

Vessel Maintenance and Repair

Environmental Concerns

Legal Setting

- Industrial Permit for Discharges from Marinas

Best Management Practices to Control Pollution from Vessel Maintenance and Repair Activities

- Designate Work Areas
- Contain Dust from Sanding
- Contain Debris from Blasting
- Minimize Impacts of Pressure Washing
- Minimize Impacts of Paints
- Minimize Impacts of Painting Operations
- Reduce Overspray
- Handle Solvents Carefully
- Repair and Maintain Engines with Care
- Winterize Safely
- Conduct In-Water Maintenance Wisely
- Educate Boaters

Information Sources

- Clean Boating Tip Sheet: Vessel Cleaning and Maintenance



Vessel Maintenance and Repair

Environmental Concerns

Vessels require a great deal of attention. They must be scraped, painted, and cleaned. Their engines need to be lubricated and otherwise tended. They need to be prepared to withstand the cold of winter. Each of these activities has the potential to introduce pollutants into the environment.

Sanding, blasting, and pressure washing are meant to remove paint and marine growth. In the process, toxic heavy metals such as copper and tin may be released. If heavy metals find their way into the water, they may be consumed by mussels, worms, and other bottom-dwelling creatures and passed up the food chain to fish, birds, and humans. Heavy metals that are not incorporated into living tissue will remain in the sediments where they will substantially increase the cost of dredge soil disposal.

Paints, solvents, thinners, and brush cleaners generally are toxic and may cause cancer. If spilled, they may harm aquatic life and water quality. Additionally, the fumes — known as volatile organic compounds (VOCs) — released by some paints and solvents contribute to air pollution. Likewise, oil and grease from maintenance areas threaten aquatic life.

Many of the cleaning products meant to be used in boat shops are also toxic. Many contain caustic or corrosive elements. They may also contain chlorine, phosphates, inorganic salts, and metals. Even non-toxic products are harmful to wildlife. For example, detergents found in many boat cleaning products will destroy the natural oils on fish gills, reducing their ability to breathe.

Legal Setting

Industrial Permit for Discharges from Marinas

As described previously, all marinas that perform vessel maintenance and repair (including washing) must obtain an industrial permit from the Texas Natural Resources Conservation Commission (TNRCC). The permit requires marina operators to control pollutants from vessel maintenance and wash areas.

Best Management Practices to Control Pollution from Vessel Maintenance and Repair Activities

The BMP's noted in this chapter are meant to assist marinas in

reducing the amount of pollutants discharged or released from the facility. Complying with these practices/recommendations does not necessarily place a marina in full compliance with all Texas environmental regulations. Marina owners should be aware that additional air regulations may apply to their facility if certain activities are conducted on-site. Some of the more common activities that are regulated include painting (spray or brush), sandblasting, fiberglass work, degreasing and oil water separation. Some of the larger operations may require a state permit or authorization to operate under a Standard Exemption which may be found in 30TAC Chapter 116 (Texas Administrative Code). In addition, certain activities that create VOC emissions may also have to comply with 30TAC Chapter 115. For further assistance with any activity that is believed to create air contaminants, or to obtain a copy of the pertinent regulations that apply to your marina, please contact your regional TNRCC air program. In addition, the generation of waste materials such as paint chips, spent sandblasting material or hydrocarbon/solvent contaminated waste may fall under the TNRCC's hazardous waste regulations. Marina owners should again contact their TNRCC regional office for further assistance in disposing of this waste material.

Designate Work Areas.

One of the easiest ways to contain waste is to restrict the area where maintenance activities may be performed. Wastewater from the maintenance and repair area may contain highly toxic materials resulting from the removal and application of anti-fouling paints, small quantities of glass fibers, chemicals, metals, grease, fuel and oils. This wastewater should not be allowed to flow into the marina or coastal waters. A curbed, concrete surface should prevent this and contain the liquid which drains to the catch basin, or the wastewater can be pumped to a storage tank to allow for the toxic materials to settle out over time.

- Perform all major repairs - such as stripping, fiberglassing, and spray painting — in designated areas.
- Collect all maintenance debris. Clean work areas after completing each operation or at the end of the day - whichever comes first. Remove sandings, paint chips, fiberglass, trash, etc.
- Locate the maintenance area as far from shore as possible.
- Vessel maintenance areas should have an impervious surface (e.g., asphalt or cement) and, where practical, a roof. Sheltering the area from rain will prevent stormwater from carrying debris into surface waters.

- If asphalt or cement is not practical, perform work over filter fabric or over canvas or plastic tarps. Filter fabric will retain paint chips and other debris yet — unlike plastic, or to a lesser extent, canvas — filter fabric will allow water to pass through. Tarps may potentially be re-used multiple times.
- Surround the maintenance area with a berm or retaining wall. If possible, the surface of the maintenance area should have a gentle slope towards drains that can be filtered with hay, or other filtration methods, rather than “sheet draining” into the neighboring body of water.
- Use vegetative or structural controls cited in Stormwater Management to treat stormwater runoff.
- Establish a schedule for inspecting and cleaning stormwater systems. Remove paint chips, dust, sediment, and other debris. Clean oil/water separators.
- Prohibit extensive maintenance or repair work outside of the designated maintenance areas.
- Clearly mark the work area with signs, e.g., “Maintenance Area for Stripping, Fiberglassing and Spray Painting.”
- Post signs throughout the boatyard describing best management practices that boat owners and contractors must follow, e.g., “Use Tarps to Collect Debris.”
- Develop procedures for managing requests to use the work space, to move boats to and from the site, and to insure the use of best management practices.

Contain Dust from Sanding.

- Invest in vacuum sanders and grinders. These tools, when operating efficiently, will collect dust as soon as it is removed from the hull. Vacuum sanders allow workers to sand a hull more quickly than with conventional sanders. Additionally, because paint is collected as it is removed from the hull, health risks to workers are reduced. Vacuum sanders, like any other equipment, is subject to variables in performance. New technology should improve the performance of these sanders.
- Require tenants and contractors to use vacuum sanders. Rent or loan the equipment to tenants and contractors.
- Post signs indicating the availability of vacuum sanders and grinders.
- Bring vacuum sanders to tenants if you see them working with non-vacuum equipment.

- Conduct shore side sanding in the hull maintenance area or over a drop cloth.
- Restrict or prohibit sanding on the water to the greatest extent practical.
- When sanding on the water is unavoidable, use a vacuum sander and keep dust out of the water.
- Use a damp cloth to wipe off small amounts of sanding dust.
- Collect debris. Have your waste hauler characterize the waste and take it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is less than 220 pounds per month or less than this amount is accumulated at any time. Refer to TNRCC manual on Industrial and Hazardous Waste: Rules and Regulations for Small-Quantity Generators.

Contain Debris from Blasting.

- Prohibit uncontained blasting (during sand blasting or hydro blasting activities).
- Perform abrasive blasting in the vessel maintenance area within a structure or under a plastic tarp enclosure. Do not allow debris to escape from the enclosure. Refer to Standard Exemption 102.
- Investigate alternatives to traditional media blasting. Hydroblasting and mechanical peeling essentially eliminate air quality problems. Debris must still be collected, however. Consider using a filter cloth ground cover.
- Avoid dust entirely by using a stripper that allows the paint to be peeled off. These products are applied like large bandages, allowed to set, and are then stripped off. When the strips are removed, the paint is lifted from the hull. Dust and toxic fumes are eliminated.
- Invest in a closed, plastic medium blast (PMB) system. These systems blast with small plastic bits. Once the blasting is completed, the spent material and the paint chips are vacuumed into a machine that separates the plastic from the paint dust. The plastic is cleaned and may be reused. The paint dust is collected for disposal. A 50-foot vessel will produce about a gallon of paint dust; substantially less than the many barrels full of sand and paint that must be disposed of with traditional media blasting methods.
- Collect debris. Have your waste hauler characterize the waste

and bring it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is less than 220 pounds per month or less than this amount is accumulated at any time.

Minimize Impacts of Pressure Washing.

- Visible solids must be removed from wash water before it may be discharged. At a minimum, allow large particles to settle out. More thorough treatment involves filtration or chemical or physical techniques to treat the rinse water.
 - filtration uses devices such as screens, filter fabrics, oil/water separators, sand filters, and hay bales to remove particles;
 - chemical treatment relies upon the addition of some type of catalyst to cause the heavy metals and paint solids to settle out of the water; and
 - swirl concentrators are examples of physical structures that can be used to concentrate pollutants. They are small, compact soil separation devices with no moving parts. Water flowing into a concentrator creates a vortex that centralizes the pollutants. Clean water is then discharged.
- Discharge treated wash water to surface water if no detergents or other chemical cleaning agents were used. If detergents were used, the wastewater must be directed into a sewer system.
- Alternatively, reuse the wash water. For example, recycle it through the power washing system (a closed water recycling operation) or use it to irrigate landscaped portions of the marina. The recycled water may be treated with an ozone generator to reduce odors.
- Pressure wash over a bermed, impermeable surface that allows the wastewater to be contained and filtered to remove sediments.
- When pressure washing ablative paint, use the least amount of pressure necessary to remove the growth but leave the paint intact. Where practical, use a regular garden-type hose and a soft cloth.
- Collect debris. Have your waste hauler characterize the waste and take it to a facility authorized to manage municipal or industrial solid waste, provided that, if the waste is hazardous, the amount generated is less than 220 pounds per month or less than this amount is accumulated at any time.

Operators must “consider containing all blasting and painting activities to prevent abrasives, paint chips, and overspray from reaching the receiving water or the storm sewer system.”

Bottom Paints

Antifouling bottom paints protect hulls from barnacles and other types of fouling organisms that can interfere with vessel performance. Pesticides within them also harm fish and other non-target species. Most paints work by slowly releasing a biocide, generally cuprous oxide (Cu_2O).

Copper-based paints are not used on aluminum hulls; the interaction of copper and aluminum leads to corrosion. Instead, tin-based paints (tributyltin or TBT) are often used on aluminum-hulled vessels. Because tin is extremely toxic, it must be applied cautiously. Concentrations of TBT as low as a few parts per trillion have caused abnormal development and decreased reproductive success in oysters, clams, and snails (EPA 1993). Tin is easily absorbed by fish through their gills and accumulates to high levels in sediments. For these reasons, Federal law restricts the use of tin-based paints to aluminum vessels, boats larger than 82 feet (25 meters), and outboard motors and lower drive units. Any boatyard operator wishing to apply TBT paints must obtain a pesticide business license from the Texas Department of Agriculture and employ an applicator certified to apply TBT.

The Industrial Permit for Discharges from TNRCC requires that discharge from pressure washing areas be collected or contained and that visible solids be removed.

Anti-fouling paints can be separated into three general categories:

Leaching Paints. Water soluble portions of leaching antifouling paints dissolve slowly in water, releasing the pesticide. The insoluble portion of the paint film remains on the hull. The depleted paint film must be removed before the boat is repainted. Most leaching paints are solvent based. Consequently, fumes are a concern.

Ablative Paints. Ablative antifouling paints also leach some toxicant into the water. The major difference is that as the active ingredient is leached out, the underlying film weakens and is polished off as the boat moves through the water. As the depleted film is removed, fresh antifouling paint is exposed. There are several water-based ablative paints on the market that are up to 97 percent solvent free. As a result, levels of volatile organic compounds are substantially reduced as compared to solvent-based paints. Ease of clean up is another advantage of water-based paints.

Non-toxic Coatings. Teflon, polyurethane, and silicone paints are nontoxic options. All deter fouling with hard, slick surfaces.

Minimize Impacts of Paints.

- Recommend antifouling paints which contain the minimum amount of toxin necessary for the expected conditions to your customers.
- Avoid soft ablative paints.
- Use water-based paints whenever practical.
- Stay informed about antifouling products, like Teflon, silicone, polyurethane, and wax, that have limited negative impacts. Pass the information along to your customers.
- Store boats out of the water, where feasible, to eliminate the need for antifouling paints.

Minimize Impacts of Painting Operations.

- Use brushes and rollers whenever possible.
- Reduce paint overspray and solvent emissions by minimizing the use of spray equipment.
- Prohibit spray painting on the water.
- Limit in-water painting to small jobs. Any substantial painting should be done on land, in the vessel maintenance area, and/or over a ground cloth.
- If painting with brush or roller on the water, transfer the paint to the vessel in a small (less than one gallon), tightly covered container. Small containers mean small spills.
- Mix only as much paint as is needed for a given job.
- Mix paints, solvents, and reducers in a designated area. It should be indoors or under a shed and should be far from the shore.
- Keep records of paint use to show where too much paint was mixed for a job. Use the information to prevent overmixing in the future.

Reduce Overspray.

In some cases, spray painting is the only practical choice in terms of time and money. Minimize the impact of spray painting by adopting the following recommendations. Refer to TAC Rule 106.433 (previously SE 75).

- Conduct all spray painting on land, in a spray booth, or under a tarp.
- Use equipment with high transfer efficiency. Tools such as high-volume, low-pressure (HVLP) spray guns direct more paint onto the work surface than conventional spray guns. As a result, less paint is in the air, less volatile organic compounds are released, less paint is used, and clean up costs are reduced. Air-atomizer

spray guns and gravity-feed guns are other types of highly efficient spray equipment.

- Train staff to use spray painting equipment properly in order to reduce overspray and minimize the amount of paint per job. To operate a permanent paint spray booth, you must obtain an air permit from the TNRCC. Note — a booth constructed of PVC piping and plastic sheeting is not considered a permanent structure.

Handle Solvents Carefully.

Refer to Waste Containment and Disposal for further information about requirements for handling, storing, and transporting hazardous wastes.

- Store open containers of usable solvents as well as waste solvents, rags, and paints in covered and approved containers.
- Hire a licensed waste hauler to recycle or dispose of used solvents.
- Direct solvent used to clean spray equipment into containers to prevent evaporation of volatile organic compounds. A closed gun cleaning system will save you money on cleaning materials.
- Use only one cleaning solvent to simplify disposal.
- Use only the minimal amount of solvent (stripper, thinner, etc.) needed for a given job.
- For small jobs, pour the needed solvent into a small container in order not to contaminate a large amount of solvent.
- Use soy-based solvents and other similar products with no or low volatility.
- Order your spray painting jobs to minimize coating changes. Fewer changes mean less frequent purging of the spray system. Order your work light to dark.
- Allow solids to settle out of used strippers and thinners so you can reuse solvents.
- Keep records of solvent and paint usage so you have a handle on the amount of hazardous waste generated on site. You are required to maintain these types of records if you have a permanent, TNRCC-approved spray booth. Again, refer to 30 TAC 106.433 and Chapter 115 - subchapter E on solvent using processes.

Repair and Maintain Engines with Care.

- Store engines and engine parts under cover on an impervious surface like asphalt or concrete.

- Do not wash engine parts over the bare ground or water.
- Use dry precleaning methods, such as wire brushing.
- Avoid unnecessary parts cleaning.
- Adopt alternatives to solvent-based parts washers such as bioremediating systems that take advantage of microbes to digest petroleum. Bioremediating systems are self contained; there is no effluent. The cleaning fluid is a mixture of detergent and water. Microbes are added periodically to “eat” the hydrocarbons.
- If you use a solvent to clean engine parts, do so in a container or parts washer with a lid to prevent evaporation of volatile organic compounds. Reuse the solvent. Once the solvent is totally spent, recycle it.
- Use drip pans when handling any type of liquid. Use separate drip pans for each fluid to avoid mixing. Recycle the collected fluid.
- Use funnels to transfer fluids.
- Drain all parts of fluids prior to disposal.
- Clean engine repair areas regularly using dry cleanup methods, e.g., capture petroleum spills with oil absorbent pads.
- Prohibit the practice of hosing down the shop floor.

Winterize Safely.

- Use propylene glycol antifreeze for all systems. It is much less toxic than ethylene glycol antifreeze.
- Use the minimum amount of antifreeze necessary for the job.
- For health reasons, ethylene glycol should never be used in potable water systems; it is highly toxic and cannot be reliably purged come springtime.
- Add stabilizers to fuel to prevent degradation. Stabilizers are available for gasoline and diesel fuels and for crankcase oil. These products protect engines by preventing corrosion and the formation of sludge, gum, and varnish. Also, the problem of disposing of stale fuel in spring is eliminated.
- Be sure fuel tanks are 85 to 90 percent full to prevent flammable fumes from accumulating and to minimize the possibility of condensation leading to corrosion. Do not fill the tank more than 90 percent full. The fuel will expand as it warms in the springtime; fuel will spill out the vent line of a full inboard tank.
- Use the highest rated octane recommended by the engine

The TNRCC requires that marinas prevent or minimize contamination of stormwater runoff from all areas used for engine maintenance and repair. It further requires that spill prevention and response procedures be developed for all areas where spills can contribute to stormwater discharge.

manufacturer; premium fuels are more stable than regular.

- Be sure the gas cap seals tightly.
- Promote reusable canvas or recyclable plastic covers. Some manufacturers will clean and store canvas covers during the boating season.
- Recycle used plastic covers.

Conduct In-water Maintenance Wisely.

- If the impacts of cleaning or maintenance activities (regardless of area involved) cannot be contained or mitigated against, remove the boat from the water. No debris should be allowed to fall into the water.
- Keep containers of cleaning and maintenance products closed.
- Restrict or prohibit sanding on the water. When it is absolutely necessary to sand on the water, use vacuum sanders to prevent dust from falling into the water. Do not sand in a heavy breeze.
- Plug scuppers to contain dust and debris.
- Do not spray paint on the water.
- Prohibit underwater hull cleaning in your facility. Given the concentration of boats, underwater cleaning is dangerous to divers and the heavy metals that are released are harmful to aquatic life. Insurance to cover divers is also expensive.
- Offer incentives, like reduced mid-season haul out rates, so that boaters can have their hulls cleaned on land where contaminants may be contained.

Educate Boaters.

- Copy the following Clean Boating Tip Sheet and distribute it to your tenants. There is room to add the name and logo of your marina.
- Find out about local hazardous waste collection days. Call 1-800-4-RECYCLE or visit www.glo.state.tx.us/Recycling for local recycling contacts. Post notices informing your tenants when and where they can take their hazardous wastes.

Information Sources

Texas Department of Agriculture

Texas Natural Resource Conservation Commission

- Air Quality Permits Program
- Industrial Permits Division

Clean Boating Tip Sheet

Vessel Cleaning and Maintenance

As a boater, you are well aware of the care your vessel requires. In order to keep your boat safe, reliable, and attractive, you must clean and maintain it. As you do so, minimize environmental impacts by following the recommendations listed here.

Caution is necessary because your choice of products and activities can have serious impacts on water quality and aquatic life. For example, if paint chips from a hull are not contained, they may end up in the water. The heavy metals in the paint chips may then be consumed by mussels, worms, and other bottom-dwelling creatures and passed up the food chain to fish, birds, and humans.


Clean Carefully

- Wash frequently with a sponge or nonabrasive pad and plain water. This approach is very effective at removing salt. Additional “elbow-grease” is required to remove stains.
- When detergents are necessary, use soaps that are phosphate-free, biodegradable, and non-toxic. Any soap should be used sparingly because even non toxic products can be harmful to wildlife. For example, detergents will destroy the natural oils on fish gills, limiting their ability to breathe.
- Wax your boat, if appropriate. A good coat of wax prevents surface dirt from becoming ingrained.
- Clean teak with a mild soap and abrasive pads or bronze wool. This method is safe for the environment and better for the boat than the solvents in standard teak cleaners which tend to eat away at the wood and to damage seam compounds.
- Avoid detergents that contain ammonia, sodium hypochlorite, chlorinated solvents (bleach), petroleum distillates, and lye.
- Try some of the alternative cleaning products listed below.

Maintain Mindfully

- Collect all paint chips, dust, and residue. Dispose in regular trash.
- Share leftover paint and varnish.
- Use less toxic propylene glycol antifreeze.
- Avoid overkill. Select a bottom paint developed for the Gulf Coast region.

Recycle Regularly

- 
- Recycle used oil, oil filters, and antifreeze.
 - Bring used solvents and waste gasoline to local hazardous waste collection days.
 - Call 1-800-4-RECYCLE for locations of recycling centers and information about hazardous waste collection days.
 - Visit the TNRCC and GIO web site at www.glo.state.tx.us/Recycling and www.tnrcc.state.tx.us/exec/sbea/recyclingmain.html for local recycling and hazardous waste contacts. Information is also available at www.1800.cleanup.org

Be a Conscientious Consumer

- Read product labels. Labels convey information about the degree of hazard associated with a particular product. For example, DANGER equates to extremely flammable, corrosive or toxic; WARNING indicates that the material is moderately hazardous; and CAUTION signals a less hazardous product. Select products that contain no warnings or which merely CAUTION consumers.
- Be wary of unqualified general claims of environmental benefit, e.g., "ozone friendly." A better, more meaningful label would read, "This product is 95 percent less damaging to the ozone layer than past formulations that contained chlorofluorocarbons (CFCs)."