Mariner Personal Safety Research Project – Sample Documents

A joint effort
between ABS and
Lamar University

Updated December, 2014

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Benchmarking Summary

The Mariner Personal Safety Database of injuries provides the data for these safety briefings. Commonly reported injuries resulting from a range of activities across the ship have been compiled, analyzed and summarized for industry consumption. The purpose of this information sharing is to bring to light common hazards and behaviors onboard ships. Alerting management, crew and visitors to these issues may lead to actions to prevent similar injuries from happening to others, and to improved procedure development and ship design.

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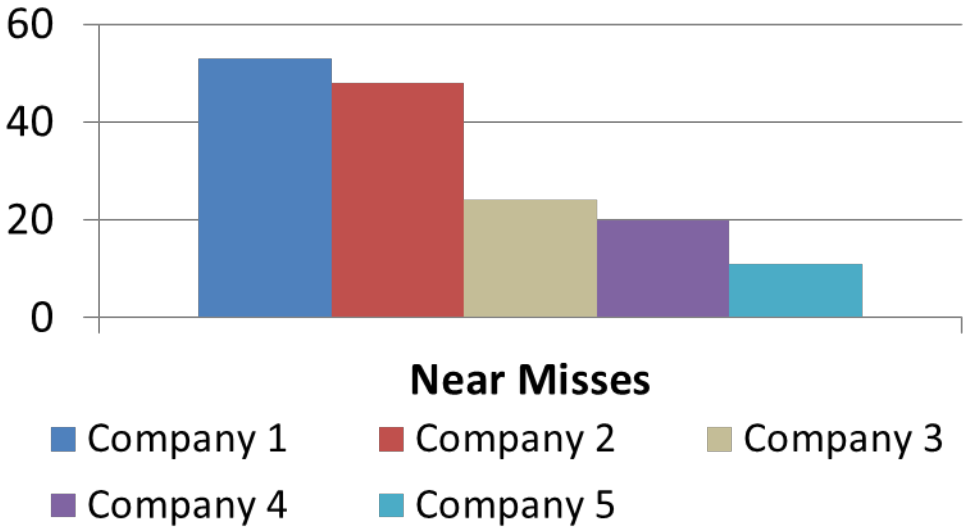
Benchmarking is the process of comparing a company's process against another's; it could be within an organization or with outside competition. Benchmarking is typically used to measure quality, time, cost or production; with the purpose of identifying the best practice and determining how your particular company stacks up against it. As a part of the Mariner Safety Personal Research Project, near miss and injury data will be benchmarked. Shown below is the initial benchmarking efforts made from data obtained from the Mariner Safety Near Miss Data Analysis System. Although the database has complied near miss data from a variety of companies in the maritime industry, the hours data needed for benchmarking purposes has only been obtained for five companies. The number of near misses per 200, 000 employee hours was conducted and the results are given in the chart shown below. The time periods for the near miss data obtained range between 9 months to 1.5 years, and compromises 6,748 near miss reports.



Besides the difference in collection time it is believed that the difference in near miss rates may be attributed to a safer environment, a more hazardous environment or employees may be confused about the definition of near miss. Further analysis will be conducted on near miss data based on the top categories of near misses reported, by vessel type, primary cause of the near miss and corrective actions. As these analyses are completed this folder will become more populated, with these results; the same will be done for injury data as well.

Corrective Actions

Communication Issues Corrective Actions

Communication errors can lead to serious problems; without proper communication employees may not be aware of the necessary procedures or tasks they are to complete. This document lists issues pertaining to communication and corrective actions.

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Communication Issues and Corrective Actions

Near Miss

Cause	Amount	Corrective Action
Change in Operation Needed	3	Procedure Reviewed and Corrected
Complacency	21	1.Situational Awareness Training 2. Complacency Training
Equipment Malfunction	15	During Inspections Add Equipment Checks
Environmental Conditions	9	Job Safety Analysis Training Situational Awareness Training
Improper Procedure	37	Procedure Training 1. Procedure Training 2. Employee Monitoring
Language Issue	6	Language Training
Maintenance Issue	61	Maintenance Training Review Maintenance Schedule and Make Necessary Improvements
Missing Equipment	4	Procedure Training
New Equipment Needed	13	1. Replace Ineffective Equipment 2. Test new equipment to determine adequacy
Not Securing Equipment	4	Procedure Training

Injury

Cause	Amount	Corrective Actions	Injury Severity
Equipment Malfunction	3	During inspection add equipment checks	Lost Time Accident to Fatality
Complacency	3	1.Situational Awareness Training 2. Complacency Training	First Aid to Lost Time Accident
Improper Procedure	37	Procedure Training Procedure Training and Employee Monitoring	First Aid to Fatality
Language Issue	1	Language Training	Lost Time Accident

Corrective Actions

Confined and Enclosed Spaces Corrective Actions

Confined space entry is a safety critical task because of the hazards that are associated. The following are some of the hazards of confined space entry: Oxygen deficiency/enrichment; Exposure to Toxic and Flammable Chemicals; Extreme Temperatures; High Noise Levels; Wet Surfaces; and Falling Objects.

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Confined and Enclosed Spaces Hazards and Corrective Actions

Near Miss

Cause	Corrective Actions
Equipment Faulty/Missing/Inadequate	1) Increase Inspection Frequency 2) Maintenance Training 3) Confined Space Procedure Training
Improper Procedure	1) Confined Space Procedure Training
No Entrance Permit	1) Confined Space Procedure Training
No PPE or PPE Faulty	1) Safety Procedure Training

Injury

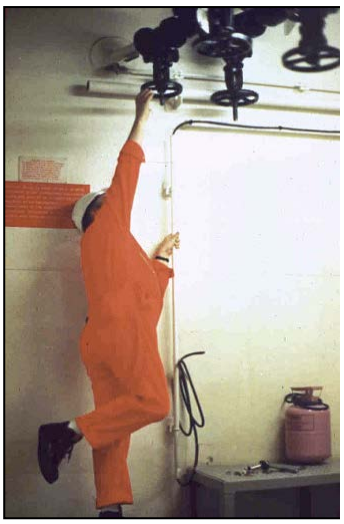
Cause	Corrective Actions	Most Common Injury Type
Ignoring Safety Practices	Safety Procedure Training	Injuries ranging from light to serious
Entering confined space without obtaining a permit, inspection, or testing	Confined Space Procedure Training	Multiple Deaths occurred but injuries ranging to light
Lack of Situational Awareness	Situational Awareness Training	Injuries ranging from light to serious

Discussion Paper
Designing Means of Access and Related Access Aids

INTRODUCTION

Falls are the leading cause of injury and death on commercial ships and offshore installations, and are common in other workplaces, including offices. Recorded fall accidents range from slips and trips while walking on even surfaces to falls from ladders and on stairs.

The most frequent types of falls are associated with stairs. In 1988, a major study was completed of approximately 602 significant accidents (i.e., those resulting in major physical injuries such as broken limbs, severe lacerations, concussions, burns or any injury requiring hospitalization). Falls down stairs were the most frequent and most costly accidents in terms of mariner lost time days and total accident costs (Templer, 1992; Templer 1985). Accident data obtained from vessels and offshore installations reveals that a cause for slips, trips and falls is a lack of adequate design for means of access.



Design or construction practices which were utilized in the past often presented situations wherein persons had to stand on pipes, cable trays, and/or wire-ways to gain eye or hand access, increasing the possibility of a fall.

Implementing suitable design of access aids will result in fewer near misses and injuries. A number of access aids and their safety concerns will be discussed in detail in the following sections. These include:

- Inclined stairs
- Vertical ladders
- Handrails
- Walkways and passageways

TERMS/DEFINITIONS

Access/Access Aids: Any item used to safely and efficiently assist movement of personnel, materials or supplies, for operation or maintenance purposes in normal and emergency conditions, or provide working surfaces (e.g., doors, stairs, vertical ladders, ramps, walkways, passageways, hatches, manholes, lightening holes, handrails, railings, and work platforms, and landings).

Accessibility: The ability for personnel to easily access equipment that requires maintenance, inspection, removal, or replacement while wearing the appropriate clothing, including personal protective equipment, and using all necessary tools and test equipment.

Anthropometry: Data relating to physical body dimensions. It includes body characteristics, such as size and breadth; the distances between anatomical landmarks, such as elbow to finger-tip; and height measured from the bottom of the feet to the top of the head.

International Maritime Organization (IMO): The arm of the United Nations (UN) that establishes policies, crew training requirements/skill levels, and ship design standards for maritime vessels to protect seafarers and the environment.

Means of Access: Any item used to safely and efficiently assist movement of personnel, materials or supplies. These can include doors, stairs, vertical ladders, ramps, walkways, passageways, hatches, manholes, lightening holes, handrails, railings, work platforms and landings.

Percentile: Given the range of variability of human bodily dimensions, anthropometric data are typically expressed as percentile statistics, such as 5th or 95th percentile. A percentile statistic defines the anthropometric point at which a percentage of a population falls above or below that value. For example, the seated eye height of a 95th percentile North American male is 853 mm (33.5 in), so by definition, 5% of North American males will have a seated eye height of greater that this figure, and 95% will have a lesser seated eye height.

Vessel: Any ship, boat, or offshore installation where people work, live and are subjected to the marine environment.

DISCUSSION

Bodily Injuries

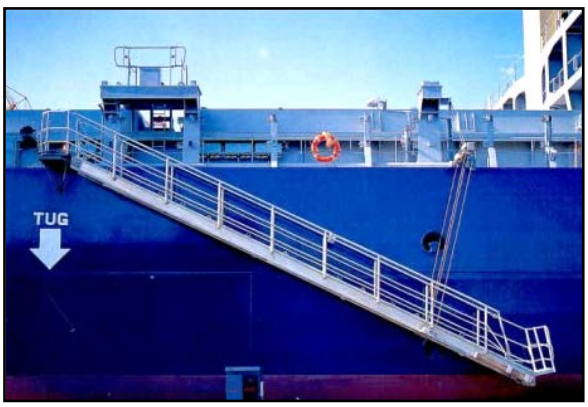
Vessel motions can have a negative influence on a person's mobility. They can introduce instability and increase the energy expended to counter those motions. Using access aids can be awkward in a best case scenario, but with motion access aids present significant safety concerns. When motion-induced instabilities are introduced and the danger of personnel injury is increased, the use of some accesses can be rendered unsafe.

The body can be injured simply from the posture required to complete a single access task; for example, a strained muscle or tendon. The body can also suffer injuries such as muscular and skeletal disorders from repeated exposure to awkward postures required to gain access and to complete tasks. Inefficient access designs can also cause extensive damage to equipment, piping insulation, frayed wires, etc., either due to a fall or from using the damaged equipment as a foot hold. As a result, design guidance and standards for accesses are provided in the recent design standards (ABS, 2009; ASTM, 2007).

A final concern to consider is that crew members often do not use means of access safely, often carrying too much, carrying objects that are too heavy, taking several steps at a time, or not using safety devices such as harnesses.

Inclined Stairs

Stairs are noted as necessary access aids that are associated with more accidents on a vessel than any other access aid.



Traditional maritime design practices allowed for stairs of up to 60° inclination. However, as the angle of inclination of stairs increase, the stair tread gets narrower and the riser height increases. This in turn decreases the amount of tread available to step on, especially during descent, thereby increasing the likelihood of a crew member's foot slipping from, or missing, a step.

In 1990, a major oil and gas exploration and production (E&P) company initiated a program to assist in the design of their first deepwater drilling and production platform. One initiative selected by the company was to reduce accidents and incidences that repeatedly appeared in the company accident database. Over a five-year span the

company had 21 serious fall accidents involving stairs. Six of these falls required hospital treatment or hospital stays for the crew members involved. More recent reviews of offshore accidents revealed that these accidents were not unique to this company, but rather reflected a general picture of fall injuries for the offshore industry.

Further research into the reasons or causes as to why these falls up and/or down stairs occur with such frequency influenced new stair design guidance. In a follow-up study of stair falls five years later, the company had only one fall associated with the new stair design (compared to 21 falls over a five-year period as discussed above) (Templer, 1992; Templer 1985). See ASTM F 1166 (2007), and ABS (2014) for the new stair design guidance.

Vertical Ladders

Falls from vertical ladders are less frequent than for stairs but can be extremely injurious or deadly. Fall data clearly shows that the risk of a fall being fatal increases after age 45. Also, the average height of a fatal fall decreases as the age of the fall victim increases, dropping from an average height of 55 feet (18.3 meters) for the 20-24 year old males to 21 feet (6.9 meter) for men between 55-59 years of age (Agnew , 1993). Translating these results into practical maritime design suggests that positive fall protection would be beneficial in the case of vertical ladder design in excess of 20 feet (6 meters) in height.

Vertical ladder landing location is another important concern. There is an increased risk of a crew member falling further when a landing is within about six feet (1830mm) from the edge of a deck. A crew member could fall over the handrail to the next deck level below, or fall overboard if falling from a ladder near the deck edge.

Design guidance for a variety of vertical ladder configurations is contained in the ASTM F1166 design standard (ASTM, 2007), the ABS Guide for Means of Access to Tanks and Holds for Inspection (ABS 2009), and the ABS Guidance Notes on the Application of Ergonomics to Marine Systems (ABS, 2014).

Handrails

Handrail heights for stairs have traditionally been 35 inches (890mm). Recently, it has been proposed that stair handrails should be closer to 36 to 37 inches (915mm to 940mm). The reasoning behind this shift in thinking is that crew members today are generally taller, and as a result their vertical center of mass is higher. The higher handrail heights help to compensate for this growth and render the increased vertical center of mass to the same level as safety rail height (ABS, 2014; ASTM, 2007).

Handrail heights for safety at deck edges can vary depending on what ship design standard is selected. Design dimensions have traditionally accommodated the lower limit required, 39 inches (1000mm); however, it has recently been recommended that 39 inches (1000mm) is insufficient. The general opinion of safety engineers is that the lower limit is no longer adequate to deter falls over a

rail for the 95th% male, especially those from the Northern European and North American regions. At the lower limit, it is judged more likely for taller crew members to rotate over the rail, as the center of mass (for a 95% Northern European and North American male) is about three inches higher than the height of the rail.

When the center of mass of a human body acts above a guardrail, a person falling against that guard rail will have a greater tendency to rotate over the top of the railing. Further, when the center of mass of a human body acts below the top of a rail that person would have a tendency to rotate under the railing. This action (rotating under the top rail), along with the provision of intermediate rail(s), helps prevent a fall either over or under the top safety rail.

The provision of lower guardrail heights puts taller offshore workers or mariners at a safety disadvantage. When considering the taller potential worker population, a guardrail height of 42 inches (1070 mm) can help protect approximately 99% of all potential workers (men and women) from falls over the rail.

Based on the state of knowledge, and a large collection of anecdotal data, a number of significant changes in vertical ladder designs have occurred over the past decade. These now appear in related and recent design standards and guidance documents (ABS, 2014; ASTM, 2007). Changes include:

- Elimination of vertical flat bar stringers
- Changes in rung design
- Limitation in the height of a single ladder run
- Use of positive fall protection (i.e., not just climber cages) for ladders over a certain height
- Special protection for ladders located within six feet of the edge of a ship or offshore installation

Walkways and Passageways

A major concern related to the simple task of walking down a passageway is the presence of bulkhead mounted equipment. Items mounted on a bulkhead, such as an electrical junction box or a fire hose box and fittings, present safety hazards. Further, it is advisable that passageways be kept free of any bulkhead-mounted objects if a passageway has any of the following characteristics (Zohar, 1978):

- Passageway is used under emergency conditions (e.g., foot traffic may be moving at accelerated speeds, passageway is used to transport injured crew members or emergency equipment)
- Passageway width is narrow
- Marginal lighting is present (such as emergency lighting lanterns, bridge companionways).

Where minimum widths are offered in walkway and passageway design standards they define the minimum clear walking surface. This is different than the dimensions of the walkways or passageway bulkheads with a walking area impeded by items mounted on walkway or passageway bulkheads. There should be suitable upper clearance for items mounted on a walkway or passageway bulkhead to prevent a person from accidentally walking into these items (Zohar, 1978).

Other Accesses

Providing appropriate means of access designs are not limited to just the stairs, ladders, walkways, etc. As an example, vessels often have lighting holes provided in bilge tanks, fuel, oil, and potable water tanks, as well as void spaces. Not only are these holes cut to help lighten the weight of the vessel or structure, but they also serve as crew member access routes during tank inspection and/or maintenance are required. These holes can be cut and located to maximize access for crew members without compromising the vessel or offshore installation structural integrity.

Dimensions and orientation of hatches, man-ways, lightening holes, inspection ports, kick-out panels (or any opening used by a crew member to pass or reach through) should be determined by the user's anthropometry, body postures required to use the opening (i.e., does the person step through, reach through, crawl through, or look through), and the tasks required of the person once the opening is passed. In addition, access openings which are used for emergency ingress or egress of spaces are routinely made larger and easier for passing through than openings infrequently used (such as entry into bilge tanks for inspection). However, in keeping with a good safety philosophy that design should be directed at the *worst case scenario*, openings into tanks in which a person could be rendered unconscious should be suitably large to accommodate the removal of that person.

REFERENCES

Agnew, Jacqueline and Suruda, Anthony. *"Age and Fatal Work-Related Falls",* Human Factors, 35(4), pp 731-726, (1993).

ABS. "*Guidance Notes on the Application of Ergonomics to Marine Systems."* Houston, TX. February, 2014.

ABS. "*Guide for Means of Access to Tanks and Holds for Inspection."* Houston,, TX. February, 2009.

American Society of Testing and Materials. "*Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities".* ASTM Standard F1166. West Conshohocken, PA, 2007.

Templer, John. *"Staircase Studies of Hazards, Falls and Safer Designs*", MIT Press, 1992.

Templer, John, Archea, John, and Cohen, Harvey. *"Study of Factors Associated With Risk of Work-Related Stairway Falls", Journal of Safety Research, Vol 16, pp183-196, 1985*.

Zohar, Dov. *"Why do we Bump Into Things While Walking"*, Human Factors, December, 1978.

Lessons Learned

Stairs
Lessons Learned

Stair hazards frequently lead to near miss and injury incidents reported in the Mariner Safety Research Center Database. Lessons learned concerning stair incidents are discussed in this paper. Hazards from stairs include, wet/slippery stairs, items left on stairs posing trip hazard, carelessness and rushing from crew members, no markings or non-slip tread provided, etc.

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Stair Hazards and Lesson Learned

Top Near Miss Hazards and Lessons Learned

Hazards	Lessons Learned
Stair Design	1) Stairs should be designed as to not be overly steep or have small tread depth 2) Stairs should be adequately lit at all times 3) There should be no obstructions to block or hinder the use of stairs (i.e., doors that open into the stairs where little or no platform is provided)
Improper Procedures/Carelessness	1) Crew should be more careful to not rush with ascending or descending stairs. 2) It should be stressed to crew the importance of always having one hand free and able to hold on to the handrail 3) Training for crew to re-iterate the proper procedures for carrying items on stairs
Wet/Slippery Steps/Housekeeping	1) Any mess spilt on stairs should be cleaned up immediately 2) Shoes and hands should be cleaned prior to using stairs 3) All stairs should be clearly marked with paint and provided with anti-slip treading 4) Crew should be more careful not to store anything on stairs or hindering the use of stairs
Damaged Stairs	1) Stairs should be inspected regularly 2) Any missing, broken, or corroded parts of the stairs or handrails should be repaired immediately

Top injuries and Lessons Learned

Cause	Lesson Learned	Most Common Injury Type
Negligence/Carelessness/ Alcohol Consumption	Crew to slow down on stairs and always use handrails	Most common injuries include bruises and fractures, but range from minor to severe, including several deaths from head injuries.
Lack of Situational Awareness	Be mindful of your surroundings at all time and be aware of sea conditions while maneuvering on stairs	Injuries ranging from light to serious, including death from head injuries.

Lessons Learned

Valves
Lessons Learned

Valve Hazards are among the leading near miss and injury incidents reported in the Mariner Safety Research Center Database. Regardless of valve locations (i.e., topside, below deck, etc..) the hazards are the same. Lessons learned concerning these incidents are discussed in this paper. Hazards from valves include, incorrect labeling, inability to safely access frequently used valves, valves stuck in the open and closed position, corrosion, improper installation, etc.

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Valve Hazards and Lesson Learned

Near Miss

Cause	Lessons Learned
Valve damage/failure	1) Regular Maintenance and testing to ensure valves are not damaged or broken 2) Prevent fatigue by not over torqueing when opening or closing valves
Improper Procedures/ Carelessness	1) Communication is required amongst crew members to ensure everyone is aware of the valve status, that the correct valve is used, and there is no known existing damage to the valve 2) Only experienced personnel should handle critical valves and provide training to less experienced crew members 3) Pay attention to the state of the valves, whether they are opened or closed before proceeding with tasks
Design/Installation/ Accessibility	1) Valves should be installed and labeled correctly from the builder 2) All valves should be accessible to crew wearing proper PPE and without having to excessively reach or be in awkward positions
No Maintenance	1) Valves should be inspected before use 2) Maintenance should be preformed and valves tested regularly

Injury

Cause	Lesson Learned	Most Common Injury Type
Lack of Procedures or Failure to Adhere to Procedures	Procedures must be followed in order to properly	Injuries include burns, breaks, and eye irritation from improper use of valves.
Accessibility, Labeling, Design of Valves	Valves must be placed for proper accessibility and labeled correctly so that the right valve is used	Most common injuries include crushed fingers and other minor bumps and burns.
Lack of Situational Awareness	Be mindful of your surroundings at all times and do not let other distractions effect the task at hand	Injuries ranging from light to serious, including death from head injuries.

Pocket Job Safety Analysis

Who? *Everyone*
What? *A Brief Safety Assessment*
Where? *At Work, at home, in the car!*
When? *When starting a routine, or non-routine task, after a break, or when conditions change.*
Why? *To ensure that the environment, your equipment, you, and those around you, are safe, you have a realistic situation assessment, and all hazards have been controlled to an acceptable level.*
How?

Performing a brief JSA reduces the risk involved in all kinds of activities. Taking a pause to assess the safety of a task will go a long way in preventing injuries and reducing near-misses. At the least, a JSA should be performed for non-routine tasks; however, assessing the safety of all tasks before you begin may eliminate new or unforeseen hazards.

There are some straightforward questions you can ask yourself during your brief JSA. Below, these questions cover the five main safety considerations:

Task

- What steps/procedure are required to perform the job?
- Do you understand your job responsibilities?
- What could go wrong?
- What are the dangers and who/what will they effect?

Workplace/Environment

- What hazards are there in the work area?
- Are the weather conditions conducive to the task?
- Is the lighting appropriate?
- Is the area tidy enough to perform the task?

Personal/Personnel Safety

- Do you need to communicate with others, if so how?
- Are there other jobs going on in the area that might affect you, or that you might affect?
- Are you physically and mentally prepared?
- Are there enough people to perform the task safely?

Equipment

- Is all necessary equipment available? In good condition?
- Do you know how to use it?
- Is the necessary PPE available? In good condition? Worn properly?

Controls

- Assess - is the job/task absolutely necessary to do?
- Is it possible to eliminate the identified hazard(s)?
- Are there engineering or design strategies that can control the hazard?
- Are there administrative controls such as procedures that may be implemented?
- Are you using the appropriate, approved PPE?
- Once implemented, is the control acceptable? Is the risk reduced to an acceptable level?

After these questions have been satisfied with an answer or an action that ensures a safe job site, work may begin.

Remember: if you take a coffee break, stop for the day and recommence, weather conditions change, or a part of the task changes, perform this quick assessment again, for the safety of you and those around you!

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MPS
Mariner Personnel Safety

The data contained in this Safety Spotlight was obtained from the ABS Mariner Safety Repository of near-misses.

This repository was developed in cooperation with Lamar University and numerous vessel owners, many of which are ABS Clients.

Near-miss incidents related to shipboard operations have been and continue to be compiled, analyzed, and summarized to share with the marine industry.

The purpose of this data sharing is to bring to light hazards and unsafe behaviors and to increase levels of awareness and safety for all…

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Visitor Safety

Procedures

Procedures provide direction for the safe order of operations, verification that all steps are performed, and provide high level guidance and standards to be met by the task at hand. Sometimes procedures may seem to make a job more attention demanding, or increase the perceived demand required of the job. Good procedures actually simplify tasks, and provide a check to verify each step is performed properly.

Using the procedure properly depends on the development of the procedure, the storage of and accessibility to the procedure, and the individual who requires the procedure to assist their task. Failure of any of these will compromise the value of the procedure. Whether it is because of a missing step, a poorly located procedure, or checklist, failure on the part of the user or supervisor, a poorly used or developed procedure can introduce hazards to the workplace.

The top ways procedures may present a hazard to the work environment

- Situation not covered;
- Unclear communication;
- Facts wrong;
- Work party coordination/supervision;
- Not readily available.

Each of these factors can be improved by improved verification processes of both procedure development and implementation, by improving supervision of critical tasks, clearly communicating the requirements, and ensuring that all facts are correct and clearly understood.

Remember that procedures are designed to make tasks easier, and when designed and used properly will enhance safety on board. When using a procedure pay attention, follow the steps and, as always, keep the spotlight on safety!

Line Handling: Injuries and Near Misses

Safety Spotlight

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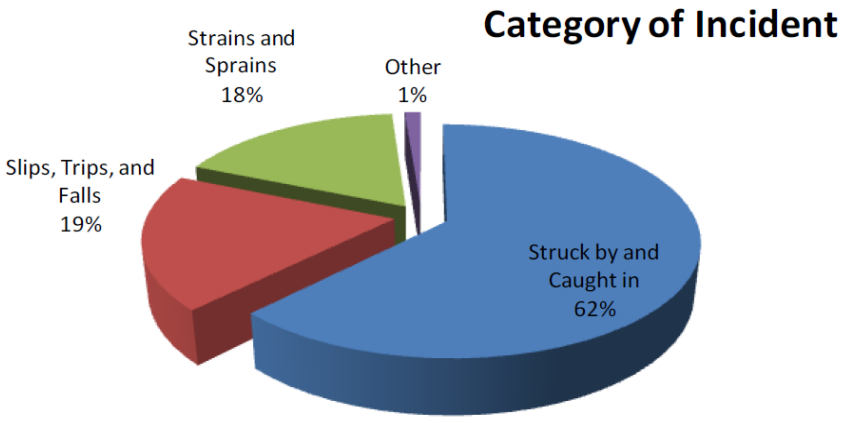
Line handling can be a very dangerous activity onboard vessels. In the injury data set, 578 records (578/8501=6.8%) relate to line handling.

Common line handling injuries include being struck by lines, caught in moving lines, struck by or caught in wrenches or other line handling equipment, tripping, and strain/sprain injuries due to moving or handling lines. The majority of incidents (63%) involved being struck by or caught in lines and line handling equipment. A smaller percentage (19%) involved slips, trips, and falls during line handling. A similar percentage (17%) involved strains and sprains due to moving lines or line handling equipment.

A considerable number of line related injuries are fatalities (27 records). For these fatalities, 10 incidents were falls to water while line handling, 16 incidents were being struck by or tangled in the line, and 1 incident was the sinking of a vessel.

Line handling near-misses account for (1435/ 17844 = 8.0%) of all near-misses in the MPS near-miss database. Common near-misses include using improper procedures while handling lines and parted lines snapping back.

The attached file contains all the injuries related to line handling: Near-misses for PPE occurred primarily on deck (46%) and engine room (16%). Common PPE items in the near-misses include harnesses and fall protection (25%), multiple or unspecified items missing (16%), hard hats (16%), safety glasses (14%), shoes (6%), lifejackets and personal flotation (5%), clothing (5%) and gloves (5%). The following data file contains all PPE issues in the database:



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Weather Deck Slips & Trips

Objects obstructing walkway

Housekeeping is an issue that arises time and again in the database of near-misses. The types of near-misses that are reported to be housekeeping related range from improperly securing items, to neglecting to clean up after a task, or an off-shift activity. Looking specifically at weather decks, a large number of the records indicate slip and trip hazards in the form of objects left in walkways, on and near ladders. To quote one of the near-miss reports, "the deck is constantly changing", and therefore requires the crew to be aware of potential hazards.

These types of near-miss reports can be largely eliminated purely by picking up after a job is complete, running hoses, wires and lines in a way that minimizes the risk of tripping, and where necessary placing signs around work areas when the job is in process to alert those entering a work zone to be more attentive.

Strategies for reducing slip and trip hazards due to ladder and walkway obstructions:

- Run hoses, wires, and lines in such a way as to avoid creating trip hazards
- Return tools, slings, tubes and other task related equipment when through using it.
- Clean up debris and rags when you have an opportunity during the task or on completion
- Be aware of surroundings and environment
- Improve communication

Remember that while you and the local crew may be well aware of the objects and lines in the work area, to others passing through they are hazards. It is important to not only communicate that work is in progress, but to also keep work areas clean and tidy and return everything to its proper place after the job is done.

Accidents happen, however, when there is opportunity to prevent accidents and near-misses that opportunity should be seized. Promoting general safety awareness will encourage the crew both on board and ashore to think about potential consequences of near-misses such as these.

Document generated in conjunction with the ABS Mariner Personal Safety Project

Design changes as remedial actions

Safety Spotlight

The data contained in this Safety Spotlight was obtained from Technology's Mariner Safety Database of near-misses.

This database was developed in cooperation with numerous vessel owners, many of which are ABS Clients.

Near-miss incidents related to shipboard operations have been and continue to be compiled, analyzed, and summarized to share with the marine industry.

The purpose of this data sharing is to bring to light hazards and unsafe behaviors and to increase levels of awareness and safety for all…

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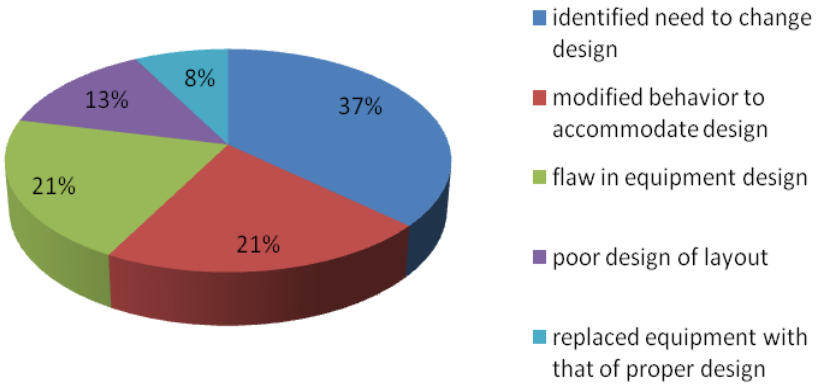
When a near miss is reported, ideally action is taken in some form to prevent future occurrences of similar events. When the near miss is equipment, structural, and sometimes even administrative related, a change in design may be what is required to rectify the situation.

A search performed with the keyword "design" yielded 752 results. Filtering was performed to remove records that we unrelated, and those that were found due to stemming (e.g. designated). Four hundred and twenty four records remained. These records were analyzed to identify how design was identified as the remedial action.

The top 5 ways design was identified as a remedial action ranged from simply stating that a design change was required, sometimes accompanied by a suggestion; behavior, training, administrative aspects of the process were identified as requiring improvement, the design of the equipment, material was sometimes blamed for the near-miss, layout of the initial space was often identified as requiring a change, and sometimes the wrong equipment, material or substance was replaced with that of the proper design at some point in the event sequence.

From this information, those involved in the design phase, develop procedures, and manage crew can assess where the challenges are and either improve the design from the outset, or come up with ways to work around identified problem areas before an accident occurs.

Top 5 design related near-misses



MPS
Mariner Personnel Safety

Toolbox Talks

Cell Phone Usage

Discussion Date: _____

"Cell phone use can negatively affect crew performance by taking their minds, eyes, and hands off of their tasks or hazards in their surroundings. All of these can increase the chance of injury or incident."

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Introduction

Cell phones can be a great convenience and a great tool . . . however their use at inappropriate times and inappropriate places can certainly be risky. It only takes a second or two for distractions to take a fatal turn or for cell phones to contribute to other undesirable outcomes.

Whether you are in the presence of a cell phone user or you are using a cell phone personally, using the phone can be a significant distraction. Being distracted while navigating, operating tools and equipment, or when walking or climbing may increase the risk of injuries and accidents.

Researchers have compared the level of distraction to a person being under the influence of alcohol. Never utilize your cell phone where your distraction may put you at a higher risk of injury, where intrinsically safe equipment is required, or where a cell phone might interfere with the ship's equipment.

Why Not Use Cell Phones?

Distraction: Cell phone use can negatively affect crew performance by taking their minds off (at least partially)of their tasks or hazards in their surroundings. Cell phones can take a crewmember's eyes off their tasks or hazards in their surroundings. Cell phones may also require a crewmember to take a hand off of their task or activity. All of these can increase the chance of injury or incident.

Intrinsically safe: For areas that may contain fuel in the atmosphere, such as flammable gases, vapors, or combustible dust that may ignite or explode, cell phones should not be used unless they are intrinsically safe and approved for use. An intrinsically safe cell phone is incapable of releasing sufficient electrical or thermal energy to ignite the fuel and cause a fire or explosion.

Interference with ship's equipment: Anywhere on board where there is sensitive critical equipment, cell phones should not be used nearby to avoid the risk of electromagnetic interference.

MPS
Mariner Personnel Safety

Toolbox Talks

Employee Participants:

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Cell Phone Usage

Where Can I Use a Cell Phone

Though each organization has their own rules concerning cell phone use, cell phone use should be limited primarily to the accommodations spaces where it is unlikely they will interfere with the ship's equipment. It is recommended that cell phones not be used in navigational spaces if they cause *any* distraction to ship operations or the ship is in restricted waters, unless they are needed for urgent matters pertaining to the safe operations of the vessel and the Master's expressed permission to use a cell phone has been obtained. Cell phone usage notices should be posted. All cell phone usage policies of each ship should be strictly followed by crew and visitors.

Example of Cell Phone Related Near Miss

Discussion: While taking stores a from barge alongside, the crane operator on the barge moved the wrong control while lowering a pallet of goods onto the vessel's deck. The crew who were guiding the pallet were nearly overcome by the improper slew and while they were getting out of the way their fingers were nearly crushed.
Observation: It was noticed immediately that the crane operator was talking on his cell phone while operating the crane.
Lessons: Full attention should be common practice while running machinery or cranes. There should be no distractions. Even though the crane operator was not a crew member, work should have stopped while crane operator used his cell phone and none of the ship's crew should assist until the cell phone is put away. This incident was also communicated with the vendor.

Discussion

Does your ship have a cell phone usage policy? Are areas where you can not use cell phones adequately marked? Where do crewmembers commonly use cell phones where it is not permitted? Why do they still use the cell phone even though it is not permitted in those areas?

Toolbox Talk

Complacency

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

The purpose of this information sharing is to bring to light common hazards and safety behaviors. Alerting management, crew and visitors to these issues may lead to actions to prevent similar near misses from happening to others and to improved procedure development and ship design.

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Introduction

While driving, we make decisions, almost every second and we aren't even aware of many of them. Have you ever suddenly realized while driving that you hadn't looked at the road recently? Have you ever stepped off a curb into a crosswalk without looking for traffic? Have you ever entered a tank without being cognizant of the potential dangers or moved at heights without noticing your height? These behaviors are examples of complacency. In this Toolbox Talk, complacency at work is discussed as well as some tips to avoid it.

What is complacency and what are the factors inducing it?

When individuals perform the same task repetitively and without incident, they begin to ignore or diminish the hazards of the task; this is the simple definition of complacency. A more detailed explanation is a sense of contentment or self-satisfaction, combined with a decreased sense of risk and reduced anticipation of possible problems. Several factors can contribute to complacency in the workplace. Listed below are some of those factors.

External factors

- Good system safety performance – thinking that accidents just don't happen and the machines seem to take care of themselves
- Lack of oversight – management seems not to care, and shows little or no proactive leadership resulting in a lack of intervention to consequences of complacency
- Unchallenging work where job tasks are mundane and repetitive
- The lack of incident identification, analysis and reporting to workers
- Intermittent rather than on-going safety training and safety emphasis

Internal factors

- Risk perception errors – making assumptions about the inherent safety of job performance
- A lack of consequence thinking – not thinking about "What could go wrong?"
- Not taking time to assess a job situation
- Tunnel vision – occurs when employees see situations narrowly, without considering risks outside the tasks at hand

Actual Near Miss

While a crew member was performing line handling operations, he stepped over a line under tension. This act is unsafe and against company procedures; the crew member was aware of the procedure but had become complacent due to the repetitiveness of the task. *(Critical behavior: Line of Fire)*

The effects of complacency

When people are complacent they may perform actions that could lead to increased errors, leading to incidents. Some of these actions are listed below.

- Taking shortcuts or omitting steps
- Rushing to the completion of the task
- Assuming that everything will go perfectly and as expected
- Assuming others are concerned with the safety aspects of the task they are performing
- Taking risks, underestimating risk, or omitting risk consideration
- Inattention while performing tasks (performing tasks on 'autopilot')
- Performing a task without following established procedures or without using the required equipment

Toolbox Talk

Complacency

Discussion Date:

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Employee Participants:

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Tips to avoid complacency

It's human nature to become complacent while performing tasks we are thoroughly familiar with. In order to combat against this, the following tips may be helpful.

- Perform a simple risk assessment prior to beginning a task, asking the following questions
  - Why is this task being performed?
  - What could go wrong (consequence thinking)?
  - What is the chance of that happening?
  - What effects can this have on personnel in the area?
  - What can be done to prevent something from going wrong?
- Follow all policies and procedures
- Train continually and review the task often
- Create mental challenges to help remain attentive to the task
- Maintain a questioning attitude
- Maintain awareness of your surroundings and the task at hand
- Avoid making assumptions about the status of the task or the system
- Avoid feeling that your years of experience mean that you can perform the job without errors.

Actual Injury Report

An employee was cleaning a sieve of the engine room bilge strainer with a wire brush when he allowed his finger to make contact with the sieve, resulting in a severe cut. The injured party was clearly complacent about the task, and did not maintain awareness of the proximity of his finger to the sieve. He was also complacent about wearing gloves while doing this task. Lastly, if he did any kind of on-the-fly risk analysis, he also did it with some degree of complacency (Critical behavior: Line of fire).

Discussion

- Complacency is very hard to overcome as an individual
- A good remedy for complacency is constantly reminding yourself about safety in the workplace: there should be continuous safety reminders put in place throughout the organization. Constant reminders about safety will remind us to be vigilant, and to not be complacent
- Near miss and incident analysis and reporting are important too. The workforce needs to be informed of injuries and near misses, and reminded that accidents can happen to any of us
- Report and discuss any incidents concerning complacency with your supervisor

Toolbox Talk

Fatigue

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

The purpose of this information sharing is to bring to light common hazards and safety behaviors. Alerting management, crew and visitors to these issues may lead to actions to prevent similar near misses from happening to others and to improved procedure development and ship design.

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Introduction

Many people ignore or simply do not recognize the symptoms of fatigue. Fatigue is the result of the body being physically or mentally exhausted; in extreme cases, it can lead to significant reduction of a person's physical and mental abilities. It is one of the leading causes of injury in the workplace and at home.

Fatigue and its factors

Fatigue is a decreased capacity or complete inability of a person to function normally because of excessive stimulation or prolonged exertion. Many factors may affect the level of fatigue a person may experience such as long work hours and interrupted or low quality sleep. A few factors that may lead to the body becoming fatigued are listed below. When these factors are combined, the level of fatigue increases.

- Sleep quality and duration
- Sleep deprivation or large sleep debt
- Inconsistent sleep/wake cycle, rotating shifts
- Diet and nutrition habits of an individual
- Change of diet, including short changes of nutrition habits, such as during vacations and social gatherings
- Work tasks (physical and mental exertion)
- Platform stability (firm ground versus moving ship)
- Individual demographics such as age, physical condition and health
- Working for prolonged periods of time (periods longer than 12 hours)
- Periods of high stress
- Harsh working conditions such as: extreme temperature, high noise levels and excessive vibration

Common fatigue misconceptions

There are many common misconceptions related to fatigue. A few examples are listed below.

- Sleeping during the day is not as fulfilling as sleeping at night - this is incorrect
- Fatigue and stress are the same thing - stress is an emotional state while fatigue is a physical state though it is true that stress and fatigue can influence each other
- Quantity is more important than quality of sleep - both the quantity and quality of sleep are equally important
- If you have slept then you should be alert - the length and quality of the sleep, as well as the previous level of fatigue, determine the alertness of the individual upon waking
- Fatigue is easily self-monitored - most people suffering from fatigue are usually unaware of it until it is too late to do anything
- Coffee is a great cure for fatigue - although coffee may help delay the onset of fatigue, its effect is short lived

Actual Injury Report

A crew member had a major car accident during the early hours of the morning (approximately 0400) while driving to attend a survey. The crew member suffered multiple injuries, including a broken leg, ribs, and neck. Driving while fatigued can result in severe consequences as evidenced in this case. Crew members experiencing fatigue should postpone a pending survey to allow time for rest or make arrangements for non-fatigued personnel to drive to the location.

Toolbox Talk

Fatigue

Discussion Date:

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Employee Participants:

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Symptoms of fatigue

Individuals suffering from fatigue may not realize they are experiencing symptoms until it is too late; therefore it is important to be on the lookout for signs of fatigue in the people around us. Some of the signs and symptoms of fatigue are listed below.

- Instability while walking, e.g. stumbling
- Drooping eyes
- Reduced short-term and long-term memory
- Slurred or slowed speech
- Irritability
- Decreased reaction time
- Short attention span
- Drooping head and uncontrollable yawning
- Increased risk tolerance(such as omitting tasks)

Some symptoms can be identified by the individual experiencing fatigue. Listed below are a few self-diagnosing symptoms of fatigue.

- Burning or itching eyes
- Moodiness
- Trembling hands
- Trouble thinking
- Headaches
- Heavy eyelids, troubling focusing
- Back, neck and muscle pain
- Difficulty waking up

Combating fatigue

Because fatigue is a serious issue and can lead to accidents and injuries it is important to know how to combat fatigue. Some suggestions are listed below.

- Get at least six to eight uninterrupted hours of sleep before starting a work shift
- If possible sleep at the same time each day
- Individuals sleeping during the day should find a dark, cool, quiet location and use earplugs to block out any noise
- Take scheduled work breaks
- Replenish resources such as proteins and sugars for muscles and fats and minerals for the brain and nerves
- Do not eat large quantities before bed; this may cause trouble sleeping
- Avoid alcohol, caffeine, and cigarettes; these substances can cause sleep disturbances
- Regular exercise, such as walking and aerobics, can increase stamina and help individuals fall asleep faster

If there is a significant amount of work for a call out, do not hesitate to ask the lead crew member or supervisor for additional assistance. When no one else is available, do not commit to performing work if the task is too extensive to be carried out by one person.

Actual Near Miss

A crew member carried out an inspection of seven big blocks at various subcontractors in excessive heat, causing the crew member to perspire profusely. After completing the inspection, the crew member was returning home when he started to experience severe cramps in his thighs and calves; the crew member was not injured due to this situation. When working in situations that may cause fatigue, crew members should take the necessary rest breaks to replenish themselves before continuing to work or drive.

Discussion

- Report and discuss any incidents pertaining to fatigue with your supervisor.

Toolbox Talk

Hearing Safety

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Introduction

Noise, often defined as unwanted sound, can have different effects:

- Interference with communication, job performance and your safety
- Disrupts concentration, and can startle, annoy, and have other effects
- Cause long-term effects such as hearing loss. Noise can cause pain, ringing in the ears, and even nausea if exposure level is severe.

Hearing Protection

Ideally, engineering design will control noise exposure; however, this may not always be feasible. In situations where it is not feasible, hearing protection can be used to reduce noise levels at the ear. Hearing protection can be provided as ear plugs or ear muffs.

When do you Need Hearing Protection?

- When you are exposed to noise that is 85 dB(a) or greater averaged over 8 hours
- Noise at and above this level is associated with situations where conversations, to be heard and understood, must be held in a very loud voice, or by shouting into the ear of a person
- Hearing noise and ringing in the ears at the end of a shift, or if speech or music sounds muffled after completing a shift, but sound fairly clear at the beginning of the next shift indicates exposure to noise levels that can cause permanent hearing impairment.

What if these Conditions Exist?

If any of these conditions exist, a qualified person should measure the noise level at various work areas with an appropriate sound level meter using appropriate techniques.

Toolbox Talk
Hearing Safety

Discussion Date:

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Employee Participants:

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Wearing Hearing Protection

Wearing good hearing protection is an important precaution to protect the ears from high levels of noise exposure. Some tips for ensuring effective hearing protection are:

- Ensure that a good seal exists between the surface of the skin and the surface of the ear protector - a very small leak can greatly reduce the effectiveness of the protection
- Ear protectors have a tendency to loosen as a result of talking, chewing, etc., and they must be reseated from time to time during the workday
- Inspect hearing protectors regularly and replace when necessary
- Maintain and clean ear protectors
- Ear plugs should be made of soft material such as neoprene
- Most of the available ear protectors, when correctly fitted, provide about the same amount of protection (plugs or muffs)
- The best ear protector, therefore, is the one that you can wear properly.

Resistance to Wearing Hearing Protection

Of all the forms of personal protective equipment that are required in work environments, hearing protection is the most common resisted. One of the main reasons given for not wearing hearing protection is they don't think they really need it. Hearing loss occurs gradually, even when exposed to short term high exposure, and when hearing loss is finally recognized, irreversible damage has been done.

Hearing protection is also reported to be uncomfortable, and therefore not worn. With the many forms of hearing protection available, it is possible, and important, to choose one that offers the most protection, and the highest level of comfort to preserve your hearing well into old age!

Toolbox Talk

Electrical Hazards

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Introduction

A world without electricity is a situation that we rarely experience, except in moments of power outages. That is also the case for maritime environments. Electrical devices are used throughout ships and other offshore vessels; however, with the use of electricity comes the risk of electrical hazards. An example of these electrical hazards is the use of frayed electric cords with a damaged earthing line.

Electrical equipment hazards

There are a number of hazards associated with electric lines and the use of electrical equipment; however the use of electrical equipment cannot be avoided. For this reason it is important to be aware of the hazards and take steps to minimize the risk. Listed below are a number of causes that can lead to electrical-related injury or death.

- Path to earthing line is missing or discontinuous
- Equipment not used in the proper manner or for its proper function
- Improper use of extension and flexible cords
- Electrical short leading to heat or fire
- Electric sparks leading to explosions

Effects of electric current on the human body

The most common injury related to being exposed to electric voltage is electrical burns, which happens as the result of electric current running through the body's tissue or bones. However there are a number of injuries that can take place depending on the level of voltage a person has running through their body. Given below is information obtained from the Occupational Safety and Health Administration (OSHA) pertaining to the number of milliamperes (mA) one is exposed to and the corresponding injury that will take place.

1 mA	Perception level, a faint tingle.
5 mA	Slight shock felt, average individual can let go.
6-16 mA	Painful shock, begin to lose muscular control. This is called the freezing current or "let-go" range. Individual cannot let go, but can be thrown away from the circuit if extensor muscles are stimulated.
17-99 mA	Extreme pain, respiratory arrest and severe muscular contractions (individual cannot let go) Death is possible.
1,000-2,000 mA	Ventricular fibrillation, muscular contraction and nerve damage occurs. Death is likely.
>2,000 mA	Cardiac arrest and severe burns. Death is likely.

Actual Near Miss

There were electrical power cables being used for work lighting on the hull. The cables had bare wires lying in puddles of water that kept shorting out. An employee received occasional shocks when touching the nearby hull surface with wet gloves. Even small voltage as used for shipyard lighting may cause a severe shock, especially if it occurs while traversing a ladder.

Toolbox Talk

Electrical Hazards

Discussion Date:

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Employee Participants:

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Guidelines to follow to reduce the risk of electrical shock

In the field

- Inspect your work area for possible hazards and electrical equipment in use Never tamper with electrical equipment
- Be sure lock-out/tag-out is in place for electrical equipment undergoing maintenance (lock-out/tag-out is a safety procedure used to verify dangerous equipment is properly shut off during servicing)
- Avoid using metal ladders located or placed near electric sources
- Use plastic flashlights, not metal, to protect against coming in contact with unforeseen exposed wires
- Only use equipment rated for hazardous areas, such as spark-proof equipment in areas that may contain flammable gas
- Avoid touching wet surfaces with bare skin or conductive materials, in maritime environments many surfaces may contain water and may lead to electric shock in the cases of faulty or damaged wiring
- Be extremely cautious when moving to avoid electric shock, most injuries related to electric shock result from moving away to quickly and falling down the stairs or into some other hazard
- Use appropriate PPE around electrical equipment (e.g. do not use wet gloves or safety shoes with worn soles)
- Verify electrical tools and equipment being used are in good condition
- Avoid areas where electrical equipment is in use with broken or removed guards
- It is advisable to ask for assistance from experienced employees, in case you are involved in high voltage survey jobs. In addition, ask for High Voltage familiarization and training

In the office

- Inspect electrical cords before use and report any electrical problems, frayed cords, or exposed wiring immediately
- Keep papers and other combustible materials away from electrical cords
- Keep electrical equipment away from water and dampness
- Never use water on an electrical fire; this, may result in electric shock
- Do not overload electrical circuits
- Always unplug electrical cords at the plug; never by pulling the cord
- Verify that electrical equipment is only used for its approved function
- Do not use electrical cords fastened or secured with metal nails or staples

Class C fire extinguishers should be used on fires involving or surrounding electrical equipment. Employees are advised to alert personnel about the fire by activating the fire alarm and vacating the building immediately. An attempt should not be made to extinguish the fire unless the only escape path is blocked by the fire or the employee has fire-fighting training.

Actual Incident Report

During a vendor survey, an employee was demonstrating a test, of an Aqueous Fire Fighting Foam (AFFF) skid. He was shocked and received a burn to his skin as a result of improper earthing of a portable controller.

Discussion

- Report any incidents pertaining to electrical hazards with your supervisor

Toolbox Talk

Job Safety Analysis

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Introduction

Nearly every task we attempt has associated risks or hazards. In an attempt to minimize these risks most individuals make a conscious effort to be aware of situations around them that may cause harm.

Job safety analysis (JSA)

Job safety analyses focus on the relationship between a worker, the task to be performed, the work environment, and the equipment and tools related to the task. The JSA process may seem simple but the benefits of performing it correctly are exponential, such as lowering the number of injuries or incidents that may occur. In order to correctly perform a JSA the following three steps must be completed.

- Identify the steps needed to complete the task
- Pinpoint possible hazards that may occur in each step
- Eliminate or reduce the severity of the hazards that may occur

Actual Near Miss

A worker was grinding on deck wearing most of the recommended PPE except for the proper eye protection. If the worker had completed a JSA prior to performing the task, he would have known that eye protection was recommended as a control against eye hazards. Once a JSA is completed, individuals involved in the task must use all controls recommended to prevent injury, including all PPE that applies for that task.

JSA hazard types

When performing a JSA it is important to identify hazards that may cause harm or injury to individuals involved in the task. When identifying hazards the following list may help to pinpoint issues.

- Is there a danger of striking or being struck by an object?
- Is there a danger of being caught in, by, or between objects?
- Is there danger of slipping, tripping, or falling?
- Can pushing, pulling, lifting, bending or twisting cause strain?
- Is there danger of harm to eyes, hands, feet or other parts of a worker's body?

There are a variety of hazards that may be presented and can be categorized as: chemical, physical, biological, and ergonomic. The table below provides example hazards associated with each category.

Chemical Hazards

- Inhalation
- Skin contact
- Absorption
- Injection
- Ingestion

Ergonomic Hazards

- Repetition
- Forceful exertions
- Awkward postures
- Contact stress
- Vibration
- Work area design
- Tool or equipment design

Physical Hazards

- Electrical
- Fire/explosion
- Noise
- Slips/falls
- Struck by
- Radiation
- Thermal stress
- Pinch points
- Struck against

Biological Hazards

- Blood borne pathogens
- Brucellosis
- Building-related illness
- Legionnaires' disease
- Mold
- Plant and insect poisons
- Tuberculosis
- Water, grey water, black water and waste water (including sewage)

Toolbox Talk

Job Safety Analysis

Discussion Date:

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Employee Participants:

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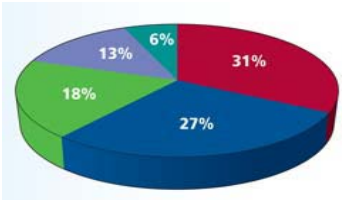

When to perform a JSA

Job safety analyses can be performed on many different tasks in the workplace. It is important to give priority to the tasks that are considered to be of the highest importance or that present the greatest risks. Listed below is a priority order of how tasks should be considered for JSA.

- Jobs with the highest injury or illness rates
- Jobs with the potential to cause severe or disabling injuries or illnesses
- Jobs in which human error could lead to a severe accident or injury
- Jobs with new processes or procedures
- Complicated jobs that may require written instructions

How to perform a JSA

When performing a JSA consider the following list to identify potential hazards:

- Environmental conditions of the work area (e.g. wet, cluttered or icy)
- The task that you need to perform
- Other people and work being performed (e.g. people working overhead)
- Equipment in operation near you (e.g. noisy equipment, welding)
- What controls, if any, are in place for the possible hazards?

While performing the JSA keep the following list in mind.

- The steps involved and the order they will occur
- The actions that each task entails (e.g. load or steer)
- The PPE needed for each task

After the steps for the task have been identified and the hazards recognized, it is necessary to make recommendations or implement controls to reduce or eliminate the hazards. There are four main types of controls that can be put in place to mitigate hazards once they are identified; they are listed below and include examples.

1. Avoidance/substitution (e.g. postpone the survey)
2. Engineering (e.g. guards/barriers or alarms)
3. Administrative (e.g. procedures or signs)
4. Personal protective equipment (e.g. safety glasses or safety harnesses)

Employees should only participate in tasks containing hazards that may be mitigated with the use of PPE or controls that are already in place, not including the use of respirators. If a job is determined to be hazardous and PPE will not control the hazard, then employees are to postpone the task until the hazard can be controlled.

Actual Near Miss

A crewmember was on board a barge preparing to leave the port. As he let go of a mooring line, he stepped on a manhole cover that was not properly secured and fell forward. Upon further safety inspection, it was found that many of the manhole covers were unsecured. The crewmember should have performed a JSA himself prior to commencing the maneuvering job even though shore side personnel had already assured him that the barge was ready for sea.

Discussion

- Take five minutes before beginning or when re-starting a job to identify risk and mitigate hazards.
- Report and discuss any incidents pertaining to JSAs with your supervisor. Share examples from some of your own JSAs

Toolbox Talk

Mechanical Equipment Safety

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

The purpose of this information sharing is to bring to light common hazards and safety behaviors. Alerting management, crew and visitors to these issues may lead to actions to prevent similar near misses from happening to others and to improved procedure development and ship design.

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Introduction

Each type of machinery has unique mechanical and non-mechanical hazards. Some machines can cause severe injuries, amputations, fractures or crushing injuries; while others may cause less severe injuries such as abrasions, sprains or strains, burns or cuts. Regardless of the type of equipment, caution should be used when machinery is in operation in your work area.

Mechanical Hazards

Examples of mechanical hazards that can hit, grab or trap someone are as follows.

- Hazardous motions – such as rotating machine parts, reciprocating motions (sliding parts or up/down motions) and transverse motions (materials moving in a continuous line)
- Points of operation – the areas where the machine cuts, shapes, bores, or forms the stock being fed through it
- Pinch points and shear points – areas where a part of the body can be caught between a moving part and a stationary object

Some other hazards to be aware of include: suction hazards – such as ventilator fans and IGS blowers; impelling hazards.

Types of Rotating Equipment

There are many different types of equipment that contain rotating or moving parts that may prove hazardous. These include but are not limited to the following.

- Fans
- Belts and pulleys
- Flywheels
- Cams/rollers/gears
- Chain/sprocket drives
- Conveyor equipment
- Exposed shafts or shaft assembly parts

Other equipment hazards to be aware of include but are not limited to the following: pumps and compressors; throwing hazards, bulk cargo loading machines; heat exchangers; boilers and associated pipes and fittings; lifting devices and devices that move objects(e.g., engine room crane); electrical boards; and electrical machinery.

Guards

In order to minimize the risks associated with mechanical equipment, guards are often put in place to prevent injuries. Guards should never be removed or otherwise altered or disabled. A guard is a barrier that helps prevent entry of someone's hands, fingers or other objects into the point of operation. Insulation is also used as a safeguard to prevent extreme temperature exposure. It is important to verify that the proper insulation is in place when it is necessary and that it has not been tampered with or removed.

Actual Near Miss

During an inspection, a grinding machine was found with no protective eye shield to protect against debris from grinding work. The eye shield had broken off. The equipment was then removed from service until the eye shield could be replaced.

Discussion Date:

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Employee Participants:

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Toolbox Talk

Mechanical Equipment Safety

Hazard Recognition

When entering a space with machinery in operation, you should be mindful of the following.

- Are there safeguards provided for the machinery in operation?
- Is there evidence that the machine's safeguards have been removed, altered, or disabled?
- Are there any unguarded gears, sprockets, pulleys, or flywheels?
- Are there any exposed belts or chain drives?
- Are there any exposed set screws, key ways, or collars?
- Is maintenance being performed on the equipment?
- Is the equipment being moved or lifted?
- Are any of the guards, including insulation, removed?

Safety Precautions when Near Operating Machinery

When machinery and equipment is in operation, there are many possible hazards. Listed below are some safety precautions to take when around mechanical equipment:

- Always wear appropriate PPE
- Do not leave lanyards hanging loose; tuck them into a pocket or into your coveralls
- Do not leave long hair hanging down; keep it tied and tucked into your coveralls
- Do not place any part of your body into moving machinery
- Do not attempt to ride machinery that is not designed for human conveyance
- Do not wear jewelry, loose-fitting clothing, or loose items extended off your person

NOTE:

- Employees should be cautious of flying debris when compressed air is used
- Employees should not remain under objects being transported or lifted
- Employees should not remain in the vicinity of unmanned running mechanical equipment

Actual Injury Report

A crew member was inspecting ventilation via an open inspection cover while a fan was running. The crew member had his ID tag hanging from his neck, and the ID tag was sucked into the fan. This resulted in the ID tag almost strangling the crew member. Loose items should not be worn near mechanical equipment.

Discussion

- All near misses and injuries related to mechanical equipment should be discussed and reported to your supervisor

Toolbox Talk

Personal Protective Equipment

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Personal protective equipment (PPE) is required to be worn while in potentially hazardous situations. Work in areas of the vessel such as confined spaces, when boarding a vessel, and walking on the deck, it is important to wear appropriate PPE.

Preceding reliance on PPE:

- Design to reduce hazards and ensure safety (ventilation, sound proofing, access, etc)
- Maintain the condition of platforms, ladders and equipment, etc
- Ask: Does this job have to be done?
- Ask: Are there alternative to entering confined spaces, climbing ladders?
- Ensure there are adequate numbers of people performing necessary tasks

How can PPE fail?

- Poor condition
- Inadequate, failure of PPE to meet the required specifications
- Improper use, or failure to use

How does PPE enhance safety?

- Protection from unpredictable events
- Increased safety awareness

Commonly Used PPE:

- Lifejackets-survival suits, PFDs
- Ear protection- hearing protection, protection from cold
- Eye protection- safety glasses, goggles, protection from light
- Head protection-helmets, hard hats, protection from heat loss
- Hand protection- gloves, protection from cold, chemical exposure
- Foot protection- steel toe, protection from cold or chemicals

Toolbox Talk

PPE- Upper Body

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Introduction

Hazards may be found on vessels or in shipyards. They come in many forms such as: sharp edges; falling objects; electrical; chemical; noise; and many other potentially dangerous situations. Each worksite contains unique hazards so it is important to be aware of the specific hazards that may be encountered in a particular worksite in order to bring the appropriate personal protective equipment (PPE) with you.

Controlling Hazards

Controlling a hazard at its source is the best way to protect anyone who will be in the vicinity of equipment. As a visitor to a worksite/vessel, it can be difficult to know the extent of hazard control. In addition, some hazards may not be eliminated or controlled completely.

PPE types and associated hazards

It is the responsibility of personnel to verify that their PPE is: maintained; industry-compliant; in good condition; and readily accessible. It is also important to know what type of PPE is appropriate for different hazards. Listed below are different types of PPE pertaining to the upper body and the hazards that may be associated with them.

Head protection

Whenever the possibility exists for items to fall, bump or splash onto the head or the head come in contact with items (including with electrical hazards), then hard hats should be used to protect personnel. There are different types of hard hats depending on their specific use. The classes of hard hats are shown here below.

Class G – Falling objects and limited electric shock (< 2,200 volts)
Class E – Falling objects and high electric shock (< 20,000 volts)
Class C – Falling objects

Actual injury report

A crew member bumped their head on crane operator's platform resulting in a bruise to the forehead. The crew member was not wearing a hard hat, which if used would have absorbed the blow.

Hearing protection

When personnel are working in areas that may produce noise levels in excess of 85 decibels, hearing protection is necessary. It is also important to note that employees (while wearing hearing protection) should not be exposed to noise for longer than the values in the table below.

Permissible noise exposures			
Duration per day (hours)	*Sound level (Decibels)*	*Duration per day (hours)*	*Sound level (Decibels)*
8	90	1.5	102
6	92	1	105
4	95	.5	110
3	97	.25	115
2	100		

Toolbox Talk

PPE- Upper Body

Discussion Date:

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Employee Participants:

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Hearing Protection (continued)

The different types of hearing protection and their advantages and disadvantages are detailed in the table below.

Protection type	Advantages	Disadvantages
Earplugs	• Lightweight • Comfortable • Easily used with other equipment	• Works loose easily • Frequently soiled • Require specific fitting instructions
Earmuffs	• One size fits all • Fits for long periods of time	• Fits tightly on the head • Uncomfortable fit • Difficult to use with other equipment

Actual near miss

A crew member was seen wearing earphones in the engine room instead of the required ear muffs, this may have resulted in hearing damage.

Face and eye protection

If the eyes or face of personnel may be exposed to hazards such as: flying particles; molten metal; heat generating sources, chemicals (vapors, acids, caustics or gases); or any other hazard that may cause injury to the eyes or face, proper PPE must be used to protect personnel from these hazards. The types of PPE used for face and eyes are shown below, along with their properties.

Protection type	Hazards combated	
Face Shield	• Chemical • Heat	• Impact
Goggles	• Dust • Chemical	• Heat • Impact
Spectacles	• Heat	• Impact
Laser goggles	• Light produced by lasers	
Welding shields	• Infrared or radiant light (such as welding devices)	

Actual injury report

A crew member was performing chipping operations on the main deck. When the wind shifted, the chipping dust blew directly into the crew member's eye causing scratches to the eye. The incident could have been avoided if the crew member was wearing goggles instead of spectacles.

Discussion

Report and discuss any incidents pertaining to upper body PPE with your supervisor

Toolbox Talk

Procedures

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Procedures may be very helpful in ensuring quality and consistency of maintenance jobs and safety critical tasks. The steps of a procedure cover all requirements that must be fulfilled in the order which they much be done. A procedure not only ensures that each person doing the task performs the task correctly, but ensures it is done safely and consistently.

How do procedures compromise safety?

- Situations not covered
- Unclear communication
- Wrong facts
- Not readily available
- Poor supervision/coordination

How can procedures improve safety?

- Use a procedure to direct the task, do not deviate from the steps
- Store the procedures in a visible location
- Ensure the procedure will not be damaged by environmental conditions
- Tell a supervisor if an error is found in a procedure, or it is difficult to locate or becomes damaged.

Procedures do not compensate for training, education, and a safety conscious attitude. Always use common sense and be alert to potentially dangerous conditions. A procedure may guide you through the steps of a task, but it will not save your life.

Toolbox Talk

Situation Awareness

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Introduction

Examining the world around us or the situations surrounding our life and our body is something we do without really noticing. During this process, there are opportunities for errors which may result in unfortunate actions or unsafe acts; in other words, human error. The culmination of this process results in a level of situation awareness (SA), the state of understanding and knowledge about a constantly changing environment.

In the context of human error, it is often the loss of situation awareness that is of interest. When information is omitted from the decision making process, or where information is incorrect, incomplete or interpreted incorrectly, there can be an inaccurate interpretation of a situation. This in turn influences decision making. This is how cognitive errors are typically made and often lead to bad or wrong decisions with unwanted outcomes.

Actual Incident Report

A surveyor was carrying out a cargo tank inspection during dry-docking and repair surveys on board a tanker at an Eastern European shipyard. The scope of the surveys required taking pictures. All precautions for the selected camera, PPE and confined space entry were taken properly but the surveyor failed to thoroughly check the structure surrounding him before taking his picture. He stepped back one foot while placing his camera back into his pocket and fell three meters (~10 ft) through a temporary opening at the bottom shell. Safety practices at that shipyard were very poor and no handrail/protection had been fitted for the temporary opening.

Components of Situation Awareness

There are several components which affect one's ability to maintain SA. These components may be divided into external and human-related factors.

External factors are external to the individual and refer to equipment, machinery or even work being carried out by others in surrounding areas. It is essential that subject equipment and machinery work properly and be well-maintained and that work performed by others is carried out safely and does not cause unsafe conditions for persons in the area of influence. Surveyors visit ships under different conditions (at sea, at a repair shipyard, in dry-dock) and visit new construction projects at different stages of their construction. These different scenarios often lead to surveyors being surrounded by machinery items, running equipment and other people working with fire, steel, higher surfaces, within confined or partly confined spaces.

Specialty work is sometimes performed concurrently in areas where surveyors have to perform their jobs or where they may decide to carry out patrolling. Both cases, regular/official call out work and patrolling surveyor's jobs, should be subjected to appropriate planning to minimize the possibility of unsafe conditions during surveys or inspections. As this planning is part of the facility's management responsibility, surveyors are encouraged to make it a priority item for discussion during safety meetings with the shipyard and other facility management.

Human-related factors are internal or inherent to the persons and can influence SA. Components of human-related factors include:

Attention – the ability to be focused on the essential information that is critical in the decision making process and outcome of your actions. Distractions or attention paid to incorrect information can easily result in a loss of SA

Toolbox Talk

Situation Awareness

Discussion Date:

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Employee Participants:

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- Expectations – what happened the last time you were in this situation? How did you perform? How did you collect and interpret the relevant information and perform the required action? Based on the current state of the situation, how do you predict it will turn out? All of these questions create expectations and dictate how we expect we must perform under these circumstances. Be careful, expectations can lead you astray. Be sure to continue to collect and assess the information available to you *this* time
- Goals – the ability to clearly and rationally establish the purpose and objective of the task
- Memory – recalling training, procedures or information that was previously collected and the accurate recall of information
- Patterns and previous experiences – looking for patterns in a similar action, task or process is helpful in recognizing and integrating information; if this is done accurately and the information obtained is correct, SA can be enhanced
- Workload – duration of shift, physical work and physical fatigue, difficulty of decision, number and sequence of actions to be performed and the amount of information required in the decision making process

Awareness for Every Situation

Accurate situation awareness is always important. When driving a vehicle, performing surveys, navigating a ship, even when cooking, the accuracy of the perception of the environment should not be underemphasized. After all, it is from this understanding of the immediate environment (SA) that decisions are ultimately made. And if the decisions are wrong, accidents happen.

Failure to perceive the speed of the car in front of you may result in a collision; failure to perceive a trip hazard when performing a survey and taking photographs of the ship may result in a fall; failure to comprehend the effects of long-term heat exposure when performing yard work may result in a heat illness in the summertime.

For your safety, maintain accurate SA:

- Avoid distractions
- Take the time to gather relevant information before and during a task, including talking with more experienced persons
- Don’t make dangerous assumptions
- Try to identify and resolve any uncertainties
- Be sure of your environment
- Have a plan of action based on your SA and predict how different decisions will work out. Change the plan if needed
- Choose wisely

If necessary, require that others stop their job prior to beginning your work.

<u>Actual Incident Report</u>

Upon completion of an inspection, the crew member went out from a double bottom tank, followed by the shipyard QC. A piece of hot steel dropped down into the crew member's boiler suit and the crew member's back was burned and injured.

Discussion

- All near misses and injuries related to situation awareness should be discussed and reported to your supervisor.

Toolbox Talk

Slips, Trips, and Falls

The ABS Mariner Personal Safety research project provided input for this Toolbox Talk. This topic has been identified as a common safety concern. The information provided on this topic may serve as an overview and a refresher.

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Introduction

People encounter hazards, on a daily basis and finding them at the office is no exception. There are many different hazards related to the office that can lead to an accident whether it is an electrical shock due to faulty wiring or falling out of your chair. The near miss and incident examples given in this Toolbox Talk are from actual ABS personnel.

Causes of slips, trips and falls

Many factors can lead to a slip, trip or fall in the workplace. In order to reduce those factors it is important to know what the causes are in order to correct them before an accident occurs. Listed below are some reasons that slips, trips and falls occur.

- Slips
  - Wet or slippery surfaces due to oil, water, leaking fluid or debris
  - Wet leaves or pine needles
- Trips
  - Protruding objects, bunched mats, holes and depressions in the walking surfaces, steps, stairs and cords or lines across walking paths
  - Transitions from one floor type to another
- Falls
  - Typically result from a slip or trip; may also occur on:
    - Stairs
    - Ladders
    - Platforms
    - Staging/scaffolds

Preventing slips, trips and falls

In order to reduce the occurrence of accidents or injuries related to slips, trips and falls; it is important to not only know the risk but also what can be done to prevent them from occurring. Listed below are things that can be done to prevent accidents and injuries related to slips, trips and falls.

- Follow good housekeeping practices
  - Clean up spills and other messes immediately
- Reduce wet or slippery surfaces
  - Be aware of common areas with wet or slippery surfaces such as:
    - Parking lots
    - Sidewalks
    - Food preparation or eating areas
    - Slick tiles and flooring areas
  - Remove snow and ice, or treat the areas containing them
  - Place wet floor signs when needed
  - Place mats near entrances

Actual Near Miss – Office

An employee almost slipped on standing water while walking to their car parked in the parking structure. There was adequate lighting and they had on appropriate footwear (safety shoes with new oil resistant soles and good traction). The amount of standing water appeared to be only a small wet area but was enough to create an unsafe situation.

Toolbox Talk

Slips, Trips, and Falls

Discussion Date:

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Employee Participants:

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- Avoid creating obstacles in aisles and walkways
  - Keep all work areas, passageways, storerooms and stairwells clean and orderly
  - Avoid stringing cords or cables across hallways or designated walkways, and tape them down when it cannot be avoided
  - Avoid leaving boxes, files or briefcases in the aisles
  - Close file cabinet drawers immediately after use
  - Do not leave loose items on the floor
  - Eliminate uneven areas on walking surfaces
- Create and maintain proper lighting
  - Use proper illumination in walkways, staircases, ramps and hallways
  - Keep work area adequately lit
  - Immediately turn on lights when entering dark areas
  - Keep areas of low illumination free of obstructions
  - Keep areas around light switches clear
  - Report inoperable lights immediately
- Wear proper footwear
  - When wearing shoes without rubber soles, be aware that the risk of slipping is increased
  - Verify that laces are tied correctly
- Control individual behavior
  - Do not run; walk slowly to avoid collisions with personnel or hazards
  - Avoid multiple tasks, such as reading documents, when walking
  - Do not carry materials that may obstruct your view when walking
- Other Hazards
  - Verify that handrails are not broken, damaged, or missing; if they are, report it immediately
  - Always use handrails when ascending and descending stairs and place your hand slightly behind you on the handrail during descent
  - Always use mats to clean liquid or debris from shoes when entering a building
  - Be cautious when moving between carpet and slippery surfaces, such as tile or waxed flooring areas
  - Worn or frayed carpet areas and broken carpet tiles should be replaced immediately
  - Never use a chair to reach an elevated surface; always use a ladder or step stool

Actual Near Miss - Field

A crew member was 0.5 m (1.6 feet) high on top of a ladder inspecting the structural member. The ladder suddenly slipped sideways resulting in the surveyor losing his balance and almost falling down onto the bottom plate stiffeners.

Discussion

- Report and discuss any incidents pertaining to slips, trips and falls with your supervisor.

Slips and Trips in Workspaces

Top 5 Near-misses

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Workspaces on ships are replete with hazards. The layout of equipment inherently requires crew to be vigilant so as not to bump their head or trip over a pipe. Even when being vigilant, hazards exist. When working long hours carefulness may start to wane and little details are overlooked, or when a task is routine it is easy to skip a small step that could have large consequences.

Slips and trips are among the largest reported type of workplace accidents and near misses. On board ships is no different, slips and trips are frequently the reported near-miss type.

A search of the Mariner Personnel Safety Repository of near-misses returned 264 slips and trips in interior workspaces such as the engine room, wheelhouse, and cargo spaces. Various causes were reported, among them fatigue, inadequate training, anti-skid and signage or markings to indicate hazards. The top 5 reported causes for near misses were situational awareness, housekeeping, maintenance, design and tripping hazards. As is evident, there is overlap between many of the categories, as so they were organized based on the primary reason for the near miss report.

Situational awareness refers to a lack of awareness about ones activities, whether it is climbing a ladder with two hands full, hurrying or other unsafe activity. Housekeeping issues range from tools not put away on completion of a job to oily rags left about. Maintenance refers to equipment or infrastructure on the ship not being properly maintained, such as a corroded grating, or an oil leak. Design issues are the result of either poor design on the shore side, or choosing a poor design on board when making repairs. Tripping hazards are either the result of something obstructing a walkway, such as a hose or line, or are the result of poor designs that are reported as trip hazards.

Most of these hazards must be mediated by raising awareness of the crew and emphasizing the importance of safety, the need to be diligent in maintenance routines, and awareness of one's surroundings. Remember that a task is never so urgent that it jeopardizes your own or another's safety.