

# Maritime Electrical Safety

2 Days, 1.6 CEUs

This course provides an understanding of the electrical safety requirements for personnel who work in the maritime industry. The maritime industry includes shipboard, shipyard, ship breaking, loading docks, etc. Electrical safety compliance for maritime workers is comprised of various regulations and standards with overlapping jurisdictions; therefore it requires a thorough understanding of applicable regulations and standards that are identified in the 2006 OSHA Shipyard Employment "Tool Bag" Directive (CPL02-00-142), which clarifies the importance of electrical safety for all maritime workers.

This Directive confirms the applicability of electrical safety regulations in OSHA 29 CFR 1915, Shipyard Employment, 1910.331-.335, *Electrical Safety-Related Work Practices* (based on NFPA 70E®, *Standard for Electrical Safety in the Workplace*) for electrical safe work practices for vessel construction, repair, ship breaking, and similar activities on both inspected and uninspected vessels, as well as 1910.302-.308, *Design Safety Standards for Electrical Systems* (based on NFPA 70®, *National Electrical Code*) for land based facilities. The NFPA 70E® provides industry accepted guidelines for ensuring an electrically safe work environment and should be utilized. The ability to interpret these regulations and standards, and understand how to apply the requirements, is essential to preventing electrical accidents involving shock, arc flash, and arc blast; improving power system safety and reliability; and ensuring OSHA compliance.

This course is intended for all maritime personnel who work on or around electrical equipment and systems rated 50 volts to ground or more in vessels, shipyards, ship breaking, and similar activities where personnel are, or may be, exposed to electrical hazards.

**Prerequisite:** A working knowledge of basic electricity.

## Learning Objectives:

Upon completion of this course, the participant should be able to:

- Identify safe work practices for working on or near electrical equipment and systems
- Describe the purpose and elements of performing electrical hazard risk assessment
- Identify standard safe work practices for performing hazardous energy control procedures
- Understand which General Industry Regulations and Electrical Safety Standards apply to the Maritime Industry under OSHA 1915 and why

## SCOPE

### Day 1\*

#### I. Class Introduction

- A. Course Purpose
- B. Course Introduction
- C. OSHA Compliance
- D. NFPA 70E Introduction

#### II. Definitions for Electrical Work

- A. Introduction Article 90
- B. Chapter 1 Safety-Related Work Practices
- C. Definitions

#### III. Application of Safety-Related Work Practices

- A. Scope
- B. Purpose
- C. Recognized Hazards
  - 1. Shock
  - 2. Arc Flash
  - 3. Arc Blast
- D. Responsibility
- E. Organization

#### IV. General Requirements for Electrical Safety-Related Work Practices

- A. Electrical Safety Program
- B. Training Requirements
- C. Host and Contractor Employer's Responsibilities
- D. Use of Electrical Equipment

\* Class scheduling times may vary based on discussions and size of class

# Maritime Electrical Safety

## SCOPE (Cont)

### V. Establishing an Electrically Safe Work Condition

- A. OSHA 1915.89 Control of Hazardous Energy (Lockout/tags-plus)
- B. Process to be Electrically Safe
- B. LOTO Application
- C. Temporary Protective Grounding Equipment
- D. 1915.89 App A - Typical Minimal Lockout/Tags-Plus Procedure

### VI. Work Involving Electrical Hazards

- A. General
- B. Electrical Safe Working Conditions
- C. Approach Boundaries to Energized Electrical conductors or Circuit Parts for Shock Protection
- D. Limited Approach Boundary
- E. Arc Flash Assessment

### Day 2

- F. Arc Flash Boundary
- G. Arc Flash Personal Protective Equipment (PPE)
- H. Incident Energy Analysis Method
- I. Equipment Labeling
- J. Other Precautions for Personnel

### Activities

- K. Personal and Other Protective Equipment
- L. Work Within the Approach Boundary or Arc Flash Boundary of Uninsulated Overhead Lines
- M. Underground Electrical Lines and Equipment (Applicable to Shipyard only)
- N. Cutting or Drilling
- E. Arc Flash Hazard Analysis
- F. Other Precautions for Personnel Activities
- G. Personal and Other Protective Equipment Selection for Low- and High-Voltage Tasks
- H. Alerting Techniques
- I. Working Near Overhead Lines
- J. Additional Safety Considerations

### VII. Safety Related Maintenance Requirements

- A. Introduction
- B. General Maintenance
- C. Substation, Switchgear Assemblies
- D. Premises Wiring
- E. Controller Equipment
- F. Fuses and Circuit Breakers
- G. Rotating Equipment

- H. Hazardous (Classified) Locations
- I. Batteries and Battery Rooms
- J. Portable Electric Tools and Equipment
- K. Personal Safety and Protective Equipment

### VIII. Safety Requirements for Special Equipment & Informative Annexes

- A. Introduction
- B. Safety-Related Practices for / Electrolytic Cells
- C. Safety Requirement Related to Batteries and Battery Rooms
- D. Safety-Related Work Practices for use of Lasers
- E. Safety-Related Work Practices: Power Electronic Equipment
- F. Safety-Related Work Requirements for Research and Development Laboratories
- G. Introduction to Informative Annexes
- H. Informative Annexes List
- I. Index
- J. Maritime Electrical Safety Summary

### IX. Final Exam and Paperwork