Overview

Lesson: Cranes

Lesson Objectives:

- Identify general information and requirements when working with cranes
- Identify the different types of cranes and derricks and implement safe work practices
- Explain the four principles of crane lifting and describe crane operating standards
- Determine the safety precautions for using all associated lifting equipment

Topics

- General Information
- Types of Cranes
- Crane Principles and Operations
- Associated Lifting Equipment

Topic: General Information

This topic introduces general information and requirements for working with cranes. You will review OSHA standards, the hierarchy of control principles, and the Preplanning Checklist.

Having completed this topic, you should be able to:

- Identify OSHA's standards for crane use at the workplace
- Implement the hierarchy of control principles within your work environment
- Use the Preplanning Checklist to discuss safety requirements prior to the lift

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- OSHA's primary concerns in establishing crane standards include:
  - Criteria for operator qualifications
  - Update of standards
  - Clarification of use
  - Inspection and maintenance of cranes
  - Certification or qualifications of riggers and signal persons
- In addition to OSHA standards, employers adopt crane standards developed by:
  - American National Standards Institute (ANSI)
  - American Society of Mechanical Engineers (ASME)
  - Specialized Carriers and Riggers Association (SC&RA)
  - Crane and Hoist Safety
- The preferred order of control is (1) engineering, (2) administration, and (3) personal protective equipment.
- Prior to a lift, use a preplanning checklist to confirm the proper operating procedures.

Overview

Topic: Types of Cranes

This topic describes the different types of cranes, derricks, and helicopters and lists OSHA's requirements for their safe use. Having completed this topic, you should be able to:

- List the six different types of cranes and give examples of each
- State the safety requirements for floating cranes and derricks
- Explain the regulations applying to operating helicopter cranes
- Comply with the five general requirements for working with cranes and derricks

Topic summary:

Please take a moment to review these key points before you continue with the next topic.

- There are six types of cranes: boom trucks, truck, crawlers, rough terrain, mobile tower, and heavy lifting.
- Each type of crane, whether it be mobile, fixed, or overhead, has its own set of safety specifications and OSHA requirements.

Topic: Crane Principles and Operations

This topic will review the basic lifting principles and operational practices for lifting or moving heavy loads. Having completed this topic, you should be able to:

- Identify the three main reasons why working with cranes can be hazardous
- Discuss the four basic lifting principles that govern a crane's mobility and safety during operation
- Identify crane capabilities, limitations, and job site restrictions for safe operations
- Describe special operational considerations for cranes powered by internal combustion engines or electric motors

Topic Summary

Please take a moment to review these key points before you continue with the next topic.

- Cranes are at risk because of their structure, stability, and rigging.
- The four basic lifting principles are the center of gravity, leverage, stability, and structural integrity.
- There are nine standard hand signals that provide directional safety for working around moving cranes.

Crane operational considerations were outlined in these areas:

- Crane and derrick operations
- Instruments and components
- Personnel platforms
- Loading
- Rigging
- Inspecting and testing
- Prelifting meeting
- Safe work practices
- Movement of cranes
- Load chart considerations
- Critical lifts
- Working with competent and qualified personnel

Overview

Topic: Associated Lifting Equipment

This topic covers the specifications and limitations applicable to working with hoists and elevators. Having completed this topic, you should be able to:

- Identify the risks and standards for working with different types of hoists
- Identify requirements for the use of conveyors

Topic Summary

Please take a moment to review these key points before you continue with the next topic.

- General requirements for the use of hoists, elevators, and conveyors involve ropes, booms, and belt-type manlifts.
- Operating specifications for material hoists include requirements for hoistways, hoist towers, and overhead protection.
- Operating specifications for personnel hoists include towers, hoistways, cars, and inspection.