

Rigging & Load Handling Equipment Engineering & Applications

Course #803 Rigging & Load Handling Equipment Engineering & Applications

This course introduces the major considerations for load handling equipment and discusses the benefits and limitations of various types of load handling equipment, including their most common applications. Course duration includes lectures, reading assignments, exercises and exams. This course is accredited by LEEA and approved by ASME for Continuing Education Units (CEUs) in compliance with the IACET Standard.

Lesson 1: Slings and Shackles

Topics

Major Considerations; Wire Rope Fundamentals; Wire Rope Slings; Chain Slings; Synthetic Web Slings; Synthetic Roundslings; Synthetic Rope Slings; Shackles; Hardware

Objectives

- Analyze wire rope construction and the applications of various unique and common construction types.
- Evaluate various sling types in terms of capacities, benefits, limitations, applications, temperature, and climate effects.
- Determine removal criteria for various sling types.
- Evaluate shackles, hooks, links, rings, and other pieces of rigging hardware utilizing an analysis framework.

Lesson 2: Below-the-Hook Lifting Devices

Topics

Major Considerations; Structural Design Factors; Lifting Beams; Spreader Bars; Lifting Lug Design

Objectives

- Explain how the ASME B30.20 and BTH-1 Standards apply to design of below-the-hook lifting devices.
- Analyze various design practices and explain how ASME BTH-1 design factors emerged.
- Analyze design factors and the Principle of Structural Reliability.
- Determine basic lifting attachment methods and how to apply standards and regulations to the design.

Lesson 3: Lifting Equipment

Topics

Major Considerations; Hand & Leaver Chain Hoists; Manual & Air Tuggers

Objectives

- Interpret chain hoist components, operations, and common applications.
- Explain how to conduct chain hoist inspections.
- Interpret tugger components, operations, and common applications.
- Explain how to conduct tugger inspections.

Lesson 4: Rigging Applications

Topics

Major Considerations; Rigging Selection; Hitch Types; Capacities; Center of Gravity & Calculations; Load Distribution; Sling Tension; Load Control; Chain Hoists; Load Drifting; Levers; Jacking & Rolling; Reeving; Winches & Blocks; Off-Level Pick Points; Load Turning

Objectives

- Determine rigging to be used and calculate loading based on hitch types and rigging capacities selected.
- Calculate center of gravity of a load.
- Calculate sling tension and forces depending on sling angle in the rigging arrangement.
- Plan safe lifts with off-level pick points considering sling loadings and center of gravity control.

Lesson 5: Rigging Arrangements & Techniques

Topics

Stability & Equilibrium; Tandem Lifting; Upending & Inverting Loads; Vessel Upending Techniques; Load Sharing & Equalizing Arrangements; Suspension of Loads from Horizontal Lines

Objectives

- Interpret the stability of a load.
- Analyze stability throughout an uprighting procedure.
- Evaluate engineering considerations during the planning of lifts with multiple cranes while considering load sharing and operational procedure.
- Evaluate engineering considerations during the planning of lifts that involve upending or inverting requirements.

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