



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.





Electrical Hazards

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.

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



Electrical Hazards

- 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

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