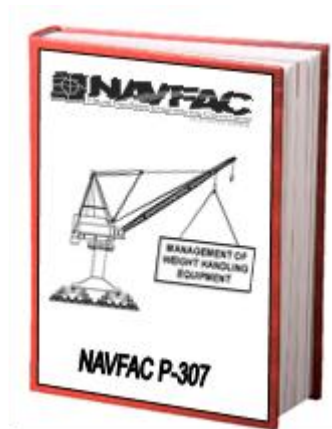




Navy Crane Center



NAVFAC P-307 Training

CERTIFYING OFFICIAL
WEB BASED TRAINING STUDENT GUIDE
NCC-CO-04

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
CRANE TESTING 1: GENERAL	50
CRANE AND RIGGING ACCIDENTS	61
CO EXPECTATIONS & RESPONSIBILITIES.....	73
CO DOCUMENTATION REVIEW	83
CO LOAD CHART REVIEW	93
CRANE CERTIFICATION PACKAGE EXERCISE	107
CRANE CERTIFICATION PACKAGE EXERCISE PART 1: IDENTIFY ANOMALIES	110
CRANE CERTIFICATION PACKAGE EXERCISE PART 2: ANOMALY DISCUSSION NOTES	127
CRANE CERTIFICATION PACKAGE EXERCISE PART 3: CORRECTED ANOMALIES	161
CERTIFYING OFFICIAL EVALUATION	180

INTRODUCTION

Welcome

Welcome to the NAVFAC P-307 Certifying Official course.



Introduction

This training contains information found throughout the NAVFAC P-307 manual, but more specifically, that information contained in sections 3 and 4 and appendices C, D, and 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.

Introduction

- This training contains information found throughout the NAVFAC P-307 manual specifically:
 - Section 3 and Section 4
 - Appendices C, D, and E
- Have a copy of the NAVFAC P-307 manual available for reference.
- Always refer directly to the NAVFAC P-307 manual for requirements.

Course Objectives

The Certifying Official course is designed to acquaint new and prospective certifying officials with Navy requirements for certifying cranes and provide a knowledge base upon which to build through on-the-job training, mentoring, and experience. Upon completion of this course, you will be able to understand NAVFAC P-307 requirements and how it is organized; identify the people, paperwork, and purposes for testing and certifying Navy cranes; list the responsibilities of the certifying official position; describe the parts of a load chart; identify the required tests for different types of cranes; accurately calculate test loads and test weights; and explain the definitions and reporting requirements for crane and rigging accidents. There are no prerequisites for this course.

Course Objectives

Upon completion of this course, you will be able to:

- Understand NAVFAC P-307 requirements
- Identify the people, paperwork, and purposes for testing and certifying Navy cranes
- List the responsibilities of the Certifying Official
- Describe the parts of a load chart
- Identify the required tests for different types of cranes
- Accurately calculate test loads and test weights
- Identify crane and rigging accidents and reporting requirements

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 Certifying Official 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.

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.



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 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.

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.

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.

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 and Licensing
- Documentation

REQUEST FOR CLARIFICATION, DEVIATION, OR REVISION			
CHECK APPROPRIATE	CLARIFICATION	DEVIATION	REVISION
BOX	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	PHONE	FAX	DATE
REPRESENTATIVE OF PREPARED AND	E-MAIL		
APPROVED CONTRACTOR			
REFERENCES			
ENCLOSURE(S)			
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

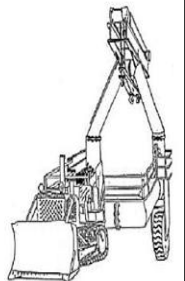


LCRU

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

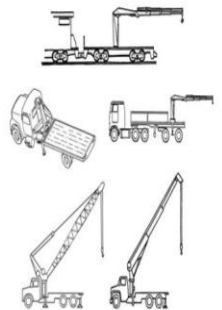
These cranes have different types of boom configurations such as telescoping, non-telescoping, and articulating. They may be mounted on flatbed trucks, trailers, stake beds, rail cars, barges, and pontoons, or may be stationary mounted on piers, wharves, and docks.

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.
-
-

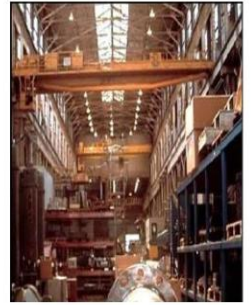
Category 2 and 3 Crane Examples

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

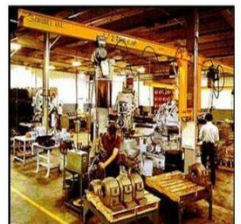


Jib Cranes

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.

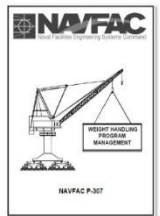


Section 2 Introduction

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:

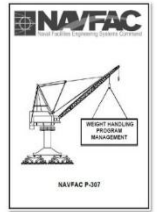
- Program management
- Program manager expectations
- Self-assessments and evaluations
- Metrics
- Monitoring programs
- Long range planning
- Lockout and tagging requirements
- Safety and Environmental considerations

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.

Sections 3, 4, & 5 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



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

Posting of Certification Information

[illegible]

Figure 3-1: WHEDR

WEIGHT HANDLING EQUIPMENT DEFICIENCY REPORT			
ACTIVITY:		DEFICIENCY REPORT NUMBER:	
SUBJECT:			
PREPARED BY:	PHONE:	FAX or EMAIL:	DATE:
APPROVED BY:	PHONE:	FAX or EMAIL:	DATE:
CRANE OR EQUIPMENT ID:	MANUFACTURER/YEAR MANUFACTURED:		SP'S CRANE Yes ___ No ___
MODEL/SERIAL NUMBER:		CAPACITY/TYPE:	
RESULTED IN ACCIDENT:		TYPE OF ACCIDENT:	
☐ YES ☐ NO			
THIS REPORT GENERATED DUE TO:			
☐ FAILURE/DEFICIENCY OF LOAD BEARING/LOAD CONTROLLING PART/OPERATIONAL SAFETY DEVICE/ DIESEL ENGINE – GENERATOR SET ☐ FAILURE/DEFICIENCY OF A SECTION 14 ITEM AFFECTING SAFETY ☐ DRAWING/DESIGN DISCREPANCY ☐ OTHER FAILURE/DEFICIENCY CONSIDERED SIGNIFICANT			
DESCRIPTION OF DEFICIENCY (INCLUDE MANUFACTURER'S PART NO., FEDERAL STOCK NO., ETC.):			
PROBABLE CAUSE:			
CORRECTIVE ACTION TAKEN/RECOMMENDATION:			
FOR NAVY CRANE CENTER USE: NAVY CRANE CENTER Control Number: _____			
☐ CSA ISSUED ☐ NO ACTION REQUIRED ☐ _____ ☐ EDM ISSUED ☐ MANDATORY CRANE ALT ISSUED ☐ LIMITED SCOPE (ACTIVITIES CONTACTED) ☐ SAFETY BRIEF/CRANE CORNER/OTHER PUBLICATION			
REMARKS (EXPLANATION OF BOX CHECKED ABOVE):			

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.			Main		lbs.	Feet
		Aux	lbs.			Aux		lbs.	Feet
		Whip	lbs.			Whip		lbs.	Feet
☐ Annual Certification ☐ Quadrennial Load Test (check box when crane is in quadrennial program and is load tested)		☐ Interim Recertification (Reason: _____)		Appendix "E" Applicable Crane Test Procedure Paragraphs (include applicable sub-paragraphs)					
Date of Previous Load Test: _____									
Category 1 Cranes*									
Boom Length	Test Load %	Minimum Radius	Load Moment or Maximum Radius						
Hoist		Pounds	Feet	Pounds	Feet				
Main									
Aux									
Other									
Hook Tram Measurements		Base Meas.	Before Test	After Test					
Main Hook									
Aux Hook									
Other									
Category 2 Cranes									
Hoist	Test Load %	Pounds	Hook Tram Measurements						
			Base Meas.	Before Test	After Test				
Main									
Aux									
Other									
Category 3 Cranes									
Hoist	Test Load %	Pounds	Hook Tram Measurements						
			Base Meas.	Before Test	After Test				
Main									
Aux									
Other									
Annual Certifications Since Hook NDT		Test Director (Signature)		Date					
Hook Material and Manufacturing Method		Inspector (Signature)		Date					
		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, lift 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	Boom Length	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	Boom Length	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/radius)				On Tires (Pick and Carry) (Describe configurations and list test loads/radius/boom length)			
Other Configurations, including ancillary equipment if applicable. (Describe and list test loads/radius)							

Figure 4-2

Figure 4-3: Crane Condition Inspection Record

Figure 4-3, the Crane Condition Inspection Record, or CCIR, is the form used to guide and document the performance of the condition inspection.

CRANE CONDITION INSPECTION RECORD									
Note: Inspect only components that are accessible to the operator while the crane is in normal operation.									
Crane No.	Type	Location	Operator's Name	Operator's License No.	Date Completed				
Purpose of Inspection					Inspected By	Date Inspected	Inspected By	Date Inspected	Inspected By
Item No.					Item Description	Pass	Fail	Remarks	Signature
1	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
2	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
3	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
4	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
5	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
6	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
7	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
8	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
9	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
10	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
11	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
12	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
13	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
14	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
15	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
16	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
17	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
18	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
19	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
20	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
21	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
22	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
23	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
24	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
25	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
26	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
27	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
28	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
29	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
30	Inspect the crane for damage or deterioration, including, but not limited to, the following:								
31	Inspect the crane for damage or deterioration, including, but not limited to, the following:								

Section 6 Introduction

NAVFAC P-307 section 6 provides requirements regarding the use and processing of the different types of crane alterations as well as engineering reasoning, considerations, and guidance on various other equipment related topics.

Section 6 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 6: Alterations and Engineering

Section 6 not only provides details on the types of crane alterations but also offers a wide variety of engineering information on end connections, indicators, crane clearances, equipment repairs and replacement, damaged booms, crane stability, and overload protection. Additional engineering policy and guidance on crane alterations can be found in appendix O.

Section 6: Alterations and Engineering

- Types of crane alterations
- Approvals and processing
- End connections
- Indicators
- Clearances
- Repairs and Replacements
- Damaged booms
- Stability
- Overload Protection

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.”

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.

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.

[illegible]

- 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 8-3: Crane Operator License Record

Shown here is Figure 8-3, the Crane Operator License Record. This is a chronological record of the crane operator's license/qualification activity. This form tracks the crane type, capacity, attachment, and control type. It shows where the license was issued and by whom, the date it was issued, the date it expires, the renewal date, the physical exam date, and if necessary, the date the license was revoked. Additional records may be attached as needed to document the operator's licensing history and progress. License records should follow the crane operator from command to command.

[illegible]

Section 9 Introduction

NAVFAC P-307 section 9 provides requirements on the types of safety and equipment checks performed by the crane operator prior to operating a crane.

Section 9 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

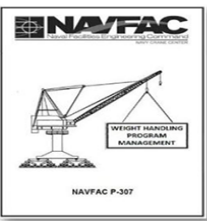
Section 10: Operations

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



The image shows the NAVFAC logo at the top, which includes the text 'NAVY FACILITIES ENGINEERING CORPS' and 'U.S. NAVY'. Below the logo is a diagram of a crane lifting a large rectangular sign that reads 'WEIGHT HANDLING PROGRAM MANAGEMENT'. The crane is a lattice boom crane with a counterweight. The sign is suspended from the crane's hook. Below the diagram, the text 'NAVFAC P-307' is visible.

Section 9: Operator Checks

A complete check of the crane shall be performed by the operator prior to the first use of the crane each day whether the crane is used in production, maintenance, testing, or being relocated. Section 9 provides instructions for performing these checks, for reporting any deficiencies, and a means for documenting these findings.

Section 9: Operator Checks

- Equipment pre-use checks
- Equipment safety checks
- Deficiency reporting
- Documentation requirements

A photograph of a construction worker wearing a yellow hard hat with the number '742' and a green short-sleeved shirt. He is holding a clipboard and looking at a document. He is standing next to a yellow piece of heavy machinery, which appears to be a crane, with the word 'CRANE' visible on its side. The background shows a construction site with various equipment and structures.

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.

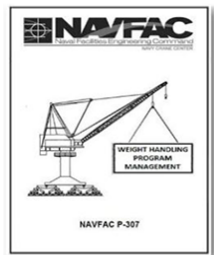
CRANE OPERATOR'S DAILY CHECKLIST															
CRANE NO.	TYPE/CAPACITY	LOCATION	CERTIFICATION EXPIRATION DATE	SHIFT	HOUR/METER	START	STOP	HRS OPERATED	DATE						
										1	2	3			
OPERATORS										LEGEND: S = SATISFACTORY U = UNSATISFACTORY NA = NOT APPLICABLE					
1. WALK AROUND CHECK				2. MACHINERY HOUSE CHECK				3. OPERATOR CAB CHECK				4. OPERATIONAL CHECK			
1. Safety Shields and Plates				1. Hoisting				1. Engine			1. Area Safety				
2. Carrier Frame and Rotate Base				2. Support Engine and Governor				2. Ventilation and Warning Lights			2. Outriggers/Steckbars				
3. Control Hardware				3. Brakes				3. Visibility			3. Outrigger Stakes				
4. Wind Probe				4. Lubrication (if it exceeds day)				4. Load Rating Chain			4. Controls and Control Action				
5. Hoisting				5. Hoisting				5. Self-Test Indicator (if using Crane)			5. Wind Probe or Chain				
6. Hook				6. Latch				6. Motor Acquisition Indicator			6. Hooks and Chimes				
7. Motion				7. Motion				7. Motor Acquisition			7. Boom Angle/Radius Length				
8. Extension or Retraction				8. Motion and Release				8. Load Indicator (Weight Crane)			8. Load Indicator				
9. Boom and Jib				9. Motion				9. Emergency Stop (Emergency)			9. Emergency Stop (Emergency)				
10. Clutch, Friction, and Boom Stops				10. Auxiliary Engine and Compressor				10. Instructions			10. Other Operational Safety Devices				
11. Windings, Cables, and Hardware				11. Motion				11. Emergency Stop			11. General Safety Devices				
12. Wind Latch, Stops, and Barriers				12. Motion				12. Emergency Stop			12. Planning Devices				
13. Wind, Whirls, and Tracks				13. Motion				13. Motion			13. Motion				
14. Latch				14. Motion				14. Motion			14. Motion				
15. Extension (if it exceeds day)				15. Motion				15. Motion			15. Motion				
16. Outrigger/Steckbars				16. Motion				16. Motion			16. Motion				
17. Load Chain				17. Motion				17. Motion			17. Motion				
18. Outrigger/Steckbars				18. Motion				18. Motion			18. Motion				
19. Area Safety				19. Motion				19. Motion			19. Motion				
20. Emergency Stop				20. Motion				20. Motion			20. Motion				
INSTRUCTIONS: Check all applicable items indicated, each shift. Suspend all operations immediately when observing an unsatisfactory condition or any item indicated with an asterisk (*) unless the condition has been reviewed and confirmed operation has been authorized by the activity engineering/inspection organization. In addition, suspend operation when any unsafe condition is observed and immediately notify supervisor. For any unsatisfactory item, identify the specific component and describe the deficiency in the "Remarks" block.										SUPERVISOR'S SIGNATURE: _____ DATE: _____					
DATE: _____ OPERATOR'S SIGNATURE: _____				DATE: _____ OPERATOR'S SIGNATURE: _____				DATE: _____ OPERATOR'S SIGNATURE: _____				DATE: _____ OPERATOR'S SIGNATURE: _____			
REMARKS															

Section 10 Introduction

NAVFAC P-307 section 10 provides general crane operations safety and precautionary considerations and requirements.

Section 10 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 10: Operations

Topics covered in section 10 include safety precautions, operating procedures, Operational Risk Management or ORM, crane teams, safety devices, additional requirements for cranes used in construction, critical lifts, lift preparations, communications, personnel lifts, adverse operating conditions, ground conditions, clearances, working around overhead power lines, and multi-purpose machines.

Section 10: Operations

- Safety precautions
- Operating procedures
- ORM
- Crane teams
- Safety devices
- Additional requirements for cranes used in construction
- Critical lifts
- Lift Preparations
- Communications
- Personnel Lifts
- Adverse operating conditions
- Ground conditions
- Clearances
- Overhead power lines
- Multi-purpose machines



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: Contractor and Other Non-Navy Owned WHE

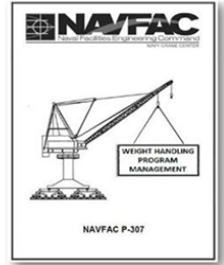
Section 11 provides detailed guidelines and requirements for contracts and contractors using non-Navy owned equipment to lift suspended loads at Navy shore activities. This includes cranes, multi-purpose machines, construction equipment, and rigging gear, as well as material handling equipment. The requirements 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 12 Introduction

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

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



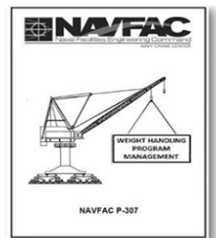
Section 11: Contractor and Other Non-Navy Owned WHE

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



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		
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:		
*When 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.

CERTIFYING OFFICIAL STUDENT GUIDE

CRANE AND RIGGING NEAR MISS REPORT				
Near Miss Category: ☐ Crane Near Miss ☐ Rigging Near Miss				
Reporting Activity:		Copy To: Navy Crane Center Bldg. 431 1815V Portsmouth, VA 23709 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 Bldg. 431 1815V Portsmouth, VA 23709 Fax: 757-967-3809		
UC:		Activity Responsible:		
UC:		Report No: Event Location UC: Event Date: Time:		
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):				
Certifying Official (Crane Event Only):				
Contracting Officer's Representative (if Applicable):				

Figure 12-3 (1 of 2)

Section 13 Introduction

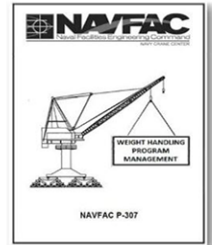
NAVFAC P-307 section 13 provides requirements for entertainment hoists. Entertainment hoists may be treated differently than category 2 or 3 cranes due to the inherent nature of their design, installation, application, and use. Unless otherwise specified, entertainment hoists are not required to meet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

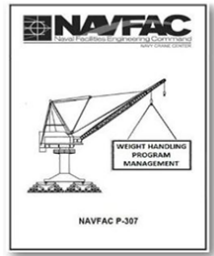
This section and the applicable portions of section 10 provide the minimum requirements for developing and maintaining a program for rigging gear and miscellaneous equipment, in other words, maintenance, inspection, and use of applicable gear, operational responsibilities and requirements, operational 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

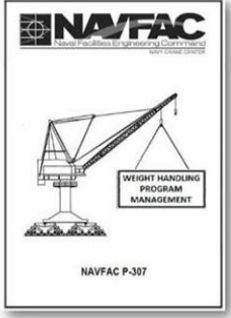
The glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307 and for improved communications within the Navy's weight handling management program.

Appendix B Introduction

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



NAVY CRANE CENTER



NAV FAC 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 Boal 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 Boal 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 Boal 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 Boal 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 Inspection	Visual	Before each use		
2	1	Structural Inspection	Visual	Monthly		
3	1	Hydraulic System Inspection	Visual	Monthly		
4	1	Electrical System Inspection	Visual	Monthly		
5	1	Brake System Inspection	Visual	Monthly		
6	1	Load Capacity Inspection	Visual	Monthly		
7	1	Control System Inspection	Visual	Monthly		
8	1	Safety System Inspection	Visual	Monthly		
9	1	Hoist System Inspection	Visual	Monthly		
10	1	Winch System Inspection	Visual	Monthly		
11	1	Drum System Inspection	Visual	Monthly		
12	1	Wire Rope System Inspection	Visual	Monthly		
13	1	Hook System Inspection	Visual	Monthly		
14	1	Attachment System Inspection	Visual	Monthly		
15	1	Counterweight System Inspection	Visual	Monthly		
16	1	Base System Inspection	Visual	Monthly		
17	1	Travel System Inspection	Visual	Monthly		
18	1	Swivel System Inspection	Visual	Monthly		
19	1	Rotation System Inspection	Visual	Monthly		
20	1	Rotation System Inspection	Visual	Monthly		

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									
NO.	ITEM	DESCRIPTION	INSPECTOR	DATE	TIME	STATUS	REMARKS	INITIALS	SIGNATURE
1	GENERAL	Visual inspection of crane structure, including boom, jib, and trolley, for damage, corrosion, and wear.							
2	WIRE ROPE	Visual inspection of wire rope for damage, corrosion, and wear.							
3	SLING	Visual inspection of sling for damage, corrosion, and wear.							
4	HOOK	Visual inspection of hook for damage, corrosion, and wear.							
5	CONTRAINER	Visual inspection of container for damage, corrosion, and wear.							
6	WINDMILL	Visual inspection of windmill for damage, corrosion, and wear.							
7	WINDMILL	Visual inspection of windmill for damage, corrosion, and wear.							
8	WINDMILL	Visual inspection of windmill for damage, corrosion, and wear.							
9	WINDMILL	Visual inspection of windmill for damage, corrosion, and wear.							
10	WINDMILL	Visual inspection of windmill for damage, corrosion, and wear.							

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



CERTIFYING OFFICIAL 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.

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	

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.

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 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 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				
Navy Crane Center recommends the following guidelines to assist in determining the life cycle costs of cranes:				
Category	1	2	3	4
Crane Type	Mobile Boat Hoist	Mobile Boat Hoist	Mobile Boat Hoist	Mobile Boat Hoist
Capacity	10,000 lbs	10,000 lbs	10,000 lbs	10,000 lbs
Life Cycle Cost	Low	Medium	High	Very High

Guidelines:

1. Life Cycle Cost (LCC) is the sum of the initial investment, maintenance, and disposal costs over the life of the crane.
2. LCC is calculated as follows: $LCC = \frac{C}{(1 + r)^t}$, where C is the cost, r is the interest rate, and t is the time.
3. The interest rate (r) is 10% per year.
4. The time (t) is the life cycle of the crane in years.
5. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.
6. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.
7. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.
8. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.
9. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.
10. The life cycle of the crane is determined by the number of hours it is used per year and the number of years it is expected to last.

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 Form: 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, unfasten rail clamps, and remove rail track 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 the 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, unobscured advance motion without a signal and without response to signal, if the operator will be required to operate without seeing the load, 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 6). (4) Notation on Test Form: 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 connections, and confirm that the proper track operation. - Check the wire and techniques and reactions. 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 controllers 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 load. - 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 hoist 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 interconnections. - 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: _____ 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) Preparation for this examination is complete. Familiarity with Standard Test System for Certifying Crane Operators (document 15-1).

(2) Performance test requirements shall be supplemented and modified by state statute and the national operating characteristics and features of the 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 used to place coys on maintenance stands. 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 examiner 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 for lifting.

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

_____ 6. Ensure no ropes are damaged.

_____ 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 swing 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), Figure 8-5.

_____ 9. Remove wheel chocks or wedges as required.

2. FAMILIARITY WITH LICENSATION REQUIREMENTS

_____ 10. Check handbook levels where applicable.

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

GROUP B - STARTING THE ENGINE

_____ 12. Check the position and discharge the master clutch or hydraulic pump when in operation.

_____ 13. 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 parts, levels, and notices on the crane.

_____ 14. Start the engine the manner prescribed by the COB.

_____ 15. Observe gauges for correct readings and describe the purpose of gauges.

_____ 16. Observe the load indicators for correct readings without loads, if applicable.

_____ 17. 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 the 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](#)

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 B: Types of Weight Handling Equipment

Appendix C: MSR for Category 1 Cranes

Appendix E: MSR 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 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 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.

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 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	

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

Appendix A: Glossary	Appendix L: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 and 4 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 and 4 Cranes	Appendix N: Personnel Competencies
Appendix D: AMISR for Category 2 and 3 Cranes	Appendix O: Navy Crane Center Engineering Policies and Guidance for Crane Alteration Requests (CAR)
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 LB, LC, and OSD	Appendix Q: References
Appendix G, H, and I: Reserved for Future Use	Appendix R: Related Documents
Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 2 and Cab-Operated Category 3 Cranes	
Appendix K: Basic Performance Test for Weight Handling Equipment Operator License: Mobile Boat Hoist and Rubber-Tired Gantry Cranes	

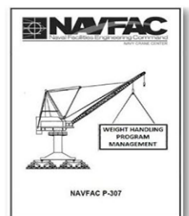


Figure P-1: Certificate of Compliance

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, MPE, 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:

- The above noted crane or alternate machine and all rigging gear conform to applicable OSHA regulations (for construction activities in foreign countries) and applicable ASME B30 or other standards. The following OSHA regulations and ASME or other standards apply:
- The operators noted above have been trained and are qualified for the operation of the above noted crane(s) or alternate machine(s).
- 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.
- The operators, riggers and company officials are aware of the actions required in the event of an accident as specified in the contract.
- Signal persons used in construction work are qualified in accordance with 29 CFR 1926.1428.
- Riggers are qualified in accordance with NAVFAC P-307, paragraph 11.1.k.
- 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	NA
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 correct operator's name listed?			
2	Is the crane machine transported and stored on 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's rated capacity in the current configuration?			
5	Are any personnel required and, if so, are they properly educated and trained?			
6	If counterweights are used, are the wheels not off the ground is this the correct setup in accordance with the OSHA?			
7	If the crane machine is used on the ground, is the ground not firm and adequate supporting materials provided?			
8	If supporting materials are provided, is the entire surface of the supporting material covered and secured with the OSHA?			
9	If counterweights are not used, is the crane machine rated for an additional 10% to the OSHA?			
10	Is the weight of the crane counterweight clear of people and obstructions and an accessible area within the same 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 to the height for lifting?			
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 hand signals?			
18	Are emergency brakes tested 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 not swinging?			
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 implemented and check off clearly related and signed off?			
25	Are overhead power lines in the vicinity, is a critical lift plan provided addressing the requirements of 29 CFR 1926.1407-1409?			
26	If peak and entry operations are allowed, are personnel, are OSHA directions followed, is a critical lift plan, boom extended over head or rear, etc. if?			
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?			

Contractor: _____ Subcontractor: _____

Location: _____ Date: _____

Notes: _____

Signature of Government Representative: _____

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 & 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.

Completion

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

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 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 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.

- 1. 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.
 - A. Certifying Official
 - B. Condition Inspector
 - C. Load Test Director
 - D. Maintenance Inspector
- 2. 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.
 - A. Certifying Official
 - B. Condition Inspector
 - C. Load Test Director
 - D. 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.

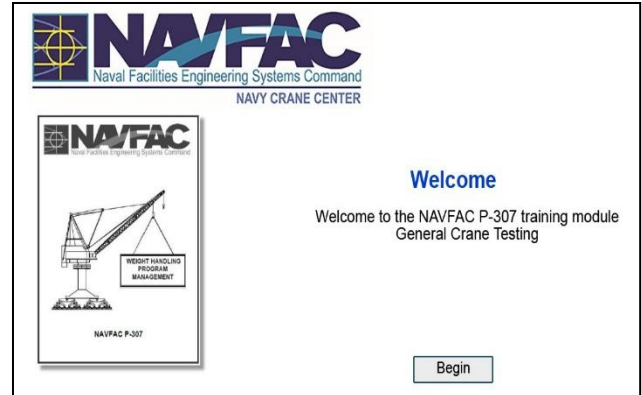
You have completed the Load Test Director Certification Program Overview module.

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

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 1



When did the accident happen?
During a load test.

What happened?
A pedestal bearing failed on the boom hoist drum, disengaging the pinion from the boom drum gear, allowing the boom to fall to the ground.

What were the results?
The driving unit, disengaging the pinion from the boom drum gear, allowing the boom to fall to the ground. Over a million dollars in damages.

- 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 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 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.

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

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?



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 operation. 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](#)

CERTIFYING OFFICIAL 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 Brake on Wire Rope Drums (Shaft Failure Detection System)
Boom	Emergency Brake on Wire Rope Drum (Shaft 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 Brake on Wire Rope Drum (Shaft 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 Brake on Wire Rope Drum (Shaft 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 Brake on Wire Rope Drum (Shaft 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 Counter 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	Rotation 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 (Shaft 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 Brake on Wire Rope Drum (Shaft 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 controls shall be operationally tested during either the maintenance inspection or the condition inspection test. Annotate in Remarks block which controls 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 test. 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 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/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.				

Figure 4-3 (1 of 2)

Item No.	Item Description	B	D	A	Pass/Fail
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery hoses/pipes 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 greases 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 stand and support assembly for condition and proper operation.				
30	Inspect slewing bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and girders for condition and proper operation.				

Remarks:

Inspector Signature: _____ Test Operator Signature: _____

Inspector Signature: _____ Test Operator Signature: _____

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 personal 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 AND RIGGING ACCIDENTS

Welcome

Welcome to Crane and Rigging Accidents.

Learning Objectives

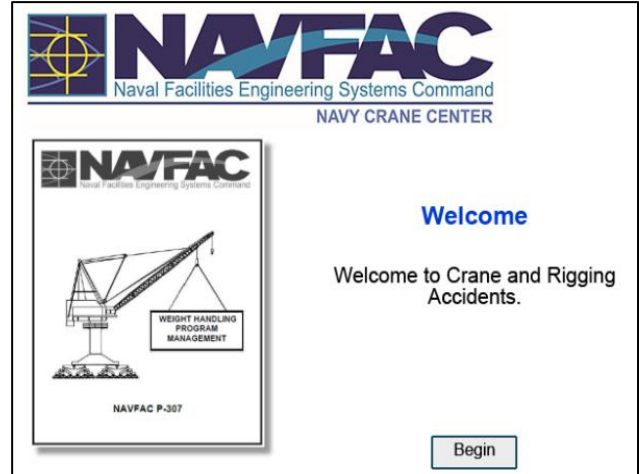
Upon successful completion of this module, you will be able to identify the elements in the crane and rigging operating envelopes, define a crane accident, define a rigging accident, near miss, and unplanned occurrence, identify the primary causes of accidents, and explain the procedures to follow when an accident occurs.

Accident Categories

There are two general categories for accidents: Crane Accidents and Rigging Accidents. Crane accidents are those that occur during operation of a Category 1, 2, or 3 crane.

Rigging accidents are those that occur when gear and equipment identified in section 14 is used by itself in a weight handling operation, for example, without Category 1 through 3 cranes, or when covered gear is used with multi-purpose machines, Material Handling Equipment (MHE) (for example, forklifts), and equipment covered by NAVFAC P-300 in a weight handling operation.

In addition, accidents that occur during the operation of entertainment hoists shall be classified as rigging accidents.



Learning Objectives

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

- Identify the elements in the crane and rigging operating envelopes
- Define a crane accident
- Define a rigging accident, near miss, and unplanned occurrence
- Identify the primary causes of accidents
- Explain the procedures to follow when an accident occurs

Accident Categories

There are two general categories of weight handling accidents: Crane Accidents and Rigging Accidents.

- A crane accident occurs during the operation of a Category 1, 2, or 3 crane.
- Rigging accidents are those that occur when gear and equipment identified in section 14 is used by itself in a weight handling operation, or when covered gear is used with multi-purpose machines, MHE and equipment covered by NAVFAC P-300 in a weight handling operation.
- Accidents that occur during the operation of entertainment hoists shall be classified as rigging accidents.

Significant Accidents

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. Other types of accidents that result in OPNAV Class A, B, C, or D reporting thresholds for material property damage are also considered significant accidents.

Significant Accidents

Significant accidents include:

- Injuries
- Overloads
- Dropped Loads
- Two-blocks
- Crane derailments
- Overturned cranes
- Contact with overhead electrical power lines

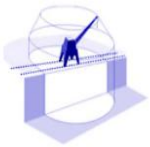
Crane Operating Envelope

In order to define a crane accident, you must first understand the crane operating envelope. The operating envelope consists of any of the following elements: the crane, the operator, the riggers, signal persons, and crane walker, other personnel involved in the operation, the rigging gear between the hook and the load, the load, the crane's supporting structure (ground, rail, etc.), and the lift procedure.

Crane Operating Envelope

The crane operating envelope consists of any of the following elements:

- the crane
- the operator
- the riggers, signal persons, and crane walker
- 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



Crane Accident Definition

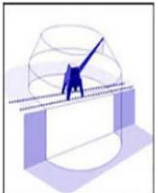
A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly during a crane operation, including operation during maintenance or testing, resulting in any of the following: personnel injury or death (Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements).

Personnel injuries occurring within the operating envelope not directly related to the weight handling operations shall be reported as unplanned occurrences in addition to the normal personnel injury reporting process of the activity.), material or

Crane Accident Definition

Occur 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
- Collision or avoidable contact



equipment damage, dropped load (including any part of the load or rigging gear and any item lifted with the load or rigging gear), derailment, two-blocking, overload (including load tests when the nominal test load is exceeded), overturned crane, and collision or avoidable contact between the load, crane, and/or other objects. Avoidable contact is defined as contact that would have been prevented with proper lift planning and execution. Simply briefing that contact will occur is not sufficient.

Rigging Operating Envelope

The operating envelope around any rigging or other section 14 equipment operation includes the rigging gear or miscellaneous equipment identified in section 14, the user of the gear or equipment (including operators of multi-purpose machines, material handling equipment, and construction equipment), other personnel involved in the operation, the load, the gear or equipment's supporting structure (padeyes, ship's structure, building structure, etc.), the load's rigging path, and the rigging or lift procedure.

Rigging Operating Envelope

Includes:

- Rigging gear or miscellaneous equipment 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



Rigging Accidents

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 (Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements.

Personnel injuries occurring within the operating envelope not directly related to the weight handling operations shall be reported as unplanned occurrences in addition to the normal personnel injury reporting process of the activity.), material or equipment damage that requires the damaged item to be repaired because it can no longer perform its

Rigging Accidents

Occur 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
- Dropped load
- Two-blocking
- Overload



Note: A dropped load, two-blocking, and overload are considered accidents even though no material damage or injury occurs.

intended function (this does not include superficial damage such as scratched paint, minor lagging damage, or normal wear on rigging gear), dropped load (including any part of the load or rigging gear and any item lifted with the load or rigging gear), two-blocking of cranes and powered hoists identified in section 14, or overload (including overload of supporting structures and load tests when the test load tolerance is exceeded).

Note: A dropped load, two-blocking, and overload are considered accidents even though no material damage or injury occurs. For dropped loads, exceptions include paper signs, tie wraps, and other minor loose material (debris) such as gravel stuck to the bottom of a pallet, that fall off during the lift. These events are not considered dropped loads as long as there is no potential for injury or significant damage.

Near Miss

A near miss is an unplanned event during a weight handling operation or maintenance that did not result in a definable accident but easily had the potential to do so. A near miss is an accident that could have and almost did take place. A near-miss report can be used to learn from lower-level situations so that a more severe event can be averted.

By focusing on and learning from near misses, it is possible to reduce the probability of an actual accident from occurring. Near-miss reporting provides an opportunity to identify risks and mitigate the potential for an accident, in addition to increasing awareness of those personnel involved in or performing work. It is not intended that a near-miss investigation and report be as thorough as that for a crane or rigging accident; however, the investigation and report should be commensurate with the significance of the event.

Near Miss

- A near miss is an unplanned event during a weight handling operation or maintenance that did not result in a definable accident but easily had the potential to do so.
- A near miss report can be used to learn from lower level situations so that a more severe event can be averted.

Unplanned Occurrence

An “unplanned occurrence” is an event involving weight handling equipment that does not meet the definition of a crane or rigging accident but results in injury or damage.

Examples include, but are not limited to, injury or damage caused by weather, damage to a mobile crane in transit, damage to a parked or stationary crane caused by another moving object (for example, a vehicle or a forklift), damage or injury caused by significant maintenance errors (for example, loss of hazardous energy control, procedural failure, personnel error), and flooding or fire damage.

For each unplanned occurrence, activities shall promptly perform an investigation commensurate with the seriousness or severity of the event. An unplanned occurrence or near miss attributed to equipment failure may also be a reportable deficiency.

Near Miss Reporting

Near Misses and unplanned occurrences that do not fall under the crane and rigging accident definitions shall be reported using Figure 12-2 (available on the Navy Crane Center website). These reports shall be submitted in accordance with NAVFAC P-307 Section 12 within 30 days of the event.

Damaged Rigging Gear

When damage to rigging gear is discovered during an inspection or when damaged rigging gear is returned to the gear room and an accident is suspected, the gear shall be immediately removed from service and disposed of or repaired, and a comprehensive investigation initiated.

For a suspected accident, the activity shall follow the investigation and reporting requirements of NAVFAC P-307 section 12, prepare a Crane and Rigging Accident Report, and forward a copy to the Navy Crane Center (Code 06) within 30 days of the

Unplanned Occurrence

An “unplanned occurrence” is an event involving weight handling equipment that does not meet the definition of a crane or rigging accident but results in injury or damage.

Examples include:

- Injury or damage caused by weather
- Damage to a mobile crane in transit
- Damage to a parked or stationary crane caused by another moving object
- Damage or injury caused by significant maintenance errors
- Flooding or fire damage

Reporting

- Near misses and unplanned occurrences shall be reported using NAVFAC P-307 figures 12-2 and 12-3 respectively.
- These reports shall be submitted within 30 days of the event.

Damaged Rigging Gear

When damage to rigging gear is discovered during an inspection or when damaged rigging gear is returned to the gear room AND an accident is suspected—

- Immediately remove the gear from service.
- A prompt comprehensive investigation shall be performed.
- The incident shall be documented on a Crane and Rigging Accident Report and forwarded to the Navy Crane Center within 30 days.

Note: Local WHE accident reporting procedures shall also be followed.



accident. Local Weight Handling Equipment accident reporting procedures shall also be followed.

Accident Examples

Some common examples of accidents are dropped loads, injuries from a shifting load, failure of rigging gear resulting in a dropped load, overloads, and improperly secured loads falling from pallets.

Accident Exception

A component failure (for example motor burnout, gear tooth failure, bearing failure) shall be considered an accident only if damage to the load or another 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 in accordance with NAVFAC P-307 paragraph 12.7.3. Exceptions also include paper signs, tie wraps, and other minor loose material or debris, such as gravel stuck to the bottom of a pallet, that fall off during the lift, as long as there is no potential for injury or significant damage.

Accident Causes

In most cases, crane accidents result from personnel error and can be avoided. Most crane accidents are caused by inattention to the task, poor judgment, bad communication, team members having too much confidence in their abilities, or operating the crane too fast.

Accident Examples

- Dropped loads
- Injuries from shifting loads
- Rigging gear failure
- Overloads
- Load falls off of pallet



Accident Exceptions

- A component failure (for example motor burnout, gear tooth failure, bearing failure) shall be considered an accident only if damage to the load or another component occurs as a result of the failure.
- An accident involving a mobile crane that is configured for transit is considered an unplanned occurrence.
- Paper signs, tie wraps, and other minor loose material or debris, such as gravel stuck to the bottom of a pallet that fall off during the lift, as long as there is no potential for injury or significant damage.



Accident Causes

In most cases, crane accidents result from personnel error and can be avoided.

In most cases, crane accidents are due to:

- Inattention to the task
- Poor judgment
- Overconfidence
- Excessive speed

Operator Responsibilities

The operator can play a significant role in eliminating human error and accidents. Drugs and alcohol can affect a person's capability to think, reason, or react in normal situations and can certainly lead to serious accidents. Operators must always consult their physicians regarding effects of prescription drugs before operating equipment and recognize that medications often affect people differently. An operator is responsible for evaluating his or her physical and emotional fitness.

Operator Responsibilities

Drugs and alcohol can affect a person's ability to think or react normally and can lead to accidents.

Operators shall:

- Consult their physician regarding effects of medications
- Evaluate his or her own physical and emotional fitness
- Inform their supervisor of conditions as appropriate

WHE Accident Response

Upon having an accident or having seen evidence of damage (suspected accident), the crane team, riggers, equipment users, etc., shall stop all operations and notify immediate supervision. If there is impending danger to the equipment or personnel, place the crane and/or load in a safe position prior to notifying supervision. Ensure the accident scene is secured and undisturbed so as to facilitate the investigation.

The supervisor shall review the situation and take any further emergency action, including stopping production work or other operations that could aggravate the situation. The supervisor shall notify management personnel and the activity safety office.

For lower threshold crane accidents or LTCAs (collision accidents that result in no damage or only superficial cosmetic damage, such as scratched paint, scuffs, or paint transfer that would not normally require repair or replacement), the evolution (for example, completion of shore power cable installation, removal of brows, stores loads, assembly of components) may be allowed to continue, with supervisor authorization and correction of the immediate cause. Actions taken when an LTCA occurs should allow for personnel

WHE Accident Response

- Upon having an accident or having seen evidence of damage, stop all operations and notify immediate supervision.
 - If there is impending danger to the equipment or personnel, place the crane and/or load in a safe position prior to notifying supervision.
 - Secure the accident scene.
 - The supervisor shall review the situation, take any further emergency action, and notify management personnel as well as the activity safety office.
-
-
-
-
-
-
-

to return to work without significant delay following permission of the supervisor and identification and correction of the immediate cause.

Upon completion of the job or evolution, the activity shall make proper notification to activity management and the activity safety office.

Notification and Reporting

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 e-mail as soon as practical but not later than four hours following the accident. Notification for all other accidents shall be made as soon as practical but no later than one working day after the accident. For each suspected accident, activities shall promptly perform an investigation commensurate with the seriousness or severity of the event. Activities shall prepare a crane and rigging accident report, NAVFAC P-307 figure 12-1, and forward a copy to the Navy Crane Center (Code 06) within 30 days of the accident.

Notification and Reporting

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 e-mail as soon as practical but not later than four hours following the accident.

For all other accidents, the Navy Crane Center must be notified as soon as practical but no later than one working day after the accident.

For each suspected accident, activities shall promptly perform an investigation, prepare a Crane and Rigging Accident Report, and forward a copy to the Navy Crane Center (Code 06) within 30 days of the accident.

Reporting Procedures: Contractor

The contractor shall notify the contracting officer as soon as practical, but not later than four hours, after any WHE accident, including lower threshold crane accidents or LTCAs. For other than an LTCA, the contractor shall secure and preserve the accident scene to facilitate the investigation until released by the contracting officer. The contractor shall conduct an investigation to establish the root cause(s) of any WHE accident. Except for an LTCA, crane operations shall not proceed until the cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer.

For an LTCA, the evolution may be allowed to continue, with supervisor authorization and correction of the immediate cause. Upon completion of the job or evolution, the contractor shall stop operations and follow normal accident protocol (for instance,

Reporting Procedures - Contractor

The contractor shall:

- Notify the contracting officer as soon as practical but no later than four hours after any WHE accident
- Secure the accident site and protect evidence until released by the contracting officer
- Conduct an accident investigation to establish the root cause(s) of any WHE accident, near miss, or unplanned occurrence

Crane operations shall not proceed until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer.

The contractor shall provide the contracting officer a report for an accident or near miss within 30 days using the appropriate form provided in NAVFAC P-307 section 12.

investigation to determine causes and required corrective actions). The contractor shall provide the contracting officer accident or near miss reports within 30 days using the appropriate form provided in NAVFAC P-307 section 12. These notifications and reporting requirements are in addition to those promulgated by OPNAVINST 5100.23 and related command instructions.

Reporting Procedures: Contracting Officer

The contracting officer shall notify the host activity of any Weight Handling Equipment accident or near misses upon notification by the contractor. Additionally, the contracting officer shall notify the Navy Crane Center, by e-mail, of any accident involving a fatality, in-patient hospitalization, emergency medical care (for example, transportation by ambulance), overturned crane, collapsed boom, or any other major damage to the crane or adjacent property as soon as possible, preferably within four hours of notification by the contractor; additionally, these accidents require an additional verbal notification to the Navy Crane Center.

For all other accidents or near misses, notify the Navy Crane Center as soon as practical but no later than one working day after the accident. Although the contractor is ultimately responsible for Weight Handling Equipment accident and near miss reporting, contracting officers or their designated oversight groups are highly encouraged to submit contractor crane near misses when identified during periodic oversight.

Reporting Procedures - Contracting Officer

The contracting officer shall:

- Notify the host activity of any WHE accident and near misses upon notification by the contractor
- Provide the Navy Crane Center and the host activity a copy of every accident report, regardless of severity, upon receipt from the contractor
- Notify the Navy Crane Center of any accident involving a fatality, inpatient hospitalization, emergency medical care, overturned crane, collapsed boom, or any other major damage to the crane, load, or adjacent property as soon as possible, preferably within 4 hours of notification by the contractor
- For all other accidents or near misses, notify the Navy Crane Center no later than one working days after the accident

Reporting Procedures: Contracting Officer Cont'd.

The contracting officer shall provide the Navy Crane Center and host activity a copy of every accident and near miss report, regardless of severity, upon receipt from the contractor. These requirements are in addition to any notification and reporting requirements promulgated in OPNAVINST 5100.23 and command instructions. When the contracting office is not in the local area, the contracting officer shall designate a local representative to ensure compliance with the above noted requirements. The contracting officer or designated weight handling representative shall sign all crane and rigging accident and near miss reports to indicate that they are satisfied that the contractor's investigation and corrective actions are sufficient. In addition, the contracting officer shall ensure reports submitted by the contractor do not contain personally identifiable information.

Reporting Procedures - Contracting Officer (Continued)

- The contracting officer shall provide the Navy Crane Center and the host activity a copy of every accident report, regardless of severity, upon receipt from the contractor.
- These requirements are in addition to any notification and reporting requirements promulgated in OPNAVINST 5100.23 and command instructions.
- When the contracting office is not in the local area, contracting officer shall designate a local representative to ensure compliance with the above noted requirements.
- The contracting officer or designated weight handling representative shall sign all crane and rigging accident and near miss reports to indicate that they are satisfied that the contractor's investigation and corrective action are sufficient.
- The contracting officer shall ensure reports submitted by the contractor do not contain personally identifiable information (PII).

Knowledge Checks

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

1. **Select all that apply.** The crane operating envelope includes the crane, the operator, the riggers, the crane walkers, signal persons, the lift procedure and—
 - A. any supporting structures
 - B. rigging gear between the hook and the load
 - C. the area where the load will be landed
 - D. the load
2. **Select all that apply.** The rigging operating envelope contains the rigging gear and miscellaneous equipment covered by P-307 section 14, the load itself, and—
 - A. other personnel involved in the operation
 - B. the crane removal procedure
 - C. the gear or equipment's supporting structure
 - D. the load rigging path
 - E. the rigging procedure
 - F. the user of the gear or equipment

3. **Select the best answer.** During maintenance, the rigging gear between the crane hook and the load fails and results in equipment damage. This is reported as a(n)—
 - A. crane accident
 - B. operator error
 - C. rigger error
 - D. rigging gear deficiency
4. **Select the best answer.** During crane operations, the load shifts. The operator reacts quickly and saves the load but causes the crane to derail. This is reported as a(n)—
 - A. crane accident
 - B. crane walker's error
 - C. load configuration error
 - D. operator error
5. **Select the best answer.** When rigging gear covered by NAVFAC P-307 section 14 fails while suspended from a structure and drops the load, it is a—
 - A. crane accident
 - B. load configuration error
 - C. rigging accident
 - D. rigging error
6. **Select the best answer.** If component failure occurs, such as motor burnout, and does not result in damage, the component failure is considered—
 - A. a crane accident
 - B. a non-accident
 - C. a rigging accident
 - D. crane maintenance's responsibility
7. **Select the best answer.** To whom or to what are the majority of crane accidents attributed?
 - A. crane operators
 - B. equipment failure
 - C. personnel error
 - D. riggers or signalmen
 - E. weather conditions
8. **Select all that apply.** Overconfidence and poor judgement among team members can contribute to crane and rigging accidents. Select additional factors that can contribute to accidents.
 - A. engineering lift specifications
 - B. inattention to the task
 - C. operating the crane too fast
 - D. the crane operating envelope

9. **Select the best answer.** If you have an accident with a crane or you find damage and suspect an accident has happened, your first step is to—
- A. Call emergency services if anyone is injured.
 - B. Notify your supervisor immediately.
 - C. Secure the crane and power as required.
 - D. Stop operations as soon as safely possible.

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 Crane and Rigging Accidents module.

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

CO EXPECTATIONS & RESPONSIBILITIES

Welcome

Welcome to the NAVFAC P-307 Certifying Official Training module: Expectations & Responsibilities.

Learning Objectives

Upon successful completion of this module, you will be able to describe the expectations and responsibilities of the certifying official, explain his or her principal and fundamental responsibilities, list personnel designations and equipment certifications, determine items and events that require approval or concurrence, and know where to find help if needed.

Expectations

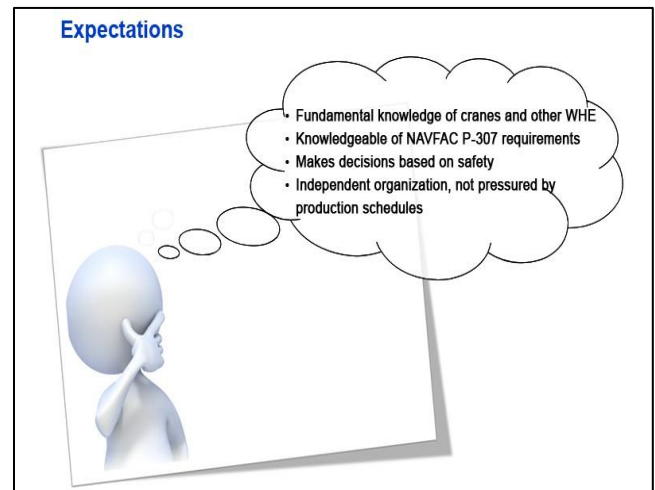
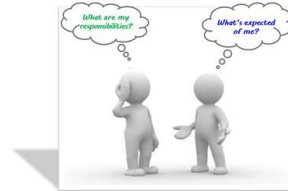
An activity's certifying official should have a fundamental knowledge of cranes, the use of weight handling equipment, and the requirements of NAVFAC P-307. Decisions regarding cranes must be based on safety. Decisions made by the certifying official not only affect the overall condition of the crane, but the safety of personnel working with, on, and around cranes. The certifying official should not be pressured by production schedules. There should be an organizational separation between the production organizations that need to use the cranes and the person who certifies the cranes.



Learning Objectives

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

- Describe the expectations and responsibilities of the certifying official
- Explain his or her principal and fundamental responsibilities
- List personnel designations and equipment certifications
- Determine items and events that require approval or concurrence
- Know where to find help if needed



Primary Responsibility

The certifying official's overarching responsibility is to maintain the integrity of the crane certification program. In doing so, the Certifying Official ensures the activity's cranes are inspected and tested in accordance with NAVFAC P-307 and that the cranes are safe for their intended purpose. The activity's certifying official must ensure the safety and reliability of weight handling equipment by determining that repairs are properly performed, tested, and documented. He or she must verify that all required certification tests have been performed, and the appropriate paperwork is complete and correct.

Primary Responsibility

- Maintain the integrity of the crane certification program.
- The certifying official ensures the activity's cranes are:
 - Inspected and tested
 - Safe and reliable
 - Properly repaired, tested, and documented

Certifying Official Responsibilities

Being accountable for the integrity of the activity's weight handling equipment, the certifying official's key responsibilities include certification of equipment; interim recertification of equipment; NCC third party certification of applicable equipment; approvals and concurrences of deferrals, extensions, procedures, configurations, reports, etc.; review of documentation; review of non-load test, non-interim recertification work; and resolution of weight handling equipment issues.

Certifying Official Responsibilities

- Key responsibilities of the certifying official include:
 - Certification
 - Interim recertification
 - NCC third party certification
 - Approvals and concurrences of deferrals, extensions, procedures, configurations, reports, etc.
 - Review of documentation
 - Review of non-load test, non-interim recertification work
 - Resolution of WHE issues

Designation of Personnel

The certifying official, including alternates, shall be designated in writing by the commanding officer or by written command or regional instruction. The certifying official may be designated by position or title in lieu of name, and the designation is considered to remain in effect until canceled or revised. NAVFAC P-307 section 3 discusses maintenance inspectors; section 4 discusses test directors and condition inspectors; section 7 outlines training requirements; section 8 discusses licensing officials, instructors, and

Designation of Personnel

- The certifying official, including alternates, shall be designated in writing by the commanding officer or by written command or regional instruction.



performance examiners; and appendix N lists competency attributes.

Annual Certification

Certifications are required annually for all cranes in the NAVFAC P-307 program and shall include a condition inspection and appropriate tests. Certifications are valid for one year from the date of the signature of the certifying official, and the certification expiration date shall be no later than one day prior to the anniversary date of the certification. A crane shall not be used in service without a valid certification except when deemed safe to do so in writing by the certifying official, activity engineering organization, or on-site designated inspectors and used only to perform maintenance lifts, no-load training, or traveled for relocation purposes. Certifications are discussed in NAVFAC P-307 section 4.

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.

Annual Certification

- **Certifications**
 - Required annually
 - Condition Inspection
 - Appropriate tests
- **A certification is required for all in-service cranes.**
 - Certification of Load Test and Condition Inspection
- **Signed by:**
 - Certifying official
 - Test Director
 - Inspectors
 - Within 60 days of testing

Interim Recertification

The certifying official must understand the circumstances that can affect a crane's certification such as overloads, accidents, or major deficiencies. If any repairs, adjustments, or alterations are made to load bearing components, load controlling components, or operational safety devices that affect the crane's current certification, a load test may be required. If a load test is required, an interim re-certification is required.

Certifying officials shall be familiar with the requirements discussed in NAVFAC P-307 section 4, paragraphs 4.3 and 4.4 to correctly determine when load tests are or are not required and whether re-certification is or is not necessary.

Interim Recertification

- Examples of items that may affect certification:
 - overloads
 - accidents
 - major deficiencies
- or any-
 - repairs
 - adjustments
 - alterations
- made to-
 - load-bearing components
 - load-controlling components
 - operational safety devices
- Interim re-certification may be required.
- Note: Certifying Officials shall be familiar with the requirements in NAVFAC P-307, section 4, paragraphs 4.3 and 4.4

Third Party Certification

In addition to annual certifications and interim re-certifications, the certifying official shall ensure that cranes, derricks, and certain other devices used in cargo transfer and floating cranes, floating derricks, and barge-mounted mobile cranes used in ship building, ship repair, and ship breaking are certified by Navy Crane Center third-party certification personnel.

The third-party certification is in addition to activity performed annual or interim certifications. Current third-party certifications become void when an annual certification expires. It is efficient to perform both the annual certification and the third-party certification at the same time. If an interim re-certification becomes necessary during the certification period, a new third-party certification will be required when the interim re-certification has been completed. More detailed information regarding third party certifications can be found in NAVFAC P-307, section 4, paragraph 4.8 and appendix M.

Third Party Certification

- Certifying officials ensure third party certification by the Navy Crane Center for the following cranes:
 - cranes used for cargo transfer
 - floating cranes used in ship building, ship repair, and ship breaking

Documentation

The certifying official shall ensure that all maintenance, inspection, and test requirements have been completed before certifying the crane. All applicable paperwork must be thoroughly reviewed. After a complete review of the crane test, inspection, and certification documentation and a determination that all requirements have been met, the certifying official may sign the crane certification. The certifying official also signs work documents involving repairs to load-bearing components, load-controlling, or operational safety device components that do not require a load test.

Documentation

- The certifying official shall:
 - thoroughly review all paperwork
 - sign certification documents
 - sign documents for Load-Bearing, Load-Controlling, and Operational Safety Device repairs not requiring load test

Deferrals and Extensions

Certifying officials provide approval and concurrence for various actions and events in the crane maintenance and certification processes. They may defer work on non-major deficiencies. Major deficiencies shall be corrected prior to annual certification unless the specific system is not in service and/or will not be placed in service. If it is not practical to complete other work to load bearing and load controlling parts and operational safety devices, such work may be deferred with the approval of the certifying official. Technical justification for deferrals shall be provided. Deferred work shall be completed prior to the next annual certification unless further deferral is approved by the certifying official. Deferrals, justifications, and approvals shall be in writing. When an emergent or other contingent condition exists precluding the timely completion of a prescribed maintenance, inspection, or lubrication and servicing schedule, the certifying official may authorize a deferral of the prescribed maintenance inspections, lubrication, or servicing work. Technical justification for deferral shall be provided.

Deferrals and Extensions

- Certifying Officials may:
 - Defer work on non-major deficiencies with technical justification
 - Not defer work on major deficiencies unless the deficient system will not be placed in service
 - Defer/extend maintenance inspections, lubrication, or service schedules, with technical justification
- Deferrals, justifications, and approvals shall be in writing.

Deferrals and Extensions Continued

Each deferral and justification shall be in writing. Certifying officials shall concur with the activity Commanding Officer when annual certifications are extended for emergent conditions. The extended certification shall not exceed 60 calendar days from the annual certification expiration date. Authority to extend a certification shall not be delegated and before extending the certification, the crane shall pass a complete condition inspection including functional testing through all motions at normal operating speed. Additionally, no-load testing of shaft failure detection systems and boom latching, pinning and multiple extend mode systems, as applicable, is required. Any authorization to extend a certification shall be filed in the crane's equipment history file.

Procedures

The certifying official is tasked with approving procedures for cranes. When cranes come with features or components not specifically covered by NAVFAC P-307, the certifying official will approve procedures developed by the activity engineering organization.

The certifying official will review and approve procedures developed for modified tests, inspections, controlled disassembly and reassembly of load bearing and load controlling components, and ancillary equipment procedures before forwarding them to the Navy Crane Center. Any changes to procedures other than minor editorial changes shall also be approved by the certifying official and forwarded to the Navy Crane Center. Minor editorial changes shall be forwarded to the Navy Crane Center for information.

In cases where it is necessary to mount a mobile crane on a barge, the certifying official shall prescribe reduced capacity ratings, wind and wave restrictions, test procedures, and test conditions and precautions for certifying barge-mounted mobile cranes. See NAVFAC P-307, appendix E, paragraph 5.2.

Deferrals and Extensions Continued

- Certifying Officials shall:
 - Concur with the commanding officer's decision to extend annual certification
 - Not to exceed 60 days
 - Documented in the equipment history file
- Deferrals, justifications, and approvals shall be in writing.

Procedures

The certifying official reviews and approves procedures for:

- Modified tests and inspections
- Controlled disassembly and reassembly of Load Bearing and Load Controlling components
- Ancillary equipment procedures
- Changes to these procedures
- Barge mounted mobile crane precautions, testing, operations

Crane Set-up and Configuration

The certifying official ensures that applicable crane set-ups and lift configurations are reviewed and approved.

One example might be where the crane's load chart permits lifts over the side without the use of outriggers. In this case, the certifying official shall review the weights and capacities involved and approve the capacity. Capacity shall not exceed 60% of the OEM's load chart values or if a stability test is performed in accordance with SAE J765, 50% of the balance point loads.

Accident

Certifying officials are often the responsible party for crane accident reporting. Regardless of whom the responsible party is, the certifying official shall review and sign all crane accident reports.

Resources

Navy Crane Center stands ready to assist you in resolving your crane-related concerns. Resources available include the Navy Crane Center website. This website contains crane-related information such as Crane Safety Advisories or CSA's and Equipment Deficiency Memorandums or EDM's, standing crane alterations, downloadable versions of various forms and manuals, including the latest version of NAVFAC P-307, training schedules, and the Crane Corner newsletter. The website also provides a comprehensive summary of evaluation findings and results from previous years.

The In-Service Engineering Branch provides engineering resolutions for cranes already in service. Located in Portsmouth, Virginia, their services include the evaluation of deficiency reports, alteration requests, requests for clarification or deviation, the development of CSA's and EDM's, and approval of various crane procedures.

Crane Set-up and Configuration

The certifying official shall review and approve applicable:

- Crane set-ups
- Configurations

Accident Reports

CRASH AND ROBBING/ACCIDENT REPORT									
Accident Category:		Crash Location:		Reporting Agency:		Officer/Investigator:			
☐ Fatal ☐ Non-Fatal		☐ Highway ☐ Non-Highway		☐ Police ☐ Fire ☐ Other		☐ Highway ☐ Non-Highway			
Name: _____ Address: _____ City: _____ State: _____ Zip: _____				Name: _____ Address: _____ City: _____ State: _____ Zip: _____		Name: _____ Address: _____ City: _____ State: _____ Zip: _____			
Date: _____ Time: _____				Date: _____ Time: _____		Date: _____ Time: _____			
Location: _____				Location: _____		Location: _____			
Description of Incident: _____				Description of Incident: _____		Description of Incident: _____			
Name of Driver: _____				Name of Driver: _____		Name of Driver: _____			
License Number: _____				License Number: _____		License Number: _____			
Vehicle Make/Model: _____				Vehicle Make/Model: _____		Vehicle Make/Model: _____			
Year: _____				Year: _____		Year: _____			
Color: _____				Color: _____		Color: _____			
Damage: _____				Damage: _____		Damage: _____			
Injuries: _____				Injuries: _____		Injuries: _____			
Property Damage: _____				Property Damage: _____		Property Damage: _____			
Other: _____				Other: _____		Other: _____			
Signature: _____				Signature: _____		Signature: _____			
Date: _____				Date: _____		Date: _____			
Time: _____				Time: _____		Time: _____			
Location: _____				Location: _____		Location: _____			
Description of Incident: _____				Description of Incident: _____		Description of Incident: _____			
Name of Driver: _____				Name of Driver: _____		Name of Driver: _____			
License Number: _____				License Number: _____		License Number: _____			
Vehicle Make/Model: _____				Vehicle Make/Model: _____		Vehicle Make/Model: _____			
Year: _____				Year: _____		Year: _____			
Color: _____				Color: _____		Color: _____			
Damage: _____				Damage: _____		Damage: _____			
Injuries: _____				Injuries: _____		Injuries: _____			
Property Damage: _____				Property Damage: _____		Property Damage: _____			
Other: _____				Other: _____		Other: _____			
Signature: _____				Signature: _____		Signature: _____			
Date: _____				Date: _____		Date: _____			
Time: _____				Time: _____		Time: _____			
Location: _____				Location: _____		Location: _____			
Description of Incident: _____				Description of Incident: _____		Description of Incident: _____			
Name of Driver: _____				Name of Driver: _____		Name of Driver: _____			
License Number: _____				License Number: _____		License Number: _____			
Vehicle Make/Model: _____				Vehicle Make/Model: _____		Vehicle Make/Model: _____			
Year: _____				Year: _____		Year: _____			
Color: _____				Color: _____		Color: _____			
Damage: _____				Damage: _____		Damage: _____			
Injuries: _____				Injuries: _____		Injuries: _____			
Property Damage: _____				Property Damage: _____		Property Damage: _____			
Other: _____				Other: _____		Other: _____			
Signature: _____				Signature: _____		Signature: _____			
Date: _____				Date: _____		Date: _____			
Time: _____				Time: _____		Time: _____			
Location: _____				Location: _____		Location: _____			
Description of Incident: _____				Description of Incident: _____		Description of Incident: _____			
Name of Driver: _____				Name of Driver: _____		Name of Driver: _____			
License Number: _____				License Number: _____		License Number: _____			
Vehicle Make/Model: _____				Vehicle Make/Model: _____		Vehicle Make/Model: _____			
Year: _____				Year: _____		Year: _____			
Color: _____				Color: _____		Color: _____			
Damage: _____				Damage: _____		Damage: _____			
Injuries: _____				Injuries: _____		Injuries: _____			
Property Damage: _____				Property Damage: _____		Property Damage: _____			
Other: _____				Other: _____		Other: _____			
Signature: _____				Signature: _____		Signature: _____			
Date: _____				Date: _____		Date: _____			
Time: _____				Time: _____		Time: _____			
Location: _____				Location: _____		Location: _____			
Description of Incident: _____				Description of Incident: _____		Description of Incident: _____			
Name of Driver: _____				Name of Driver: _____		Name of Driver: _____			
License Number: _____				License Number: _____		License Number: _____			
Vehicle Make/Model: _____				Vehicle Make/Model: _____		Vehicle Make/Model: _____			
Year: _____				Year: _____		Year: _____			
Color: _____				Color: _____		Color: _____			
Damage: _____				Damage: _____		Damage: _____			
Injuries: _____									

- The certifying official shall review and sign all crane accident reports.

Resources for the Certifying Official

- Website
- NAVFAC P-307 manual
- In-Service Engineering
- NCCR's
- Evaluation Teams
- Web-Based Training

Other:

- OEM
- Local Engineering and Inspection staff
- Other activity WHE programs

NCCR and evaluation team personnel are a good source of information about your equipment and can also provide points of contact for other activities with similar equipment. Stay in touch with your evaluation team throughout the year. NAVFAC P-307 web-based training courses are available via the Navy eLearning website. Other resources include the OEM representative and manuals, local engineering and inspection staff, and other activity weight handling equipment program points-of-contact.

Knowledge Checks

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

1. **Select the best answer.** The certifying official must base all crane related decisions on—
 - A. contractor approval
 - B. management expectations
 - C. production
 - D. safety
2. **Select all that apply.** Before certifying a crane, the certifying official must ensure all requirement have been met for—
 - A. documentation
 - B. inspection
 - C. maintenance
 - D. testing
3. **Select the best answer.** The certifying official shall designate, in writing, which of the following personnel—
 - A. condition inspectors and load test directors
 - B. crane operator license examiners
 - C. crane operator performance examiners
 - D. none of the above
4. **Select the best answer. True or False:** The certifying official’s primary responsibility is to maintain the integrity of the crane certification program.
 - A. True
 - B. False

- 5. Select all that apply.** The certifying official shall review and approve which of the following—
- A.** 90-day crane certification extensions
 - B.** ancillary equipment procedures
 - C.** crane set-up and lift configurations
 - D.** procedures for the controlled disassembly and reassembly of critical components.
 - E.** reduced capacity ratings, test procedures, and test conditions for barge mounted cranes
- 6. Select the best answer. True or False:** The certifying official shall review and sign all crane and rigging gear accident reports.
- A.** True
 - B.** False
- 7. Select the best answer.** What certification, in addition to other required certifications, is necessary for cranes engaged in cargo transfer, ship building, ship repair, and ship breaking?
- A.** Annual
 - B.** Conditional
 - C.** Interim
 - D.** Third party
- 8. Select the best answer.** What two items are required to allow the certifying official to defer work on components?
- A.** commanding officer's approval and inspector's justification
 - B.** engineering evaluation and approval
 - C.** inspector's notes and LTD's concurrence
 - D.** written technical justification and written deferral
- 9. Select the best answer.** To which sections, appendices, or paragraphs in the NAVFAC P-307 would you refer to correctly determine when load tests are or are not required and whether recertification is required following any repairs, adjustments, or alterations to a crane?
- A.** Appendix C
 - B.** Appendix E, paragraphs 1.3 through 1.8
 - C.** Paragraphs 3.7 and 3.8
 - D.** Paragraphs 4.3 and 4.4
 - E.** Section 2

Summary

This module presented the expectations and responsibilities of a certifying official and explained his or her principal and fundamental responsibilities. It listed personnel designations, types of equipment certifications, and items and events that require approval or concurrence. It also provided information on how to find help from NCC if needed.

Next, you will be introduced to various documents that you will encounter in the crane repair, inspection, and testing process.

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:

- Expectations
- Responsibilities
- Personnel designations
- Certifications and interim certifications
- Procedure concurrence and approvals
- Resources and Assistance

Completion

Congratulations.

You have completed the Certifying Official Expectations and Responsibilities module.

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

CO DOCUMENTATION REVIEW

Welcome

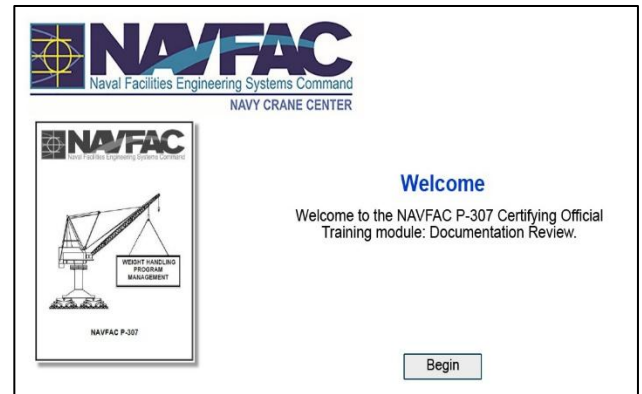
Welcome to the NAVFAC P-307 Certifying Official Training module: Documentation Review.

Learning Objectives

Upon successful completion of this module, you will be able to identify documents used in the crane maintenance and certification process. You will be able to explain their purpose and determine their accuracy. This includes the Maintenance Inspection Specification Record (MISR), the Crane Condition Inspection Record (CCIR), and the Certification of Condition Inspection and Test form. Also addressed is the documentation used for repairs and alterations.

Certification Review Documents

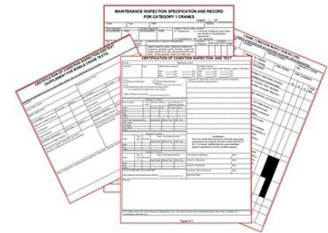
During the annual certification process and prior to signing, the certifying official shall assure him or herself that the certification package accurately represents the correct maintenance, inspection, and testing requirements by reviewing the following documents: the Maintenance Inspection Specification and Record for category 1 cranes, the Annual Maintenance Inspection Specification and Record for category 2 and 3 cranes, the Crane Condition Inspection and Record for all cranes, and the Certification of Condition Inspection and Test form also for all cranes. In addition to these documents, Shop Repair Orders and other types of work documents may be reviewed at the discretion of the certifying official.



Course Objectives

Identify and determine the accuracy of—

- Maintenance Inspection Specification Record or MISR
- Crane Condition Inspection Record or CCIR
- Certification of Condition Inspection and Test
- Shop Repair Order (as an example work document)



Certification Review

During the annual certification process, review the following documents:

- Maintenance Inspection Specification and Record (MISR)
- Annual Maintenance Inspection Specification and Record (AMISR)
- Crane Condition Inspection Records (CCIR)
- Certification of Condition Inspection and Test
- Shop Repair Orders (SRO)(or other work/repair documents)

The image shows a form titled "CERTIFICATION OF CONDITION INSPECTION AND TEST". The form has several sections for recording inspection data, including "Inspection Date", "Inspector", "Crane ID", "Crane Type", "Crane Location", "Inspection Type", "Inspection Results", and "Certification". There are checkboxes for "Inspected", "Reviewed", and "Certified". The form is labeled "Figure 4-1" at the bottom.

MISR, AMISR Review

The Maintenance Inspection Specification and Record is used for category 1 cranes. This document is found in NAVFAC P-307 appendix C. It is referred to by the acronym M-I-S-R and is pronounced 'mizer.'

For category 2 and category 3 cranes, the Annual Maintenance Inspection Specification and Record, found in NAVFAC P-307 appendix D, is used. It is referred to by the acronym A-M-I-S-R and is pronounced 'A-mizer.'

When reviewing these forms, the certifying official shall verify that the information blocks at the top of each sheet are filled in with the correct information. He or she shall further verify that all inspection blocks are marked appropriately to indicate that the inspected items are satisfactory, unsatisfactory, corrected, or not-applicable. If an inspected item is identified as unsatisfactory, verify that it is also marked corrected, indicating satisfactory resolution of the deficient condition. Or, if not corrected, verify that the item is identified as "D", deferred, on the Unsatisfactory Items sheet. This information is discussed in detail in NAVFAC P-307 section 3 and appendices C and D.

MISR and AMISR Review

- Information blocks correct and complete
- Inspection blocks marked appropriately
- Unsatisfactory items identified and corrected or deferred
- Inspector signatures/dates

Systems Inspected

In cases where the attribute is one that applies to different systems on the crane, each system must be identified and the results recorded on the form. As shown in this example, there are three different sets of clutches listed on the form in the systems inspected column: a hoist clutch, a boom clutch, and a swing clutch. Each system that applies has been written in and each must be marked with an "X" in the appropriate block. For equipment with multiple hoists, each hoist clutch would have to be identified individually, for example main hoist, aux hoist, and whip hoist.

Systems Inspected Block

- Individually identify each system and its inspection results. See example below.

Item No	Inspection Type			Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
	A	B	C				S	U	C	NA
23	X	X	X	Clutches (Boom, Hoist, Swing, and Travel)	Inspect clutch linkage for damage, for evidence of binding and loose or worn components, and for proper lubrication and adjustment. Inspect clutch linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. During operation, inspect for slippage and evidence of binding. Listen for abnormal noise.	HOIST	X			
						BOOM	X			
						SWING	X			

Unsatisfactory Items

If an item is marked unsatisfactory on the MISR or AMISR, it must be listed on the Unsatisfactory Items sheet in accordance with note 4 of appendices C and D along with a statement of the condition observed.

The certifying official should consider the following when evaluating the completeness of the document: Is there an adequate and specific description of the observed condition? Is the repair SRO number listed? Is the Verification of Correction column signed and dated for each item? If the item is being deferred, is the SRO block marked with a D?

Deferred work to load bearing, load controlling, and operational safety devices requires the review and approval of the certifying official and written technical justification. NAVFAC P-307 paragraph 3.3.5 provides additional details for deferring work.

Brake Data Sheet

The Brake Data Sheet is the last page of the MISR and AMISR documents. The certifying official should verify it for accuracy and completeness. Measurement attributes and criteria shall be based on brake and/or crane OEM recommendations or recommendations from the activity engineering organization. Ask yourself: Have all brake data measurements been recorded on the sheet? Are the OEM tolerances recorded in the minimum and maximum or MIN and MAX columns?

If OEM or activity engineering criteria are not available, contact Navy Crane Center. In some cases, depending on the type of brake, not all measurements may be filled in.

Unsatisfactory Items Sheet Example

Review for correctness and accuracy:

- Adequate description
- SRO (or other work document) number
- Signature and date for corrected items
- D annotated for deferred items

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 1 CRANES UNSATISFACTORY ITEMS SHEET 1 OF 1			
Crane 62-00051			
NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO/WORK NUMBER ISSUED FOR CORRECTIVE ACTION. SIGN AND DATE TO VERIFY THAT THE DEFICIENCY HAS BEEN CORRECTED OR ACCEPTED AS IS. IDENTIFY DEFERRED ITEMS BY ANNOTATING A "D" IN THE SRO/WORK BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)			
Item No.	Deficiency	SRO/WORK No.	Verification of Correction (Signature and Date)
2	Leak in filter inlet line	9825	J N Spector 1/5/2018
51	Aux boom nose sheave worn	D	

Brake Data Sheet

The certifying official reviews the brake data sheet and verifies:

- brake data measurements are recorded properly on the sheet
- OEM tolerances are properly recorded in the minimum and maximum columns

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 1 CRANES BRAKE DATA SHEET 1 OF 1													
CRANE: _____													
NOTE: RECORD MEASUREMENTS IN ACCORDANCE WITH THE CRANE AND/OR OEM. RECORD ACTUAL MEASUREMENTS IN THE "ACT" COLUMNS. IF EQUIPMENT IS A CRANE, RECORD MEASUREMENTS IN THE "ACT" COLUMNS. IF EQUIPMENT IS A CRANE, RECORD MEASUREMENTS IN THE "ACT" COLUMNS. IF EQUIPMENT IS A CRANE, RECORD MEASUREMENTS IN THE "ACT" COLUMNS.													
BRAKE	TYPE	MIN		MAX		ACT		MIN		MAX		ACT	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
HOIST	PM	5.38	5.1	5.58	5.38	1.8	5.16	3.8	1.8				

For category 2 and category 3 cranes, if no major deficiencies are found in the maintenance inspection, and if no work is done between the maintenance inspection and the load test, the maintenance inspection may serve as the “before” portion of the condition inspection. Both inspection forms shall be fully completed. All major deficiencies should be corrected prior to completing the load test.

Certification of Condition Inspection and Test Form Review

Certifications are valid for one year from the date of the certifying official's signature. The certification process shall include a condition inspection and appropriate tests. For category 1 cranes, the annual tests shall include a load test. Category 2 and 3 cranes shall be inspected, operationally tested (without load), and certified annually; however, a load test shall be performed at every fourth annual certification, as a minimum. The certification shall indicate when a crane is in the quadrennial load test program.

The Certification of Condition Inspection and Test form documents the load test.

Some important points to verify: The information blocks are correctly filled-in with the required information at the top of each sheet; the certified capacity is explained in the ‘Remarks’ section if different from the OEM capacity, such as in the case where the OEM capacity has been down rated by the activity; the appropriate load test percentages have been used in the calculation of test loads, and the actual test loads are within allowed tolerances; the hook tram measurements are listed, including the base measurement; the Annual Certifications Since Hook N-D-T has been listed; the applicable test paragraphs (including applicable subparagraphs) from appendix E are listed; and the hook material and manufacturing method are identified.

To confidently make these verifications, the certifying official must be familiar with the configuration of the crane during load test and NAVFAC P-307 section 4 and appendix E requirements.

Certification of Condition Inspection and Test Form Review

Verify:

- the information blocks are correctly filled in with the required information at the top of each sheet
- the certified capacity is explained in the Remarks section if different from the OEM capacity, such as in the case where the OEM capacity has been down rated by the activity
- the appropriate load test percentages have been used in the calculation of test loads and the actual test loads are within allowed tolerances
- the hook tram measurements are listed, including the base measurement
- the Annual Certifications Since Hook NDT has been listed
- the applicable test paragraphs (including applicable subparagraphs) from appendix E are listed
- the hook material and manufacturing method are identified

Mobile Crane Testing Supplemental

When testing mobile cranes, in addition to the Certification of Condition Inspection and Test form, a supplemental form will be needed. This form is used because mobile cranes generally have ancillary equipment such as jibs and interchangeable hook blocks, which must be tested. The Certification of Condition Inspection and Test form does not have room for all these additional tests, so a supplemental form is used. One example of when this supplemental form may be used is when the crane has on-rubber or free-rated capabilities which must be tested.

When reviewing mobile crane load test documentation, make sure that the supplemental form has been used as necessary and that all required tests have been identified. Confirm that the actual test loads being applied to the crane are based on the total weight of the test weights, rigging gear, and applicable attachments, components, and equipment as specified on the OEM load chart. Typical considerations may include the weight of an erected or stowed jib, the overhaul or headache ball, the hook block, the auxiliary boom nose, and in some cases, the weight of the wire rope.

Shop Repair Order

All work, including work to disassemble and reassemble components, including disassembly/reassembly for inspections of appendices C and D, shall be documented on a shop repair order (SRO), technical work document (TWD), work order (WO), or other work document.

When reviewing an SRO or other work document, ask yourself: Are the information blocks filled out with the correct information? Does the SRO clearly describe, in detail, the work performed? Are all replacement parts and part numbers listed? Are the appropriate test and/or re-certification requirements listed? Have the approval and completion blocks been signed and dated?

Mobile Crane Testing Supplemental Form

CERTIFICATION OF CONDITION INSPECTION AND TEST (SUPPLEMENT FOR MOBILE CRANE TESTS)							
Complete as applicable for the type of crane certified. Indicate "N/A" 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/radius)				On Tires (Pick and Carry) (Describe configurations and list test loads/radius/boom length)			
Other Configurations, including ancillary equipment if applicable. (Describe and list test loads/radius)							

Repair Documents: Shop Repair Order

- All work performed on cranes shall be documented on a Shop Repair Order (SRO) or other document.
- When reviewing a SRO or other work document, ask yourself:
 - Are the information blocks filled out with the correct information?
 - Does the SRO clearly describe, in detail, the work performed?
 - Are all replacement parts and part numbers listed?
 - Are the appropriate test and/or re-certification requirements listed?
 - Have the approval and completion blocks been signed and dated?

[illegible]

When adjustment or repair of a load bearing or load controlling part or operational safety device does not require a load test for verification of satisfactory work, one of the following, at the activity's option, is required prior to returning the crane to service. After all work, inspection, and operational testing required by NAVFAC P-307 section 3 are completed, the work document(s) shall be signed by the chief engineer or the certifying official. An interim re-certification is not required. A selective inspection, operational test, and recertification shall be performed. This is in addition to the inspection requirements of NAVFAC P-307 section 3.

Crane Alterations

When reviewing crane certification documentation, the certifying official should check to see if any of the repairs described on the Shop Repair Order or in the MISR should constitute an alteration. If so, verify that the approval has gone to the proper level. Alterations to load bearing parts, load controlling parts, or operational safety devices must have the approval of the Navy Crane Center. Other alterations may be approved locally but shall be forwarded to the Navy Crane Center within 14 days after approval. NAVFAC P-307 section 6 and appendix O describes alterations and gives guidance on the approval process. The illustration shows an example of an alteration in the form of a bracket that has been welded onto the boom tip. Since the boom tip assembly is a load bearing part, approval from the Navy Crane Center would be required.

Crane Alterations

The certifying official will—

- Verify alterations have been approved by:
 - the activity engineering organization
 - Navy Crane Center

CRANE ALTERATION REQUEST		STATUS	
CRANE	ALTERATION	APPROVED	REJECTED
1	Welded bracket to boom tip		
2	Replaced hook		
3	Adjusted brakes		
4	Replaced cables		
5	Adjusted limit switches		
6	Replaced rollers		
7	Adjusted clutch		
8	Replaced gears		
9	Adjusted motor		
10	Replaced motor		
11	Adjusted drum		
12	Replaced drum		
13	Adjusted winch		
14	Replaced winch		
15	Adjusted hoist		
16	Replaced hoist		
17	Adjusted trolley		
18	Replaced trolley		
19	Adjusted crane		
20	Replaced 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.** The annual certification process requires the certifying official to review which of the following documents?
 - A. CCIR
 - B. Certification of Condition Inspection and Test
 - C. MISR
 - D. Operator License Record
 - E. SRO
2. **Select the best answer.** If an inspection block on a MISR or AMISR is marked with a “U,” and the work has been corrected, what other mark would you expect to see in that inspection block?
 - A. C
 - B. D
 - C. R
 - D. S
3. **True or False. Select the best answer.** For category 2 and 3 cranes, if no major deficiencies are found in the maintenance inspection, and if no work is done between the maintenance inspection and the load test, the maintenance inspection can serve as the “before” portion of the condition inspection.
 - A. True
 - B. False
4. **Select the best answer.** Your bridge crane has been downrated by your activity resulting in a reduced certified capacity. How would you expect this to be documented in the certification paperwork?
 - A. an explanation in the remarks section of the CCIR
 - B. an explanation in the remarks section of the Certification of Condition Inspection form
 - C. an explanation in the remarks section of the MISR
5. **Select the best answer.** On the MISR or the AMISR, all inspection blocks must be marked S, U, C, or N/A. The letter D may be found on the Unsatisfactory Items sheet. What do these letters indicate?
 - A. satisfactory, unsatisfactory, completed, not available, deferred
 - B. satisfactory, unsatisfactory, corrected, not applicable, deferred
 - C. Satisfied, unsatisfied, concealed, not applicable, deferred
 - D. selected, unselected, completed, detailed, not available, detailed

6. **Select all that apply.** When a load test is performed, who is required to sign the Certification of Condition Inspection and Test Form?
- A. Certifying Official
 - B. Electrical Crane Inspector
 - C. Engineer
 - D. Load Test Director
 - E. Maintenance Supervisor
 - F. Mechanical Crane Inspector
7. **Select the best answer.** Which additional form is used on mobile cranes to record tests for ancillary equipment such as interchangeable hook blocks and jibs?
- A. Certification of Condition Inspection and Mobile Crane Ancillary Equipment Tests
 - B. Certification of Condition Inspection and Test
 - C. Certification of Condition Inspection and Test Supplement for Mobile Crane Tests
 - D. Certification of Load Test for Mobile Cranes
 - E. Crane Condition Certification Record for Mobile Crane Tests
8. **Select the best answer.** Other than qualified mechanical and electrical inspectors, who may sign MISR inspection items designated with a lower case sigma (σ)?
- A. certifying official
 - B. condition inspector
 - C. engineer
 - D. load test director
 - E. mechanic/electrician
9. **Select the best answer. True or False:** In cases where the MISR or AMISR inspection item is one that applies to different systems on the crane, each system must be identified and the results recorded on the form.
- A. True
 - B. False
10. **Select the best answer. True or False:** Category 2 and 3 cranes shall be inspected, tested, and certified annually.
- A. True
 - B. False

Documentation Review Module Summary

This module identified documents used in the crane maintenance and certification processes such as the MISR, AMISR, CCIR, Certification of Condition Inspection and Test, SRO, and the Crane Alteration Request. You should be able to explain their purpose and determine their accuracy. Remember, review all documents carefully. Be aware of the requirements. Don't be afraid to ask questions. Don't sign the certification form until everything is correct.

Next, you will be introduced to load charts and how to determine capacities.

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?

Documents used in the crane maintenance and certification processes:

- MISR
- AMISR
- CCIR
- Certification of Condition Inspection and Test
- Shop Repair Order (SRO)
- Crane Alteration Request

Remember:

- Review all documents carefully
- Be aware of the requirements
- Don't be afraid to ask questions
- Don't sign the certification form until everything is correct

Completion

Congratulations.

You have completed the Certifying Official Documentation Review module.

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

CO LOAD CHART REVIEW

Welcome

Welcome to the NAVFAC P-307 Certifying Official Training module: Load Chart Review.



Introduction

This module presents crane operation load charts. A good working knowledge of the OEM load chart is necessary for calculating lifting capacities. Generally, load charts list the maximum rated capacity of the crane for every permissible configuration, specify the crane's operational limitations, and detail the set-up requirements for safe operation.

Load charts also show configuration variables affecting the capacity of the crane at the time of the lift and identify factors influencing the crane's capacity, such as boom angle, boom length, load radius, deductions from gross capacity, configuration of the crane, and quadrants of operation.

Introduction

- Load charts:
 - List the maximum rated capacity of the crane
 - Specify the crane's operational limitations
 - Detail crane set-up requirements
 - Show configuration variables affecting the capacity of the crane
 - Identify factors influencing the crane's capacity
-
-
-

Learning Objectives

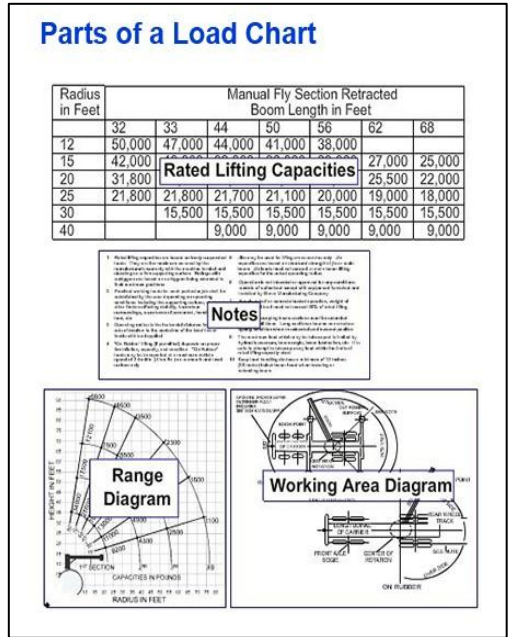
Upon successful completion of this module, you will be able to identify and describe the parts of a load chart, explain the difference between gross and net capacities, describe the purpose of the crane's range diagram and working area diagram, and identify two consequences of exceeding the crane's rated capacity.

Learning Objectives

- Upon successful completion of this module, you will be able to:
- Identify the uses of the parts of a load chart
 - Explain the difference between gross and net capacities
 - Describe the purpose of the—
 - Range Diagram
 - Working Area Diagram
 - Identify consequences of exceeding the crane's rated capacity

Parts of a Load Chart

The load chart usually contains the following parts: rated capacities chart, notes section, range diagram, and a working area diagram.



Load Chart Notes Section

Before calculating the crane's capacity, the operator must read the general notes found on the load chart or in the load chart package. Load chart notes contain important information such as deductions from listed capacities, allowable boom lengths, instructions for determining structural vs. stability limitations, wire rope type and reeving information, crane set up requirements, crane configuration requirements for travel, and general crane safety reminders. Load chart notes also serve as a safety review.

Load Chart Notes Section

The Notes section of the load chart provides valuable information such as:

- Deductions from the listed capacity
- Allowable boom lengths
- Instructions for determining structural vs. stability limitations
- Wire rope type and reeving information
- Crane set-up requirements
- Crane configuration requirements for travel
- General crane safety information and reminders

Note: Reviewing the Notes section not only provides the reader with specific and important information, it also serves as a general safety overview of the crane and its characteristics.

NOTES FOR LIFTING CAPACITIES
For Training Only

GENERAL:

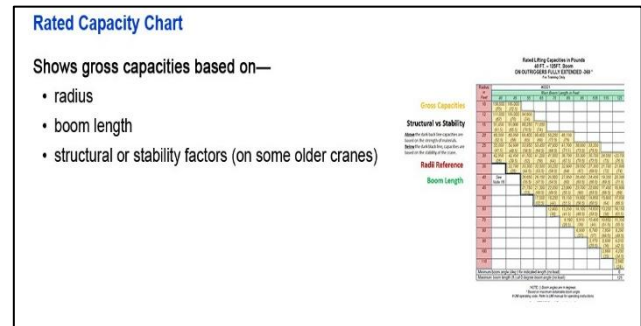
1. Rated loads on shown on lift chart pertain to this machine as originally manufactured and equipped. Modifications to the machine or use of optional equipment other than that specified can result in a reduction of capacity.
2. Construction equipment can be hazardous if improperly operated or maintained. Operation and maintenance of this machine shall be in compliance with the information in the Operator's and Safety Handbook, Service Manual, and Parts Manual supplied with the machine. If these manuals are missing, order replacements from the manufacturer through the distributor.
3. The operator and other personnel associated with machine shall fully acquaint themselves with the United States National Standards Institute (ANSI) Safety Standards for cranes.

SETUP:

1. The machine shall be leveled on a firm supporting surface. Depending on the nature of the supporting surface, it may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
2. For outrigger operation, outriggers shall be properly extended with lines raised free of crane weight before operating the boom or lifting loads.
3. If machine is equipped with front jack cylinder, the front jack cylinder shall be set in accordance with written procedure.
4. When equipped with extendible counterweight, the counterweight shall be fully extended before operation.
5. Tires shall be inflated to the recommended pressure before lifting on rubber.
6. With certain boom and hoist/tackle combinations, maximum capacities may not be obtainable with standard cable lengths.
7. Do not travel with crane boom extended or jib extended unless otherwise noted. Refer to "Operator's and Safety Handbook".

Rated Capacity Chart

The rated capacity chart is that part of the load chart that is referenced to determine the crane's gross capacities. Gross capacities are listed for various boom lengths and radii.



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.

Rated Lifting Capacities Chart with Asterisks

Some manufacturers use asterisks to mark the structural areas of the load chart. While no longer used, some older cranes may have load charts that use bold lines or shaded areas to designate differences between stability and structural capacities.

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

Rated Lifting Capacity Charts with Asterisks

RADII US	BOOM LENGTH 33'				BOOM LENGTH 45'				BOOM LENGTH 57'			
	FRONT		360°	Angle	FRONT		360°	Angle	FRONT		360°	
10	67	80,000 *	80,000 *	74	75,000 *	75,000 *	74	59,600 *	59,600 *			
12	63	76,100 *	76,100 *	71	73,000 *	72,900 *	72	55,000 *	55,000 *			
15	57	64,200 *		67	61,700 *	61,700 *	66	46,300 *	45,700 *			
20	46	45,800 *		57	46,100 *	45,600 *	60	35,300 *	35,000 *			
25	31	34,700 *		47	35,100 *	34,800 *	54	28,600 *	27,800 *			
30				37			47	22,800 *	22,600 *			
35				30			40	18,900 *	18,700 *			
40				23	17,600 *	17,500 *	32	15,800 *	14,700 *			
45				20			20	12,700 *	11,700 *			

* Asterisks are used on older crane load charts to indicate the structural areas of the load chart.

Gross Capacity

What can be safely lifted on the hook? To answer this question, we must understand what gross capacity is. Gross capacity is the weight value shown on a manufacturer's load chart and the maximum amount of weight, per specific configuration, that the crane can lift prior to deductions. In other words, the gross capacity values found on this chart are not the loads that can be suspended from the crane's hook. What then can be safely lifted on the hook? To answer this question, we must find the net capacity of the crane.

Common Deductions

The weight of attachments, such as swing away jibs, stowed or erected, and the weight of auxiliary boom heads and rooster sheaves must be deducted from the gross capacity. The weight of the hooks, blocks and overhaul balls are also deducted from the gross capacity. The crane may be equipped with standard or optional hook blocks having different weights. Hook block weights and capacities should be stamped on each hook block. Be aware that some manufacturers require the weight of excess wire rope to be deducted.

Gross Capacity

- The values listed on the capacity chart show the maximum load or the gross capacity the crane can lift for the noted configuration. This is prior to any deductions.
- In this picture, we see the crane has a gross capacity of 45,800 pounds for 33 feet of boom at a 20 foot radius over the front.

R A D I U S	Angle	BOOM LENGTH 33'		Angle	BOOM LENGTH 45'		Angle	BOOM LENGTH 57'	
		FRONT	350°		FRONT	350°		FRONT	350°
		Capacity	Capacity		Capacity	Capacity		Capacity	Capacity
10	67°	80,000*	80,000*	74	75,000*	75,000*	74	59,600*	59,600*
12	63°	76,100*	76,100*	71	73,000*	72,800*	72	55,000*	55,000*
15	57°	64,200*	63,200*	67	61,700*	61,700*	66	48,300*	45,700*
20	48°	45,800*	45,800*	60	48,100*	45,800*	60	35,200*	35,000*
25	39°	34,400*	34,400*	52	35,100*	34,800*	54	28,800*	27,800*
30				43	27,800*	27,800*	47	22,800*	22,600*
35				32	22,500*	22,400*	40	18,800*	18,700*
40				18	17,800*	17,800*	30	15,800*	14,700*
45							20	12,700*	11,700*

45,800

Common Deductions

A few of the more common deductions include the weights of:

- Attachments
 - Stowed or erected jibs
- Aux boom heads
- Rooster sheaves
- Hooks and blocks
 - Main and Aux
- In some cases, the weight of excess wire rope



Net Capacity

Net capacity is equal to the weight value shown on the manufacturer's load chart (the gross capacity) minus all deductions. To calculate net capacity, total the weight of all deductions and then subtract this sum from the gross capacity. Common deductions include the weight of hook blocks, headache balls, below-the-hook lifting devices, spreader-beams, wire rope, rigging, and attachments such as extensions, swing-away jibs, and auxiliary boom nose sections.

Attachments may possess different effective weights depending on whether they are in the stowed and erected position. The effective weight of these attachments is listed in the load chart notes. Net capacity may not be the most restrictive limit for the crane. In some cases, the capacity of the wire rope as reeved or the capacity of the hook block may be the value that limits the lift capacity of the crane. Limiting factors will be discussed more in a few screens.

Range Diagram

Range diagrams are used for planning lifts. You can use them to determine the configuration of the crane needed for a particular job. By laying out the geometry of the job on the diagram, the boom length, boom angle, jib length, and jib offset required for the lift can be determined. When loads must be placed above grade, the boom-tip height must allow for clearance between the boom tip and the load blocks and the height of the load including the slings. When loads must be set a certain distance in from the edge of a roof, the length of jib and necessary jib offset are easily determined by using the range diagram. The range diagram may be used to determine the boom angle of telescopic booms when the boom is only partially extended and the radius is known. It may also be used to identify the allowable clearances between the load blocks and boom tip.

Net Capacity

- Net Capacity is equal to the values shown on the OEM capacity chart, minus all required deductions such as:

- Hook blocks
- Headache balls
- Below-the-hook lifting devices
- Spreader beams
- Wire rope
- Rigging gear
- Jibs
- Aux boom nose sections

- Net capacity limiting factors may include:

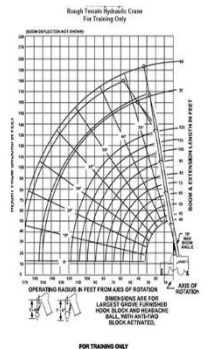
- Wire rope capacity
- Reeving configuration capacity
- Hook block capacity



Range Diagram

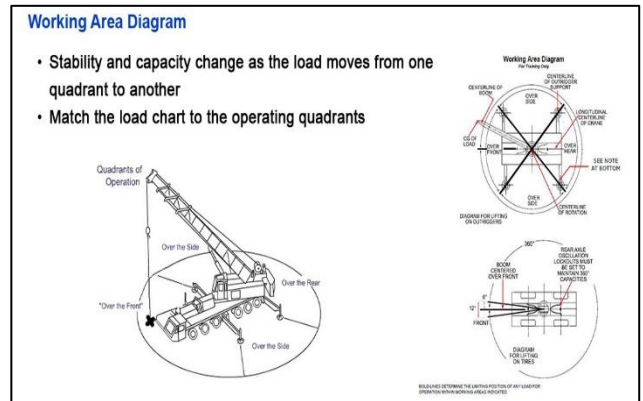
Range Diagrams are used to determine:

- Configuration of the crane
- Geometry of the job
- Maximum hook height
- Jib length and offset
- Jib radius and boom angles
- Clearances between the boom tip and hook block



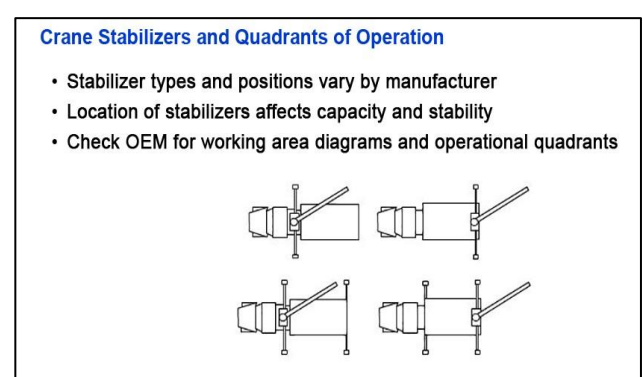
Working Area Diagram

Another important part of the load chart is the working area diagram. Crane stability and capacity will vary as the load moves from one quadrant of operation to another. Because the crane's capacity is different in each quadrant of operation, it is important to match the load chart to the quadrant or quadrants the crane will be working in and through.



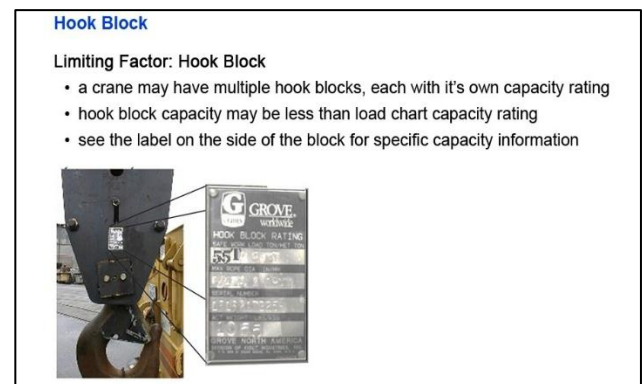
Crane Stabilizers and Quadrants of Operation

Stabilizers and operational quadrants can vary considerably between manufacturers. Always check OEM documentation for the location of quadrants for your specific machine. The working area diagram should provide examples of the different crane set-ups and stabilizer placements that may be encountered.



Hook Block

The lifting capacity of a crane may be limited to the rated load for the particular hook and block that's installed on the crane. Hook block capacity information is normally located on the side of the block.



Parts of Line

The number or parts of line may limit the lifting capacity on a crane. Count the total number of lines suspending the load. In this example, there are eight parts of line between the hoisting sheaves and the hoist block sheaves.

Line Pull Value

Next, determine the allowable line pull for the wire rope. The line pull value can be found in the load chart. In this example, the allowable line pull for each part of wire rope is 12,920 pounds.

Wire Rope Capacity

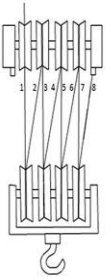
Finally, to find the capacity of the wire rope as reeved, multiply the allowable line pull by the number of parts. In this example, we multiply the line pull of 12,920 pounds per part by eight parts. The wire rope in this reeved configuration has a rated load of 103,360 pounds.

If the hook block capacity is less than the rated load of the wire rope, the hook will be the limiting factor.

Parts of Line

Limiting Factor: Parts of Line

- Count the total number of lines
- In this case, the number of lines (or parts of line) is 8



Line Pull Value

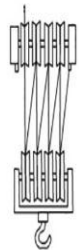
Limiting Factor: Line Pull Value

- The capacity of the crane's hoist may depend on the wire rope's—
 - Size
 - Type
 - Number of parts
- In this example, each part of line has a permissible pull of 12,920 pounds.

Hoists	Cable specs	Permissible Line pulls
Main & Aux Model 30	1/2" (13 mm) 18 x 7 Class or 30 x 7 Rotation Resistant	12,920 lbs.
Main & Aux Model 30	Min. Breaking Str. 66,580 lbs.	
Main & Aux Model 30	1/2" (13 mm) 8 x 37 Class	12,920 lbs.
	SPS WRC Special Fraction	
	Min. Breaking Str. 59,000	

Line Pull - Wire Rope Capacity Calculation

- Limiting Factor: Wire Rope Capacity
 - Multiply line pull value by number of parts
 - Line pull = 12,920 pounds per part
 - Parts of line = 8
- Wire rope capacity = 103,360 pounds



Multiply the rated load by the number of parts:

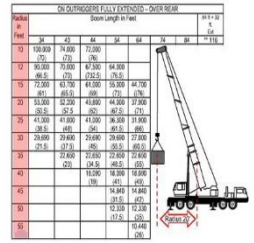
$$\begin{array}{r} 12,920 \text{ lbs.} \\ \times 8 \text{ parts} \\ \hline 103,360 \text{ lbs.} \end{array}$$

Load Radius

The load radius is equal to the horizontal distance measured from the center of rotation of the crane center pin to the center of the hook. Load radius can be established by centering the hook over the load and referring to the crane's radius indicator. For fixed boom lengths, radius can be calculated using boom angle and a load chart. On telescoping boom cranes, boom deflection can increase the radius and must be taken into account. See the screen titled "Flex" for additional information on boom deflection. On critical lifts, the radius should be measured manually. Monitor the radius throughout the lift.

Load Radius

- Load Radius = horizontal distance between center pin and load hook
- Radius Indicator
- Boom angle and load chart
- Caution: boom deflection
- Critical Lifts: measure radius manually

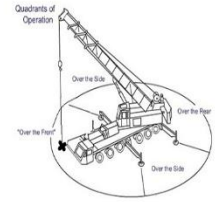


Quadrants of Operation

As mentioned earlier, the crane's working areas are divided into quadrants of operation. During pre-lift planning, it's important to note which quadrant the load will be lifted from, carried through, and landed in. Knowing the load's weight, the load's travel path, and the crane's capacity in each quadrant of operation are three very key considerations in preventing possible structural or stability failures.

Quadrants of Operation

- Key considerations during pre-lift planning is knowing which quadrant the load is—
 - Lifted from
 - Carried through
 - Landed in
- As well as the—
 - Load weight
 - Travel path
 - Crane capacity in each quadrant
- For example:
 - Lifting over the front
 - Rotating 180 degrees over the rear
 - Passing over the side along the way



Flex

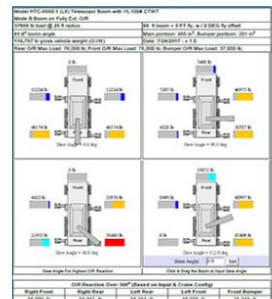
Be aware, especially on truck cranes, that as the load is rotated from the side to the front or rear of the crane, the flex in the crane will relax; deflection in the carrier will decrease, bringing the load closer to the crane. If it is anticipated that the load will come too close to the crane, select 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.

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.



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



Loss of Stability



Structural Failure

Overloading – Example 1

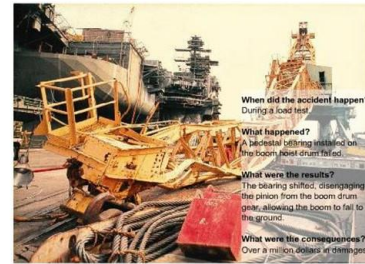
An unknown maintenance problem was discovered in a most unfortunate manner. A pedestal bearing installed on the boom hoist drum failed. The bearing shifted, disengaging the pinion from the boom drum gear, allowing the boom to fall to the ground. No injuries were reported, but over one million dollars 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 1

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



Overloading – 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 did result 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 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.



Overloading – 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.

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 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.



Overloading – 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 that, 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.



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 all the items that are usually found in the OEM load chart document.
 - A. Certificate of Compliance
 - B. Notes Section
 - C. Operator’s Daily Checklist
 - D. Quadrants of Operation
 - E. Range Diagram
 - F. Rated Capacities
2. **Select the best answer.** Deducting the weight of all attachments, hooks, and blocks from the capacities listed in the OEM Rated Lifting Capacities chart provides the operator with the—
 - A. Gross capacity
 - B. Net capacity
 - C. Overall capacity
 - D. Total capacity
3. **Select the best answer. True or False:** Gross capacity is the weight value shown on a manufacturer’s load chart and the maximum amount of weight, per specific configuration, that the crane may lift prior to deductions.
 - A. True
 - B. False
4. **Select the best answer.** Which part of the OEM load chart would you use to determine maximum hook height, jib length and offset, boom radius angles, and clearances between the boom tip and hook block?
 - A. Notes Section
 - B. Range Diagram
 - C. Rated Lifting Capacities
 - D. Shaded Capacity Areas
 - E. Working Area Diagram
5. **Select the best answer.** Which part of the OEM load chart would you use to find information about working over the side, working over the rear, and working over the front?
 - A. Notes Section
 - B. Range Diagram
 - C. Rated Lifting Capacities
 - D. Shaded Capacity Areas
 - E. Working Area Diagram

- 6. Select all that apply.** Exceeding the crane's rated capacity may result in one or two consequences. They are—
- A.** Dead battery
 - B.** Flat outrigger
 - C.** Inadequate fleet angle
 - D.** Loss of stability
 - E.** Miss-spooling
 - F.** Structural failure
- 7. Select the best answer.** Which part of the OEM load chart would you use to find the values for deductions that may need to be made from the listed capacities, for example, the weight of the block or swing-away jib?
- A.** Notes Section
 - B.** Range Diagram
 - C.** Rated Capacities
 - D.** Work Area Diagram
- 8. Select all that apply.** Select the items that may limit the crane's lifting capacity (limiting factors).
- A.** Diesel generator horsepower
 - B.** Hook block capacity
 - C.** Hydraulic pressure
 - D.** Outrigger load capacity
 - E.** Wire rope line pull
- 9. Select the best answer.** Select the term that is defined as the measurement from the center of rotation of the crane to the center of the hook.
- A.** Boom length
 - B.** Capacity
 - C.** Radius
 - D.** Range
- 10. Select the best answer. True or False:** The capacity of the crane changes as it rotates through different quadrants of operation.
- A.** True
 - B.** False

Load Chart Review Summary

In this lesson, you explored the parts of a load chart including the notes section, rated capacity chart, range diagram, and working area diagram. You also looked at differences in gross and net capacity, various capacity limiting factors, and the consequences of overloading a crane.

Next, you will demonstrate your ability to correctly identify and resolve issues and problems related to the crane by addressing the conditions in the certification package.

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?

- **Parts of a Load Chart:**
 - Notes
 - Rated Capacity Chart
 - Range Diagram
 - Working Area Diagram
- **Gross vs. Net Capacity**
 - **Gross Capacity** = the values shown on the OEM's load capacity chart
 - **Net Capacity** = the OEM load capacity value minus all gear and equipment weight deductions
- **Consequences of Overloading Cranes:**
 - Stability
 - Structural Failure

Completion

Congratulations.

You have completed the Certifying Official Load Chart Review module.

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

CRANE CERTIFICATION PACKAGE EXERCISE

Welcome

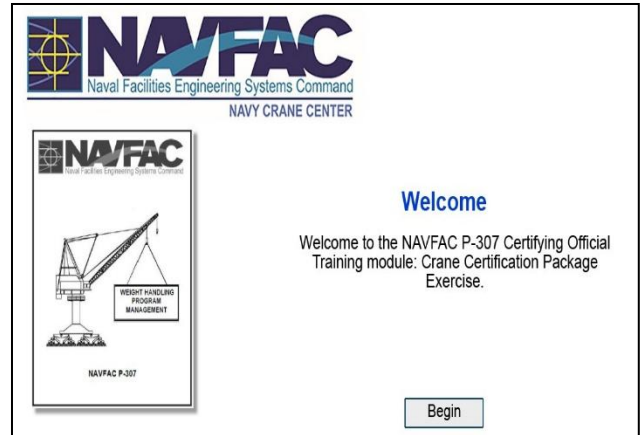
Welcome to the NAVFAC P-307 Certifying Official Training module: Crane Certification Package Exercise.

Learning Objectives

Upon successful completion of this module, you will have demonstrated your ability to correctly identify and resolve issues and problems related to the crane by addressing the conditions in the certification package.

Crane Certification Package Exercise Overview

This scenario involves a bridge crane. Whether your inventory contains bridge cranes, mobile cranes, or a mix of different categories and types of cranes is not important to this exercise. As the certifying official, your focus should be on reviewing these documents for accuracy and completeness by identifying and correcting any errors you may encounter. The errors contained in these documents are an amalgamation of some of the more common concerns found in the crane certification packages at many activities. You will hopefully find more errors in this exercise than in any of the actual certification package reviews you perform in the field. The idea is to allow you to experience as many concerns as possible here, so you will be better equipped to deal with concerns should you encounter them in the field.



Learning Objectives

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

- Apply your knowledge
- Perform a thorough certification package review
- Recognize problems with a certification package
- Identify adequate resolution for the identified problems

Crane Certification Package Exercise Overview

To get the best experience from this exercise follow these guidelines:

1. Read the scenario description on screen 2 of 3
2. Review the following documents in the order listed
 - A. Review the anomalous certification package for errors, omissions, and any other questionable items. Identify as many anomalies as possible. There are 27 recognized anomalies/teaching points. How would you correct these anomalies?
 - B. Review the anomaly discussion notes. Compare your findings to those identified. How did you do?
 - C. Review the corrected copy for suggested correction techniques
3. A copy of the anomalous bridge crane certification package is available in the student guide
4. Links to the anomalous certification package, anomaly discussion notes, and corrected certification package are provided on screen 3 of 3

Screen 1 of 3

To get the best experience from this exercise follow these guidelines:

- 1. Read the scenario description on screen 2 of 3.**
- 2. Review the following documents in the order listed:**
 - A.** Review the anomalous certification package for errors, omissions, and any other questionable items. Identify as many anomalies as possible. There are 27 recognized anomalies/teaching points. How would you correct these anomalies?
 - B.** Review the anomaly discussion notes. Compare your findings to those identified. How did you do?
 - C.** Review the Corrected Copy for suggested correction techniques.
- 3. A copy of the anomalous bridge crane certification package is available in the student guide.**
- 4. Links to the anomalous certification package, anomaly discussion notes, and corrected certification package are provided on screen 3 of 3.**

Crane Certification Package Exercise Scenario

You are the certifying official at Navy Shore Station Charlie. Crane personnel, including qualified electrical inspector H. Dee Dumtey, qualified mechanical inspector Lyle B. Bluegh, and qualified load test director John C. Laitlee, have completed their annual maintenance and certification service including inspection, repairs, adjustments, and tests for crane number 349 in building 1539.

Crane number 349 was initially certified for use in November 2014 and is in a quadrennial load test program. On 16 November 2018, the load test director submitted the bridge crane certification package for your review, approval, and signature. Included in this package are the AMISR, CCIR, and the Certification of Condition Inspection and Test form.

Crane number 349 is a Wallace-Grommet, 25,000-pound capacity, non-cab, pendant-controlled, AC, two-speed, dual girder, top running, single trolley, single hook, general purpose service bridge crane with a grooved hoist drum reeved with the original half inch wire rope. It is equipped with a load indicating device, primary and back-up upper limit switches, a lower limit switch, shoe-type electro-magnetic brakes, and a mechanical load brake. Automatic braking is provided in both travel modes.

Crane Certification Package Exercise Scenario

- You are the certifying official at Navy Shore Station Charlie.
- Crane personnel, including qualified electrical inspector H. Dee Dumtey, qualified mechanical inspector Lyle B. Bluegh, and qualified load test director John C. Laitlee, have completed their annual maintenance and certification service including inspection, repairs, adjustments, and tests for crane #349 in building 1539.
- Crane #349 was initially certified for use in November 2014 and is in a quadrennial load test program. On 16 November 2018, the load test director submitted the bridge crane certification package for your review, approval, and signature.
- Included in this package are the AMISR, CCIR, and the Certification of Condition Inspection and Test (CCIT).
- Crane #349 is a Wallace-Grommet, 25,000 lb. capacity, non-cab, pendant-controlled, AC, two-speed, dual girder, top running, single trolley, single hook, general purpose service bridge crane with a grooved hoist drum reeved with the original ½" wire rope. It is equipped with a load indicating device, primary and backup upper limit switches, a lower limit switch, shoe type electro-magnetic brakes, and a mechanical load brake. Automatic braking is provided in both travel modes.

Screen 2 of 3

Crane Certification Package Exercise Document Links

Listed here are links to the documents you will need to complete this exercise. Click on each link to view and/or print the document. As noted on screen, one of these instructions, review these documents in the order listed and one at a time.

Crane Certification Package Exercise Document Links

- Select the following links to view and/or print the identified documents.
 - [Anomalous Certification Package](#)
- to review and identify anomalies
 - [Anomaly Discussion Notes](#)
- to aid in understanding the anomalies
 - Each anomaly is highlighted with a yellow question mark with a footnote number in the top corner of the box.
 - On the following page of the PDF, footnotes correlating to each anomaly are listed with the discussion points.
- to show how the anomalies may be corrected
 - [Corrected Copy](#)

Screen 3 of 3

CRANE CERTIFICATION PACKAGE EXERCISE PART 1:

IDENTIFY ANOMALIES



Review the following Anomalous Certification Package for errors, omissions, and any other questionable items. Identify as many anomalies as possible. There are twenty-seven recognized anomalies [or teaching points]. Consider how you would react to each one.

CERTIFYING OFFICIAL STUDENT GUIDE

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>1</u> OF <u>13</u>							
Crane <u>#349</u>	Type <u>Bridge</u>	OEM <u>Wallace-Grommet</u>	Capacity <u>25,000 lbs</u>				
Prior Inspection DATE <u>11/22/2017</u>		Current Inspection DATE <u>11/14/2018</u>		Legend: Check under condition S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet) U = Unsatisfactory NA = Not Applicable			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
1	Structure (Bridge Girders, Trolley, Trucks, Equalizer Beams, Gantry, Boom, Jib, Pillar, etc.)	Inspect structural components for damage, distortion, or deterioration, and for evidence of loose or missing fasteners and cracked welds. Inspect truck equalizer pins for proper lubrication. Ensure there is no interference between crane and building during operation. Ensure drain holes are clear for outdoor cranes.		X			
2	Rails and Tracks, including top running trolley rail, top running "inverted angle" gantry crane rail, and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes. See NAVFACINST 11230.1.)	Inspect rails, tracks, splices, switches, hanger rod assemblies, and end stops for damage, deterioration, visible misalignment, and for evidence of loose or missing fasteners and cracked welds. Inspect for abnormal wear or other evidence of bridge or trolley misalignment. For rail systems used by multiple cranes, this rail inspection may be independent of the crane inspection, but shall be performed annually and be current at the time of the cranes' certification. Rail inspection is separate sign off on the Unsatisfactory Items page.		X			
3 ^a	Handrails, Walkways, Ladders, and Personnel Safety Guards	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds.		X			
4 ^a	Bumpers	Inspect for damage or deterioration, and for evidence of loose or missing fasteners.	<u>Trolley</u> <u>Bridge</u>	X X			
5	Jib Boom Bearings	Inspect rotate bearings for proper lubrication. Rotate boom and inspect for evidence of bearing damage, overheating, and abnormal wear.					X
6	Wheels and Axles; load bari/yoke and related components/assemblies; trolley/tractor/tractions wheels and related assemblies.	Inspect wheels for uneven wear, flat spots, chips, flange wear, or cracks, for evidence of loose or missing fasteners and bearing caps, and for proper lubrication. Inspect load bari/yoke and related components/assemblies for damage or uneven wear. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise. Components showing signs of damage or wear during the visual inspection shall be given a more detailed inspection including OEM provided measurements.	<u>Trolley</u> <u>Bridge</u>	X X			
7	Shafts and Couplings, including couplings integral to motor/speed reducer assemblies	Inspect for evidence of damage, misalignment, leaking seals, and loose keys, coupling bolts, and covers. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged components or bearings. Listen for abnormal noise. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.	<u>Trolley</u> <u>Bridge</u> <u>Hoist</u>	X X X			
	Shafts and Couplings (Hoist Drives)	Verify coupling/shaft alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations) and when connected components are replaced or moved. Coupling alignment verification data shall be included in the crane's history file. Connected equipment should be checked/corrected for soft foot at this time.					
8a	Gearing (Hoist, Rotate, Travel) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage. Inspect for evidence of bearing damage, overheating, and abnormal wear. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by overtensioned fasteners.	<u>Bridge</u>	X			

TRAINING ONLY
Bridge Crane Certification Package - Identify the Anomalies
Page 1 of 16

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>2</u> OF <u>13</u>							
Crane <u>#349</u>	Type <u>Bridge</u>	OEM <u>Wallace-Grommet</u>	Capacity <u>25,000 lbs.</u>				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8b	Gearing (Hoist, Rotate, Travel) Internal Gears, including clutches. (Not applicable to manual chain hoists).	Inspect gear case for proper lubricant level. Inspect for leaks, including visual inspection of seals/gaskets where possible, and for evidence of loose or missing fasteners. Inspect breathers for restrictions. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged internal components or bearings. Listen for abnormal noise.	<u>Trolley</u> <u>Bridge</u> <u>Hoist</u>	<u>X</u>		<u>X</u>	
	Hoist Gears (Not applicable to category 2 and 3 package hoist assemblies or manual chain hoists.)	Additionally, internal gearing for hoists shall be monitored by an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source and documented and retained in the equipment history file for the life of the component.					<u>X</u>
		As an alternative to oil or vibration analysis, internal gears shall be visually inspected for wear or damage and for evidence of misalignment. If all gears cannot be visually inspected through inspection ports or by video probe or similar inspection devices, gear cases shall be disassembled for visual inspection. If this alternative is selected, perform no later than every 12th annual inspection.					
8c	Gearing, Manual Chain Hoists	Inspect for evidence of worn, corroded, cracked, or distorted parts such as shafts, gears, bearings, pins, rollers, load sprockets, idler sprockets, or hand chain wheels. Manual chain hoists shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					<u>X</u>
9a	Mechanical Load Brakes - Powered Hoists	Inspect for proper lubricant level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise. For mechanical load brakes that cannot be tested independently (see appendix E), disassemble no later than every 12th annual inspection and inspect for damage and deterioration.		<u>X</u>			
9b	Mechanical Load Brakes - Manual Hoists	Inspect for evidence of worn, glazed, or oil contaminated friction discs; worn pawls, cams or ratchet; corroded, stretched, or broken pawl springs in brake mechanism. Manual hoist load brakes shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					<u>X</u>

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>3</u> OF <u>13</u>							
Crane <u>#349</u>	Type <u>Bridge</u>	OEM <u>Wallace-Grommet</u>	Capacity <u>25,000 lbs.</u>				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. Inspect master cylinders for proper hydraulic brake fluid level. Inspect lines for damage, leakage, and evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.				X	
12	Air Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings and discs for wear, de-bonding, and glazing, and drums or rotors for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of shoes and calipers. Inspect air lines for damage and evidence of loose connections. During operation, verify proper release and engagement, and stopping action in both directions of motion. Inspect air lines and air application valves for proper operation and air leaks. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.				X	
13a	Electric Magnetic Brake System (Shoe and Band Type Brakes including Thruster Brakes)	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect linings for wear, de-bonding, and glazing, and brake drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of brake shoes. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion and timing of release and engagement. Inspect for evidence of overheating or other evidence of incomplete brake release. For thruster brakes, check hydraulic thruster actuator reservoir for fluid level and leakage. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.	<u>Trolley</u> <u>Bridge</u> <u>Hoist</u>	X	X	X	

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. Inspect for loose fasteners. Inspect brakes for proper settings. Inspect wiring for damage or deterioration, and for evidence of loose connections. Disassemble, as required, to inspect for damaged brake discs, splines, or other components, for glazing, de-bonding, alignment of components, and for proper brake lining thickness. During operation, verify proper release, engagement, alignment of components, and stopping action in both directions of motion and timing of release and engagement. Listen for abnormal noise, and inspect for vibration and overheating. Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
13c	Electric Magnetic Brake System (Caliper Brakes on Wire Rope Drums)	Inspect system for damage, for evidence of binding, such as binding calipers, loose and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, glazing, and de-bonding. Inspect brake surfaces on drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of calipers. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, inspect for proper release and engagement and stopping action in both directions of motion and timing of release and engagement. For brakes with Belleville torque springs, record the number of cycles as shown on the brake cycle counter. Compare the total number of cycles applied to each brake actuator's Belleville springs to the allowable maximum number of cycles specified for that actuator and ensure none of the springs have exceeded the maximum value. Record Belleville spring cycle limit and number of cycles in the equipment history file. (For brakes without cycle counters, the activity shall conservatively estimate the brake usage and ensure the springs are replaced before their fatigue life is reached.) Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
14	Sheaves, Equalizer Bar	Inspect for abnormally worn or corrugated grooves, flat spots, abnormal play, and broken or cracked flanges. Inspect for evidence of loose or missing fasteners, keepers, and lubrication fittings. Gage the wire rope grooves of all sheaves using a worn sheave gauge (nominal rope diameter plus 2.5 percent). Expose and examine sections of equalizer sheaves and saddles in contact with wire rope and where corrosion may develop because of poor drainage. During operation, verify free movement of all sheaves, and inspect for abnormal play, overheating, and other evidence of bearing or component wear or damage. Inspect equalizer bar for damage or deteriorated components. Ensure free movement and that bar does not bottom out over range of hoist operation.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>5</u> OF <u>13</u>							
Crane #349	Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
15	Wire Rope Drum, Followers, and Machinery Foundations	Inspect drums for distortion, cracks, worn grooves, and for evidence of cracked welds and loose or missing fasteners. Inspect wire rope followers for proper adjustment and alignment. Inspect bearings for evidence of damage, overheating, or abnormal wear. Inspect machinery foundations for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. During operation, verify that at least two complete wraps of wire rope remain on drums in all operating conditions (or more if required by the crane OEM). Listen for abnormal noise. Inspect for vibration, overheating, and other evidence of misaligned, worn or damaged components or bearings. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.		X			
16	Wire Rope, Fastenings, and Terminal Hardware. See next page for wire rope rejection criteria	Thoroughly inspect entire length of wire rope. The depth and detail of the inspection shall be that necessary to ensure the entire rope is acceptable with special attention paid to areas of expected wear or damage, areas not normally visible to the operator during operation or pre-use check, and to rotation-resistant rope. During the inspection, pay the wire rope out as far as possible. For sections that cannot be spooled off the drum, visual inspection of the wire rope on the drum is sufficient. Remove wire rope dressing from selected areas subjected to significant wear, exposure, and abuse. Diameter measurements shall be performed at several places over the length of the rope. Record minimum dimension measured in the "Remarks" block. Expose and examine sections in contact with equalizer sheaves and saddles or where corrosion may develop because of poor drainage. Lubricate areas after inspection. Inspect sockets, swivels, trunnions, and connections for undue looseness, wear, cracks, corrosion, improper installation, or other damage, a special area to inspect is the base (lug or bail) to shank transition area for swaged sockets. Undue looseness in poured sockets is defined as looseness or evidence of slippage of wires in the securing material, evidence of deterioration of the securing material, looseness of wire rope strands or wires adjacent to the socket or any looseness resulting from cracks or other defects in the basket. Evidence of looseness between the securing material and the basket resulting solely from seating of the material in basket is acceptable. Drum end fittings need only be disconnected or disassembled when experience or visible indications deem it necessary.	1/2"	X			
17	Load Chains, Chain Guides, and Sprockets	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. Measure for increase in chain length. Record measurements or gage part/drawing number in the "Remarks" block. Ensure chain is not twisted and is properly oriented with link welds facing away from load sprockets unless otherwise specified by the OEM. During operation, listen for abnormal noise. Inspect for overheating and other evidence of worn or damaged components and bearings. Inspect chain guides, guide rollers, side plates and chain end connection for loose fasteners and for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, that mounting fasteners/connectors are present and not loose/damaged, and that container is in the correct location and orientation in accordance with OEM guidance.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>6</u> OF <u>13</u>							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
18	Hoist Blocks and Hooks (Including Hoist Mounting Hooks)	Inspect hoist blocks, cheek plates, swivels, trunnions, and lubrication fittings for damage or deterioration, cleanliness, freedom of movement, and for evidence of loose or missing fasteners. Inspect for loose, damaged, missing, or improperly sized retaining rings. Inspect hooks and mousing devices for damage. Inspect drip pans and gaskets for damage, proper clearance, and for evidence of loose or missing fasteners. Inspect for evidence of bearing damage, overheating, and abnormal wear. See appendix E for further inspection and test of hooks.		X			
19	Insulated Link	Inspect link surface for conductive contaminants such as graphite, grease, metallic particles, or rust streaks. Inspect for damage. See appendix E for further inspection and test of insulated links.					X
20	Air Operating System	Inspect motors, valves, filters, water separators, cylinders, lines, regulators, and gauges for missing parts, damage, and evidence of loose or missing fasteners. Inspect for proper lubrication. Verify proper operation and inspect system for leaks. If no filters, lubricators, or water separators are installed, request engineering evaluation of system.					X
21	Runway and Trolley Electrification (Collector Bar, Festoon, and Cable Track Systems)	Inspect system and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections (e.g., track joint assemblies, track hanger clamps, end clamps/stops, saddle assemblies, cable connectors, tow trolley). Inspect collector shoes, springs, and conductor bar surfaces for evidence of excessive wear and/or misalignment. Cleaning shoes should only be utilized when recommended by the collector bar OEM and in accordance with OEM recommendations; cleaning shoes should not be left installed after cleaning. Verify proper operation and that all moving parts operate freely without binding.	Trolley Bridge	X X			
21a	Crane Grounding	At every eighth annual inspection, for all cranes where the bridge or trolley frames are grounded through the bridge and trolley wheels and their respective rails, perform a resistance check to determine the reliability of the crane's ground in at least four areas of the trolley and/or runway (crane shall be in an unloaded condition). Resistances greater than five ohms require corrective action and/or activity engineering evaluation. Wheels and/or rails may require cleaning to reduce the resistance to less than five ohms. The resistance check shall be performed both between the load block and ground and between the pendant and ground. If there is no metallic pendant, but an external metallic strain relief cable/chain/mechanism, the check shall be between the strain relief cable/chain/mechanism and ground. If there is no metallic pendant or external strain relief cable/chain/mechanism, or no metallic pendant and the strain relief cable/chain/mechanism is non-conductive, the pendant to ground check may be omitted.					X
22	Cable Reels	Inspect reel assembly and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections. Inspect slip rings for damage, deterioration, indications of excessive wear, streaking or arcing/overheating, and proper contact. Verify proper operation.					X
23 ^o	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, water intrusion, loose components, and for evidence of loose connections. Verify operation of lights. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection.			X		

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>7</u> OF <u>13</u>							
Crane	Type	OEM	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
24	Control Panels, Relays, Coils, Transfer and Disconnect Switches (including main disconnect switch), Conductors and Electronic (Solid State) Drive Control Systems, Brake Sensor/Proximity Switches.	Inspect (without removing) contacts for proper alignment, pitting, and evidence of excess heating and arcing. Inspect transfer and disconnect switches, conductors, coils and contact leads, and shunts for insulation breakdown, missing hardware, and evidence of overheating. Inspect wiring for damage, deterioration, and evidence of loose connections. Inspect fuses for proper ratings and type (see note 1 regarding disassembly), and for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness, loose broken worn or missing parts, and proper operation. Inspect panel boards and arc shields for cracks, evidence of loose or missing fasteners, cleanliness, and moisture. Manually operate relays, switches, contactors, and interlocks and verify that all moving parts operate freely without binding or excessive play. Inspect enclosures for cleanliness or damage, and for evidence of loose or missing fasteners, support components, and gaskets. During operation, verify proper operation of panel indicating lights and contactor sequence. Verify proper setting and operation of brake sensor switch. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect the electronic (solid state) drive control systems wiring for damage or deterioration, and for evidence of loose connections. Visually inspect (without removing) components for evidence of damage or overheating. Verify that the drive is dry and free of dust, dirt, and debris. If applicable/possible, inspect condition of or replace drive backup batteries. Ensure disconnect switches are not blocked and are accessible to personnel in accordance with National Electric Code NFPA 70. At every eighth annual inspection, verify that the switch mechanism and/or handle on disconnects and safety switches cannot be moved to the energized or on position when locked in the de-energized or off position and that the handle properly indicates whether the switch is energized or de-energized.	Trolley Bridge Hoist				X X X
25	Controllers	Inspect cab and floor operated controllers for broken or loose springs, cracked or loose operating levers or push buttons, and pitted or burned contact points and segments. Inspect for broken segment dividers and insulators, proper contact pressure, excessive arcing, and worn or loose cams, pins, rollers, or chains, and for evidence of loose or missing fasteners. Inspect wiring, seals, boots, and guards for damage or deterioration, and for evidence of loose connections. Inspect pendant cable for proper securing hardware and ensure the strain relief cable fully supports pendant weight. Inspect for identifying label plates and direction indicators, and that crane and controller horizontal direction indicators match. Crane directional indicators may be located on the facility in lieu of the crane as long as the markings are visible to the operator from all operating locations. Inspect such parts as bearings, star wheels, and pawls for proper lubrication. During operation, verify proper sequencing of speed points and operation of indicating lights, and deadman switches. Verify proper spring return and neutral latching. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either this inspection or the CCIR/test. If performed at the CCIR/test, note this in Remarks.	Pendant	X			
26 ^a	Resistors and Transformers (outside of control panels)	Inspect resistors and transformers (outside of control panels), insulators, and brackets for damage, distortion, or deterioration, and for evidence of loose or missing fasteners or overheating. Inspect wiring and connections for damage or deterioration/corrosion, and for evidence of loose connections. Resistance measurements or other checks to verify proper performance should be accomplished if the condition is questionable or recommended by the activity engineering organization. The activity engineering organization may reduce the frequency of these inspections based on past findings. The reduced frequency shall be no less frequent than every 8th annual inspection.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>8</u> OF <u>13</u>							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
27	Electric Motors (Hoist, Rotate, Travel)	Inspect motors (including accessible internal areas such as commutators and brushes) and associated wiring for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect slip rings for damage and proper contact and commutators for evidence of destructive commutation. Inspect brushes for proper brush tension and length. Inspect insulation for deterioration and evidence of overheating. During operation, inspect for any abnormal vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect motor encoders (or other feedback devices) for proper condition and evidence of misalignment.	Trolley Bridge Hoist	X X X			
28	Eddy Current Brakes	Inspect for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, listen for any abnormal noise. Inspect for vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings.		X			
29	Limit and Bypass Switches	Remove covers and inspect electrical and mechanical components for damage or deterioration, and for evidence of loose connections. Inspect enclosures for evidence of moisture and arcing. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect drive and actuating components for damage, deterioration, and proper lubrication, and for evidence of loose connections. During operation, verify proper functioning of primary and secondary limit switches, indicator lights, settings, and bypass switches. Ensure proper functioning and setting of secondary hoist limit switches by using block to engage limit switch and ensure block does not two-block. This shall be performed and documented at least once during the life of the crane (or limit switch) and re-performed if the setting is affected or changed. Before performing, ensure switch is functioning properly electrically and station watch-stander to prevent damage. Check electrical function annually at this inspection, CCIR, or appendix E no-load test by using hand or other means to activate the switch. If proper operation of secondary upper limit switch and/or lower limit switch is performed at the CCIR or appendix E no-load test, note this in Remarks. Ensure proper functioning of slow-down limit switches.	Hoist	X			
30 ^o	Operator's Cab	Inspect for leaks, broken glass, deterioration, and cleanliness. Inspect louvers, doors, windows, windshield wipers, heaters, air conditioners, operator's chair, and communication equipment for proper operation.					N/A
31	Warning Devices, Operational Aids, General Safety Devices (Horns, Bells, Lights, etc.), Wind speed Indicator, Enabling switches.	Inspect components and associated wiring for damage or deterioration, and for evidence of loose connections. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection. During operation, verify proper functioning of devices. Verify proper functioning of wind speed indicator. Verify proper functioning of enabling switches.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>9</u> OF <u>13</u>							
Crane	Type	OEM	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
32	Load Warning Devices, Load Shutdown Devices	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is to warn or shutdown at the set weight minus 10 percent of the actual weight at the set point. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is to warn or shutdown at the set point plus 5 percent minus 10 percent of the actual weight at the set point. Do not test beyond 125 percent of rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36. Testing shall ensure the overload warning or shutdown works properly to warn or prevent an overload and does not engage at a nuisance low level. Testing values will depend on test weight availability and is not required to prove exact tolerances specified above.		X			
32a	Load Indicators	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is plus 10 percent minus 0 percent of actual weight. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is plus 10 percent minus 5 percent of the actual weight. Do not test beyond 125 percent of rated capacity.					N/A
33 ^σ	Capacity Signs and Load Ratings	Inspect capacity signs and brackets for damage or deterioration, and for evidence of loose or missing fasteners. Verify that load ratings are correct, are noted in pounds, and are posted in view of operator and riggers. In those instances where two or more hoists may be arranged on a single beam, such as an interlocking monorail system, verify that the capacity of the supporting beam is clearly marked to preclude an overload condition.		X			
34 ^σ	Fire Extinguishers	Ensure inspection is current.					X
35	Crane Davits	Inspect davit structure for proper operation and any signs of damage. Check davit rope for cuts, abnormal wear, heat damage, or discoloration. Check tackle for free movement and operation. Check hook and tackle attachments for signs of damage and corrosion.					X
36	Overload Clutches/Load Limiting Clutches for Air Hoists.	For air hoists that are not equipped with limit switches, follow OEM procedure if available; however, do not follow if OEM procedure requires overloading more than 125 percent of capacity. If no OEM procedure is available, operationally inspect overload clutch by running the stop or block into the upper hoist frame at slowest possible speed. While continuing to hoist, listen for a clutching noise. If no clutching noise is heard, contact the hoist OEM for further evaluation. If a test weight is used, do not test beyond 125 percent of rated capacity. Note that padding or dunnage may need to be temporarily installed between the top of the block and upper hoist frame to prevent minor damage. This item is for air hoists only (not manual or electric hoists). Due to the wide variation in overload clutch settings for various models and vintages of electric hoists, and the large amount of torque that can be produced by a motor in a locked rotor condition, testing of overload clutches for electric hoists shall not be performed.					X

[illegible]

TRAINING ONLY
Bridge Crane Certification Package - Identify the Anomalies
Page 10 of 16

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES UNSATISFACTORY ITEMS			
Crane #349			
NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SROWO NUMBER ISSUED FOR CORRECTIVE ACTION. SIGN AND DATE TO VERIFY THAT THE DEFICIENCY HAS BEEN CORRECTED OR ACCEPTED AS IS. IDENTIFY DEFERRED ITEMS BY ANNOTATING A "D" IN THE SROWO BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)			
Item No.	Deficiency	SROWO No.	Verification of Correction (Signature and Date)
13a	bridge brake spring length out of spec - 1/8" over maximum allowed dimension	0174.18	Lyle B. Bluegh, 11/15/18
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature): <i>H. Dee Dumtey</i>	Date: <i>11/15/18</i>
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Rail Inspection Completed In Accordance with Item 2 (Signature):	Date:	Rail Inspection Completed In Accordance with Item 2 (Signature):	Date:
Mechanic (Signature):	Date:	Electrician (Signature):	Date:

121 of 180

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES BRAKE DATA											
SHEET <u>12</u> OF <u>13</u>											
CRANE: <u>#349</u>											
NOTE TO INSPECTOR: Fill in applicable data as recommended by the brake and/or crane OEM. Record actual measurement inspected in "INSP" block. If adjustments are made, record adjusted setting in "ADJ" block. Otherwise indicate "NA". List repair document number and corrective action required under Remarks.											
BRAKE	TYPE	SPRING LENGTH/ TORQUE SETTING				AIR GAP/ PLUNGER STROKE				LINING THICKNESS	
		MIN	MAX	ACTUAL		MIN	MAX	ACTUAL		MIN	ACT
				INSP	ADJ			INSP	ADJ		
<i>Trolley</i>	<i>TM43</i>	<i>3"</i>	<i>3 1/2"</i>	<i>3 5/16"</i>	<i>3"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Bridge</i>	<i>TM83</i>	<i>4"</i>	<i>4 1/2"</i>	<i>4 5/8"</i>	<i>4"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Hoist</i>	<i>TM1355</i>	<i>5"</i>	<i>5 1/2"</i>	<i>5 1/16"</i>	<i>N/A</i>	<i>1/8"</i>	<i>3/8"</i>	<i>3/8"</i>	<i>1/16"</i>	<i>3/32"</i>	<i>3/8"</i>

[illegible]

TRAINING ONLY
Bridge Crane Certification Package - Identify the Anomalies
Page 13 of 16

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: <i>#349</i>	Type: <i>Bridge</i>	Location: <i>Bldg. 1539</i>	Operator's Name: <i>Rick L. Welch</i>		Operator's License No.: <i>C20549</i>	
Purpose of Inspection: <i>Annual Certification</i>		Legend: B = Before A = After D = During		Date Started: <i>11/16/18</i>	Date Completed: <i>11/16/18</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
6	Inspect motors for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
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.)	<i>S</i>			<i>HDD</i>	
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.)	<i>N/A</i>	<i>N/A</i>		<i>HDD</i>	
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
12	Inspect load chains and sprockets for condition and proper operation.	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>LBB</i>	
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	<i>S</i>			<i>HDD</i>	

TRAINING ONLY

Bridge Crane Certification Package - **Identify the Anomalies**

Page 14 of 16

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.	N/A			HDD
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.	S	S	S	HDD
17	Verify current inspection of fire protection equipment.	N/A			HDD
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)	N/A			HDD
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.	N/A	N/A	N/A	HDD
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.)	N/A	N/A	N/A	HDD
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.)	N/A	N/A		HDD
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.	S			LBB
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	HDD
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	N/A	N/A	N/A	HDD
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A		HDD
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A			HDD
27	Verify barge compartment (voids) cover bolts are installed.	N/A			HDD
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	HDD
29	Inspect rotate path assembly and center pin steadiment/support assembly for condition and proper operation.	N/A	N/A	N/A	HDD
30	Inspect slewing ring bearings for condition and proper operation.	N/A	N/A	N/A	HDD
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	N/A	N/A	N/A	HDD
Remarks:					
Inspector Signature/Date: <i>H. Dee Dumtey, 11/16/18</i>		Test Director Signature/Date: <i>John C. Laitlee, 11/16/18</i>			
Inspector Signature/Date:		Inspector Signature/Date:			

CERTIFICATION OF CONDITION INSPECTION AND TEST

Activity <i>Navy Shore Station Charlie</i>				Building/Location <i>Bldg: 1539</i>																																															
Crane No. <i>#349</i>	Type <i>Bridge</i>	OEM's Rated Capacity				Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")																																													
		Main	<i>25,000</i>	lbs.	<i>N/A</i>	feet	Main	<i>25,000</i>	lbs.	<i>N/A</i>	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 subparagraphs)																																														
					<i>1 1.1 1.2 1.3 1.4 1.4.1 1.4.2 1.4.3</i>																																														
					<i>1.4.4 1.4.5 1.6 1.6.1 1.6.2 1.6.4 1.7 1.7.1</i>																																														
					<i>6 6.1 6.1.1 a,b,c,d 6.1.2 6.1.3 6.2 6.2.1</i>																																														
					<i>6.2.1a 6.2.1d 6.2.1e 6.2.2 6.2.3</i>																																														
Category 1 Cranes* <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Boom Length</th> <th>Test Load %</th> <th colspan="2">Minimum Radius</th> <th colspan="2">Load Moment or Maximum Radius</th> </tr> <tr> <td></td> <td></td> <td>Pounds</td> <td>Feet</td> <td>Pounds</td> <td>Feet</td> </tr> <tr> <td>Hoist</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Main</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Whip</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Boom Length	Test Load %	Minimum Radius		Load Moment or Maximum Radius				Pounds	Feet	Pounds	Feet	Hoist						Main						Aux						Whip						Other					
Boom Length	Test Load %	Minimum Radius		Load Moment or Maximum Radius																																															
		Pounds	Feet	Pounds	Feet																																														
Hoist																																																			
Main																																																			
Aux																																																			
Whip																																																			
Other																																																			
Hook Tram Measurements <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Whip Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </table>											Base Meas.	Before Test	After Test	Main Hook				Aux Hook				Whip Hook				Other																									
	Base Meas.	Before Test	After Test																																																
Main Hook																																																			
Aux Hook																																																			
Whip Hook																																																			
Other																																																			
Category 2 Cranes <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Hoist</th> <th>Test Load %</th> <th>Pounds</th> <th colspan="3">Hook Tram Measurements</th> </tr> <tr> <th></th> <th></th> <th></th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main</td> <td><i>125</i></td> <td><i>38,212</i></td> <td><i>6"</i></td> <td><i>6"</i></td> <td><i>6"</i></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Hoist	Test Load %	Pounds	Hook Tram Measurements						Base Meas.	Before Test	After Test	Main	<i>125</i>	<i>38,212</i>	<i>6"</i>	<i>6"</i>	<i>6"</i>	Aux						Other																	
Hoist	Test Load %	Pounds	Hook Tram Measurements																																																
			Base Meas.	Before Test	After Test																																														
Main	<i>125</i>	<i>38,212</i>	<i>6"</i>	<i>6"</i>	<i>6"</i>																																														
Aux																																																			
Other																																																			
Category 3 Cranes <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Hoist</th> <th>Test Load %</th> <th>Pounds</th> <th colspan="3">Hook Tram Measurements</th> </tr> <tr> <th></th> <th></th> <th></th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Hoist	Test Load %	Pounds	Hook Tram Measurements						Base Meas.	Before Test	After Test	Main						Aux						Other																	
Hoist	Test Load %	Pounds	Hook Tram Measurements																																																
			Base Meas.	Before Test	After Test																																														
Main																																																			
Aux																																																			
Other																																																			
Annual Certifications Since Hook NDT <i>4</i>					Test Director (Signature) <i>John C. Laitlee</i> Date <i>11/16/2018</i> Inspector (Signature) <i>H. Dee Dumtey</i> Date <i>11/16/2018</i> Inspector (Signature) _____ Date _____ Certifying Official (Signature) _____ Date _____ Expiration Date _____																																														
Hook Material and Manufacturing Method <i>Forged Alloy Steel</i>																																																			
Remarks <i>25,000 x 1.25 = 31,250 x 1.05 = 38,212</i>																																																			

* 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

CRANE CERTIFICATION PACKAGE EXERCISE PART 2:

ANOMALY DISCUSSION NOTES



Review the following Anomaly Discussion Notes.
Compare your findings to those identified here.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES						SHEET <u>1</u> OF <u>13</u>	
Crane #349	Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs				
Prior Inspection DATE 11/22/2017		Current Inspection DATE 11/14/2018		Legend: Check under condition S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet) U = Unsatisfactory NA = Not Applicable			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
1	Structure (Bridge Girders, Trolley, Trucks, Equalizer Beams, Gantry, Boom, Jib, Pillar, etc.)	Inspect structural components for damage, distortion, or deterioration, and for evidence of loose or missing fasteners and cracked welds. Inspect truck equalizer pins for proper lubrication. Ensure there is no interference between crane and building during operation. Ensure drain holes are clear for outdoor cranes.		X			
2	Rails and Tracks, including top running trolley rail, top running "inverted angle" gantry crane rail, and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes. See NAVFACINST 11230.1.)	Inspect rails, tracks, splices, switches, hanger rod assemblies, and end stops for damage, deterioration, visible misalignment, and for evidence of loose or missing fasteners and cracked welds. Inspect for abnormal wear or other evidence of bridge or trolley misalignment. For rail systems used by multiple cranes, this rail inspection may be independent of the crane inspection, but shall be performed annually and be current at the time of the cranes' certification. Rail inspection is separate sign off on the Unsatisfactory Items page.		X			
3 ^σ	Handrails, Walkways, Ladders, and Personnel Safety Guards	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds.		X			
4 ^σ	Bumpers	Inspect for damage or deterioration, and for evidence of loose or missing fasteners.	Trolley Bridge	X X			
5	Jib Boom Bearings	Inspect rotate bearings for proper lubrication. Rotate boom and inspect for evidence of bearing damage, overheating, and abnormal wear.					X
6	Wheels and Axles; load bar/yoke and related components/assemblies; trolley/tractor/tractions wheels and related assemblies.	Inspect wheels for uneven wear, flat spots, chips, flange wear, or cracks, for evidence of loose or missing fasteners and bearing caps, and for proper lubrication. Inspect load bar/yoke and related components/assemblies for damage or uneven wear. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise. Components showing signs of damage or wear during the visual inspection shall be given a more detailed inspection including OEM provided measurements.	Trolley Bridge	X X			
7	Shafts and Couplings, including couplings integral to motor/speed reducer assemblies	Inspect for evidence of damage, misalignment, leaking seals, and loose keys, coupling bolts, and covers. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged components or bearings. Listen for abnormal noise. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.	Trolley Bridge Hoist	X X X			
	Shafts and Couplings (Hoist Drives)	Verify coupling/shaft alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations) and when connected components are replaced or moved. Coupling alignment verification data shall be included in the crane's history file. Connected equipment should be checked/corrected for soft foot at this time.					
8a	Gearing (Hoist, Rotate, Travel) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage. Inspect for evidence of bearing damage, overheating, and abnormal wear. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by overtensioned fasteners.	Bridge	X			

Anomaly Discussion: Page 1

Anomaly 1: AMISR item 7 paragraph 2 is unmarked. As the certifying official you should determine why it's unmarked before accepting this package. The second part of this item states that alignment checks are required at every eighth annual inspection. Which annual inspection is this? Are alignment checks required at this time?

Conclusion: According to the ANNUAL CERTIFICATIONS SINCE HOOK NDT block of the CCIT form, this is the fourth annual inspection, not the eighth; therefore, this item should have been N/A'ed. The inspector failed put an X in the N/A column. Have the inspector validate this condition and take corrective action as appropriate.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES					SHEET <u>2</u> OF <u>13</u>		
Crane <u>#349</u>	Type <u>Bridge</u>	OEM <u>Wallace-Grommet</u>	Capacity <u>25,000 lbs.</u>				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8b	Gearing (Hoist, Rotate, Travel) Internal Gears, including clutches. (Not applicable to manual chain hoists).	Inspect gear case for proper lubricant level. Inspect for leaks, including visual inspection of seals/gaskets where possible, and for evidence of loose or missing fasteners. Inspect breathers for restrictions. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged internal components or bearings. Listen for abnormal noise.	Trolley Bridge Hoist	X X	 X 	 ? 	1
	Hoist Gears (Not applicable to category 2 and 3 package hoist assemblies or manual chain hoists.)	Additionally, internal gearing for hoists shall be monitored by an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source and documented and retained in the equipment history file for the life of the component.					X
		As an alternative to oil or vibration analysis, internal gears shall be visually inspected for wear or damage and for evidence of misalignment. If all gears cannot be visually inspected through inspection ports or by video probe or similar inspection devices, gear cases shall be disassembled for visual inspection. If this alternative is selected, perform no later than every 12th annual inspection.				?	2
8c	Gearing, Manual Chain Hoists	Inspect for evidence of worn, corroded, cracked, or distorted parts such as shafts, gears, bearings, pins, rollers, load sprockets, idler sprockets, or hand chain wheels. Manual chain hoists shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					X
9a	Mechanical Load Brakes - Powered Hoists	Inspect for proper lubricant level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise. For mechanical load brakes that cannot be tested independently (see appendix E), disassemble no later than every 12th annual inspection and inspect for damage and deterioration.		X			
9b	Mechanical Load Brakes - Manual Hoists	Inspect for evidence of worn, glazed, or oil contaminated friction discs; worn pawls, cams or ratchet; corroded, stretched, or broken pawl springs in brake mechanism. Manual hoist load brakes shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.				?	3
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X

Anomaly Discussion: Page 2

Anomaly 1: The “Bridge” portion of AMISR item 8b paragraph 1 is marked UNSAT. However, there is no indication of any corrective action. As the certifying official you should determine what’s going on with this item. Is it really UNSAT? Was it corrected? Was it deferred? Is it listed on the UNSATISFACTORY ITEMS sheet? Is this a major deficiency? Can it be deferred? Is there any paperwork regarding the status of this item?

Conclusion: This item was corrected. This inspector failed to put an X in the CORRECTED column. Also, unsatisfactory items are supposed to be listed on the UNSATISFACTORY ITEMS SHEET with a brief, concise explanation of the condition observed. Have the inspector validate your concerns and take corrective actions as appropriate.

Anomaly 2: AMISR Item 8b paragraph 3 is unmarked. Why? This item is an alternative to the actions listed in item 8b paragraph 2. The N/A in the preceding paragraph indicates that this paragraph has been invoked. How often do the requirements of this paragraph need to be performed?

Conclusion: noted previously this is the fourth annual certification. This item requires action at every tenth annual inspection. Therefore, this item should have been N/A’ed. The inspector failed to put an X in the N/A column. Have the inspector validate this condition and take corrective action as appropriate.

Anomaly 3: Anomaly 4: AMISR Item 9b is unmarked and as the certifying official you should question this. Does this crane have a powered or manual hoist? What does item 9a indicate?

Conclusion: This crane uses a powered hoist...as indicated by the X in the SAT column on item 9a. If this is the case, then item 9b should be N/A’ed. The inspector failed to put an X in the N/A column. Have the inspector validate this condition and take corrective action as appropriate.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES						SHEET <u>3</u> OF <u>13</u>	
Crane <u>#349</u>		Type <u>Bridge</u>	OEM <u>Wallace-Grommet</u>	Capacity <u>25,000 lbs.</u>			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. Inspect master cylinders for proper hydraulic brake fluid level. Inspect lines for damage, leakage, and evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
12	Air Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings and discs for wear, de-bonding, and glazing, and drums or rotors for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of shoes and calipers. Inspect air lines for damage and evidence of loose connections. During operation, verify proper release and engagement, and stopping action in both directions of motion. Inspect air lines and air application valves for proper operation and air leaks. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
13a	Electric Magnetic Brake System (Shoe and Band Type Brakes including Thruster Brakes)	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect linings for wear, de-bonding, and glazing, and brake drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of brake shoes. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion and timing of release and engagement. Inspect for evidence of overheating or other evidence of incomplete brake release. For thruster brakes, check hydraulic thruster actuator reservoir for fluid level and leakage. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.	<i>Trolley</i> <i>Bridge</i> <i>Hoist</i>	X	X	X	1

Anomaly Discussion: Page 3

Anomaly 1: The bridge brake in AMISR item 13a is marked SAT. This appears to be okay. However, when you look at the BRAKE DATA sheet and the UNSATISFACTORY ITEMS sheet you see that this brake is out of specification and that SRO 0174-18 has been issued to resolve the condition. Based on this information, how would you expect this item to be marked?

Conclusion: The bridge brake for this item was found to be UNSAT. It was subsequently corrected. It should display X's in the UNSAT and the CORRECTED columns. The inspector appears to have marked the item incorrectly. Have the inspector validate these conditions and take the necessary corrective actions.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. Inspect for loose fasteners. Inspect brakes for proper settings. Inspect wiring for damage or deterioration, and for evidence of loose connections. Disassemble, as required, to inspect for damaged brake discs, splines, or other components, for glazing, de-bonding, alignment of components, and for proper brake lining thickness. During operation, verify proper release, engagement, alignment of components, and stopping action in both directions of motion and timing of release and engagement. Listen for abnormal noise, and inspect for vibration and overheating. Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.				X	
13c	Electric Magnetic Brake System (Caliper Brakes on Wire Rope Drums)	Inspect system for damage, for evidence of binding, such as binding calipers, loose and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, glazing, and de-bonding. Inspect brake surfaces on drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of calipers. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, inspect for proper release and engagement and stopping action in both directions of motion and timing of release and engagement. For brakes with Belleville torque springs, record the number of cycles as shown on the brake cycle counter. Compare the total number of cycles applied to each brake actuator's Belleville springs to the allowable maximum number of cycles specified for that actuator and ensure none of the springs have exceeded the maximum value. Record Belleville spring cycle limit and number of cycles in the equipment history file. (For brakes without cycle counters, the activity shall conservatively estimate the brake usage and ensure the springs are replaced before their fatigue life is reached.) Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.				X	
14	Sheaves, Equalizer Bar	Inspect for abnormally worn or corrugated grooves, flat spots, abnormal play, and broken or cracked flanges. Inspect for evidence of loose or missing fasteners, keepers, and lubrication fittings. Gage the wire rope grooves of all sheaves using a worn sheave gauge (nominal rope diameter plus 2.5 percent). Expose and examine sections of equalizer sheaves and saddles in contact with wire rope and where corrosion may develop because of poor drainage. During operation, verify free movement of all sheaves, and inspect for abnormal play, overheating, and other evidence of bearing or component wear or damage. Inspect equalizer bar for damage or deteriorated components. Ensure free movement and that bar does not bottom out over range of hoist operation.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
15	Wire Rope Drum, Followers, and Machinery Foundations	Inspect drums for distortion, cracks, worn grooves, and for evidence of cracked welds and loose or missing fasteners. Inspect wire rope followers for proper adjustment and alignment. Inspect bearings for evidence of damage, overheating, or abnormal wear. Inspect machinery foundations for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. During operation, verify that at least two complete wraps of wire rope remain on drums in all operating conditions (or more if required by the crane OEM). Listen for abnormal noise. Inspect for vibration, overheating, and other evidence of misaligned, worn or damaged components or bearings. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.		X			
16	Wire Rope, Fastenings, and Terminal Hardware. See next page for wire rope rejection criteria	Thoroughly inspect entire length of wire rope. The depth and detail of the inspection shall be that necessary to ensure the entire rope is acceptable with special attention paid to areas of expected wear or damage, areas not normally visible to the operator during operation or pre-use check, and to rotation-resistant rope. During the inspection, pay the wire rope out as far as possible. For sections that cannot be spooled off the drum, visual inspection of the wire rope on the drum is sufficient. Remove wire rope dressing from selected areas subjected to significant wear, exposure, and abuse. Diameter measurements shall be performed at several places over the length of the rope. Record minimum dimension measured in the "Remarks" block. Expose and examine sections in contact with equalizer sheaves and saddles or where corrosion may develop because of poor drainage. Lubricate areas after inspection. Inspect sockets, swivels, trunnions, and connections for undue looseness, wear, cracks, corrosion, improper installation, or other damage, a special area to inspect is the base (lug or bail) to shank transition area for swaged sockets. Undue looseness in poured sockets is defined as looseness or evidence of slippage of wires in the securing material, evidence of deterioration of the securing material, looseness of wire rope strands or wires adjacent to the socket or any looseness resulting from cracks or other defects in the basket. Evidence of looseness between the securing material and the basket resulting solely from seating of the material in basket is acceptable. Drum end fittings need only be disconnected or disassembled when experience or visible indications deem it necessary.	1/2" ?	X			
17	Load Chains, Chain Guides, and Sprockets	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. Measure for increase in chain length. Record measurements or gage part/drawing number in the "Remarks" block. Ensure chain is not twisted and is properly oriented with link welds facing away from load sprockets unless otherwise specified by the OEM. During operation, listen for abnormal noise. Inspect for overheating and other evidence of worn or damaged components and bearings. Inspect chain guides, guide rollers, side plates and chain end connection for loose fasteners and for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, that mounting fasteners/connectors are present and not loose/damaged, and that container is in the correct location and orientation in accordance with OEM guidance.		X		?	

Anomaly Discussion: Page 5

Anomaly 1: AMISR item 16 is marked SAT, which is okay. However, the wire rope measurement is recorded in the SYSTEM INSPECTED column. After reading the highlighted sentences in the middle of this specification, what would you expect, or in this case, not expect, to see?

Conclusion: The requirement states to "record minimum dimension measured in the remarks block." This measurement should not be recorded here. Have the inspector correct this mistake.

Additional considerations: There is only one fractional dimension listed and it appears to be a nominal dimension. Is this an actual measurement? Is this the average of several measurements? Is this the minimum or maximum measurement taken? Confirm with the inspectors. New wire rope may be slightly larger than its nominal diameter. This wire rope is 4 years old. Wire rope should be measured using a caliper and is normally recorded in thousandths of an inch or 64ths of an inch. If measuring in 64ths of an inch, it is understood that the using the lowest common denominator may result in a recording that displays a denominator other than 64, e.g., $36/64=9/16$; $32/64=1/2$; $30/64=15/32$; $24/64=3/8$. For an aid in determining the size of the wire rope, consult the Wire Rope Certification Sheet in the Equipment History File.

Anomaly 2: AMISR item 17 is marked SAT. The question is: Does this crane have load chains and sprockets? What other information is available to help resolve this matter? What does the scenario description indicate? What does item 8c indicate? What does item 16 indicate? What do the inspectors say?

Conclusion: This is a pendant controlled AC crane with electrically powered functions. The hoist utilizes wire rope, not load chains or sprockets. The inspector inadvertently put an X in the SAT column; this item should be NA'ed. Have the inspector validate this condition and take corrective action.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
SHEET <u>6</u> OF <u>13</u>							
Crane	Type	OEM	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
18	Hoist Blocks and Hooks (Including Hoist Mounting Hooks)	Inspect hoist blocks, cheek plates, swivels, trunnions, and lubrication fittings for damage or deterioration, cleanliness, freedom of movement, and for evidence of loose or missing fasteners. Inspect for loose, damaged, missing, or improperly sized retaining rings. Inspect hooks and mousing devices for damage. Inspect drip pans and gaskets for damage, proper clearance, and for evidence of loose or missing fasteners. Inspect for evidence of bearing damage, overheating, and abnormal wear. See appendix E for further inspection and test of hooks.		X			
19	Insulated Link	Inspect link surface for conductive contaminants such as graphite, grease, metallic particles, or rust streaks. Inspect for damage. See appendix E for further inspection and test of insulated links.					X
20	Air Operating System	Inspect motors, valves, filters, water separators, cylinders, lines, regulators, and gauges for missing parts, damage, and evidence of loose or missing fasteners. Inspect for proper lubrication. Verify proper operation and inspect system for leaks. If no filters, lubricators, or water separators are installed, request engineering evaluation of system.					X
21	Runway and Trolley Electrification (Collector Bar, Festoon, and Cable Track Systems)	Inspect system and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections (e.g., track joint assemblies, track hanger clamps, end clamps/stops, saddle assemblies, cable connectors, tow trolley). Inspect collector shoes, springs, and conductor bar surfaces for evidence of excessive wear and/or misalignment. Cleaning shoes should only be utilized when recommended by the collector bar OEM and in accordance with OEM recommendations; cleaning shoes should not be left installed after cleaning. Verify proper operation and that all moving parts operate freely without binding.	Trolley Bridge	X X			
21a	Crane Grounding	At every eighth annual inspection, for all cranes where the bridge or trolley frames are grounded through the bridge and trolley wheels and their respective rails, perform a resistance check to determine the reliability of the crane's ground in at least four areas of the trolley and/or runway (crane shall be in an unloaded condition). Resistances greater than five ohms require corrective action and/or activity engineering evaluation. Wheels and/or rails may require cleaning to reduce the resistance to less than five ohms. The resistance check shall be performed both between the load block and ground and between the pendant and ground. If there is no metallic pendant, but an external metallic strain relief cable/chain/mechanism, the check shall be between the strain relief cable/chain/mechanism and ground. If there is no metallic pendant or external strain relief cable/chain/mechanism, or no metallic pendant and the strain relief cable/chain/mechanism is non-conductive, the pendant to ground check may be omitted.					X
22	Cable Reels	Inspect reel assembly and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections. Inspect slip rings for damage, deterioration, indications of excessive wear, streaking or arcing/overheating, and proper contact. Verify proper operation.					X
23 ^a	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, water intrusion, loose components, and for evidence of loose connections. Verify operation of lights. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection.			X		

Anomaly Discussion: Page 6

Anomaly 1: AMISR item 23 is marked UNSAT; however, it is not marked as being corrected. If this item has been corrected, there should be an X in the CORRECTED column. As the certifying official you should determine the status of this item prior to certifying the package/crane. Additional concerns: Is this a major deficiency? Can it be deferred? Is there any supporting paperwork? Has this item been listed on the UNSATISFACTORY ITEMS SHEET?

Conclusion: This item was corrected. This inspector failed to mark the CORRECTED column. Unsatisfactory items are supposed to be listed on the UNSATISFACTORY ITEMS SHEET with a brief, concise explanation of the condition observed. Have the inspector validate these conditions and take corrective actions as appropriate.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES					SHEET <u>7</u> OF <u>13</u>		
Crane	Type	OEM	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
24	Control Panels, Relays, Coils, Transfer and Disconnect Switches (including main disconnect switch), Conductors and Electronic (Solid State) Drive Control Systems, Brake Sensor/Proximity Switches.	Inspect (without removing) contacts for proper alignment, pitting, and evidence of excess heating and arcing. Inspect transfer and disconnect switches, conductors, coils and contact leads, and shunts for insulation breakdown, missing hardware, and evidence of overheating. Inspect wiring for damage, deterioration, and evidence of loose connections. Inspect fuses for proper ratings and type (see note 1 regarding disassembly), and for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness, loose broken worn or missing parts, and proper operation. Inspect panel boards and arc shields for cracks, evidence of loose or missing fasteners, cleanliness, and moisture. Manually operate relays, switches, contactors, and interlocks and verify that all moving parts operate freely without binding or excessive play. Inspect enclosures for cleanliness or damage, and for evidence of loose or missing fasteners, support components, and gaskets. During operation, verify proper operation of panel indicating lights and contactor sequence. Verify proper setting and operation of brake sensor switch. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect the electronic (solid state) drive control systems wiring for damage or deterioration, and for evidence of loose connections. Visually inspect (without removing) components for evidence of damage or overheating. Verify that the drive is dry and free of dust, dirt, and debris. If applicable/possible, inspect condition of or replace drive backup batteries. Ensure disconnect switches are not blocked and are accessible to personnel in accordance with National Electric Code NFPA 70.	Trolley Bridge Hoist				X X X
		At every eighth annual inspection, verify that the switch mechanism and/or handle on disconnects and safety switches cannot be moved to the energized or on position when locked in the de-energized or off position and that the handle properly indicates whether the switch is energized or de-energized.					
25	Controllers	Inspect cab and floor operated controllers for broken or loose springs, cracked or loose operating levers or push buttons, and pitted or burned contact points and segments. Inspect for broken segment dividers and insulators, proper contact pressure, excessive arcing, and worn or loose cams, pins, rollers, or chains, and for evidence of loose or missing fasteners. Inspect wiring, seals, boots, and guards for damage or deterioration, and for evidence of loose connections. Inspect pendant cable for proper securing hardware and ensure the strain relief cable fully supports pendant weight. Inspect for identifying label plates and direction indicators, and that crane and controller horizontal direction indicators match. Crane directional indicators may be located on the facility in lieu of the crane as long as the markings are visible to the operator from all operating locations. Inspect such parts as bearings, star wheels, and pawls for proper lubrication. During operation, verify proper sequencing of speed points and operation of indicating lights, and deadman switches. Verify proper spring return and neutral latching. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either this inspection or the CCIR/test. If performed at the CCIR/test, note this in Remarks.	Pendant	X			
26 ^a	Resistors and Transformers (outside of control panels)	Inspect resistors and transformers (outside of control panels), insulators, and brackets for damage, distortion, or deterioration, and for evidence of loose or missing fasteners or overheating. Inspect wiring and connections for damage or deterioration/corrosion, and for evidence of loose connections. Resistance measurements or other checks to verify proper performance should be accomplished if the condition is questionable or recommended by the activity engineering organization. The activity engineering organization may reduce the frequency of these inspections based on past findings. The reduced frequency shall be no less frequent than every 6 th annual inspection.		X			

Anomaly Discussion: Page 7

Anomaly 1: AMISR item 24 (above the dotted line) is marked N/A for all functions. Does this crane have control panels, relays, coils and transfer/ disconnect switches? Of course it does. As the certifying official you should question why the inspector marked these N/A. Are these items SAT or UNSAT? If UNSAT, are they listed on the UNSATISFACTORY ITEMS SHEET? Is there any supporting documentation for any items that might be UNSAT?

Conclusion: These items were found to be SAT and should have been marked accordingly. The inspector failed to put X's in the SAT column. Have the inspector validate these conditions and take corrective actions as appropriate.

Anomaly 2: AMISR item 24 (below the dotted line) is unmarked. What is the frequency of this item? What is the current certification? Based on this, how would you expect this item to be marked?

Conclusion: This item requires verification at the eighth annual inspection. This is the fourth; therefore, this item should be N/A'ed. The inspector failed put an X in the N/A column for the second section. Have the inspector validate this concern and take corrective action as appropriate.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
27	Electric Motors (Hoist, Rotate, Travel)	Inspect motors (including accessible internal areas such as commutators and brushes) and associated wiring for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect slip rings for damage and proper contact and commutators for evidence of destructive commutation. Inspect brushes for proper brush tension and length. Inspect insulation for deterioration and evidence of overheating. During operation, inspect for any abnormal vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect motor encoders (or other feedback devices) for proper condition and evidence of misalignment.	Trolley Bridge Hoist	X X X			
28	Eddy Current Brakes	Inspect for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, listen for any abnormal noise. Inspect for vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings.		X			
29	Limit and Bypass Switches	Remove covers and inspect electrical and mechanical components for damage or deterioration, and for evidence of loose connections. Inspect enclosures for evidence of moisture and arcing. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect drive and actuating components for damage, deterioration, and proper lubrication, and for evidence of loose connections. During operation, verify proper functioning of primary and secondary limit switches, indicator lights, settings, and bypass switches. Ensure proper functioning and setting of secondary hoist limit switches by using block to engage limit switch and ensure block does not two-block. This shall be performed and documented at least once during the life of the crane (or limit switch) and re-performed if the setting is affected or changed. Before performing, ensure switch is functioning properly electrically and station watch-stander to prevent damage. Check electrical function annually at this inspection, CCIR, or appendix E no-load test by using hand or other means to activate the switch. If proper operation of secondary upper limit switch and/or lower limit switch is performed at the CCIR or appendix E no-load test, note this in Remarks. Ensure proper functioning of slow-down limit switches.	Hoist	X			
30 ^Q	Operator's Cab	Inspect for leaks, broken glass, deterioration, and cleanliness. Inspect louvers, doors, windows, windshield wipers, heaters, air conditioners, operator's chair, and communication equipment for proper operation.					 N/A
31	Warning Devices, Operational Aids, General Safety Devices (Horns, Bells, Lights, etc.), Wind speed Indicator, Enabling switches.	Inspect components and associated wiring for damage or deterioration, and for evidence of loose connections. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection. During operation, verify proper functioning of devices. Verify proper functioning of wind speed indicator. Verify proper functioning of enabling switches.		X			

Anomaly Discussion: Page 8

Anomaly 1: AMISR item 28 is marked SAT. Does this crane have eddy current brakes? Is there any evidence to indicate otherwise?

Conclusion: This item should be N/A'ed. The inspector mistakenly put an X in the SAT column. Have the inspector validate this condition and take corrective action.

Note: A crane will not have both a mechanical load brake and an eddy current brake. This package indicates, in several locations (the scenario description, AMISR item 9a, CCIT test paragraph 6.2.1d) that this crane has a mechanical load brake.

Anomaly 2: Item 30 is marked N/A. How does this notation differ from all the other notation marks made by the inspectors throughout this document? This is a non-cab, pendant controlled crane. The question is not whether there is a cab or not; the question is about the manner in which the item is marked. As the certifying official, you should consider continuity in the documentation process.

Conclusion: The inspector placed an actual N/A in the box. This is different from all the other markings, which are X's. There should be an X in the N/A column. Have the inspector correct this and inform him of your expectations.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES						SHEET <u>9</u> OF <u>13</u>	
Crane	Type	OEM	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
32	Load Warning Devices, Load Shutdown Devices	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is to warn or shutdown at the set weight minus 10 percent of the actual weight at the set point. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is to warn or shutdown at the set point plus 5 percent minus 10 percent of the actual weight at the set point. Do not test beyond 125 percent of rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36. Testing shall ensure the overload warning or shutdown works properly to warn or prevent an overload and does not engage at a nuisance low level. Testing values will depend on test weight availability and is not required to prove exact tolerances specified above.		X			
32a	Load Indicators	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is plus 10 percent minus 0 percent of actual weight. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is plus 10 percent minus 5 percent of the actual weight. Do not test beyond 125 percent of rated capacity.					N/A
33 ^a	Capacity Signs and Load Ratings	Inspect capacity signs and brackets for damage or deterioration, and for evidence of loose or missing fasteners. Verify that load ratings are correct, are noted in pounds, and are posted in view of operator and riggers. In those instances where two or more hoists may be arranged on a single beam, such as an interlocking monorail system, verify that the capacity of the supporting beam is clearly marked to preclude an overload condition.		X			
34 ^a	Fire Extinguishers	Ensure inspection is current.					X
35	Crane Davits	Inspect davit structure for proper operation and any signs of damage. Check davit rope for cuts, abnormal wear, heat damage, or discoloration. Check tackle for free movement and operation. Check hook and tackle attachments for signs of damage and corrosion.					X
36	Overload Clutches/Load Limiting Clutches for Air Hoists.	For air hoists that are not equipped with limit switches, follow OEM procedure if available; however, do not follow if OEM procedure requires overloading more than 125 percent of capacity. If no OEM procedure is available, operationally inspect overload clutch by running the stop or block into the upper hoist frame at slowest possible speed. While continuing to hoist, listen for a clutching noise. If no clutching noise is heard, contact the hoist OEM for further evaluation. If a test weight is used, do not test beyond 125 percent of rated capacity. Note that padding or dunnage may need to be temporarily installed between the top of the block and upper hoist frame to prevent minor damage. This item is for air hoists only (not manual or electric hoists). Due to the wide variation in overload clutch settings for various models and vintages of electric hoists, and the large amount of torque that can be produced by a motor in a locked rotor condition, testing of overload clutches for electric hoists shall not be performed.					X

CERTIFYING OFFICIAL STUDENT GUIDE

[illegible]

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussion
Page 10 of 17

Anomaly Discussion: Page 10

Anomaly 1: The AMISR REMARKS section does not contain any remarks. What AMISR items, if any, require entries to be made here? What about remarks explaining any corrections/changes made to the documentation in response to the concerns noted during your review?

Conclusion: Item 16 wire rope measurements should be listed here. Have the inspector validate this item and take corrective action as deemed appropriate.

Notes: If your activity were to require Item 14 sheave gauge readings to be recorded – they could be recorded here (or on the USATISFACTORY ITEMS sheet, as applicable). While any item may require further explanation in the REMARKS section, some items, such as 8b, 8c, 9a, 13b, 13c, 14, 21a, or 24 often need further clarification (to note analysis type, measurement results, or to specify the current annual inspection requirements); check local activity/ command requirements. Written remarks are also very helpful when explaining corrections/changes made to this documentation. In fact, it's good work practice. Additional lines or sheets may be added as needed.

CERTIFYING OFFICIAL STUDENT GUIDE

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD			
FOR CATEGORY 2 AND 3 CRANES			
UNSATISFACTORY ITEMS			
SHEET 11 OF 13			
Crane #349			
NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO/WO NUMBER ISSUED FOR CORRECTIVE ACTION. SIGN AND DATE TO VERIFY THAT THE DEFICIENCY HAS BEEN CORRECTED OR ACCEPTED AS IS. IDENTIFY DEFERRED ITEMS BY ANNOTATING A "D" IN THE SRO/WO BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)			
Item No.	Deficiency	SRO/WO No.	Verification of Correction (Signature and Date)
13a	bridge brake spring length out of spec - 1/8" over maximum allowed dimension	0174.18	Lyle B. Bluegh, 11/15/18
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature): H. Dee Dumtey	Date: 11/15/18
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Rail Inspection Completed In Accordance with Item 2 (Signature):	Date:	Rail Inspection Completed In Accordance with Item 2 (Signature):	Date:
Mechanic (Signature):	Date:	Electrician (Signature):	Date:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussion
Page 11 of 17

Anomaly Discussion: Page 11

Anomaly 1: The AMISR UNSATISFACTORY ITEMS sheet shows one entry. Should there be more? Have any other unsatisfactory items been identified either by you or the inspectors? What about items 8b and 23?

Conclusion: Items 8b paragraph 1 and 23 should be listed. Have the inspector validate these conditions and take corrective actions as deemed appropriate.

Notes: When listing items on the UNSATISFACTORY ITEMS sheet, a clear, concise description of the condition observed shall be noted (see Appendix D Note 4). Cite the applicable item, paragraph, system/component and the exact condition observed. As the certifying official, you would expect to see:

- Item 8b paragraph 1: bridge output shaft seal leaking
- Item 23: main hoist control panel pendant festoon wiring connector loose in panel opening

You would not want to see: seal defective (for item 8b) or loose fastener (for item 23).

Failure to properly identify and describe these conditions is a frequent evaluation finding.

Anomaly 2: AMISR SIGNATURES – Are all the necessary signatures present? Do the dates shown here agree with other dates in this package (CCIR, CCIT)? Are the inspectors properly qualified to perform these actions and make these sign-offs?

Conclusion: Two inspectors worked this AMISR – both should sign their respective signature blocks. Have the mechanical inspector validate his actions and sign the document.

Note: Mechanical and electrical inspectors are qualified [by the command/activity] to perform [and sign for] their respective tasks. General inspectors are qualified [by the command/activity] to perform both mechanical and electrical inspections and therefore, may inspect and sign for both types of work. Additional signature blocks may be added as needed.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES

BRAKE DATA

SHEET 12 OF 13

CRANE: #349

NOTE TO INSPECTOR: Fill in applicable data as recommended by the brake and/or crane OEM. Record actual measurement inspected in "INSP" block. If adjustments are made, record adjusted setting in "ADJ" block. Otherwise indicate "NA". List repair document number and corrective action required under Remarks.

BRAKE	TYPE	SPRING LENGTH/ TORQUE SETTING				AIR GAP/ PLUNGER STROKE				LINING THICKNESS	
		MIN	MAX	ACTUAL		MIN	MAX	ACTUAL		MIN	ACT
				INSP	ADJ			INSP	ADJ		
<i>Trolley</i>	<i>TM43</i>	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
<i>Bridge</i>	<i>TM83</i>	4"	4 1/2" ¹	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
<i>Hoist</i>	<i>TM1355</i>	5"	5 1/2"	5 1/16"	N/A	3/8"	3/8"	3/8"	1/16" ²	3/32"	3/8"

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussion

Page 12 of 17

Anomaly Discussion: Page 12

Anomaly 1: The BRAKE DATA sheet has two notable problems. Here, you see that the bridge brake (TM83) spring length was found to be 1/8" over the maximum allowed dimension of 4 1/2". How would you expect this condition to be resolved?

Conclusion: This is an out-of-spec condition; however, obtain further clarification from the inspector regarding your concerns. Even though SRO 0168-18 had been issued for within spec adjustments on the bridge brake, it does not apply in the case of an out-of-spec condition. Another SRO will be needed. SRO 0174-18 was written and referenced on the UNSATISFACTORY ITEMS sheet. This issue will also impact item 13a. Have the inspector validate this finding and take any corrective actions deemed appropriate.

Anomaly 2: The BRAKE DATA sheet has two notable problems. Here, in the case of the hoist brake (TM1355), it was inspected and found to have the maximum air gap. Because it was not "out-of-spec", SRO 0166-18 provides authorization to make the adjustment. However, it appears that the air gap was adjusted below the minimum allowable dimension of 1/8". Was this brake actually adjusted to below minimum specs? Why? Is there an SRO documenting this [now out-of-spec] condition?

Conclusion: This is a recording error (the inspector meant to write 1/8" instead of 1/16"). Have the inspector validate this finding and correct the documentation.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES

BRAKE DATA

SHEET **13** OF **13**

REMARKS:

SRO-0166-18 issued to adjust within-tolerance trolley brake (model TM43) spring length and air gap to minimum specifications, as needed.

SRO-0167-18 issued to adjust within-tolerance trolley brake (model TM1355) spring length and air gap to minimum specifications, as needed.

SRO-0168-18 issued to adjust within-tolerance trolley brake (model TM83) spring length and air gap to minimum specifications, as needed.



D-16

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussion

Page 13 of 17

Anomaly Discussion: Page 13

Anomaly 1: The BRAKE DATA REMARKS sheet, like the AMISR REMARKS sheet, allows for referencing documentation and/or providing explanations. Notice the last sentence in the NOTE TO INSPECTOR block, in the upper part of the BRAKE DATA sheet. It reads: “List repair document number and corrective action required under remarks.” The trolley and bridge brake spring lengths and air gaps were adjusted. The hoist brake air gap was adjusted. Do any of these actions require comments or documentation to be recorded here? You can see that the pre-maintenance SROs 166, 167 and 168 were issued to allow within spec adjustments and are listed here as required. Would you expect to see any other documentation or notes listed here? Perhaps SROs for the out-of-spec conditions of the bridge spring length and the apparent over correction of the hoist air gap setting?

Conclusion: The out-of-spec bridge brake spring length condition requires an SRO to document and resolve the condition. SRO 0174-18 (noted on the UNSATISFACTORY ITEMS sheet) should be listed in the REMARKS section. The out-of-spec adjustment to the hoist brake air gap is a recording error and should read 1/8” instead of 1/16”. An entry in the BRAKE DATA REMARKS section explaining this error and the subsequent correction would be appropriate. Have the inspector validate these findings and take corrective actions.

Wire Rope Rejection Criteria. Remove damaged portions (or replace entire length, if necessary) if any of the following are found:

1. Distortion of Rope Structure Including Kinked, Birdcaged, Doglegged, Flattened, or Crushed Sections. Kinked, birdcaged, doglegged, flattened, or crushed rope in straight runs where the core is missing or protrudes through or between strands, or where the rope does not fit properly in sheave or drum grooves. (This does not apply to runs around eyes, thimbles, shackles). Flattened or crushed sections where the diameter across the flat or crushed section is less than 5/6 of nominal diameter. (This does not apply to runs around eyes, thimbles, and shackles.)
2. Broken Wires.

Rope Type	Number of Visible Broken Wires Requiring Removal of Rope				
	Over Length of 6 × Nominal Rope Diameter		Over Length of 30 × Nominal Rope Diameter		At End Termination Plate (2)
	Within a Single Strand	Across All Strands	Across All Strands	Of the Valley Break Type (Note (1))	
Running rope					
60 strands, 19 class	3	6	12	2	2
60 strands, 19 class	4	8	16	2	2
60 strands, 16 class	5	10	20	2	2
60 strands, 16 class	6	12	24	2	2
Rotation-resistant Category 1	N/A	6	12	2	2
Rotation-resistant Category 2	N/A	2	4	2	2
Rotation-resistant Category 3	N/A	2	4	2	2
Standing rope					
All	1	3	1	1	2

NOTES:

- (1) If one valley break is detected, sections of rope 30 × nominal rope diameter in length on both sides of the detected valley break should be inspected over a bend for additional breaks.
- (2) Broken wires at end terminations may be eliminated by cutting and reattaching the end termination, if reducing the length is allowable.

3. Loss in Diameter. Reduction from nominal diameter of more than five percent.
4. High or Low Strand. High or low strand where the height or depth exceeds one-half the strand diameter.
5. Corrosion. Corrosion such that significant pitting occurs on the surfaces of outside wires and obvious signs of internal corrosion such as magnetic debris coming from the valleys. Minor surface roughness on outside wires is acceptable provided no significant pitting occurs and the rope is not corroded internally. Significant pitting is defined as pitting that cannot be removed by abrasive removal of less than 1/3 of the original diameter of individual outside wires.
6. Heat Damage. Evidence of heat damage from any cause.
7. Wavy Rope. Wavy rope (where the longitudinal axis of the wire rope takes the shape of a helix instead of a line) when the diameter of the envelope of the wave is greater than 110 percent of the diameter of the nominal diameter of the wire rope (133 percent in straight runs where the rope does not pass over sheaves or the drum). Use ISO 4309 as a guide.
8. Accumulation of Defects. An accumulation of defects that in the judgment of the inspector creates an unsafe condition.
9. Splices. Wire rope shall not contain splices.

Note: For those sections of wire rope with high strands, wavy or flattened rope, or sections with sheaves/drums that have minor corrugation, consideration should be given to increasing the inspection periodicity due to the possibility of increased wear and reeving/spooling issues. As the rope ages and nears the end of its useful life (an increase in broken wires or other deficiencies within acceptable limits), consideration should be given to increasing the inspection frequency. Additional guidance including visual examples and guidance on corrugation may be found in ASME B30.30 and ISO 4309. If synthetic rope is installed, follow OEM and B30.30 recommendations.

Anomaly Discussion: Page 14

Anomaly 1: Before moving on to the CCIR, is there anything else wrong with, or missing from, the AMISR? Hint: have you noticed that the AMISR page numbers appear in red? Have you wondered why? What “page” is missing?

Conclusion: The AMISR WIRE ROPE REJECTION CRITERIA sheet should be included in the AMISR package. This page will be page 6, just after the page that contains AMISR items 15 and 16 (wire rope inspections). This page is vital to proper inspection and evaluation of wire rope and must be included with the AMISR. When added, the page numbers will change and will have to be corrected. A note in the AMISR REMARKS section would be appropriate to explain the page number changes. Have the inspector validate these concerns and take corrective action.

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: <i>#349</i>	Type: <i>Bridge</i>	Location: <i>Bldg. 1539</i>	Operator's Name: <i>Rick L. Welch</i>		Operator's License No.: <i>C20549</i>	
Purpose of Inspection: <i>Annual Certification</i>		Legend: B = Before A = After D = During		Date Started: <i>11/16/18</i>	Date Completed: <i>11/16/18</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
6	Inspect motors for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
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.)	<i>S</i>			<i>HDD</i>	
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.)	<i>N/A</i>	<i>N/A</i>		<i>HDD</i>	
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
12	Inspect load chains and sprockets for condition and proper operation.	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>LBB</i>	
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	<i>S</i>			<i>HDD</i>	

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussion

Page 15 of 17

Anomaly Discussion: Page 15

Anomaly 1: CCIR item 8 is marked N/A. Is this a load test year? As the certifying official you should determine whether this action was performed during either the AMISR or CCIR. How is AMISR item 32 marked?

Conclusion: This is a load test year and AMSIR item 32 is marked SAT. These tests were performed during the AMISR inspection so it is okay that CCIR item 8 is marked N/A. If AMISR item 32 had been N/A'ed, CCIR item 8 would have to be marked with something other than N/A, i.e., SAT or UNSAT, as applicable.

Note: The purpose of this anomaly is to illustrate that this item requires close attention, especially during load test years, to ensure the necessary tests are performed, either with the AMISR or the CCIR. In this scenario, this is not an actual anomaly as it has been correctly performed and recorded.

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.	N/A			HDD
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.	S	S	S	HDD
17	Verify current inspection of fire protection equipment.	N/A			HDD
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)	N/A			HDD
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.	N/A	N/A	N/A	HDD
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.)	N/A	N/A	N/A	HDD
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.)	N/A	N/A		HDD
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.	S			LBB
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	HDD
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	N/A	N/A	N/A	HDD
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A		HDD
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A			HDD
27	Verify barge compartment (voids) cover bolts are installed.	N/A			HDD
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	HDD
29	Inspect rotate path assembly and center pin steadment/support assembly for condition and proper operation.	N/A	N/A	N/A	HDD
30	Inspect slewing ring bearings for condition and proper operation.	N/A	N/A	N/A	HDD
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	N/A	N/A	N/A	HDD
Remarks: 2					
Inspector Signature/Date: H. Dee Dumtey, 11/16/18		3 Test Director Signature/Date: John C. Laitlee, 11/16/18			
Inspector Signature/Date:		Inspector Signature/Date:			

Anomaly Discussion: Page 16

Anomaly 1: CCIR item 22 is marked SAT. Is this correct? Is this crane equipped with ratchets, pawls, and rotate locks?

Conclusion: This is a bridge crane; item 22 does not apply. The inspector marked the item SAT in error – it should have been marked N/A. Have the inspector validate this concern and take corrective action.

Anomaly 2: Would you expect to see any entries in the REMARKS section? Perhaps a note explaining the correction made to item 22? What about the requirements of the paragraph that follows P-307 appendix E, 6.2.1d Note 1g?

Conclusion: A note explaining changes to the documentation, such as item 22, would be beneficial. A comment stating how the holding brake was defeated during the mechanical load brake test is required. Have the inspector validate these concerns and take corrective action.

Anomaly 3: Are the SIGNATURE BLOCKS completed in a satisfactory manner? Do these dates agree with the other dates in the package? Have all necessary personnel signed? How many inspectors worked the CCIR?

Conclusion: The AMISR shows a single signature with a date of 11/15/2018; the CCIT shows two signatures with dates of 11/16/2018; the below dates appear satisfactory. Inspector LBB performed many of the inspections on the CCIR and should have signed below. Just like the AMISR and the CCIT, his signature is not present. Have inspector LBB validate your concerns, his actions, and make the necessary sign-offs.

Note: Additional signature blocks may be added as needed.

CERTIFICATION OF CONDITION INSPECTION AND TEST

Activity <i>Navy Shore Station Charlie</i>		Building/Location <i>Bldg. 1539</i>	
Crane No. _____	Type _____	OEM's Rated Capacity	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")
Document was last saved: Just now		Main <i>25,000</i> lbs. <i>N/A</i> feet	Main <i>25,000</i> lbs. <i>N/A</i> feet
		Aux _____ lbs. _____ feet	Aux _____ lbs. _____ feet
		Whip _____ lbs. _____ feet	Whip _____ lbs. _____ feet

☒ Annual Certification ☐ Interim Recertification (Reason _____)		Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs)	
☐ Quadrennial Load Test (check box when crane is in quadrennial program and is load tested.)		1 1.1 1.2 1.3 1.4 1.4.1 1.4.2 3 4.3 1	
Date of Previous Load Test _____		4 4.4 5 4.5 1.6 1.6.1 1.6.2 1.6.4 1.7 1.7.1	
Category 1 Cranes*		6 6.1 6.1.1 7 6.1.2 6.1.3 6.2 6.2.1	
Boom Length _____ Hoist _____ Main _____ Aux _____ Whip _____ Other _____	Test Load % _____ Minimum Radius _____ Load Moment or Maximum Radius _____	6.2.1a 6.2.1d 6.2.1e 6.2.2 6.2.3	
Hook Tram Measurements _____ Main Hook _____ Aux Hook _____ Whip Hook _____ Other _____		Base Meas. Before Test After Test	
Category 2 Cranes		Certification This is to certify that inspections and tests have been conducted in accordance with the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.	
Hoist _____ Main _____ Aux _____ Other _____	Test Load % _____ Pounds _____ Base Meas. Before Test After Test	Test Director (Signature) <i>John C. Laitlee</i> Date <i>11/16/2018</i> Inspector (Signature) <i>H. Dee Dumtre</i> Date <i>11/16/2018</i> Inspector (Signature) _____ Date _____ Certifying Official (Signature) _____ Date _____ Expiration Date _____	
Category 3 Cranes		9	
Annual Certifications Since Hook NDT <i>4</i> Hook Material and Manufacturing Method <i>Forged Alloy Steel</i>		Remarks <i>25,000 x 1.25 = 31,250 x 1.05 = 38,212</i>	

* 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

Anomaly Discussion: Page 17

Anomaly 1: The APPLICABLE TEST PARAGRAPHS section should list ALL applicable paragraphs covered during the test. Are all the correct paragraphs listed here? Are they listed correctly? Are there any that shouldn't be here? Review appendix E to confirm.

Conclusion:

- Delete 1.4.3, 1.4.4 and 1.4.5: they are not needed because this is the 4th certification and hook NDT is not required until the 6th, 8th, or 24th
- Add 1.4.6 to verify hook markings
- Add 1.6.3 to verify/test crane rails (top running bridge crane)
- 6.1.1a, b, c, and d need to be listed individually
- Add 6.2.1c to include the dynamic hoist test
- Add 6.2.1d Note 1e to identify the method for releasing the holding brake
- Have the LTD validate these items and take corrective actions as appropriate.

Anomaly 2: The QUADRENNIAL LOAD TEST box is not marked. Is this a load test year? Is this crane in the quadrennial load test program? Should this box be marked?

Conclusion: This is a load test year. This crane is in a quadrennial load test program (see scenario discussion). The load test director (LTD) should have placed an X in this box. Have the LTD validate this concern and correct the paperwork.

Anomaly 3: The POUNDS block shows 38,212 pounds. Is this correct? Is the math in the REMARKS section correct? Does the total weight include rigging gear?

Conclusion: This information is incorrect. A check of the math shows critical errors. The test weight should be a maximum of 125% of the crane's rated capacity. The actual test weight should be 31,250 pounds which is 125% of 25,000 lbs.

Have the LTD validate your findings, as well as the weights used to test the crane, and resolve these concerns accordingly.

Anomaly 4: Are the SIGNATURE BLOCKS satisfactory? Do these dates agree with the other dates in the package? Have all necessary personnel signed? How many inspectors worked the CCIR?

Conclusion: There have been two inspectors involved in this certification process. Only one has signed; the other should also sign. The AMISR shows a single signature with a date of 11/15/2018; the CCIR shows two signatures with dates of 11/16/2018; these dates appear to be satisfactory. Inspector LBB performed many of the inspections and should have signed the

CCIT. Just like the AMISR and the CCIR, his signature is not present. Have the LTD and inspector LBB validate your concerns, their actions, and make the necessary signoff.

Note: The correct order for completing these documents is: Have the LTD validate your findings, as well as the weights used to test the crane, and resolve these concerns accordingly.

Anomaly 5: $25,000 \times 1.25 = 31,250 \text{ lbs} \times 1.05 = 38,212$ is not the correct formula for determining the test load. The formula to determine the test load tolerance is

- $25,000 \times 1.25 \pm 5\%$, so the correct test load tolerances are...
- 29,687.5 lbs to 31,250 lbs
- 31,000 lbs of test weights plus 250 lbs of rigging gear = 125% of 25,000 lbs
- 31,250 lbs is the number that should appear in the POUNDS block for the main hoist.

CRANE CERTIFICATION PACKAGE EXERCISE PART 3:

CORRECTED ANOMALIES



Review the following Corrected Copy for suggested correction techniques.

CERTIFYING OFFICIAL STUDENT GUIDE

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Prior Inspection DATE 11/22/2017		Current Inspection DATE 11/14/2018		Legend: Check under condition S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet) U = Unsatisfactory NA = Not Applicable			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
1	Structure (Bridge Girders, Trolley, Trucks, Equalizer Beams, Gantry, Boom, Jib, Pillar, etc.)	Inspect structural components for damage, distortion, or deterioration, and for evidence of loose or missing fasteners and cracked welds. Inspect truck equalizer pins for proper lubrication. Ensure there is no interference between crane and building during operation. Ensure drain holes are clear for outdoor cranes.		X			
2	Rails and Tracks, including top running trolley rail, top running "inverted angle" gantry crane rail, and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes. See NAVFACINST 11230.1.)	Inspect rails, tracks, splices, switches, hanger rod assemblies, and end stops for damage, deterioration, visible misalignment, and for evidence of loose or missing fasteners and cracked welds. Inspect for abnormal wear or other evidence of bridge or trolley misalignment. For rail systems used by multiple cranes, this rail inspection may be independent of the crane inspection, but shall be performed annually and be current at the time of the cranes' certification. Rail inspection is separate sign off on the Unsatisfactory Items page.		X			
3 ^σ	Handrails, Walkways, Ladders, and Personnel Safety Guards	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds.		X			
4 ^σ	Bumpers	Inspect for damage or deterioration, and for evidence of loose or missing fasteners.	Trolley Bridge	X			
5	Jib Boom Bearings	Inspect rotate bearings for proper lubrication. Rotate boom and inspect for evidence of bearing damage, overheating, and abnormal wear.					X
6	Wheels and Axles; load bar/yoke and related components/assemblies; trolley/tractor/tractions wheels and related assemblies.	Inspect wheels for uneven wear, flat spots, chips, flange wear, or cracks, for evidence of loose or missing fasteners and bearing caps, and for proper lubrication. Inspect load bar/yoke and related components/assemblies for damage or uneven wear. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise. Components showing signs of damage or wear during the visual inspection shall be given a more detailed inspection including OEM provided measurements.	Trolley Bridge	X			
7	Shafts and Couplings, including couplings integral to motor/speed reducer assemblies	Inspect for evidence of damage, misalignment, leaking seals, and loose keys, coupling bolts, and covers. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged components or bearings. Listen for abnormal noise. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.	Trolley Bridge Hoist	X			
	Shafts and Couplings (Hoist Drives)	Verify coupling/shaft alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations) and when connected components are replaced or moved. Coupling alignment verification data shall be included in the crane's history file. Connected equipment should be checked/corrected for soft foot at this time.					X
8a	Gearing (Hoist, Rotate, Travel) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage. Inspect for evidence of bearing damage, overheating, and abnormal wear. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.	Bridge	X			

TRAINING ONLY
 Bridge Crane Certification Package - Anomalies Corrected
 Page 1 of 17

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES						HDD 11/16/18	
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8b	Gearing (Hoist, Rotate, Travel) Internal Gears, including clutches. (Not applicable to manual chain hoists).	Inspect gear case for proper lubricant level. Inspect for leaks, including visual inspection of seals/gaskets where possible, and for evidence of loose or missing fasteners. Inspect breathers for restrictions. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged internal components or bearings. Listen for abnormal noise.	Trolley Bridge Hoist	X X	 X	 X	
	Hoist Gears (Not applicable to category 2 and 3 package hoist assemblies or manual chain hoists.)	Additionally, internal gearing for hoists shall be monitored by an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source and documented and retained in the equipment history file for the life of the component.					X
		As an alternative to oil or vibration analysis, internal gears shall be visually inspected for wear or damage and for evidence of misalignment. If all gears cannot be visually inspected through inspection ports or by video probe or similar inspection devices, gear cases shall be disassembled for visual inspection. If this alternative is selected, perform no later than every 12th annual inspection.					X
8c	Gearing, Manual Chain Hoists	Inspect for evidence of worn, corroded, cracked, or distorted parts such as shafts, gears, bearings, pins, rollers, load sprockets, idler sprockets, or hand chain wheels. Manual chain hoists shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					X
9a	Mechanical Load Brakes - Powered Hoists	Inspect for proper lubricant level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise. For mechanical load brakes that cannot be tested independently (see appendix E), disassemble no later than every 12th annual inspection and inspect for damage and deterioration.		X			
9b	Mechanical Load Brakes - Manual Hoists	Inspect for evidence of worn, glazed, or oil contaminated friction discs; worn pawls, cams or ratchet; corroded, stretched, or broken pawl springs in brake mechanism. Manual hoist load brakes shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					X
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X

TRAINING ONLY
 Bridge Crane Certification Package – **Anomalies Corrected**
 Page 3 of 16

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. Inspect master cylinders for proper hydraulic brake fluid level. Inspect lines for damage, leakage, and evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
12	Air Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings and discs for wear, de-bonding, and glazing, and drums or rotors for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of shoes and calipers. Inspect air lines for damage and evidence of loose connections. During operation, verify proper release and engagement, and stopping action in both directions of motion. Inspect air lines and air application valves for proper operation and air leaks. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
13a	Electric Magnetic Brake System (Shoe and Band Type Brakes including Thruster Brakes)	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect linings for wear, de-bonding, and glazing, and brake drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of brake shoes. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, verify proper release, engagement, and stopping action in both directions of motion and timing of release and engagement. Inspect for evidence of overheating or other evidence of incomplete brake release. For thruster brakes, check hydraulic thruster actuator reservoir for fluid level and leakage. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.	Trolley Bridge Hoist	X X X	X X X	X X X	

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. Inspect for loose fasteners. Inspect brakes for proper settings. Inspect wiring for damage or deterioration, and for evidence of loose connections. Disassemble, as required, to inspect for damaged brake discs, splines, or other components, for glazing, de-bonding, alignment of components, and for proper brake lining thickness. During operation, verify proper release, engagement, alignment of components, and stopping action in both directions of motion and timing of release and engagement. Listen for abnormal noise, and inspect for vibration and overheating. Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
13c	Electric Magnetic Brake System (Caliper Brakes on Wire Rope Drums)	Inspect system for damage, for evidence of binding, such as binding calipers, loose and worn components, and for proper lubrication. Inspect for loose fasteners. Disassemble as required to inspect brake linings for wear, glazing, and de-bonding. Inspect brake surfaces on drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and alignment of calipers. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, inspect for proper release and engagement and stopping action in both directions of motion and timing of release and engagement. For brakes with Belleville torque springs, record the number of cycles as shown on the brake cycle counter. Compare the total number of cycles applied to each brake actuator's Belleville springs to the allowable maximum number of cycles specified for that actuator and ensure none of the springs have exceeded the maximum value. Record Belleville spring cycle limit and number of cycles in the equipment history file. (For brakes without cycle counters, the activity shall conservatively estimate the brake usage and ensure the springs are replaced before their fatigue life is reached.) Note: For hoists without mechanical load brakes or self-locking worm gears and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for holding brakes and travel and rotate brakes, disassemble at every eighth annual inspection.					X
14	Sheaves, Equalizer Bar	Inspect for abnormally worn or corrugated grooves, flat spots, abnormal play, and broken or cracked flanges. Inspect for evidence of loose or missing fasteners, keepers, and lubrication fittings. Gage the wire rope grooves of all sheaves using a worn sheave gauge (nominal rope diameter plus 2.5 percent). Expose and examine sections of equalizer sheaves and saddles in contact with wire rope and where corrosion may develop because of poor drainage. During operation, verify free movement of all sheaves, and inspect for abnormal play, overheating, and other evidence of bearing or component wear or damage. Inspect equalizer bar for damage or deteriorated components. Ensure free movement and that bar does not bottom out over range of hoist operation.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.	SHEET 5 OF 13-14		
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
15	Wire Rope Drum, Followers, and Machinery Foundations	Inspect drums for distortion, cracks, worn grooves, and for evidence of cracked welds and loose or missing fasteners. Inspect wire rope followers for proper adjustment and alignment. Inspect bearings for evidence of damage, overheating, or abnormal wear. Inspect machinery foundations for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. During operation, verify that at least two complete wraps of wire rope remain on drums in all operating conditions (or more if required by the crane OEM). Listen for abnormal noise. Inspect for vibration, overheating, and other evidence of misaligned, worn or damaged components or bearings. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.		X			
16	Wire Rope, Fastenings, and Terminal Hardware. See next page for wire rope rejection criteria	Thoroughly inspect entire length of wire rope. The depth and detail of the inspection shall be that necessary to ensure the entire rope is acceptable with special attention paid to areas of expected wear or damage, areas not normally visible to the operator during operation or pre-use check, and to rotation-resistant rope. During the inspection, pay the wire rope out as far as possible. For sections that cannot be spooled off the drum, visual inspection of the wire rope on the drum is sufficient. Remove wire rope dressing from selected areas subjected to significant wear, exposure, and abuse. Diameter measurements shall be performed at several places over the length of the rope. Record minimum dimension measured in the "Remarks" block. Expose and examine sections in contact with equalizer sheaves and saddles or where corrosion may develop because of poor drainage. Lubricate areas after inspection. Inspect sockets, swivels, trunnions, and connections for undue looseness, wear, cracks, corrosion, improper installation, or other damage, a special area to inspect is the base (lug or bail) to shank transition area for swaged sockets. Undue looseness in poured sockets is defined as looseness or evidence of slippage of wires in the securing material, evidence of deterioration of the securing material, looseness of wire rope strands or wires adjacent to the socket or any looseness resulting from cracks or other defects in the basket. Evidence of looseness between the securing material and the basket resulting solely from seating of the material in basket is acceptable. Drum end fittings need only be disconnected or disassembled when experience or visible indications deem it necessary.		X			
17	Load Chains, Chain Guides, and Sprockets	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. Measure for increase in chain length. Record measurements or gage part/drawing number in the "Remarks" block. Ensure chain is not twisted and is properly oriented with link welds facing away from load sprockets unless otherwise specified by the OEM. During operation, listen for abnormal noise. Inspect for overheating and other evidence of worn or damaged components and bearings. Inspect chain guides, guide rollers, side plates and chain end connection for loose fasteners and for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, that mounting fasteners/connectors are present and not loose/damaged, and that container is in the correct location and orientation in accordance with OEM guidance.			X		X

Wire Rope Rejection Criteria. Remove damaged portions (or replace entire length, if necessary) if any of the following are found:

1. Distortion of Rope Structure Including Kinked, Birdcaged, Doglegged, Flattened, or Crushed Sections. Kinked, birdcaged, doglegged, flattened, or crushed rope in straight runs where the core is missing or protrudes through or between strands, or where the rope does not fit properly in sheave or drum grooves. (This does not apply to runs around eyes, thimbles, shackles). Flattened or crushed sections where the diameter across the flat or crushed section is less than 5/6 of nominal diameter. (This does not apply to runs around eyes, thimbles, and shackles.)

2. Broken Wires.

Rope Type	Number of Visible Broken Wires Requiring Removal of Rope				
	Over Length of 6 × Nominal Rope Diameter		Over Length of 30 × Nominal Rope Diameter		
	Within a Single Strand	Across All Strands	Across All Strands	Of the Valley Break Type [Note (1)]	At End Termination [Note (2)]
Running rope					
56 strands, 19 class	3	6	12	2	2
56 strands, 19 class	4	8	16	2	2
56 strands, 36 class	5	10	20	2	2
56 strands, 36 class	6	12	24	2	2
Rotation-resistant Category 1	3/A	6	12	2	2
Rotation-resistant Category 2	3/A	2	4	2	2
Rotation-resistant Category 3	3/A	2	4	2	2
Standing rope					
All	—	3	—	—	2

NOTES:

(1) If one valley break is detected, sections of rope 30 × nominal rope diameter in length on both sides of the detected valley break should be inspected over a bend for additional breaks.

(2) Broken wires at end terminations may be eliminated by cutting and reattaching the end terminations, if reducing the length is allowable.

3. Loss in Diameter. Reduction from nominal diameter of more than five percent.

4. High or Low Strand. High or low strand where the height or depth exceeds one-half the strand diameter.

5. Corrosion. Corrosion such that significant pitting occurs on the surfaces of outside wires and obvious signs of internal corrosion such as magnetic debris coming from the valleys. Minor surface roughness on outside wires is acceptable provided no significant pitting occurs and the rope is not corroded internally. Significant pitting is defined as pitting that cannot be removed by abrasive removal of less than 1/3 of the original diameter of individual outside wires.

6. Heat Damage. Evidence of heat damage from any cause.

7. Wavy Rope. Wavy rope (where the longitudinal axis of the wire rope takes the shape of a helix instead of a line) when the diameter of the envelope of the wave is greater than 110 percent of the diameter of the nominal diameter of the wire rope (133 percent in straight runs where the rope does not pass over sheaves or the drum). Use ISO 4309 as a guide.

8. Accumulation of Defects. An accumulation of defects that in the judgment of the inspector creates an unsafe condition.

9. Splices. Wire rope shall not contain splices.

Note: For those sections of wire rope with high strands, wavy or flattened rope, or sections with sheaves/drums that have minor corrugation, consideration should be given to increasing the inspection periodicity due to the possibility of increased wear and reeving/spooling issues. As the rope ages and nears the end of its useful life (an increase in broken wires or other deficiencies within acceptable limits), consideration should be given to increasing the inspection frequency. Additional guidance including visual examples and guidance on corrugation may be found in ASME B30.30 and ISO 4309. If synthetic rope is installed, follow OEM and B30.30 recommendations.

TRAINING ONLY

Bridge Crane Certification Package - Anomalies Corrected

Page 6 of 17

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
18	Hoist Blocks and Hooks (Including Hoist Mounting Hooks)	Inspect hoist blocks, cheek plates, swivels, trunnions, and lubrication fittings for damage or deterioration, cleanliness, freedom of movement, and for evidence of loose or missing fasteners. Inspect for loose, damaged, missing, or improperly sized retaining rings. Inspect hooks and mousing devices for damage. Inspect drip pans and gaskets for damage, proper clearance, and for evidence of loose or missing fasteners. Inspect for evidence of bearing damage, overheating, and abnormal wear. See appendix E for further inspection and test of hooks.		X			
19	Insulated Link	Inspect link surface for conductive contaminants such as graphite, grease, metallic particles, or rust streaks. Inspect for damage. See appendix E for further inspection and test of insulated links.					X
20	Air Operating System	Inspect motors, valves, filters, water separators, cylinders, lines, regulators, and gauges for missing parts, damage, and evidence of loose or missing fasteners. Inspect for proper lubrication. Verify proper operation and inspect system for leaks. If no filters, lubricators, or water separators are installed, request engineering evaluation of system.					X
21	Runway and Trolley Electrification (Collector Bar, Festoon, and Cable Track Systems)	Inspect system and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections (e.g., track joint assemblies, track hanger clamps, end clamps/stops, saddle assemblies, cable connectors, tow trolley). Inspect collector shoes, springs, and conductor bar surfaces for evidence of excessive wear and/or misalignment. Cleaning shoes should only be utilized when recommended by the collector bar OEM and in accordance with OEM recommendations; cleaning shoes should not be left installed after cleaning. Verify proper operation and that all moving parts operate freely without binding.	Trolley Bridge	X X			
21a	Crane Grounding	At every eighth annual inspection, for all cranes where the bridge or trolley frames are grounded through the bridge and trolley wheels and their respective rails, perform a resistance check to determine the reliability of the crane's ground in at least four areas of the trolley and/or runway (crane shall be in an unloaded condition). Resistances greater than five ohms require corrective action and/or activity engineering evaluation. Wheels and/or rails may require cleaning to reduce the resistance to less than five ohms. The resistance check shall be performed both between the load block and ground and between the pendant and ground. If there is no metallic pendant, but an external metallic strain relief cable/chain/mechanism, the check shall be between the strain relief cable/chain/mechanism and ground. If there is no metallic pendant or external strain relief cable/chain/mechanism, or no metallic pendant and the strain relief cable/chain/mechanism is non-conductive, the pendant to ground check may be omitted.					X
22	Cable Reels	Inspect reel assembly and associated wiring for damage or deterioration, and for evidence of loose fasteners or connections. Inspect slip rings for damage, deterioration, indications of excessive wear, streaking or arcing/overheating, and proper contact. Verify proper operation.					X
23 ^a	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, water intrusion, loose components, and for evidence of loose connections. Verify operation of lights. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection.			X	X	

TRAINING ONLY
 Bridge Crane Certification Package - Anomalies Corrected
 Page 7 of 17

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane #349		Type Bridge	OEM Wallace-Grommet	Capacity 25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
24	Control Panels, Relays, Coils, Transfer and Disconnect Switches (including main disconnect switch), Conductors and Electronic (Solid State) Drive Control Systems, Brake Sensor/Proximity Switches.	Inspect (without removing) contacts for proper alignment, pitting, and evidence of excess heating and arcing. Inspect transfer and disconnect switches, conductors, coils and contact leads, and shunts for insulation breakdown, missing hardware, and evidence of overheating. Inspect wiring for damage, deterioration, and evidence of loose connections. Inspect fuses for proper ratings and type (see note 1 regarding disassembly), and for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness, loose broken worn or missing parts, and proper operation. Inspect panel boards and arc shields for cracks, evidence of loose or missing fasteners, cleanliness, and moisture. Manually operate relays, switches, contactors, and interlocks and verify that all moving parts operate freely without binding or excessive play. Inspect enclosures for cleanliness or damage, and for evidence of loose or missing fasteners, support components, and gaskets. During operation, verify proper operation of panel indicating lights and contactor sequence. Verify proper setting and operation of brake sensor switch. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect the electronic (solid state) drive control systems wiring for damage or deterioration, and for evidence of loose connections. Visually inspect (without removing) components for evidence of damage or overheating. Verify that the drive is dry and free of dust, dirt, and debris. If applicable/possible, inspect condition of or replace drive backup batteries. Ensure disconnect switches are not blocked and are accessible to personnel in accordance with National Electric Code NFPA 70. At every eighth annual inspection, verify that the switch mechanism and/or handle on disconnects and safety switches cannot be moved to the energized or on position when locked in the de-energized or off position and that the handle properly indicates whether the switch is energized or de-energized.	Trolley Bridge Hoist	X			ADD 11/18/18 X ADD 11/18/18 X ADD 11/18/18 X
							X
25	Controllers	Inspect cab and floor operated controllers for broken or loose springs, cracked or loose operating levers or push buttons, and pitted or burned contact points and segments. Inspect for broken segment dividers and insulators, proper contact pressure, excessive arcing, and worn or loose cams, pins, rollers, or chains, and for evidence of loose or missing fasteners. Inspect wiring, seals, boots, and guards for damage or deterioration, and for evidence of loose connections. Inspect pendant cable for proper securing hardware and ensure the strain relief cable fully supports pendant weight. Inspect for identifying label plates and direction indicators, and that crane and controller horizontal direction indicators match. Crane directional indicators may be located on the facility in lieu of the crane as long as the markings are visible to the operator from all operating locations. Inspect such parts as bearings, star wheels, and pawls for proper lubrication. During operation, verify proper sequencing of speed points and operation of indicating lights, and deadman switches. Verify proper spring return and neutral latching. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either this inspection or the CCIR/test. If performed at the CCIR/test, note this in Remarks.	Pendant	X			
26 ^e	Resistors and Transformers (outside of control panels)	Inspect resistors and transformers (outside of control panels), insulators, and brackets for damage, distortion, or deterioration, and for evidence of loose or missing fasteners or overheating. Inspect wiring and connections for damage or deterioration/corrosion, and for evidence of loose connections. Resistance measurements or other checks to verify proper performance should be accomplished if the condition is questionable or recommended by the activity engineering organization. The activity engineering organization may reduce the frequency of these inspections based on past findings. The reduced frequency shall be no less frequent than every 8th annual inspection.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
27	Electric Motors (Hoist, Rotate, Travel)	Inspect motors (including accessible internal areas such as commutators and brushes) and associated wiring for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect slip rings for damage and proper contact and commutators for evidence of destructive commutation. Inspect brushes for proper brush tension and length. Inspect insulation for deterioration and evidence of overheating. During operation, inspect for any abnormal vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings. Verify proper operation of environmental controls (e.g., strip heaters, cooling fans). Inspect motor encoders (or other feedback devices) for proper condition and evidence of misalignment.	Trolley Bridge Hoist	X X X			
28	Eddy Current Brakes	Inspect for cleanliness, damage, or deterioration, and for evidence of loose connections. Inspect for proper lubrication. Inspect wiring for damage or deterioration, and for evidence of loose connections. During operation, listen for any abnormal noise. Inspect for vibration, overheating, or other evidence of misaligned, worn, or damaged internal components or bearings.		X LBB 11/16/18			X
29	Limit and Bypass Switches	Remove covers and inspect electrical and mechanical components for damage or deterioration, and for evidence of loose connections. Inspect enclosures for evidence of moisture and arcing. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect drive and actuating components for damage, deterioration, and proper lubrication, and for evidence of loose connections. During operation, verify proper functioning of primary and secondary limit switches, indicator lights, settings, and bypass switches. Ensure proper functioning and setting of secondary hoist limit switches by using block to engage limit switch and ensure block does not two-block. This shall be performed and documented at least once during the life of the crane (or limit switch) and re-performed if the setting is affected or changed. Before performing, ensure switch is functioning properly electrically and station watch-stander to prevent damage. Check electrical function annually at this inspection, CCIR, or appendix E no-load test by using hand or other means to activate the switch. If proper operation of secondary upper limit switch and/or lower limit switch is performed at the CCIR or appendix E no-load test, note this in Remarks. Ensure proper functioning of slow-down limit switches.	Hoist	X			
30 ^g	Operator's Cab	Inspect for leaks, broken glass, deterioration, and cleanliness. Inspect louvers, doors, windows, windshield wipers, heaters, air conditioners, operator's chair, and communication equipment for proper operation.					X LBB 11/16/18 N/A
31	Warning Devices, Operational Aids, General Safety Devices (Horns, Bells, Lights, etc.), Wind speed Indicator, Enabling switches.	Inspect components and associated wiring for damage or deterioration, and for evidence of loose connections. The activity engineering organization may reduce the frequency of opening enclosures based on their exposure to weather and past findings. The reduced frequency shall be no less frequent than every eighth annual inspection. During operation, verify proper functioning of devices. Verify proper functioning of wind speed indicator. Verify proper functioning of enabling switches.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
Crane		Type	OEM	Capacity			
#349		Bridge	Wallace-Grommet	25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
32	Load Warning Devices, Load Shutdown Devices	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is to warn or shutdown at the set weight minus 10 percent of the actual weight at the set point. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is to warn or shutdown at the set point plus 5 percent minus 10 percent of the actual weight at the set point. Do not test beyond 125 percent of rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36. Testing shall ensure the overload warning or shutdown works properly to warn or prevent an overload and does not engage at a nuisance low level. Testing values will depend on test weight availability and is not required to prove exact tolerances specified above.		X			
32a	Load Indicators	Inspect wiring for damage or deterioration, and for evidence of loose connections. During a load test year only, these devices shall be tested for proper operation at this inspection or the CCIR/load test (mark N/A and note this in Remarks if performed at the CCIR/load test). If not specified by the device OEM, the preferred accuracy requirement for all devices is plus 10 percent minus 0 percent of actual weight. If preferred accuracy requirement cannot be met, the minimum accuracy requirement is plus 10 percent minus 5 percent of the actual weight. Do not test beyond 125 percent of rated capacity.					X N/A
33 ^a	Capacity Signs and Load Ratings	Inspect capacity signs and brackets for damage or deterioration, and for evidence of loose or missing fasteners. Verify that load ratings are correct, are noted in pounds, and are posted in view of operator and riggers. In those instances where two or more hoists may be arranged on a single beam, such as an interlocking monorail system, verify that the capacity of the supporting beam is clearly marked to preclude an overload condition.		X			
34 ^a	Fire Extinguishers	Ensure inspection is current.					X
35	Crane Davits	Inspect davit structure for proper operation and any signs of damage. Check davit rope for cuts, abnormal wear, heat damage, or discoloration. Check tackle for free movement and operation. Check hook and tackle attachments for signs of damage and corrosion.					X
36	Overload Clutches/Load Limiting Clutches for Air Hoists.	For air hoists that are not equipped with limit switches, follow OEM procedure if available; however, do not follow if OEM procedure requires overloading more than 125 percent of capacity. If no OEM procedure is available, operationally inspect overload clutch by running the stop or block into the upper hoist frame at slowest possible speed. While continuing to hoist, listen for a clutching noise. If no clutching noise is heard, contact the hoist OEM for further evaluation. If a test weight is used, do not test beyond 125 percent of rated capacity. Note that padding or dunnage may need to be temporarily installed between the top of the block and upper hoist frame to prevent minor damage. This item is for air hoists only (not manual or electric hoists). Due to the wide variation in overload clutch settings for various models and vintages of electric hoists, and the large amount of torque that can be produced by a motor in a locked rotor condition, testing of overload clutches for electric hoists shall not be performed.					X

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES							
NDD 11/16/18 SHEET 10-11 OF 13-14							
Crane <i>#349</i>	Type <i>Bridge</i>	OEM <i>Wallace-Grommet</i>	Capacity <i>25,000 lbs.</i>				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
37	Lubrication and Servicing Records	Perform a review of lubrication and servicing records since the last annual maintenance inspection to ensure the lubrication and servicing were performed as specified.		<i>X</i>			
38	Pneumatic hoists/cranes' air filters/separators.	Review hoist/crane servicing records for air/water separators/lubricators maintenance.					<i>X</i>
38a	Servicing record for building air systems if available.	If available, perform a review of building air system servicing records since the last annual maintenance inspection to ensure the building air system has been maintained.					<i>X</i>
REMARKS:							
<i>Item 16: the minimum wire rope dimension measured was 0.484" (31/64")</i>							
<i>The wire rope rejection criteria sheet (page 6) was omitted from the original package submitted to the certifying official. The inspectors subsequently inserted the missing page and adjusted the page numbers accordingly.</i>							
<i>Items 13a, 17, 24, 28 and 30 were found during the certifying official's review of the original package to be questionable (did not appear to be marked correctly). On the certifying official's request, the inspectors reviewed and re-validated these concerns and took the noted corrective actions.</i>							

CERTIFYING OFFICIAL STUDENT GUIDE

[illegible]

TRAINING ONLY
Bridge Crane Certification Package - Anomalies Corrected
Page 12 of 17

MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES BRAKE DATA											
HDD 11/16/18 SHEET 12 13 OF 13 14											
CRANE: #349											
NOTE TO INSPECTOR: Fill in applicable data as recommended by the brake and/or crane OEM. Record actual measurement inspected in "INSP" block. If adjustments are made, record adjusted setting in "ADJ" block. Otherwise indicate "NA". List repair document number and corrective action required under Remarks.											
BRAKE	TYPE	SPRING LENGTH/ TORQUE SETTING				AIR GAP/ PLUNGER STROKE				LINING THICKNESS	
		MIN	MAX	ACTUAL		MIN	MAX	ACTUAL		MIN	ACT
				INSP	ADJ			INSP	ADJ		
<i>Trolley</i>	<i>TM43</i>	<i>3"</i>	<i>3 1/2"</i>	<i>3 5/16"</i>	<i>3"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Bridge</i>	<i>TM83</i>	<i>4"</i>	<i>4 1/2"</i>	<i>4 5/8"</i>	<i>4"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Hoist</i>	<i>TM1355</i>	<i>5"</i>	<i>5 1/2"</i>	<i>5 1/16"</i>	<i>NA</i>	<i>1/8"</i>	<i>3/8"</i>	<i>3/8"</i>	<i>1/16"</i> <i>1/8"</i>	<i>3/32"</i>	<i>3/8"</i>

[illegible]

TRAINING ONLY
Bridge Crane Certification Package - Anomalies Corrected
Page 14 of 17

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: <i>#349</i>	Type: <i>Bridge</i>	Location: <i>Bldg. 1539</i>	Operator's Name: <i>Rick L. Welch</i>	Operator's License No. <i>C20549</i>		
Purpose of Inspection: <i>Annual Certification</i>		Legend: B = Before A = After D = During	Date Started: <i>11/16/18</i>	Date Completed: <i>11/16/18</i>		
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
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.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
6	Inspect motors for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>HDD</i>	
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.)	<i>S</i>			<i>HDD</i>	
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.)	<i>N/A</i>	<i>N/A</i>		<i>HDD</i>	
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	<i>S</i>	<i>S</i>	<i>S</i>	<i>LBB</i>	
12	Inspect load chains and sprockets for condition and proper operation.	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>LBB</i>	
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	<i>S</i>			<i>HDD</i>	

TRAINING ONLY

Bridge Crane Certification Package - **Anomalies Corrected**

Page 15 of 17

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.	N/A			HDD
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.	S	S	S	HDD
17	Verify current inspection of fire protection equipment.	N/A			HDD
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)	N/A			HDD
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.	N/A	N/A	N/A	HDD
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.)	N/A	N/A	N/A	HDD
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.)	N/A	N/A		HDD
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks. <i>LBB 11/16/18</i>	S N/A			LBB
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	HDD
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	N/A	N/A	N/A	HDD
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A		HDD
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A			HDD
27	Verify barge compartment (voids) cover bolts are installed.	N/A			HDD
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	HDD
29	Inspect rotate path assembly and center pin steadiment/support assembly for condition and proper operation.	N/A	N/A	N/A	HDD
30	Inspect slewing ring bearings for condition and proper operation.	N/A	N/A	N/A	HDD
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	N/A	N/A	N/A	HDD
Remarks: 1-For mechanical load brake test (6.2.1d) the holding brake was defeated using the brake release lever (6.2.1d Note 1e) per OEM instructions. 2- Item 22 marked Sat in error - corrected by inspector					
Inspector Signature/Date: <i>H. Dee Dumtey, 11/16/18</i>		Test Director Signature/Date: <i>John C. Laitlee, 11/16/18</i>			
Inspector Signature/Date: <i>Lyle B. Bluegh, 11/16/18</i>		Inspector Signature/Date:			

CERTIFICATION OF CONDITION INSPECTION AND TEST

Activity <i>Navy Shore Station Charlie</i>		Building/Location <i>Bldg. 1539</i>																																											
Crane No. <i>#349</i>	Type <i>Bridge</i>	OEM's Rated Capacity Main <i>25,000</i> lbs. <i>N/A</i> feet Aux _____ lbs. _____ feet Whip _____ lbs. _____ feet	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks") Main <i>25,000</i> lbs. <i>N/A</i> Feet Aux _____ 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 subparagraphs) <i>JOL 11/16/18</i> <table border="1"> <tr> <td><i>1</i></td> <td><i>1.1</i></td> <td><i>1.2</i></td> <td><i>1.3</i></td> <td><i>1.4</i></td> <td><i>1.4.1</i></td> <td><i>1.4.2</i></td> <td><i>1.4.3</i></td> </tr> <tr> <td><i>1.4.4</i></td> <td><i>1.4.5</i></td> <td><i>1.6</i></td> <td><i>1.6.1</i></td> <td><i>1.6.2</i></td> <td><i>1.6.4</i></td> <td><i>1.7</i></td> <td><i>1.7.1</i></td> </tr> <tr> <td><i>6</i></td> <td><i>6.1</i></td> <td><i>6.1.1</i></td> <td><i>6.1.2</i></td> <td><i>6.1.3</i></td> <td><i>6.2</i></td> <td><i>6.2.1</i></td> <td></td> </tr> </table>		<i>1</i>	<i>1.1</i>	<i>1.2</i>	<i>1.3</i>	<i>1.4</i>	<i>1.4.1</i>	<i>1.4.2</i>	<i>1.4.3</i>	<i>1.4.4</i>	<i>1.4.5</i>	<i>1.6</i>	<i>1.6.1</i>	<i>1.6.2</i>	<i>1.6.4</i>	<i>1.7</i>	<i>1.7.1</i>	<i>6</i>	<i>6.1</i>	<i>6.1.1</i>	<i>6.1.2</i>	<i>6.1.3</i>	<i>6.2</i>	<i>6.2.1</i>																			
<i>1</i>	<i>1.1</i>	<i>1.2</i>	<i>1.3</i>	<i>1.4</i>	<i>1.4.1</i>	<i>1.4.2</i>	<i>1.4.3</i>																																						
<i>1.4.4</i>	<i>1.4.5</i>	<i>1.6</i>	<i>1.6.1</i>	<i>1.6.2</i>	<i>1.6.4</i>	<i>1.7</i>	<i>1.7.1</i>																																						
<i>6</i>	<i>6.1</i>	<i>6.1.1</i>	<i>6.1.2</i>	<i>6.1.3</i>	<i>6.2</i>	<i>6.2.1</i>																																							
Category 1 Cranes* <table border="1"> <tr> <th>Boom Length</th> <th>Test Load %</th> <th>Minimum Radius</th> <th>Load Moment or Maximum Radius</th> </tr> <tr> <td></td> <td></td> <td>Pounds</td> <td>Feet</td> </tr> <tr> <td>Hoist</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Main</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Whip</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </table>		Boom Length	Test Load %	Minimum Radius	Load Moment or Maximum Radius			Pounds	Feet	Hoist				Main				Aux				Whip				Other				<table border="1"> <tr> <td><i>6.2.1a</i></td> <td><i>6.2.1d</i></td> <td><i>6.2.1e</i></td> <td><i>6.2.2</i></td> <td><i>6.2.3</i></td> <td><i>1.4.6</i></td> <td><i>1.6.3</i></td> </tr> <tr> <td><i>6.1.1a</i></td> <td><i>6.1.1b</i></td> <td><i>6.1.1c</i></td> <td><i>6.1.1d</i></td> <td><i>6.2.1c</i></td> <td><i>6.2.1d</i></td> <td><i>Note 1e</i></td> </tr> </table>		<i>6.2.1a</i>	<i>6.2.1d</i>	<i>6.2.1e</i>	<i>6.2.2</i>	<i>6.2.3</i>	<i>1.4.6</i>	<i>1.6.3</i>	<i>6.1.1a</i>	<i>6.1.1b</i>	<i>6.1.1c</i>	<i>6.1.1d</i>	<i>6.2.1c</i>	<i>6.2.1d</i>	<i>Note 1e</i>
Boom Length	Test Load %	Minimum Radius	Load Moment or Maximum Radius																																										
		Pounds	Feet																																										
Hoist																																													
Main																																													
Aux																																													
Whip																																													
Other																																													
<i>6.2.1a</i>	<i>6.2.1d</i>	<i>6.2.1e</i>	<i>6.2.2</i>	<i>6.2.3</i>	<i>1.4.6</i>	<i>1.6.3</i>																																							
<i>6.1.1a</i>	<i>6.1.1b</i>	<i>6.1.1c</i>	<i>6.1.1d</i>	<i>6.2.1c</i>	<i>6.2.1d</i>	<i>Note 1e</i>																																							
Hook Tram Measurements <table border="1"> <tr> <th></th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Whip Hook</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> </tr> </table>			Base Meas.	Before Test	After Test	Main Hook				Aux Hook				Whip Hook				Other				Certification This is to certify that inspections and tests have been conducted in accordance with the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.																							
	Base Meas.	Before Test	After Test																																										
Main Hook																																													
Aux Hook																																													
Whip Hook																																													
Other																																													
Category 2 Cranes <table border="1"> <tr> <th>Hoist</th> <th>Test Load %</th> <th>Pounds</th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main</td> <td><i>125</i></td> <td><i>31,250</i></td> <td><i>6"</i></td> <td><i>6"</i></td> <td><i>6"</i></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Hoist	Test Load %	Pounds	Base Meas.	Before Test	After Test	Main	<i>125</i>	<i>31,250</i>	<i>6"</i>	<i>6"</i>	<i>6"</i>	Aux						Other						Test Director (Signature) <i>John C. Laitlee</i> Date <i>11/16/2018</i> Inspector (Signature) <i>H. Dee Dumtey</i> Date <i>11/16/2018</i> Inspector (Signature) <i>Lyle B. Bluggh</i> Date <i>11/16/2018</i> Certifying Official (Signature) _____ Date _____ Expiration Date _____																			
Hoist	Test Load %	Pounds	Base Meas.	Before Test	After Test																																								
Main	<i>125</i>	<i>31,250</i>	<i>6"</i>	<i>6"</i>	<i>6"</i>																																								
Aux																																													
Other																																													
Category 3 Cranes <table border="1"> <tr> <th>Hoist</th> <th>Test Load %</th> <th>Pounds</th> <th>Base Meas.</th> <th>Before Test</th> <th>After Test</th> </tr> <tr> <td>Main</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Aux</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Hoist	Test Load %	Pounds	Base Meas.	Before Test	After Test	Main						Aux						Other						Annual Certifications Since Hook NDT <i>4</i> Hook Material and Manufacturing Method <i>Forged Alloy Steel</i>																			
Hoist	Test Load %	Pounds	Base Meas.	Before Test	After Test																																								
Main																																													
Aux																																													
Other																																													
Remarks <i>31,250</i> $25,000 \times 1.25 = 31,250 \times 1.05 = 38,212$ <i>JOL 11/16/18</i>																																													

* 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

Summary

This training course provided the opportunity to test your knowledge and understanding by engaging in a certification package review exercise. Should you wish to further your understanding of the Navy's shore based weight handling program, it is recommended you, as the certifying official, also complete the following NAVFAC P-307 courses which are available: General Crane Safety and Load Test Director. The following courses would be beneficial: The crane safety course(s) relating to cranes at your facility, Crane Mechanic, Mechanical Crane Inspector, Crane Electrician, Electrical Crane Inspector, and Rigging Practices. Next, you will be provided an opportunity to test the knowledge you gained from this training. A minimum score of 80% is required to pass the final exam. Good luck.

Recap, Wrap Up, and What's Next?

- It is recommended that the certifying official complete the following NAVFAC P-307 courses:
 - General Crane Safety
 - Load Test Director
- The following courses would also be beneficial:
 - The specific crane safety course(s) relating to cranes at your facility
 - Crane Mechanic
 - Mechanical Crane Inspector
 - Crane Electrician
 - Electrical Crane Inspector
 - Rigging Practices

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 Certifying Official Crane Certification Package Exercise module.

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



CERTIFYING OFFICIAL 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.					
Your overall opinion of the training facilities.					

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
