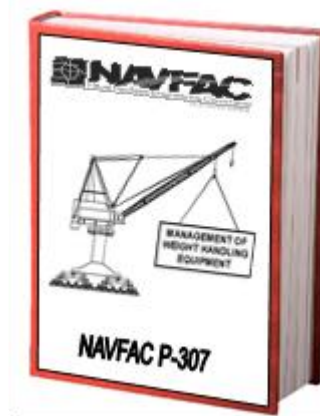




Navy Crane Center



NAVFAC P-307 Training

LOAD TEST DIRECTOR WEB BASED TRAINING STUDENT GUIDE NCC-LTD-4.0

Naval Facilities Engineering Systems Command
Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709-5000
Comm. Phone: 757.967.3803, DSN: 387
Fax: 757.967.3808
<https://ncc.navfac.navy.mil/>

TABLE OF CONTENTS

INTRODUCTION	4
NAVFAC P-307 OVERVIEW SECTIONS 1-14.....	7
NAVFAC P-307 OVERVIEW APPENDICES A-R.....	32
LTD CERTIFICATION PROGRAM OVERVIEW	43
LTD QUALIFICATIONS AND RESPONSIBILITIES	50
LTD PRE-TEST PREPARATIONS.....	56
LTD CONDITION INSPECTION	65
CRANE TESTING 1: GENERAL	73
CRANE TESTING 2: CATEGORY 1 CRANES.....	84
CRANE TESTING 3: CATEGORIES 2 AND 3.....	106
AFTER THE LOAD TEST	119
LOAD TEST CALCULATION EXERCISES	123
LOAD TEST DIRECTOR EVALUATION.....	132

INTRODUCTION

Welcome

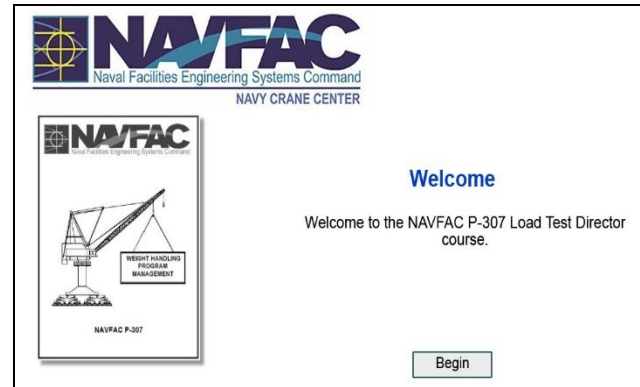
Welcome to the NAVFAC P-307 Load Test Director course.

Introduction

This training contains information found throughout the NAVFAC P-307 manual but more specifically that information contained in section 4 and appendix E. You are encouraged to have a copy of the NAVFAC P-307 manual available for reference as you go through this course. In the execution of your weight handling tasks and duties, always refer directly to the NAVFAC P-307 manual for exact wording. You may contact Navy Crane Center at any time for assistance.

Course Objectives

Following a brief explanation on navigating this type of web based training course, you will be required to complete an overview of the NAVFAC P-307 Weight Handling Program Management Manual. This is followed by detailed information that will allow you to identify the people, paperwork, and purposes for testing Navy cranes; explain the necessary preparations for conducting a safe load test; identify the required tests for different types of cranes; correctly perform and document a condition inspection; accurately calculate test loads and test weights; and identify the load test team members and their responsibilities.



Slide 2 of 10

Introduction

- This training contains information contained in section 4 and Appendix E.
- Have a copy of NAVFAC P-307 available for reference while taking this course.
- During execution of your tasks and duties, refer directly to the NAVFAC P-307 manual.
- Contact the Navy Crane Center for assistance.

Course Objectives

- You will receive an overview of the NAVFAC P-307 Weight Handling Program Management Manual.
- This is followed by detailed information that will allow you to:
 - Identify the people, paperwork, and purposes for testing Navy cranes
 - Explain the necessary preparations for conducting a safe load test
 - Identify the required tests for different types of cranes
 - Correctly perform and document a condition inspection
 - Accurately calculate load test weights
 - Identify the load test team members and their responsibilities

References

A copy of the NAVFAC P-307 and Student Guides are available on the Navy Crane Center website:
<https://ncc.navfac.navy.mil/Popular-Links>

Getting the Most Out of this Course

To get the most out of this training, pay close attention to the narrations and information provided on each screen. There may be information in the narration that is not shown on the screen, and vice versa, there may be information on the screen that is not contained in the narration. Replay narrations and screen content as often as needed by clicking on the topic title or the tab title as applicable. Complete all knowledge checks to help reinforce your understanding of the material covered.

Navigating the Course

As you navigate through this course, you will find several helpful tools and features that will facilitate your learning. This interactivity enables you to easily navigate and access various training aids and tools using the following buttons: The navigation buttons (top right) look like arrow heads and allow you to move forward to the next screen or back to the previous screen by clicking on the arrowhead pointing to the right or left, respectively. The 'pause' and 'continue' buttons (top right) allow you to pause and continue (or start) the course or module. The 'exit' button (top right) closes the module and returns you to the main module menu. The 'view and hide narration' links (lower right on the content screen) allow you to view and/or hide a text version of the audible narration.

Knowledge Checks

These courses use various types of questions to help you retain the material presented. As you proceed through each topic, you will be asked questions in the form of knowledge checks. The knowledge checks will help you prepare for the final exam. Question types include: Fill in the Blank, Drag and Drop, Multiple Choice - Single Answer, Multiple Choice - Multiple Answer, and True/False.

References

Click on your choice from the reference links below.

[NAVFAC P-307](#)

[View or Print Student Guides](#)

Getting the Most Out of this Course

To get the most out of this online course, you should:

- ✓ Pay attention to narrations and screens (narration and screen information may differ)
- ✓ Replay as needed
- ✓ Complete knowledge checks and learning activities

The learning activities will help reinforce your learning and prepare you for the final assessment.

Navigating the Course

Interactive navigation features help to:

- facilitate your learning
- access various learning tools

Buttons include:

- the **navigation buttons** which allow you to move to the next or previous screen
- the **pause and continue** buttons which stop and start the course
- the **exit** button which closes the module
- the **view narration** link which allows you to view a text version of the audible narration

Knowledge Checks

- Most topics contain **Knowledge Checks**
- Knowledge checks will help you prepare for the final exam.
- The questions asked during the presentation and on the exam will be in the form of:
 - Fill in the Blank
 - Drag and Drop
 - Multiple Choice - Single Answer
 - Multiple Choice - Multiple Answer
 - True/False

Exam Directions

When taking exams, keep the following in mind. Some questions require multiple answers and have check boxes next to the choices. Single answer questions have circles next to the choices. You can go back and review any content prior to taking a final exam. You can review and change your answers any time before you select the "Score Exam" button. A score of 80% or higher is required to pass.

Feedback

Upon completion of the training or at any time during the training, please feel free to provide feedback to Navy Crane Center on how to improve or better deliver this presentation. Include suggestions such as current WHE accidents, near misses, and trends (with narratives and pictures); content changes, additions, and deletions; other topics; clarifications, corrections, and delivery methodologies. Contact information is provided on the screen and in the student guide. You can come back to this screen at any time prior to passing the final exam. After passing the final exam, the course will roll up, your information will go to "My Transcripts," and the course content will no longer be available. However, you may still refer to the student guide for contact information, or you can go to the Navy Crane Center's training web page and provide feedback via the links found there.

Completion

You are now ready to begin your training. Navigate back to the main module menu, select the next module, and begin your training. Good luck.

Exam Directions

Read each question carefully and select the best answer or answers.

- multiple answers - square check boxes
- single answer - round check circles
- Review any topic or module prior to taking a final exam.
- Final exam answers may be changed any time prior to selecting the "Score Exam" button.
- A score of 80% or higher is required to pass the final exam.

Feedback

Please provide feedback to the presenter and/or Navy Crane Center on how to improve or better deliver this presentation. Include suggestions such as:

- Current WHE accidents, near misses, trends (with narratives and pictures)
- Content change suggestions (i.e., additions, deletions, modifications)
- Other topics
- Clarifications, corrections
- Delivery methodologies

Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709-5000

757-967-3803, DSN 387 (general)
757-967-4185 (training)
757-967-3808/3799 (fax)

navfac_ncc_training@us.navy.mil (email)

Completion

You have completed the Load Test Director Introduction module.

You are now ready to begin your training.

Click on the exit button to return to the main module menu, select the next module, and click where indicated to launch the lesson.

NAVFAC P-307 OVERVIEW SECTIONS 1-14

Welcome

Welcome to the NAVFAC P-307 Weight Handling Program Management manual overview.



Introduction

This training contains abbreviated explanations of the content found in this manual. You are encouraged to have a copy of the NAVFAC P-307 manual available for reference as you go through this material. In the execution of your weight handling tasks and duties, always refer directly to the NAVFAC P-307 manual for exact wording. You may contact Navy Crane Center at any time for assistance. Contact information is provided at the bottom of the screen.

Introduction

- This training contains abbreviated explanations of the content found in the NAVFAC P-307 manual
- Have a copy of the NAVFAC P-307 manual available for reference
- Always refer directly to the manual for exact wording
- You may contact Navy Crane Center at any time for assistance

Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709
Phone: 757.967.3803, DSN: 387, Fax: 757.967.3808
<https://ncc.navfac.navy.mil/Contact-Us/>

Learning Objectives

Upon successful completion of this training, you will possess a general understanding of the NAVFAC P-307 Weight Handling Program Management manual. This understanding will enable you to explain the purpose of NAVFAC P-307; identify types of covered equipment; list load bearing, load controlling, and operational safety device components and equipment; find maintenance, inspection, testing, and certification requirements; describe training, competency, and licensing requirements for Navy Weight Handling Program personnel; find information to facilitate working with contractors; identify various forms used in the Navy's Weight Handling Program; and know how to obtain support from Navy Crane Center.

Learning Objectives

Upon successful completion of this NAVFAC P-307 Overview training, you will possess a general understanding of the NAVFAC P-307 Weight Handling Program Management manual. This understanding will enable you to:

- Explain the purpose of NAVFAC P-307
 - Identify types of covered equipment
 - List load bearing, load controlling, and operational safety device components and equipment
 - Find maintenance, inspection, testing, and certification requirements
 - Describe training, competency, and licensing requirements
 - Find information to facilitate working with contractors
 - Identify various forms
 - Obtain support from Navy Crane Center
-
-
-

Section 1 Introduction

NAVFAC P-307, Section 1 provides a general overview of the Navy's weight handling program including the purpose, applicability, some basic requirements, and descriptions of the types of covered equipment.

Section 1 Introduction

Section 1: General Overview

Section 2: Program Management
Section 3: Maintenance and Inspection
Section 4: Certification
Section 5: Equipment History File
Section 6: Alterations and Engineering
Section 7: Training and Qualification
Section 8: Operator Licensing
Section 9: Operator Checks
Section 10: Operations
Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
Section 12: Accidents, Near Misses, and Unplanned Events
Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment



NAVFAC P-307 Purpose

The overall purpose of NAVFAC P-307 is to maintain the level of safety and reliability that was originally built into the equipment, ensure optimum service life, provide training and competency standards for all personnel involved with the maintenance, inspection, testing, certification, engineering, rigging and operation of weight handling equipment, or WHE, ensure the safe lifting and controlling capability of WHE, promote safe operating practices, and provide guidance for overall weight handling program management.

NAVFAC P-307 Purpose

The overall purpose of NAVFAC P-307 is to:

- Maintain the level of safety and reliability that was originally built into the equipment
- Ensure optimum service life
- Provide training and competency standards for all personnel involved with WHE
- Ensure safe lifting and controlling capability of WHE and promote safe operating practices
- Provide guidance for overall weight handling program management

Note: Weight Handling Equipment includes both cranes and the rigging gear used for lifting operations.

NAVFAC P-307 Applicability

NAVFAC P-307 is applicable to the Department of the Navy, which includes the Navy and Marine Corps. Where the word Navy is used, it means Navy and Marine Corps. Activities covered include Navy shore activities, the Naval Construction Force (NCF), Amphibious Construction Battalions (PHIBCB), and Naval Special Operating Units (SOU). Also included are Navy fleet activities and detachments that operate shore based weight handling equipment along with Navy activities on joint bases and bases of other military services and agencies. These criteria are the minimum requirements for all applicable equipment. NAVFAC P-307 meets or exceeds all applicable OSHA requirements for maintenance, inspection, testing, certification, repair, alteration, and operation

NAVFAC P-307 Applicability

- NAVFAC P-307 applies to:
 - Department of Navy Shore Activities
 - including Navy and Marine Corps activities on joint bases and bases of other military services and agencies
 - Naval Construction Force
 - Amphibious Construction Battalions
 - Naval Special Operating Units
 - Fleet activities and detachments that operate shore based weight handling equipment
 - NAVFAC P-307 meets or exceeds all applicable OSHA requirements for maintenance, inspection, testing, certification, repair, alteration, and operation of WHE.
-
-
-

of equipment covered herein. Also covered are requirements for contractor and other non-Navy owned weight handling equipment operating on Navy property.

Covered Equipment

NAVFAC P-307 covers shore-based category 1, 2, and 3 cranes, including shore-based barge-mounted cranes. Detailed descriptions of the crane types are contained in section 1. Illustrations of individual crane types can be found in appendix B. Rigging Gear is covered in section 14.

Covered Equipment

- NAVFAC P-307 covers shore-based equipment including:
 - Category 1, 2, and 3 cranes
 - Barge mounted cranes
 - Rigging gear (section 14)
- Detailed lists of the crane types are contained in section 1.
- Illustrations can be found in appendix B.

Weight Handling Program Requirements

NAVFAC P-307 provides program requirements for covered equipment to include program management, maintenance, inspection, testing, certification, alteration and engineering, crane and rigging operations, training, licensing, and documentation.

Weight Handling Program Requirements

NAVFAC P-307 provides program requirements for covered equipment to include:

- Program Management
- Maintenance
- Inspection
- Testing
- Certification
- Alteration and Engineering
- Crane and Rigging Operations
- Training and Licensing
- Documentation

Figure 1-1

Figure 1-1: the Request for Clarification, Deviation, or Revision form, referred to as a RCDR, is discussed in paragraph 1.9 and allows users to request additional information or explanations of NAVFAC P-307 requirements or assistance with unique program circumstances. This form also allows users with sound reasoning to request to deviate from specified NAVFAC P-307 program requirements.

REQUEST FOR CLARIFICATION, DEVIATION, OR REVISION			
CHECK APPROPRIATE	CLARIFICATION	DEVIATION	REVISION
ACTIVITY	ACTIVITY REQUEST NUMBER		
WIRE NUMBER	MANUFACTURER	SPE. CRANE No.	
SUBJECT			
PREPARED BY	PHONE	FAX	DATE
	E-MAIL		
APPROVED BY	PHONE	FAX	DATE
	E-MAIL		
CONTRACTING OFFICER'S REPRESENTATIVE OF PREPARED AND APPROVED CONTRACTOR	PHONE	FAX	DATE
	E-MAIL		
REFERENCES			
ENCLOSURES			
PURPOSE			
BACKGROUND			
DISCUSSION			
REQUEST			
NAVY CRANE CENTER RESPONSE			
NAVY CRANE CENTER CONTACT NUMBER			
PREPARED BY	PHONE	FAX	DATE
	E-MAIL		
APPROVED BY	PHONE	FAX	DATE
	E-MAIL		

Figure 1-1: Request for Clarification, Deviation, or Revision (RCDR)

Category 1 Cranes

This is a list of some of the more common types of category 1 cranes. Category 1 cranes come in a wide variety of sizes and configurations and include portal cranes, hammerhead cranes, locomotive cranes, derricks, YD floating cranes*, tower cranes, container cranes, mobile cranes, aircraft crash cranes, mobile boat hoists including self-propelled and towed types, mini-cranes, pick-and-carry cranes, rubber-tired gantry cranes, commercial truck mounted cranes, articulating boom cranes, and other hydraulic telescoping or articulating boom cranes. They are considered category 1 cranes regardless of capacity. All category 1 cranes require a license to operate.

*Note: Other cranes on barges or floating mountings are the category of the crane itself, for example, monorail, jib crane, gantry crane.

Category 1 Crane Examples

Floating Cranes

Here, and on the next few slides, are some pictures and descriptions of different types of category 1 cranes. Floating cranes include barge, pontoon, or hull mounted cranes with an integral base. The luffing booms are capable of continuous 360-degree rotation. They are powered by diesel-electric generators, diesel-driven hydraulic pumps, and may be self-propelled and/or tug assisted.

Hammerhead Cranes

Hammerhead cranes have a rotating counterbalanced cantilevered boom equipped with one or more trolleys that move along the length of the boom. Most are supported by a pintle or turntable mounted to a traveling or fixed tower assembly.

Category 1 Cranes

Category 1 Cranes include:

- Portal Cranes
- Hammerhead Cranes
- Locomotive Cranes
- Derricks
- YD Floating Cranes*
- Tower Cranes
- Container Cranes
- Mobile Cranes
- Aircraft Crash Cranes
- Mobile Boat Hoists
- Mini-cranes
- Pick-and-carry Cranes
- Rubber-tired Gantry Cranes
- Commercial Truck Mounted Cranes
- Articulating Boom Cranes
- Other Hydraulic Telescoping or Articulating Boom Cranes

*Note: Other cranes on barges or floating mountings are the category of the crane itself, e.g., monorail, jib crane, gantry crane.

Floating Cranes

- include barge, pontoon, or hull mounted with an integral base
- luffing booms are capable of continuous 360-degree rotation
- are powered by:
 - diesel-electric generators
 - diesel-driven hydraulic pumps
 - may be self-propelled and/or tug assisted



Hammerhead Cranes

- have a rotating counterbalanced cantilevered boom equipped with one or more trolleys that move along the length of the boom
- are supported by a pintle or turntable mounted to a traveling or fixed tower assembly



Container Cranes

Container cranes have hinged booms and main beams with traveling trolleys mounted on rails, which in turn, is mounted on a traveling gantry structure. These cranes are used at several military port activities to quickly transfer containers on and off ships.

Container Cranes

- have hinged booms and main beams with traveling trolleys mounted on rails
 - is mounted on a traveling gantry structure
- are used at several military port activities to quickly transfer containers



Derricks

Derricks have a boom that is hinged near the base of a fixed mast. Typically, the boom rotates left and right between the mast support legs or “stiff legs.” These stiff legs are capable of handling tensile and compressive forces. The pictured crane is referred to as a stiff-leg derrick and can rotate 180 degrees.

Derricks

- has a boom that is hinged near the base of a fixed mast
- boom rotates left and right between the mast support/stiff legs
 - are capable of handling tensile and compressive forces



Portal Cranes

Portal cranes consist of a rotating superstructure mounted on a gantry structure. The gantry style structure allows for the free movement of traffic and materials when the crane is located on the pier. There is an operator's cab, machinery house, and a luffing boom. The primary source of power is a diesel engine that drives generators or hydraulic pumps. They are supported by wide gauge rails, allowing the portal crane to move about the facility or pier locations.

Portal Cranes

- rotating superstructure mounted on a gantry structure
- structure allows for the free movement of traffic and materials when the crane is located on the pier
- contains:
 - an operator's cab
 - machinery house
 - luffing boom.
- diesel engine that drives generators or hydraulic pumps
- supported by wide gauge rails



Mobile Cranes

The most common type of mobile crane is the truck mounted hydraulic crane. These cranes consist of a rotating superstructure mounted on a specialized truck chassis equipped with a power plant, driver's cab, and operator's cab. The primary source of power for these types of cranes are diesel engines that drive hydraulic pumps and provide electric power.

Mobile Cranes

- most common type: the truck mounted hydraulic crane
- consist of a rotating superstructure mounted on a specialized truck chassis
- primary source of power: diesel engines that drive hydraulic pumps and provide electric power



Mobile Boat Hoist

A mobile boat hoist consists of a steel structure of rectangular box sections, supported by four sets of wheels capable of straddling and carrying boats.

Mobile Boat Hoists:

- Straddle type carrier
- steel structure of rectangular box sections
- supported by four sets of wheels
- are capable of straddling and carrying boats

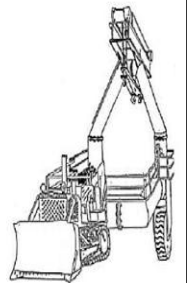


LCRU

A landing craft retrieval unit, or LCRU, is a type of mobile boat hoist with self-propelled or towed carriers consisting of a wheeled steel structure capable of straddling and carrying boats.

Landing Craft Retrieval Unit:

- Self propelled or towed
- Steel structure on wheels
- Capable of straddling and carrying boats



Rubber Tired Gantry Crane

A rubber-tired gantry crane may be single beamed or double beamed. Often, it resembles a mobile bridge crane with its hoist mounted on a bridge which spans two beams. As shown in the illustration, it may be configured with two hoists mounted on opposing beams which utilize a spreader bar or similar mechanism to lift loads. The gantry style legs allow the crane to hover overloads improving stability. The wheels and rubber tires may be motorized or non-motorized.

Rubber-Tired Gantry Crane:

- portable elevated bridge crane or hoist(s) mounted on legs
- legs mounted on rubber tires
- may be self-propelled or towed



Commercial Truck Mounted Cranes

Typically, Commercial Truck Mounted Cranes are independently manufactured boom mechanisms that are subsequently attached to or mounted on commercially available trucks. These cranes are operated independent of the vehicle controls from standard ground control stations and may be powered by the truck engine or a power sending unit. The booms may rotate or articulate. Outriggers or stabilizers shall be used as required.

Commercial Truck Mounted Cranes

- have manufactured booms mounted on commercial trucks
- operated independently
- may be powered by the truck or a by power sending unit
- outriggers shall be used as required



Articulating Boom Cranes & Other Hydraulic Telescoping or Articulating Boom Cranes

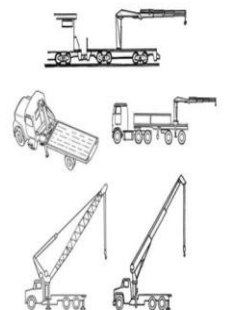
These cranes have different types of boom configurations such as telescoping, non-telescoping, and articulating. They may be mounted on flatbed trucks, trailers, stake beds, rail cars, barges, and pontoons, or may be stationary mounted on piers, wharves, and docks.

Articulating Boom Cranes and other Hydraulic Telescoping or Articulating Boom Cranes

- Articulating
- Telescoping
- Non-telescoping

Mounts

- Flatbed Trucks
- Trailers
- Stake Beds
- Railcars
- Barges, Pontoons
- Piers, Wharves, Docks



Mini Cranes

Mini-cranes are a type of mobile crane characterized by its extremely compact design typically designed to travel through a standard commercial single or double doorway. These cranes are typically equipped with remote or pendant controls, crawler tracks, a hydraulically telescoping and luffing boom, and spider-leg style outriggers. They are considered category 1 cranes and typically covered by ASME B30.5.

Mini-cranes

- a type of mobile crane with a compact design
- typically equipped with:
 - remote or pendant controls
 - crawler tracks
 - hydraulically telescoping and luffing boom
 - spider-leg style outriggers



Category 2 and 3 Cranes Include:

Category 2 and category 3 cranes include overhead traveling cranes, gantry cranes, wall cranes, jib cranes, davits, pillar cranes, pillar jib cranes, stacker cranes, storage/retrieval machines when equipped with a hoist for vertical lifting, winches or base-mounted drum hoists used for vertical lifting, monorails and associated hoists, fixed overhead hoists with no trolley or bridge function, portable hoists used exclusively in a single location that is 6 months or more (12 months for shipboard availabilities), portable A-frames and portable gantries with permanently installed hoists, and pedestal mounted commercial boom assemblies attached to stake trucks, trailers, flatbeds, railcars, or stationary mounted to piers, etc.

Category 2 and 3 Cranes Include:

- Overhead Traveling Cranes
 - Rail Mounted Gantry Cranes
 - Wall Cranes
 - Jib Cranes
 - Davits
 - Pillar Cranes
 - Pillar Jib Cranes
 - Stacker Cranes
 - Storage/retrieval machines equipped with a hoist
 - Monorails and Associated Hoists
 - Fixed Overhead Hoists with no trolley or bridge function
 - Portable hoists used exclusively in a single location (6 months or more, 12 months for shipboard availabilities)
 - Portable A-frames and portable gantries with permanently installed hoists
 - Pedestal mounted commercial boom assemblies attached to stake trucks, trailers, flatbeds, railcars, or stationary mounted to piers, etc.
-
-

Certified Capacity Separates Category 2 and 3 Cranes

The category of a category 2 or 3 crane is determined by its certified capacity. Category 2 cranes have a certified capacity of 20,000 pounds and greater. Category 3 cranes are those with a certified capacity of less than 20,000 pounds.

Certified Capacity Separates Category 2 and 3 Cranes

- Category 2 cranes have a capacity of 20,000 lbs. or greater.
 - Category 3 cranes have a capacity of less than 20,000 lbs.
-
-

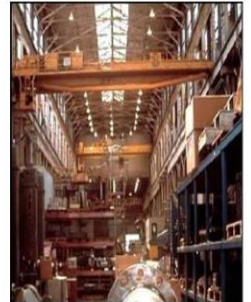
Category 2 and 3 Crane Examples

Bridge or OET Cranes

Here, and on the next few slides, are descriptions of several types of category 2 and 3 cranes. Bridge or Overhead Electric Traveling (OET) cranes may be cab, pendant, or radio controlled. Principal parts include the bridge, girders, end trucks, trolley, hoist, and controls. Mobility is limited to the height of the bay, length of the runway, and the span of the bridge.

Bridge or Overhead Electric Traveling Cranes

- may be cab, pendant, or radio controlled
- parts include the bridge, girders, end trucks, trolley, hoist, and controls
- Mobility is limited to the height of the bay, length of the runway, and the span of the bridge.



Pillar Jib Cranes

Pillar jib cranes are fixed cranes consisting of a rotating vertical member with a horizontal arm supporting a trolley and hoist. Pillar jib cranes normally rotate 360 degrees.

Pillar Jib Cranes

- fixed cranes
- consists of a rotating vertical member with a horizontal arm supporting a trolley and hoist
- normally rotate 360 degrees

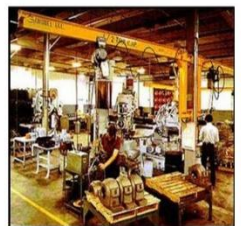


Jib Cranes

Jib cranes are normally category 3 cranes but can be category 2 cranes. They consist of a horizontal boom that is either cantilevered or supported by tie rods and is capable of rotating left and right. They are equipped with either powered or manual hoists and may have trolleys. They are usually mounted on a wall or column.

Jib Cranes

- normally category 3 cranes but can be category 2 cranes
- consist of a horizontal boom that is either cantilevered or supported by tie rods
- is capable of rotating left and right
- are equipped with either powered or manual hoists
- may have trolleys
- are usually mounted on a wall or column



Trolley Mounted Overhead Hoists

Trolley Mounted Overhead Hoists typically consist of an under-hung trolley with one or more drums and sheaves for wire rope or chain. They are powered manually, electrically, hydraulically, or pneumatically. Mobility is limited to the height and length of the supporting beam.

Trolley Mounted Overhead Hoists

- consist of an under-hung trolley with one or more drums and sheaves for wire rope or chain
- are powered either:
 - manually
 - electrically
 - hydraulically
 - pneumatically
- Mobility is limited to the height and length of the supporting beam.

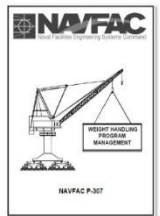


Section 2 Introduction

NAVFAC P-307, Section 2 provides weight handling equipment program management concepts and guidance.

Section 2 Introduction

Section 1: General Overview
Section 2: Program Management
Section 3: Maintenance and Inspection
Section 4: Certification
Section 5: Equipment History File
Section 6: Alterations and Engineering
Section 7: Training and Qualification
Section 8: Operator Licensing
Section 9: Operator Checks
Section 10: Operations
Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
Section 12: Accidents, Near Misses, and Unplanned Events
Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment



Section 2: Program Management

Derived from the lessons learned and best practices of several successful weight handling organizations, section 2 offers information to aid your organization in successfully managing its weight handling program. Topics found in section 2 include program management, program manager expectations, improvement opportunities by way of self-assessments and evaluations, the benefits of collecting and interpreting metrics, the value of a high-quality monitoring program, long range planning strategies, lockout and tagging requirements, and safety and environmental considerations.

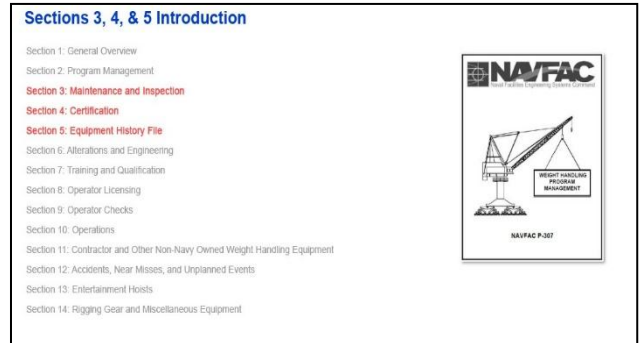
Section 2: Program Management

Topics include:

- Program management
- Program manager expectations
- Self-assessments and evaluations
- Metrics
- Monitoring programs
- Long range planning
- Lockout and tagging requirements
- Safety and Environmental considerations

Sections 3, 4, and 5 Introduction

NAVFAC P-307 sections 3, 4, and 5 provide instructions on the maintenance, inspection, and certification processes and their documentation requirements.



Maintenance, Inspection, Certification, and Record Keeping

Sections 3 and 4 provide requirements for crane maintenance, inspection, and certification functions of a weight handling program. Section 3 lists requirements for maintenance and inspection personnel, the different types of inspections and their frequencies, how deficiencies and work deferrals are processed, and the performance of routine service work. Section 4 picks up after maintenance and provides the requirements for certifying a crane for use. This includes personnel requirements, certification periodicities, load test requirements, test weights and capacities, the voiding and extending of certifications, considerations for specific types of equipment, and an explanation of the crane condition inspection. Section 4 also addresses third party certification of cranes and equipment used in cargo transfer and floating cranes used in ship repair. Section 5 is all about documentation and requires an equipment history file to be kept for each crane. It also provides a list of the various documents that must be kept in the history file, as well as the lengths of time they must be retained.

Maintenance, Inspection, Certification, and Record Keeping

NAVFAC P-307 Sections 3, 4, and 5

- **Section 3: Maintenance & Inspection** provides maintenance and inspection requirements including:
 - personnel requirements
 - inspection types, frequencies, and specifications
 - deficiencies and deferrals
 - routine services
- **Section 4: Certification** is a lengthy section that provides crane certification requirements including:
 - personnel requirements
 - periodicities
 - load testing and capacities
 - voiding and extending certifications
 - specific equipment considerations
 - condition inspections
 - third party certifications
- **Section 5: Equipment History File** provides record keeping requirements

Figure 4-1: Certification of Condition Inspection and Test

The certifying official shall ensure the activity's cranes are inspected, tested, and certified. Certifications shall be based on the noted condition inspections and tests. The purpose of the condition inspection is to ensure that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly. The purpose of the load test is to ensure by controlled operation with prescribed test loads that the equipment is capable of safely lifting and moving the rated load through all design motions. Figure 4-1, Certification of Condition Inspection and Test, is the form used to certify that these requirements have been met. Activities shall use this form or develop a similar form.

CERTIFICATION OF CONDITION INSPECTION AND TEST									
Activity		Building/Location		Crane No.					
Type		OEM's Rated Capacity		Certified Capacity (if different from OEM's rated capacity, explain in "Remarks")					
		Main _____ lbs. _____ feet		Main _____ lbs. _____ feet					
		Aux _____ lbs. _____ feet		Aux _____ lbs. _____ feet					
		Whip _____ lbs. _____ feet		Whip _____ lbs. _____ feet					
☐ Annual Certification ☐ Interim Recertification (Reason: _____) ☐ Quadrennial Load Test (check box when crane is in quadrennial program and is load tested.) Date of Previous Load Test: _____				Appendix "E" Applicable Crane Test Procedure Paragraphs (include applicable sub-paragraphs)					
Category 1 Cranes* Boom Length _____ Test Load _____ Minimum Radius _____ Load Moment or Maximum Radius _____ Hoist _____ Pounds _____ Feet _____ Pounds _____ Feet _____ Main _____ Aux _____ Whip _____ Hook Tram Measurements _____ Base Mean _____ Before Test _____ After Test _____ Main Hook _____ Aux Hook _____ Other Hook _____ Other _____									
Category 2 Cranes Hoist _____ Test Load _____ Pounds _____ Hook Tram Measurements _____ Main _____ Base Mean _____ Before Test _____ After Test _____ Aux _____ Other _____									
Category 3 Cranes Hoist _____ Test Load _____ Pounds _____ Hook Tram Measurements _____ Main _____ Base Mean _____ Before Test _____ After Test _____ Aux _____ Other _____									
Annual Certifications Since Hook NDT				Test Director (Signature) _____ Date _____					
Hook Material and Manufacturing Method				Inspector (Signature) _____ Date _____					
				Certifying Official (Signature) _____ Date _____					
				Expiration Date _____					
Remarks									
* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, traveling, etc.) If necessary, use figure 4-2.									

Figure 4-1

Figure 4-2: Certification of Condition Inspection and Test Supplement

For the additional testing and certification requirements on mobile cranes, locomotive cranes, aircraft crash cranes, articulating boom and telescoping boom cranes, an attachment similar to Figure 4-2, Certification of Condition Inspection and Test Supplement for Mobile Crane Tests, shall be developed and used by activities with these types of cranes.

CERTIFICATION OF CONDITION INSPECTION AND TEST (SUPPLEMENT FOR MOBILE CRANE TESTS)							
Complete as applicable for the type of crane certified. Indicate "NA" for configurations that do not apply.							
Crane No. _____							
Lattice Boom Crane				Telescoping Boom Crane			
Boom Length (Feet) _____							
On Outriggers	Test Load	Radius	On Outriggers	Test Load	Radius	Boom Length	
Maximum Certified Capacity			Maximum Certified Capacity				
Load Moment			Load Moment				
Free-Fall Mode			Free-Fall Mode				
On Rubber (Stationary)	Test Load	Radius	On Rubber (Stationary)	Test Load	Radius	Boom Length	
Maximum Certified Capacity			Maximum Certified Capacity				
On Tires or Crawler Tracks (Pick and Carry) (Describe configurations and list test loads/radii)				On Tires (Pick and Carry) (Describe configurations and list test loads/radii/boom length)			
Other Configurations, including ancillary equipment if applicable. (Describe and list test loads/radii)							

Figure 4-2

Figure 6-: Crane Alteration Request

Alterations shall be documented on Figure 6-1, the Crane Alteration Request, which is commonly referred to by the acronym “CAR.”

CRANE ALTERATION REQUEST				PAGE 1 OF 2	
ACTIVITY		ACTIVITY WORK ORDER NUMBER			
CRANE ALTERATION TYPE		NAVY CRANE CENTER APPROVAL ()			
CRANE DESCRIPTION		NAVY CRANE CENTER APPROVAL ()			
CAPACITY / TYPE	MANUFACTURER	SPS CRANE YES / NO			
CRANE ALTERATION DESCRIPTION		CRANE IDENTIFICATION			
ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART		
NARRATIVE					
ACTIVITY APPROVAL / REQUEST					
DATE	PHONE	FAX			
DATE	PHONE	FAX			
DATE	PHONE	FAX			
DATE	PHONE	FAX			
NAVY CRANE CENTER APPROVAL					
DATE	PHONE	FAX			
DATE	PHONE	FAX			
DATE	PHONE	FAX			
DATE	PHONE	FAX			
APPROVED ()					
APPROVED ()					

Figure 6-1: Crane Alteration Request (CAR)

Figure 6-2

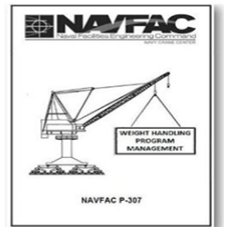
Figure 6-2, the Mandatory Alteration, is used by Navy Crane Center to issue mandatory alteration notices and directions. Activities shall provide notification of completion of the mandatory alteration to Navy Crane Center upon accomplishment by using Figure 6-2. E-mail or fax is acceptable.

MANDATORY ALTERATION N3258A-			
The alteration identified below, and attached, has been classified as:			
Mandatory – Now: Cranes shall be removed from service until alteration is complete.			
Mandatory – Delayed: Alteration shall be accomplished before or during the next () Type A () Type B () Type C inspection per NAVFAC P-307 or within _____ days.			
Mandatory – When Needed: Alteration will correct a deficiency when the deficiency occurs.			
Mandatory – Site Specific: Approved as a unique alteration for an activity or particular crane.			
ALTERATION IDENTIFICATION			
ACTIVITY		ORIGINAL ALTERATION NUMBER	
ALTERATION TITLE		ALTERATION ORIGINALLY LOCALLY APPROVED () SUBMITTED FOR NAVY CRANE CENTER APPROVAL ()	
CRANE DESCRIPTION			
CAPACITY / TYPE	MANUFACTURER	SPS CRANE YES / NO	
ALTERATION DESCRIPTION			
ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART
NARRATIVE			
COMNAVSEASYS COM CONCURRENCE: Received _____ N/A _____			
NAVY CRANE CENTER APPROVAL			
CONFIGURATION / MANAGER	DATE	PHONE	FAX
DIRECTOR IN-SERVICE ENGINEERING	DATE	PHONE	FAX
NOTIFICATION OF COMPLETION			
(WHEN THE ALTERATION IS COMPLETED, A COPY OF THIS FORM (or e-mail confirmation) SHALL BE RETURNED TO THE NAVY CRANE CENTER WITH THE FOLLOWING INFORMATION:			
CRANE IDENTIFICATION _____		COMPLETION DATE _____	
DISTRIBUTION			

Sections 7 and 8 Introduction

NAVFAC P-307 sections 7 and 8 provide information on the training, testing, licensing, and competency requirements for personnel who work in a weight handling program managed in accordance with NAVFAC P-307.

Sections 7 & 8 Introduction	
Section 1: General Overview	
Section 2: Program Management	
Section 3: Maintenance and Inspection	
Section 4: Certification	
Section 5: Equipment History File	
Section 6: Alterations and Engineering	
Section 7: Training and Qualification	
Section 8: Operator Licensing	
Section 9: Operator Checks	
Section 10: Operations	
Section 11: Contractor and Other Non-Navy Owned Cranes	
Section 12: Accidents, Near Misses, and Unplanned Events	
Section 13: Entertainment Hoists	
Section 14: Rigging Gear and Miscellaneous Equipment	



Section 7: Training and Qualification

Section 7 provides information on training and qualifications for personnel who work in a NAVFAC P-307 weight handling program. It provides the course titles for mandatory training, where to find the training courses, basic training requirements and exceptions, training for specific types of equipment, record keeping requirements, and Table 7-1 which lists the most common WHE job functions and their required courses. Click on the link to view Table 7-1.

Section 7: Training and Qualification

- Course titles
- Course locations
 - Navy eLearning (NeL)
 - JKO
 - Waypoints
- Qualification and Re-qualification requirements
 - Maintenance and Operations
- Training exceptions
- Record Keeping
- Table 7-1: Training Courses for WHE Job Functions



[Click to view Table 7-1](#)

Course Title Frequency	General Crane Safety Note 1	General Crane Safety Note 2	Category 1 and 2 Crane Safety Note 3	Category 3 Crane Safety Note 4	Category 4 Crane Safety Note 5	Rigging Practices Note 6	Rigging Practices Note 7
Job Function	Initial	Initial	Initial	Initial	Initial	Initial	Initial
Category 1 Crane Operator	X	X					
Category 2 Crane Operator			X	X			
Category 3 Crane Operator				X	X		
Category 4 Crane Operator					X	X	
Category 5 Crane Operator						X	X
Category 6 Crane Operator							X
Category 7 Crane Operator							
Category 8 Crane Operator							
Category 9 Crane Operator							
Category 10 Crane Operator							
Category 11 Crane Operator							
Category 12 Crane Operator							
Category 13 Crane Operator							
Category 14 Crane Operator							
Category 15 Crane Operator							
Category 16 Crane Operator							
Category 17 Crane Operator							
Category 18 Crane Operator							
Category 19 Crane Operator							
Category 20 Crane Operator							
Category 21 Crane Operator							
Category 22 Crane Operator							
Category 23 Crane Operator							
Category 24 Crane Operator							
Category 25 Crane Operator							
Category 26 Crane Operator							
Category 27 Crane Operator							
Category 28 Crane Operator							
Category 29 Crane Operator							
Category 30 Crane Operator							
Category 31 Crane Operator							
Category 32 Crane Operator							
Category 33 Crane Operator							
Category 34 Crane Operator							
Category 35 Crane Operator							
Category 36 Crane Operator							
Category 37 Crane Operator							
Category 38 Crane Operator							
Category 39 Crane Operator							
Category 40 Crane Operator							
Category 41 Crane Operator							
Category 42 Crane Operator							
Category 43 Crane Operator							
Category 44 Crane Operator							
Category 45 Crane Operator							
Category 46 Crane Operator							
Category 47 Crane Operator							
Category 48 Crane Operator							
Category 49 Crane Operator							
Category 50 Crane Operator							
Category 51 Crane Operator							
Category 52 Crane Operator							
Category 53 Crane Operator							
Category 54 Crane Operator							
Category 55 Crane Operator							
Category 56 Crane Operator							
Category 57 Crane Operator							
Category 58 Crane Operator							
Category 59 Crane Operator							
Category 60 Crane Operator							
Category 61 Crane Operator							
Category 62 Crane Operator							
Category 63 Crane Operator							
Category 64 Crane Operator							
Category 65 Crane Operator							
Category 66 Crane Operator							
Category 67 Crane Operator							
Category 68 Crane Operator							
Category 69 Crane Operator							
Category 70 Crane Operator							
Category 71 Crane Operator							
Category 72 Crane Operator							
Category 73 Crane Operator							
Category 74 Crane Operator							
Category 75 Crane Operator							
Category 76 Crane Operator							
Category 77 Crane Operator							
Category 78 Crane Operator							
Category 79 Crane Operator							
Category 80 Crane Operator							
Category 81 Crane Operator							
Category 82 Crane Operator							
Category 83 Crane Operator							
Category 84 Crane Operator							
Category 85 Crane Operator							
Category 86 Crane Operator							
Category 87 Crane Operator							
Category 88 Crane Operator							
Category 89 Crane Operator							
Category 90 Crane Operator							
Category 91 Crane Operator							
Category 92 Crane Operator							
Category 93 Crane Operator							
Category 94 Crane Operator							
Category 95 Crane Operator							
Category 96 Crane Operator							
Category 97 Crane Operator							
Category 98 Crane Operator							
Category 99 Crane Operator							
Category 100 Crane Operator							

Section 8: Operator Licensing

Section 8 provides uniform standards for crane operator training, testing, examining, and licensing. Category 1, category 2, and cab-operated category 3 operators must be licensed. Licenses are not required to operate non-cab operated category 3 cranes. However, training and a demonstration of ability to operate safely are required.

Section 8: Operator Licensing

Category 1, 2, and Cab-Operated Category 3 Operators must:

- Pass a physical (except for pendant-operated and remote-operated category 2 cranes)
- Pass training
- Pass examinations
- Be licensed

Non-Cab Operated Category 3 Operators must:

- Pass training
- Prove ability to operate safely
- No license is required

Operator Training

Prior to taking any performance test, the license candidates or operators-in-training shall be thoroughly trained on the operation of the type of crane for which a license is to be issued. The operator-in-training shall operate that type of crane only under the direct observation (i.e., line of sight) and continuous supervision of a licensed operator mentor. The licensed operator mentor shall retain full responsibility for the safe operation of the crane and perform no other tasks that detract from monitoring the operator-in-training. Prior to lifting loads or operating with personnel in the crane operating envelope, the operator-in-training's supervisor shall approve lifting of loads based on the operator-in-training's demonstration of knowledge, skill, and ability with the crane and safe operation without loads. The operator-in-training shall not perform critical lifts.

Figure 8-1: Crane Operator License Application

Pictured here is the Application for Crane Operator License, Figure 8-1. This form, or one similar, shall be used by Navy activities when nominating a candidate for a crane operator license.

Operator Training

- License candidates shall be thoroughly trained on the operation of the types of cranes to be licensed.
- Trainees shall operate the crane only under the direct observation of a licensed operator.
- Trainees shall not perform critical lifts.

Figure 8-1: Crane Operator License Application

Figure 8-2: Crane Operator License

Pictured on the screen is Figure 8-2, the Crane Operator License. This form or one similar shall be used by the License Issuing Official when issuing a license to an operator who has satisfactorily completed all requirements. This form may be modified for local use. Personally Identifiable Information has been removed from the license form; however, a separate photo ID is required to accompany this license, both of which must be in the possession of the operator when operating a crane.

CRANE OPERATOR LICENSE		QUALIFIED TO OPERATE			
NAME OF OPERATOR	DATE ISSUED	CRANE TYPE	CAPACITY	ATTACHMENT	PERFORMANCE EXAMINER
LICENSE NO.	DATE EXPIRES				
THE HOLDER OF THIS CARD IS QUALIFIED TO OPERATE U.S. NAVY CRANES AS SPECIFIED ON REVERSE OF THIS CARD					
SIGNATURE OF ISSUING OFFICIAL					
SIGNATURE OF OPERATOR					
Card must be carried at all times when operating Navy cranes. Not transferable to other personnel. NOTE: INFORMATION ON THIS LICENSE IS SUBJECT TO SAFEGUARD AND DISCLOSURE CONDITIONS OF THE PRIVACY ACT OF 1974.					
		RESTRICTIONS (Vision, Hearing, Other)			
FRONT		BACK			

Figure 9-1

Figure 9-1, the Crane Operator's Daily Checklist or ODCL, shall be used to document the pre-use equipment and safety checks. This shall be performed by the operator prior to the first use of the crane each day. The first operator in each subsequent shift shall perform the operational checks of paragraph 9.1.2.1.4. All other operators shall review and sign the ODCL and review any tags posted on the crane. For cranes used in construction operations, a complete check shall be performed each shift.

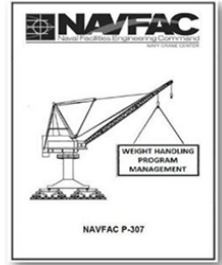
CRANE OPERATOR'S DAILY CHECKLIST															
CRANE NO.	TYPE/CAPACITY	LOCATION	CERTIFICATION EXPIRATION DATE	SHIFT	HOUR/METER	START	STOP	HRS OPERATED	DATE						
				1	2	3									
OPERATORS				LEGEND				U = SATISFACTORY U = UNSATISFACTORY NA = NOT APPLICABLE							
1. WALK AROUND CHECK				2. MACHINERY HOUSE CHECK				3. OPERATOR CAB CHECK				4. OPERATIONAL CHECK			
1. Safety Shields and Plates	2. 1	2. 2	2. 3	2. 4	2. 5	2. 6	2. 7	2. 8	2. 9	2. 10	2. 11	2. 12	2. 13		
2. Safety Shields and Plates	3. 1	3. 2	3. 3	3. 4	3. 5	3. 6	3. 7	3. 8	3. 9	3. 10	3. 11	3. 12	3. 13		
3. Safety Shields and Plates	4. 1	4. 2	4. 3	4. 4	4. 5	4. 6	4. 7	4. 8	4. 9	4. 10	4. 11	4. 12	4. 13		
4. Safety Shields and Plates	5. 1	5. 2	5. 3	5. 4	5. 5	5. 6	5. 7	5. 8	5. 9	5. 10	5. 11	5. 12	5. 13		
5. Safety Shields and Plates	6. 1	6. 2	6. 3	6. 4	6. 5	6. 6	6. 7	6. 8	6. 9	6. 10	6. 11	6. 12	6. 13		
6. Safety Shields and Plates	7. 1	7. 2	7. 3	7. 4	7. 5	7. 6	7. 7	7. 8	7. 9	7. 10	7. 11	7. 12	7. 13		
7. Safety Shields and Plates	8. 1	8. 2	8. 3	8. 4	8. 5	8. 6	8. 7	8. 8	8. 9	8. 10	8. 11	8. 12	8. 13		
8. Safety Shields and Plates	9. 1	9. 2	9. 3	9. 4	9. 5	9. 6	9. 7	9. 8	9. 9	9. 10	9. 11	9. 12	9. 13		
9. Safety Shields and Plates	10. 1	10. 2	10. 3	10. 4	10. 5	10. 6	10. 7	10. 8	10. 9	10. 10	10. 11	10. 12	10. 13		
10. Safety Shields and Plates	11. 1	11. 2	11. 3	11. 4	11. 5	11. 6	11. 7	11. 8	11. 9	11. 10	11. 11	11. 12	11. 13		
11. Safety Shields and Plates	12. 1	12. 2	12. 3	12. 4	12. 5	12. 6	12. 7	12. 8	12. 9	12. 10	12. 11	12. 12	12. 13		
12. Safety Shields and Plates	13. 1	13. 2	13. 3	13. 4	13. 5	13. 6	13. 7	13. 8	13. 9	13. 10	13. 11	13. 12	13. 13		
13. Safety Shields and Plates	14. 1	14. 2	14. 3	14. 4	14. 5	14. 6	14. 7	14. 8	14. 9	14. 10	14. 11	14. 12	14. 13		
14. Safety Shields and Plates	15. 1	15. 2	15. 3	15. 4	15. 5	15. 6	15. 7	15. 8	15. 9	15. 10	15. 11	15. 12	15. 13		
15. Safety Shields and Plates	16. 1	16. 2	16. 3	16. 4	16. 5	16. 6	16. 7	16. 8	16. 9	16. 10	16. 11	16. 12	16. 13		
16. Safety Shields and Plates	17. 1	17. 2	17. 3	17. 4	17. 5	17. 6	17. 7	17. 8	17. 9	17. 10	17. 11	17. 12	17. 13		
17. Safety Shields and Plates	18. 1	18. 2	18. 3	18. 4	18. 5	18. 6	18. 7	18. 8	18. 9	18. 10	18. 11	18. 12	18. 13		
18. Safety Shields and Plates	19. 1	19. 2	19. 3	19. 4	19. 5	19. 6	19. 7	19. 8	19. 9	19. 10	19. 11	19. 12	19. 13		
19. Safety Shields and Plates	20. 1	20. 2	20. 3	20. 4	20. 5	20. 6	20. 7	20. 8	20. 9	20. 10	20. 11	20. 12	20. 13		
20. Safety Shields and Plates	21. 1	21. 2	21. 3	21. 4	21. 5	21. 6	21. 7	21. 8	21. 9	21. 10	21. 11	21. 12	21. 13		
21. Safety Shields and Plates	22. 1	22. 2	22. 3	22. 4	22. 5	22. 6	22. 7	22. 8	22. 9	22. 10	22. 11	22. 12	22. 13		
22. Safety Shields and Plates	23. 1	23. 2	23. 3	23. 4	23. 5	23. 6	23. 7	23. 8	23. 9	23. 10	23. 11	23. 12	23. 13		
23. Safety Shields and Plates	24. 1	24. 2	24. 3	24. 4	24. 5	24. 6	24. 7	24. 8	24. 9	24. 10	24. 11	24. 12	24. 13		
24. Safety Shields and Plates	25. 1	25. 2	25. 3	25. 4	25. 5	25. 6	25. 7	25. 8	25. 9	25. 10	25. 11	25. 12	25. 13		
25. Safety Shields and Plates	26. 1	26. 2	26. 3	26. 4	26. 5	26. 6	26. 7	26. 8	26. 9	26. 10	26. 11	26. 12	26. 13		
26. Safety Shields and Plates	27. 1	27. 2	27. 3	27. 4	27. 5	27. 6	27. 7	27. 8	27. 9	27. 10	27. 11	27. 12	27. 13		
27. Safety Shields and Plates	28. 1	28. 2	28. 3	28. 4	28. 5	28. 6	28. 7	28. 8	28. 9	28. 10	28. 11	28. 12	28. 13		
28. Safety Shields and Plates	29. 1	29. 2	29. 3	29. 4	29. 5	29. 6	29. 7	29. 8	29. 9	29. 10	29. 11	29. 12	29. 13		
29. Safety Shields and Plates	30. 1	30. 2	30. 3	30. 4	30. 5	30. 6	30. 7	30. 8	30. 9	30. 10	30. 11	30. 12	30. 13		
30. Safety Shields and Plates	31. 1	31. 2	31. 3	31. 4	31. 5	31. 6	31. 7	31. 8	31. 9	31. 10	31. 11	31. 12	31. 13		
31. Safety Shields and Plates	32. 1	32. 2	32. 3	32. 4	32. 5	32. 6	32. 7	32. 8	32. 9	32. 10	32. 11	32. 12	32. 13		
32. Safety Shields and Plates	33. 1	33. 2	33. 3	33. 4	33. 5	33. 6	33. 7	33. 8	33. 9	33. 10	33. 11	33. 12	33. 13		
33. Safety Shields and Plates	34. 1	34. 2	34. 3	34. 4	34. 5	34. 6	34. 7	34. 8	34. 9	34. 10	34. 11	34. 12	34. 13		
34. Safety Shields and Plates	35. 1	35. 2	35. 3	35. 4	35. 5	35. 6	35. 7	35. 8	35. 9	35. 10	35. 11	35. 12	35. 13		
35. Safety Shields and Plates	36. 1	36. 2	36. 3	36. 4	36. 5	36. 6	36. 7	36. 8	36. 9	36. 10	36. 11	36. 12	36. 13		
36. Safety Shields and Plates	37. 1	37. 2	37. 3	37. 4	37. 5	37. 6	37. 7	37. 8	37. 9	37. 10	37. 11	37. 12	37. 13		
37. Safety Shields and Plates	38. 1	38. 2	38. 3	38. 4	38. 5	38. 6	38. 7	38. 8	38. 9	38. 10	38. 11	38. 12	38. 13		
38. Safety Shields and Plates	39. 1	39. 2	39. 3	39. 4	39. 5	39. 6	39. 7	39. 8	39. 9	39. 10	39. 11	39. 12	39. 13		
39. Safety Shields and Plates	40. 1	40. 2	40. 3	40. 4	40. 5	40. 6	40. 7	40. 8	40. 9	40. 10	40. 11	40. 12	40. 13		
40. Safety Shields and Plates	41. 1	41. 2	41. 3	41. 4	41. 5	41. 6	41. 7	41. 8	41. 9	41. 10	41. 11	41. 12	41. 13		
41. Safety Shields and Plates	42. 1	42. 2	42. 3	42. 4	42. 5	42. 6	42. 7	42. 8	42. 9	42. 10	42. 11	42. 12	42. 13		
42. Safety Shields and Plates	43. 1	43. 2	43. 3	43. 4	43. 5	43. 6	43. 7	43. 8	43. 9	43. 10	43. 11	43. 12	43. 13		
43. Safety Shields and Plates	44. 1	44. 2	44. 3	44. 4	44. 5	44. 6	44. 7	44. 8	44. 9	44. 10	44. 11	44. 12	44. 13		
44. Safety Shields and Plates	45. 1	45. 2	45. 3	45. 4	45. 5	45. 6	45. 7	45. 8	45. 9	45. 10	45. 11	45. 12	45. 13		
45. Safety Shields and Plates	46. 1	46. 2	46. 3	46. 4	46. 5	46. 6	46. 7	46. 8	46. 9	46. 10	46. 11	46. 12	46. 13		
46. Safety Shields and Plates	47. 1	47. 2	47. 3	47. 4	47. 5	47. 6	47. 7	47. 8	47. 9	47. 10	47. 11	47. 12	47. 13		
47. Safety Shields and Plates	48. 1	48. 2	48. 3	48. 4	48. 5	48. 6	48. 7	48. 8	48. 9	48. 10	48. 11	48. 12	48. 13		
48. Safety Shields and Plates	49. 1	49. 2	49. 3	49. 4	49. 5	49. 6	49. 7	49. 8	49. 9	49. 10	49. 11	49. 12	49. 13		
49. Safety Shields and Plates	50. 1	50. 2	50. 3	50. 4	50. 5	50. 6	50. 7	50. 8	50. 9	50. 10	50. 11	50. 12	50. 13		
50. Safety Shields and Plates	51. 1	51. 2	51. 3	51. 4	51. 5	51. 6	51. 7	51. 8	51. 9	51. 10	51. 11	51. 12	51. 13		
51. Safety Shields and Plates	52. 1	52. 2	52. 3	52. 4	52. 5	52. 6	52. 7	52. 8	52. 9	52. 10	52. 11	52. 12	52. 13		
52. Safety Shields and Plates	53. 1	53. 2	53. 3	53. 4	53. 5	53. 6	53. 7	53. 8	53. 9	53. 10	53. 11	53. 12	53. 13		
53. Safety Shields and Plates	54. 1	54. 2	54. 3	54. 4	54. 5	54. 6	54. 7	54. 8	54. 9	54. 10	54. 11	54. 12	54. 13		
54. Safety Shields and Plates	55. 1	55. 2	55. 3	55. 4	55. 5	55. 6	55. 7	55. 8	55. 9	55. 10	55. 11	55. 12	55. 13		
55. Safety Shields and Plates	56. 1	56. 2	56. 3	56. 4	56. 5	56. 6	56. 7	56. 8	56. 9	56. 10	56. 11	56. 12	56. 13		
56. Safety Shields and Plates	57. 1	57. 2	57. 3	57. 4	57. 5	57. 6	57. 7	57. 8	57. 9	57. 10	57. 11	57. 12	57. 13		
57. Safety Shields and Plates	58. 1	58. 2	58. 3	58. 4	58. 5	58. 6	58. 7	58. 8	58. 9	58. 10	58. 11	58. 12	58. 13		
58. Safety Shields and Plates	59. 1	59. 2	59. 3	59. 4	59. 5	59. 6	59. 7	59. 8	59. 9	59. 10	59. 11	59. 12	59. 13		
59. Safety Shields and Plates	60. 1	60. 2	60. 3	60. 4	60. 5	60. 6	60. 7	60. 8	60. 9	60. 10	60. 11	60. 12	60. 13		
60. Safety Shields and Plates	61. 1	61. 2	61. 3	61. 4	61. 5	61. 6	61. 7	61. 8	61. 9	61. 10	61. 11	61. 12	61. 13		
61. Safety Shields and Plates	62. 1	62. 2	62. 3	62. 4	62. 5	62. 6	62. 7	62. 8	62. 9	62. 10	62. 11	62. 12	62. 13		
62. Safety Shields and Plates	63. 1	63. 2	63. 3	63. 4	63. 5	63. 6	63. 7	63. 8	63. 9	63. 10	63. 11	63. 12	63. 13		
63. Safety Shields and Plates	64. 1	64. 2	64. 3	64. 4	64. 5	64. 6	64. 7	64. 8	64. 9	64. 10	64. 11	64. 12	64. 13		
64. Safety Shields and Plates	65. 1	65. 2	65. 3	65. 4	65. 5	65. 6	65. 7	65. 8	65. 9	65. 10	65. 11	65. 12	65. 13		
65. Safety Shields and Plates	66. 1	66. 2	66. 3	66. 4	66. 5	66. 6	66. 7	66. 8	66. 9	66. 10	66. 11	66. 12	66. 13		
66. Safety Shields and Plates	67. 1	67. 2	67. 3	67. 4	67. 5	67. 6	67. 7	67. 8	67. 9	67. 10	67. 11	67. 12	67. 13		
67. Safety Shields and Plates	68. 1	68. 2	68. 3	68. 4	68. 5	68. 6	68. 7	68. 8	68. 9	68. 10	68. 11	68. 12	68. 13		
68. Safety Shields and Plates	69. 1	69. 2	69. 3	69. 4	69. 5	69. 6	69. 7	69. 8	69. 9	69. 10	69. 11	69. 12	69. 13		
69. Safety Shields and Plates	70. 1	70. 2	70. 3	70. 4	70. 5	70. 6	70. 7	70. 8	70. 9	70. 10	70. 11	70. 12	70. 13		
70. Safety Shields and Plates	71. 1	71. 2	71. 3	71. 4	71. 5	71. 6	71. 7	71. 8	71. 9	71. 10	71. 11	71. 12	71. 13		
71. Safety Shields and Plates	72. 1	72. 2	72. 3	72. 4	72. 5	72. 6	72. 7	72. 8	72. 9	72. 10	72. 11	72. 12	72. 13		
72. Safety Shields and Plates	73. 1	73. 2	73. 3	73. 4	73. 5	73. 6									

Section 11 Introduction

NAVFAC P-307 section 11 provides requirements for contractor operated cranes (and multi-purpose machines, material handling equipment, and construction equipment used to lift loads suspended by rigging gear) and to all rigging equipment used in weight handling operations at a naval activity.

Section 11 Introduction

Section 1: General Overview
Section 2: Program Management
Section 3: Maintenance and Inspection
Section 4: Certification
Section 5: Equipment History File
Section 6: Alterations and Engineering
Section 7: Training and Qualification
Section 8: Operator Licensing
Section 9: Operator Checks
Section 10: Operations
Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
Section 12: Accidents, Near Misses, and Unplanned Events
Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment



Section 11: Contractor and Other Non-Navy Owned WHE

Section 11 provides detailed guidelines and requirements for contracts and contractors using non-Navy owned equipment to lift suspended loads at Navy shore activities. This includes cranes, multi-purpose machines, construction equipment, and rigging gear, as well as material handling equipment. The requirements of this section do not apply to NAVFAC facilities construction contracts, which are defined as contracts that involve construction, alteration, or repair of buildings, structures, or other real property. Contained in section 11 are contract requirements, contracting officer responsibilities, host activity responsibilities, and requirements for using rented or leased weight handling equipment.

Section 11: Contractor and Other Non-Navy Owned WHE

- Contractor Operated Cranes & Multi-Purpose Machines
- Contracted Work Requirements
- Contracting Officers
- Host Activities
- Rented or Leased WHE Requirements

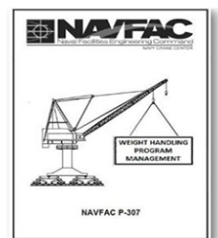


Section 12 Introduction

NAVFAC P-307, Section 12 provides requirements for reporting accidents, near misses, and other unplanned events.

Section 12 Introduction

Section 1: General Overview
Section 2: Program Management
Section 3: Maintenance and Inspection
Section 4: Certification
Section 5: Equipment History File
Section 6: Alterations and Engineering
Section 7: Training and Qualification
Section 8: Operator Licensing
Section 9: Operator Checks
Section 10: Operations
Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
Section 12: Accidents, Near Misses, and Unplanned Events
Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment



Section 12: Accidents, Near Misses, and Unplanned Occurrences

Section 12 combines decades of experience with input from across the Navy to provide detailed weight handling accident information and definitions which include the two categories of accidents: crane and rigging. Other information includes an explanation of significant accidents, detailed accident definitions, and expected actions personnel should take when responding to accidents, near misses, or unplanned events, along with the applicable notification and reporting procedures. The following screens will provide the definitions of a crane accident and a rigging accident.

Section 12: Accidents, Near Misses, and Unplanned Occurrences

- Accident categories
- Significant accidents
- Crane accident definition
- Rigging accident definition
- Accident response expectations
- Near misses
- Unplanned occurrences
- Notifications & reporting

Significant Accident Definition

A significant accident is an accident that typically has a greater potential to result in serious injury or substantial property damage. The following accident types are considered significant accidents: injuries (regardless of severity), overloads, dropped loads, two-blocks, crane derailments, overturned cranes, or contact with overhead electrical power lines. Note: Other types of accidents that meet or exceed the OPNAV Class A, B, C, or D reporting thresholds for material property damage are also considered significant accidents.

Significant Accident Definition

- A significant accident is an accident that typically has a greater potential to result in:
 - Serious injury
 - Substantial property damage
- The following accident types are considered significant accidents:
 - Injuries (regardless of severity)
 - Overloads
 - Dropped loads
 - Two-blocks
 - Crane derailments
 - Overturned cranes
 - Contact with overhead electrical power lines

Note: OPNAV Reportable - Other types of accidents that meet or exceed the OPNAV Class A, B, C, or D reporting thresholds for material property damage are also considered significant accidents.

Crane Accident Definition

For the purpose of this definition, it is assumed there is an operating envelope around any crane. The operating envelope consists of any of the following elements: the crane, the operator, the riggers, signal persons, and crane walkers, other personnel involved in the operation, the rigging gear between the hook and the load, the load, the crane's supporting structure, and the lift procedure.

A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly during a crane operation including operation during maintenance or testing resulting in any of the following: personnel injury or death, material or equipment damage, dropped load, derailment, two-blocking, overload, overturned crane, or collision.
Note: The last six bullets are considered accidents even though no material damage or injury occurs.

Exceptions: A component failure shall be considered an accident only if damage to the load or another crane component occurs as a result of the failure. An accident involving a mobile crane that is configured for transit is considered an unplanned occurrence and shall be reported as such.

Crane Accident Definition

- The operating envelope consists of any of the following elements:
 - the crane
 - the operator
 - the riggers, signal persons, and crane walkers
 - other personnel involved in the operation
 - the rigging gear between the hook and the load
 - the load
 - the crane's supporting structure
 - the lift procedure
- A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly during a crane operation (see appendix A), including operation during maintenance or testing, resulting in any of the following:
 - Personnel injury or death
 - Material or equipment damage
 - Dropped load
 - Derailment
 - Two-blocking
 - Overload
 - Overturned crane
 - Collision

Note: The last six bullets are considered accidents even though no material damage or injury occurs.

Rigging Accident Definition

For the purpose of this definition, it is assumed there is an operating envelope around any rigging or other section 14 equipment operation, and inside the envelope are the following: rigging gear or miscellaneous equipment identified in section 14, the user of the gear or equipment, other personnel involved in the operation, the load, the gear or equipment's supporting structure, the load's rigging path, and the rigging or lift procedure.

A rigging accident occurs when any of the elements in the operating envelope fails to perform correctly during a rigging operation, resulting in any of the following: personnel injury or death, material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function (this does not include superficial damage such as scratched paint, minor lagging damage, or normal wear on rigging gear), dropped

Section 12: Rigging Accident Definition

For the purpose of this definition, it is assumed there is an "operating envelope" around any rigging or other Section 14 equipment operation and inside the envelope are the following:

- rigging gear or miscellaneous equipment identified in Section 14
- the user of the gear or equipment
- other personnel involved in the operation
- the load
- the gear or equipment's supporting structure
- the load's rigging path
- the rigging or lift procedure

A rigging accident occurs when any of the elements in the operating envelope fails to perform correctly during a rigging operation resulting in any of the following:

- Personnel injury or death
- Material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function. This does not include superficial damage such as scratched paint, minor lagging damage, or normal wear on rigging gear.
- Dropped load
- Two-blocking of cranes and powered hoists identified in Section 14
- Overload (includes load tests when the test load tolerance is exceeded)

Note: The last three bullets are considered accidents even though no material damage or injury occurs.

load, two-blocking of cranes and powered hoists identified in section 14, or overload (includes overload of supporting structures and load tests when the test load tolerance is exceeded). Note: The last three bullets are considered accidents even though no material damage or injury occurs.

Exception: A component failure shall be considered an accident only if damage to the load or another component occurs as a result of the failure.

Figure 12-1: Crane and Rigging Accident Report

For each suspected accident, activities shall promptly perform an investigation. Activities shall prepare a Crane and Rigging Accident Report, Figure 12-1 (available on the Navy Crane Center web site) and forward a copy to the Navy Crane Center within 30 days of the accident. For accidents involving a fatality, inpatient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane, load, or adjacent property, notify the Navy Crane Center by email as soon as practical but not later than eight hours following the accident. Notification for all other accidents shall be made as soon as practical but no later than three working days after the accident.

CRANE AND RIGGING ACCIDENT REPORT				
Accident Category: ☐ Crane Accident ☐ Rigging Accident		☐ * Significant Accident		
Reporting Activity:		Copy To: Navy Crane Center Bldg. 451 Navy Portsmouth, VA 23708 Fax: 757-567-3800		
UIC:		Report No:		
Activity Responsible for the Accident:		Accident Location UIC:		
UIC:		Accident Date: Time:		
Contractor Operation: ☐ Yes ☐ No		BO's Contractor ☐ Yes ☐ No		
If Yes, Contract No:		BO's Contractor Equip. ☐ Yes ☐ No		
Crane No:	Crane Type:	Category:	Crane OEM:	
Crane Capacity:	Hoist Capacity:	Weight of Load on Hook:	Weather:	
Critical Lift/Reel/Not-Crane Rigging Operation? ☐ Yes ☐ No		Ordinance LIFT? ☐ Yes ☐ No		
Lost Work Days? ☐ Yes ☐ No		Fatality or Permanent Disability? ☐ Yes ☐ No		
Material Property Cost Estimate:				
Accident Type (check all that apply):				
☐ Personal Injury*	☐ Overload*	☐ Two Blocked*	☐ Power Line Contact*	
☐ Dropped Load*	☐ Derail*	☐ Overturned Crane*	☐ Crane Collision	
☐ Damaged Crane	☐ Damaged Load	☐ Load Collision	☐ Damaged Rigging Gear	
☐ Lower Threshold Crane Accident	☐ Other: Specify _____		* signifies significant accident	
Cause of Accident (check all that apply):				
☐ Improper Operation	☐ Equipment Failure	☐ Inadequate Visibility		
☐ Improper Rigging	☐ Switch Alignment	☐ Inadequate Communication		
☐ Track Condition	☐ Procedural Failure	☐ Other: Specify _____		
Responsibility (check all that apply):				
☐ Crane Walker	☐ Rigger	☐ Rigger-In-Charge	☐ Operator	☐ Signal Person
☐ Maintenance	☐ Management/Supervision	☐ Other: Specify _____		
Crane Function:				
☐ Travel	☐ Hoist	☐ Rotate	☐ Luffing	☐ Telescoping ☐ Other ☐ N/A
Is this accident indicative of a recurring problem? ☐ Yes ☐ No				
If yes, list Accident Report No.:				
ATTACH: COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSURE (1). Include root cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions assigned and respective codes.				
INCLUDE: Printed Name, Code and Date.				
Preparer:	Phone:	E-mail:	Code:	Date:
Concurrence:	Code:	Date:		
*If Program Manager or Contracting Officer designee (if Applicable)				
Certifying Official (Crane Accident Only):				
Contracting Officer's Representative (if Applicable):				

Figure 12-2: Crane and Rigging Near Miss Report

Near misses and unplanned occurrences shall be reported using Figure 12-2 and 12-3 respectively (available on the Navy Crane Center website). These reports shall be submitted in accordance with section 12 within 30 days of the event.

LOAD TEST DIRECTOR STUDENT GUIDE

CRANE AND RIGGING NEAR MISS REPORT				
Near Miss Category: ☐ Crane Near Miss ☐ Rigging Near Miss				
Reporting Activity:		Copy To: Navy Crane Center Rm. 403 1815V Portsmouth, VA 23708 Fax: 757-967-3809		
UC:		Activity Responsible for the Near Miss:		
UC:		Report No: Location: Date: Time:		
BO's Contractor: ☐ Yes ☐ No		Other Contractor: ☐ Yes ☐ No If Yes, Contract #		
Crane No:	Crane Type:	Category:	Crane OEM:	
Crane Capacity:	Hoist Capacity:	Weight of Load on hook:	Weather:	
Critical Lift or Critical Non-Crane Rigging Operation? ☐ Yes ☐ No				
Is this near miss indicative of a recurring problem? ☐ Yes ☐ No				
In the space below, include a description of the event, root cause and corrective actions taken to prevent recurrence: Brief description:				
Root cause:				
Corrective Actions:				
*INCLUDE: Printed Name, Code and Date unless otherwise specified.				
Preparer:	Phone:	E-mail:	Code:	Date:
Approved by:	Phone:	E-mail:	Code:	Date:

Figure 12-2 (1 of 2)

CRANE AND RIGGING UNPLANNED OCCURRENCE REPORT				
Unplanned Occurrence Category: ☐ Crane ☐ Rigging ☐ Injury/Substantial				
Reporting Activity:		Copy To: Navy Crane Center Rm. 403 1815V Portsmouth, VA 23708 Fax: 757-967-3809		
UC:		Activity Responsible:		
UC:		Report No: Event Location UC: Event Date: Time:		
BO's Contractor: ☐ Yes ☐ No		BO's Contractor Equip: ☐ Yes ☐ No		
Crane No:	Crane Type:	Category:	Crane OEM:	
Crane Capacity:	Hoist Capacity:	Weight of Load on hook:	Weather:	
Lost Work Days? ☐ Yes ☐ No Fatality or Permanent Disability? ☐ Yes ☐ No Material Property Cost Estimate:				
Unplanned Occurrence Type (check all that apply):				
☐ Personal Injury* ☐ Substantial Damage* ☐ Crane Collision ☐ Damaged Crane				
☐ Damaged Rigging Gear ☐ Equipment Failure ☐ Other: Specify _____				
Cause of Unplanned Occurrence (check all that apply):				
☐ Foreign Material Contamination ☐ Inadequate Visibility ☐ Improper Rigging Inspection				
☐ Hazardous Energy Control ☐ Inadequate Communication ☐ Poor Mechanic Technique				
☐ Unclear Procedure ☐ Procedure Violation ☐ Other: Specify _____				
Responsibility (check all that apply):				
☐ Mechanic ☐ Electrician ☐ Operator ☐ Rigger				
☐ Engineer ☐ Inspector ☐ Management/Supervisor ☐ Other: Specify _____				
Is this event indicative of a recurring problem? ☐ Yes ☐ No				
If yes, list Report No.:				
ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSEURE (S). Include root cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions assigned and respective codes.				
INCLUDE: Printed Name, Code and Date.				
Preparer:	Phone:	E-mail:	Code:	Date:
Concurrence:			Code:	Date:
WRE Program Manager or Contracting Officer's Representative (if Applicable)				
Contracting Official (Crane Event Only):				
Contracting Officer's Representative (if Applicable):				

Figure 12-3 (1 of 2)

Section 13 Introduction

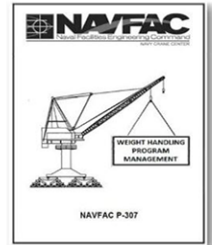
NAVFAC P-307 section 13 provides requirements for entertainment hoists. Entertainment hoists may be treated differently than category 2 or 3 cranes due to the inherent nature of their design, installation, application, and use. Unless otherwise specified, entertainment hoists are not required to meet other requirements of this publication.

Entertainment Hoists

Entertainment hoists, as defined in Appendix A, shall meet all of the requirements shown regarding design, installation, testing, maintenance, operations and record keeping. If the hoist cannot meet all of these requirements, then the hoist shall be treated as a category 2 or 3 crane. Section 13 also provides requirements for alterations to entertainment hoists, compliance reviews for existing entertainment hoists, procurement of new hoists, and accident, near miss, and unplanned occurrence reporting.

Section 13 Introduction

- Section 1: General Overview
- Section 2: Program Management
- Section 3: Maintenance and Inspection
- Section 4: Certification
- Section 5: Equipment History File
- Section 6: Alterations and Engineering
- Section 7: Training and Qualification
- Section 8: Operator Licensing
- Section 9: Operator Checks
- Section 10: Operations
- Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
- Section 12: Accidents, Near Misses, and Unplanned Events
- Section 13: Entertainment Hoists**
- Section 14: Rigging Gear and Miscellaneous Equipment



Section 13: Entertainment Hoists

- Designed and installed by a specialized company
- Designed, tested, maintained, operated IAW ANSI E1.6
- Equipment History File
- Alterations
- Existing EH reviews
- Procurement
- Accident, near misses, and unplanned occurrences



Section 14 Introduction

Section 14 is the last section in the main body of NAVFAC P-307. It provides selection, maintenance, inspection, test, and use requirements for rigging gear and miscellaneous lifting equipment. These requirements apply to covered equipment used with or without cranes in weight handling operations and to covered equipment used with multi-purpose machines, material handling equipment or MHE (for example forklifts), and equipment covered by NAVFAC P-300. These requirements also apply to contractor-owned rigging equipment used with Navy and BOS contractor-owned WHE, multi-purpose machines, MHE, and equipment covered by NAVFAC P-300 used in weight handling operations.

Section 14: Gear and Equipment

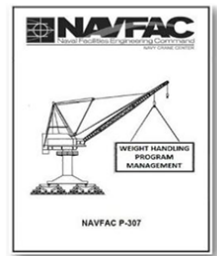
This section and the applicable portions of section 10 provide the minimum requirements for developing and maintaining a program for rigging gear and miscellaneous equipment, in other words, maintenance, inspection, and use of applicable gear, operational responsibilities and requirements, operational risk management, and critical non-crane rigging operations, etc. These requirements also apply to rigging gear and miscellaneous equipment used by other military services on Navy maintained and certified cranes at joint bases.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Section 14 Introduction

Section 1: General Overview
 Section 2: Program Management
 Section 3: Maintenance and Inspection
 Section 4: Certification
 Section 5: Equipment History File
 Section 6: Alterations and Engineering
 Section 7: Training and Qualification
 Section 8: Operator Licensing
 Section 9: Operator Checks
 Section 10: Operations
 Section 11: Contractor and Other Non-Navy Owned Weight Handling Equipment
 Section 12: Accidents, Near Misses, and Unplanned Events
 Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment



Completion

Congratulations.

You have completed the NAVFAC P-307 Overview Sections 1-14 module.

Click on the Exit button to return to the main module menu.

Navy Crane Center
 Norfolk Naval Shipyard, Bldg. 491
 Portsmouth, VA 23709
 Phone: 757.967.4185, DSN: 387, Fax: 757.967.3808
<https://ncc.navfac.navy.mil/>

NAVFAC P-307 OVERVIEW APPENDICES A-R

Welcome

Welcome to NAVFAC P-307 Overview Appendices A-R.

Appendix A Introduction

NAVFAC P-307 Appendix A provides a glossary of terms and definitions that help further explain various aspects of the Navy's weight handling program.

Appendix A: Glossary

The glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307 and for improved communications within the Navy's weight handling management program.

Appendix B Introduction

NAVFAC P-307 Appendix B provides labeled illustrations of many types of weight handling equipment.



NAVY CRANE CENTER



NAVFAC P-307

Welcome

Welcome to NAVFAC P-307 Overview Appendices A - R.

Begin

Appendix A Introduction

Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment
Appendix C: MISR for Category 1 Cranes
Appendix D: MISR for Category 2 and 3 Cranes
Appendix E: Crane Test Procedures
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices
Appendix G: Useful Lives of Cranes
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines
Appendix I: Post-Lift Debrief Sheet
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix N: Personnel Competencies
Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix Q: References
Appendix R: Related Documents

Appendix A - Glossary

• Why use the glossary?

- provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307
- improves communications within the Navy's weight handling community.



Appendix B Introduction

Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment
Appendix C: MISR for Category 1 Cranes
Appendix D: MISR for Category 2 and 3 Cranes
Appendix E: Crane Test Procedures
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices
Appendix G: Useful Lives of Cranes
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines
Appendix I: Post-Lift Debrief Sheet
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix N: Personnel Competencies
Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix Q: References
Appendix R: Related Documents

Appendix B: Types of WHE

Appendix B contains close to 50 drawings that illustrate the basic configurations of many crane types found in the Navy's inventory. Like appendix A, it is intended to improve communication and understanding within the Navy's weight handling community.

Directions: Match terms 1 through 6 with the correct Appendix B illustration by selecting the appropriate number for each crane pictured.

5 ▾ Portal Crane

6 ▾ Rubber-Tired Gantry Crane

1 ▾ Commercial Truck-Mounted Articulating Boom Crane

3 ▾ Mobile Boat Hoist

2 ▾ Jib Crane

4 ▾ Pillar Jib Crane

They say a picture is worth a thousand words. If so, Appendix B reads like a novel. It contains close to 50 drawings that illustrate the basic configurations of many crane types found in the Navy's inventory. Like Appendix A, it is intended to improve communication and understanding within the Navy's weight handling community.

Appendices C and D Introduction

NAVFAC P-307 Appendices C and D provide the maintenance inspection specifications and record requirements for all cranes. These appendices contain the minimum inspection requirements. Additional inspection requirements, or more frequent inspections, may need to be developed locally, depending on the particular piece of equipment being used and the Original Equipment Manufacturer (or OEM) requirements.

Appendices C and D Introduction

Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment

Appendix C: MISR for Category 1 Cranes

Appendix D: MISR for Category 2 and 3 Cranes

Appendix E: Crane Test Procedures

Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices

Appendix G: Useful Lives of Cranes

Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines

Appendix I: Post-Lift Debrief Sheet

Appendix J: Basic Performance Test for Weight Handling Equipment

Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.

Appendix K: Basic Performance Test for Weight Handling Equipment

Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator

License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes

Appendix M: Procedures for Third Party Certification by the Navy Crane Center

Appendix N: Personnel Competencies

Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests

Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements

Appendix Q: References

Appendix R: Related Documents

Appendix C: MISR

Appendix C contains the Maintenance Inspection Specification and Record for category 1 cranes. This document is commonly referred to by the acronym MISR and is pronounced "mizer." You can see in the illustration a sample of the many items that must be inspected, the manner or specification in which to perform the inspection, and the acceptance criteria to be used. Local variations of this document may be developed. See section 3 for additional inspection details.

ITEM	TYPE	DESCRIPTION	INSPECTION METHOD	INSPECTION FREQUENCY	INSPECTION RESULTS	REMARKS
1	1	General Condition	Visual	Before use		
2	1	Structural Integrity	Visual	Before use		
3	1	Hydraulic System	Visual	Before use		
4	1	Electrical System	Visual	Before use		
5	1	Brake System	Visual	Before use		
6	1	Load Capacity	Visual	Before use		
7	1	Control System	Visual	Before use		
8	1	Safety System	Visual	Before use		
9	1	Hoist System	Visual	Before use		
10	1	Winch System	Visual	Before use		
11	1	Drum System	Visual	Before use		
12	1	Wire Rope System	Visual	Before use		
13	1	Hook System	Visual	Before use		
14	1	Shackle System	Visual	Before use		
15	1	Chain System	Visual	Before use		
16	1	Turnbuckle System	Visual	Before use		
17	1	Pin System	Visual	Before use		
18	1	Washer System	Visual	Before use		
19	1	Nut System	Visual	Before use		
20	1	Bolt System	Visual	Before use		
21	1	Bracket System	Visual	Before use		
22	1	Plate System	Visual	Before use		
23	1	Angle System	Visual	Before use		
24	1	Channel System	Visual	Before use		
25	1	Beam System	Visual	Before use		
26	1	Column System	Visual	Before use		
27	1	Truss System	Visual	Before use		
28	1	Arch System	Visual	Before use		
29	1	Scissor System	Visual	Before use		
30	1	Scissor System	Visual	Before use		

Appendix C: Maintenance Inspection Specification and Record (MISR)

Appendix D: AMISR

Appendix D contains the Annual Maintenance Inspection Specification and Record for category 2 and 3 cranes. This document is commonly referred to by the acronym AMISR and is pronounced “A-mizer.” You can see in the illustration a sample of the many items that must be inspected, the manner or specification in which to perform the inspection, and the acceptance criteria to be used. Local variations of this document may be developed. See section 3 for additional inspection details.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 1 OF 1									
DATE	TIME	LOCATION	INSPECTOR	CRANE	TYPE	MODEL	YEAR	STATUS	REMARKS
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Appendix D: Annual Maintenance Inspection Specification and Record (AMISR)

Appendix E Introduction

NAVFAC P-307 Appendix E provides crane test procedures. Because of the various makes and models of cranes in the Navy’s inventory, it is not possible to include specific tests for each individual crane or component, and some tests may not be applicable. All applicable tests shall be performed, and activities shall ensure that all additional components and features that affect load bearing, load control, or operational safety are properly tested and documented even though not specifically noted in these tests.

Appendix E Introduction

Appendix A: Glossary
 Appendix B: Types of Weight Handling Equipment
 Appendix C: MSIR for Category 1 Cranes
 Appendix D: MSIR for Category 2 and 3 Cranes
Appendix E: Crane Test Procedures
 Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices
 Appendix G: Useful Lives of Cranes
 Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines
 Appendix I: Post-Lift Debrief Sheet
 Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes
 Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
 Appendix M: Procedures for Third Party Certification by the Navy Crane Center
 Appendix N: Personnel Competencies
 Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
 Appendix P: Contractor Crane (or Alternate Method Used to Lift Suspended Loads) and Rigging Gear Requirements
 Appendix Q: References
 Appendix R: Related Documents

Appendix E Test Procedures

In addition to load test prerequisites and precautions, appendix E provides inspection and test requirements for hook assemblies, insulated links, duplex hooks with shackle pin holes, portal cranes, floating cranes, tower cranes, hammerhead cranes, mobile cranes, aircraft crash cranes, articulating and telescoping boom cranes, bridge and overhead traveling cranes, wall cranes, gantry cranes, semi-gantry and cantilever gantry cranes, portable gantry/A-frames with permanently

Appendix E: Crane Test Procedures

- Hooks
- Insulated Links
- Duplex Hooks
- Portal, Floating, Tower, and Hammerhead Cranes
- Mobile, Aircraft Crash, RTG, and Category 4 Cranes
- Bridge, Overhead Traveling, and Wall Cranes
- Gantry, Semi-gantry, and Cantilever Gantry Cranes
- Portable gantry/A-Frames with Permanently Mounted Hoists
- Jib, Pillar, and Pillar-jib Cranes
- Monorail Cranes
- Davits
- Fixed Overhead Hoists
- Mobile Boat Hoists



LOAD TEST DIRECTOR STUDENT GUIDE

mounted hoists, jib, pillar, and pillar-jib cranes, monorail cranes, davits, fixed overhead hoists, mobile boat hoists, and rubber-tired gantry cranes.

Appendix F Introduction

NAVFAC P-307 Appendix F provides examples of load bearing parts, load controlling parts, and operational safety devices.

LB, LC, OSDs

Below is a sample listing of components, parts and devices from Appendix F. Correctly identify each item as either a load bearing part, load controlling part, or an operational safety device by clicking in the appropriate box.

Appendix F- Introduction	
Appendix A: Glossary	Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix B: Types of Weight Handling Equipment	Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix C: MISR for Category 1 Cranes	Appendix N: Personnel Competencies
Appendix D: MISR for Category 2 and 3 Cranes	Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix E: Crane Test Procedures	Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices	Appendix Q: References
Appendix G: Useful Lives of Cranes	Appendix R: Related Documents
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines	
Appendix I: Post-Lift Debrief Sheet	
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes	
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	

Below is a sample listing of components, parts, and devices from Appendix F. Correctly identify each item as either a load bearing part, load controlling part, or an operational safety device by clicking in the appropriate box.

1	Hook	
3	Radius Indicator	
2	Travel Gear Shafts	
1	Hoist Drive Train Components	
2	Rotate Electric Brakes	
3	Overload Indicator with Shutdown Capability	
3	Upper Hoist Limit Switch	
1	Wire Rope Drum	
		1) Load Bearing Part
		2) Load Controlling Part
		3) Operational Safety Device

Appendix G: Useful Lives of Cranes

The content of NAVFAC P-307 Appendix G, Useful Lives of Cranes, provides useful life recommendations for determining the life-cycle costs of cranes.

Appendix G - Useful Lives of Cranes

Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment

Appendix C: MISR for Category 1 Cranes

Appendix D: MISR for Category 2 and 3 Cranes

Appendix E: Crane Test Procedures

Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices

Appendix G: Useful Lives of Cranes

Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines

Appendix I: Post-Lift Debrief Sheet

Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, Except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.

Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes

Appendix M: Procedures for Third Party Certification by the Navy Crane Center

Appendix N: Personnel Competencies

Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests

Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements

Appendix Q: References

Appendix R: Related Documents

APPENDIX G: USEFUL LIVES OF CRANES

New Crane Center recommends the following values to be used in determining the useful lives of cranes:

	Category 1	Category 2	Category 3	Category 4
STRUCTURAL	25	20	15	10
WHEELS	15	10	7	5
HYDRAULIC	15	10	7	5
OPERATOR	15	10	7	5
WINDING	15	10	7	5
CONTROL	15	10	7	5

Notes:

Category 1 Cranes – cranes which are not cab-operated, hoisting, variable speed and have a rated capacity of 10,000 lbs or less.

Category 2 Cranes – cab-operated and cab-controlled, hoisting, variable speed and have a rated capacity of 10,000 lbs or less.

Category 3 Cranes – cab-operated and cab-controlled, hoisting, variable speed and have a rated capacity of 10,000 lbs or less.

Category 4 Cranes – cab-operated and cab-controlled, hoisting, variable speed and have a rated capacity of 10,000 lbs or less.

Exceptions:

1. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

2. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

3. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

4. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

5. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

6. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

7. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

8. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

9. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

10. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

11. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

12. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

13. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

14. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

15. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

16. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

17. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

18. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

19. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

20. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

21. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

22. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

23. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

24. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

25. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

26. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

27. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

28. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

29. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

30. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

31. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

32. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

33. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

34. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

35. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

36. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

37. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

38. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

39. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

40. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

41. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

42. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

43. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

44. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

45. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

46. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

47. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

48. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

49. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

50. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

51. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

52. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

53. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

54. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

55. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

56. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

57. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

58. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

59. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

60. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

61. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

62. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

63. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

64. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

65. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

66. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

67. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

68. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

69. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

70. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

71. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

72. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

73. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

74. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

75. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

76. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

77. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

78. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

79. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

80. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

81. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

82. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

83. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

84. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

85. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

86. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

87. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

88. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

89. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

90. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

91. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

92. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

93. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

94. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

95. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

96. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

97. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

98. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

99. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

100. A crane with a rated capacity of 10,000 lbs or less, which is not cab-operated, hoisting, variable speed and has a rated capacity of 10,000 lbs or less, shall be assigned a useful life of 10 years.

Appendix H: Condition Based Maintenance Req.

The content of NAVFAC P-307 Appendix H, Condition-Based or Reliability-Based Maintenance Guidelines, provides predictive condition monitoring techniques that may be utilized in lieu of specific required maintenance inspection items found in appendices C and D. The allowance for the listed techniques to be utilized in lieu of the maintenance inspection items presumes that the activity has sufficient training in the specified techniques or has arranged for expert level collection or review of data where required.

Appendix H - Condition-Based Maintenance Requirements

Appendix I: Crew Debrief Sheet

NAVFAC P-307 Appendix I, Post-Lift Debrief Sheet, provides a post-lift debrief document that is recommended to be completed when an immediate debrief would be worthwhile, such as changed conditions affecting the lift, the lift procedure was not fully followed, crane team personnel were distracted, or when monitor program observers detected tangible deficiencies. Reviewing the lifting evolution soon after the lift provides a unique opportunity to improve the process.

Appendix I - Crew Debrief Sheet

Appendices J, K, & L Introduction

NAVFAC P-307 Appendices J, K, and L provide the basic attributes for testing a crane operator candidate's operational performance. These basic performance tests shall be supplemented and modified as needed by each activity for specific crane types, characteristics, and operations.

Appendices J, K, and L Introduction

Appendix A: Glossary Appendix B: Types of Weight Handling Equipment Appendix C: MISH for Category 1 Cranes Appendix D: MISH for Category 2 and 3 Cranes Appendix E: Crane Test Procedures Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices Appendix G: Useful Lives of Cranes Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines Appendix I: Post-LIR Defect Sheet Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes Appendix M: Procedures for Third Party Certification by the Navy Crane Center Appendix N: Personnel Competencies Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alliteration Requests Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements Appendix Q: References Appendix R: Related Documents
---	--

Appendices J, K, & L: Performance Tests

This screen provides descriptions of the content for each appendix. Appendix J contains the basic performance test requirements and instructions for applicants of category 1 crane licenses. Appendix K provides the basic performance test requirements and instructions for applicants of category 2 and cab-operated category 3 crane licenses. Appendix L provides the basic performance test requirements and instructions for applicants of mobile boat hoists and rubber-tired gantry crane licenses.

Appendices J, K, and L - Crane Operator Basic Performance Tests

- Appendix J - Contains the basic performance test requirements and instructions for applicants of category 1 crane licenses
- Appendix K - Provides the basic performance test requirements and instructions for applicants of category 2 and cab-operated category 3 crane licenses
- Appendix L - Provides the basic performance test requirements and instructions for applicants of mobile boat hoists and rubber tired gantry crane licenses

Appendix J: Cat. 1 Crane Operator Performance Test

Shown here is a preview of the first two pages of the category 1 crane operator performance test displaying various instructions and attributes.

Appendix J - Category 1 Crane Operator Basic Performance Test

APPENDIX J - BASIC PERFORMANCE TEST FOR WEIGHT-HANDLING EQUIPMENT OPERATOR LICENSE CATEGORY 1 CRANES EXCEPT MOBILE BOAT HOISTS AND RUBBER-TIRED GANTRY CRANES	
Notes: (1) Prerequisite for this examination is complete familiarity with Standard Hand Signals for Controlling Crane Operations shown in Figure 10-1. (2) Performance test requirements shall be supplemented and modified by each activity for the particular operating characteristics and features of these cranes as well as the unique nature of the activity. (3) Performance tests for articulating boom and other telescoping boom cranes shall be modified, as necessary, for the type of crane being used. (4) Notation on Test Forms: A short line is provided before each test item. The examiner shall make a check mark to indicate that the applicant has correctly performed or otherwise the applicant fails to perform or answer correctly. The examiner shall provide a short written explanation of all failures. Items that are not applicable shall be marked "N/A."	GROUP A - PRE-OPERATION INSPECTION 1. PRE-USE CHECK. Note: The hook should be accessible for inspection. - Ensure the crane is currently certified before proceeding. - Check the crane for tags or other operational restrictions or warnings. - Ensure no repairs are in progress. - Ensure no vehicles or objects are in a position where they might be struck by the crane and that no other ground or overhead obstructions and hazards are in the crane parking, travel, and work areas. - Perform a pre-use walk around check, a machinery check, and an operator cab check, and document on a Crane Operator's Daily Checklist (COC), (Figure 9-1). - Remove all old chocks, unlabeled rail clamps, and remove rail truck spring wedges as required. 2. FAMILIARITY WITH LUBRICATION REQUIREMENTS. - Check lubricant levels where accessible and identify points that may require lubrication during periods of operation. GROUP B - STARTING THE ENGINE - Check the position and disengage the master switch, engine clutch, or hydraulic pump drive as applicable. - Check controller handles and ensure they are in neutral. Note: The operator shall explain to the examiner the function of the control handles and of all other pedals, levers, and switches on the crane. - Start the engine in sequence and in the manner prescribed by the OEM. - Observe gauges for correct readings and describe purpose of gauges. - Allow the engine to warm up as appropriate. Note: Cranes equipped with air or hydraulic controls shall not be operated until gauges show required operating pressure.
GENERAL INFORMATION: TESTING ACTIVITY: _____ TEST DATE: _____ APPLICANT'S NAME: _____ TO BE COMPLETED BY EXAMINER MAKE AND MODEL OF TEST CRANE: _____ TYPE AND CAPACITY (See section 8, paragraph 8.7.3): _____ RESULTS: SATISFACTORY _____ UNSATISFACTORY _____ REMARKS: _____ SIGNATURE: _____ J-1	J-2

Appendix K: Cat. 1 Crane Operator Performance Test

Shown here is a preview of the first two pages of the category 2 and cab-operated category 3 crane operator performance test displaying various instructions and attributes.

Appendix K - Category 2 and Cab-Operated Category 3 Crane Operator Basic Performance Test

APPENDIX K - BASIC PERFORMANCE TEST FOR WEIGHT-HANDLING EQUIPMENT OPERATOR LICENSE CATEGORY 2 AND CAB-OPERATED CATEGORY 3 CRANES	
Notes: (1) Prerequisite for this examination is complete familiarity with Standard Hand Signals for Controlling Crane Operations shown in Figure 10-1. (2) Performance test requirements shall be supplemented and modified by each activity for the particular operating characteristics and features of these cranes as well as the unique nature of the activity. (3) The performance testing includes evaluation of the operator's ability to follow hand signals. Unacceptable actions include moving without a signal and incorrect response to signals. If the operator will be required to operate without seeing the last, the test shall be modified accordingly. Additional criteria for testing the ability to follow hand signals and hand operator are included in appendix L (Basic performance test problem 4). (4) Notation on Test Forms: A short line is provided before each test item. The examiner shall make a check mark to indicate that the applicant has correctly performed or otherwise the applicant fails to perform or answer correctly. The examiner shall provide a short written explanation of all failures. Items that are not applicable shall be marked "N/A."	GROUP A - PRE-OPERATION INSPECTION 1. PRE-USE CHECK. - Ensure the crane is currently certified before proceeding. - Check the crane for tags or other operational restrictions or warnings. - Ensure no repairs are in progress. - Perform the walk-around, machinery, and operator's cab checks listed on the Operator Daily Checklist (COC), and document on the COC, (Figure 9-1). - If applicable, check tracks for obstructions, misalignment, damage, loose components, and confirm that no repair is in progress. - Check the wire and techniques and observe. Inspect condition before proceeding (see Note). 2. FAMILIARITY WITH LUBRICATION REQUIREMENTS. - Check lubricant levels where accessible and identify points that may require lubrication during periods of operation. GROUP B - TESTING OPERATING CONTROLS - Check to assure that all controls are in the "OFF" position. - Engage the crane. - If equipped, check the action of clamping, switching. - Test the action of load controllers by raising, lowering, and stopping the hook. - Test the action of load controllers and brakes by moving the crane back and forth a few feet. Check for proper brake action. - Test the braking controllers and brakes by moving the hook back and forth a few feet. Check for proper brake action. - Test the end switches and other safety devices. - Check the emergency stop, operational safety devices, warning devices and gauges. Describe number of interdependencies. - Document the operating test portion on the COC. The applicant and the performance examiner shall sign the COC.
GENERAL INFORMATION: TESTING ACTIVITY: _____ TEST DATE: _____ APPLICANT'S NAME: _____ TO BE COMPLETED BY EXAMINER MAKE AND MODEL OF TEST CRANE: _____ CAPACITY: _____ TYPE OF CONTROLS: _____ RESULTS: SATISFACTORY _____ UNSATISFACTORY _____ REMARKS: _____ SIGNATURE: _____ K-1	K-2

Appendix L: Cat. 1 Crane Operator Performance Test

Shown here is a preview of the first two pages of the mobile boat hoist and rubber tired gantry crane operator performance test displaying various instructions and attributes.

Appendix L - Mobile Boat Hoist and Rubber Tired Gantry Crane Operator Basic Performance Test

APPENDIX L: BASIC PERFORMANCE TEST
FOR WEIGHT HANDLING EQUIPMENT OPERATOR LICENSE:
MOBILE BOAT HOISTS AND RUBBER-TIRED GANTRY CRANES

TEST: (1) *Prepared for this examination is a complete familiarity with Standard Load Tables for Container Crane Candidates issued from 19-1.*

(2) Performance test requirements shall be supplemented and modified by such other test the national operating characteristics and features of their mobile boat hoist or rubber-tired gantry crane, as well as the unique features of the activity.

(3) Performance tests may be modified to assess an operator's ability to safely operate a mobile boat hoist used for purposes other than lifting loads in or out of the water. For example, some mobile boat hoists are not used to place cargo on maintenance docks. Similarly, this test may be modified as needed for rubber-tired gantry cranes.

(4) **Notation on Test Form:** A spot line is provided before each test item. The operator shall make a check mark to indicate that the applicant has correctly performed or answered the question. The examiner shall indicate by zero or circle where applicant fails to perform or answer correctly. The examiner shall provide a brief written explanation of all failures. Items that are not applicable shall be marked "N/A".

GENERAL INFORMATION

TESTING ACTIVITY: _____ TEST DATE: _____

APPLICANT'S NAME: _____

TO BE COMPLETED BY EXAMINER

NAME AND MODEL OF TEST CRANE: _____

CAPACITY: _____

RESULTS: SATISFACTORY _____ UNSATISFACTORY _____

REMARKS: _____

SIGNATURE: _____

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

NOTE: Hooks should be accessible for inspection.

_____ 4. Ensure the crane is currently certified/under processing.

_____ 5. Check the crane for any other operational conditions or warnings.

_____ 6. Ensure no repairs are in progress.

_____ 7. Ensure no vehicles or objects are in a position where they might be struck by the crane and that no other ground or overhead obstacles and hazards are in the pathing, travel and work areas.

_____ 8. Perform a walk around check, a machinery check, and an operator cab check, and document on a Crane Operator's Daily Checklist (COC, Type B-1).

_____ 9. Remove wheel chocks or wedges as required.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS

_____ 10. Check lubricant levels where accessible.

_____ 11. Identify points that may require lubrication during periods of operation.

GROUP B - STARTING THE ENGINE

_____ 1. Check the position and discharge the master clutch or hydraulic pump when in operation.

_____ 2. Check the controller handles and ensure that they are in neutral.

NOTE: The operator shall explain to the examiner the function of the controller handles and of all other pedals, levers, and switches on the crane.

_____ 3. Start the engine the manner prescribed by the COB.

_____ 4. Observe gauges for correct readings and describe the position of gauges.

_____ 5. Observe the load indicators for correct readings without load, if applicable.

_____ 6. Allow the engine to warm up as appropriate. []

Appendix M Introduction

NAVFAC P-307 Appendix M provides procedures for third party certifications performed by Navy Crane Center on Navy owned cranes, derricks, container spreaders, and below-the-hook lifting devices. This includes a documentation review, condition inspection, load test, and satisfactory completion of local certification requirements. NAVFAC P-307 section 4 provides additional certification information.

Appendix M Introduction

Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment

Appendix C: MISR for Category 1 Cranes

Appendix D: MISR for Category 2 and 3 Cranes

Appendix E: Crane Test Procedures

Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices

Appendix G: Useful Lives of Cranes

Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines

Appendix I: Post-Lift Debrief Sheet

Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.

Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes

Appendix M: Procedures for Third Party Certification by the Navy Crane Center

Appendix N: Personnel Competencies

Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests

Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements

Appendix Q: References

Appendix R: Related Documents

Appendix M Forms

Appendix M contains two forms used by Navy Crane Center third party certifiers: Figures M-1 and M-2. Click on either title to display the forms. Figure M-1 is the Certificate of Unit Test and/or Examination of Crane, Derrick, or Other Material Handling Device and is used to indicate a satisfactory third-party certification of applicable equipment. Figure M-2 is the Notice to Owner of Deficiencies Found on the Certification Survey and is used to document uncorrected deficiencies found during the third-party test and examination.

Appendix M Forms: Figure M-1 and Figure M-2

Click on either title to view the form.

[Third Party Certificate](#)

[Notice of Deficiencies](#)



NAVY CRANE CENTER
Naval Facilities Engineering Command

Certificate of Unit Test and/or Examination of Crane, Derrick, or Other Material Handling Device

This certificate may be issued only by persons specifically approved by the Navy Crane Center to comply with the Navy's Alternate Standard for Certification of Weight Handling Equipment. NAVFAC P-307 has been approved by the U.S. Department of Labor, Occupational Safety and Health Administration, as an alternate means of compliance with the provisions of 29 CFR Part 1919.

1. Owner: _____

2. Description (check): Crane _____ Derrick _____ Other (describe): _____
Location: (a) Remains at work site _____ (b) Changes work site _____ (c) Aboard vessel _____
if (a) or (c), describe: _____
if crane, type (truck, rail, etc.): _____
Manufacturer: _____ Model: _____ Serial No.: _____
if derrick, describe: _____
Owner's identification, if any: _____

3. Service status at time of survey (check): Lifting _____ Clamshell _____ Magnet _____
Other: Describe: _____

4. Boom at time of survey (except bridge cranes): Length _____ Type _____

5. Test loads applied (cross out if only examination conducted):
Radius _____ Proof Loads (TEST LOAD) _____ Rated Loads _____

Means of application of proof load: _____
Basis for assigned load ratings: _____

6. Remarks and/or limitations imposed: _____

7. Load indicating or limiting device (check): Filled _____ Not filled _____ Accuracy per _____
I certify that on the _____ day of _____, 20____, the above described device was (tested and examined) (examined) by the undersigned or his/her authorized representative, that said (tested and examined) (examination) met in all respects with the requirements of NAVFAC P-307, an OSHA approved alternate standard for compliance with the provisions of 29 CFR Part 1919; any deficiencies considered to constitute an unsatisfactory condition have been corrected; and that the device has been found to be in compliance in all applicable respects with the governing requirements.
Name and address of accredited or otherwise authorized organization making the test and/or examination: Navy Crane Center, Bldg 481 NNSV, Portsmouth, VA 23769
Name and address of authorized person carrying out the test and/or examination: _____
Position of signatory in the organization making the test and/or examination: _____

Distribution:
Original - Owner (post in operator cab) _____ Signature: _____
Copies to - Owner (equipment history file) _____
Certifier _____ Date: _____
Navy Crane Center

Figure M-1



NAVY CRANE CENTER
Naval Facilities Engineering Command

Notice to Owner of Deficiencies Found on Certification Survey

This notice may be issued only by persons specifically approved by the Navy Crane Center to comply with the Navy's Alternate Standard for Certification of Weight Handling Equipment. NAVFAC P-307 has been approved by the U.S. Department of Labor, Occupational Safety and Health Administration, as an alternate means of compliance with the provisions of 29 CFR Part 1919.

1. Owner: _____

2. Identification, location, and specific description of equipment: _____

3. The undersigned, being authorized to do so, hereby renders notification of the following listed uncorrected deficiencies, found upon (test and examination) (examination) of the described equipment in accordance with the requirements of NAVFAC P-307, to constitute in the opinion of the undersigned a currently unsatisfactory condition.

4. Under the applicable requirements of NAVFAC P-307, an OSHA approved alternate standard for compliance with the provisions of 29 CFR Part 1919; the issuance of any certificate of (test and examination) (examination) is prohibited until such time as correction of deficiencies has been verified by the undersigned.

5. Name and address of accredited or otherwise authorized organization making the test and/or examination: Navy Crane Center, Bldg 481 NNSV, Portsmouth, VA 23769

6. Name and address of authorized person carrying out the test and/or examination: _____

7. Position of signatory in the organization making the test and/or examination: _____

Distribution:
Original - Owner (post in operator cab) _____ Signature: _____
Copies to - Certifier _____ Date: _____
Navy Crane Center

Figure M-2

Appendix N Introduction

NAVFAC P-307 Appendix N provides a listing of competency attributes that personnel must satisfy prior to performing assigned weight handling duties in the noted positions. Appendix N augments the requirements of sections 1, 3, 4, 7, 8, and 10, all of which discuss personnel qualifications.

Appendix N: Personnel Competencies

Listed here are the positions found in appendix N, Competency Requirements. Additional requirements, competencies, skills, and knowledge may be required by individual activities or by other policies, instructions, or directives.

Appendix N Introduction

Appendix A: Glossary	Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix B: Types of Weight Handling Equipment	Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix C: MSRs for Category 1 Cranes	Appendix N: Personnel Competencies
Appendix D: MSRs for Category 2 and 3 Cranes	Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix E: Crane Test Procedures	Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices	Appendix Q: References
Appendix G: Useful Lives of Cranes	Appendix R: Related Documents
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines	
Appendix I: Post-Lift Debrief Sheet	
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes	
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	

Appendix N: Personnel Competencies

- Maintenance Personnel: Mechanic and Electrician
- Inspector
- Load Test Director
- Operator of Non-Cab Operated Category 3 WHE
- Rigger
- Crane Walker
- Crane Signal Person
- Operator Supervisor
- Rigger Supervisor
- Maintenance Mechanic/Electrician, Inspector, and Load Test Director Supervisor
- Engineer
- Certifying Official
- Weight Handling Program Manager

Appendix O Introduction

NAVFAC P-307 Appendix O provides supplemental engineering policies and guidance for crane alteration requests. This appendix works in conjunction with section 6, which provides the basic information for the crane alteration process as well as examples of the crane alteration request and mandatory alteration forms found in Figures 6-1 and 6-2.

Appendix O Introduction

Appendix A: Glossary	Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix B: Types of Weight Handling Equipment	Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix C: MISR for Category 1 Cranes	Appendix N: Personnel Competencies
Appendix D: MISR for Category 2 and 3 Cranes	Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix E: Crane Test Procedures	Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices	Appendix Q: References
Appendix G: Useful Lives of Cranes	Appendix R: Related Documents
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines	
Appendix I: Post-Lift Debrief Sheet	
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes	
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	

Appendix O Topics

What is in appendix O? Appendix O discusses the prioritization and scoping of alteration requests, when alteration requests should and should not be used, design and as built considerations, and industry standards related to the certification of weight handling equipment. See the list on the screen for additional topics contained in appendix O.

What is in Appendix O?

- Prioritization
- Scope
- When and When Not Required
- Design vs. As-Built
- Industry Related Standards
- Tires
- Shaft Alignment
- Shear Loads
- Multiple Crane CARs
- Locally Approved CARs
- Microprocessor Controlled Cranes
- Component Adjustments

Appendix P Introduction

NAVFAC P-307 Appendix P, Contractor Crane and Rigging Gear Requirements, provides copies of the Certificate of Compliance and the Contractor Crane or Rigging Operation Checklist. These forms are more commonly known as the “P-1” and “P-2.” These forms augment section 11 requirements and assist with oversight of contractor crane and rigging operations on Navy property.

Appendix P: Introduction

Appendix A: Glossary	
Appendix B: Types of Weight Handling Equipment	
Appendix C: MISR for Category 1 and 4 Cranes	
Appendix D: AMISR for Category 2 and 3 Cranes	
Appendix E: Crane Test Procedures	
Appendix F: Examples of LB, LC, and OSD	
Appendix G, H, and I: Reserved for Future Use	
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 and 4 Cranes	
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	
Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes	
Appendix M: Procedures for Third Party Certification by the Navy Crane Center	
Appendix N: Personnel Competencies	
Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests (CAR)	
Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements	
Appendix Q: References	
Appendix R: Related Documents	

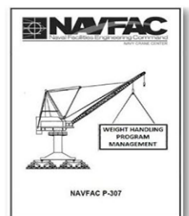


Figure P-1: Certificate of Compliance

This certificate shall be signed by an official of the company that provides cranes or rigging gear for any application under a contract. A completed certificate shall be posted on each crane or alternate machine brought onto Navy property. Briefly, the company official signing this form certifies that the equipment conforms to applicable industry standards, the equipment operators are properly trained and are qualified, all safety devices and operator aids are enabled and functioning properly, personnel are aware of the actions required in the event of an accident, signal persons used in construction work are properly qualified, riggers are qualified, and personnel have been trained to not stand under a load or in the fall zone. See section 11 and appendix P for more detailed descriptions of these requirements.

APPENDIX P – CONTRACTOR CRANE (OR ALTERNATE MACHINE USED TO LIFT SUSPENDED LOADS) AND RIGGING GEAR REQUIREMENTS	
CERTIFICATE OF COMPLIANCE	
This certificate shall be signed by an official of the company that provides cranes (or multi-purpose machines, MHE, or construction equipment used to lift loads suspended by rigging gear) or rigging gear for any application under this contract. Post a completed certificate on each crane or alternate machine (or in the contractor's on-site office for rigging operations) brought onto Navy property.	
CONTRACTING OFFICER'S POINT OF CONTACT (Government Representative)	PHONE
PRIME CONTRACTOR/PHONE	CONTRACT NUMBER
CRANE OR ALTERNATE MACHINE SUPPLIER/PHONE (if different from prime contractor)	CRANE OR ALTERNATE MACHINE NUMBER (i.e., ID number)
CRANE OR ALTERNATE MACHINE MANUFACTURER/TYPE/CAPACITY	
CRANE OR ALTERNATE MACHINE OPERATOR'S NAME(S)	
I certify that:	
1. The above noted crane or alternate machine and all rigging gear conform to applicable OSHA regulations (for station regulations for naval activities in foreign countries) and applicable ASME B30 or other standards. The following OSHA regulations and ASME or other standards apply:	
2. The operators noted above have been trained and are qualified for the operation of the above noted crane(s) or alternate machine(s).	
3. All safety devices and operator aids are enabled and functioning properly and the operators noted above have been trained not to bypass safety devices and operator aids during lifting operations.	
4. The operators, riggers and company officials are aware of the actions required in the event of an accident as specified in the contract.	
5. Signal persons used in construction work are qualified in accordance with 29 CFR 1926.1428.	
6. Riggers are qualified in accordance with NAVFAC P-307, paragraph 11.1.k.	
7. All personnel working on the job site have been trained to not stand under a load or in the fall zone of a suspended load unless specifically allowed by USACE EM 385.1.1.	
COMPANY OFFICIAL SIGNATURE	DATE
COMPANY OFFICIAL NAME/TITLE	
POST ON CRANE (OR ALTERNATE MACHINE) (IN CAB OR VEHICLE) (or in the contractor's on-site office for rigging operations)	

Figure P-1

Figure P-1: Certificate of Compliance

Figure P-2: Contractor Crane or Rigging Operation Checklist

Appendix P, Figure P-2, provides a checklist that shall be used during oversight of contractor crane and rigging operations. Copies of Figure P-2 shall be kept on file for one year. Personnel performing oversight shall complete the Contractor Crane Awareness training course or the NAVFAC 40-hr Contract Hazard Awareness Training Course.

CONTRACTOR CRANE OR RIGGING OPERATION CHECKLIST		YES	NO	N/A
1	Is the Certificate of Compliance, P-1, in the operator's cab (or in the contractor's on-site office for rigging operations) with the current operator's name listed?			
2	Is the crane machine transported and for the job site correctly? Are the OSHA instructions for being followed?			
3	Does the operator know the weight of the load to be lifted?			
4	Is the load to be lifted within the crane machine manufacturer's rated capacity in the present configuration?			
5	Are any personnel required and, if so, are they properly educated and trained?			
6	If all personnel are used, and the vehicle is not off the ground is this the correct setup in accordance with the OSHA?			
7	Is the crane machine used and on the ground, and if the ground is not firm are adequate supporting materials provided?			
8	If supporting materials are provided, is the entire surface of the supporting material used and is the supporting material of sufficient strength to support the loaded suspended load?			
9	If supporting materials are not used, is the crane machine used for an additional 10% to the OSHA rated capacity?			
10	Is the weight of the crane counterweight clear of people and obstructions and are accessible areas within the basic area facilitated to prevent injury or damage?			
11	Has the load been centered over the load in such a manner to prevent sway?			
12	Is the load secured and balanced in the sling or lifting device after it is lifted in the hoist for the lift?			
13	Is the lift and release path clear of obstructions?			
14	Provision of the load being lifted is suspension, is a negative or other restraint being used?			
15	Are personnel prevented from standing or passing under a suspended load?			
16	Is the operator paying full attention to the signal person?			
17	Are proper signals being used? Is the operator responding properly to the signals? Are radios used for the lift?			
18	Are emergency blocks raised or otherwise secured during travel to prevent swinging?			
19	Does the operator remain at the controls while the load is suspended?			
20	Does the operator ensure that the load is a positive?			
21	Are personnel prevented from being in a fall zone?			
22	Are dual and other motions in a smooth fluid motion (no sudden accelerations or decelerations)?			
23	Is this a critical lift?			
24	If yes, is a lift plan provided and understood and checked off clearly related and signed off?			
25	Is overhead power lines in the vicinity, is a critical lift plan provided addressing the requirements of 29 CFR 1926.1407?			
26	If peak and entry operations are allowed, are personnel, are OSHA directions followed, is a caution lock engaged, boom extended over head or rear, etc.?			
27	When the crane/machine is not in operation, is it in a safe condition?			
28	Is rigging gear undamaged and acceptable for the application?			

Figure P-2 (1 of 2)

Figure P-2 (2 of 2)

Figure P-2: Contractor Crane or Rigging Operation Checklist

Appendices Q and R Introduction

NAVFAC P-307 Appendix Q “References” and appendix R “Related Documents” provide lists of documents, manuals, instructions, publications, and standards either directly referenced in the manual appendix Q or related to the subject matter of the manual appendix R.

Appendices Q and R Introduction

Appendix A: Glossary
Appendix B: Types of Weight Handling Equipment
Appendix C: MISR for Category 1 Cranes
Appendix D: MISR for Category 2 and 3 Cranes
Appendix E: Crane Test Procedures
Appendix F: Examples of Load Bearing Parts, Load Controlling Parts, and Operational Safety Devices
Appendix G: Useful Lives of Cranes
Appendix H: Condition-Based/Reliability-Based Maintenance Guidelines
Appendix I: Post-Lift Debrief Sheet
Appendix J: Basic Performance Test for Weight Handling Equipment
Operator License: Category 1 Cranes, except Mobile Boat Hoists and Rubber-Tired Gantry Cranes.
Appendix K: Basic Performance Test for Weight Handling Equipment
Operator License: Category 2 and Cab-Operated Category 3 Cranes

Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes
Appendix M: Procedures for Third Party Certification by the Navy Crane Center
Appendix N: Personnel Competencies
Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests
Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix Q: References
Appendix R: Related Documents

Appendices Q & R: References and Related Documents

Appendix Q identifies the 83 military, federal, industry, and consensus standards referenced in the manual.

Appendix R provides a list of standards and guides that provide additional weight handling related information.

Appendices Q and R - References and Related Documents

Appendix Q Examples:

- United Facilities Criteria 3-430-07, Operations and Maintenance: Inspection and Certification of Boilers and Unfired Pressure Vessels
- NAVFAC Instruction 11230.1, Inspection, Certification, and Audit of Crane and Railroad Trackage
- NAVAIR 00-80T-119, Weight Handling Equipment Support Manual
- EM 385-1-1, Safety and Health Requirements Manual
- Motor Carrier Safety Regulation 49 CFR Part 391, Sections 41-43, Physical Qualifications and Examinations

Appendix R Examples:

- Bob's Rigging and Crane Handbook
- Handbook for Riggers, Mobile Craning Today
- OPNAV Instruction 5450.348, Mission, Functions and Tasks of the Naval Facilities Engineering Command
- Wire Rope Users Manual
- Naval Ships' Technical Manual S9086-T4-STM-010, Chapter 589, Cranes

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Completion

Congratulations.

You have completed the NAVFAC P-307 Overview Appendices A-R module.

Click on the Exit button to return to the main module menu.

LTD CERTIFICATION PROGRAM OVERVIEW

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Certification Program Overview.

Introduction

This module introduces two primary activities of the Navy's crane certification program: inspection and testing. The personnel, paperwork, and general process associated with these activities will be presented. Understanding that the safety of personnel and equipment is the cornerstone of any Navy process, engaging in a high-quality crane certification program should be the aim of every weight handling management team. In the field, ensure the correct requirements are followed for each specific situation by paying particular attention to the wording found in NAVFAC P-307 section 4 "Certification" and appendix E, "Crane Test Procedures."

Learning Objectives

Upon successful completion of this module, you will be able to identify the titles of the personnel assigned to ensure that an activity's cranes are inspected, tested, and certified in accordance with NAVFAC P-307; define three key terms that categorize the major equipment, parts, and components on the crane; explain the purpose of the load test and condition inspection; identify the forms used to document the inspection and testing processes; provide a general overview of the certification and recertification process; and explain when a load test may or may not be required.



Naval Facilities Engineering Systems Command
NAVY CRANE CENTER



NAVFAC P-307

Welcome

Welcome to the NAVFAC-P307 Load Test Director Training module: Certification Program Overview.

Begin

Introduction

- This module introduces two primary activities of the Navy's crane certification program:
 - Inspection
 - Testing
 - A high quality crane certification program should be the aim of every weight handling management team.
 - Ensure the correct requirements are followed for each specific situation.
-
-
-

Learning Objectives

Upon successful completion of this module, you will be able to:

- Identify the titles of program personnel
- Define three key equipment terms
- Explain the purpose of test and inspection
- Identify the forms used
- Provide a process overview
- Explain whether or not a load test is required



Personnel

The principal personnel in the Navy's crane certification program include the certifying official, the test director, and the condition inspector. The certifying official shall ensure the activity's cranes are inspected, tested, and certified in accordance with NAVFAC P-307. The test director has the overall responsibility for performing the load test. The condition inspector ensures, through the inspection process, that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

Personnel

- The **Certifying Official** ensures cranes are
 - Inspected
 - Tested
 - Certified
- The **Test Director**
 - Has overall responsibility of the load test
- The **Condition Inspector** ensures that the overall
 - Structural
 - Mechanical
 - Electrical
 components are maintained in a safe and serviceable condition and are functioning properly.



Terminology

Here are three important terms that you must understand in the certification process. They are load bearing parts, load controlling parts, and operational safety devices. Study these definitions. It is vital that you, the load test director, understand how crucial these parts and devices are to the safe operation of the crane. Specific examples of load bearing parts, load controlling parts, and operational safety devices can be found in NAVFAC P-307, appendix F.

Terminology

Load Bearing Parts - Those parts of WHE that support the load and upon failure could cause dropping, uncontrolled shifting, or uncontrolled movement of the load. Backup components to primary load bearing parts, such as secondary brakes or shaft failure detection systems, shall also be considered as load bearing parts.

Load Controlling Parts - Those parts of WHE that position, restrain, or control the movement of the load (e.g., rotate and travel brakes, clutches), a malfunction of which could cause dropping, uncontrolled shifting, or uncontrolled movement of the load. Crane mounted diesel engines, generators, electrical power distribution systems, and electrical control circuits, associated with the movement of the load, shall be treated as load controlling parts except as noted. Backup components to primary load controlling parts, such as secondary brakes or shaft failure detection systems, shall also be considered as load controlling parts.

Operational Safety Devices - Safety devices that affect the safe load lifting and handling capability of the equipment, such as interlocks, limit switches, load moment and overload indicators with shutdown capability, anti-two-block limit switches with warning capability, emergency stop switches, radius indicating devices, and locking devices.

Note: See **appendix F** for examples of load bearing parts, load controlling parts, and operational safety devices.

Purpose of the Load Test

Load tests of Navy weight handling equipment are performed in accordance with NAVFAC P-307 requirements. Refer to section 4 and appendix E. The purpose of the load test is to ensure by controlled operation with prescribed test loads that the equipment is capable of safely lifting and moving the rated load through all design motions.

The Purpose of the Load Test

- Ensure by controlled operation with prescribed test load that the equipment is capable of safely lifting and moving the rated load through all design motions



Recertification

Except when an annual certification expires, in which case a new annual certification is required, an interim recertification is required whenever the annual certification is voided. Recertification may differ from certification, especially when changes are made to crane components during the annual certification period. If these changes void the crane's current certification, an interim recertification is required.

Examples of cases that require interim recertification are the inadvertent overload of a crane's certified capacity or when an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed. See NAVFAC P-307 paragraphs 4.4 and 4.5 for additional information.

Required Load Test

Listed here are five events that require a load test. The acceptance of newly procured cranes; the annual certification for category 1 cranes; every fourth annual certification for category 2 and 3 cranes in the quadrennial load test program; an inadvertent overload which exceeds 125% of a crane's certified capacity (or 105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber-tired gantry cranes, articulating boom cranes and other telescoping boom cranes); and when an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed. See NAVFAC P-307 paragraphs 4.4, 4.5, and 4.7 for details and exceptions.

Recertification is Required

- When certification expires
 - when this happens, the crane will need to be recertified and have a "new" certification established
- When there is inadvertent overload in excess of the crane's certified capacity
- When an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed

See NAVFAC P-307 paragraphs 4.4 and 4.5 for additional information.

Required Load Test

- A load test is required:
 - For new crane procurement/acceptance
 - Annually for category 1 cranes
 - Every fourth annual certification for category 2 and 3 cranes
 - For an inadvertent overload
 - For an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device



See NAVFAC P-307 paragraph 4.4, 4.5, and 4.7 for details and exceptions.

Selective Load Test

A deficiency, adjustment, alteration, etc., to one function will not necessarily void the entire crane certification provided the affected function is appropriately tagged and, if practical, made non-operational. Selective load testing affords the opportunity to test a single component or system in lieu of testing the entire crane thereby allowing other portions of the crane to remain unaffected.

To determine if a load test is required, the component's impact on holding strength shall be assessed. If holding strength could be affected by the work performed then a selective inspection, load test, and recertification shall be performed. The extent of the inspection and testing may be limited, where practical, to those parts and components of systems affected, but shall fully ensure that the adjustment, repair, disassembly, replacement, or alteration has been performed correctly and that the crane operates properly.

When load tests are performed, they shall include the applicable portions of both the static and dynamic tests of appendix E. See NAVFAC P-307 paragraphs 4.4 and 4.5 for additional information.

Selective Load Test

- Test only the component or system being worked on
- Has the holding strength of the component been affected?
- Must fully ensure proper operation
- All applicable portions of the static and dynamic tests shall be performed

See NAVFAC P-307 paragraph 4.4 and 4.5 for additional information.

Knowledge Checks

Online answers may appear in a different order than those shown below.

- Select the best answer to fill in the blank.** The _____ ensures that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.
 - Certifying Official
 - Condition Inspector
 - Load Test Director
 - Maintenance Inspector
- Select the best answer to fill in the blank.** The _____ ensures that the activity's cranes are inspected, tested, and certified in accordance with NAVFAC P-307 requirements.
 - Certifying Official
 - Condition Inspector
 - Load Test Director
 - Maintenance Inspector

3. **Select the best answer to fill in the blank.** The _____ directs the load test and ensures that it is performed safely and in accordance with NAVFAC P-307 requirements.
- A. Certifying Official
 - B. Condition Inspector
 - C. Load Test Director
 - D. Maintenance Inspector
4. **Select the best answer.** The purpose of the load test is to ensure by controlled operation with prescribed test loads that the equipment is capable of safely lifting and moving the rated load through all design motions.
- A. True
 - B. False
5. **Select the best answer to fill in the blank.** The purpose of the _____ is to ensure the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.
- A. condition inspection
 - B. load test
 - C. maintenance inspection
 - D. validation
6. **Select the best answer.** Identify the form used to record completion of the load test and condition inspection.
- A. Certification of Condition Inspection and Test
 - B. Crane Condition and Inspection Record
 - C. Maintenance Inspection Specification Record
 - D. Supplement for Mobile Cranes
7. **Select the best answer.** Of all the Navy's cranes, only category 1 cranes (all types and capacities) need to be inspected, tested, and certified every year.
- A. True
 - B. False
8. **Select the best answer. True or False:** When the repair or replacement of a load bearing part requires a load test for verification of satisfactory work performed, an interim load test is required.
- A. True
 - B. False

9. Select all that apply. From the items listed below, identify the events that require a load test.

- A. lifting a load within the crane's certified capacity
- B. mobile crane annual certification
- C. new crane acceptance
- D. replacement of the upper hoist limit switch
- E. the second annual certification of a one-ton pillar jib crane in a quadrennial program
- F. work performed on a component that affects holding strength

10. Select the best answer. To determine if a load test is required after a crane component is repaired—

- A. assess the component's impact on holding strength
- B. contact the chief engineer
- C. contact the OEM and review the OEM manuals
- D. research the equipment history files
- E. write an RCDR to Navy Crane Center

Summary

This module introduced two primary activities of the Navy's crane certification program: inspection and testing. It explained the purpose of inspection and testing and introduced the personnel and paperwork associated with these activities which include: the certifying official who is responsible for safe reliable cranes; the test director who oversees safe load testing of cranes; and the condition inspector who ensures equipment is in satisfactory condition. Equipment inspections, tests, and certifications are documented using the Crane Condition Inspection Record and the Certification of Condition Inspection and Test form. A deficiency, repair, or modification to one component or system does not mean that all systems need to be recertified. Selective inspection, testing, and recertification may be employed by following the requirements listed in NAVFAC P-307 section 4.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Recap, Wrap-Up, and What's Next?

- Two primary activities of crane certification: inspection and testing
- Purpose of inspection and testing
- Personnel and paperwork
- **Certifying Official:** responsible for safe reliable cranes
- **Test Director:** oversees load testing
- **Condition Inspector:** ensures equipment is in a satisfactory condition
- **Crane Condition inspection Record:** inspection documentation
- **Certification of Condition Inspection and Test form:** certification documentation

Similarities, differences, and explanations for:

- Annual Certification and Interim Recertification
- Load Test and Selective Load Test

Completion

Congratulations.

You have completed the Load Test Director Certification Program Overview module.

Click on the Exit button to return to the main module menu.

LTD QUALIFICATIONS AND RESPONSIBILITIES

Welcome

Welcome to the NAVFAC-P307 Load Test Director Training module: Qualifications and Responsibilities.



Learning Objectives

Upon successful completion of this module, you will be able to identify the individual load test team members, describe their fundamental training and qualification requirements, and list their basic individual and group responsibilities. We'll start with the load test director, then the condition inspector, followed by the crane operator, the rigger, and finally the crane walker.

Learning Objectives

Upon successful completion of this module, you will be able to:

- Identify the individual load test team members
- Describe their training and qualification requirements
- List basic individual and group responsibilities



Load Test Director Qualifications

Load test directors shall possess the knowledge and experience relevant to a particular crane's operations, component functions, and its maintenance and test procedures to competently load test that crane. They shall understand the duties and responsibilities of all other test team members. A load test director's qualification is a function of the local activity or command. As a minimum, test directors shall satisfy the training and competency requirements outlined in NAVFAC P-307 section 7 and appendix N. Additional training, such as OEM schools, vendor training, or locally developed competency attributes specific to an activity's equipment and processes should be considered. Test Directors shall be designated to oversee and direct

Load Test Director Qualifications

- Specific knowledge and experience
 - crane operations
 - component functions
 - maintenance and test procedures
- Duties and responsibilities of team members
- Satisfy NAVFAC P-307 requirements
- Be **designated** to oversee and direct load tests



Note: Refer to NAVFAC P-307 sections 4, 7, and appendix N for additional information.

load tests. Refer to NAVFAC P-307 sections 4, 7, and appendix N for additional information.

Load Test Director Responsibilities

Crane load tests require extreme caution and control. The test director has overall responsibility of the load test. This includes planning, directing, and controlling all aspects of the test, conducting the pre-test briefing, coordinating the activities of all test team members, ensuring the safety of personnel and equipment, having proper communications, ensuring accurate weight calculations, sizing the rigging gear correctly, and keeping non-essential personnel clear of the area.

Load Test Director Responsibilities

The load test director has overall responsibility for the load test:

- Planning, directing, controlling
- Pre-test briefing
- Coordinating activities
- Safety
- Communications
- Weight handling calculations
- Rigging gear
- No non-essential personnel



Condition Inspector

The condition inspector assists the test director by inspecting the current condition of safety devices, electrical components, mechanical equipment, and structural assemblies before, during, and after the load test. The inspector documents these findings on a Crane Condition Inspection Record or CCIR. Observed defects critical to continued testing are reported immediately to the test director, who shall suspend testing until the deficiency is corrected. The condition inspector will stop operations whenever safety becomes a concern.

The condition inspector's qualification is a function of the local activity or command. Condition inspectors shall have specific knowledge, relevant experience and technical competence to perform required inspections. As a minimum, they shall satisfy the training and competency requirements of NAVFAC P-307, section 7 and appendix N. Additional training, such as OEM schools, vendor training, or locally developed competency attributes specific to an activity's equipment and processes should be considered.

Condition Inspector

Condition Inspector Responsibilities:

- Assists the test director
- Assesses the condition of:
 - Safety devices
 - Electrical components
 - Mechanical equipment
 - Structural assemblies
- Inspects before, during, and after the load test
- Documents findings on a CCIR

Condition Inspector Qualifications:

- Qualified by the local activity
- Knowledge, experience, competence
- Satisfy NAVFAC P-307 requirements



Crane Operator

The load test team crane operator's primary responsibility is the safe operation of the crane. The crane operator shall perform a pre-use check of the crane prior to lifting loads. The operator shall only operate the crane as signaled and will stop all operations whenever safety becomes a concern or as signaled. Crane operators shall be licensed or qualified per NAVFAC P-307 requirements for the type, category, and capacity of crane they will be operating. Because of the additional risks associated with load testing, the load test team crane operator should have significant experience with, and knowledge of, the operating characteristics of the specific equipment being tested.

Crane Operator

Crane Operator Responsibilities:

- Safe operation of the crane
- Pre-use check of the crane
- Operates only as signaled
- Stops when safety is in question

Crane Operator Qualifications:

- Licensed or qualified (as required)
- Experienced and knowledgeable



Rigger

The load test team rigger has the responsibility of safely rigging test loads by correctly sizing, selecting, and inspecting the rigging gear, and for configuring the gear for the lift. The rigger provides signals to the operator, including the "all stop" signal should safety become a concern. Additionally, the rigger(s) may assist the crane operator with performing the pre-use check of the crane and the load test director with calculating test loads and staging test weights. The activity shall ensure the test team rigger is properly trained and qualified per NAVFAC P-307, section 7 and appendix N requirements and adequately prepared for the specific risks associated with load testing. Because of these additional risks, the load test team rigger(s) should be selected from the most experienced and knowledgeable rigger personnel.

Rigger

Rigger Responsibilities:

- Safely rig test loads
- Conduct lifting and handling operations in a safe manner
- Provide signals to the crane operator
- Stop operations whenever safety becomes a concern
- Assist the operator with the pre-use check
- Assist with calculations
- Stage test weights
- Size, select and inspect rigging gear
- Configure the gear for the lift

Rigger Qualifications:

- Trained and qualified
- Experienced and Knowledgeable



Crane Walker

The primary responsibility of the crane walker is to ensure safe travel of the crane by observing for potential obstructions, properly aligning crane rail switches, and being in a position to immediately notify the operator to stop operations should safety become a concern. The crane walker, if assigned, may assist the rigger and operator with the pre-use check of the crane. The activity shall ensure crane walkers are properly trained and qualified per NAVFAC P-307 section 7 and appendix N requirements.

Crane Walker Qualifications and Responsibilities

- Primary responsibility: **the safe travel of the crane**
- Stops operations should safety become a concern
- May assist with the pre-use check of the crane
- Satisfy NAVFAC P-307 requirements



Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** The test director’s qualifications include—
 - A. An ASME B30 certification
 - B. Being a licensed crane operator
 - C. Completing NAVFAC P-307 training requirements
 - D. Possessing specific crane knowledge and experience
 - E. Understanding all team member duties
 - F. Written designation to oversee load tests
2. **Select all that apply.** The test director’s responsibilities include—
 - A. Adequate and proper communications
 - B. Conducting the pre-test briefing
 - C. Coordinating social activities
 - D. Painting a yellow circle around the test area
 - E. Planning, directing, and controlling the load test
 - F. Proper weight calculations and rigging gear selections

3. **Select the best answer.** Which of the following personnel inspects crane systems and components before, during, and after the load test?
- A. Condition Inspector
 - B. Crane Walker
 - C. Operator
 - D. Rigger
 - E. Test Director
4. **Select the best answer.** What is the crane operator's primary responsibility?
- A. Mentoring
 - B. ODCL
 - C. Performance testing
 - D. Placing rigging gear on the crane hook
 - E. Safe operation of the crane
5. **Select the best answer. True or False:** The load test director has overall responsibility for the load test.
- A. True
 - B. False
6. **Select all that apply.** Which of the following personnel must be designated in writing to perform their duties?
- A. Certifying Official
 - B. Condition Inspector
 - C. Crane Operator
 - D. Rigger
 - E. Test Director
7. **Select the best answer.** Load test inspection results are documented on the—
- A. AMISR
 - B. CCIR
 - C. MISR
 - D. RCDR
8. **Select the best answer. True or False:** The rigger is solely responsible for calculating the test weight load and for selecting, inspecting, and configuring the rigging gear and the test load used during the load test.
- A. True
 - B. False

- 9. Match the following.** Correctly identify each job responsibility to the position by selecting the appropriate number in the box adjacent to that responsibility.

	Responsibility	Position
_____	Observes safety, mechanical, electrical, and structural components	1. Test Director
_____	Ensures safe travel of the crane	2. Condition Inspector
_____	Coordinates the activities of team members	3. Rigger
_____	Signals the crane operator	4. Crane Walker

- 10. Select the best answer to fill in the blank.** Any _____ can stop testing and operations whenever safety becomes a concern during the load test.

- A. team member
- B. shop
- C. engineer
- D. manager

Summary

This module presented the basic qualification requirements and responsibilities for personnel who perform Navy WHE load tests. You can now identify the individual load test team members, describe their fundamental training and qualification requirements, and list their basic individual and group responsibilities. This includes the load test director, condition inspector(s), crane operator, rigger(s), and the crane walker. Next, you will be introduced to various precautions and preparations that need to be considered, agreed upon, and/or completed prior to beginning the test.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Recap, Wrap Up, and What's Next

This module presented basic qualification requirements and responsibilities for personnel who perform Navy WHE load tests:

- ⇒ Load Test Director
- ⇒ Condition Inspector
- ⇒ Crane Operator
- ⇒ Rigger
- ⇒ Crane Walker

Next, you will be introduced to various precautions and preparations that need to be considered, agreed upon, and/or completed prior to beginning the test.

Completion

Congratulations.

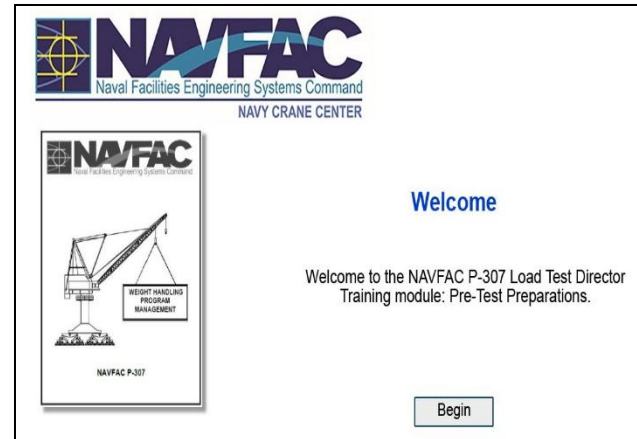
You have completed the LTD Qualifications and Responsibilities module.

Click on the Exit button to return to the main module menu.

LTD PRE-TEST PREPARATIONS

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Pre-Test Preparations.

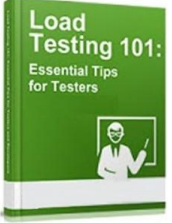


Learning Objectives

Upon successful completion of this module, you will be able to identify actions to perform and information to consider when preparing to load test a Navy crane. This may include researching the equipment history files and original equipment manufacturer manuals, performing a condition inspection, selecting, preparing, and maintaining a safe test site, calculating test loads and obtaining the correct test weights and rigging gear for the test, determining the best form of communications to use, and briefing the team on these items and other safety precautions, including stopping points and any special instructions.

Learning Objectives

- Research records
- "Before" Condition Inspection
- Select test site
- Prepare & maintain the test site
- Calculate test loads
- Stage weights and gear
- Communications
- Conduct briefing



Research Documentation

The first step in preparing for a load test is to research the crane's documentation. Review the equipment history file. Look at the MISR's, CCIR's, and any other maintenance, inspection, and load test records. Hook and insulated link certifications, which should be reviewed, will be discussed in more detail in the Condition Inspection module. Look for deferred work items, unsatisfactory items, alterations, accidents, etc. All documents listed in NAVFAC P-307 Table 5-1 shall be contained in the equipment history files and available for review. Review the Original Equipment

Research Documentation	
OEM Manual	Equipment History File
• Configuration changes • Ancillary devices • Outrigger requirements • Load charts • Range charts • Quadrants of operation	• MISRs • CCIRs • Hook and Insulated Link inspections and NDT results • Previous Certification of Load Test and Condition Inspection records • Accidents • Crane Alterations
Note: All documents listed in NAVFAC P-307 Table 5-1 shall be contained in the equipment history file and available for review.	

LOAD TEST DIRECTOR STUDENT GUIDE

Manufacturer (or OEM) manuals. Note any specific procedures for changing crane configurations, erecting ancillary devices, or instructions for setting up outriggers, etc. Review the load charts, range charts, quadrants of operation, and any other information that may help with the load test and calculating test loads.

Condition Inspection

To accurately determine a crane's current condition and establish a baseline with which to compare the "during-test" and "after-test" conditions, have the condition inspector perform and document a "before-test" condition inspection. This action shall be validated by the Load Test Director by reviewing the CCIR. Click "View CCIR" to see the entire form.

Crane Condition Inspection Record

- Ensure the "before" portion of the CCIR is completed.

[View CCIR](#)

CRANE CONDITION INSPECTION RECORD						
Note: Inspect components that are reasonably accessible without disassembly.						
Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.:		
Purpose of Inspection:		Legend: B = Before A = After D = During		Date Started:	Date Completed:	
Item No.	Item Description	B	D	A	Insp/ Init.	
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.					
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.					
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.					
4	Inspect hold brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.					
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall					

CRANE CONDITION INSPECTION RECORD						
Note: Inspect components that are reasonably accessible without disassembly.						
Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.:		
Purpose of Inspection:		Legend: B = Before A = After D = During		Date Started:	Date Completed:	
Item No.	Item Description	B	D	A	Insp/ Init.	
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.					
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.					
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.					
4	Inspect hold brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.					
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.					
6	Inspect motors for condition and proper operation.					
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a switch is set for drydock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection.) Annotate in Remarks block if performed at the maintenance inspection.)					
8	If a load test is performed at certification, inspect LIDs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection.) Annotate in Remarks block if performed at the maintenance inspection.)					
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.					
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.					
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.					
12	Inspect load chains and sprockets for condition and proper operation.					
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.					

Figure 4-3 (1 OF 2)

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFG 3-430-07 or appropriate document for test procedure.)				
19	Inspect outriggers, jacks, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, mobile boat hoists, rubber-tired gantry cranes, and certain articulating boom cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of ratchets.				
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.				
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.				
27	Verify barge compartment (voids) cover bolts are installed.				
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin steadment/support assembly for condition and proper operation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				

Remarks:

Inspector Signature/Date:	Test Director Signature/Date:
Inspector Signature/Date:	Inspector Signature/Date:

Figure 4-3 (2 OF 2)

Selecting the Test Site

Selecting a suitable test area is important and considerations will vary depending on the type of crane being tested. In general, select a test site that is firm, level, and free of ground obstructions. Other considerations should include sufficient room to safely conduct the test and inspections, adequate ground or structural load capacities to support the crane and test weights, and the ability to restrict traffic into the area. Remember, a weight test may be an overload condition, and the crane has the potential to fail. Ensure the test site is large enough to handle all contingencies, such as a falling boom and that the area remains secure throughout the entire test and inspection process.

Selecting the Test Site

Consider the following:

- Firm, level ground
- Free of obstructions
- Room to safely conduct the test and inspections
- Ground or structural load capacities
- Traffic control



Preparations

Once an adequate site has been selected, ensure it is properly prepared to support the test. The following questions indicate many of the preparatory actions that should be completed. Additionally, they provide a guide for the pre-test briefing discussion points:

Is the crane operator ready? Has the ODCL been completed? Is the crane ready? Are the crane tracks and rails, supports and foundations certified? Will the ground or structure support the weight of the crane and the test weights? Are there any underground or overhead structures to consider? Is the correct rigging gear available on-site, and have the riggers completed their pre-use inspections? Are the test weights on-site? Have the on-site weights been validated to the specified calculations? Has the test site been secured to control traffic and prevent access? Is the area large enough to contain the crane should it tip over?

Brief the test team to include all aspects of the test and inspection process, planned movements, stopping points, communications, safety precautions, and each person's responsibilities and expectations. For large and complex cranes, it is recommended the brief be interactive to ensure all participants understand their responsibilities.

Preparations

- Is the crane operator ready?
 - Has the ODCL been completed?
 - Is the crane ready?
 - Are the crane tracks and rails, supports, and foundations certified?
 - Will the ground or structure support the weight of the crane and the test weights?
 - Are there any underground or overhead structures to consider?
 - Is the correct rigging gear available on-site, and have the riggers completed their pre-use inspections?
 - Are the test weights on-site?
 - Have the on-site weights been validated to the specified calculations?
 - Has the test site been secured to control traffic and prevent access?
 - Is the area large enough to contain the crane should it tip over?
-
-
-
-
-
-
-

Test Site Maintenance

All members of the test team shall maintain site safety. They must remain attentive and observant of the established boundaries to ensure all signs and barriers remain in place, thus preventing the entry of unauthorized personnel and vehicles. Be aware of counterweight swing and barricade as necessary to protect test personnel. Fall zones change often during the test. Constantly monitor fall zones and insist personnel stand clear. Know the plan, know your role, and keep the site organized and clutter free.

Test Site Maintenance

All test team members shall maintain site safety:

- Boundaries
- Signs
- Barriers
- Prevent unauthorized entry



Know the plan, know your role, and keep the site organized and clutter free.

Test Weights

Navy cranes shall be tested using test weights. Using dynamometers in lieu of test weights is not permitted. Each weight shall be marked with a unique ID number and the weight in pounds. The listed weight shall be within plus or minus two percent of the actual weight obtained from calibrated measuring equipment. A list of test weights, with ID numbers and weights, shall be retained and shall include the types and serial numbers of the weighing devices used to weigh the test weights. Where a lifting attachment or test weight supports multiple weights, the total capacity shall be marked on the attachment or test weight. Stackable test weights shall be rigged and lifted in accordance with the Original Equipment Manufacturer or activity engineering instructions.

Test Weights

- Test weights required
- Unique ID number marked
- Weight marked (in pounds), +/- 2% actual
- Documentation required
- Reference measuring device
- Total capacity of test weight or attachment marked



On-Site Gear

Prior to the test, the load test director and riggers shall ensure that the rigging gear and test weights are available on site. A thorough pre-use inspection of all rigging gear and test weights shall be performed. Validate that the rigging gear is correctly marked, certified, and sized for lifting the calculated test loads and that the test weights are properly identified and of sufficient variety to support the various tests. Double check all calculations to ensure the gear and weights on-hand are adequate.

On-Site Gear

- ⇒ Are all the necessary test weights and rigging gear on-site?
- ⇒ Have all pre-use inspections been performed?
- ⇒ Are the components properly marked, certified, and sized?
- ⇒ Have all calculations been double-checked?



Communications

Clear communications are vital to the safety of personnel and equipment during a test. The communication method and a designated signal person must be established. Operators, riggers, and signal persons shall understand and use standard hand signals. Where hand signals are not feasible, the signal person shall remain in continuous voice communication with the operator. Devices used to transmit voice signals shall be tested on-site before beginning operations to ensure effective, clear, reliable communications. If communications are lost or cannot be understood, the operator shall stop operations until communications are reestablished.

Communications

Communications:

- Clear communications are vital
- Designated method & signaler
- Understand standard hand signals

Voice communications:

- Test devices on-site prior to operations
- Effective, clear, reliable
- Stop if communications are lost

Communications Continued

Voice directions are given from the operator's directional perspective. A proper continuous voice signal contains the following elements: function, direction, distance, speed, function, stop, for example, "hoist up 4 feet slowly, hoist... hoist... hoist... stop" or "rotate left 8 feet slowly, rotate... rotate... rotate... stop" or "trolley west 15 feet slowly, trolley... trolley... trolley... trolley... stop." Note: It should be emphasized to the test team that anyone can communicate an emergency stop signal.

Communications Continued

Voice signal elements:

- Function
- Direction (from operator's directional perspective)
- Distance
- Speed
- Function
- Stop



Note: It should be emphasized to the test team that anyone can communicate an emergency stop signal to the crane operator.

Test Team Briefing

The final step prior to starting the test is for the load test director to conduct a briefing with all test team members. Topics covered should include role assignments and responsibilities, confirmation that preparatory actions have been completed, communication methods to be used, safety precautions, test procedures, stopping points, traffic and site control, and any other relevant information specific to the test, equipment, and environment. Briefings shall be conducted before starting the test and should be repeated if a new person joins the test team after the test has begun. This may include briefing the team each time one test phase ends and before another begins or before restarting a test after an emergency stop has occurred. For tests of larger and more complex cranes, it is recommended that the briefing be interactive to further ensure all team members understand their responsibilities.

Test Team Briefings

Topics:

- Role assignments
- Responsibilities
- Preps completed
- Communication method(s)
- Safety precautions
- Test procedure
- Stopping points
- Test site control

When conducted?

- Before starting the test
- A new team member joins
- Before starting a new test phase
- Restarting after emergency stop signal
- As often as needed for safety

Interactive Briefing (Best Practice) - An interactive briefing is where the leader, in this case the load test director, directs specific questions to each team member about their roles, responsibilities, safety precautions, test procedures, and other pertinent topics, and then validates responses with the entire team.

Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** Before starting the load test, the load test director should—
 - A. complete a CCIR
 - B. remove test site boundaries
 - C. research the crane history file
 - D. review OEM manuals and load charts
 - E. select test site
 - F. write a shift report
2. **Select the best answer.** Why are condition inspections required, and when are they performed?
 - A. to verify and record the current condition of the crane before, during, and after the load test.
 - B. to verify and record the number of broken wires on the wire rope during a Type A periodic maintenance
 - C. to verify MISR findings after a Type C periodic maintenance
 - D. to verify the crane is safe to operate, prior to use each day.
3. **Select the best answer. True or False:** Test site considerations include sufficient room to safely conduct the test and inspections, adequate support and ground loading for the crane and the test weights, and the ability to restrict traffic into and nearby the area.
 - A. True
 - B. False
4. **Select the best answer. True or False:** The “during” inspection of the CCIR is performed during pre-test preparations.
 - A. True
 - B. False
5. **Select all that apply.** As part of the pre-test briefing, the load test director should discuss which of the following items with the test team?
 - A. Assignment and responsibilities
 - B. Communications
 - C. Crane specific characteristics and precautions
 - D. Traffic control and barricades
 - E. Training schedules
6. **Select the best answer. True or False:** The operator shall stop operations when voice communications are lost.
 - A. True
 - B. False

7. Select all that apply. Select the attributes for identifying test weights.

- A.** Eye-bolt installed
- B.** Painted yellow
- C.** Stackable
- D.** Unique ID number
- E.** Weight marked in pounds

8. Select the best answer. Who can give an emergency stop signal?

- A.** Any team member
- B.** Condition inspector
- C.** Designated signal person
- D.** Load test director
- E.** Rigger
- F.** Rigger-in-Charge

9. Select the best answer. When testing a mobile crane, what area (or zone) other than the test site itself shall be barricaded to prevent personnel injury?

- A.** Counterweight swing zone
- B.** Fall zone
- C.** Rigging gear lay down zone
- D.** Test team vehicle parking zone
- E.** Test weight staging zone

Summary

This module identified various actions to perform and information to consider when preparing to load test a Navy crane. This included researching records and manuals, performing a “before-test” condition inspection, establishing a safe test site, considering test loads, obtaining the correct test weights and rigging gear for the test, determining the best method of communication, and conducting a pre-test briefing. Putting this knowledge into practice will improve the safety and success of the load test team in the execution of its duties. Next, you will take a closer look at the condition inspection record, inspection methods, inspection safety, documentation, deficiencies, unsatisfactory items, repairs, replacements, re-inspections, and retesting.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Recap, Wrap Up, and What's Next

This module identified various actions to perform and information to consider when preparing to load test a Navy crane including:

- ⇒ researching records and manuals
- ⇒ performing a “before-test” condition inspection
- ⇒ establishing a safe test site
- ⇒ considering test loads
- ⇒ obtaining the correct weights and rigging gear for the test
- ⇒ determining the best method of communication
- ⇒ conducting a pre-test briefing

Next, you will take a closer look at the condition inspection record, inspection methods and safety, documentation, deficiencies, unsatisfactory items, repairs, replacements, re-inspections, and retesting.

Completion

Congratulations.

You have completed the LTD Pre-Test Preparations module.

Click on the Exit button to return to the main module menu.

LTD CONDITION INSPECTION

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Condition Inspection.

Learning Objectives

Upon successful completion of this module, you will be able to describe the safe manner in which inspections shall be conducted, list the methods employed to perform inspections, define deficiencies, and explain how inspection findings are documented, corrected, deferred, retested, and re-inspected. Special attention will be given to the inspection, care, testing, and documentation of hooks and insulated links, which will prepare you to explain the same.

Safety

When engaged in the condition inspection and test process, the primary emphasis shall be on safety. This includes the safety of personnel and the safety of the equipment both now and during future operations. Inspectors shall not engage in calculated risks or depend on their judgment alone when there is a doubt in their mind regarding the questionable condition of a load bearing part, load controlling part, or operational safety device. Questionable conditions of load bearing parts, load controlling parts, or operational safety devices shall be referred immediately to the activity engineering organization and, if necessary, to the certifying official for resolution. If there is no activity engineering organization, the inspection organization shall evaluate the deficiency, and the certifying official shall approve the resolution.



Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Condition Inspection.



Begin

Learning Objectives

- Describe inspection safety
- List inspection methods
- Define deficiencies
- Explain how inspection findings are—
 - Documented
 - Corrected
 - Deferred
 - Re-tested
 - Re-inspected



Safety

- Safety of personnel and equipment now and in the future.
- No calculated risks.
- Refer questionable Load Bearing, Load Controlling, and Operational Safety Device items to:
 - Engineering
 - Certifying Official



Methods

Condition inspections shall be performed, in general, by sight, sound, and touch with the depth and detail limited to that necessary to verify the overall condition. It is not intended to be in the same detail as the maintenance inspection (except for those items transferred from the maintenance inspection to the condition inspection). Other inspection methods that may be employed include the use of instrumentation, non-destructive testing, and disassembly, if required, to validate the current condition.

Methods

Inspections are by:

- sight
- sound
- touch

Additional methods may include:

- Instrumentation
- Non-destructive testing
- Disassembly

Documentation

As shown in the example on screen, each item on the CCIR shall be marked as either satisfactory (S) or unsatisfactory (U). Where an inspection item is not applicable, the symbol "NA" shall be used or the appropriate block blanked out. Alternatively, the figure 4-3 CCIR form may be modified by the local activity for specific cranes (see NAVFAC P-307 paragraph 1.8). The completed CCIR shall be signed and dated by the inspectors and test director and included with the crane certification package submitted to the certifying official. See NAVFAC P-307 paragraph 4.6 for specific information.

Documentation

On the CCIR, record inspection results as:

- Satisfactory: **S**
- Unsatisfactory: **U**
- Not applicable: **NA**

Deficiencies

Deficiencies include and may be caused by the failure or malfunction of equipment, improper engineering, inspection, or maintenance procedures, or discrepancies between design drawings and equipment configuration. Deficiencies and corrective actions to load bearing and load controlling parts and operational safety devices shall be documented and filed in the equipment history file.

Deficiencies

- Equipment failures
- Equipment malfunctions
- Improper procedures
- Design-configuration gaps
- Deficiencies & corrective actions shall be—
 - documented
 - filed in the equipment history file



Documenting Unsatisfactory Items

If during a condition inspection an item is identified as unsatisfactory, the CCIR shall be marked with a “U” in the appropriate “before,” “during,” or “after” column adjacent to the applicable item description. While it’s uncommon to find a deficiency during a condition inspection, it can happen from time to time. When it does, the CCIR item number and a concisely specific description of the unsatisfactory condition shall be noted in the “Remarks” portion of the form. An unsatisfactory item that is corrected prior to completing the load test will have an associated work document that was generated to correct the deficiency. These work documents should be completed and closed out prior to continuing the test. Therefore, and in addition to the item number and description, the serial number of that work document shall be added to the entry in the “Remarks” section. Locally modified CCIR forms may expand the size of the remarks section to provide additional space. NAVFAC P-307 section 3.4.1 describes the manner in which work is documented.

Major Deficiencies

Some unsatisfactory items may meet the definition of a major deficiency. A major deficiency is a deficiency of a load bearing or load controlling part or operational safety device that hinders the safe operation or reduces the load bearing or load controlling capability of the equipment or component. See appendix F for a list of load bearing parts, load controlling parts, and operational safety devices. Unsatisfactory items not classified as major deficiencies are those that do not affect load bearing or load controlling capabilities or the operational safety of the crane, for example, general lighting and electrical outlets, air conditioning, fire extinguisher, and general safety devices.

Documenting Unsatisfactory Items

- Mark the appropriate box with a “U”
- Note a brief yet concise description in the “Remarks” area

CRANE CONDITION INSPECTION RECORD					
Note: Inspected components that are reasonably accessible without disassembly					
Crane No.	Type	Location	Operator's Name	Operator's License No.	
Purpose of Inspection		Legend: B = Before A = After D = During	Date Started	Date Completed	
Item No.	Item Description	B	D	A	Inspr Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, jagged, distortion, and freedom of movement.				
30	Inspect operating bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				
Remarks: If the defect cannot be repaired, derate the crane.					
Inspector Signature/Date:			Test Director Signature/Date:		
Inspector Signature/Date:			Inspector Signature/Date:		

Handling Major Deficiencies

- A major deficiency involves a load bearing part, load controlling part, or an operational safety device and affects the safe operation of the crane.
- Major deficiencies must be corrected prior to starting or completing the load test on the component or system.
- See Appendix F



A cut in the sidewall of a crane tire is considered a major deficiency (load bearing/load controlling) if the crane is certified for on-rubber lifts.

Repairs

In the event a major deficiency is identified, it shall be corrected prior to starting or completing the load test or returning the crane to production service, unless the system is not in service and will not be placed in service. The next screen provides additional information on deferrals. Corrective action shall be properly documented. NAVFAC P-307 section 3.4.1 describes the manner in which work is documented. Replacement load bearing and load controlling parts and safety devices shall be identical to those of the original design. See NAVFAC P-307 sections 3.4.3 and 6.4.2 for additional guidance.

Deferral of Work

Major deficiencies shall be corrected prior to annual certification or return to production service unless the specific system is not in service and/or will not be placed in service. If it is not possible to complete other work on load bearing parts, load controlling parts, or operational safety devices, such work may be deferred upon review and approval by the certifying official. Technical justification for deferral shall be provided. See NAVFAC P-307 paragraph 3.4.5, Deferral of Work During Maintenance Inspections and Certifications.

Retesting

If a major deficiency is found after the load test, it shall be corrected, and if required by paragraph 4.4.2.1, a selective load test shall be performed. A record of the retest shall be recorded in the "Unsatisfactory Items" sheet portion of the CCIR (example, note that a retest was required, note details, or note other documents where details are located).

Repairs

- Major deficiencies shall be corrected prior to completing the load test
- Corrective action shall be documented
- Replacement parts shall be identical
 - See paragraphs 3.4.3 and 6.4.2

Deferral of Work

Major Deficiencies

- Shall be corrected prior to annual certification or return to production service

Deferrals must be ...

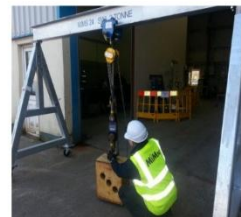
- Approved by the certifying official
- Justified by engineering

Deferred work must be completed by the next annual certification, unless further deferral is approved by the certifying official.

See NAVFAC P-307 paragraph 3.4.5, Deferral of Work During Maintenance Inspections and Certifications.

Retesting

- If a major deficiency is found after the load test, it shall be corrected, and if required by paragraph 4.4.2.1, a selective load test shall be performed.
- A record of the retest shall be recorded in the Unsatisfactory Items sheet portion of the CCIR.



Re-Inspection

When a selective load test is performed, a condition inspection shall be performed on all the items on the CCIR that experienced greater than normal loading to ensure that the load test has not caused any damage. The certifying official shall withhold certification pending the correction of all inspection deficiencies existing after the load test that, in his or her judgment, could cause unsafe conditions.

Re-Inspection

- When a selective load test is performed, a condition inspection shall be performed on all CCIR items that experienced greater than normal loading to ensure that the load test has not caused any damage.
- Certification package shall be withheld until all unsafe deficiencies are corrected.



Hook Measurements

Hook identification and the correct number of hook NDT annual certification periods shall be validated as part of the certification process. See NAVFAC P-307, appendix E, paragraph 1.4.4 for material types and periodicities. An initial throat dimension base measurement shall be established by installing two tram points and measuring the distance between them. This base dimension shall be retained in the equipment history file for the life of the hook. The distance between tram points shall be measured before and after the load test and compared to the base measurement. Hooks showing an increase in the throat opening by more than five percent, not to exceed $\frac{1}{4}$ inch (or as recommended by the hook OEM) from the base measurement shall be discarded. This information shall be recorded on the Certification of Load Test and Condition Inspection form.

Hook Measurements

Perform before and after testing:

- Measure between tram points
- Record on certification form
- Compare to base measurement
- Replace if hook spreads more than 5% from base measurement or $\frac{1}{4}$ "



Insulated Link Inspection and Test

Each link shall be uniquely identified with some type of permanent marking to provide positive traceability to its base tram measurement and NDT report.

Establish tram points across the dielectric structure of the link and measure the base tram reading before initial installation of the link. Measure the distance between the tram points before and after the load test. Compare the measurement to the base tram measurement.

Reject the link if the measurement exceeds the base tram measurement by more than one percent. After reassembly of the link on the crane and at every annual certification, perform an in-service electrical test of the link in accordance with ASTM F2973.

Insulated Link Inspection and Test

Disassemble and inspect in conjunction with hook NDT.

- **Identification**
 - Unique, permanent markings
 - Positive traceability to tram measurements and NDT report
- **Dimensions**
 - Compare actual to base measurement
 - Reject if more than 1%
- **Electrical tests**
 - After each re-assembly and at every annual certification
- **Cleanliness**
 - Inspect for clean outer surface
 - Free of conductive material
 - No grease, graphite, metallic particles, rust
- **Mechanical damage**
 - Obvious damage
 - Minor nicks, cuts
 - Abrasions on outer cover are acceptable



Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** When engaged in the condition inspection and test process the primary emphasis shall be on—
 - A. crane inspection
 - B. documentation of deficiencies
 - C. safety
 - D. testing
2. **Select all that apply.** Condition inspections shall be performed—
 - A. by sight
 - B. by sound
 - C. by touch
 - D. in depth and detail limited to that needed to verify overall condition
 - E. in the same detail as a maintenance inspection
3. **Select the best answer. True or False:** The completed CCIR only needs to be signed by the load test director before submitting it to the certifying official.
 - A. True
 - B. False

4. **Select the best answer.** Your condition inspector identified an unsatisfactory item. A work document was issued, and the deficiency corrected. What is required of this work document prior to continuing with the test?
- A. It may be disposed of as it is no longer needed.
 - B. It shall be closed out and attached to the Certification of Condition Inspection and Test.
 - C. It shall be signed by the certifying official.
 - D. Nothing further
5. **Select all that apply.** A major deficiency is a deficiency associated with—
- A. general safety devices
 - B. load bearing parts
 - C. load construction parts
 - D. load controlling parts
 - E. load sharing parts
 - F. operational safety devices
6. **Select the best answer. True or False:** Replacement load bearing and load controlling parts and safety devices shall be identical to those of the original design.
- A. True
 - B. False
7. **Select the best answer.** If it is not possible to complete work on load bearing parts, load controlling parts, or operational safety devices, such work may be deferred upon review and approval by the—
- A. certifying official
 - B. commanding officer
 - C. condition inspector
 - D. engineering department
8. **Select the best answer to fill in the blank.** The distance between tram points shall be measured before and after the load test and compared to the base measurement. Hooks showing an increase in the throat opening by more than _____ shall be discarded.
- A. 0.1250 inches
 - B. 3.5 percent
 - C. 5 mm
 - D. 5 percent

9. Select the best answer. After reassembly of the insulated link on the crane and at every annual certification, and in-service electrical test of the link shall be performed in accordance with the requirements of—

- A. ASTM F2973
- B. EM385-1-1
- C. NAVGAC P-307
- D. OSHA 29 CFR 1926

Summary

This module described the safe manner in which inspections shall be conducted and listed the methods employed to perform inspections. It defined and categorized deficiencies and explained how inspection findings are documented, corrected, deferred, retested, and re-inspected. A special emphasis section was provided to improve your knowledge and understanding of the significance of properly inspecting, repairing and testing hooks and insulated links. With this knowledge, you are better equipped to understand the condition inspection process and to oversee the duties of the condition inspector in a much more efficient and successful manner. Next, you will be exposed to general and specific testing requirements and considerations. This includes safe lifting, safe testing, test types, and test calculations for specific crane types and categories.

Recap, Wrap Up, and What's Next?

This module:

- ⇒ described the safe manner in which inspections shall be conducted
- ⇒ listed the methods employed to perform inspections
- ⇒ defined deficiencies
- ⇒ explained how inspection findings are—
 - documented
 - corrected
 - deferred
 - retested
 - re-inspected.

Next, you will be exposed to general and specific testing requirements and considerations including safe lifting, safe testing, test types, and test calculations for specific crane types and categories.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Completion

Congratulations.

You have completed the LTD Condition Inspection module.

Click on the Exit button to return to the main module menu.

CRANE TESTING 1: GENERAL

Welcome

Welcome to the NAVFAC P-307 Training module:
General Crane Testing.



Introduction

This is the first of three modules on crane testing and presents general information for all cranes. Modules two and three present specific testing information and crane test procedures for the NAVFAC P-307 categories of cranes. The information provided in these three modules is for training purposes only. For specific wording and requirements refer to the NAVFAC P-307 manual.

Introduction

- This is the first of three modules on crane testing.
- The information provided is for training purposes only.
- For specific requirements, refer to the NAVFAC P-307 manual.

Learning Objectives

This module provides load test information relevant to all cranes and includes scenario-based examples that illustrate why safety is so important when performing load tests. It describes various precautions to consider during testing including gross and net capacities, the potential consequences of overloading a crane, the importance of teamwork, the general types of tests performed, the test load weight requirements and tolerances, down rating cranes, the during-test condition inspection, and the importance of remaining vigilant at all times.

Learning Objectives

- General load test information
- Scenario-based examples
- Precautions
- Gross & Net capacities
- Overload Consequences
- Teamwork
- Test types
- Load weight specifications
- Down Rating
- Inspections
- Vigilance

Safe Lifting Capacities

When calculating safe lifting capacities, you must consider the total weight of the load, the lift radius, the height of the lift, and quadrants of operation. The load chart will provide the safe lifting capacity based on each of these variables. The gross capacity of a crane is the value which is shown on the load chart for a particular radius. The net capacity is the value shown on the load chart minus all deductions. To determine the net capacity, you must subtract all the applicable deductions from the gross capacity.

Safe Lifting Capacities

- **Considerations for calculating safe lifting capacities of the crane**
 - Total weight of the load
 - Lift radius
 - Lift height
 - Quadrants of operation
 - Job site considerations
- **Gross Capacity**
 - Gross capacity is the value shown on the load chart
- **Net Capacity**
 - Net capacity is the value shown on the load chart minus all deductions
 - Net capacity is calculated by subtracting the total weight of all deductions from the gross capacity

Consequences of Overloading

Exceeding the crane's rated capacity may result in one of two consequences: loss of stability or structural failure.

When a crane loses stability, the tipping force of the load overcomes the counteracting load of the crane. When tipping begins, especially with loads high in the air, it is very unlikely that the crane operator can do much to prevent overturning. As the crane begins to tip, the load radius increases; and as the load radius increases, the capacity of the crane decreases. This happens so rapidly that recovery is nearly impossible. It is critical for you to know the safe capacity of your crane at all times.

Cranes can fail structurally if the rated capacity is exceeded. Structural failure is not limited to total fracture of a component. It includes hidden or less visible damage such as cracking, bending, or twisting of any component. It is difficult to predict which component in a crane may fail structurally when overloaded. Loss of stability and structural failure from overloading the crane are avoidable when you understand and follow the crane capacity load chart.

The following four screens display examples of why load tests should be performed in controlled areas and why safety should always be the primary focus. When viewing each of these events, ask yourself: Could this happen during my load test? What factors contributed to the accident? How could this have been avoided?

Consequences of Overloading

- **Exceeding the crane's rated capacity may result in:**
 - loss of stability
 - once tipping begins, recovery is impossible
 - structural failure
 - not limited to total fracture
 - includes hidden or less visible damage
 - cracking
 - bending
 - twisting
 - Loss of stability and structural failure are avoidable
-
-
-
-
-
-

Example 1

An unknown maintenance problem was discovered in a most unfortunate manner. A pedestal bearing installed on the boom hoist drum failed. The bearing shifted, disengaging the pinion from the boom drum gear allowing the boom to fall to the ground. No injuries were reported, but over one million dollars in damages occurred. Possible causes might include poor workmanship, inadequate maintenance and inspection procedures, or improper replacement parts.

Can you think of any other possible causes or contributing factors? Can you think of any other possible outcomes or results?

Example 2

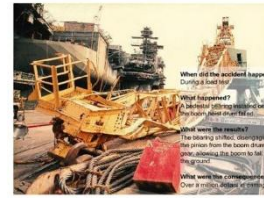
The crane had a fully extended boom with a lattice extension erected. There was no load on the crane. The crane was being boomed out to the location of the test load. A gust of wind pushing on the back side of the boom contributed to the crane overturning. No injuries were reported, but it resulted in extensive and expensive damages. Possible causes might include inattention, lack of concern regarding the weather, or failure to recognize a potentially hazardous environment.

Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions and concerns addressed? Can you think of any other possible outcomes or results?

Example 3

This operator had performed the same operation many times before with the weight of the main hook block removed. In this case, the additional weight of the main block with the extended boom was enough to cause the crane to tip. No injuries were reported and damage was minimal. Possible causes might include complacency, failure to understand or follow the load chart, or inattention to details.

Example 1



- Can you think of any other possible causes or contributing factors?
- Can you think of any other possible outcomes or results?

Example 2

A gust of wind pushing on the back side of the boom during the load test while the boom was fully extended with a lattice extension erected contributed to this accident. Extensive damage occurred.

- Can you think of any other possible causes or contributing factors?
- Can you think of any other possible outcomes or results?



Example 3

This accident occurred during an evaluation. The operator had performed this operation many times before, except with the main hook block resting on the ground. The weight of the main block on an extended boom was enough to cause the crane to tip. No injuries were reported and only minimal damage resulted.

- Can you think of any other possible causes or contributing factors?
- Can you think of any other possible outcomes or results?



Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions and concerns addressed? Can you think of any other possible outcomes or results?

Example 4

While preparing to conduct a free-rated (on-rubber) load test, the load moment indicator was mistakenly programmed for on-outrigger operations. As the boom was extended and lowered to reach the test load, the crane overturned. The boom fell across a parked vehicle, which fortunately, had no one in it. No injuries were reported, but it did result in extensive and expensive damages. Possible causes might include complacency, failure to understand or follow proper procedures, or simply inattention to details.

Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions asked and answered? Can you think of any other possible outcomes or results?

Example 4

While preparing to do a free-rated load test, the load moment indicator was mistakenly programmed for on-outrigger operation. As the operator extended and lowered the boom to reach the test load, the crane overturned. The boom fell across a parked vehicle, that fortunately, was unoccupied. No injuries were reported, but the accident did result in extensive damage.



- Can you think of any other possible causes or contributing factors?
- Can you think of any other possible outcomes or results?

Vigilance

Shown here are cranes being load tested under controlled conditions with experienced test teams. Yet, mistakes were made. Testing cranes can be extremely hazardous, especially when testing extended long booms with jibs attached. Three best practices for improved safety and incident avoidance during testing is to perform a thorough CCIR before-test inspection, an ODCL, and a pre-test brief. Emphasize the importance of the pre-test inspections.

During the briefing, question your team about their findings and all other aspects of the test and any potential concerns in their areas of responsibility. Remember, their perspectives are different from yours. Take advantage of this and allow them to share in the brief for the benefit and safety of the team and the crane. There is no margin for error when testing cranes.

Vigilance

- Best Practices
 - Thorough CCIR
 - Complete ODCL
 - Pre-test briefing
- There is no margin for error.
- Always remain vigilant.



Precautions

Over-turning, due to instability, may occur without warning, especially during a load test. Caution is advised. Test personnel shall remain fully alert to wind, weather, and visibility conditions that may jeopardize the safe performance of the test. Attach taglines to the load to control oscillation. Lift the test load only high enough to perform the required tests. If lifting on outriggers or stabilizers, ensure they are properly extended per OEM instructions and that the crane is level.

A crane's outrigger may become light, and the outrigger pad may clear the ground during testing, depending on the make and model of crane. This will most likely occur when the boom is positioned over the opposite corner. One outrigger lifting off is normal and not an indication of a loss of stability; however, if two outriggers exhibit this condition simultaneously, the activity shall verify with the crane OEM that the crane exhibiting this condition is safe for use. If lifting on rubber, ensure all lifting requirements established by the OEM and the activity are followed. Extend outriggers and maintain a minimal clearance of three to four inches above the ground.

Test personnel shall stand clear of tires and outriggers during on-rubber load tests. When lifting test loads, always lift the load well within the maximum radius and slowly boom down to the pre-measured radius, stopping at least once to test the effectiveness of the boom brake and holding valve. Do not perform any booming when rotating. Be aware that when the load is rotated over the front of the crane, deflection of the crane will begin to relax, and radius will tend to decrease. If it does not appear that the load will safely clear the front of the crane, return the load over the side, set the load down, and perform the test at the next allowable radius and load.

Precautions

Overturning due to instability, may occur without warning, especially during a load test - caution is advised.

- Watch wind, weather, and visibility conditions
- Attach tag lines
- Lift test loads only as high as necessary
- Properly extend outriggers/stabilizers
- Level the crane
- One light outrigger does not necessarily indicate loss of stability
- Stand clear of tires and outriggers
- Lift slowly. Stop to test the brake.
- Do not boom while rotating
- Rotating may alter the radius, changing crane and load characteristics
- Stop for safety. Perform the test at the next allowable radius and load.

[illegible]

Teamwork

While individual team members have their own responsibilities, they also have group responsibilities such as supporting the goal of safe crane testing, attending all briefings, and keeping other team members informed of current conditions. All team members share the responsibility for stopping the test whenever safety is in question. Teamwork is an essential element for safe crane tests.



Tests

There are many tests that are performed on Navy cranes. Most can be categorized as some type of load, no-load, static, or dynamic test. Variations of these tests are performed on different functions, in different ways including boom, hoist, rotate, trolley, and bridge motion tests, loss of power test, brake tests, and the maximum certified capacity and load moment tests. In some cases, these tests may be combined.

Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations. Tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures during the certification period. The testing sequence may be varied by the activity. For cranes with multiple reeving configurations, the maximum line pull test should be performed first. See the linked document for a list of the NAVFAC P-307 crane tests.

Tests

Click on the link below to open and view an extensive list of NAFAC P-307 crane tests.

- Load and no-load tests
- Static and dynamic tests
- Boom, hoist, rotate, travel, trolley, and bridge tests
- Maximum certified capacity test
- Load moment test
- Maximum line pull test

[View NAFAC P-307 Crane Tests](#)



LOAD TEST DIRECTOR STUDENT GUIDE

Appendix E Tests (For Training Use Only)	
<u>Portal and Floating Cranes</u> (app E, para 2)	
No-Load Test	Hoist Operating and Limit Switch Test Emergency Brakes on Wire Rope Drums (Shift Failure Detection System)
Boom	Emergency Brake on Wire Rope Drum (Shift Failure Detection System)
Luffing Drum Pawl (Dog)	
Rotation Lock (Wind Lock, Spool Lock)	
Rotation	
Trolley	
Deadman Switches	
Load Test	Load Test for Variable Rated Cranes
Stability Test	
Man and Boom Hoists, Rotate, and Trolley	
Hoist and Boom Static Test	
Hoist Dynamic Test	
Wire Rope Test for New Rope	
Boom Hoist Operating Test	
Hoist Foot Brake Test (Hydraulic or Mechanical)	
Boom Foot Brake Test (Hydraulic or Mechanical)	
Hoist Loss of Power (Panic Test)	
Boom Loss of Power (Panic Test)	
Rotation	
Rotate Stopping Test	
Travel Test (Boom over side)	
Travel Test (Boom over hoist)	
Emergency Brakes on Wire Rope Drum (Shift Failure Detection System)	
Static Test	
Dynamic Test	
Auxiliary Hoist	
Static Test	
Dynamic Test	
Wire Rope Test for New Rope	
Foot Brake Test (Hydraulic or Mechanical)	
Loss of Power (Panic Test)	
Emergency Brakes on Wire Rope Drum (Shift Failure Detection System)	
Static Test	
Dynamic Test	
Whip Hoist	
Static Test	
Dynamic Test	
Wire Rope Test for New Rope	
Foot Brake Test (Hydraulic or Mechanical)	
Loss of Power (Panic Test)	
Emergency Brakes on Wire Rope Drum (Shift Failure Detection System)	
Static Test	
Dynamic Test	
Variable Rated Load Test	
Stability Test	
Static Test	
Dynamic Test	
Boom Hoist Operating Test	
Boom Foot Brake Test (Hydraulic or Mechanical)	
Automatic Boom Brake (Where applicable, i.e., Washington Crane Company)	
Rotation	
Tower Cranes and Derricks	See portal cranes (app E, para 3)
Hammerhead Cranes	(app E, para 4)
Hoists (see portal cranes)	
Rotation (see portal cranes)	
Trolley Motion	
No-Load Test	
Load Test	
Travel (see portal cranes)	
For Training Use Only: See NAVFAC P-307 Appendix E for specific tests, descriptions, and instructions.	

Appendix E Tests (For Training Use Only)	
<u>Mobile Cranes, Aircraft Crash Cranes, and Category 4 Cranes</u> (app E, para 5)	
Telescoping Boom Cranes	
No-Load Tests	Hoists Booms Other Functions
Load Test	Maximum Certified Capacity Test Load Moment Test Telescopic Component Stipage Counter/Retarder Component Stipage Auxiliary and Whip Hoist Maximum Line Pull Test and Ancillary Equipment Tests Maximum Line Pull Test Ancillary Equipment Tests Ancillary Equipment Tests Without AEPs On-Rubber Load Test Maximum Certified On-Rubber Capacity
Lattice Boom Cranes	
No-Load Tests	Hoists Booms Other Functions
Load Test	Maximum Certified Capacity Test Load Moment Test Counter/Retarder Component Stipage Crawler Crane Rotation Boom Operation Auxiliary and Whip Hoist Maximum Line Pull Test and Ancillary Equipment Tests Maximum Line Pull Test Ancillary Equipment Tests Ancillary Equipment Tests Without AEPs On-Rubber Load Test Maximum Certified On-Rubber Capacity Crawler Travel Test Maximum Certified Travel Capacity
Test after Change or Repair of Tires	
Wire Rope Test for New Rope	
Articulating Boom Cranes	
Maximum Test Load for the Outer Hook or Paleys	Static Test Dynamic Test Boom Operation Hydraulic Component Stipage Test (Telescoping)
Stability	Rotation Boom Operation Hydraulic Component Stipage Test (Telescoping)
Maximum Test Load for the Inner Hook or Paleys	Static Test Dynamic Test Ancillary Equipment Ancillary Equipment Used Without AEPs
Weight Handling Equipment Used for Other than Lift Crane Service	
Tested at the maximum safe working load permitted for the size of wire rope being used; see Appendix E paragraph 5.9	
For Training Use Only: See NAVFAC P-307 Appendix E for specific tests, descriptions, and instructions.	

Appendix E Tests (For Training Use Only)	
<u>Bridge/Overhead Traveling Wall Gantry, Cantilever Gantry and Semi-gantry Cranes, Including Portable Gantry/A-Frames With Permanently Mounted Hoists</u> (app E, para 6)	
No-Load Test	Hoist Emergency Brake on Wire Rope Drum (Shift Failure Detection System)
Trolley	
Bridge/Gantry	
Load Test	Test each load hook separately Hoist Static Test Primary and Secondary Holding Brakes Dynamic Test, Including Dynamic Load Brake Mechanical Load Brake Loss of Power (Panic Test) Emergency Brakes on Wire Rope Drum (Shift Failure Detection System) Static Test Dynamic Test
Trolley Motion	
Bridge/Gantry Motion	
Stopping Under Loss of Power (For Cranes without Bridge/Gantry or Trolley Automatic Brakes)	
Gantry Frame Extension Pins	
<u>Jib, Pillar, Pillar Jib, Monorail, Davit, and Fixed Overhead Hoist</u> (app E, para 7)	
No-Load Test	Hoist Trolley Rotate
Load Test	Hoist Static Test Dynamic Test, Including Dynamic Load Brake Mechanical Load Brake Loss of Power (Panic Test)
Trolley	
Rotate (Jib, Pillar, Jib, and Davit)	
Boom Angle and Extension Pins	
<u>Mobile Boat Hoists Including Self Propelled and Towed Types, and Rubber-Tired Gantry Cranes</u> (app E, para 8)	
No-Load Test	Hoist Travel Test Trolley Test Load Test
Hoist	Static Test Hoist Dynamic Test Hoist Brake
Travel Test	
Trolley Test	
Test after Change or Repair of Tires	

Total Test Load

Total test loads must be calculated for specific cranes, tests, and configurations. Depending on the crane, the total test load may include one or more of the following weights: rigging gear, ancillary devices, hooks, blocks, wire rope, below the hook lifting devices, and of course, the test weights. Follow OEM load chart instructions for deduction values. Depending on the equipment being tested, the actual test load shall be within one of the following specifications: 125% +0%/-5% of the rated capacity, 100% +0%/-5% of the rated capacity, or 110% +0%/-5% of the rated capacity.

Total Test Load

Calculate total test loads for specific cranes, tests, and configurations. The total test load may include rigging gear, ancillary devices, hooks, blocks, wire rope, below-the-hook lifting devices, and test weights.

Test Load specifications:

- 125 percent +0/-5 percent of the rated capacity
 - Except as noted in NAVFAC P-307, portal, floating, tower, hammerhead, derrick, bridge, wall, gantry, cantilever gantry, semi-gantry, portable gantry, or A-frame with a permanently mounted hoist, jib, pillar, pillar jib, monorail, davit, and fixed overhead hoist cranes shall be tested at a nominal test load value of 125% of their rated capacity.
 - The actual test load shall be within +0/-5 percent of the nominal test load value.

Total Test Load Continued

Load testing outside these limits is not authorized. Test each hook at the nominal test load for the crane's configuration considering reeving, boom length, etc. The rated capacity may be stenciled on the crane, obtained from the equipment history file, or found on the posted load chart. The rated capacity may be limited by wire rope line pull depending on the current reeving configuration. See NAVFAC P-307 section 4 and appendix E for specific tests, applications, and exceptions.

Total Test Load Cont'd.

Test Load specifications:

- **100 percent +0/-5 percent of the rated capacity**
 - Except as noted in NAVFAC P-307, the mobile, locomotive, aircraft crash, mobile boat hoist, rubber-tired gantry, articulating boom, and other telescoping boom cranes shall be tested at a nominal test load value of 100% of their rated capacity.
 - The actual test load shall be within +0/-5 percent of the nominal test load value.
- **110 percent +0/-5 percent of the rated capacity**
 - When any of the cranes normally tested at 100 percent become third party certified, the nominal test load value shall be 110% of their rated capacity. The actual test load shall be within +0/-5 percent of that nominal test load value.

See NAVFAC P-307 section 4 and appendix E for specific tests, applications, and exceptions.

Down Rating

For cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent periodic overload tests, the cranes shall be down rated to 80 percent of the OEM's allowable test load or 90 percent for third party certified mobile cranes, articulating boom cranes, and other telescoping boom cranes and tested to the requirements of NAVFAC P-307. See paragraph 4.7.1. Document reduced capacity by crane alteration in accordance with NAVFAC P-307, section 6.

Down Rating

- For cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent periodic overload tests, the cranes shall be down rated to 80 percent of the OEM's allowable test load (90 percent for third party certified mobile cranes, articulating boom cranes, and other telescoping boom cranes) and tested to the requirements of NAVFAC P-307. See paragraph 4.7.1.
- Document reduced capacity by crane alteration in accordance with section 6.

Crane Condition Inspection Record (CCIR)

Have the condition inspector perform a follow-up to the "before-test" condition inspection with a "during-test" condition inspection to ensure all components and parts are operating within normal parameters. Document results on the CCIR. This action should be validated by the load test director by reviewing the CCIR. Click on "View CCIR" to view the complete CCIR.

Crane Condition Inspection Record

- Ensure the "during" portion of the CCIR is completed.

CRANE CONDITION INSPECTION RECORD						
Note: Inspect components that are reasonably accessible without disassembly.						
Crane No.	Type	Location	Operator's Name	Operator's License No.		
Purpose of Inspection:		Legend: B = Before A = After D = During	Date Started	Date Completed		
Item No.	Item Description		B	D	A	Insp/Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.					
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.					
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.					
4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.					
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall.					

[View CCIR](#)

CRANE CONDITION INSPECTION RECORD					
Note: Inspect components that are reasonably accessible without disassembly.					
Crane No.	Type	Location	Operator's Name	Operator's License No.	
Purpose of Inspection		Legend: B = Before A = After D = During	Date Started	Date Completed	
Item No.	Item Description	B	D	A	Pass/Fail
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, cracked or flattened sections, condition of sockets, dead end connections, and/or proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on traveling cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controls, all controllers shall be operationally tested during either the maintenance inspection or the condition inspection test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hoist/lower limit switch inspections/verifications (where a switch is set for drydock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If a load test is performed at certification, inspect LDCs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendices C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and/or condition and evidence of loose bearings and misalignment.				
12	Inspect lead chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery housings for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFG 3-430-07 or appropriate document for test procedures.)				
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking and locking devices for condition and proper operation. (Applies to mobile cranes, mobile boist hoists, crawler track gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
22	Inspect pins, rollers, and slide locks for proper engagement and operation of interlocks.				
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.				
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.				
27	Verify large compartment (radio cover bolts) are installed.				
28	Verify accuracy of list and/or indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin stands and support assembly for condition and proper operation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and girders for condition and proper operation.				

Remarks:

Inspector Signature: _____ Test Director Signature: _____

Inspector Signature: _____ Test Director Signature: _____

Figure 4-3 (1 of 2)

Figure 4-3 (2 of 2)

Knowledge Checks

Online answers may appear in a different order than those shown below.

- Select the best answer.** What is the difference between gross and net capacity?
 - load chart capacity values at different radii
 - the combined weight of the hook and block
 - the total weight of all rigging gear
 - the weight of all equipment deductions
 - the weight of wire rope
- Select all that apply.** Identify the potential consequence(s) of exceeding the crane's rated capacity.
 - electrical malfunction
 - loss of stability
 - rigging accident
 - structural failure
- Select the best answer.** Best practices for improved safety and incident avoidance include—
 - a detailed pre-test brief
 - a thorough before-test CCIR inspection
 - complete an ODCL
 - all of the above

- 4. Select the best answer.** What is the test load specification for testing a mobile crane?
- A. 100% +0%/-5%
 - B. 100% +5%/-0%
 - C. 110% +0%/-5%
 - D. 110% +5%/-0%
 - E. 125% +0%/-5%
- 5. Select the best answer. True or False:** Responsibilities for safe testing are both individually assigned and team shared; however, only the crane riggers are allowed to signal “all stop” whenever the safety of the test or personnel become a concern.
- A. True
 - B. False
- 6. Select all that apply.** From the list below, identify the general categories of crane tests.
- A. Dynamic Test
 - B. Load Test
 - C. Maximum Height Test
 - D. No-Load Test
 - E. Static Test
 - F. Swing Range Test
- 7. Select the best answer.** What is the nominal test load and tolerance for testing third party certified mobile cranes?
- A. 00% +0%/-5%
 - B. 100% +5%/-0%
 - C. 110% +0%/-5%
 - D. 110% +5%/-0%
 - E. 125% +0%/-5%
- 8. Select the best answer.** True or False: Cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent periodic overload tests shall be down-rated to 50% of the OEM’s allowable test load or 60% for third part certified mobile cranes, articulating boom cranes, and other telescoping boom cranes.
- A. True
 - B. False
- 9. Select all that apply.** Identify conditions for which test personnel shall remain fully alert during testing.
- A. Family matters
 - B. Visibility
 - C. Weather
 - D. Wind

10. Select the best answer. What is the nominal test load and tolerance for testing portal and floating cranes?

- A. 100% +0%/-5%
- B. 100% +5%/-0%
- C. 110% +0%/-5%
- D. 110% +5%/-0%
- E. 125% +0%/-5%

Summary

This module, the first of three modules on crane testing, presented general test and inspection information relevant to all cranes. It included examples of why safety is so important when performing load tests and described various precautions to consider during testing, including gross and net capacities, the potential consequences of overloading a crane, the importance of teamwork, the test load weight requirements and tolerances, down rating cranes when necessary, and the importance of remaining vigilant at all times. The next module provides a look at the primary causes of accidents and the procedures to follow when an accident occurs.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Recap, Wrap Up, and What's Next?

This module, the first of three modules on crane testing, presented general test and inspection information relevant to all cranes. It included:

- Examples of why safety is so important
 - Various precautions
 - Gross and net capacities
 - Consequences of overloading
 - Teamwork
 - Test Weight requirements/tolerances
 - Down rating
 - Vigilance
-
-
-

Completion

Congratulations.

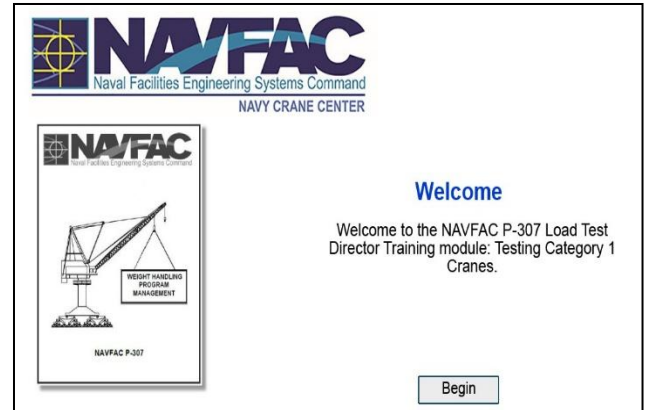
You have completed the General Crane Testing module.

Click on the Exit button to return to the main module menu.

CRANE TESTING 2: CATEGORY 1 CRANES

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Testing Category 1 Cranes.



Introduction

This is the second of three modules on crane testing. This module provides a review of the tests and test requirements for category 1 cranes and discusses some special testing situations. NAVFAC P-307 appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests. For Category 1 cranes this may include a no-load test, load test, emergency brake test, static and dynamic hoist and boom tests, brake test, maximum certified capacity test, load moment test, maximum line pull test, loss of power test, auxiliary and ancillary equipment tests, or component travel and rotate tests. Depending on the type of crane and it's intended use, category 1 cranes are tested at either 125% +0%/-5%, 110% +0%/-5%, or 100%+0%/-5% of certified capacity, unless otherwise approved. Hooks and insulated links are inspected annually and tested as outlined in appendix E. Test paragraphs and results are recorded on the Certification of Load Test and Condition Inspection form. The certifying official's signature on this form confirms that all applicable testing has been conducted as prescribed and that the crane is safe to operate. The information provided in this module is for training purposes only. For specific wording, requirements, and applications, refer to the NAVFAC P-307 manual.

Introduction

- This module provides a review of the tests and test requirements for category 1 cranes and discusses some special testing situations.
 - NAVFAC P-307 Appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests.
 - For specific requirements, refer to the NAVFAC P-307 manual.
-
-
-
-
-
-
-
-

Learning Objectives

Upon successful completion of this module, you will be able to describe test procedures for portal cranes, floating cranes, and mobile cranes, including load tests, no-load tests, and some special testing requirements.

Learning Objectives

Upon successful completion of this module, you will be able to list and describe:

- Tests for category 1 cranes, including:
 - portal cranes
 - floating cranes
 - mobile cranes
- Load and no-load tests
- Special testing situations

Hoist & Boom No-Load Tests

Perform the no-load tests checking all functions. Check all hoist and boom primary upper and lower limit switches and, if installed, all secondary upper and lower limit switches. Using the limit switch bypass, check the secondary limit switches by carefully moving the boom or hoist slowly through each primary limit switch and into the secondary limit switch. The verification of secondary limit switches by movement of the boom or hoist is a one-time test. Verifications during future load tests may be performed by manual activation of the secondary limit switches. See appendix C, item 64. Check emergency brakes on wire rope drums, where installed, by simulating a fault.

Hoist & Boom No-Load Tests

- Check all functions with no load.
- In a slow and cautious manner, test:
 - Primary upper and lower limits
 - Secondary upper and lower limits
 - Bypass switches
 - Emergency brakes on wire rope drums (where installed)



Luffing Drum Pawl & Rotation

Check the luffing drum pawl for proper engagement with the ratchet gear and limit switch. Check the pawl limit switch, if installed, for proper operation. Some pawl limit switches allow the hoist to raise but not lower. Others cut out movement in both directions. With the drum pawl disengaged, manually activate the limit switch and ensure the boom hoist motor shuts off, the brakes engage, and the indicator lights operate correctly. Alternatively, engage the drum pawl with the boom hoist de-energized and then ensure that the drive cannot be energized in the downward direction. Check the rotation lock by engaging it and inspecting it for full engagement. Check that the rotation lock limit switches prevent rotation in both the clockwise and counterclockwise directions. Operate the rotation lock bypass for both the clockwise and

Luffing Drum Pawl & Rotation No-Load Tests

- Check Luffing Drum Pawl:
 - Limit switches
 - Motor shut off
 - Brakes
 - Indicator lights
- Check Rotation Lock:
 - Engagement
 - Limit switches
 - Bypass
- Rotate 360 Degrees in Both Directions
 - Minimum boom radius



counterclockwise directions and ensure proper operation. Use only enough power to check the operation of the bypass. Limit switches may be operated manually to check for correct operation in lieu of engaging rotation lock. Ensure the rotation lock is disengaged prior to continuing to the next step of the test. Check rotation by rotating in both the clockwise and counterclockwise directions with the boom at minimum radius.

Travel & Deadman Switches No Load Tests

Finally, verify that the crane can safely travel and that the dead-man controls perform properly. Check the travel function with the boom centered between the crane rails and the boom dog engaged. Travel the crane in one direction a minimum of 50 feet. After travel stops, and if there are no problems, rotate the boom 180 degrees and travel a minimum of 50 feet in the opposite direction. The dead-man controls, where installed, are tested by engaging each motion at the slowest practical speed and then releasing the dead-man control. Power should be interrupted and the motion shall stop.

Portal & Floating Cranes

The nominal test load for portal and floating cranes shall be 125% +0%/-5% of the crane's rated capacity unless otherwise approved. Load tests for portal and floating cranes include the requirements listed in appendix E, paragraph 2.2. In addition to these tests, variable rated cranes shall also be tested in accordance with paragraph 2.3 using the appropriate test load at maximum radius on the main hoist. The stability test is for balanced deck design cranes only. Balanced deck design cranes are portal cranes with large diameter roller assemblies and center pin assemblies. This test is done during the static and dynamic load test, observing for clearance between the rollers and the upper and lower roller rails. If no clearance is observed, stability is satisfactory. If clearance is observed, follow the specific procedure outlined in appendix E.

Travel & Deadman Switches No-Load Tests

- **Travel function**
 - Boom centered
 - Boom dog engaged
 - Travel 50 feet
 - Rotate 180 degrees
 - Travel 50 feet
- **Deadman controls**
 - Engage motion at slow speed
 - Release deadman control
 - Power should be interrupted and motion shall stop



Portal & Floating Cranes

- Nominal test load = 125% +0%/-5% of rated capacity
- Appendix E, paragraphs 2.2 and 2.3
- Stability testing - for balanced deck design cranes only



Hoist & Boom Static and Dynamic Tests

Main and boom hoists, rotate, and travel load tests are performed using the maximum test load at maximum radius. For the boom hoist tests, the test load and radius shall produce the maximum line pull. This may require a different test load. Typically, this is done at maximum radius for maximum load.

To perform the main hoist and boom hoist static test, raise the test load to clear the ground and hold for ten minutes at the maximum radius for the load lifted. Rotate the load and hook 360 degrees clockwise and counterclockwise to check bearing operation. Do not allow the pawl or dog to carry the load. Observe for lowering of the test load, which may indicate equipment malfunction. If either hoist has a primary or secondary holding brake, where each brake is designed to individually hold the load, additional tests shall be performed in lieu of a single ten-minute hold test: See appendix E.

To perform the hoist dynamic test, raise and lower the load. Stop the load during hoisting and lowering. Ensure the crane operates smoothly through the range, holds the load when stopped, and the dynamic braking functions properly.

New wire rope shall be tested through its maximum working length before being put into service. This may be accomplished during either the dynamic or static tests. To test the boom hoist, start from maximum radius with load attached. Raise the boom to minimum radius and then lower it back to maximum radius. Ensure the crane operates smoothly through the range, holds the load when stopped, and the dynamic braking functions properly.

Hoist & Boom Static and Dynamic Tests

Main and Boom Hoist Static Test

- Raise test load to clear ground
- Hold 10 minutes at maximum radius
- Rotate 360 degrees clockwise and counterclockwise
- Observe for lowering
- Do not allow pawl to carry the load

New Wire Rope Test

- Maximum working length
- Prior to production service
- Accomplished during dynamic or static tests

Boom Hoist Dynamic Test

- Start at maximum radius with load attached
- Raise to minimum radius
- Lower to maximum radius
- Ensure smooth operation
- Ensure brakes hold load
- Ensure dynamic braking functions properly

Hoist Dynamic Test

- Raise and lower the load
- Ensure smooth operation
- Brakes hold load when stopped
- Dynamic braking functions properly

Hoist & Boom Foot Brake and Loss of Power Tests

The hoist foot brake and boom foot brake tests, hydraulic or mechanical, are designed to test the ability of the foot brakes to stop the lowering motion. For the boom test, have the boom near maximum radius. In both tests, hoist the test load a few feet above the ground. Lower the test load at slow speed with controller in the first control point. Apply the foot brake. The lowering motion shall stop.

The hoist loss of power and boom loss of power tests are designed to test the reaction of the applicable hoisting unit in the event of power failure during a lift. For the boom test, have the boom near maximum radius. In both tests, hoist the test load about 10 feet above the ground. Lower the test load for the hoist loss of power test or the boom for the boom loss of power test at slow speed, and with controller in the slow lowering position, disconnect the main power source by pushing the main power stop button. The test load shall stop. If the load or boom does not stop until the controller is returned to the neutral position, notify the activity engineering organization and Navy Crane Center to verify this is the intended OEM design. These tests are only done on cranes with powered down hoists. These tests are not applicable to load-sensitive reactor type hoist controls. Cautions apply and may require engineering involvement. See appendix E for details.

Travel and Rotate Load Tests

The rotation test is done at maximum radius, rotating left and right 360 degrees, if possible. If not possible, rotate at least two complete revolutions of the swing pinion. Rotate brakes shall demonstrate ability to stop the rotating motion in both directions in a smooth, positive manner. The boom-over-the-side travel test for portal cranes is conducted with the boom at maximum allowable radius and positioned perpendicular to the crane rails. With the boom dog engaged, travel in one direction a minimum of 50 feet. Repeat with the boom over the opposite side where space and conditions permit. The boom-over-the-front and boom-over-the-opposite-end travel tests for portal cranes are performed in the same manner except the

Hoist & Boom Foot Brake and Loss of Power Tests

• Hoist Hydraulic or Mechanical Foot Brake Test

- Perform test with boom near maximum radius
- Position test load approximately 2 feet off the ground
- Lower load in first control point
- Push the main power stop button or buttons

• Hoist Loss of Power Test

- Hoist test load approximately 10 feet
- Lower load slowly
- Disconnect main power - load should stop lowering
- Performed only on cranes with powered down hoists
- Engineering shall evaluate electronic controls before performing this test

Travel and Rotate Load Tests

• Rotate Test

- Performed at maximum radius
- Rotated left and right 360 degrees
- Brakes shall stop rotating motion

• Travel Test

- Performed with:
 - Boom over the side
 - Boom over the front
 - Boom over the opposite end
- Boom shall be at maximum radius



Caution: When traveling with the boom over the side, use a very slow travel speed to ensure the track and supporting foundation are sound and the travel area is free of obstructions.

boom shall be parallel to the crane tracks. In each travel test, operate the controller through normal operating speeds. The crane shall accelerate, decelerate, and stop smoothly. **CAUTION:** Use very slow travel speed to ensure the track and supporting foundation are sound and the travel area is free of obstructions.

Auxiliary, Whip, Variable Rated Cranes

For auxiliary and whip hoists, the static, dynamic, loss of power, emergency drum brake, foot brake, and new wire rope tests, are all conducted in a manner similar to the tests performed on the main hoist. In addition to the tests prescribed in paragraph 2.2, variable rated cranes shall be tested with the appropriate test load at the maximum radius of the crane. These additional tests include a stability and static test, boom hoist, boom foot brake, and rotation test, and, where applicable, an automatic boom brake test (free-fall prevention). It's very important that you be aware of and follow all the precautions listed in this section of appendix E.

Auxiliary, Whip, and Variable Rated Cranes

- Testing is also required for:
 - Auxiliary and Whip Hoists
 - Static and dynamic tests
 - Loss of power
 - Emergency drum brakes
 - Foot brakes
 - New wire rope
 - Variable Rated Cranes
 - Tested to paragraphs 2.2.2 through 2.2.5 and 2.3
 - Static tests and stability (as applicable) tests
 - Boom hoist operation
 - Boom mechanical or hydraulic foot brake
 - Rotation
 - Automatic boom brake (ex.: Washington Crane Company)



Floating Crane Tests

Load and no-load tests for floating cranes are done in the same manner as portal cranes for all functions that apply. Use caution when rotating loads over water. Ensure the floating crane has adequate draft readings per design data during the initial load test. Monitor the radius during the test to stay within the allowable radius. Where space permits, the parking brake must prevent rotation when applied with the boom at 45 degrees from the centerline of the barge. Hold for 10 minutes with brake applied. See NAVFAC P-307, appendix E for specific instructions.

Floating Crane Tests

- Rotation Test
 - Use caution testing over water
 - Stay within radius
 - Draft readings per design data
- Rotate Brake Test
 - Must prevent rotation
 - Hold at 45 degrees from centerline
 - Hold 10 minutes
 - Boom shall be at maximum radius



Caution: Exercise care when rotating loads over water. Carefully review and follow all precautions listed in this section.

Mobile Crane Testing Appendix E, Paragraph 5

Mobile cranes, aircraft crash cranes, articulating boom cranes, and other telescoping boom cranes are tested in accordance with appendix E, paragraph 5, which sorts the various load and no-load test requirements by boom type. For example, sub-paragraph 5.4 provides test requirements for telescoping boom cranes, sub-paragraph 5.5 for lattice boom cranes, and sub-paragraph 5.8 for articulating boom cranes. Test procedures for other telescoping boom cranes shall follow OEM procedures and recommendations. Where no procedures are provided by the OEM, procedures shall be developed by the activity engineering organization using the procedures of this subsection as a guide.

The remaining paragraphs 5.1, 5.2, 5.3, 5.6, 5.7, and 5.9 discuss requirements for test loads, cranes temporarily mounted on barges, pre-test preparations and precautions, testing after changing or repairing tires, testing new wire rope, and testing non-lift service equipment. The nominal test load for mobile cranes, aircraft crash cranes, articulating boom cranes, and other telescoping boom cranes shall be 100% of the rated capacity or 110% for third party certified cranes.

Mobile Crane Testing No-Load Tests

Test all functions through their full range of motion. Check all limit switches and bypasses where applicable. Check that the load moment indicator, or LMI, functions properly and that all data such as radius and boom length, etc. is accurate. Check anti-two block device function. Raise each hoist block into the limit switch, where installed, at slow speed. Ensure the anti-two block alarm operates or that the hoist is disabled in accordance with the OEM's operating instructions. If the crane is equipped with control lockouts, function limiters, or kick-outs, carefully ensure that all applicable functions that could two-block the hoist, such as telescope out and boom down, are disabled in accordance with the OEM's operating instructions. After lowering the hook, check that the wire rope drum is packed tightly before lifting loads. This is especially important for smooth drums.

For hydraulic cranes, extend and retract the telescoping boom fully. For latching boom cranes,

Mobile Crane Testing (MCT) Appendix E, Paragraph 5

Testing of Mobile Cranes, Aircraft Crash Cranes, Articulating Boom Cranes, and other Telescoping Boom Cranes

- Boom Types:
 - Commercial Truck-Mounted Telescoping (5.4)
 - Lattice (5.5)
 - Articulating (5.8)
- Other telescoping boom crane testing:
 - Per OEM
 - Locally developed

Various load test requirements, temporary barge mounted cranes, preparations, precautions, tire and wire rope testing, and non-lift service equipment.

Nominal test loads:

- 100% +0%/-5% of rated capacity
- 110% +0%/-5% for third party certified cranes

Mobile Crane Testing - No-Load Tests

- All functions
- Full motion range
 - Limit switches
 - Bypasses
 - LMIs
 - Anti-two-block devices
 - Ensure wire rope is packed tight on the drum
- Hydraulic Cranes
 - Fully extend & retract boom
- Latching Boom Cranes
 - All extend boom modes
 - Proper latch/pin engagement



***Warm components and fluids as required before testing.

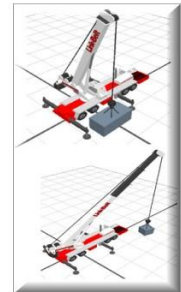
ensure all boom extend modes operate properly and ensure all boom latching/pinning positions engage properly for each section. The no-load test for hydraulic cranes will normally accomplish this. Additional no-load operation may be required. Torque converter temperatures should be in the normal range before doing travel tests. Hydraulic fluids should be brought up to normal operating temperature before the load test.

Mobile Crane Testing Load Tests

The mobile crane load test consists of a maximum certified capacity test and a load moment test. In some cases, these tests may be combined. Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations. Other appropriate tests are required for cranes that use ancillary equipment with AEP's during the certification period. For cranes with multiple reeving configurations, the maximum line pull test should be performed first. The following screens will provide additional details regarding mobile crane testing. These nine topics are prefixed, in the list on the left, with the abbreviation MCT, which stands for mobile crane testing.

Mobile Crane Testing - Load Tests

- Maximum Certified Capacity
- Load Moment
- Maximum Line Pull

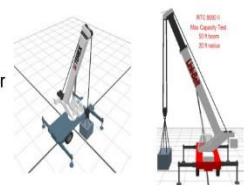


Maximum Certified Capacity Test

The test load shall be 100% of the maximum certified capacity of the crane or 110% for third-party certified cranes. Determine the maximum permissible radius for the maximum certified capacity. Perform this test at the maximum boom length and radius for the maximum certified capacity. Raise the test load using the hoist. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. With the test load raised, rotate the hook 360 degrees clockwise and counterclockwise to check bearing operation. If the size of the test load precludes a full 360 degrees rotation of the hook, perform the hook rotation test during the load moment test. Operate the boom from maximum radius to minimum radius. Repeat the test,

Maximum Certified Capacity Test

- Test load = 100% of the maximum certified capacity
- Determine maximum radius for maximum certified capacity
- Test at maximum boom length and radius allowed for the maximum certified capacity
- Hoist load / lower load
- Test brakes - hold ten minutes - observe
- Rotate hook 360 degrees clockwise and counterclockwise
- Boom up / boom down
- Reduce test load and capacity if required



Check appendix E for other tests that may apply.

operating the boom from minimum radius to maximum radius for the load applied. Due to the number of layers of wire rope on the drum, some cranes may not be able to lift the test load per the OEM's load chart. If the crane cannot lift the test load, check the OEM's hoist line pull for the particular model hoist and layer of rope. If hoist line pull or available torque is the limiting factor, reduce the test load based on the hoist line pull limitation and perform the required test. Certify the crane based on the reduced test load. If the crane cannot lift the reduced test load, verify that the system hydraulic pressure and relief valves are set within OEM specifications. If the settings are within specification, contact the OEM. Other tests and conditions may apply. Review NAVFAC P-307, appendix E section 5 for details.

Load Moment Test

It is not intended to test each and every component to its maximum stress state, but instead, the load moment test is one of several tests configured to safely and efficiently test the greatest number of critical components to a specified load level. During the load moment test, the crane's boom length, radius, and capacity are the inputs that establish the test parameters and the maximum load moment value required to safely perform the component slippage tests while at the same time clearing the carrier and the outriggers through the entire swing range. The test load shall be 100% of OEM load chart capacity at the determined boom length and radius. For the purposes of this test, load moment is the product of capacity multiplied by radius. The manner in which a crane is evaluated for maximum load moment is by performing the telescopic component slippage and outrigger/stabilizer component slippage tests.

Load Moment Test

- Boom length and radius
 - values that create the max load moment
 - through complete swing range, clearing outriggers/stabilizers and carrier
- Test load = 100% of load chart capacity at the applicable boom length and radius
- Load moment = capacity x radius

Telescopic Component Slippage Test

During the telescopic component slippage test, the test load is raised using the hoist. The boom is operated from maximum radius to minimum radius for the load applied. The load is then held for 5 minutes without use of controls while observing for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. Lower the boom from minimum radius to maximum radius before proceeding to the next test.

Telescopic Component Slippage Test

- Telescopic component slippage test:
 - hoist load
 - operate boom from max radius to minimum radius
 - hold 5 minutes
 - observe

Outrigger/Stabilizer Component Slippage Test

During the outrigger/stabilizer component slippage test, swing the test load at slow speed through the complete swing range as allowed by the OEM, and apply the brake periodically during rotation. The brake shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. Hold the load with the boom positioned over each outrigger or stabilizer for 5 minutes. Holding over the center front outrigger or stabilizer is not required. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. Swing the crane in the opposite direction through the complete swing range as allowed by the OEM. Stopping over outriggers or stabilizers is not required. The significance of any lowering shall be evaluated by the activity engineering organization depending on operating requirements and safety. Outrigger locking device and latching boom telescoping cylinder tests are determined by operating characteristics, local procedures, and appendix E paragraph 5 notes.

Outrigger/Stabilizer Component Slippage Test

- Outrigger/stabilizer component slippage test:
 - Swing test load slowly through complete swing range and apply brakes to test stopping ability
 - Stop and hold load over each outrigger/stabilizer for 5 minutes
 - Observe
 - Swing reverse direction
 - stopping over outriggers/stabilizers is not required

Notes:

- Engineering shall evaluate observed lowering
- Outrigger locking device and latching boom telescoping cylinder tests are determined by operating characteristics, local procedures, and appendix E paragraph 5 notes

See appendix E for details.

Load Moment Test: Boom Length

The boom length shall be the shortest length where all sections are partially extended, but not less than 50% total powered boom length or latching section boom length. Total boom length includes the length of the base section but not the power-pinned fly sections or jibs. The boom length selected shall be the shortest boom length that meets these conditions. Cranes with multiple boom modes must have multiple load charts checked to ensure maximum load moment is selected. For example, as shown on the screen, on the boom extend mode chart for the Link-Belt RTC 8090, boom modes EM2 and EM3 can be quickly eliminated since section T4 is not partially extended for all boom lengths. In boom mode EM1, the first length where all sections are partially extended is 120 feet. To view examples of cranes with synchronous type booms, click on the Synchronous Booms link. On cranes with synchronized full power booms, all sections extend equally. To view an example and description on how a sequenced-synchronized boom extends, click on the Sequence-Synchronized Boom link.

Load Moment Test: Boom Length

Shortest length that meets the following:

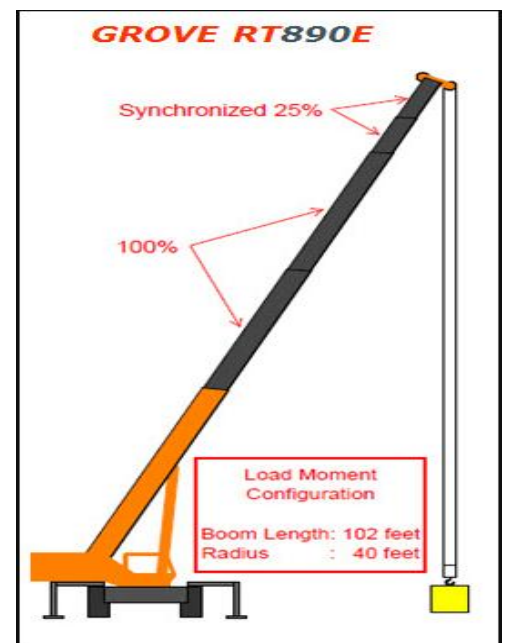
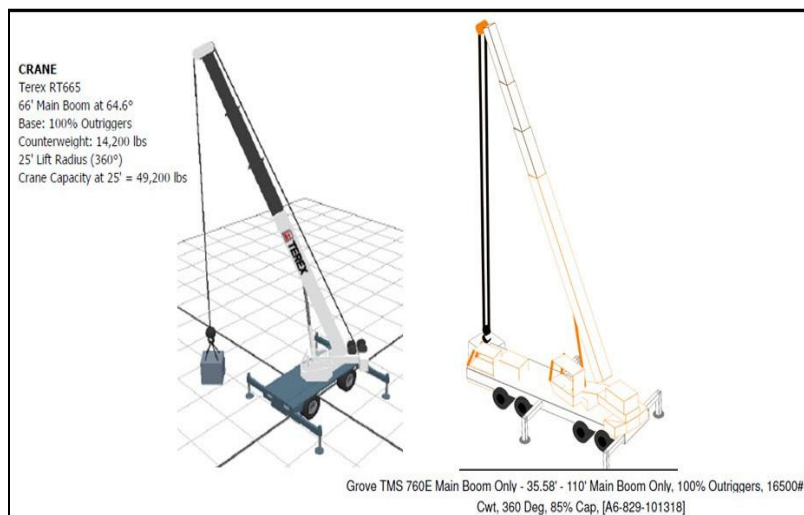
- All sections partially extended
- Not less than 50% total boom length
- Total boom length includes base section

Note:

- Cranes with multiple boom modes must have multiple load charts checked to ensure maximum load moment is selected.

[Synchronous Booms](#)

[Sequenced Synchronized Booms](#)



Load Moment Test: Radius

The radius for the load moment test is determined by calculating the maximum load moment at the determined boom length that will safely clear the outriggers and the carrier. Calculate the load moment starting at the first radius that will clear the outriggers and crane carrier. Through process of elimination, recalculate the load moment at increasing radii until the resulting load moment decreases. Use the radius that results in the maximum load moment. Ensure that the radius selected allows for changes in carrier deflection that will not take the load out of radius or take the load into contact with the crane. During rotation, the radius may be adjusted due to carrier frame deflection, but do not increase radius once it has been decreased. When determining the load moment test configuration, the load test director will have to consider the wire rope as reeved, wire rope line pull, and winch performance as necessary.

The example shows a Grove RT 865 load chart. The radius required to clear the outriggers and carrier is about 18 feet. Considering the size of the test weight, load moment calculations would begin at 25 feet and are as follows:

- 25 ft. x 53,450 lbs. = 1,336,250 ft. lbs.
- 30 ft. x 41,200 lbs. = 1,236,000 ft. lbs.

The maximum load moment is at the 25-foot radius. If the test load will not safely clear the outriggers at 25 feet due to size, the test can be performed at 30 feet.

Load Moment Test: Radius

- **Radius:**
 - max load moment at a boom length that clears outriggers and carrier
- **Process of Elimination**
 - Calculate at first radius
 - Calculate at subsequent radii until load moment decreases
- **Be cautious and considerate of:**
 - Carrier deflection
 - Boom deflection
 - Wire rope reeving and line pull
 - Winch performance

Calculation Example

First, determine the mid boom length. Using the load chart on the screen we see a crane with a maximum of 110' of boom. We can assume a halfway point of 55'. On this load chart, we will round up to 60'. Second, we will use the process of elimination to determine the correct load moment. Along the 60-foot boom length column, we'll start with the 20-foot radius. We start here because this has been determined to be the minimum radius which will allow the test load to safely clear the outriggers. A 20-foot radius with 60' of boom indicates a capacity of 33,550 lbs. Using the formula 'capacity x radius,' we can now determine the load moment for this radius. Repeat this step for the next several radii, for example: 25,' 30,' 35,' and so on until we get to the radius where the calculated load moment value is less than the previous

Calculation Example

- **Boom Length:**
 - 1/2 of 110' = 55'
 - Mid boom length = 60' (rounded up)
- **Radius:**
 - 20' x 33,550 lbs = 671,000 ft lbs (i.e., load moment)
 - 25' x 27,750 lbs = 693,750 ft lbs (increase)
 - 30' x 23,300 lbs = 699,000 ft lbs (increase)
 - 35' x 20,000 lbs = 700,000 ft lbs (increase)
 - 40' x 15,850 lbs = 634,000 ft lbs (decrease)
- **Maximum load moment:**
 - 700,000 ft lbs
- **Test Load:**
 - The maximum test load is 100% of capacity or 20,000 pounds
 - To obtain the minimum test load, multiply the capacity by .95 (i.e., 100% +0/-5%), 20,000 x .95 = 19,000
- **Test configuration:** 60' boom, 35' radius, test load: 19,000 to 20,000 pounds

one. The largest product observed is the maximum load moment. In cases where you begin your calculations at too high a radius and the load moments are trending down, reverse direction and work the radius scale the other way until you determine the correct product.

Calculation Example Continued

Reviewing the calculations on the screen, we can see how the load moment increases as the radius increases. However, at 40' we see the load moment decrease. Therefore, in this example, 700,000 ft. lbs. is the maximum load moment. Third, we read the load chart for 60' of boom at 35' of radius and obtain a capacity of 20,000 lbs. Now that we have this value, we can calculate the minimum and maximum test loads to achieve maximum load moment. Multiply 20,000 lbs. by 1.0 (or 100%) to obtain the maximum test load of 20,000 lbs. Multiply 20,000 lbs. by 0.95 (or 95%) to obtain the minimum test load of 19,000 lbs. So, our set-up for this load moment test is 60' of boom at 35' of radius with a test load value between 19,000 lbs. and 20,000 lbs. To avoid an inadvertent overload, do not forget to subtract any deductions, such as rigging gear, from these values.

Flex

Be aware, especially on truck cranes, that as the load is rotated from the side to the front or rear of the crane, the flex in the crane will relax; deflection in the carrier will decrease, bringing the load closer to the crane. If it is anticipated that the load will come too close to the crane, select the next longer radius. This graphic illustrates the change in outrigger load as the crane rotates. These dynamic forces create transient stresses, resulting in crane components flexing in different directions and at different rates.

Calculation Example

- Boom Length:
 - 1/2 of 110' = 55'
 - Mid boom length = 60' (rounded up)
- Radius:
 - 20' x 33,550 lbs = 671,000 ft lbs (i.e., load moment)
 - 25' x 27,750 lbs = 693,750 ft lbs (increase)
 - 30' x 23,300 lbs = 699,000 ft lbs (increase)
 - 35' x 20,000 lbs = 700,000 ft lbs (increase)
 - 40' x 15,850 lbs = 634,000 ft lbs (decrease)
- Maximum load moment:
 - 700,000 ft lbs
- Test Load:
 - The maximum test load is 100% of capacity or 20,000 pounds
 - To obtain the minimum test load, multiply the capacity by .95 (i.e., 100% +0/-5%), 20,000 x .95 = 19,000
- Test configuration: 60' boom, 35' radius, test load: 19,000 to 20,000 pounds

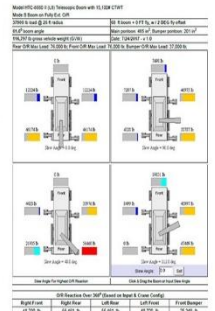
Radius in Feet	20'	25'	30'	35'	40'	45'	50'	55'	60'	65'	70'	75'	80'	85'	90'	95'	100'	110'
10	100,000	125,000	150,000	175,000	200,000	225,000	250,000	275,000	300,000	325,000	350,000	375,000	400,000	425,000	450,000	475,000	500,000	525,000
12	120,000	150,000	180,000	210,000	240,000	270,000	300,000	330,000	360,000	390,000	420,000	450,000	480,000	510,000	540,000	570,000	600,000	630,000
14	140,000	175,000	210,000	245,000	280,000	315,000	350,000	385,000	420,000	455,000	490,000	525,000	560,000	595,000	630,000	665,000	700,000	735,000
16	160,000	200,000	240,000	280,000	320,000	360,000	400,000	440,000	480,000	520,000	560,000	600,000	640,000	680,000	720,000	760,000	800,000	840,000
18	180,000	225,000	270,000	315,000	360,000	405,000	450,000	495,000	540,000	585,000	630,000	675,000	720,000	765,000	810,000	855,000	900,000	945,000
20	200,000	250,000	300,000	350,000	400,000	450,000	500,000	550,000	600,000	650,000	700,000	750,000	800,000	850,000	900,000	950,000	1,000,000	1,050,000
22	220,000	275,000	330,000	385,000	440,000	495,000	550,000	605,000	660,000	715,000	770,000	825,000	880,000	935,000	990,000	1,045,000	1,100,000	1,155,000
24	240,000	300,000	360,000	420,000	480,000	540,000	600,000	660,000	720,000	780,000	840,000	900,000	960,000	1,020,000	1,080,000	1,140,000	1,200,000	1,260,000
26	260,000	325,000	390,000	455,000	520,000	585,000	650,000	715,000	780,000	845,000	910,000	975,000	1,040,000	1,105,000	1,170,000	1,235,000	1,300,000	1,365,000
28	280,000	350,000	420,000	490,000	560,000	630,000	700,000	770,000	840,000	910,000	980,000	1,050,000	1,120,000	1,190,000	1,260,000	1,330,000	1,400,000	1,470,000
30	300,000	375,000	450,000	525,000	600,000	675,000	750,000	825,000	900,000	975,000	1,050,000	1,125,000	1,200,000	1,275,000	1,350,000	1,425,000	1,500,000	1,575,000
32	320,000	400,000	480,000	560,000	640,000	720,000	800,000	880,000	960,000	1,040,000	1,120,000	1,200,000	1,280,000	1,360,000	1,440,000	1,520,000	1,600,000	1,680,000
34	340,000	425,000	510,000	595,000	680,000	765,000	850,000	935,000	1,020,000	1,105,000	1,190,000	1,275,000	1,360,000	1,445,000	1,530,000	1,615,000	1,700,000	1,785,000
36	360,000	450,000	540,000	630,000	720,000	810,000	900,000	990,000	1,080,000	1,170,000	1,260,000	1,350,000	1,440,000	1,530,000	1,620,000	1,710,000	1,800,000	1,890,000
38	380,000	475,000	570,000	665,000	760,000	855,000	950,000	1,045,000	1,140,000	1,235,000	1,330,000	1,425,000	1,520,000	1,615,000	1,710,000	1,805,000	1,900,000	1,995,000
40	400,000	500,000	600,000	700,000	800,000	900,000	1,000,000	1,100,000	1,200,000	1,300,000	1,400,000	1,500,000	1,600,000	1,700,000	1,800,000	1,900,000	2,000,000	2,100,000
42	420,000	525,000	630,000	735,000	840,000	945,000	1,050,000	1,155,000	1,260,000	1,365,000	1,470,000	1,575,000	1,680,000	1,785,000	1,890,000	1,995,000	2,100,000	2,205,000
44	440,000	550,000	660,000	770,000	880,000	990,000	1,100,000	1,210,000	1,320,000	1,430,000	1,540,000	1,650,000	1,760,000	1,870,000	1,980,000	2,090,000	2,200,000	2,310,000
46	460,000	575,000	690,000	805,000	920,000	1,035,000	1,150,000	1,265,000	1,380,000	1,495,000	1,610,000	1,725,000	1,840,000	1,955,000	2,070,000	2,185,000	2,300,000	2,415,000
48	480,000	600,000	720,000	840,000	960,000	1,080,000	1,200,000	1,320,000	1,440,000	1,560,000	1,680,000	1,800,000	1,920,000	2,040,000	2,160,000	2,280,000	2,400,000	2,520,000
50	500,000	625,000	750,000	875,000	1,000,000	1,125,000	1,250,000	1,375,000	1,500,000	1,625,000	1,750,000	1,875,000	2,000,000	2,125,000	2,250,000	2,375,000	2,500,000	2,625,000
52	520,000	650,000	780,000	910,000	1,040,000	1,170,000	1,300,000	1,430,000	1,560,000	1,690,000	1,820,000	1,950,000	2,080,000	2,210,000	2,340,000	2,470,000	2,600,000	2,730,000
54	540,000	675,000	810,000	945,000	1,080,000	1,215,000	1,350,000	1,485,000	1,620,000	1,755,000	1,890,000	2,025,000	2,160,000	2,295,000	2,430,000	2,565,000	2,700,000	2,835,000
56	560,000	700,000	840,000	980,000	1,120,000	1,260,000	1,400,000	1,540,000	1,680,000	1,820,000	1,960,000	2,100,000	2,240,000	2,380,000	2,520,000	2,660,000	2,800,000	2,940,000
58	580,000	725,000	870,000	1,015,000	1,160,000	1,305,000	1,450,000	1,595,000	1,740,000	1,885,000	2,030,000	2,175,000	2,320,000	2,465,000	2,610,000	2,755,000	2,900,000	3,045,000
60	600,000	750,000	900,000	1,050,000	1,200,000	1,350,000	1,500,000	1,650,000	1,800,000	1,950,000	2,100,000	2,250,000	2,400,000	2,550,000	2,700,000	2,850,000	3,000,000	3,150,000

Flex

Rotating loads cause the crane to flex:

- Over the front or rear - less flex
- Over the sides - more flex
- Less flex = less radius
- More flex = more radius

Select a radius that compensates for carrier and boom deflection during rotation.



Structural and Stability Ranges

Depending on the specific crane configuration, the total test load weight, which may be at, near, or above 100%, may place the crane in the structural or stability range of the load chart, either of which is acceptable. Keep in mind, a load that exceeds the stability rating in one area of the chart may exceed the structural rating in another area of the chart. Review load charts and working range diagrams carefully and exercise caution when testing at or near these ranges. The stability load changes with the swing angle, and structural failure can happen without warning especially in areas of the crane that cannot flex or, as with some older cranes, can no longer flex. Vigilance during testing, a well-prepared load test director, an alert test team, a quality maintenance program, and thoughtful pre-test inspections are the best methods to minimize the possibility of any problems associated with stability and structural concerns. Outrigger lift-off is often an indication of frame flex and not an indication of instability.

Structural and Stability Ranges

- Testing at, near, or above 100% can place a loaded crane in the stability or structural range of the load chart.
- Exercise caution and review all parts of the load charts and range charts carefully.
- Minimize Stability and Structural concerns:
 - Vigilance
 - Well prepared test director
 - Alert test team
 - Quality maintenance program
 - In-depth pre-test inspection



Maximum Line Pull

For cranes that will use multiple reeving configurations during the certification period, a maximum line pull test is required. This test should be performed first to identify hoist performance issues at the beginning of the test. Testing of all possible reeving configurations is not required. The reeving configuration to be tested shall be such that the test load produces 100% of the maximum allowable wire rope line pull. If the crane cannot lift the test load due to the number of layers of wire rope on the drum, see appendix E, paragraph 5.4.2.1.

Maximum Line Pull

Maximum Line Pull:

- for multiple reeving configurations during certification period
- Perform at the beginning of testing
- All configurations are not required to be tested
- Test to 100% of maximum allowable line pull
- May be combined with maximum certified capacity test or load moment test



For cranes with identical main and auxiliary hoists (winches) and an approved reeving AEP:

- either hoist may be used to the maximum certified crane capacity based on satisfactory max line pull tests on each hoist
- a satisfactory completion of the maximum certified capacity and load moment test on one hoist.

1. Raise the test load using the hoist
2. Lower test load, stop to test brake, hold load 10 minutes

Note. In some cases, this test may be combined with the maximum certified capacity test or load moment test. For cranes with identical main and auxiliary hoists and an approved reeving AEP, either hoist may be used to the maximum certified crane capacity based on satisfactory maximum line pull tests on each hoist and a satisfactory completion of the maximum certified capacity and load moment test on one hoist. 1. Raise the test load using the hoist. 2. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes.

Ancillary Equipment Testing

For cranes that will use approved ancillary equipment such as swing-away jibs, power pinned fly sections, manual extensions, jibs at variable offsets, multiple load blocks, etc., during the certification period, ancillary equipment testing is required. The test load shall be 100% of the maximum certified capacity of the equipment or 100% of the maximum allowable wire rope line-pull if the equipment is not fully reeved.

For jibs with variable offset angles, test at the greatest offset used. For telescoping extensions, test at the fully extended length. Each point of a bi-fold swing-away shall be tested if both points are used and/or certified. All counterweight configurations that will be used during the certification period shall be tested. Record each test configuration and test load on the certification supplement form, figure 4-2.

Ancillary Equipment Testing

- Ancillary equipment, such as the following, when approved for use during the certification period, shall be tested:
 - Swing-away jibs
 - Power pinned fly sections
 - Manual extensions
 - Variable offset jibs
 - Multiple load blocks, etc.
- Tested to:
 - 100% maximum certified capacity, or
 - 100% maximum line pull, if not fully reeved
- All counterweight configurations that will be used during the certification period shall be tested.
- Record each test configuration and test load on the certification supplement form, figure 4-2.



Auxiliary Hoists Test

The test load shall be 100% of the maximum certified capacity for the hoist to be tested. Tests shall be performed with the boom fully extended or until two wraps of wire rope remain on a grooved hoist drum or three wraps of wire rope remain on a smooth hoist drum.

1. Raise the test load using the hoist.
2. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes.
3. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers/stabilizers.

With the test load raised, rotate the hook 360 degrees clockwise and counterclockwise to check bearing operation.

Auxiliary Hoists Test

- Test load = 100%
- Boom = fully extended, or as wraps allow
 - Raise the test load using the hoist
 - Lower the test load and test the ability of the brake to control, stop, and hold the test load
 - 10 minute hold
 - Observe for any lowering
 - Rotate the hook 360 degrees clockwise and counterclockwise



On-Rubber Load Testing

The on-rubber or free-rated load test checks the stability and operation of a mobile crane's carrier, wheels, tires, brakes, etc., under load when lifting without the use of outriggers and while traveling with the load. Do the test only when free-rated lifts are permitted at the activity and OEM for the type of crane being tested. Follow all OEM on-rubber lifting requirements. Use taglines to control the load. Extend outriggers where equipped and keep them no more than three to four inches above the ground. Do a test for each allowable configuration. Allowable on-rubber rated capacity for over-the-side lifting for cranes equipped with outriggers or stabilizers shall not exceed 60% of the OEM's load chart values.

For those cranes, testing over the side on-rubber is not required. For rubber tired cranes without outriggers or stabilizers, contact the Navy Crane Center. See section 6 for allowable on-rubber capacities, capacity rating information, and initial stability testing for used and altered cranes. Some cranes have different ratings for stationary lifts and for traveling with a load. Each allowable configuration shall be tested.

On-Rubber Load Testing

- Checks mobile crane
 - Stability, operation, carrier, wheels, brakes, tires, etc.
 - Under load, without outriggers, traveling
- Only test if on-rubber lifting and traveling are permitted by the activity.
- Use taglines
- Extend outriggers: keep pads 3" to 4" above ground
- Test each configuration
- Over-the-side lifts w/outriggers <60%, testing over the side is not required
- Over-the-side lifts w/o outriggers - contact NCC
- See NAVFAC P-307 section 6 for allowable capacities
- Test each allowable configuration



Maximum Certified On-Rubber Capacity Test

For the Maximum Certified On-Rubber Capacity test, hoist 100% of the maximum certified on-rubber capacity at the minimum possible radius over the rear or over the front as required by the OEM. Slowly lower the boom to the maximum radius for the maximum certified capacity. Observe for any lowering that may occur, which may indicate a malfunction of the boom, hoisting components, brakes, wheels, tires, or axle components. Rotate through the on-rubber working arc as allowed by the OEM. Observe for any lowering that may occur, which may indicate a malfunction of boom, hoisting components, brakes, wheels, tires, or axle components. Travel a minimum of 50 feet with the test load over the rear, or front as required by the OEM, with the boom parallel to the longitudinal axis of the crane carrier. Observe for any lowering that may occur, which may indicate a malfunction of boom, hoisting components, brakes, wheels, tires, or axle components.

Maximum Certified On-Rubber Capacity Test

- Test load = 100% at minimum radius over rear or front
 - Boom down to max radius
 - Engage pawls
 - Observe for any lowering
 - Rotate through the on-rubber arc
 - Observe for any lowering
 - Travel 50 feet with load over rear or front as required
 - Observe for any lowering



Lattice Boom Crane Tests

Lattice boom cranes shall be tested in accordance with appendix E paragraph 5.5. These testing procedures have been discussed on previous slides. Tests include the following: maximum certified capacity test, load moment test, auxiliary and whip hoist, maximum line pull test and ancillary equipment tests, ancillary equipment used without AEPs, on-rubber load test, and crawler travel test. The load test director must possess a thorough understanding of the crane's set-up requirements and allowable working quadrants prior to testing.

Lattice Boom Crane Tests

- **Tests include:**
 - Maximum certified capacity test
 - Load moment test
 - Auxiliary and whip hoist
 - Maximum line pull test and ancillary equipment tests
 - Ancillary equipment used without AEPs
 - On-rubber load test
 - Crawler travel test
- **Review and understand OEM testing requirements.**

Articulating Boom Crane Tests

Articulating boom cranes shall be tested in accordance with the instructions listed in appendix E paragraph 5.8. Follow the requirements of paragraphs 5.1, 5.3, and 5.3.1, and perform a no-load test in accordance with paragraph 5.4.1, as applicable. Refer directly to appendix E, paragraph 5.8 for additional testing details, safety precautions, and helpful notes. The load test consists of a maximum certified capacity test and a load moment test. Additionally, a maximum line pull test is required for cranes that are equipped with a hoist or winch of lower capacity. Multiple reeving configurations, and other appropriate tests are required for cranes that use ancillary equipment with AEPs during the certification period. The sequence may be varied by the activity; however, the sequence in paragraph 5.8 is recommended. If the crane is equipped with an inner/outer hook or padeye that is utilized by the activity but was not tested in paragraph 5.8.1, perform the test required by paragraph 5.8.1.b on the inner or outer hook or padeye that was not tested. When authorized for use, ancillary equipment shall be load tested. The test load shall be based on the maximum rated load for the equipment or as limited by wire rope line pull if the equipment is not fully reeved. Record each test configuration and test load on the certification supplement form, figure 4-2.

Articulating Boom Crane Tests

- **Maximum Certified Capacity Test**
 - Static and Telescopic Cylinder Hydraulic Component Slippage Test
 - Dynamic Test
 - Boom Test
- **Load Moment Test**
 - Static Test
 - Rotation and outrigger/Stabilizer Component Slippage Test
 - Telescopic Cylinder Hydraulic Component Slippage Test
- **Maximum Test Load for Inner/outer Hook or Padeye**
- **Ancillary Equipment**
- **Ancillary Equipment Uses Without AEPs**



Mobile Boat Hoist: Self-Propelled and Towed

Mobile boat hoists and rubber-tired gantry cranes require load and no-load testing. During the no-load test, slowly raise and lower each block through its maximum working range and into the upper limit switch. Travel the crane 50 feet, steering left and right. Test travel alarms and e-stops. Slowly travel the trolley along its full length of available travel. Verify proper brake operations. Mobile boat hoists and rubber-tired gantry cranes, both self-propelled and towed types are load tested at 100% of their rated capacity. On certain types of mobile boat hoists that use deck fittings for lifting the test load, ensure the deck fittings are aligned in the plane of the sling. Lift the test load only high enough to perform the required tests.

During the static load test, raise the load approximately one foot and hold for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of the hoist components or hoist brakes. Conduct the hoist dynamic load test by raising and lowering the test load at normal operating speeds and observe smooth control. The hoist brake load test is performed to validate the ability of the brake to control and stop the load while slowly hoisting and lowering. The travel and trolley load tests validate the ability of the components to satisfactorily travel under load. Self-propelled and towed types of boat hoists shall travel a minimum of 50 feet in each direction, steering right and left while traveling. Trolleys shall travel their full length of available travel range. At a slow speed, verify proper brake operation.

Mobile Boat Hoist: Self Propelled and Towed

- Tested at 100% of rated capacity
- Check alignment of deck fittings, as required
- Static Test: Raise load one foot, hold ten minutes, observe for lowering
- Hoist Dynamic Test: Raise/lower load, observe for smooth operations
- Hoist Brake Test: should safely control and stop load movement
- Travel Test: travel/tow minimum of 50 feet in each direction, engage steering and brakes, observe for proper function



Barge Mounted Mobile Crane Testing

Mobile cranes certified for use on shore may be mounted on barges or other floating structures, such as floating piers, after meeting specified requirements. When removed from a barge, the crane's land-based certification continues in effect. Barge stability calculations shall be performed and reduced load charts shall be established by the activity engineering organization and approved by the certifying official. The reduced load chart test need only include the appendix E tests that induce the maximum load on the outrigger pads and the rotate brake. The crane shall be load tested and certified on the barge with a test load of 100% +0%/-5% of the reduced load chart capacities. Load testing on the barge shall be performed once yearly as a minimum. A marine list and

Barge Mounted Mobile Crane Testing

- Stability Calculations
 - Established by Engineering
 - Approved by the Certifying Official
- Load tested and certified on-board
 - Reduced load chart required
 - Tested to 100% +0%/-5% of reduced capacity
- List and trim indicator required
 - Shall not exceed 3 degrees during load test
- Carrier frame shall be tied down
- 12" freeboard shall be maintained



See section 4, paragraph 4.9 and appendix E, paragraph 5.2 for more information.

trim indicator shall be installed in the operator's cab. List and trim shall not exceed 3 degrees during the load test and shall be within the OEM's requirements. The crane carrier frame shall be secured to the barge deck with tie-downs to resist lateral loads. Tie-downs shall have some slack when the crane is fully raised on outriggers. Additionally, a minimum of twelve inches of freeboard shall be maintained during the load test. See section 4, paragraph 4.9 and appendix E, paragraph 5.2 for more information.

Testing Replaced or Repaired Tires

Appendix E paragraph 5.6 provides information on testing repaired or replaced tires on category 1 mobile cranes. Category 1 cranes with on-rubber lift capability may perform the following test in lieu of a load test: travel the crane with no load on the hook, a minimum of 100 feet in forward and reverse directions, with the counterweight positioned over the affected tire, and the boom at minimum radius. Use this method only when allowed by the OEM. Use extreme caution moving a crane with the boom off center and at a minimum radius. Some mobile cranes may become unstable in this position, especially when traveled over uneven surfaces. For articulating and other telescoping boom cranes where tires remain on the ground with outriggers/stabilizers extended, perform the maximum capacity test on the side of the crane with the affected tire. For mobile boat hoists and rubber-tired gantry cranes, appendix E paragraph 8.3.4 states that the static, dynamic, and travel load tests are required after change or repair of tires unless there are eight or more tires on the crane; in which case, the static and dynamic tests are not required, and the travel test may be performed under no load due to redundancy.

Testing Replaced or Repaired Tires

Required for cranes with on-rubber capability.

Category 1 (In lieu of a load test and if allowed by OEM)

- Travel crane with no load 100' in forward and reverse directions
- Counterweight over affected tire
- Boom at minimum radius

Articulating and other Telescoping Boom Cranes

- Maximum capacity test on the side with the affected tire

MBHs and RTGs

- Static load test
- Dynamic load test
- Travel load test



Used and Altered Cranes

All newly acquired used truck, rough-terrain, all-terrain, crash, commercial truck mounted, articulating boom, and crawler cranes shall be initially tested for stability in those cases where the OEM's load and stability data are not available or where the acquiring activity suspects that previously performed alterations may affect stability. In addition, a crane shall be tested for stability after alterations that significantly affect the stability of the crane.

Note: Have engineering perform a complete review and evaluation prior to conducting any margin of stability or balance point load testing on any crane. Refer to SAE J765, Crane Load Stability Test Code for stability limitations and determination of balance point loads. See NAVFAC P-307 section 6, paragraph 6.7 for additional details.

Used and Altered Cranes

- Newly acquired used cranes including:
 - Truck
 - Rough terrain
 - All terrain
 - Crash
 - Commercial truck mounted
 - Articulating boom
 - Crawler
- Stability testing required if:
 - OEM load and stability data unavailable
 - Previous alterations suspected of affecting stability
 - Current alterations significantly affect stability
- Activity engineering shall perform and complete analysis prior to conducting any margin of stability or balance point load testing. Navy Crane Center is available to assist.
- Prior to testing, refer to SAE J765 for stability limitations and determination of balance point loads. See NAVFAC P-307, section 6, paragraph 6.7 for more information.

Non-Lift Service Crane Testing

Crawler, truck, and cruiser cranes that are used with ancillary lifting devices for clamshell, dragline, magnet, pile driving, or other non-lift crane work shall be tested at the maximum safe working load permitted for the size of wire rope being used. This test shall be performed in all working motions except travel. Buckets, magnets, etc., may be removed for testing wire rope. No test is required after reassembly. Retesting is not required when an end attachment is changed during the certification period. See NAVFAC P-307 appendix E, paragraph 5.9.

Non-Lift Service Crane Testing

- Operations such as:
 - Clamshell
 - Dragline
 - Magnet
 - Pile Driving
 - Other non-lift work
- Shall be tested:
 - At maximum safe working load permitted
 - In all working motions (except travel)
- Attachments may be removed to test wire rope. No test required after re-assembly.
- Retesting not required when attachment is changed.
- See NAVFAC P-307 appendix E, paragraph 5.9 for more information.



Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** Identify the components tested when performing the portal and floating crane no-load test for the hoist and boom.
 - A. Lower limit switch
 - B. Secondary lower limit switch
 - C. Secondary upper limit switch
 - D. Upper limit switch
 - E. Wire rope drum emergency brakes
2. **Match the following.** Match each portal crane test description to its test by selecting the correct number.

	Description	Test
_____	Boom at max radius, perpendicular to tracks	1. Boom Loss of Power Test
_____	Lower boom, disconnect main power, return controller to neutral	2. Travel Load Test
_____	Raise load, hold 10 minutes, rotate hook	3. Hoist & Boom No Load Test
_____	Boom centered and locked, move 50', rotate 180 degrees, move 50'	4. Travel No-Load Test
_____	Check emergency brakes on wire rope drums by simulating a fault	5. Hoist Static Load Test

3. **Select the best answer.** Choose the statement that accurately describes an attribute of the load moment test (LMT).
 - A. Hoist LMT load 10 feet, lower load, disconnect main power, return controller to neutral
 - B. Load moment is the product of capacity x radius
 - C. The LMT shall be configured at maximum radius and maximum boom length
 - D. The test specification for the LMT shall be 125% +5%/-0%

4. **Select the best answer.** You're calculating the maximum load moment for a crane with a maximum boom length of 100 feet. The test load will clear the crane at 15 feet. The load chart shows that at a 15 feet radius, the crane's capacity is 43,000 pounds; at 20 feet, it's 38,000 pounds; at 25 feet, it's 29,000 pounds; at 30 feet, it's 22,000 pounds; and at 35 feet, it's 17,000 pounds. Which radius provides the maximum load moment?
- A. 15 feet
 - B. 20 feet
 - C. 25 feet
 - D. 30 feet
 - E. 35 feet
5. **Select all that apply.** Which of the following requirements applies when performing on-rubber testing of mobile cranes?
- A. Outriggers fully retracted and stowed
 - B. Permitted by the local activity
 - C. Permitted by the OEM
 - D. Test each allowable configuration
 - E. None of the above
6. **Select the best answer.** When removed from a barge, a mobile crane's land-based certification—
- A. continues in effect
 - B. expires
 - C. shall be recertified
 - D. transfers back to the barge

Summary

This module, the second of three discussing crane testing, presented specific information on the different tests and test requirements for category 1 cranes including portal cranes, floating cranes, mobile cranes, mobile boat hoists, and rubber-tired gantry cranes. Special emphasis was given to the maximum certified capacity, load moment, and maximum line-pull tests. Also covered were some special testing situations involving barge mounted cranes, changed or repaired tires, non-lift service cranes, and used or altered cranes.

Next, you will see the third of three crane testing modules. It provides a look at specific testing requirements for category 2 and 3 cranes.

Recap, Wrap-Up, and What's Next?

Various tests and test requirements for category 1 cranes including:

- Portal
- Floating cranes
- Mobile cranes
- Mobile boat hoists
- Rubber-tired gantries

Special emphasis on:

- Certified capacity
- Load moment
- Maximum line pull

Other testing:

- Barge mounted cranes
- Changed/repaired tires
- Non-lift service cranes
- Used/altered cranes

Next: Specific testing for category 2 and 3 cranes

CRANE TESTING 3: CATEGORIES 2 AND 3

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Testing Category 2 and 3 Cranes.



Introduction

This is the third of three modules that presents information on specific crane testing. This module provides a review of tests and test requirements for category 2 and category 3 cranes. NAVFAC P-307 appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests.

For category 2 and 3 cranes, this may include a no-load test, load test, emergency brake test, static and dynamic test, primary and secondary holding brake test, mechanical load brake test, loss of power test, and component travel and rotate tests. Category 2 and 3 cranes are tested at 125% +0%/-5%, unless noted otherwise. Hooks and insulated links are inspected annually and tested as outlined in appendix E. Test paragraphs and results are recorded on the Certification of Load Test and Condition Inspection form. The certifying official's signature on this form confirms that all applicable testing has been conducted as prescribed and that the crane is safe to operate. The emergency drum brake dynamic test is performed with a 100% nominal test load.

Introduction

- This module provides a review of the tests and test requirements for category 2 and 3 cranes.
 - NAVFAC P-307 appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests.
 - Category 2 and 3 cranes are tested at 125% +0%/-5%.
-
-
-
-
-
-

Testing Category 2 and 3 Cranes: Sub-Groups

Testing requirements for category 2 and 3 cranes are further broken down into sub-groups which can be found in sections 6 and 7 of appendix E. Section 6 focuses on bridge or overhead traveling, gantry, cantilever gantry, and semi-gantry cranes as well as portable gantries and A-Frames with fixed overhead hoists. Section 7 addresses jib, pillar, pillar jib, and monorail cranes in addition to davits and fixed overhead hoists. The information provided in this module is for training purposes only. For specific wording and requirements refer to the NAVFAC P-307 manual.

Testing Category 2 and 3 Cranes: Sub-Groups

- Appendix E, Section 6
 - Bridge or Overhead Traveling
 - Wall
 - Gantry
 - Cantilever Gantry
 - Semi-Gantry
 - Portable Gantry/A-Frames with permanently mounted hoists
- Appendix E, Section 7
 - Jib
 - Pillar
 - Pillar Jib
 - Monorail
 - Davit
 - Fixed Overhead Hoist



Learning Objectives

Upon successful completion of this module, you will be able to list the types of tests performed on category 2 and 3 cranes, describe the test procedures, and name the section of appendix E where these test requirements can be found.

Learning Objectives

Upon successful completion of this module, you will be able to:

- list the types of tests performed on category 2 and 3 cranes
- describe the test procedures
- name the applicable Appendix E section

Section 6 No-Load Tests: General

The no-load test checks all crane functions for proper operation through all motions and design speeds. This is the time to check general safety devices such as horns, bells, whistles, travel alarms, warning lights, and bumpers. During the no-load test, the test crew can familiarize themselves with the crane and its characteristics. No-load testing allows the crane systems to come up to normal operating temperatures prior to hanging a 125% test load on the hook.

Section 6 No-Load Tests: General

- Check:
 - All functions
 - Proper operation
 - All motions
 - All speeds
 - Safety devices
- Crew-crane familiarization
- Attain normal operating temperatures



Hoist No-Load Test

The no-load testing procedure may vary for individual cranes. Generally, raise each hoist slowly into, then through the upper limit switch by using the limit switch bypass. Activate the secondary hoist upper limit switch, where applicable. Lower and raise each hook through the controller range. Lower each hook into the lower limit switch, where applicable. Lower the hook slowly through the lower limit switch by using the limit switch bypass, where applicable. Activate the secondary limit switch, where applicable. See additional details for limit switches in appendix D, item 29.

Hoist No-Load Test

- Raise hoist into, then through the upper limit
- Activate secondary limit
- Lower and raise each hook through the controller range
- Lower each hook into the lower limit switch
- Lower the hook slowly through the lower limit switch by using the limit switch bypass
- Activate the secondary limit switch



Emergency Hoist Drum Brake Fault Simulation

For cranes equipped with emergency brakes on wire rope drums, simulate a system fault by disconnecting the motor encoder signal while lowering at slow speed. Verify the brake applies within the designed delay and that the hoist control is disabled in each direction. Reconnect the encoder and repeat the test with the drum encoder. If the system uses components other than encoders to provide detection, contact engineering for test requirements.

Emergency Hoist Drum Brake Fault Simulation No-Load Test

Simulate a system fault:

- Disconnect the motor encoder while lowering at slow speed
- Verify the brake applies
- Verify hoist control is disabled
- Reconnect the encoder
- Repeat the test



Trolley No-Load Test

Operate the trolley through the controller range in both directions. Operate the full distance of the bridge rails and slowly contact the trolley rail stops with the bumpers. Verify proper brake operations.

Trolley No-Load Test

- Trolley through the controller range - both directions
- Slowly contact bumpers
- Verify proper braking



Bridge and Gantry No-Load Test

Operate the bridge and/or gantry through the controller range in both directions. Operate the full distance of the runway and slowly contact the runway rail stops with the bumpers. Verify proper brake operation. Travel portable gantry or A-frame with permanently mounted hoists only if allowed by OEM.

Bridge and Gantry No-Load Test

- Travel bridge and/or gantry through the controller range in both directions
- Operate the full distance of the runway and slowly contact bumpers
- Verify proper braking
- Follow OEM instructions for traveling portable gantries and A-Frames



Static Load Test

Test each hook separately. Raise the load approximately one foot. Measure from a fixed point on the load to fixed point on the floor; mark these points for future use. Hold the load in place for at least 10 minutes and watch for any signs of lowering. Check the hook bearing by rotating clockwise and counterclockwise 360 degrees. After 10 minutes, re-measure the height of the load using the previously marked points.

Static Load Test

Test each hook separately:

- Raise the load approximately one foot
- Measure from a fixed point on the load to the floor, mark the point, record the measurement
- Hold in place for 10 minutes, watch for signs of lowering
- Check hook bearing operation by rotating the hook 360 degrees clockwise and counterclockwise
- After 10 minutes, re-measure from the marked point on the load to the floor to determine if any lowering occurred



Primary and Secondary Holding Brake

For hoists with primary and secondary holding brakes, raise the test load and observe the proper timing sequence in the application of the primary and secondary brake when the controller is returned to neutral. Visually observe both hoist holding brakes to ensure correct operation. Raise the test load and inactivate the secondary holding brake while testing the primary holding brake. Hold for 10 minutes. Observe for lowering of the load, which may indicate malfunction of hoisting components or brakes. Re-engage the secondary holding brake and release the primary holding brake. Hold for 10 minutes. Observe for lowering of the load, which may indicate malfunction of hoisting components or brakes. Re-engage the primary holding brake. Recheck proper operation of time delay and ensure smooth positive

Primary and Secondary Holding Brakes

- Raise the load and inactivate the secondary holding brake
- Hold for ten minutes
- Observe for lowering of the load
- Re-engage the secondary holding brake and release the primary holding brake
- Hold for ten minutes
- Observe for lowering of the load
- Re-engage the primary holding brake
- Recheck proper operation of time delay and ensure smooth positive stopping
- Rotate the load and hook 360 degrees clockwise and counterclockwise



stopping. Rotate load and hook 360 degrees clockwise and counterclockwise to check bearing operation (if there is no anti-friction bearing in the hook block, the hook rotation test may be omitted). For methods of releasing the holding brake, see appendix E paragraph 6.2.1, note 1.

Dynamic Test and Load Brake Testing

Perform a dynamic load test on each hoist by raising and lowering the test load using normal operating speeds and observing for smooth control and acceleration between points or speed range. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Only raise the load as high as necessary to perform the test. If equipped and accessible, test the mechanical load brake. Raise the test load approximately five feet (higher or lower as appropriate for the conditions). With the hoist controller in the neutral position, release the holding brake. The load brake shall hold the test load. Raise the test load the minimum amount to perform the following test. Again, with the holding brake in the released position, start the test load down slowly and return the controller to the neutral position as the test load lowers. The load brake shall stop the test load. If the load brake does not stop the test load, but prevents the test load from accelerating, activities shall contact the OEM or activity engineering organization to ensure the load brake is operating as designed. This characteristic and OEM or activity engineering organization correspondence shall be documented in the equipment history file. For methods of releasing the holding brake, see appendix E paragraph 6.2.1.d, note 1. For brakes that are not accessible, observe for expected behavior.

Dynamic Test and Load Brake Testing

- **Dynamic Load Test**
 - Raise and lower the test load using normal operating speeds
 - Observe for smooth control and acceleration between points
 - Stop the load during hoisting and lowering to verify the brake stops and holds the load
 - Only raise the load high enough to perform the test
- **Mechanical Load Brake Testing**
 - Raise the test load approximate five feet
 - Release the holding brake (verify that brake holds the load)
 - Lower the test load slowly and return the controller to the neutral position as the load lowers
 - The load brake shall stop the test load
 - Observe for lowering
- If the load brake does not stop the load, but prevents the load from accelerating, contact the OEM or activity engineering organization to ensure proper operation.
- For methods of releasing the holding brake, see appendix E, paragraph 6.2.1.d, note 1.

Loss of Power Test

The loss of power test is designed to test the reaction of a hoisting unit in the event of power failure during a lift. Hoist the test load to approximately 10 feet (higher or lower as appropriate for the conditions). Lower the test load at slow speed, and with the controller in the slow lowering position, disconnect the main power source. The load shall stop. Return the controller to the neutral position. If the load does not stop until the controller is placed in the neutral position, the activity engineering organization and the Navy Crane Center (Code 03) shall review the circuitry to ensure this is the intended OEM design.

Loss of Power Test

- Designed to test the reaction of the hoisting unit in the event of power failure during a lift.
 - Hoist test load approximately 10 feet
 - Lower test load at slow speed
 - Disconnect the main power source - lowering shall stop
 - Return the controller to the neutral position
 - If the load does not stop until the controller is placed in the neutral position, notify engineering and Navy Crane Center
- The activity engineering organization shall review the system circuitry for cranes with electronic controls to ensure that this test can be performed safely without damaging the control system.
 - For cranes where the controls may be damaged, the activity engineering organization shall document their justification and fully describe the alternate tests performed.
 - Alternate test procedures require Navy Crane Center approval.



Emergency Brake on Wire Rope Drum Load Test

Static Test: After testing the other holding brakes, test the emergency hoist drum brake, where equipped. Raise the test load. Depress the emergency stop pushbutton to disconnect the main power source, which sets the brakes. Disable all hoist brakes except the wire rope drum brake. Verify the load does not lower. Reset all other brakes.

Dynamic Test: Perform this test with a test load of 100% +0%/-5% of rated load. Raise the load to a sufficient height to perform the test. Lower the load at the minimum speed necessary to simulate a shaft failure. Manually release all hoist brakes except the wire rope drum brake and simulate a system fault by interrupting the motor or drum encoder. If the system uses components other than encoders to provide detection, contact engineering for resolution. The brake shall stop the load. Reset all brakes.

CAUTION: Station trained personnel at each disabled hoist brake in case the drum brake fails to stop the test load. These personnel shall be in constant contact with the load test director and prepared to safely engage the hoist brakes when directed.

Emergency Brake on Wire Rope Drum Load Test

- **Static Test**
 - Raise test load off the ground
 - Depress emergency stop button
 - Disable all other hoist brakes
 - Hold load for 10 minutes - observe for lowering
 - Reset all brakes
- **Dynamic Test**
 - Test Load: 100% +0%/-5% of rated capacity
 - Raise load
 - Lower load to simulate fault
 - Disable all other hoist brakes
 - Observe that the load stops lowering
 - Reset all brakes



Caution: Station trained personnel at each disabled hoist brake in case the drum brake fails to stop the test load. These personnel shall be in constant contact with the LTD and prepared to safely engage the hoist brakes when directed.

Trolley, Bridge, and Gantry Motion Test

Use extreme caution when performing these tests. Operate the trolley the full distance of the bridge rails. Verify proper brake operation. Travel the bridge or gantry the full length of the runway with the trolley positioned at one end of the bridge. Travel the trolley to the opposite end of the bridge or gantry and operate the bridge or gantry in the opposite direction the full distance of the runway. Observe for any binding of the bridge or gantry trucks and verify proper brake operation. Travel portable gantry/A-frames with permanently mounted hoists with a load only under specific OEM instruction.

Trolley, Bridge, and Gantry Motion Test

- Operate the trolley the full distance of the bridge rails and verify proper brake operation
- Travel the bridge or gantry the full length of the runway with the trolley positioned at one end of the bridge or gantry
- Position the trolley at the opposite end of the bridge or gantry and operate in the opposite direction the full length of the runway
- Observe for binding of the trucks and verify proper brake operation

***Travel portable gantries/A-frames with permanently mounted hoists with a load only under specific OEM instruction.



Trolley and Bridge Loss of Power

For each bridge, gantry, or trolley without automatic brakes, test the crane's response when stopping in the event of a power failure. For certain cranes, a safety hazard may exist in controlling the motion of the bridge and trolley and therefore the motion of the load. The hazard can vary due to the speed, size, weight, environment, and characteristics of the crane and load. To mitigate, the following actions shall be taken. The operating characteristics of the crane under a loss of power shall be determined by operational field testing, with test load, and recorded.

The certifying official shall make a determination that the operating characteristics are within acceptable limits of safety for operations under loss of power. Instructions shall be posted in the cab or on the pendant controller to warn the operator of these characteristics and any necessary precautions.

Trolley and Bridge Loss of Power Test

- **No automatic brakes?**
 - Test braking characteristics
- **Is controlling the motion of the bridge or trolley a problem?**
 - Field test - record results
 - Certifying Official makes determination
 - Instructions/precautions posted

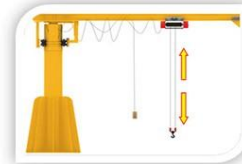


Section 7 Hoist No-Load Test

Raise each hook slowly into the hoist limit switch. Raise the hook slowly through the upper limit switch by using the limit switch bypass. Activate the secondary limit switch, where applicable. Lower and raise each hook through the controller range. Lower each hook into the lower limit switch. See additional details for limit switches in appendix D, item 29.

Section 7 Hoist No-Load Test

- Raise each hook slowly into the hoist limit switch
- Raise the hook slowly through the upper limit switch
- Activate secondary limit (where applicable)
- Lower and raise each hook through the controller range
- Lower the hook into the lower limit



See additional details for limit switches in appendix D, item 29.

Section 7: Trolley No-Load Test

Operate the trolley through the controller range in both directions. Operate the full length of the monorail or jib and slowly contact the stops. Verify proper brake operations. Operate all rail switches and verify proper operation.

Section 7 Trolley No-Load Test

- Trolley through the controller range - both directions
- Operate the full length of the monorail or jib and slowly contact bumpers
- Verify proper braking
- Operate all rail switches and verify proper operation

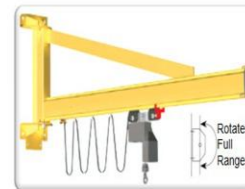


Section 7: Rotate No-Load Test

Rotate jib, pillar, and pillar jib cranes through the working range (where space is available) at maximum radius.

Section 7 Rotate No-Load Test

- For jib, pillar, and pillar jib cranes, rotate through the working range (where space is available) at maximum radius.



Section 7: Static Load Test

Raise the test load and hold for 10 minutes. If the hook is equipped with a bearing, rotate the load 360 degrees clockwise and counterclockwise to check bearing operation. If there is no anti-friction bearing in the hook block, the hook rotation test may be omitted. Observe for lowering of the load, which may indicate malfunction of a hoisting component or brake.

Section 7 Static Load Test

- Raise the test load, hold 10 minutes
- Rotate the load clockwise and counterclockwise
- Observe for lowering



Primary and Secondary Holding Brakes

For hoists with primary and secondary holding brakes (for example, where each brake is designed to individually hold the load), raise the test load and observe the proper timing sequence in the application of the primary and secondary brake when the controller is returned to neutral. Visually observe both hoist holding brakes to ensure correct operation. Raise the test load and inactivate the secondary holding brake while testing the primary holding brake. Hold for 10 minutes. Observe for lowering of the load, which may indicate malfunction of hoisting components or brakes. Re-engage the secondary holding brake and release the primary holding brake. Hold for 10 minutes. Observe for lowering of the load, which may indicate malfunction of hoisting components or brakes. Re-engage the primary holding brake. Recheck proper operation of time delay and ensure smooth positive stopping. Rotate the load and hook 360 degrees clockwise and counterclockwise to check bearing operation (if there is no anti-friction bearing in the hook block, the hook rotation test may be omitted).

Primary and Secondary Holding Brakes

- Raise the test load, and observe the proper timing sequence of the brakes when the controller is returned to neutral
 - Observe both hoist holding brakes to ensure correct operation
 - Raise the test load and inactivate the secondary holding brake while testing the primary holding brake
 - Hold for 10 minutes
 - Observe for lowering of the load
 - Re-engage the secondary holding brake and release the primary holding brake
 - Hold for 10 minutes
 - Observe for lowering of the load
 - Re-engage the primary holding brake
 - Recheck proper operation of time delay and ensure smooth positive stopping
 - Rotate the load and hook 360 degrees clockwise and counterclockwise to check bearing operation
-
-
-

Dynamic Test and Mechanical Load Brake

Dynamic test including Dynamic Load Brake: Raise and lower the test load and visually observe smooth control and acceleration between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Mechanical Load Brake: Raise the test load approximately 5 feet. With the hoist controller in the neutral position, release the holding brake. The load brake shall hold the test load. Raise the test load the minimum amount to perform the following test. With the holding brake in the released position, start the test load down slowly and return the controller to the neutral position as the test load lowers. The load brake shall stop the test load. If the load brake does not stop the test load but prevents the test load from accelerating, activities shall contact the OEM or activity engineering organization to ensure that the load brake is operating as designed. This characteristic and OEM or activity engineering organization correspondence shall be documented in the equipment history file. See appendix E, paragraph 7.2.1 for specific notes and precautions about this test.

Dynamic Test and Mechanical Load Brake

- Dynamic Test, including Dynamic Load Brake:
 - Raise and lower the test load
 - Observe smooth control and acceleration
 - Stop the load during hoisting and lowering
 - Verify braking
- Mechanical Load Brake:
 - Raise the test load approximately five feet
 - With the hoist controller in neutral, release the holding brake
 - Load brake shall hold the load
 - Raise test load
 - With the holding brake in the released position, lower test load slowly
 - Return controller to neutral
 - Load brake shall stop the load

See appendix E, paragraph 7.2.1 for specific notes and precautions for this test.

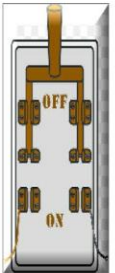
Section 7 Loss of Power Test

This test is designed to test the reaction of a hoisting unit in the event of power failure during a lift. Hoist the test load to approximately 10 feet. Lower the test load at slow speed, and with the controller in the slow lowering position, disconnect the main power source. The load shall stop. Return the controller to the neutral position. If the load does not stop until the controller is returned to the neutral positions for electric hoists, the activity engineering organization and Navy Crane Center (Code 03) shall review the circuitry to ensure this is the intended OEM design. Certain air hoist designs must be returned to the neutral position before the load will stop.

Section 7 Loss of Power Test

- Hoist the test load to approximately ten feet
- Slowly lower the load
- Disconnect the main power source
- Lowering of the load shall stop
- Return the controller to neutral

*If the load does not stop until the controller is returned to the neutral position, contact engineering.



Section 7: Trolley Load Test

Operate the trolley through the full distance of the monorail or jib. Observe for any malfunctioning of the trolley assembly and alignment of monorail or jib. Verify proper brake operation.

Section 7: Rotate Load Test

For jib, pillar, pillar jib cranes, and davits, rotate the crane through the working range at maximum radius, stopping the load at several points. There shall be no excessive drift of jib or trolley at any of these points. If a horizontal force of fifteen pounds or less will restrain the load, then the drift is acceptable.

Boom Angle and Extension Pins

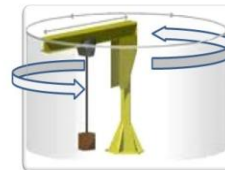
As noted in section 4, paragraphs 4.5.3.1.2 and 4.5.3.1.3, AEPs are not required and the existing certification is not voided when removing and reinstalling pins on category 3 pedestal mounted commercial boom assemblies and pins used to raise and lower gantry cranes, provided the pins are load tested and certified with the crane at the highest elevation. The OEM's instructions shall be followed when installing or removing these items.

Section 7 Trolley Load Test



Section 7 Rotate Load Test

- Rotate the crane through the working range at maximum radius
- Stop at several points
- There shall be no excessive drift of jib or trolley
- If a horizontal force of fifteen pounds or less will restrain the load, then the drift is acceptable.



Boom Angle and Extension Pins

- Current certifications are not voided when removing and reinstalling pins, provided the pins are load tested and certified with the crane at the highest elevation.



Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** From the list below, select the tests that may be performed on category 2 and 3 cranes.
 - A. Dynamic Load Test
 - B. Hoist Drive Test
 - C. Holding Brakes Test
 - D. Operator Test
 - E. Static Load Test
2. **Select the best answer.** When is the best time for the test crew to check general safety devices and become familiar with the crane’s operating characteristics?
 - A. As soon as the AMISR is complete
 - B. Before starting any testing
 - C. During the no-load operational test
 - D. While performing the CCIR
3. **Select the best answer. True or False:** Hooks may remain in service as long as measurements indicate the throat opening has not increased more than 10 percent from the base measurement.
 - A. True
 - B. False
4. **Select the best answer to fill in the blank.** A _____ test is performed on each hoist by hoisting and lowering the test load using normal operating speeds and watching for smooth operation.
 - A. Dynamic
 - B. Loss of power
 - C. Static
5. **Select the best answer. True or False:** Load tests for jibs, pillars, pillar-jibs, monorails, davits, and/or fixed overhead hoists are the same as for bridge cranes.
 - A. True
 - B. False

6. Arrange in sequence. Place the following emergency hoist drum brake no-load test steps in the correct sequential order.

- _____ Disconnect motor encoder while lowering at slow speed
- _____ Reconnect
- _____ Repeat
- _____ Verify brake applies

7. Select the best answer to fill in the blanks. Current certifications for the listed crane types are _____, and AEP's are _____ when removing and installing extension pins and boom angle pins, provided the pins are load tested and certified with the crane.

- A. not required, required
- B. not voided, not required
- C. voided, not approved
- D. voided, required

Summary

This module, the last of the three crane testing modules, presented information on the load and no-load testing procedures and requirements for various types of crane components and configurations included in category 2 and 3 cranes. Also discussed was how appendix E is further broken down into sub-groups of these categories which can be found in sections 6 and 7. Section 6 focuses on bridge, overhead traveling, gantry, cantilever gantry, and semi-gantry cranes as well as portable gantries and A-Frames with fixed overhead hoists. Section 7

addresses jib, pillar, pillar-jib, and monorail cranes, in addition to davits and fixed overhead hoists. Next, you will learn of the expected actions following the completion of a load test.

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Recap, Wrap-Up, and What's Next?

Discussed:

- Load testing
- No-load testing
- Appendix E sub-groups

• Section 6 focuses on:

- bridge
- overhead traveling
- gantry
- cantilever gantry
- semi-gantry cranes
- portable gantries
- A-Frames with fixed overhead hoists
-

• Section 7 addresses:

- jib
- pillar
- pillar-jib
- monorail cranes
- davits
- fixed overhead hoists

Next: After the load test

Completion

Congratulations.

You have completed the Testing Category 2 and 3 Cranes module.

Click on the Exit button to return to the main module menu.

AFTER THE LOAD TEST

Welcome

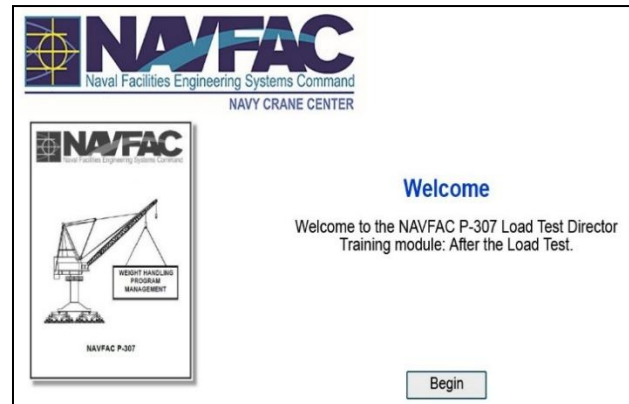
Welcome to the NAVFAC P-307 Load Test Director Training module: After the Load Test.

Learning Objectives

Upon successful completion of this module, you will be able to describe the follow-up inspections, re-test and re-inspection actions, documentation and certification requirements, and expected posting and filing activities that complete the certification process.

Post Test Inspections

After the test, check all hooks for hook throat spread. Measure between the tram marks and compare the new measurement to the baseline measurement. Any hooks showing an increase in the throat opening by more than 5 percent, or 1/4 inch, or as recommended by the hook OEM, from the base measurement shall be discarded. In addition to checking the hooks for throat spread, the condition inspector shall carefully post-inspect the items identified in the “after” or “A” column of the CCIR in the same manner as described in the Condition Inspection training module. Look for any damage that may have occurred during the test. If a major deficiency is found after the load test, it shall be corrected and a selective load test shall be performed, if required by NAVFAC P-307 paragraph 4.4.2.1, to test the components corrected. When a selective load test is performed, a condition inspection shall be performed on all items on the CCIR that experienced greater than normal loading to ensure that the load test has not caused any damage.



Learning Objectives

Upon successful completion of this module, you will be able to:

- Follow-up inspections
- Re-test & Re-inspection actions
- Documentation and certification requirements
- Posting and filing



Post Test Inspections

- Measure tram marks
- Compare with baseline
- Discard if more than 5%, 1/4", or OEM specs
- CCIR column A items
- Correct, retest, and re-inspect post-load test major deficiencies



Documentation

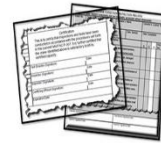
Upon completion of all tests and inspections, the following shall be performed. A record of any retesting discussed on the previous screen shall be recorded in the "Remarks" portion of the CCIR. The hook tram point measurements and the number of hook NDT annual certification periods shall be validated and recorded on the Certification of Load Test and Condition Inspection form. The CCIR and the Certification of Load Test and Condition Inspection form shall be signed and dated by the inspectors and the test director.

Note: After successful completion of the condition inspection and tests, the certification shall be signed by the test director, inspection personnel, and the certifying official within 60 days of the performance of the load test or no-load test, or the condition inspection and load test or no-load test shall be re-performed. The test director is not required to sign the certification when a load test is not performed.

Documentation

- Record any post-load test retests and re-inspections in CCIR Remarks
- Record hook tram measurements and NDT annual certification periods on the Certification of Load Test and Condition Inspection form
- Sign and date both documents

Note: After successful completion of the condition inspection and tests, the certification shall be signed by the test director, inspection personnel, and the certifying official within 60 days of the performance of the load test or no-load test, or the condition inspection and load test or no-load test, as applicable, shall be re-performed. The test director is not required to sign the certification when a load test is not performed.



Completing the Certification Process

The certification package shall be submitted to the certifying official for approval and signature. The date of the certifying official's signature is the official certification date from which the certification expiration date is determined. The crane shall not be returned to service prior to obtaining the certifying official's signature. Completed records are filed in the crane's equipment history file. The certification card, tag, or paperwork with the crane identification number, certified capacity, and the certification expiration date shall be posted in a conspicuous location on or near the crane (for example, controller, power supply, cab, jib column).

Completing the Certification Process

When all inspection and testing have been satisfactorily completed—

- Submit certification package to certifying official
- Certifying official's signature certifies crane
- File records in the equipment history file
- Post the certification document in a conspicuous location on or near the crane



Knowledge Checks

Online answers may appear in a different order than those shown below. Correct answers are indicated by “red” font color.

1. **Select all that apply.** Upon completion of all tests and inspections, select the items that shall be performed.
 - A. A record of any retesting shall be recorded in the “Remarks” portion of the CCIR
 - B. The CCIR and the Certification of Condition Inspection and Test form shall be signed and dated by the inspectors and the test director
 - C. The hook tram point measurements and the number of hook NDT annual certification periods shall be validated and recorded on the Certification of Condition Inspection and Test form
 - D. None of the listed items above need to be performed
2. **Select the best answer.** Within what length of time shall the Certification of Condition Inspection and Test be signed by the test director, inspection personnel, and the certifying official to avoid rework?
 - A. 15 days
 - B. 30 days
 - C. 60 days
 - D. 90 days
3. **Select all that apply.** What are the consequences of not signing the Certification of Condition Inspection and Test within the specified amount of time?
 - A. None
 - B. Re-perform the condition inspection
 - C. Re-perform the MISR
 - D. Re-perform the test
4. **Select the best answer.** The date of the certifying official's signature is the official certification date from which the certification expiration date is determined.
 - A. True
 - B. False

Summary

This module discussed the follow-up inspections, re-test, and re-inspection actions, documentation and certification requirements, and expected posting and filing activities that complete the certification process. Next, you will be required to complete a few scenario-based exercises that will challenge your knowledge and understanding of the materials presented in this training course.

Recap, Wrap-Up, and What's Next?

Discussed:

- Follow-up inspections
- Re-test & re-inspection actions
- Documentation and certification requirements
- Posting and filing

Next: Exercises

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Completion

Congratulations.

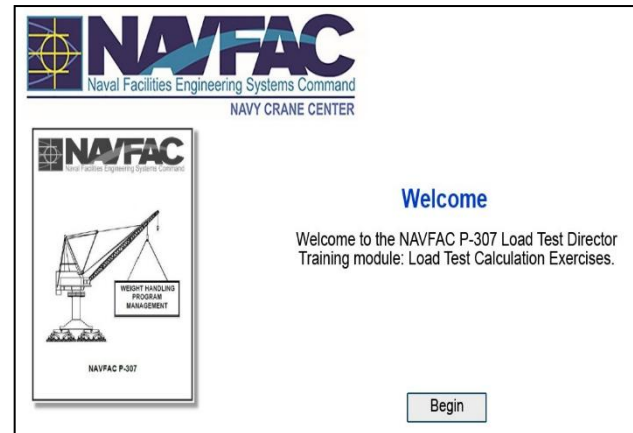
You have completed the After the Load Test module.

Click on the Exit button to return to the main module menu.

LOAD TEST CALCULATION EXERCISES

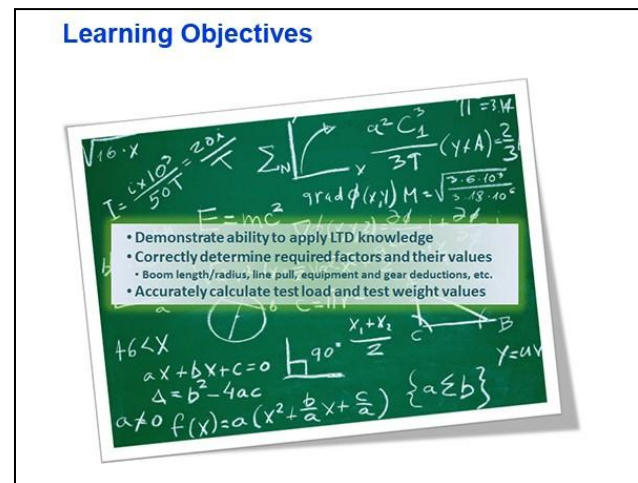
Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Load Test Calculation Exercises.



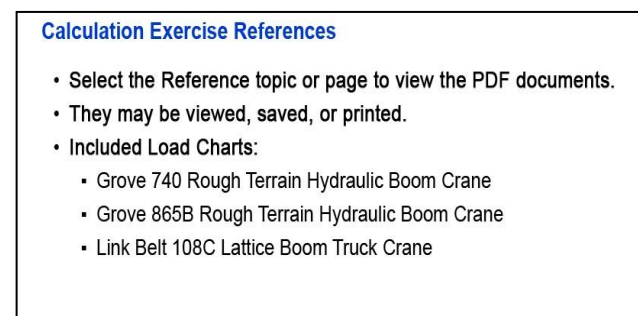
Learning Objectives

Upon successful completion of this module, you will have demonstrated your ability to apply the knowledge learned in this course by correctly identifying and calculating the values for items such as boom length, radius, line pull, test load, test load deductions, and test weights by answering the questions asked in each of the 3 load test calculation exercises.



Calculation Exercise References

The Load Test Calculation Exercises will require you to have the load chart packages available for reference. These documents can be found in the Reference area and can either be printed or saved to your computer. These load chart packages may be needed again during the final exam.



Calculation Exercise References

Select the crane load chart packages to view, print, or save the packages to your computer. These load chart packages may be needed again during the final exam. If you would like to view or print the course Student Guide or NAVFAC P-307, click on your choice from the reference links below.

References

Click on your choice from the reference links below:

[NAVFAC P-307](#)

[View or Print Student Guides](#)

[Grove 740 Rough Terrain Hydraulic Boom Crane](#)

[Grove 865B Rough Terrain Hydraulic Boom Crane](#)

[Link Belt 108C Lattice Boom Crane](#)

Load Test Calculation Exercise Example: Configuration

The next five screens provide an example of how the exercises may be completed. This screen describes the crane configuration that will be used for this example. The applicable load chart package should be used to help determine the correct values when answering the questions. In this example, you would need the Grove 740 rough terrain load chart package.

Load Test Calculation Exercise Example: Configuration

The Grove 740 Rough Terrain Load Chart Package would be used as a reference for the below scenario:

- Set up as follows:
 - Main hoist reeved with 4 parts of 3/4" 18x19 rotation-resistant wire rope
 - Stowed 32' - 56' tele-offsettable, swing-away extension
 - Auxiliary boom nose
 - 45-Ton 3 sheave hook block with cheek plates



Load Test Calculation Exercise Example: Considerations

Listed here are some of the items that need to be considered when determining values such as maximum gross capacity, limiting factors, line pull, parts of line, etc.

Load Test Calculation Exercise Example: Considerations

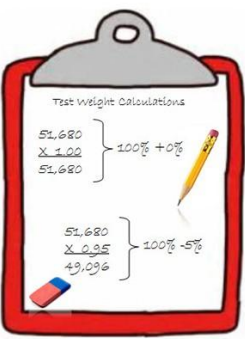
- Maximum gross capacity = 80,000 pounds
- Any limiting factors: Yes
- Permissible line pull: 12,920 pounds
- Total wire rope capacity: 12,920 pounds x 4 parts = 51,680 pounds



Load Test Calculation Exercise Example: Calculations

Recall from previous training that the nominal test load for a non-third-party mobile crane such as this Grove RT 740 is 100% +0%/-5% of the rated capacity, as configured. To calculate the maximum test load (or 100% + 0%), multiply the rated capacity of the crane by one. To find the minimum test load (or 100% -5%), multiply the maximum weight by 0.95. As you see, in this example, the calculations show a maximum test load of 51,680 lbs. and a minimum test load of 49,096 lbs.

Load Test Calculation Exercise Example: Calculations



Load Test Calculation Exercise Example: Deductions

These deductions come directly from the load chart and include an 846 lb. tele-off-settable extension, a 143 lb. auxiliary boom nose, and a 1095 lb. hook block. The total weight of deductions, not including rigging gear, is 2,084 lbs.

To determine the test weight values, these deductions are subtracted from both the maximum and minimum test load values as follows: The maximum test weight value equals the maximum test load value of 51,680 lbs. minus the equipment deductions value of 2,084 lbs., resulting in 49,596 lbs. Similarly, the minimum test weight value equals the minimum test load value of 49,096 lbs. minus the equipment deductions value of 2,084 lbs., resulting in 47,012 lbs. Note that these values do not take into account the weight deductions of any rigging gear.

Load Test Calculation Exercise Example: Deductions

Deduct:

- Stowed tele-offsettable extension: 846 lbs
- Auxiliary boom nose: 143 lbs
- 45-ton 3-sheave hook block w/cheek plates: 1,095 lbs
- Total: 2,084 lbs
- Maximum Test Weight: 51,680 lbs - 2,084 lbs = 49,596 lbs
- Minimum Test Weight: 49,096 lbs - 2,084 lbs = 47,012 lbs

Note: The values shown above do not include the weight deductions for any rigging gear. See training modules "Pre-Test Preparations / Test Weights and On-site Gear" and "General Crane Testing / Tests" for additional information.

Load Test Calculation Exercise Example: Total Test Load

When calculating the test load and test weight values, remember to include the weight of all rigging gear. On some cranes, the weight of excess wire rope may also be considered a deduction.

Load Test Calculation Exercise Example: Total Test Load

When calculating the test load to be used, remember to include the weight of all rigging gear that will be suspended by the crane hook.

- On some cranes, the weight of excess wire rope may also be considered a deduction.

LTD Load Test Calculation Exercises

There are three exercises: one involving the Grove RT 740 hydraulic crane load chart package, one using the Grove RT 865 load chart package, and one requiring the Linkbelt 108 lattice boom truck crane load chart package. You will need all three load chart packages.

LTD Load Test Calculation Exercises

- This exercise presents questions based on information normally found in a load chart package.
- Read each question carefully. Research the appropriate values in the applicable load chart. Determine the correct answers. Select the corresponding answer and check correctness.
- In many cases, the weight of rigging gear and excess wire rope must be considered when calculating deductions, for simplicity, these will not be deducted in these scenarios unless otherwise specified.
- Select the appropriate load chart package on the References topic or screen (Grove RT 740, Grove RT 865, or Link Belt HC 108) to answer the various exercise questions. You will need all three. These PDFs can be opened, printed, and/or saved.

Exercise 1: Grove 740 Rough Terrain Hydraulic Boom Crane Questions and Answers

Use the following set-up for the questions below: To answer the question, use the Grove RT 740 rough terrain hydraulic crane load chart package with a 35' to 110' power boom, reeved with 6 parts of line with a permissible line pull of 12,920 pounds, a 45 ton 3-sheave hook block with cheek plates, a 32-foot normally stowed extension, and a 7 and 1/2 ton headache ball reeved over the auxiliary boom nose.

1. **Select the best answer.** What is the gross capacity for this crane as configured on outriggers with the boom fully retracted at minimum radius?
 - A. 56,500 pounds
 - B. 67,400 pounds
 - C. 77,520 pounds
 - D. 80,000 pounds

- 2. Select the best answer.** What is the capacity limiting factor?
- A. Boom capacity
 - B. Hook block
 - C. Outriggers
 - D. Wire roper line pull
- 3. Select the best answer.** Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?
- A. 62,150 lbs. – 65,257 lbs.
 - B. 73,644 lbs. – 77,520 lbs.
 - C. 74,140 lbs. – 77,847 lbs.
 - D. 88,000 lbs. – 92,400 lbs.
- 4. Select the best answer.** What is the sum of the equipment deductions for this crane as configured?
- A. 1,707 lbs.
 - B. 2,222 lbs.
 - C. 2,237 lbs.
 - D. 2,422 lbs.
- 5. Select the best answer.** After equipment deductions, what is the minimum and maximum range for the test weights?
- A. 59,728 lbs. – 62,835 lbs.
 - B. 71,222 lbs. – 75,098 lbs.
 - C. 71,718 lbs. – 75,425 lbs.
 - D. 85,578 lbs. – 89,978 lbs.
- 6. Select the best answer.** What is the boom length and radius for the load moment test?
- A. 50' boom, 10' radius
 - B. 60' boom, 15' radius
 - C. 60' boom, 35' radius
 - D. 110' boom, 100' radius
- 7. Select the best answer.** What is the minimum and maximum test load range for the load moment test? Do not include any deductions.
- A. 1,969 lbs. – 2,067 lbs.
 - B. 16,578 lbs. – 17,578 lbs.
 - C. 36,300 lbs. – 38,115 lbs.
 - D. 63,910 lbs. – 67,105 lbs.

8. **Select the best answer.** What are the minimum and maximum test load values for the auxiliary hoist on this crane? Do not include any deductions.
- A. 12,274 lbs. – 12,920 lbs.
 - B. 13,835 lbs. – 14,527 lbs.
 - C. 15,000 lbs. – 15,750 lbs.
 - D. 16,500 lbs. – 17,325 lbs.
9. **Select the best answer.** What is the boom length and maximum radius for the auxiliary hoist test? No on-rubber capacity required.
- A. 35' boom, 10' radius
 - B. 35' boom, 35' radius
 - C. 110' boom, 35' radius
 - D. 110' boom, 45' radius

Exercise 2: Grove 865 Rough Terrain Hydraulic Boom Crane Questions and Answers

Use the following set-up for the questions below: The crane is configured with a stowed 35' to 60' tele-extension, an auxiliary boom head, a 65-ton 6-sheave hook block without cheek plates, and a 10-ton headache ball. It's reeved with 10 parts of line with a permissible line pull of 12,920 pounds. Only use on-outrigger capacities with outriggers fully extended.

1. **Select the best answer.** Considering the limiting factors, what is the maximum gross capacity of this crane as configured?
- A. 105,000 pounds
 - B. 126,721 pounds
 - C. 129,200 pounds
 - D. 130,000 pounds
2. **Select the best answer.** What is the limiting factor?
- A. Boom capacity
 - B. Hook block
 - C. Outriggers
 - D. Wire rope line pull
3. **Select the best answer.** Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?
- A. 115,500 lbs. – 121,275 lbs.
 - B. 122,740 lbs. – 129,200 lbs.
 - C. 139,393 lbs. – 146,362 lbs.
 - D. 143,000 lbs. – 150,150 lbs.

4. **Select the best answer.** What is the sum of the equipment deductions for this crane as configured?
- A. 3,279 lbs.
 - B. 3,615 lbs.
 - C. 24,873 lbs.
 - D. 25,191 lbs.
5. **Select the best answer.** After equipment deductions, what is the minimum and maximum range for the test weights?
- A. 112,221 lbs. – 117,996 lbs.
 - B. 119,461 lbs. – 125,921 lbs.
 - C. 136,114 lbs. – 143,083 lbs.
 - D. 139,721 lbs. – 146,871 lbs.
6. **Select the best answer.** What is the boom length and radius during this test?
- A. 40' boom, 10' radius
 - B. 45' boom, 10' radius
 - C. 40' boom, 30' radius
 - D. 125' boom, 110' radius
7. **Select the best answer.** What is the boom length and radius for the load moment test?
- A. 60' at a 20' radius
 - B. 65' at a 25' radius
 - C. 75' at a 25' radius
 - D. 100' at a 30' radius
8. **Select the best answer.** What are the minimum and maximum test load values for the auxiliary hoist on this crane? (Do not include any deductions.)
- A. 12,274 lbs. – 12,920 lbs.
 - B. 13,835 lbs. – 14,527 lbs.
 - C. 15,000 lbs. – 15,750 lbs.
 - D. 16,500 lbs. – 17,325 lbs.

Exercise 3: Link Belt 108C Lattice Boom Truck Crane Questions and Answers

Use the following set-up for the questions below: This crane is configured with 120' of boom, a 50-ton block reeved with 4-parts of 3/4" wire rope (16,800 pounds rated load), a 30' jib at 0° offset, and an 8.5-ton headache ball. On-outrigger capacities only.

1. **Select the best answer.** What is the maximum gross capacity for this crane as configured?
 - A. 3,300 pounds
 - B. 20,600 pounds
 - C. 31,200 pounds
 - D. 100,000 pounds
2. **Select the best answer.** What is the capacity limiting factor?
 - A. Hook block capacity
 - B. Structural capacity
 - C. Tipping capacity
 - D. Wire rope capacity
3. **Select the best answer.** Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?
 - A. 3,630 lbs. – 3,811 lbs.
 - B. 22,660 lbs. – 23,793 lbs.
 - C. 29,640 lbs. – 31,200 lbs.
 - D. 110,000 lbs. – 115,500 lbs.
4. **Select the best answer.** What will the boom angle and radius be during the test?
 - A. 39.5 degree angle, 120' radius
 - B. 68.2 degree angle, 60' radius
 - C. 76.2 degree angle, 40' radius
 - D. 77.6 degree angle, 30' radius
5. **Select the best answer.** What is the sum of the equipment deductions for this configuration?
 - A. 1,250 pounds
 - B. 2,475 pounds
 - C. 2,595 pounds
 - D. 3,125 pounds
6. **Select the best answer.** What is the radius of the load moment test?
 - A. 35' radius
 - B. 40' radius
 - C. 45' radius
 - D. 50' radius

7. Select the best answer. What will be the minimum and maximum test range for the job?

- A.** 6,600 lbs. – 6,930 lbs.
- B.** 8,800 lbs. – 9,240 lbs.
- C.** 9,500 lbs. – 10,000 lbs.
- D.** 20,300 lbs. – 21,505 lbs.

Summary

This module allowed you to test your knowledge, skills, and abilities to derive the pertinent information from the load charts of various cranes and to calculate the proper test load and test weight values. This completes the content presentation portion of this course. Next, you will have the opportunity to test your knowledge by taking the final exam.

Recap, Wrap-Up, What's Next

Practiced:

- Identifying and understanding load chart references
- Calculating the proper test load
- Calculating test weight values

Next: Load Test Director Final Exam

Completion

Congratulations. You have completed the module. Click on the Exit button to return to the main module menu.

Completion

Congratulations.

You have completed the LTD Load Test Calculation Exercises module.

Click on the Exit button to return to the main module menu.



LOAD TEST DIRECTOR EVALUATION

Student Name: _____

Command/Activity/Organization: _____

Instructor: _____ **Date:** _____

Directions: To assist in evaluating the effectiveness of this course, we would like your reaction to this class.
Do not rate questions you consider not applicable.

Please rate the following items:	Excellent	Very Good	Good	Fair	Poor
Content of the course met your needs and expectations.					
Content was well organized.					
Materials/handouts were useful.					
Exercises/skill practices were helpful.					
Training aids (slides, videos, etc.) were used effectively.					
Instructor presented the material in a manner which was easy to understand.					
Instructor was knowledgeable and comfortable with the material.					
Instructor handled questions effectively.					
Instructor covered all topics completely.					
Probability that you will use ideas from the course in your work.					
Your opinion of the course.					

What were the key strengths of the training? How could the training be improved? Other comments?

List other training topics in which you are interested: _____

Note: If you would like a staff member to follow up and discuss this training, please provide your phone number
