDs or lifejackets are available for activities such as kayaking, sail-boarding, water-skiing, and white water rafting); and**

4. **Lifejackets should be designed to turn an unconscious person face up in the water**.

The operator should place special emphasis on the importance of wearing a PFD at all times while on board. Wearing a flotation device is the most important factor in preventing boating deaths.

Since some passengers will prefer not to wear their PFD, the operator should also instruct them on how a person can don a PFD while in the water. **A technique for donning a PFD while in the water should include the following steps:**

1. **Spread the PFD open so that it floats with the inside facing up;**
2. **Rotate the device so that you are looking at the end with the neck opening;**
3. **Extend both of your arms through the arm openings;**
4. **Lift your arms over your head;**
5. **Position the PFD around your body; and**
6. **Fasten it up so that it fits snugly.**

An All-Too-Common Misconception

It is incorrect to assume that it will be possible for you to locate and put on a flotation device once you have fallen into water, even if you are a very good swimmer. Here are some reasons why:

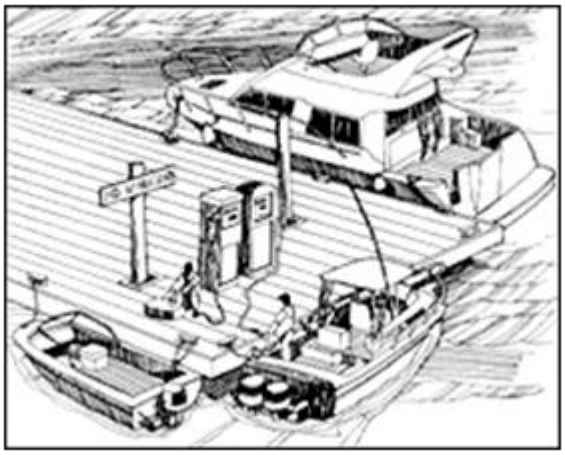
- Cold water temperatures will paralyze you and sap your strength rapidly;
- Wind and waves will hamper your search for a flotation device and will make it difficult to put the device on; and
- The flotation device may stay in the boat, away from your reach.

Ensure that you wear your flotation device at all times when on the water. **Even when within arm's reach, the device could still be far too far away in an emergency**.

5.8 FUEL SAFETY PRECAUTIONS

The following procedure is a step-by-step guide to follow when refuelling a pleasure craft fitted with a gasoline or diesel engine. Note: these steps are not only good common sense, they are the law:

1. **Moor the vessel securely to prevent spillage;**
2. **Shut off all engines;**
3. **Ensure that persons not involved in fuelling the craft go ashore;**
4. **Extinguish all open flames;**
5. **Ensure no-one smokes in the area while refuelling is in progress;**
6. **Turn off electrical switches; do not operate electrical devices;**
7. **Close all windows, portholes, hatches, and cabin doors;**
8. **Move portable tanks ashore before refilling them with fuel;**



Gasoline and diesel fuels are highly volatile and readily give off explosive vapours. A fuel tank that is empty of fuel is dangerous because it is full of explosive vapours given off by fuel residues in the tank. When you fill a portable fuel tank while it is still in a boat, vapours from inside the tank pour out of the top of the tank and, because these vapours are heavier than air, settle into the bottom of the cockpit and mix with air. One spark can ignite this fuel-air mixture, resulting in fire or an explosion. ***Never*** **fill a portable fuel tank while it is still in the boat**.

9. **Sparks must always be avoided when filling a fuel tank**. To prevent a spark while filling a tank, first touch the side of the tank with your hand before and while you insert the fuel-dispensing nozzle into the tank's fill inlet. This will prevent a spark from jumping between the fill opening and the dispenser. While the dispenser is in the tank opening, keep it grounded against the edge of the fuel tank opening. Maintain this contact as you withdraw the dispenser nozzle when you are finished filling the tank. Before withdrawing the nozzle completely, again touch the side of the tank with one hand while removing the nozzle with the other.

10. **Know the capacity of your fuel tank and do not overfill it. You have a duty to prevent the release of fuel into the hull or into the water;**

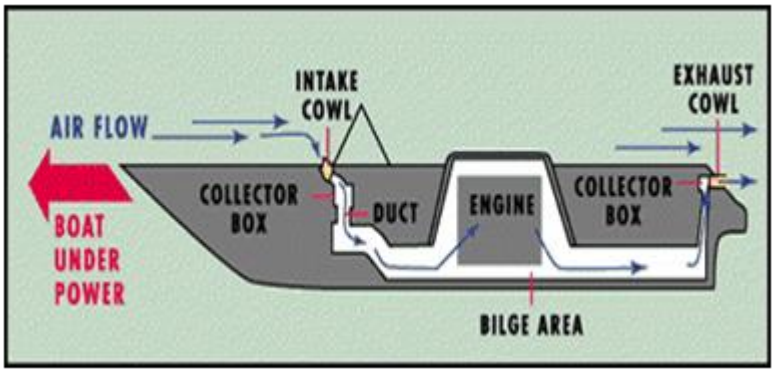
11. **Clean up any spillage;**

12. **Always operate the engine compartment ventilation blower for at least four (4) minutes immediately before starting a cold engine as well as before re-starting a hot engine; and**

13. **Always sniff the air to check for fuel vapours and odours before starting the engine.**

5.8.1 How to Start An Inboard Motor Safely

To prevent a build-up of explosive vapours, enclosed gasoline engine and fuel tank compartments must be fitted with a **blower** to remove fuel vapours before starting the engine. The boat must also be equipped with an **underway ventilation system** that ventilates the engine compartment without the aid of the blower while the vessel is moving. **Both the blower and the underway ventilation system must comply with the *Construction Standards for Small Vessels***.



If your vessel is equipped with a blower system, the *Small Vessel Regulations* (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-91/page-1.html) **require that it be operated for at least four (4) minutes immediately before every time you start the engine** to ensure the fuel concentration in the air in the engine compartment is below explosive levels (i.e.: less than 1.4%).

Once the engine is started, allow it to warm up. While you are waiting, check and pump your bilge and check your fuel gauge to verify that you have enough fuel for your trip. In addition, keep an eye on the water temperature gauge, voltmeter, and oil pressure gauge. The water temperature gauge reports the temperature of coolant water circulating in the engine and warns you if it is overheating. The voltmeter tells you the condition of the battery by indicating how long the battery is charging. The oil pressure gauge warns you of low oil pressure, which could damage the engine. You are ready to depart when the engine is warmed up and running smoothly.

5.8.2 Ignition Protection

Any pleasure craft operating in Canada that is powered by a gasoline engine or equipped with a propane-fueled device must be equipped with ignition-protected electrical devices (wiring, electrical coils, etc.). Ignition-protected devices are designed, constructed, and installed so that under normal conditions they will not create a spark that can ignite gasoline- or propane-rich fumes or vapours. This protection uses seals and flame arrestors to prevent sparks from escaping when the equipment is operating. Most Canadian ignition-protected components are labelled.

Only electrical devices that are equipped with components that are clearly labelled as "**Ignition Protected**" should be used on a pleasure craft equipped with a gasoline engine or propane-burning appliances.

Many older boats, recently refitted boats (and even newly constructed boats) have been found to be fitted with car or truck engines (which are not equipped with ignition-protected components).

If you are not sure that your vessels' engine is equipped with ignition-protected parts, then you should have it inspected and serviced by a certified marine technician. A certified marine technician can tell you if a replacement part (or work done to the engine) has compromised the engine's ignition protection, thus placing you at risk.

5.9 CARBON MONOXIDE POISONING

Fuel-burning engines and appliances can produce **carbon monoxide** as the result of the incomplete combustion of fossil fuels such as gasoline and diesel. Carbon monoxide (CO) is completely invisible to humans; it is colourless, odourless, and tasteless.

Condition – **Carbon monoxide is acutely toxic because it cripples the ability of the body's blood to absorb and transfer oxygen to body cells, leading to asphyxiation or suffocation.** Even at low concentrations, carbon monoxide can injure or kill those breathing it (a concentration of 1,000 ppm can cause unconsciousness after one (1) hour of exposure and death by asphyxiation occurs after four (4) hours). You can protect yourself by equipping your vessel with a standard, battery-operated carbon monoxide detector. Follow the manufacturer's instructions for locating, installing, and maintaining the detector.

Recognizing symptoms – Low levels of carbon monoxide poisoning can be confused with flu symptoms, food poisoning, or other illnesses and can have a long-term health risk if left unattended. Some of the symptoms are:

- Shortness of breath
- Mild nausea
- Mild headaches

Moderate levels of CO exposure can cause death if the following symptoms persist for a long period of time:

- Headaches
- Dizziness
- Nausea
- Light-headedness

High levels of CO can cause death within minutes.

Treatment - **Carbon monoxide poisoning is reversible; when exposure to carbon monoxide is discontinued, it is spontaneously released from the blood**. There are immediate measures you can take to help those suffering from carbon monoxide poisoning.

- Get the victim into fresh air immediately.
- If you cannot get the victim to fresh air immediately, then open all windows and doors. Any combustion appliances should be turned off.
- Take those who were subjected to carbon monoxide to a hospital emergency room as quickly as possible. A simple blood test will be able to determine if carbon monoxide poisoning has occurred.

If your pleasure craft has accommodations and is fitted with an inboard engine, a generator, or a fuel-burning appliance, then you should install a high-quality carbon monoxide detector close to where people will be sleeping.

Prevention Tips – To help protect yourself and others from carbon monoxide poisoning, always adhere to the following practices:

- Only idle your engine in well ventilated areas,
- Be aware that tail winds can easily carry carbon monoxide back on board
- Ensure that you only heat the cabin or cook with gas indoors when you are in well-ventilated areas,
- Check to ensure that any cabin extension and areas fitted with canvas tops are well ventilated.
- Install a carbon monoxide detector that is designed for marine use close to where people will be sleeping and check the CO detector's batteries before every trip.
- Ensure there is fresh air circulation in cabin areas even in inclement weather.
- Ensure that any enclosed space that contains fuel-burning engines, appliances or fuel is well ventilated.
- On vessels with enclosed gasoline engine and fuel tank compartments, ensure that the powered ventilation blower is operated for four minutes to ventilate the area before the engine is started.
- Be aware that CO can build up when:
  - Your powered pleasure craft is idling in poorly ventilated areas
  - Two powered vessels are tied to each other,
  - Your powered vessel is docked beside a seawall,
  - Your vessel load causes the bow to ride high in the water, or
  - A fuel-burning appliance or engine is running while your vessel is stationary.

Warning to Swimmers – Carbon monoxide is not just a risk for people on board a pleasure craft. People swimming in the water can be overcome by CO gas in only minutes and drown. To prevent this, always avoid swimming between houseboat pontoons, under swimming rafts, under diving platforms, or in any area or space where air circulation may be poor and where recently released engine exhaust gases may have been trapped.

Using Fuel-Burning Appliances

The propane and butane often used in fuel-burning appliances on boats must be treated with the utmost care and respect.

Propane and **butane**, like gasoline vapours, are heavier than air and will flow rapidly into the lower parts of your craft. These gases are extremely difficult to remove and they are highly explosive. **Thus, propane and butane are riskier to use than gasoline**. **To prevent accidents, always be sure to provide good ventilation when using a fuel-burning appliance with a pilot light**.

While on a boat, you should check regularly the condition of any open-flame heating, cooking, or refrigeration system that uses a gaseous fuel. **Verify that the installation complies with the manufacturer's recommended practices.**

To use propane and butane safely:

- Use a fuel-burning appliance only when in a well-ventilated area;
- Secure portable appliances and heaters so that a shift in the appliances position does not cause a gas leak;
- Secure gas cylinders and tanks in an area with good ventilation;
- Install all fuel-burning equipment by following the manufacturer's instructions; and
- Never leave an open-flame heating, cooking, or refrigeration system unattended.

End of Chapter 5

Chapter 5 Review Quiz

The questions included in the following quiz are not sample questions taken from actual tests. They are provided merely to acquaint you with the breadth and depth of knowledge required to pass a Transport Canada Boating Safety Test. Merely memorizing these questions and answers will not be adequate preparation to pass the Boating Safety Test; you must acquire an understanding of the material contained in all seven chapters of this free course. Every topic in this course is a potential test question.

QUESTIONS

1. **Describe how to bring bulky or heavy gear aboard a pleasure craft.**

2. **When should the operator check the overall mechanical condition of his or her pleasure craft?**

3. **When taking onboard gear (for camping, a day trip, or whatever), what is the primary consideration to take into account?**

4. **What risk is created when a pleasure craft is overloaded and sits lower in the water?**

5. **What risk is created when a pleasure craft is overpowered (equipped with a motor that is too large) or when a heavy load sits too high in the craft and raises its centre of gravity?**

6. **What items should be on your pre-departure checklist?**

7. **What is a good rule of thumb for estimating your fuel requirements?**

8. **What are some sources of weather information?**

9. **List the following Environment Canada weather terms in decreasing order of wind speed: moderate winds, strong wind warning, strong winds, light winds, gale warning, storm warning.**

10. **When is the best time to explain safety equipment and emergency procedures to your passengers?**
    a.) Verbally or in writing, a week before departing
    b.) On the boat, before leaving the dock
    c.) On the boat, while underway
    d.) On the boat, whenever an emergency occurs

11. Why is it a very good idea to file (leave a copy with a trusted, responsible person on shore) a sail plan?

12. What information should appear in a sail plan? With whom should the plan be filed?

13. Why should you be sure to close or deactivate a sail plan when the trip is completed?

14. Never use automotive parts to repair/modify a marine engine. Why?

15. Describe a safe procedure for fuelling a boat equipped with a portable fuel tank.

16. What are some potential sources of carbon monoxide (CO) gas on a boat?

17. What are some symptoms of CO (carbon monoxide) poisoning?

18. How should one aid a person apparently suffering from CO poisoning?

19. When boarding a small (unstable) boat from a dock or low pier:

a.) step onto the bow of the boat
b.) step into the centre of the boat
c.) step onto the side of the boat
d.) jump into the boat

20. A pleasure craft is less stable and more likely to capsize when:

a.) overloaded or overpowered
b.) its load is kept low and evenly distributed
c.) it is empty
d.) it is in deep water

21. Describe a good practice to follow when starting a craft equipped with an inboard motor.

ANSWERS

1. Place bulky or heavy on the dock where you can reach it from in the boat.

2. The overall condition of your pleasure craft should be assessed and repair and maintenance executed as part of a pre-season check annually. In addition, before every trip a pre-departure check should be made as per the checklist provided in Section 4.3.

3. The primary consideration to consider when loading gear onto a craft is to always remember to keep the load's centre of gravity as low as possible in the hull. The next consideration to secure the load it to keep it from shifting or getting underfoot. And always obey your craft's compliance notice: do not carry a load greater than allowed according to your vessel's Compliance Notice.

4. An overloaded pleasure craft will sit lower in the water than normal and as a result it will be much more prone to being swamped and sinking.

5. A pleasure craft is less stable and more likely to capsize when it is overloaded or overpowered. Always remember to keep the load's centre of gravity as low as possible and to secure it to keep it from shifting. Keeping the centre of gravity of your vessel low is your primary consideration. Next, you need to ensure that gear on board is lashed down and stored out of the way (not underfoot, creating a tripping hazard).

6. See pre-departure checklist outlined in Section 4.3.

7. A good rule of thumb is that one-third of the fuel on board will be enough for the trip out, one-third will be enough for the return trip, and one-third will be left over as a reserve.

8. Weather forecasts can be obtained from a number of sources, including:
   - Your own personal observations;
   - Newspapers;
   - Radiotelephones;
   - Local Environment Canada information lines;
   - Radio channels 21B, 25B, and 83B (Atlantic Coast and the Great Lakes);
   - Radio channels 21B, WX1, WX2, and WX3 on the Pacific Coast;
   - In Vancouver, Toronto, Montreal, and Halifax VHF broadcasts from Weather Radio Canada (a service of Environment Canada);
   - Via the Internet at: https://weather.gc.ca/canada_e.html;
   - Regular AM and FM radio weather forecasts; and
   - Television weather channels and telephone weather services.

9. In decreasing order of wind speed: warnings - storm warning, gale warning, strong wind warning, and wind speeds - strong winds, moderate winds, light winds.

10. b.) On the boat and before departure. Before taking passengers out on the water, the operator should provide passengers with an on-board, pre-departure safety briefing that covers the points outlined in Section 4.6.

11. Filing a trip plan (leaving a copy of your route and itinerary with a responsible person) provides crucial information to people mounting a rescue effort to find you in case you get into trouble and become overdue. Without a filed plan, who is to know when you are overdue? Or when to become concerned?

12. The information in a sail plan (trip plan) should include the type, size and colour of your craft; equipment on board; number of people on board; description of the trip itinerary; and instruction in case of an emergency. You do not take the plan with you or put it in a drawer; it must be filed (i.e.: you must give it to someone you trust to verify that you have returned and (if you do not return) to take prompt action to alert the nearest rescue co-ordination centre).

13. It is crucial to close (deactivate) your sail plan by reporting to the sail plan holder that you have returned from your trip. This will prevent them launching an unnecessary search.

14. Any pleasure craft operating in Canada that is powered by a gasoline engine or equipped with a propane-fuelled device must be equipped with ignition-protected electrical devices (wiring, electrical coils, etc.).Ignition-protected devices are designed, constructed, and installed so that under normal conditions they will not create a spark that can ignite gasoline- or propane-rich fumes or vapours. This protection uses seals and flame arrestors to prevent sparks from escaping when the equipment is operating. Automotive parts do NOT incorporate this protection.

15. Remove the tank from the boat and refuel it onshore. Never refuel a portable fuel tank while it is in a boat.

16. Fuel-burning engines and appliances can produce carbon monoxide as the result of the incomplete combustion of fossil fuels such as gasoline and diesel. Carbon monoxide (CO) is completely invisible; it is colourless, odourless, and tasteless.

17. Typical symptoms of CO poisoning are mild headaches, nausea, and fatigue.

18. Take the following steps to aid a person apparently suffering the effects of carbon monoxide (CO) poisoning:
    - Get the victim into fresh air immediately.
    - If you cannot get the victim to fresh air immediately, then open all windows and doors. Any combustion appliances should be turned off.

- Take those who were subjected to carbon monoxide to a hospital emergency room as quickly as possible. A simple blood test will be able to determine if carbon monoxide poisoning has occurred.

19. b.)

20. a.)

21. Run the engine compartment's ventilation blower for 4 minutes before starting the motor.