



MOBILE CRANE OPERATIONS

Competencies / Objectives

Level One

MODULE 21101-04 – ORIENTATION TO THE TRADE

1. Identify career opportunities in the mobile crane industry.
2. Describe the duties and responsibilities of mobile crane operators.
3. Describe the physical requirements for mobile crane operators.
4. Name the different categories of mobile cranes and describe how each is used.
5. Identify common mobile crane attachments and explain how each is used.

MODULE 21102-04 – BASIC PRINCIPLES OF CRANES

1. Identify the types of mobile cranes found on construction sites.
2. Identify mobile crane components and boom attachments.
3. Identify mobile crane reeving patterns.
4. Define the effects of leverage as it applies to mobile cranes.
5. Define the factors affecting mobile crane lifting capacities.
6. Define a critical lift.
7. Identify basic instrumentation, gauges, and safety devices.
8. Define the basic steps in preparing a mobile crane for transportation.

MODULE 21103-04 – RIGGING PRACTICES

1. Identify and describe the uses of common rigging hardware and equipment.
2. Perform a safety inspection on common rigging hardware and equipment.
3. Identify common slings and describe their uses.
4. Determine sling capacities and sling angles.

MODULE 21104-04 – CRANE SAFETY

1. Identify basic mobile crane safety and rigging procedures.
2. Identify and explain how to avoid the swing paths of a crane.
3. Identify site and environmental hazards associated with mobile cranes.
4. State the safety practices associated with driving a mobile crane.

MODULE 21105-04 – OPERATING A CRANE

1. Perform site analysis and pre-operation and post-operation inspections.
2. Set up cribbing, matting, outriggers, and barricades as required for the safe operation of a crane.
3. Interpret and follow hand signals.
4. Manipulate crane controls to smoothly maneuver a load.
5. Shut a crane down to ensure safety and security.

Level Two

MODULE 21201-04 – COMMUNICATION

1. Identify the signal person on a job site.
2. Communicate effectively at the job site with management, the crew, and the signal person.
3. Demonstrate the standard hand signals as specified in ASME B30.5.
4. Describe the communication dynamics involved in conducting multiple-crane lifts.
5. Describe the signaling procedure used when crane operations require more than one signal person.
6. Identify the various methods of communication on the job.
7. Demonstrate communication procedures using a handheld radio.

MODULE 21202-04 – MACHINE POWER FLOW

1. Describe the various types of power sources used on mobile cranes.
2. Identify the major components used in mobile crane power systems, including the mechanical, electrical, pneumatic, and hydraulic power systems.
3. Identify the major power flow systems associated with transmitting power through mobile cranes.

MODULE 21203-04 – PREVENTIVE MAINTENANCE

1. Define the responsibilities of the operator in the preventive maintenance program.
2. Perform various preventive maintenance functions.
3. Define the safety requirements that apply when checking various fluid levels.
4. Identify the differences between preventive maintenance inspections and compliance inspections.
5. Identify the different types of compliance inspections and their requirements.
6. Perform a daily pre-startup inspection.
7. Identify the requirements for frequent and periodic inspections.

MODULE 21204-04 – WIRE ROPE

1. Describe how wire rope is constructed and secured and how its breaking strength is determined.
2. Determine the allowable working load of wire rope.
3. Perform a wire rope inspection.
4. Identify wire rope replacement criteria and describe procedures for replacement.
5. Describe the proper maintenance procedures for wire rope.
6. Describe proper procedures and methods of reeving all wire ropes and multiple-part lines.
7. Describe the advantages of using multi-part reeving.

MODULE 21205-04 – COMPUTER AIDS/OPERATOR AIDS

1. Define the purpose of a load indicator (LI) and a load moment indicator (LMI).
2. Identify the inputs for an LMI.
3. Describe the input devices for an LI, LMI, and anti-two-block (ATB) device.
4. Recognize the conditions that activate various alarms on an LMI and ATB.
5. Identify the conditions that affect various crane controls.
6. Predict which crane controls will be affected by various out-of-specification conditions on the LMI.
7. Interpret signals received through various operator aids.
8. Describe various operator aids not associated with an LI, LMI, or ATB.

MODULE 21206-04 – LOAD DYNAMICS

1. Describe the principles of mobile crane operations as they relate to leverage and center of gravity.
2. Identify a mobile crane's tipping axis as it relates to leverage and center of gravity.
3. Describe changes in a mobile crane's leverage relative to various boom operating quadrants.
4. Describe the effects of load radius on the rate of tipping.
5. Describe the effects of load movement on measured radius.
6. Define the effects of a submerged lift on crane capacity

MODULE 21207-04 – ON-SITE EQUIPMENT MOVEMENT

1. Configure the crane for movement.
2. Travel with the boom over the front and rear.
3. Identify various site hazards and restrictions to on-site equipment movement.
4. Identify manufacturer's data and documentation.
5. Identify the safety considerations involved in movement preparation.
6. Travel the crane over unlevel ground, and identify the safety considerations involved in this travel.
7. Identify the safety considerations involved in a pick-and-carry operation.
8. Define flotation capacity.
9. Define the importance of proper tire pressure.

Level Three

MODULE 21301-05 – LOAD CHARTS

1. Define the concepts of center of gravity and leverage.
2. Define the importance of using a load/capacity chart for lifting operations.
3. Define the terms on a load/capacity chart to indicate boom angle, load radius, and boom length.
4. Calculate crane capacity using a load/capacity chart.
5. Calculate parts of line.
6. Identify the differences between on-rubber and on-outrigger charts.
7. Identify the difference between lattice boom, hydraulic boom, and boom truck, and boom attachment charts.
8. Describe different crane counterweight configurations.
9. Explain the importance of reviewing setup and operational procedures.

MODULE 21302-05 – TELESCOPIC BOOM ATTACHMENT ASSEMBLY AND DISASSEMBLY

1. Determine if there is adequate space and resources for crane assembly and disassembly.
2. Define the relationship of the counterweight to the assembly and disassembly of the boom.
3. Assemble and disassemble various crane attachments and components.

MODULE 21303-05 – ADVANCED OPERATIONAL TECHNIQUES

1. Recognize the crane, communication, and personnel requirements for multiple-crane lifts, and identify requirements for personnel lifts.
2. Perform a blind lift under the direction of one or more signal people.
3. Identify the crane requirements and environmental guidelines for critical lifts.
4. Identify safety practices when operating in the path of transmitter energy.
5. Define the regulations for demolition procedures.
6. Describe the guidelines for safely operating a vacuum lifting device for lifting purposes.
7. Define the requirements for operating a magnet for lifting purposes.
8. Define the guidelines for operating a crane in extreme weather conditions.

MODULE 21304-05 – LIFT PLANNING

1. Provide the necessary information requested on a lift plan.
2. Reference available material that will assist in a safe lifting operation.
3. Calculate additions and deductions involved in lifting operations.
4. Identify existing operations that need special approval.
5. Identify engineering considerations in a lift plan.
6. Identify the various types of lift plans and their differences.
7. Identify the importance of lift plan implementation.
8. Describe the importance of following and adhering to a lift plan.

MODULE 21305-05 – HOISTING PERSONNEL

1. Identify which federal regulations apply to hoisting personnel.
2. Identify which consensus standards apply to hoisting personnel.
3. Visually inspect the platform, suspension system, and attachment points.
4. Perform a test lift following appropriate safety procedures and regulations, including the use of fall protection.
5. Define operation techniques for hoisting personnel near power lines.

MODULE 21306-05 – LATTICE BOOM ASSEMBLY AND DISASSEMBLY

1. Determine if there is adequate space and resources for crane assembly and disassembly.
2. Identify lattice boom components.
3. Define the relationship of the counterweight to the assembly and disassembly of the boom.
4. Assemble and disassemble a short lattice boom.
5. Assemble and disassemble a long lattice boom.
6. Assemble and disassemble a jib at a lattice boom top.
7. Define and evaluate foundation requirements unique to long lattice boom erection.

MODULE 21307-05 – EMERGENCY PROCEDURES

1. Explain legal responsibilities associated with crane operations, including accident prevention and investigation guidelines.
2. Describe the fire prevention standard for mobile crane operations.
3. Describe operational guidelines for lifting around power lines.
4. Recognize various failures in lifting and how to avoid them.

MODULE 21308-05 – TRANSPORTING REQUIREMENTS

1. Describe the proper handling of crane components.
2. Describe the proper procedures for securing the crane and its components for transport.
3. Describe the proper procedures for loading and unloading mobile crane components.
4. Properly load a crane and its components onto a flatbed trailer.
5. Properly secure a load on a flatbed trailer.
6. Recognize applicable local, state, and federal requirements.

