RIGGING ENGINEERING

Crane & Derrick Engineering, Installation & Planning

Course #802 Crane & Derrick Engineering, Installation & Planning

Covers the foundational knowledge of crane and derrick engineering for those hoping to complete the full Rigging Engineering Library. Installation and planning methods are introduced from the engineer or lift planner's perspective. 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: Introduction to Cranes & Derricks

Topics

Major Considerations; Hoisting; Drums; Sheaves; Wire Rope; Powered Lifting; Luffing; Derricks; the Contemporary Crane; Basis for Load Ratings

Objectives

- Analyze and measure basic hoisting mechanics, and drum and sheave characteristics including fleet angle, drum capacity, line pull, friction and overhaul weight.
- Determine appropriate wire rope requirements for various projects.
- Evaluate the forces in various derrick designs.
- Determine structural and mechanical load limits, as well as overturning and strength limitations of various crane types.

Lesson 2: Crane Configurations

Topics

Major Considerations; Derricks; Mobile Cranes; Load Spreading; Tower Cranes; Various Cranes

Objectives

- Analyze functional affinity of various crane types by working environment.
- Analyze common derrick types and their advantages and disadvantages.
- Calculate the mobile crane foundation support requirements for various crane sizes and configurations including ground bearing pressure and crane mat design.

Lesson 3: Loads & Forces

Topics

Major Considerations; Static Loads; Dynamic Loads; Wind Loads

Objectives

- Evaluate and interpret design loading concepts, codes and standards, and load classifications.
- Analyze the effects of swinging load distribution, friction, out-of-level supports, misalignment and skew, and earthquake loads.
- Evaluate storms and statics, gust factors and a crane's natural frequency.

Lesson 4: Stability Against Overturning

Topics

Major Considerations; Mobile Cranes; Tower & Self-Erecting Cranes; Dynamic Stability

Objectives

- Identify the general concepts of stability against overturning.
- Measure the tipping fulcrum on outriggers, crawler cranes, and on tires.
- Interpret stability-based ratings.

Lesson 5: Crane Use & Planning

Topics

Major Considerations; Mobile Crane Installations; Tower Crane Installations; Derrick Installations; Controlling Risk; Load Charts; Rating Charts; Overloading; Mobile Cranes on Barges

Objectives

- Understand and interpret Grove and Manitowoc Load Charts.
- Explain the OSHA regulations of a crane mounted on a barge.
- Identify common hazards of mobile cranes on barges.

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