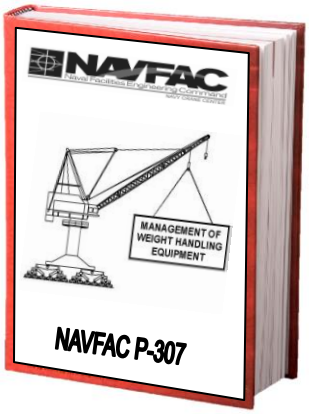
Navy Crane Center



NAVFAC P-307 Training

CERTIFYING OFFICIAL

WEB BASED TRAINING STUDENT GUIDE

NCC-CO-03

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

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INTRODUCTION

Welcome

Welcome to the NAVFAC P-307 Certifying Official course. 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.

Certifying Official Course Overview

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: possess an understanding of NAVFAC P-307 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.

NOTES

NAVFAC P-307 OVERVIEW SECTIONS 1-14

Welcome

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

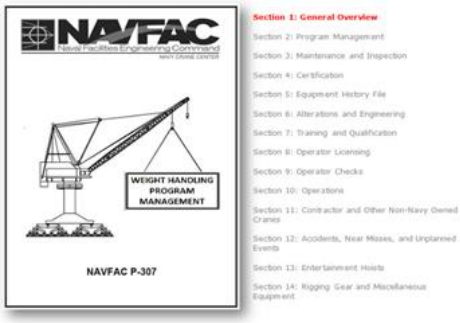
This training contains abbreviated explanations of the content found in this manual. You are encouraged to have a copy of the NAVFAC P-307 manual available for reference as you go through this material. In the execution of your weight handling tasks and duties, always refer directly to the NAVFAC P-307 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 and on the last screen in this presentation.

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.

Section 1: General

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.



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.

Applicability

NAVFAC P-307 applies to Navy shore activities, including Navy activities on joint bases and bases of other military services and agencies; Naval Construction Forces, including the naval construction training centers, and naval special operating units; and 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 equipment.

Equipment

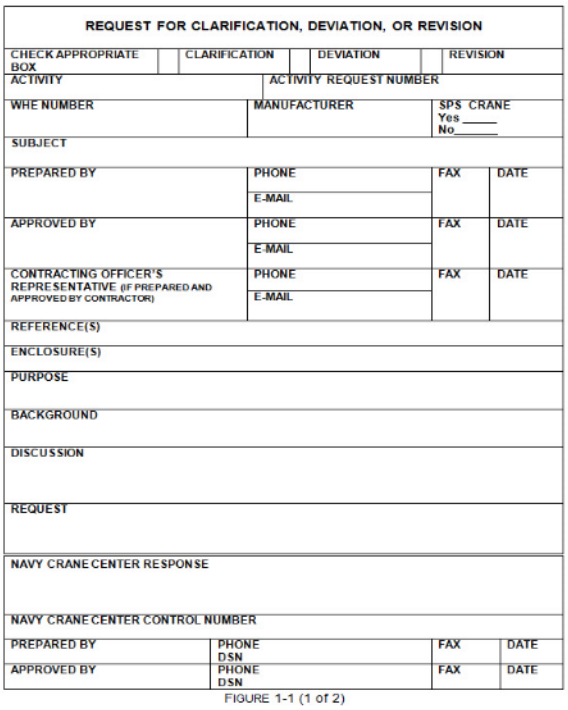
NAVFAC P-307 covers shore-based category 1, 2, 3, and 4 cranes including shore-based barge-mounted cranes. Detailed descriptions of the crane types are contained in Section 1. Illustrations of individual crane types can be found in Appendix B. Rigging Gear is covered in Section 14.

Program

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 R C D R), is discussed in paragraph 1.9 and allows users to request additional information or explanations of NAVFAC P-307 requirements or assistance with unique program circumstances. This form also allows users with sound reasoning to request to deviate from specified NAVFAC P-307 program requirements.



REQUEST FOR CLARIFICATION, DEVIATION, OR REVISION

CHECK APPROPRIATE BOX	CLARIFICATION	DEVIATION	REVISION	
ACTIVITY	ACTIVITY REQUEST NUMBER			
WHE NUMBER	MANUFACTURER	SPS CRANE Yes ____ No____		
SUBJECT				
PREPARED BY	PHONE / E-MAIL	FAX	DATE	
APPROVED BY	PHONE / E-MAIL	FAX	DATE	
CONTRACTING OFFICER'S REPRESENTATIVE (IF PREPARED AND APPROVED BY CONTRACTOR)	PHONE / E-MAIL	FAX	DATE	
REFERENCE(S)				
ENCLOSURE(S)				
PURPOSE				
BACKGROUND				
DISCUSSION				
REQUEST				
NAVY CRANE CENTER RESPONSE				
NAVY CRANE CENTER CONTROL NUMBER				
PREPARED BY	PHONE DSN	FAX	DATE	
APPROVED BY	PHONE DSN	FAX	DATE	

FIGURE 1-1 (1 of 2)

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

Category 1 Cranes & Examples

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, and
- rubber-tired gantry 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, e.g., monorail, jib crane, gantry crane.

Category 1 Crane Examples

Here are some pictures and descriptions of different types of category 1 cranes.

Category 1 Crane
Floating Crane

Types:
- barge, pontoon, or hull mounted with an integral base

Luffing booms:
- capable of continuous 360° rotation

Primary power
- supplied by a diesel-electric generator or diesel-driven hydraulic pumps
- While some are self propelled, most require tug boat assist to move about

Floating Crane

Category 1 Crane
Hammerhead

Consists of:
- rotating counterbalanced, cantilevered boom equipped with one or more trolleys that move in and out on the boom

Supported by:
- a pintle or turntable mounted atop a traveling or fixed tower

Category 1 Crane
Container Cranes

Consists of:
- hinged boom and main beam
- with a traveling trolley mounted on a rail mounted traveling gantry structure

At military port facilities Used for:
- quickly transferring containers on and off ships

Container Cranes

Category 1 Crane
Portal

Consists of:
- Rotating superstructure mounted on a gantry structure with:
  - operator's cab
  - machinery
  - luffing boom

Primary power:
- diesel-engine driven generators or hydraulic pumps
- electric driven

Support:
- supported by wide gauge rail allowing the portal crane to move about the facility

Portal

Category 1 Crane
Mobile Crane

Example:
Truck mounted hydraulic Cranes
• most common mobile cranes

Consists of:
• rotating superstructure
• upperworks mounted on an specialized truck chassis equipped with a power plant and cab for traveling over the road

Primary power:
• one engine for both the upper works and the carrier or
• a separate engine for each

Mobile

Category 1 Crane
Derrick

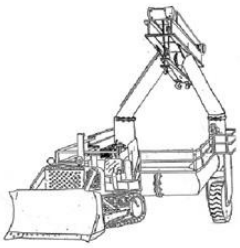
Example:
• crane with a boom hinged near the base of a fixed mast

Typically:
• boom may rotate 90° or more between the mast supports or "stiff legs" or members capable of resisting both tensile and compressive forces

Derrick

MBH

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.



LCRU

A landing craft retrieval unit, or L C R U, 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.

RTG

A rubber tire 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 over loads, improving stability. The wheels and rubber tires may be motorized or non-motorized.

Category 4 Crane Examples

General: Typically, category 4 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.

Booms & Mounts: Category 4 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.

Capacities & Categories: Pedestal mounted commercial fixed length and telescoping boom assembly cranes with less than 2,000-pounds capacity are considered Category 3 cranes. Capacities greater than 2,000 pounds are Category 4 cranes.

Standards & Licensing: Commercial truck mounted cranes, as described in ASME B-30.5, and articulating boom cranes, as described in ASME B-30.22, of all capacities, are Category 4 cranes and require a licensed operator - even if the crane is down rated for administrative purposes.

Category 2 and 3 Cranes

Category 2 and Category 3 cranes include:

- overhead traveling cranes
- gantry cranes
- wall cranes
- jib cranes
- davits
- pillar cranes
- pillar jib cranes
- monorails and associated hoists
- fixed overhead hoists, including fixed manual and powered hoists
- portable hoists used continuously in a single location, that is, 6 months or more
- portable A-frames and portable gantries with permanently installed hoists and
- pedestal mounted commercial boom assemblies attached to stake trucks, trailers, flatbeds, or railcars, or stationary mounted to piers, etc., with certified capacities less than 2,000 pounds.

Capacity

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.

Category 2 and 3 Crane Examples

Here are some pictures and descriptions of different types of category 2 and 3 cranes.

Category 2 and 3 Cranes

Bridge or OET Crane

Example:
- cab-operated
- can be pendant or radio controlled

Principal parts include:
- Bridge girders, end trucks, trolley with hoisting mechanism, and operator's cab or pendant control

Mobility:
- limited to the area between the runways

Bridge or OET Crane

Category 2 and 3 Cranes

Pillar-Jib Crane

- A fixed crane consisting of a rotating vertical member with a horizontal arm supporting a trolley and hoist
- Normally rotates 360°

Pillar Jib

Category 2 and 3 Cranes

Jibs

Points:
- normally category 3 cranes
- category 2 if certified capacity of 20,000 pounds or greater

Consists of:
- a rotating horizontal boom (either cantilevered or supported by tie rods) carrying a trolley and hoist.
- usually mounted on a wall or building column

Jib

Category 2 and 3 Cranes

Trolley Mounted Overhead Hoist

Consists of:
- an under-hung trolley
- one or more drums and sheaves for wire rope or chain

Powered by:
- manual
- electric
- hydraulic
- or pneumatic powered

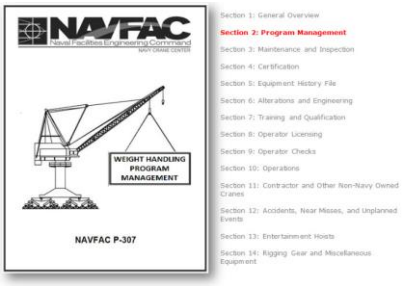
Mobility:
- fixed
- or may travel on jib crane booms or monorail track

Trolley Mounted Overhead Hoist

Section 2: Program Management

Introduction

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



Topics

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 3, 4 and 5: Maintenance, Inspection, Certification, Equipment History File

Introduction

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

Topics

Sections 3 and 4 provide requirements for crane maintenance, inspection and certification functions of a weight handling program.

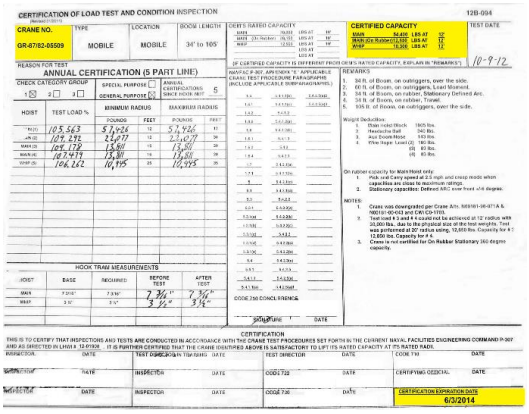
Section 3 lists requirements for maintenance and inspection personnel, the different types of inspections and their frequencies, how deficiencies and work deferrals are processed, and the performance of routine service work.

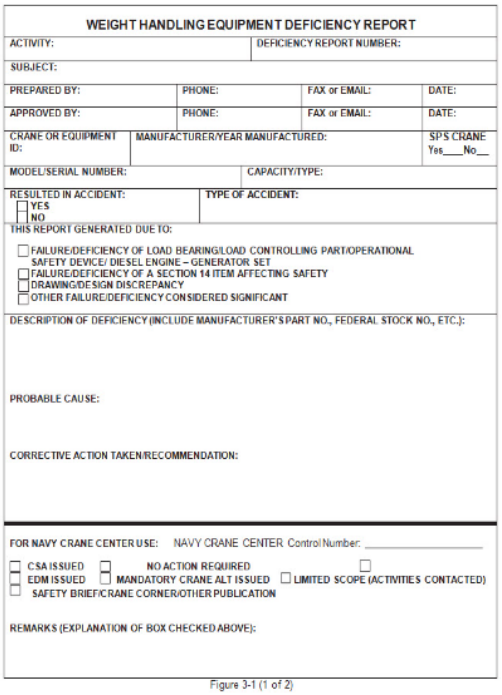
Section 4 picks up after maintenance and provides the requirements for certifying a crane for use. This includes personnel requirements, certification periodicities, load test requirements, test weights and capacities, the voiding and extending of certifications, considerations for specific types of 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.

Certification Posting

The crane identification number, certified capacity and certification expiration date must be posted on or near the crane. Posting a copy of the actual certification, crane test cards, stickers or signs, are all acceptable methods provided they include the required information.





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: | SPS CRANE Yes___No__

MODEL/SERIAL NUMBER: | CAPACITY/TYPE:

RESULTED IN ACCIDENT: ☐ YES ☐ NO | TYPE OF ACCIDENT:

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 3-1 (1 of 2)

Figure 3-1: WHEDR

Figure 3-1 WHEDR

In those instances where a deficiency is detected that has applicability at other Navy activities, the Navy Crane Center shall be notified as soon as practical, but in no case later than five days of the discovery. A summary report of the deficiency, including corrective actions taken or recommended, shall be forwarded to Navy Crane Center within 21 days.

Figure 3-1, the *Weight Handling Equipment Deficiency Report*, or W H E D R *(pronounced: weeder)*, shall be used to report the deficiency to Navy Crane Center.

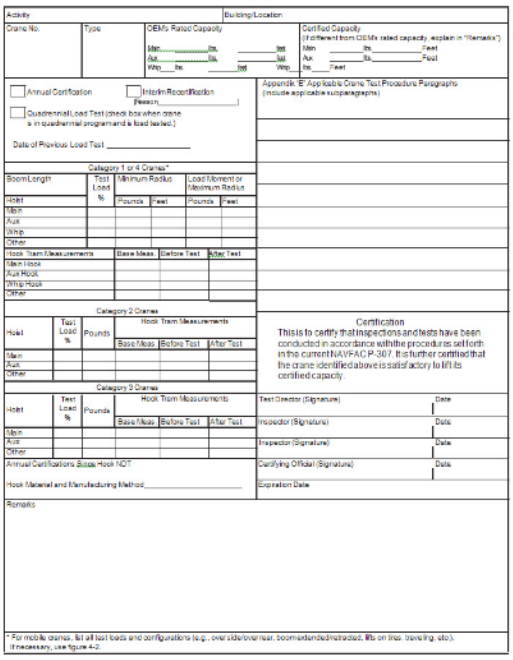
Figure 4-1

The certifying official shall ensure the activity's cranes are inspected, tested, and certified. Certifications shall be based on the noted condition inspection 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 Load Test and Condition Inspection* is the form used to certify that these requirements have been met. Activities shall use this form or develop a similar form.



CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity | Building/Location:

Crane No. | Type | OEM's Rated Capacity | Certified Capacity (if different from OEM's rated capacity, explain in "Remarks")

☐ 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)

Category 1 or 4 Cranes*

Boom/Length / Hoist	Test Load %	Minimum Radius Pounds	Minimum Radius Feet	Load Moment or Maximum Radius Pounds	Load Moment or Maximum Radius Feet
Main					
Aux					
Whip					
Other					

Hook Tram Measurements	Base Meas.	Before Test	After Test
Main Hook			
Aux Hook			
Whip 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 Blocks NOT Hook Material and Manufacturing Method: _____

Certification

This is to certify that inspections and tests have been conducted in accordance with the procedures set forth in the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.

Test Director (Signature) | Date
Inspector (Signature) | Date
Inspector (Signature) | Date
Certifying Official (Signature) | Date
Expiration Date

Remarks

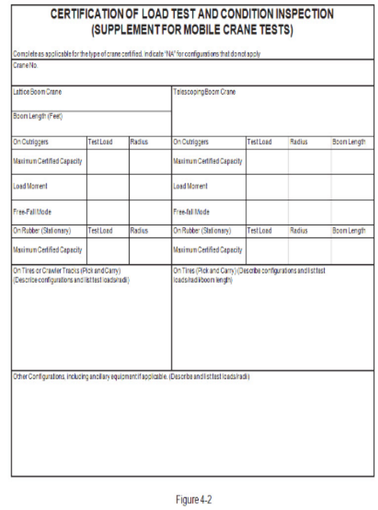
* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, traveling, etc.). If necessary, use figure 4-2.

Figure 4-1

Figure 4-1: CoLTaCI

Figure 4-2

For the additional testing and certification requirements on mobile cranes, locomotive cranes, aircraft crash cranes, and category 4 cranes, an attachment similar to figure 4-2: *Certification of Load Test and Condition Inspection Supplement for Mobile Cranes* form shall be developed and used by activities with these types of cranes.



CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION (SUPPLEMENT FOR MOBILE CRANE TESTS)

Complete as applicable for the type of crane certified. Indicate "NA" for configurations that do not apply

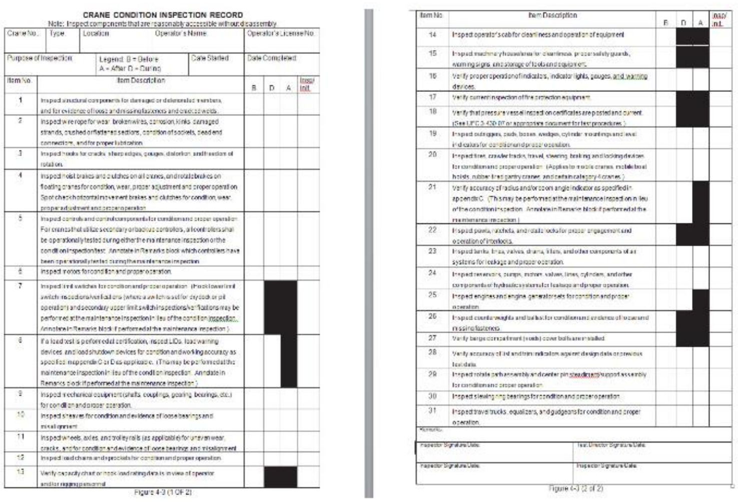
Crane No.							
Lattice Boom Crane				Telescoping Boom Crane			
Boom Length (Feet)							
On Outriggers	Test Load	Radius		On Outriggers	Test Load	Radius	Boom Length
Maximum Certified Capacity				Maximum Certified Capacity			
Load Moment				Load Moment			
Free-Fall Mode				Free-fall Mode			
On Rubber (Stationary)	Test Load	Radius		On Rubber (Stationary)	Test Load	Radius	Boom Length
Maximum Certified Capacity				Maximum Certified Capacity			
On Tires or Crawler Tracks (Pick and Carry) (Describe configurations and list test loads/radii)				On Tires (Pick and Carry) (Describe configurations and list test loads/radii/boom length)			
Other Configurations, including ancillary equipment if applicable. (Describe and list test loads/radii)							

Figure 4-2

Figure 4-2: CoLTaCI Supplement

Figure 4-3

Figure 4-3, the *Crane Condition Inspection Record*, or *C C I R*, is the form used to perform and document this inspection.



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.

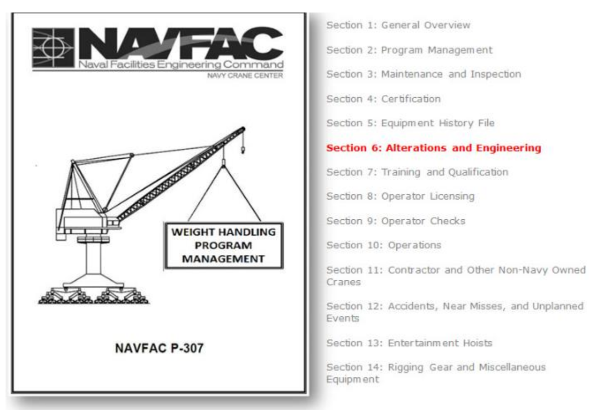
Figure 4-3 (1 OF 2)

Figure 4-3 (2 of 2)

Figure 4-3: CCIR

Section 6: Alterations and Engineering 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.



Topics

Section 6 not only provides the 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.

Figure 6-1

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

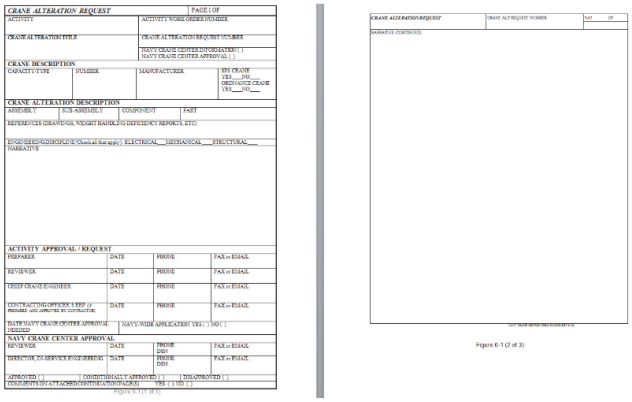


Figure 6-1: Crane Alteration Request (CAR)

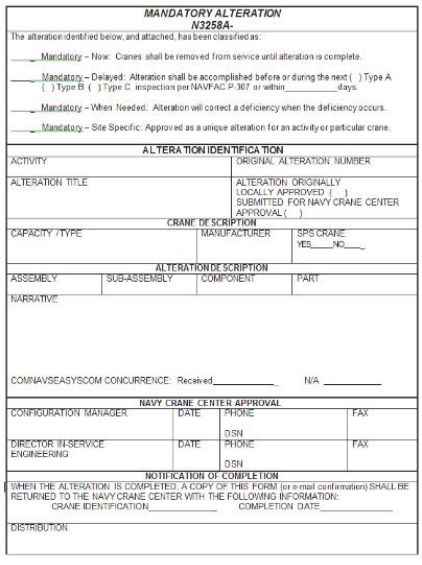


Figure 6-2

Figure 6-2: Mandatory Alteration

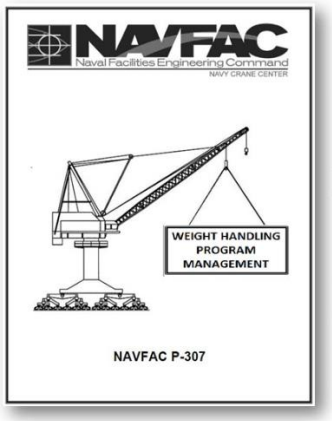
Figure 6-2

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.

Section 7 & 8: Training, Qualification, and Operator Licensing

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.



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

Section 7

Section 7 provides information on training and qualifications for personnel who work in a NAVFAC P-307 weight handling program. It provides:

- course titles for mandatory training
- where to find the training courses
- basic training requirements and exceptions
- training for specific types of equipment, and
- record keeping

It features Table 7-1 which lists the most common WHE job functions and their required courses.

These web-based training courses can be found on Navy E-Learning, more commonly known as N E L.

Table 7-1 Training Courses for WHE Job Functions

Course Title / Frequency / Job Function	General Crane Safety Initial	General Crane Safety Refresher Every Two Years (after initial)	Category 2 and Cab-Operated Category 3 Crane Safety Initial	Category 2 Crane Safety Refresher Every Two Years (after initial)	Category 3 (non-cab-operated) Crane Safety Initial then repeated Every Three Years	Category 4 Crane Safety Initial	Rigging Practices Once	Rigging Gear Inspection Once
Category 1 Crane Operator: Note 01	X	X						
Mobile Boat Hoist or Rubber-Tired Gantry Crane Operator Note 01			X Note 03	X Note 07				
Category 2 Crane Operator: Note 02			X Note 03	X Note 07				
Category 3 Cab-Operated Crane Operator			X Note 03	X Note 07				
Category 3 Non-cab Crane Operator: Notes 04 & 05					X Note 06			
Category 4 Crane Operator: Note 01		X				X Note 03		
Rigger: Note 04							X	
Rigging Gear Inspector: Note 04								X Note 08

Notes

01 Category 1 and category 4 crane operators shall also satisfy the requirements in this section, section 8, and appendices J and L, as applicable. Mobile boat hoists and rubber-tired gantry cranes are category 1 cranes although *Category 2 and Cab-Operated Category 3 Crane Safety* is the designated training course for these cranes.

02 Category 2 and cab-operated category 3 crane operators shall also satisfy the requirements of this section, section 8, and appendix K.

03 Satisfactory completion of *General Crane Safety* or *Category 4 Crane Safety* satisfies the requirements of this course.

04 Personnel shall also satisfy applicable appendix N requirements.

05 Personnel who meet Category 3 non-cab operated qualification requirements may perform rigging on category 3 cranes. All other rigging requires satisfactory completion of *Rigging Practices*.

06 Satisfactory completion of *General Crane Safety* or *Category 2 and Cab-Operated Category 3 Crane Safety* or *Category 4 Crane Safety* satisfies the initial training requirements of this course.

07 Satisfactory completion of *General Crane Safety Refresher* or *Category 2 Crane Safety Refresher* satisfies the retraining requirement for this course.

08 Satisfactory completion of *Rigging Practices* satisfies the requirements of this course.

Table 7-1 Training Courses for WHE Job Functions

Course Title / Frequency / Job Function	Crane Mechanic Once	Mobile Crane Mechanic Once	Mechanical Crane Inspector Once	Crane Electrician Once	Electrical Crane Inspector Once	Load Test Director Once	Certifying Official Once	Contractor Crane Awareness Once
Crane Mechanic: Note 04	X							
Mobile Crane Mechanic: Note 04	X	X Note 09						
Mechanical Crane Inspector: Notes 04 & 11	X	X Note 09	X Note 10					
Crane Electrician: Note 04				X				
Electrical Crane Inspector: Notes 04 & 11				X	X Note 12			
General Inspector: Notes 04, 11 & 13	X	X Note 09	X Note 10	X	X Note 12			
Load Test Director: Notes 04 & 14						X		
Certifying Official: Note 04							X	
Contracting Officer Representatives who perform oversight of contractor WHE operations								X

Notes

09 Satisfactory completion of *Crane Mechanic* is prerequisite to taking this course.

10 Satisfactory completion of *Mobile Crane Mechanic* is prerequisite to taking *Mechanical Crane Inspector* for personnel who will be inspecting mobile cranes.

11 Personnel who perform maintenance and/or condition inspections are required to satisfactorily complete *Mechanical Crane Inspector* or *Electrical Crane Inspector*, as applicable.

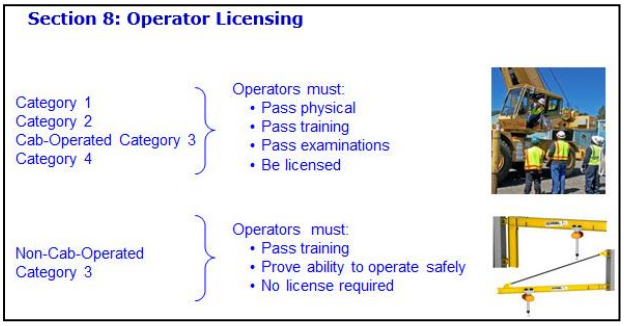
12 Satisfactory completion of *Crane Electrician* is prerequisite to taking this course.

13 Crane inspectors who inspect both mechanical and electrical components (i.e., General Inspector) must satisfy these requirements.

14 Satisfactory completion of the applicable crane safety course [for the type of crane to be tested by the candidate] is prerequisite to taking *Load Test Director*.

Section 8

Section 8 provides uniform standards for crane operator training, testing, examining and licensing. Category 1, category 2, cab-operated category 3, and category 4 crane operators must be licensed.



Licenses are not required to operate non-cab operated category 3 cranes. However, training and a demonstration of ability to operate safely are required.

Operator Training

Prior to taking a performance test, the license candidate shall be thoroughly trained on the operation of the type of crane for which a license is to be issued. The candidate shall operate that type of crane only under the direct observation of a licensed operator. The licensed operator shall retain full responsibility for the safe operation of the crane. The supervisor shall approve lifting of loads based upon the candidate's demonstration of knowledge of the equipment and operation without loads. The candidate shall not perform complex lifts.

Figure 8-1

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.

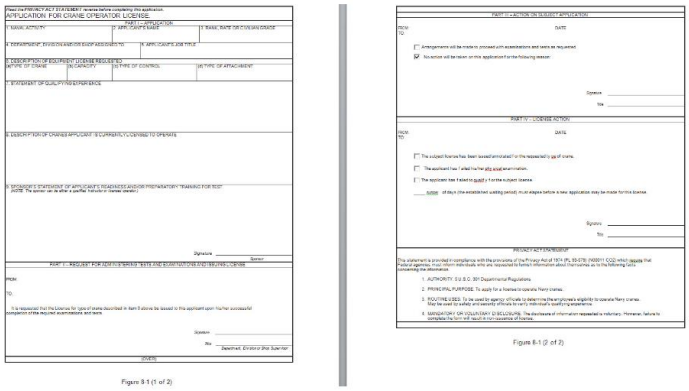


Figure 8-1: Crane Operator License Application

Figure 8-2

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.

Figure 8-2

CRANE OPERATOR LICENSE		QUALIFIED TO OPERATE				
NAME OF OPERATOR	DATE ISSUED	CRANE TYPE	CAPACITY	ATTACHMENT	TYPE CONTROLS	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 8-2: Crane Operator License

Figure 8-3

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.

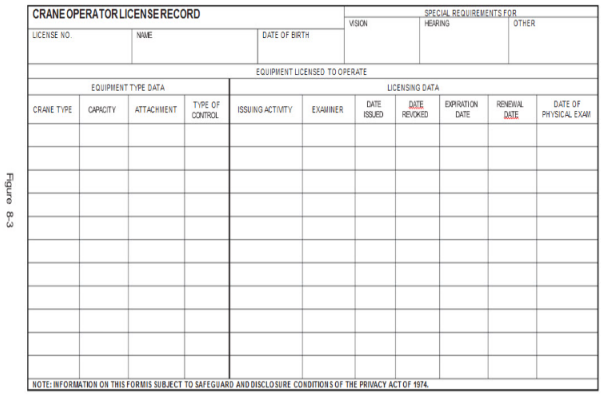


Figure 8-3

CRANE OPERATOR LICENSE RECORD

SPECIAL REQUIREMENTS FOR: VISION | HEARING | OTHER

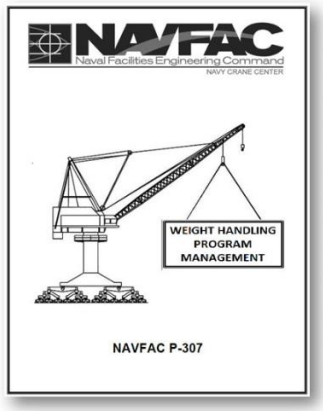
LICENSE NO. | NAME | DATE OF BIRTH

EQUIPMENT LICENSED TO OPERATE

EQUIPMENT TYPE DATA				LICENSING DATA							
CRANE TYPE	CAPACITY	ATTACHMENT	TYPE OF CONTROL	ISSUING ACTIVITY	EXAMINER	DATE ISSUED	DATE REVOKED	EXPIRATION DATE	RENEWAL DATE	DATE OF PHYSICAL EXAM

NOTE: INFORMATION ON THIS FORM IS SUBJECT TO SAFEGUARD AND DISCLOSURE CONDITIONS OF THE PRIVACY ACT OF 1974.

Figure 8-3: Crane Operator License Record



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 9: Operator Checks Introduction

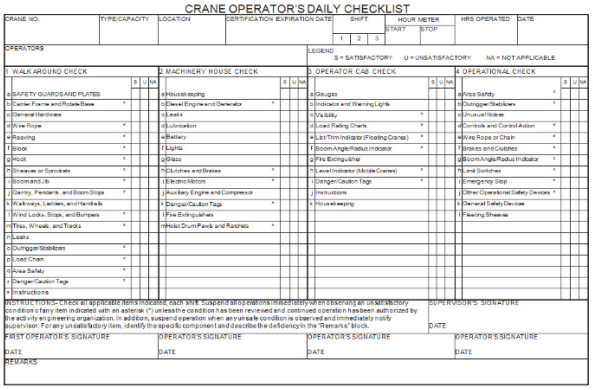
NAVFAC P-307 Section 9 provides requirements on the types of safety and equipment checks performed by the crane operator prior to operating a crane.

Operator Checks

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

Figure 9-1

Figure 9-1, the Crane *Operator's Daily Checklist* or *O D C L*, 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 1 2 3 | HOUR METER START STOP | HRS OPERATED | DATE

OPERATORS

LEGEND: S = SATISFACTORY U = UNSATISFACTORY NA = NOT APPLICABLE

1 WALK AROUND CHECK	S	U	NA	2 MACHINERY HOUSE CHECK	S	U	NA	3 OPERATOR CAB CHECK	S	U	NA	4 OPERATIONAL CHECK	S	U	NA
a SAFETY GUARDS AND PLATES				a Housekeeping				a Gauges				a Hoist Safety			
b Center Frame and Rotate Base	*			b Diesel Engine and Generator	*			b Indicator and Warning Lights				b Outrigger/Stabilizers	*		
c General Hardware				c Leaks				c Visibility	*			c Unusual Noises			
d Wire Rope	*			d Lubrication				d Load Rating Charts	*			d Controls and Control Action	*		
e Reeving	*			e Battery				e List/Trim Indicator (Floating Cranes)	*			e Wire Rope or Chain	*		
f Boom	*			f Lights				f Boom Angle/Radius Indicator	*			f Brakes and Clutches	*		
g Hook	*			g Glass				g Fire Extinguisher				g Boom Angle/Radius Indicator	*		
h Sheaves or Sprockets	*			h Clutches and Brakes	*			h Level Indicator (Mobile Cranes)	*			h Limit Switches	*		
i Boom and Jib	*			i Electric Motors	*			i Danger/Caution Tags	*			i Emergency Stop	*		
j Derrig, Pendants, and Boom Stops	*			j Auxiliary Engine and Compressor				j Instructions				j Other Operational Safety Devices	*		
k Walkways, Ladders, and Handrails				k Danger/Caution Tags	*			k Housekeeping				k General Safety Devices			
l Wind Locks, Stops, and Bumpers	*			l Fire Extinguishers								l Reeving Sheaves			
m Tires, Wheels, and Tracks	*			m Hoist Drum Pawls and Ratchets	*										
n Leaks															
o Outrigger Stabilizers	*														
p Load Chain	*														
q Area Safety	*														
r Danger/Caution Tags	*														
s Instructions	*														

INSTRUCTIONS: Check all applicable items indicated each shift. Suspend all operations immediately when observing an unsatisfactory condition of any item indicated with an asterisk (*) unless the condition has been reviewed and continued operation has been authorized by the activity engineering organization. In addition, suspend operation when any unsafe condition is observed and immediately notify supervision. For any unsatisfactory item, identify the specific component and describe the deficiency in the "Remarks" block.

SUPERVISOR'S SIGNATURE / DATE

FIRST OPERATOR'S SIGNATURE / DATE | OPERATOR'S SIGNATURE / DATE | OPERATOR'S SIGNATURE / DATE | OPERATOR'S SIGNATURE / DATE

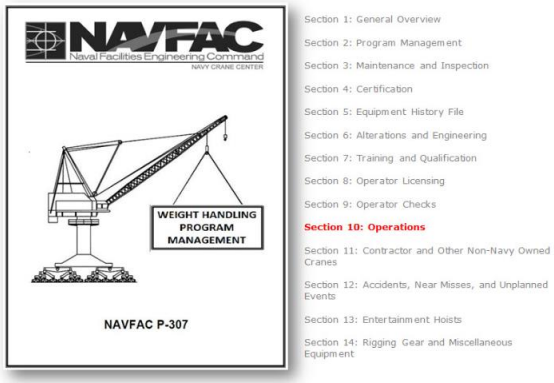
REMARKS

Figure 9-1: Operator's Daily Checklist (ODCL)

Section 10: Operations

Introduction

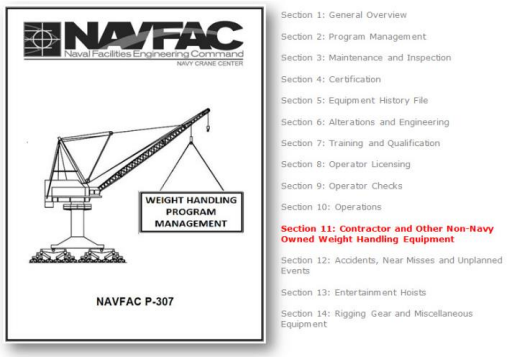
NAVFAC P-307 section 10 provides general crane operations safety and precautionary considerations and requirements.



Operations

Topics covered in section 10 include:

- safety precautions
- operating procedures
- operational risk management (or ORM)
- crane teams
- safety devices
- assembly and disassembly requirements for cranes used in construction
- complex lifts
- lift preparations
- communications
- personnel lifts
- adverse operating conditions
- ground conditions
- clearances
- working around overhead power lines, and
- multi-purpose machines.



Section 11: Contractor and Other Non-Navy Owned Cranes

Introduction

NAVFAC P-307 Section 11 provides requirements for cranes and rigging gear not belonging to the Navy but used on Navy property.

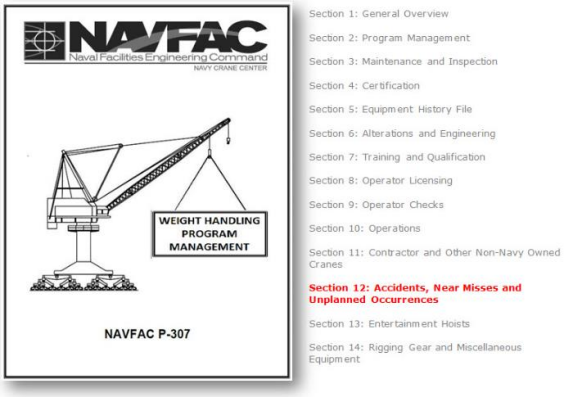
Non-Navy WHE

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. Contained in section 11 are contract requirements, contracting officer responsibilities, host activity responsibilities, and requirements for using rented or leased WHE.

Section 12: Accidents, Near Misses, and Unplanned Occurrences

Introduction

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



Topics

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.

Significant Accident

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
- 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.

Crane Accident

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
- 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
- Collision

Note: The last five 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.

Rigging Accident

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).

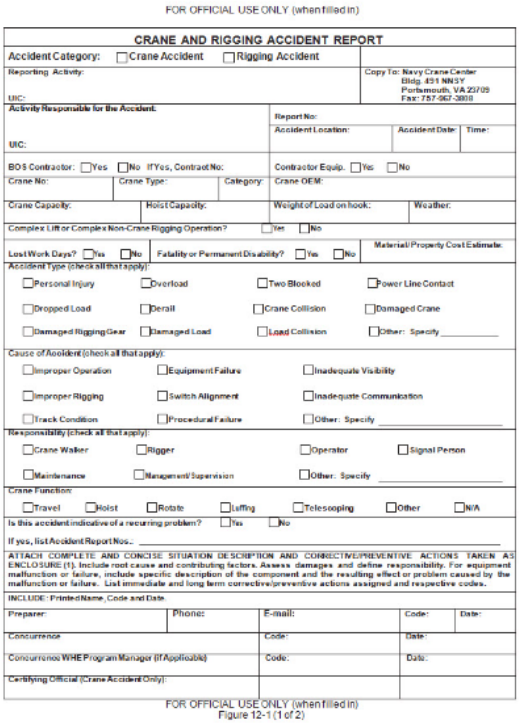
Note: The last three bullets are considered accidents even though no material damage or injury occurs.

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

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.**



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CRANE AND RIGGING ACCIDENT REPORT

Accident Category: ☐ Crane Accident ☐ Rigging Accident

Reporting Activity:

Copy To: Navy Crane Center
Bldg. 491 NNSY
Portsmouth, VA 23709
Fax: 757-967-3808

UIC:

Activity Responsible for the Accident:

Report No:

UIC:

Accident Location: | Accident Date: | Time:

BOS Contractor: ☐ Yes ☐ No If Yes, Contract No: | Contractor Equip. ☐ Yes ☐ No

Crane No: | Crane Type: | Category: | Crane OEM:

Crane Capacity: | Hoist Capacity: | Weight of Load on hook: | Weather:

Complex Lift or Complex Non-Crane Rigging Operation? ☐ 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 ☐ Crane Collision ☐ Damaged Crane
☐ Damaged Rigging Gear ☐ Damaged Load ☐ Load Collision ☐ Other: Specify

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 ☐ 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 Nos.:

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:

Concurrence WHE Program Manager (If Applicable) | Code: | Date:

Certifying Official (Crane Accident Only):

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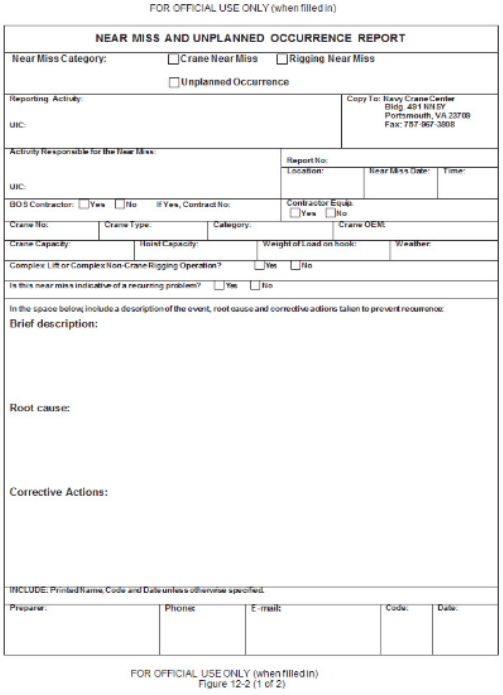
Figure 12-1 (1 of 2)

Figure 12-1: Crane and Rigging Accident Report



FOR OFFICIAL USE ONLY (when filled in)

NEAR MISS AND UNPLANNED OCCURRENCE REPORT

Near Miss Category: ☐ Crane Near Miss ☐ Rigging Near Miss
☐ Unplanned Occurrence

Reporting Activity:

Copy To: Navy Crane Center
Bldg. 491 NNSY
Portsmouth, VA 23709
Fax: 757-967-3808

UIC:

Activity Responsible for the Near Miss:

Report No:

Location: | Near Miss Date: | Time:

UIC:

BOS Contractor: ☐ Yes ☐ No If Yes, Contract No: | Contractor Equip. ☐ Yes ☐ No

Crane No: | Crane Type: | Category: | Crane OEM:

Crane Capacity: | Hoist Capacity: | Weight of Load on hook: | Weather:

Complex Lift or Complex 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:

FOR OFFICIAL USE ONLY (when filled in)
Figure 12-2 (1 of 2)

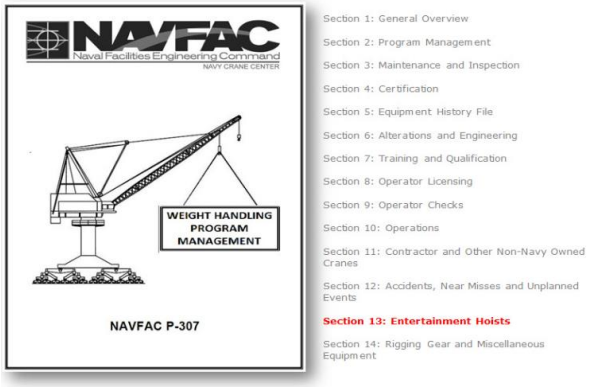
Figure 12-2: Near Miss and Unplanned Occurrence Report

Figure 12-2

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 section 12 within 30 days of the event.

Section 13: Entertainment Hoists

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

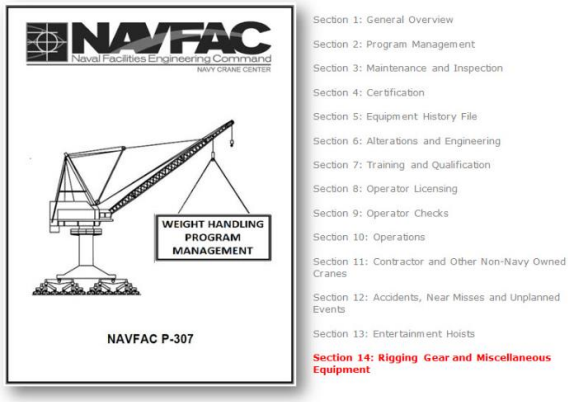
If the hoist cannot meet all of these requirements, then the hoist shall be treated as a category 2 or 3 crane.

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 14: Rigging Gear and Miscellaneous Equipment

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.

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
- 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.

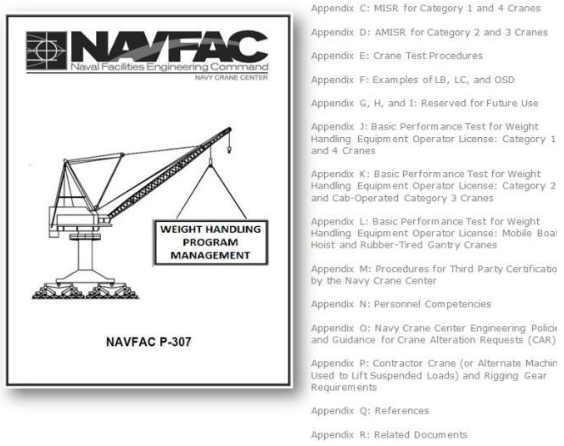
NOTES

NAVFAC P-307 OVERVIEW APPENDICES A-R

Appendix A: Glossary

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.



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.

Below are three sample definitions found in the glossary.

Binding Condition

The condition that exists when a load being lifted or lowered is not free to move due to an external force such as friction, suction, the object being frozen or rusted to another object, or paint. Additionally, potential for unremoved restraints (e.g., fasteners or welds) due to complexity, number, or location/accessibility.

Crane Attachment

A structural and/or mechanical component added to a piece of materials handling equipment (forklift) or equipment covered by NAVFAC P-300 (backhoe, front-end loader) that extends the load center of the machine beyond the machine's existing capability without the component.

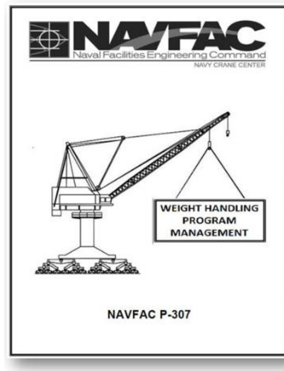
Multi-Purpose Machine

A machine that is designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. This includes machines that are sometimes referred to as telescopic handlers or rough-terrain forklifts.

Appendix B: Types of WHE

Introduction

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



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

Types of WHE

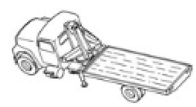
They say a picture is worth a thousand words. If so, Appendix B reads like a novel. It contains close to 50 drawings that illustrate the basic configurations of many crane types found in the Navy's inventory. Like Appendix A, it is intended to improve communication and understanding within the Navy's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

A sampling of Appendix B illustrations is provided below.

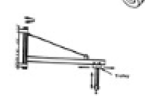
Test your understanding by correctly matching terms 1 through 7 to the pictured cranes by selecting appropriate box.

Q: Match terms 1 through 7 with the correct Appendix B illustration by clicking on the appropriate box next to each crane pictured.

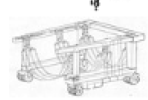
1. Semi-Gantry Crane
2. Rubber-Tired Gantry
3. Commercial Truck Mounted Articulating Boom Crane
4. Jib crane
5. Pillar Jib Crane
6. Mobile Boat Hoist
7. Portal Crane



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

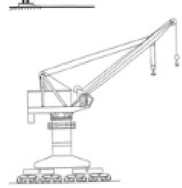


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

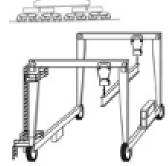


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

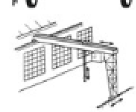
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



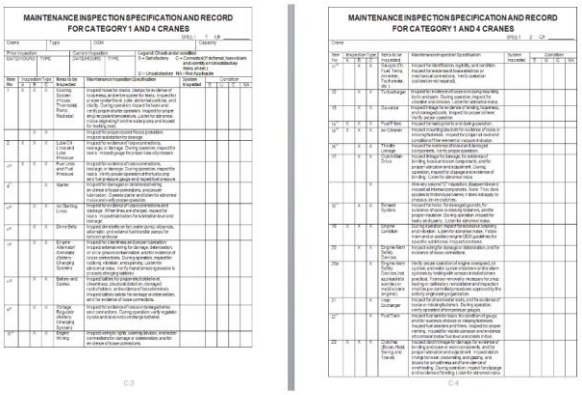
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Appendices C and D: MISR and AMISR Introduction

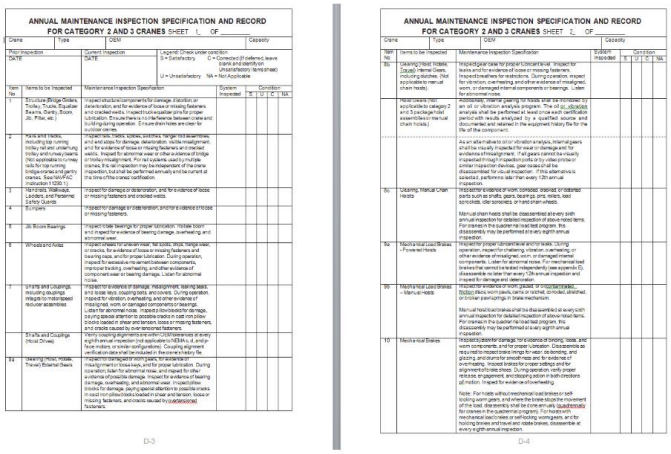
NAVFAC P-307 appendixes C and D provide the maintenance inspection specifications and record requirements for all cranes. These appendices contain the minimum inspection requirements. Additional inspection requirements or more frequent inspections may need to be developed locally depending on the particular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

MISR

Appendix C contains the *Maintenance Inspection Specification and Record* for category 1 and 4 cranes. *This document is commonly referred to by the acronym M-I-S-R 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.



Appendix C: Maintenance Inspection Specification and Record (MISR)



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

AMISR

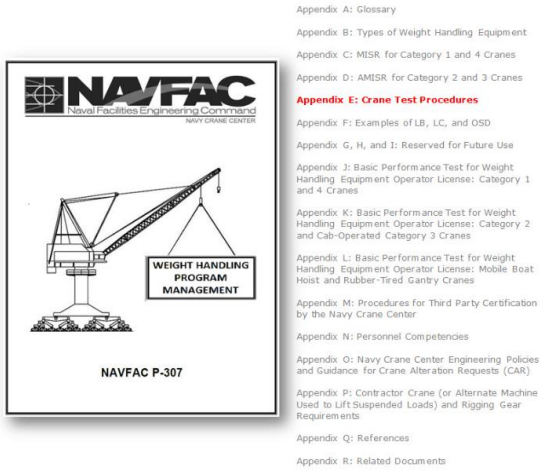
Appendix D contains the *Annual Maintenance Inspection Specification and Record* for category 2 and 3 cranes. *This document is commonly referred to by the acronym A-M-I-S-R and is pronounced "A-mizer".* You can see in the illustration a sample of the many items that must be inspected, the manner or 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.

Appendix E: Crane Test Procedures

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.



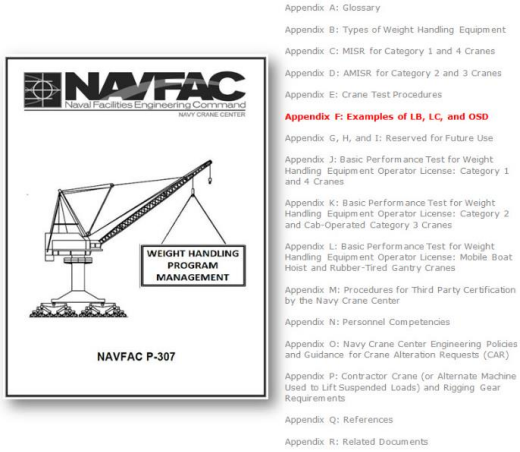
Procedures

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
- rubber-tired gantry cranes
- category 4 cranes
- bridge and overhead traveling cranes
- 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, and
- mobile boat hoists.

Appendix F: Examples of LB Parts, LC Parts, and OSDs Introduction

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



LB, LC, OSDs

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

Load Bearing (LB) parts, Load Controlling (LC) parts, and Operational Safety Devices (OSD)

Q: Below is a sample listing of components from NAVFAC P-307 appendix F. Correctly identify each item as either a load bearing part, a load controlling part or an operational safety device.

1. Load Bearing Part
2. Load Controlling Part
3. Operational Safety Device

Hook	☐1	☐2	☐3
Radius Indicator	☐1	☐2	☐3
Travel Gear Shafts	☐1	☐2	☐3
Hoist Drive Train Components	☐1	☐2	☐3
Rotate Electric Brakes	☐1	☐2	☐3
Overload Indicator with Shutdown Capability	☐1	☐2	☐3
Upper Hoist Limit Switch	☐1	☐2	☐3
Wire Rope Drum	☐1	☐2	☐3
Anti-Two-Block Warning Limit Switch	☐1	☐2	☐3
Crane Mounted Electrical Power Distribution	☐1	☐2	☐3

Appendices G, H, and I: Reserved
Introduction

The content of NAVFAC P-307 appendixes G, H and I were removed in the 2016 revision of the manual. They once contained test questions about crane operations and safety. These questions have been incorporated into pertinent NAVFAC P-307 crane safety courses. These appendixes are now reserved for future use.

Appendices J, K, and L: Crane Operator Basic Performances Tests
Introduction

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

Topics

This screen provides descriptions of the content for each appendix.

Appendix J

Appendix J contains the basic performance test requirements and instructions for applicants of category 1 and 4 crane licenses.

Appendix K

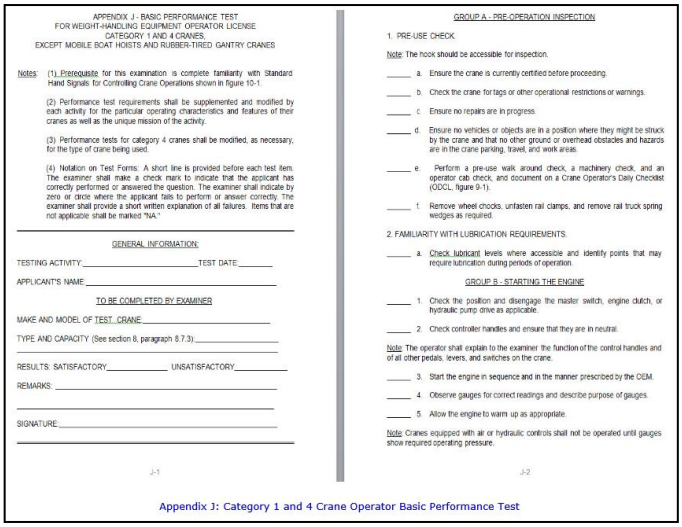
Appendix K provides the basic performance test requirements and instructions for applicants of category 2 and cab-operated category 3 crane licenses.

Appendix L

Appendix L provides the basic performance test requirements and instructions for applicants of mobile boat hoists and rubber tired gantry crane licenses.

Cat 1&4 PT

Shown here is a preview of the first two pages of the category 1 and 4 crane operator performance test displaying various instructions and attributes.



APPENDIX J - BASIC PERFORMANCE TEST
FOR WEIGHT-HANDLING EQUIPMENT OPERATOR LICENSE
CATEGORY 1 AND 4 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 their cranes as well as the unique mission of the activity.

(3) Performance tests for category 4 cranes shall be modified, as necessary, for the type of crane being used.

(4) Notation on Test Forms: A short line is provided before each test item. The examiner shall make a check mark to indicate that the applicant has correctly performed or answered the question. The examiner shall indicate by zero or circle where 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 "NA."

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

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

Note: The hook should be accessible for inspection.

_____ a. Ensure the crane is currently certified before proceeding.

_____ b. Check the crane for tags or other operational restrictions or warnings.

_____ c. Ensure no repairs are in progress.

_____ d. 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 crane parking, travel, and work areas.

_____ e. Perform a pre-use walk around check, a machinery check, and an operator cab check, and document on a Crane Operator's Daily Checklist (ODCL, figure 9-1).

_____ f. Remove wheel chocks, unfasten rail clamps, and remove rail truck spring wedges as required.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

_____ a. Check lubricant levels where accessible and identify points that may require lubrication during periods of operation.

GROUP B - STARTING THE ENGINE

_____ 1. Check the position and disengage the master switch, engine clutch, or hydraulic pump drive as applicable.

_____ 2. Check controller handles and ensure that 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.

_____ 3. Start the engine in sequence and in the manner prescribed by the OEM.

_____ 4. Observe gauges for correct readings and describe purpose of gauges.

_____ 5. Allow the engine to warm up as appropriate.

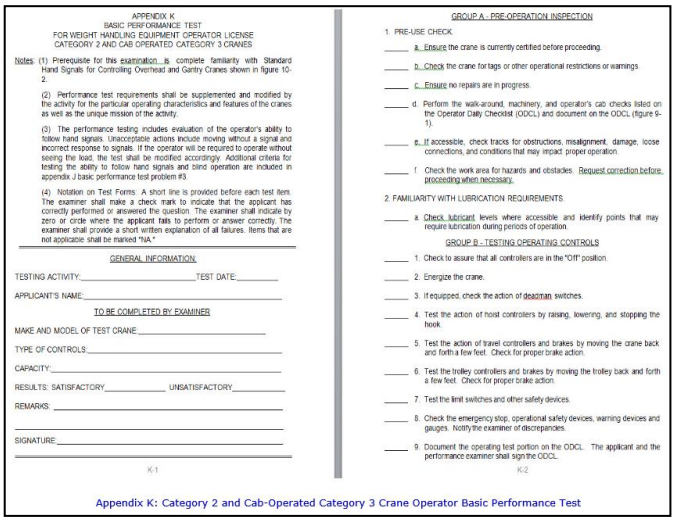
Note: Cranes equipped with air or hydraulic controls shall not be operated until gauges show required operating pressure.

J-2

Appendix J: Category 1 and 4 Crane Operator Basic Performance Test

Cat 2 & 3 PT

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
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 Overhead and Gantry Cranes shown in figure 10-2.

(2) Performance test requirements shall be supplemented and modified by the activity for the particular operating characteristics and features of the cranes as well as the unique mission of the activity.

(3) The performance testing includes evaluation of the operator's ability to follow hand signals. Unacceptable actions include moving without a signal and incorrect response to signals. If the operator will be required to operate without seeing the load, the test shall be modified accordingly. Additional criteria for testing the ability to follow hand signals and blind operation are included in appendix J basic performance test problem #3.

(4) Notation on Test Forms: A short line is provided before each test item. The examiner shall make a check mark to indicate that the applicant has correctly performed or answered the question. The examiner shall indicate by zero or circle where 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 "NA."

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

TYPE OF CONTROLS:_____

CAPACITY:_____

RESULTS: SATISFACTORY_____ UNSATISFACTORY_____

REMARKS: _____

SIGNATURE:_____

K-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

_____ a. Ensure the crane is currently certified before proceeding.

_____ b. Check the crane for tags or other operational restrictions or warnings.

_____ c. Ensure no repairs are in progress.

_____ d. Perform the walk-around, machinery, and operator's cab checks listed on the Operator Daily Checklist (ODCL) and document on the ODCL (figure 9-1).

_____ e. If accessible, check tracks for obstructions, misalignment, damage, loose connections, and conditions that may impact proper operation.

_____ f. Check the work area for hazards and obstacles. Request correction before proceeding when necessary.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

_____ a. Check lubricant levels where accessible and identify points that may require lubrication during periods of operation.

GROUP B - TESTING OPERATING CONTROLS

_____ 1. Check to assure that all controllers are in the "Off" position.

_____ 2. Energize the crane.

_____ 3. If equipped, check the action of deadman switches.

_____ 4. Test the action of hoist controllers by raising, lowering, and stopping the hook.

_____ 5. Test the action of travel controllers and brakes by moving the crane back and forth a few feet. Check for proper brake action.

_____ 6. Test the trolley controllers and brakes by moving the trolley back and forth a few feet. Check for proper brake action.

_____ 7. Test the limit switches and other safety devices.

_____ 8. Check the emergency stop, operational safety devices, warning devices and gauges. Notify the examiner of discrepancies.

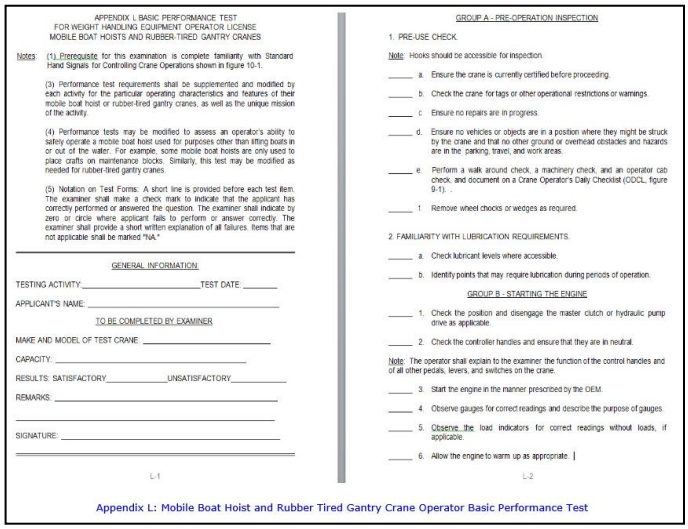
_____ 9. Document the operating test portion on the ODCL. The applicant and the performance examiner shall sign the ODCL.

K-2

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

MBH and RTG PT

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 BASIC PERFORMANCE TEST
FOR WEIGHT HANDLING EQUIPMENT OPERATOR LICENSE
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.

(3) Performance test requirements shall be supplemented and modified by each activity for the particular operating characteristics and features of their mobile boat hoist or rubber-tired gantry cranes, as well as the unique mission of the activity.

(4) Performance tests may be modified to assess an operator's ability to safely operate a mobile boat hoist used for purposes other than lifting boats in or out of the water. For example, some mobile boat hoists are only used to place crafts on maintenance blocks. Similarly, this test may be modified as needed for rubber-tired gantry cranes.

(5) Notation on Test Forms: A short line is provided before each test item. The examiner shall make a check mark to indicate that the applicant has correctly performed or answered the question. The examiner shall indicate by zero or circle where 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 "NA."

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: _____

L-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

Note: Hooks should be accessible for inspection.

_____ a. Ensure the crane is currently certified before proceeding.

_____ b. Check the crane for tags or other operational restrictions or warnings.

_____ c. Ensure no repairs are in progress.

_____ d. 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 parking, travel, and work areas.

_____ e. Perform a walk around check, a machinery check, and an operator cab check, and document on a Crane Operator's Daily Checklist (ODCL, figure 9-1).

_____ f. Remove wheel chocks or wedges as required.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

_____ a. Check lubricant levels where accessible.

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

GROUP B - STARTING THE ENGINE

_____ 1. Check the position and disengage the master clutch or hydraulic pump drive as applicable.

_____ 2. Check the controller handles and ensure that 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.

_____ 3. Start the engine in the manner prescribed by the OEM.

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

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

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

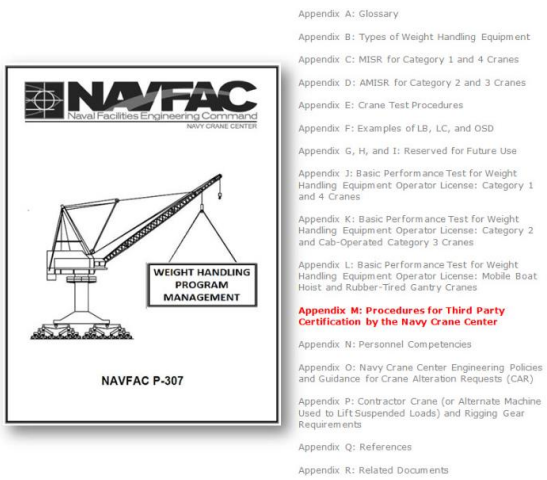
L-2

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

Appendix M: Third Party Certification By Navy Crane Center

Introduction

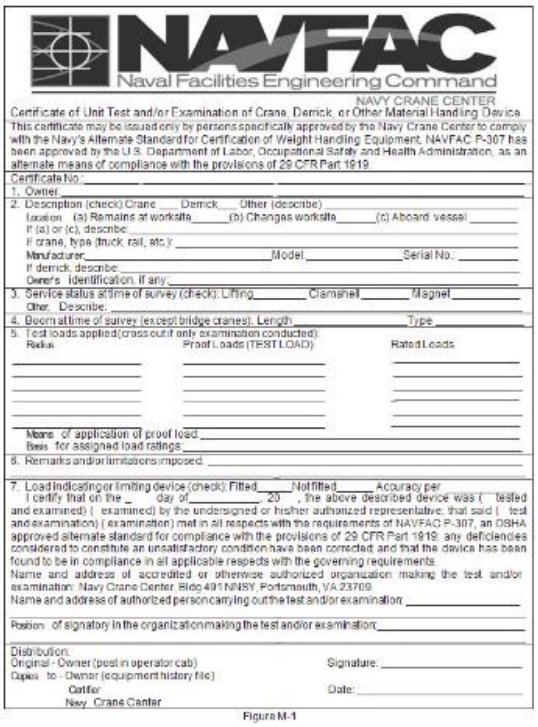
NAVFAC P-307 appendix M provides procedures for third party certifications performed by Navy Crane Center on Navy owned cranes, derricks, container spreaders and below-the-hook lifting devices. This includes a documentation review, condition inspection, load test, and the satisfactory completion of local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



Figures M-1 and M-2

Appendix M contains two forms used by Navy Crane Center third party certifiers: figures M-1 and M-2.

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.


NAVFAC
Naval Facilities Engineering Command
NAVY CRANE CENTER

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

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

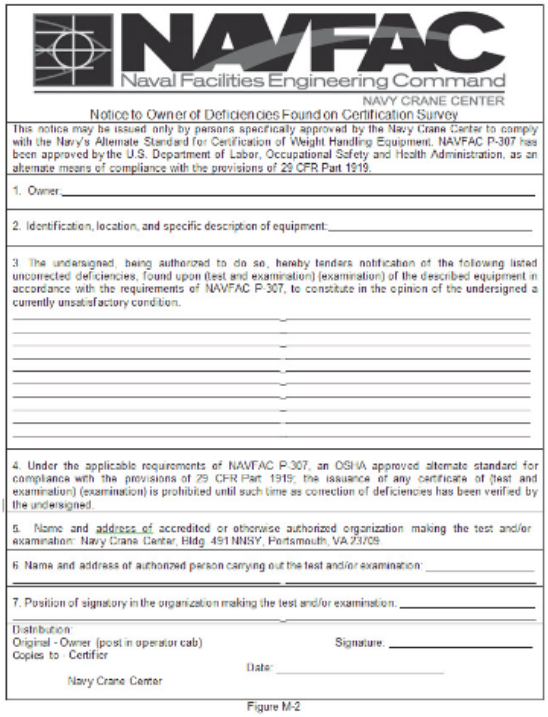
Certificate No.:
1. Owner:
2. Description (check) Crane ___ Derrick ___ Other (describe):
Location: (a) Remains at worksite_____(b) Changes worksite_____(c) Aboard vessel _____
If (a) or (c), describe:
If crane, type (truck, rail, etc.):
Manufacturer:_____Model:_____Serial No.: _____
If derrick, describe:
Owner's identification, if any:
3. Service status at time of survey (check): Lifting_____ Clamshell_____ Magnet _____
Other. Describe:
4. Boom at time of survey (except bridge cranes): Length:_____ Type:_____
5. Test loads applied (cross out if only examination conducted):

Radius	Proof Loads (TEST LOAD)	Rated Loads

Means of application of proof load:
Basis for assigned load ratings:
6. Remarks and/or limitations imposed:
7. Load indicating or limiting device (check): Fitted_____ Not fitted_____ Accuracy per
I certify that on the _ day of _____, 20__, the above described device was (__ tested and examined) (__ examined) by the undersigned or his/her authorized representative; that said (__ test and examination) (__ examination) met in all respects with the requirements of NAVFAC P-307, an OSHA approved alternate standard for compliance with the provisions of 29 CFR Part 1919; any deficiencies considered to constitute an unsatisfactory condition have been corrected and that the device has been found to be in compliance in all applicable respects with the governing requirements.
Name and address of accredited or otherwise authorized organization making the test and/or examination: Navy Crane Center, Bldg 491 NNSY, Portsmouth, VA 23709
Name and address of authorized person carrying out the test and/or examination:
Position of signatory in the organization making the test and/or examination:
Distribution:
Original - Owner (post in operator cab)
Copies to - Owner (equipment history file)
Certifier
Navy Crane Center
Signature:
Date:

Figure M-1

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.


NAVFAC
Naval Facilities Engineering Command
NAVY CRANE CENTER

Notice to Owner of Deficiencies Found on Certification Survey

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

1. Owner:
2. Identification, location, and specific description of equipment:
3. The undersigned, being authorized to do so, hereby tenders notification of the following listed uncorrected deficiencies, found upon (test and examination) (examination) of the described equipment in accordance with the requirements of NAVFAC P-307, to constitute in the opinion of the undersigned a currently unsatisfactory condition.
4. Under the applicable requirements of NAVFAC P-307, an OSHA approved alternate standard for compliance with the provisions of 29 CFR Part 1919; the issuance of any certificate of (test and examination) (examination) is prohibited until such time as correction of deficiencies has been verified by the undersigned.
5. Name and address of accredited or otherwise authorized organization making the test and/or examination: Navy Crane Center, Bldg 491 NNSY, Portsmouth, VA 23709
6. Name and address of authorized person carrying out the test and/or examination:
7. Position of signatory in the organization making the test and/or examination:

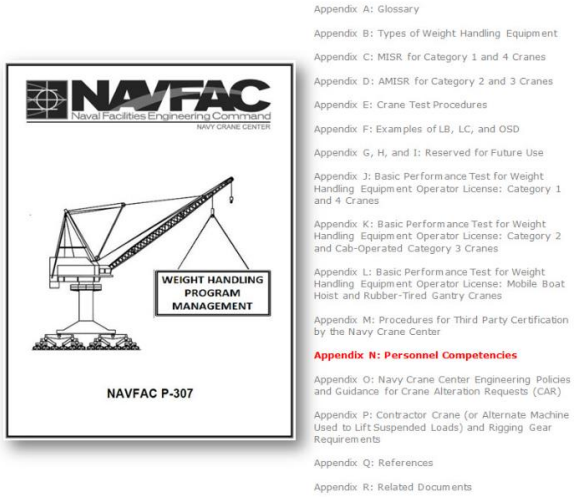
Distribution:
Original - Owner (post in operator cab)
Copies to - Certifier
Navy Crane Center
Signature:
Date:

Figure M-2

Appendix N: Personnel Competencies 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.

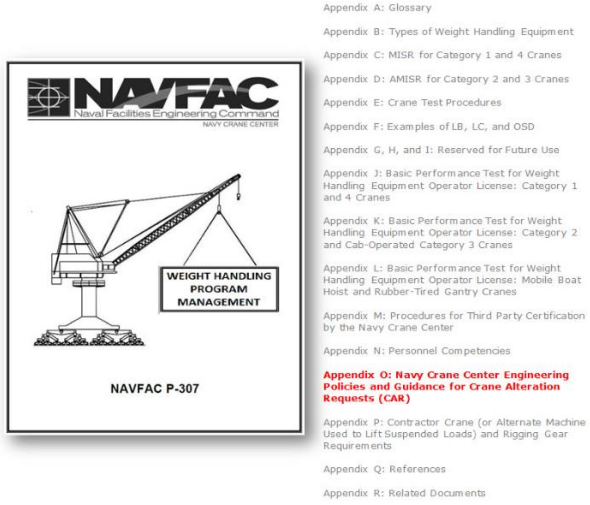


Competencies

Listed here are the positions found in Appendix N.
Refer to NAVFAC P-307 appendix N

These are the requirements of NAVFAC P-307. Additional requirements, competencies, skills, and knowledge may be required by individual activities or by other policies, instructions or directives.

- 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

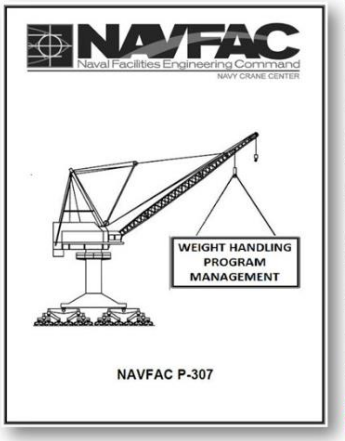


Appendix O: Engineering Policies and Crane Alteration Guidance Introduction

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.

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 A: Glossary

Appendix B: Types of Weight Handling Equipment

Appendix C: MISR for Category 1 and 4 Cranes

Appendix D: AMISR for Category 2 and 3 Cranes

Appendix E: Crane Test Procedures

Appendix F: Examples of LB, LC, and OSD

Appendix G, H, and I: Reserved for Future Use

Appendix J: Basic Performance Test for Weight Handling Equipment Operator License: Category 1 and 4 Cranes

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

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

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

Appendix N: Personnel Competencies

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

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

Appendix Q: References

Appendix R: Related Documents

Appendix P: Contractor Crane and Rigging Gear Requirements 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.

Figure P-1

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

APPENDIX P – CONTRACTOR CRANE (OR ALTERNATE MACHINE USED TO LIFT SUSPENDED LOADS) AND RIGGING GEAR REQUIREMENTS

CERTIFICATE OF COMPLIANCE

This certificate shall be signed by an official of the company that provides cranes (or multi-purpose machines, MHE, or construction equipment used to lift loads suspended by rigging gear) or rigging gear for any application under this contract. Post a completed certificate on each crane or alternate machine (or in the contractor's on-site office for rigging operations) brought onto Navy property.

CONTRACTING OFFICER'S POINT OF CONTACT (Government Representative)	PHONE
PRIME CONTRACTOR/PHONE	CONTRACT NUMBER
CRANE OR ALTERNATE MACHINE SUPPLIER/PHONE (if different from prime contractor)	CRANE OR ALTERNATE MACHINE NUMBER (i.e., ID number)
CRANE OR ALTERNATE MACHINE MANUFACTURER/TYPE/CAPACITY	
CRANE OR ALTERNATE MACHINE OPERATOR'S NAME(S)	

I certify that

1. The above noted crane or alternate machine and all rigging gear conform to applicable OSHA regulations (host nation regulations for naval activities in foreign countries) and applicable ASME B30 or other standards. The following OSHA regulations and ASME or other standards apply _____
2. The operators noted above have been trained and are qualified for the operation of the above noted crane(s) or alternate machine(s).
3. All safety devices and operator aids are enabled and functioning properly and the operators noted above have been trained not to bypass safety devices and operator aids during lifting operations.
4. The operators, riggers and company officials are aware of the actions required in the event of an accident as specified in the contract.
5. Signal persons used in construction work are qualified in accordance with 29 CFR 1926.1428.
6. Riggers are qualified in accordance with NAVFAC P-307, paragraph 11.1.k.
7. All personnel working on the job site have been trained to not stand under a load or in the fall zone of a suspended load unless specifically allowed by USACE EM 385-1-1.

COMPANY OFFICIAL SIGNATURE	DATE
COMPANY OFFICIAL NAME/TITLE	

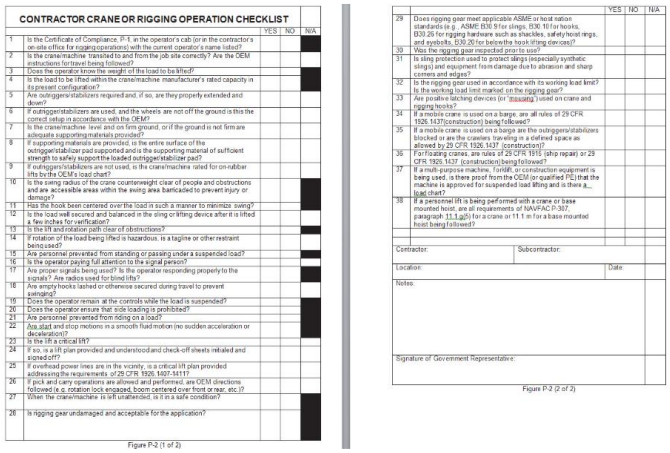
POST ON CRANE (OR ALTERNATE MACHINE)
(IN CAB OR VEHICLE)
(or in the contractor's on-site office for rigging operations)

Figure P-1

Figure P-1: Certificate of Compliance

- riggers are qualified
- 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.



CONTRACTOR CRANE OR RIGGING OPERATION CHECKLIST

		YES	NO	N/A
1	Is the Certificate of Compliance, P-1, in the operator's cab (or in the contractor's on-site office for rigging operations) with the current operator's name listed?			
2	Is the crane/machine transited to and from the job site correctly? Are the OEM instructions for travel being followed?			
3	Does the operator know the weight of the load to be lifted?			
4	Is the load to be lifted within the crane/machine manufacturer's rated capacity in its present configuration?			
5	Are outriggers/stabilizers required and, if so, are they properly extended and down?			
6	If outrigger/stabilizers are used, and the wheels are not off the ground is this the correct setup in accordance with the OEM?			
7	Is the crane/machine level and on firm ground, or if the ground is not firm are adequate supporting materials provided?			
8	If supporting materials are provided, is the entire surface of the outrigger/stabilizer pad supported and is the supporting material of sufficient strength to safely support the loaded outrigger/stabilizer pad?			
9	If outriggers/stabilizers are not used, is the crane/machine rated for on-rubber lifts by the OEM's load chart?			
10	Is the swing radius of the crane counterweight clear of people and obstructions and are accessible areas within the swing area barricaded to prevent injury or damage?			
11	Has the hook been centered over the load in such a manner to minimize swing?			
12	Is the load well secured and balanced in the sling or lifting device after it is lifted a few inches for verification?			
13	Is the lift and rotation path clear of obstructions?			
14	If rotation of the load being lifted is hazardous, is a tagline 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 blind lifts?			
18	Are empty hooks lashed 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 side loading is prohibited?			
21	Are personnel prevented from riding on a load?			
22	Are start and stop motions in a smooth fluid motion (no sudden acceleration or deceleration)?			
23	Is the lift a critical lift?			
24	If so, is a lift plan provided and understood and check-off sheets initialed and signed off?			
25	If overhead power lines are in the vicinity, is a critical lift plan provided addressing the requirements of 29 CFR 1926.1407-1417?			
26	If pick and carry operations are allowed and performed, are OEM directions followed (e.g. rotation lock engaged, boom centered over front or rear, etc.)?			
27	When the crane/machine is left unattended, is it in a safe condition?			
28	Is rigging gear undamaged and acceptable for the application?			

Figure P-2 (1 of 2)

		YES	NO	N/A
29	Does rigging gear meet applicable ASME or local nation standards (e.g., ASME B30.9 for slings, B30.10 for hooks, B30.26 for rigging hardware such as shackles, safety hoist rings, and eyebolts, B30.20 for below-the-hook lifting devices)?			
30	Was the rigging gear inspected prior to use?			
31	Is sling protection used to protect slings (especially synthetic slings) and equipment from damage due to abrasion and sharp corners and edges?			
32	Is the rigging gear used in accordance with its working load limit? Is the working load limit marked on the rigging gear?			
33	Are positive latching devices (or "moused") used on crane and rigging hooks?			
34	If a mobile crane is used on a barge, are all rules of 29 CFR 1926.1437(construction) being followed?			
35	If a mobile crane is used on a barge are the outriggers/stabilizers blocked or are the cranes traveling in a defined space as allowed by 29 CFR 1926.1437 (construction)?			
36	For floating cranes, are rules of 29 CFR 1915 (ship repair) or 29 CFR 1926.1437 (construction) being followed?			
37	If a multi-purpose machine, forklift, or construction equipment is being used, is there proof from the OEM (or qualified PE) that the machine is approved for suspended load lifting and is there a load chart?			
38	If a personnel lift is being performed with a crane or base mounted hoist, are all requirements of NAVFAC P-307, paragraph 11.1.g(5) for a crane or 11.1.m for a base mounted hoist being followed?			

Contractor: Subcontractor:

Location: Date:

Notes:

Signature of Government Representative:

Figure P-2 (2 of 2)

Figure P-2: Contractor Crane or Rigging Operation Checklist

Figure P-2

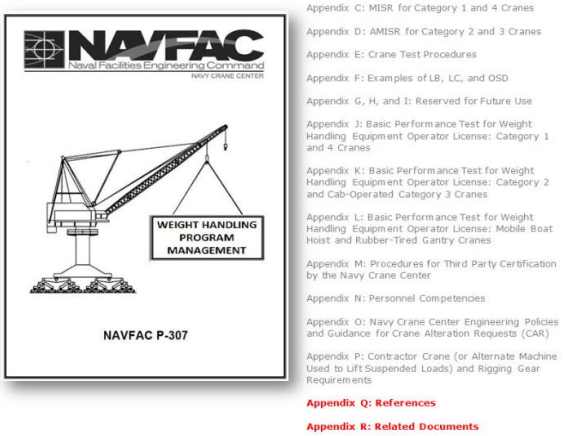
Appendix P, figure P-2, provides a checklist that shall be used during oversight of contractor crane and rigging operations. Copies of figure P-2 shall be kept on file for one year.

Personnel performing oversight shall complete the Contractor Crane Awareness training course or the NAVFAC 40-hr Contract Hazard Awareness Training Course.

Appendices Q and R: References and Related Documents

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).



Examples

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.

A partial list of some of the references and documents is shown.

- Unified Facilities Criteria 3-320-07N, Weight Handling Equipment
- NAVFAC Instruction 11230.0, Inspection, Certification, and Audit of Crane 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
- ASTM A36, Standard Specifications for Carbon Structural Steel

- Bob's Rigging and Crane Handbook
- Handbook for RiggersMobile 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

NOTES

NAVFAC P-307 OVERVIEW QUIZ AND SUMMARY

Knowledge Check Questions & Answers

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

1. Select all that apply.
The overall purpose of NAVFAC P-307 is to…

A. Promote safe operating practices
B. Provide detailed maintenance, test and certification schedules for specific or unique pieces of WHE
C. Ensure the safe lifting and controlling capability of WHE
D. Provide training and qualification standards for all personnel involved in maintenance, inspection, test, certification, engineering, rigging and operation of WHE
E. Maintain the level of safety and reliability that was originally built into the equipment

2. Select the best answer.
Which document would you use to request a revision, deviation or clarification to NAVFAC P-307?

A. CCIR
B. CAR
C. RCDR
D. ODCL

3. Select the best answer.
Which NAVFAC P-307 section or appendix would you read to learn more about self-assessments, monitoring programs, metrics, and general program management?

A. Section 1
B. Appendix E
C. Appendix C
D. Section 10
E. Section 2
F. Section 4
G. Section 7

4. Select the best answer.
Sections 3, 4 and 5 provide information on which topics?

A. Performance testing for category 1, 2 and 3 crane operators
B. Inspection, maintenance, certification
C. Operations, operator inspections, operator licensing
D. Alterations, engineering policies, technical advisories

5. True or False
The crane identification number, certified capacity and certification expiration date must be posted on or near the crane.

A. True
B. False

6. Select all that apply.
The purpose of the condition inspection is to ensure that…

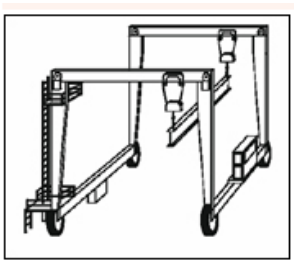
A. the overall mechanical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly
B. the overall electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly
C. work required by all WHEDRs, CARs and ODCLs has been satisfactorily completed and properly recorded
D. the overall structural components of the equipment have been maintained in a safe and serviceable condition and are functioning properly
E. All listed answer are correct.

7. Fill in the blank.
The purpose of the _____ 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.

8. Select the best answer.
What section and/or appendix contains information on crane alterations?

A. Appendix O
B. Section 8
C. Appendix P
D. Section 6 and appendix O
E. Section 6
F. Section 8 and appendix P
G. Sections 5 and 11

9. Select the best answer.
What is the category of this crane?



A. Category 1
B. Category 2
C. Category 3
D. Category 4

10. Select the best answer.
What is the category of a jib crane with a capacity of less than 20,000 pounds?

A. Category 1
B. Category 2
C. Category 3
D. Category 4

11. Matching
Correctly identify each item as either a load bearing component, a load controlling component or an operational safety device by checking the appropriate box adjacent to that item.

1. Load bearing part
2. Load controlling part
3. Operational safety device

☐1 ☐2 ☐3 A. Load block
☐1 ☐2 ☐3 B. Locking devices
☐1 ☐2 ☐3 C. Rotate drive keys
☐1 ☐2 ☐3 D. Truck axles/wheels
☐1 ☐2 ☐3 E. Travel electric brakes
☐1 ☐2 ☐3 F. Proximity switch
☐1 ☐2 ☐3 G. Luffing hoist limit switch
☐1 ☐2 ☐3 H. Drum shafts
☐1 ☐2 ☐3 I. Emergency stop switches
☐1 ☐2 ☐3 J. Crane mounted diesel engines and generators

12. Select the best answer.
Who is responsible for completing, signing, posting, and retaining this (P-1) form?

A. Certifying Official
B. Oversight Inspector
C. Crane Owner
D. Contracting Officer

13. True or False
NAVFAC P-307 provides guidance to shore based naval activities for weight handling equipment program management.

A. True
B. False

14. True or False
Non-cab operated category 3 cranes require a license to operate.

A. True
B. False

15. Select all that apply.
A license is required to operate:

A. Category 1 cranes
B. Category 2 cranes
C. Cab-operated category 3 cranes
D. Category 4 cranes

16. Matching
Assign the correct NAVFAC P-307 crane category to the pictured items by clicking the appropriate box next to the picture.

1. Category 4
2. Category 3
3. Category 2
4. Category 1
5. None of the listed categories


☐1 ☐2 ☐3 ☐4 ☐5


☐1 ☐2 ☐3 ☐4 ☐5


☐1 ☐2 ☐3 ☐4 ☐5

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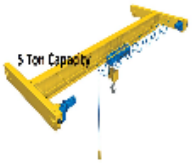


☐1 ☐2 ☐3 ☐4 ☐5


☐1 ☐2 ☐3 ☐4 ☐5

17. Select the best answer.
Which form would be used to perform a maintenance inspection on a cab-operated category 3 crane?

A. AMISR
B. MISR

18. Select all that apply.
A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly resulting in any of the following EXCEPT when…

A. the crane two-blocks
B. a mobile crane is configured for transit
C. personnel injury or death occurs
D. material or equipment is damaged
E. a load is dropped
F. a component fails with no other damage occurring
G. an overload occurs

19. Fill in the blank.
Section _____ 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.

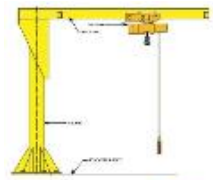
20. Fill in the blank.
NAVFAC P-307 appendix N provides a listing of _____ that personnel must satisfy prior to performing assigned weight handling duties in the noted positions.

21. True or False
The appendix B glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307.

A. True
B. False

22. Matching
Match terms 1 through 7 with the correct picture by clicking in the appropriate box next to each pictured crane.

1. Mobile Boat Hoist
2. Bridge Crane
3. Rubber-Tired Gantry Crane
4. Portal Crane
5. Commercial Truck Mounted Hydraulic Boom Crane
6. Floating Crane
7. Jib Crane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☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7


☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

23. Select the best answer.
To review basic crane test procedures for most cranes you would refer to which part of the NAVFAC P-307 manual?

A. Appendix T: Testing
B. Section 15 and Appendix T: Test Specifications and Testing
C. Appendix E: Crane Test Procedures
D. Section 15: Test Specifications

24. Select the best answer.

A Navy Crane Center third party certifier would use which of the listed forms to inform the crane owner of uncorrected deficiencies found on the crane?

A. Figure M-2: Notice to Owner of Deficiencies Found on the Certification Survey
B. Figure M-1: Certificate of Unit Test and Examination
C. Figure M-3: Deficient Items List

25. Fill in the blank.
A significant accident is an accident that typical has a greater potential to result in _____.

Summary & Contact Information

During this overview you were exposed to all the sections, appendices, and forms found in the NAVFAC P307 manual along with a brief explanation of each one. Your understanding of this manual includes: its purpose and scope, the types of equipment covered, load bearing, load controlling and operational safety devices, training, competency and licensing requirements, information on working with contractors, various tables and figures, and how to obtain support and assistance from Navy Crane Center.

Now that you have completed this brief introduction, you are encouraged to learn more about the Navy's weight handling program by mentoring, shadowing or simply listening to more experienced program personnel. You can also go to the Navy Crane Center's web page where you can download a copy of NAVFAC P307, review and print crane safety advisories, equipment deficiency memorandums, RCDRs, safety and training briefs, and other forms and figures. Above all, be ever vigilant, situationally aware, and stay safe at all times, not only for yourself but for all your teammates as well.

The following screen provides contact information and is the final screen in this overview. Thank you for taking the time to learn more about NAVFC P-307 and the Navy's Weight Handling Program.

Contact

The Navy Crane Center is available to assist in matters relating to Navy weight handling equipment and programs. Navy Crane Center can be contacted by mail, phone, fax, internet, email or in-person visit. Review the data on the screen for brief descriptions and general information about NCC including services, office locations, and contact information.

Navy Crane Center General and Contact Information

Director (Attn: xxx)
Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709
General Phone: 757-967-3803, DSN: 387, Fax: 757.967.3808

Headquarters: Portsmouth, VA

- Acquisition: Project Management (757-967-3810), Contracts (757-967-3819), and Design Engineering (757-967-3822), Technical pre-delivery
- In-Service Engineering: RCDRs, WHEDRs, Alterations, P-307 Interpretations, Technical post-delivery, 757-396-0220
- Compliance: Reviews, Evaluations, 757-967-3855
- Safety and Training: Safety, Accidents, Near Misses, Unplanned Events, Training, Licensing, 757-967-4042
- NCCR: On-site Representation, 08 liaison, 757-967-3838

Engineering, Compliance and On-Site Representative (NCCR) Field Offices

- Norfolk Naval Shipyard NCCR, 757-396-1771 (DSN 386)
- Puget Sound Naval Shipyard and Intermediate Maintenance Facility NCCR, 360-476-8011 (DSN 439)
- Portsmouth Naval Shipyard NCCR, 207-438-4740 (DSN 684)
- Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility NCCR, 808-473-8000 ext. 6112 (DSN 449)
- Newport News Shipbuilding NCCR, 757-534-3519
- General Dynamics Electric Boat NCCR, 806-433-6699
- Pacific Northwest Region Compliance and Engineering: Silverdale, WA, 360-476-8050/2054 (DSN 439)
- Pacific Southwest Region Compliance: San Diego, CA, 619-532-2232 (DSN 526)

Internet: https://www.navfac.navy.mil/ncc

- NAVFAC P-307 (nfsh_ncc_p307@navy.mil)
- CSAs, EDMs, Safety Messages (nfsh_ncc_csa@navy.mil)
- Training (nfsh_ncc_training@navy.mil)
- Alterations (nfsh_ncc_cranealt@navy.mil)
- Crane Corner Articles, Reports
- Safety Videos
- Accident Prevention
- Safety Briefs
- Other Links and Information

NOTES

LTD CERTIFICATION PROGRAM OVERVIEW

Introduction

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

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".

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.

Personnel

The principal personnel in the Navy's crane certification program include the certifying official, the load 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 load 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.

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. 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.

Load Bearing Parts are 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, shall also be considered as load bearing parts.

Load Controlling Parts are 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, shall also be considered as load controlling parts.

Operational Safety Devices are safety devices that affect the safe load lifting and handling capability of the equipment, such as interlocks, limit switches, load/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.

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.

Condition Inspection

Condition inspections are performed before, during and after the load test in accordance with NAVFAC P-307 requirements. Refer to section 4 and appendix E. 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.

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:

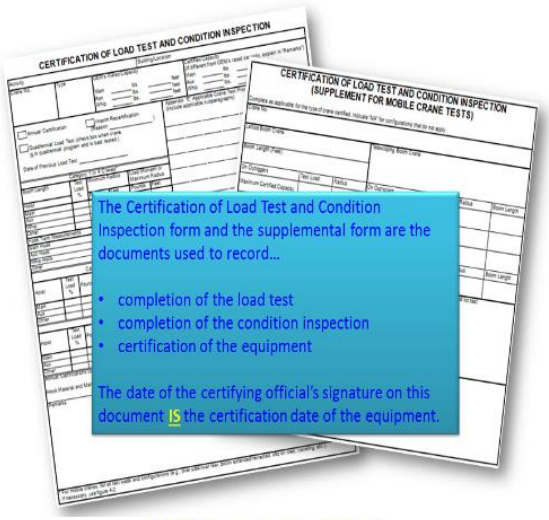
Item No.	Item Description	B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end				
3					
4					
5					
6					
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a drydock or pit is required) and backup upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If a load test is performed at certification, inspect load indicators, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				

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.

Certification

The certification process shall include a condition inspection and the appropriate testing. All cranes in the Navy's inventory require an annual certification. In other words, and to be clear, all Navy cranes, in all categories, of all types and capacities, shall be inspected, tested, and certified every year, if they are to remain in productive service.

The Certification of Load Test and Condition Inspection form, and if needed, the supplemental form for mobile crane tests, are used to document the satisfactory completion of certification actions. The Certification of Load Test and Condition Inspection form shall be signed by the load test director, condition inspectors, and the certifying official. The date of the certifying official's signature IS the certification date of the equipment.



The certification is valid for one year from the date of the signature of the certifying official. The certification expiration date shall be one day prior to the anniversary date of the certification. The crane may remain in service on the expiration date.

A card or tag with the crane identification number, certified capacity, and the certification expiration date shall be posted in a conspicuous location on or near the crane, for example: on the controller, on the power supply, in the cab, or on the jib column.

See NAVFAC P-307 paragraphs 4.3, 4.4 and 4.5 for details and exceptions.

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.

Load Test

Listed here are five events that require a load test.

- The acceptance of newly procured cranes.
- The annual certification for category 1 and 4 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 (105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber-tired gantry cranes, and category 4 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.

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.

Knowledge Check

1. Select the best answer.
   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. Condition Inspector
   B. Certifying Official
   C. Maintenance Inspector
   D. Load Test Director

2. Select the best answer.
   The _____ ensures that the activity's cranes are inspected, tested, and certified in accordance with NAVFAC P-307 requirements.

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

3. Fill In the Blank.
   The certifying official must base all crane related decision on _____. (Hint: one word)

4. Select the best answer.
   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

5. True or False
   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

6. Select the best answer.
   The purpose of the _____ 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.

   A. Maintenance inspection
   B. Condition inspection
   C. Load test
   D. Validation

7. Select the best answer.
   Identify the form used to record completion of the load test and condition inspection.

   A. Crane Condition and Inspection Record
   B. Maintenance Inspection Specification Record
   C. Supplement for Mobile Cranes
   D. Certification of Load Test and Condition Inspection

8. True or False
   Of all the Navy's cranes, only category 1 and 4 cranes (all types and capacities) need to be inspected, tested, and certified every year.

   A. True
   B. False

9. 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

10. 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. New crane acceptance
    C. Replacement of the upper hoist limit switch
    D. Work performed on a component that affects holding strength
    E. Mobile crane annual certification
    F. The second annual certification of a one ton pillar jib crane in a quadrennial program

11. Select the best answer.
    To determine if a load test is required…

    A. Contact the chief engineer
    B. Research the equipment history files
    C. Contact the OEM and review the OEM manuals
    D. Write an RCDR to Navy Crane Center
    E. Assess the component's impact on holding strength

Summary

Congratulations. You've completed the Certification Program Overview training module.

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 load 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 Load Test and Condition Inspection 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.

Next, you will be introduced to the team members that carry out the duties required to support the test, inspection and certification program. The next module will cover the qualifications and responsibilities of the load test director and the other load test team members.

Certification Program Overview Summary

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
- Load Test Director - oversees load testing
- Condition Inspector - ensures equipment is in satisfactory condition

- Crane Condition Inspection Record - inspection documentation
- Certification of Load Test and Condition Inspection form certification documentation

Similarities, differences, and explanations for...

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

NOTES

CRANE TESTING 1: GENERAL

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: General Crane Testing. This is the first of three modules on crane testing and presents general information for all cranes. Modules 2 and 3 present specific testing information and crane test procedures for the four 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.

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.

Capacity

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 that value which is shown on the OEM 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.

Overload

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

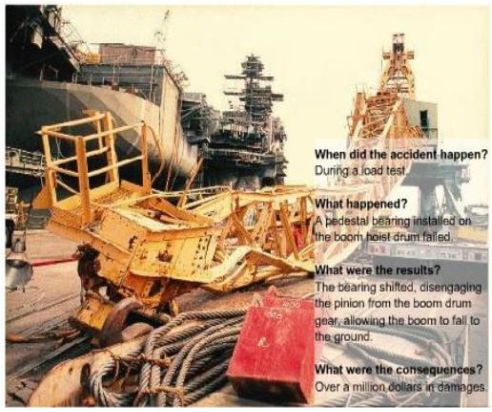
When a crane loses stability, the tipping force of the load overcomes the counteracting load of the crane. When tipping begins, especially with loads high in the air, it is very unlikely that the crane operator can do much to prevent overturning. As the crane begins to tip, the load radius increases 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 over loading 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?

Example 1



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

Example 2

The crane had a fully extended boom with a lattice extension erected. There was no load on the crane. The crane was being boomed out to the location of the test load. A gust of wind pushing on the back side of the boom contributed to the crane overturning. No injuries were reported but it 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 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 4

While preparing to conduct a free-rated (on-rubber) load test, the load moment indicator was mistakenly programmed for on-outrigger operations. As the boom was extended and lowered, to reach the test load, the crane overturned. The boom fell across a parked vehicle, which fortunately, had no one in it. No injuries were reported but it did result in extensive and expensive damages.
Possible causes might include complacency, failure to understand or follow proper procedures, or simply inattention to details. Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions asked and answered? Can you think of any other possible outcomes or results?

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. To minimize the risks, perform the tests with the boom about half way between minimum and maximum extension.
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. Stay 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 or 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.

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 - General

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 (AEPs) 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.

Note: The link information is not provided in the Instructor or Student Guides. See NAVFAC P-307 Appendix E.

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
- 110% +0%/-5%, of the rated capacity

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.

125%: Except as noted in NAVFAC P-307, the following cranes: 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…shall be tested at a nominal test load value of 125% of their rated capacity. The actual test load shall be within +0%/-5% of the nominal test load value.

100%: Except as noted in NAVFAC P-307, the following cranes: mobile, locomotive, aircraft crash, mobile boat hoist, rubber-tired gantry, and category 4…shall be tested at a nominal test load value of 100% of their rated capacity. The actual test load shall be within +0%/-5% of the nominal test load value.

110%: 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% of that nominal test load value.

Down Rating

For cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent the specified overload percentages, the cranes shall be down rated to 80% of the OEM's allowable test load or 90% for third party certified mobile and category 4 cranes, and then tested to the requirements of NAVFAC P-307. See paragraph 4.7.1.

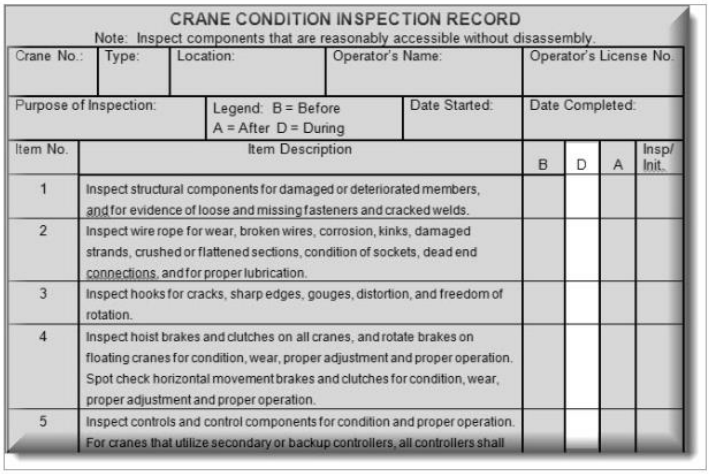
Document reduced capacity by crane alteration in accordance with NAVFAC P-307, section 6.

Condition Inspection

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 “View CCIR” to see the entire form. Drag the corner of the pop-up window to enlarge the form.



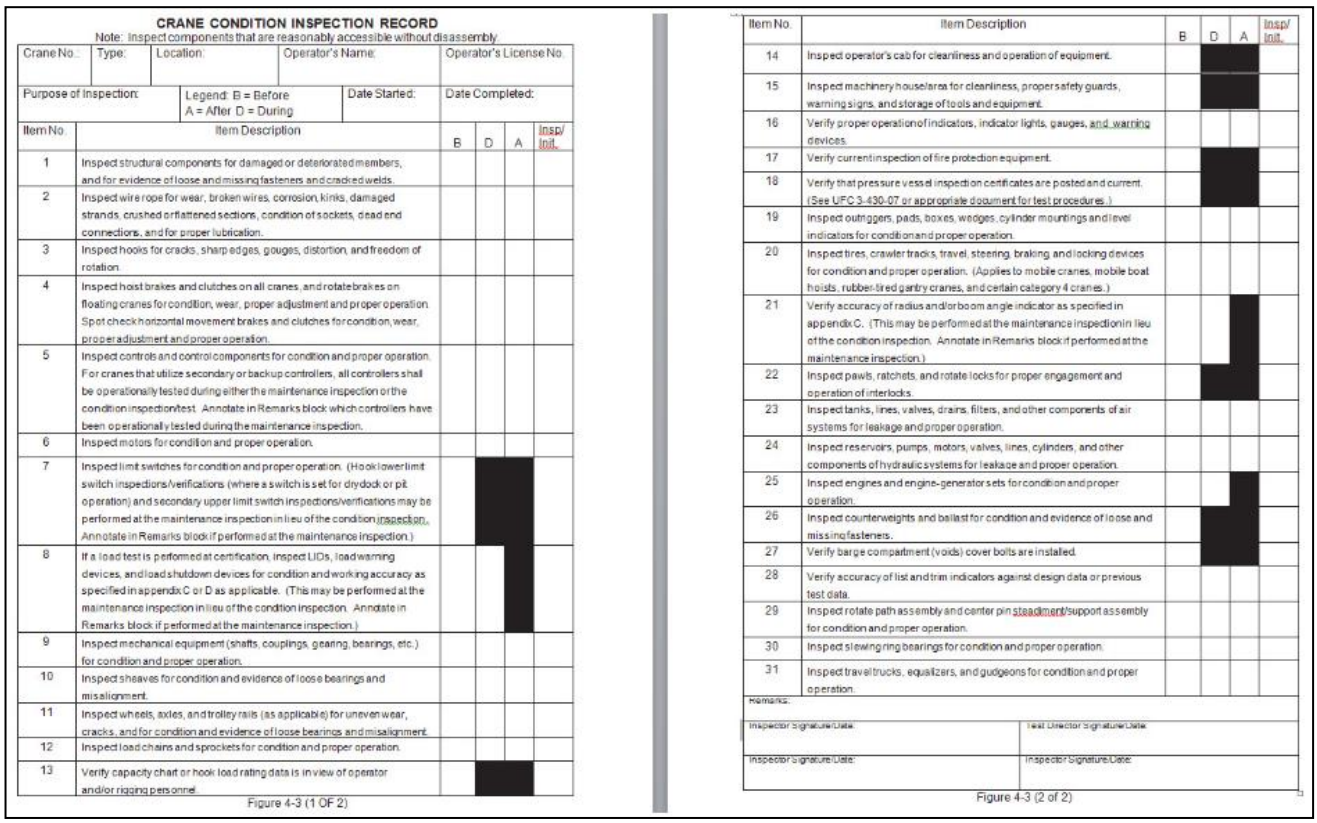
CRANE CONDITION INSPECTION RECORD

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				



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 be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a switch is set for drydock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If a load test is performed at certification, inspect LIDs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				

Figure 4-3 (1 OF 2)

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 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 boat hoists, rubber-tired 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 pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.				
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.				
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.				
27	Verify barge compartment (voids) cover bolts are installed.				
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin steadment/support assembly for condition and proper operation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				

Remarks:

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

Figure 4-3 (2 of 2)

Knowledge Check

1. Select the best answer
   What is the difference between gross and net capacity?

   A. The weight of the wire rope
   B. The weight of all equipment deductions
   C. The total weight of all rigging gear
   D. Load chart capacity values at different radii
   E. The combined weight of the hook and block

2. Select all that apply.
   Identify the potential consequence(s) of exceeding the crane's rated capacity.

   A. Electrical malfunction
   B. Loss of stability
   C. Structural failure
   D. Rigging accident

3. Select the best answer.
   Three best practices for improved safety and incident avoidance include:

   A. Thorough before-test CCIR inspection
   B. Complete ODCL
   C. Detailed pre-test brief
   D. All of the listed items
   E. None of the listed items

4. Select the best answer.
   What is the test load specification for testing a mobile crane?

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

5. 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. Static Test
   B. No-load Test
   C. Swing Range Test
   D. Load Test
   E. Dynamic Test
   F. Maximum Height Test

7. Select the best answer.
   What is the test load specification for testing third party certified mobile cranes?

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

8. True or False
   Cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent the specified overload percentages shall be down rated to 50% of the OEM's allowable test load or 60% for third party certified mobile and category 4 cranes.

   A. True
   B. False

9. Select all that apply.
   Identify conditions for which test personnel shall remain fully alert during testing.

   A. Family matters
   B. Visibility
   C. Weather
   D. Complacency
   E. Wind

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

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

Summary

Congratulations. You've completed the General Crane Testing training module.
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 specific testing requirements for category 1 and 4 cranes as well as some special testing situations.

NOTES

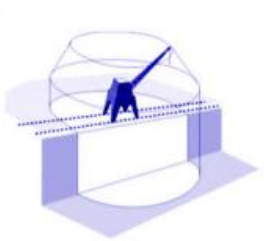
CRANE AND RIGGING ACCIDENTS

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 of accidents: crane accidents and rigging accidents. Crane accidents are those that occur during operation of a category 1, 2, 3, or 4 crane. Rigging accidents are those that occur when gear and equipment identified in section 14 is used by itself in a weight handling operation, i.e., without category 1 through 4 cranes, or when covered gear is used with multi-purpose machines, MHE (e.g., 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.

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, 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.

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 (except a crane being operated in transit as defined in NAVFAC P-307 appendix A), 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.

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.

Knowledge Check

1. Select all that apply.
   The crane operating envelope includes the crane, the operator, the riggers, the crane walkers, and …

   A. Rigging gear between the hook and the load
   B. The area where the load will be landed
   C. The load
   D. Any supporting structures

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. The user of the gear or equipment
   B. Other personnel involved in the operation
   C. The rigging procedure
   D. The crane removal procedure
   E. The gear or equipment’s supporting structure
   F. The load rigging path

Near Miss

A near miss is an unplanned event during a weight handling operation that did not result in a definable accident but easily had the potential to do so. Only a break in the chain of events prevented an accident. Simply put, a near miss is an accident that almost took place. The difference between a near miss and an accident (serious or otherwise) is often a fraction of an inch or a split second of time. A near miss report is used to learn from situations where an accident "almost" happened so that the real event can be averted.

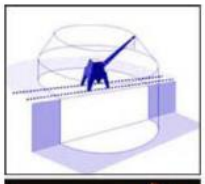
Unplanned Occurrence

An "unplanned occurrence" describes an event that does not meet the definition of a crane or rigging accident but results in injury or damage to a crane, crane component, or related equipment due to an event not directly related to a weight handling operation. Examples include, but are not limited to, injury or damage caused by weather, damage to a parked or stationary crane caused by another moving object (e.g. vehicle, forklift), and flooding or fire damage.

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.

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, material or 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), or collision (avoidable contact between the load, crane, and/or other objects).

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, material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function, 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 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.

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

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.

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.

Accident Actions

Upon having an accident or having seen evidence of damage, the crane team, riggers, equipment users, etc., shall stop all operations and notify immediate supervisor(s).
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.
The supervisor shall notify management personnel as well as the activity safety office.

Crane Accident Actions

If a crane accident occurs, personnel must take the following actions:
Stop operations as soon as possible, however don't stop at the expense of safety.
In some circumstances, for example, if a crane is involved in a collision as a load is being lowered, the operator should first land the load, then, follow the accident response procedure.
Don't try to correct the problem unless life or limb is in danger.
Call, or have someone call 911 if an injury occurs.
Secure the crane.
Secure power as required.
If danger exists to the crane or personnel, place the crane and load in a safe position.
Notify supervision as soon as safely possible.
Ensure that the accident scene is preserved to aid the investigation.

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 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.
For each suspected accident, activities shall promptly perform an investigation, prepare a crane and rigging accident report using figure 12-1 (available on the Navy Crane Center web site), 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, secure the accident site and protect evidence until released by the contracting officer, and conduct an investigation to establish the root cause(s) of any WHE accident, near miss, or unplanned occurrence.
Crane operations shall not proceed until the 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 consisting of a summary of circumstances, an explanation of causes, photographs (if available), and corrective actions taken.

Reporting Procedures – Contracting Officer

The contracting officer shall notify the host activity of any WHE accident upon notification by the contractor. Additionally, the contracting officer shall notify the Navy Crane Center, by e-mail (nfsh_ncc_accident@navy.mil), of an accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane or adjacent property as soon as possible, preferably within 8 hours of notification by the contractor. For all other accidents, notify the Navy Crane Center as soon as practical but no later than three working days after the accident.
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.

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.

Knowledge Check

1. 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:

   A. Operator error
   B. Crane accident
   C. Rigging gear deficiency
   D. Rigger error

2. 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:

   A. Crane accident
   B. Load configuration error
   C. Operator error
   D. Crane walker’s error

3. Select the best answer.
   When rigging gear covered by P-307 Section 14 fails while suspended from a structure and drops the load it is a:

   A. Load configuration error
   B. Rigging accident
   C. Crane accident
   D. Rigging error

4. Select the best answer.
   If component failure occurs, such as motor burnout, and does not result in damage, the component failure is considered:

   A. Crane maintenance’s responsibility
   B. A crane accident
   C. A non-accident
   D. A rigging accident

5. Select the best answer.
   To whom or to what are the majority of crane accidents attributed?

   A. Weather conditions
   B. Personnel error
   C. Crane operators
   D. Equipment failure
   E. Riggers or signalmen

6. Select all that apply.
   Over-confidence 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. The crane operating envelope
   C. Operating the crane too fast
   D. Inattention to the task

7. 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. Stop operations as soon as safely possible
   B. Notify your supervisor immediately
   C. Secure the crane and power as required
   D. Call emergency services if anyone is injured

NOTES

CO EXPECTATIONS & RESPONSIBILITIES

Welcome
Welcome to the NAVFAC P-307 Certifying Official Training module: Expectations & Responsibilities. This module describes the basic requirements, responsibilities, and expectations of the certifying official.

Module 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

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.

Key Responsibilities


Being accountable for the integrity of the activity's weight handling equipment, some of the key responsibilities of the certifying official include:

- Certification of equipment
- Interim recertification of equipment
- NCC third party certification of applicable equipment
- Designation of test and inspection personnel
- Approvals and concurrences of deferrals, extensions, procedures, configurations, reports, etc.
- Review documentation
- Review of non-load test, non-interim recertification work
- Resolution of weight handling equipment issues

Designation of Personnel

The certifying official shall be designated in writing by the commanding officer or by official instruction. The certifying official, in turn...

Designates, in writing, the test directors and condition inspectors who are going to perform the inspections and load tests on the cranes.

For activities that obtain weight handling services from other activities, they shall designate in writing the activity and services that are being provided in lieu of the specific personnel.

If the certifying official is also designated by the activity commanding officer as the official responsible for the crane operator licensing program, he or she shall designate the license issuing officials, instructors, and performance examiners for the training, testing, and licensing of crane operators.

Before designating personnel, confirm they are well qualified and possess the necessary knowledge, skills, experience, attitude, and training to perform the tasks and duties of the position. 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 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, minus one day. A crane shall not be used in service without a valid certification except to perform maintenance lifts when deemed safe to do so by the certifying official. Certifications are discussed in NAVFAC P-307 section 4.

For out-of-service cranes, after successful completion of the condition inspections and tests, a Certification of Load Test and Condition Inspection 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 shall be re-performed.

Interim Recertification

You, 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.

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 recertification becomes necessary during the certification period, a new third party certification will be required when the interim recertification 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.

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.

Approvals and Concurrences

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 should 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. 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

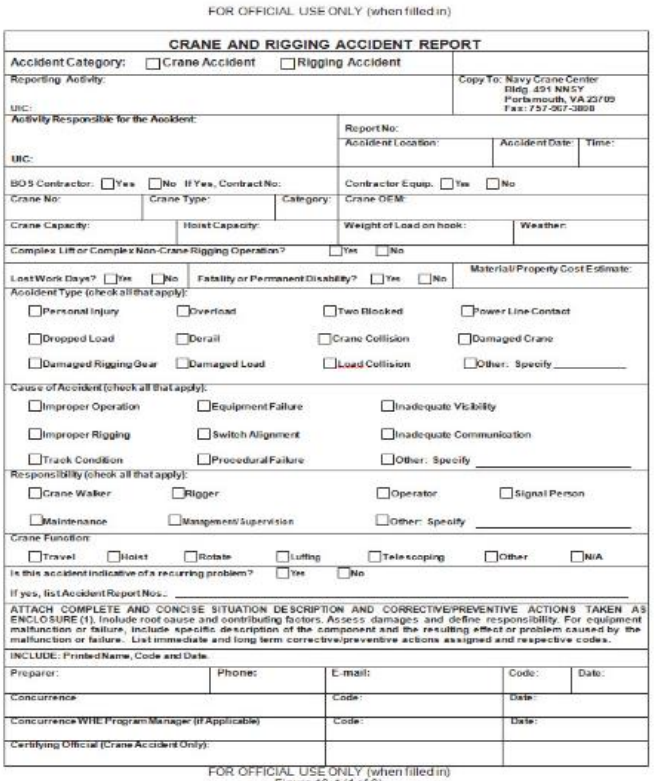
The certifying official is tasked with approving procedures for cranes. When cranes come with features or components not specifically covered by NAVFAC P-307, the certifying official will approve procedures developed by the activity engineering organization.
The certifying official will review and approve 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 for approval.
Any changes to procedures other than minor editorial changes shall also be approved by the certifying official and 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.

Configurations

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 Reports

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.



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CRANE AND RIGGING ACCIDENT REPORT

Accident Category: ☐ Crane Accident ☐ Rigging Accident

Reporting Activity: | Copy To: Navy Crane Center, Bldg. 491 NNSY, Portsmouth, VA 23709, Fax: 757-967-3808

UIC:

Activity Responsible for the Accident: | Report No:

UIC: | Accident Location: | Accident Date: | Time:

BOS Contractor: ☐ Yes ☐ No If Yes, Contract No: | Contractor Equip. ☐ Yes ☐ No

Crane No: | Crane Type: | Category: | Crane OEM:

Crane Capacity: | Hoist Capacity: | Weight of Load on hook: | Weather:

Complex Lift or Complex Non-Crane Rigging Operation? ☐ 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 ☐ Crane Collision ☐ Damaged Crane

☐ Damaged Rigging Gear ☐ Damaged Load ☐ Load Collision ☐ Other: Specify _____

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 ☐ 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 Nos.: _____

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:	
Concurrence WHE Program Manager (if Applicable)		Code:	Date:	
Certifying Official (Crane Accident Only):				

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Figure 12-1 (1 of 2)

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.

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 web site.

Other resources include the OEM representative and manuals, local engineering and inspection staff, and other activity weight handling equipment program points-of-contact.

Knowledge Check

1. Fill In the Blank.
   The certifying official must base all crane related decisions on _____.
   (Hint: one word)

2. Select all that apply.
   Before certifying a crane, the certifying official must ensure all requirements have been met for …

   A. Testing
   B. Documentation
   C. Inspection
   D. Maintenance

3. Select the best answer.
   The certifying official shall designate, in writing, which of the following personnel …

   A. Crane operator instructors
   B. Crane operator performance examiners
   C. Condition inspectors and load test directors
   D. All of the listed personnel
   E. None of the listed personnel

4. 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. Crane set-up and lift configurations
   B. Procedures for the controlled disassembly and reassembly of critical components
   C. Reduced capacity ratings, test procedures, and test conditions for barge mounted cranes
   D. 90-day crane certification extensions
   E. Ancillary equipment procedures

6. 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 certification, is necessary for cranes engaged in cargo transfer, ship building, ship repair, and ship breaking?

   A. Third Party
   B. Conditional
   C. Interim
   D. Annual

8. Select the best answer.
   What two items are required to allow the certifying official to defer work on components?

   A. Engineering evaluation and approval
   B. Written technical justification, written deferral
   C. Inspector's notes and LTD's concurrence
   D. Commanding officer's approval, inspector's justification

9. Select the best answer.
   To which sections, appendices, or paragraphs in NAVFAC P-307 would you refer to correctly determine when load tests are or are not required and whether or not recertification is required following any repairs, adjustments or alterations to a crane?

   A. Paragraphs 3.7 and 3.8
   B. Appendix E, paragraphs 1.3 through 1.8
   C. Appendix C
   D. Section 2
   E. Paragraphs 4.3 and 4.4

10. Select all that apply.
    Identify key responsibilities of the certifying official.

    A. In-writing designation of WHE manager
    B. Concur with certification extensions
    C. Designation of maintenance inspectors
    D. Approval of work deferrals
    E. Review and approval of crane test and configuration procedures
    F. Review and sign crane accident reports
    G. In-writing designation of load test directors
    H. Equipment certification
    I. Verbal designation of condition inspectors
    J. Resolution of weight handling equipment issues

Summary

Congratulations. You've completed the Expectations & Responsibilities training module. 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.

NOTES

CO DOCUMENTATION REVIEW

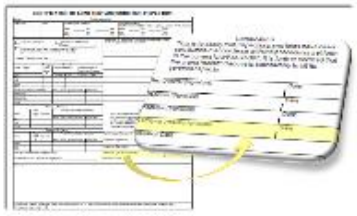
Welcome

Welcome to the NAVFAC P-307 Certifying Official Training module: Documentation Review. This module reviews the various crane repair, inspection, testing, and certification documents.

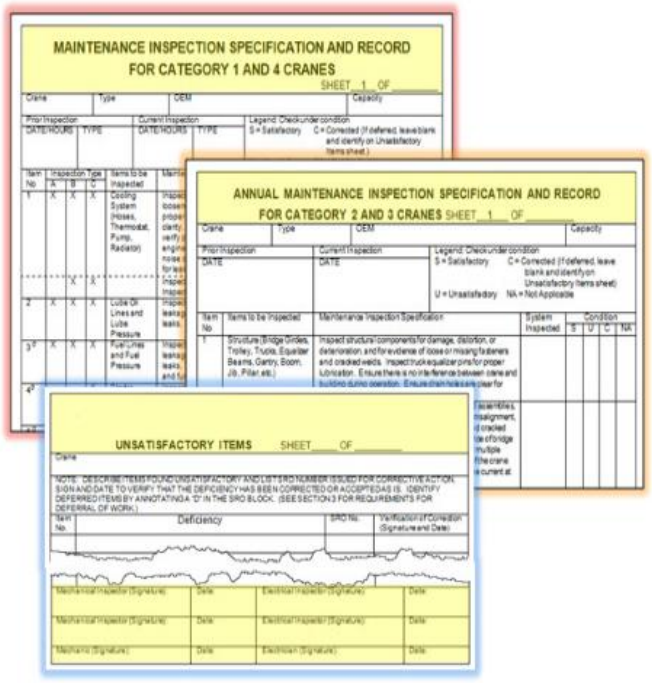
Module Objectives

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, or MISR, the Crane Condition Inspection Record, or CCIR, and the Certification of Load Test and Condition Inspection 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 and 4 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 Load Test and Condition Inspection 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.



MISR, AMISR Review

The Maintenance Inspection Specification and Record is used for category 1 and category 4 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'. When using the MISR for category 4 cranes, only the applicable portions of appendix C are used, as needed and recommended by the original equipment manufacturer or O-E-M.
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

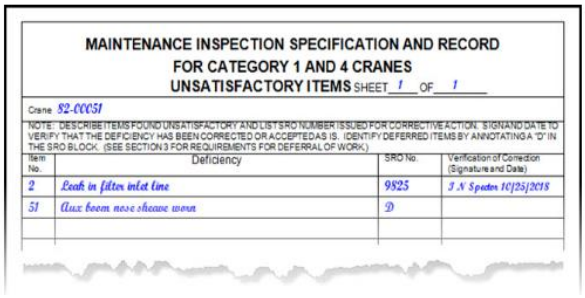
certifying official shall verify that the information blocks at the top of each sheet are filled in with the correct information. He or she shall further verify that all inspection blocks are marked appropriately to indicate that the inspected items are satisfactory, unsatisfactory, corrected, or not-applicable. 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.

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.

Item No	Inspection Type A	B	C	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition 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			

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.



MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 AND 4 CRANES
UNSATISFACTORY ITEMS SHEET 1 OF 1

Crane 82-00051

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)

Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)
2	Leak in filter inlet line	9825	J.N Spates 10/25/2018
51	Aux boom nose sheave worn	D	

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 appendixes 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?

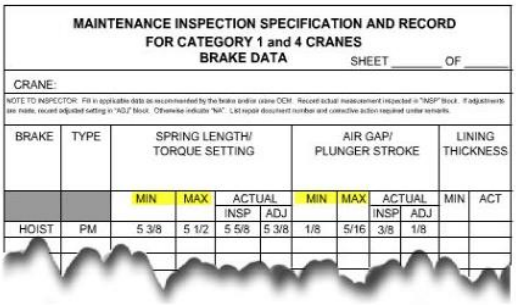
Deferred work to load bearing, load controlling and operational safety devices requires the review and approval of the certifying official and written technical justification.
NAVFAC P-307 paragraph 3.3.5 provides additional details for deferring work.

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?



MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 and 4 CRANES
BRAKE DATA SHEET _____ OF _____

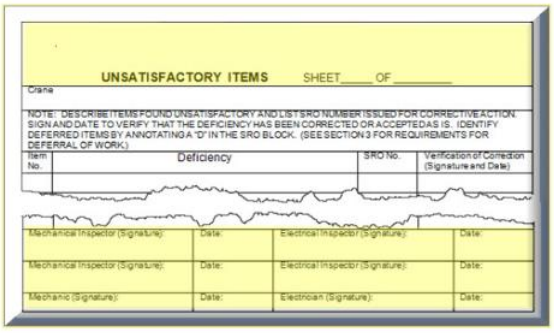
CRANE:

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		
HOIST	PM	5 3/8	5 1/2	5 5/8	5 3/8	1/8	5/16	3/8	1/8		

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____ OF _____

Crane

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK)

Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)

Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Mechanic (Signature):	Date:	Electrician (Signature):	Date:

Required Inspection Signatures

The certifying official should verify that the mechanical and electrical crane inspectors have signed and dated their respective signature blocks on the MISR or AMISR. Where sigma notation allows, verify the mechanic or electrician have signed and dated their respective signature blocks, if applicable.

If only one inspector performs both the electrical and mechanical inspections, for example a general inspector, then that individual must have the pre-requisite training and qualifications to perform all of the applicable inspections as required. See NAVFAC P-307, sections 3, 7 and appendix N for additional information.

Mechanics and electricians do not need to complete inspector training to sign for sigma designated MISR and AMISR inspections.

Crane Condition Inspection Record (CCIR)

The Crane Condition Inspection Record form, referred to by the acronym C-C-I-R, is used for all categories of cranes and can be found in the NAVFAC P-307 manual, Figure 4-3.

The CCIR is completed by condition inspectors and if a load test is performed, by the test director. It documents the condition of the crane before, during, and after a load test. When a load test is not performed, only the “Before” portion of the CCIR is required. NAVFAC P-307 paragraph 4.6 contains information about completing the CCIR. As the certifying official, you should verify the following:

- The information blocks at the top of the first sheet must be annotated with the correct information.
- Each inspection block has been marked as satisfactory, with an S; unsatisfactory, with a U; or not-applicable, with an N-A. Initials, check marks and other annotations shall not be used in lieu of S, U, or N-A with the exception of blocks that are not applicable, which may contain the symbol N-A, or be blacked out.
- The ‘INSPECTOR- INITIAL’ column must be initialed for each item.
- If a block is marked “U”, a description of the unsatisfactory condition shall be noted in the Remarks section.
- For category 3 jib, pillar, or monorail cranes, and fixed overhead hoists, 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. Both inspection forms shall be completed.
- All major deficiencies should be corrected prior to completing the load test.

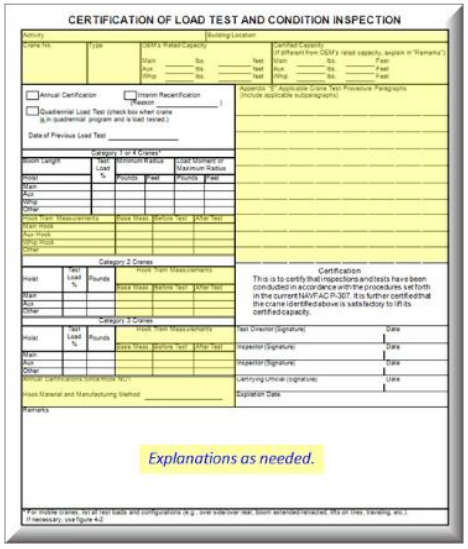
CRANE CONDITION INSPECTION RECORD

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/ Ind.
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 be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a switch is set for drydock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If a load test is performed at certification, inspect LIDs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				

Figure 4-3 (1 OF 2)



Certification of Load Test and Condition Inspection 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 and 4 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 so indicate when a crane is in the quadrennial load test program.

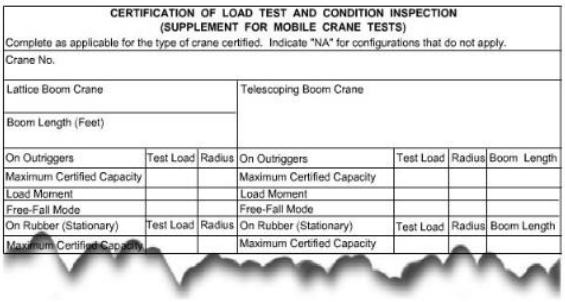
The Certification of Load Test and Condition Inspection form documents the load test.

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
- the hook material and manufacturing method are identified

In order 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 Load Test and Condition Inspection Supplemental Form for Mobile Cranes



CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION (SUPPLEMENT FOR MOBILE CRANE TESTS)

Complete as applicable for the type of crane certified. Indicate "NA" for configurations that do not apply.

Crane No.						
Lattice Boom Crane			Telescoping Boom Crane			
Boom Length (Feet)						
On Outriggers	Test Load	Radius	On Outriggers	Test Load	Radius	Boom Length
Maximum Certified Capacity			Maximum Certified Capacity			
Load Moment			Load Moment			
Free-Fall Mode			Free-Fall Mode			
On Rubber (Stationary)	Test Load	Radius	On Rubber (Stationary)	Test Load	Radius	Boom Length
Maximum Certified Capacity			Maximum Certified Capacity			

When testing mobile cranes, in addition to the 'Certification of Load Test and Condition Inspection' 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 Load Test and Condition Inspection' form does not have room for all of 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


SHOP REPAIR ORDER

All work performed on cranes shall be documented on a Shop Repair Order or other work 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?

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 sections 3 and 4 are completed, the work document 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 sections 3 and 4.

Crane Alterations


CRANE ALTERATION REQUEST

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 would 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 the Navy Crane Center must be copied within 14 days.
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.

Knowledge Check

1. Select all that apply.
   The annual certification process requires the certifying official to review which of the following documents?

   A. CCIR
   B. SRO
   C. Operator License Record
   D. Certification of Load Test and Condition Inspection
   E. MISR

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. S
   C. D
   D. R

3. True or False
   For category 3 jib cranes, pillar cranes, monorail cranes, and fixed overhead hoists, 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 down rated 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 Certification of Load Test and Condition Inspection form
   B. An explanation in the remarks section of the CCIR
   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, N/A, and/or D. What do these letters indicate?

   A. Satisfactory, unsatisfactory, corrected, deferred, not applicable
   B. Satisfactory, unsatisfactory, completed, deferred, not available
   C. Selected, unselected, completed, detailed, not available
   D. Satisfied, unsatisfied, concealed. Deferred, not applicable

6. Select all that apply.
   When a load test is performed, who is required to sign the Certification of Load Test and Condition Inspection form?

   A. Electrical Crane Inspector
   B. Load Test Director
   C. Maintenance Supervisor
   D. Engineer
   E. Mechanical Crane Inspector
   F. Certifying Official

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 Load Test and Condition Inspection
   B. Certification of Load Test and Condition Inspection Supplement for Mobile Crane Tests
   C. Certification of Load Test for Mobile Cranes
   D. Crane Condition Certification Record for Mobile Crane Tests
   E. Certification of Condition Inspection and Mobile Crane Ancillary Equipment Tests

8. Other than qualified maintenance inspectors, who may sign MISR inspection items designated with a lower case sigma (σ)?

   A. Load test director
   B. Certifying official
   C. Condition inspector
   D. Mechanic/electrician
   E. Engineer

9. True or False
   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.

   A. True
   B. False

10. True or False
    Category 2 and 3 cranes shall be inspected, tested, and certified annualy.

    A. True
    B. False

Documentation Review Module Summary

Congratulations. You've completed the Documentation Review training module.

You are able to identify documents used in the crane maintenance and certification processes such as the MISR, AMISR, CCIR, Certification of Load Test and Condition Inspection, SRO, and the crane alteration request. You can 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 until everything is correct.

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

NOTES

CO LOAD CHART REVIEW

Welcome

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

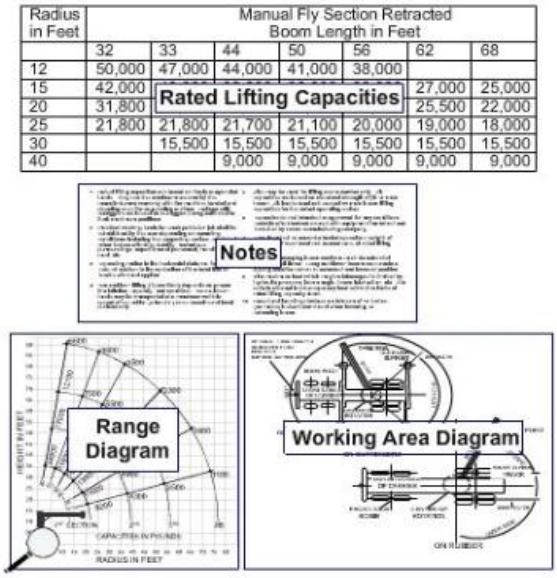
Load charts also show configuration variables affecting the capacity of the crane at the time of the lift and identify factors influencing the crane's capacity, such as boom angle, boom length, load radius, deductions from gross capacity, configuration of the crane, and quadrants of operation.

Module 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.

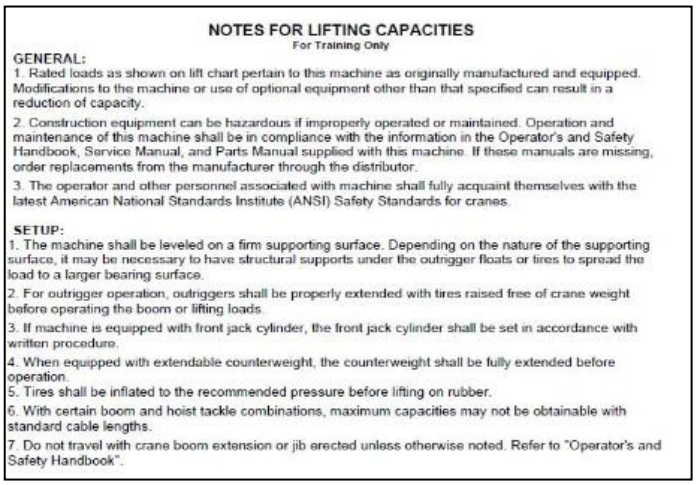
Parts of a Load Chart

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



Load Chart Notes Section

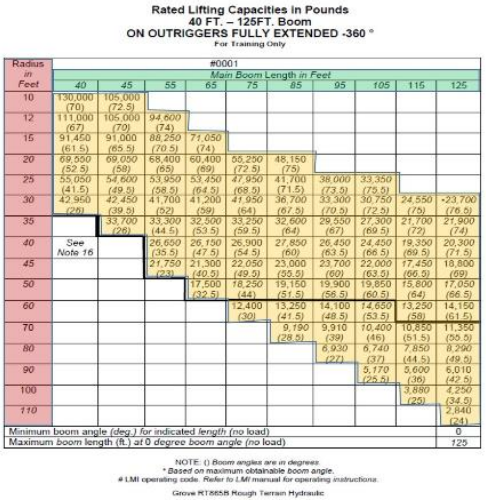
Before calculating the crane's capacity, the operator must read the general notes found on the load chart or in the load chart package. Load chart notes contain important information such as: deductions from listed capacities, allowable boom lengths, instructions for determining structural vs. stability 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.



NOTES FOR LIFTING CAPACITIES
For Training Only

GENERAL:
1. Rated loads as 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 this 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 latest American 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 tires 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 extendable 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 extension or jib erected unless otherwise noted. Refer to "Operator's and Safety Handbook".



Rated Lifting Capacities in Pounds
40 FT. – 125FT. Boom
ON OUTRIGGERS FULLY EXTENDED -360 °
For Training Only

Radius in Feet	#0001 Main Boom Length in Feet									
	40	45	55	65	75	85	95	105	115	125
10	130,000 (70)	105,000 (72.5)								
12	111,000 (67)	105,000 (70)	94,600 (74)							
15	91,450 (61.5)	91,000 (65.5)	88,250 (70.5)	71,050 (74)						
20	69,550 (52.5)	69,050 (58)	68,400 (65)	68,400 (69)	55,250 (72.5)	48,150 (75)				
25	55,050 (41.5)	54,600 (49.5)	53,950 (58.5)	53,450 (64.5)	47,950 (68.5)	41,700 (71.5)	38,000 (73.5)	33,350 (75.5)		
30	42,950 (26)	42,450 (39.5)	41,700 (52)	41,200 (59)	41,950 (64)	36,700 (67.5)	33,300 (70.5)	30,750 (72.5)	24,550 (75)	23,700 (76.5)
35		33,700 (26)	33,300 (44.5)	32,500 (53.5)	33,250 (59.5)	32,600 (64)	29,550 (67)	27,300 (69.5)	21,700 (72)	21,900 (74)
40	See Note 16		26,650 (35.5)	26,150 (47.5)	26,900 (54.5)	27,850 (60)	26,450 (63.5)	24,450 (66.5)	19,350 (69.5)	20,300 (71.5)
45			21,750 (23)	21,300 (40.5)	22,050 (49.5)	23,000 (55.5)	23,700 (60)	22,000 (63.5)	17,450 (66.5)	18,800 (69)
50				17,500 (32.5)	18,250 (44)	19,150 (51.5)	19,900 (56.5)	19,850 (60.5)	15,800 (64)	17,050 (66.5)
60					12,400 (30)	13,250 (41.5)	14,100 (48.5)	14,650 (53.5)	13,250 (58)	14,150 (61.5)
70						9,190 (28.5)	9,910 (39)	10,400 (46)	10,850 (51.5)	11,350 (55.5)
80							6,930 (22)	6,740 (37)	7,850 (44.5)	8,290 (49.5)
90								5,170 (25.5)	5,600 (36)	6,010 (42.5)
100									3,880 (26)	4,250 (34.5)
110										2,840 (24)
Minimum boom angle (deg.) for indicated length (no load)										0
Maximum boom length (ft.) at 0 degree boom angle (no load)										125

NOTE: () Boom angles are in degrees.
* Based on maximum obtainable boom angle.
# LMI operating code. Refer to LMI manual for operating instructions.
Grove RT865B Rough Terrain Hydraulic

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.

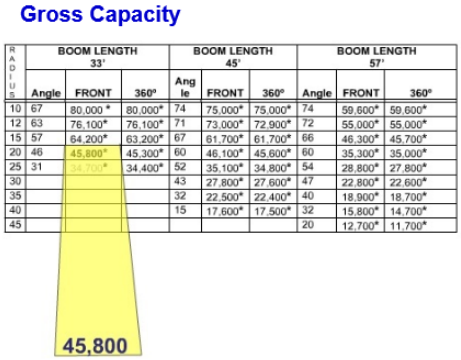
Rated Lifting Capacities Chart with Asterisks

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.

RADIUS	BOOM LENGTH 33'			BOOM LENGTH 45'			BOOM LENGTH 57'		
	Angle	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			46,100*	45,600*	60	35,300*	35,000*
25	31	34,70	63,200* 45,300* 34,400*		35,100*	34,800*	54	28,800*	27,800*
30							47	22,800*	22,600*
35					22,500	22,400	40	18,900*	18,700*
40					17,600*	17,500*	32	15,800*	14,700*
45							20	12,700*	11,700*

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 may 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.



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.

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.

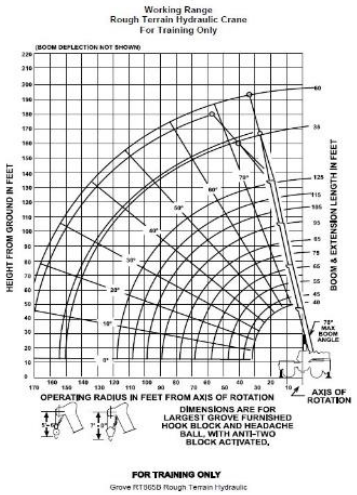
Range Diagram

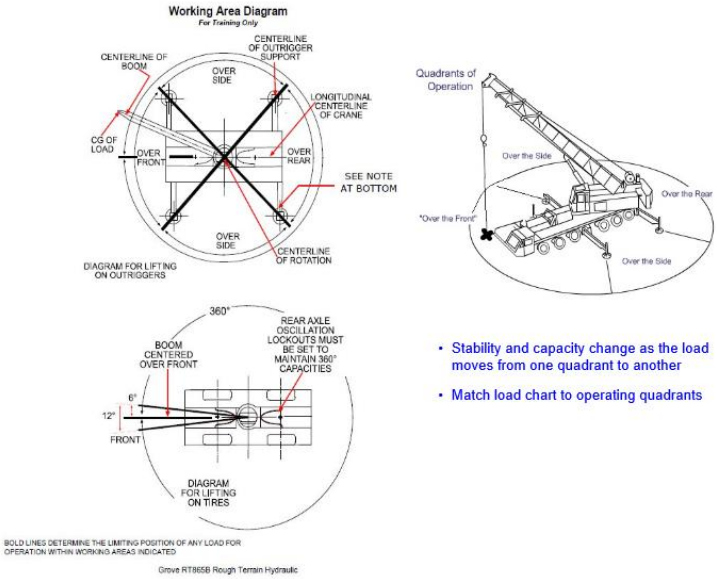
Range diagrams are used for planning lifts. You can use them to determine the configuration of the crane needed for a particular job. By laying out the geometry of the job on the diagram, the boom length, boom angle, jib length and jib offset required for the lift can be determined.

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. It may also be used to identify the allowable clearances between the load blocks and boom tip.



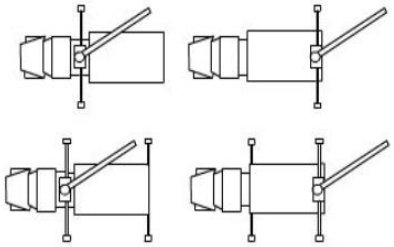


Working Area Diagram

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.

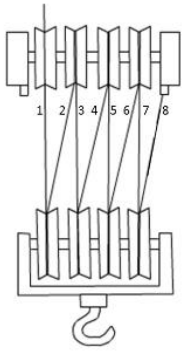
Category 4 Quadrants

Category 4 cranes require close attention because stabilizers and operational quadrants can vary considerably between manufacturers. Always check O-E-M 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.



Limiting Factors – 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.

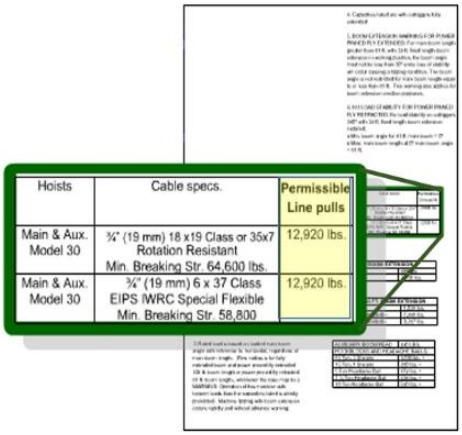


Parts of Line

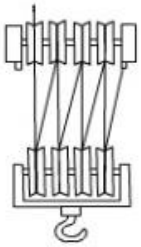
The number, or parts, of line may limit the lifting capacity on a crane. Count the total number of lines suspending the load. In this example there are 8 parts of line between the hoisting sheaves and the hoist block sheaves.

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.



Hoists	Cable specs.	Permissible Line pulls
Main & Aux. Model 30	¾" (19 mm) 18 x19 Class or 35x7 Rotation Resistant Min. Breaking Str. 64,600 lbs.	12,920 lbs.
Main & Aux. Model 30	¾" (19 mm) 6 x 37 Class EIPS IWRC Special Flexible Min. Breaking Str. 58,800	12,920 lbs.



Multiply the rated load by the number of parts:

12,920 lbs.
x 8 parts
103,360 lbs.

Wire Rope Capacity

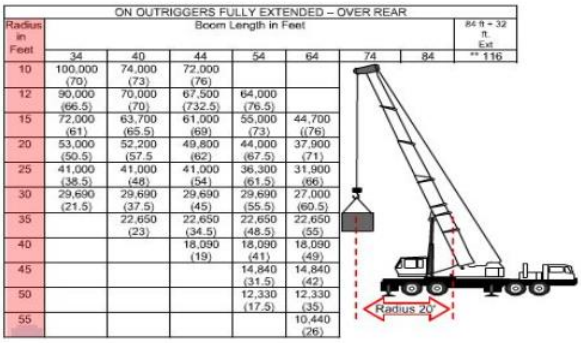
Finally, to find the capacity of the wire rope as reeved, multiply the allowable line pull by the number of parts. In this example we multiply the line pull of 12,920 pounds per part by eight parts. The wire rope in this reeved configuration has a rated load of 103,360 pounds.

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

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 addition information on boom deflection.

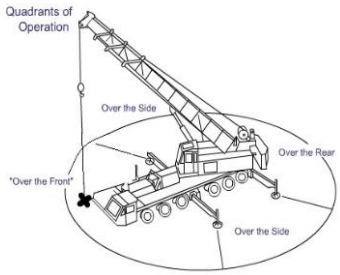


ON OUTRIGGERS FULLY EXTENDED – OVER REAR

Radius in Feet	Boom Length in Feet							84 ft + 32 ft Ext
	34	40	44	54	64	74	84	** 116
10	100,000 (70)	74,000 (73)	72,000 (76)					
12	90,000 (66.5)	70,000 (70)	67,500 (732.5)	64,000 (76.5)				
15	72,000 (61)	63,700 (65.5)	61,000 (69)	55,000 (73)	44,700 ((76)			
20	53,000 (50.5)	52,200 (57.5	49,800 (62)	44,000 (67.5)	37,900 (71)			
25	41,000 (38.5)	41,000 (48)	41,000 (54)	36,300 (61.5)	31,900 (66)			
30	29,690 (21.5)	29,690 (37.5)	29,690 (45)	29,690 (55.5)	27,000 (60.5)			
35		22,650 (23)	22,650 (34.5)	22,650 (48.5)	22,650 (55)			
40			18,090 (19)	18,090 (41)	18,090 (49)			
45				14,840 (31.5)	14,840 (42)			
50				12,330 (17.5)	12,330 (35)			
55					10,440 (26)			

Radius 20'

On critical lifts, the radius should be measured manually. Monitor the radius throughout the lift.



Quadrants of Operation

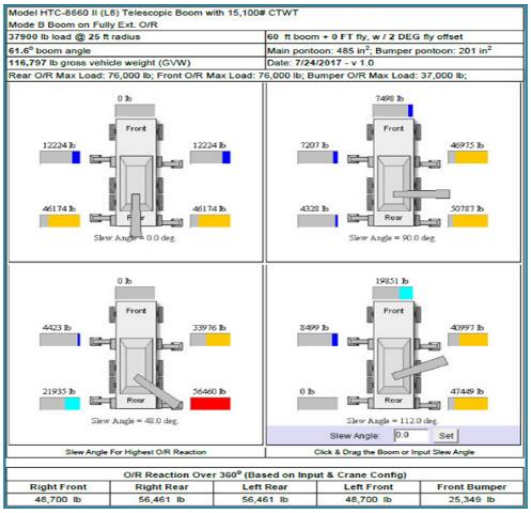
As mentioned earlier, the crane’s working areas are divided into quadrants of operation. During pre-lift planning, it’s important to note which quadrant the load will be lifted from, carried through, and landed in. Knowing the load’s weight, the load’s travel path, and the crane’s capacity in each quadrant-of-operation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

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.

Click on the boom-flex link below the graphic to view a picture of boom flex.



Model HTC-8660 II (L8) Telescopic Boom with 15,100# CTWT
Mode B Boom on Fully Ext. O/R
37900 lb load @ 25 ft radius | 60 ft boom + 0 FT fly, w / 2 DEG fly offset
61.6° boom angle | Main pontoon: 485 in², Bumper pontoon: 201 in²
116,797 lb gross vehicle weight (GVW) | Date: 7/24/2017 - v 1.0
Rear O/R Max Load: 76,000 lb; Front O/R Max Load: 76,000 lb; Bumper O/R Max Load: 37,000 lb;

Slew Angle = 0.0 deg.
Slew Angle = 90.0 deg.
Slew Angle = 46.0 deg.
Slew Angle = 112.0 deg.
Slew Angle: 0.0 Set
Slew Angle For Highest O/R Reaction
Click & Drag the Boom or Input Slew Angle

O/R Reaction Over 360° (Based on Input & Crane Config)

Right Front	Right Rear	Left Rear	Left Front	Front Bumper
48,700 lb	56,461 lb	56,461 lb	48,700 lb	25,349 lb

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 over loading 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?

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?

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?

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?

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, 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?

Knowledge Check

1. Select all that apply.
   Identify all the items that are usually found in the OEM load chart document.

   A. Rated Capacities
   B. Range Diagram
   C. Operator's Daily Checklist
   D. Certificate of Compliance
   E. Areas of Operation
   F. Notes Section

2. Fill in the blank.
   Deducting the weight of all attachments, hooks, blocks, rigging and lifting gear from the capacities listed in the OEM Rated Lifting Capacities chart, provides the operator with the _____.
   (Hint: two words)

3. 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. Working Area Diagram
   B. Rated Lifting Capacities
   C. Notes Section
   D. Range Diagram
   E. Shaded Capacity Areas

5. 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. Rated Capacities Chart
   B. Notes Section
   C. Working Area Diagram
   D. Range Diagram
   E. Shaded Capacity Areas

6. Select all that apply.
   Exceeding the crane's rated capacity may result in one or two consequences. They are …

   A. Flat outrigger
   B. Miss-spooling
   C. Inadequate fleet angle
   D. Structural failure
   E. Dead Battery
   F. Loss of stability

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. Rated Capacities
   C. Range Diagram
   D. Working Area Diagram

8. Select all that apply.
   Select the items that may limit the crane's lifting capacity (limiting factors).

   A. Outrigger load capacity
   B. Hook block capacity
   C. Hydraulic pressure
   D. Wire rope line pull
   E. Diesel generator horse power

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. Range
   C. Radius
   D. Capacity

10. 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

Congratulations. You've completed the Load Chart Review training module.
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 be exposed to general crane testing requirements and considerations. This includes safe lifting, safe testing, test types, and test specifications.

NOTES

CO Crane Certification Package Exercise

Welcome

Welcome to the NAVFAC P-307 Certifying Official Training module: Crane Certification Package Exercise. This module allows you to apply your knowledge and experience to a scenario based practical example.

Objectives

Upon successful completion of this module you will have demonstrated your ability to apply the knowledge learned in this course by correctly identifying and resolving issues and problems relating to the crane by addressing the conditions in the certification package.

Exercise Review Introduction

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 certification packages of many cranes, 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 in here so you will be better enabled to deal with them should you encounter them out there.

To get the best experience from this exercise follow these guidelines…
Read the scenario description on screen 2 of 3.
Review the following documents in the order listed.
First, review the 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.
Second, review the Anomaly Discussion Notes. Compare your findings to those identified. How did you do?
Finally, review the Corrected Copy for suggested correction techniques.
A copy of the Anomalous Certification Package is available in the student guide.

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 Load Test and Condition Inspection form.

Crane number 349 is a Wallace-Grommet, 25K 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 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.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 1 OF 12

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Prior Inspection DATE	Current Inspection DATE	Legend: Check under condition
11/22/2017	11/14/2018	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 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.		X			
3	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	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	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. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise.	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 alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations). Coupling alignment verification data shall be included in the crane's history file.					
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			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF 12

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
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 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 		
	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 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 quadrenial program, this disassembly my be performed at every 8th 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 can not be tested independently (see appendix E), disassemble at 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 quadrenial program, this disassembly my be performed at every 8th annual inspection					
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. 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

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 3 OF 12

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	Condition U	Condition C	Condition NA
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. 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. 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. 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 resevoir 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			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 4 OF 12

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	Condition U	Condition C	Condition NA
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. 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, loose and worn components, and for proper lubrication. 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 that 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 that 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. 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 5 OF 12

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
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 grooved drums (at least three complete wraps on ungrooved drums) in all operating conditions. 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 that the entire rope is acceptable with special attention paid to areas of expected wear or damage, and to 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 can not 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. Dimensional (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, or other damage, a special area to inpect 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.	½"	X			
17	Load Chains, Chain Guides and Sprokets	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,and sideplates for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, and that container is in the correct location.		X			
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			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 6 OF 12

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
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 additional 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. Verify proper operation and that all moving parts operate freely without binding.	Trolley Bridge	X X			
21a	Crane Grounding	At 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 a least four areas of the trolley and or runway. 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, the check shall be between the strain relief cable and ground. If there is no metallic pendant or external strain relief cable, or no metallic pendant and the strain relief cable 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[d]	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, 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 7 OF 12

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	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 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. 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	Resistors	Inspect resistors, insulators, and brackets for damage, distortion, or deterioration, and for evidence of loose or missing fasteners. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect for evidence of overheating.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 8 OF 12

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).	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-attender 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.	Hoist	X			
30 [a]	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	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.		X			
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 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

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 9 OF 12

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
33	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
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.		X			

REMARKS:

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
UNSATISFACTORY ITEMS

SHEET 10 OF 12

Crane #349

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)

Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)

Mechanical Inspector (Signature): M. Dee Dumtey		Date: 11/15/18	Electrical Inspector (Signature):		Date:
Mechanical Inspector (Signature):		Date:	Electrical Inspector (Signature):		Date:
Mechanic (Signature):		Date:	Electrician (Signature):		Date:

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MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

SHEET 11 OF 12

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		
Trolley	TM43	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Bridge	TM83	4"	4 1/2"	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Hoist	TM1355	5"	5 1/2"	5 1/16"	N/A	1/8"	3/8"	3/8"	1/16"	3/32"	3/8"

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MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

SHEET 12 OF 12

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 hoist brake (model TM1355) spring length and air gap to minimum specifications, as needed

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

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CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.
#349	Bridge	Bldg. 1539	Rick L. Welch	C20549

Purpose of Inspection:	Legend:	Date Started:	Date Completed:
Annual Certification	B = Before A = After D = During	11/16/18	11/16/18

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.	S	S	S	LBB
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.	S	S	S	LBB
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	S	S	S	LBB
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.	S	S	S	LBB
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.	S	S	S	HDD
6	Inspect motors for condition and proper operation.	S	S	S	HDD
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.)	S			HDD
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.)	N/A	N/A		HDD
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	S	S	S	LBB
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
12	Inspect load chains and sprockets for condition and proper operation.	N/A	N/A	N/A	LBB
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	S			HDD

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 category 4 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:	Test Director Signature/Date:
H. Dee Dumtey, 11/16/18	John C. Laitlee, 11/16/18
Inspector Signature/Date:	Inspector Signature/Date:

TRAINING ONLY
Bridge Crane Certification Package – Identify the Anomalies
Page 14 of 15

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: Navy Shore Station Charlie | Building/Location: Bldg. 1539

Crane No.	Type	OEM's Rated Capacity			Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")		
#349	Bridge	Main	25,000 lbs.	N/A feet	Main	25,000 lbs.	N/A feet
		Aux	lbs.	feet	Aux	lbs.	feet
		Whip	lbs.	feet	Whip	lbs.	feet

[X] 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.)

1	1.1	1.2	1.3	1.4	1.4.1	1.4.2	1.4.3
1.4.4	1.4.5	1.6	1.6.1	1.6.2	1.6.4	1.7	1.7.1
6	6.1	6.1.1	a,b,c,d	6.1.2	6.1.3	6.2	6.2.1
6.2.1a	6.2.1d	6.2.1e	6.2.2	6.2.3			

Category 1 or 4 Cranes *

Boom Length	Test Load %	Minimum Radius Pounds	Minimum Radius Feet	Maximum Radius Pounds	Maximum Radius Feet
Hoist					
Main					
Aux					
Whip					
Other					

Hook Tram Measurements	Base Meas.	Before Test	After Test
Main Hook			
Aux Hook			
Whip Hook			
Other			

Category 2 Cranes

Hoist	Test Load %	Pounds	Hook Tram Measurements: Base Meas.	Before Test	After Test
Main	129	38,212	6"	6"	6"
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: 4

Hook Material and Manufacturing Method: Forged Alloy Steel

Certification

This is to certify that inspections and tests have been conducted in accordance with the procedures set forth in the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.

Test Director (Signature): John C. Laitlee	Date: 11/16/2018
Inspector (Signature): H. Dee Dumtey	Date: 11/16/2018
Inspector (Signature):	Date:
Certifying Official (Signature):	Date:
Expiration Date:	

Remarks: 25,000 x 1.25 = 31,250 x 1.05 = 38,212

* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, travelling, etc.). If necessary, use figure 3-2.

TRAINING ONLY

Bridge Crane Certification Package – Identify the Anomalies

Page 15 of 15

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 1 OF 12

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Prior Inspection DATE	Current Inspection DATE	Legend: Check under condition
11/22/2017	11/14/2018	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 and underhung trolley and runway beams (Not applicable to runway rails for t… cran… See … 112	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		X			
3	Har… Lac… Saf…			X			
4	Bur…			X X			
5	Jib						X
6	Wh…			X			
				X			
7	Sha… incl… inte… red…			X			
				X			
		fasteners.	Hoist	X			
	Shafts and Couplings (Hoist Drives)	Verify coupling alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations). Coupling alignment verification data shall be included in the crane's history file.				?	
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			

Reply

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 CLTCI 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over ~~or click on~~ the circled question marks to display the discussion notes.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF 12

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
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 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 	 ? 	
	Hoist Gears (Not	Additionally, internal gearing for hoists shall be monitored by					X
8c						?	
9							X
9b		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. 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

Reply ✕

Anomaly 2: 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF 12

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
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 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 	 ? 	
	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
				X			
						?	
		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

Reply

Anomaly 3: 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: As 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF 12

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
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 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 	 ? 	
	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.				?	
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.				?	
10							X

Reply

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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 3 OF 12

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
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. 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					X
12							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. 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		?	

Reply

Anomaly 5: The bridge brake in AMISR item 13a is marked SAT. This, in itself, 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 0174-13 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 4 OF 12

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	Condition U	Condition C	Condition NA
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. 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, loose and worn components, and for proper lubrication. 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 that 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 that 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. 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			

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

Reply

Anomaly 6: 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 maybe 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 and 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.

		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, 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.	? ½"	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, and side plates for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, and that container is in the correct location.		X		?	
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			

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 5 OF 12

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
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 grooved drums (at least three complete wraps on ungrooved drums) in all operating conditions. 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 that 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	(?) ½"	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, and side plates for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, and that container is in the correct location.		X		(?)	
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			

Reply

Anomaly 7: 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
(?) Mouse over or click on the circled question marks to display the discussion notes. (?)

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 6 OF 12

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
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					X
				X			
				X			
							X
							X
	General Lighting	and associated wiring for damage or deterioration, 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 (?)		

Reply

Anomaly 8: 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
(?) Mouse over or click on the circled question marks to display the discussion notes. (?)

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 7 OF 12

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	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 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
					(?)		
				X			
		overheating.		X			

Reply ✕

Anomaly 9: 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 put X's in the SAT column. Have the inspector validate these conditions and take corrective actions as appropriate.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
(?) Mouse over or click on the circled question marks to display the discussion notes. (?)

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 7 OF 12

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	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 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.					
				X			
				X			

Reply

Anomaly 10: 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.

12/4/2012 8:36 AM

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Bridge Crane Certification Package - Anomaly Discussions
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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 8 OF 12

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).	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		?	
				X			
							? N/A
				X			
		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 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

Reply

Anomaly 11: 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, CLTCI test paragraph 6.2.1d) that this crane has a mechanical load brake.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 8 OF 12

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).	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.	Hoist	X			
30#	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
				X			
				X			
		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

Reply ×

Anomaly 12: 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 and actual N/A in the box. This is different from all the other markings, which are X's. There should be and X in the N/A column. Have the inspector correct this and inform him of your expectations.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
? Mouse over or click on the circled question marks to display the discussion notes. ?

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES SHEET 9 OF 12

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
33	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					

Reply

Anomaly 13: 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 a good work practice. Additional lines or sheets may be added as needed.

REMARKS:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
UNSATISFACTORY ITEMS SHEET 10 OF 12

Crane #349

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)

Item No.	Deficiency	SRO 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

Reply

Anomaly 14: 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 audit finding.

Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Mechanical (Signature):	Date:	Electrical (Signature):	Date:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES

UNSATISFACTORY ITEMS SHEET 10 OF 12

Crane #349

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 3 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)

Item No.	Deficiency	SRO 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

Reply

Anomaly 15: AMISR SIGNATURES – Are all the necessary signatures present? Do the dates shown here agree with other dates in this package (CCIR, CLTCI)? Are the inspectors properly qualified/designated 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/designated [by the command/activity] to perform [and sign for] their respective tasks. General inspectors are qualified/designated [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.

Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature): H. Dee Dumtey	Date: 11/15/18
Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Mechanical (Signature):	Date:	Electrical (Signature):	Date:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

SHEET 11 OF 12

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		
Trolley	TM43	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Bridge	TM83	4"	4 1/2"	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Hoist	TM1355	5"	5 1/2"	5 1/16"	N/A	1/8"	3/8"	3/8"	1/16"	3/32"	3/8"

Reply

Anomaly 16: 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 0168-13 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 0174-13 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

SHEET 11 OF 12

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		
Trolley	TM43	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Bridge	TM83	4"	4 1/2"	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Hoist	TM1355	5"	5 1/2"	5 1/16"	N/A	1/8"	3/8"	3/8"	1/16"	3/32"	3/8"

Reply

Anomaly 17: The BRAKE DATA sheet has two notable problems. Here, in the case of the hoist brake (TM43), it was inspected and found to have the maximum air gap. Because it was not "out-of-spec", SRO 0166-13 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.

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Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA SHEET 12 OF 12

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 hoist brake (model TM1355) spring length and air gap to minimum specifications, as needed

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

Reply

Anomaly 18: 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 anything 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 0174-13 (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.

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Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

6 of 13

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

Reply

Status 1

Anomaly 19: Before moving on the 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.

3/9/2018 9:29 AM

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

8. 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.

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

10. Splices. Wire rope shall not contain splices.

NOTE: For those sections of wire rope with high strands, wavy or flattened rope, consideration should be given to increasing the inspection periodicity due to the possibility of increased wear and reeving/spooling issues.

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Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.
#349	Bridge	Bldg. 1539	Rick L. Welch	C20549

Purpose of Inspection:	Legend:	Date Started:	Date Completed:
Annual Certification	B = Before A = After D = During	11/16/18	11/16/18

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.	S	S	S	LBB
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end	S	S	S	LBB
					B
					B
					D
					D
					D
	at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				D
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	S	S	S	LBB
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
12	Inspect load chains and sprockets for condition and proper operation.	N/A	N/A	N/A	LBB
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	S			HDD

Reply

Status 1

Anomaly 20: 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.

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussions

Mouse over or click on the circled question marks to display the discussion notes.

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
		S	S	S	HDD
		N/A			HDD
		N/A			HDD
		N/A	N/A	N/A	HDD
		N/A	N/A	N/A	HDD
	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	N/A			HDD
		N/A			HDD
		N/A	N/A	N/A	HDD
		N/A	N/A	N/A	HDD
		N/A	N/A	N/A	HDD
		N/A	N/A	N/A	HDD
	operation.				

Reply

Status 1

Anomaly 21: 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 22: 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-307appendix 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.

Remarks:	
Inspector Signature/Date: H. Dee Duntey, 11/16/18	Test Director Signature/Date: John C. Laitlee, 11/16/18
Inspector Signature/Date:	Inspector Signature/Date:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

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 category 4 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
				/A	HDD
					HDD
					HDD
					HDD
				/A	HDD
				/A	HDD
				/A	HDD
				/A	HDD

Reply

Anomaly 23: 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 11/15/2013; the CLTCI shows two signatures with dates of 11/16/2013; 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 CLTCI, his signature is not present. Have inspector LBB validate your concerns, his actions, and make the necessary signoffs.

Note: Additional signature blocks may be added as needed.

12/4/2012 11:01 AM

Inspector Signature/Date:	Test Director Signature/Date:
H. Dee Dumtey, 11/16/18	John C. Laitlee, 11/16/18
Inspector Signature/Date:	Inspector Signature/Date:

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: Navy Shore Station Charlie | Building/Location: Bldg. 1539

Crane No.	Type	OEM's Rated Capacity	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")
#349	Bridge	Main 25,000 lbs. N/A feet	Main 25,000 lbs. N/A feet
		Aux ____ lbs. ____ feet	Aux ____ lbs. ____ feet
		Whip ____ lbs. ____ feet	Whip ____ lbs. ____ feet

[X] Annual Certification [ ] Interim Recertification (Reason_____)

[ ] Quadrennial Load Test (check box when crane is in quadrenical program and is load tested) Date of Previous Load Test _____

Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs.)

1	1.1	1.2	1.3	1.4	1.4.1	1.4.2	1.4.3
1.4.4	1.4.5	1.6	1.6.1	1.6.2	1.6.4	1.7	1.7.1
1	6.1.1	a,b,c,d	6.1.2	6.1.3	6.2	6.2.1	
.1d	6.2.1e	6.2.2	6.2.3				

Reply

Anomaly 24: The QUADRENIAL 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 and X in this box. Have the LTD validate this concern and correct the paperwork.

Main	120	38,212	6"	6"	6"
Aux					
Other					

Certification

...is to certify that inspections and tests have been conducted in accordance with the procedures set forth in the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory ...ft its certified capacity.

...r (Signature) John C. Laitlee Date 11/16/2018

...ignature) H. Dee Dumtey Date 11/16/2018

...ignature) Date

...ficial (Signature) Date

...ate

Anomaly 25: The POUNDS block shows 38,212 pounds. Is this correct? Does 38,212 equate to 129% of capacity? Is the math in the REMARKS section correct? Does the total weight include rigging gear?

Additional information is available by mousing over, or clicking on, the question mark in the REMARKS section below.

Conclusion: This information is incorrect. A check of the math shows critical errors. Furthermore, 129% of capacity does not equal 38,212 pounds; in fact, 38,212 lbs is 158% of capacity. The actual test weight should be 32,250 pounds which is 129% 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.

* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, travelling, etc.). If necessary, use figure 3-2.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: Navy Shore Station Charlie		Building/Location: Bldg. 1520	
Crane No.: #240	Type: Bridge	OEM's Rated Capacity: Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks"): Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet

[x] 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.)

1	1.1	1.2	1.3	1.4	1.4.1	1.4.2	1.4.3
1.4.4	1.4.5	1.6	1.6.1	1.6.2	1.6.4	1.7	1.7.1

Category 1 or 4 Cranes *

Boom Length	Test Load	Minimum Radius		Maximum Radius		6	6.1	6.1.1	a,b,c,d	6.1.2	6.1.3	6.2	6.2.1
Hoist	%	Pounds	Feet	Pounds	Feet	6.2.1a	6.2.1d	6.2.1e	6.2.2	6.2.3			

Reply

Anomaly 25 continued...

25,000 x 1.05 = 31,250 lbs x 1.05 = 32,812 lbs (NOT 38,212 lbs)...it appears that the 8 and 2 were transposed when the answer was recorded. Therefore, the correct test tolerances are...

31,250 lbs - 32,812 lbs

32,000 lbs of test weights plus 250 lbs of rigging gear = 129% of 25,000 lbs

32,250 lbs is the number that should appear in the POUNDS block for the main hoist.

12/4/2012 11:07 AM

Remarks

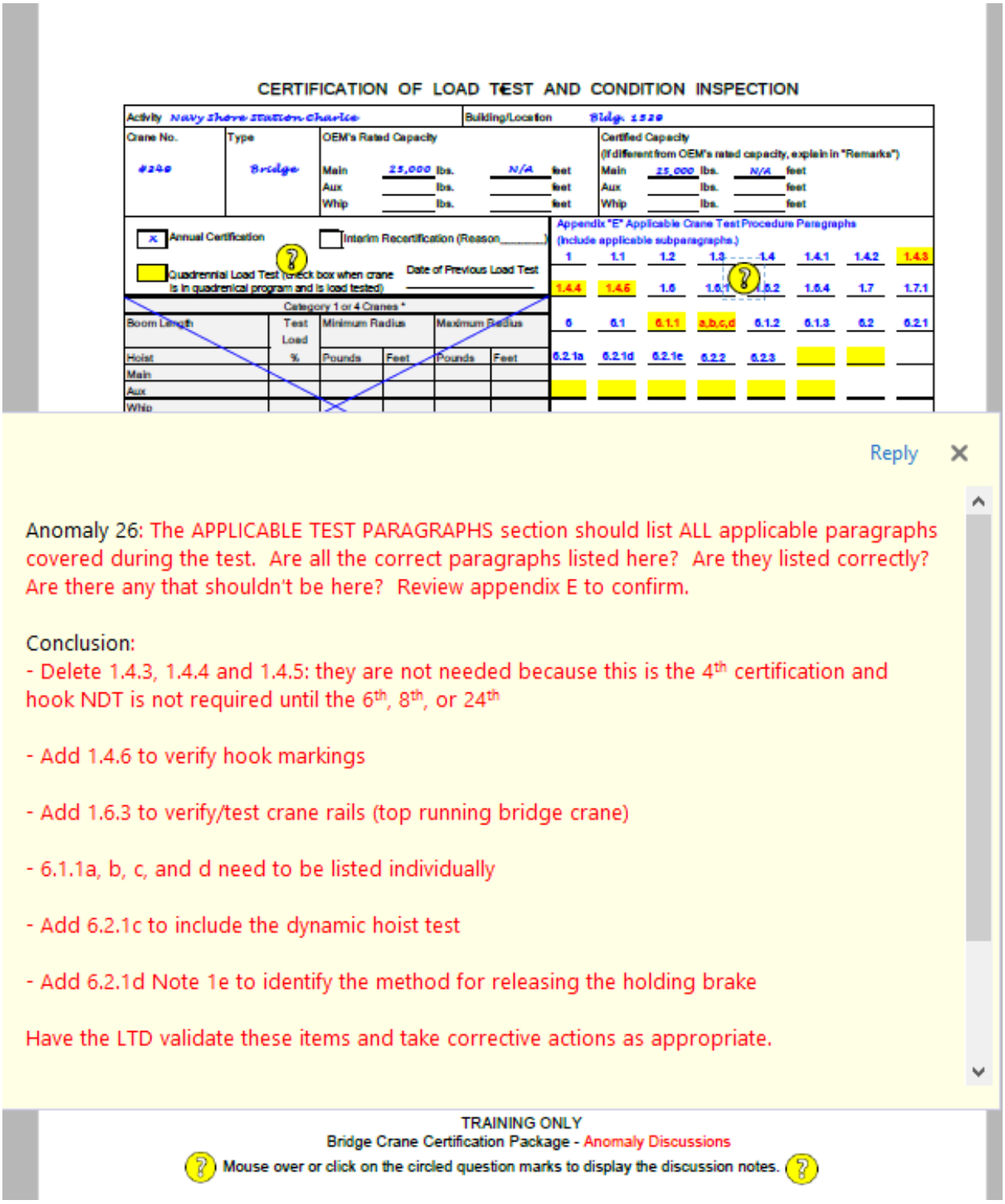
25,000 x 1.25 = 31,250 x 1.05 = 38,212

* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, travelling, etc.). If necessary, use figure 3-2.

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussions

Mouse over or click on the circled question marks to display the discussion notes.



CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: Navy Shore Station Charlie			Building/Location: Bldg. 1520	
Crane No.: #240	Type: Bridge	OEM's Rated Capacity: Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks"): Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet	

[X] 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 _____

Category 1 or 4 Cranes *

Boom Length / Hoist	Test Load %	Minimum Radius: Pounds	Minimum Radius: Feet	Maximum Radius: Pounds	Maximum Radius: Feet
Main					
Aux					
Whip					

Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs.)

1	1.1	1.2	1.3	1.4	1.4.1	1.4.2	1.4.3
1.4.4	1.4.5	1.6	1.6.1	1.6.2	1.6.4	1.7	1.7.1
6	6.1	6.1.1	a,b,c,d	6.1.2	6.1.3	6.2	6.2.1
6.2.1a	6.2.1d	6.2.1e	6.2.2	6.2.3			

Reply

Anomaly 26: 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.

TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Reply

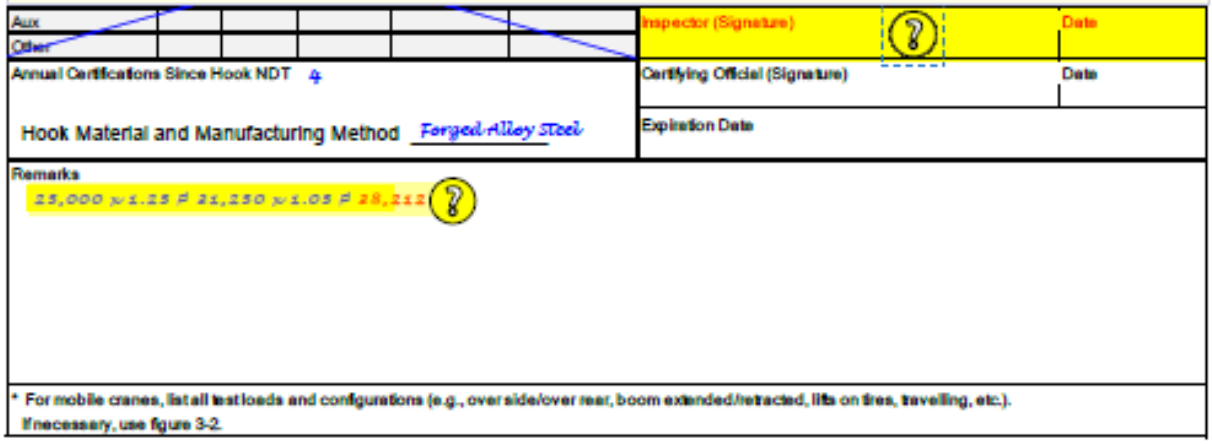
Anomaly 27: Are the SIGNATURE BLOCKS satisfactory? Do these dates agree with the other dates in the package? Have all necessary personnel signed? How many inspectors worked the CCIR?

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 11/15/2013; the CCIR shows two signatures with dates of 11/16/2013; these dates appear to be satisfactory. Inspector LBB performed many of the inspections and should have signed the CLTCI. 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:

1st: AMISR; 2nd: CCIR; 3rd: CLTCI

These documents may all be completed on the same day but should still be completed in order. If completed on different days, the dates should reflect the proper order.



TRAINING ONLY
Bridge Crane Certification Package - Anomaly Discussions
Mouse over or click on the circled question marks to display the discussion notes.

CRANE CERTIFICATION PACKAGE EXERCISE PART 3:

CORRECTED ANOMALIES

Review the following Corrected Copy for suggested correction techniques.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

MOD 11/14/18

FOR CATEGORY 2 AND 3 CRANES SHEET 1 OF ~~12~~ 13

Crane	Type	OEM	Capacity
#349	Bridge	Wallace-Grommet	25,000 lbs.

Prior Inspection DATE	Current Inspection DATE	Legend: Check under condition
11/22/2018	11/14/2018	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 and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes. See NAVFAC Instruction 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.		X			
3	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	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	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. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise.	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 alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations). Coupling alignment verification data shall be included in the crane's history file.					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 overtensioned fasteners.	Bridge	X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

MOD 11/16/12

FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF ~~12~~ 13

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
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 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. 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

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

FOR CATEGORY 2 AND 3 CRANES SHEET 3 OF ~~12~~ 13 MDD 11/16/18

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
11	Hydraulic Brake System	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. 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. 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)	nspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. 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~~ MDD 11/16/18 X	X	X	

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

MOD 11/18/18

FOR CATEGORY 2 AND 3 CRANES SHEET 4 OF ~~12~~ 13

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
13b	Electric Magnetic Brake System (Disc Type Brakes)	Inspect brake housings for damage or evidence of loose hardware. 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, loose and worn components, and for proper lubrication. 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 that 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 that 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. 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

MOD 11/16/18

FOR CATEGORY 2 AND 3 CRANES SHEET 5 OF ~~12~~ 13

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
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 grooved drums (at least three complete wraps on ungrooved drums) in all operating conditions. 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 that 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, or other damage, a special area to inspect is the base (lug or ball) 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 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, and side plates for evidence of damage. Verify that chain bag or container is not overfilled with excess load chain, that chain correctly enters and exits container, and that container is in the correct location.		~~X~~			X
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			

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

1. Kinked, Birdcaged, Doglegged, or Crushed Sections. Kinked, birdcaged, doglegged, 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).

2. Flattened Sections. Flattened sections where the diameter across the flat is less than 5/6 of nominal diameter. (This does not apply to runs around eyes, thimbles, and shackles.)

3. Broken Wires. Six randomly distributed broken wires in one lay or three broken wires in one strand in one lay. For rotation-resistant wire rope, two in a length equal to six times the rope diameter or four in a length equal to 30 times the rope diameter. One outer wire broken at the point of contact with the core of the rope that has worked its way out of the rope structure and protrudes or loops out from the rope structure ("valley break"). For end connections, two broken wires within one lay length of the end connection.

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

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

6. 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.

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

8. 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.

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

10. Splices. Wire rope shall not contain splices.

NOTE: For those sections of wire rope with high strands, wavy or flattened rope, consideration should be given to increasing the inspection periodicity due to the possibility of increased wear and reeving/spooling issues.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

FOR CATEGORY 2 AND 3 CRANES SHEET ~~6~~ 7 OF ~~12~~ 13

MOD 11/14/13

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
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. Verify proper operation and that all moving parts operate freely without binding.	Trolley Bridge	X X			
21a	Crane Grounding	At 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. 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, the check shall be between the strain relief cable and ground. If there is no metallic pendant or external strain relief cable, or no metallic pendant and the strain relief cable 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[7]	Electrical Hardware and General Lighting	Inspect conduits, raceways, junction boxes, light fixtures, and associated wiring for damage or deterioration, 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	

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES

SHEET ~~7~~ 8 OF ~~12~~ 13 (MDD 11/16/18)

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	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 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			~~X~~ MDD 11/16/18 ~~X~~ MDD 11/16/18 ~~X~~ MDD 11/16/18
		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.					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. 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.		X			
26	Resistors	Inspect resistors, insulators, and brackets for damage, distortion, or deterioration, and for evidence of loose or missing fasteners. Inspect wiring for damage or deterioration, and for evidence of loose connections. Inspect for evidence of overheating.		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

FOR CATEGORY 2 AND 3 CRANES SHEET 8 9 OF 12 13

MOD 11/16/18

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).	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.	LMB 11/16/18 ~~X~~				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.	Hoist	X			
30[a]	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~~ X LMB 11/16/18
31	Warning Devices, Operational Aids, General Safety Devices (Horns, Bells, Lights, etc.), Wind speed Indicator.	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.		X			
32	Load Indicators, 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 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

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD

HDD 11/14/13

FOR CATEGORY 2 AND 3 CRANES SHEET ~~9~~ 10 OF ~~12~~ 13

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
33	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*	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
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.		X			

REMARKS:

Item 16: the minimum wire rope dimension measured was 0.484" (31/64")

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.

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.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
MOD 11/16/18

UNSATISFACTORY ITEMS SHEET ~~10~~ 11 OF ~~12~~ 13

Crane #349

NOTE: DESCRIBE ITEMS FOUND UNSATISFACTORY AND LIST SRO 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 BLOCK. (SEE SECTION 2 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)

Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)
8b	paragraph 3: bridge travel output shaft seal leaking	0165-18	Lyle B. Blough 11/16/18
13a	bridge brake spring length out of spec - 1/8" over maximum allowed dimension	0174.18	Lyle B. Blough 11/15/18
23	main hoist control panel pendant festoon wiring connector loose in panel opening	0168-18	H. Dee Dumley 11/16/18

Mechanical Inspector (Signature):	Date:	Electrical Inspector (Signature):	Date:
Lyle B. Blough	11/15/18	H. Dee Dumley	11/15/18

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

HDD 11/16/18
SHEET ~~11~~ 12 OF ~~12~~ 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		
Trolley	TM83	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Bridge	TM83	4"	4 1/2"	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
Hoist	TM1355	5"	5 1/2"	5 1/16"	N/A	1/8"	3/8"	3/8"	~~1/16"~~ 1/8" LHD 11/16/18	3/32"	3/8"

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

NDD 11/16/18

SHEET ~~12~~ 13 OF ~~12~~ 13

REMARKS:

SRO-0166-18 issued to adjust within-tolerance trolley brake (model TM93) spring length and air gap to minimum specifications, as needed

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

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

SRO-0174-18 issued to document and resolve deficient out-of-spec condition (1/8" over maximum allowed dimension) on the bridge brake spring length

Brake Data Spec Sheet - hoist air gap adjustment recorded incorrectly as 1/16" instead of the actual adjustment setting of 1/8"; measurement re-verified and entry corrected by inspector (LBB)

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.
#349	Bridge	Bldg. 539	Rick L. Welch	C20549

Purpose of Inspection:	Legend:	Date Started:	Date Completed:
Annual Certification	B = Before A = After D = During	11/16/18	11/16/18

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.	S	S	S	LBB
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.	S	S	S	LBB
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	S	S	S	LBB
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.	S	S	S	LBB
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.	S	S	S	HDD
6	Inspect motors for condition and proper operation.	S	S	S	HDD
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.)	S			HDD
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.)	N/A	N/A		HDD
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.	S	S	S	LBB
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.	S	S	S	LBB
12	Inspect load chains and sprockets for condition and proper operation.	N/A	N/A	N/A	LBB
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.	S			HDD

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 category 4 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. LBB 11/16/18	~~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 - correct by inspector.

Inspector Signature/Date	Test Director Signature/Date
H. Dee Dumtey 11/16/18	John C. Laitlee 11/16/18
Inspector Signature/Date	Inspector Signature/Date
Lyle B. Bluegh 11/16/18	

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity: Navy Shore Station Charlie		Building/Location: Bldg: 1530	
Crane No.: #340	Type: Bridge	OEM's Rated Capacity: Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet	Certified Capacity (If different from OEM's rated capacity, explain in "Remarks"): Main 25,000 lbs. N/A feet; Aux ____ lbs. ____ feet; Whip ____ lbs. ____ feet

[X] Annual Certification [ ] Interim Recertification (Reason_____)

[X] 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.)

1	1.1	1.2	1.3	1.4	1.4.1	1.4.2	~~1.4.3~~ JCL 11/16/18
~~1.5~~ JCL 11/16/18	~~1.5.1~~	1.6	1.6.1	1.6.2	1.6.4	1.7	1.7.1
6	6.1	6.1.1	6.1.1 a,b,c,d JCL 11/16/18	~~6.1.2~~	6.1.3	6.2	6.2.1
6.2.1a	6.2.1d	6.2.1e	6.2.2	6.2.3	1.4.6	1.6.3	
6.1.1a	6.1.1b	6.1.1c	6.2.1c	6.1.1d	6.2.1d	Note 1e	

Category 1 or 4 Cranes *

Boom Length / Hoist	Test Load %	Minimum Radius: Pounds	Minimum Radius: Feet	Maximum Radius: Pounds	Maximum Radius: Feet
Main					
Aux					
Whip					
Other					

Hook Tram Measurements	Base Meas.	Before Test	After Test
Main Hook			
Aux Hook			
Whip Hook			
Other			

Category 2 Cranes

Hoist	Test Load %	Pounds	Hook Tram Measurements: Base Meas.	Before Test	After Test
Main	120	~~30,000~~ 32,812 JCL 11/16/18	6"	6"	6"
Aux					
Other					

Category 3 Cranes

Hoist	Test Load %	Pounds	Hook Tram Measurements: Base Meas.	Before Test	After Test
Main					
Aux					
Other					

Certification

This is to certify that inspections and tests have been conducted in accordance with the procedures set forth in the current NAVFAC P-307. It is further certified that the crane identified above is satisfactory to lift its certified capacity.

Test Director (Signature): John C. Laitlra	Date: 11/16/2018
Inspector (Signature): H. Dee Dumday	Date: 11/16/2018
Inspector (Signature): Lyle B. Blough	Date: 11/16/2018
Certifying Official (Signature)	Date
Expiration Date	

Annual Certifications Since Hook NDT: 4

Hook Material and Manufacturing Method: Forged Alloy Steel

Remarks

25,000 x 1.25 = 31,250 x 1.05 = ~~32,812~~ 32,812 JCL 11/16/18

* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, travelling, etc.). If necessary, use figure 3-2.

TRAINING ONLY

Bridge Crane Certification Package – Anomalies Corrected

Page 16 of 16

NOTES

CO COURSE SUMMARY

Course Summary

Congratulations. You've completed all the course materials.

This training course provided information found throughout the NAVFAC P-307 manual but more specifically it covered information found in sections 3 and 4 and appendices C, D and E.

As an introduction to the certifying official's role, you were first provided an overview of the NAVFAC P-307 Weight Handling Program Management Manual followed by a general understanding of the purpose of the Navy's crane certification program including the personnel involved, and a summary of Navy crane testing. A review of crane and rigging accidents, their definitions and the reporting process was also included.

You were then presented with more specific information discussing the expectations and responsibilities of the certifying official position along with a detailed look at the maintenance, inspection, test and certification documentation you will encounter. You were provided the opportunity to test your knowledge and understanding by engaging in a certification package review exercise.

You were reminded throughout this training that when you execute your weight handling equipment certification tasks and duties, you should refer directly to the NAVFAC P-307 manual or your local procedures for exact wording and requirements.

Thank you for taking the time to improve your knowledge and understanding of the certifying official's duties and responsibilities and his or her role in improving the safety of the Navy's weight handling program and the safety of the people who work with and around the equipment you test.

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 on Navy eLearning:

- General Crane Safety
- Load Test Director

The following courses would 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

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.

NOTES

Naval Facilities Engineering Command
NAVY CRANE CENTER

CERTIFYING OFFICIAL COURSE 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?

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List other training topics in which you are interested: _____

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Note: If you would like a staff member to follow up and discuss this training, please provide your phone number_____