

Module Overview

This module introduces the uses of slings and common rigging hardware. Trainees will learn basic inspection techniques, hitch configurations, and load-handling safety practices, as well as how to use American Society of Mechanical Engineers hand signals.

Objectives

Upon completion of this module, the trainee will be able to do the following:

1. Identify and describe the use of slings and common rigging hardware.
2. Describe basic inspection techniques and rejection criteria used for slings and hardware.
3. Describe basic hitch configurations and their proper connections.
4. Describe basic load-handling safety practices.
5. Demonstrate proper use of American Society of Mechanical Engineers (ASME) hand signals.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Select and inspect appropriate slings for a lift.
2. Given various loads, determine the proper hitch to be used.
3. Select and inspect appropriate hardware and/or lifting equipment.
4. Demonstrate and/or simulate the proper techniques for connecting hitches.
5. Demonstrate the proper use of all hand signals according to *ASME B30.2* and *B30.5*.
6. Describe or demonstrate pre-lift safety checks.
7. Demonstrate and/or simulate how to lift the load level.
8. Describe and/or demonstrate safety precautions for attaching and disconnecting a load.

Materials and Equipment

Multimedia projector and screen	Anchor shackles and chain shackles
<i>Basic Rigger / Intermediate Rigger / Advanced Rigger</i>	Various types of pins, including:
PowerPoint® Presentation Slides	Screw pin shackle
(ISBN 978-0-13-257363-4)	Round pin or straight pin shackle
Computer	Safety shackle
Whiteboard/chalkboard	Damaged shackles and pins
Markers/chalk	Damaged and undamaged eyebolts
Pencils and scratch paper	Undamaged lifting clamps
Copies of your local code	Rusty or corroded lifting clamps
Appropriate personal protective equipment	Damaged and undamaged rigging hooks
Identification tags for slings	Trade Terms Quiz*
Copies of <i>Figure 16</i> with labels covered	Module Examinations**
Damaged slings or photos of damaged slings	Performance Profile Sheets**

* Located at the back of the Trainee Guide module

** Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment. Always work in a clean, well-lit, and appropriate work area.

Note

Due to liability issues, trainees under the age of 18 should not perform hoisting maneuvers; therefore, trainees under 18 should not perform the demonstration aspect of Performance Task numbers 4, 7, and 8. The instructor may choose to have trainees simulate the concepts underlying the tasks by using alternative methods.

If you do not have access to rigging hardware or equipment, there are many resources available to you including local contractors, rigging equipment manufacturers, or even your local Training Program.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

Bob's Rigging and Crane Handbook, Latest Edition. Bob DeBenedictis. Leawood, KS: Pellow Engineering Services, Inc.

High Performance Slings and Fittings for the New Millennium, 1999 Edition. Dennis St. Germain. Aston, PA: I & I Sling, Inc.

Mobile Crane Manual, 1999. Donald E. Dickie, D. H. Campbell. Toronto, Ontario, Canada: Construction Safety Association of Ontario.

Rigging Manual, 1997. Toronto, Ontario, Canada: Construction Safety Association of Ontario.

Teaching Time for this Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Basic Rigging*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction and Slings	
A. Introduction	_____
B. Tagging Requirements	_____
C. Synthetic Slings	_____
D. Alloy Steel Chain Slings	_____
E. Wire Rope Slings	_____
F. Laboratory	_____
Have trainees practice selecting and inspecting slings for a lift. This laboratory corresponds to Performance Task 1.	
Session II. Hitches	
A. Vertical Hitch	_____
B. Choker Hitch	_____
C. Basket Hitch	_____
D. Laboratory	_____
Have trainees practice selecting appropriate hitches for loads. This laboratory corresponds to Performance Task 2.	

Session III. Rigging Hardware

- A. Shackles
- B. Eyebolts
- C. Lifting Clamps
- D. Rigging Hooks
- E. Laboratory

Have trainees practice selecting and inspecting appropriate hardware and/or lifting equipment. This laboratory corresponds to Performance Task 3.

Session IV. Sling Stress and Hoists

- A. Sling Stress
- B. Operation of Chain Hoists
- C. Hoist Safety and Maintenance

Session V. Rigging Operations and Practices

- A. Rated Capacity
- B. Sling Attachment
- C. Hardware Attachment
- D. Load Control
- E. Laboratory

Have trainees practice demonstrating proper use of all hand signals and completing pre-lift safety checks. These laboratories correspond to Performance Tasks 5 and 6.

Session VI. Review and Testing

- A. Review
- B. Module Examination
 - 1. Trainees must score 70 percent or higher to receive recognition from the NCCER.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.
- C. Performance Testing
 - 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module covers how to inspect and use common rigging hardware, slings, and tag lines. It also explains how to select, inspect, use, and maintain special rigging equipment, including block and tackle, chain hoists, ratchet-lever hoists, jacks, and base-mounted drum hoists (tuggers).

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Basic Rigger*, Module 00106-09.

Objectives

Upon completion of this module, the trainee will be able to do the following:

1. Identify and describe the uses of common rigging hardware and equipment.
2. Perform a safety inspection on hooks, slings, and other rigging equipment.
3. Describe common slings and determine sling capacities and angles.
4. Select, inspect, use, and maintain special rigging equipment, including:
 - Block and tackle (bull rigging)
 - Chain hoists
 - Ratchet-lever hoists
 - Jacks
 - Base-mounted drum hoists (tuggers)
5. Inspect heavy rigging hardware.
6. Tie knots used in rigging.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Perform a safety inspection on hooks, slings, and other rigging equipment.
2. Select, inspect, and use special rigging equipment, including:
 - Block and tackle (bull rigging)
 - Chain hoists
 - Ratchet-lever hoists
 - Jacks
 - Base-mounted drum hoists (tuggers)
3. Tie knots in rigging.

Materials and Equipment

Multimedia projector and screen
Basic Rigger / Intermediate Rigger / Advanced Rigger
PowerPoint® Presentation Slides
(ISBN 978-0-13-257363-4)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Manufacturer's literature on different rigging hooks
Various rigging hooks with wear, cracks, and corrosion

Manufacturer's literature on shackles
Various types of shackles
Various eyebolts
Various lifting lugs
Turnbuckles
Manufacturer's literature on plate clamps
Various rigging plates and links
Various types of slings
A rigging pocket guide
ASME B30.9, Slings
Samples of wire rope that have failed inspection
Rope for tying knots
Block and tackle lifting system

continued

Sample loads for lifting
 Spur-gearred chain hoist
 Electric chain hoist
 Ratchet-lever hoist or come-along
 Ratchet jack

Screw jack
 Hydraulic jack
 Base-mounted drum hoists (tuggers)
 Module Examinations*
 Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module requires trainees to use various types of hoists, jacks, and base-mounted drum hoists. Ensure that all trainees are briefed on lifting safely and any other shop safety procedures. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

Machinery's Handbook, Latest Edition. Erik Oberg, Franklin D. Jones, Holbrook L. Horton, and Henry H. Ryffel. New York, NY: Industrial Press Inc.

Occupational Safety and Health Standards for the Construction Industry, 29 CFR Part 1926. Washington, DC: OSHA Department of Labor, U.S. Government Printing Office.

Teaching Time for This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 10 hours are suggested to cover *Rigging Equipment*. You will need to adjust the time required for testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Session I. Introduction; Rigging Hardware	
A. Introduction	_____
B. Rigging Hardware	_____
1. Hooks	_____
2. Shackles	_____
3. Eyebolts	_____
4. Lifting Lugs	_____
5. Turnbuckles	_____
6. Beam Clamps	_____
7. Plate Clamps	_____
8. Rigging Plates and Links	_____
9. Spreader and Equalizer Beams	_____

Session II. Slings; Tag Lines

- A. Slings _____
 - 1. Sling Capacity _____
 - 2. Sling Care and Storage _____
 - 3. Chain Slings _____
- B. Laboratory _____

Have trainees practice performing a safety inspection on hooks, slings, and other rigging equipment. This laboratory corresponds to Performance Task 1.
- C. Tag Lines _____
- D. Laboratory _____

Have trainees practice tying knots used in rigging. This laboratory corresponds to Performance Task 3.

Session III. Block and Tackle; Chain Hoists; Ratchet-Lever Hoists and Come-Alongs; Jacks; Base-Mounted Drum Hoists

- A. Block and Tackle (Bull Rigging) _____
- B. Chain Hoists _____
 - 1. Spur-Geared Chain Hoists _____
 - 2. Electric Chain Hoists _____
 - 3. Care of Chain Hoists _____
- C. Ratchet-Lever Hoists and Come-Alongs _____
- D. Jacks _____
 - 1. Ratchet Jacks _____
 - 2. Screw Jacks _____
 - 3. Hydraulic Jacks _____
 - 4. Inspecting and Using Jacks _____
- E. Base-Mounted Drum Hoists (Tuggers) _____
- F. Laboratory _____

Have trainees practice selecting, inspecting, and using special rigging equipment. This laboratory corresponds to Performance Task 2.

Session IV. Review and Testing

- A. Review _____
- B. Module Examination _____
 - 1. Trainees must score 70 percent or higher to receive recognition from NCCER.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.
- C. Performance Testing _____
 - 1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
 - 2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

Module Overview

This module covers communications, basic rigging safety precautions, lift planning, and load and sling calculations. It also covers load charts and load balancing.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Basic Rigger*, Modules 00106-09 and 38101-11.

Objectives

Upon completion of this module, the trainee will be able to do the following:

1. Identify and use the correct ASME hand signals to guide a crane operator.
2. Identify basic rigging and crane safety procedures and determine the center of gravity of a load.
3. Identify the pinch points of a crane and explain how to avoid them.
4. Identify site and environmental hazards associated with rigging.
5. Properly attach rigging hardware for routine lifts and pipe lifts.
6. Explain the importance of sling tension calculations.

Performance Tasks

Under the supervision of the instructor, the trainee should be able to do the following:

1. Use and interpret hand signals.
2. Determine the center of gravity of a load.
3. Properly attach rigging hardware for routine lifts and pipe lifts.

Materials and Equipment

Multimedia projector and screen
Basic Rigger / Intermediate Rigger / Advanced Rigger
PowerPoint® Presentation Slides
(ISBN 978-0-13-257363-4)
Computer
Whiteboard/chalkboard
Markers/chalk
Pencils and scratch paper
Appropriate personal protective equipment
Walkie-talkies

Throat microphone
Hardwired communication system
ASME B30.5 Consensus Standard 29 CFR 1926.550
Completed lift plan
Crane manufacturer's literature
Typical teeter-totter and weights
Various lifting eyebolts
Rigging hardware
Module Examinations*
Performance Profile Sheets*

* Single-module AIG purchases include the printed exam and performance task sheet. If you have purchased the perfect-bound version of this title, download these materials from the IRC using your access code

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require that the trainees visit job sites. Ensure that trainees are briefed on site safety policies prior to any site visits.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

Crane Safety on Construction Sites, 1998. Task Committee on Crane Safety on Construction Sites. Reston, VA: ASCE.

Rigging Handbook, 2003. Jerry A. Klinke. Stevensville, MI: ACRA Enterprises, Inc.

Teaching Time for This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Rigging Practices*. You will need to adjust the time required for testing based on your class size and resources. Because laboratories often correspond to Performance Tasks, the proficiency of the trainees may be noted during these exercises for Performance Testing purposes.

Topic	Planned Time
Sessions I and II. Introduction; Methods and Modes of Communication	
A. Introduction	_____
B. Methods and Modes of Communication	_____
1. Verbal Modes of Communication	_____
2. Nonverbal Modes of Communication	_____
C. Laboratory	_____
Have trainees practice using and interpreting hand signals. This laboratory corresponds to Performance Task 1.	
Session III. General Rigging Safety; Working Around Power Lines; Site Safety	
A. General Rigging Safety	_____
1. Personal Protection	_____
2. Equipment and Supervision	_____
3. Basic Rigging Precautions	_____
4. Load Path, Load Control, and Tag Lines	_____
5. Barricades	_____
6. Load-Handling Safety	_____
B. Working Around Power Lines	_____
C. Site Safety	_____
1. Site Hazards and Restrictions	_____
Session IV. Emergency Response	
A. Emergency Response	_____
1. Fire	_____
2. Malfunctions During Lifting Operations	_____
3. Hazardous Weather	_____

Session VI. Review and Testing

A. Review

B. Module Examination

1. Trainees must score 70 percent or higher to receive recognition from NCCER.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

C. Performance Testing

1. Trainees must perform each task to the satisfaction of the instructor to receive recognition from NCCER. If applicable, proficiency noted during laboratory exercises can be used to satisfy the Performance Testing requirements.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.

