



## **Safety Alert: Ventilation Procedures in Shipyard Employment**

This Safety Alert identifies ventilation-related hazards and procedures in shipyard employment and provides possible solutions for workers and employers to reduce injuries and fatalities in the maritime industry. Occupational Safety and Health Administration (OSHA) standards establishing minimum performance requirements can be found at 29 CFR 1915, Subpart B, C, and D.

Shipyard employers and workers **must** be fully aware of the variety of workplace hazards and dangers posed by toxic atmospheres. Where ventilation is not adequate, appropriate respirators will be necessary to protect workers.

### **Fast Fact:**

**Since 2000, there have been 12 ventilation-related fatalities in shipyard employment.**

### **Ensure the Following:**

#### **Proper evaluation and preparation of the work area....**

- Identify all potential harmful emission sources in work area.
- Ensure adequate access/egress, illumination and ventilation, keeping access/egress paths clear of ventilation equipment.
- Ventilate spaces to minimize worker exposure to harmful concentrations of fumes, vapors, gases, and other hazardous aerosols.
- Utilize explosion-proof mechanical ventilation rated by Nationally Recognized Testing Labs in potentially flammable atmospheres.
- Ensure that supplied-air is from a clean source and that the hazardous atmosphere is exhausted to a safe area, where the contaminated air cannot re-enter the air-supply system. Keep the ducts as short and straight as possible for efficient air movement.

#### **Proper work set-up:**

- Ensure that ventilation is adequate to maintain a safe atmosphere. A Shipyard Competent Person should be consulted before selecting a dilution and local exhaust ventilation system.
- **Local Exhaust Ventilation Systems** are typically composed of five parts: hood(s), duct(s), air cleaner(s), a fan and a stack (or fan discharge duct). Local exhaust ventilation is designed to capture and remove an airborne contaminant at or near its source, before the contaminant has a chance to disperse into the workplace air and potentially expose workers.
- **Dilution Ventilation** is a form of exposure control that dilutes the concentration of air contaminants (e.g., gases and vapors) before they reach the worker's breathing zone by mixing with uncontaminated air. It dilutes airborne contaminants by circulating (supplying and exhausting) large quantities of air throughout a work area. Additionally, acceptable oxygen content can be achieved and maintained in confined spaces by introducing outside air. The use of dilution ventilation to reduce the concentration of hazardous air contaminants in a workplace is almost always achieved by mechanical means.

#### **During the job:**

- Ensure that additional hazards are not introduced into the work area. Work in confined spaces need to be continually tested and monitored.

- Ventilation measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure should be made at least every three months.
- Ensure proper air flow in hoods. Check for: (1) fan rotation for reversed polarity, (2) fan RPM for belt slippage, (3) clogged or corroded fan wheel and housing, (4) clogged duct work, (5) closed dampers in duct work, (6) clogged dust collector, and (7) poorly designed duct work.
- Be alert to signs and symptoms of adverse health effects from overexposure to harmful contaminants.



**Improper Ventilation**



**Proper Ventilation**

### **Possible Solutions to Shipyard Ventilation Hazards:**

- Conduct a hazard assessment Job Safety Analysis to evaluate the specific work tasks, hazards and necessary control measures. Wherever practical, use engineering and work practice controls to aid in lowering worker exposures to hazardous substances.
- Consider mechanical ventilation or airline respirators in confined spaces.
- Maintain safe access/egress routes for enclosed and confined spaces.
- Under certain hazardous conditions, workers working in a confined space must be protected by airline respirators, and an employee on the outside of the confined space must be assigned to maintain communication with those working within it, and to aid them in an emergency.
- Train workers to identify and report potential unsafe hazardous atmospheric working conditions.
- Post warning signs as appropriate, and ensure that they are easily visible from all routinely used approaches to the work area.

#### **Discussion Leader Talking Points**

##### ***What this Safety Alert Covers:***

This Safety Alert identifies ventilation-related hazards and procedures in shipyard employment and provides possible solutions for workers and employers to reduce injuries and fatalities in the maritime industry.

##### ***Discussion Leader Duties:***

Distribute Safety Alert to shipyard workers in a safe and secure work zone and highlight and demonstrate key safety points, such as the need for inspection of hazardous atmospheres.

##### ***Discussion Notes:***

- Emphasize the importance of working safe, staying alert, and utilizing ventilation-related procedures in hazardous atmospheres.
- Discuss associated hazards improper ventilation poses.
- Discuss what environments and variables pose the greatest risk and how to mitigate that risk through the choice of proper ventilation methods.

#### **DISCLAIMER**

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