

Boatyard Health Hazards

From *Pacific Fishing*, September 1998

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Like that other love in your life, your boat can be both a key to your joy and success, and a serious threat to your health. Boats and boatyards are full of health hazards, some of them causing a slow, insidious erosion of your body's vital systems, others ready to strike you down where you stand.

Many of the boatyard hazards, including hazards associated with maintenance and repair at sea, are obvious and easily avoidable. Slips and falls are a major source of injury. Open deck hatches and unsecured ladders have injured many a mariner, and probably killed a few. Revolving shafts, such as propeller shafts and winch drums, often hurt people severely during repair and maintenance. Broken cable strands and just plain sharp edges inflict a painful toll on crew members and boatyard workers.

Electricity is a real threat, both on board and in the yard. Even low voltage from a vessel's 12 volt DC electrical system has the potential to kill a person by disrupting the heart's electrical pattern. The body is not a good electrical conductor, but a charge of as little as a tenth of an amp passing through the arms and chest can cause fibrillation—a rapid and uncontrolled heartbeat that can be fatal. But the bigger dangers from your 12-volt system are burns, flashes, and explosions that can result from inadvertently grounding a battery's positive terminal.

High voltage, like the 120-volt AC that runs power tools, is another matter. Any time you become the most direct route between a high voltage power source and the ground (or water), you risk electrocution. When using or repairing AC systems, ensure that outlets have ground fault interrupter (GFI) devices, be sure to wear rubber boots, knee pads, gloves, and a plastic hardhat, and use only power tools and electrical cords with the three-prong plug that

indicates a grounded system. Vessel electrical and grounding systems tend to be complex and individual, so it pays to study your boat's systems before putting yourself in a hazardous environment.

Hazardous substances abound aboard boats and in the boatyard. Silica dust, fiberglass insulation, asbestos, the smoke of burning plastics, and the chromates that are released by working with chrome and stainless steel can all cause skin and lung irritation in the short term, and lung cancer in the long.

Chemicals, including solvents, paints, glues, polyester and epoxy resins, and wood preservatives are also irritants and potential carcinogens. Most are aromatic (released in a gaseous form that can be breathed). Some also are absorbed through the skin, and some can be swallowed while you're eating if they are on your hands.

Refrigerants, including ammonia and freon, cause eye, throat, lung, and liver damage, asphyxiation in a closed space, and frost injuries. Fire extinguishing agents, such as halon and its replacements, cause eye and lung irritation, and in a few cases have actually killed people.

Carbon dioxide (CO₂) displaces oxygen and can be fatal in an enclosed space. Carbon monoxide, nitrogen dioxide, and sulfur dioxide are all toxic gases present in engine exhaust. Methane and hydrogen sulfide gases produced by rotting fish have killed crew members who entered a hold without a breathing apparatus. Recharging batteries produces hydrogen gas, which can explode if ignited by a spark.

Used motor oil causes cancer, and diesel fuel, expelled at high pressure from an open injector line, can pierce the skin and cause gangrene if not surgically removed quickly.

"Non-ionizing radiation" is the term for the infrared and ultraviolet energy emitted

by radars, low-pressure mercury lamps, microwave ovens, and from electric welding. People working with electronic devices and in sheet metal and welding are particularly at risk. Early signs of exposure include burning of skin or eyes and skin disorders, while chronic exposure can cause permanent eye damage, skin cancer, and birth defects.

People doing welding, soldering, brazing, and metal cutting breathe solvents, gases, acids, fumes from various metals including chromium, lead, and zinc; and they risk burns, irritation to the eyes, and injury from explosion due to mishandling of gas cylinders. Metal fume fever is a temporary flu-like condition, and long-term exposure can cause metal poisoning.

Please be sure that young children and dogs are kept completely away from the site of arc welding. They are attracted to the intense light of a welder and will watch it at length, unaware that it causes painful eye burns and permanent loss of sight.

Respirators, eye and hearing protectors, gloves, and protective clothing are the first line of defense against most of the common vessel and boatyard hazards. But protective items are effective only if they are maintained in good condition, if the user is informed of their necessity and trained in their use, and if the work is conducted in a generally safe environment. Maritime law places the full responsibility for ensuring safe working conditions squarely on the shoulders of the vessel owner and operator.

For more details on effects, prevention, and treatments for many of the above hazards, check the University of Alaska Sea Grant publication by Carl Hild called *Hazardous Materials On Board*. Another good source is *Vessel Safety Manual* published by the North Pacific Fishing Vessel Owners' Association. ♦