



SHIPBUILDER HANDBOOK

Environmental, Health & Safety

CONTRACTOR AND EXTERNAL CUSTOMER EDITION



INGALLS
SHIPBUILDING
A Division of HII



Shipbuilder Environmental Health & Safety Handbook

CONTRACTOR AND EXTERNAL CUSTOMER EDITION

Preface

This edition of Ingalls Shipbuilding's *Shipbuilder Environmental Health and Safety Handbook* is provided so that our contractor partners and external customers can reference the occupational health and safety rules, regulations and requirements that keep all who work at our facilities safe and injury/illness-free.

Ingalls safety programming has been developed to ensure compliance with the Occupational Safety and Health Administration's (OSHA) standards. The content of this handbook has been excerpted from the *Shipbuilder Environmental Health and Safety Handbook* used by all Ingalls Shipbuilding direct employees; therefore, there may be references to the Ingalls' Safety Management System's written programs, documents, and forms. If further information, clarification, or access to the detailed written programming from which this handbook is derived, contact the EHS Department's Safety Engineering Office at (228) 935-2100 for assistance.

All contractor companies have the same obligations and responsibilities towards providing a safe workplace for their employees, as directed by OSHA's standards, that Ingalls has towards our own employees. However, to maintain a safe and healthy workplace for all, contractors must reconcile any differences between their written safety programming and that of Ingalls, while working at our facilities. Many of Ingalls' safety and health requirements exceed the minimal requirements set forth by OSHA, so it is important that contractors become familiar with the mandatory Ingalls Shipbuilding safety management system and facility regulations.

Again, if a contractor has conflicts or obstacles with fully complying with Ingalls Shipbuilding's requirements or seeks additional information or assistance, contact the Safety Engineering Office.



Message from Ingalls Shipbuilding President Brian Blanchette



People are the most important reason we do what we do, as well as the most critical ingredient in how we do it. Our sense of community within the shipyard empowers us to tackle some of the most challenging tasks every day, all while supporting one another. As we work to strengthen our legacy, we continue to keep safety our top priority above everything else. Taking care of ourselves and those around us — both at work and at home — is crucial in this highly dynamic environment.

Our commitment to a robust environmental, health and safety program is vital. It requires us to adhere to the extensive policies, procedures and processes designed to keep everyone safe. We must hold ourselves and each other accountable to these systems to minimize risk and maintain a safe, healthy workplace. Our dedication to one another necessitates that we ensure everyone adheres to these standards.

No system of administrative, mechanical or operational safeguards is complete without everyone on the team maintaining a constant state of alertness, cooperation, and safety awareness. This includes shipbuilders, subcontractors, suppliers, customers and visitors alike. Safety is a team effort.

We expect everyone entering this shipyard to understand and follow the policies, procedures, and processes outlined in this handbook. Adhering to the guidelines of the environmental, health and safety program is essential to maintaining a safe workplace. Each person on this team is important, and I ask for your personal commitment, as you have mine, to do everything possible to take care of one another. Simply stated, if you know what you're supposed to do, do it. If you have any doubt, ask someone.

Thank you for being an Ingalls shipbuilder and for your dedication to strengthening the legacy of a world-class environmental, health and safety culture.

Brian Blanchette
President, Ingalls Shipbuilding
Executive Vice President, HII

Message from the Director of Environmental, Health & Safety Brian McVey



Environmental, health and safety within the shipbuilding industry has come a long way over the years. Although shipbuilding may be among the most dangerous industries, the number of shipbuilders injured each year has fallen dramatically over the past decades. At Ingalls Shipbuilding, we are proud of the effort all of our shipbuilders have put into reducing injuries and illnesses at work and at home and making our environmental, health and safety program a leader in our industry.

From new hire training to shipbuilder involvement to injury management, Ingalls has many proactive programs within our EH&S management system. Our programs, processes and procedures help protect our shipbuilders and the environment and ensure compliant, effective response whenever mishaps occur. In addition to our written programs, we have a full complement of safety and environmental professionals, medical staff and fire department.

However, the most important parts of any successful EH&S program are the individual shipbuilders that contribute daily to the safety and well-being of themselves, their co-workers and our environment.

As an Ingalls shipbuilder, contractor, vendor or visitor — everyone has the authority and responsibility to stop any activity they feel could jeopardize the safety, quality or ethical operation of our company. "If you see something... say something!"

Always remember — it is the everyday action of everyday shipbuilders that is the single most influencing force in our safety, our business and our success. Carefully consider what your everyday actions should be. What you do today truly matters!

Brian McVey
Director, Environmental, Health & Safety
Ingalls Shipbuilding

Company Values



INGALLS
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INTEGRITY

SAFETY



HONESTY

ENGAGEMENT



RESPONSIBILITY

PERFORMANCE

Live Our Values!



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Our Priorities

1. SAFETY

Working safely every day in everything we do, while also looking out for our fellow employees

2. QUALITY

Ensuring first-time quality of our products and processes while focusing on continuous improvement

3. COST

Delivering our products for the contract amount

4. SCHEDULE

Delivering all of our products on time during each phase of the project





Ingalls Shipbuilding Environmental, Health & Safety Policy

Ingalls Shipbuilding is committed to:

- Full compliance with laws, regulations and policies that protect people and the environment
- Prevention of pollution, injuries and illness
- Involvement of employees, customers and suppliers
- Continuous improvement

Ingalls Shipbuilding operates in a manner that is protective of the:

- Health and safety of its employees, visitors and customers
- Communities in which it operates
- Environment

Ingalls Shipbuilding strives to sustain EH&S excellence by:

- Allocating and sustaining adequate resources
- Complying with applicable EH&S laws and regulations
- Assigning EH&S responsibilities with accountability
- Implementing appropriate procedures and self-governance
- Integrating EH&S requirements into planning, design, and modification activities
- Responding to new and emerging EH&S requirements
- Implementing waste minimization and pollution prevention programs
- Implementing injury and illness prevention programs
- Communicating with employees, customers, suppliers, the general public, law makers and regulators
- Participating in legislative and public review processes to promote EH&S laws and regulations that are protective of human health and the environment
- Sharing and adopting industry best practices
- Training employees and contractors
- Participating in Huntington Ingalls Industries Environmental, Health & Safety Leadership Council initiatives
- Conducting periodic evaluation of its EH&S programs
- Continuing to improve EH&S performance through process improvement initiatives

Contact Numbers



ORGANIZATIONAL RESPONSE	LAND LINE WITHIN THE YARD	CELL PHONE
Safety Concern or Hazardous Condition	911 or ext. <u>2100</u>	(228) 935-2100
Environmental Concern or Spill	911 or ext. <u>6101</u>	(228) 935-6101
Fire, Medical or HAZMAT Release Report	911 or ext. <u>6101</u>	(228) 935-6101
Physical Security and Plant Protection	Security Hotline ext. <u>3273</u> or ext. <u>0020</u>	(228) 935-3273
Security-Visitor Control, and Badging	ext. <u>8446</u> or ext. <u>2360</u>	(228) 935-8446 or (228) 935-2360
Safety Data Sheet Information	ext. <u>2100</u>	(228) 935-2100
Ingalls Shipbuilding Open Line	1-(877) 631-0020	1-(877) 631-0020
Shipyard Competent Person or Arranging for a Marine Chemist	ext. <u>2100</u>	(228) 935-2100
Maintenance Dispatch	ext. <u>2400</u>	(228) 935-2400
Safety Center (Formerly known as the Safety Store)	ext. <u>3375</u>	(228) 935-3375
Emergency Safety Hotline (Weather and Yard Closing/Opening Related)	1-(877) 871-2058	1-(877) 871-2058



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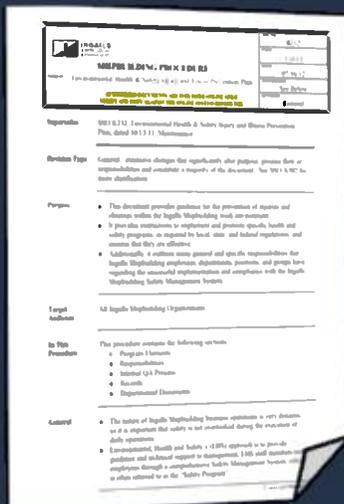


EH&S Injury and Illness Prevention Plan (I2P2) and General Programs and Procedures

EH&S Injury & Illness Prevention Plan (I2P2)

Ingalls Shipbuilding's I2P2 is a written program that identifies many of the procedures and responsibilities for conducting shipbuilding work in the safest manner possible. It is also an overview of our Safety Management System, commonly referred to as our "Safety Program." It describes the roles that specific employees have in interfacing with our Safety Management System, from hourly-represented employees to various management teams to the EH&S Department, everyone has safety responsibilities and duties.

Many elements of our Safety Management System are defined in written programs, procedures, work instructions and guidance. These documents make up our written safety program and are maintained in Ingalls' electronic repository for documents called Command Media.



Many of the topics in this handbook are covered in more detail in their corresponding Command Media documents and have specific document identifiers to enable quickly locating the most up-to-date version. For example, the I2P2 program is known as (SSO K232) EH&S Injury and Illness Prevention Plan. Anytime an employee would like to review a copy of a written safety program document, they should let their supervisor know that they would like a copy, contact a Safety-Fire Prevention (S-FP) Staff representative, or call or visit the (S-FP) Department (ext. 2100).

Shipbuilder Responsibilities

All shipbuilders are responsible for preventing injuries and illness, and the I2P2 explains the general and specific duties to eliminate conditions and behaviors that are an unacceptable risk to employees safety and health. The following list contains many of the general safety and health responsibilities that shipbuilders have, but it is not an all-inclusive list:

- Conduct a pre-use visual inspection of all tools, equipment, lines, cords, hoses, materials, PPE and work area
- Review the EH&S program procedures that are applicable to the work environment or job and always comply with those requirements
- Complete required EH&S training and certification courses applicable to the work environment and job
- Ask questions if unsure of any safety-related issue or situation
- Use a STOP badge and halt any unsafe activity, behavior or process that is observed
- Wear all required PPE to control exposures within the work area
- Get involved! Attend safety meetings and participate in corrective action activities or continuous improvement initiatives
- Be aware of the location of our Hazardous Communication Program and Safety Data Sheets and understand container-labeling requirements
- Report any unsafe conditions, including chemical spills and at-risk behaviors, to management and/or an EH&S staff member
- Get involved in the Near Miss Program

- Immediately inform management when an occupational injury or illness occurs, regardless of severity
- Conduct a "Take 5 for Safety" job-site inspection prior to the start of the work shift
- Never come to work under the influence of alcohol or controlled substances and notify management or the Medical Department when an illness or medication impairs your ability to perform required tasks, climb, operate any equipment or vehicles or use any hazardous materials
- Do not make unauthorized repairs or modifications to equipment, tools or PPE
- Immediately report any defective item to management
- Unless otherwise instructed, use only Ingalls-issued tools, equipment or PPE to perform your tasks
- Shipbuilder-supplied tools must be in good condition, inspected on a regular basis and approved for use by management
- Always show up to work well rested, hydrated, wearing proper work apparel and not wearing jewelry that could cause or contribute to an injury



The “STOP is Good Progress” Badge

One of the most important ways for employees to correct hazardous conditions and activities before they become a serious mishap is the STOP Badge program. *STOP is Good Progress Badge* (SSO K202) contains the full program details.

The STOP Badge is designed to empower every shipbuilder at Ingalls Shipbuilding with the ability to stop any act or process they believe to be unsafe, unethical or poor quality, contrary to our company priorities (Safety, Quality, Cost and Schedule) or in opposition to our leadership behaviors to:

- Seek and tell the truth
- Take ownership and be accountable
- Make and meet commitments
- Communicate openly and honestly



Any employee that witnesses an act or condition mentioned above has the authority and obligation to pull his STOP Badge and bring attention to the situation. No employee will be disciplined for stopping a situation that they believe to be unsafe. Any employee that feels they have received retaliation for using the STOP Badge should call the Ethics Open Line immediately at 1-877-631-0020. Retaliation is not tolerated at Ingalls Shipbuilding and will be investigated with the possible results of disciplinary action being administered up to and including discharge.

Any employee that fails to stop or acknowledge the use of the STOP Badge when used by a fellow employee shall be subject to disciplinary action in accordance with *EH&S Enforcement Discipline Safety Control Program* (SSO K200).

“Take Five” Pre-Job Inspection Program

The intent of a pre-job inspection is to identify and eliminate hazards and thereby reduce the risk of injury and illness to our production workforce. Ingalls’ pre-job inspection process is described in *“Take Five” Supervisor’s Pre-Job Inspection Program* (SSO K229).

“Take Five” is a two part, risk reduction initiative consisting of a Take Five Hazard Review as well as Take Five Work Area Inspection. This ensures that prior to beginning job assignments:

- employees are suitably equipped for work
- employees have been made aware of hazards and controls associated with specific tasks and locations
- Job sites undergo a visual inspection and hazard recognition effort by supervisors and craft shipbuilders
- All observed work area hazards are abated or properly controlled and documented
- Work areas are free of recognized safety hazards or all required hazard controls are in place, and foremen and craft shipbuilders document their concurrence of such with their signatures

Each main production craft has their own specific Take Five form. The forms list the specific personal protective equipment (PPE) required for the tasks that each craft would execute. There is a full listing of all of the Take Five forms in the Appendix of this handbook.

Emergency Action, Communication and Injury/Illness Management

Emergency Action

Ingalls Shipbuilding has a written Fire Safety Plan that covers all the actions that shipbuilders must take to ensure our safety in the event of a fire. The Fire Safety Plan defines the fire protection program for all Ingalls facilities, as well as establishes individual actions and responsibilities during emergencies. The written plan includes:

- Identification of significant fire hazards and ignition sources
- Procedures for recognizing and reporting unsafe conditions
- Alarm procedures
- Procedures for notifying employees of a fire emergency
- Procedures for notifying fire response organizations of a fire emergency
- Procedures for evacuation
- Procedures to account for all employees after an evacuation
- Individuals who can be contacted for further information about the plan



The written Fire Safety Plan is reviewed annually and is always accessible to Ingalls employees and on-site contractors by contacting the (S-FP) Department (ext. 2100) or by accessing it in Command Media by its formal title, *Fire Prevention, Protection & Response Plan FPPRP Manual*. (SSG K0400).

The occurrence of certain emergencies is cause for the immediate evacuation of facilities in a safe, orderly fashion. These emergencies include, but are not limited to, fire and/or smoke, indications of such by fire alarm, bomb threat, or loss of electrical power (blackout).

In the event of a building or a ship alarm being activated, all employees shall evacuate the building or ship and assemble at a predetermined location where supervision will account for their personnel. Supervision must then report to the On-Scene Fire Commander at the fire truck, if they have any missing employee.

On vessels, evacuation begins with the abandon ship alarm. On **landside**, the evacuation shall immediately commence when the fire alarm has sounded or a public address announcement directing ship or building evacuations has been made. During any evacuation, elevators are not to be used. Evacuate using the nearest exit and the closest stairway.

Assembly areas are pre-determined by the Ingalls Fire Department (IFD) and are posted in buildings requiring assembly areas. If the abandon ship alarm sounds, complete evacuation of the vessel is required. However, if conditions do not favor establishment of assembly area at the designated location due to smoke, burning debris, etc., the assembly area must be quickly established where these hazards do not exist but still should be in sight of the original area wherever possible. Smoking is prohibited in assembly areas at all times. All occupants must stay in their designated assembly areas, regardless of if the alarm has stopped, and wait for further instructions. An "all clear" will be issued by the IFD when conditions are resolved, and no one is permitted to re-enter the building or vessel without the IFD's permission.



Ingalls Fire Department has a full complement of firefighting equipment

Emergency Information & Signals

Any person discovering a fire shall immediately, if on a ship equipped with a temporary fire alarm system, activate the nearest fire alarm signal box; or, if on a ship equipped with ship's installed telephone and 1-MC fire alarm system, immediately dial 2211. If a fire is confirmed, they shall advise the shipboard CASCON by sound powered phone or by ship's telephone, who, in turn, shall immediately call the Command & Emergency Operations Center (CEOC) by dialing 911. The alerting party shall dispatch someone to meet the responding firefighters at the arriving firetruck and quickly direct them to the fire scene.



Building Fire Alarm— This evacuation signal consists of an intermittent siren and flashing strobe, a traditional fire bell or voice direction by intercom

Shipboard Fire Alert Alarm— This signal shall consist of a constant monotone sound

Abandon Ship Alarm— This signal shall consist of an oscillating high-low sound accompanied by the flashing of all temporary lights and ship's service lighting onboard ship

Flooding Alarm— This signal shall consist of an automatic beep-beep sound

Cease Hot Work Alarm— Notification shall be accomplished by voice announcement over the Public Address (PA) system identifying the area of the ship where all hot work is to be immediately halted until further notice

Emergency Contacts

Ingalls Fire Department has a full complement of firefighting equipment.

Individuals who discover a fire or other emergency on Ingalls property shall immediately notify the CEOC by dialing 911 on any yard phone or 228-935-6101 on a cell phone. Activating a manual pull station will also notify CEOC. For offsite locations that do not have access to a yard phone, call local 911 first and then call the CEOC using the numbers for cell phone use and supply CEOC the emergency information.

Any time you are reporting an emergency the following information will be needed from the caller:

- Nature of call (fire, medical, or HAZ-MAT)
- Caller name and call back number
- Location where the response is needed
- Type of injury or incident

Situational Awareness (SA)

Situational Awareness

The largest percent of mishaps occur due to human error and one of the most common human errors is called Loss of Situational Awareness. Situational Awareness (also referred to as Situational Perception) is the ability to recognize, by sensory cues, then process and comprehend the critical information about what is happening to (or around) you or those working near you. You then must make an appropriate decision regarding personal safety. More simply, it is knowing what is going on around you and avoiding dangerous situations. When you do not realize what you are doing or what is happening in and around your work area, you are far more likely to exhibit at-risk behaviors or allow unsafe conditions to develop. As your SA drops your risk for a mishap rises. When you maintain a high level of SA, you can readily "size up" the sights, smells and sounds around you and then predict what could be too risky. You can then avoid potentially unsafe situations.

CLUES TO DIMINISHING SITUATIONAL AWARENESS

EXAMPLES

Confusion	<ul style="list-style-type: none"> • Unsure if you are in the right place, using the right materials in the correct manner or not understanding written or verbal directions
You stop actively looking for hazards	<ul style="list-style-type: none"> • Failing to conduct a pre-use inspection of tools, lines and equipment • Not taking the time to read signs, warnings or procedures
You begin using improper procedures	<ul style="list-style-type: none"> • Unsure if you are in the right place, using the right materials in the correct manner, or not understanding written or verbal directions
You allow your performance to become a departure from regulations	<ul style="list-style-type: none"> • Beginning hot work before checking both sides of surface or removing combustibles • Not ensuring that you have "NO HOT WORK OR OPEN FLAMES" signs posted prior to painting • Not wearing required PPE
You become less effective and may miss your planned work targets	<ul style="list-style-type: none"> • Having to stop and start a task because you don't already have all of the required hazard controls in place such as lighting, ventilation and access
Even if you notice discrepancies or conflicting information, you fail to act on figuring out what is wrong	<ul style="list-style-type: none"> • You smell strong paint vapors but do not see painters or NO HOT WORK signs, so you decide to do hot work anyhow • You didn't hear everything your foreman mentioned about safety precautions during the Take Five but you ask for clarification prior to starting your job.
Ambiguity	
Fixation or Preoccupation	<ul style="list-style-type: none"> • You are walking to your work area while talking on your phone or texting and you do not see the crane track in your path • You are thinking about upsetting personal issue at home and forget to wrench-tighten your torch line

Clues to Losing Situational Awareness

The loss of SA can occur slowly over time, but often leaves clues or signals that it is happening. Recognizing and understanding these signals may warn of lost or diminished SA. If you find yourself having difficulty paying attention or staying on task, you may be experiencing less-than-optimal SA. Realizing your SA is not where it should be is the first step in improving it. The table on the next page gives examples of clues that your SA may be slipping

Barriers to SA

When trying to maintain SA, it is important to understand that there are barriers that can hinder concentration, scatter focus and increase risks. The behaviors that block SA are generally controllable, so it is important that everyone is aware of these behaviors.

BARRIERS TO SITUATIONAL AWARENESS	EXAMPLES
Perception based on faulty information processing	<ul style="list-style-type: none"> Acting on information based on your knowledge When something looks similar to what you're familiar with, you may react as if it were the same
Excessive Motivation	<ul style="list-style-type: none"> Rushing to complete a task at all costs, hurrying to get to a meeting, or an all-out effort to finish before quitting time can cause you to not notice changes around you as you barrel on
Complacency	<ul style="list-style-type: none"> Assuming everything is under control affects vigilance When things are slow, tasks are routine, and/or when you have completed your task complacency can occur and you may shortcut hazard controls
Overload	<ul style="list-style-type: none"> Overload causes distractions, fixation, increased errors and high stress Prioritizing tasks, seeking assistance and minimizing job distractions can improve safety in conditions of overload.
Fatigue and Heat Stress	<ul style="list-style-type: none"> Getting plenty of sleep, eating properly, remaining properly hydrated and adjusting work routines are ways to avoid allowing your physical health to affect your ability to concentrate on your tasks and work environment activities
Poor Communications	<ul style="list-style-type: none"> The level of SA achieved is related to the level and quality of communications observed by you and those working around you Listen carefully and take time to ensure you understand instructions Openly and clearly communicate your intentions with those around you

Maintaining Situational Awareness

A key component of SA maintenance is effective communication. Much of what we are expected to do in the workplace is based on communication, so naturally poor communication directly affects performance. The large amount of information processed by the workforce and the many necessary interactions within and between craft crews, work teams and various other departments provides the opportunity for human error. The level of SA achieved is related to the level and quality of communication. Effective work teams are alert to errors and use assertive communications to alert others to the problem.

Like any skill, practice makes perfect and the more you actively conduct these Situational Awareness maintenance tips, the safer you will work.

The following table describes specific methods and examples for maintaining Situational Awareness.

MAINTAINING SITUATIONAL AWARENESS

MAINTENANCE OF SITUATIONAL AWARENESS OCCURS THROUGH EFFECTIVE COMMUNICATION AND A COMBINATION OF THE FOLLOWING ACTIONS:

Recognize and make others aware when deviations from the standard procedures start occurring.

Comment clearly and specifically. Correct the process so that it follows procedures and requirements.

Monitor what others working with or around you are doing.

When hazards are developing or at-risk behaviors are occurring, step up and use your STOP Badge.

Provide information in advance.

Do not wait to be asked! If you have information critical to the safety of the workplace, speak up!

Identify potential or existing hazards.

Inspect your work area before starting and conduct a pre-use inspection on all tools, equipment, leads, lines, hoses, PPE, etc. Abate all hazards before proceeding with work. Ask if you are unsure of a hazard or its control.

Demonstrate awareness of task performance.

Know how your job and those of shipbuilders working around you contribute to the overall mission. Understand how job tasks may have to be managed, such as hot work and painting, that must be done at separate times.

Communicate a course of action.

Let those around you know where you are going or what you intend, such as having personnel move out of the way until a crane lift passes overhead.

Continually assess the situation.

As your work environment changes, hazard controls may as well. Make sure that signs or barricades are still in place and ventilation and lighting are still on. Periodically re-inspect your tools and equipment.

Clarify expectations.

Understand that clear expectations lead to safe work performance. The expectations that are made of you and the attention and cooperation that you expect from those you are working with are equally important.

NOTE: Texting, using or reading a phone, tablet, document or any other item or device while walking or driving is a safety violation. If you must talk, text or read, you **MUST** stop and stand in a safe location until finished and your items/devices are secured.



Maintaining a high level of SA will allow you to anticipate that there may be improperly routed lines at the top of the stair trunk.

When you are not aware of hazards around you, you may not see the lines, hang your foot in them and subsequently fall down the stairs



Certain things always reduce Situational Awareness

Safety Signs

As previously established, a key component of SA maintenance is effective communication. Safety signs communicate critical information and quickly allow us to understand what is or could be, happening around us, and whether or not special hazard controls are needed for employee safety. Within a shipyard, there are a number of important signs, each alerting shipbuilders to a caution or warning to be heeded.

The following page displays examples of some of the signs that are posted within the shipyard. Compliance to safety signage is mandatory and violations will warrant enforcement discipline. Always consult with your area S-FP staff member or the EH&S office if unsure of the meaning or requirements of safety signage.



Safety signs used in communicating scaffolding hazards and hazard controls



Safety signs used in communicating inert gas purging operations



Safety signs used in communicating specific confined/enlosed space entry restrictions



Safety signs used in communicating specific access restrictions



Safety signs used in communicating hot work restrictions





Safety signs used in communicating hazardous material requirements

Safety signs used in communicating various warnings



Safety Barricading & Restricted Access

There are times when shipbuilding operations may present hazards to pedestrians and employees in an area who may be unaware of ongoing activities. A few examples are:

- Overhead work with falling object hazards
- Temporary removal of deck opening covers to accommodate material handling
- Removal of a deck-edge guardrail to join two assemblies
- Slag or process fire falling or being blown into a pedestrian walkway
- Traffic or material movement at a blind corner or intersection to which pedestrian or other vehicles may unknowingly expose themselves
- Anytime employees, without warning, could enter into an unsafe situation that has developed in what is a normally secure location



It is critical that employee maintain a high level of situational awareness in these type of work areas. Barricades are frequently required to assist in employee awareness when approaching hazardous areas by giving a visual cue, as well as a physical barrier prior to being exposed to the hazard.



There are two primary types of barricading tape used at Ingalls Shipbuilding. Each are used for specific reasons. Understand the following points to know how to ensure safe interaction with any barricaded work areas that you encounter.

- A restricted area must have at a minimum a barricade-taped perimeter
- A restricted access area requires a perimeter of (red) DANGER-DO NOT ENTER barricade tape
- To restrict an area fully, do not use (yellow) CAUTION barricade tape because yellow tape simply means to proceed with caution, not that the area is off limits
- Red barricade tape means that no one may cross without permission from the personnel that installed the barricade as they are the ones that know what the hazards are requiring the perimeter
- Failure to comply with restricted access signs or crossing a red, DANGER-DO NOT ENTER barricade without authorization, is grounds for enforcement discipline in accordance with (SSO K200) EH&S Enforcement Discipline Safety Control Program





Personal Protective Equipment (PPE)



All employees must wear personal protective equipment (PPE) whenever there is a reasonable probability it can prevent injury or illness. The overall purpose of PPE is to protect the body from exposures to the hazards associated with shipbuilding. It takes coordination from suppliers, vendors, and Ingalls to provide PPE, and shipbuilders to wear it to help reduce injury risks.

When potential chemical hazards exist, review the appropriate SDS to determine the correct protective measures to avoid overexposure. If unsure about the equipment or clothing for a specific job consult your supervisor, a Job Safety Analysis or the S-FP Dept. for help in obtaining and correctly using it. Maintain all PPE according to the instructions of the manufacturer or S-FP Dept. and return damaged PPE for repair or replacement

SAFETY CENTER



From glasses to work boots, the Safety Center has what you need to help keep you safe

The Safety Center is located just outside of Gate #1.

Here are a few reminders regarding Safety Center use:

- Safety Center hours are from 5 a.m. to 3 p.m. Monday through Friday
- For day shift employees, the only times you can access the Safety Center are before work, during lunch and after work
- Second shift employee will need to arrive to work early enough to go to the Safety Center before the shift starts
- If your PPE ever needs replacing during your work shift, report directly to your supervisor for instructions on what to do
- Do not leave your work area to go to the Safety Center without informing your supervisor
- The contact number for the Safety Center is (228) 935-3375

Contractors must use a credit or debit card for purchases.

Other unique items, such as arc flash shields/suits, specialty gloves, etc., are available through your department. Remember, the purpose of personal protective equipment is to reduce employee exposure to hazards when engineering and administrative controls are not feasible or not completely effective in reducing risks to acceptable levels. The Safety Center is here for the benefit of Ingalls employees.

Gate-to-Gate PPE

A Gate-to-Gate PPE policy was implemented at Ingalls in 2013. This means that all employees must be wearing their hard hat, safety glasses and safety-toed footwear (base PPE) as soon as they enter the shipyard.

Exceptions: PPE is not required within landside offices, inside a vehicle's closed cab or in a designated eating area during lunch. Hearing protection does not have to be used when walking on the roadways or crane tracks.

NOTE: Safety glasses with dark lenses are not allowed in shops, buildings, units, modules, vessels or in low-light areas such as during night or early morning hours.



PPE Conformance

- Prescription safety glasses must bear the inscription "ANSI Z87.1" on frames and side shields
- Prescription safety glasses lens must bear the manufacturer's mark with a "+" plus sign
- Safety footwear must be inscribed with the ASTM F2413 conformance designation
- Hard hats must be marked that they conform to ANSI Z89.1
- Never perform modifications on any protective equipment; it voids the manufacturer's approval and may compromise safety performance
- Employees must take care of the PPE they are issued; if lost or damaged, other than by normal wear and tear, the employee may be charged for a replacement

Eye & Face Protection

Eye injuries are one of the most common injuries in shipbuilding; therefore, Ingalls has a comprehensive eye and face PPE program. The details are set forth in *Eye & Face Protection and Personal Protective Eye Equipment* (SSO K201). Eye and face PPE compliance is closely monitored and aggressively enforced.

Safety Glasses: Provide minimum protection and are for general working conditions with minor dust, chips or flying particles.

Goggles: Provide higher impact protection and create a better barrier than safety glasses alone; they fit closer to the face than glasses and close the gap between the face and the frame that glasses have.

Burning Goggles: Required when cutting with an oxygen/fuel gas torch. Burning and cutting operations produce non-ionizing light radiation such as UV. While the radiation may not be as intense as arc welding, prolonged exposure without protection can cause eye injuries. Burning goggles must have the correct shade of light filtering lens.



Eyes suffering from a chemical burn



Embedded foreign body in the eye

Face Shields: Guard against injuries to the face by protecting from spraying, chipping, grinding, chemicals or blood-borne hazards. Goggles or prescription safety glasses (if needed) are worn in conjunction with face shields when there is a high potential for eye/face exposure to projected chips, flying particles or harmful splashes. Face shield eye and face protection is critical when transferring or using hazardous chemicals. Face shields must be used anytime brushing or rolling paints and/or solvents above chest-high or where splash and splatter could land on bare facial skin.



Face shields are required PPE to protect against flying particles



Full-Face Welding Shields: Protect against multiple hazards. The filter lens keeps light radiation from burning the eyes while the shield protects the face from arc light, popping/flying hot metal and sparks. It must be worn with hearing protection, safety glasses and the correct shade of light filtering lens for the task being conducted. Shields must be properly affixed to the hard hat and cannot be simply held in the hand when welding or tacking. Instructors/observers are the only persons allowed to hold a observation shield that is designed for instructional purposes. Some shields have a flip up, ANSI Z87.1 lens window that allows the dark filter lens to be raised without raising the entire welding hood. This allows use of grinders and scalers without having to switch to a grinding shield each time they must chip or grind.

Never modify a welding shield by cutting, drilling, riveting, painting, taping, attaching materials or any other treatment. Inspect it frequently for defects or damage. When not in use, it should be stored where it will not become damaged. Do not store in the bottom of a gang box where other tools and equipment could be dropped on top of it. A cut off or taped-up welding shield is not compliant and is a citable violation.

A cut off or taped-up welding shields is not complaint and is a citable violation



Welding shields are available in the Safety Center

Employees choosing to use auto-darkening lenses are restricted to using the specific auto-darkening lenses sold at the Safety Center. Prior to using auto-darkening lenses, the employee must complete the product-specific training for the lens and sign a training roster. Other auto-darkening lenses brought from home or elsewhere are not allowed in the shipyard.

Using damaged or modified PPE of any kind is a violation of EH&S requirements and will be enforced in accordance with the *EH&S Enforcement Discipline Safety Control Program* (SSO K200)

The following IF/THEN table defines when and what types of eye and face PPE must be worn:

Employees Engaged in the Following Tasks Shall Wear the Specified Eye/Face Protection.

If...	Then...
Grinding, scaling, forging, machining rough/brittle material, chipping, rusting, chemical handling, pressure washing, using caustics and abrasives -	<ul style="list-style-type: none"> Wear face shield in addition to approved goggles or prescription safety glasses with side shields NOTE: For grinding, chipping, and scaling by welders, see the Welding section below. NOTE: If wearing foam-lined, tight-fitting safety glasses such as UVEX SEISMIC™ or approved equivalent and the head strap is securely adjusted, they may serve as the goggles when grinding, chipping, scaling, forging, rusting, and similar particulate generating tasks. NOTE: Foam-lined, tight-fitting safety glasses such as UVEX SEISMIC™ shall not be used as goggles for handling or using chemicals.
Foundry and furnace work, handling of molten metal, machinery operators such as drill presses, milling, needle gun cleaning, and drilling	<ul style="list-style-type: none"> Wear a face shield and approved safety glasses with side shields.
Abrasive blasting	<ul style="list-style-type: none"> Wear blasting hood. Immediately after removal of blasting hood, safety glasses with side shields.
Burning and acetylene welders -	<ul style="list-style-type: none"> Wear burning goggles. Others working in area - wear safety glasses with side shields.
Welding -	<ul style="list-style-type: none"> Wear welding shields and safety glasses with side shields under the welding shields. If welding shield has a "flip up" shaded lens and a fixed American Nation Standards Institute (ANSI) Z87 clear lens, the welder can grind, chip, and scale with their welding hood down and safety glasses on underneath. If the welder must raise the entire welding shield to grind, chip or scale, he must wear a face shield in addition to approved goggles or, prescription safety glasses with side shields. In open areas in shops, screens shall be erected to reduce exposure of weld spatter and arc radiation to other employees.
Brazing	<ul style="list-style-type: none"> Wear #3 shade brazing glasses available at the Safety Center
Plasma Arc Cutting	<ul style="list-style-type: none"> Wear a shade #10 face shield and approved safety glasses with side shields.

Employees Needing Eye Protection for Working in Production Areas Shall:

Needing a pair of safety glasses meeting ANSI Z87.1 requirements with side shields, (clear or amber lens meeting the requirements for working inside shops, buildings, units, modules and vessels) – NO DARK LENSES IN LOW-LIGHT AREAS!	<ul style="list-style-type: none"> Obtain a pair from the PPE vending machines. The Safety Center is an additional resource for safety glasses.
Safety glasses are lost or damaged while at work -	<ul style="list-style-type: none"> Obtain a replacement pair from the PPE vending machines.
Safety goggles are needed for work tasks -	<ul style="list-style-type: none"> PPE vending machines and Safety Center.
Needed by vendors, visitors, contractors for brief in-yard visits	<ul style="list-style-type: none"> Safety glasses with side shields are available in the Safety Center, or approved safety cover lenses may be used over prescription eyewear.
Purchasing prescription safety glasses meeting ANSI Z87.1 requirements, with side shields - NOTE: Wearing safety cover lenses over corrective lenses is a short-term corrective action only. If an employee is observed by EHS staff wearing prescription eyewear that is not ANSI Z87 safety eyewear with side shields in production areas: <ul style="list-style-type: none"> They will be given 30 days to purchase prescription safety eyewear. It will be documented and tracked. They must bring the safety eyewear to the EHS office upon receipt. They will not be allowed in production areas without prescription safety eyewear after 30 days. 	Wear approved safety cover lenses over corrective lenses until the ordered safety glasses are received. (Not to exceed 30 days.) <ul style="list-style-type: none"> Bring a current prescription to the Safety Center to order. Purchase them from the Safety Center by paying cash or by payroll deduction. They may also be purchased privately from an outside vendor, however, they must bear the markings of "ANSI Z87" or "Z87" on the frames and side shields and the manufacturer's mark with a "+" (plus sign) on the lens.

Employees Needing Eye Protection for Working in Production Areas Shall (continued):

If...	Then...
A welding shield is needed for work/tasks -	<ul style="list-style-type: none"> • Available in the Safety Center. • When worn out or damaged, shield or goggles shall be returned to the Safety Center and exchanged for a new one, free of charge.
Burning goggles are needed for work/tasks -	<ul style="list-style-type: none"> • Available in the Safety Center.
A face shield and frame are needed for abrasive or corrosive work -	<ul style="list-style-type: none"> • Obtain shield and frame from the Safety Center. • When worn or damaged, return to the Tool Room and exchange them for a new one.

Emergency flushing stations are required whenever a person's eyes, face or body may be exposed to corrosive or caustic materials or toxic materials that can be absorbed through the skin.

Activities that may result in these exposures include, but are not limited to:

- Spraying, transferring and mixing of paints and solvents
- Acid dipping
- Battery charging
- Hazardous waste handling

Should there be a question as to whether an operation requires an emergency flushing station consult the:

- Product label
- Safety Data Sheet (SDS)
- S-FP Department



Hearing Protection

Certain shipbuilding job tasks create high occupational noise levels. This work includes, but is not limited to:

- Chipping or grinding
- Blasting
- Arc gouging
- Shipfitting
- Operating any pneumatic tools
- Many types of power tools



Hearing protection is available through vending machines throughout the yard, your supervisor or other locations throughout the shipyard. There are three types available:

- Corded Smart Fit (soft plastic)
- Corded Push-Ins w/Grip-Rings (foam)
- Earmuffs (Safety Center)

Hearing protection must be properly worn and maintained. They require clean storage and hygiene -- washing with soapy water daily to prevent dirt and wax build-up. If employees have trouble with fit or other issues with hearing protection, they should consult Ingalls' audiologist. Shipbuilders who use hearing aids shall not use them as ear plugs even if they are turned off. Shipbuilders prescribed hearing aids must wear proper hearing protection where required.

NOTE: Personal stereo headphones, headsets, bone conduction headsets and ear buds are restricted for use as hearing protection and are not to be worn in the gates of facilities. For the comprehensive, formal program, see: *Hearing Conservation Program* (SSO K305).

Head Protection

Approved hard hats will provide acceptable head protection if worn properly without obstructions restricting the fit. Hard hats are available at the Safety Center. Only the following items are allowed under hard hats:

- Welder's cap
- 100% cotton or FR balaclava
- Winter liners
- Paint Department cloth head cover

Ball caps or visor caps are not allowed under hard hats. Hoodies must be worn over hard hats, never underneath them.

NOTE: Any hairstyle that does not allow the hard hat's suspension to fit around the skull is not permitted.

Inspect your hard hat daily! Gently press the side edges of the rim inward; the hat should flex and spring back. If it is too rigid, it is no good. Never drill holes, cut or modify hard hats. The suspension may wear out before the shell, but it can be replaced separately. Unapproved bump caps or safety "cowboy" hats, as well as metal hard hats, shall not be worn.

NOTE: Regardless of bill being worn in the front or the back, the adjustment knob shall always be worn in the back.



Not wearing your hard hat, when no one is watching can be regretful



Hard hats are capable of absorbing a lot of energy during "struck-by" mishaps



Protective Footwear

Shipbuilders must wear protective footwear to protect against the danger of foot injuries due to falling or rolling objects or objects piercing the sole. You must inspect your safety footwear prior to putting them on. Do not wear footwear that is damaged, defective, worn out or in need of repair. Do not wear safety-toed footwear that has worn out spots where the metal caps are exposed. Ensure that the soles of the footwear are not worn to the point that they lose their slip resistance or are so worn over the foot/ankle are in an unnatural position while standing.

Safety footwear must have a pronounced heel — an elevated footwear heel as opposed to a flat heel.

Shipbuilders working around hot work must wear safety shoes made of all leather tops a minimum of 6" high. Pants legs must be worn over boot tops and without a cuff when conducting hot work or working with paints, solvents or other hazardous material. Shipbuilders exposed to irritating or corrosive substances or wet conditions shall wear impermeable (rubber, neoprene, etc.) boots with a safety toe. Shipbuilders performing the following jobs must wear boots at least six inches high:

- Welding, burning, gouging, and other hot work applications
- Applications involving exposures to paints, solvents and other irritating or corrosive chemicals
- Applications involving exposures to stagnant water or liquids

Re-cap or replace footwear when the caps are exposed. Make sure your footwear has a good fit. Your toes should not rub against the toecaps to the point they blister. Remember — you earn your living in your boots. Make sure they are comfortable and supportive.



Personal Flotation Devices

- When working over water or near unguarded deck edges of floating vessels, you must wear an approved personal flotation device (PFD)
- When working on scaffolding over the side of vessels afloat, you must wear an approved PFD
- When working near unguarded deck edges or in personnel baskets suspended over water, you must wear an approved PFD
- U.S.C.G. approved 30" life rings with at least 90' of line attached shall be installed aboard all vessels, barges and floating staging on which work is being performed
- In the vicinity of each occupied floating vessel, there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event they fall into the water

Work vests are available from the Tool Room



Work vests must be adjusted properly and snugly fit. If they are too loose, they may separate from the wearer upon entering the water

Hand Protection

Many jobs require special gloves for hand protection. See your foreman for specific gloves. Gloves commonly in used in shipbuilding include:

- Cotton or fabric gloves — Protect yard laborers, ship cleaners and others against dirt, slivers, chafing or abrasion
- Leather welding gloves — Burners, welders and other employees performing hot work shall wear these gloves for protection against burns
- High and low voltage gloves — Protect trained electricians during very specific tasks
- Impermeable neoprene or latex gloves — Painters and other chemical users wear these when handling chemicals or corrosive materials; nurses, EMTs and porters wear them when exposed to bodily fluids
- Leather work gloves — All craft employees involved in production work, except operating rotating machinery, should wear these to protect against light sparks, grinding, moderate heat, flying chips and rough-edged objects
- Cut resistant gloves — Kevlar gloves are provided for electricians involved in stripping cables and banding and to Sheetmetal employees handling sharp-edged material

Good gripping gloves reduce the amount of force needed to pull. This equals less risk of musculoskeletal disorders



Gloves that were caught in a drill press

Whenever there is a danger of gloves becoming entangled in moving parts of machinery, they shall not be worn

Working Apparel, Personal Clothing & Accessories

- Wear clothing specific for the work being done. Do not wear loose gloves, sleeves, scarves, neckties, necklaces or other loose clothing or jewelry that can become entangled in moving machinery.
- While working around machinery keep long hair confined. Head coverings must not hang loosely or allow hair to protrude.
- Skirts, dresses and tank tops are prohibited in production areas. Shirts and blouses must cover the shoulder and the midriff. Shorts are prohibited throughout the shipyard.
- Loose, looped or dangling earrings, facial piercings, bracelets, rings or similar jewelry in are prohibited in production areas. Jewelry that poses a recognized hazard shall not be worn.
- Fingernails must be trimmed to be no longer than ½" from fingertips.
- Long hair must be covered with non-combustible material/wrap if conducting hot work.
- Personal headset radios or earbuds are not permitted in production areas.
- Employees must wear ankle-length trousers, slacks or jeans. Wear long sleeve shirts and clothing made of 100% cotton or leather when performing hot work.
- When worn while conducting hot work, 100% cotton material must be substantial; for example: a minimum of 6 oz/yd² (heavyweight).
- An employee conducting hot work has the responsibility to know the type of material from which the attire is made. If challenged by S-FP or supervision, he or she must be able to prove suitability for hot work by product labels or other such designation.
- Hoodies or any hooded article of clothing shall not be worn while conducting hot work.
- Fire resistant balaclavas can only be worn by individuals conducting hot work—they are not to be worn generally throughout the Yard.
- "Skinny" jeans or pants with fabrics with stretchable/elastic material are not allowed around hot work.
- 100% cotton or FR balaclavas should be used especially for overhead and/or aggressive hot work.
- Slip-on sleeves shall not be worn solely with short-sleeved shirts but may be worn as extra protection over long-sleeved shirts.
- Leather cape/bib or jacket must be worn when conducting hot work above chest-high and the collar must be fully fastened closed.
- Welding in the rain or standing water is not permitted.
- Painters must wear sleeves to avoid material contact with skin.

Degloving of the scalp due to hair being caught in rotating equipment



Never conduct hot work while wearing polyester or other synthetic material clothing



Degloving of a finger due to a ring being caught on moving equipment



Arcing on the ring caused burns



Hot work clothing must be 100% cotton, leather or fire resistant material such as Nomex®

Coveralls



Long Sleeve Shirt



Full-length Pants

If you are observed working without the proper work attire for your job task, the violation will be enforced in accordance with the *EH&S Enforcement Discipline Safety Control Program (SSO K200)*

Personal Fall Arrest Systems (PFAS)

Inspecting, Wearing, & Caring for PFAS

If working 5' or higher and not protected by a fully decked and properly guard-railed work platform or you are otherwise exposed to a fall greater than 5', you must utilize a Personal Fall Arrest System (PFAS). PFAS is a full body harness -- a lanyard, connecting hardware and an anchor point rated for a minimum of 5000 pounds per person attached.

PFAS is a life-critical portion of your PPE so, when it is needed, it must be damage-free. Prior to donning a safety harness, you must always inspect it and your lanyard. Any defects you find will disqualify it from use; return it to the Tool Room and show them what is wrong with it.

Proper wearing, cleaning and storage will ensure that your PFAS is in good shape and will function correctly if ever needed to stop a fall. Always be mindful of where your PFAS is stored and avoid placing it in situations that could damage or degrade its ability to function as designed.



Pre-use Inspection of Full Body Harness

When inspecting the webbing, check the whole length of all straps (sides and edges) and pay close attention to heavy stitching at webbing intersections and attachments.

- To begin a PFAS inspection, first ensure the information tags/labels are intact and legible
 - There should be one on the harness and another on the lanyard
 - If the information tags/labels cannot be read, remove it from service
- Inspect the "D" ring and other hardware for cracks, burns, bends, distortion, corrosion, deep cuts and pitting
- Abrasions, cuts, tears, flat spots, permanent pinches and frayed fabric in the webbing
- Welding splatter, pinholes, burned spots, punctures, split/separating seams and popped or unraveled stitching
- Ensure that no excessive paint, glue, grease or insulation coatings are hiding defects
- Check for odd textures on the webbing fabric, stains, stiff spots or webbing that has reduced flexibility, which may indicate deterioration



If you notice any damage or defects when you inspect your harness, it must come out of service



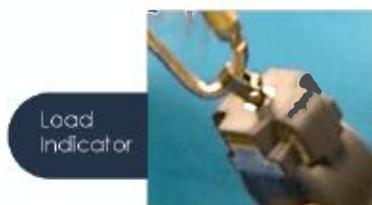
Inspect every section of the webbing: shoulder, leg, back and chest strap



Shake out the straps before inspecting the harness

Pre-use Inspection of Self-Retracting Lanyards

- Ingalls exclusively uses self-retracting lanyards (SRL)
- Any lanyard or PFAS components, other than Ingalls-issued, must be approved by S-FP prior to use
- Use the same inspection criteria for lanyard webbing as for harness webbing
- Pull all of the line out and check the whole length of webbing on both sides and edges
- Check the line extraction and re-traction by pulling out the full length of line and carefully letting it slip back into the unit through your fingers
 - DO NOT let the line freely re-reel and snap back as this can damage the unit
 - If it jams on the way out, "stalls" repeatedly on the way back in or does not retract completely, remove it from service
- Check line locking by pulling the line out very sharply
 - The device should lock and remain locked until you relax the pull, then let it retract
 - Repeat this process three times — if it does not always lock or retract normally, remove from service
- Check for structural defects and corrosion
- Load indicator
- Verify no missing, altered or damaged parts, no cracks, deformations or cuts in the housing, webbing or snap hook
- Perform a function test on the snap hook by squeezing and releasing the gate (latch) to see if it automatically closes
- Check the load indicator at the top of the reel to see if it has been involved in a fall; remove from service if it indicates that it has been deployed



Donning a Harness

STEP ONE

- Inspect harness straps, "D" ring and labels prior to donning
- Hold harness from back "D" ring locator pad with leg straps toward you
- Gently shake harness to remove any twists in straps



STEP TWO

- Rotate harness, similar to donning a vest or jacket
- Slip shoulder strap over left shoulder
- Be sure to have the leg straps behind you at this point



STEP THREE

- Locate the right side of the shoulder strap retainer and make sure it is not twisted in any of the straps
- Grasp the other shoulder strap and pull it over the shoulder
- Settle the straps comfortably and evenly over both shoulders



STEP FOUR

- Connect the shoulder strap retainer
- Squat slightly, reach behind, grasp the sub-pelvic strap with thumbs and position it beneath the buttocks
- Make sure the leg straps are not twisted



QWIKFIT or "Parachute" Buckles

- Start end of smaller element through slightly larger mating connector
- Push through fully
- Check for proper connection by pulling on each end of strap

STEP FIVE

- Pull each leg strap between legs and fasten the buckle
- Adjustments should be to a snug, comfortable fit
- Use two fingers as a "feeler gauge" to check leg strap fit



STEP SIX

- Adjust the shoulder straps to be even by using the adjusting buckles on each shoulder strap
- Check and adjust strap retainer
- Adjustments should be to a snug, comfortable fit



Leg Strap Fit Check

- Use two fingers, side-by-side and slide them behind the leg strap just below the buckles
- The fingers should drag easily but firmly against your leg on one side and the strap on the other when properly adjusted

STEP SEVEN

- Make sure "D" ring is centered between the shoulder blades
- Utilize strap collars to hold excess lengths of straps in place
- Best comfort and function may require minor readjustments until ideal fit is achieved



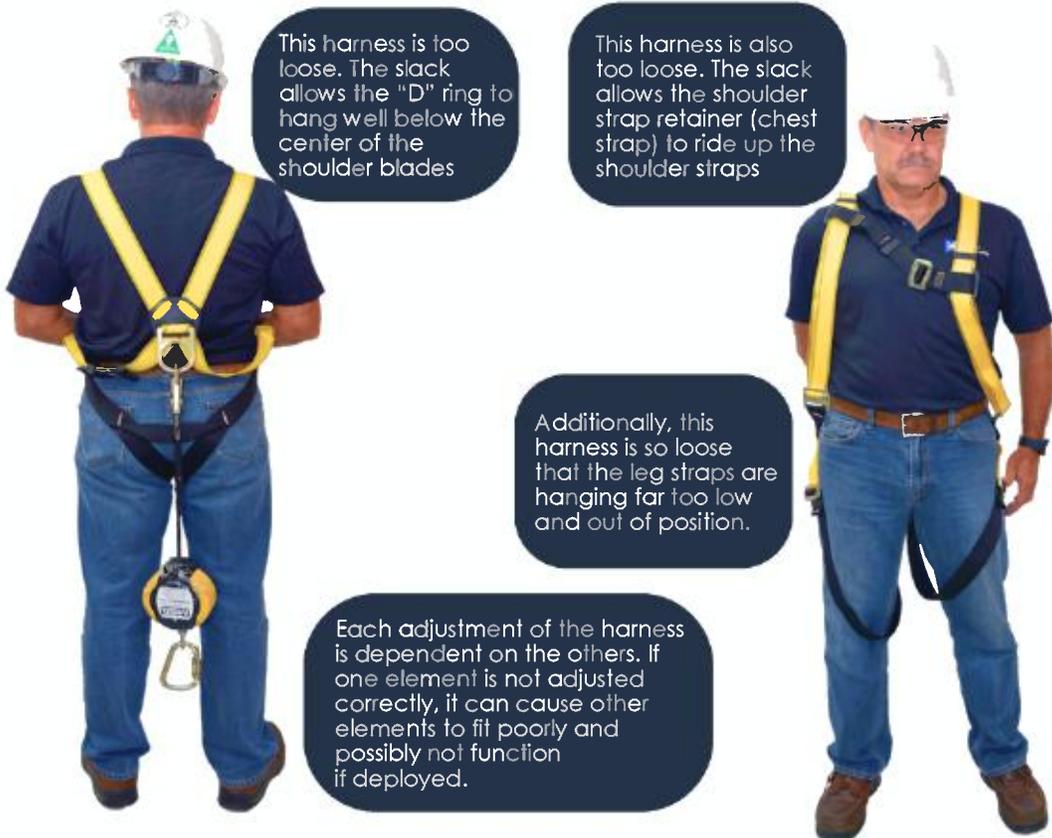
Attaching the SRL

- The carabineer that connects the SRL and the "D" ring has an automatically closing barrel gate that must be inspected
- Turn the barrel, push the gate open, and then let go; the gate should close automatically and the barrel turn back to the locked position
- Open the carabineer gate and attach through the SRL's top eye above the load indicator, close the gate and confirm positive connection
- Open the carabineer gate, attach to "D" ring, close gate and confirm positive connection
- If you attach the SRL while wearing the harness, have a coworker visually assure positive connection to the "D" ring.



After wearing the PFAS for a while, check to ensure the "D" ring is still in the center of the shoulder blades and readjust if necessary.

Improperly Fitted PFAS



This harness is too loose. The slack allows the "D" ring to hang well below the center of the shoulder blades

This harness is also too loose. The slack allows the shoulder strap retainer (chest strap) to ride up the shoulder straps

Additionally, this harness is so loose that the leg straps are hanging far too low and out of position.

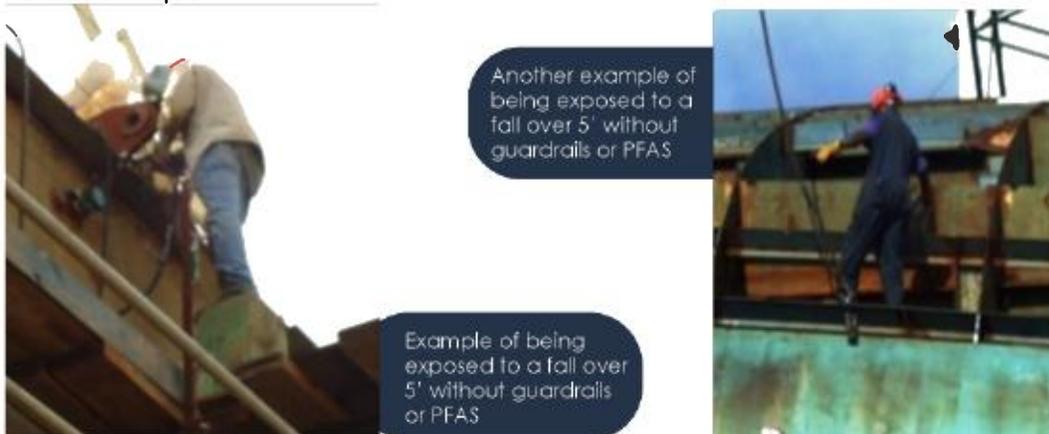
Each adjustment of the harness is dependent on the others. If one element is not adjusted correctly, it can cause other elements to fit poorly and possibly not function if deployed.

Cleaning & Storing PFAS

- The users of PFAS must maintain their harness and lanyard by cleaning as often as necessary
- Clean entire PFAS with mild soap and water, but the SRL should only be wiped with a damp cloth
- Use no chemicals, harsh detergents, abrasives or pressure washers to clean any PFAS component and never immerse an SRL in water or any other liquid
- Dry the hardware with a cloth and hang harness to air dry — DO NOT use heat to speed up the drying process
- Store the harness and SRL in a cool, dry, clean place out of direct sunlight
- Avoid areas where heat, moisture, light, oil and chemicals or their vapors may be present
- Store SRLs with the line fully retracted
- Do not store damaged PFAS next to usable equipment — return to Tool Room immediately
- Do not attempt repairs of any kind
- Do not store PFAS in the bottom of a gang box or where tools and material can be dropped on it
- If PFAS will not be used for an extended period, return it to the Tool Room

Use of PFAS

- Supervisors are responsible to point out acceptable anchor points before deploying workers to elevated work locations
- Fatal falls have occurred when workers temporarily disconnect PFAS from an anchorage point or unbuckled a harness — stay tied off the entire time you are exposed to fall hazards
- When floor or deck openings cannot be covered or protected by a guardrail system, PFAS must be used
- The yellow SRL commonly used in the shipyard cannot be wrapped around anything and attached back to itself
- There are special "tie-back" lanyards that can be wrapped around a suitable anchor and hooked back into its line
- The locking device on the lanyard hook must be closed 360° around the anchor
- Never hook a lanyard on a plate-edge or attach it in any manner that would allow "roll out" and detachment
- Another example of being exposed to a fall over 5' without guardrails or PFAS
- Always hook the lanyard overhead unless in an aerial lift or a location where there is no overhead anchorage
- PFAS that has been exposed to a fall must be immediately taken out of service and given to the EH&S Department
- Anchorage points must support at least 5000 lbs. static load per person attached
- Never hook two lanyards together
- You can hook into the rosette rings on manufactured, modular scaffolding
- Ask your supervisor or an S-FP staff member if unsure of an anchor point or attachment technique



PFAS Rescue

If you ever experience a fall and deployment of your PFAS and you cannot immediately climb back onto the structure, then remain calm, alert any bystanders in the area and try to pull your knees up towards your chest in a sitting-type of position. This will help you maintain blood flow through your limbs and avoid static suspension trauma.

Ingalls has trained responders with a variety of specialized equipment to rescue you



Respiratory Protection & Ventilation

Respiratory Protection

Sometimes the air in a work area becomes unfit for breathing because of the presence of dust, fumes, gases, vapors or mists. Contaminated air is made safe using respirators designed for the specific contaminant.

Ingalls Shipbuilding's written **respiratory** protection program is Maintenance and Usage of Respirators and Respiratory Equipment (SSO K204). It contains further details on the requirements associated with ensuring workers are not overexposed to airborne contaminants.

The following defines the respiratory hazards that may require the use of a respirator:

- Oxygen-deficient atmosphere
- Toxic (gas and vapor) atmosphere
- Particulate contaminated atmosphere
- Any combination of the above

The two main classes of respirators are:

- Air Purifying Respirators (APR): Uses filters and absorbents to remove contamination from the air drawn through them
- Air Supply Respirators (ASR): Furnishes breathable air needed in highly toxic or oxygen-deficient atmospheres.=



Minimum Level of Respiratory Protection for Routine & Emergency Operations:

OPERATION	WHEN	MINIMUM RESPIRATOR
Abrasive Blasting	Blasting personnel	Supplied air w/ blast helmet
	Working near blasting operations for short periods	½ face APR w/ P100 Filters
	Glove box blasting operations	Respiratory protection not required
Painting	Brush or roller painting w/ organic solvent based paints	½ face APR w/organic vapor cartridges
	Spray painting	Supplied air paint hood
	Personnel working near spray operations	½ face APR w/ organic vapor cartridges and pre-filter
	Painting w/ coal tar epoxy, antifouling or polyurethane (isocyanate) coatings	Supplied air paint hood
Grinding or Scaling	All grinding on all surfaces	½ face APR w/ P100 Filters
Tack Welding (short duration) 1. Welding beads of less than 2 inches 2. Less than 15 tack beads per hour (Also, see welding on toxic materials below)	On bare mild steel and in open areas or in enclosed/confined areas where general exhaust ventilation is used	Respiratory protection not required
Welding	All areas on bare mild steel	½ face APR w/ P100 Filters
Cutting, Heating & Burning	On bare mild steel and in open areas or in enclosed/confined areas where general exhaust ventilation is used	Respiratory protection not required
	Enclosed/confined areas where general exhaust ventilation is not feasible	½ face APR w/P100 Filters
Welding, Tacking, Cutting, Heating & Burning On Toxic Base Metals, Fillers, Coatings Containing: -Cadmium -Chromium -Copper -Lead -Nickel -Stainless steel -Zinc	Beryllium base metals, fillers and coatings that contain therein	Airline supplied respirator
	In open areas or in enclosed/confined areas where local exhaust ventilation is used	½ face APR w/ P100 Filters
	Enclosed/confined areas where general exhaust ventilation is not feasible	Airline supplied respirator
Carbon Arc Gouging On Any Metal	Carbon arc gouging in open areas with general exhaust ventilation	½ face APR w/ P100 Filters
	Carbon arc gouging in enclosed/confined areas	Airline supplied respirator
Hazardous Materials Handling and Usage	Particulates: fiberglass, mineral wool, ceramic fiber, asbestos	½ face APR w/ P100 Filters
	Liquids/Vapors: solvents, insecticides, herbicides, caustic or acid solutions	½ face APR w/ specialty cartridges issued by IH Section of the EHS Department
Rescue, Emergency Response, Fire Fighting, Confined Space Entry		Self Contained Breathing Apparatus (SCBA) in pressure demand mode or as deemed necessary by the IH Section of the EHS Department

If you are ever unsure about what type of respirator you need for a particular atmospheric hazard, contact the S-FP Department at ext. 2100.

Using a Respirator

- Prior to receiving a respirator, shipbuilders are required to have a respirator fit test. The test determines proper fit and size respirator required for the user. A fit test card is issued to the employee to keep and must be presented when requesting a respirator at the Tool Room. All users must be clean-shaven when reporting for the fit test and when using a respirator on the job. Fit tests must be conducted annually. You must bring your current fit test card to the annual re-fit test.
- Respirator users must have initial and then annual fit tests.
- Respirators must be used only for the purpose intended and no modifications to the equipment may be made. Never use a cartridge-type respirator in place of an airline respirator. Cartridge respirators filter the air you breathe; they DO NOT provide breathing air or oxygen.
- The two primary places to check to determine the appropriate respiratory protection for your tasks are:
 - 1) The Safety Data Sheet for the chemical you are working with.
 - 2) Ask an S-FP staff member for assistance.
- Respirators must be inspected prior to use and maintained in good condition.



Respirator users must have initial and then annual fit tests

- The cartridges must be replaced as necessary by the user to avoid undue resistance to breathing. Organic vapor cartridges should be replaced after approximately 4 hours or midway in an 8-hour work shift. If breakthrough is detected by smell, taste or by nose or throat irritation, cartridges should be replaced earlier.
- Shipbuilders are responsible for cleaning and disinfecting their equipment daily. Do not borrow respirators from others; always use your own.
- When not being used, users must store their respirator in a clean plastic bag in a location where it will not be damaged. Never throw a respirator in the bottom of a toolbox or gang box where heavy tools and materials can land on it and cause damage.
- When an airline respirator is used, the airline must be fitted with the proper pressure regulating valve and filter, which will remove oil, water and rust particles. The air intake must be from a source that is free from all contaminants. Mechanical exhaust ventilation systems must be used in addition to airline respirators to clear contaminants from the work area or to provide fresh air to the compartment.
- Prior to initial entry, all confined spaces, which may have contained a hazardous substance, must be checked for oxygen content, combustible gases and possible toxicity by a shipyard competent person, industrial hygienist or marine chemist.
- A clean and disinfected respirator can be acquired from the tool room or exchanged when the older one has been damaged or excessively soiled.



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Ventilation

Mechanical forced air ventilation is used to add clean, fresh air to the atmosphere in a space, thereby diluting the number of contaminants. It is also used to exhaust the contaminations out of the space. Shipbuilding makes wide use of various blowers and fans to move air in or out of the enclosed and confined spaces of vessels and vessel sections.



- Confined/enclosed space ventilation
- Confined/enclosed spaces must have mechanical ventilation operating before employee entry
- Prior to welding inside any vessel, unit or structure, adequate mechanical forced-air exhaust ventilation shall be operating
- Contaminated air exhausted from a space shall be discharged into the open air, away from other intake sources and away from personnel
- Flammable paints, toxic solvents, acids or other hazardous materials shall not be used until adequate exhaust ventilation is operating and employees have proper respiratory equipment
- Before operating an internal combustion engine below decks, authorization must first be obtained from the S-FP Dept. and supplied air and exhaust ventilation shall be used to ensure that carbon monoxide levels are not at dangerous concentrations
- Under no circumstances shall any employee alter ventilation, except for the Temporary Ventilation crews, unless directed by the S-FP Department
- Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing or for cleaning the work area
- Air hoses and/or air rings are not suitable ventilation — yard air (pressurized service air) shall not be used for ventilation or cooling
- Never cut holes in ventilation duct or modify in any way; doing so is grounds for enforcement discipline
- Air that has not been properly filtered can have oil and hazardous gasses in it
- Never blow down with compressed air that does not have a ported, "safety nozzle" or is not regulated to 30 psi or lower



Air that has not been properly filtered can have oil and hazardous gasses in it and should not be used for respiratory protection or cooling air



Never cut holes in ventilation duct or modify in any way; doing so is grounds for enforcement discipline

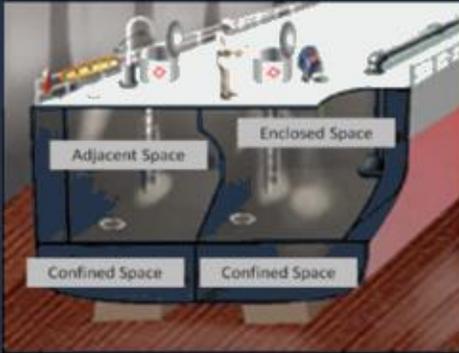


Before operating an internal combustion engine below decks, authorization must first be obtained from the S-FP Department

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Confined & Enclosed Space Entry & Inerting Gas Safety

Confined Space General Rules



Confined Space: Any space of small size and limited access such as a double bottom tank, cofferdam, void, or other space which by its small size and confined nature, can readily create or aggravate a hazardous exposure

Enclosed Space: A space, other than confined spaces, that are enclosed by bulkheads and overhead, including cargo holds, quarters, passageways, machinery and boiler spaces.

Precautions for Working In and Around Hazardous Atmospheres

IF...	THEN...
An employee becomes suspicious of the quality of the atmosphere of any space	Employee should evacuate the area immediately and notify their supervisor to request an atmosphere survey by the EHS Dept
Personnel are assigned to enter: <ul style="list-style-type: none"> • Confined spaces that have been sealed. • Spaces that have been coated and closed up • Unventilated freshly painted spaces. • If any charged gas line appears to have been left inside or right at the entrance of a space such as at the very beginning of an oncoming shift or appear to be unattended. • NOTE During a production shift, it would not be uncommon to see lines running into spaces for process tasks. 	<ul style="list-style-type: none"> • Employees must not enter. • Ships Management must request an atmosphere survey by a Shipyard Competent Person (SCP) or Certified Marine Chemist (CMC) and follow all posted instructions listed on the colored entry permit tag. • Personnel permitted to enter only after reading and understanding all instructions on colored entry permit tag.
Inert, toxic, flammable or otherwise harmful gases are released in any confined space	<ul style="list-style-type: none"> • The employee shall evacuate the area immediately. • Take the necessary steps to prevent personnel entry by roping off the area or posting signs, etc. • Request an atmosphere survey by a SCP or CMC. • Follow posted instructions by SCP or CMC.

Confined Space Entry Control Requirements

Prior to entry into any space, a visual inspection of the area around the access should be conducted to determine if there are any conditions that could potentially contribute to atmospheric hazards within the space. Conditions that could indicate that there may be a substandard atmosphere are (but not limited to):

- Unattended or non-wrench tightened inerting gas lines or torch lines running into the space
- Previous cargo of flammable/combustible materials
- Previous cargo toxic/corrosive/irritant material
- Previous cargo of organic material
- Freshly painted surfaces
- Sewage or wastewater
- Odd smells
- Excessive smoke or vapor being released
- Previously sealed spaces

Always remember:
Employees shall never
work alone in a
confined space



If any of these conditions are observed, a Shipyard Competent Person (SCP) or Certified Marine Chemist (CMC) may need to inspect the space and require special hazard controls prior to entry.

Hot work is not permitted in or on the following spaces, adjacent spaces, or other dangerous atmospheres until they have been tested by a SCP and determined to contain no concentrations of flammable vapors equal to or greater than 10 percent of the lower explosive limit:

- Dry cargo holds
- Bilges
- Engine room and boiler spaces for which a CMC or a Coast Guard Authorized Person (CGAP) certificate is not required
- Vessels and vessel sections for which a CMC or CGAP certificate is not required
- Landside confined and enclosed spaces or other dangerous atmospheres that do not require inspection by a CMC or CGAP because they are located 25 feet or more from the hot work

To maintain safe working conditions, SCPs shall conduct follow-up inspections to the CMC's initial inspection at the interval specified in the Marine Chemist Certificate. For hot work operations, the atmosphere must be at 0% of the Lower Explosive Level (LEL) in the areas that will be designated as "Safe for Hot Work."

For employee entry:

- The oxygen content in air must be 20.8%
- The atmosphere must be less than 10% of the LEL for painting operations or other flammable liquid processes
- The atmosphere must be at 0% of the LEL for all other operations
- The level of toxic, corrosive or irritant materials exposure must be within permissible limits
- An area in this condition will be designated as "Safe for Workers"

All previously sealed and reopened confined spaces shall be atmospherically tested and visually inspected by a CMC or SCP and the appropriate colored and dated entry tag affixed at the designated opened accesses prior to entry by Ingalls Shipbuilding personnel. Should an inspection reveal a change in conditions, all work will stop and the area will be evacuated until:

- The source of the change is identified and controlled
- The atmosphere is returned to a safe condition
- The CMC re-inspects the area and issues a new Marine Chemist Certificate authorizing resumption of the job

All employees, who must enter confined or enclosed spaces, must be trained and authorized to enter. This training is conducted by the following:

- New hire orientation
- Weekly safety training modules
- On-the-job-training

When practicable, the owner of the space shall correctly identify the space and all accesses shall bear the label or markings of the name of the space (Example: Port #2 Ballast Tank). When a space has more than one opening or access cover, at least two covers must be opened. Shipbuilders shall read both sides of any entry permit tag, confirm the tag has a valid date and follow any requirements listed prior to entry. Proper ventilation and lighting must be installed 30 minutes prior to entry before work can begin in the space. Protective devices to prevent falls into open holes (ring guards, horseshoe guards, goal posts, flat bar, cages, etc.) shall be installed prior to entry. Lifelines and personal fall arrest systems may be required if there are fall exposures over five feet within a space.

Confined Space Colored Entry Permit Tags

The front side of the tag identifies the space, date of test and inspection, name of person who authorized entry, and any special limitations. Except the red tag back side lists the atmospheric conditions found at the time of the inspection and lists requirements and restrictions for entry and work. Always follow all instructions on both sides of the red or orange tags.

No one shall be allowed to enter the space until it has a valid tag. No one shall apply a tag except a SCP or CMC. Red or orange-tagged spaces shall not be opened without the permission of the tag issuer.

For more information see: *Confined and Enclosed Spaces and Other Dangerous Atmospheres (SSO K215)*

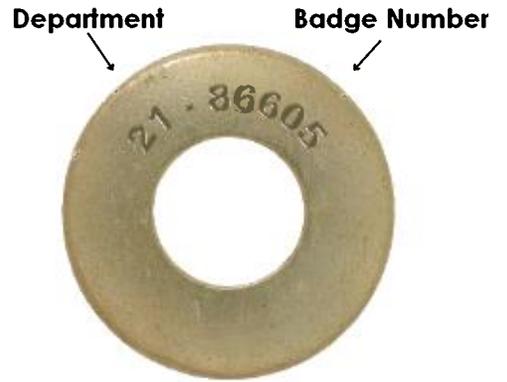


If a tag is found adrift, give it to a supervisor immediately; the supervisor shall contact S-FP for follow up

WHEN...	THEN...
An access is tagged with a RED tag - <i>Do Not Enter Tag</i> (SSF K9462).	NOT SAFE FOR WORKERS—NOT SAFE FOR HOT WORK
An access is tagged with a GREEN tag - <i>Hot Work Tag</i> (SSF K9461).	SAFE FOR WORKERS—SAFE FOR HOTWORK
An access is tagged with a YELLOW tag - <i>Cold Work Tag</i> (SSF K9459).	SAFE FOR WORKERS—NOT SAFE FOR HOT WORK
An access is tagged with an ORANGE tag - <i>Space Inerting Tag</i> (SSF K9460).	NOT SAFE FOR WORKERS—SAFE FOR HOTWORK <i>This tag is used when a space is inerted for hot work but entry would expose workers to the oxygen deficient atmosphere.</i>

Inerting Gas Safety

- Everyone using any inerting gas shall have proper identification washers on their lines regardless of vessel or shipyard location
- When inerting gas lines are used in enclosed/confined spaces, the line shall not be left unattended with the gas supply left on
- Single inert lines must be rolled back to open air
- "Triple lines" must be rolled back to within 20' of the manifold
- If in doubt about the presence of any gas in a tank, compartment, etc., contact the S-FP Department and have the space checked by a competent person



Flow meters must be vertical and plumb when using.

- Welders certified to use an inerting shield gas must use a flow meter attached to the output of their supply manifold
- Welders will also be responsible for insuring that their gas line fittings are tight and that the lines are either capped at the wire feeder end or attached securely to a wire feeder at the end of each shift
- Welders will also be responsible for charging their lines and monitoring their flow meter at the beginning of their shift to determine the condition of their individual gas line; for more regarding flow meters, see (SSW M3023).



Everyone should pay close attention to warning signs regarding purging operations. Never move, alter or modify ventilation duct that is being used for purging processes. Duct used for purging operations is yellow and shall not be used for regular mechanical ventilation applications.

Argon gas will displace the air in confined spaces. Special care shall be exercised to ensure proper ventilation by exhausting argon gas outside of compartments and other closed working spaces. For shipboard applications, hoses connected to fittings at the purge exit can be used to redirect gas flow away from confined work areas and to an open environment. For shop applications, exhaust fans will be used to ventilate argon gases to an open environment. See (SSW M3312) for more on purging processes.

Inert gas purging operations use blowers and yellow duct



Line Control & Housekeeping/Shipkeeping

Line Control

Poor line control has several negative effects — tripping and “clothesline” injuries, as well as damage to lines that can create shock and electrocution hazards. It is critical that all shipbuilders using leads, lines, cords and hoses maintain good line control throughout their shift. The following are some of the common requirements needed to help reduce hazards caused by inadequate line control:

- Good line control shall be maintained at all times
- Ensure walkways and accesses remain clear of lines by keeping them off decks to reduce hazards
- Line racks, line trees, S-hooks and J-hooks shall be used to elevate lines
- Line trees help maintain clear, safe passageways
- Lines shall be elevated over, placed under walkways or working surfaces, or covered by adequate crossover protection
- Where possible, electrical lines shall be separated from gas and fluid lines routed throughout ships and assemblies
- Unused lines shall be removed from ships and assemblies
- Lines shall never be supported by light cords, valve handles or insulated pipe
- Lines shall never be routed across the top of guard cables or ladders
- Lines shall not be hung on or block access to manifolds, electrical equipment or fire protection equipment
- All damaged lines shall be reported promptly to your supervisor and may not be used until repaired
- Ventilation equipment routing is part of line control, and the duct and blower/fan power cords are required to be properly routed
- **YOU CANNOT WALK ON LINES AND HOSES** even if the walkway is not a striped, designated passageway



Line trees help maintain clear, safe passageways



Example of poor line control: Lines running across the face of a ladder



Example of poor line control: Lines running over fire equipment



Examples of good line control: Lines and hoses safely stored on hooks



Housekeeping & Shipkeeping

Each employee is responsible for cleaning up and properly disposing of the debris that they generates, including:

- Food wrappers, beverage containers and food scraps
- Job supplies, such as welding rod stubs, used grinding wheels and paint sticks

Much of the waste must be segregated for proper disposal, so place each type of waste in its designated receptacle. For instance, do not throw cardboard into a scrap metal bin. Properly store tools, equipment, and material. Do not allow items that are not immediately being used to accumulate.

Never block fire protection equipment, electrical services, manifolds or emergency egress routes with anything. Do not feed stray or feral animals that make their way into the Yard. Use only designated restrooms to discharge bodily wastes. A violation of this rule may result in immediate termination of employment.



Do not allow trash containers to overflow



Poor housekeeping creates tripping hazards and fire hazards

Do not feed animals in the shipyard unless directed to



Fire Prevention & Hot Work Operations

Fire Prevention Introduction

Of all the safety problems an employee can encounter, fire can be the most frightening. Many employees do not realize how their own actions can contribute to the risk of fire. It is imperative that all employees be aware of the risks involving hot work and the prevention measures that must be taken to prevent a fire from occurring.



Fire Prevention
is a core
responsibility of
all shipbuilders.



Fire Terminology

To better understand fire, how it starts and how it is sustained, shipbuilders must become familiar with the following terms and their definitions:

- Hot work — Any welding, burning, grinding or other fire/spark producing operations (including smoking)
- Flash point — The temperature at which the vapors from a combustible or flammable material ignites
- Fire retardant — A rating meaning that the product will ignite but will not maintain combustion for more than two seconds once the heat source is removed
- Fire watch — An employee that has gone through the necessary training and is certified by Ingalls to perform the duty of observing hot work operations to prevent fires from occurring, as well as extinguish incipient stage fires should one occur
- Fire cloth — A woven fiber cloth that is fireproof and should be used to protect equipment during hot work operations
- Hot work permit — A document for authorizing a hot work operation to be conducted in a specific location on vessels
- Combustible — Any trash, debris, plastic, wood, or other material that will burn and has a flash point of 200°F or more
- Flammable — Any liquid, gas or solid that has a flash point of less than 200°F

Fire Science

For years, fire science was taught using the Fire Triangle to explain that there must be all three elements (sides) present to sustain combustion: Fuel, Heat and Oxygen. Removing any one of the three would stop the fire. However, the Fire Triangle does not completely describe everything that occurs during fire growth. This led to the development of the Fire Tetrahedron.



The Fire Tetrahedron recognizes a fourth element: uninhibited chemical chain reaction. Some fire suppression agents do not remove or reduce any of the three necessary components, but rather interfere with their chemical combination.

Hot Work Requirements

OSHA's 29 CFR 1915 Subpart P, Fire Protection in Shipyard Employment, states that combustibles must be removed at least 35' from the hot work operation. The 35-Foot Rule is not applicable if there is a solid barrier between the hot work and the combustible material, i.e. solid bulkheads, decks or overheads without penetrations.

Hot work operators must always ensure combustibles are not in close proximity to the opposite side of the bulkhead, deck or overhead. If the combustibles cannot be removed, they must be adequately protected. If unable to remove or protect the combustibles, a fire watch must be posted.

Shipbuilder Responsibilities

Prior to performing hot work, employees and supervisors are required to perform a thorough inspection of the work area.

- Smoke only in designated areas, including vaping or other electronic smoking devices
 - Vaping must follow the same restrictions as traditional smoking and is considered an ignition source
- During the inspection, employees and foremen should be looking for:
 - Combustible material, flammables, penetrations or holes in decks, overheads and bulkheads
 - Signs posted in the area warning of other cold work jobs (painting, gluing, etc.) or flammable/hazardous environments
 - Shipbuilders operating in surrounding areas that could potentially increase the risk of having a fire or causing injury
- The hot worker and fire watch (when one is required) shall be responsible for maintaining a safe work environment, free of combustibles and other hazards for the duration of the hot work operation, including inspection of the hot work area when the hot work is complete
- Tool bags/boxes, plastic items, personal belongings and required material for the job being performed must be protected during the hot work operation
 - Combustibles, whether personal effects or tools, must be maintained in a company-issued flame-retardant backpack, which is available at the tool rooms
- Protection measures to be taken include removal of combustibles from the area, covering them with fire cloth or separating them from the deck or bulkhead
- At shift's end, disconnect all gas lines at the manifold, store them in the open air and reinstall manifold caps on valve outlets:
 - Never leave an unattended torch line or torch in an enclosed space for more than 15 minutes or in a confined space for any length of time
 - Never store torch hoses in gang boxes or other locations that may retain gas still trapped in the lines

Fire Watch Requirements

A certified fire watch shall be assigned when the following conditions are present during hot work:

- Slag, weld splatter or sparks might pass through an opening or pass behind shielding material
- Fire-resistant guards or curtains are not being used to prevent ignition of combustible materials on or near decks, bulkheads, partitions or overheads
- Combustible material is closer than 35' to the hot work (including grinding) that cannot be removed, covered or shielded
- Hot work is done on or near insulation, combustible coatings or sandwich-type construction that cannot be shielded, cut back or removed, or in a space within a sandwich-type construction that cannot be inerted
- Combustible materials adjacent to opposite sides of bulkheads, decks, overheads, metal partitions or sandwich-type construction may be ignited by penetration, conduction or radiation from hot work
- The hot work is close enough to cause ignition through heat radiation or conduction on insulated pipes, bulkheads, decks, partitions or overheads, or on combustible materials or coatings
- The hot work is close enough to unprotected combustible pipe or cable runs to cause ignition
- A marine chemist or shipyard-competent person requires that a fire watch be posted

The primary function of fire watch personnel is to safeguard life and property by closely monitoring hazardous operations and hot work operations to prevent a fire or explosion. Craft supervision shall select a suitable number of their personnel to be trained for fire watch duty and shall coordinate their training with the Training Department. Supervision shall ensure that the appropriate training has been performed prior to job assignments. Shipbuilders shall not function as a fire watch unless they have attended the training and their certification is current. (Certification expires annually.) Certification badges must be worn when serving as a fire watch. To schedule fire watch training, contact Maritime Training Center of Excellence at ext. 7721.

Care & Protection Materials vs. Fire Cloth Materials



Red Polypropylene Cloth



Herculite



Grey Fiberglass Cloth



These materials are fire retardant, but they will burn; fire cloth must be used for protection of combustibles when hot work is being done within 35' of them

Ensure that proper protection measures have been taken prior to hot work being performed:

- Use fire cloth to cover and protect all equipment and combustibles that cannot be removed in the area
- Cover cables and lights with fire cloth
- Use fire cloth or sheet metal to cover penetrations in the deck or bulkhead
- Fire cloth can also be used to create a curtain or catch to prevent damage from hot work
- **NOTE:** Fire cloth is re-usable until it has holes in it. This product is expensive! Do not waste it!

Fire Extinguisher Training

The classifications for the most common fires are:

- "A" — Routine solid materials, such as wood, paper, leaves and many plastics
- "B" — Oils, fuels, solvents or other hydrocarbons
- "C" — Electrical
- "D" — Metal fires



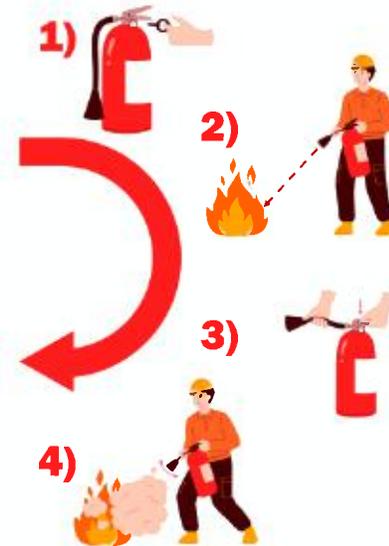
Never use an extinguisher for any purpose other than firefighting. Never use more than one extinguisher. If one does not extinguish the fire, leave the area and call for help. Notify Ingalls Fire Department whenever you discharge a fire extinguisher so that they can replace it with a fully charged one.

The CO₂ fire extinguisher is for early-stage small fires only. If you encounter a large blaze, activate the nearest alarm, alert occupants, evacuate the location and notify management so that they can contact Ingalls Fire Department.

PASS Method

Use the "PASS" method for extinguishing fires.

- 1) **P**ULL THE PIN FROM THE HANDLE
- 2) **A**IM THE NOZZLE
- 3) **S**QUEEZE THE DISCHARGE HANDLE
- 4) **S**WEEP THE NOZZLE BACK AND FORTH AT THE BASE OF THE FIRE



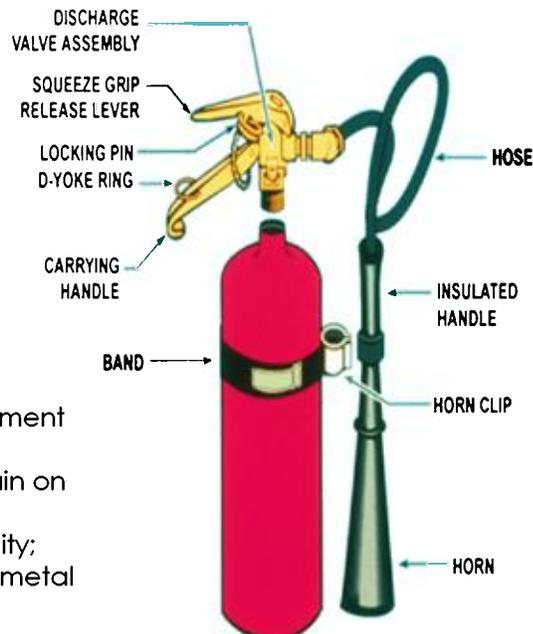
CO₂ Extinguishers (15lb).

- Located in most spaces of the ship
- Intended for small class "C" fires but can be used for small class "A" and "B" fires
- Effective range: 4'–6'
- Lasts 45 seconds with continuous use

Note: Exclusive Fire Watch extinguishers are (10LB.) units

CO₂ Special Hazards

- No reflash protection
- Displaces oxygen, DO NOT enter a compartment that CO₂ has been discharged
- Can cause frostbite burns if allowed to remain on the skin
- Discharge of CO₂ will build up static electricity; therefore, keep the cylinder in contact with metal structure.



Hot Work Permit System

The Hot Work Permit System is in place to ensure that policies and procedures are followed during the implementation of hot work.

The ship's construction manager shall ensure the Hot Work Permit process is started when the physical progress of the ship is reported as 30%. The Hot Work Permit system may be enforced prior to this milestone at the discretion of the Ship's Construction Manager.

All hot work performed on ships with physical progress of 30% complete shall be documented by the Hot Work Permit, (SSF K8430) *Designated Hot Work Space Permit*. The fire marshal shall maintain a log of all Hot Work Permits. The permit is a three-part form. The white copy shall be posted at the work site by the foreman after delivering the yellow copy to the fire marshal. The yellow copy will remain with the fire marshal. The pink copy will remain with the foreman. The white copy shall be returned to the fire marshal at the end of the shift.

Hot work in Shop areas and construction prior to 30% physical progress will not require Hot Work Permits. Fire marshals in these areas shall ensure that foreman and employees are meeting the requirements of SSG K0400. The applicable fire marshal and shop or ship management shall implement Hot Work Permit process as necessary.

The Hot Work Permit shall be filled out by the employee's foreman. The Hot Work Permits will then be given to the fire marshal. This will be accomplished by placing the permit in the fire marshal's folder in the fire marshal's office prior to the commencement of hot work. The fire marshal shall monitor the hot work operation to confirm that precautions are properly identified on the Hot Work Permit and that the hot work operation complies with (SSG K0400) *Fire Prevention, Protection & Response Plan FPPRP Manual*.

Hot Work Permit Process :

1	<ul style="list-style-type: none"> General foreman will fill out the Hot Work Permit prior to assigning hot work to employee.
2	<ul style="list-style-type: none"> General foreman, foreman and employee will verify the "Safety Precautions To Be Taken" portion of the Hot Work Permit during the required pre-hot work inspection. The general foreman shall provide the yellow copy of the permit to the FM prior to commencing the hot work operation. Once step 2 has been completed work can begin.
3	<ul style="list-style-type: none"> FM and Ship's Management shall visually monitor the hot work area identified to confirm hot work precautions to be taken and/or followed are properly identified on the Hot Work Permit and the hot work operation is in the compliance with this manual.
4	<ul style="list-style-type: none"> If the FM determines violations of this manual are committed, he/she will stop hot work process and notify the general foreman and foreman. The hot work process will resume when violations are corrected and verified by the FM. (The FM may require the GF to resubmit a new hot work permit.)
5	<ul style="list-style-type: none"> If for any reason correction(s) or modifications are made to an existing Hot Work Permit, one line will be drawn through the incorrect information and initialed by the person making the correction. Only the requesting GF or FM are authorized to make changes/corrections to an existing Hot Work Permit.
6	<ul style="list-style-type: none"> The white copy of the Hot Work Permit shall be turned into the Fire Marshal's Office, only—by the foreman or general foreman—when the hot work job is complete or at the end of the shift.
7	<ul style="list-style-type: none"> GF will coordinate continuation of hot work through shifts to support hot work process. The general foreman will be required to submit a new Hot Work Permit to the FM for any overtime or carry-over hot work. "OT" shall be written on the top of the form.

Hot work operations found to be in violation of this work instruction will be subject to disciplinary action in accordance with (SSG K0200) *Ingalls Shipbuilding Employee Environmental, Health & Safety Handbook*. Examples of violations are not filling out a Hot Work Permit, improperly filling out a Hot Work Permit, performing hot work operations outside the scope of the Hot Work Permit, and failure to maintain a safe hot work environment.

In the event that hot work is stopped due to noncompliance with a hot work permit or changes in ship's conditions, the fire marshal shall reserve the right to require the foreman to submit a new Hot Work Permit to resume hot work once the conditions are corrected and/or addressed.

“Hot Work In Progress” Sign

In order to assist with identifying hot work, the “Caution: Hot Work in Progress” sign shall be provided. The purpose of the sign is to alert other employees in the area that hot work is being performed in the compartment or area. When hot work is being performed on decks, overheads or bulkheads, a “Caution: Hot Work in Progress” sign shall be posted at the entrance to compartments adjacent (opposite sides of the deck, overhead or bulkhead) to where the work is being performed. These signs shall be posted or removed by the foreman/leaderman of the hot worker doing the job if one is required. The signs shall be taken down when the hot work operation is complete and the area is safe for other operations, i.e. paint or flammables.



In order to assist with identifying where hot work is not allowed, the “No Smoking, Hot Work, Open Flame” sign has been provided. The purpose of the sign is to alert other employees in the area that hot work is not allowed in the compartment or area. These signs are posted when flammable operations, such as spray painting, glue operations, etc., are being conducted. Hot work employees are responsible for making sure that these signs are not posted in the area prior to beginning their hot work operation.



These signs shall be placed by the employee performing the painting, gluing or other flammable operation and will remain in place for one full shift after the operation is completed. The unauthorized removal of these signs will result in disciplinary action up to and including discharge. If you discover these signs in the area you are wanting to perform hot work in, and the signs are out of date (meaning they have been left in the area), contact your foreman for assistance.

While performing hot work, always:

- Periodically check work area to ensure your job is not causing any fires
- Periodically check to ensure the fire barriers are still in place and are not damaged
- Ensure that fire barriers are kept damp

**FIRES CAUSED BY HOT WORK OPERATIONS
ARE PREVENTABLE!**

Walking/Working Surfaces, Ladders, Scaffolding & Fall Protection



Walking/Working Surfaces

In shipbuilding, there are many government regulations, company safety rules and national consensus standards that define steps needed to avoid slip, trip and fall hazards. Some of the Occupational Safety and Health Administration's (OSHA) walk/work surface requirements are:

- 1910.22(b)(2): Permanent aisles and passageways shall be appropriately marked
- 1910.22(b): Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, loading docks, doorways and wherever turns or passage must be made; aisles and passageways shall be kept clear and in good repairs with no obstruction across or in aisles that could create a hazard
- 1915.81(a)(4): The employer shall maintain easy and open access to each fire-alarm box, fire-call station, fire-fighting equipment and each exit, including ladders, staircases, scaffolds and gangways
- 1915.8: ...the employer also shall ensure that each walkway:
 - Provides adequate passage
 - Is clear of debris, including solid and liquid wastes, that may create a hazard for employees
 - Is clear of tools, materials, equipment and other objects that may create a hazard for employees
 - Is clear of hoses and electrical service cords
 - Place each hose and cord above walkways in a location that will prevent injury to employees and damage to the hoses and cords
 - Place each hose and cord underneath walkways
 - Place each hose and cord on walkways, provided the hoses and cords are covered by crossovers or other means that will prevent injury to employees and damage to the hoses and cords
 - Protect each hose and cord by other suitable means
- 1915.81: While a walkway or part of a walkway is being used as a working surface, the employer shall cordon off that portion to prevent it from being used as a walkway
- Working surfaces: Employer shall ensure that each working surface:
 - Is cleared of tools, material and equipment that are not necessary to perform the job in progress
 - Is cleared of debris, including solid and liquid wastes, at the end of each work shift or job, whichever occurs first
- 1915.82: The employer shall ensure that each work area and walkway is adequately lighted whenever an employee is present



In the written procedures and work instructions for Ingalls Shipbuilding, there are the following requirements and responsibilities regarding walking and working surfaces:

- Visually inspect work area prior to starting work
- Keep all aisles, passageways, stairs, ladders and other working surfaces clear of lines, tools, material and debris
- Except when prevented by the vessel's configuration, all temporary working surfaces must have at least a 20" clear width
- Aisles in shops and warehouses must be clearly marked and unobstructed
- All floor and deck openings through which a person or any part of a person can pass must be securely covered or guarded
- When working below deck plates, employees shall remove only the minimum number necessary and barricade openings with "CAUTION" tape
- Access to a work area must be hazard-free, the same as the work area itself
- All hoses, cables, temporary fans and welding machines must be arranged in a safe, orderly manner
- When routing lines, ensure that the lines are not creating slip/trip/fall hazards and that the lines are protected from becoming damaged
- Any identified hazards should be abated by the employee if possible; if not, report the hazard to a foreman for abatement
- Craft removing board/grating shall post signs at all entrances to the area warning of the hazards

Walking/Working Surfaces (Good/Bad Examples)



The first photo shows poor line control. Lines should never be in front of the ladder or cluttered in the area of the landing base.

The second photo shows the proper way to route lines around ladders. Always route lines behind the ladder.



Shows a gap between the two scaffold planks, making this two, 10" walkways; Does not meet requirements for a 20" walkway or the requirement that "an opening through which a person or any part of a person can pass must be securely covered or guarded"

The second photo shows a proper 20" walkway.



Shows pipes placed in a walkway, which is dangerous to pedestrians and violates requirements for permanent aisles in shops and warehouses to be clearly marked and unobstructed

Shows the proper way to designate and mark walkways





Safe Practices for Ascending and Descending Ship Stairs

Face the Stairs:

- When ascending or descending, always face the stairs. This approach provides stability and control, reducing the risk of slips.
- If you were to slip, facing inward allows you to catch yourself with less risk of falling down the stairs and sustaining serious injuries.

Maintain Three-Point Contact:

- To ensure safe movement, maintain three-point contact by using both hands and one foot or both feet and one hand in contact with the stair treads and railings at all times.
- This method is critical in maintaining balance, especially on narrow/steep ship stairs.

Wear Proper Footwear:

- Make sure your work boots have good tread and a defined heel.
 - Proper tread and heel design enhance traction and reduce the risk of slipping, especially on metal stair surfaces commonly found in ship environments.
 - This method is critical in maintaining balance, especially on narrow/steep ship stairs.

Safe Practices for Ascending and Descending Ship Stairs (CONTINUED)

Take It Slow:

- Avoid rushing—each step should be taken with care to ensure firm footing, as even a small misstep can result in a dangerous fall.

Avoid Oversized Backpacks or Loads:

- Heavy loads such as an over-stuffed backpack can raise your center of gravity and increase your risk of a slip, trip, fall mishap when using stairs.
- Never carry heavy loads of material or tools as this will keep you from being able to maintain 3-points of contact and can increase the severity of a mishap if you were to lose control of the load or misstep.

Pedestrian Traffic

- On narrow stairs ensure no one else is on the stairs prior to ascending or descending.
- On narrow stairs only one person should use the stairs at a time.

Report Any Hazards:

- If you notice any issues with the stair conditions, such as slippery surfaces, worn treads, or lack of adequate handholds, report them to your supervisor immediately.
- Proactive reporting helps maintain a safe work environment for all.

Never ascend or descend ship's ladders/stairs while carrying items in your hands or bulky items that could catch and hang up on the rails, stanchions or other adjacent structures. This may prevent maintaining three points of contact or a sudden jerk and balance loss from a carried item hanging up while moving.



Maintaining three points of contact helps stabilize your positioning within the stairway as well as anchors your position if a slip and fall was to occur, often reducing the opportunity of a serious multiple, impact fall causing severe or multiple injuries.

Ladder Inspection

Ladders must be visually inspected prior to using them by following these Ladder Inspection Guidelines:

- Begin at the bottom and ensure the feet are not damaged or show signs of unauthorized repairs
- Inspect the ladder for cracks, bends and splits on side rails, rungs and steps
- Check all rung-to-side rail connections, as well as hardware, fittings and accessories
- Ensure all bolts and rivets are secure; never use a ladder if they are missing or if the joints between the rungs and the side rails are not tight
- Make sure the side rails and rungs are free of foreign materials such as oil and grease
- For stepladders, make sure the spreader braces are not bent, are secure and working properly
- Make sure the ladder is not covered with excessive paint or adhesive that could hide splits, cracks or other damage
- Ensure that the top cap is not melted or otherwise damaged
- Remove ladder from service if any defects are found

Ladder Safety Requirements

- Straight ladders shall only be constructed, installed, modified or repaired by the X10 scaffold carpenters
- When ascending or descending, the user should always face the ladder and use both hands; three points of contact shall be maintained at all times on ladders
- Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations
- Ladders shall not be placed on boxes, barrels or other unstable bases to obtain additional height
 - Ladders shall not be used as braces, guys or skids, or for other than their intended purpose
 - Ladders shall be kept free and clear of welding lines, material, debris, etc., at all times, to provide safe access
 - Portable ladders shall be lashed, blocked or otherwise secured to prevent being displaced
- The side rails of ladders, used for access to any level, shall extend not less than 36" above that level; when this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed, such as a handrail stanchion
- Ladder rungs shall be parallel, level and uniformly spaced, with spacing no more than 12"
- When sections of ladders are spliced, the ends shall be abutted, and no fewer than two cleats shall be securely nailed or bolted to each rail
- Ladders shall be installed with at least 7" clearance between the back of rungs and any surface or obstruction
- Temporary wooden ladders over 5' shall have a green scaffold tag attached; if ladder is not tagged or if only the white plastic retainer is on the ladder, it should not be used and scaffold carpenters should be contacted to secure and tag the ladder
- Always physically shake access ladders to scaffolds and work platforms to ensure that they are secured and stable



Ladder Safety "DOs" and "DON'Ts"

✓ DO'S

- Inspect ladder when you receive it and before each use.
- Place ladder on a firm, level base.
- Lock spreaders with ladder open before climbing.
- Keep your belt buckle between the side rails of the ladder.
- Face ladder when ascending or descending and maintain three points of contact.
- Maintain a firm hold on the ladder.
- Keep metal ladders away from power lines or other live electrical circuits.
- Keep ladder close to work.
- Descend and relocate ladder, if necessary.

✗ DON'TS

- Climb on back section of stepladders.
- Stand on ladder top cap, the first step down from the top cap or bucket shelf.
- Use ladders on ice, snow, mud, grease or other slippery surfaces.
- Climb onto a ladder from the side or from another ladder.
- Use a stepladders to access a structure or to step off a structure. Stepladders are for working from, not transferring on or off from other structures.
- Use a ladder as a brace, platform or plank.
- Use a ladder on a scaffold to gain additional height.
- Apply side load to ladder.
- Over-reach, push or pull anything when using a ladder.



Scaffolding

Ingalls only authorizes trained Scaffold Competent Persons to erect, alter and dismantle scaffolds and temporary staging. Never attempt to build your own scaffold or modify existing scaffolds except for simple maintenance adjustments, such as restoring the tension on wire rope guardrails by tightening turnbuckles or tightening loosened connections on temporary access ladders.

Ingalls uses a tagging system to advise you when a scaffold is ready to use and alert you when it is not. The tags are color-coded with the "GO" side green and the "STOP" side red. Never climb onto scaffold that has a red "DANGER" placard or one that has no tag. You will find these tags at the access points to the staging. Even if the scaffold is green-tagged, always inspect the scaffold before you begin the job.

Make sure that the structure meets these requirements:

- Guardrails must consist of a top rail that's 42-45 inches high with a mid-rail one-half the height between the upper rail and the working/walking surface
- Wire rope guardrails must be taut
- Turnbuckle bolts must be fully engaged and protrude past the nut ends
- Cable eye clamps must be tight
- Platforms must be at least 20" wide
- Walking/working platforms must be banded or otherwise secured to the supporting structure
- Walking/working platforms must be intact and not cracked, splintered or excessively charred
- Access ladders must be secured to prevent slippage
- The scaffold must include all bracing and reinforcing members

- Locking pins, bolts and nuts must be in place and fully engaged.
- Wooden scaffold boards must be OSHA-approved fire-retardant planking.
- Access ladders must be installed so that employees do not have to step any more than 12" onto a platform.
- Never attempt to move a rolling tubular scaffold while someone is atop the platform.
- Always lock the casters before mounting a rolling scaffold.
- Shipbuilders who must use a powered adjustable scaffold, such as Spider®, must receive specialized training in its correct operation.
- Staging must include toeboards where tools or equipment may accidentally fall and strike workers below.



Fall Protection

Scaffolding, staging or other work platforms 5' or higher that are fully decked, completely encompassed by standard guard railing and have no other fall exposures are considered compliant fall protection. Any other time a employee is exposed to a fall 5' or higher they must utilize a personal fall arrest system (PFAS).

Lifelines are used in some PFAS applications and require 100% tie-off at all times. Inspect lifelines to ensure they are 3/8" cable, capable of holding 5000 lbs. static weight per person using them, have a minimum of three cable clamps on the terminal ends and there are no holes in the stanchions below where the cable is attached. Shipbuilders must look for special signs that are posted on scaffolding by the Scaffold Competent Persons that state that PFAS is required — even if the scaffold appears to be complete.

Fall Protection (Aerial Lifts and Crane Baskets)

- Shipbuilders must complete specialized training and be authorized/licensed in order to operate an aerial lift or similar equipment
- Aerial lifts shall never be operated beyond their rated capacity or with more than two persons in the basket
- Operators must conduct a pre-use inspection of aerial lifts prior to using them and document the inspection on an *Manlift Utilization and Maintenance Log* (SSF M7561)
- Any deficiencies noted must be corrected prior to use
- The first thing a user must do upon entering an aerial lift or crane basket is attach their PFAS to the designated anchor points — even if they are not intending to exceed 5' of elevation
- Aerial lifts are not elevators; do not transfer from the lift to a structure and back
- Users of aerial lifts/crane baskets working over water shall wear a personal flotation device on top of their PFAS
- Contrary to industry practices of years past, aerial lift/crane basket users must keep their PFAS attached while over water



Aerial lifts are not elevators; do not transfer from the lift to a structure and back



Remember

- A Personal Flotation Device (PFD) alone will not help if a worker falls from heights of more than 40 feet to the water, or onto objects below (camels, floats, punts, fenders, or large floating objects). Always tie-off.



Electrical Safety, Illumination, & Control of Hazardous Energy Lockout/Tags Plus (LO/TP)

Electrical Safety

Shipbuilders use electricity to power a multitude of different production processes during vessel construction. Electricity is probably the most common and the most versatile energy source in shipyards. However, if not respected and its hazards not properly controlled, it can also be one of the deadliest. Always adhere to the following guidelines and requirements to make working with and around electricity as safe as possible:

- Ingalls only permits authorized electricians and electrical technicians to repair and service electrical equipment
- Assume that all electrical wires, conductors and equipment are energized until positively determined otherwise
- All light streamers and extension cords shall be equipped with three conductor cords
- Electrically powered tools and equipment must be adequately grounded
 - When handheld power tools are used on temporary power circuits, such as extension cords, the circuit must employ a ground fault circuit interrupter (GFCI)
- Do not use equipment without a ground conductor unless the tool is double insulated
- Do not store anything in or on breaker boxes or other electrical cabinets
- All main circuit switches must be properly labeled, identifying the locations affected by the switch
- Never splice, tap into or otherwise modify electrical equipment to accommodate work tools, household appliances, makeshift heating or cooking devices, or any type of unapproved apparatus
- Do not bring personal electrical equipment or tools into the facility
- Frequently inspect portable power tools for worn or damaged electrical cords
- Homemade pig tail electric cords are prohibited
- Keep electrical cords clean and free of kinks
- Make sure the insulation on an electrical cord is in good condition
- Do not drag electrical cords over hot or rough surfaces
- Keep electrical cords free of grease and oil
- Immediately report any electrical hazards to your foreman, area EH&S staff member or Maintenance



Homemade plug sets are not allowed in the shipyard



A noncompliant extension cord



Always inspect for damage before using



Electric Shock -- The physical stimulation or trauma caused by the flow of electricity through the human body. It can occur during contact with or by being near live (energized) electrical parts or without direct contact with electricity. The most common electric shock injury is a burn. Electrocution results when death occurs from an electric shock.

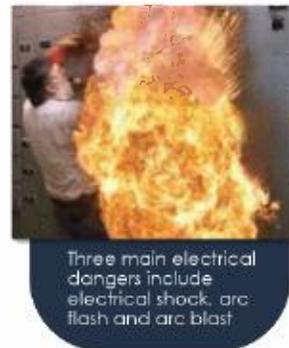
Electrical Shock Hazards Can Be Created By:

Defective electrical tools	Untrained or unqualified personnel attempting electrical power connections
Improper electrical phasing	Damaged wire insulation as a result of hot work processes
Inaccurate schematic drawings	Corroded connectors due to saltwater intrusion or contact
Worn or frayed electric cables	Inadequate electrical isolation, failure to test for deenergization, and improper lockout/tags-plus application
Electric cables pinched in hatches/doors	Tools and equipment not properly grounded
Electric cables struck by grinders/saws	Blind-side drilling into electrical conductors

Electric Arc -- The luminous electrical discharge that occurs when high voltages exist across a gap between conductors and current travels through the air; often caused by equipment failure as a result of poor maintenance or overuse

Arc Flash -- The release of heat and bright intense light from an electric arc with temperatures recorded as high as 35,000°F.

- Exposure to extreme temperatures can burn the skin directly and cause the ignition of clothing
- An arc flash can be spontaneous or result from bridging the gap between electrical contacts with a conductive object such as a tool or jewelry.
- Other causes may include dropped tools on energized conductors which create sparks, breaks or gaps in insulation, as well as the buildup of dust, corrosion or other impurities on the surface of an insulator, creating a fault path



Arc Blast -- The explosive release of molten material from equipment caused by high amperage arcs.

- The pressure waves produced by an arc blast are powerful enough that workers can be knocked off, onto or into objects
- The high pressure can cause injuries such as falls, exposure to being struck by molten metal and loose materials or equipment, ruptured eardrums and memory loss as a result of a concussion

Illumination

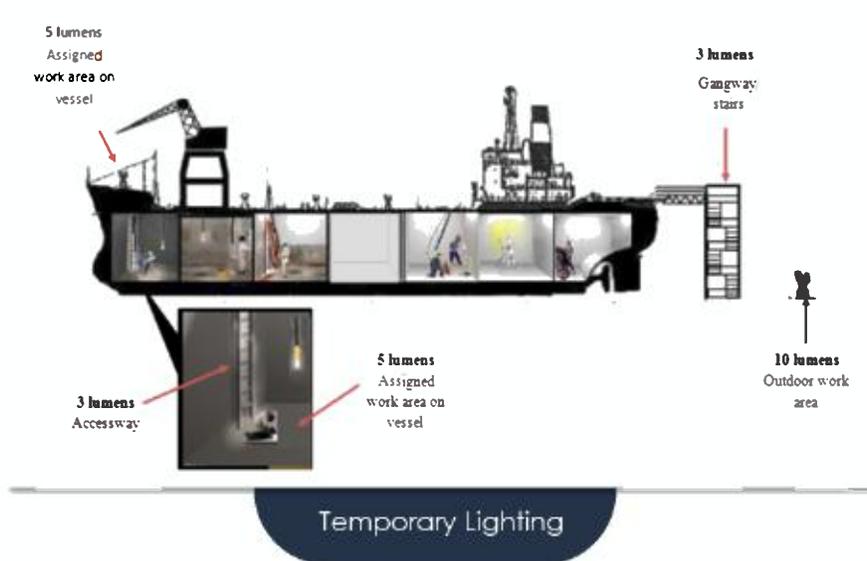
Over the years in the shipbuilding industry, many injuries and fatalities have occurred because of inadequate lighting. Slips, trips and falls, electric shock and burns and the inability to exit a space are examples of the hazards created and/or made worse by improper lighting. Well-lit workplaces, whether on vessels, vessel sections or at landside areas, are essential to help prevent such incidents.

When shipbuilders are assigned tasks in a specific location within a larger area, the minimum lumens are only required where the work is being performed. However, if any part of the larger work area is used as an accessway, the minimum lighting required on vessels or vessel sections is three lumens, or five lumens at general landside areas.

The following table outlines the minimum required lighting levels required for shipbuilders to perform their work and move between job sites safely. Elevated lighting levels, such as in landside work areas, are necessary for precision work, operating heavy equipment, and for reading and comprehending signs, warning labels and instructions.

Lumens (a unit of light measure)	3	5	10	30
Areas of Operation	General areas on vessels and vessel sections such as • Accessways • Exits • Gangways • Stairs • Walkways	General landside areas such as ➢ Corridors ➢ Exits ➢ Stairs ➢ Walkways	Landside work areas such as: ➢ Machine shops ➢ Electrical equipment rooms ➢ Carpenter shops ➢ Lofts ➢ Tool rooms ➢ Warehouses ➢ Outdoor work areas	First-aid stations
		Landside tunnels, shafts, vaults, pumping stations, and underground work areas		Infirmaries
		All assigned work areas on any vessel or vessel section	Health and sanitation facilities such as: ➢ Changing rooms ➢ Showers ➢ Sanitized toilets ➢ Eating or drinking areas ➢ Break areas	Offices

Out-of-service lighting needs to be promptly replaced or repaired before work or passage is permitted in that area. In walkways and passageways, traffic may need to be diverted until lighting replacement/repairs are completed.



Where required lighting levels cannot be met by permanent lighting sources, temporary lighting may be used in combination with permanent lighting to achieve the minimum required lighting levels.

Temporary lighting must be:

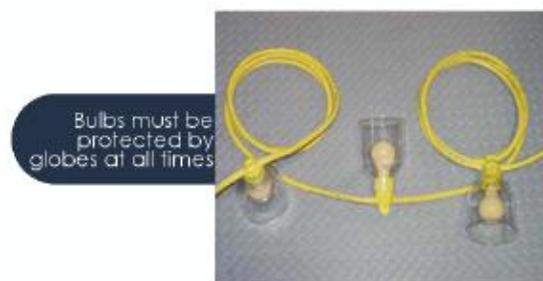
- Guarded when bulbs are not completely recessed to prevent workers from coming in contact with a hot bulb
- Equipped with electric cords designed with sufficient capacity to safely carry the electric load, protecting workers from hazards such as electrical shock and fire
- Equipped with electric cord connections and insulation that are maintained in a safe condition (e.g., free from being broken, cracked or damaged)
- Grounded, through a third wire either in the cord or through a separate wire when non-current-carrying metal parts are exposed

Additional requirements to ensure the safety of shipbuilders:

- Never suspend lights or lighting stringers solely by their electric cords (e.g., from the rungs or side rails of ladders) unless they are designed to do so; improper suspension can place tension on cords, causing them to fray, break or become otherwise damaged, which can expose workers to electrical shock or fire
- Branch circuits must have over-current protection that does not exceed the rated current-carrying capacity of the cord used; over-current protection helps prevent possible electrical and fire hazards associated with circuit overloading
- When splicing is necessary, its insulation must exceed that of the original cord; this will help prevent worker injury and ignition of combustible materials should a surplus of energy or a "hot spot" occur at the splice junction

Emergency or Portable Lighting

Emergency or portable lights do not fall within the "temporary lighting" category and are not required to meet similar lighting levels. However, such lights are only intended for short-term use, such as evacuating a space, and must not be used to perform work tasks unless it is in addition to the already existing lighting.



Examples of such lighting may include, but are not limited to flashlights, headlamps, glow sticks and clamp/magnetic portable lights.

Portable or emergency lights are required:

- In any dark area that does not have permanent or temporary lights
- Where lights are not working
- Where lights are not readily accessible
- On a vessel or vessel section where the only means of illumination are not part of the vessel or vessel section, and where natural sunlight provides insufficient illumination

Risk of Fire or Explosion:

- In any area where the atmosphere contains a concentration of flammable vapors that are at or above 10 percent of the lower explosive limit, explosion-proof, self-contained temporary and portable lights must be used
- All explosion-proof, self-contained temporary and portable lights must be approved by a nationally recognized testing laboratory (NRTL)
- Only use explosion proof or intrinsically safe lights approved for use in Class 1 Group D atmosphere to work in potentially flammable or explosive environments
- Never use matches or open-flame devices for lighting purposes

Additional Lighting Precautions:

- Only use portable lights that are in good condition
- Never remove broken light bulbs from lighting fixtures; if replacements are required, notify a qualified electrician
- Always keep light extensions out of water
- Never attempt to change the bulb in an explosion-proof light; bring the light to qualified electricians so that they can correctly reassemble and torque the globe to specifications
- Keep electrical cords clear of working surfaces and walkways or other locations where they would be readily exposed to damage
- Temporary lights shall have approved guards covering the bulbs at all times
- Never enter a darkened area without a suitable light
 - Take a flashlight into confined spaces as a backup/emergency light
 - See your supervisor if you need a flashlight
- In the event electrical power is lost and the lights go out, use your flashlight to exit
 - If your flashlight fails, stop what you are doing and stay where you are until help arrives



Never enter an unlit space.
Let your foreman know you
need lights before entry

Lockout/Tags Plus (LO/TP)

Control of Hazardous Energy (SSO K221) is the LO/TP program and contains the requirements for working in the vicinity of hazardous energy or controls the accidental startup or release of hazardous energy. There are also work instructions and supplemental guidance documents that contain detailed requirements for LO/TP applications. The LO/TP program must be complied with by all Ingalls employees and contractors. Any employee or contractor with questions regarding LO/TP should ask for assistance from their supervisor, their area S-FP staff member or contact the S-FP Department.

Hazardous energy can come in many forms. Examples are electrical, pneumatic, mechanical, gravitational, etc. If an employee is exposed to the accidental release of any hazardous energy, the LO/TP must be utilized.

WHO?	<p>Affected Employee: An employee who normally operates or uses the equipment that is going to be serviced under LO/TP or who is working in the area where servicing is being performed under LO/TP.</p> <p>Authorized Employees: An employee who performs one or more of the following LO/TP responsibilities: 1) Executes the LO/TP procedures; 2) Installs a lock or tags-plus system on machinery, equipment, or systems; 3) Services any machine, equipment or system under lockout/tags-plus application.</p> <p>Other Employee: Any employee who passes through or briefly enters an area where an LO/TP system has been applied.</p>
WHY?	<p>Purpose: The purpose of the Ingalls Shipbuilding energy control program is to establish the requirements for the application of energy isolating devices that control hazardous energy during servicing operations of machinery, equipment or systems. By controlling hazardous energy, we enhance protection of employees from injury caused by the accidental startup or energization of equipment.</p>
WHAT?	<p>Lockout: The placement of a lock on an energy-isolating device in accordance with an established procedure, thereby ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lock is removed.</p> <p>Tag-Plus System: A system to control hazardous energy that consists of an energy-isolating device with a tag affixed to it and at least one additional safety measure.</p>
WHERE?	<p>Gate-to-Gate: Anywhere shipbuilding work is being performed, regardless whether landside, vessel or vessel sections. If servicing is taking place in the shipyard and employees could be exposed to the release of hazardous energy, then LO/TP controls must be used.</p>
WHEN?	<p>Servicing: Workplace activities that involve the construction, installation, adjustment, inspection, modification, testing or repair of machinery, equipment or systems. Servicing also includes maintaining machines, equipment or systems when performing these activities would expose the employee to harm from the startup or energization of the system being serviced, or the release of hazardous energy.</p>
HOW?	<p>Locks, Tags, and Devices: Locks, tags and LO/TP devices that are used to identify and protect Authorized Employees while servicing can only be used for LO/TP purposes. Tags are standardized with a unique identity (size, color, print, or format) to indicate that there is an LO/TP application in progress. All employees, except Authorized Employees, are prohibited from attaching or removing LO/TP locks or tags and from tampering with, moving or defeating an energy-isolating device.</p>
WITH?	<p>LO/TP Components: An LO/TP system uses an energy isolating device which is secured in the safe position by a lock or a tag and an additional safety measure. Additional safety measures may include such things as blocking a control switch, blanking and bleeding lines or removing a valve handle. Ingalls Shipbuilding uses several different types of custom-designed LO/TP devices to ensure energy isolation on the unique equipment aboard Naval vessels.</p>

Notification

Affected Shipbuilders will be notified of an LO/TP system affecting their particular area and/or equipment. Notification is made prior to applying or removing an LO/TP system and again after servicing is complete, but prior to re-energization of the equipment or system. If an Affected Shipbuilder must stay in the area, perhaps to assist the Authorized Shipbuilders, the Affected Shipbuilder must be trained to the LO/TP Tier III (Authorized Employee) level and must participate fully in the LO/TP application.

LO/TP Participation

Affected Shipbuilders will be notified of an LO/TP system affecting their particular area and/or equipment. Notification is made prior to applying or removing an LO/TP system and again after servicing is complete, but prior to re-energization of the equipment or system. If an Affected Shipbuilder must stay in the area, perhaps to assist the Authorized Shipbuilders, the Affected Shipbuilder must be trained to the LO/TP Tier III (Authorized Employee) level and must participate fully in the LO/TP application.

Hazardous energy can be extremely unforgiving if not properly controlled



Shipbuilder LO/TP Program Compliance

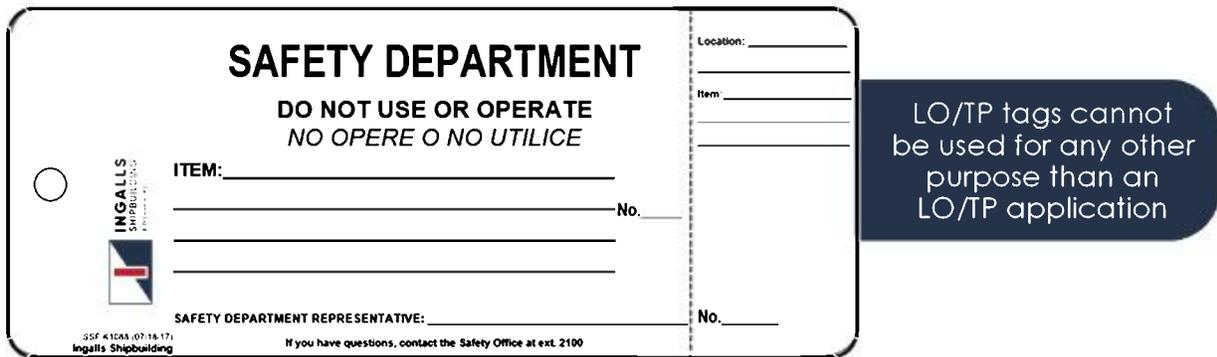
All employees are required to comply with the restrictions and limitations imposed on them during the use of lockout or tags-plus applications. No employee, upon observing that machinery, equipment or systems are secured using LO/TP applications, shall attempt to start, open, close, energize or operate that machinery, equipment or system.

Any violations of the procedures required by this program will be investigated. Any Ingalls Shipbuilding employee found to have violated these procedures will be subject to current Ingalls Shipbuilding enforcement discipline processes up to and including immediate discharge.

Any contractor, sub-contractor, vendor or their employees found to have violated these procedures may be immediately discharged from an Ingalls Shipbuilding facility, property and/or contract.

No employee shall attempt to start, open, close, energize or operate any machinery, equipment, or system when secured through LO/TP applications.

LO/TP Program Tags



Supervision shall ensure that all employees remain informed of the prohibition against tampering with or removing any lockout/tags-plus system and the prohibition against restarting or re-energizing any machinery, equipment or system being serviced under a lockout/tags-plus system.

Any LO/TP Tag that is found adrift or appears to have become separated from its attachment shall be brought immediately to the LO/TP Coordinator, any member of management, or an S-FP Department staff member.

The tag represented below is exclusive to the LO/TP Program. LO/TP tags may be different colors; however, they will always have the "Danger Do Not Operate" legend on one side. The Authorized Shipbuilder, serialized control number and date will be contained on the back of the tag. Additional information and remarks may be listed as well.

These are the only LO/TP tags that will be used at Ingalls and may not be used for any other purpose than LO/TP program. Contractors conducting or participating in LO/TP application in Ingalls facilities shall use our LO/TP program tags.

Lock Color Codes

Electricians — Red
 Machinist — Blue
 Pipe — Green
 Foreman — Brown
 All Others — Black

LO/TP Tag Colors

Electrical — Red
 Facilities/Maintenance — White
 Mechanical Test — Orange

The Maintenance Department commonly uses locks on landside work areas and follows the color-coding listed above.

Tags-Plus (a tag-out with an additional safety feature) will primarily be used onboard vessels so locks may not be required. If locks are not used, there will be an additional safety device along with the tag.

**Written Programs**

The over-arching energy control written program is Control of Hazardous Energy (SSO K221). Additionally, three Command Media work instruction documents exist to give specific direction for Authorized Shipbuilders in the energy control procedures of Mechanical Test & Trials, Electrical Test & Trials, and Facility Maintenance. These documents are:

- Facilities-Maintenance — *Energy Control (Lockout/Tags Plus (LO/TP)) Facilities Maintenance (SSW N3009)*
- Mechanical Test and Trials — *Shipboard Tag-Out of Mechanical Systems, Naval Surface Ships (SSW S2101)*
- Electrical Test and Trials — *Precautions and Tag-Out Procedure for Energizing and Working Shipboard Electrical Circuits (SSW M3103)*



Hazard Communications (HAZCOM)

Hazard Communications Program

Hazardous materials can present themselves in many forms, for example: solids, liquids, gases, vapors, fumes, dusts and mists. The hazards these materials create can be physical, such as simple asphyxiation, or chemical, as with the damaging interaction with the agent's makeup itself. From coatings to fuels to welding rods, knowing information about the products shipbuilders work with is key in the employee protection that our Hazard Communication Program provides.

The Ingalls Shipbuilding HAZCOM Program consists of four basic parts: (1) a formal written program; (2) safety data sheets (SDS); (3) chemical classification and labeling; and (4) employee training.

1. The first part of our HAZCOM Program is a formal written program (SSO K214). This document outlines and details how the program works. It is located in Command Media and employees requesting a copy can notify their supervisor or the S-FP Department.
2. Another very important piece of the HAZCOM Program is the SDSs. An SDS is a form generated by a hazardous substance manufacturer or distributor, which describes the characteristics of the product supplied. This is the most comprehensive source, which is readily available, to explain hazards and hazard controls associated with the chemicals that shipbuilders use or that may be present in the shipyard.
3. Another key element of HAZCOM is hazardous substance labeling. Signs are posted in certain work areas warning shipbuilders of possible hazards associated with the substances being used in that area. In addition, containers that hazardous materials are kept in shall be marked.
4. The last portion of the HAZCOM Program consists of employee training. In order for shipbuilders to work safely with chemicals, they must be educated as to the material's hazards and hazard controls. Types of training include, but are not limited to, new hire orientation, Weekly Safety Training Modules, Safety Alerts, on-the-job training and Job Safety Analysis.

Employees have a right to know what chemicals and hazardous materials they work with or work around, and employees have the obligation to provide this information. Anytime a shipbuilder or contractor has questions concerning a hazardous material there are several avenues to ensure that their questions are answered. Employees should ask their supervisor or an area S-FP staff member if they have questions or concerns regarding any hazardous material in the shipyard. Supervisors must maintain SDSs for the materials that their crewmembers could be exposed to and consult with the EH&S Department if additional HAZCOM information is needed.

Supervisors and employees must remember that in a large shipyard there could be hazardous materials being used in different process areas and in different geographical areas of the facility. If you are assigned to a location or process that uses a hazardous material, you must be trained in safe storage and use, prior to beginning work.

The EH&S Department and its Industrial Hygiene section conduct a variety of monitoring and sampling throughout the facility. They review all hazardous materials introduced into the Yard. However, anytime an employee detects a visible cloud, a known or unknown odor or any other indication of the presence or release of a hazardous material, they must clear the area and report it at once.

Safety Data Sheets (SDS)



The Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), requires that the chemical manufacturer, distributor or importer provide Safety Data Sheets (SDSs) (formerly MSDs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in the SDS is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent, user-friendly, 16-section format. This chapter provides guidance to help shipbuilders who handle hazardous chemicals become familiar with the format and understands the contents of the SDSs.

The SDS includes such information as the properties of each chemical; the physical, health and environmental health hazards; protective measures; and safety precautions for handling, storing and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well). In addition, OSHA requires that SDS preparers provide specific minimum information but they may also include additional information in various section(s).

Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices and emergency control measures, e.g., firefighting. This information should be helpful to those who need to get the information quickly. Sections 9 through 11 and Section 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information and other information including the date of preparation or last revision. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS), but OSHA will not enforce the content of these sections because they concern matters handled by other regulatory agencies.

A description of all 16 sections of the SDS, along with their contents, is presented below in this table published by the Occupational Safety & Health Administration (OSHA):

Section 1: Identification
<p>This section identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:</p> <ul style="list-style-type: none"> • Product identifier used on the label and any other common names or synonyms by which the substance is known. • Name, address, phone number of the manufacturer, importer or other responsible party and emergency phone number. • Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).
Section 2: Hazard(s) Identification
<p>This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:</p> <ul style="list-style-type: none"> • The hazard classification of the chemical (e.g., flammable liquid, category 1). • Signal word. • Hazard statement(s). • Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (e.g., skull and crossbones, flame). • Precautionary statement(s). • Description of any hazards not otherwise classified. • For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Please note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3: Composition/Information on Ingredients
<p>This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures and all chemicals where a trade secret is claimed. The required information consists of:</p> <p>Substances</p> <ul style="list-style-type: none"> • Chemical name. • Common name and synonyms. • Chemical Abstracts Service (CAS) number and other unique identifiers. • Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical. <p>Mixtures</p> <ul style="list-style-type: none"> • Same information required as for substances (above). • The chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are: <ul style="list-style-type: none"> ➤ Present above their cut-off/concentration limits, or ➤ Present a health risk below the cut-off/concentration limits. • The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations: <ul style="list-style-type: none"> ➤ A trade secret claim is made. ➤ There is batch-to-batch variation, or ➤ The SDS is used for a group of substantially similar mixtures.
Section 4: First Aid Measures
<p>This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:</p> <ul style="list-style-type: none"> • Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact and ingestion). • Description of the most important symptoms or effects, and any symptoms that are acute or delayed. • Recommendations for immediate medical care and special treatment needed, when necessary.
Section 5: Fire Fighting Measures
<p>This section provides recommendations for fighting a fire caused by the chemical. The required information consists of:</p> <ul style="list-style-type: none"> • Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation. • Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns. • Recommendations on special protective equipment or precautions for firefighters.
Section 6: Accidental Release Measures
<p>This section provides recommendations on the appropriate response to spills, leaks or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:</p> <ul style="list-style-type: none"> • Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eyes and clothing. • Emergency procedures, including instructions for evacuations, consulting experts when needed and appropriate protective clothing. • Methods and materials used for containment (e.g., covering the drains and capping procedures). • Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning or vacuuming; adsorbent materials; and/or equipment required for containment/clean up).
Section 7: Handling and Storage
<p>This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:</p> <ul style="list-style-type: none"> • Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment and providing advice on general hygiene practices (e.g., eating, drinking and smoking in work areas is prohibited). • Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

Section 8: Exposure Controls/Personal Protection

This section indicates the exposure limits, engineering controls and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer, importer or employer preparing the safety data sheet, where available.
- Appropriate engineering controls (e.g., use local exhaust ventilation, or use only in an enclosed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure).
- Any special requirements for PPE, protective clothing or respirators (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of the glove material).

Section 9: Physical and Chemical Properties

This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

- Appearance (physical state, color, etc.);
- Upper/lower flammability or explosive limits;
- Odor;
- Vapor pressure;
- Odor threshold;
- Vapor density;
- pH;
- Relative density;
- Melting point/freezing point;
- Solubility (g/L);
- Initial boiling point and boiling range;
- Flash point;
- Evaporation rate;
- Flammability (solid, gas);
- Upper/lower flammability or explosive limits;
- Vapor pressure;
- Vapor density;
- Relative density;
- Solubility (g/L);
- Partition coefficient: n-octanol/water;
- Auto-ignition temperature;
- Decomposition temperature; and
- Viscosity.

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (K_{St}) for combustible dust, used to evaluate a dust's explosive potential.

Section 10: Stability and Reactivity

This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability and other. The required information consists of:

Reactivity

- Description of the specific test data for the chemical(s). This data can be for a class or family of the chemical if such data adequately represent the anticipated hazard of the chemical(s), where available.

Chemical stability

- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
- Description of any stabilizers that may be needed to maintain chemical stability.
- Indication of any safety issues that may arise should the product change in physical appearance.

Other

<ul style="list-style-type: none"> • Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat or create other hazardous conditions. Also, a description of the conditions under which hazardous reactions may occur. • List of all conditions that should be avoided (e.g., static discharge, shock, vibrations or environmental conditions that may lead to hazardous conditions) • List of all classes of incompatible materials (e.g., classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation. • List of any known or anticipated hazardous decomposition products that could be produced because of use, storage or heating (Hazardous combustion products should also be included in Section 5 (Fire-Fighting Measures) of the SDS.)
Section 11: Toxicological Information
<p>This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:</p> <ul style="list-style-type: none"> • Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). The SDS should indicate if the information is unknown. • Description of the delayed, immediate or chronic effects from short- and long-term exposure. • The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (median lethal dose) - the estimated amount [of a substance] expected to kill 50% of test animals in a single dose). • Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure. • Indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.
Section 12: Ecological information
Note: Since other Agencies regulate this information, OSHA does not enforce this section.
Section 13: Disposal Information
Note: Since other Agencies regulate this information, OSHA does not enforce this section.
Section 14: Transport Information
Note: Since other Agencies regulate this information, OSHA does not enforce this section.
Section 15: Regulatory Information
<p>This section identifies the safety, health and environmental regulations specific for the product that is not indicated anywhere else on the SDS. The information may include:</p> <ul style="list-style-type: none"> • Any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency or Consumer Product Safety Commission regulations).
Section 16: Other Information
<p>This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.</p>

Shipbuilders can obtain an SDS for any chemical in the shipyard. The Master Chemical List and SDS database containing all products is located on Ingalls' intranet, under "Resources" or you can contact the EH&S Department for a copy of any particular SDS.

The file needs to have a Master Chemical List and have the SDSs alphabetized so that the order of information matches their Master Chemical List. Each department is responsible for maintaining their SDS files and for updating the SDSs when new versions are published. If an SDS is missing or obsolete, they must retrieve a new copy from the SDS database. Any issues or problems regarding a specific SDS, or with the database, should be relayed to the Environmental Engineering section of the EH&S Department for assistance.

Production departments must ensure that their employees are aware of their right to access an SDS for any chemical they use and be able to readily provide a copy if requested. The field training of employees on the safe handling, use and storage of any specific chemical should be conducted with the use of its SDS so employees are familiar with all associated elements, characteristics, hazards and hazard controls. The information included in the SDS should be incorporated into Job Safety Analysis sheets and used to assist in employee training. The recommended PPE listed on the SDS must be used. Contact the EH&S Department if clarity or assistance is needed regarding any information provided on an SDS.



HAZCOM Labeling

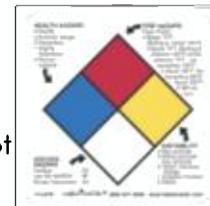
Traditionally, Ingalls has used National Fire Protection Association (NFPA) or the American Coating Association's Hazardous Material Identification System (HMIS) labels. Shipbuilders have seen these labels in the shipyards for years. Now, shipbuilders should only see new-style labels with the Globally Harmonized System (GHS) elements. The GHS labels require that several new features be included regardless of the chemical container on which they are affixed. Shipbuilders should expect to see the following elements on the GHS labels:

- Name, address and phone number: How to contact the chemical manufacturer, distributor or importer.

Product Identifier: How the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in Section 1 of the SDS (Identification).



HMIS Label



NFPA Label

Signal Word: Used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. There are only two signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the signal word "Warning," then only "Danger" should appear on the label.

Pictograms: Are graphic symbols used to communicate specific information about the hazards of a chemical. On hazardous chemicals being shipped or transported from a manufacturer, importer or distributor, the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label.

Health Hazard Carcinogen Mutagenicity Reproductive Toxicity Respiratory Sensitizer Target Organ Toxicity Aquatic Toxicity	Flame Flammable Pyrophoric Self-Heating Self-Reacting Solid Peroxides Organic Peroxides	Explosion Mark Irritant to skin and eyes Skin Sensitizer Acute Toxicity (Hazardous) Harsh Effects Respiratory Tract Irritant Harmful to Aquatic Life (Non-Hazardous)
Gas Cylinder Gas Under Pressure	Corrosion Skin Corrosion/ Burns Eye Damage Corrosive to Metals	Explosive Bomb Explosives Self-Reactives Organic Peroxides
Flame Over Circle Oxidizers	Environment (Non-Hazardous) Aquatic Toxicity	Skull and Crossbones Acute Toxicity (Oral or Inhalation)

The pictograms OSHA has adopted improve worker safety and health, conform to the GHS and are used worldwide. While the GHS uses nine pictograms, OSHA will only enforce the use of eight. The environmental pictogram is not mandatory but may be used to provide additional information. Workers may see the ninth symbol on a label because label preparers may choose to add the environment pictogram as supplementary information.

Most of the symbols are already used for transportation and many chemical users may be familiar with them. The following table shows the symbol for each pictogram, the written name for each pictogram and the hazards associated with each of the pictograms:

It is important to note that the OSHA pictograms do not replace the diamond-shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks or other containers. Those labels must be on the external part of a shipped container and must meet the DOT requirements. While the DOT diamond label is required for all hazardous chemicals on the outside shipping containers, chemicals in smaller containers inside the larger shipped container do not require the DOT diamond but do require the OSHA pictograms. Labels must be legible, in English and prominently displayed. Other languages may be displayed in addition to English.

OSHA Adopted Pictograms and Hazards

Hazard Statement(s): Describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example, "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards, no matter what the chemical is or who produces it.

Precautionary Statement(s): Means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling. There are four types of precautionary statements: prevention (to minimize exposure); response (in case of accidental spillage or exposure emergency response, and first aid); storage; and disposal.

For example, a chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: "Do not breathe dust/fume/gas/mist/vapors/spray. Get medical advice/attention if you feel unwell. Dispose of contents/ container in accordance with local/regional/ national and international regulations." A forward slash (/) designates that the classifier can choose one of the precautionary statements.

In most cases, the precautionary statements are independent. However, OSHA does allow flexibility for applying precautionary statements to the label, such as combining statements, using an order of precedence or eliminating an inappropriate statement. When there are similar precautionary statements, the one providing the most protective information must be included on the label.

Supplementary Information: The label producer may provide additional instructions or information that it deems helpful. It may also list any hazards not otherwise classified under this portion of the label. This section must also identify the percentage of ingredient(s) of unknown acute toxicity when it is present in a concentration of ≥1% (and the classification is not based on testing the mixture as a whole). If an employer decides to include additional information regarding the chemical that is beyond what the standard requires, it may list this information under what is considered "supplementary information." There is also no required format for how a workplace label must look and no particular format an employer has to use; however, it cannot contradict or detract from the required information.

An example of an item that may be considered supplementary is the personal protective equipment (PPE) pictogram indicating what workers handling the chemical may need to wear to protect them. For example, the Hazardous Materials Information System (HMIS) pictogram of a person wearing goggles may be listed. Other supplementary information may include directions of use, expiration date or fill date, all of which may provide additional information specific to the process in which the chemical is used.

Much of the information needed to ensure that a shipbuilder properly stores a material is included on the label and listed in the precautionary statements. The labels also help to locate quickly, information on first aid or emergency response if needed. However, the information on the label may not be as comprehensive as the information on the SDS. The label and the SDS should have the same precautionary statements and other information, but the SDS may go into further details. Always consult the SDS if the information needed is not on a label.

Any time a hazardous material will be removed from its bulk-shipping container and stored in a secondary container, a label must be completed and affixed to the secondary container. If hazardous chemicals are transferred from a labeled container to a portable container that is only intended for immediate use by the same employee who performs the transfer, and it is maintained in exclusive control of that employee, no labels are required for the portable container. All other containers require labeling.

SAMPLE LABEL

CODE _____ Product Name _____ } **Product Identifier**

Company Name _____ } **Supplier Identification**

City _____ State _____ Country _____

Phone Number _____

Hazard Pictograms

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor. May cause liver and kidney damage.

Precautionary Statements

Keep container tightly closed. Store in a cool, well-ventilated place. Do not breathe. Keep away from heat/sparks/open flames. No smoking. Only use non-sparking tools. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Ground and bond container and receiving equipment. Do not breathe vapors. Wear protective gloves. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Dispose of its contents into local, regional, national, international regulations as specified.

Supplementary Information

In Case of Fire use dry chemical (BC) or Carbon Dioxide (CO2) fire extinguisher to extinguish.

First Aid: If inhaled call Poison Center. If on skin for 60 sec. Take off immediately any contaminated clothing. Rinse skin with water.

Directions for Use _____

Fill weight _____ Lit./Number _____

Gross weight _____ Fill Date _____

Expiration Date _____



Crane Operations, Powered Industrial Vehicles & Shipyard Traffic

Powered Industrial Vehicles (PIVs)

- Shipbuilders must be trained and authorized to operate specific types of vehicles, including cranes, aerial lift platforms, forklifts and skid steer loaders (Bobcats).
- Operators shall never load a PIV's structure, hoisting gear, rigging gear, attachments, extensions or personnel platforms beyond its rated capacity
- Operators must use the vehicle's daily checklist to inspect the equipment before the start of the shift -- DO NOT OPERATE DEFECTIVE VEHICLES.
- Report all deficiencies to your supervisor and/or the Maintenance Department so that the appropriate persons can correct them.
- Contractors, subcontractors or other non-Ingalls personnel are restricted from using Ingalls-owned or leased equipment.

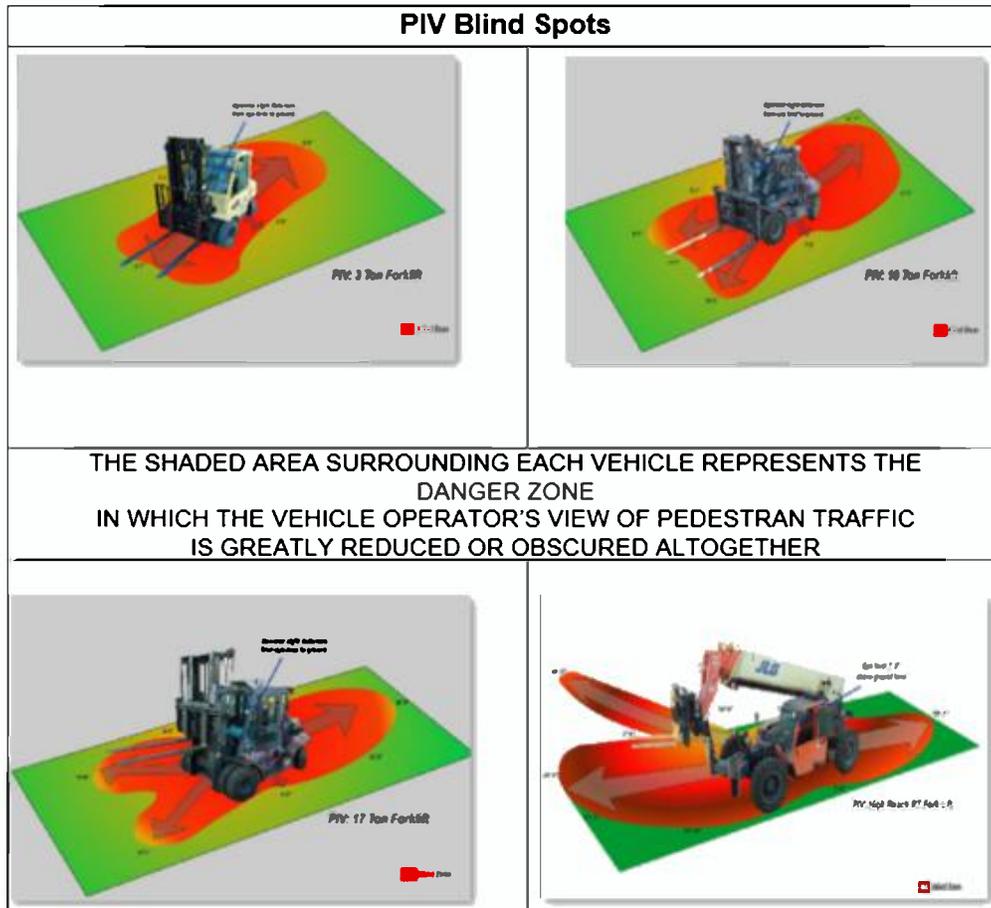
Working Around PIVs

- Shipbuilders shall never ride on a forklift or other vehicle that is not equipped with a passenger seat
- Look and listen -- Always visually confirm the location **and** movement of a PIV when you hear a nearby backup alarm, horn, revving engine or other unique PIV sounds
- Understand that a PIV is designed to brake more slowly than a normal automobile so that it can maintain its stability and not shift or spill its load
- Never walk out in front of a PIV expecting it to instantly stop because you are a pedestrian and have the right of way
- Ensure you do not position yourself in the operator's blind spots -- if you cannot see the operator's eyes directly or in a mirror, they cannot see you
- Never distract a PIV operator; however, as with crane operations, anyone can signal "All Stop" to a PIV operator and they must comply
- When assisting with material handling operations, never allow a forklift operator to pick up a damaged wooden pallet
- Never pass or stand underneath an elevated load or empty forks
- Never add "homemade" extensions or devices to the forks of a PIV; fork extensions must be approved by the vehicle manufacturer for use on that vehicle
- Alert an operator if you notice a problem with their machine such as leaking hydraulic fluid, lights not working, low tire, etc.
- Be aware of "rear-end swing out" when near a turning forklift; as a forklift turns, the back of the vehicle will swing out in the opposite direction of the turn; if you are too close, you could be struck
- Never stand behind a forklift -- not all makes and models have backup alarms, or an alarm may not be working

CAUTION

**LOOK OUT
FOR POWERED
INDUSTRIAL
TRUCKS**





Crane Operations

- Riggers directing the operator must know and use the appropriate hand signals and remain within the operator's line of sight
- It is everyone's responsibility to pay attention to their surroundings and maintain a high level of Situational Awareness around cranes
- Pay attention to the crane's travel bell and warning horn; make sure you are clear of the tracks and suspended loads
- Never pass underneath a suspended load
- Abide by the instructions of the crane rigger
- Listen to the crane riggers and crane leg walkers:
 - They will verbally instruct you to stay clear of crane operations.
 - Evacuate the intended path of an approaching load and remain clear of overhead loads
 - Crane riggers and crane leg walkers may use whistles or bullhorns to keep people away from suspended loads or moving cranes
 - Failure to comply with instructions from a crane rigger or crane leg walker while they are performing their job may result in disciplinary action



Maintain high levels of situational awareness when working around crane operations.

Crane Rigger Responsibilities

- Know the capacity of the crane and the weight of all loads being lifted
- Select the proper equipment to attach a load
- Inspect all rigging equipment and take any damaged equipment out of service before each use
- Stop lifts if you suspect it is unsafe (crane riggers and everyone else are responsible for this)
- Verify the direction of the crane and that the load motion is clear prior to signaling the crane to move
- Control personnel access around suspended loads and loads about to be suspended. If circumstances interrupt a lift in progress, the crane crew shall set the load on the ground pending resumption of the job. If this is not possible and a suspended load must remain stationary for a lengthy period, riggers must barricade the area and post attendants
- Do not direct loads over people in the area
- Verify the hook is directly over the load and the lift will not be side-loaded
- Ensure a crane leg walker alerts employee in the surrounding area by blowing a whistle whenever the crane is in motion and during all lifts until the load safely reaches its destination
- Check the entire area surrounding the travel path to make sure no obstacles are present
- The crane rigger and/or crane leg walker shall not engage in any practice that will divert attention while actually engaged in supporting crane operations
- Whenever there is any doubt as to the safety of a lift, the rigger shall consult with the crane operator or the supervisor before handling the load
- Failure of riggers to abide by these responsibilities may result in disciplinary action

Shipyard Traffic

The following rules and regulations regarding shipyard traffic and pedestrian safety must be closely adhered to at all times:

- Obey all traffic signs and the standard rules of the road
- Speed limits across Ingalls facilities are 15 mph in main roadways and 5 mph in production areas.
- Vehicles, including bicycles, cannot be operated during shift change (5:45-6 a.m. and 2:30-2:45 p.m.)
- Drivers, operators and passengers must use seat belts or shoulder harnesses in vehicles equipped with them
- Hard hats, safety glasses and safety-toed footwear are required when operating or riding in utility vehicles "mules" or golf carts
- All vehicles used to transport passengers must have firmly secured seats and passengers must use those seats
- No one may ride unsecured in vehicles, such as pickup trucks and flatbeds
- Shipbuilders may not drive passenger vehicles into shops or other covered worksites.
- Bicycle operators must wear high-visibility reflective vests
- Never park or store material within six feet of crane/railroad tracks
- Except for emergency vehicles, never leave the engine running in unattended motor vehicle
- Prior to operating a Utility Vehicle (UV) "mule" or golf cart, always inspect the vehicle for defects and ensure everything is in working order
- Do not operate if defects exist; report defects to supervisor to arrange for repairs by Maintenance Department
- Yield to emergency vehicles and stop for pedestrians in crosswalks
- Headlights shall be used from a half hour before dusk until a half hour after sunrise
- Keep all extremities (arms and legs) inside the vehicle
- The use of cell phones is prohibited while operating a vehicle
- Do not park within six feet of a crane track and never block fire equipment, electrical control panels, manifolds/valves or park anywhere that would hinder emergency response efforts
- Do not pass busses when they are loading or unloading



Maintain high levels of situational awareness when driving or walking on the roadways within the shipyard



Manual Hand Tools, Powered Hand Tools & Machine Guarding

Manual Hand Tools

Hand tools are such a common part of our lives that it may be difficult at times to remember that they present hazards that must be controlled. Manual hand tools are non-powered, but we can generate a lot of force with them. Hand tools include anything from axes to wrenches, from sledgehammers to the smallest screwdriver. Hand tools are manufactured with safety in mind; however, too often tragic accidents occur when hand tool hazards are not adequately addressed by tool users.

Prior to using any hand tool, a careful visual inspection must be conducted to ensure the tool is in a safe, well-maintained condition and ready for use. Once the user is satisfied that there are no hazards associated with the condition of the tool, they must recognize the hazards associated with the use of tool. The greatest hazards posed by hand tools result from misuse and improper maintenance. Since shipbuilders use many different types of hand tools, they must learn to recognize the hazards associated with each tool they use and the safety precautions necessary to prevent them from creating mishaps.

Examples of Condition & Use Hazards:

- Using a tool inappropriately -- Example: Using a screwdriver as a chisel or a pry bar, which may cause the tip of the screwdriver to break off and fly out, hitting the user or other employees
- Using the wrong tool for the job -- Example: Using an adjustable wrench vs. a combination wrench, wherein the adjustable wrench could slip
- If a wooden handle on a tool such as a hammer or an axe is loose, it may slip off and become a projectile in the work area. Similarly, when an impact is made by a tool with a splintered or cracked handle, it may sustain a catastrophic failure, allowing the head and broken handle to fly off and strike the user or another worker
- A wrench with sprung jaws or its hex-edges rounded out, may slip on a nut or bolt head and cause the user to fall or lurch in the direction of the force they were applying. This can cause anything from falls to "struck against" injuries, many of which can be quite serious
- Impact tools such as chisels, wedges or drift pins are unsafe if they have mushroomed heads. The mushroomed edges chip off when struck, sending sharp fragments flying into the work area
- Tape around a hammer handle can hide defects such as splintering or cracking and is, therefore, forbidden
- If the grip teeth on the jaws of pliers are rounded down or **worn out**, it can allow the tool to slip causing a "struck against" injury. Additionally, it may require excessive grip-strength force from the user to get the tool to "bite," which can cause musculo-skeletal disorders and strains (ergonomic injuries)



The greatest hazards posed by hand tools result from misuse and improper maintenance

Hand Tool Care & Maintenance

Ingalls is responsible for the safe condition of tools and equipment used by employees, regardless of the tool's origin; however, employees have the responsibility for properly using and maintaining tools. Shipbuilders must inspect all hand tools for defects before use and alert their supervision if deficiencies are found. Always store tools in a safe place where the tool will not be damaged and it does not pose a hazard to others in the area.

- Never use a damaged tool
- Keep saw blades, knives or other tools with cutting edges clean and sharp because dull tools require excessive hand force and are more hazardous than sharp ones
- Never use modified or "homemade" tools
- Keep tools clean, dry and properly lubricated but do not allow lubricant to get on the tool's handle
- Unless a tool is designed to be periodically adjusted or the manufacturer allows specific repairs such as changing a broken hammer handle, never attempt to repair a tool; replace it instead

Basic Safety Rules for Hand Tools

- Appropriate personal protective equipment, e.g., safety goggles, gloves, etc., should be worn to protect the user from hazards that may be encountered while using hand tools
- Keep floors as clean and dry as possible to prevent accidental slips and to provide a firm, stable base while working with hand tools
- When working around flammable substances, sparks produced by iron and steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, aluminum, or another non-ferrous material are required
- Use tools that are the right size and type for your job
- Do not work with oily or greasy hands or slippery tool handles
- Cut away from yourself when you use chisels, knives and other sharp-edged tools
- Handle sharp-edged and pointed tools with care and always pass a sharp tool to a co-worker handle-first
- Sharp-edged tools must be directed away from aisle areas and places where other employees working in close proximity and covered when not in use
- Secure all small work pieces with a vise or clamp so it does not slip under your tool
- When using an adjustable tool such as a crescent wrench or slip-joint pliers, ensure they are properly adjusted before applying force
- Never apply heat to a tool unless it is specifically designed for that purpose as it can change the temper of the tool steel and its specific design characteristics
- Let the tool do the work; do not try to overpower or force a tool. If it is well maintained, and by using only a sensible amount of effort, it will perform better, and you will have more stable work control
- Wrench handle length is designed to be the right size and strength for the tool's service requirements so never try to increase your leverage by using a "cheater" pipe or handle
- Never hammer or beat with a tool that is not made for striking
- When using hand tools ensure safe body positioning so that if a slip occurs your "follow through" motion will not cause and injury



The greatest hazards posed by hand tools result from misuse and improper maintenance



Safely Carrying Hand Tools

- When hand-carrying tools, keep sharp points or cutting edges covered and hold them away from you
- Do not stuff your pockets with too many tools; use a toolbox or tool belt
- Keep your toolbox, tool bucket or tool belt clean and orderly so you can easily find the tool you need without being cut or gouged
- If a co-worker wants to borrow a tool, hand it to them; do not toss it and never free-drop to a lower level

Powered Hand Tools

Power tools demand users obey safe practices and maintain a high level of situational awareness for injury-free operation. All safety devices on tools and equipment must function properly. Safety devices are designed and installed on tools to control hazards. Removing safety devices or not ensuring they are maintained in working order can result in serious injury. The following points must be consistently followed by all power tool users:



- Always bring the proper tools with you to your worksite
- Never use a tool that you are unfamiliar with or that is not designed to perform your work task
- Never use another worker's power tool without first being trained on its use
- Never pick up an unattended power tool and use it; it may be there because it is damaged or missing a guard and the owner has gone to get parts or new blades/disks
- Inspect all powered hand tools prior to use:
 - Ensure cord is unplugged prior to handling the tool
 - Inspect the tool's cord, plug and strain relief boot as well as the extension cord to be used
 - Only authorized electricians can repair damaged cords and plugs
- Electrically powered tools and equipment must be adequately grounded (unless marked as double insulated) and if used on a temporary power (extension cords), it must utilize ground fault circuit interruption (GFCI) protection
- Before using pneumatic tools, inspect the airline for damage and always ensure that the crow's foot connections are secured with a safety clip or wire and the hose fittings are wrench-tightened to the tool
- Never remove or alter a guard or safety device; if equipment comes with a guard, then you must use it with the guard in place and intact
- Never disable a safety device or override a normal operating control switch, lever or pushbutton
- On tools designed with trigger safety devices, the devices must function properly to avoid inadvertent activation if trigger is mistakenly pressed
- Continuous run controls on hand-held electric tools must be disabled before these tools are placed into service
- Powered hand tools brought from home are not allowed

Trigger Safeties

An often overlooked safety mechanism on grinders and other hand-held power tools is the trigger safety. The trigger safety is a small, often spring-loaded lever device that blocks the trigger from closing until a separate motion of the user's hand folds it back. This ensures that if the user sets the tool down on the deck or a work table and it rolls over or lands on the trigger that the tool will not unintentionally activate. If a grinder takes off while the user is not holding it there is a possibility that it can contact the user or bystanders causing severe injuries or damage to equipment and property.



Never use a tool that you are unfamiliar with or that is not designed to perform your work task

Here are two types of trigger safeties. If you are unsure of how the trigger and its safety work, ask your supervisor before using the grinder. At any time the safety does not function by stopping the trigger from activating, the tool must come out of service and be returned for repair.

When inspecting the trigger safety on a grinder, make sure that:

- The trigger safety is in place – There should be a tab or lever on the trigger to block it from being pressed
- It takes two distinct motions of the hand to activate or "tuck" the safety under the trigger for the trigger to be activated
- The spring on the safety has a firm tension and is not loose or coming out of its attachment
- The trigger safety passes a functional test when squeezed and does not allow inadvertent activation

Hand-Held Grinders "Buckeyes"

Ingalls has numerous safety controls in place regarding the use of all grinders, including both electric and pneumatic buckeye grinders and the grinding wheels.

- Before each use, closely inspect your grinding wheel for cracks, nicks or any other defects that may cause the wheel to shatter
- Insure the wheel fits freely on the spindle and is not forced on
- When in use, ensure the grinding wheel is oriented correctly at the point of work
- If the wheel jams, especially the thin cutting blades, it can kick back and/or shatter
- All guards are required to be in place and properly adjusted on all machines and power tools that are equipped with them
 - Removal of these guards could cause serious injury and subject the operator to disciplinary action
 - If you feel the guard needs to be removed because it is in the way, contact your supervisor who will give you direction. If your grinder does not have a guard installed on it or the guard has been modified, return it to the tool room where it will be replaced.
 - These guards:
 - Must cover one-half (180°) of the cutting edge
 - Be properly aligned with the wheel
 - Strong enough to contain fragments if the wheel shatters
- Be careful when handling and storing grinding wheels as they are easily damaged
- Storing wheels, especially the thin cutting blades, in gang boxes or in tool bags and then throwing tools in on top of them can cause damage
- Minimal damage to these wheels can cause them to shatter
- Always check the maximum RPMs listed on the tool is less than the maximum RPMs for the attachment
- Do not use if the maximum RPMs is not indicated on the tool or attachment
- Before changing grinding wheels, de-energize the tool:
 - Pneumatic: Turn off air supply
 - Electrical: Unplug from the power source
- Grinder attachments shall only be used according to the manufacturer's design and recommendations
 - Never stack multiple discs on a grinder

Never operate a power tool while wearing loose clothing or other articles that can become entangled in the rotating tool



There are very important safety precautions you must take in order to prevent injury with abrasive wheel grinders. One of the most important is to use the correct PPE and clothing. Buckeye operators are required to use the following eye and face PPE: Safety goggles or prescription safety glasses with side shields and a full-face shield.

Removal of Equipment Safety Devices:

- When tight quarters require an employee to remove a grinder's dead handle, they may only remove the handle with the approval of their foreman and only for brief duration tasks
 - Guards are required on all grinder attachments exceeding 2" in diameter except when used for internal work, such as grinding or cutting inside of a pipe. This includes sanding and buffing discs
 - Pencil grinders using grinding disk attachments must have a guard on them
- Auxiliary handles (dead handles) are required on:
 - Hand-held angle grinders
 - Most grinders have the ability to install the handles for right- or left-hand use
 - Any ½" or larger drills
- Many drill handles are 360° rotational and locking; these are adaptable to most job configurations
- Any tool that is designed and manufactured with a handle
- Ensure sparks are directed away from people at all times
- Operating a grinder without specific authorization is a citable safety violation and will result in a one-day suspension without pay on the first offense.



This buckeye grinder was without a guard when the disk shattered. This resulted in a significant injury to the employee

**Inspect the grinder disks and wheels before each use
to insure that there is no damage!**



Manual Material Handling & Ergonomics

Musculoskeletal Disorders (MSDs)

The largest injury type in shipbuilding is musculo-skeletal disorders. MSDs include:

- Muscle strains and back injuries from repeated use or overexertion
- Tendonitis
- Carpal tunnel syndrome
- Rotator cuff injuries (a shoulder problem)
- Epicondylitis (an elbow problem)
- Trigger finger from repeated use of a single finger
- Hand-arm vibration syndrome (Vibration White Finger)
- Other cumulative trauma disorders



The Maritime Industry has a higher rate of ergonomic-related injuries than General Industry and Construction.
—U.S. DOL Bureau of Labor Statistics

Early indications of MSDs include numbness, tingling, pain, restriction of joint movement or soft tissue swelling. Shipyard employees experience lower extremity MSDs, strains and sprains of the low back muscles and associated low back disorders. Moreover, hand-arm vibration syndrome, known as "vibration white finger," is often identified among shipyard employees who use vibrating tools. Some MSDs develop gradually over time as a result of intensive work. When the work environment requires employees to assume awkward or static body postures for a prolonged period, the workers may be at risk of developing MSDs. The ergonomics-related risk factors that shipyard employees are most often exposed to include:

- **Force** — The amount of physical effort required to perform a task (such as heavy lifting, pushing, pulling) or to maintain control of the equipment or tools
- **Repetition** — Frequently performing the same motion, or series of motions, for an extended period
- **Awkward and prolonged static postures** — Assuming positions that place stress on the body, such as repeated or prolonged reaching above the shoulder height, bending forward or to the side, twisting, kneeling or squatting
- **Contact stress** — Pressing the body or part of the body (such as the hand) against hard or sharp edges or using the hand as a hammer
- **Vibration** — Using vibrating tools such as sanders, chippers, drills, grinders or reciprocating saws may result in fatigue, pain, numbness, increased sensitivity to cold and decreased sensitivity to touch in fingers, hands and arms. Exposure to whole body vibration may damage the joints of the skeletal system
- **Cold temperatures** — Combined with the risk factors above, may increase the risk of musculoskeletal disorders



Protecting oneself from overexertion or musculo-skeletal injuries is extremely important

When there are several risk factors in a job, as is often found in shipyards, there can be a greater risk of injury. Whether certain work activities put an employee at risk of injury can depend on the how long (duration), how often (frequency) and how intense (magnitude) the employee's exposure to the risk factors in the activity, as well as other factors. These characteristics are particularly important when considering work activities and conditions.

Each year, MSDs are one of the most pervasive and painful injuries that shipbuilders experience and cost Ingalls more than any other single injury type. However, the earlier symptoms of MSDs are reported and treatment started the better chance that the injury will not become a long-enduring, agonizing problem. Always notify your supervisor if you experience soreness, strains, sprains, tingling sensations, loss of range of motion or other potential signs of an MSD.

Manual Lifting & Carrying Techniques

Using poor manual lifting techniques or over lifting greatly increases the chance of sustaining a sprain or strain to the back, neck, shoulders, groin, abdomen and other body parts. Having slip/trip hazards in an area where you are carrying materials can also cause injuries. A considerable number of injured shipbuilders failed to practice safe lifting techniques or did not seek assistance before lifting or carrying heavy loads.

Many personal factors increase or decrease any individual's risk for a strain or sprain from manual material handling. Shipbuilders come in all sizes, ages, heights and physical conditioning. It is not always true that a short, slender person cannot lift much or that a large, tall person can. However, before employees are assigned to jobs requiring heavy or frequent lifting, they should be physically suited for the job. The following may contribute to the risk of a strain injury:

- Poor physical fitness
- Lack of flexibility
- Recreational activities
- Emotional stress
- Attitude of invincibility
- Lack of rest
- Unwillingness to ask for help
- Poor back support when sleeping
- Poor posture when sitting or standing

Some of these risk factors can be controlled by employees while they are away from work, but there are many other things that can be done on the job to reduce the risk of strains and sprains.



Is the Work Area Clear Enough to Lift and Carry Material?

Adequate housekeeping, line control and cleared walking/working surfaces are all good hazard controls that can reduce lifting/carrying strain risks. Congested areas, uneven or slippery surfaces or low hanging lines can compound the risks associated with an otherwise simple task of moving items by hand. When you slip or trip with a load in hand and try to regain your balance, you can often overexert yourself because the weight of the load is further out of position and the quick twist of the torso puts too much strain on muscles or damages discs in the spine. Before you pick the material up, always make sure that the lift/carry path is clear of obstacles and other pedestrians are not in your way.

Basic Rules for Lifting or Moving Objects:

- Size up the load first — If there is any doubt in your mind about your ability to lift it, do not attempt to do so alone
- Make sure that your footing is secure, your balance is good and there are no foreign objects lying on the floor
- Place feet shoulder-width apart, one foot slightly ahead of the other
- Bend knees and squat keeping the back straight and as nearly vertical as possible, but also at a comfortable angle. If necessary, spread the knees or lower one knee to get closer to the object
- Tighten your stomach muscles as you lift for additional support for the spine
- Start pushing up with your legs, thereby using your strongest set of muscles; keep the load close to your body as you come up; lift gradually with the legs; don't jerk the load; sudden movements such as twisting, turning or jerking can cause strains or sprains
- Lift the object to the carrying position; if it is necessary to change your direction when in the upright position, be careful not to twist the body; turn your body with changes of foot position
- Vision should always be unobstructed and if the load interferes with normal walking, help should be obtained

- If putting the load down to the floor surface from a waist-high carrying position, bend the knees with a straight back, load close to the body and lower the load with the arms and leg muscles
- Specially shaped objects require special handling – One person can easily roll a compressed gas cylinder on its bottom edge, but it may take two people to load it on a truck, or into a rack
- To carry boxes and cartons, grasp opposite bottom corners and draw the object into the body
- When lifting or carrying with another person, teamwork is important; the load should be equally distributed, and movements coordinated so that all persons involved start and finish the lift at the same time and perform turning movements together
- Remember -- Things not meant to be moved by hand should be carried or lifted with hand trucks, forklifts or hoisting equipment



Horizontal Distance of Load from the Body

The further the load is from the center of the body, the more compressive force it puts on the vertebrae and discs in the lower back as well as stress on back muscles. Always try to keep the load tight to your torso and your torso straight. When you bend over, you have the weight of the load and the weight of your torso that must be countered by the lower back muscles. Avoid twisting your torso while handling a load. A rule of thumb for the maximum horizontal distance of the load from the body is to — never lift anything past 10" from your toes, measured when standing straight up.

Poor Hand Holds

Handling materials without adequate handholds increases the chance of dropping the load. It also decreases the amount of weight you can safely handle by about 10%. Without handholds, the hands and arms need more force to support the load; awkward postures are more likely if the object starts to slip or if you need to change grasp positions while lifting, lowering or carrying. In addition, when lifting objects from the floor, you will have to bend down further if there are no handles to grasp. While not all objects have handles, a good grip on the load is essential for safe carrying. Some types of gloves can improve grip; however, make sure they have a good friction surface (rubber dots or palms) and fit well or they may actually not allow you to feel the load or require excessive grip strength.

The 50-Pound Rule

Shipbuilders must observe the personal load limit of 50 pounds. However, this does not mean that all 50-pound loads are created equal nor should they be lifted and carried by one person. If an object is oddly shaped or heavier on one side you may still need two people to transport it. Additionally, the 50-pound rule is only for lifting and only when proper positioning and lifting techniques can be used. If a 50-pound object must be carried (especially up stairs) or lifted into above-chest levels, it is not a single person task. Remember, fifty pounds is the maximum allowed to be lifted by one person—it does not mean that all people, in all cases, should attempt a 50-pound lift.



Ergonomics

Because MSD injuries are one of the most common injury types we experience, it is important that all employees remain engaged in identifying opportunities to change work processes that reduce the risk of MSDs. There are things that all shipbuilders can do to take advantage of known ergonomic solutions for Shipbuilding MSD hazards. Some are prior to the task and some are during the job.

Before starting the job:

- Workers should work with management to identify possible tasks in shipyard employment that present ergonomics-related hazards; a team should develop a plan to control tasks that put workers at risk of developing MSDs, and shipyard employees must be informed and trained on the ergonomic concerns in the workplace and ways to minimize the risk of injury
- Position lights directly over a work area and/or equipment to reduce awkward neck and back positions
- Identify appropriate PPE to help reduce localized pressure on the body and unnecessary fatigue.
- Position equipment and devices, such as point-of-use tool boards and rigging racks, within easy reach (e.g., between the knees and shoulders) to reduce awkward postures and fatigue
- Identify proper worker assist devices/equipment, such as standing platforms or workbenches, that can be easily transported to the work area to reduce the amount of overhead reaching that may place stress on the body

During the job:

- Wear appropriate PPE, including gloves (with anti-vibration properties when needed), elbow, knee and shoulder pads, and kneeling supports to reduce localized pressure on the body and reduce fatigue
- Use material/equipment-handling wheeled devices such as carts, hand trucks and pallet jacks designed to transport heavy and awkward materials, tools or equipment; applying the wheeled devices will reduce lifting, pushing and pulling forces
- Use additional material/equipment-handling devices such as drum movers, overhead cranes, conveyors, hoists/balancers, movable containers and pulley systems to transport heavy and awkward materials, tools or equipment; use of these devices also reduces lifting, pushing and pulling forces

Heat Stress Prevention

Heat Stress

Heat illnesses most commonly result from a reduction or collapse of the body's ability to shed heat by sweating. When an individual generates body heat by strenuous work, especially if the environment is hot and humid, the body cools itself by perspiring and the evaporating sweat takes the heat with it. When there is a disruption of this process, overheating and heat illness may occur. Most often, the disruption occurs because the body's fluid levels become low when fluids are not replaced fast enough to compensate for the amount leaving the body through perspiration and/or urination. When the body's core temperature rises and it is experiencing heat stress, it will develop some or all of the symptoms of the two main forms of heat illness: heat exhaustion and heat stroke. Unrecognized or untreated heat stress can kill you. It will certainly make you very sick and can contribute to a separate accident because it causes unclear thinking, poor balance and weakness.



Symptoms of Heat Exhaustion

- Heat Cramps — Painful cramps indicated by muscle pain from the excessive loss of water and/or electrolytes
- Fatigue and Weakness — Feeling really tired regardless of the amount of exertion you have been performing. Slow or incomplete muscle response (weak feeling)
- Blurred Vision — Difficulty focusing and possibly seeing spots, flashes and colors floating in your field of vision; it can progress into tinting or graying until fading to black upon fainting
- Wet Skin — Although the body is at a fluid deficit, you are still sweating as the body attempts to give up every ounce of available water in order to reduce its rising core temperature
- Headache — Can vary from mild to intense; however, it is usually persistent and intensifies the further into heat stress the body continues
- Dizziness or Fainting — Balance is affected and can continue worsening until you faint; combined with the fatigue and vision changes, you may feel sleepy and then pass out (faint)
- Irritable or Confused — Cognitive focus depreciates, and you may become frustrated or irritable; difficulty concentrating and your "train of thought" becomes broken
- Thirst and/or Nausea — Mild thirst, turning to craving water as symptoms advance; mild nausea and stomach upset, to actually dry heaving or vomiting, as the response to heat stress progresses
- Increased Heartbeat — Pulse rate increases as the body attempts to increase its effectiveness in controlling its critical systems; circulating more blood, faster, near the skin, helps cool by convection of heat into the air



Symptoms of Heat Stroke

- Red, Hot, or Dry Skin — The body no longer has a practical amount of fluid left to attempt to control its core temperature through perspiration. Skin feels hot and dries out
- High Temperature — Without effective cooling from the perspiration process, the body's core temperature climbs, metabolism runs very high and produces high fever-like temperatures
- Confusion and Severe Disorientation — Individual responses may run between confusion to complete in comprehension and continue progressing until passing out
- Passing Out and Collapse — You no longer possess the ability to focus or control balance; vision fades and muscles can no longer maintain upright postures; unconsciousness follows
- Convulsions and Seizures — Involuntary physical response to the critical level where heat stress has progressed



Contributing Factors for Heat Stress

- High heat and humidity
- Limited or no air movement over the body
- Working in direct sunlight
- Heavy or large amounts of physical exertion
- Wearing dark, heat absorbing clothing
- Tight clothes or PPE that limits air movement over the skin
- Age
- Poor physical conditioning
- Limited or no acclimation to working in heat
- Previous, recent cases of heat illness
- Inconsistent and insufficient sleep and rest
- Improper diet (high fat, and poor in nutrients, vitamins and minerals)
- Drug and alcohol abuse
- High caffeine/alcohol consumption causing dehydration
- Taking certain prescription or over-the-counter medications
- Not drinking enough pre-hydration "Pre-Work" water
- Not drinking enough rehydration "During Work" water
- Not drinking enough replenishment "After Work" water
- Not replacing electrolytes and minerals lost through perspiration
- Not taking enough/frequent breaks out of the direct sun
- Not seeking medical attention at the onset of symptoms

Treating Heat Stress

Anytime you are starting to feel the symptoms described above, it is very important to seek medical assistance. Remember, the symptoms can appear and progress rather quickly depending on the factors associated with the task, environment and individual. If the symptoms are mild, report them to your supervisor or carefully make your way to the Incident Response Team (IRT) office.

Do not attempt walking, climbing or negotiating obstacles if you are experiencing dizziness or vision problems. If you feel that it becomes too difficult or unsafe to walk, ask a co-worker to contact your supervisor, (any manager, if supervisor is unavailable) notify the Boat Foreman or Shop Office, contact an area S-FP staff member or make a 911 call to CEOC. Always try to remove yourself from the source of the heat. Go to a shady area, near a fan or to a climate controlled space. Remove PPE and protective clothing to allow body heat to dissipate and perspiration to evaporate. If you are assisting someone experiencing heat illness symptoms, follow the previous guidance; however, if they lose consciousness, contact CEOC immediately.

Heat Stress Prevention

- It is better to drink small amounts frequently, as opposed to larger amounts less often
- Drink even if you do not feel thirsty
- Avoid drinks like sodas or coffee that have caffeine or alcoholic drinks — these drinks dehydrate you
- People worry that if they drink a lot of water, they will have to go to the bathroom more often; in fact, you will mostly sweat it off
- Prior to heavy work, drink plenty of water -- You do not want to start out with a deficit of fluids and try to "play catch up" soon after beginning work
- When you are not at work, still drink plenty of water to help your body recover from the workday
- Take frequent breaks during physically demanding tasks
- Carefully consider the amount of "sport drinks" you consume -- While they do replace vital electrolytes and minerals lost to heavy sweating, they are often high in sugar and salt; balanced diets provide the proper amount of minerals for most people
- Only drink "sports drinks" if you are doing an unusually high amount of sweating because of heavy exertion, not as a total replacement for water
- If wearing PPE such as welding leathers remove them when taking a break and allow air movement to evaporate perspiration
- Always ensure there is forced air ventilation operating when working in confined and enclosed spaces
- On high heat days, it is recommended to take breaks more frequently

Drink water even if you do not feel thirsty



Urine Color Chart

Anytime you are starting to feel the symptoms described above, it is very important to seek medical assistance. Remember, the symptoms can appear and progress rather quickly depending on the factors associated with the task, environment and individual. If the symptoms are mild, report them to your supervisor or carefully make your way to the Incident Response Team (IRT) office.

Even dehydrated personnel will continue to produce urine, called "obligatory urine." When dehydration is inevitable for operational reasons, obligatory water loss in urine can be reduced by avoiding diuretics like coffee and tea.

Dark yellow urine is a sure indicator that the individual is dehydrated and that the fluid consumption must be increased. The aim is to produce urine no darker than Color #3 of the Urine Color Chart.

Urinating less than twice per day and/or producing urine darker than Color #3 in the chart indicate severe dehydration; the individual must start drinking immediately.

NOTE: some vitamins and medications may alter the color of urine.

How dehydrated are you?



Highly dehydrated!

Go drink a large bottle of water immediately!



You are still seriously dehydrated.

Drinking a bottle of water now will make you feel much better.



Moderately dehydrated. You lose water on a regular basis throughout the day.

Drink more water.



You're almost there.

Get some water in your system to flush out all those toxins from your workout.



Don't let yourself get dehydrated!

Drink at least 8-12 large glasses or a gallon of water throughout the day.

Do not wait until the workday begins to start pre-hydration.

Continue to hydrate over the weekend and on Monday morning as soon as you wake up and prior to shift start.

Hazardous Conditions & At-Risk Behaviors

Hazardous Conditions

During a ship's construction, shipbuilders intentionally transform their work areas as they turn raw materials into a finished vessel. Work areas in a shipyard are very dynamic and constantly changing as progress is made. Without consistent efforts to control the hazards in these ever-changing work areas, the risk for a mishap can climb to a level that practically guarantees that someone will get hurt or killed.

Maintaining a safe work environment is everyone's responsibility and everyone must help control hazards. Unfortunately, it is often a person's at-risk behavior that creates a hazardous condition. Conversely, hazardous conditions may contribute to some employees' unsafe work performance.

Housekeeping, line control and proper material storage are all things that affect everyone's ability to safely move from one area to another. Material and scrap can easily become clutter and increase the risk for slip or trip mishaps. Uncovered or unguarded holes can contribute to the chances of a fall injury. The following are examples of unsafe conditions that can expose shipbuilders to an unacceptable level of risk of injury:





The strain relief has failed and allowed the cable to be pulled out exposing the wires inside of the cable

The bulb and globe are missing creating a shock or electrocution hazard



Inspect ladders before use; do not use or repair damaged ladders; remove them from service



Unprotected lines
ran across
designated
walkway and
doorway creating
a tripping hazard

Energized lugs on
welding machine
not covered
creating an arc
flash, shock and
burn hazard



Do not work in
smoke-filled
spaces with
inadequate
ventilation



Lines and hose/duct covering the face and landing of ladder; tool left out is a tripping hazard.

Tip sprung hook; hook is missing safety latch; hot work damage on hook; improper rigging technique (tip loading); using damaged and uninspected equipment



Never leave scrap or materials on a scaffold



Deck plates removed; barricade tape torn down; inadequate walkway; employees shall not walk on the frames of the deck plate grid

Poor line control. Walkways must be kept clear of lines; walking on lines will damage them and create other hazards



Walkway not at least 20" wide; work platform not built by Scaffold Competent Person; guardrail only on one side; improper rigging technique – come-a-long is plate-edge hooked.





Illegal
"homemade"
extension
cord/unmounte
d receptacle;
plug
set/receptacle
in water

Mushroomed
wedge –
mushrooming
tools must be
dressed so they
do not chip off
and strike
someone



Rod left in
electrode
holder when
not in use

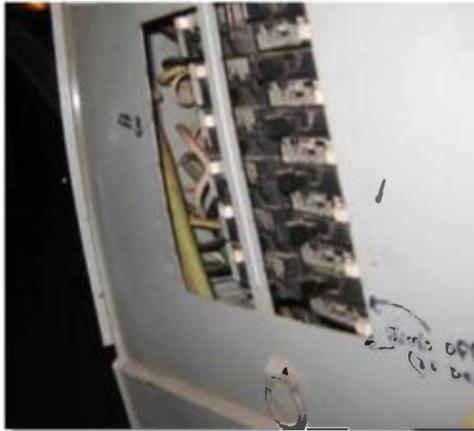


Uncovered/unguarded open hole on deck

Mechanical ventilation duct is damaged allowing contaminated air to be released where it should not be and/or reduced volume of air being exchanged



Hot work above pedestrian walkway without posting fire watch or "DO NOT ENTER" barricaded drop zone; combustibles not remove >35' from hot work; poor line control in walkway; damaged ladder/work platform left in work area



Flash panel on breaker box damaged or not fitted/secured properly. (bowed out allowing access to internals)

Damaged rung on wooden ladder requires removing the ladder from service and discarding or being repaired by a scaffold competent person from scaffold carpenters



Cracked rung on stepladder requires removing the ladder from service and discarding



Accumulated trash can become a fire hazard and should never be placed in an access or egress walkway.

Safety pin or wire left out of crow's foot connection



Damaged air line in use

At-Risk Behaviors (ARB)

The product of multiplying the severity (consequence) of a mishap, times the frequency the mishap occurs for a specific task, is called risk. Risk is a major element used to develop the Environmental, Health and Safety rules that all shipbuilders must follow. The lower the risk of a mishap for a specific task, craft, tool, work area or process — the less likely a mishap will occur.

Obviously, there is some risk inherent in everything we do, on or off the job; however, we always want to control the things we can so that risk is kept as low as possible. One of the things we can control is our personal decisions and work performance. When mishaps are prevented, property damage does not occur, schedules are maintained, quality ships are built and workers return to their families each day, healthy and injury-free.

The risk of workplace hazards causing mishaps can be greatly reduced by engineering controls, administrative controls and personal protective equipment. However, humans are capable of using or not using, all of these controls. Human activity in the shipyard is what changes raw materials into great ships, but these activities also have the ability to increase or decrease risk. When safety rules are consistently followed, risks are reduced. When safety rules are not followed, risk goes up—increasing the chance of injury.

Regarding safety, each worker is directly responsible for the actions that he or she can control and in assisting fellow shipbuilders in controlling theirs. This includes knowing the safety requirements for working in the shipyard and reminding others when necessary. The safety function of each shipbuilder's daily activities always includes using the hazard controls that are required of the job or pulling out a "STOP" Badge and stopping an activity if the risk of a mishap is too high.

Within the context of occupational health and safety, the Ingalls Shipbuilding definition of at-risk behavior is as follows in the statement below:

“Any employee’s activities or performance within the shipyard which removes or diminishes the required engineering, administrative, personal protective equipment, or job process hazard controls that maintain a safe work environment is an At-Risk Behavior.”

Remember, many unsafe conditions are the result of an ARB. Example: a shipbuilder decides not to clean up their work area before leaving for the day and their scrap material is laying on the deck and in walkways. That is a job performance issue wherein they have executed an at-risk behavior by not keeping their work area clean as they worked. However, because of their unwanted behavior, there now is an area where uncontrolled combustibles have created a fire hazard condition.

Sometimes ARBs put the person conducting it, or those in the area, in immediate peril. Activities such as climbing on a structure without fall protection or not removing a leaking inert gas line from a confined space are examples. Whether the ARB puts a shipbuilder in imminent danger or creates a hazardous condition that could subsequently cause a mishap, ARBs are unacceptable and counterproductive to everyone's effort towards maintaining a safe shipyard.

The following photos are examples of various types of ARBs and are used for hazard recognition training. In these cases, the ARBs were observed and corrected before any shipbuilder was injured. Unfortunately, not all ARBs are intercepted before translating into serious mishaps.



Hot work without sleeves; using cutting torch without burning goggles; hot work with only one glove



Grinding with the guard removed from grinder; conducting hot work without removing combustibles 35' or more; holding unsecured stock in hand while grinding



Working >5'
without fall
protection

Working >5'
without fall
protection on
deck edge;
accessing
structure with a
stepladder



Not maintaining
3-point contact
on ladder due
to carrying item
in hand; always
use a hand line
to pull up tools
and materials





Not complying with sign stating, "Safety harnesses required"; working exposed to a fall >5' with openings in guardrail

Improper use of a stepladder.



Using torch without burning goggles



Standing on guardrail of scaffolding; exposed to fall >5' without fall protection

Wearing ear buds instead of required hearing protection



Improper use of a stepladder



Improper use of a stepladder; exposed to fall >5' without fall protection



Standing beside lifeline but not tied off; not wearing harness properly; "D" ring is not centered between shoulder blades



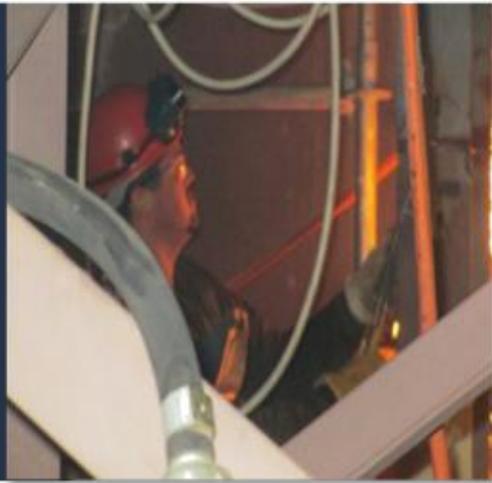
Using torch without burning goggles; no ear plugs; conducting hot work without wearing-gauntlet type gloves



Supervisor working on a scaffold with a damaged guardrail; conducting hot work while not wearing gloves, sleeves and 6" high safety footwear; not wearing hearing protection



Burning without wearing burning goggles



Exposed to a fall >5' without using fall protection



Not wearing hardhat; Not wearing proper shield/hood; improper use of a stepladder



Improper use of a stepladder and standing on guardrail



Sitting on guardrail; exposed to a fall >5' without fall protection or PFAS



Operating lathe without chuck guard in place

Grinding stainless steel without wearing a respirator



Grinding without a guard on grinder



Wearing PFAS
improperly
while
operating
aerial lift

Improper use of
stepladder;
using torch with
pants tucked in
boots



Not using a
proper
walk/work
surface to
conduct work



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