



Appendix B

Maintenance & Repair

Fire Watch Training

Fire Watch Training Guide 2022

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APPENDIX B

FIRE WATCH TRAINING GUIDE

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Fire Watch Duties

- Before hot work begins, **fire watches assist the welder in preparing the work space** according to the directions of the **Marine Chemist** and/or **Shipyard Competent Person (SCP)**.
 - o Know where the **Hot Work Permit** is located and what it says.

<u>SHIPYARD COMPETENT PERSON LOG</u>									
Vessel Name			Month/Year			Location/Pier			
Work Space			Marine Chemist Cert#						
SCP NAME	DAY	TIME	TEST RESULTS				Safe For Hot Work	Safe For Workers	Preparation
			O ₂ %	LEL	CO	TOXIC			
Instructions:									Flammable/Combustible materials removed 35 feet <input type="text"/>
Instructions:									Toxic Coatings removed 4 inches in all directions. <input type="text"/>
Instructions:									Foam Insulation removed 12 inches in all directions. <input type="text"/>
Instructions:									No-Char / Fire Blanket <input type="text"/>
Instructions:									Local Ventilation required <input type="text"/>
Instructions:									Area Ventilation required <input type="text"/>
Safe Entry Conditions: LEL = ≤10% Toxics= < PEL/TLV									
PPE NEEDED: <input type="checkbox"/> WORK GLOVES <input type="checkbox"/> WELDING HOOD <input type="checkbox"/> CHARGED FIREHOSE <input type="checkbox"/> SAFETY GLASSES/GOGGLES <input type="checkbox"/> HEARING PROTECTION <input type="checkbox"/> HARD HAT <input type="checkbox"/> RESPIRATOR/DUST MASK									

- **During hot work** fire watches shall have **no other** duties than to watch for fire or any other hazardous conditions, sound an alarm and attempt to extinguish **incipient** stage fires.
 - o This includes using hand or power tools, cleaning, sweeping or assisting someone with another task.

- After hot work, fire watches shall **stay** at the hot work site for a no less than **1 Hour**, unless the lead man or SCP surveys the exposed area and makes the determination there is not further fire hazard. (296-304-01011(3)(b)(iv) **This includes breaks, lunches and end of day or shift.**
- The Fire Watch shall have a **clear view** of, and immediate access to, each worker.
- **No more than 4 workers** performing hot work shall be attended by a single fire watch.
- Report directly to their lead person.
- Be alert and pay attention.
- Take **immediate action** when needed.

Physical & Health Hazards

- Adverse health effects that may be caused by hot work:
 - o Smoke or fume inhalation
 - o Burns from flying particles, sparks, flames or hot surfaces
 - o Flash burn from arc welding
 - o Loud noise from hand and power tools



Physical demands of fire watch duties include:

- o Exposure to inclement weather
- o Lifting or moving awkward and/or heavy tools and materials
- o Standing for long periods of time

- Tight or enclosed spaces

PPE & Clothing

- Protective clothing may consist of:
 - Long sleeve shirts and **pants** preferably made of cotton or other flame resistant material. These should be free from oil, grease or solvent stains Work boots or safety shoes. No open toed footwear.
 - Rain gear



- **Personal Protective Equipment (PPE)** available in the Tool Room
 - Shaded and Clear safety glasses
 - Ear Plugs
 - Gloves
 - Face Shields
 - Hard Hats
 - Respirators & Filters
 - Dust Masks
 - Personal Fall Arrest gear
 - Personal Floatation Device



- **Hi-Vis** vests will be issued and **must** be worn for easy identification.

Precautions for Hot Work

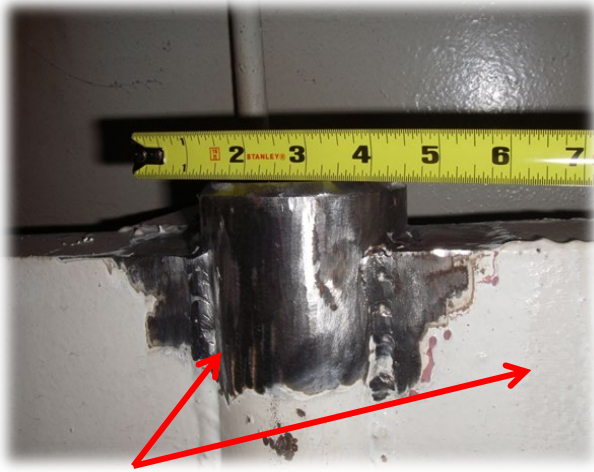
- **Barriers** are used to protect employees and surrounding area from arcs, sparks and fire.
 - o Examples are: Flash screens, curtains, fire blankets, wood or metal.



- Many different types of coatings can be found on vessel surfaces and may require removal prior to hot work.
 - o Polyurethane Foam Insulation – Must be removed in all directions from the area of heat application. **See your SCP for exact removal distance. Removed foam must be completely removed from the area.**
 - Flame retardant products such as “Fire and Ice” can be directly applied to the exposed surface for additional protection.



- Paint or other Preservative Coating – **Must be removed 4 inches** in all directions from the area of heat application.



Incorrect



Incorrect

- Removal of coatings on surfaces exposed to the weather creates a potential pollution hazard. **Preparatory work should be protected from the weather (wind, rain etc.) and the area cleaned frequently.**



Flammables & Combustibles

- Combustible Material - Shall be removed at least **35 feet** away from the hot work location. (ex: Plastic Garbage bags, hydraulic fluid, diesel fuel, cardboard, rope, plastic, paneling or other combustible surfaces)
- Flammable Liquids – Shall be separated **100 feet** from the hot work. (ex: Gasoline, acetone, Brakeclean, spray paint)

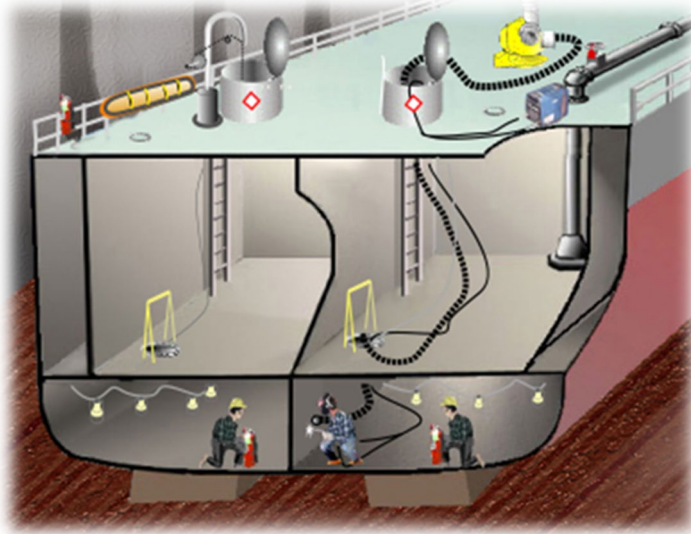


Slag, Splatter, Sparks

- **Sparks** and splatter can easily **fly** through small openings or under materials where they can **smolder** or **ignite** with dust or other materials.
 - Slag, sparks, splatter may smolder and create fires long after the work has stopped.
-
- Adjacent decks, bulkheads, overheads, pipes, partitions may require the same level of protection and preparation as the area of direct heat application.
- Any questions should be referred to the welder or Shipyard Competent Person

VENTILATION

- **Ventilation is required for all hot work.** The Tool Room has fans, blowers and ducting for setting up customized ventilation for each job.



- Types of Ventilation
 - o **Natural Ventilation** – Unassisted movement of the air. Typically, inadequate for respiratory protection.
 - o **Area Ventilation** – Moves large volumes of air in a space or room using large fans.
 - o **Local Ventilation** – Removes the smoke and fumes directly at the source of generation. This requires ducting using blowers and smaller ventilation hoses.



Nature of Fire

- The Basics of Fire

- The fire triangle or combustion triangle is a simple model for understanding the ingredients necessary for most fires.



- The triangle illustrates that a fire requires three elements: **heat**, **fuel**, and an **oxidizing agent (usually oxygen)**. A fire naturally occurs when these three elements are combined in the right mixture and can be **PREVENTED by removing** any one of them.

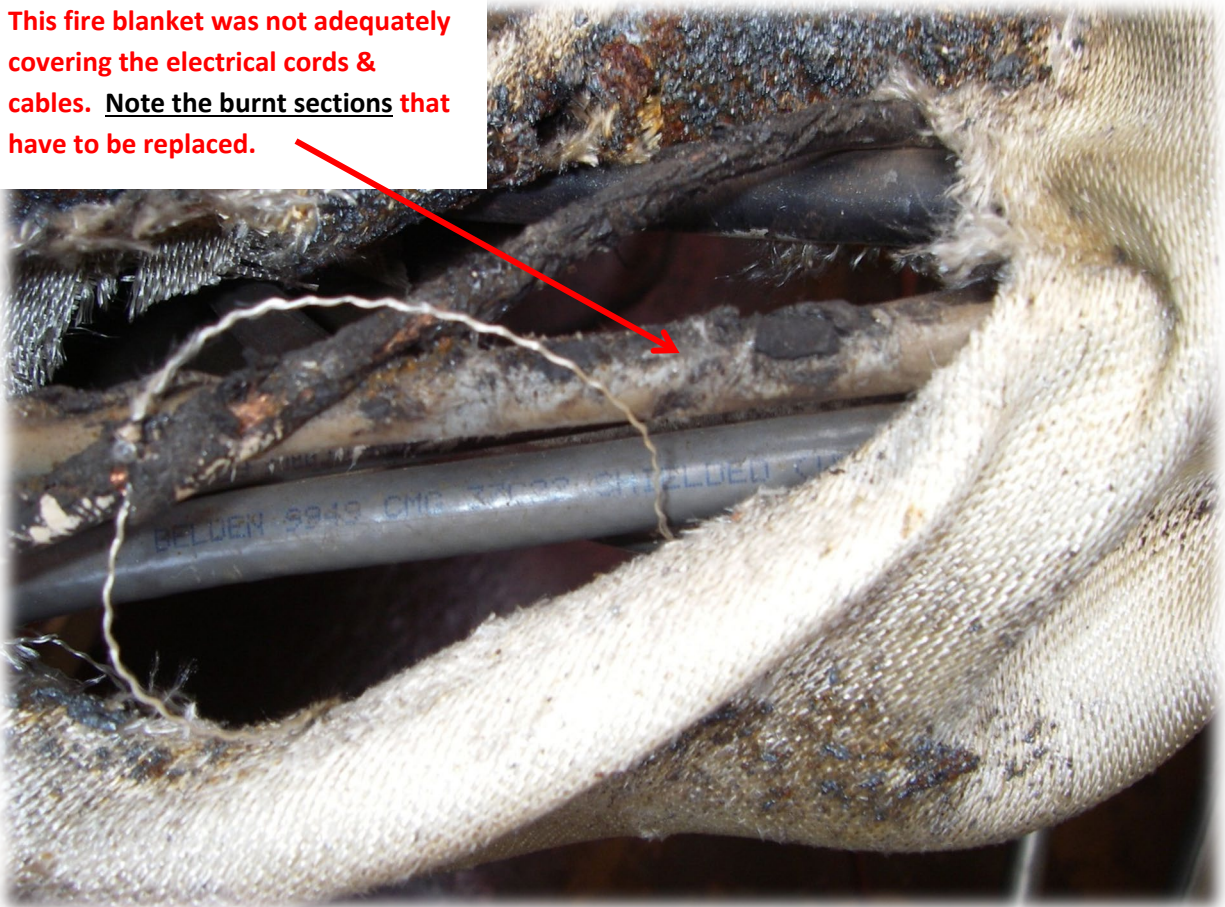
- Fire Detection

- **Hot Spots** – Are created on the adjacent side of bulkheads and decks when hot work is performed for sustained periods of time. The metal may smoke or become red hot. If there is a coating of foam or paint it may turn black, bubble up or start burning.








- **Smoke** – Is a sign that a combustible material is close to flaming up or is already on fire.
 - **Smell** – Stay conscious of the smells in your work area. Even before a fire breaks out, paint, foam, wood and other materials will begin creating an odor as they become heated.
 - **Visual** – Don't just focus on the area of heat application. Be alert and keep a visual on all the areas where sparks and splatter could go.
- **Radiation or Combustion**
- Flames or welding arcs do not have to physically touch something to create a fire. The surrounding area can heat up and catch small dust particles, foam bits or other tiny pieces of debris on fire.
 - Heat buildup can also make liquids turn into ignitable gasses. Hot work is not allowed in or on spaces that contain or have contained flammable liquids, **without a Marine Chemist certificate.**

This fire blanket was not adequately covering the electrical cords & cables. Note the burnt sections that have to be replaced.



Classification of Fires and Extinguishment Methods

A		Common Combustibles	Wood, Paper, Cloth, Etc.
B		Flammable Liquids & Gases	Gasoline, Propane other Solvents
C		Live Electrical Equipment	Computers, Fax Machines, Etc.
D		Combustible Metals	Magnesium, Lithium, Titanium
K		Cooking Media	Oils, Lards, Fats

- Class A Fire

- Fires involving ordinary combustible materials, such as wood, cloth, paper, rubber and many plastics.
- **Water from a fire hose** is the best method. The ABC fire extinguisher issued from the Tool Room can also be used.

- Class B Fires

- Fires involving flammable liquids, greases and gases.
- **Use the ABC fire extinguisher or a misty spray from fire hose (not a direct stream).**

- Class C Fires

- Fires involving energized electrical equipment.
- If possible the electrical source needs to be de-energized.
- Use the ABC fire extinguisher issued from the Tool Room on Class C fires. This fire is best extinguished with Carbon Dioxide
- **Do not spray water** on electrical fires. It poses a shock hazard.

- Class D Fires

- Fires involving combustible metals, such as magnesium, titanium, zirconium, sodium and potassium, burn at extremely high temperatures.
- Call the Fire Department Immediately.
- Neither the water hose nor the portable fire extinguisher will put out these types of fires. They can be used to cool the surrounding areas until the Fire Department arrives.

Stages of Fire

- Incipient Phase (Growth Stage)
 - In this first phase, the fire is small but may be producing a flame temperature well above 1,000°F (537°C).
 - This fire should be no larger than a trash can. Evacuate if it grows larger.
 - Only fight this type of fire if it's possible to stay clear of the smoke.

- Free-Burning Phase (Fully Developed Stage)
 - During this second phase of burning, oxygen-rich air is drawn into the flame as the rise of heated gases carries the heat to the upper most regions of the space. One breath of this super-heated air can sear the lungs.
 - At this point, the temperature in the upper regions can exceed 1,300°F (700°C).
 - **DO NOT ATTEMPT to fight this stage of fire!**

- Smoldering Phase (Decay Stage)
 - In the third phase, flame may cease to exist if the area of confinement is sufficiently airtight.
 - During this stage the burning is reduced to glowing embers. The space becomes completely filled with dense smoke and gases to the extent that it is forced from all cracks under pressure.
 - **DO NOT ATTEMPT to fight this stage of fire!**



Using the Extinguisher & Fire Hose

- **PASS** – This system will help to remember the basics of using an extinguisher to fight a fire.

P Pull the pin out of the extinguisher handle.



A Aim at the base of the fire.



S Squeeze the handle.

S Sweep back and forth at the base of the fire.



- **Fire Hose** – Using the fire hose is similar to the extinguisher.
 - o AIM – Aim at the base of the fire
 - o TURN – Turn on the fire nozzle
 - o SWEEP – Sweep back and forth at the base of the fire



Important:
When turned on the valve handle must point in the same direction as the hose.

NOTE: If the fire is located behind a panel or wall and the base of the fire cannot be accessed, try to direct the water in the direction that will most quickly reach the flames.



Recognizing and Reporting Unsafe Conditions

- It is **everyone's** job to recognize and immediately report, or take care of unsafe conditions to their supervisor, shipyard competent person, and/or other person in authority.
- **Unsafe conditions include:**
 - Changes in the conditions set by the Marine Chemist or Shipyard Competent Person.
 - Example: The accumulation of flammable or combustible liquids, gasses, or materials in the vicinity of hot work.
 - **Failure** of the ventilation system
 - Cutting torch hoses **left unattended** in a confined or enclosed space.
 - **Trash** should be in the proper receptacles and emptied at the end of each day or shift.
 - Accumulation of **dirty or oily** rags.
 - Painting activity in the vicinity of hot work.
 - **Entangled** welding leads, cutting torch hose lines, fire hoses, electrical cords, etc., can make evacuation and response difficult.



DO NOT FORGET: If there is anything about the job that appears to be unsafe...**YOU** have the authority to stop the work and **immediately** get the Shipyard Competent Person or other supervisor.

Alerting & Communication

- The fire alarm procedure at this facility is verbal communications on board the vessels.

FIRE...FIRE...FIRE!!!

- On the vessels, fixed fire suppression systems protect engine rooms and other large enclosed spaces which sound an approximately 30-second siren prior to flooding the protected area.
 - o **Fixed Systems** – The facility buildings and vessels have fixed fire systems in certain locations. On the vessels **DO NOT PULL a fire alarm**, alert a crew member and evacuate. The fixed systems aboard vessels remove oxygen you must evacuate within 45 seconds.
- Trident Seafoods Tacoma facility has an alarm system that is activated by pulling any fire alarm. The entrance guard shack can also activate an electronic siren that alerts everyone to evacuate.
- Procedures for Reporting Fires
 - o **Stay Calm. Alert everyone in your area.**
 - o **If the alarm has not yet sounded, contact your supervisor.**
 - o **Evacuate the area if the fire is not containable.**
 - o **Supervisory personnel will contact the fire department and management.**

REMEMBER:

When escaping or exiting from an area where there is smoke from a fire **STAY AS LOW AS POSSIBLE** while making your escape. The most breathable air will be very near the deck or ground.

911 Emergency

Evacuation

- **Everyone** is to evacuate the space/vessel immediately once the verbal alarm is sounded.
- ALWAYS **know the way out** of the vessel or building to the dock or the facility parking lot.
- If there is only one exit, as may be the case when working in confined spaces, try to stay between the exit and potential ignition sources to **avoid becoming trapped**.
- Always be aware of the various routes out of the interior of the vessel to the gangway or other exit to the dock in the event that one route may be blocked by fire.
- It is recommended that flashlights are carried when on board a vessel.
- If it's necessary to go through smoke filled areas **stay low**, cover your mouth and nose with a clean, and wet if possible, rag, cloth, shirt, etc.
- If possible close all windows and doors on the way out to help prevent the fire from spreading.
- Proceed away from the building or vessel and head to the designated Safe Zone outside the Guard Shack and **underneath the light poles**.



- **Stay clear** of all fire lanes and access to the facility.
- Do not return to the work space until given "All Clear" by the incident commander.
- **Notify** your supervisor if someone remains on the vessel, in a space or a building.

References

OSHA

29 CFR 1915 Maritime

Subpart D: Welding, Cutting, and Heating

Subpart P: Fire Protection in Shipyard Employment

1915.504 – Fire Watches

1915.508 – Training

29 CFR 1910 General Industry

Subpart Q: Welding, Cutting and Brazing

Title 33 CFR Part 154 – Facilities Transferring Oil or Hazardous Material in Bulk

Subpart D – Facility Operations

DOSH

WAC 296-24-Part (I): Welding, Cutting and Brazing

NFPA 51B: Standard for Fire Prevention in Use of Cutting and Welding Processes

NFPA 306: Standard for the Control of Gas Hazards on Vessels

NFPA 312: Standard for Fire Protection of Vessels during Construction, Conversion, Repair & Lay-Up

International Fire Code: Chapter 26 “Welding and Other Hot Work”

Tacoma Fire Department – Annual Hot Work Permit Requirements