PORTDENARAUMARINA

CUSTOMER HANDBOOK

This manual is intended as both an educational resource and a reference tool for standard operating procedures and best management practices while operating your vessels and performing repairs and maintenance on your vessels while in Port Denarau Marina.

This document represents Industry Best Practices at time of going to issue and is therefore subject to change without notice. Port Denarau Marina reserves the right to do so and requires all customers to abide by these practices.

Some tasks pose risks to employees. It is important that these Best Management Practices are performed in conjunction to all Marina and Government Health and Safety procedures. Please ensure that your staff are equipped with protective clothing, gloves, safety boots and masks/respirators as required for their specific task or area of operation.

Ensure that all staff who are not employed by the company are authorised contractors to work within the marina premises.

Marina Operating Hours

- The Marina and Reception operating hours are 0800 to 1800, Monday to Sunday.
- The Marina Head Office operating hours are 0800 to 1700, Monday to Friday.
- The Boat Yard operating hours are 0800 to 1700, Monday to Friday. 0800 to 1300 Saturday.
- Marina Security Services are on site 24 hours per day, all year round and can be contacted on 7075651
- Port Denarau Marina Security Supervisor can be contacted on 7075646, security@denaraumarina.com
- Marina Managers can be contacted on 7075650, cynthia@denaraumarina.com (Cynthia Rasch) or 7075630, nigel@denaraumarina.com (Nigel Skeggs)

Damage

- Marina property damaged by a customer or contractor will be repaired at the employees company or contractor's expense.

Discipline

- Port Denarau Marina Management reserves the right to refuse access to any staff member or contractor.

Dress and conduct

- Port Denarau Marina Management reserves the right to ask customers or contractors to wear clothing that is in keeping with safety requirements and standards appropriate to the overall presentation of the marina.
- All staff and contractors must be in uniform when on PDML property. PDML reserves the right to deny access to staff or contractors who fail to abide.

Housekeeping

- Work areas must be kept clean and tidy with prompt removal of all garbage.
- Oily rags and any flammable material residue are to be disposed of correctly.
- The marina structure and walkways are to be kept clear at all times.

It is the responsibility of the contractor or customer to remove all rubbish unless otherwise agreed with Port Denarau Marina management.

Hoses

- Water hoses located on the marina belong to marina customers or to PDML. They are not for general or contractor use.
- If you require the use of a hose please bring your own. If in doubt, contact the marina office.

Alcohol

Consumption of alcohol by contractors or staff is not permitted on PDML premises.

HEALTH AND SAFETY

All Staff and Contractors are required to ensure that they are physically fit and capable of undertaking the work for which they have been employed or contracted.

Accidents and Incidents

Any accident or incident that results in property damage or injury, or in environmental harm, or threatens environmental harm, must be reported immediately to marina security.

Compressed air cylinders

- Safety valves are to be utilised in the use of compressed air.
- Cylinders are to be stored and used in a secure and upright position.
- All air-lines are to be securely joined to prevent separation during operation.

Diving work

- Marina Management MUST approve all diving work.
- Divers are to ensure compliance with occupational diving operations Part 1: Standard Operational Practice.
- All divers are to be appropriately certified and possess a medical certificate certifying fitness to undertake the diving work.
- Port Denarau Marina will require copies of Commercial Diving Tickets for each diver.

Electrical

- Electricity and water are a lethal combination.
- All electrical equipment must have been recently tested and tagged before being used at Port Denarau Marina.
- Any equipment supplied and/or installed by your organisation at Port Denarau Marina must be tested and tagged before 'handing over'.
- On arrival on site, or during your work at Port Denarau Marina management may inspect your electrical equipment.
- Extra care must be exercised during and immediately following periods of rainfall.
- Electrical leads must be switched off at the point of power supply and removed when not in use.

Fire hoses

- Fire hoses are not to be used for any purpose other than for the fighting of fires.

Hazardous substances

- A Material Safety Data Sheet (MSDS) for all hazardous substances must be available upon request by the marina manager or his representative.
- All users must be familiar with, and understand the first aid and control measures required.

Hot Work / Welding

- Welding operations must be screened to protect all personnel against flashes. All gas cylinders, including propane, must be restrained i.e. in a trolley.
- A Hot Work Permit must be completed prior to any indoors welding commencing.

Personal protective equipment and clothing

- Appropriate personal protective equipment and clothing, including shoes, must be worn at all times.

Working at heights

- Any working platform must conform to the relevant Standards.
- Ladders must be of industrial standard and be tied off at the top and secured on even ground at the bottom.
- No one is permitted to work from the top step of a ladder including freestanding industrial ladders. It is advisable to always have one hand holding the ladder
- Safety harnesses must be worn and properly secured at heights greater than 2.4 meters and must always be worn in cherry-pickers and other mobile working platforms.

BOAT YARD SPECIFIC RULES AND REGULATIONS

The Boat Yard is an inherently dangerous area and therefore access is restricted to boat owners and staff who are on site purely for the purpose of working on a vessel on the hard stand.

All staff are required to be in uniform while in the boat yard. Any person without uniform must be wearing a high visibility vest. This can be lent out by PDML staff.

All persons in the boat yard MUST be in safety boots or solid closed in shoes.

All outside contractors must sign in at the PDML office prior to entering the boat yard and commencing work.

When lifting equipment is in operation, all PDML staff, owners etc must be in high visibility vests and wear a hard hat.

BEST MANAGEMENT PRACTICES

Best Management Practices (BMP's) are low cost, low technology ways of protecting the environment.

In general BMP's are pollution control activities designed to prevent or reduce the discharge of contaminants into the environment. Achieving pollution reduction through initiating simple management practices is simple good sound business.

BMP's help resolve the environmental pollution problems that result from marina activities, such as boat maintenance and cleaning, vessel fueling, and waste management and disposal.

BOATYARD OPERATIONS & VESSEL MAINTENANCE

Boat maintenance and repair include hull, topside and equipment washing, sanding, painting, fiberglassing and a wide variety of mechanical work. These activities produce liquid and solid wastes that must be contained, stored and disposed of. Designating specific areas for work provides maximum control of wastes, including cleanup in the event of spills.

This document sets out Port Denarau Marina's Best Management Practices (BMPs) to those using the areas. This includes customers and outside contractors, as well as marina employees.

Port Denarau Marina employees are versed in the guidelines and empowered to ensure customers and contractors abide by the BMPs involved.

Before beginning work outside contractors and customers must sign a contract, which includes BMP requirements for the designated areas.

Best Management Practices:

- Perform as much boat repair and maintenance as practicable inside workshop buildings.
- Where an inside workspace is not available, perform blasting and sanding within spray booths or tarpaulin enclosures.
- Collect as much maintenance debris on tarpaulins, filter fabric, or paved surfaces
- Use vacuum sanders to collect dust and chips while removing paint from hulls.
- Clean, by sweeping or vacuuming hull maintenance areas immediately after any maintenance is done to remove debris, and dispose of collected material properly.
- Capture pollutants out of run-off water with permeable tarpaulins, screens, and filter cloths.
- Sweep or vacuum around maintenance areas, car parking areas, and driveways frequently, where appropriate.
- Store all pollutants such as paints, coatings, pesticides, used oil containers, detergents, etc. under cover.

Air Quality Management

Air pollution can be caused by dust, fumes, gases and smoke emitted from activities associated with the operation of marinas and boat maintaining and repairing facilities.

- Potential sources of air pollutants include:
- Organic solvent vapours from degreasers, thinners and paints
- Overspray from spraypainting
- Dust from sanding, abrasive dry blasting and grinding
- Wood waste from work on timber and plywood
- Air pollution from fuel and oil storage and the exhaust fumes of boat engines
- Sewage pump out operations

Best Management Practices:

- No incineration of burning of wastes permitted on site
- Boat owners should be encouraged to shut down engines as soon as possible after mooring, thus avoiding prolonged idling
- Fuel drums and oil waste drums are sealed tightly after use & removed to a safe secure location.
- The use of 4 stroke engine technology & unleaded fuel is encouraged.
- Boat owners are encouraged to keep their machinery in good order - a tuned engine is a clean engine
- Dry sand blasting totally prohibited unless fully tented
- Wet blasting should only be carried out by marina staff in the designated washdown bay.
- Antifouling should be applied by rollers, where practical, as an alternative to airless spraying

Pressure Washing

Potential Environmental Impacts:

- When the marine organisms that accumulate on the hull of a vessel are removed, fragments of hull paint/hull coating and hull materials are often chipped off in the process.
- In a concentrated form, these untreated particles can have water quality impacts.
- Pressure washing in particular removes antifouling paint from hulls and fouling organisms, including marine pests, which can get washed into the marina basin.
- Waste water from pressure washing may contain viable fragments or spores of marine pests and should therefore not be permitted to enter the marina basin.
- Sediments contaminated with copper can cause problems related to the disposal of dredged materials.

Best Management Practices:

- It is prohibited to conduct hull cleaning or hull scraping or any process that occurs in-water/underwater to remove antifouling paint or fouling organisms from the boat hull.
- Contain and treat all wastewater from pressure washing to prevent the return of biofouling, including marine pests, to the near shore marine environment.
- Remove anodes before commencing.
- The first priority for the marina facility is to keep the wash-water free of soaps and/or other additives. Collect all of the wash-water, treat it, and discharge.
- Minimise the amount of water used when boats are pressure washed. For example, wash the hull above the waterline by hand.

Zinc and Magnesium Anode Replacement

Potential Environmental Impacts:

- Zinc and Magnesium anodes fight vessel corrosion.
- Elevated levels of Zinc and Magnesium have been found to be associated with boat operation and maintenance.
- Zinc and Magnesium, in high concentrations, can be toxic to marine life, and can be toxic to those humans who eat contaminated shellfish or fish.

Best Management Practices:

- Remove anodes prior to abrasive blasting and pressure washing tasks. Remember, of course, to replace them when the job is done.
- Recycle Zinc and Magnesium anodes with other scrap metals. Scrap metal dealers will take used Zinc and Magnesium anodes,
- Store Zinc and Magnesium anodes with other recyclable scrap metals in clearly marked containers protected from the elements.

Bilge Cleaning

Potential Environmental Impacts:

- Bilge water can contain oil, fuel, radiator fluids/coolants, marine pests and other contaminants,
- Even small amounts of such materials can cause environmental problems.
- Although some oil that spills into the water evaporates, petroleum hydrocarbons can remain suspended in the water, concentrate on the surface or adhere to hulls.
- Oil sheen can block necessary oxygen and light from moving through the surface of the water.
- Hydrocarbons in oil harm fish, upset fish reproduction and interfere with the growth and reproduction of hull-dwelling organisms.

Best Management Practices:

- Wherever practicable, do not discharge bilge water directly into the marine environment. Discharge it to an onshore holding tank or sewer.
- If bilge water is pumped directly overboard, endeavour to do this in the open sea.
- Before pumping out a bilge, visually inspect the bilge water to determine whether there is a sheen of oil.

- Use oil absorbent materials to remove oil before pumping a bilge.
- Use an oil/water separator to remove oil from bilge water.
- Don't use soaps and detergents to clean up oily bilge water,

It is very important to keep engines properly maintained, to continually check and fix all leaks and to keep an absorbent pad or pillow in the, bilge to absorb small drips and spills.

Shrink Wrap and Plastic Sheeting

Potential Environmental lmpacts:

- Shrink-wrap and some plastics are non-biodegradable, and can become a disposal problem at landfills.

Best Management Practices.

- We encourage customers to use reusable or recyclable boat covers.
- Please recycle used plastics.

Boat Recovery and Disposal of Sunken and/or Abandoned Vessels

Potential Environmental Impacts:

- Sunken or abandoned vessels pose environmental and safety risks by leaking oil and fuel in concentrated areas.
- Sunken and/or abandoned vessels can accumulate significant biofouling, which may include marine pests.
- They can also cause navigational and safety hazards. If boats are properly disposed of before they become unseaworthy the chances that the vessel will become an environmental risk are reduced.

Best Management Practices:

- Contain the area with floating booms and tarpaulins etc.
- Empty the boat's fuel tanks and reuse or dispose of used petrol and petrol products as hazardous waste.
- Remove and recycle the following boat parts and fluid:
    - Used oil and oil filter,

    - Used radiator fluids/coolants
    - Boat engine (recycle as scrap metal) and
    - Any metal with reuse value, such as lead, zinc, aluminium, magnesium
- Remove all mercury-containing devices (i.e., some electronic equipment, bilge pumps, old ship's barometers) and handle as hazardous waste.
- Where possible, contact the relevant authority, such as harbourmaster, to advise them of the situation.
- In the event that you deal with the vessel yourself, do not dismantle the vessel while it is in the water. Remove it from the water as soon as possible, onto a hardstand area or slipway, taking care not to dislodge fouling organisms. If fouling is dislodged, every attempt should be made to retrieve it.
- If the vessel is to be disposed of, reduce educe the size of the hull into smaller pieces (out of the water and outside the catchment area if possible) and dispose of appropriately.
- If the vessel is sold, ensure that the new owner slips, cleans and antifouls the vessel in the recommended fashion prior to moving it to a new location.

Long Term Storage of Vessels – Cyclone Holes

Potential Environmental Impacts:

- The activity of preparation of a vessel for longer-term storage may contribute to nonpoint source pollution through the use of heavy equipment (forklifts, cranes and travel lifts) as well as through managing various storage procedures (use of radiator fluids/coolants and battery storage).

Best Management Practices:

- Use propylene glycol radiator fluids/coolants (usually pink) that are less toxic than ethylene glycol (usually green) except in "closed" or freshwater cooling systems. See "Refrigerants/Coolants" for more information.
- Inspect and clean bilges prior to extended vessel storage.
- Clean all water, oil, or foreign materials from the bilge using absorbent material. See "Bilge Cleaning" for more information.
- Promote reusable or recyclable boat covers.
- See also "Pressure Washing," "Decommissioning Engines," "Oil Changes" and "Battery Replacement" for more information on these activities.

MECHANICAL SERVICE ACTIVITIES

Used Lead Acid Batteries

When lead acid batteries are removed from vessels, you need to be aware of local hazardous waste regulations that apply to this activity, If lead acid batteries are handled improperly, they can pose both environmental and health hazards. Battery components are toxic and corrosive. Batteries contain heavy metals such as nickel, cadmium, lead and sulfuric acid, which can contaminate the air, soil and water.

Facilities that generate used load acid batteries are encouraged to send there to a reputable recycling facility. Through recycling, the nickel, cadmium, lead and sulfuric acid can be recovered from batteries.

Potential Environmental Impacts:

- If handled improperly acid batteries pose hazards.
- Battery components are toxic and corrosive, and can also be a fire and explosion hazard.
- Lead and sulphuric acid contaminate the air, soil and water. Direct contact can burn the skin and eyes.
- Exposure to lead in the environment can pose serious health hazards.
- Lead, which is very toxic to aquatic life, can enter marina basins through stormwater when waste acid batteries are not managed properly.
- Mark all batteries (or containers holding such batteries) with the words "Waste Batteries," or "Used Batteries."
- Store batteries for no more than one year before sending them off-site for recycling.
- Place any battery that shows signs of leakage, spillage, or damage in a container that is kept closed, is structurally sound, and that is compatible with and can contain the contents of the battery.
- Immediately contain any releases of batteries fluids.

Acid battery recycling rules:

- Segregate batteries from paper, rags, garbage, flammables, and scrap metal or hazardous chemicals by means of a dike, berm, wall or other physical barrier.
- Store used acid batteries on an impervious surface, such as sealed/painted concrete (to protect the surface from degradation), and inspect used acid batteries weekly for leaks and deterioration.
- Open/handle/ store used acid batteries so that the battery case does not rupture, leak, or produce short circuits.

- Before shipping batteries off-site, ensure that they are packaged and marked appropriately.

Best Management Practices:

- Avoid long-term storage of acid batteries,
- Store used acid batteries upright in a secure location, protected frorn the elements.
- Batteries should be stored on an impervious surface, stored under cover and picked up by an approved recycler.
- Never stack batteries directly on top of each other. Layer with wood. Never drain batteries or crack the casings.
- Place cracked or leaking batteries in a sturdy, acid-resistant, leak-proof, sealed container.
- The container should be kept closed within the battery storage area.
- Strap batteries to pallets or wrap batteries and pallet in plastic during transport.
- Keep written records of weekly inspections of used acid batteries.

Commissioning Engines

Potential Environmental Impacts:

- The waste fluids generated when commissioning engines, if not property managed, can enter the water in stormwater runoff.
- Contact with the fluids can harm fish and other marine and aquatic life.
- If certain fluids are mixed, they may become dangerous/unstable and subject to hazardous waste requirements and be more expensive to dispose.
- Waste fluids from commissioning engines may include engine oil, petrol and petrol products, diesel fuel and radiator fluids/coolants.

Best Management Practices-

- Inspect fuel lines for leaks or potential leaks such as cracks and loose, connections. These can be persistent problems that last throughout the season, leaking engine fluids into the bilge.
- Local waste programmes may accept unwanted petrol and petrol products and fuel/oil blends generated by individual boat owners.

Decommissioning Engines

Potential Environmental Impacts:

- The waste fluids generated when decommissioning engines, if not properly managed, can enter the water in stormwater runoff. Contact with the fluids can harm fish and other marine and aquatic life.
- Waste fluids from commissioning engines may include engine oil, petrol and petrol products, diesel fuel and radiator fluids/coolants.

Best Management Practices:

- Use propylene glycol radiator fluids/coolants except in "closed or freshwater" cooling systems.
- Propylene glycol radiator fluids/coolants are much less toxic than ethylene glycol radiator fluids coolants.
- Use the minimum volume of radiator fluids/coolants necessary for the job.
- Where appropriate, add stabilisers to fuel to protect engines against corrosion and the formation of sludge etc. Stabilisers are available for petrol/petrol products including diesel fuels, and gearbox oil.
- Check manufacturer's warranty on engines before adding fuel stabilisers.
- Fill fuel tanks to 85-90% full to prevent flammable fumes from accumulating and to minimise the possibility of condensation leading to corrosion.
- Do not fill the tank more than 90% full if the boat has an external overflow vent. The fuel will expand as it warms and fuel will spill out the vent line of a full inboard tank.

Degreasing/Parts Washing

Potential Environmental Impacts:

- Degreasers used to clean metal may be organic solvents (chlorinated/non-chlorinated) or water-based cleaners.
- Organic solvents usually contain volatile organic compounds (VOCs), which can evaporate quickly.
- Many VOCs combine with combustion emissions to form ground level ozone, a major component of "smog" and a contributor to the greenhouse effect.
- Ozone damages lungs and degrades many materials.

- When solvents are released and reach water, even in very small quantities, they may render the water unfit for human consumption and uninhabitable for aquatic life.
- Many organic solvents are also combustible, posing a fire hazard.

Products that list compounds with "...chloro..."are chlorinated compounds, most of which are hazardous due to their toxicity. Many non-chlorinated organic solvents and common parts washer solutions such as petroleum naphtha or mineral spirits are also typically hazardous due to their flammability and ease of ignition.

Best Management Practices:

- Use water-based, non-VOC cleaners that are less hazardous than solvent based degreasers. They are also less toxic and non-flammable.
- Don't use a toxic or flammable organic solvent if you don't have to.
- If using VOC-based solvents is unavoidable, catch excess solvents in a drip tray and reuse.
- Do not mix or add other types of solvents to any degreaser.
- Never discard any degreasing solvent into sinks, floor drains or onto the ground. It will ultimately find its way to local waters, and as little as a spoon-full may render tons of thousands of litres of water uninhabitable for aquatic life or unfit for human consumption.

Waste Oil

Used engine oil, gearbox oil, automatic transmission fluid, power steering fluid and hydraulic fluid are all considered waste oil.

These must be disposed of in the Waste Oil facility located beside the Pacific Energy office.

Potential Environmental Impacts:

- Even small amounts of oil introduced into the marina; environment can cause environmental problems.
- Although some oil flat spills into the water evaporates, petroleum hydrocarbons can remain suspended in the water, concentrate on the surface, or adhere to hulls.
- Because of the properties of oil, even a cup of oil can spread sheen over nearly one hectare of calm water.
- Oil sheen can block necessary oxygen and light from moving through the surface of the water.
- The hydrocarbons in oil harm juvenile fish, upset fish reproduction, and interfere with the growth and reproduction of hull-dwelling organisms.

Best Management Practices:

- The best option for managing used oil is to carefully collect and store it and then have it removed for disposal.
- Visually inspect the holding tank or container on a regular basis for leaks or malfunctions. Maintain written inspection records.
- Materials that contain or are contaminated with used oil can also fall under the definition of used oil.
- The most common of these are used oil absorbent pads, rags and wipers, and absorbents such as kitty litter.
- Never mix used oil with radiator fluids/coolants or hazardous waste, such as waste petrol and petrol products.
- Use "kitty litter", saw dust or other commercially available products to absorb oil from minor spills.
- Slip a plastic bag over used oil filters prior to removal to prevent drips.
- Recycle used oil filters. Puncture and drain them first. Collect and manage the contained waste oil. Use oil absorbent materials to clean up small drips and spills.
- Do not use soaps and detergents to clean up oily drips and spills.
- Avoid pumping bilge water that is oily or has a visible sheen.
- Use oil absorbent materials or an oil/water separator to remove oil before pumping.
- Use a portable or stationary oil/water separator to clean bilge water. These devices draw contaminated water from bilges, capture hydrocarbons in a filter and discharge clean water.

Rags

Potential Environmental Impacts:

- Contaminated rags that are improperly managed may pose fire, health and environmental risks.
- Minimising contamination of rags reduces health risks to workers and reduces emissions of volatile organic compounds to the air, improves effluent discharge from industrial laundries.

Best Management Practices:

- Keep oily rags separate from rags that have been contaminated with hazardous materials such as solvents.
- Reduce the amount of solvent used in cleaning through improved work practices. Use solvents only when "absolutely necessary.
- Use non-VOC cleaners.
- Remove excess solvent from rags by wringing or pressing excess into coverable container.

Refrigerants/Coolants:

Potential Environmental Impacts:

- Coolants and refrigerants become an environmental problem when they escape into the air.
- Chlorofluorocarbons (CFCs, or Freon) are used primarily as refrigerants in air conditioners, refrigerators and freezers. When CFCs are released into the air, they rise into the upper atmosphere where they damage the protective ozone layer in the stratosphere.
- A single CFC molecule can destroy 100,000 molecules of ozone.
- The ozone layer absorbs the sun's harmful ultraviolet (UV) radiation, and as it is damaged, living things on the earth become exposed to harmful UV radiation which can lead to skin cancer and cataracts.

Best Management Practices:

- It is recommended to use non ozone depleting refrigerants/coolants
    - R401A is a replacement for R22
    - R404A is a replacement for R22 and R502

Fibreglassing

Potential Environmental Impacts:

- The processes involved in fibreglassing, whether using epoxy, polyester, or vinyl resins for small or big jobs, can have environmental impacts.
- Some of the materials used in the fibreglassing process can be dangerous to workers.
- Some resins, catalysts and the solvents used for cleanup can be flammable, irritate the skin and respiratory system, and some may cause cancer.

Best Management Practices:

- Conduct all laying up of moulds in a booth, shed or building. Keep the doors closed when undertaking this work and ventilate mechanically.
- Always conduct spray lay-up within an approved booth.
- Minimise waste by working with small batches of resin.
- Avoid putting liquid hardener in the garbage since it can spontaneously combust if mixed with sawdust/other materials.

PREPARATION AND PAINTING BOAT HULLS

Paint Stripping

Potential Environmental Impacts:

- Many paint strippers are solvent-based, and contain chemicals that are dangerous to humans.
- Some are flammable and most cause water and air pollution if not handled properly.
- Toxic chemicals in paint strippers may include methylene chloride (also called dichloromethane, or DCM), methyl ethylketorie (or 2-Butanone), acetone, toluene, methanol, N-methylpyrrolidone (NMP), or xylene.
- There are less environmentally damaging and less hazardous paint strippers available on the market.

Best Management Practices:

- Consider alternatives to chemical paint stripping depending on the characteristics of the surface being stripped, the type of paint being removed, and the volume and type of waste produced.
- Alternatives include scraping, sanding, and/or abrasive blasting.
- Use a heat gun to remove paint and varnish where appropriate.
- If paint strippers must be used, use soy-based or water-based products, which are less hazardous.
- Use only the minimum amount of paint stripper needed for a job.
- Prevent evaporation by using tight fitting lids or stoppers. Reducing evaporation protects air quality, saves product and money.
- Reduce the chance of spills by storing unused paint stripper where it's used most; in the workshop.
- Place the product on an impervious base.
- Please train employees to use less paint stripper, to properly store new and used paint strippers, to use clean-up procedures and prevent leaks and spills.

Abrasive Blasting

Potential Environmental Impacts:

- In abrasive blasting sand, glass or plastic beads, metal shot or grit, sodium bicarbonate or dry ice pellets are used with air pressure or water pressure to remove paint and coatings.
- Traditional abrasive blasting of boat hulls is a messy job resulting in large quantities of used abrasive mixed with hull paint/hull coatings. While the abrasive can be relatively cheap, the labour is costly and the potential environmental impacts are large.
- Biofouling dislodged from the hull may include marine pests that can colonise local waterways.
- Perform abrasive blasting so that emissions do not cross outside of the property boundary or cause a nuisance.

Best Management Practices:

- Consider alternatives to abrasive blasting on-site, such as dusts sanders or contracting the work off-site.
- If abrasive blasting must be done, perform it within ventilated spray booths or other enclosures away from the water to minimise the spreading of dust and windblown material.
- Ensure that anodes are removed before commencing.
- If tarpaulin enclosures are used, avoid blasting on windy days.
- Un-contained blasting in the marina is prohibited.
- Store used sandblasting grit, scrapings and debris under cover.
- Recycle used blast materials.

Hull and Topside Painting

Potential Environmental Impacts:

- Hull and topside paints may be toxic and inhalation may cause cancer.
- If spilled, these paints and coatings may harm aquatic life and water quality.
- Additionally, the fumes released by some paints contribute to air pollution.

Best Management Practices:

- Store all paint in a centralised covered area.
- Never spray items outside of an approved booth or other structure.
- Return all unused paints to that area and immediately and properly manage empty containers.

- Avoid the problem of having leftover paint by mixing only as much paint as is needed for a given job.
- Limit in-water painting to areas where paint materials and spills can be contained and prevented from entering the water.
- No in-water hull scraping or any process that occurs underwater to remove paint or biofouling from the boat hull is permitted.
- Although it is not advised to conduct painting while the boat is in the water, if it must be done:
    - Transfer the paint in a small, tightly covered container. Small containers mean small spills.
    - Debris-producing maintenance activities such as sanding and painting must be approved by the marina and only done in a designated area.
- Do as much work as is possible away from the water, including mixing paints and/or cleaning brushes.
- Use tarpaulins or drop cloths to collect drips and hull scrapings (including biofouling).
- Weight the hull edges of tarpaulins and plastic sheeting to keep them in place.
- Use drip trays for all paint mixing, paint transfer, and/or equipment clean up.
- Use low-VOC, high solids content and water-based paints/surface preparations instead of traditional paints/primers.
- Use brushes and rollers instead of paint sprayers whenever possible, since spray-painting is more wasteful and more harmful to the environment,
- Reuse solvents and thinners by draining the clean product off the top once solids settle out.
- Contain and clean up spilled paint or varnish immediately.

Antifouling Paints and Coatings

Potential Environmental Impacts:

- Most antifouling paint contains copper, copper oxide and/or organic compounds, which kill organisms attempting to attach to a painted surface.
- The use of antifouling treatments such as tributyltin (TBT) is banned.
- TBT has largely been replaced in antifouling paints by mixtures of new types of biocides, including copper-based compounds. However, many of these new biocides are now also being banned because of their environmental side effects, and there are growing concerns about the long-term environmental effects of copper-based compounds. This

highlights an urgent need to find alternative antifoulants with much better environmental performance.

- By design, antifouling paints are toxic to marine life and can he absorbed by edible fish and shellfish,
- The toxins in antifouling paints enter the environment through the water's contact with treated marina piles, the hull, pillage, sanding, sand blasting, or scraping.
- Biofouling scraped from the hull may include marine pests that can colonise local waterways.
- Antifouling paint chips and biofouling (which may include marine pest organisms) left on the ground or driveway can be transported into the water by stormwater runoff.
- Toxicants in antifouling paint can be passed into the food chain via shellfish/worms to fish, birds and humans.
- Incorrect choice or application of antifouling paint may increase the risk of biofouling accumulating on a vessel's hull, which may include marine pests.

Best Management Practices:

- Change to long-lasting, low-toxicity antifouling paint.
- The marina recommends antifouling paints containing the minimum amount of toxin necessary.
- Select an antifouling paint that will be effective under the conditions in which the vessel is used and renew it in accordance with the manufacturer's specifications, or before it becomes ineffective.
- The marina recommends that boats that are rack/stack stored or trailered use alternatives to antifouling paint such as polyurethane, hull wax, or non-metallic epoxies, since antifouling paint is not normally necessary for boats that are not continuously in the water.
- Use dust-collecting sanders when sanding anti-fouling paint.
- Blasting is not recommended for removal of antifouling paint.
- If blasting is necessary, see the "Abrasive Blasting" section in this guide.
- Sweep and collect paint chips and biofouling debris (don't hose) immediately after scraping or sanding.
- Mix paints and solvents away from the water and prevent drips.
- Avoid mixing paint or cleaning brushes on open pontoons or other structures over the water.
- Use drip trays, tarpaulins and sheeting to contain droppings and spilled materials.
- Drip trays should be used for all paint mixing, solvent transfer or equipment clean-up operations unless the operations are conducted in controlled areas away from stone drains, surface waters, shorelines, jetties/piers, docks or pontoons.
- Weight the edges of tarpaulins and plastic sheeting to keep them in place.
- Mix only enough material necessary for the job.
- Save excess or unused antifouling paint for future uses.

- Re-use solvents and thinners by draining the clean product off the top once solids settle out.

Scraping and Sanding

Potential Environmental Impacts:

- Scraping removes marine organisms from the hull and this may include marine pests, which, if not properly disposed of, may enter and colonise the marina basin.
- Hull paints can contain heavy metals and volatile organic compounds (VOCs).
- Sanding chips and dust that fall onto the ground can enter a marina basin through stormwater runoff. Paint chips and sanding debris can be particularly dangerous when shellfish ingest them and other animals including humans, ingest the shellfish.

Best Management Practices:

- Sanding and grinding operation shall be carried out using equipment which captures the majority of particulates by way of vacuum assisted scrapers and sanders
- Remove anodes before commencing work.
- Appropriate boat maintenance areas can be a temporary structure or plastic sheeting to minimise the spreading of dust and windblown material.
- Place drop cloths or tarpaulins under vessels when sanding or scraping.
- Weight the edges of tarpaulins and drop cloths to keep them in place. Do not tie to boat stands.
- Clean up debris, garbage, sanding dust, biofouling and paint chips immediately following any maintenance or repair activity.
- When sanding or grinding hulls over a paved surface, vacuuming or sweeping loose paint particles is the preferred cleanup method. Do not hose the debris away.
- Avoid scraping or sanding on windy days, unless conducting the activity in an enclosed maintenance structure.
- Use dustless/vacuum sanders. These tools can collect over 98% of dust instead of releasing it into the air. Workers can use this equipment without full suits/respirators and spend less time in clean-up activities.
- If sanding, scraping or grinding must take place while the boat is in the water, use tarpaulins and sheeting installed between the vessel being worked on and the pontoons or walking surface to prevent dust, paint chips, debris, or other materials (including fouling organisms) from falling or being blown into the water.

- The sheeting should have a tight seal to the vessel and adjacent surfaces to prevent leakage of particles outside the work area.
- Remove the sheeting carefully to prevent the loss of accumulated waste material into the water.

Spray Painting

Potential Environmental Impacts:

- Spray painting has potential air and water quality impacts.
- Most paints contain volatile organic compounds (VOCs) that evaporate quickly and are flammable.
- Many paints are toxic.
- When released to the atmosphere, VOCs combine with combustion emissions of nitrogen oxides to form urban ozone (i.e. smog), which damages lungs and degrades many materials.
- Marine paint may be toxic to aquatic and marine life.

Best Management Practices:

- **Unprotected spray painting is prohibited throughout the entire marina facility.**
- Spray painting may be conducted:
    - inside designated structures with ventilation and filter systems;
    - at designated on-shore areas away from open water,
    - with temporary structures or plastic sheeting provided to minimise the spreading of overspray; or in covered slips, with tarpaulins and sheeting installed with a tight seal between the vessel being worked on and the pontoons or walkway surface.
- It is prohibited to do exterior spray painting on the water without protective sheeting
- Be sure to remove the protective sheeting with care to prevent loss of accumulated waste material into the water.
- If spraying outdoors with protective sheeting, avoid working on windy days when controlling the protective covering and the paint spray drift is difficult.
- Use spray equipment with high transfer efficiency, High Volume I_ow Pressure (HVLP).
- Paint guns used in spray booths should be either High Volume Low Pressure (HVLP) or High Efficiency Low Pressure (HELP) that are rated at 65% efficient paint transfer. HVLP guns can reduce overspray by 25% to 50%.
- Electrostatic spraying requires less pressure, produces little overspray, and uses relatively little paint.
- The marina encourages the use of non-toxic, high bonding, and easily cleaned hull coatings.

- Limit the amount of leftover paint and decrease solvent use by using a smaller paint spray gun cup.
- Reuse solvents and thinners by draining the clean product off the top once solids settle out.
- Whenever possible use brushes and rollers instead of paint sprayers since spray painting is more wasteful and more harmful to the environment than applying paint by hand.
- Let waste paint dry in the tin before discarding to the waste bin. Recycle where possible.

Compounds Waxing

Potential Environmental Impacts:

- Whether a hull is slightly oxidised or heavily oxidized and stained, whether a one or two step process is required to improve the sheen of the hull, there are few environmental impacts from compounding and waxing a hull.
- Basic pollution prevention techniques and proper management of the substances used to restore fibreglass hulls will help keep waxes and cleaners out of the environment.

Best Management Practices:

- Check all likely products to assist with the task and choose only those which are non-hazardous.
- Conduct compounding and waxing away from the water.
- If possible, use phosphate free, biodegradable and non-toxic soap when preparing a hull.
- When removing tough stains, use only as much stain remover as is necessary, or use a more abrasive rubbing or polishing compound.
- Manage used rags and buffing pads as described earlier.

Teak Refinishing

Potential Environmental Impacts:

- Teak cleaners that contain acids and caustic materials are toxic to marine life.

Best Management Practices:

- Avoid teak cleaners containing acids (such as phosphoric acid or oxalic acid) or those labelled "caustic, corrosive, or acidic."
- Clean teak with a mild, phosphate-free detergent with bronze wool, if possible.
- If sanding teak use a dustless or vacuum sander.
- If possible, conduct teak refinishing away from the water's edge. If not possible, use safer cleaners and avoid flushing teak cleaner and teak oil into the marina basin.

Varnishing

Potential Environmental Impacts:

- Spills of varnishes are detrimental to the marine and aquatic environment.
- Since many are petroleum-based, spills may have similar impact as oil spills.
- Chemicals in varnishes can be highly flammable and harmful to human health.

Best Management Practices:

- Avoid the disposal problem of leftover varnish by mixing only as much as is needed for a given job.
- Use less hazardous, water-based varnishes that pose less of a threat to human health or the environment.
- In case of spills of varnish on land, use absorbent material to clean it up, and collect any contaminated soils.
- Spills into water must be contained/mopped up with booms or pads that repel water/absorb petroleum products.

Solvents

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

Best Management Practices:

- Store open containers of usable solvents as well as waste solvents, rags, and paints in covered and approved containers.
- 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.
- Organise your spray painting jobs to minimize coating changes. Fewer changes means 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.