

Module Overview

This module covers specialized rigging techniques and equipment. Load dynamics are explained. The use of specialized equipment including cribbing, slings, and beams is described.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Basic Rigger* and *Intermediate Rigger*.

Objectives

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

1. Explain how the center of gravity of the load affects the rigging.
2. Explain how the weight of the load and the position of the crane boom affect the load capacity of the crane.
3. Explain how cribbing is used to support loads.
4. Select the appropriate spreader bars or equalizer beam for a given load.
5. Demonstrate the ability to determine the center of gravity for a non-symmetrical load.
6. Given a particular load, select the appropriate sling(s) for a lift.

Performance Tasks

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

1. Select the appropriate spreader bars or equalizer beam for a given load.
2. Demonstrate the ability to determine the center of gravity for a non-symmetrical load.
3. Given a particular load, select the appropriate sling(s) for a given lift.

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
Cribbing
Copies of *ASME B30.5-2004*
Beams and spreader bars
Slings
Copies of the Quick Quiz*
Module Examinations**
Performance Profile Sheets**

* Located in the back of this module.

** Available on the IRC (Instructor Resource Center) at www.NCCERContrenIRC.com using the access code supplied with the Annotated Instructor's Guide.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require trainees to visit construction sites. Brief trainees on site safety procedures. This module requires trainees to use specialized rigging equipment and may require trainees to work around cranes. Ensure that all trainees know site safety and crane safety procedures and emphasize crane safety.

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. Leawood KS: Pellow Engineering Services.

IPT's Crane and Rigging Handbook, Latest Edition. Edmonton, Alberta, Canada: IPT Publishing and Training.

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 20 hours are suggested to cover *Advanced Rigging*. 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; Load Dynamics	
A. Introduction	_____
B. Load Dynamics	_____
1. Rotational Forces or Moments	_____
2. Crane Stability	_____
C. Laboratory	_____
Have trainees practice determining the center of gravity for a non-symmetrical load. This laboratory corresponds to Performance Task 2.	
Session III. Special Equipment Used in Heavy Rigging	
A. Special Equipment Used in Heavy Rigging	_____
1. Cribbing	_____
2. Inclined Planes	_____
Sessions IV and V. Slings	
A. Slings	_____
1. Sling Tensions	_____
2. Bridle Hitches	_____
3. Basket Hitches	_____
4. Choker Hitches	_____
B. Laboratory	_____
Have trainees practice selecting the proper sling(s) for a given lift. This laboratory corresponds to Performance Task 3.	

Module Overview

This module provides in-depth information on lift plan implementation, including the use of load charts. The topics covered include reference information, calculations, single- and multiple-crane lifting, critical lifts, and engineering considerations.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Basic Rigger*; *Intermediate Rigger*; and *Advanced Rigger*, Module 38301-11.

Objectives

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

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

Performance Tasks

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

1. Fill out portions of a critical lift plan as given/directed by the instructor.
2. Perform single-crane lifting calculations.
3. Perform multiple-crane lifting calculations.
4. Identify boom angle, boom length, and load radius on a load/capacity chart.
5. Identify the requirements of the on-rubber load/capacity chart.
6. Identify the requirements of the on-outrigger load/capacity chart.

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
OSHA 29 CFR 1910.180
OSHA 29 CFR 1926.550
ASME B30.5
ANSI/SAE J987

Copies of a critical lift plan
Crane(s) and operator's manuals available for performing lifts
Copies of site emergency procedures
Copies of sample pre-lift worksheets and lift plans
Load/capacity charts for different machines
Copies of site safety manual or procedures
Videotape: *Lift Calculations*
TV and VCR
Load moment indicator
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 trainees to visit construction sites and observe crane operations. Brief trainees on site safety and crane safety procedures.

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. Leawood, KS: Pellow Engineering Services.

IPT's Crane and Rigging Handbook, Latest Edition. Edmonton, Alberta, Canada: IPT Publishing and Training.

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 40 hours are suggested to cover *Lift Planning*. 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; Lift Plan	
A. Introduction	_____
B. Lift Plan	_____
C. Laboratory	_____
Have trainees practice filling out portions of a lift plan.	
Sessions II and III. Calculations for Single Crane Lifts	
A. Calculations for Single-Crane Lifts	_____
B. Laboratory	_____
Have trainees practice performing calculations for single-crane lifts.	
This laboratory corresponds to Performance Task 2.	
Sessions IV through VI. Calculations for Multiple Crane Lifts	
A. Calculations for Multiple-Crane Lifts	_____
B. Laboratory	_____
Have trainees practice performing calculations for multiple-crane lifts.	
This laboratory corresponds to Performance Task 3.	
Session VII. Lift Plan Laboratory	
A. Laboratory	_____
Have trainees practice preparing a lift plan based on criteria provided by the instructor.	

Sessions VIII and IX. Crane Configuration, Part One

A. Boom Length, Boom Angle, and Load Radius _____

B. Laboratory _____

Have trainees practice identifying boom angle, boom length, and load radius on a load/capacity chart. This laboratory corresponds to Performance Task 4.

C. Quadrants of Operation _____

D. Configuration of the Crane Base _____

E. Laboratory _____

Have trainees practice identifying requirements of the on-rubber load/capacity chart and the on-outrigger load/capacity chart. This laboratory corresponds to Performance Tasks 5 and 6.

F. Tower and Ring Attachments _____

Sessions X and XI. Crane Configuration, Part Two

A. Counterweight Configurations _____

B. Laboratory _____

Have trainees practice identifying load/capacity charts that are used in different configurations.

C. Deduction Charts _____

D. Laboratory _____

Have trainees practice identifying parts of line and counterweight considerations in load/capacity chart information. _____

Sessions XII through XIV. Calculating Crane Capacity

A. Calculating Crane Capacity _____

B. Laboratory _____

Have trainees practice calculating crane capacities using load/capacity charts. This laboratory corresponds to Performance Task 1.

Session XV. Critical Lifts; Engineering Considerations; Lift Plan Implementation

A. Critical Lifts _____

B. Engineering Considerations _____

C. Lift Plan Implementation _____

D. Laboratory _____

Have trainees practice filling out portions of a critical lift plan. This laboratory corresponds to Performance Task 1.

Session XVI. 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 provides an in-depth discussion of the *ASME B30.23* and *29 CFR 1926.550(g)* requirements as it presents advanced operating techniques for hoisting personnel.

Prerequisites

Prior to training with this module, it is recommended that the trainee shall have successfully completed *Basic Rigger*; *Intermediate Rigger*; and *Advanced Rigger*, Modules 38301-11 and 38302-11.

Objectives

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

1. Identify which federal regulations and consensus standards apply to hoisting personnel.
2. Visually inspect the platform, suspension system, and attachment points.
3. Define operation techniques for hoisting personnel near power lines.

Performance Task

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

1. Visually inspect the platform, suspension system, and attachment points.

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
Copies of OSHA and ASME regulations
OSHA 29 CFR 1926.104, 1926.106, 1926.550(g),
and *1926.753*

OSHA document: *Crane or Derrick Suspended Personnel Platforms ASME B30.23*
Fall protection equipment
Fall protection safety video or DVD
TV and VCR or DVD player
Personnel platform
Personnel platform pre-lift inspection form
Rigging hardware for personnel platform
Copies of the Quick Quiz*
Module Examinations**
Performance Profile Sheets**

* Located in the back of this module.

** Available on the IRC (Instructor Resource Center) at www.NCCERContrenIRC.com using the access code supplied with the Annotated Instructor's Guide.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly. This module may require trainees to observe crane operations. Review site safety procedures and site evacuation procedures. Ensure that all trainees are familiar with hand signals and other site communication procedures. Brief trainees on pinching and crushing hazards associated with crane operations. This module requires trainees to work with lifting equipment. Brief trainees on slip and fall hazards of platform work.

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.

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

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 5 hours are suggested to cover *Personnel Lifts*. 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; Fall Protection; Platform Requirements; Boom-Attached Platform Requirements; Crane and Operational Requirements; Personnel Platform Inspection; Trial Lift	
A. Introduction	_____
B. Fall Protection	_____
C. Platform Requirements	_____
1. Design Criteria	_____
2. Platform Specifications	_____
3. Personnel Platform Loading	_____
4. Rigging	_____
D. Boom-Attached Platform Requirements	_____
E. Crane and Operational Requirements	_____
1. Operational Criteria	_____
2. Instruments and Components	_____
3. Work Practices	_____
4. Traveling	_____
F. Personnel Platform Inspection	_____
1. ASME-Prescribed Personnel Platform Inspection	_____
G. Laboratory	_____
Have trainees practice inspecting the platform, suspension system and attachment points. This laboratory corresponds to Performance Task 1.	
H. Trial Lift	_____
1. Proof Testing	_____

**Session II. Advanced Operations Techniques for Hoisting Personnel;
Review and Testing**

- A. Advanced Operations Techniques for Hoisting Personnel _____
- B. Review _____
- C. 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.
- D. 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.

