

VESSEL MAINTENANCE AND REPAIR

Environmental Concerns

Many common maintenance activities have the potential to introduce pollutants into the environment. Sanding, blasting, and pressure washing used to remove paint and aquatic growth can release toxic heavy metals, such as copper and tin. If heavy metals find their way into the water, they may be consumed by 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 may substantially increase the disposal cost of any dredged material.

Paints, solvents, thinners, and brush cleaners generally are toxic. 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 for use in boat shops are also toxic and contain caustic or corrosive elements. They may also contain chlorine, phosphates, inorganic salts, and metals. Even non-toxic products can be harmful to wildlife. For example, detergents found in many boat-cleaning products will destroy the natural oils on fish gills, reducing their ability to take up oxygen.

Laws and Permits

Antifouling Paints

The Illinois Pesticide Act (415 ILCS 60) requires marinas that apply antifouling paints to boats to follow certain licensing and certification regulations. These requirements differ depending on whether the marina is applying the antifouling paints in a for-hire status and whether the paint is a restricted-used product. In Illinois, antifouling paints containing tributyl tin are classified as a restricted-use pesticide. The federal Organotin Antifouling Paint Control Act (OAPCA) also restricts the use of tin-based paints on aluminum vessels, boats larger than 82 feet (25 meters), outboard motors, and lower drive units.

Marinas that apply antifouling paint for-hire need a commercial pesticide applicator license. In addition, the person(s) applying the antifouling paint would need to be a certified pesticide applicator in the antifouling paint category and be licensed as an individual commercial pesticide applicator for-hire. This is required regardless of whether the antifouling paint contains a restricted-use or nonrestricted-use pesticide.

A pesticide applicator license is not required for people to apply

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a non-restricted pesticide to their boat or a boat owned by their employer. However, a person must be certified as a pesticide applicator in the antifouling paint category and be licensed as an individual commercial applicator to apply a restricted-use pesticide. Businesses do not need to obtain a commercial pesticide applicator license for employees to be able to apply antifouling paint to a boat owned by the business.

For more information on the certification process, visit www.agr.state.il.us/Environment/Pesticide/training/commappl.html.

Best Management Practices for Vessel Maintenance and Repair

Marinas that provide maintenance and repair services should implement the practices described in this chapter to control pollution caused by common maintenance activities. Where boaters are allowed to perform their own maintenance work, marina personnel should encourage them to follow relevant procedures as well.

Work Areas

One of the easiest ways to control waste and runoff pollution is to restrict the area where the maintenance activities may be performed.

- ✓ Require marina personnel and boaters to perform all major repairs, such as stripping, fiberglassing, and spray painting, in designated areas as far away from the water as possible.
- ✓ Prohibit maintenance or repair work outside of designated maintenance areas.
- ✓ Clearly mark the work area with signs, such as “Maintenance Area for Stripping, Fiberglassing, and Spray Painting.”
- ✓ Locate boat maintenance areas for new marinas upland of a 100-foot shoreline buffer zone.
- ✓ Locate boat maintenance areas on an impervious surface where debris can be collected easily and, where practical, under a roof. Sheltering the area from rain will prevent stormwater from carrying debris into surface waters.
- ✓ Perform work over filter fabric, canvas, or plastic tarps if asphalt, cement, or other impervious surfaces are not practical. Filter fabric will retain paint chips and other debris while still allowing water to pass through. Tarps may potentially be reused.
- ✓ Surround maintenance areas on impervious surfaces with a berm or retaining wall to contain waste and spills. This practice is not recommended for pervious surfaces, as it would promote ponding and infiltration of



contaminated water.

- ✓ Clean work areas after completing each operation or at the end of the day, whichever comes first. Remove sanding dust, paint chips, fiberglass, and trash.
- ✓ Ensure that stormwater runoff from other areas does not flow over the maintenance area.
- ✓ Use vegetative or structural controls described in the Stormwater Management chapter to treat stormwater runoff.
- ✓ Place a screen or filter fabric over storm drain grates to collect paint chips and other debris.
- ✓ Establish a schedule for inspecting and cleaning stormwater systems. Remove paint chips, dust, sediment, and other debris. Clean oil/water separators.
- ✓ Post signs in the boatyard describing BMPs that boat owners and contractors must follow, such as “Use Tarps to Collect Debris.”
- ✓ Distribute your environmental policy to boaters.
- ✓ Develop procedures for managing requests to use the work space, to move boats to and from the site, and to ensure the use of BMPs.

Boat and Equipment Washing

Wastewater from equipment washing can contain contaminants like detergents, oils, dirt, solvents, and other chemicals that can flow into nearby rivers and lakes if not properly managed. Marinas can reduce the need for a NPDES Permit of Industrial Storm Water for washing activities (see the Stormwater Management chapter for additional information) by adopting the following practices:

- ✓ Require personnel and boaters to wash boats and equipment in designated areas away from the shoreline.
- ✓ Locate washing facilities on a permeable surface, such as grass or gravel. If a permeable surface is not possible, ensure that washing is done in a contained area where the wash water can be collected and treated, such as a bermed, impermeable surface.
- ✓ Direct water containing solids and particulates to a seepage



area, such as a vegetative buffer, so that solids are trapped by the soil.

- ✓ Remove collected solids from settling and filtration areas periodically to ensure continued settling and filtration capacity and to prevent solids from being carried into surface waters.
- ✓ Use devices such as compost socks, screens, filter fabrics, oil/water separators, sand filters, and hay bales to remove particles from water discharged directly to surface waters.
- ✓ Prohibit personnel and boaters from washing engine parts at a boat washing station.
- ✓ Prohibit the use of cleaners that contain ammonia, phosphates, petroleum distillates, sodium hypochlorite, or chlorinated solvents (415 ILCS 5/12).
- ✓ Use cleaning products that are non-toxic and phosphate free. Always follow the instructions on the label and test the product in an inconspicuous area. Beware of biodegradable products that may cause water-quality problems.
- ✓ Use products sparingly and only when “elbow-grease” is not working.
- ✓ Keep boats waxed to make it easier to clean and prevent surface dirt from becoming ingrained in the hull.
- ✓ Use the least amount of pressure necessary to remove growth but still leave the paint intact when pressure washing ablative/antifouling paint. Use a regular garden-hose and a soft cloth where practical.
- ✓ Reuse 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.
- ✓ Use alternative cleaning techniques, such as:
 - ♦ Chemical treatments that rely on the addition of some type of catalyst to cause the heavy metals and paint solids to settle out of the water.
 - ♦ Physical treatments that can be used to concentrate pollutants, such as swirl concentrators. These are small, compact soil separation devices with no moving parts that discharge clean water. The process will only remove large particulate material.

Solvents

Refer to the Waste Contaminant and Disposal chapter for more

information about requirements for handling, storing, and transporting hazardous wastes.

- ✓ Store containers of usable solvents, as well as waste solvents, rags, and paints, in covered, UL-listed approved containers.
- ✓ Use one cleaning solvent to simplify disposal.
- ✓ Use the minimum amount of solvent needed for a given job.
- ✓ Direct solvents used to clean spray equipment into containers to prevent evaporation of volatile organic compounds. A closed gun cleaning system will reduce cleaning material costs.
- ✓ Pour solvents into containers that are the appropriate size for the job. This practice will prevent the contamination of a large amount of solvent.
- ✓ Use citrus-based solvents and other products with no or low volatility.
- ✓ Plan 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 know the amount of hazardous waste generated on-site (35 IAC 722).
- ✓ Hire a permitted and registered hazardous waste hauler to recycle or dispose of used solvents.

Compound Waxing

- ✓ Check all product material safety data sheets (MSDSs) and purchase products that are non-hazardous.
- ✓ Conduct compounding and waxing away from the water.
- ✓ Use phosphate-free, biodegradable, and non-toxic soap when prepping a hull, if possible. When removing tough stains, use only as much stain remover as necessary, or use a more abrasive rubbing or polishing compound.

Fiberglassing

- ✓ Minimize waste by working with small batches of resin.
- ✓ Avoid putting liquid hardener in the trash. It can spontaneously combust when mixed with sawdust and other materials.

- ✓ Store acetone appropriately. Refer to the Waste Containment and Disposal chapter for more information on handling, storing, and disposal requirements.

Teak Refinishing

- ✓ Avoid teak cleaners containing acids or those labeled as caustic, corrosive, or acidic. These cleaners can be toxic to marine life when spilled in water.
- ✓ Clean teak with a mild, phosphate-free detergent and bronze wool, if possible.
- ✓ Refinish teak in an upland maintenance area, if possible. If not, use safer cleaners and avoid flushing excess teak cleaner and teak oil into the marina basin.
- ✓ Consider selling environmentally friendly cleaning and maintenance products.
- ✓ Use a dustless or vacuum sander when sanding teak.

Varnishing

- ✓ Mix only as much varnish as is needed for a job.
- ✓ Consider sharing leftover varnishes with customers or setting up an exchange area for customers to swap unused items.
- ✓ Use less hazardous, water-based varnishes that pose less threat to human health or the environment.
- ✓ Clean up if varnish spills on land with absorbant materials and collect any contaminated soils. Spills in waterways should be contained and mopped up with booms or pads that repel water but absorb petroleum.

Repairing and Maintaining Engines

- ✓ Avoid unnecessary parts cleaning.
- ✓ Do not wash engine parts over the bare ground or water.
- ✓ Use dry pre-cleaning methods, such as wire brushing.
- ✓ Adopt alternatives to solvent-based parts washers, such as bioremediation systems that take advantage of microbes that digest petroleum. Bioremediation systems are self-contained with no effluent discharge and use a mixture of detergent and hot water.
- ✓ Use water-based, non-VOC cleaners that are less hazardous than solvent-based degreasers. These are also less toxic and non-flammable.
- ✓ Clean engine parts in a container or parts washer with a lid when using a solvent to prevent evaporation of VOCs. Keep the container lid closed when not in use. Continue to

reuse the solvent until it is totally spent, then recycle it.

- ✓ Use funnels to transfer fluids.
- ✓ Use drip pans when handling any type of liquid. Use separate drip pans for each fluid to avoid mixing.
- ✓ Recycle collected fluids whenever possible. Mixed liquids cannot be recycled and must be stored and disposed of as hazardous waste.
- ✓ Prohibit the discharge of antifreeze into drains or surface waters.
- ✓ Drain all fluids from parts prior to disposal.
- ✓ Clean engine repair areas regularly using dry cleanup methods, such as cleaning petroleum spills with oil-absorbent pads.
- ✓ Prohibit personnel from hosing down the shop floor.
- ✓ Store engines and engine parts under a cover on impervious surfaces, such as asphalt or concrete.

Maintaining Bilges

- ✓ Ensure that bilge water is not discharged into any waterway or public drain without proper filtration to separate the oil from the water. Any unfiltered bilge water or oil accumulated by oil/water separators should be treated as waste oil and handled accordingly. Refer to the Waste Containment and Disposal chapter for more information.
- ✓ Require boats to pull out and away from the water to the boat ramp so bilgewater does not drain back into the water.
- ✓ Provide oil/water separators for boaters to purchase and install in their boats. Consider providing land-mounted oil/water separators for boaters to empty their bilges at dockside.
- ✓ Check local regulations to determine whether filtered water can be discharged into the waterway when an oil/water separator is mounted on a vessel.
- ✓ Inspect lines and hoses for deterioration and prevent lines from chafing.
- ✓ Check for oil and fuel leaks into the bilge and fix leaks that contaminate bilgewater.
- ✓ Use absorbent pads to remove as much oil and fuel from bilgewater as possible.

- ✓ Remove pollutants before removing the plug or drain the water ashore into oil/water separators.
- ✓ Clean all water, oil, and foreign materials from the bilge prior to extended boat storage using oil-absorbent materials.
- ✓ Avoid using emulsifying soaps such as dish detergent to clean the bilge. Emulsified oil and water will make oil/water separators unusable. Use products that are either non-emulsifying or that quickly separate into oil and water.
- ✓ Check that bilge contents are disposed of properly before the drain plug is pulled. If a vessel has a through-hull discharge, check bilges to ensure that no oily or industrial water will be discharged to surface waters.
- ✓ Require boaters to keep bilges clean and dry throughout storage.
- ✓ Place absorbents around areas where pollutants can drain into the stormwater system.
- ✓ Educate boaters on the importance of the proper discharge of contaminated bilge.

Winterizing

Antifreeze

- ✓ Use the minimum amount of antifreeze necessary for a job.
- ✓ Use propylene glycol antifreeze for all systems. Do not use ethylene glycol. It is highly toxic and cannot be reliably purged come springtime.
- ✓ Prohibit any “blow out” of antifreeze directly into the water or onto any surface that drains to the water.
- ✓ Provide an antifreeze recapture and recycling service.
- ✓ Collect and recycle antifreeze when boats are put in the water for the first time after being winterized.
- ✓ Dispose of any antifreeze not recycled in a closed loop system on-site as hazardous waste. See the Waste Containment and Disposal chapter for more information.

Gasoline

- ✓ Add stabilizers to fuel to prevent degradation and eliminate the need to dispose of stale fuel in the spring. 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.
- ✓ Fill fuel tanks to 85-90 percent capacity to prevent flammable fumes from accumulating and to minimize the

possibility of corrosion due to condensation. Do not fill the tank more than 90 percent full. Fuel expands as it warms in the springtime and will spill out the vent line of a full inboard tank.

- ✓ Ensure the gas cap seals tightly.

Covers

- ✓ Promote reusable canvas or recyclable plastic covers. Some manufacturers will clean and store canvas covers during the boating season.
- ✓ Recycle used plastic and shrink wrap covers.

Battery Storage and Disposal

Do not burn lead acid batteries or dispose of them in landfills (415 ILCS 5/22.23). See the Waste Containment and Disposal chapter for more information on managing spent batteries.

Boat Disposal

- ✓ Empty fuel tanks and reuse or dispose of used gasoline as hazardous waste.
- ✓ Remove and recycle the following boat parts and fluids:
 - ♦ Used oil
 - ♦ Used antifreeze
 - ♦ Boat engine (recycle as scrap metal)
 - ♦ Any metal with recyclable value, such as lead, zinc, aluminum, copper
 - ♦ Appliances or HVAC equipment containing refrigerants
- ✓ Remove all mercury-containing devices (some electronic equipment, bilge pump switches, old ship barometers, fluorescent lights) and manage as universal waste. See the Waste Containment and Disposal chapter for more information.
- ✓ Break the hull into smaller pieces as directed by the solid waste facility. The smaller the pieces, the easier it is for the facility to take. Measures should be taken during this process to control fugitive dust. Many marine products contain toxic materials that may become airborne.

In-Water Maintenance

- ✓ Do not allow debris or chemical wastes to fall into the water.
- ✓ Remove the boat from the water if the impacts of in-water cleaning or maintenance activities cannot be contained or mitigated.
- ✓ Keep containers of cleaning and maintenance products closed.

- ✓ Restrict or prohibit sanding on the water.
- ✓ Use vacuum sanders to prevent dust from falling into the water when it is necessary to sand on the water.
- ✓ Do not sand in a heavy breeze.
- ✓ Plug scuppers to contain dust and debris.
- ✓ Restrict or prohibit spray painting on the water.
- ✓ Discourage underwater hull cleaning in your facility. Underwater cleaning is dangerous to divers and the heavy metals released are harmful to aquatic life.

Sanding

- ✓ Conduct sanding in the maintenance area or over a drop cloth.
- ✓ Do not let dust fall onto the ground, flow into the water, or become airborne.
- ✓ Restrict or prohibit sanding on or near the water.
- ✓ Establish a marina policy that prohibits sanding without vacuum equipment.
- ✓ Consider renting or loaning vacuum sanders and grinders to tenants and contractors. These tools 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.
- ✓ Use a damp cloth to wipe off small amounts of sanding dust.
- ✓ Collect and dispose of debris as appropriate. If it is non-hazardous and does not contain free liquids, dispose of debris at a municipal landfill or in a dumpster. Refer to the Waste Containment and Disposal chapter for information on how to dispose of debris classified as hazardous waste.

Blasting

- ✓ Prohibit uncontained abrasive blasting at your facility.
- ✓ Perform abrasive blasting in the maintenance area, within a structure, or under a plastic tarp enclosure. Do not allow debris to escape from the enclosure.
- ✓ Avoid blasting on windy days when using tarp enclosures. Because tarps are not rigid, they allow the wind to carry blasting material and residue into surface waters.
- ✓ Consider alternatives to traditional media blasting. Hydroblasting and mechanical peeling essentially eliminate air quality problems, but still require a filter

cloth to collect debris on the ground.

- ✓ 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 then stripped off. When the strips are removed, the paint is lifted from the hull.
- ✓ Invest in a closed, plastic media blast (PMB) system. These systems blast small plastic bits and then vacuum spent material and paint chips into a machine that separates the plastic from the paint dust. The plastic is then cleaned and reused. A 50-foot boat will produce about a gallon of paint dust, substantially less than the many barrels of sand and paint that must be disposed of with traditional media blasting methods.
- ✓ Collect debris and provide for proper disposal. If the waste is hazardous, send it to a permitted hazardous waste disposal facility. See the Waste Containment and Disposal chapter for more information.
- ✓ Recycle used blast media. Investigate companies that recycle used blast media into new media or other products.

Painting Operations

- ✓ Limit in-water painting to small jobs. Any substantial painting should be done in the maintenance area or over a ground cloth.
- ✓ Use brushes and rollers whenever possible.
- ✓ Restrict painting outside of designated shops to the use of rollers and brushers. Ensure that proper tarps and tenting are also used to protect the surrounding area.
- ✓ Transfer the paint to the boat in a small (less than 1 gallon), tightly covered container if painting with a brush and roller on the water. Small containers mean small spills.
- ✓ Mix paints, solvents, and reducers in a designated indoor or covered area far from the shore.
- ✓ Mix only as much paint as is needed for a job.
- ✓ Consider sharing leftover paints with customers or setting up an exchange area for customers to swap unused items.
- ✓ Keep records of paint use. Use the information to prevent over-mixing.

Antifouling Painting

- ✓ Become familiar with state, federal, and local antifouling paint regulations.

- ✓ Maintain a pesticide applicator license if applying antifouling paints to boats (415 ILCS 60/1).
- ✓ Recommend antifouling paints that contain the minimal amount of toxic ingredient necessary for the expected conditions to your customers.
- ✓ Stay informed about antifouling products like Teflon, silicone, polyurethane, and wax that have limited negative impacts.
- ✓ Avoid soft ablative paints.
- ✓ Use water-based paints whenever practical.
- ✓ Store boats out of the water, where feasible, to eliminate the need for antifouling paints.
- ✓ Dispose of waste antifouling paints containing pesticides, solvents, or metals such as barium, chromium, cadmium, or lead as hazardous waste. Hazardous waste antifouling paints cannot be mixed with non-hazardous paints for disposal. Refer to the Waste Containment and Disposal chapter for more information on the disposal of hazardous waste.

Spray Painting

- ✓ Consider establishing a marina policy that prohibits customers from spray painting.
- ✓ Prohibit spray painting on the water. Conduct all spray painting on land, in a spray booth, or under a tarp.
- ✓ Minimize the use of spray equipment or use equipment with high transfer efficiency to reduce paint overspray and solvent emissions. Tools such as high-volume, low-pressure (HVLV) spray guns release less paint and volatile organic compounds into the air, use less paint, and are cheaper to clean up. Air atomizer spray guns and gravity feed guns are other types of highly efficient spray equipment.
- ✓ Educate personnel on how to properly operate spray equipment to reduce overspray and minimize the amount of paint per job.

Paint Stripping

- ✓ Consider alternatives to chemical paint stripping, such as using a heat gun, scraping, sanding, or abrasive blasting. The best practice to use depends on the characteristics of the surface being stripped, the type of paint being removed, and the volume and type of waste produced.

- ✓ Use citrus-based or water-based products if paint strippers must be used. These products are less hazardous.
- ✓ Use only the minimum amount of paint stripper needed for a job.
- ✓ Use tight-fitting lids or stoppers to prevent evaporation. Reducing evaporation protects air quality and saves product and money.
- ✓ Store paint strippers on an impervious surface and where they are most used in the designated maintenance area.
- ✓ Train employees to use less paint stripper, to properly store new and used paint strippers, to use wise clean-up procedures, and to prevent leaks and spills.

Educating Boaters

- ✓ Copy the Clean Boater Tip Sheets from this guidebook and distribute them to your boaters. There is room to add the name and logo of your marina to these tip sheets. Applicable Clean Boater Tip Sheets for this section include Engine Maintenance, Hull Maintenance, Spring Start-Up: Antifreeze Collection and Disposal, and Boat Cleaning.
- ✓ Inform all workers and operators of the hazardous nature of chemicals and products used in maintenance activities, as well as the purchasing and recycling costs.
- ✓ Inform your boaters/clients when and where they can take their recyclable materials and any hazardous waste.

References

United States Environmental Protection Agency. 1993. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. Washington, DC: EPA-840-B-92-002