

Hot Work Safety on Hollow or Enclosed Structures in Shipyards

Hot work performed on hollow or enclosed structures on a vessel or shoreside can present hazards to workers, as well as the vessel and shipyard facility. Hot work includes welding, burning, brazing, and the use of powder-actuated tools or similar fire or spark-producing operations (e.g., cutting with abrasive or metal blades).

Hollow or enclosed structures, which employees work on, but that are not large enough for them to enter, may include: drums, inaccessible voids, sealed bulkheads, hatches and coamings, skegs, bilge keels, rudders, fairwaters, pipes or piping systems, pipe stanchions, masts, booms, lampposts, crane pedestals, lapped-plates, doubler-plates, railings, rub-rails, mooring bits and bollards, vents, container frames, box girders, cargo lids, sponsons, pontoons, floats, or buoys.

Such structures should not be confused with tanks or confined and enclosed spaces, which are large enough that workers can enter them. Work performed in such spaces must comply with requirements in 29 CFR 1915, Subpart B.

Explosion and Fire Hazards on Hollow or Enclosed Structures during Hot Work

- Flammable materials can catch fire or release toxic vapors;
- Toxic, corrosive, or irritant gases, liquids, or residues can cause injury to workers if inhaled or contact the eyes or skin;
- Combustible preservatives can explode when combined with an ignition source, such as hot work;
- Often contain saltwater that causes metal to rust, releasing hydrogen gas;
- Fuel oil, solvents, degreasers or cleaning chemicals may leak from adjacent spaces; and

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- Fluctuating temperatures can cause high pressure or vacuum effects, which can injure workers and damage property.

Prior to Doing Hot Work

- Always wear proper personal protective equipment (PPE) for the eyes, face, head, torso, extremities and respiratory system (i.e., clothing, gloves, eyewear, respirators, etc.) during welding, burning, brazing, or cutting operations.
- Inspect all areas that may be affected by the hot work to ensure that combustible materials are removed, covered, or isolated.
- Open all sampling ports to drain residual products.
- Have a shipyard competent person (SCP) inspect the structure and, if necessary, test for the presence of flammable vapors or liquids. A National Fire Protection Association (NFPA)-certified Marine Chemist may perform these functions (29 CFR 1915.14).
- When a sampling port is not available, drill a small hole into the structure to allow for air sampling and testing. Use a sharp bit and/or metal blade, and lubricate the drilling bit and/or metal blade with cutting oil or soapy water to help minimize the generation of heat and sparks.
- During testing, if any flammable vapors, liquids, or preservatives are detected, and a gas reading is determined to be above 10% of the lower explosive limit (LEL), carefully drill a second hole, further away, to ventilate by blowing compressed air through the structure at volumes and flow rates sufficient to lower the concentration below 10% of the LEL.
- After the structure is ventilated, a SCP, or a NFPA-certified Marine Chemist must retest the structure to ensure that it has been made safe before any hot work is performed.

Note: States with OSHA-approved state plans may have different requirements. See www.osha.gov.

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