



Navy Crane Center



NAVFAC P-307 Training

CERTIFYING OFFICIAL

WEB BASED TRAINING STUDENT GUIDE

NCC-CO-02

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INTRODUCTION

[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 experience. Topics covered include NAVFAC P-307 familiarization, responsibilities, test procedures, documentation, and accident identification and reporting.

There are no prerequisites for this course.

[CERTIFYING OFFICIAL COURSE MODULES](#)

Here is a list of the modules used in this training course



Course Module Listing

- Introduction
- NAVFAC P-307 Training - Overview
- NAVFAC P-307 Manual - Overview
- Crane Components
- Responsibilities
- Documentation - Review
- Load Tests - Overview
- Records and Requirements
- Load Charts - Review
- Testing Category 1 and 4 Cranes
- Testing Category 2 and 3 Cranes
- Crane Certification Package Exercise
- Crane and Rigging Gear Accidents
- Final Exam

NOTES

NAVFAC P-307

NAVFAC P-307 PURPOSE

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

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

NAVFAC P-307 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.

NAVFAC P-307 CONTENTS

For an overview of NAVFAC P-307, review this table of contents.

Section	Contents
1	General Overview
2	Maintenance
3	Certification
4	Crane Alterations
5	Equipment History File
6	Operator Licensing Program
7	Operator Qualification and Testing
8	Licensing Procedures and Documentation
9	Operator Checks
10	Operation Safety
11	Additional Requirements
12	Investigation and Reporting of Crane and Rigging Gear Accidents
13	Training and Qualification
14	Rigging Gear and Miscellaneous Equipment

WEIGHT HANDLING REQUIREMENTS

NAVFAC P-307 provides requirements for Weight Handling Equipment including maintenance (repairs and alterations), inspection, test, certification, operations, training, licensing, and rigging gear use.

WHE MAINTENANCE AND INSPECTION

NAVFAC P-307 provides requirements for documentation of maintenance and inspection, including: types and frequency of inspection; deficiencies to load bearing parts, load controlling parts, and operational safety devices; repairs and alterations made to cranes; and minimum requirements for record keeping retention.

The form is titled "CERTIFICATION OF DESIGN OF A COVERED CRANE" and includes sections for "IDENTIFICATION", "ANNUAL CERTIFICATION (PART I)", and "INSPECTION RECORDS". It contains numerous tables and fields for recording crane specifications, inspection dates, and signatures.

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.

NAVFAC P-307 COVERED EQUIPMENT

NAVFAC P-307 covers category 1, 2, 3, and 4 cranes, as well as rigging gear. Detailed descriptions of the cranes are included in Section 1. Illustrations of individual crane types can be found in Appendix B. Rigging gear is covered in Section 14.



Knowledge Check 1: Select the best answer.

NAVFAC P-307 uses the term weight handling equipment to refer to:

- A. cranes, crane gear, rigging gear, and all equipment*
- B. only rigging gear*
- C. all cranes and rigging gear*
- D. anything within the crane envelope*

Knowledge Check 2: True or False.

NAVFAC P-307 provides guidance to shore based naval activities for management of weight handling equipment.

- A. True*
- B. False*

NAVFAC P-307 OVERVIEW SECTION 1

Section 1 describes cranes and crane-related equipment used in weight handling operations, discusses qualifications of personnel involved in the maintenance, alteration, repair, inspection, testing and operation of Weight Handling Equipment (WHE), discusses Third Party Certification of cranes, and provides requirements for Non-Navy owned cranes and rigging equipment at Naval Activities.

CATEGORY 1 CRANES

This is a list of category 1 cranes. Category 1 cranes include

- Portal cranes
- Hammerhead cranes
- Locomotive cranes
- Derricks
- 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.



CRANE COMPONENTS

The principal parts of most Category 1 and Category 4 cranes are:

- the boom
- machinery house
- roller path or rotate bearing
- supporting structure
- travel system

The boom is defined as an inclined spar, strut, or other long structural member that supports the hoisting tackle (blocks and hooks). A jib is an extension that may be attached to the main boom when lifting light loads to a higher elevation than that permitted by the main boom. Boom length is the distance from the boom "heel" or "foot" pins to the center of the boom tip sheave. The machinery house normally contains the diesel engine and generator, batteries, clutches, brakes, motors, and drums.

The rotate bearing is a large, precision machined ring bearing connecting the stationary and rotating portions cranes. The supporting structure consists of the carrier frame, rotate base, and gantry. The travel system may include wheels, tires, tracks, travel motors, clutches, and brakes.

CATEGORY 1 CRANE EXAMPLES



Floating



Hammerhead



Container



Derrick



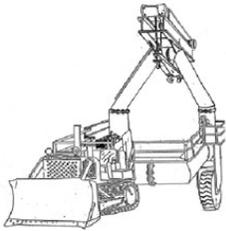
Portal



Mobile

MOBILE BOAT HOIST

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



LANDING CRAFT RETRIEVAL UNIT

The landing craft retrieval unit 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.

RUBBER TIRE GANTRY

The rubber tire gantry crane shown is a Cat 1 crane as described in NAVFAC P-307.



CATEGORY 2 AND CATEGORY 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 A-frames and portable gantries with permanently installed hoists
- 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.

Portable manual and powered hoists are covered in Section 14 of the NAVFAC P-307 (they are defined in Section 1). The activity may, however, treat them as Category 2 or 3 cranes.

CATEGORY 2 AND 3 CRANES CAPACITY

The certified capacity of these cranes determines the category.

- Category 2 cranes have a certified capacity of 20,000 lbs. and greater.
- Category 3 cranes are those with a certified capacity of less than 20,000 lbs.

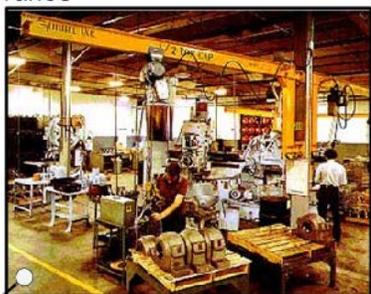
CATEGORY 2 AND CATEGORY 3 CRANE EXAMPLES



Bridge (OET)



Pillar Jib



Jib



Trolley Mounted
Overhead Hoist

Knowledge Check 1: Select the best answer.

Category 2 and category 3 cranes are separated by...

- A. licensing requirements*
- B. certification date*
- C. boom capacity and length*
- D. certified capacity*

Knowledge Check 2: True or False.

Boom length is the distance from the boom “heel” or “foot” pins to the center of the boom tip sheave.

- A. True
- B. False

Knowledge Check 3: Select the best answer.

What is the category of this crane?

- A. category 1
- B. category 2
- C. category 3
- D. category 4



Knowledge Check 4: Select the best answer.

What is the category of a jib crane with a capacity of less than 20,000 lbs.?

- A. category 1
- B. category 2
- C. category 3
- D. category 4

Knowledge Check 5: Select the best answer.

What is the category of this crane?

- A. category 1
- B. category 2
- C. category 3
- D. category 4

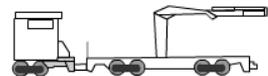


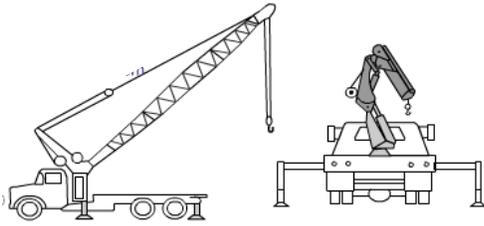
CATEGORY 4 CRANES – MOUNTING

Category 4 cranes may be attached to stake beds, trailers, flatbed trucks, rail cars, or may be stationary mounted on piers, barges, etc.



Category 4 Cranes





CATEGORY 4 CRANES – BOOMS

Category 4 Cranes may have a non-telescoping, telescoping, or articulating boom.

PEDESTAL MOUNTED - CAPACITY

Pedestal mounted commercial boom assembly cranes of with less than 2,000 lbs. capacity are considered Category 3 cranes. Capacities greater than 2,000 lbs. are category 4 cranes and require a licensed operator.



Pedestal mounted commercial boom assembly:
 Category 3 = Capacity less than 2,000 lbs.
 Category 4 = Capacity 2,000 lbs. or greater

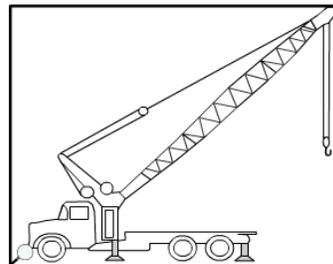
CATEGORY 4 CRANES - SPECIAL CONSIDERATIONS

Commercial truck mounted cranes [described in ASME B30.5] and articulating boom cranes [described in ASME B30.22] of all capacities are Category 4 cranes and require a licensed operator - even if the crane is down rated for administrative purposes.

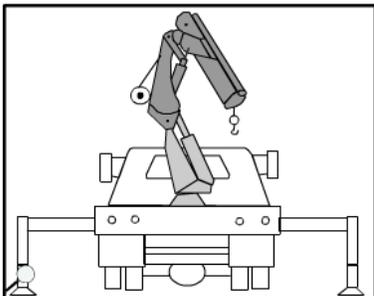
CATEGORY 4 CRANES - EXAMPLES



Truck Mounted Commercial Boom Assembly



Non-Telescoping Boom



Articulating Boom Crane

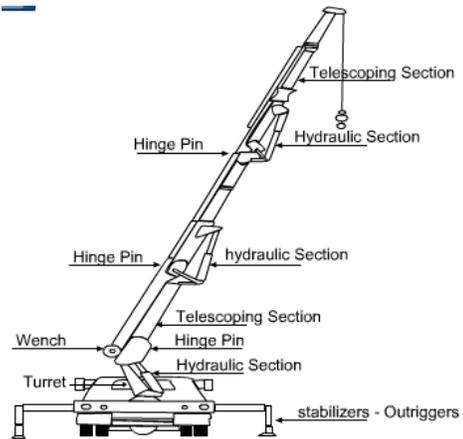


Articulating Boom Crane Truck Mounted



Hydraulic Extendible Boom

CATEGORY 4 CRANES – COMPONENTS



Category 4 Cranes



CATEGORY 4 CRANE LICENSES

All Category 4 cranes require a licensed operator.

MAINTENANCE, CERTIFICATION AND ALTERATIONS (SECTIONS 2, 3 AND 4)

NAVFAC P-307 Section 2 (Maintenance) provides maintenance inspection frequencies and details. Personnel performing maintenance inspections shall be trained and qualified as inspectors per section 13.

Section 3 (Certification) provides crane certification requirements.

Section 4 (Alterations) provides crane alteration requirements.



OPERATOR LICENSING (SECTIONS 6, 7, 8)

NAVFAC P-307 provides uniform standards for crane operator licensing. Cat 1, Cat 2, cab-operated Cat 3, and Cat 4 operators must be trained and licensed according to Sections 6, 7, and 8. Licenses are not required to operate non-cab operated Cat 3 cranes. However, training and a demonstration of ability to operate safely is required.



OPERATOR TRAINING

Prior to taking any 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.

NAVFAC P-307 SECTION 9 OPERATOR CHECKS

A complete check of the crane shall be performed by the operator prior to the first use of the crane each day (whether the crane is used in production, maintenance, testing, or being relocated). NAVFAC P-307 Section 9 covers pre-use check and documentation requirements, procedure requirements, specific instructions, and deficiency reporting and requirements.



NAVFAC P-307 OPERATION SAFETY AND ADDITIONAL REQUIREMENTS

NAVFAC P-307 Section 10 includes crane operation safety procedures, crane team responsibilities and lifting and crane operation requirements. Section 11 provides additional crane requirements.

CRANE AND RIGGING GEAR ACCIDENTS

In the event of an accident, activities shall investigate and report the accident in accordance with NAVFAC P-307 Section 12, as well as OPNAV Instructions 5102.1 and 5100.23.

Crane and Rigging Gear Accident definitions can be found in Section 12.



Crane Accidents Defined

A crane accident occurs when any of the elements of the operating envelope fail to perform correctly during operations, including operation during maintenance or testing resulting in the following:

- Personnel Injury or death
 - Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements.
- Material or equipment damage
- Dropped load
- Derailment
- Two-blocking
- Overload (This includes load tests when the test load tolerance is exceeded)
- Collision: unplanned contact between the load, crane, and/or other objects.

Rigging Gear Accident Defined

A rigging gear accident occurs when any of the elements of the operating envelope fails to perform correctly during weight handling operations resulting in the following:

- Personnel injury or death.
 - Minor injuries that are inherent in any industrial operation, including strains and repetitive motion related injuries, shall be reported by the normal personnel injury reporting process of the activity in lieu of these requirements.
- Material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function.
- Dropped load
- Two-blocking or cranes and powered hoists covered by section 14 (Rigging Gear and Miscellaneous Equipment)
- Overload (This includes load tests when the test load tolerance is exceeded)

NAVFAC P-307 TRAINING

Section 13 of NAVFAC P-307 provides training and qualification requirements for personnel involved in the operation, rigging, maintenance, inspection, and testing of Navy shore based Weight Handling Equipment.

NAVFAC P-307 Section 14 - Rigging Gear

Section 14 of NAVFAC P-307 provides maintenance, inspection, test requirements, and specific use criteria and precautions for rigging gear and miscellaneous equipment not covered in sections 2 through 11.



CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 1: True or False.

Non-cab operated category 3 cranes require a license to operate.

- A. True*
- B. False*

Knowledge Check 2: Check all that apply.

A license is required to operate...

- A. category 1 cranes*
- B. category 2 cranes*
- C. cab-operated category 2 cranes*
- D. category 4 cranes*

NOTES

CRANE COMPONENTS

TYPES OF POWER

Category 1 and 4 cranes generally use electric or hydraulic power that is supplied by a diesel engine. A collector ring system conveys electrical current from the revolving portion of the crane to the lower crane structure.



CATEGORY 2 AND 3 CRANE POWER SUPPLY

Current to Category 2 and 3 cranes is carried from the building or shore power to the bridge and trolley by an insulated electrification conductor system, festoon system, or cable track system.

CATEGORY 1 AND 4 CRANE COMPONENTS

The principal parts of most Category 1 and 4 cranes are:

- boom
- machinery house
- roller path or rotate bearing
- supporting structure
- travel system.



CATEGORY 2 AND 3 CRANE COMPONENTS

The principal parts of overhead traveling cranes are:

- bridge girders
- end trucks
- trolley with hoisting mechanism
- operator's cab or pendant control.



CRANE COMPONENTS - GENERAL

Careful repair and maintenance are essential to safe crane operations. To ensure repairs are not compromised by sub-standard parts, critical crane components are clearly identified. NAVFAC P-307, appendix F provides examples of load bearing parts, load controlling parts, and operational safety devices.

LOAD-BEARING PARTS

Load-bearing parts support the load. Failure of a load-bearing part can cause dropping, uncontrolled shifting or uncontrolled movement of the load.



LOAD-BEARING PARTS EXAMPLES

Examples of load-bearing parts are wire rope, sheaves, hooks, hook blocks, and hoist drum pawls. The next example screen shows a boom dog, used to prevent unwanted rotation of a boom or hoist drum.



Wire rope,
Hooks, & Blocks



Sheaves

Dogs or Pawls



LOAD-BEARING PARTS - CARRIER FRAME STRUCTURE EXAMPLES

The carrier frame provides a working base for the upper works of the crane. The tires, wheels, and axles support the carrier frame for transporting and for lifting loads on rubber. Outriggers, stabilizers, and locking devices provide support for on-outrigger operations. Failure of any one of these components or systems can cause the load to drop or cause uncontrolled movement of the load. These are critical components that must be carefully checked before operations or testing.

LOAD-BEARING PARTS - BRIDGE CRANE EXAMPLES

Load-bearing parts found on bridge cranes include the bridge girders that carry the weight of the trolley including hoisting machinery and the load; and the wire rope drum and hoisting machinery that lifts and supports the load. Appendix F of NAVFAC P-307 provides examples of load-bearing parts.



LOAD-CONTROLLING PARTS

Load-controlling parts are crane components that position, restrain, or control movement of the load. Malfunction of these parts can cause dropping, uncontrolled shifting, or movement of the load.

LOAD-CONTROLLING PARTS EXAMPLES (1)

Examples of load-controlling components are foot-controlled brakes used as secondary brakes for hoist speed control, travel gear assemblies, rotate gear assemblies, and rotate locks. Appendix F of NAVFAC P-307 lists examples of load-controlling parts.



Foot-controlled Brakes



Travel-Gear Assemblies



Rotate-Gear Assemblies



LOAD-CONTROLLING PARTS EXAMPLES (2)

Some additional examples are electrical crane-control circuits related to rotate and travel including brakes and clutches. Crane-mounted diesel-engines and generators and electrical-power-distribution systems must be treated as load controlling parts.

Knowledge Check 1: Select the best answer.

What types of power does a category 1 or 4 crane generally use and what is its source?

- A. hydraulic and water power supplied by a compressor*
- B. pneumatic and electric power supplied by a backup generator*
- C. electric or hydraulic power supplied by a diesel engine*
- D. pneumatic and hydraulic power supplied by a compressor*

Knowledge Check 2: Select the best answer.

Load- _____ parts are those that restrain, position or control the movement of the load.

- A. operation*
- B. handling*
- C. lifting*
- D. bearing*
- E. controlling*

Knowledge Check 3: Select the best answer.

A hook is what type of component?

- A. operational safety devices*
- B. load bearing part*
- C. load controlling part*
- D. general safety device*

Knowledge Check 4: Select the best answer.

Hydraulic foot brakes are what type or group of components?

- A. operational safety devices*
- B. load bearing part*
- C. load controlling part*
- D. general safety device*

Knowledge Check 5: Select the best answer.

Load- _____ parts are those that support the load.

- A. lifting*
- B. operation*
- C. controlling*
- D. bearing*
- E. handling*

Knowledge Check 6: Select the best answer.

How is electrical current conveyed from the revolving portion of the crane to the lower crane structure?

- A. through the electrical panels*
- B. through the collector ring system*
- C. through the main circuit board*
- D. through transistors*

SAFETY DEVICES

Safety devices are divided into two groups:

- general safety devices
- operational safety devices (OSD)

General safety devices provide protection for personnel and equipment on or in the crane operating path.

Operational safety devices are critical crane components that can affect the safe lifting and handling ability of the equipment.

OSD: LOAD INDICATORS

Load-moment indicators are operational aids providing the crane operator necessary information to stay within the capacity of the crane. Load-moment indicators that provide shutdown capabilities are operational safety devices. They may provide the operator with load weight, boom angle, and boom length. As the operator approaches critical limits load moment devices may sound an audible alarm, illuminate warning lights, or lock out functions that could possibly allow the operator to overload the crane.



If a load moment device has lockout capability, it must be treated as an operational safety device.

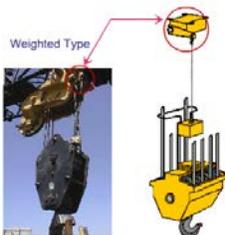
OSD: BOOM ANGLE INDICATORS

Mechanical boom angle indicators are operational safety devices. These devices provide the operator with the boom angle needed to calculate the radius of the crane. Mechanical boom angle indicators are usually mounted on the boom where they can easily be read from the cab.



OSD: LIMIT SWITCHES

Limit switches are operational safety devices that prevent damage to the crane if a loss of control occurs. Most cranes are equipped with limit switches. The purpose of a hoist limit switch is to prevent over-travel of the hook block and the possibility of two-blocking. Two-blocking occurs when the hook block comes in contact with the upper sheave block during hoisting of the hook (or lowering the boom). Two-blocking is dangerous because it could result in damage to the crane, parting of the hoist lines, and dropping the load.



These images are examples of weighted-type hoist upper-limit switches. A spring-loaded switch opens the circuit when the hook block raises the weight. Interruption of power to the hoist function stops the upward movement of the hoist block to prevent two-blocking.

OSD: OVER SPEED

Over-speed, pressure, and temperature devices on crane-mounted engines are operational safety devices. When the engine provides the power to move loads, the devices provide shutdown ability to protect the engine from damage. Appendix F of the P-307 provides a comprehensive list of operational safety devices.



GENERAL SAFETY DEVICES

General safety devices are those devices that protect or alert the operator or personnel working in the vicinity of the crane. Some general safety devices used to warn personnel working on or around the crane are horns, bells, whistles, travel alarms, travel warning lights, and bumpers.



Horns, Bells, Whistles



Travel Alarms



Travel Warning Lights



Bumpers

Knowledge Check 1: Select the best answer.

Safety devices that provide protection for personnel and equipment are considered _____ safety devices.

- A. load bearing*
- B. general*
- C. operational*
- D. universal*

Knowledge Check 2: Select the best answer.

Safety devices that affect the safe load lifting and handling capabilities of equipment are considered _____ safety devices.

- A. load bearing*
- B. operational*
- C. universal*
- D. general*

Knowledge Check 3: Select the best answer.

Which of the following does not affect the safe operation of the crane?

- A. load bearing parts*
- B. operational safety devices*
- C. general safety devices*
- D. load controlling parts*

Knowledge Check 4: Select the best answer.

A travel alarm is what type of group of components?

- A. general safety devices*
- B. operational safety devices*
- C. load controlling part*
- D. load bearing part*

NOTES

RESPONSIBILITIES

CANDIDATE 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 primary responsibility is to maintain the integrity of the crane certification program. In doing this, 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 and documented. He or she must verify that all required certification tests have been performed and the appropriate paperwork is complete and correct.



MAJOR RESPONSIBILITIES

The major responsibilities of the certifying official include:

- certifying cranes
- designating load test directors and condition inspectors
- ensuring third party certifications on long-shoring cranes
- confirming, concurring and/or approving, as applicable, procedures
- work deferrals
- certification and service cycle extensions
- lift configurations
- documentation, certification of work
- activity crane accident reports
- resolving any issues that may arise regarding the activity's weight handling equipment and program.

PERSONNEL DESIGNATIONS

One of the first responsibilities of the certifying official is to designate the test and inspection personnel who will be involved in the certification of weight handling equipment. The certifying official must designate, in writing, the condition inspectors and test directors 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 2, discusses maintenance inspectors; section 3 discusses test directors and condition inspectors; section 6 discusses licensing officials, instructors, and performance examiners; section 13 outlines training requirements; and appendix N lists competency attributes.

CRANE CERTIFICATIONS

A major responsibility of the certifying official is crane certification. The certifying official ensures all certifications, including third party certifications, are performed. Certifications are discussed in NAVFAC P-307 section 3.



DOCUMENTATION REVIEW

All applicable paperwork must be reviewed before the certifying official certifies the crane. The certifying official must make sure that all maintenance, inspection, and test requirements, both load and operational, have been completed before signing the crane certification. After a complete review of the crane test, inspection, and certification documentation, the certifying official signs the crane

certification.

CRANE RECERTIFICATION

The certifying official plays an important part in the crane re-certification process. He or she must be aware of any repairs, adjustments, and alterations to any critical components that affect the crane's current certification. Certifying officials must understand the load test requirements after repairs, adjustments, or alterations have been made. The certifying official must sign work documents involving repairs to load bearing components, load controlling components or operational safety devices that do not require a load test. Certifying officials must understand other circumstances which affect crane certification, for example: overloads, accidents, and major deficiencies.



THIRD PARTY CERTIFICATION

The Certifying Official must ensure that applicable cranes receive a third party certification by the Navy Crane Center. Cranes that require third-party certification are those used in cargo transfer and floating cranes used for ship building, ship repair, or ship breaking. Information about third party certification can be found in NAVFAC P-307, section 3 and Appendix M.

APPROVALS AND CONCURRENCES

Certifying officials provide approval and concurrence for various evolutions 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.

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 inspection, lubrication or servicing. Technical justification for deferral shall be provided. Each deferral and justification shall be in writing.

Certifying officials shall provide concurrence with the activity Commanding Officer when extending the annual certification of the crane for emergent conditions. The extended certification shall not exceed forty-five 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.

Deferrals, justifications, and approvals shall be in writing.

PROCEDURE APPROVALS

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 approve procedures developed for modified test inspections and for controlled disassembly and reassembly of critical components before the procedures are sent to the Navy Crane Center for approval. He or she is also required to review and approve 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.

The certifying official approves reduced capacity ratings, test procedures, and test conditions for certifying barge-mounted mobile cranes, as well as wind and wave restrictions. More detailed information on these procedures may be found in NAVFAC P-307, section 3.

LIFT CONFIGURATION APPROVALS

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.



BARGE MOUNTED MOBILE CRANES

In cases where it is necessary to install a mobile crane on a barge, the certifying official shall prescribe appropriate test conditions and precautions as outlined in NAVFAC P-307, Section 3.



CRANE AND RIGGING GEAR ACCIDENT REPORT			
Accident Category: <input type="checkbox"/> Crane Accident <input type="checkbox"/> Rigging Gear Accident		To: Navy Crane Center 13 Memorial Hwy 8552 Littleton, CO 80120-2296 FAO (311) 889-9111	
From:	Activity:	Report No.:	
Crane No.:	Category:	Accident Date:	Title: N/A
Category of Service: <input type="checkbox"/> SPS <input type="checkbox"/> SPS	Crane Type:	Crane Manufacturer:	
Location:	Reason:		
Crane Capacity:	Deck Details:	Weight of Load on Deck:	
<input type="checkbox"/> No. <input type="checkbox"/> No. <input type="checkbox"/> No. <input type="checkbox"/> No.	Deck Details:	Deck Details:	
CONCURRENCES			CODE
			DATE
Certifying Official (Crane Accidents Only):			CODE
			DATE

CRANE 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.

ADDITIONAL 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 information, and the Crane Corner newsletter. The website also provides a comprehensive summary of evaluation outcomes and results from previous years.

Director
 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>

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, and the development of CSA's and EDM's.

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 audit team throughout the year.

NAVFAC P-307 web-based training courses are available via the Navy eLearning web site.

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 1: Fill in the blank.

The certifying official must base all crane related decisions on _____.

Knowledge Check 2: Select all that apply.

Before certifying a crane, the certifying official must ensure all requirements have been met for...

- A. inspection*
- B. maintenance*
- C. documentation*
- D. testing*

Knowledge Check 3: Select the best answer.

The certifying official shall designate, in writing, which of the following personnel?

- A. all of the listed personnel*
- B. crane operator instructors*
- C. condition inspectors and load test directors*
- D. crane operator performance examiners*
- E. none of the listed personnel*

Knowledge Check 4: True or False.

The certifying official's primary responsibility is to maintain the integrity of the crane certification program.

- A. True*
- B. False*

Knowledge Check 5: Select all that apply.

The certifying official shall review and approve which of the following?

- A. crane set-up and lift configurations*
- B. reduced capacity ratings, test procedures, and test conditions for barge mounted cranes*
- C. ancillary equipment procedures*
- D. procedures for the controlled disassembly and reassembly of critical components*
- E. 60-day crane certification extensions*

Knowledge Check 6: True or False.

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

- A. True*
- B. False*

NOTES

DOCUMENTATION REVIEW

CERTIFICATION REVIEW

The annual crane certification process requires that the certifying official review the following documents, as applicable:

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION			
Activity		Certification	
Crane No.	Type	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.	
OEM's Rated Capacity		Test Director (Signature) _____ Date _____	
Main	_____ lbs. _____ feet	Inspector (Signature) _____ Date _____	
Aux	_____ lbs. _____ feet	Inspector (Signature) _____ Date _____	
Whip	_____ lbs. _____ feet	Certifying Official (Signature) _____ Date _____	
<input type="checkbox"/> Annual Certification <input type="checkbox"/> Quadrennial Load Test <input type="checkbox"/> Interim Recertification (Reason: _____)		Expiration Date _____	
Category 1 or 4 Cranes *		Maximum Radius _____	

- Maintenance Inspection Specification and Record for category 1 and 4 cranes or Annual Maintenance Inspection Specification and Record, for category 2 and 3 cranes
- Crane Condition Inspection and Record, for all cranes
- 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 authorizing documents may be reviewed at the discretion of the certifying official.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD (MISR)

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 OEM.

MAINTENANCE INSPECTION SPECIFICATION AND RECORD			
CATEGORY 1 CRANES			
Crane	Type	Manufacturer	Capacity
Prior Inspection DATE	Current Inspection DATE	Legend: Check under condition	
		S = Satisfactory U = Unsatisfactory C = Corrected (if deferred, leave blank and identify on Unsatisfactory Items sheet) NA = Not Applicable	
Item No.	Inspection Type	Items to be Inspected	Condition
1	A	Structure (bridge orders, inspect structural components for damage.	S U C NA

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD			
FOR CATEGORY 2 AND 3 CRANES			
Crane	Type	Manufacturer	Capacity
Prior Inspection DATE	Current Inspection DATE	Legend: Check under condition	
		S = Satisfactory U = Unsatisfactory C = Corrected (if deferred, leave blank and identify on Unsatisfactory Items sheet) NA = Not Applicable	
Item No.	Inspection Type	Items to be Inspected	Condition
1	A	Structure (bridge orders, inspect structural components for damage.	S U C NA

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 must verify that the information blocks at the top of each sheet are filled in with the correct information and that all inspection blocks are marked either

- satisfactory, with an S
- unsatisfactory, with a U
- corrected, with a C
- not-applicable, with an N-A

If an inspection block is marked "U", verify, that it is also marked "C", showing that it has been corrected. 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 appendixes C and D.

MISR BLOCKS: SYSTEM IDENTIFICATION

In cases where the attribute is one that applies to different systems on the crane, each system must be identified and the results recorded on the form. As shown on this example, there are three different sets of clutches listed on the form in the systems-inspected column: a rotate clutch, a hoist clutch, and a boom 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.

Item No	Inspection Type			Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition				
	A	B	C				S	U	C	NA	
23	X	X	X	Clutches (Boom, Hoist, Swing, and Travel)	Inspect clutch linkage for damage, for evidence of binding and loose or worn components, and for proper lubrication and adjustment. Inspect clutch linings for wear, debonding, 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				
						ROTATE	X				

MISR 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. It must include 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?

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 2 FOR REQUIREMENTS FOR DEFERRAL OF WORK.)			
Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)
2	Leak in filter at inlet line	9825	John Lee 12 08 06
51	Aux boom nose sheave worn	D	

Deferred work to load bearing, load controlling and operational safety devices requires approval by the certifying official with engineering justification. NAVFAC P-307, Section 2, *Maintenance: Deferral of Work During Annual Inspections/Certifications* outlines the procedure and actions to be taken. The deferral must be in writing and limited for a period up to the next certification.

MISR: BRAKE DATA SHEET

The Brake Data Sheet is the last page of the MISR form. The certifying official should verify it for accuracy and completeness. Ask yourself...

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 vendor unless OEM record actual measurement requested in "MSP" block. If adjustments are made, record adjusted setting in "ADJ" block. Otherwise indicate "N/A". List major dimension number and condition unless noted under remarks.											
BRAKE	TYPE	SPRING LENGTH/TORQUE SETTING				AIR GAP/PLUNGER STROKE				LINING THICKNESS	
		MIN	MAX	ACTUAL INSP	ADJ	MIN	MAX	ACTUAL INSP	ADJ	MIN	ACT
HOIST	PM	5 3/8	5 1/2	5 5/8	5 3/8	1/8	5/16	3/8	1/8		

- Have all brake data measurements been recorded on the sheet?
- Are the OEM tolerances recorded in the minimum and maximum, or MIN and MAX columns?

If OEM criteria are not available [then] verify the settings have local engineering and NCC approval. In some cases, depending on the type of brake, not all measurements may be filled in.

REQUIRED SIGNATURES ON MISR

The certifying official should verify that both the mechanical and electrical inspectors have signed and dated their respective signature blocks on the MISR or AMISR. If only one person performs both the electrical and mechanical inspections, for example a general inspector, then that individual must have the prerequisite training and qualifications to perform all of the applicable inspections as outlined in NAVFAC P-307, Section 13.

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 2 FOR REQUIREMENTS FOR DEFERRAL OF WORK.			
Item No.	Deficiency	SRO No.	Verification of Correction (Signature and Date)
Mechanical Inspector (Signature): I.N. Smith	Date: 10 Dec 03	Electrical Inspector (Signature): Pat Reedh	Date: 10 Dec 03

CRANE CONDITION INSPECTION RECORD (CCIR)

The Crane Condition Inspection and 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 3-3.

The CCIR is completed by one or two condition inspectors and a test director and documents the condition of the crane before, during and after a load test. NAVFAC P-307 section 3 contains information about completing the CCIR. As the certifying official, you should verify the following:

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			

- 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", is a description of the unsatisfactory condition noted in the remarks section of the form?

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 shall 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 D = During A = After	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.			
Remarks:				
Inspector Signature/Date:			Test Director Signature/Date:	

CCIR: SELECTIVE TESTING

If a major deficiency is found after the load test, it shall be corrected. A selective load test shall be performed to test the corrected components.

When a selective load test is performed, a condition inspection shall be performed on all items in the CCIR that experience greater than normal loading to ensure that the load test has not caused any damage. A record of this retest

shall be recorded in the "Remarks" portion of the CCIR and should be examined for accuracy.

Make sure the method for defeating/testing the load brake is described in the remarks section of the CCIR. If the remarks section is not used, a detailed or standard written procedure must be developed. See appendix E.

Review the signature blocks at the bottom of the form. The signature blocks should be signed and dated by the condition inspectors and test director.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION (1)

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 include:

Activity		Building Location	
Crane No.	Type	OEM's Rated Capacity	
		Main _____ lbs. _____ feet	Certified Capacity (If different from OEM's rated capacity, explain in Remarks)
		Aux _____ lbs. _____ feet	Main _____ lbs. _____ feet
		Whip _____ lbs. _____ feet	Aux _____ lbs. _____ feet
			Whip _____ lbs. _____ feet
<input type="checkbox"/> Annual Certification <input type="checkbox"/> Quadrennial Load Test		Appendix "C" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs)	
<input type="checkbox"/> Interim Recertification (Reason: _____)			
Category 1 and 4 Cranes:			
Boom Length	Total Load	Minimum Radius	Load Moment or Maximum Radius
	%	Feet	Feet
Hoist		Feet	Feet

- Verifying the information blocks are annotated with the required information at the top of each sheet.
- If the certified capacity is different from the OEM capacity, the reason must be explained in the remarks section. A typical case might be if a crane is reconfigured with fewer parts of hoist line.
- Verify the appropriate test load has been used in the calculation of test weights. Mobile cranes are load tested at 105% of rated capacity; all other crane types are load tested at 125% of rated capacity.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION (2)

The ‘Certification of Load Test and Condition Inspection’ form documents the load test. Additional points requiring verification include:

- Verifying the hook tram measurements are listed, including the base measurement.
- Verifying the ‘annual-certifications-since-hook-NDT’ have been listed.
- Confirming all of the appropriate test paragraphs (including subparagraphs and notes) from Appendix E, are listed on the load test form. In order to confidently make this confirmation, the certifying official must be familiar with the configuration of the crane during load test and appendix E.

Other considerations might include whether or not the crane is equipped with a load brake or whether a mobile crane being certified for an on-rubber capacity is actually allowed by the O-E-M to have free rated capability.

MOBILE CRANE SUPPLEMENTAL FORM

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

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			

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 ORDERS (SRO)

All work performed on cranes shall be documented on a Shop Repair Order (SRO) or other work document. If 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?

NAVFAC 112002A (Rev. 1-73) SUPERSEDES NAVDOCKS1948 SN-0105-LF-004-1001					SHOP REPAIR ORDER		(1) SRO NUMBER	(2) JOB ORDER NUMBER - USN NUMBER
					PAGE OF			
(3) DESCRIPTION	(4) MAKE	(5) MODEL	(7) EQUIP. CODE		(8) DOD ALPHA			
(9) ACTIVITY	(10) PHONE NUMBER	(11) LAST "A" TYPE PM	(12) LAST "B" TYPE PM	(13) LAST "C" TYPE PM	(14) ACCV. MILES/HR.			
TO BE COMPLETED UPON EQUIPMENT AVAILABILITY FOR MAINTENANCE REPAIR								
PM GROUP (15)	PM TYPE DUE (16)	PM DATE DUE (17)	(18) DOWNTIME			TOTAL HOURS	(19) PRESENT METER READING	
			IN DATE TIME	OUT DATE TIME				

When adjustment or repair of a load bearing or load controlling part or operation safety device does not require a load test for verification of satisfactory work, one of the following (at the activity's option) is required prior to returning the crane to service. After all work, inspection, and operational testing required by NAVFAC P-307 section 2 are completed, the work document(s) shall be signed by the chief engineer or the certifying official. An interim re-certification is not required. A selective inspection, operational test, and recertification shall be performed. This is in addition to the inspection requirements of NAVFAC P-307 section 2.

ALTERATIONS

When reviewing crane certification documentation, the certifying official should check to see if any of the repairs described on the Shop Repair Order or in the MISR 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. Section 4 of NAVFAC P-307 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.



CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 1: Select all that apply.

The annual certification process requires the certifying official to review which of the following documents?

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

Knowledge Check 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 the inspection block?

- A. S*
- B. D*
- C. R*
- D. C*

Knowledge Check 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*

Knowledge Check 4: Select the best answer.

Your mobile crane has been reconfigured with fewer parts of hoist line 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 MISR*
- B. An explanation in the remarks section of the Certification of Load Test and Condition Inspection form*
- C. An explanation in the remarks section of the CCIR*

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 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. satisfied, unsatisfied, concealed, deferred, not applicable*
- B. selected, unselected, completed, detailed, not available*
- C. satisfactory, unsatisfactory, completed, deferred, not available*
- D. satisfactory, unsatisfactory, corrected, deferred, not applicable*

Knowledge Check 6: Select all that apply.

Who is required to sign the Certification of Load Test and Condition Inspection form?

- A. maintenance supervisor*
- B. electrical inspector*
- C. certifying official*
- D. load test director*
- E. mechanical inspector*
- F. engineer*

NOTES

LOAD TESTS – OVERVIEW

THE PURPOSE OF THE LOAD TEST

The purpose of load testing is to ensure by controlled operation with prescribed test loads, that the equipment is capable of safely lifting and moving the rated load through all design motions.



The Load Test Director has overall responsibility of the test including:

- Planning, directing, controlling all aspects of the test
- Conducting the test briefing
- Coordinating the activities of team members
- Ensuring the safety of test personnel and personnel around the test area, as well as the equipment being tested
- Choosing the communication method(s)
- Double-checking the weight calculation of each test load
- Ensuring the proper gear is used for rigging the test loads
- Keeping the crane test area clear of non-essential persons or equipment

TEST DIRECTOR RESPONSIBILITIES

Crane load tests are overload conditions, requiring extreme caution and control. The test director has overall responsibility of the load test. This includes planning, calculating, assigning, directing, controlling and coordinating all test equipment and activities. The test director also ensures the safety of the personnel, gear, equipment, and test area.

TEST DIRECTOR QUALIFICATIONS

Test directors must be qualified and designated to oversee and direct load tests. Qualification is a function of the local activity or command. As a minimum, test directors must complete the training outlined in NAVFAC P-307. They must possess experience, technical competency, and knowledgeable of crane operations, component functions, and maintenance and test procedures. They must understand their duties as well as the duties of the other test team members.

Additional training, such as OEM schools or competency attributes specific to your equipment or activity, are encouraged.

Refer to NAVFAC P-307 sections 3, 13, and appendix N for minimum designation, training, and competency requirements.



TEST DIRECTOR TRAINING

A well-qualified load test director will know and understand:

- the operational characteristics of the equipment and components being tested
- the proper use of measuring instruments
- load charts
- crane communications, including hand signals

LOAD TEST DIRECTOR APPOINTMENTS



When the activity or command is satisfied that the candidate has completed all applicable local, NAVFAC P-307, and corporate requirements, the certifying official will authorize the candidate to perform load tests by-way-of written designation. A well written designation letter would be on official letter head and include the position title and/or candidate's name, the crane category and/or equipment type, and the functional or geographical area of responsibility.

LOAD TEST NECESSITY

Certifications, for all cranes, 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, which are in a quadrennial load test program, 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 crane certification shall indicate when a crane is in the quadrennial load test program.

When the 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, recertification is required. 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. Inspection and testing shall fully ensure the work has been performed correctly and that the crane operates properly.

If an inadvertent overload exceeds 110% of the certified capacity, or 105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber tired gantry cranes, and category 4 cranes, a load test is required, along with the condition inspection, for recertification. Where only distinct portions of the equipment are affected, only those portions need to be inspected and tested.

RE-CERTIFICATION

WHE certifications are good for one year unless voided. Re-certification requires a condition inspection. Depending on the type of crane, a load test is required at every annual or quadrennial certification.

Certification is void whenever the rated capacity is exceeded, except during a load test.

Selective load tests and re-certification may be required after an adjustment, replacement, disassembly, alteration or repair of load-bearing and in some cases load-controlling components.

Load-controlling components, such as the rotate function on a floating crane, may require load testing to verify satisfactory work. Some exceptions apply for brake adjustments and certain disassembly and reassembly procedures.

See NAVFAC P-307 section 3 for additional information on what type of work may or may not require recertification, when a load test is or is not required, and what may void a certification.

SELECTIVE LOAD TESTING (1)

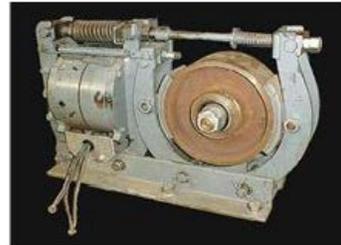
Selective load tests for interim re-certification are required when adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test to verify the work performed.

A selective load test is limited to components in an affected system. When load tests are performed, they shall include applicable portions of both the static and dynamic tests. For mobile cranes the applicable portions of the 'maximum certified capacity test' and the 'load moment test' shall be included. See appendix E for test requirements.

SELECTIVE LOAD TESTING (2)

Disassembly or repair to a hoist holding brake requires the static and/or dynamic portions of appendix E testing, as applicable to crane type.

Some repairs, like the brake adjustment example shown on-screen, may be excluded from a selective load test.



CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 1: Select the two correct answers.

The purpose of the load test is to ensure by _____ that the equipment is capable of _____ through all design motions.

- A. safely lifting and moving the rated load*
- B. detailed written documentation*
- C. controlled and standardized procedures*
- D. safely lifting and moving any load*
- E. operation/operating*
- F. controlled operation with prescribed test loads*

Knowledge Check 2: Select all that apply.

Identify all the items on the below list that would require a load test.

- A. work performed on horizontal movement functions*
- B. each annual certification for category 2 and 3 cranes in a quadrennial program*
- C. work on a hoist drive train*
- D. work on a component resulting in no impact on its load holding capability*
- E. work affecting limit switches*
- F. each category 1 and 4 crane annual certification*
- G. each fourth annual certification for category 2 and 3 crane sin a quadrennial program*

Knowledge Check 3: Select all that apply.

Select the items from the below list that are responsibilities of the load test director.

- A. choosing the communication method(s)*
- B. attaching the rigging gear and test load to the crane's hook*
- C. directing the load test*
- D. operating the crane*
- E. conducting the pre-test briefing*

Knowledge Check 4: Select the best answer.

Which of the following best describes the qualification(s) a load test director must possess?

- A. possess experience and knowledge of crane operations and component functions*
- B. be designated in writing*
- C. complete applicable NAVFAC P-307 training requirements*
- D. understand other test team member duties*
- E. all listed items*

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 5: True and False.

Navy load test directors, designated and qualified in accordance with NAVFAC P-307, must be certified by OSHA to perform load tests on Navy cranes.

- A. True*
- B. False*

Knowledge Check 6: True and False.

The load test director is appointed by the commanding officer.

- A. True*
- B. False*

Knowledge Check 7: Fill in the blank.

Load test directors are designated _____.

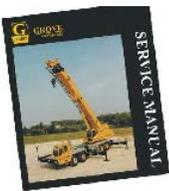
Hint: Complete the sentence indicating the manner in which the designation is made and by whom (six words should do it).

NOTES

RECORDS AND REQUIREMENTS

BEFORE THE LOAD TEST

Before starting the load test, the load test director should research the crane history file and examine the previous condition inspection, test, and certification records. These will help determine the current condition of the crane. Select an appropriate test site for the type of crane being tested and have the necessary test weights delivered to the site.



RESEARCHING RECORDS

The first step in preparing for the load test is to research the crane's records. Look at the crane's history jacket. Look at previous inspection, test, and certification records. Review OEM manuals to include: procedures for changing crane configurations and erecting ancillary devices, load charts, instructions for setting up outriggers, and if provided, information that may help with calculating test loads.

DETERMINING CRANE CONDITIONS

To accurately establish a crane's current condition, a crane condition inspection will need to be performed and documented. This is done using a Crane Condition Inspection Record or CCIR. This document records inspection results found before, during, and after a load test.

CRANE CONDITION INSPECTION RECORD						
Note: Inspect components that are reasonably accessible without disassembly.						
Operator's Name	Operator's License	Operator's Location	Operator's Name	Operator's License No.	Purpose of Inspection	
Purpose of Inspection		Legend	Site Started	Date Completed		
		B = Before A = After D = During				
Item No.	Item Description	B	D	A	Insp./Unit	
1						
2	When is a Condition Inspection performed? • before, • during • aftera load test					
	Why is a Condition Inspection performed? To verify the condition of the crane					
	How is a Condition Inspection documented? Crane conditions are recorded on the Crane Condition Inspection Record (CCIR)					

CERTIFYING OFFICIAL STUDENT GUIDE

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, 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.									
6	Inspect motors for condition and proper operation.									
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)									
8	If load test is performed, 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 CCIR. Mark N/A 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.									
14	Inspect operator's cab for cleanliness and operation of equipment.									
15	Inspect machinery house 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, 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.									
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 steadiment/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:					

BEFORE THE LOAD TEST

Selecting a suitable test area is important. Considerations include sufficient room to safely conduct the test and inspections, adequate support and ground loading for the crane and the test weights, and the ability to restrict traffic into and nearby the area.



Remember, a weight test is an overload condition and the crane has the potential to fail. Ensure the test site is large enough to handle all contingencies and that it remains secured throughout the entire test and inspection process.



TEST SITE PREPARATION

Preparing both equipment and personnel are part of the test site preparations. Double check that the correct test weights and rigging gear are available on-site to perform the tests. Conduct an interactive briefing with the crew on all aspects of the test and inspection process, safety precautions, and each person's responsibilities. Is the crane operator ready and has he or she completed the ODCL? If not already done, double check all calculations. Finally, ensure barricades are in-place to control traffic and the safety of non-test personnel.

MAKING THE TEST SITE SAFE

Erect barriers to prevent entry of unauthorized personnel and vehicles into the test area. The barricaded area should be large enough to protect personnel should a major component fail, such as a boom. Enforce the barriers with the help of other test-team members to keep the test site safe. Be aware of counterweight swing and barricade as necessary to protect test personnel.



TEST WEIGHTS

Test weights must be accurately weighed, measured and labeled. The load test director must ensure the test weights are accurately weighed, measured and labeled. The consequences of using the wrong size weights may lead to catastrophe during the load test or, even worse, after the crane has returned to production.

TOTAL TEST LOAD

Total test loads must be calculated for specific cranes and specific tests. Test loads are either 125% or 105%, depending on the type of crane. Test load tolerance is +5%/-0%. The test load includes the weight of the test weights, rigging gear, and below the hook lifting devices.



- Nominal Test Load
 - 125% of Rated Capacity
 - 105% for Mobile Cranes, Mobile Boat Hoists, Rubber-tired Gantry Cranes, and Category 4 Cranes
- Tolerance =
 - + 5 - 0%
- Includes:
 - Rigging Gear
 - Below the Hook Lifting devices



STAGING THE WEIGHTS

Prior to the load test, a pre-use inspection of all rigging gear and test weights should be performed. Ensure all gear is in good condition and adequately identified. This is a good time to re-verify test load calculations using the labeled weight markings on the rigging gear and test weights.

TEST CREW BRIEFING

After pre-test preparations are complete and the test is ready to begin, the load test director will conduct an interactive briefing with the test team covering such topics as communications, precautions, procedures, assignments, responsibilities, traffic control, and anything else relevant to the specific crane and environment.

Should any new personnel join the test crew after the test has begun, they shall be thoroughly briefed-in before starting work.



COMMUNICATIONS

Clear communications are vital to the safety of personnel and equipment during a test. The communication method and a designated signal person must be established. It should be emphasized to the test team that anyone can give an emergency stop signal and that if communications are lost or cannot be understood, the operator is to immediately stop operations. Any automatic or pre-determined stopping points that have been built-in to the test procedures must be understood by all personnel.

TESTING PRECAUTIONS

During the test, normal operating speed shall be used. Rated equipment speeds do not need to be attained. The emphasis shall be placed on the ability to safely control loads through all motions at normal speed.

Extreme caution should be exercised during the tests. These tests create overload conditions that may cause failure. Personnel must stay clear of suspended loads and out of areas where they could be struck by a falling hoist assembly or boom.



Raise the test weights just high enough to safely perform the required test. For mobile cranes this will help to prevent the crane from tipping if problems arise.

FINAL CHECKS BEFORE THE TEST



- Is the 'pre-test' portion of the CCIR complete?
- Are inspectors ready to begin?
- Have all safety concerns been addressed?
- Is the ODCL complete?
- Has all gear been checked?
- Are personnel briefed and ready to go?

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 1: Select all that apply.

Before starting the load test, the load test director should...

- A. safely lifting and moving the rated load*
- B. detailed written documentation*
- C. controlled and standardized procedures*
- D. safely lifting and moving any load*
- E. operation/operating*
- F. controlled operation with prescribed test loads*

Knowledge Check 2: Select the best answer.

Why are condition inspections required and when are they performed?

- A. work performed on horizontal movement functions*
- B. each annual certification for category 2 and 3 cranes in a quadrennial program*
- C. work on a hoist drive train*
- D. work on a component resulting in no impact on its load holding capability*
- E. work affecting limit switches*
- F. each category 1 and 4 crane annual certification*
- G. each fourth annual certification for category 2 and 3 crane sin a quadrennial program*

Knowledge Check 3: True or False.

Test site considerations include: sufficient room to safely conduct the test and inspections, adequate support and ground loading for the crane and the test weights, and the ability to restrict traffic into and nearby the area.

- A. True*
- B. False*

Knowledge Check 4: True or False.

Highly effective, experienced, and cohesive test teams with proven track records are permitted to waive the requirements for double checking test weight calculations, conducting pre-test briefings, and verifying individual team member responsibilities.

- A. True*
- B. False*

Knowledge Check 5: Select the best answer.

You are about to test a 25T mobile crane. You have 420 pounds of gear attached which includes a below-the-hook lifting device, hook and block, wire, slings, shackles, etc. Based on the information provided, (disregard boom radius and length), what is the minimum and maximum weight of the test load?

- A. 52,080 lbs. to 54,705 lbs.*
- B. 62,080 lbs. to 64,705 lbs.*
- C. 54,580 lbs. to 57,330 lbs.*
- D. 52,500 lbs. to 55,125 lbs.*

Knowledge Check 6: Select all that apply.

As part of the pre-test briefing, the load test director should discuss which of the following items with the test team?

- A. crane specific characteristics and precautions*
- B. training schedules*
- C. assignments and responsibilities*
- D. traffic controls and barricades*
- E. communications*

Knowledge Check 7: Fill in the blank.

During the test, the emphasis shall be placed on the ability to safely control loads through all motions and at _____ speeds.

NOTES

LOAD CHART REVIEW

INTRODUCTION

A good working knowledge of the OEM load chart is necessary to calculate safe lifting capacities.

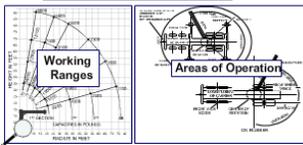
Generally, load charts list the maximum rated capacity of the crane for every permissible configuration, specify the crane's operational limitations, and set-up requirements for safe operation.

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.



Radius in Feet	Manual Fly Section Retracted Boom Length in Feet							
	32	33	44	50	56	62	68	71
12	50,000	47,000	44,000	41,000	38,000	35,000	32,000	29,000
15	42,000	40,000	38,000	36,000	33,000	30,000	27,000	25,000
20	31,800	31,400	31,000	29,500	28,000	25,500	22,000	20,000
25	21,800	21,800	21,700	21,100	20,000	18,000	17,000	15,500
30	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500
40	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000

Notes	
1	Load Chart Capacity Note
2	Crane set up requirements
3	Operating radius is the horizontal distance from the axis of rotation to the centerline of the hoist line or tackle with load applied.
4	"On Rubber" lifting (if permitted) depends on proper tire inflation, capacity, and condition. "On Rubber" loads may be transported at a maximum vehicle speed of 25 mph (4 km/hr.) on a smooth and level surface only.
5	Power-telescoping boom sections must be extended equally at all times. Long cantilever booms can create a tipping condition when in extended and lowered position.
6	The maximum load which may be telescoped is limited by hydraulic pressure, boom angle, boom lubrication, etc. It is safe to attempt to telescope any load within the limits of rated lifting capacity chart.
7	Keep load landing devices a minimum of 12 inches (30 mm) below boom head when lowering or extending booms.



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.

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 may serve as a safety refresher.

Load Chart Capacity Note	
1	deductions from listed capacity
2	allowable boom lengths
3	instructions for determining structural VS. stability limitations
4	wire rope type and reeving information
5	crane set up requirements
6	crane configuration requirements for travel
7	general crane safety reminders

Radius in Feet	Manual Fly Section Retracted Boom Length in Feet										Manual Fly End
	32	33	44	50	56	62	68	71	76	82	
12	50,000	47,000	44,000	41,000	38,000	35,000	32,000	29,000	26,000	23,000	20,000
15	42,000	40,000	39,000	36,000	33,000	30,000	27,000	25,000	22,000	20,000	19,000
20	31,800	31,400	31,000	29,500	28,000	25,500	22,000	20,000	19,000	18,000	17,000
25	21,800	21,800	21,700	21,100	20,000	19,000	18,000	17,000	16,000	15,500	15,000
30	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500
40	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
50				9,700	9,700	5,700	5,700	5,700	5,700	5,700	5,700
60					5,700	5,700	3,500	3,500	3,500	3,500	3,500
70							3,100	3,100	3,100	3,100	3,100
80								2,100	2,100	2,100	2,100
90									1,500	1,500	1,500

Capacities appearing above bold line are based on machinery strength, and tipping should not be relied upon as the capacity limitation.
* Indicates capacity of extended fly section, regardless of boom length.

RATED LIFTING CAPACITY CHART

The rated capacity chart is that part of the load chart that we reference to determine the crane's gross capacities. Gross capacities are listed for various boom lengths and load radii. The bold line, running between the listed capacities,

separates capacities based on strength of materials where overload may cause structural failure and capacities based on stability where overload may cause the crane to become unstable and tip over. Capacities above the line are based on material strength. Capacities below the line are based on stability. Not all manufacturers use the bold line method of separating the listed capacities.

RATED LIFTING CAPACITIES CHART - ASTERISKS

Some manufacturers use asterisks, instead of bold lines, to mark the structural areas of the load chart.

R A D I U S	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*
12	63	76,100*	76,100*	71	73,000*	72,900*	72	55,000*	55,000*
15	57	64,200*	64,200*	67	61,700*	61,700*	66	46,300*	46,700*
20	46	45,800*	45,800*	52	46,100*	45,800*	50	35,300*	35,000*
25	31	34,700*	34,700*	43	35,100*	34,800*	41	28,800*	27,800*
30				35	22,500*	22,400*	37	22,800*	22,800*
35				32	22,500*	22,400*	40	18,900*	18,700*
40				15	17,600*	17,500*	20	15,800*	14,700*
45									

* Asterisks may be used to mark the structural areas of the load chart

JIB POINT RADIUS FEET	CAPACITIES IN POUNDS								JIB POINT RADIUS FEET
	BOOM LENGTH FEET								
75	110	130	140	150	160	170	180	180	75
80	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,200	80
85	39,400	39,400	39,400	39,400	37,000	36,700	36,100	35,000	85
90	38,400	38,400	34,900	34,500	33,800	33,600	33,100	30	90
95	33,700	32,000	32,200	31,800	31,200	30,900	30,400	29	95
100	31,300	30,700	30,500	29,900	29,400	28,800	28,500	28,000	100
105	29,200	28,600	28,400	27,700	27,300	26,700	26,400	25,800	105

Shaded areas indicate structural or strength of materials lifting areas

JIB POINT RADIUS FEET	CAPACITIES IN POUNDS								JIB POINT RADIUS FEET
	BOOM LENGTH FEET								
80	110	120	130	140	150	160	170	180	80
85	30,000	30,000	30,000	30,000	30,000	29,000	28,000	27,000	85
90	30,000	30,000	30,000	30,000	29,000	28,000	27,000	26,000	90
95	30,000	30,000	30,000	30,000	29,000	28,000	27,000	26,000	95
100	30,000	30,000	30,000	30,000	29,000	28,000	27,000	26,000	100
105	29,600	29,000	28,800	28,100	27,400	26,700	26,000	25,300	105
110	27,700	27,100	26,800	26,200	25,700	25,000	24,300	23,600	110
115	24,300	23,700	23,500	22,800	22,400	21,700	21,500	21,000	115

RATED LIFTING CAPACITIES CHART - SHADED AREAS

In this example, shaded areas, instead of asterisks or bold lines, are used to identify capacities based on structural strength.

R A D I U S	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*
12	63	76,100*	76,100*	71	73,000*	72,900*	72	55,000*	55,000*
15	57	64,200*	64,200*	67	61,700*	61,700*	66	46,300*	46,700*
20	46	45,800*	45,800*	52	46,100*	45,800*	50	35,300*	35,000*
25	31	34,700*	34,700*	43	35,100*	34,800*	41	28,800*	27,800*
30				35	22,500*	22,400*	37	22,800*	22,800*
35				32	22,500*	22,400*	40	18,900*	18,700*
40				15	17,600*	17,500*	20	15,800*	14,700*
45									

45,800 Gross Lifting Capacity

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 be the loads that can be suspended from the crane's hook.

What then can be safely lifted on the hook? To answer this question we must find the net capacity of the crane.

NET CAPACITY

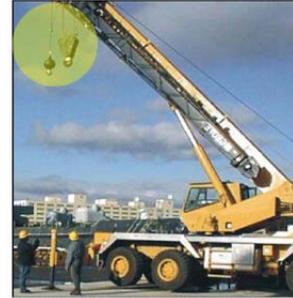
Net capacity is equal to the weight value shown on the manufacturer's load chart (the gross capacity) minus all deductions. To calculate net capacity, add the weight of all deductions and then subtract this sum from the gross capacity.



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.

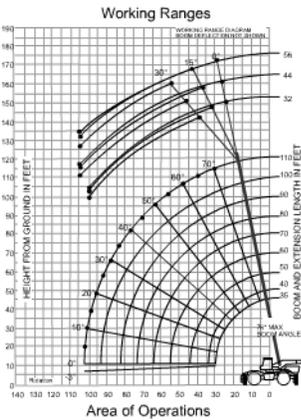
COMMON DEDUCTIONS

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, not necessary for a lift, to be deducted.



RANGE DIAGRAM

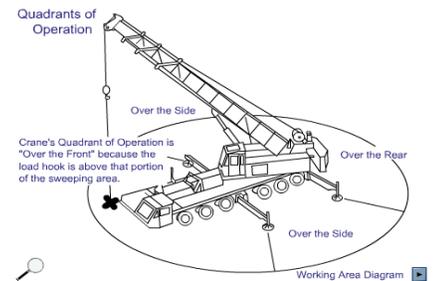
Range diagrams are used for planning lifts. You can use them to determine the configuration of the crane needed for a particular job. By laying out the geometry of the job on the diagram, the boom length, boom angle, jib length and jib offset required for the lift can be determined.



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.

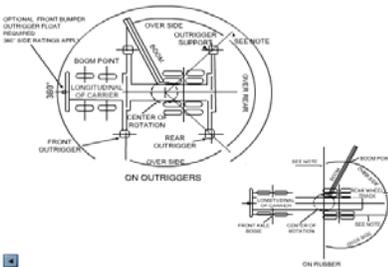
The range diagram may be used to determine the boom angle of telescopic booms, when the boom is only partially extended and the radius is known. It may also be used to identify the allowable clearances between the load blocks and boom tip.

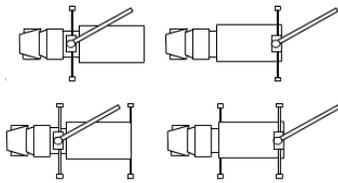


WORKING AREA DIAGRAM

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.



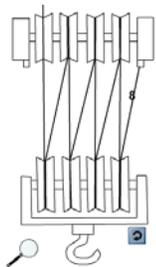


CATEGORY 4 QUADRANTS

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.

CAPACITY LIMITING FACTORS

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



PARTS OF LINE

Before making any lift, you must ensure that the crane has sufficient net capacity to lift the load and is reeved with enough parts of line to lift the load without exceeding the rated load of the hoist wire rope.

The number of parts used may limit lifting capacity. Count the number of lines suspending the load. In this example we have 8 parts of line between the hoisting sheaves and the hoist block sheaves

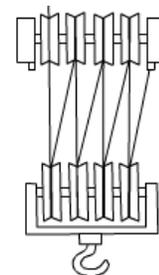
Hoists	Cable specs.	Permissible Line pulls
Main & Aux. Model 30	3/4" (19 mm) 18 x19 Class or 35x7 Rotation Resistant Min. Breaking Str. 64,600 lbs.	12,920 lbs.
Main & Aux. Model 30	3/4" (19 mm) 6 x 37 Class EIPS IWRC Special Flexible Min. Breaking Str. 58,800	12,920 lbs.

WIRE ROPE CAPACITY

The rated load of the crane’s hoist depends on the wire rope size, type, and the number of parts of line. The allowable line pull is found in the crane’s load chart. In this example the allowable line pull of each part of the wire rope is 12,920 pounds.

CALCULATING WIRE ROPE CAPACITY

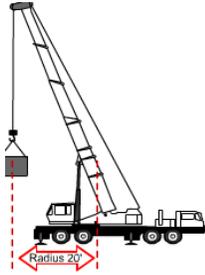
To find the capacity of the crane’s wire rope, multiply the rated load or line pull by the number of parts. In this example we multiply the rated load of 12,920 pounds by eight parts. This wire rope configuration has a rated load of 103,360 pounds.



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.



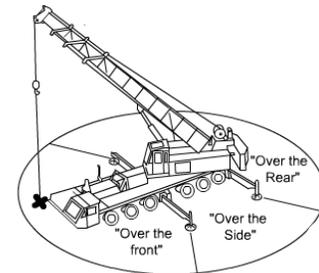
For fixed boom lengths, radius can be calculated using boom angle and a load chart.

On telescoping boom cranes, boom deflection can increase the radius and must be taken into account.

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

QUADRANTS OF OPERATION

As mentioned earlier, the crane's working area is divided into areas called quadrants of operation. During pre-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.



Loss of Stability



Structural Failure

CONSEQUENCES OF OVERLOADING

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

LOSS OF STABILITY

When a crane loses stability, the tipping force of the load overcomes the counteracting load, or counterweight, of the crane. When tipping begins, especially with loads high in the air, it's very unlikely that the crane operator can do much to prevent overturning. As the crane begins to tip, the load radius increases; as the load radius increases the capacity of the crane decreases rapidly. This happens so quickly that recovery is almost impossible. It is therefore critical for the operator to maintain focus and situational awareness. A thorough understanding of the crane's dynamic capabilities and capacities in its current configuration and quadrant of operation is critical.



STRUCTURAL FAILURE

Cranes can fail structurally if the rated capacity is exceeded. Structural failure can occur before any signs of tipping when the capacities in the strength area of the load chart are exceeded. Structural failure is not limited to total fracture or failure of a component; it also includes hidden and less visible damages such as cracking, bending, or twisting of components. It is difficult to predict which component in a crane may fail structurally when overloaded.



Loss of stability and structural failure from overloading a crane are avoidable by understanding and following the crane's load chart.

Knowledge Check 1: Select all that apply.

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

- A. certificate of compliance*
- B. rated capacities*
- C. notes section*
- D. operator's daily checklist*
- E. range diagram*
- F. areas of operation*

Knowledge Check 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

_____.

Knowledge Check 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*

Knowledge Check 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 the hook block?

- A. working area diagram*
- B. rated lifting capacities*
- C. notes sections*
- D. range diagram*
- E. shaded capacity areas*

Knowledge Check 5: Select the best answer.

Which part of the OEM load chart would you use to find information about “working over the side,” “working over the rear,” and working over the front”?

- A. shaded capacity areas*
- B. working area diagram*
- C. range diagram*
- D. notes sections*
- E. rated capacities chart*

Knowledge Check 6: Select all that apply.

Exceeding the crane’s rated capacity may result in one of two consequences. They are...

- A. loss of stability*
- B. inadequate fleet angle*
- C. flat outrigger*
- D. misspooling*
- E. structural failure*
- F. dead battery*

NOTES

LOAD TESTING CATEGORY 1 AND 4 CRANES

PORTAL CRANE NO-LOAD TEST 1



Perform the no-load tests checking all functions.

Check all hoist and boom primary upper and lower limit switches and, if installed, all secondary upper and lower limit switches. Using the limit switch bypass, check the secondary limit switches by carefully moving the boom or hoist slowly through each primary limit switch and into the secondary limit switch. Check emergency brakes on wire rope drums where installed, by simulating a fault.

PORTAL CRANE NO-LOAD TEST 2

Check the boom drum pawl for proper engagement with the ratchet gear and limit switch. Check the pawl limit switch, if installed, for proper operation. Some pawl limit switches allow the hoist to raise but not lower. Others cut out movement in both directions.

Ensure the boom hoist motor shuts off, the brakes engage, and the indicator lights operate correctly.

Check the rotation lock by engaging it and inspecting for full engagement. Check that the rotation lock limit switches prevent rotation in both the clockwise and counterclockwise directions. Operate the rotation lock bypass for both the clockwise and counterclockwise directions and ensure proper operation. Use only enough power to check the operation of the bypass. Limit switches may be operated manually to check for correct operation in lieu of engaging rotation lock. Ensure the rotation lock is disengaged prior to continuing to the next step of the test.



Check rotation by rotating in both the clockwise and counterclockwise directions with the boom at minimum radius.



PORTAL CRANE NO-LOAD TEST 3

Finally, verify that the crane can safely travel and that the dead-man controls perform properly.

Check the travel function with the boom centered between the crane rails and the boom dog engaged. Travel the crane in one direction a minimum of fifty feet. After travel stops, and if there are no problems, rotate the boom one-hundred-eighty degrees and travel a minimum of fifty feet in the opposite direction.

The dead-man controls, where installed, are tested by engaging each motion at the slowest practical speed and then releasing the dead-man control. Power should be interrupted and the motion shall stop.

PORTAL CRANE LOAD TEST PERCENTAGE

When performing a load test on a portal crane the nominal test load shall be 125% +5%, -0% of the crane's rated capacity.



PORTAL CRANE LOAD TEST SPECIAL REQUIREMENTS

The load test for portal cranes includes the following special requirements in addition to the standard tests in Appendix E.

Variable rated cranes shall be tested at the maximum load at maximum radius.



The stability test is for balanced deck design cranes only. Balanced deck design cranes are portal cranes with large diameter roller assemblies and center pin assemblies. This test is done during the static and dynamic load test observing for clearance between the rollers and the upper and lower roller rails. If no clearance is observed, stability is satisfactory. If clearance is observed, follow the specific procedure outlined in Appendix E.

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

PORTAL CRANE HOIST LOAD TEST 1

To perform the main hoist and boom hoist static test, raise the test load to clear the ground and hold for ten minutes at the maximum radius for the load lifted. Rotate the load and hook 360 degrees clockwise and counter-clockwise to check bearing operation. Do not allow the pawl, or dog, to carry the load. Observe for lowering of the test load, which may indicate equipment malfunction.



If either hoist has a primary or secondary holding brake, where each brake is designed to individually hold the load, additional tests shall be performed in lieu of a single ten minute hold test. See appendix E.

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

New wire rope shall be tested through its maximum working length before being put into service. This may be accomplished during either the dynamic or static tests.

To test the boom hoist, start from maximum radius with load attached. Raise the boom to minimum radius and then lower it back to maximum radius. Ensure the crane operates smoothly through the range, holds the load when stopped and the dynamic braking functions properly.

PORTAL CRANE HOIST LOAD TEST 2

The hoist foot brake and boom foot brake tests, hydraulic or mechanical, are designed to test the ability of the foot brakes to stop the lowering motion. For the boom test, have the boom near maximum radius. In both tests, hoist the test load a few feet above the ground. Lower the test load at slow speed with controller in the first control point. Apply the foot brake. The lowering motion shall stop. These tests are not applicable to load-sensitive reactor type hoist controls.

The hoist loss of power and boom loss of power tests, or panic tests, are designed to test the reaction of the applicable hoisting unit in the event of power failure during a lift. For the boom test, have the boom near maximum radius. In both tests, hoist the test load about ten feet above the ground. Lower test load, for the hoist panic test, or the boom, for the boom panic test, at slow speed and, with controller in the slow lowering position, disconnect the main power source by pushing the main power stop button, then return the controller to neutral position. The test load or boom shall stop lowering when the controller is placed in the neutral position. These tests are only done on cranes with powered down hoists. Cautions apply and may require engineering involvement. See Appendix E for details.



TRAVEL AND ROTATE LOAD TESTS

The rotation test is done at maximum radius, rotating left and right 360 degrees, if possible. If not possible, rotate at least two complete revolutions of the swing pinion. Rotating brakes shall demonstrate ability to stop the rotating motion in both directions in a smooth, positive manner.

The boom-over-the-side travel test is conducted with the boom at maximum allowable radius and positioned perpendicular to the crane rails. With the boom dog engaged, travel in one direction a minimum of 50 feet. Repeat with the boom over the opposite side, where space and conditions permit.

The boom-over-the-front and boom-over-the-opposite-end travel tests are performed in the same manner except boom shall be parallel to the tracks. In each travel test, operate the controller through normal operating speeds. The crane shall accelerate, decelerate, and stop smoothly.

 *Use a very slow travel speed to ensure the track and supporting foundation are sound and the travel area is free of obstructions.*
Caution

OTHER PORTAL CRANE TESTS

Test the auxiliary hoist, whip hoist, and emergency drum brakes in the same manner as the main hoist using the maximum test load for the maximum radius of the crane.



In addition to the prescribed tests of Appendix E section 2, variable rated portal cranes shall be tested with the appropriate test load at the maximum radius of the crane on the main hoist. This may include, as applicable, a stability test, static test, boom hoist and foot brake tests, automatic brake test and rotate test.

 *Exercise care when rotating loads over water.*
Caution



MOBILE CRANE TYPES

The types of mobile cranes covered are locomotive, crawler, cruiser or rough terrain, truck, and crash. Category 4 cranes included in this procedure are commercial truck-mounted, articulating-boom cranes, and all cranes mounted on automotive truck chassis.

Hydraulic boom crane and lattice boom crane load test requirements are similar in some ways, such as the rotate and hoist tests; however, significant differences exist with other tests.

Refer to NAVFAC P-307, appendix E, section 5 for additional mobile crane testing details and descriptions.

PRE-TEST PREPARATIONS

Select a test site that is firm, level, and free of ground obstructions.

Crane set-up: Extend outriggers or stabilizers as specified by the OEM. For most truck and cruiser cranes the crane carrier shall be raised sufficiently to completely unload the tires. Level the crane as required by the OEM load chart.



Precautions: Over-turning, due to instability, may occur without warning; caution is advised. Test personnel shall remain alert to wind, weather, and visibility conditions that may jeopardize the safe performance of the tests. When lifting test loads always lift the load over the side of the crane, 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. Lift the test load only high enough to perform the required tests.

A crane's outrigger may become light and the outrigger pad may clear the ground during testing, depending on the make and model. 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.



MOBILE CRANE TESTING

Test each hook. The nominal test load shall be 105 percent of the rated capacity for the crane's configuration considering reeving, boom length, etc. The rated capacity shall be the capacity shown on the posted load chart. The rated capacity may be limited by wire rope line pull or parts of line if the crane is not fully reeved.

Test load calculations must consider the weight of, or deduction values for, the hook, block, slings, and ancillary lifting devices, and for some cranes, excess wire rope. Deductions shall be subtracted from the nominal test load in order to determine the test weights required. Follow OEM load chart instructions for deduction values.

Ancillary equipment such as a swing-away extension or jibs shall be tested during the annual load test.

MOBILE CRANE NO-LOAD TESTS

Test all functions through their full range of motion. Check all limit switches and bypasses where applicable. Check the load moment indicator, or LMI, functions and all no-load data such as radius, boom length, etc. Check anti-two block device function. Raise each hoist block into the limit switch, where installed, at slow speed. Ensure the anti-two block alarm operates or that the hoist is disabled in accordance with the OEM's operating instructions. If the crane is equipped with control lockouts, function limiters, or kick-outs, carefully ensure that all applicable functions that could two-block the hoist, such as telescope out and boom down, are disabled in accordance with the OEM's operating instructions. After lowering the hook, check that the wire rope drum is packed tightly before lifting loads. This is especially important for smooth drums.



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



MOBILE CRANE LOAD TESTS

The mobile crane load test consists of two parts: a maximum certified capacity test and a load moment test. In some cases, these tests may be combined.

MAXIMUM CERTIFIED CAPACITY TEST

The test load shall be 105 percent of the maximum certified capacity of the crane. Determine the maximum permissible radius for the maximum certified capacity. Perform the test at the maximum boom length for this capacity and radius. Raise the test load using the hoist. Lower the test load and test the ability of the brake to control, stop, and hold the test load for ten minutes.

Maximum Certified Capacity Test

- Test load = 105% +5%/-0% of max certified capacity
- Determine max radius for max certified capacity
- Test at max boom length for the determined capacity and radius
- Hoist load / lower load
- Test brakes - hold ten minutes - observe
- Rotate 360 degrees X 2
- Boom up / boom down
- Static Test
- Maximum Line Pull Test
- AEP Tests, as required
- Limiting factors may require reduced test loads

Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. With the test load raised, rotate the hook 360 degrees clockwise and counter-clockwise to check bearing operation. If the size of the test load precludes a full 360 degree rotation of the hook, perform the hook rotation test during the load moment test. Operate the boom from maximum radius to minimum radius. Repeat the test, operating the boom from minimum radius to maximum radius for the load applied.

Beginning with the main hoist, do the static test with maximum load, the boom at minimum radius, and with the boom and load hoist pawls, or dogs, disengaged. Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations. Other tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures, or AEPs, during the certification period.

Due to the number of layers of wire rope on the drum, some cranes may not be able to lift the test load per the OEM's load chart. If the crane cannot lift the test load, check the OEM's hoist line pull for the particular model hoist and layer of rope. If hoist line pull, or available torque, is the limiting factor, reduce the test load based on the hoist line pull limitation and perform the required test. Certify the crane based on the reduced test load. If the crane cannot lift the reduced test load, verify that the system hydraulic pressure and relief valves are set within OEM specifications. If the settings are within specification, contact the OEM.

Other tests and conditions may apply. Review NAVFAC P-307, Appendix E section 5 for details.

LOAD MOMENT TEST

For the load moment test, configure the crane as follows...

The boom length shall be the shortest length where all sections are partially extended, but not less than 50 percent total powered boom length or latching section boom length. The maximum radius is the radius that creates the maximum load moment through the complete swing range that safely clears the carrier and the outriggers or stabilizers. The test load shall be 105 percent of OEM load chart capacity at this boom length and radius. For the purposes of this test, load moment is the product of capacity multiplied by radius. Cranes equipped with multiple boom modes must have multiple load charts checked to ensure the maximum load moment is selected.

For the telescopic component slippage test, raise the test load using the hoist. Operate the boom from maximum radius, as defined above, to minimum radius for the load applied. Hold the load for 5 minutes without use of controls by the operator. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. Lower the boom from minimum radius to maximum radius, as defined above, before proceeding to the next test.

For the outrigger/stabilizer component slippage test, swing the test load at slow speed through the complete swing range as allowed by the OEM, and apply the brake periodically during rotation. The brake shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. Hold the load with the boom positioned over, or as close as permitted by OEM, each outrigger or stabilizer for 5 minutes. Holding over the center front outrigger or stabilizer is not required. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. Swing the crane in the opposite direction through the complete swing range as allowed by the OEM.

Notes regarding the telescopic and outrigger/stabilizer component slippage tests: The significance of any lowering shall be evaluated by the activity engineering organization depending on operating requirements and safety.

Load Moment Test

-All booms shall be partially extended no less than 50%

-Max radius = radius that creates the max load moment (through complete swing range, clearing outriggers/stabilizers and carrier)

-Test load = 105% +5% / -0% of load chart capacity at this boom length and radius

-Load moment = capacity x radius

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

Outrigger/stabilizer component slippage test: swing test load slowly through complete swing range, applying brakes to test stopping ability. Stop and hold load over each outrigger/stabilizer (or as close to the outrigger as permitted) for 5 minutes, observe. Swing reverse direction.

Notes...

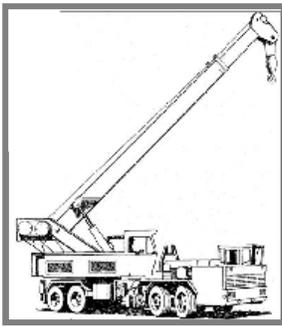
- Engineering shall evaluate observed lowering.
- Test outrigger locking devices and latching boom telescoping cylinders according to operating characteristics.
- See appendix E for details.

For cranes equipped with outrigger locking devices but where activity operating procedures permit operation without the use of the locking devices, this test shall be performed with the locking devices disengaged.

If a latching boom crane's telescoping cylinder has the capability to telescope, retract or hold the boom while unpinned under load, it shall be tested by repeating the telescopic component slippage test at 105 percent of the maximum telescoping, retracting, or unpinned holding capacity with the boom unpinned. However if the only function of the telescoping capacity is to extend or retract boom sections, ancillary equipment, or rigging hardware, and no loads are telescoped, then the telescoping cylinder does not require a telescopic component slippage test.

FREE-RATED (ON-RUBBER) LOAD TEST

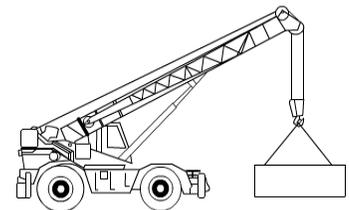
The on-rubber (or free rated) load test checks the stability and operation of a mobile crane under load when lifting without the use of outriggers and while traveling with the load.



- Do the test only when free-rated lifts are permitted at the activity for the type of crane being tested.
- Follow all OEM on-rubber lifting requirements.
- Use taglines to control the load.
- Extend outriggers where equipped and keep them no more than three to four inches above the ground.
- Do a test for each allowable configuration.

The on-rubber, or free rated, load test checks the stability and operation of a mobile crane under load when lifting without the use of outriggers and while traveling with the load.

Allowable on-rubber rated capacity for over the side lifting for cranes equipped with outriggers shall not exceed sixty percent of the OEM's load chart values per paragraph 11.3. For those cranes, testing over the side on-rubber is not required. For rubber tired cranes without outriggers, contact the Navy Crane Center. See section 11 for allowable on-rubber, or free rated, capacities and other stability information for used and altered cranes. Check the stability and operation of the crane, carrier, wheels, tires, brakes, etc., under load by performing the following tests, where lifting without outriggers and/or traveling with the load are permitted at an activity for the type of crane being tested. Some cranes have different ratings for stationary lifts and for traveling with a load. Each allowable configuration shall be tested.



For the Maximum Certified On-Rubber Capacity test...

- Hoist 105 percent of the maximum certified on-rubber capacity at the minimum possible radius over the rear or over the front as required by the OEM.
- Slowly lower the boom to the maximum radius for the maximum certified capacity.
- Observe for any lowering that may occur, which may indicate a malfunction of the boom, hoisting components, brakes, wheels, tires, or axle components.
- Rotate through the on-rubber working arc as allowed by the OEM.
- Observe for any lowering that may occur, which may indicate a malfunction of boom, hoisting components, brakes, wheels, tires, or axle components.
- Travel a minimum of 50 feet with the test load over the rear, or front as required by the OEM, with the boom parallel to the longitudinal axis of the crane carrier.
- Observe for any lowering that may occur, which may indicate a malfunction of boom, hoisting components, brakes, wheels, tires, or axle components.



CATEGORY 4 CRANE TESTING

Articulating boom machines shall be tested in accordance with NAVFAC P-307 Appendix E. This procedure follows the mobile crane pre-test preparation and test load criteria. For conventional boom machines, follow OEM test procedures. Where no procedures are provided by the OEM, procedures must be developed by the activity engineering organization using Appendix E as a guide.



Some category 4 crane manufacturers require that the tires be in contact with the ground when properly set up on outriggers or stabilizers. The test director should thoroughly review the crane's set-up requirements and allowable working quadrants prior to testing.

Test category 4 cranes at 105 percent unless the crane manufacturer prohibits overload testing. When the OEM prohibits overload testing, down-rate the crane to allow the 105 percent load test at the original rated capacity.

SPECIAL MOBILE CRANE TEST PROCEDURES

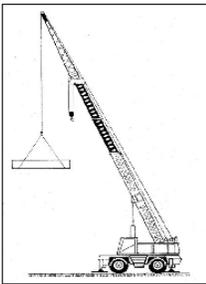
Special testing procedures are required after changing or repairing tires.

For cranes with on rubber lift capability, travel the crane with no load on the hook, a minimum of 100 feet in forward and reverse directions, with the counterweight positioned over the affected tire, and the boom at minimum radius or as required by the OEM.



Use this method only when allowed by the OEM. Use extreme caution moving a crane with the boom off center and at a minimum radius. Some mobile cranes may become unstable in this position, especially when traveled over uneven surfaces.

Free-Fall Operation Mode Test: If the OEM and activity permits operation of the crane in free-fall mode, test the ability of the brake to stop the load with the friction clutch disengaged. This test shall be performed in strict accordance with the OEM and activity instructions and shall not exceed maximum recommended OEM allowances for loads.



AUXILIARY HOOKS AND ANCILLARY EQUIPMENT

Test procedures for auxiliary hoists, whip hoists, ancillary equipment used without procedures, and line pull tests are outlined for each type of crane and can be found in NAVFAC P-307, appendix E.

MOBILE BOAT HOIST TESTING

Boat hoists are load tested at 105 percent of the rated capacity unless the OEM does not allow load testing over 100 percent of capacity. On certain types of mobile boat hoists that use deck fittings for lifting the test load, ensure the deck fittings are aligned in the plane of the sling. Lift the test load only high enough to perform the required tests.

Static Test: Raise the load approximately one foot and hold for ten minutes. Observe for any lowering that may occur, which may indicate a malfunction of the hoist components or hoist brakes.

Hoist Dynamic Test: Raise and lower the test load at normal operating speeds and observe smooth control.

Hoist Brake Test: Test the ability of the brake to control and stop the load.

Travel Test: Travel self-propelled boat hoists a minimum of 50 feet in each direction, steering right and left while traveling. At a slow speed, apply the foot brake. For towed boat hoists tow a minimum of 50 feet.





BARGE MOUNTED MOBILE CRANE TESTING

Mobile cranes certified for shore use may be temporarily mounted on barges. They must be re-tested and re-certified for this use.

Barge stability calculations must be done and reduced load charts, based on maximum list and trim, shall be established by the activity engineering organization.

These must be approved by the certifying official. The certifying official shall prescribe the test conditions and precautions, such as, limit of wind velocity, list, trim, etc.

The following conditions, as a minimum, shall be observed. A marine list and trim indicator shall be installed in the operator's cab. Maximum list and trim shall not exceed three degrees under test conditions. The crane carrier shall be secured to barge deck padeyes or connectors with tie-downs at each crane outrigger or corner. Tie-downs shall have some slack when the crane is fully raised on outriggers. The crane shall be load tested and re-certified on the barge using 105%, +5%, -0% of the reduced load chart capacities.

Note: When removed from the barge, the crane's land-based certification continues in effect.

FLOATING CRANE TESTING

Load and no-load tests for floating cranes are done in the same manner as portal cranes for all functions that apply.

Use caution when rotating loads over water. Ensure the floating crane has adequate draft readings per design data during the initial load test. Monitor the radius during the test to stay within the allowable radius.



Where space permits, the parking brake must prevent rotation when applied with the boom at 45 degrees from the centerline of the barge. Hold for ten minutes with brake applied.

See NAVFAC P-307, Appendix E for specific instructions.

NON-LIFT SERVICE CRANE TESTING

Locomotive, crawler, truck, and cruiser cranes that are used for clamshell, dragline, magnet, pile driving, or other non-lift crane work shall be tested at the maximum safe working load permitted for the wire rope being used. Test in all working motions except travel.



Attachments such as buckets, magnets, etc., may be removed for testing wire rope. No test is required after reassembly. Retesting is not required when an end attachment is changed from the original connection such as changing from clamshell to dragline during the certification period.

See NAVFAC P-307 appendix E, section 5.

SPECIAL TESTING SITUATIONS

Special situations may require special tests.

Newly acquired and previously used locomotive, truck, cruiser, crash and crawler cranes may require stability testing and calibration for two reasons.

- 1- when the manufacturer's load chart and stability data are no longer available.
- 2- when the acquiring activity suspects that previously performed alterations may affect stability.

In addition, all locomotive, truck, cruiser, crash, and crawler cranes are tested for stability after alterations are performed that affect the original stability ratings.

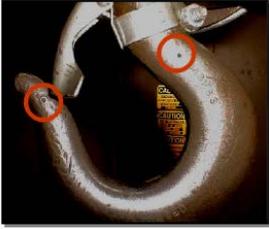
Stability testing is done to the industry standard, SAE-J765, Crane Load Stability Test Code.

See NAVFAC P-307 section 11 for additional details.

AFTER THE LOAD TEST

After the test, check the hook, perform post inspection, complete all documentation, and submit the completed package to the certifying official.





HOOK THROAT SPREAD

After the test, check all hooks for hook throat spread. Measure between the tram marks and compare the new measurement to the baseline measurement. Any hooks showing an increase in the throat opening of more than 5% from the base measurement shall be discarded and replaced.

DOCUMENTATION

After the test, the condition inspector shall carefully post-inspect the items identified on the CCIR and look for any damage that may have occurred during the test. When completed, all documentation shall be signed and dated by the inspectors and test directors.

Detailed Condition Inspection Results						
Crane No.	Type	Condition	Inspector's Name	Inspector's License No.		
Particulars of Inspection		Inspected by	Inspected on	Date Reported		
Inspected		A = All	B = Partial			
Defects						
1	Defects				OK	NG
2	Defects				OK	NG
3	Defects				OK	NG
4	Defects				OK	NG

COMPLETING THE CERTIFICATION PROCESS

The certification package is submitted to the certifying official for approval and signature. Completed records are filed in the crane's equipment history file. The certification card, tag, or paperwork shall be posted in the crane cab, on the control station, or in a conspicuous location near the crane.

CRANE NO. 12345-7	TYPE CRANE OET	TEST LOAD (lbs.) 12,500	TEST PROCEDURE APPENDIX E
MAIN HOIST	MAX. HOIST	AUX. HOIST	WPP/HOIST
RATED CAPACITY 10,000 lbs.	5,000 lbs.		
TYPE SERVICE AUTHORIZED GPS	SPECIAL PURPOSE SERVICE OR GENERAL PURPOSE SERVICE		
CERTIFICATION DATE 1 July 20xx	CERTIFICATE EXPIRATION DATE 30 JUNE 20xx 1 YEAR		
SIGNATURE OF TEST DIRECTOR John Q. Tester		DATE 1 July 20xx	
OPERATOR AND LICENSE NUMBER Pat Operator #123456			

Knowledge Check 1: Select the best answer.

There are two general categories of crane testing, they are...

- A. no-load testing and load testing*
- B. slow testing and fast testing*
- C. free-rated testing and dynamic testing*
- D. maximum load testing and minimum load testing*
- E. annual testing and quadrennial testing*

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 2: Select all that apply.

The no-load test may include which of the following items?

- A. load moment test*
- B. hoist and boom static test*
- C. component slippage test*
- D. luffing drum pawl and rotate lock engagement /function*
- E. free-rated test*
- F. maximum certified capacity test*
- G. hoist and boom loss of power test*
- H. emergency wire rope drum brake actuation*
- I. hoist and boom limit switch actuation (including bypasses)*

Knowledge Check 3: Matching.

The numbers next to the boxes [bottom right] represent each of the numbered statements [below]. Place a check mark in the numbered box that correctly matches that statement to the associated percentage amount [bottom left].

- 1. Test load tolerance.*
- 2. Overload threshold, if exceeded, requires a load test for recertification of portal, bridge, wall, and floating cranes.*
- 3. Test load for portal, bridge, wall, tower, hammerhead, and floating cranes.*
- 4. Test load for mobile and locomotive cranes, category 4 cranes, mobile boat hoists, and rubber-tired gantry cranes.*
- 5. None of the above.*

<i>125%</i>	<input type="checkbox"/>	<i>1</i>	<input type="checkbox"/>	<i>2</i>	<input type="checkbox"/>	<i>3</i>	<input type="checkbox"/>	<i>4</i>	<input type="checkbox"/>	<i>5</i>
<i>105%</i>	<input type="checkbox"/>	<i>1</i>	<input type="checkbox"/>	<i>2</i>	<input type="checkbox"/>	<i>3</i>	<input type="checkbox"/>	<i>4</i>	<input type="checkbox"/>	<i>5</i>
<i>110%</i>	<input type="checkbox"/>	<i>1</i>	<input type="checkbox"/>	<i>2</i>	<input type="checkbox"/>	<i>3</i>	<input type="checkbox"/>	<i>4</i>	<input type="checkbox"/>	<i>5</i>
<i>+5%/-0%</i>	<input type="checkbox"/>	<i>1</i>	<input type="checkbox"/>	<i>2</i>	<input type="checkbox"/>	<i>3</i>	<input type="checkbox"/>	<i>4</i>	<input type="checkbox"/>	<i>5</i>
<i>+5%/-5%</i>	<input type="checkbox"/>	<i>1</i>	<input type="checkbox"/>	<i>2</i>	<input type="checkbox"/>	<i>3</i>	<input type="checkbox"/>	<i>4</i>	<input type="checkbox"/>	<i>5</i>

Knowledge Check 4: True or False.

The mobile crane load test consists of a minimum certified capacity test and a load static test. In some cases, these tests may be combined. Additionally, a test is required for the cranes that use multiple line-limit configurations. Other tests are required for cranes that use auxiliary equipment with Auxiliary Equipment Procedures (or AEPs) during the certificate period.

- A. True*
- B. False*

Knowledge Check 5: Select all that apply.

From the list below, select the reason(s) that require stability testing and calibration for newly acquired/previously used locomotive, truck, cruiser, crash, and crawler cranes.

- A. the acquiring activity suspect that the previously performed alterations may affect stability*
- B. the manufacturer's load chart and stability data are no longer available*
- C. maximum list and trim is exceeded by three degree under normal conditions*
- D. used wire rope shall be tested through its mean working length during either the dynamic or static tests*

Knowledge Check 6: True or False.

For cranes used in duty cycle (or non-lift service) applications, a new load test is required each time the end attachment is changed out (or replaced) with another end attachment during the certification period (such as changing from clamshell to dragline).

- A. True*
- B. False*

Knowledge Check 7: Select the best answer.

The term "free-rated capacity" implies...

- A. a specific type of crane used on extremely rough terrains*
- B. the capacity-to-load configurations allowed by the OEM before requiring the used of the load chart*
- C. the amount of weight that a mobile crane my lift without the use of outriggers*
- D. the amount of weight that can be lifted for free (without incurring costs) on a rental crane*

Knowledge Check 8: True or False

Load and no-load tests for floating cranes are done in the same manner as portal cranes for all functions that apply.

- A. True*
- B. False*

NOTES

LOAD TESTING CATEGORY 2 AND 3 CRANES

GENERAL TEST REQUIREMENTS



All cranes and hoists must be tested following the requirements found in NAVFAC P-307 Appendix E, Crane Test Procedures. Depending on the type of equipment and any local test procedures that might be involved, test sequences may be varied. Most cranes are tested to 125%. All test tolerances are +5% / - 0%.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION FORM

All test results shall be recorded on the Certification of Load Test and Condition Inspection form. Spaces on the form that do not apply shall be marked N/A. Ensure that ALL applicable Appendix E paragraph and sub-paragraph numbers are listed on the form. Test each hook separately.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION									
Agency		Headquarters Location				Contract Details			
Crane No.	Type	DCMA Field Country				Description of CM's rated capacity system in "Item 1"			
		Make	Model	Year	Serial	Year	Serial	Year	Serial
		Year	Serial	Year	Serial	Year	Serial	Year	Serial
<input type="checkbox"/> Annual Certification <input type="checkbox"/> Condition <input type="checkbox"/> Annual Inspection/Review <input type="checkbox"/> Load Test		<input type="checkbox"/> Substrate (Detail applicable substructure)				<input type="checkbox"/> Capacity/Condition Data Test/Inspection Paragraphs (Detail applicable substructure)			
Section Length Test Measure Points Maximum Rating									
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Hook Test Measurements		Date Meas	Before Test	After Test					
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Category 2 Cranes Hook Test Measurements Certification									
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Category 3 Cranes		Hook Test Measurements				Certification			
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Year	Load	Points	Year	Points	Year	Points	Year	Points	Year
Annual Certification Since Hook ICT		Certifying Official Signature				Date			
		Certifying Official Signature				Date			
		Condition Date							
Remarks									
<small>* For crane cranes (or other cranes and configurations) or p. in an electronic form, please enter the date of the first testing and the inspection date (p. 2). </small>									

ANNUAL HOOK INSPECTION

Annual hook inspections are performed to ensure hooks are capable of safely lifting and moving loads. Check for evidence of wear in the swivels and pins. Check the proper operation and condition of safety latches. Inspect for deformation such as bending, twisting or spreading and for signs of corrosion, nicks, cracks, and gouges. Painted or plated hooks are not acceptable although a clear corrosion prevention coating is allowed. Hooks damaged beyond acceptable limits shall be discarded. Hook inspection and testing requirements can be found in appendix E.



HOOK MEASUREMENTS

Hook measurements are used to identify stretch. If not already done, in other words, if the hook is new, establish trammel points and a base measurement. This initial base measurement shall be retained in the equipment history file for the life of the hook. During subsequent test evolutions, take and record measurements between these same two tram points, both before and after the test. These dimensions shall be compared to the base measurement. Hooks showing an increase in the throat opening of more than 5% from the base measurement shall be discarded. Tram point measurements are recorded on the 'Certification of Load Test and Condition Inspection' form.



INSULATED LINKS

Insulated link inspections and tests are required before load tests for cranes and hoists so equipped. Check for cleanliness, obvious mechanical damage, and required markings that provide traceability to its base trammel measurement and NDT report. Reject the link if the current tram measurement exceeds the base tram measurement by more than one percent. Insulated links shall be disassembled and inspected in conjunction with hook disassembly. Perform electrical testing upon re-assembly and at every annual certification. See appendix E for details.



APPENDIX E CATEGORY 2 AND 3 TESTING

Appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests. For Category 2 and 3 cranes this may include a:

- no-load test
- emergency brake test
- static load test
- primary and secondary holding brake test
- dynamic load test
- mechanical load brake test
- loss of power test
- component travel test

NO-LOAD OPERATIONAL TEST (1)

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



NO-LOAD OPERATIONAL TEST (2)

The no-load testing procedure may vary for individual cranes. Generally, each hoist will be operated to verify proper operation of the upper and lower limit switches, as applicable. During hoisting, run through the various speed points, if so equipped. If the crane has a bridge or trolley, travel them through the various speed points while checking for satisfactory brake operation in both directions. Run the bridge the full distance of the runway and slowly contact the runway rail stops with the crane bumpers.



EMERGENCY HOIST DRUM BRAKE FAULT SIMULATION

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

STATIC LOAD TEST

Test each hook separately. Raise the load several inches, but no more than one foot. Measure from a fixed point on the load to fixed point on the floor; mark these points for future use. Hold the load in place for at least ten minutes and watch for any signs of lowering. Check the hook bearing by rotating clockwise and counter clockwise 360 degrees. After ten minutes, re-measure the height of the load using the previously marked points.



PRIMARY AND SECONDARY BRAKE TEST



Follow this procedure for cranes that are equipped with primary and secondary brakes. Raise the load, no more than one foot, and hold for ten minutes. Release the secondary brake and test the primary brake. Observe for lowering. Re-measure. Reset the secondary brake. Repeat the test for the secondary brake by releasing the primary brake.

DYNAMIC LOAD TEST

Perform a dynamic load test on each hoist by hoisting and lowering the test load using normal operating speeds and watching for smooth operation. Stop the load during hoisting and lowering to verify the brake stops and holds the load. Only raise the load as high as necessary to perform the test.



LOAD BRAKE TESTING

If equipped and accessible, test the mechanical load brake. Raise the load a few feet. With the hoist controller in neutral, carefully release the holding brake. The load brake should hold the test load. Raise the test load the minimum amount to perform the following. While slowly lowering the test load return the controller to neutral. The load brake should stop the test load. Should the load brake fail to stop the lowering of the load, contact engineering and/or the OEM for further evaluation. Document this information in the equipment history file.



For brakes that are not accessible, observe for expected behavior.

LOSS OF POWER TEST

The loss of power, or panic test, is designed to test a hoisting unit's ability to stop the load if power fails during a lift. Hoist the load. Not too high. Remember, if this test fails, the load may fall. While lowering the test load at slow speed, disconnect the main power source and return the controller to neutral. The expectation is for the load to stop lowering.



EMERGENCY HOIST DRUM BRAKE TEST

After testing the other holding brakes, test the emergency hoist drum brake, when equipped, with a 100 % test load, +5%, -0%. Raise the test load. Disable all hoist brakes except the wire rope drum brake. Lower the load at minimum speed necessary to simulate a shaft failure. Simulate a system fault by interrupting the motor or drum encoder. The brake shall stop the load. Reset all brakes.



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

TROLLEY AND BRIDGE LOAD TEST

Travel the bridge and trolley at normal speeds and watch for proper clearances. A minimum of three inches of vertical clearance and two inches of lateral clearance shall be maintained.



Travel the bridge the full length of the runway with the trolley positioned at one end of the bridge. Travel the trolley to the opposite end of the bridge and return the bridge to the other end of the runway. Verify minimum clearances. Confirm all brake pedals, brakes, and/or automatic braking, as applicable, are functioning properly.

TROLLEY AND BRIDGE LOSS OF POWER TEST

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



The operating characteristics of the crane under a loss of power shall be determined by operational field testing, with test load, and recorded. The certifying official shall make a determination that the operating characteristics are within acceptable limits of safety for operations under loss of power. Instructions shall be posted in the cab or on the pendant controller to warn the operator of these characteristics and any necessary precautions.

OTHER LOAD TESTS: JIB, PILLAR, PILLAR-JIB, MONORAILS, ETC.

When testing jibs, pillars, pillar-jibs, monorails, davits, and fixed overhead hoists, perform the no-load and load test following this general procedure. These cranes vary in design therefore perform tests as applicable.



No Load: Hoist through the controller range checking all limit switches. Travel the trolley through the controller range or full length of the rail verifying brakes and clearances. Swing the jib through the working range, at maximum radius, checking clearances and jib drift.

The load test is the same as it is for bridge cranes including the static test, dynamic test, dynamic and mechanical load brake tests, and component travel tests, etc.

See appendix E for details.

Knowledge Check 1: Select all that apply.

From the list below, select the tests that may be performed on category 2 and 3 cranes.

- A. component travel test*
- B. static load test*
- C. operator test*
- D. dynamic load test*
- E. hoist drive test*

Knowledge Check 2: Select the best answer.

When is the best time for the test crew to check general safety devices and become familiar with the crane's operating characteristics?

- A. during the no-load operational test*
- B. as soon as the AMISR is complete*
- C. before starting any testing*
- D. while performing the CCIR*

Knowledge Check 3: True or False.

Hooks may remain in service as long as measurements indicate the throat opening has not increased more than 10% from the base measurement.

- A. True*
- B. False*

Knowledge Check 4: Select the best answer.

The following describes which test: Perform the test on each hoist by hoisting and lowering the test load using normal operating speeds and watching for smooth operation.

- A. loss of power*
- B. static*
- C. dynamic*

Knowledge Check 5: Select the best answer.

What are the minimum vertical and lateral clearances (from obstructions) that must be maintained in a bridge crane's travel path?

- A. 3" vertical, 2" lateral*
- B. 5" vertical, 8" lateral*
- C. 12" vertical, 12" lateral*
- D. 2" vertical, 3" lateral*

Knowledge Check 6: True or False.

Load tests for jib, pillars, pillar-jibs, monorails, davits, and/or fixed overhead hoists are the same as for bridge cranes.

- A. True*
- B. False*

NOTES



CRANE CERTIFICATION PACKAGE

EXERCISE

CRANE CERTIFICATION PACKAGE EXERCISE 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 represent 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.

- 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.

CRANE CERTIFICATION PACKAGE EXERCISE SCENARIO

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

Crane number 349 was initially certified for use in November 2009 and is in a quadrennial load test program. On 16 November 2013 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 LINKS

All three parts of this exercise may be viewed and/or printed using the links contained in the online course.

Crane Certification Package Exercise Document Links

Click the following links to view/print the identified documents. (drag corner of PDF to enlarge document)

[Anomalous Certification Package](#) (for students to review and identify anomalies)

[Anomaly Discussion Notes](#) (to aid students in understanding the anomalies)

-mouse over the question marks to read the note in a smaller box; you may not see the entire note in this view

-right click on the question marks to read the note in a larger box

[Corrected Copy](#) (to show students how the anomalies may be corrected)

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CRANE CERTIFICATION PACKAGE EXERCISE PART 1:

IDENTIFY ANOMALIES

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

CERTIFYING OFFICIAL STUDENT GUIDE

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>1</u> OF <u>12</u>							
Crane #349	Type Bridge	Manufacturer Wallace-Grommet	Capacity 25,000 lbs.				
Prior Inspection DATE 11/22/2012		Current Inspection DATE 11/14/2013		Legend: Check under condition S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet) U = Unsatisfactory NA = Not Applicable			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
1	Structure (Bridge Girders, Trolley, Trucks, Equalizer Beams, Gantry, Boom, Jib, Pillar, Etc.)	Inspect structural components for damage, distortion, or deterioration, and for evidence of loose or missing fasteners and cracked welds. Inspect truck equalizer pins for proper lubrication. Ensure there is no interference between crane and building during operation. Ensure drain holes are clear for outdoor cranes.		X			
2	Rails and Tracks, including top running trolley rail and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes.)	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 overtensioned 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.					
8 a	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			

TRAINING ONLY

Bridge Crane Certification Package – Identify the Anomalies

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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>2</u> OF <u>12</u>							
Crane	Type	Manufacturer	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	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	
	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 can not 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 at every tenth annual inspection.					
8 c	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.					X
9 a	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, disassemble at every tenth annual inspection and inspect for damage and deterioration. (See appendix E.)		X			
9 b	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.					
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, debonding, 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 <u>3</u> OF <u>12</u>						
Crane	Type	Manufacturer		Capacity		
#349	Bridge	Wallace-Grommet		25,000 lbs.		
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition		
				S	U	C
11	Hydraulic Brake System	<p>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, debonding, 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.</p> <p>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.</p>				X
12	Air Brake System	<p>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, debonding, 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.</p> <p>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.</p>				X
13 a	Electric Magnetic Brake System (Shoe and Band Type Brakes)	<p>Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Disassemble as required to inspect linings for wear, debonding, 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.</p> <p>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.</p>	Trolley Bridge Hoist	X	X	X

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 Bridge Crane Certification Package – **Identify the Anomalies**
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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD						
FOR CATEGORY 2 AND 3 CRANES SHEET <u>4</u> OF <u>12</u>						
Crane	Type	Manufacturer			Capacity	
#349	Bridge	Wallace-Grommet			25,000 lbs.	
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition		
				S	U	C
13 b	Electric Magnetic Brake System (Disc Type Brakes)	<p>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, debonding, 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.</p> <p>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.</p>				X
13 c	Electric Magnetic Brake System (Caliper Brakes on Wire Rope Drums)	<p>Inspect system for damage, for evidence of binding, loose and worn components, and for proper lubrication. Inspect brake linings for wear, glazing, debonding, and 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.)</p> <p>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.</p>				X
14	Sheaves	<p>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. Gauge 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.</p>		X		

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Bridge Crane Certification Package – Identify the Anomalies

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>5</u> OF <u>12</u>							
Crane	Type	Manufacturer	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. 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. 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. The Federal Specification for wire rope is RR-W-410.	½"	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 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.		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 mouising 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			

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Bridge Crane Certification Package – Identify the Anomalies

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 6 OF 12							
Crane	Type	Manufacturer	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 testing requirements for 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.					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, etc.). 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 and 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 between both the load block and ground and between the pendant and ground. If there is no metallic pendant, the pendant to ground check will 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	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		

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 Bridge Crane Certification Package – Identify the Anomalies
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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>7</u> OF <u>12</u>							
Crane	Type	Manufacturer	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	<p>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, for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness 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).</p> <p>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. Ensure disconnect switches are not blocked and are accessible to personnel in accordance with National Electric Code NFPA 70.</p>	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 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. 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 devices. Verify proper spring return and neutral latching.	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			

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Bridge Crane Certification Package – Identify the Anomalies

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>8</u> OF <u>12</u>							
Crane	Type	Manufacturer	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 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.	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
31	Warning Devices, Operational Aides, General Safety Devices (Horns, Bells, Lights, etc.)	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.		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 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 rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36.		X			

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Bridge Crane Certification Package – Identify the Anomalies

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

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Bridge Crane Certification Package – **Identify the Anomalies**
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MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 2 AND 3 CRANES
BRAKE DATA

SHEET 12 OF 12

REMARKS:

SRO-0166-13 issued to adjust within tolerance trolley brake (model TM43) spring length and air gap to minimum specifications, as needed

SRO-0167-13 issued to adjust within tolerance hoist brake (model TM1355) spring length and air gap to minimum specifications, as needed

SRO 0168-13 issued to adjust within tolerance bridge brake (model TM83) spring length and air gap to minimum specifications, as needed

TRAINING ONLY

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

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CERTIFYING OFFICIAL STUDENT GUIDE

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: #349	Type: Bridge	Location: Bldg. 1539	Operator's Name: Rick L. Welch	Operator's License No. C20549		
Purpose of Inspection: Annual Certification		Legend: B = Before A = After D = During	Date Started: 11/16/13	Date Completed: 11/16/13		
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, 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.	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 may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)	S			HDD	
8	If 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 CCIR. Mark N/A 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	

TRAINING ONLY

Bridge Crane Certification Package – Identify the Anomalies

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CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house 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, 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.	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:					
<i>H. See Sunday, 11/16/18</i> Inspector Signature/Date:		<i>John C. Laiter, 11/16/18</i> Test Director Signature/Date:			

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity <i>Navy Shore Station Charlie</i>			Building/Location <i>Bldg. 1539</i>											
Crane No. #349	Type Bridge	OEM's Rated Capacity			Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")									
		Main	<u>25,000</u> lbs.	<u>N/A</u> feet		Main <u>25,000</u> lbs. <u>N/A</u> feet								
		Aux	_____ lbs.	_____ feet		Aux _____ lbs. _____ feet								
		Whip	_____ lbs.	_____ feet		Whip _____ lbs. _____ feet								
<input checked="" type="checkbox"/> Annual Certification <input type="checkbox"/> Quadrennial Load Test <input type="checkbox"/> Interim Recertification (Reason: _____)			Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs.)											
			<u>1</u>	<u>1.1</u>	<u>1.2</u>	<u>1.3</u>	<u>1.4</u>	<u>1.4.1</u>	<u>1.4.2</u>	<u>1.4.3</u>				
			<u>1.4.4</u>	<u>1.4.5</u>	<u>1.6</u>	<u>1.6.1</u>	<u>1.6.2</u>	<u>1.6.4</u>	<u>1.7</u>	<u>1.7.1</u>				
Category 1 or 4 Cranes *														
Boom Length		Test Load %	Minimum Radius		Maximum Radius		<u>6</u>	<u>6.1</u>	<u>6.1.1</u>	<u>a,b,c,d</u>	<u>6.1.2</u>	<u>6.1.3</u>	<u>6.2</u>	<u>6.2.1</u>
			Pounds	Feet	Pounds	Feet	<u>6.2.1a</u>	<u>6.2.1d</u>	<u>6.2.1e</u>	<u>6.2.2</u>	<u>6.2.3</u>			
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		<u>129</u>	<u>38,212</u>	<u>6"</u>	<u>6"</u>	<u>6"</u>								
Aux														
Other														
Category 3 Cranes														
Hoist		Test Load %	Pounds	Hook Tram Measurements			Test Director (Signature)		Date					
				Base Meas	Before Test	After Test	<u>John C. Lantlee</u>		<u>11/16/2013</u>					
Main							Inspector (Signature)		Date					
Aux							<u>H. Dee Dumley</u>		<u>11/16/2013</u>					
Other							Inspector (Signature)		Date					
Annual Certifications Since Hook NDT			Certifying Official (Signature)		Date		Expiration Date							
<u>4</u>														
Remarks														
<u>25,000 x 1.25 = 31,250 x 1.05 = 38,212</u>														
* 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.														



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 #349	Type Bridge	Manufacturer Wallace-Grommet			Capacity 25,000 lbs.		
Prior Inspection DATE 11/22/2012		Current Inspection DATE 11/14/2013		Legend: Check under condition S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet) U = Unsatisfactory NA = Not Applicable			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
1	Structure (Bridge Girders, Trolley, Trucks, Equalizer Beams, Gantry, Boom, Jib, Pillar, Etc.)	Inspect structural components for damage, distortion, or deterioration, and for evidence of loose or missing fasteners and cracked welds. Inspect truck equalizer pins for proper lubrication. Ensure there is no interference between crane and building during operation. Ensure drain holes are clear for outdoor cranes.		X			
2	Rails and Tracks, including top running trolley rail and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes.)	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		X			
3	Handrails, Walkways, Ladders, and Platform Safety Guards			X			
4	Bumpers			X			
5	Jib Boom Bearings						X
6	Wheels and Axles			X			
7	Shafts and Couplings (Hoist Drives)	blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by overtensioned 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.					?
8 a	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			

12/3/2012 15:39:32

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'd. 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	Manufacturer		Capacity			
#349	Bridge	Wallace-Grommet		25,000 lbs.			
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	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	?	
	Hoist Gears (Not applicable to category 2 and 3 package hoist assemblies or manual chain hoists.)						X
						?	
8 c	Gearing, Manual Chain Hoists						X
9 a	Mechanical Load Brakes - Powered Hoists			X			
9 b	Mechanical Load Brakes - Manual Hoists	Inspect brake linings for wear, scoring, 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.				?	
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, debonding, 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

12/3/2012 14:42:04

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	Manufacturer	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	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	?	
	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 at every tenth annual inspection.			?		
8 c	Gearing, Manual Chain Hoists						X
9 a	Mechanical Load Brakes - Powered Hoists			X			
9 b	Mechanical Load Brakes - Manual Hoists					?	
10	Mechanical Brakes	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

10/8/2013 13:11:38

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 #349	Type Bridge	Manufacturer Wallace-Grommet			Capacity 25,000 lbs.		
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	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	?
	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 at every tenth annual inspection.				?	
8 c	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.					X
9 a	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, disassemble at every tenth annual inspection and inspect for damage and deterioration. (See appendix E.)		X			
9 b	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.				?	
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and					X

10/8/2013 13:11:45

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	Manufacturer			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, debonding, 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.					X
12	Air Brake System	every eighth annual inspection.					X
13 a	Electric Magnetic Brake System (Shoe and Band Type 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, debonding, 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. 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			

12/4/2012 8:23:40

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 5 OF 12							
Crane	Type	Manufacturer			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 overtensioned 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. 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. Undue looseness in pinned sockets is defined	 1/2"	X			

4/1/2015 13:36:49

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 an inch or 64ths of an inch. If measuring in 64ths of an inch, it is understood that the using the lowest common denominator may result in a recording that displays a denominator other than 64, e.g., 36/64=9/16; 32/64=1/2; 30/64=15/32; 24/64=3/8. For an aid in determining the size of the wire rope, consult the Wire Rope Certification Sheet in the Equipment History File.

		Inspect for evidence of bearing damage, overheating, and abnormal wear. See appendix E for further inspection and test					
--	--	--	--	--	--	--	--

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 #349	Type Bridge	Manufacturer Wallace-Grommet			Capacity 25,000 lbs.		
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
15	Wire Rope Drum, Followers, and Machinery Foundations	Inspect drums for distortion, cracks, worn grooves, and for evidence of cracked welds and loose or missing fasteners. Inspect wire rope followers for proper adjustment and alignment. Inspect bearings for evidence of damage, overheating, or abnormal wear. Inspect machinery foundations for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds. During operation, verify that at least two complete wraps of wire rope remain on 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 overtensioned 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. 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					

12/4/2012 9:15:28

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.

		indications deem it necessary. The Federal Specification for wire rope is RR-W-410.					
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 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.		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 6 OF 12									
Crane #349		Type Bridge		Manufacturer Wallace-Grommet			Capacity 25,000 lbs.		
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition				Condition	
				S	U	C	NA	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 testing requirements for 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						X	
21	Runway Electrification Bar, Fest Track System								X
21A	Crane G							X	
22	Cable R							X	
23	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	?	

12/4/2012 9:31:27

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 <u>7</u> OF <u>12</u>							
Crane	Type	Manufacturer			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, for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness 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. 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
25	Controllers	<p>12/4/2012 9:34:37</p> <p>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?</p> <p>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.</p>					
26	Resistors	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			

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 <u>7</u> OF <u>12</u>							
Crane	Type	Manufacturer	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, for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness 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. 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
25	Controllers	Inspect cab and floor operated controllers for broken or loose					
26	Resistors						

12/4/2012 9:36:38

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.

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	Manufacturer	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 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					
30	Operational	<p>Anomaly 11: AMISR item 28 is marked SAT. Does this crane have eddy current brakes? Is there any evidence to indicate otherwise?</p> <p>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.</p> <p>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.</p>					?
31	Warning Operational General (Horns, Bells, etc.)						N/A
32	Load Indicators, Load Warning Devices, Load Shutdown Devices	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 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 131.25 percent of rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36.		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 8 OF 12							
Crane	Type	Manufacturer	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 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.	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.					?
31	Warning Devices	Inspect components and associated wiring for damage or					N/A
32	Load Indic Warning D Shutdown	<p>4/1/2015 13:43:31</p> <p>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.</p> <p>Conclusion: The inspector placed an actual N/A in the box. This is different from all the other markings, which are X's. There should be an X in the N/A column. Have the inspector correct this and inform him of your expectations.</p>					

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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 <u>10</u> OF <u>12</u>			
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)
13a	bridge brake spring length out of spec - 1/8" over maximum allowed dimension	0174.13	Lyle B. Bluegh 11/15/13
			

11/30/2012 16:58:06

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): <i>H. Dee Dumtey</i>	Date: 11/15/13

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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 <u>11</u> OF <u>12</u>	
CRANE: #349											
<small>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.</small>											
BRAKE	TYPE	SPRING LENGTH/ TORQUE SETTING				AIR GAP/ PLUNGER STROKE				LINING THICKNESS	
		MIN	MAX	ACTUAL		MIN	MAX	ACTUAL		MIN	ACT
				INSP	ADJ			INSP	ADJ		
<i>Trolley</i>	<i>TM43</i>	3"	3 1/2"	3 5/16"	3"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
<i>Bridge</i>	<i>TM83</i>	4"	4 1/2" ?	4 5/8"	4"	1/16"	1/4"	1/8"	1/16"	1/8"	1/4"
<i>Hoist</i>	<i>TM1355</i>	5"	5 1/2"	5 1/16"	N/A	1/8"	3/8"	3/8" ?	1/16"	3/32"	3/8"

4/1/2015 13:46:27

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.

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

12/4/2012 10:22:25

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.

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 12 OF 12
REMARKS:		
<i>SRO-0166-13 issued to adjust within-tolerance trolley brake (model TM43) spring length and air gap to minimum specifications, as needed</i>		
<i>SRO-0167-13 issued to adjust within-tolerance hoist brake (model TM1355) spring length and air gap to minimum specifications, as needed</i>		
<i>SRO 0168-13 issued to adjust within tolerance bridge brake (model TM83) spring length and air gap to minimum specifications, as needed</i>		
?		
<div style="border: 1px solid black; padding: 5px;"> <p>12/4/2012 10:28:00</p> <p>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?</p> <p>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.</p> </div>		

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Bridge Crane Certification Package - **Anomaly Discussions**

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

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. One outer wire broken at the point of contact with the core of the rope that has

12/4/2012 11:20:35

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.

- percent of the diameter of the nominal diameter of the wire rope. Use 100-400x 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. 

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Bridge Crane Certification Package - Anomaly Discussions

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

CERTIFYING OFFICIAL STUDENT GUIDE

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: #349	Type: Bridge	Location: Bldg. 1539	Operator's Name: Rick L. Welch	Operator's License No. C20549	
Purpose of Inspection: Annual Certification		Legend: B = Before A = After D = During	Date Started: 11/16/13	Date Completed: 11/16/13	
Item No.	Item Description	B	D	A	Insp/Init.
1	Inspect structural components for damaged or deteriorated members,	S	S	S	LBB
<div style="border: 1px solid black; padding: 5px;"> <p>4/1/2015 13:53:11</p> <p>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?</p> <p>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.</p> <p>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.</p> </div>					
	if performed at the maintenance inspection.)				HDD
8	If 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 CCIR. Mark N/A if performed at the maintenance inspection.)	?	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

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Bridge Crane Certification Package - Anomaly Discussions

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

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house 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	<div style="border: 1px solid gray; padding: 5px;"> <p>12/4/2012 11:58:46</p> <p>Anomaly 21: CCIR item 22 is marked SAT. Is this correct? Is this crane equipped with ratchets, pawls and rotate locks?</p> <p>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.</p> <p></p> </div>	N/A			HDD
18		N/A			HDD
19		N/A	N/A	N/A	HDD
20		N/A	N/A	N/A	HDD
21		N/A	N/A		HDD
	appendix C.				
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.	S			LBB
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	HDD
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	N/A	N/A	N/A	HDD
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A		HDD
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A			HDD
27	Verify barge compartment (voids) cover bolts are installed.	N/A			HDD
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	HDD
29	Inspect rotate path assembly and center pin steadiment/support assembly for condition and proper operation.	N/A	N/A	N/A	HDD
30	Inspect slewing ring bearings for condition and proper operation.	N/A	N/A	N/A	HDD
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	N/A	N/A	N/A	HDD
Remarks:					
Inspector Signature/Date: <i>H. Dee Dumtrey, 11/16/13</i>			Test Director Signature/Date: <i>John C. Laitlee, 11/16/13</i>		

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussions

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

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house 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, 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.	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
<div data-bbox="269 1121 1247 1577" style="border: 1px solid black; padding: 5px;"> <p>12/4/2012 12:00:14</p> <p>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?</p> <p>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.</p> </div>		N/A			HDD
					HDD
					HDD
		N/A	N/A	HDD	
		N/A	N/A	HDD	
		N/A	N/A	HDD	
		N/A	N/A	HDD	
operation.					
Remarks: 					
H. Dee Dumtrey, 11/16/13 		John C. Laitlee, 11/16/13			
Inspector Signature/Date:		Test Director Signature/Date:			

TRAINING ONLY

Bridge Crane Certification Package - Anomaly Discussions

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

CERTIFYING OFFICIAL STUDENT GUIDE

Item No.	Item Description	B	D	A	Insp/Init.
14	Inspect operator's cab for cleanliness and operation of equipment.	N/A			HDD
15	Inspect machinery house 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, 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.	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 h	N/A	N/A	N/A	HDD
25	Inspect engines : operation.				
26	Inspect counterw and missing fast				
27	Verify barge com				
28	Verify accuracy c test data.				
29	Inspect rotate pa assembly for cor				
30	Inspect slewing r				
31	Inspect travel tru operation.				
Remarks: 					
 					

12/4/2012 12:01:54

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.

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

12/4/2012 12:07:01

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.

Capacity
from OEM's rated capacity, explain in "Remarks")
25,000 lbs. N/A feet
____ lbs. ____ feet
____ lbs. ____ feet

Cable Crane Test Procedure Paragraphs (subparagraphs.)

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

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	

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

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) <i>John C. Laitlee</i>	Date 11/16/2013
Inspector (Signature) <i>H. Dee Dumtey</i>	Date 11/16/2013
Inspector (Signature)	Date
Certifying Official (Signature)	Date
Expiration Date	

* 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 <i>Navy Shore Station Charlie</i>				Building/Location <i>Bldg. 1539</i>							
Crane No. #349	Type Bridge	OEM's Rated Capacity				Certified Capacity <small>(If different from OEM's rated capacity, explain in "Remarks")</small>					
		Main	<u>25,000</u> lbs.	<u>N/A</u>	feet	Main	<u>25,000</u> lbs.	<u>N/A</u>	feet		
		Aux	_____	_____	feet	Aux	_____	_____	feet		
		Whip	_____	_____	feet	Whip	_____	_____	feet		
<input checked="" type="checkbox"/> Annual Certification <input type="checkbox"/> Interim Recertification (Reason _____)		<input type="checkbox"/> Quadrennial Load Test		Appendix "E" Applicable Crane Test Procedure Paragraphs <small>(Include applicable subparagraphs.)</small>							
				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 *				6	6.1	6.1.1	a,b,c,d	6.1.2	6.1.3	6.2	6.2.1
Boom Length	Test Load %	Minimum Radius Pounds	Feet	Maximum Radius Pounds	Feet						
Hoist						6.2.1a	6.2.1d	6.2.1e	6.2.2	6.2.3	
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	Base								
Main	129	38,212									
Aux											
Other											
Category 3 Cranes											
Hoist	Test Load %	Pounds	Base								
Main											
Aux											
Other											
Annual Certifications Since Hook NDT											
4											
Remarks											
25,000 x 1.25 = 31,250 x 1.05 = 38,212											
<p>* 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.</p>											

12/4/2012 12:07:06

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.

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 <i>Navy Shore Station Charlie</i>				Building/Location <i>Bldg. 1539</i>											
Crane No. <i>#349</i>	Type <i>Bridge</i>	OEM's Rated Capacity				Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")									
		Main	<i>25,000</i>	lbs.	<i>N/A</i>	feet	Main	<i>25,000</i>	lbs.	<i>N/A</i>	feet				
		Aux		lbs.		feet	Aux		lbs.		feet				
		Whip		lbs.		feet	Whip		lbs.		feet				
<input checked="" type="checkbox"/> Annual Certification <input type="checkbox"/> Quadrennial Load Test <input type="checkbox"/> Interim Recertification (Reason <i>?</i>)							Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs.)								
							<i>1</i>	<i>1.1</i>	<i>1.2</i>	<i>1.3</i>	<i>1.4</i>	<i>1.4.1</i>	<i>1.4.2</i>	<i>1.4.3</i>	
							<i>1.4.4</i>	<i>1.4.5</i>	<i>1.6</i>	<i>1.6.1</i>	<i>1.6.2</i>	<i>1.6.4</i>	<i>1.7</i>	<i>1.7.1</i>	
Category 1 or 4 Cranes *															
Boom Length	Test Load	Minimum Radius		Maximum Radius		<i>6</i>	<i>6.1</i>	<i>6.1.1</i>	<i>a,b,c,d</i>	<i>6.1.2</i>	<i>6.1.3</i>	<i>6.2</i>	<i>6.2.1</i>		
Hoist	%	Pounds	Feet	Pounds	Feet	<i>6.2.1a</i>	<i>6.2.1d</i>	<i>6.2.1e</i>	<i>6.2.2</i>	<i>6.2.3</i>					
Main															
Aux															
Whip															

12/4/2012 12:09:35

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.

* 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 <i>Navy Shore Station Charlie</i>			Building/Location <i>Bldg. 1539</i>		
Crane No. <i>#349</i>	Type <i>Bridge</i>	OEM's Rated Capacity			Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")
		Main	<u>25,000</u> lbs.	<u>N/A</u> feet	Main <u>25,000</u> lbs. <u>N/A</u> feet
		Aux	_____ lbs.	_____ feet	Aux _____ lbs. _____ feet
		Whip	_____ lbs.	_____ feet	Whip _____ lbs. _____ feet
<input checked="" type="checkbox"/> Annual Certification <input type="checkbox"/> Interim Recertification (F		<div style="border: 1px solid black; padding: 5px;"> <p>12/4/2012 12:20:48</p> <p>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?</p> <p>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.</p> <p>Note: The correct order for completing these documents is: 1st: AMISR; 2nd: CCIR; 3rd: CLTCI</p> <p>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.</p> </div>			
Boom Length Hoist Main Aux Whip Other Hook Tram Measurements Main Hook Aux Hook Whip Hook Other					
Hoist	Test Load %	Pounds		Percentage of Rated Capacity	
Main	<u>129</u>	<u>32,212</u>		<u>129%</u>	
Aux	<u>?</u>	<u>?</u>		<u>?</u>	
Other					
Category of Cranes			to which it's certified capacity:		
Hoist	Test Load %	Hook Tram Measurements			Test Director (Signature)
		Base Meas.	Before Test	After Test	<i>John C. Laitlee</i>
Main					Date <i>11/16/2013</i>
Aux					Inspector (Signature) <i>H. Dee Dumtey</i>
Other					Date <i>11/16/2013</i>
Annual Certifications Since Hook NDT			Inspector (Signature) <u>?</u>		
<i>4</i>			Date		
			Certifying Official (Signature)		
			Date		
			Expiration Date		
Remarks					
<u>25,000 x 1.25 = 31,250 x 1.05 = 32,212</u> <u>?</u>					
* 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. ?



CRANE CERTIFICATION PACKAGE EXERCISE PART 3:

CORRECTED ANOMALIES

Review the following Corrected Copy for suggested correction techniques.

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 1 OF 12 ^{ADD 11/16/13} 13							
Crane	Type	Manufacturer	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Prior Inspection		Current Inspection		Legend: Check under condition			
DATE		DATE		S = Satisfactory C = Corrected (If deferred, leave blank and identify on Unsatisfactory Items sheet)			
11/22/2012		11/14/2013		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.)	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 overtensioned 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
8 a	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 <u>2</u> OF 12 ^{MOD 11/16/13} <u>13</u>							
Crane	Type	Manufacturer	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
8 b	Gearing (Hoist, Rotate, Trolley) 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	X			
			Bridge		X	X	
			Hoist	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 can not 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 at every tenth annual inspection.					X
8 c	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.					X
9 a	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, disassemble at every tenth annual inspection and inspect for damage and deterioration. (See appendix E.)		X			
9 b	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.					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, debonding, 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 <u>3</u> OF <u>12</u> ^{HDD 11/16/13} 13							
Crane	Type	Manufacturer	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	<p>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, debonding, 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.</p> <p>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.</p>				X	
12	Air Brake System	<p>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, debonding, 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.</p> <p>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.</p>				X	
13 a	Electric Magnetic Brake System (Shoe and Band Type Brakes)	<p>Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Disassemble as required to inspect linings for wear, debonding, 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.</p> <p>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.</p>	Trolley Bridge Hoist	X X X	^{HDD 11/16/13} X X	X X X	

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 4 OF 12 ^{12/13}							
Crane	Type	Manufacturer	Capacity				
#349	Bridge	Wallace-Grommet	25,000 lbs.				
Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition			
				S	U	C	NA
13 b	Electric Magnetic Brake System (Disc Type Brakes)	<p>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, debonding, 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.</p> <p>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.</p>					X
13 c	Electric Magnetic Brake System (Caliper Brakes on Wire Rope Drums)	<p>Inspect system for damage, for evidence of binding, loose and worn components, and for proper lubrication. Inspect brake linings for wear, glazing, debonding, and 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.)</p> <p>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.</p>					X
14	Sheaves	<p>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. Gauge 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.</p>		X			

ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET <u>5</u> OF 12 ^{WOP 11/16/13} <u>13</u>							
Crane	Type	Manufacturer	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 overtensioned 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. 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. 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. The Federal Specification for wire rope is RR-W-410.		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 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.		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			

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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. 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 Strand. High strand where the height exceeds 10 percent of the nominal diameter.
6. Corrosion. Corrosion such that significant pitting occurs on the surfaces of outside wires. 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 133 percent of the diameter of the nominal diameter of the wire rope. 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.

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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 6 ^{REDO 11/16/13} OF 12 ¹³							
Crane	Type	Manufacturer	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 testing requirements for 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.					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, etc.). 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 and 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 between both the load block and ground and between the pendant and ground. If there is no metallic pendant, the pendant to ground check will 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	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	

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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD								
FOR CATEGORY 2 AND 3 CRANES SHEET 7 ^{HOD 11/16/13} 8 OF 12 ^{HOD 11/16/13} 13								
Crane	Type	Manufacturer	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, for evidence of loose connections and overheating. Inspect overload devices for evidence of loose connections and overheating. Inspect circuit breakers and switches for cleanliness 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. 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 X X	HOD 11/16/13 HOD 11/16/13 HOD 11/16/13
		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 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. 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 dead man devices. Verify proper spring return and neutral latching.		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				

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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 8 ^{WDD 11/16/13} 9 OF 12 13							
Crane	Type	Manufacturer	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 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.		LSS 11/16/13	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.	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	LSS 11/16/13
31	Warning Devices, Operational Aides, General Safety Devices (Horns, Bells, Lights, etc.)	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.		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 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 131.25 percent of rated capacity. This inspection item does not apply to overload clutches; for overload clutches, see item 36.		X			

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ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD							
FOR CATEGORY 2 AND 3 CRANES SHEET 9 ^{ADD 11/12/13} 10 OF 12 13							
Crane	Type	Manufacturer	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	For air hoists that are not equipped with limit switches, follow OEM procedure if available. 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 131.25 percent of rated capacity. 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 MISR to ensure the lubrication and servicing was performed as specified.		X			
REMARKS:							
<i>Item 16: the minimum wire rope dimension measured was 0.484" (31/64")</i>							
<i>The wire rope rejection criteria sheet (page 6) was omitted from the original package submitted to the certifying official. The inspector subsequently inserted the missing page and adjusted the page numbers accordingly.</i>							
<i>Items 13a, 17, 24, 28 and 30 were found during the certifying official's review of the original package to be questionable (did not appear to be marked correctly). On the certifying official's request, the inspectors reviewed and re-validated these concerns and took the noted corrective actions.</i>							

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

RDO 11/16/13
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		
<i>Trolley</i>	<i>TM83</i>	<i>3"</i>	<i>3 1/2"</i>	<i>3 5/16"</i>	<i>3"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Bridge</i>	<i>TM83</i>	<i>4"</i>	<i>4 1/2"</i>	<i>4 5/8"</i>	<i>4"</i>	<i>1/16"</i>	<i>1/4"</i>	<i>1/8"</i>	<i>1/16"</i>	<i>1/8"</i>	<i>1/4"</i>
<i>Hoist</i>	<i>TM1355</i>	<i>5"</i>	<i>5 1/2"</i>	<i>5 1/16"</i>	<i>N/A</i>	<i>1/8"</i>	<i>3/8"</i>	<i>3/8"</i>	<i>1/16"</i> <i>1/8"</i> <small>LSS 11/16/13</small>	<i>3/32"</i>	<i>3/8"</i>

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

SHEET ^{HDD 11/16/13}~~12-13~~ OF ~~12-13~~

REMARKS:

SRO 0166-13 issued to adjust within tolerance trolley brake (model TM43) spring length and air gap to minimum specifications, as needed

SRO 0167-13 issued to adjust within tolerance hoist brake (model TM1355) spring length and air gap to minimum specifications, as needed

SRO 0168-13 issued to adjust within tolerance bridge brake (model TM83) spring length and air gap to minimum specifications, as needed

SRO 0174-13 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)

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CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.: #349	Type: Bridge	Location: Bldg. 539	Operator's Name: Rick L. Welch	Operator's License No. C20549			
Purpose of Inspection: Annual Certification		Legend: B = Before A = After D = During		Date Started: 11/16/13	Date Completed: 11/16/13		
Item No.	Item Description			B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, <u>and</u> 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 <u>connections</u> , 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, 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.			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 may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)			S			HDD
8	If 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 CCIR. Mark N/A 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 <u>misalignment</u> .			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 <u>and/or</u> rigging personnel.			S			HDD

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Bridge Crane Certification Package – Anomalies Corrected

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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 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, 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.	N/A	N/A		HDD
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks. <i>LBB 11/16/13</i>	S N/A			LBB
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.	N/A	N/A	N/A	HDD
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.	N/A	N/A	N/A	HDD
25	Inspect engines and engine-generator sets for condition and proper operation.	N/A	N/A		HDD
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.	N/A			HDD
27	Verify barge compartment (voids) cover bolts are installed.	N/A			HDD
28	Verify accuracy of list and trim indicators against design data or previous test data.	N/A	N/A	N/A	HDD
29	Inspect rotate path assembly and center pin steadment/support assembly for condition and proper operation.	N/A	N/A	N/A	HDD
30	Inspect slewing ring bearings for condition and proper operation.	N/A	N/A	N/A	HDD
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.	N/A	N/A	N/A	HDD
Remarks: <i>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.</i>					
<i>H. Dee Dumtrey 11/16/13</i> Inspector Signature/Date:		<i>John C. Laitlee 11/16/13</i> Test Director Signature/Date:			
<i>Lyle B. Bluegh 11/16/13</i> Inspector Signature/Date					

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity <i>Navy Shore Station Charlie</i>				Building/Location <i>Bldg. 1539</i>							
Crane No.	Type	OEM's Rated Capacity				Certified Capacity (If different from OEM's rated capacity, explain in "Remarks")					
<i>#349</i>	<i>Bridge</i>	Main	<i>25,000</i>	lbs.	<i>N/A</i>	feet	Main	<i>25,000</i>	lbs.	<i>N/A</i>	feet
		Aux		lbs.		feet	Aux		lbs.		feet
		Whip		lbs.		feet	Whip		lbs.		feet
<input checked="" type="checkbox"/> Annual Certification <input checked="" type="checkbox"/> Quadrennial Load Test <input type="checkbox"/> Interim Recertification (Reason: _____)							Appendix "E" Applicable Crane Test Procedure Paragraphs (Include applicable subparagraphs.)				
							1.1 1.2 1.3 1.4 1.4.1 1.4.2 1.4.3 1.4.4				
							1.5 1.6 1.6.1 1.6.2 1.6.3 1.6.4 1.7 1.7.1				
Category 1 or 4 Cranes *											
Boom Length		Test Load %	Minimum Radius		Maximum Radius						
			Pounds	Feet	Pounds	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	<i>129</i>	<i>32,250</i>	<i>6"</i>	<i>6"</i>	<i>6"</i>						
Aux		38,212									
Other											
Category 3 Cranes											
Hoist	Test Load %	Pounds	Hook Tram Measurements								
			Base Meas.	Before Test	After Test						
Main											
Aux											
Other											
Annual Certifications Since Hook NDT							Test Director (Signature)		Date		
<i>4</i>							<i>Jahn C. Laithe</i>		<i>11/16/2013</i>		
							Inspector (Signature)		Date		
							<i>H. Sue Sunday</i>		<i>11/16/2013</i>		
							Inspector (Signature)		Date		
							<i>Lyla B. Blusgh</i>		<i>11/16/2013</i>		
							Certifying Official (Signature)		Date		
							Expiration Date				
Remarks											
$25,000 \times 1.25 = 31,250 \times 1.05 = 32,812$ $38,212$											
* 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.											

NOTES

CRANE AND RIGGING GEAR ACCIDENTS

ACCIDENT CATEGORIES

There are two general categories of weight handling accidents:

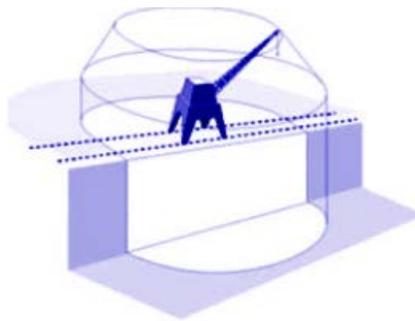
- Crane Accidents
- Rigging Gear Accidents.

Crane Accidents are those that occur during operation of category 1, 2, 3, or 4 cranes.

Rigging Gear Accidents are those that occur when gear covered by NAVFAC P-307 section 14 is used by itself in a weight handling operation, i.e., without a crane. Or, when covered gear is used with multi-purpose machines, material handling equipment (forklifts), and with equipment covered by NAVFAC P-300 in a weight handling operation.

CRANE ENVELOPE

In order to define a crane accident, you must first understand the crane operating envelope. The operating envelope includes the:



- crane
- operator
- riggers
- crane walkers
- other personnel
- rigging gear between the hook and the load
- load
- supporting structures, such as the rails or the ground, and the lift procedure

RIGGING GEAR ENVELOPE

The rigging gear operating envelope contains:

- rigging gear
- miscellaneous equipment covered by NAVFAC P-307 section 14
- user of the gear
- load
- other personnel involved in the operation
- structure supporting the gear
- load rigging path
- the rigging procedure



Knowledge Check 1: Select all that apply.

The crane operating envelope includes the crane, the operator, the riggers, the crane walkers, and...

- A. the load*
- B. the area where the load will be landed*
- C. rigging gear between the hook and the load*
- D. any supporting structures*

Knowledge Check 2: Select all that apply.

The rigging gear operating envelope contains the rigging gear and miscellaneous equipment covered by NAVFAC P-307 section 14, the load itself, and...

- A. the user of the gear or equipment*
- B. the load's rigging path*
- C. the rigging procedure*
- D. the crane removal procedure*
- E. other gear or equipment's supporting structure-rated test*
- F. other personnel involved in the operation*

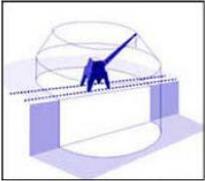
NEAR MISS

A near miss is a situation where an accident was avoided by mere chance or where intervention prevented an ongoing sequence of events that would have resulted in an accident.

Near misses and other unplanned occurrences with lessons to be learned that do not fall under the crane and rigging gear accident definitions, shall be reported using NAVFAC P-307, Section 12, Figure 12-2 (Near Miss Report). This report must be e-mailed (nfsh_ncc_accident@navy.mil) to the Navy Crane Center (Code 06) within 30 days of the occurrence.

CRANE ACCIDENT

A crane accident occurs when any of the elements in the operating envelope fail to perform correctly during operations, including operations during maintenance or testing, resulting in the following:



- personnel injury or death
- material or equipment damage
- dropped load
- derailment
- two-blocking
- overload
- collision.

RIGGING GEAR ACCIDENT

Rigging gear accidents occur when any of the elements in the operating envelope fails to perform correctly during weight handling operations resulting in the following:



- personnel injury or death
- material or equipment damage
- dropped load
- two blocking
- overload

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
- improperly secured loads falling from pallets

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
- a comprehensive investigation shall be initiated
- document and report accident and findings



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 Gear 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 EXCEPTION

Component failure such as motor burnout, gear tooth breakage, bearing failure, etc. is not considered an accident just because damage to equipment occurred, unless the component failure causes other damage such as a dropped boom or dropped load.

ACCIDENT CAUSES

In most cases, crane accidents result from personnel error and can be avoided. Most crane accidents are caused by:

- inattention to the task
- poor judgment
- bad communication
- team members having too much confidence in their abilities
- 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
- evaluate his or her physical and emotional fitness
- inform supervisors of conditions

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 ACCIDENTS

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 crane and load in a safe position)
- notify supervision as soon as safely possible
- insure that the accident scene is preserved to aid the investigation



ACCIDENT REPORTING

Activities shall notify the Navy Crane Center by fax, phone, or e-mail as soon as practical but not later than 24 hours after an accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane, load or adjacent property.

For all other accidents the Navy Crane Center must be notified no later than three working days after the accident.

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

ACCIDENT REPORTING - CONTRACTOR

The contractor shall

- notify the contracting officer as soon as practical but no later than four hours after any WHE accident
- secure the accident site and protect evidence until released by the contracting officer
- conduct an accident investigation to establish the root cause(s) of any WHE accident

Crane operations shall not proceed until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer. Contractors shall provide to the contracting officer, within thirty days of any accident, a Crane and Rigging Gear Accident Report using the form provided in NAVFAC P-307 Section 12 consisting of a summary of circumstances, an explanation of cause or causes, photographs (if available), and corrective actions taken.

ACCIDENT REPORTING - CONTRACTING OFFICER

The contracting officer shall

- notify the host activity of any WHE accident upon notification by the contractor
- provide the Navy Crane Center and the host activity a copy of every accident report, regardless of severity, upon receipt from the contractor
- notify the Navy Crane Center of any accident involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane, load, or adjacent property as soon as possible, preferably within twenty four hours of notification by the contractor

CERTIFYING OFFICIAL STUDENT GUIDE

When the contracting officer is not in the local area, the contracting officer shall designate a local representative to ensure compliance with the above noted requirements.

The above requirements are in addition to those promulgated by OPNAVINST 5100.23 and related local instructions.

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. crane accidents*
- B. operator error*
- C. rigging gear deficiency*
- D. rigging error*

Knowledge Check 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. load configuration error*
- B. operator error*
- C. crane walker error*
- D. crane accident*

Knowledge Check 3: Select the best answer.

When rigging gear, covered by NAVFAC P-307 section 14, fails while suspended from a structure and drops the load, it is a...

- A. crane accident*
- B. load configuration error*
- C. rigging gear accident*
- D. rigging error*

CERTIFYING OFFICIAL STUDENT GUIDE

Knowledge Check 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. a crane accident*
- B. a rigging gear accident*
- C. crane maintenance's responsibility*
- D. a non-accident*

Knowledge Check 5: Select the best answer.

To whom or to what are the majority of crane accidents attributed?

- A. equipment failure*
- B. crane operators*
- C. riggers or signalmen*
- D. weather conditions*
- E. personnel error*

Knowledge Check 6: Select all that apply.

Over confidence and poor judgment amount team members can contribute to crane and rigging gear accidents. Select additional factors that can contribute to accidents.

- A. inattention to the task*
- B. the crane operating envelope*
- C. engineering lift specifications*
- D. operating the crane too fast*

Knowledge Check 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. secure the crane and power as required*
- B. stop operations as soon as safely possible*
- C. notify your supervisor immediately*
- D. call emergency services if anyone is injured*

NOTES



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?

List other training topics in which you are interested: _____

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