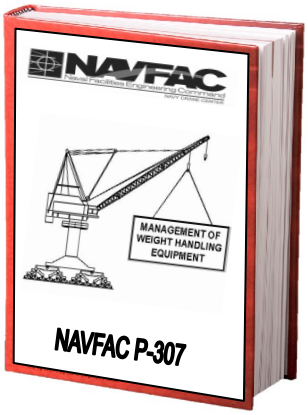
Navy Crane Center



NAVFAC P-307 Training

LOAD TEST DIRECTOR

WEB BASED TRAINING STUDENT GUIDE

NCC-LTD-03

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

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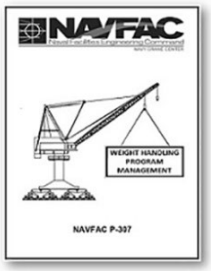
COURSE INTRODUCTION

Welcome

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



Introduction

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

Knowledge Checks

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

Final Exam

The final exam question types include: Fill in the Blank, Multiple Choice – Single Answer, Multiple Choice – Multiple Answer, Matching, and True/False. When taking exams, keep the following in mind. A score of 80% or higher is required to pass.

NAVFAC P-307 Overview Sections 1-14

Welcome

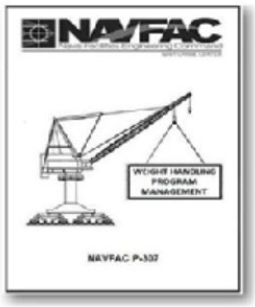
Welcome to the NAVFAC P-307 Weight Handling Program Management manual overview.

Introduction

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

Learning Objectives

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



Section 1 Introduction

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

Purpose

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

NAVFAC P-307 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.

Covered Equipment

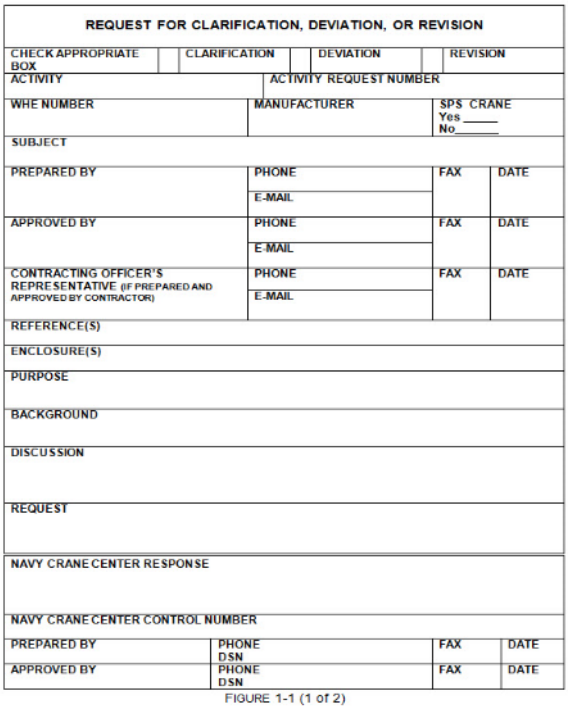
NAVFAC P-307 covers shore-based category 1, 2, 3, and 4 cranes, including shore-based barge-mounted cranes. Detailed descriptions of the crane types are contained in Section 1. Illustrations of individual crane types can be found in Appendix B. Rigging Gear is covered in Section 14.

Program Requirements

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

Figure 1-1

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



REQUEST FOR CLARIFICATION, DEVIATION, OR REVISION

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

FIGURE 1-1 (1 of 2)

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

Category 1 Cranes

This is a list of some of the more common types of category 1 cranes. Category 1 cranes come in a wide variety of sizes and configurations and include: portal cranes, hammerhead cranes, locomotive cranes, derricks, YD floating cranes, tower cranes, container cranes, mobile cranes, aircraft crash cranes, mobile boat hoists including self-propelled and towed types, and rubber-tired gantry cranes. They are considered category 1 cranes regardless of capacity. All category 1 cranes require a license to operate. Note: Other cranes on barges or floating mountings are the category of the crane itself, e.g., monorail, jib crane, gantry crane.

Cat 1 Crane Examples

Category 1 Crane Examples

Floating Cranes

These types of cranes include barge, pontoon, or hull mounted with an integral base.

The luffing booms are capable of continuous 360 degrees rotation.

They are powered by diesel-electric generators, diesel-driven hydraulic pumps, and may be self-propelled and/or tug assisted.

Category 1 Crane Examples

Hammerhead Cranes

Hammerheads have a rotating counterbalanced cantilevered boom, equipped with one or more trolleys that move along the length of the boom.

Most are supported by a pintle or turntable mounted atop a traveling or fixed tower assembly.

Category 1 Crane Examples

Container Cranes

Container cranes have hinged booms and main beams with traveling trolleys mounted on rails, which in turn is mounted on a traveling gantry structure.

These cranes are used at several military port activities to quickly transfer containers on and off ships.

Category 1 Crane Examples

Derricks

This crane has a boom that is hinged near the base of a fixed mast.

Typically, the boom rotates left and right between the mast support legs or "stiff legs". These stiff legs are capable of handling tensile and compressive forces.

The pictured crane is referred to as a stiff-leg derrick and can rotate 180 degrees.

Category 1 Crane Examples

Portal Cranes

Portal cranes consist of a rotating superstructure mounted on a gantry structure. The gantry style structure allows for the free movement of traffic and materials when the crane is located on the pier.

There is an operator's cab, machinery house, and a luffing boom.

The primary source of power is a diesel engine that drives generators or hydraulic pumps.

They are supported by wide gauge rail, allowing the portal crane to move about the facility.

Category 1 Crane Examples

Mobile Cranes

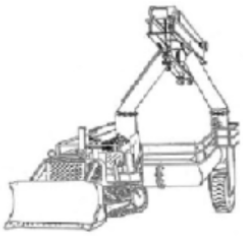
The most common type of mobile crane is the truck mounted hydraulic crane.

These cranes consist of a rotating superstructure mounted on a specialized truck chassis equipped with a power plant, driver's cab, and operator's cab.

The primary source of power for these types of cranes are diesel engines that drive hydraulic pumps and provide electric power.

Mobile Boat Hoist

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



LCRU

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

Rubber Tired Gantry Crane

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

Cat 4 Crane Examples

Typically, category 4 cranes are independently manufactured boom mechanisms that are subsequently attached to or mounted on commercially available trucks. These cranes are operated independent of the vehicle controls from standard ground control stations and may be powered by the truck engine or a power sending unit. The booms may rotate or articulate. Outriggers or stabilizers shall be used as required.

Cat 4 Crane Examples 2

Booms and Mounts: Category 4 cranes have different types of boom configurations such as: telescoping, non-telescoping, and articulating.

They may be mounted on flatbed trucks, trailers, stake beds, rail cars, barges and pontoons, or may be stationary mounted on piers, wharves, and docks.

Cat 4 Crane Examples 3

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

Cat 4 Crane Examples 4

Standards & Licensing: Commercial truck mounted cranes, as described in ASME B30.5, and articulating boom cranes, as 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.

Cat 2 and 3 Cranes

Category 2 and Category 3 cranes include: overhead traveling cranes; gantry cranes; wall cranes; jib cranes; davits; pillar cranes; pillar jib cranes; monorails and associated hoists; fixed overhead hoists, including fixed manual and powered hoists; portable hoists used continuously in a single location, that is, 6 months or more; portable A-frames and portable gantries with permanently installed hoists; and pedestal mounted commercial boom assemblies attached to stake trucks, trailers, flatbeds, or railcars, or stationary mounted to piers, etc., with certified capacities less than 2,000 pounds.

Cat 2 and 3 Crane Capacity

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

Cat 2 and 3 Crane Examples

Category 2 and 3 Crane Examples

Bridge or OET Cranes

These types of cranes may be cab, pendant, or radio controlled.

Principal parts include the bridge, girders, end trucks, trolley, hoist, and controls.

Mobility is limited to the height of the bay, length of the runway, and the span of the bridge.

Category 2 and 3 Crane Examples

Pillar-Jib Cranes

This is a fixed crane consisting of a rotating vertical member with a horizontal arm supporting a trolley and hoist.

Pillar-jib cranes normally rotate 360 degrees.

Category 2 and 3 Crane Examples

Jib Cranes

Jib cranes are normally category 3 cranes, but can be category 2 cranes.

They consist of a horizontal boom that is either cantilevered or supported by tie rods and is capable of rotating left and right. They're equipped with either powered or manual hoists and may have trolleys.

Usually mounted on a wall or column.

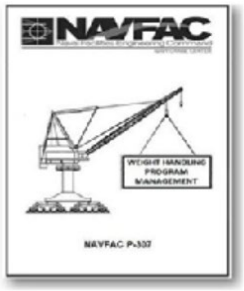
Category 2 and 3 Crane Examples

Trolley Mounted Overhead Hoists

These cranes consist of an under-hung trolley with one or more drums and sheaves for wire rope or chain.

They are powered manually, electrically, hydraulically, or pneumatically.

Mobility is limited to the height and length of the supporting beam.



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

Section 2 Introduction

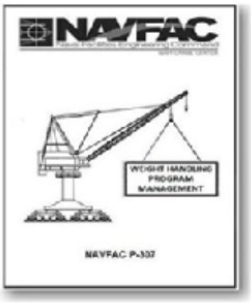
NAVFAC P-307, Section 2 provides weight handling equipment program management concepts and guidance.

Section 2 Topics

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

Sections 3, 4, and 5 Introduction

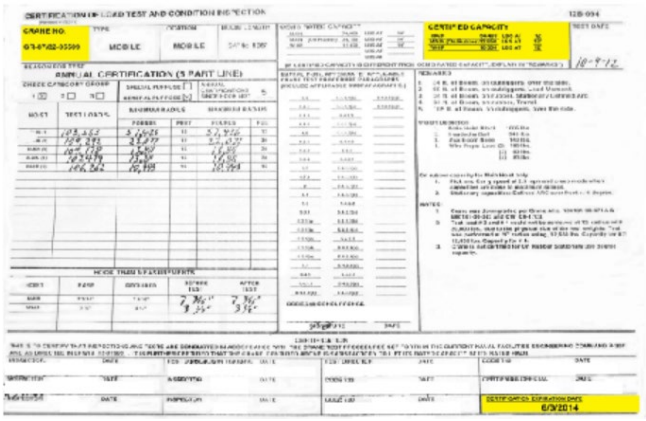
NAVFAC P-307, Sections 3, 4, and 5 provide instructions on the maintenance, inspection, and certification processes and their documentation requirements.



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

Section 3, 4, and 5 Topics

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

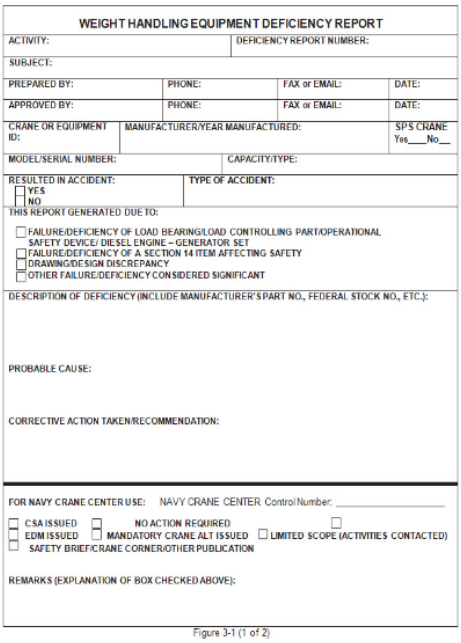


Certification Posting

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

WHEDR

In those instances where a deficiency is detected that has applicability at other Navy activities, the Navy Crane Center shall be notified as soon as practical, but in no case later than five days of the discovery. A summary report of the deficiency, including corrective actions taken or recommended, shall be forwarded to Navy Crane Center within 21 days. Figure 3-1, the Weight Handling Equipment Deficiency Report, or WHEDR (pronounced: weeder), shall be used to report the deficiency to Navy Crane Center.



WEIGHT HANDLING EQUIPMENT DEFICIENCY REPORT

ACTIVITY: | DEFICIENCY REPORT NUMBER:

SUBJECT:

PREPARED BY: | PHONE: | FAX or EMAIL: | DATE:

APPROVED BY: | PHONE: | FAX or EMAIL: | DATE:

CRANE OR EQUIPMENT ID: | MANUFACTURER/YEAR MANUFACTURED: | SPS CRANE Yes___No__

MODEL/SERIAL NUMBER: | CAPACITY/TYPE:

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

THIS REPORT GENERATED DUE TO:

☐ FAILURE/DEFICIENCY OF LOAD BEARING/LOAD CONTROLLING PART/OPERATIONAL SAFETY DEVICE/ DIESEL ENGINE – GENERATOR SET
☐ FAILURE/DEFICIENCY OF A SECTION 14 ITEM AFFECTING SAFETY
☐ DRAWING/DESIGN DISCREPANCY
☐ OTHER FAILURE/DEFICIENCY CONSIDERED SIGNIFICANT

DESCRIPTION OF DEFICIENCY (INCLUDE MANUFACTURER'S PART NO., FEDERAL STOCK NO., ETC.):

PROBABLE CAUSE:

CORRECTIVE ACTION TAKEN/RECOMMENDATION:

FOR NAVY CRANE CENTER USE: NAVY CRANE CENTER Control Number: _____

☐ CSA ISSUED ☐ NO ACTION REQUIRED ☐
☐ EDM ISSUED ☐ MANDATORY CRANE ALT ISSUED ☐ LIMITED SCOPE (ACTIVITIES CONTACTED)
☐ SAFETY BRIEF/CRANE CORNER/OTHER PUBLICATION

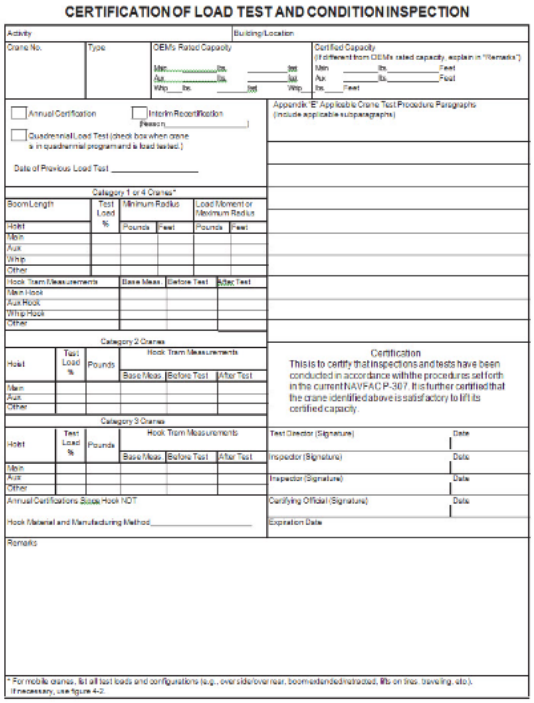
REMARKS (EXPLANATION OF BOX CHECKED ABOVE):

Figure 3-1 (1 of 2)

Figure 3-1: WHEDR

Figure 4-1

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



CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity | Building/Location

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

Annual Certification | Interim Recertification (Reason) | Quadrennial Load Test (check box when crane is in quadrennial program and is load tested.) | Date of Previous Load Test

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

Category 1 or 4 Cranes*

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

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

Category 2 Cranes

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

Category 3 Cranes

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

Certification

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

Test Director (Signature) | Date

Inspector (Signature) | Date

Annual Certifications Block Hook NDT

Hook Material and Manufacturing Method

Qualifying Official (Signature) | Date

Expiration Date

Remarks

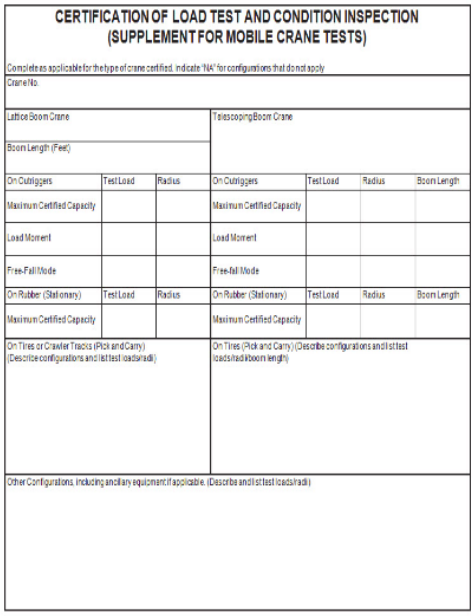
* For mobile cranes, list all test loads and configurations (e.g., over side/over rear, boom extended/retracted, lifts on tires, traveling, etc.). If necessary, use figure 4-2.

Figure 4-1

Figure 4-1: CoLTaCI

Figure 4-2

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



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

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

Crane No.

Lattice Boom Crane			Telescoping Boom Crane			
Boom Length (Feet)						
On Outriggers	Test Load	Radius	On Outriggers	Test Load	Radius	Boom Length
Maximum Certified Capacity			Maximum Certified Capacity			
Load Moment			Load Moment			
Free-Fall Mode			Free-fall Mode			
On Rubber (Stationary)	Test Load	Radius	On Rubber (Stationary)	Test Load	Radius	Boom Length
Maximum Certified Capacity			Maximum Certified Capacity			

On Tires or Crawler Tracks (Pick and Carry) (Describe configurations and list test loads/radii)	On Tires (Pick and Carry) (Describe configurations and list test loads/radii/boom length)

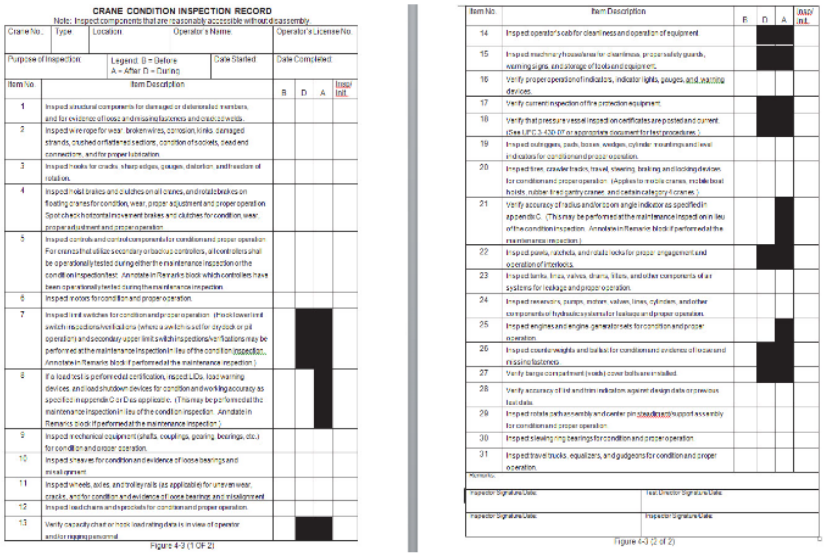
Other Configurations, including ancillary equipment if applicable. (Describe and list test loads/radii)

Figure 4-2

Figure 4-2: CoLTaCI Supplement

Figure 4-3

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



CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.	Type	Location	Operator's Name	Operator's License No.

Purpose of Inspection	Legend: B = Before A = After D = During	Date Started	Date Completed

Item No.	Item Description	B	D	A	Insp/ Init.
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 for excess of rotation.				
4	Inspect hoist brakes and clutches on all cranes, and rotating 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 conditions and proper operation. For cranes that utilize secondary or backup controllers, all control functions shall be operationally tested during either the maintenance inspection or the condition inspection(s). Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect wires for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (The lower limit switch inspections/verifications (where a switch is used for drydock or pit operations) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If a load test is performed at certification, reset LOs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of bore bearings and misalignment.				
12	Inspect load chains and specials for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and for rigging personnel.				

Figure 4-3 (1 OF 2)

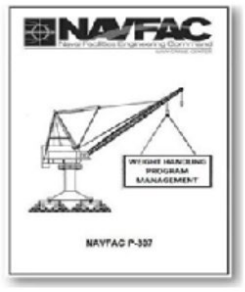
Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire extinction equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See LPCD-43D-07 or appropriate document for test procedures.)				
19	Inspect outriggers, pads, bases, wedges, cylinder mountings and level indicators for conditions and proper operation.				
20	Inspect tires, crawler tracks, travel, slewing, braking and blocking devices for conditions and proper operation. (Applies to mobile cranes, mobile boat hoists, rubber tired gantry cranes, and mechanical gantry cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)				
22	Inspect pawls, ratchets, and static 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 conditions 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 cab assembly and center pin steadiment/support assembly for conditions and proper operation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and guideons for conditions and proper operation.				

Remarks:

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

Figure 4-3 (2 of 2)

Figure 4-3: CCIR



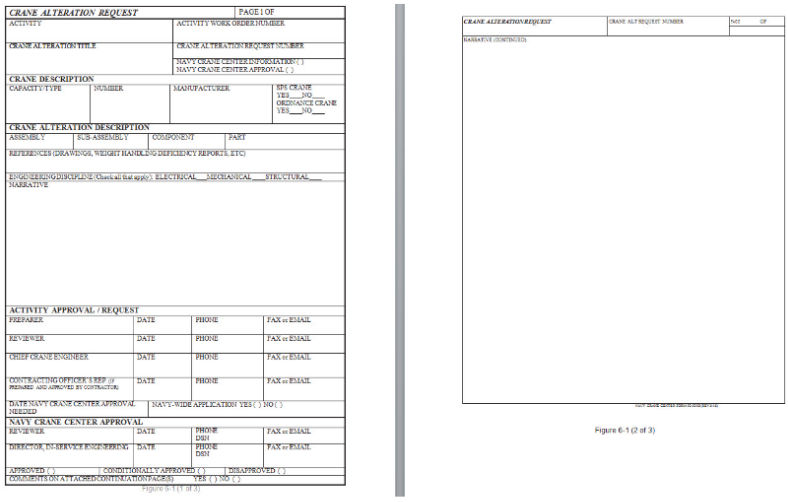
Section 1: General Overview
Section 2: Program Management
Section 3: Maintenance and Inspection
Section 4: Certification
Section 5: Equipment History File
Section 6: Alterations and Engineering
Section 7: Training and Qualification
Section 8: Operator Licensing
Section 9: Operator Checks
Section 10: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

Section 6 Introduction

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

Section 6 Topics

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



CRANE ALTERATION REQUEST — PAGE 1 OF

ACTIVITY | ACTIVITY WORK ORDER NUMBER

CRANE ALTERATION TITLE | CRANE ALTERATION REQUEST NUMBER

NAVY CRANE CENTER INFORMATION ( )
NAVY CRANE CENTER APPROVAL ( )

CRANE DESCRIPTION

CAPACITY/TYPE	NUMBER	MANUFACTURER	SPS CRANE YES___NO___ ORDNANCE CRANE YES___NO___

CRANE ALTERATION DESCRIPTION

ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART

REFERENCES (DRAWINGS, WEIGHT HANDLING DEFICIENCY REPORTS, ETC)

ENGINEERING DISCIPLINE (Check all that apply): ELECTRICAL___MECHANICAL___STRUCTURAL___
NARRATIVE

ACTIVITY APPROVAL / REQUEST

PREPARER	DATE	PHONE	FAX or EMAIL
REVIEWER	DATE	PHONE	FAX or EMAIL
CHIEF CRANE ENGINEER	DATE	PHONE	FAX or EMAIL
CONTRACTING OFFICER'S REP (If PREPARED AND APPROVED BY CONTRACTOR)	DATE	PHONE	FAX or EMAIL

DATE NAVY CRANE CENTER APPROVAL NEEDED | NAVY-WIDE APPLICATION YES ( ) NO ( )

NAVY CRANE CENTER APPROVAL

REVIEWER	DATE	PHONE DSN	FAX or EMAIL
DIRECTOR, IN-SERVICE ENGINEERING	DATE	PHONE DSN	FAX or EMAIL

APPROVED ( ) | CONDITIONALLY APPROVED ( ) | DISAPPROVED ( )
COMMENTS ON ATTACHED CONTINUATION PAGE(S) | YES ( ) NO ( )

Figure 6-1 (1 of 3)

CRANE ALTERATION REQUEST | CRANE ALTERATION REQUEST NUMBER | SHT OF

NARRATIVE (CONTINUED)

Figure 6-1 (2 of 3)

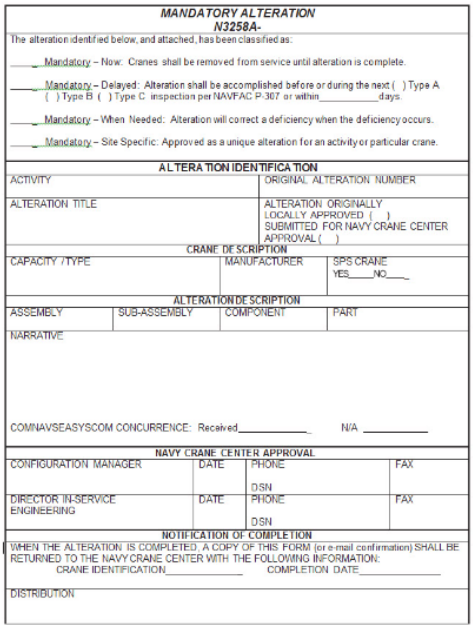
Figure 6-1: Crane Alteration Request (CAR)

Figure 6-1

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

Figure 6-2

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



MANDATORY ALTERATION
N3258A-

The alteration identified below, and attached, has been classified as:

___ Mandatory – Now. Cranes shall be removed from service until alteration is complete.

___ Mandatory – Delayed: Alteration shall be accomplished before or during the next ( ) Type A ( ) Type B ( ) Type C inspection per NAVFAC P-307 or within_____days.

___ Mandatory – When Needed: Alteration will correct a deficiency when the deficiency occurs.

___ Mandatory – Site Specific: Approved as a unique alteration for an activity or particular crane.

ALTERATION IDENTIFICATION

ACTIVITY	ORIGINAL ALTERATION NUMBER
ALTERATION TITLE	ALTERATION ORIGINALLY LOCALLY APPROVED ( ) SUBMITTED FOR NAVY CRANE CENTER APPROVAL ( )

CRANE DESCRIPTION

CAPACITY /TYPE	MANUFACTURER	SPS CRANE YES_____NO____

ALTERATION DESCRIPTION

ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART

NARRATIVE

COMNAVSEASYSCOM CONCURRENCE: Received_____ N/A _____

NAVY CRANE CENTER APPROVAL

CONFIGURATION MANAGER	DATE	PHONE DSN	FAX
DIRECTOR IN-SERVICE ENGINEERING	DATE	PHONE DSN	FAX

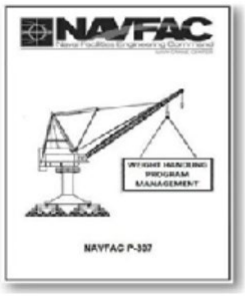
NOTIFICATION OF COMPLETION

WHEN THE ALTERATION IS COMPLETED, A COPY OF THIS FORM (or e-mail confirmation) SHALL BE RETURNED TO THE NAVY CRANE CENTER WITH THE FOLLOWING INFORMATION:
CRANE IDENTIFICATION_____ COMPLETION DATE_____

DISTRIBUTION

Figure 6-2

Figure 6-2: Mandatory Alteration



Section 1: General Overview
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Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment

Sections 7 and 8 Introduction

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

Section 7

Section 7 provides information on training and qualifications for personnel who work in a NAVFAC P-307 weight handling program. It provides the course titles for mandatory training, where to find the training courses, basic training requirements and exceptions, training for specific types of equipment, and record keeping, and features Table 7-1 which lists the most common WHE job functions and their required courses. These web-based training courses can be found on Navy e-Learning, more commonly known as NeL. Click on the Table 7-1 link below the picture to view Table 7-1.

Table 7-1 Training Courses for WHE Job Functions

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

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

Notes

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

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

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

04 Personnel shall also satisfy applicable appendix N requirements.

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

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

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

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

Notes

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

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

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

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

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

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

Section 8

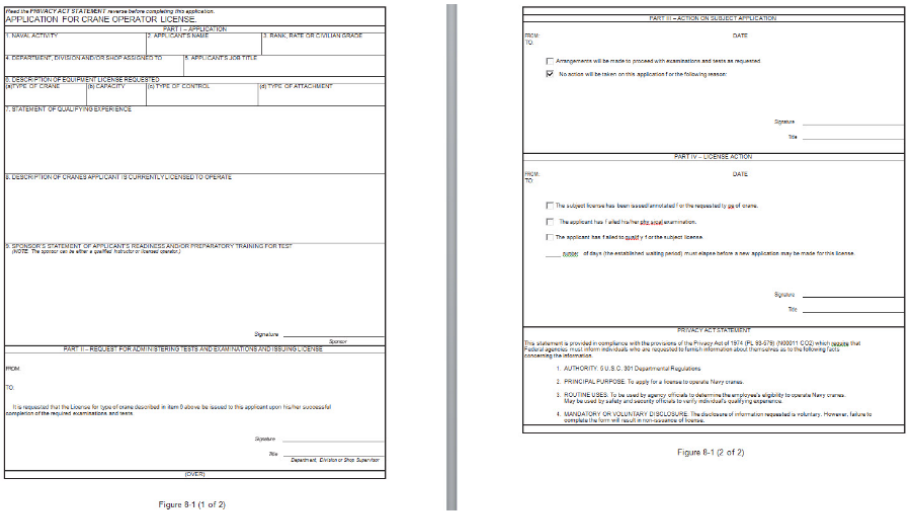
Section 8 provides uniform standards for crane operator training, testing, examining, and licensing. Category 1, category 2, cab-operated category 3, and category 4 operators must be licensed. Licenses are not required to operate non-cab operated category 3 cranes. However, training and a demonstration of ability to operate safely are required.

Operator Training

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

Figure 8-1

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



APPLICATION FOR CRANE OPERATOR LICENSE.

PART I – APPLICATION

PART II – ACTION ON SUBJECT APPLICATION

PART III – REQUEST FOR ADMINISTERING TESTS AND EXAMINATIONS AND ISSUING LICENSE

PART IV – LICENSE ACTION

PRIVACY ACT STATEMENT

Figure 8-1 (1 of 2)

Figure 8-1 (2 of 2)

Figure 8-1: Crane Operator License Application

Figure 8-2

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

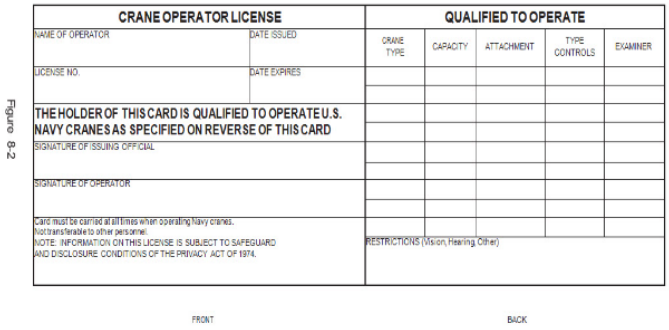


Figure 8-2

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

FRONT BACK

Figure 8-2: Crane Operator License

Figure 8-3

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

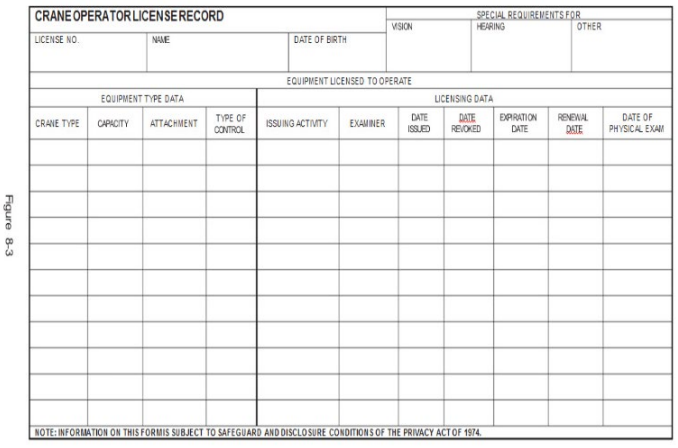


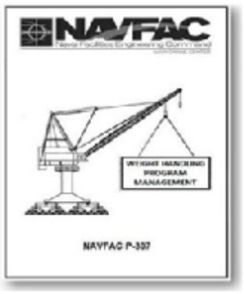
Figure 8-3

CRANE OPERATOR LICENSE RECORD				SPECIAL REQUIREMENTS FOR		
LICENSE NO.	NAME	DATE OF BIRTH		VISION	HEARING	OTHER
EQUIPMENT LICENSED TO OPERATE						
EQUIPMENT TYPE DATA				LICENSING DATA		
CRANE TYPE	CAPACITY	ATTACHMENT	TYPE OF CONTROL	ISSUING ACTIVITY	EXAMINER	DATE ISSUED	DATE REVOKED	EXPIRATION DATE	RENEWAL DATE	DATE OF PHYSICAL EXAM
NOTE: INFORMATION ON THIS FORM IS SUBJECT TO SAFEGUARD AND DISCLOSURE CONDITIONS OF THE PRIVACY ACT OF 1974.										

Figure 8-3: Crane Operator License Record

Section 9 Introduction

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

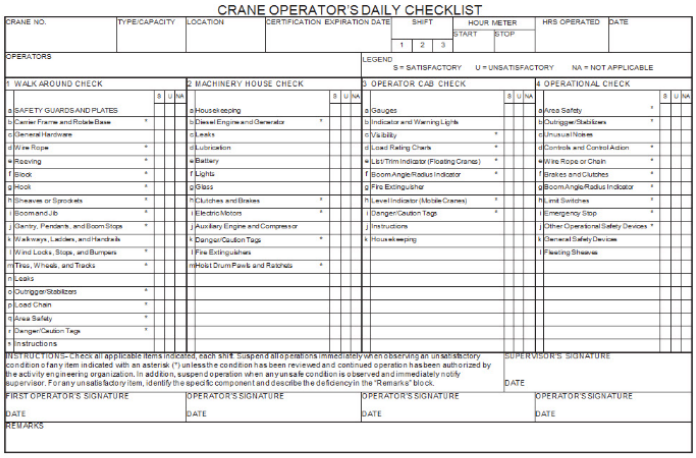


Operator Checks

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

Figure 9-1

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



CRANE OPERATOR'S DAILY CHECKLIST

CRANE NO.	TYPE/CAPACITY	LOCATION	CERTIFICATION EXPIRATION DATE	SHIFT 1 2 3	HOUR METER START	STOP	HRS OPERATED	DATE

OPERATORS

LEGEND S = SATISFACTORY U = UNSATISFACTORY NA = NOT APPLICABLE

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

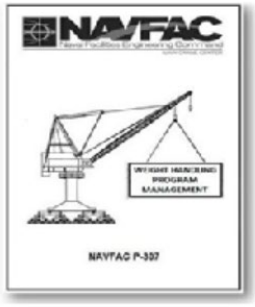
INSTRUCTIONS: Check all applicable items indicated, each shift. Suspend all operations immediately when observing an unsatisfactory condition of any item indicated with an asterisk (*) unless the condition has been reviewed and continued operation has been authorized by the activity engineering organization.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

SUPERVISOR'S SIGNATURE DATE

FIRST OPERATOR'S SIGNATURE DATE	OPERATOR'S SIGNATURE DATE	OPERATOR'S SIGNATURE DATE	OPERATOR'S SIGNATURE DATE

REMARKS

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

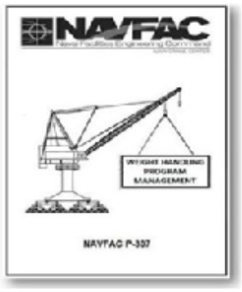


Section 10 Introduction

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

Operations

Topics covered in section 10 include: safety precautions, operating procedures, operational risk management (or ORM), crane teams, safety devices, assembly and disassembly requirements for cranes used in construction, complex lifts, lift preparations, communications, personnel lifts, adverse operating conditions, ground conditions, clearances, working around overhead power lines, and multi-purpose machines.



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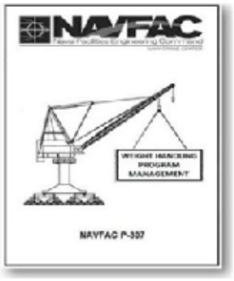
Section 13: Entertainment Hoists
Section 14: Rigging Gear and Miscellaneous Equipment

Section 11 Introduction

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

Non-Navy WHE

Section 11 provides detailed guidelines and requirements for contracts and contractors using non-Navy owned equipment to lift suspended loads at Navy shore activities. This includes cranes, multi-purpose machines, construction equipment, and rigging gear, as well as material handling equipment. Contained in Section 11 are contract requirements, contracting officer responsibilities, host activity responsibilities, and requirements for using rented or leased WHE.



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Section 12 Introduction

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

Section 12 Topics

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

Significant Accident

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

Crane Accident

For the purpose of this definition, it is assumed there is an "operating envelope" around any crane. The operating envelope consists of any of the following elements: the crane, the operator, the riggers, signal persons, and crane walkers, other personnel involved in the operation, the rigging gear between the hook and the load, the load, the crane's supporting structure, and the lift procedure. A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly during a crane operation, including operation during maintenance or testing, resulting in any of the following: personnel injury or death, material or equipment damage, dropped load, derailment, two-blocking, overload, and collision.

Note: The last five bullets: dropped load, derailment, two-blocking, overload, and collision are considered accidents even though no material damage or injury occurs.

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

Rigging Accident

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

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

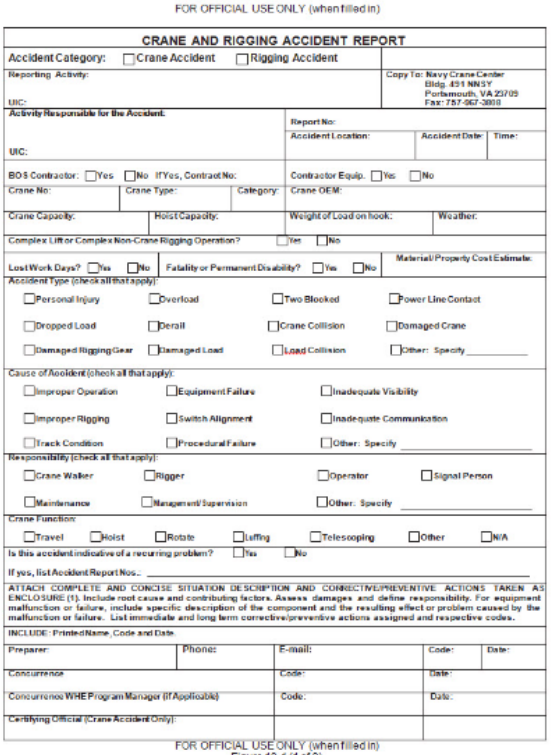
injury or death, material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function (This does not include superficial damage such as scratched paint, minor lagging damage, or normal wear on rigging gear), dropped load, two-blocking of cranes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

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

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

Figure 12-1

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



FOR OFFICIAL USE ONLY (when filled in)

CRANE AND RIGGING ACCIDENT REPORT

Accident Category: ☐ Crane Accident ☐ Rigging Accident

Reporting Activity:

UIC:

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

Activity Responsible for the Accident:

UIC:

Report No:

Accident Location: | Accident Date: | Time:

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

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

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

Complex Lift or Complex Non-Crane Rigging Operation? ☐ Yes ☐ No

Lost Work Days? ☐ Yes ☐ No | Fatality or Permanent Disability? ☐ Yes ☐ No | Material/Property Cost Estimate:

Accident Type (check all that apply):

☐ Personal Injury ☐ Overload ☐ Two Blocked ☐ Power Line Contact
☐ Dropped Load ☐ Derail ☐ Crane Collision ☐ Damaged Crane
☐ Damaged Rigging Gear ☐ Damaged Load ☐ Load Collision ☐ Other: Specify

Cause of Accident (check all that apply):

☐ Improper Operation ☐ Equipment Failure ☐ Inadequate Visibility
☐ Improper Rigging ☐ Switch Alignment ☐ Inadequate Communication
☐ Track Condition ☐ Procedural Failure ☐ Other: Specify

Responsibility (check all that apply):

☐ Crane Walker ☐ Rigger ☐ Operator ☐ Signal Person
☐ Maintenance ☐ Management/Supervision ☐ Other: Specify

Crane Function:

☐ Travel ☐ Hoist ☐ Rotate ☐ Luffing ☐ Telescoping ☐ Other ☐ N/A

Is this accident indicative of a recurring problem? ☐ Yes ☐ No

If yes, list Accident Report Nos.:

ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSURE (1). Include root cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions assigned and respective codes.

INCLUDE: Printed Name, Code and Date.

Preparer: | Phone: | E-mail: | Code: | Date:

Concurrence | Code: | Date:

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

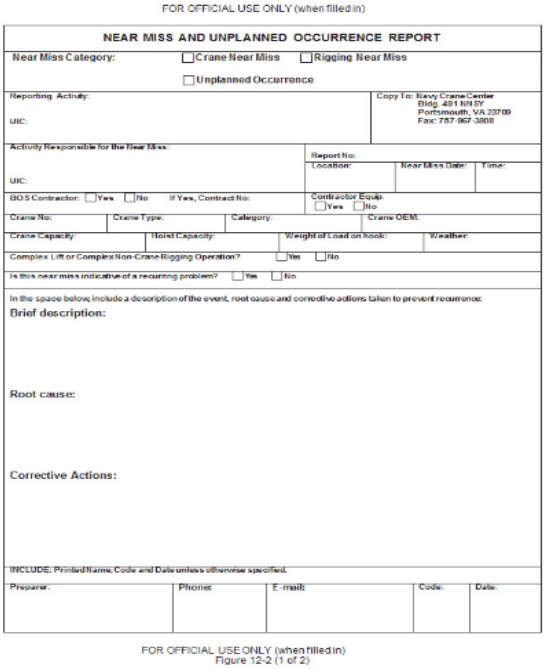
Certifying Official (Crane Accident Only):

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

Figure 12-1: Crane and Rigging Accident Report

Figure 12-2

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



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NEAR MISS AND UNPLANNED OCCURRENCE REPORT

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

Reporting Activity:

UIC:

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

Activity Responsible for the Near Miss:

UIC:

Report No:

Location: | Near Miss Date: | Time:

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

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

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

Complex Lift or Complex Non-Crane Rigging Operation? ☐ Yes ☐ No

Is this near miss indicative of a recurring problem? ☐ Yes ☐ No

In the space below, include a description of the event, root cause and corrective actions taken to prevent recurrence:

Brief description:

Root cause:

Corrective Actions:

INCLUDE: Printed Name, Code and Date unless otherwise specified.

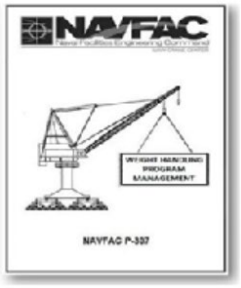
Preparer: | Phone: | E-mail: | Code: | Date:

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

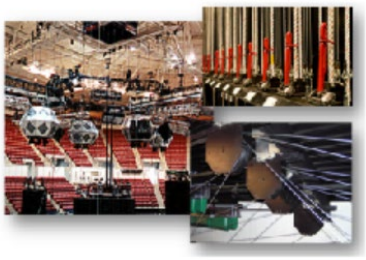
Figure 12-2: Near Miss and Unplanned Occurrence Report

Section 13 Introduction

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



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

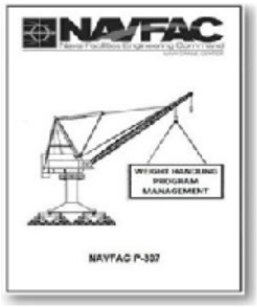


Entertainment Hoists

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

Section 14 Introduction

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



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

Gear and Equipment

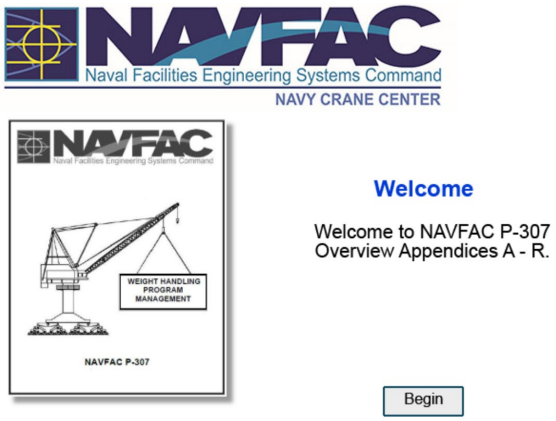
This section and the applicable portions of section 10 provide the minimum requirements for developing and maintaining a program for rigging gear and miscellaneous equipment, in other words, maintenance, inspection, and use of applicable gear, operational responsibilities and requirements, operational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

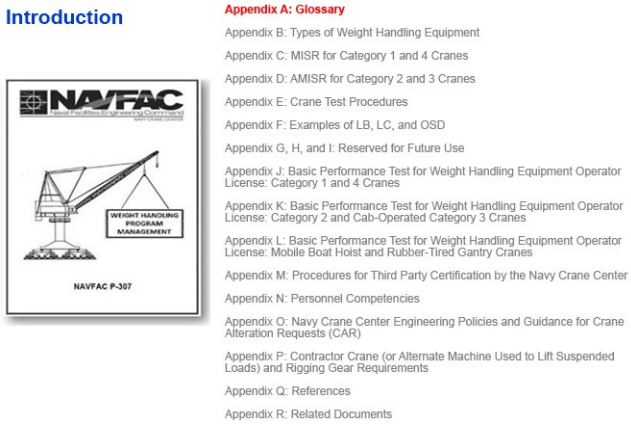
NOTES

NAVFAC P-307 OVERVIEW APPENDICES A-R

Welcome

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



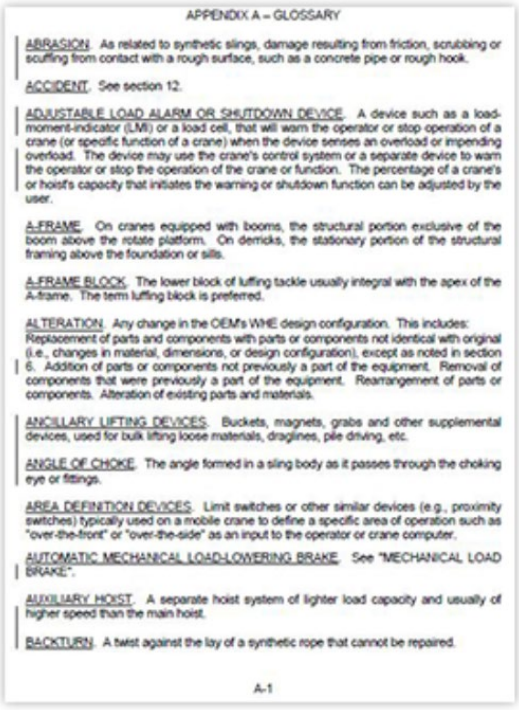


Introduction

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

Glossary

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



APPENDIX A – GLOSSARY

ABRASION. As related to synthetic slings, damage resulting from friction, scrubbing or scuffing from contact with a rough surface, such as a concrete pipe or rough hook.

ACCIDENT. See section 12.

ADJUSTABLE LOAD ALARM OR SHUTDOWN DEVICE. A device such as a load-moment-indicator (LMI) or a load cell, that will warn the operator or stop operation of a crane (or specific function of a crane) when the device senses an overload or impending overload. The device may use the crane's control system or a separate device to warn the operator or stop the operation of the crane or function. The percentage of a crane's or hoist's capacity that initiates the warning or shutdown function can be adjusted by the user.

A-FRAME. On cranes equipped with booms, the structural portion exclusive of the boom above the rotate platform. On derricks, the stationary portion of the structural framing above the foundation or sills.

A-FRAME BLOCK. The lower block of luffing tackle usually integral with the apex of the A-frame. The term luffing block is preferred.

ALTERATION. Any change in the OEM's WHE design configuration. This includes: Replacement of parts and components with parts or components not identical with original (i.e., changes in material, dimensions, or design configuration), except as noted in section 6. Addition of parts or components not previously a part of the equipment. Removal of components that were previously a part of the equipment. Rearrangement of parts or components. Alteration of existing parts and materials.

ANCILLARY LIFTING DEVICES. Buckets, magnets, grabs and other supplemental devices, used for bulk lifting loose materials, draglines, pile driving, etc.

ANGLE OF CHOKE. The angle formed in a sling body as it passes through the choking eye or fittings.

AREA DEFINITION DEVICES. Limit switches or other similar devices (e.g., proximity switches) typically used on a mobile crane to define a specific area of operation such as "over-the-front" or "over-the-side" as an input to the operator or crane computer.

AUTOMATIC MECHANICAL LOAD-LOWERING BRAKE. See "MECHANICAL LOAD BRAKE".

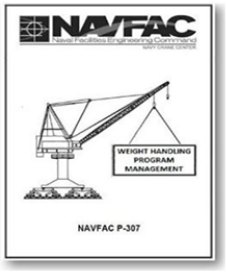
AUXILIARY HOIST. A separate hoist system of lighter load capacity and usually of higher speed than the main hoist.

BACKTURN. A twist against the lay of a synthetic rope that cannot be repaired.

A-1

Appendix B Introduction

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



Types of WHE

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

Test your understanding by correctly matching terms to the pictured cranes by writing the appropriate number for each crane pictured on the line adjacent to correct crane type.

A. ____ Mobile Boat Hoist

B. ____ Portal Crane

C. ____ Commercial Truck-Mounted Articulating Boom Crane

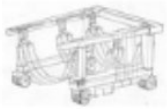
D. ____ Jib Crane

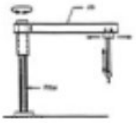
E. ____ Rubber-Tired Gantry Crane

F. ____ Pillar Jib Crane

1)


2)


3)


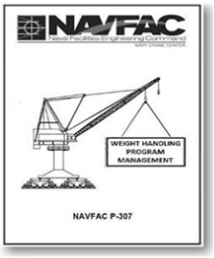
4)


5)


6)

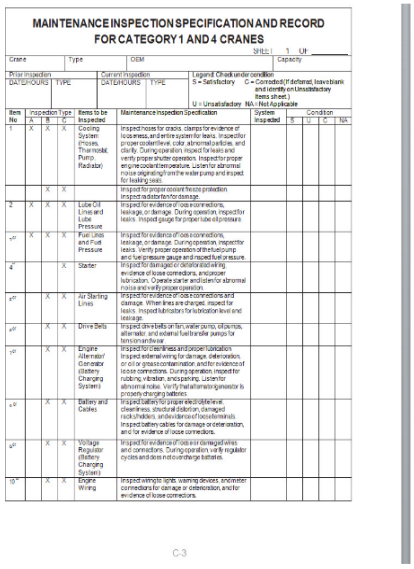

Appendix C and D Introduction

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



MISR

Appendix C contains the Maintenance Inspection Specification and Record for category 1 and 4 cranes. This document is commonly referred to by the acronym MISR and is pronounced “mizer”. You can see in the illustration a sample of the many items that must be inspected, the manner or specification in which to perform the inspection, and the acceptance criteria to be used. Local variations of this document may be developed. See section 3 for additional inspection details.



MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 AND 4 CRANES

C-3

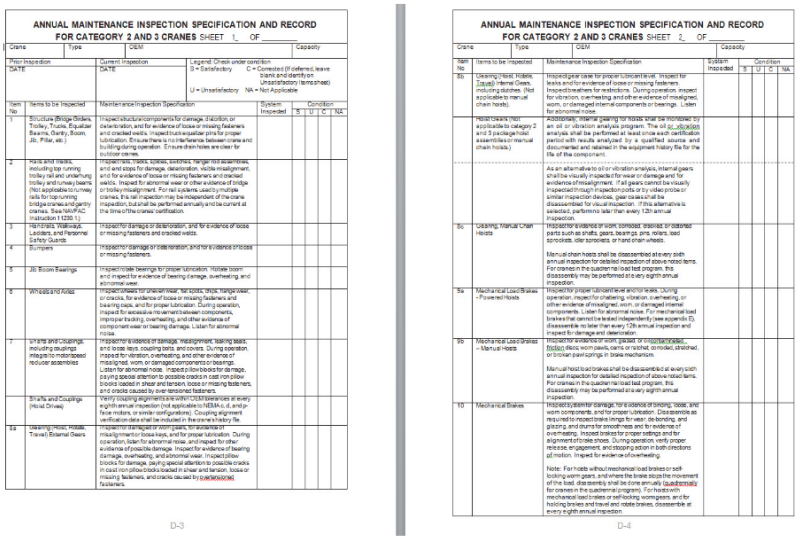
MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 AND 4 CRANES

C-4

Appendix C: Maintenance Inspection Specification and Record (MISR)

AMISR

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



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

Crane | Type | OEM | Capacity

Prior Inspection DATE | Current Inspection DATE | 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.					
2	Rails and Tracks, including top running trolley rail and underhung trolley and runway beams (Not applicable to runway rails for top running bridge cranes and gantry cranes. See NAVFAC Instruction 11230.1)	Inspect rails, tracks, splices, switches, hanger rod assemblies, and end stops for damage, deterioration, visible misalignment, and for evidence of loose or missing fasteners and cracked welds. Inspect for abnormal wear or other evidence of bridge or trolley misalignment. For rail systems used by multiple cranes, this rail inspection may be independent of the crane inspection, but shall be performed annually and be current at the time of the cranes certification.					
3	Handrails, Walkways, Ladders, and Personnel Safety Guards	Inspect for damage or deterioration, and for evidence of loose or missing fasteners and cracked welds.					
4	Bumpers	Inspect for damage or deterioration, and for evidence of loose or missing fasteners.					
5	Jib Boom Bearings	Inspect noted bearings for proper lubrication. Rotate boom and inspect for evidence of bearing damage, overheating, and abnormal wear.					
6	Wheels and Axles	Inspect wheels for abnormal wear, flat spots, shims, hanger 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.					
7	Drums 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 drive blocks for damage, paying special attention to possible cracks in cast iron pillow blocks cracked in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.					
	Shafts and Couplings (Hoist Drives)	Verify coupling alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA C, d, and p-face motors, or similar configurations). Coupling alignment verification data shall be included in the crane's history file.					
8a	Gearing (Hoist, Hoists, 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 cracked in shear and tension, loose or missing fasteners, and cracks caused by overstressed fasteners.					

D-3

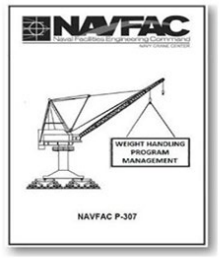
ANNUAL MAINTENANCE INSPECTION SPECIFICATION AND RECORD FOR CATEGORY 2 AND 3 CRANES SHEET 2 OF

Crane | Type | OEM | Capacity

Item No	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	U	C	NA
8b	Gearing (Hoist, Hoists, Travel) Internal Gears, including clutches. (Not applicable to manual chain hoists).	Inspect gear case for proper lubrication 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.					
	Hoist Chains (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. 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, performance later than every 12th annual inspection.					
8c	Gearing, Manual Chain Hoists	Inspect for evidence of worn, corroded, cracked, or distorted parts such as shafts, gears, bearings, pins, rollers, load sprockets, idler sprockets, or hand chain wheels. Manual chain hoists shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					
9a	Mechanical Load Brakes – Powered Hoists	Inspect for proper lubrication level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise. For mechanical load brakes that cannot be tested independently (see appendix D), disassemble no later than every 12th annual inspection and inspect for damage and deterioration.					
9b	Mechanical Load Brakes – Manual Hoists	Inspect for evidence of worn, glazed, or impacted disks, friction discs, worn pawls, cams, or ratchet, corroded, stretched, or broken pawl springs in brake mechanism. Manual hoist load brakes shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smooth-ness and for evidence of overheating. Inspect brakes for proper settings and the 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 hoisting brakes and travel and rotate brakes, disassemble at every eighth annual inspection					

D-4

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



Appendix A: Glossary

Appendix B: Types of Weight Handling Equipment

Appendix C: MISR for Category 1 and 4 Cranes

Appendix D: AMISR for Category 2 and 3 Cranes

Appendix E: Crane Test Procedures

Appendix F: Examples of LB, LC, and OSD

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

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

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

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

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

Appendix N: Personnel Competencies

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

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

Appendix Q: References

Appendix R: Related Documents

Appendix E Intro

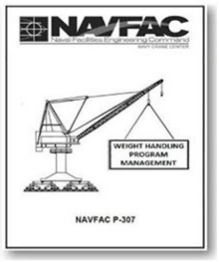
NAVFAC P-307, Appendix E provides crane test procedures. Because of the various makes and models of cranes in the Navy’s inventory, it is not possible to include specific tests for each individual crane or component, and some tests may not be applicable. All applicable tests shall be performed, and activities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

Appendix E Test Procedures

In addition to load test prerequisites and precautions, Appendix E provides inspection and test requirements for: hook assemblies, insulated links, duplex hooks with shackle pin holes, portal cranes, floating cranes, tower cranes, hammerhead cranes, mobile cranes, aircraft crash cranes, rubber-tired gantry cranes, category 4 cranes, bridge and overhead traveling cranes, wall cranes, gantry, semi-gantry and cantilever gantry cranes, portable gantry/A-frames with permanently mounted hoists, jib, pillar, and pillar-jib cranes, monorail cranes, davits, fixed overhead hoists, and mobile boat hoists.

Appendix F Intro

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



LB, LC, or OSD

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

A. ____ Hook

B. ____ Radius Indicator

C. ____ Travel Gear Shafts

D. ____ Hoist Drive Train Components

E. ____ Rotate Electric Brakes

F. ____ Overload Indicator with Shutdown Capability

G. ____ Upper Hoist Limit Switch

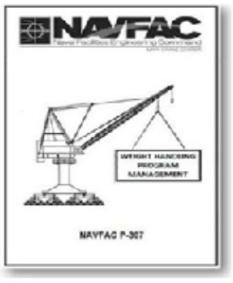
1) Load Bearing Part

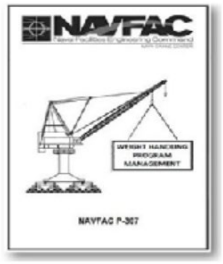
2) Load Controlling Part

3) Operational Safety Device

Appendix G, H, and I

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





Appendix A: Glossary
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Appendix P: Contractor Crane (or Alternate Machine Used to Lift Suspended Loads) and Rigging Gear Requirements
Appendix Q: References
Appendix R: Related Documents

Appendix J, K, and L Intro

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

Performance Tests

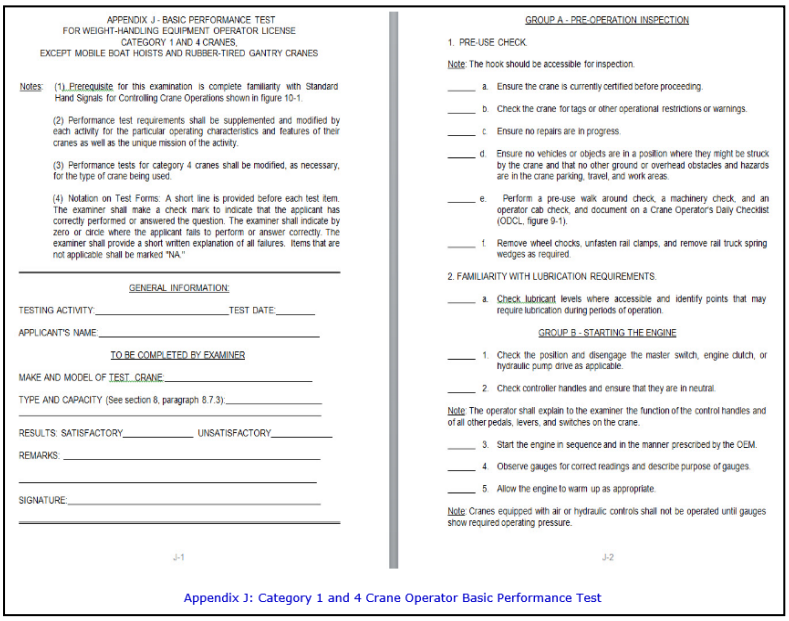
Appendix J contains the basic performance test requirements and instructions for applicants of category 1 and 4 crane licenses.

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

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

Cat 1 and 4 PT

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



APPENDIX J - BASIC PERFORMANCE TEST
FOR WEIGHT-HANDLING EQUIPMENT OPERATOR LICENSE
CATEGORY 1 AND 4 CRANES,
EXCEPT MOBILE BOAT HOISTS AND RUBBER-TIRED GANTRY CRANES

Notes: (1) Prerequisite for this examination is complete familiarity with Standard Hand Signals for Controlling Crane Operations shown in figure 10-1.

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

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

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

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

TYPE AND CAPACITY (See section 8, paragraph 8.7.3):_____

RESULTS: SATISFACTORY_____ UNSATISFACTORY_____

REMARKS: _____

SIGNATURE:_____

J-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK.

Note: The hook should be accessible for inspection.

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

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

_____ c. Ensure no repairs are in progress.

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

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

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

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

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

GROUP B - STARTING THE ENGINE

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

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

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

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

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

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

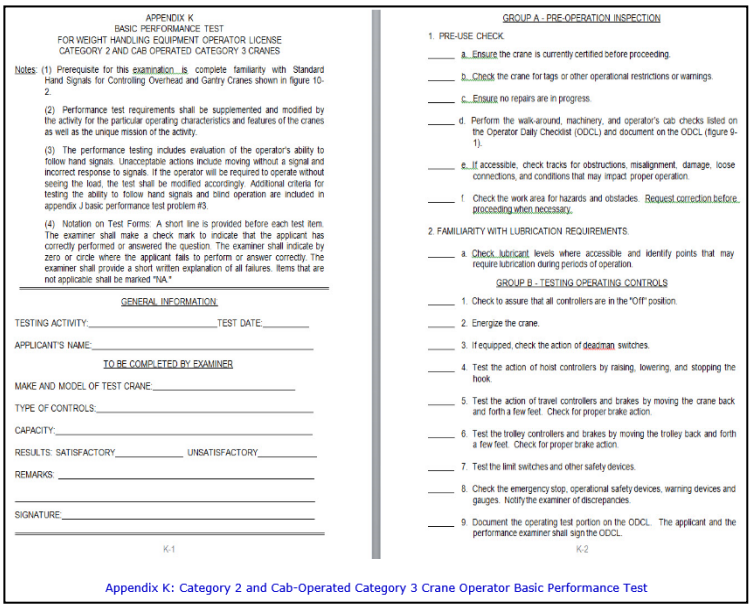
Note: Cranes equipped with air or hydraulic controls shall not be operated until gauges show required operating pressure.

J-2

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

Cat 2 and 3 PT

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



APPENDIX K
BASIC PERFORMANCE TEST
FOR WEIGHT HANDLING EQUIPMENT OPERATOR LICENSE
CATEGORY 2 AND CAB OPERATED CATEGORY 3 CRANES

Notes: (1) Prerequisite for this examination is complete familiarity with Standard Hand Signals for Controlling Overhead and Gantry Cranes shown in figure 10-2.

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

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

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

GENERAL INFORMATION

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

TYPE OF CONTROLS:_____

CAPACITY:_____

RESULTS: SATISFACTORY_____ UNSATISFACTORY_____

REMARKS: _____

_____

SIGNATURE:_____

K-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK.

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

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

_____ c. Ensure no repairs are in progress.

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

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

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

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

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

GROUP B - TESTING OPERATING CONTROLS

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

_____ 2. Energize the crane.

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

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

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

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

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

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

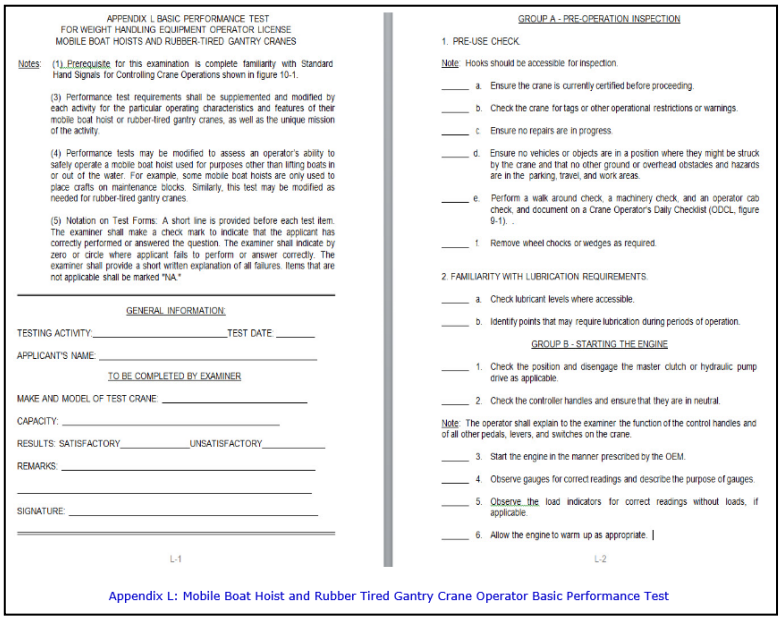
_____ 9. Document the operating test portion on the ODCL. The applicant and the performance examiner shall sign the ODCL.

K-2

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

MBH and RTG PT

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



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

Notes: (1) Prerequisite for this examination is complete familiarity with Standard Hand Signals for Controlling Crane Operations shown in figure 10-1.

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

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

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

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE: _____

APPLICANT'S NAME: _____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE: _____

CAPACITY: _____

RESULTS: SATISFACTORY_____UNSATISFACTORY_____

REMARKS: _____

_____

SIGNATURE: _____

L-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK.

Note: Hooks should be accessible for inspection.

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

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

_____ c. Ensure no repairs are in progress.

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

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

_____ f. Remove wheel chocks or wedges as required.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

_____ a. Check lubricant levels where accessible.

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

GROUP B - STARTING THE ENGINE

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

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

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

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

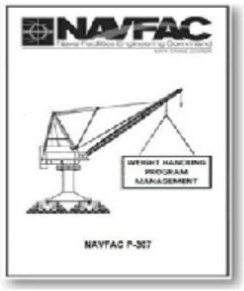
_____ 4. Observe gauges for correct readings and describe the purpose of gauges.

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

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

L-2

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



Appendix M Intro

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

Appendix M Forms

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

NAVFAC
Naval Facilities Engineering Command
NAVY CRANE CENTER

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

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

Certificate No.:

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

Radius	Proof Loads (TEST LOAD)	Rated Loads

   Means of application of proof load:
   Basis for assigned load ratings:
6. Remarks and/or limitations imposed:
7. Load indicating or limiting device (check): Fitted _____ Not fitted _____ Accuracy per:

I certify that on the ___ day of _____, 20___, the above described device was (tested and examined) (examined) by the undersigned or his/her authorized representative; that said (test and examination) (examination) met in all respects with the requirements of NAVFAC P-307, an OSHA approved alternate standard for compliance with the provisions of 29 CFR Part 1919; any deficiencies considered to constitute an unsatisfactory condition have been corrected; and that the device has been found to be in compliance in all applicable respects with the governing requirements.

Name and address of accredited or otherwise authorized organization making the test and/or examination: Navy Crane Center, Bldg 491 NNSY, Portsmouth, VA 23709.

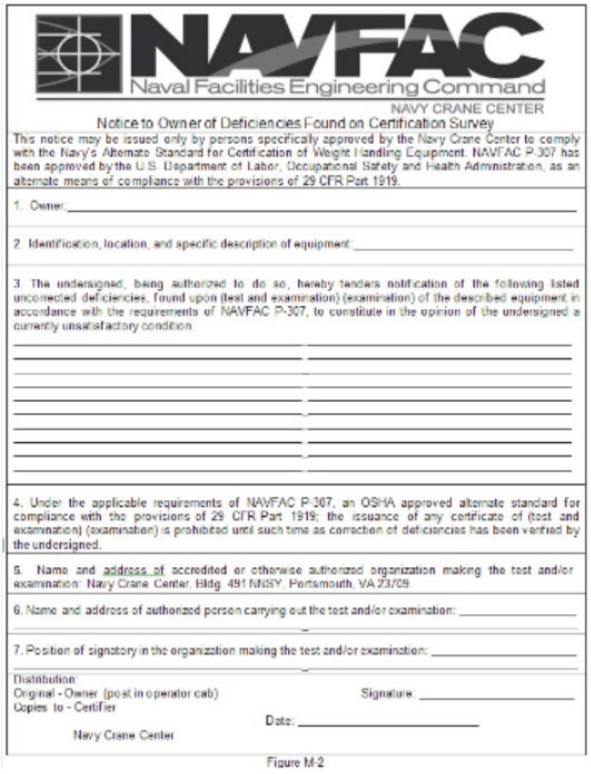
Name and address of authorized person carrying out the test and/or examination: _____

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

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

Signature: _____
Date: _____

Figure M-1



NAVFAC
Naval Facilities Engineering Command
NAVY CRANE CENTER

Notice to Owner of Deficiencies Found on Certification Survey

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

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

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

Signature: _____
Date: _____

Figure M-2

Appendix N Intro

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

Competencies

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

Appendix N: Personnel Competencies

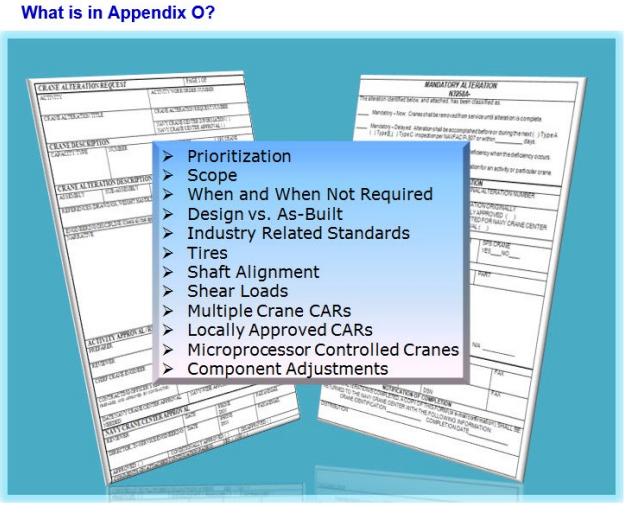
- Maintenance Personnel: Mechanic and Electrician
- Inspector
- Load Test Director
- Operator of Non-Cab Operated Category 3 WHE
- Rigger
- Crane Walker
- Crane Signal Person
- Operator Supervisor
- Rigger Supervisor
- Maintenance Mechanic/Electrician, Inspector, and Load Test Director Supervisor
- Engineer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

Appendix O Intro

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

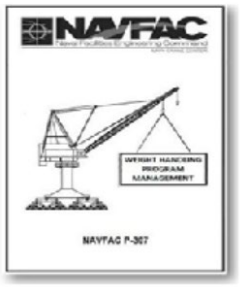
Appendix O Topics

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



Appendix P Intro

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



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

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

CERTIFICATE OF COMPLIANCE

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

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

I certify that

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

COMPANY OFFICIAL SIGNATURE	DATE
COMPANY OFFICIAL NAME/TITLE	

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

Figure P-1

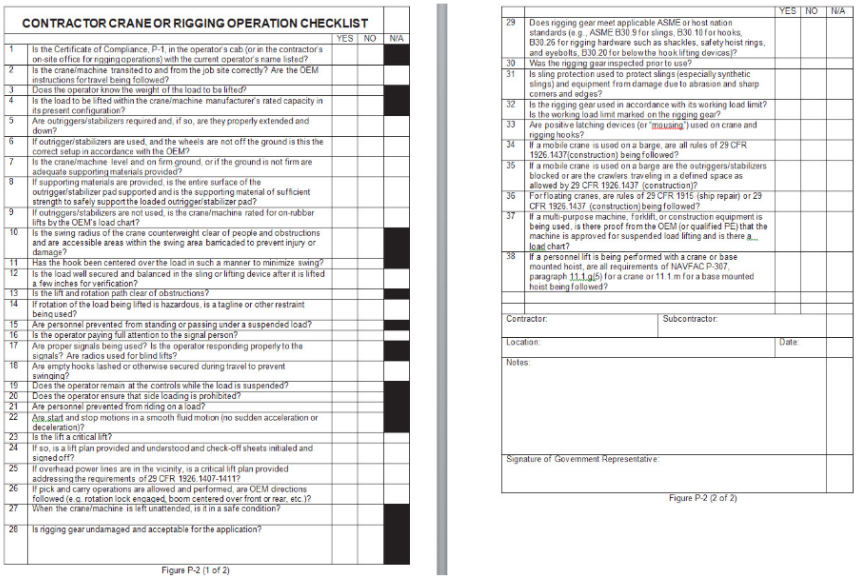
Figure P-1: Certificate of Compliance

Figure P-1

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

Figure P-2

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



CONTRACTOR CRANE OR RIGGING OPERATION CHECKLIST

		YES	NO	N/A
1	Is the Certificate of Compliance, P-1, in the operator's cab (or in the contractor's on-site office for rigging operations) with the current operator's name listed?			
2	Is the crane/machine transited to and from the job site correctly? Are the OEM instructions for travel being followed?			
3	Does the operator know the weight of the load to be lifted?			
4	Is the load to be lifted within the crane/machine manufacturer's rated capacity in its present configuration?			
5	Are outriggers/stabilizers required and, if so, are they properly extended and down?			
6	If outrigger/stabilizers are used, and the wheels are not off the ground is this the correct setup in accordance with the OEM?			
7	Is the crane/machine level and on firm ground, or if the ground is not firm are adequate supporting materials provided?			
8	If supporting materials are provided, is the entire surface of the outrigger/stabilizer pad supported and is the supporting material of sufficient strength to safely support the loaded outrigger/stabilizer pad?			
9	If outriggers/stabilizers are not used, is the crane/machine rated for on-rubber lifts by the OEM's load chart?			
10	Is the swing radius of the crane counterweight clear of people and obstructions and are accessible areas within the swing area barricaded to prevent injury or damage?			
11	Has the hook been centered over the load in such a manner to minimize swing?			
12	Is the load well secured and balanced in the sling or lifting device after it is lifted a few inches for verification?			
13	Is the lift and rotation path clear of obstructions?			
14	If rotation of the load being lifted is hazardous, is a tagline or other restraint being used?			
15	Are personnel prevented from standing or passing under a suspended load?			
16	Is the operator paying full attention to the signal person?			
17	Are proper signals being used? Is the operator responding properly to the signals? Are radios used for blind lifts?			
18	Are empty hooks lashed or otherwise secured during travel to prevent swinging?			
19	Does the operator remain at the controls while the load is suspended?			
20	Does the operator ensure that side loading is prohibited?			
21	Are personnel prevented from riding on a load?			
22	Are start and stop motions in a smooth fluid motion (no sudden acceleration or deceleration)?			
23	Is the lift a critical lift?			
24	If so, is a lift plan provided and understood and check-off sheets initialed and signed off?			
25	If overhead power lines are in the vicinity, is a critical lift plan provided addressing the requirements of 29 CFR 1926.1407-1411?			
26	If pick and carry operations are allowed and performed, are OEM directions followed (e.g. rotation lock engaged, boom centered over front or rear, etc.)?			
27	When the crane/machine is left unattended, is it in a safe condition?			
28	Is rigging gear undamaged and acceptable for the application?			

Figure P-2 (1 of 2)

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

Contractor: Subcontractor:

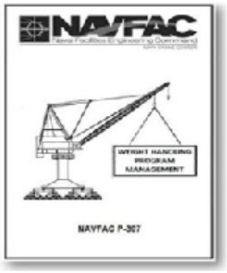
Location: Date:

Notes:

Signature of Government Representative:

Figure P-2 (2 of 2)

Figure P-2: Contractor Crane or Rigging Operation Checklist



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Appendix Q: References
Appendix R: Related Documents

Appendices Q and R Intro

NAVFAC P307, Appendix Q, "References" and Appendix R, "Related Documents" provide lists of documents, manuals, instructions, publications, and standards, either directly referenced in the manual (Appendix Q) or related to the subject matter of the manual (Appendix R).

References and Documents

Appendix Q identifies the 83 military, federal, industry, and consensus standards referenced in the manual. Appendix R provides a list of standards and guides that provide additional weight handling related information.

Appendixes Q and R: References and Related Documents

Appenx Q Examples:
- United Facilities Criteria 3-320-07N, Weight Handling Equipment
- NAVFAC Instruction 11230.0, Inspection, Certification, and Audit of Crane Railroad Trackage
- NAVAIR 00-80T-119, Weight Handling Equipment Support Manual
- EM 385-1-1, Safety and Health Requirements Manual
- Motor Carrier Safety Regulation 49 CFR Part 391, Sections 41-43, Physical Qualifications and Examinations

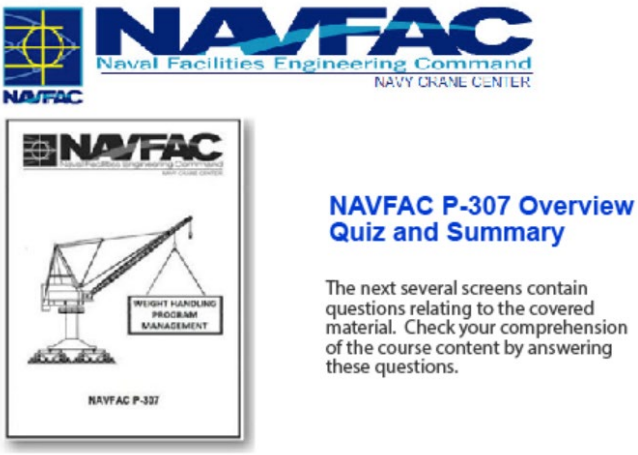
Appenx R Examples:
- Bob's Rigging and Crane Handbook
- Handbook for Riggers, Mobile Craning Today
- OPNAV Instruction 5450.348, Mission, Functions and Tasks of the Naval Facilities Engineering Command
- Wire Rope Users Manual
- Naval Ships' Technical Manual S9086-T4-STM-010, Chapter 589, Cranes

NOTES

NAVFAC P-307 OVERVIEW QUIZ AND SUMMARY

Welcome

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.



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

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

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

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

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

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

4. **Select the best answer.** NAVFAC P-307 Sections 3, 4, and 5 provide information on which topics?

A. performance testing for category 1, 2, and 3 crane operators
B. inspection, maintenance, certification
C. operations, operator inspections, operator licensing
D. alterations, engineering policies, technical advisories

5. **Select the best answer.** The crane identification number, certified capacity, and certification expiration date must be posted on or near the crane.

A. True
B. False

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

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

7. **Select the best answer to fill in the blank.** The purpose of the _____ is to ensure by controlled operation with prescribed test loads that the equipment is capable of safely lifting and moving the rated load through all design motions.

A. load test
B. condition inspection
C. maintenance inspection
D. ODCL

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

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

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

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

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

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

11. **Match the following.** Correctly identify each item as either a load bearing component, a load controlling component, or an operational safety device by writing the appropriate number on the line adjacent to that item.

A. ____ Load Block

B. ____ Locking Devices

C. ____ Rotate Drive Keys

D. ____ Truck Axles/Wheels

E.____ Travel Electric Brakes

F. ____ Proximity Switch

G. ____ Drum Hoist

H. ____ Luffing Hoist Limit Switch

1. Load Bearing Part

2. Load Controlling Part

3. Operational Safety Device

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


CERTIFICATE OF COMPLIANCE

POST ON CRANE (OR ALTERNATE MACHINE)

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

13. **Select the best answer.** NAVFAC P-307 provides guidance to shore based naval activities for weight handling equipment program management.

A. True
B. False

14. **Select the best answer**. Non-cab operated category 3 cranes require a license to operate.

A. True
B. False

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

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

16. **Matching**

Assign the correct NAVFAC P-307 crane category to the pictured items by writing the appropriate number on the line adjacent to the picture.

A. ____ 

B. ____ 

C. ____ 

D. ____ 

E. ____ 

F. ____ 

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

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

A. AMISR
B. MISR
C. CCIR
D. RCDR

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

A. The crane two-blocks
B. A mobile crane is configured for transit
C. Personnel injury or death occurs
D. Material or equipment is damaged
E. A load is dropped
F. A component fails with no other damage occurring
G. An overload occurs

19. **Select the best answer to fill in the blank.** Section _____ of NAVFAC P-307 provides a list of the various documents that must be kept in the history file, as well as the lengths of time they must be retained.

A. 5
B. 3
C. 2
D. 7

20. **Select the best answer to fill in the blank.** NAVFAC P-307 appendix N provides a list of _____ that personnel must satisfy prior to performing assigned weight handling duties in the noted positions.

A. personnel competencies
B. training qualifications
C. performance exams
D. examinations

21. **Select the best answer.** The Appendix B glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307.

A. True
B. False

22. **Matching.** Assign the correct crane type to the pictured crane by writing the correct number or crane type adjacent to the picture.

A. ____ 

B. ____ 

C. ____ 

D. ____ 

E. ____ 

1. Mobile Boat Hoist
2. Bridge Crane
3. Rubber-Tire Gantry Crane
4. Portal Crane
5. Commercial Truck Mounted Crane

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

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

24. **Select the best answer.** A Navy Crane Center third party certifier would use which of the listed forms to inform the crane owner of uncorrected deficiencies found on the crane?

A. Figure M-2: Notice to Owner of Deficiencies Found on the Certification Survey
B. Figure M-1: Certificate of Unit Test and Examination
C. Appendix E: Crane Test Procedures

25. **Select the best answer to fill in the blank.** A significant accident is an accident that typically has a greater potential to result in _____.

A. serious injury or substantial property damage
B. crane component failure
C. rigging equipment damage
D. voiding of crane certification

Summary

During this overview you were exposed to all the sections, appendices, and forms found in the NAVFAC P307 manual along with a brief explanation of each one. Your understanding of this manual includes: its purpose and scope, the types of equipment covered, load bearing, load controlling and operational safety devices, training, competency and licensing requirements, information on working with contractors, various tables and figures, and how to obtain support and assistance from Navy Crane Center. Now that you have completed this brief introduction, you are encouraged to learn more about the Navy's weight handling program by mentoring, shadowing or simply listening to more experienced program personnel. You can also go to the Navy Crane Center's web page where you can download a copy of NAVFAC P307, review and print crane safety advisories, equipment deficiency memorandums, RCDRs, safety and training briefs, and other forms and figures. Above all, be ever vigilant, situationally aware, and stay safe at all times, not only for yourself but for all your teammates as well. The following screen provides contact information and is the final screen in this overview. Thank you for taking the time to learn more about NAVFC P307 and the Navy's Weight Handling Program.

Contact

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

Navy Crane Center General and Contact Information

Director (Attn: xxx)
Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709
General Phone: 757-967-3803, DSN: 387, Fax: 757-967-3808

Headquarters: Portsmouth, VA

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

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

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

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

- NAVFAC P-307 (NAVFAC_NCC_P307@us.navy.mil)
- CSAs, EDMs, Safety Messages (NAVFAC_NCC_CSA@us.navy.mil)
- Training (NAVFAC_NCC_TRAINING@us.navy.mil)
- Alterations (NAVFAC_NCC_CRANEALT@us.navy.mil)
- Crane Corner Articles, Reports, Safety Videos, Accident Prevention, Safety Briefs, Orther Links & Information

NOTES

LTD CERTIFICATION PROGRAM OVERVIEW

Welcome

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

Introduction

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

Learning Objectives

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

Personnel

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

Terminology

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

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

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

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

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

Load Test Purpose

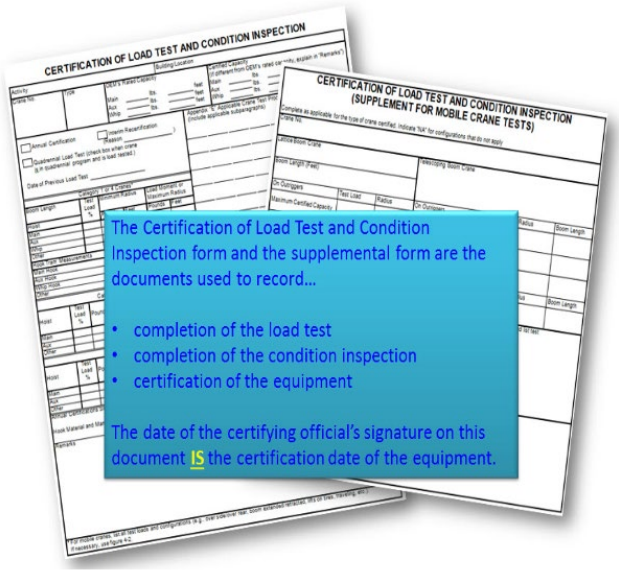
Load tests of Navy weight handling equipment are performed in accordance with NAVFAC P-307 requirements. Refer to Section 4 and Appendix E. The purpose of the load test is to ensure by controlled operation with prescribed test loads that the equipment is capable of safely lifting and moving the rated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

Condition Inspection Purpose

Condition inspections are performed before, during and after the load test in accordance with NAVFAC P-307 requirements. Refer to Section 4 and Appendix E. The purpose of the condition inspection is to ensure that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

Certification

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



The Certification of Load Test and Condition Inspection form, and if needed, the supplemental form for mobile crane tests, are used to document the satisfactory completion of certification actions.

The Certification of Load Test and Condition Inspection form shall be signed by the load test director, condition inspectors, and the certifying official.

The date of the certifying official's signature IS the certification date of the equipment. The certification is valid for one year from the date of the signature of the certifying official.

The certification expiration date shall be one day prior to the anniversary date of the certification. The crane may remain in service on the expiration date. A card or tag with the crane identification number, certified capacity, and the certification expiration date shall be posted in a conspicuous location on or near the crane, for example: on the controller, on the power supply, in the cab, or on the jib column. See NAVFAC P-307, paragraphs 4.3, 4.4 and 4.5 for details and exceptions.

Recertification

Except when an annual certification expires, in which case a new annual certification is required, an interim recertification is required whenever the annual certification is voided.

Recertification may differ from certification, especially when changes are made to crane components during the annual certification period. If these changes void the crane's current certification, an interim recertification is required.

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

Load Test

Listed here are five events that require a load test. The acceptance of newly procured cranes; the annual certification for category 1 and 4 cranes; every fourth annual certification for category 2 and 3 cranes in the quadrennial load test program; an inadvertent overload which exceeds 125% of a crane's certified capacity (or 105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber-tired gantry cranes, and category 4 cranes); and when an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed. See NAVFAC P-307, paragraphs 4.4, 4.5 and 4.7 for details and exceptions.

Selective Load Test

A deficiency, adjustment, alteration, etc., to one function will not necessarily void the entire crane certification provided the affected function is appropriately tagged and, if practical, made non-operational. Selective load testing affords the opportunity to test a single component or system in lieu of testing the entire crane thereby allowing other portions of the crane to remain unaffected. To determine if a load test is required, the component's impact on holding strength shall be assessed. If holding strength could be affected by the work performed then a selective inspection, load test, and recertification shall be performed. The extent of the inspection and testing may be limited, where practical, to those parts and components of systems affected, but shall fully ensure that the adjustment, repair, disassembly, replacement, or alteration has been performed correctly and that the crane operates properly. When load tests are performed, they shall include the applicable portions of both the static and dynamic tests of Appendix E. See NAVFAC P-307, paragraphs 4.4 and 4.5 for additional information.

Knowledge Check

Check your comprehension of the course content by answering these questions.

1. **Select the best answer to fill in the blank.** The _____ ensures that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

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

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

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

3. **Select the best answer to fill in the blank**. The _____ directs the load test and ensures that it is performed safely and in accordance with NAVFAC P-307 requirements.

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

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

A. True
B. False

5. **Select the best answer to fill in the blank.** The purpose of the _____ is to ensure the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

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

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

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

7. **Select the best answer.** Of all the Navy's cranes, only category 1 and 4 cranes (all types and capacities) need to be inspected, tested, and certified every year.

A. True
B. False

8. **Select the best answer.** When the repair or replacement of a load bearing part requires a load test for verification of satisfactory work performed, an interim load test is required.

A. True
B. False

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

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

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

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

Summary

Congratulations. You've completed the Certification Program Overview training module. This module introduced two primary activities of the Navy's crane certification program: inspection and testing. It explained the purpose of inspection and testing and introduced the personnel and paperwork associated with these activities which include: the certifying official who is responsible for safe reliable cranes; the load test director who oversees safe load testing of cranes; and the condition inspector who ensures equipment is in satisfactory condition. Equipment inspections, tests, and certifications are documented using the Crane Condition Inspection Record and the Certification of Load Test and Condition Inspection form. A deficiency, repair or modification to one component or system does not mean that all systems need to be recertified. Selective inspection, testing and recertification may be employed by following the requirements listed in NAVFAC P-307, Section 4. Next, you will be introduced to the team members that carry out the duties required to support the test, inspection and certification program. The next module will cover the qualifications and responsibilities of the load test director and the other load test team members.

NOTES

LTD QUALIFICATIONS AND RESPONSIBILITIES

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Qualifications and Responsibilities. This module describes the basic qualification requirements and responsibilities for personnel performing Navy WHE load tests.

Welcome

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

This module describes the basic qualification requirements and responsibilities for personnel performing Navy WHE load tests.

Learning Objectives

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

LTD Qualifications

Load test directors shall possess the knowledge and experience relevant to a particular crane's operations, component functions, and its maintenance and test procedures to competently load test that crane.

They shall understand the duties and responsibilities of all other test team members. A load test director's qualification is a function of the local activity or command.

As a minimum, test directors shall satisfy the training and competency requirements outlined in NAVFAC P-307, Section 7 and Appendix N. Additional training, such as OEM schools, vendor training, or locally developed competency attributes specific to an activity's equipment and processes should be considered.

Test Directors shall be designated in writing by the certifying official to oversee and direct load tests.

Refer to NAVFAC
P-307, Sections 4, 7, and Appendix N for additional information.

LTD Responsibilities

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

Condition Inspector

The condition inspector assists the test director by inspecting the current condition of safety devices, electrical components, mechanical equipment, and structural assemblies before, during, and after the load test.

The inspector documents these findings on a Crane Condition Inspection Record, or CCIR. Observed defects critical to continued testing are reported immediately to the test director, who shall suspend testing until the deficiency is corrected. The condition inspector(s) will stop operations whenever safety becomes a concern.

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

Condition inspectors are designated in writing by the certifying official to perform condition inspections.

Crane Operator

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

Rigger

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

Crane Walker

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

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select all that apply.** The test director's qualifications include…

A. Completing NAVFAC P-307 training requirements
B. Possessing specific crane knowledge and experience
C. Understanding all team member duties
D. Written designation to oversee load tests
E. An ASME B30 certification
F. Being a licensed crane operator

2. **Select all that apply.** The test director's responsibilities include…

A. Conducting the pre-test briefing
B. Painting a yellow circle around the test area
C. Adequate and proper communications
D. Coordinating social activities
E. Proper weight calculations and rigging gear selections
F. Planning, directing, and controlling the load test

3. **Select the best answer.** Which of the following personnel inspects crane systems and components before, during, and after the load test?

A. Rigger
B. Condition Inspector
C. Crane Walker
D. Operator
E. Test Director

4. **Select the best answer.** What is the crane operator's primary responsibility?

A. ODCL
B. Safe operation of the crane
C. Performance testing
D. Placing rigging gear on the crane hook
E. Mentoring

5. **Select the best answer.** The load test director has the overall responsibility for the load test.

A. True
B. False

6. **Select all that apply.** Which of the following personnel must be designated in writing to perform their duties?

A. Test Director
B. Rigger
C. Crane Operator
E. Condition Inspector
F. Crane Walker

7. **Select the best answer to fill in the blank.** Load test inspection results are documented on the _____.

A. CCIR
B. MISR
C. AMISR
D. RCDR

8. **Select the best answer.** The rigger is solely responsible for calculating the test weight load, and for selecting, inspecting, and configuring the rigging gear and the test load used during the load test.

A. True
B. False

9. **Match the following**. Correctly identify each job responsibility to the position by writing the appropriate number or position adjacent to that responsibility.

A. ____ Observes safety, mechanical, electrical, and structural components

B. ____ Ensures safe travel of the crane

C. ____ Coordinates the activities of team members

D. ____ Signals the crane operator

1. Test Director
2. Condition Inspector
3. Rigger
4. Crane Walker

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

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

Summary

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

NOTES

LTD PRE-TEST PREPARATIONS

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Pre-Test Preparations. This module describes pre-test planning, including actions to be taken and concerns that should be resolved prior to conducting a load test on a Navy crane.

Welcome

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

This module describes pre-test planning, including actions to be taken and concerns that should be resolved prior to conducting a load test on a Navy crane.

Learning Objectives

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

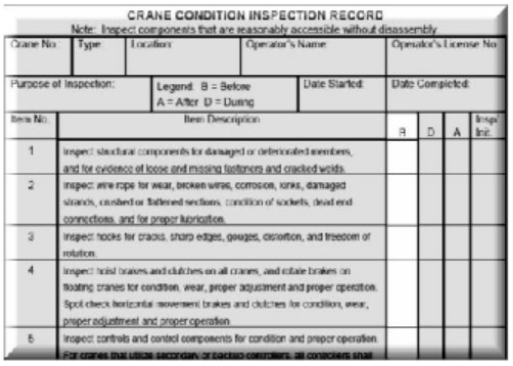
Research Documentation

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

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

Condition Inspection

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



CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.

Purpose of Inspection:	Legend: B = Before A = After D = During	Date Started:	Date Completed:

Item No.	Item Description	B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall				

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

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

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Purpose of Inspection:	Legend: B = Before A = After D = During	Date Started:	Date Completed:

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4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a switch is set for dry dock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)		■	■	
8	If a load test is performed at certification, inspect LIDs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)			■	
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.		■		

Figure 4-3 (1 OF 2)

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.		■		
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.		■		
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.		■		
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)		■		
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, mobile boat hoists, rubber-tired gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)			■	
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.		■		
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.			■	
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.		■		
27	Verify barge compartment (voids) cover bolts are installed.		■		
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin 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:
Inspector Signature/Date:	Inspector Signature/Date:

Figure 4-3 (2 of 2)

Test Site Selection

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

Preparations

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

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

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

Test Site Maintenance

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

Test Weights

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

On-Site Gear

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

Communications

Clear communications are vital to the safety of personnel and equipment during a test. The communication method and a designated signal person must be established. Operators, riggers, and signal persons shall understand and use standard hand signals. Where hand signals are not feasible, the signal person shall remain in continuous voice communication with the operator.

Devices used to transmit voice signals shall be tested on-site before beginning operations to ensure effective, clear, reliable communications. If communications are lost or cannot be understood, the operator shall stop operations until communications are reestablished.

Voice directions are given from the operator's directional perspective. A proper continuous voice signal contains the following elements: function, direction, distance, speed, function, stop.

For example: "hoist up 4 feet slowly, hoist, hoist, hoist, stop", or "rotate left 8 feet slowly, rotate, rotate, rotate, stop", or "trolley west 15 feet slowly, trolley, trolley, trolley, trolley, stop". Note: It should be emphasized to the test team that anyone can communicate an emergency stop signal.

Test Team Briefing

The final step prior to starting the test is for the load test director to conduct a briefing with all test team members. Topics covered should include: role assignments and responsibilities, confirmation that preparatory actions have been completed, communication methods to be used, safety precautions, test procedures, stopping points, traffic and site control, and any other relevant information specific to the test, equipment, and environment.

Briefings shall be conducted before starting the test and should be repeated if a new person joins the test team after the test has begun. This may include briefing the team each time one test phase ends and before another begins or before restarting a test after an emergency stop has occurred. For tests of larger and more complex cranes, it is recommended that the briefing be interactive to further ensure all team members understand their responsibilities.

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select all that apply.** Before starting the load test, the load test director should…

A. Select test site
B. Research the crane history file
C. Complete a CCIR
D. Remove test site boundaries
E. Review OEM manuals and load charts
F. Write a shift report

2 **Select the best answer.** Why are condition inspections required and when are they performed?

A. To verify and record the current condition of the crane before, during, and after the load test.
B. To verify the crane is safe to operate, prior to use each day.
C. To verify and record the number of broken wires on the wire rope, during an A PM
D. To verify MISR findings, after a C PM

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

A. True
B. False

4. **Select the best answer**. The “during” inspection of the CCIR is performed during pre-test preparations.

A. True
B. False

5. **Select the best answer**. You’re assigned to load test a mobile crane with a rated capacity of 25 tons. You have 920 pounds of gear attached, which includes a below-the-hook lifting device, hook, block, wire, slings, shackles, etc. Based on the information provided here (disregarding boom radius and length), what is the range (net minimum and net maximum weights) for the test load?

A. 43,080 to 45,620 pounds
B. 49,550 lbs. to 51,330 pounds
C. 46,580 to 49,080 pounds
D. 52,500 to 55,125 pounds

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. Communications
B. Assignment and responsibilities
C. Training schedules
D. Crane Specific characteristics and precautions
E. Traffic control and barricades

7. **Select the best answer.** The operator shall stop operations when voice communications are lost.

A. True
B. False

8. **Select all that apply**. Select the attributes for identifying test weights.

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

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

A. Any team member
B. Load Test Director
C. Designated signal person
D. Rigger-in-Charge
E. Rigger
F. Condition Inspector

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

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

Summary

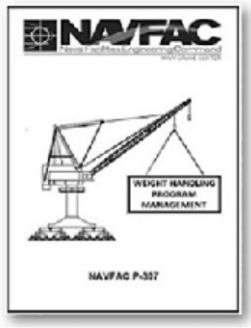
Congratulations. You've completed the Pre-Test Preparations training module. This module identified various actions to perform and information to consider when preparing to load test a Navy crane. This included researching records and manuals, performing a "before-test" condition inspection, establishing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

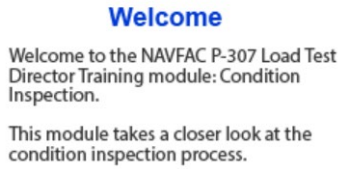
NOTES

LTD CONDITION INSPECTION

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Condition Inspection. This module takes a closer look at the condition inspection process.





Learning Objectives

Because the condition inspection is an integral part of the certification process, the results of which may lead to additional testing, you, the load test director, will benefit by having a suitable understanding of this process. Upon successful completion of this module you will be able to describe the safe manner in which inspections shall be conducted, list the methods employed to perform inspections, define deficiencies, and explain how inspection findings are documented, corrected, deferred, retested, and re-inspected. Special attention will be given to the inspection, care, testing, and documentation of hooks and insulated links, which will prepare you to explain the same.

Safety

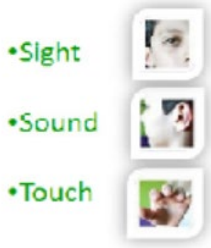
When engaged in the condition inspection and test process, the primary emphasis shall be on safety. This includes the safety of personnel and the safety of the equipment, both now and during future operations.

Inspectors shall not engage in calculated risks or depend on their judgment alone when there is a doubt in their mind regarding the questionable condition of a load bearing part, load controlling part or operational safety device.

Questionable conditions of load bearing parts, load controlling parts or operational safety devices shall be referred immediately to the activity engineering organization and, if necessary, to the certifying official for resolution. If there is no activity engineering organization, the inspection organization shall evaluate the deficiency and the certifying official shall approve the resolution.

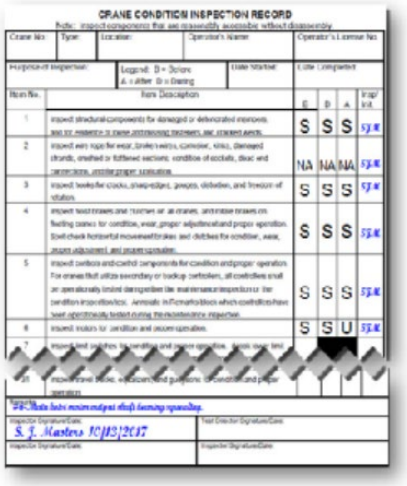
Methods

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



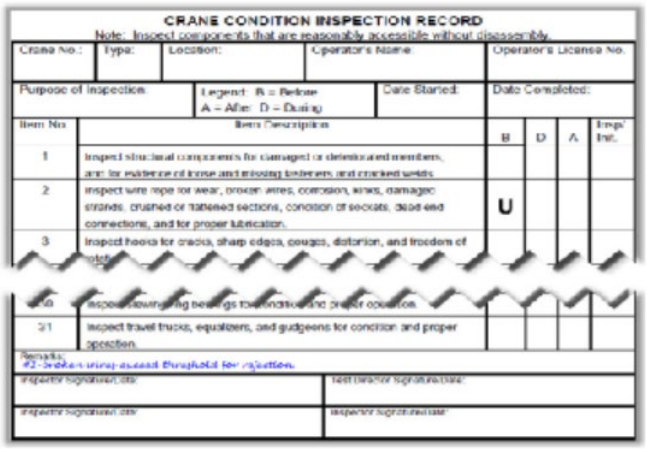
Documentation

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


CRANE CONDITION INSPECTION RECORD

Deficiencies

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


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, corrosion of sockets, dead end connections, and for proper lubrication.	U			
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of				
10	Inspect slewing ring bearings for lubrication and proper operation.				
11	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				

Remarks:

#2 broken wire exceed threshold for rejection.

Inspector Signature/Date: Test Director Signature/Date:

Inspector Signature/Date: Inspector Signature/Date:

Unsatisfactory Items

If, during a condition inspection, an item is identified as unsatisfactory, the CCIR shall be marked with a “U” in the appropriate “before”, “during”, or “after” column adjacent to the applicable item description.

While it’s uncommon to find a deficiency during a condition inspection it can happen from time-to-time. When it does, the CCIR item number and a concisely specific description of the unsatisfactory condition shall be noted in the “Remarks” portion of the form.

An unsatisfactory item that is corrected prior to completing the load test will have an associated work document that was generated to correct the deficiency. These work documents should be completed and closed out prior to continuing the test. Therefore, and in addition to the item number and description, the serial number of that work document shall be added to the entry in the “Remarks” section. Locally modified CCIR forms may expand the size of the remarks section to provide additional space. NAVFAC P-307, Section 3.3.1 describes the manner in which work is documented.

Major Deficiencies

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

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

Major Deficiency Repairs

In the event a major deficiency is identified, it shall be corrected prior to starting or completing the load test or returning the crane to production service, unless the system is not in service and will not be placed in service. The next screen provides additional information on deferrals. Corrective action shall be properly documented. NAVFAC P-307, Section 3.3.1 describes the manner in which work is documented. Replacement load bearing and load controlling parts and safety devices shall be identical to those of the original design. See NAVFAC P-307, Sections 3.3.3 and 6.4.2 for additional guidance.

Deferral of Work

Major deficiencies shall be corrected prior to annual certification or return to production service, unless the specific system is not in service and-or will not be placed in service. If it is not possible to complete other work on load bearing parts, load controlling parts or operational safety devices, such work may be deferred upon review and approval by the certifying official. Technical justification for deferral shall be provided. See NAVFAC P-307, paragraph 3.3.5: Deferral of Work during Inspections and Certifications.

Retesting

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

Re-Inspection

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

Hook Measurements

Hook identification and the correct number of hook NDT annual certification periods shall be validated as part of the certification process. See NAVFAC P-307, Appendix E, paragraph 1.4.4 for material types and periodicities.

An initial throat dimension base measurement shall be established by installing two tram points and measuring the distance between them. This base dimension shall be retained in the equipment history file for the life of the hook. The distance between tram points shall be measured before and after the load test and compared to the base measurement.

Hooks showing an increase in the throat opening by more than 5%, or ¼ inch, or as recommended by the hook OEM, from the base measurement shall be discarded. This information shall be recorded on the Certification of Load Test and Condition Inspection form.

Insulated Links

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

Establish tram points across the dielectric structure of the link and measure the base tram reading before initial installation of the link. Measure the distance between the tram points before and after the load test. Compare the measurement to the base tram measurement. Reject the link if the measurement exceeds the base tram measurement by more than 1%.

Ensure at every annual certification, a minimum of ten-thousand volts is applied across the insulated link and that leakage current is measured. Leakage shall not exceed 70 micro-amps/1,000 volts.

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select the best answer to fill in the blank**. When engaged in the condition inspection and test process, the primary emphasis shall be on ____.

A. safety
B. crane inspection
C. testing
D. documentation of deficiencies

2. **Select all that apply.** Condition inspections shall be performed---

A. In depth and detail limited to that needed to verify overall condition
B. By sight
C. By sound
D. By touch
E. In the same detail as a maintenance inspection

3. **Select the best answer**. The completed CCIR only needs to be signed by the load test director before submitting it to the certifying official.

A. True
B. False

4. **Select the best answer.** Your condition inspector identified an unsatisfactory item. A work document was issued and the deficiency corrected. What is required of this work document prior to continuing with the test?

A. It shall be closed out and attached to the Certification of Load Test and Condition Inspection
B. It may be disposed of as it is no longer needed
C. Nothing
D. It shall be signed by the certifying official.

5. **Select all that apply.** A major deficiency is a deficiency associated with---

A. Operational safety devices
B. General safety devices
C. Load construction parts
D. Load sharing parts
E. Load bearing parts
F. Load controlling parts

6. **Select the best answer.** Replacement load bearing and load controlling parts and safety devices shall be identical to those of the original design.

A. True
B. False

7. **Select the best answer to fill in the blank.** If it is not possible to complete work on load bearing parts, load controlling parts, or operational safety devices, such work may be deferred upon review and approval by the _____.

A. certifying official
B. commanding officer
C. engineering department
D. condition inspector

8. **Select the best answer**. If a major deficiency is found after the load test, it shall---

A. Be corrected
B. Have a selective load test performed, if required
C. Be recorded in the Remarks section of the CCIR
D. Have a condition inspection performed
E. All of the listed actions are correct
F. None of the listed actions are correct
G. Some of the listed actions are correct

9. **Select the best answer to fill in the blank.** The distance between tram points shall be measured before and after the load test and compared to the base measurement. Hooks showing an increase in the throat opening by more than _____ shall be discarded.

A. 0.1250 inches
B. 3.5%
C. 5 mm
D. five percent
E. None of the listed answers above are correct

10. **Select the best answer.** Ensure at every annual certification, a minimum of ten thousand volts is applied across the insulated link and that leakage current is measured. Leakage shall not exceed…

A. 70 amps/1,000 volts
B. 70 micro-amps/1,000 amps
C. 70 micro-amps/10,000 volts
D. 70 micro-amps/1,000 volts

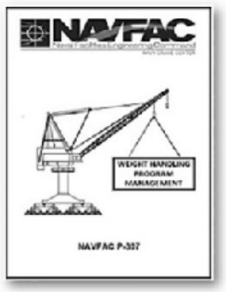
Summary

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

NOTES

CRANE TESTING 1: GENERAL

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



Welcome

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

Introduction
This is the first of three modules on crane testing and presents general information for all cranes. Modules 2 and 3 present specific testing information and crane test procedures for the four NAVFAC P-307 categories of cranes. The information provided in these three modules is for training purposes only. For specific wording and requirements refer to the NAVFAC P-307 manual.

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

Capacity
When calculating safe lifting capacities, you must consider the total weight of the load, the lift radius, the height of the lift and quadrants of operation. The load chart will provide the safe lifting capacity based on each of these variables.

The gross capacity of a crane is the value which is shown on the OEM load chart for a particular radius.

The net capacity is the value shown on the load chart minus all deductions. To determine the net capacity, you must subtract all the applicable deductions from the gross capacity.

Overload
Exceeding the crane's rated capacity may result in one of two consequences: loss of stability or structural failure. When a crane loses stability, the tipping force of the load overcomes the counteracting load of the crane. When tipping begins, especially with loads high in the air, it is very unlikely that the crane operator can do much to prevent overturning. As the crane begins to tip, the load radius increases and as the load radius increases, the

capacity of the crane decreases. This happens so rapidly that recovery is nearly impossible. It is critical for you to know the safe capacity of your crane at all times. Cranes can fail structurally if the rated capacity is exceeded. Structural failure is not limited to total fracture of a component. It includes hidden or less visible damage such as cracking, bending, or twisting of any component. It is difficult to predict which component in a crane may fail structurally when overloaded. Loss of stability and structural failure from overloading the crane are avoidable when you understand and follow the crane capacity load chart. The following four screens display examples of why load tests should be performed in controlled areas and why safety should always be the primary focus.

When viewing each of these events, ask yourself:
Could this happen during my load test?
What factors contributed to the accident?
How could this have been avoided?

Example 1

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

Example 2

The crane had a fully extended boom with a lattice extension erected. There was no load on the crane. The crane was being boomed out to the location of the test load. A gust of wind pushing on the back side of the boom contributed to the crane overturning. No injuries were reported, but it did result in extensive and expensive damages. Possible causes might include inattention, lack of concern regarding the weather, or failure to recognize a potentially hazardous environment.
Can you think of any other possible causes or contributing factors?
Was an interactive pre-test briefing conducted with all pertinent questions and concerns addressed?
Can you think of any other possible outcomes or results?

Example 3

This operator had performed the same operation many times before with the weight of the main hook block removed. In this case, the additional weight of the main block with the extended boom was enough to cause the crane to tip. No injuries were reported and damage was minimal. Possible causes might include complacency, failure to understand or follow the load chart, or inattention to details.
Can you think of any other possible causes or contributing factors?
Was an interactive pre-test briefing conducted with all pertinent questions and concerns addressed?
Can you think of any other possible outcomes or results?

Example 4

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

Vigilance

Shown here are cranes being load tested under controlled conditions with experienced test teams. Yet, mistakes were made. Testing cranes can be extremely hazardous, especially when testing extended long booms with jibs attached. To minimize the risks, perform the tests with the boom about half way between minimum and maximum extension. Three best practices for improved safety and incident avoidance during testing is to perform a thorough CCIR before-test inspection, an ODCL, and a pre-test brief. Emphasize the importance of the pre-test inspections. During the briefing, question your team about their findings and all other aspects of the test and any potential concerns in their areas of responsibility. Remember, their perspectives are different from yours. Take advantage of this and allow them to share in the brief for the benefit and safety of the team and the crane. There is no margin for error when testing cranes. Stay vigilant.

Precautions

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

Test personnel shall remain fully alert to wind, weather, and visibility conditions that may jeopardize the safe performance of the test. Attach taglines to the load to control oscillation.

Lift the test load only high enough to perform the required tests. If lifting on outriggers or stabilizers, ensure they are properly extended per OEM instructions and that the crane is level.

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

Test personnel shall stand clear of tires and outriggers during on-rubber load tests. When lifting test loads, always lift the load well within the maximum radius and slowly boom down to the pre-measured radius, stopping at least once to test the effectiveness of the boom brake and holding valve.

Do not perform any booming when rotating. Be aware that when the load is rotated over the front of the crane, deflection of the crane will begin to relax and radius will tend to decrease. If it does not appear that the load will safely clear the front of the crane, return the load over the side, set the load down, and perform the test at the next allowable radius and load.

Teamwork

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

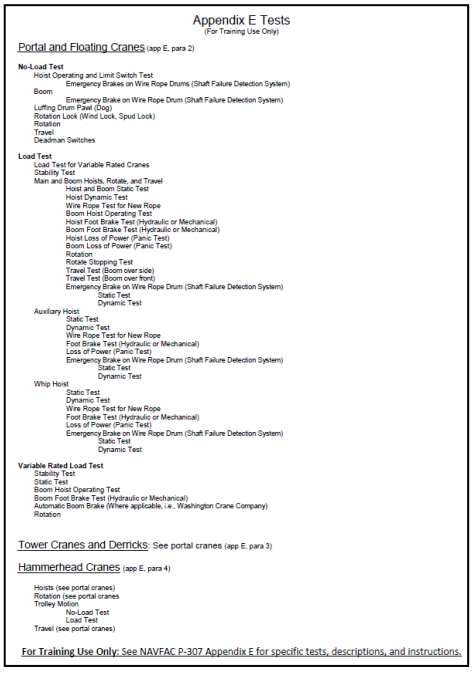
Tests

There are many tests that are performed on Navy cranes. Most can be categorized as some type of load, no-load, static, or dynamic test.

Variations of these tests are performed on different functions, in different ways including boom, hoist, rotate, trolley, and bridge motion tests, loss of power test, brake tests, and the maximum certified capacity and load moment tests.

In some cases, these tests may be combined. Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations.

Tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures (AEPs) during the certification period. The testing sequence may be varied by the activity. For cranes with multiple reeving configurations, the maximum line pull test should be performed first. The below documents are a 3-page list of the NAVFAC P-307 crane tests.



Appendix E Tests
(For Training Use Only)

Portal and Floating Cranes (app E, para 2)

No-Load Test
- Hoist Operating and Limit Switch Test
  - Emergency Brakes on Wire Rope Drums (Shaft Failure Detection System)
- Boom
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
- Luffing Drum Pawl (Dog)
- Rotation Lock (Wind Lock, Spud Lock)
- Rotation
- Travel
- Deadman Switches

Load Test
- Load Test for Variable Rated Cranes
- Stability Test
- Main and Boom Hoists, Rotate, and Travel
  - Hoist and Boom Static Test
  - Hoist Dynamic Test
  - Wire Rope Test for New Rope
  - Boom Hoist Operating Test
  - Hoist Foot Brake Test (Hydraulic or Mechanical)
  - Boom Foot Brake Test (Hydraulic or Mechanical)
  - Hoist Loss of Power (Panic Test)
  - Boom Loss of Power (Panic Test)
  - Rotation
  - Rotate Stopping Test
  - Travel Test (Boom over side)
  - Travel Test (Boom over front)
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
    - Static Test
    - Dynamic Test
- Auxiliary Hoist
  - Static Test
  - Dynamic Test
  - Wire Rope Test for New Rope
  - Foot Brake Test (Hydraulic or Mechanical)
  - Loss of Power (Panic Test)
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
    - Static Test
    - Dynamic Test
- Whip Hoist
  - Static Test
  - Dynamic Test
  - Wire Rope Test for New Rope
  - Foot Brake Test (Hydraulic or Mechanical)
  - Loss of Power (Panic Test)
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
    - Static Test
    - Dynamic Test

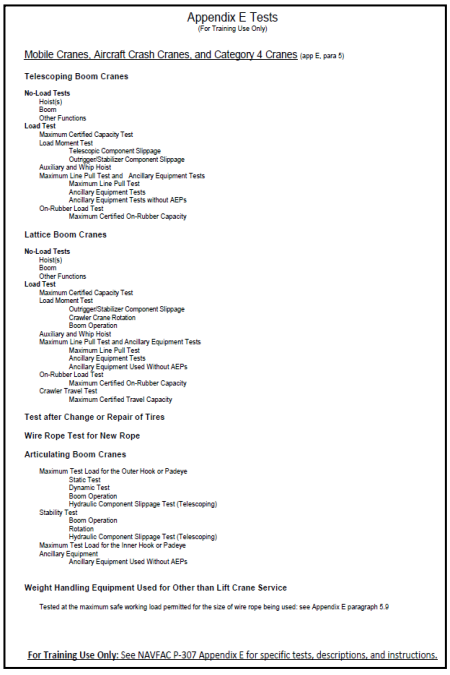
Variable Rated Load Test
- Stability Test
- Static Test
- Boom Hoist Operating Test
- Boom Foot Brake Test (Hydraulic or Mechanical)
- Automatic Boom Brake (Where applicable, i.e., Washington Crane Company)
- Rotation

Tower Cranes and Derricks: See portal cranes (app E, para 3)

Hammerhead Cranes (app E, para 4)

- Hoists (see portal cranes)
- Rotation (see portal cranes
- Trolley Motion
  - No-Load Test
  - Load Test
- Travel (see portal cranes)

For Training Use Only: See NAVFAC P-307 Appendix E for specific tests, descriptions, and instructions.



Appendix E Tests
(For Training Use Only)

Mobile Cranes, Aircraft Crash Cranes, and Category 4 Cranes (app E, para 5)

Telescoping Boom Cranes

No-Load Tests
- Hoist(s)
- Boom
- Other Functions

Load Test
- Maximum Certified Capacity Test
- Load Moment Test
  - Telescopic Component Slippage
  - Outrigger/Stabilizer Component Slippage
- Auxiliary and Whip Hoist
- Maximum Line Pull Test and Ancillary Equipment Tests
  - Maximum Line Pull Test
  - Ancillary Equipment Tests
  - Ancillary Equipment Tests without AEPs
- On-Rubber Load Test
  - Maximum Certified On-Rubber Capacity

Lattice Boom Cranes

No-Load Tests
- Hoist(s)
- Boom
- Other Functions

Load Test
- Maximum Certified Capacity Test
- Load Moment Test
  - Outrigger/Stabilizer Component Slippage
  - Crawler Crane Rotation
  - Boom Operation
- Auxiliary and Whip Hoist
- Maximum Line Pull Test and Ancillary Equipment Tests
  - Maximum Line Pull Test
  - Ancillary Equipment Tests
  - Ancillary Equipment Used Without AEPs
- On-Rubber Load Test
  - Maximum Certified On-Rubber Capacity
- Crawler Travel Test
  - Maximum Certified Travel Capacity

Test after Change or Repair of Tires

Wire Rope Test for New Rope

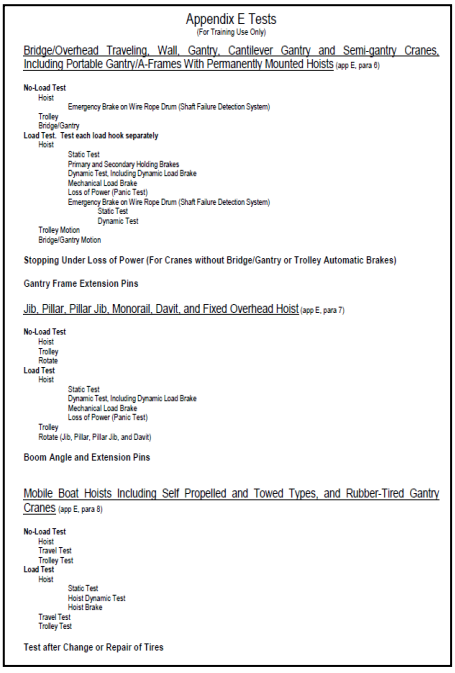
Articulating Boom Cranes

- Maximum Test Load for the Outer Hook or Padeye
  - Static Test
  - Dynamic Test
  - Boom Operation
  - Hydraulic Component Slippage Test (Telescoping)
- Stability Test
  - Boom Operation
  - Rotation
  - Hydraulic Component Slippage Test (Telescoping)
- Maximum Test Load for the Inner Hook or Padeye
- Ancillary Equipment
  - Ancillary Equipment Used Without AEPs

Weight Handling Equipment Used for Other than Lift Crane Service

Tested at the maximum safe working load permitted for the size of wire rope being used: see Appendix E paragraph 5.9

For Training Use Only: See NAVFAC P-307 Appendix E for specific tests, descriptions, and instructions.



Appendix E Tests
(For Training Use Only)

Bridge/Overhead Traveling, Wall, Gantry, Cantilever Gantry and Semi-gantry Cranes, Including Portable Gantry/A-Frames With Permanently Mounted Hoists (app E, para 6)

No-Load Test
- Hoist
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
- Trolley
- Bridge/Gantry

Load Test. Test each load hook separately
- Hoist
  - Static Test
  - Primary and Secondary Holding Brakes
  - Dynamic Test, Including Dynamic Load Brake
  - Mechanical Load Brake
  - Loss of Power (Panic Test)
  - Emergency Brake on Wire Rope Drum (Shaft Failure Detection System)
    - Static Test
    - Dynamic Test
- Trolley Motion
- Bridge/Gantry Motion

Stopping Under Loss of Power (For Cranes without Bridge/Gantry or Trolley Automatic Brakes)

Gantry Frame Extension Pins

Jib, Pillar, Pillar Jib, Monorail, Davit, and Fixed Overhead Hoist (app E, para 7)

No-Load Test
- Hoist
- Trolley
- Rotate

Load Test
- Hoist
  - Static Test
  - Dynamic Test, Including Dynamic Load Brake
  - Mechanical Load Brake
  - Loss of Power (Panic Test)
- Trolley
- Rotate (Jib, Pillar, Pillar Jib, and Davit)

Boom Angle and Extension Pins

Mobile Boat Hoists Including Self Propelled and Towed Types, and Rubber-Tired Gantry Cranes (app E, para 8)

No-Load Test
- Hoist
- Travel Test
- Trolley Test

Load Test
- Hoist
  - Static Test
  - Hoist Dynamic Test
  - Hoist Brake
- Travel Test
- Trolley Test

Test after Change or Repair of Tires

Total Test Load

Total test loads must be calculated for specific cranes, tests, and configurations. Depending on the crane, the total test load may include one or more of the following weights: rigging gear, ancillary devices, hooks, blocks, wire rope, below the hook lifting devices, and of course, the test weights.

Follow OEM load chart instructions for deduction values. Depending on the equipment being tested, the actual test load shall be within one of the following specifications, 125% +0%/-5% of the rated capacity, 100% +0%/-5% of the rated capacity, 110% +0%/-5% of the rated capacity. Load testing outside these limits is not authorized.

Test each hook at the nominal test load for the crane's configuration considering reeving, boom length, etc. The rated capacity may be stenciled on the crane, obtained from the equipment history file, or found on the posted load chart. The rated capacity may be limited by wire rope line pull, depending on the current reeving configuration. See NAVFAC P-307, Section 4 and Appendix E for specific tests, applications, and exceptions.

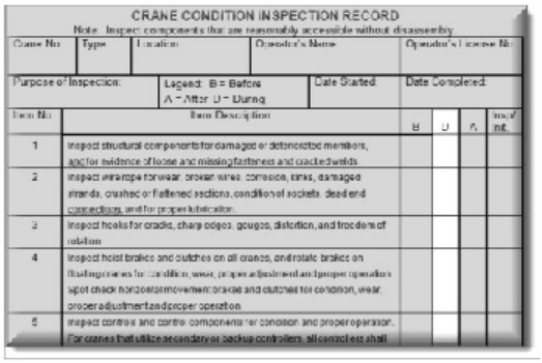
Down Rating

For cranes that cannot be load tested to specified overload percentages due to OEM restrictions or designs that prevent the specified overload percentages, the cranes shall be down rated to 80% of the OEM's allowable test load or 90% for third party certified mobile and category 4 cranes, and then tested to the requirements of NAVFAC P-307. See paragraph 4.7.1. Document reduced capacity by crane alteration in accordance with NAVFAC P-307, Section 6.

Condition Inspection

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

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



CRANE CONDITION INSPECTION RECORD

View CCIR

CCIR

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.
Purpose of Inspection:	Legend: B = Before A = After D = During	Date Started:	Date Completed:	

Item No.	Item Description	B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications (where a switch is set for drydock or pit operation) and secondary upper limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)		■	■	
8	If a load test is performed at certification, inspect LIDs, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)			■	
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.		■		

Figure 4-3 (1 OF 2)

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.		■		
15	Inspect machinery house/area for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.		■		
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.		■		
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)		■		
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, mobile boat hoists, rubber-tired gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C. (This may be performed at the maintenance inspection in lieu of the condition inspection. Annotate in Remarks block if performed at the maintenance inspection.)			■	
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.		■	■	
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.			■	
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.		■		
27	Verify barge compartment (voids) cover bolts are installed.		■		
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin 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:
Inspector Signature/Date:	Inspector Signature/Date:

Figure 4-3 (2 of 2)

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

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

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

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

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

3. **Select the best answer.** Best practices for improved safety and incident avoidance include---

A. A thorough before-test CCIR inspection
B. Complete an ODCL
C. A detailed pre-test brief
D. All of the listed items above
E. None of the listed items

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

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

5. **Select the best answer.** Responsibilities for safe testing are both individually assigned and team shared; however, only the crane riggers are allowed to signal "all stop" whenever the safety of the test or personnel become a concern.

A. True
B. False

6. **Select all that apply.** From the list below, identify the general categories of crane tests.

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

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

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

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

A. True
B. False

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

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

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

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

Summary

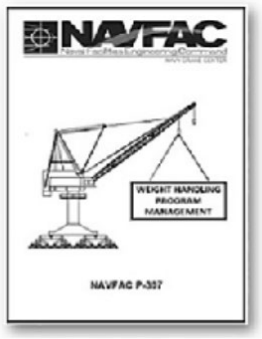
Congratulations. You've completed the General Crane Testing training module.
This module, the first of three modules on crane testing, presented general test and inspection information relevant to all cranes. It included examples of why safety is so important when performing load tests and described various precautions to consider during testing including gross and net capacities, the potential consequences of overloading a crane, the importance of teamwork, the test load weight requirements and tolerances, down rating cranes when necessary, and the importance of remaining vigilant at all times. The next module provides a look at specific testing requirements for category 1 and 4 cranes, as well as some special testing situations.

NOTES

CRANE TESTING 2: CATEGORIES 1 AND 4

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Testing Category 1 and 4 Cranes.



Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Testing Category 1 and 4 Cranes.

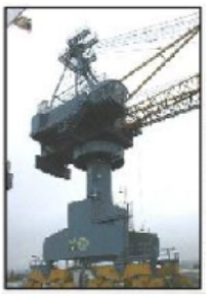
Introduction

This is the second of three modules on crane testing. This module provides a review of the tests and test requirements for category 1 and 4 cranes and discusses some special testing situations. NAVFAC P-307, Appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests. For Category 1 and 4 cranes this may include a no-load test, load test, emergency brake test, static and dynamic hoist and boom tests, brake test, maximum certified capacity test, load moment test, maximum line pull test, loss of power test, auxiliary and ancillary equipment tests, or component travel and rotate tests. Depending on the type of crane and it's intended use, category 1 and 4 cranes are tested at either 125% +0%/-5%, 110% +0%/-5%, or 100%+0%/-5% of certified capacity, unless otherwise approved. Hooks and insulated links are inspected annually and tested as outlined in Appendix E. Test paragraphs and results are recorded on the Certification of Load Test and Condition Inspection form. The certifying official's signature on this form confirms that all applicable testing has been conducted as prescribed and that the crane is safe to operate. The information provided in this module is for training purposes only. For specific wording, requirements, and applications refer to the NAVFAC P-307 manual.

Learning Objectives

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

Portal and Floating Crane No-Load Tests



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

Luffing Drum Pawl & Rotation

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

Check the rotation lock by engaging it and inspecting 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.

Travel & Deadman Switches

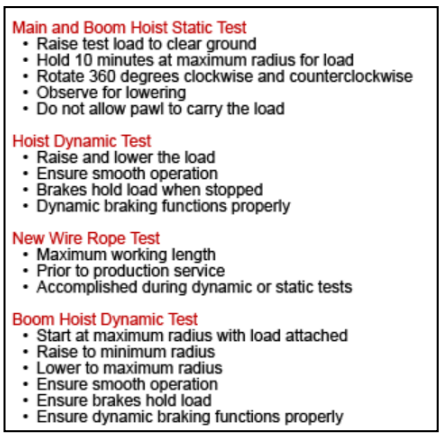
Finally, verify that the crane can safely travel and that the dead-man controls perform properly. Check the travel function with the boom centered between the crane rails and the boom dog engaged. Travel the crane in one direction a minimum of 50 feet. After travel stops, and if there are no problems, rotate the boom 180 degrees and travel a minimum of 50 feet in the opposite direction.

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

Portal & Floating Crane Load Tests

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

Hoist & Boom Static and Dynamic Tests



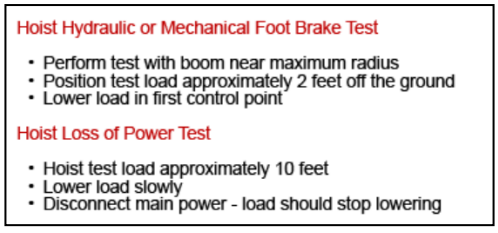
Main and boom hoists, rotate, and travel load tests are performed using the maximum test load at maximum radius. For the boom hoist tests, the test load and radius shall produce the maximum line pull. This may require a different test load. Typically, this is done at maximum radius for maximum load.

To perform the main hoist and boom hoist static test, raise the test load to clear the ground and hold for ten minutes at the maximum radius for the load lifted. Rotate the load and hook 360 degrees clockwise and 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.



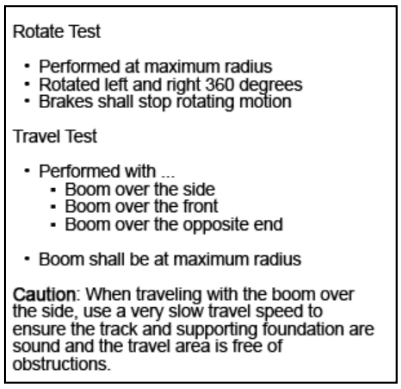
Hoist & Boom Foot Brake and Loss of Power Tests

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

The hoist loss of power and boom loss of power tests, 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 10 feet above the ground. Lower the 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. The

test load shall stop. If the load or boom does not stop until the controller is returned to the neutral position, notify the activity engineering organization and Navy Crane Center [Code 03] to verify this is the intended OEM design. These tests are only done on cranes with powered down hoists. These tests are not applicable to load-sensitive reactor type hoist controls. Cautions apply and may require engineering involvement. See Appendix E for details.

Travel and Rotate Load Tests



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

The boom-over-the-side travel test for portal cranes is conducted with the boom at maximum allowable radius and positioned perpendicular to the crane rails. With the boom dog engaged, travel in one direction a minimum of 50 feet. Repeat with the boom over the opposite side, where space and conditions permit. The boom-over-the-front and boom-over-the-opposite-end travel tests, for portal cranes, are performed in the same manner except boom shall be parallel to the crane tracks. In each travel test, operate the controller through normal operating speeds. The crane shall accelerate, decelerate, and stop smoothly.

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

Aux, Whip, Variable Rated Crane Tests

For auxiliary and whip hoists, the static, dynamic, loss of power, emergency drum brake, foot brake, and new wire rope tests, are all conducted in a manner similar to the tests performed on the main hoist.

In addition to the tests prescribed in paragraph 2.2, variable rated cranes shall be tested with the appropriate test load at the maximum radius of the crane. These additional tests include a stability and static test, boom hoist, boom foot brake, and rotation test, and, where applicable, an automatic boom brake test (free-fall prevention). It's very important that you be aware of and follow all the precautions listed in this section of Appendix E.

Floating Crane Tests

Same as portal cranes (for functions that apply)

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

MCT Appendix E Paragraph 5

Testing of Mobile Cranes, Aircraft Crash Cranes, and Category 4 Cranes

Boom Types:

- Telescoping (5.4)
- Lattice (5.5)
- Articulating (5.8)

Other category 4 crane testing:

- Per OEM
- Locally developed

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

Mobile and category 4 crane nominal test loads:

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

Mobile cranes are tested in accordance with Appendix E, paragraph 5, which sorts the various load and no-load test requirements by boom type. For example: sub-paragraph 5.4 provides test requirements for Telescoping Boom Cranes, sub-paragraph 5.5 – Lattice Boom Cranes, and sub-paragraph 5.8 – Articulating Boom Cranes.

Test procedures for other category 4 cranes shall follow OEM procedures and recommendations. Where no procedures are provided by the OEM, procedures shall be developed by the activity engineering organization using the procedures of this subsection as a guide. The remaining paragraphs: 5.1, 5.2, 5.3, 5.6, 5.7, and 5.9, discuss requirements for test loads, cranes temporarily mounted on barges, pre-test preparations and precautions, testing after changing or repairing tires, testing new wire rope, and testing non-lift service equipment. The nominal test load for mobile cranes and category 4 cranes shall be 100% of the rated capacity or 110% for third party certified cranes.

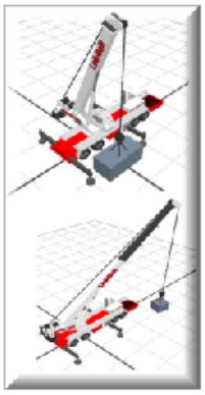
MCT No-Load Tests

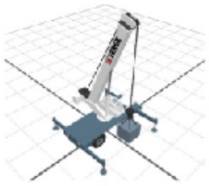
Test all functions through their full range of motion. Check all limit switches and bypasses where applicable. Check that the load moment indicator, or LMI, functions properly and that all data such as radius and boom length, etc. is accurate. Check anti-two block device function. Raise each hoist block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

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

MCT Load Tests

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

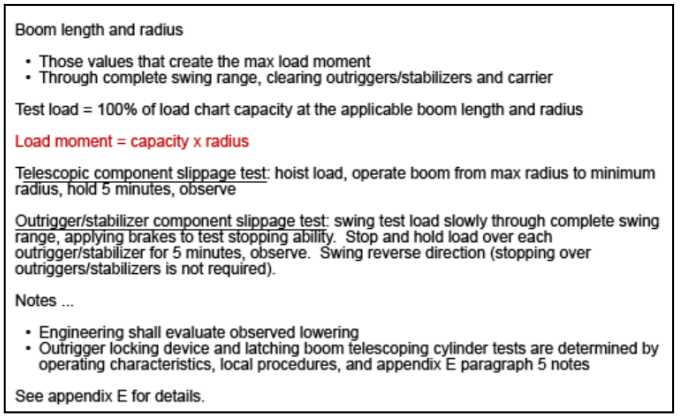




MCT Maximum Certified Capacity Test

The test load shall be 100% of the maximum certified capacity of the crane or 110% for third-party certified cranes. Determine the maximum permissible radius for the maximum certified capacity. Perform this test at the maximum boom length and radius for the maximum certified capacity. Raise the test load using the hoist. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. With the test load raised, rotate the hook 360 degrees clockwise and counter-clockwise to check bearing operation. If the size of the test load precludes a full 360 degrees rotation of the hook, perform the hook rotation test during the load moment test. Operate the boom from maximum radius to minimum radius. Repeat the test, operating the boom from minimum radius to maximum radius for the load applied. Due to the number of layers of wire rope on the drum, some cranes may not be able to lift the test load per the OEM's load chart. If the crane cannot lift the test load, check the OEM's hoist line pull for the particular model hoist and layer of rope. If hoist line pull, or available torque, is the limiting factor, reduce the test load based on the hoist line pull limitation and perform the required test. Certify the crane based on the reduced test load. If the crane cannot lift the reduced test load, verify that the system hydraulic pressure and relief valves are set within OEM specifications. If the settings are within specification, contact the OEM. Other tests and conditions may apply. Review NAVFAC P-307, Appendix E, Section 5 for details.

MCT Load Moment Test



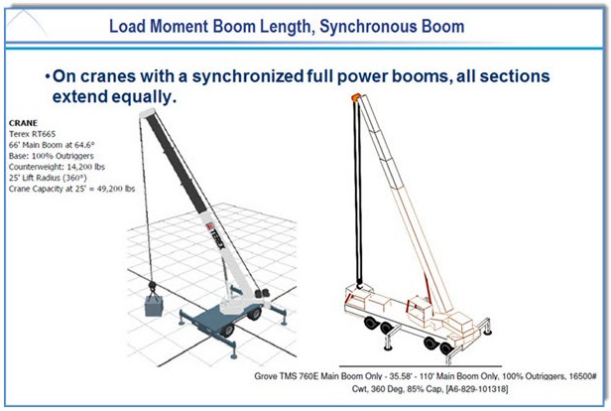
It is not intended to test each and every component to its maximum stress state but instead, the load moment test is one of several tests configured to safely and efficiently test the greatest number of critical components to a specified load level. During the load moment test, the crane's boom length, radius, and capacity are the inputs that establish the test parameters and the maximum load moment value required to safely perform the component slippage tests while at the same time clearing the carrier and the outriggers through the entire swing range. This is discussed in further detail on the next two screens.

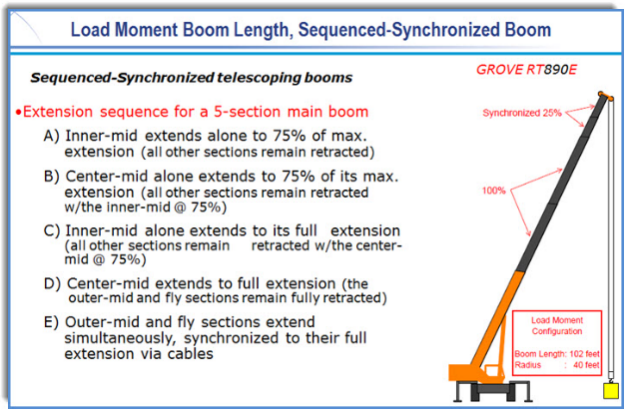
The test load shall be 100% of OEM load chart capacity at the determined boom length and radius. For the purposes of this test, load moment is the product of capacity multiplied by radius. The manner in which a crane is evaluated for maximum load moment is by performing the telescopic component slippage and outrigger/stabilizer component slippage tests. During the telescopic component slippage test, the test load is raised using the hoist. The boom is operated from maximum radius to minimum radius for the load applied. The load is then held for 5 minutes without use of controls while observing for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers. Lower the boom from minimum radius to maximum radius before proceeding to the next test.

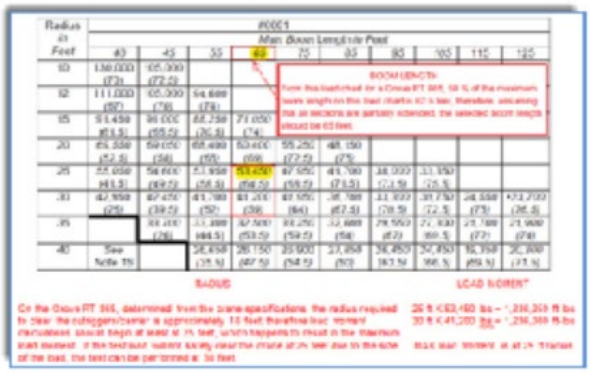
During the outrigger/stabilizer component slippage test, swing the test load at slow speed through the complete swing range as allowed by the OEM, and apply the brake periodically during rotation. The brake shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. Hold the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

Load Moment Test Boom Length

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







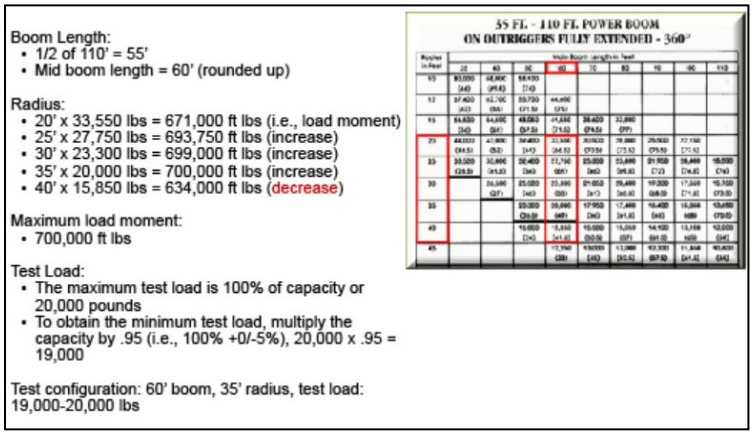
Load Moment Test Radius

The radius for the load moment test is determined by calculating the maximum load moment at the determined boom length that will safely clear the outriggers and the carrier. Calculate the load moment starting at the first radius that will clear the outriggers and crane carrier. Through process of elimination, recalculate the load moment at increasing radii until the resulting load moment decreases. Use the radius that results in the maximum load moment. Ensure that the radius selected allows for changes in carrier deflection that will not take the load out of radius or take the load into contact with the crane. During rotation the radius may be adjusted due to carrier frame deflection, but do not increase

radius once it has been decreased. When determining the load moment test configuration, the load test director will have to consider the wire rope as reeved, wire rope line pull, and winch performance as necessary.

The example shows a Grove RT 865 load chart. The radius required to clear the outriggers and carrier is about 18 feet. Considering the size of the test weight, load moment calculations would begin at 25 feet and are as follows:
25 ft. x 53,450 lbs. = 1,336,250 ft. lbs.
30 ft. x 41,200 lbs. = 1,236,000 ft. lbs.
The maximum load moment is at the 25 foot radius. If the test load will not safely clear the outriggers at 25 feet due to size, the test can be performed at 30 feet.

LMT Calculation Example



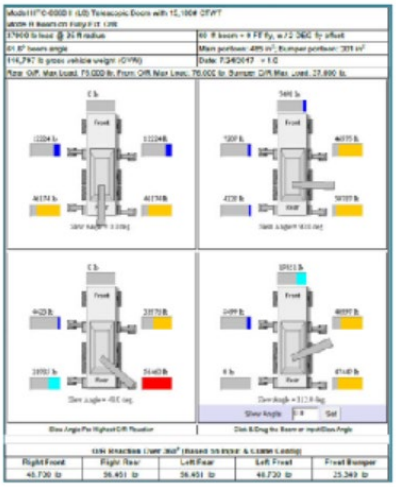
First, determine the mid boom length. Using the load chart on the screen we see a crane with a maximum of 110’ of boom. We can assume a half way point of 55’. On this load chart we will round up to 60’. Second, we will use the process of elimination to determine the correct load moment. Along the 60 foot boom length column, we’ll start with the 20 foot radius. We start here because this has been determined to be the minimum radius which will allow the test load to safely clear the outriggers. A 20 foot radius with 60’ of boom indicates a capacity of 33,550 lbs. Using the formula 'capacity x radius', we can now determine the load moment for this radius.

Repeat this step for the next several radii, for example: 25’, 30’, 35’, and so on until we get to the radius where the calculated load moment value is less than the previous one. The largest product observed is the maximum load moment. In cases where you begin your calculations at too high a radius and the load moments are trending down, reverse direction and work the radius scale the other way until you determine the correct product. Reviewing the calculations on the screen we can see how the load moment increases as the radius increases. However, at 40’ we see the load moment decrease. Therefore, in this example, 700,000 ft. lbs. is the maximum load moment. Third, we read the load chart for 60’ of boom at 35’ of radius and obtain a capacity of 20,000 lbs. Now that we have this value, we can calculate the minimum and maximum test loads to achieve maximum load moment. Multiply 20,000 lbs. by 1.0 (or 100%) to obtain the maximum test load of 20,000 lbs. Multiply 20,000 lbs. by 0.95 (or 95%) to obtain the minimum test load of 19,000 lbs.

So, our set-up for this load moment test is: 60’ of boom at 35’ of radius, with a test load value between 19,000 lbs. and 20,000 lbs. To avoid an inadvertent overload, do not forget to subtract any deductions, such as rigging gear, from these values.

Flex

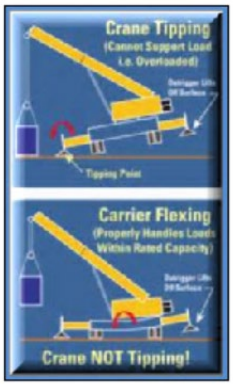
Be aware, especially on truck cranes that as the load is rotated from the side to the front or rear of the crane the flex in the crane will relax; deflection in the carrier will decrease, bringing the load closer to the crane. If it is anticipated that the load will come too close to the crane, select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



Rotating loads cause the crane to flex.

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

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



Structural and Stability Ranges

Depending on the specific crane configuration, the total test load weight, which may be at, near, or above 100%, may place the crane in the structural or stability range of the load chart, either of which is acceptable. Keep in mind, a load that exceeds the stability rating in one area of the chart may exceed the structural rating in another area of the chart. Review load charts and working range diagrams carefully and exercise caution when testing at or near these ranges. The stability load changes with the swing angle and structural failure can happen without warning especially in areas of the crane that cannot flex or, as with some older cranes, can no longer flex.

Vigilance during testing, a well prepared load test director, an alert test team, a quality maintenance program, and thoughtful pre-test inspections are the best methods to minimize the possibility of any problems associated with stability and structural concerns. Outrigger lift-off is often an indication of frame flex and not an indication of instability.

Maximum Line Pull

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

For cranes with identical main and auxiliary hoists and an approved reeving AEP, either hoist may be used to the maximum certified crane capacity based on satisfactory maximum line pull tests on each hoist and a satisfactory completion of the maximum certified capacity and load moment test on one hoist.

1. Raise the test load using the hoist.
2. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes.

Ancillary Equipment Testing

For cranes that will use approved ancillary equipment such as swing-away jibs, power pinned fly sections, manual extensions, jibs at variable offsets, multiple load blocks, etc., during the certification period, ancillary equipment testing is required.

The test load shall be 100% of the maximum certified capacity of the equipment, or 100% of the maximum allowable wire rope line-pull if the equipment is not fully reeved. For jibs with variable offset angles, test at the greatest offset used. For telescoping extensions, test at the fully extended length. Each point of a bi-fold swing-away shall be tested if both points are used and/or certified. All counterweight configurations that will be used during the certification period shall be tested. Record each test configuration and test load on the certification supplement form, Figure 4-2.

Auxiliary Hoists Test

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

1. Raise the test load using the hoist.
2. Lower the test load and test the ability of the brake to control, stop, and hold the test load for 10 minutes.
3. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers/stabilizers. With the test load raised, rotate the hook 360 degrees clockwise and counterclockwise to check bearing operation.

On-Rubber Load Testing

The on-rubber or free-rated load test checks the stability and operation of a mobile crane's carrier, wheels, tires, brakes, etc., under load when lifting without the use of outriggers and while traveling with the load. Do the test only when free-rated lifts are permitted at the activity and OEM for the type of crane being tested. Follow all OEM on-rubber lifting requirements. Use taglines to control the load. Extend outriggers where equipped and keep them no more than three to four inches above the ground. Do a test for each allowable configuration. Allowable on-rubber rated capacity

for over-the-side lifting for cranes equipped with outriggers shall not exceed 60% of the OEM's load chart values. For those cranes, testing over the side on-rubber is not required. For rubber tired cranes without outriggers, contact the Navy Crane Center. See section 6 for allowable on-rubber capacities, capacity rating information, and initial stability testing for used and altered cranes. Some cranes have different ratings for stationary lifts and for traveling with a load. Each allowable configuration shall be tested.

Maximum Certified On-Rubber Capacity Test

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

Commercial truck mounted telescoping and lattice boom cranes shall be tested in accordance with paragraphs 5.4 and 5.5 respectively. These testing procedures have been discussed on previous slides. Other category 4 cranes shall 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 load test director must possess a thorough understanding of the crane's set-up requirements and allowable working quadrants prior to testing.

Articulating Boom Tests

Category 4 articulating boom cranes shall be tested in accordance with the instructions listed in Appendix E paragraph 5.8 as they apply to the crane's configuration. Additionally, the requirements of paragraphs 5.1, 5.3, 5.3.1, and 5.4.1 shall be followed. Refer directly to Appendix E, paragraph 5.8 for additional testing details, safety precautions, and helpful notes not discussed here.

Maximum test load for the outer and inner hook or padeye tests: Perform the static test on both the outer and inner hooks or padeyes, if an inner hook is utilized by the activity. Raise the test load to clear the ground with boom sections at either the minimum

allowable articulating angle or at the maximum allowable articulating angle for the size of the load, and at the minimum possible radius for the load and hold for ten minutes. Rotate the load and hook. Observe for lowering. Perform the dynamic test on the outer hook or padeye. Raise and lower the test load at normal operating speeds using the winch if so equipped. Test the ability of the winch brake and controls to control and stop the load. If the crane is not equipped with a winch skip this step. Perform the boom operation tests on both the outer and inner hooks or padeyes, if an inner hook is utilized by the activity. Using the inner and secondary boom lift cylinders, operate the boom from minimum radius to maximum radius for the load applied. Repeat the test in the opposite direction. Perform the hydraulic component slippage test on the outer hook or padeye. Lift the test load inside the maximum radius and allow time for fluid and component temperatures to stabilize. Hold the load for 10 minutes without use of controls by the operator. Observe for lowering.

Stability Tests: The test load shall be established based on the maximum hydraulically extended boom length, minimum articulation angles, and maximum allowable radius as determined by the posted load chart. Perform the boom operation test by raising and lowering the boom using the inner boom lift cylinder through a safe working range based on the length of the slings for the length of boom extended and radius. Observe for smooth operation. Perform the rotation test at slow speed, rotating left and right the maximum degrees allowed by the OEM at the radius with boom and load hoist pawls engaged where applicable. The crane shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. The Hydraulic Component Slippage test portion of the stability test is performed in the same manner as previously described in the Maximum load test for the inner and outer hooks. When authorized for use, ancillary equipment shall be load tested. Test load shall be based on the maximum rated load for the equipment, or as limited by wire rope line pull if the equipment is not fully reeved. Record each test configuration and test load on the certification supplement form, Figure 4-2.

MBH Self-Propelled and Towed

Mobile boat hoists and rubber–tired gantry cranes require load and no-load testing. During the no-load test, slowly raise and lower each block through its maximum working range and into the upper limit switch. Travel the crane 50 feet, steering left and right. Test travel alarms and e-stops. Slowly travel the trolley along its full length of available travel. Verify proper brake operations.

Mobile boat hoists and rubber-tired gantry cranes, both self-propelled and towed types are load tested at 100% of their rated capacity. On certain types of mobile boat hoists that use deck fittings for lifting the test load, ensure the deck fittings are aligned in the plane of the sling. Lift the test load only high enough to perform the required tests. During the static load test, raise the load approximately one foot and hold for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of the hoist components or hoist brakes.

Conduct the hoist dynamic load test by raising and lowering the test load at normal operating speeds and observe smooth control. The hoist brake load test is performed to validate the ability of the brake to control and stop the load while slowly hoisting and lowering. The travel and trolley load tests validate the ability of the components to satisfactorily travel under load. Self-propelled and towed types of boat hoists shall travel a minimum of 50 feet in each direction, steering right and left while traveling. Trolleys shall travel their full length of available travel range. At a slow speed, verify proper brake operation.

Barge Mounted Mobile Crane Testing

Mobile cranes certified for use on shore may be mounted on barges or other floating structures, such as floating piers, after meeting specified requirements. When removed from a barge, the crane's land-based certification continues in effect.

Barge stability calculations shall be performed and reduced load charts shall be established by the activity engineering organization and approved by the certifying official. The reduced load chart test need only include the Appendix E tests that induce the maximum load on the outrigger pads and the rotate brake.

The crane shall be load tested and certified on the barge with a test load of 100% +0%/-5% of the reduced load chart capacities. Load testing on the barge shall be performed once yearly as a minimum. A marine list and trim indicator shall be installed in the operator's cab.

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

Replaced or Repaired Tires

Appendix E, paragraph 5.6 provides information on testing repaired or replaced tires on category 1 and category 4 cranes.

Category 1 cranes with on-rubber lift capability may perform the following test in lieu of a load test: travel the crane with no load on the hook, a minimum of 100 feet in forward and reverse directions, with the counterweight positioned over the affected tire and the boom at minimum radius. Use this method only when allowed by the OEM. Use extreme caution moving a crane with the boom off center and at a minimum radius. Some mobile cranes may become unstable in this position, especially when traveled over uneven surfaces.

For category 4 cranes where tires remain on the ground with outriggers/stabilizers extended, perform the maximum capacity test on the side of the crane with the affected tire. For mobile boat hoists and rubber-tired gantry cranes, Appendix E, paragraph 8.3.4 states that the static, dynamic, and travel load tests are required after change or repair of tires unless there are 8 or more tires on the crane, in which case the static and dynamic tests are not required and the travel test may be performed under no load due to redundancy.

Used and Altered Cranes

All newly acquired used truck, rough-terrain, all-terrain, crash, commercial truck mounted, articulating boom, and crawler cranes shall be initially tested for stability in those cases where the OEM's load and stability data are not available or where the acquiring activity suspects that previously performed alterations may affect stability. In addition, a crane shall be tested for stability after alterations that significantly affect the stability of the crane. Note: Have engineering perform a complete review and evaluation prior to conducting any margin of stability or balance point load testing on any crane. Refer to SAE J765, Crane Load Stability Test Code for stability limitations and determination of balance point loads. See NAVFAC P-307, Section 6, paragraph 6.7 for additional details.

Non-Lift Service Cranes

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

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select all that apply.** Identify the components tested when performing the portal and floating crane no-load test for the hoist and boom.

A. Secondary upper limit switch
B. Lower limit switch
C. Wire rope drum emergency brakes
D. Upper limit switch
E. Secondary lower limit switch
F. None of the items listed above are checked during this test

2. **Match the following**. Match each portal crane test description to its test by writing the correct number next to each description.

A. ____ Boom at Max radius, perpendicular to tracks

B. ____ Lower boom, disconnect main power, return controller to neutral

C. ____ Raise load, hold 10 minutes, rotate hook

D. ____ Boom centered and locked, move 50', rotate 180 degrees, move 50'

E. ____ Check emergency brakes on wire rope drums by simulating a fault

1. Boom Loss of Power Load Test
2. Travel Load Test
3. Hoist & Boom No-Load Test
4. Travel No-Load Test
5. Hoist Static Load Test

3. **Select the best answer.** Choose the statement that accurately describes an attribute of the load moment test (LMT).

A. The LMT shall be configured at maximum radius and maximum boom length
B. The test specification for the LMT shall be 125% +5%/-0%
C. Hoist LMT load 10 feet, lower load, disconnect main power, return controller to neutral
D. Load moment is the product of capacity x radius

4. **Select the best answer.** You're calculating the maximum load moment for a crane with a maximum boom length of 100'. The test load will clear the crane at 15'. The load chart shows that at a 15' radius the crane's capacity is 43,000 pounds, at 20' it's 38,000 pounds, at 25' it's 29,000 pounds, at 30' it's 22,000 pounds, and at 35' it's 17,000 pounds. Which radius provide the maximum load moment?

A. 20'
B. 30'
C. 25'
D. 15'
E. 35'

5. **Select the best answer.** For cranes that will use multiple reeving configurations during the certification period, a maximum line pull test is required. Testing of all possible reeving configurations is not required.

A. True
B. False

6. **Select all that apply.** Which of the following requirements applies when performing on-rubber testing of mobile cranes?

A. Test each allowable configuration
B. Permitted by the local activity
C. Outriggers fully retracted and stowed
D. Permitted by the OEM
E. None of the listed items above apply

7. **Select the best answer to fill in the blank.** Category 4 testing shall follow _____ and/or _____ test procedures.

A. OEM, activity
B. management, contractor
C. management, OEM
D. ASME, Engineering

8. **Select the best answer.** 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

9. **Select the best answer.** Mobile boat hoists and rubber-tired gantry cranes do not require no-load testing.

A. True
B. False

10. **Select the best answer.** When removed from a barge, a mobile crane's land-based certification---

A. expires.
B. shall be recertified
C. continues in effect
D. transfers back to the barge

Summary

Congratulations. You've completed the Testing Category 1 and 4 Cranes training module. This module, the second of three discussing crane testing, presented specific information on the different tests and test requirements for category 1 and 4 cranes including portal cranes, floating cranes, mobile cranes, mobile boat hoists, and rubber-tired gantry cranes. Special emphasis was given to the maximum certified capacity, load moment, and maximum line-pull tests. Also covered were some special testing situations involving barge mounted cranes, changed or repaired tires, non-lift service cranes, and used or altered cranes. Next you will see the third of three crane testing modules. It provides a look at specific testing requirements for category 2 and 3 cranes.

NOTES

CRANE TESTING 3: CATEGORIES 2 AND 3

Welcome

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

Introduction

This is the third of three modules that presents information on specific crane testing. This module provides a review of tests and test requirements for category 2 and category 3 cranes.

NAVFAC P-307, Appendix E crane test procedures help ensure the integrity and function of crane components through a series of tests. For category 2 and 3 cranes this may include a no-load test, load test, emergency brake test, static and dynamic test, primary and secondary holding brake test, mechanical load brake test, loss of power test, and component travel and rotate tests.

Category 2 and 3 cranes are tested at 125% +0%/-5%, unless noted otherwise. Hooks and insulated links are inspected annually and tested as outlined in Appendix E. Test paragraphs and results are recorded on the Certification of Load Test and Condition Inspection form. The certifying official's signature on this form confirms that all applicable testing has been conducted as prescribed and that the crane is safe to operate. The emergency drum brake dynamic test is performed with a 100% nominal test load.

Sub-Groups

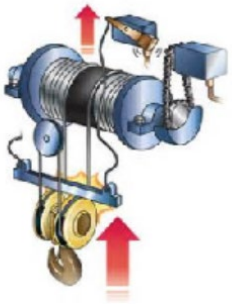
Testing requirements for category 2 and 3 cranes are further broken down into sub-groups which can be found in Sections 6 and 7 of Appendix E. Section 6 focuses on bridge, overhead traveling, gantry, cantilever gantry, and semi-gantry cranes as well as portable gantries and A-Frames with fixed overhead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

Learning Objectives

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

Section 6 No-Load Tests

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



Hoist No-Load Test

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

Emergency Hoist Drum Brake Fault Simulation

Simulate a system fault

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

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

Trolley No-Load Test

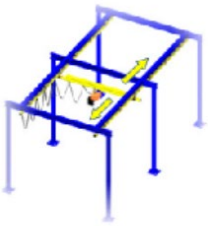
Operate the trolley through the controller range in both directions. Operate the full distance of the bridge rails and slowly contact the trolley rail stops with the bumpers. Verify proper brake operations.

Bridge and Gantry No-Load Test

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

- Travel bridge or gantry through controller range
- Both directions
- Slowly contact bumpers
- Verify braking

- Follow OEM instructions for traveling portable gantries and A-Frames



Test each hook separately

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

Static Load Test

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

Holding Brake

Follow this procedure for cranes that are equipped with primary and secondary brakes. Raise the load, approximately one foot, and hold for 10 minutes. Release the secondary brake and test the primary brake. Observe for lowering. Reset the secondary brake. Repeat the test for the secondary brake by releasing the primary brake. For methods of releasing the holding brake, see Appendix E paragraph 6.2.1.d, Note 1.

Load Brakes

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. 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. If the load brake fails to stop the load from lowering, contact engineering and/or the OEM for further evaluation. Document this information in the equipment history file. For methods of releasing the holding brake, see Appendix E paragraph 6.2.1.d, Note 1. For brakes that are not accessible, observe for expected behavior.

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. The load should stop. If the load does not stop until the controller is returned to neutral, notify engineering and the Navy Crane Center.

Emergency Hoist Drum Brake

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

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

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

Trolley, Bridge, Gantry Motion

Travel the bridge, gantry and trolley at normal speeds. Travel the bridge and gantry the full length of the runway with the trolley positioned at one end of the bridge. Travel the trolley to the opposite end of the bridge and return the bridge to the other end of the runway. Confirm all brake pedals, brakes, and/or automatic braking, as applicable, are functioning properly. Travel portable gantry/A-frames-with-permanently-mounted-hoists with a load only under specific OEM instruction.

- Normal speeds
- Observer for truck binding
- Test with trolley on both sides
- Verify brakes function properly

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

Note: Fun Fact: Do you know the travel path clearances?
While not part of the load test or the load testing process, this is a good place in the lesson to mention travel path clearances, which are: 3" vertical, 2" lateral the full length of runway or span. See 20 CFR 1910.179(b)(6)(i) and/or CMAA 70 1.3 rev 2015 for specific details.

Trolley and Bridge Loss of Power

For each bridge, gantry or trolley without automatic brakes, test the crane's response when stopping in the event of a power failure. For certain cranes, a safety hazard may exist in controlling the motion of the bridge and trolley, and therefore the motion of the load. The hazard can vary due to the speed, size, weight, environment and characteristics of the crane and load. To mitigate, the following actions shall be taken. The operating characteristics of the crane under a loss of power shall be determined by operational field testing, with test load, and recorded. The certifying official shall make a determination that the operating characteristics are within acceptable limits of safety for operations under loss of power. Instructions shall be posted in the cab or on the pendant controller to warn the operator of these characteristics and any necessary precautions.

Section 7 Hoist No-Load Test

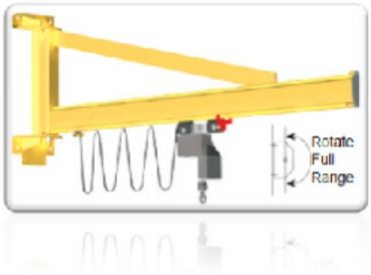
Raise each hook slowly into the hoist limit switch. Raise the hook slowly through the upper limit switch by using the limit switch bypass. Activate the secondary limit switch, where applicable. Lower and raise each hook through the controller range. Lower each hook into the lower limit switch. See additional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

Section 7 Trolley No-Load Test

Operate the trolley through the controller range in both directions. Operate the full length of the monorail or jib and slowly contact the stops. Verify proper brake operations. Operate all rail switches and verify proper operation.

Section 7 Rotate No-Load Test

Rotate jib, pillar, and pillar jib cranes through the working range, where space is available, at maximum radius.



Section 7 Static Load Test

Raise the test load and hold for 10 minutes. If the hook is equipped with a bearing, rotate the load 360 degrees clockwise and counterclockwise to check bearing operation. If there is no anti-friction bearing in the hook block, the hook rotation test may be omitted. Observe for lowering of the load, which may indicate malfunction of hoisting component or brake.

Section 7 Load Brake Tests

Dynamic test including Dynamic Load Brake: Raise and lower the test load and visually observe smooth control and acceleration between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load.

Dynamic Test, including Dynamic Load Brake

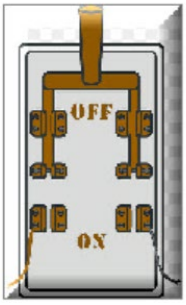
- Raise and lower the test load
- Observe smooth control and acceleration
- Stop the load during hoisting and lowering
- Verify braking

Mechanical Load Brake

- Raise the test load approximately five feet
- With the hoist controller in neutral, release the holding brake
- Load brake shall hold the load
-
- Raise test load
- With the holding brake in the released position, lower test load slowly
- Return controller to neutral
- Load brake shall stop the load

Mechanical Load Brake: Raise the test load approximately 5'. With the hoist controller in the neutral position, release the holding brake. The load brake shall hold the test load. Raise the test load the minimum amount to perform the following test. With the holding brake in the released position, start the test load down slowly and return the controller to the neutral position as the test load lowers. The load brake shall stop the test load. If the load brake does not stop the test load, but prevents the test load from accelerating, activities shall contact the OEM or activity engineering organization to ensure that the load brake is operating as designed. This characteristic and OEM or activity engineering organization correspondence shall be documented in the equipment history file. See Appendix E, paragraph 7.2.1 for specific notes and precautions about this test.

Section 7 Loss of Power Test

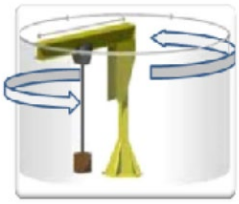


To perform the loss of power, or panic test, hoist the test load to approximately 10’ and, while slowly lowering test load, cut main power to hoist. The load shall stop. Return the controller to the neutral position. If the load does not stop until the controller is returned to the neutral positions for electric hoists, notify the activity engineering organization. Engineering and Navy Crane Center shall review the circuitry to ensure this is the intended OEM design. Certain air hoist designs must be returned to the neutral position before the load will stop. The significance of the stopping distance for air hoists shall be evaluated and published by the certifying official depending on operating requirements and safety.

Section 7 Trolley Load Test

Operate the trolley through the full distance of the monorail or jib. Observe for any malfunctioning of the trolley assembly and alignment of monorail or jib. Verify proper brake operation.

Section 7 Rotate Load Test



For jib, pillar, pillar jib cranes, and davits rotate the crane through the working range at maximum radius, stopping the load at several points. There shall be no excessive drift of jib or trolley at any of these points. If a horizontal force of 15 pounds or less will restrain the load, then the drift is acceptable.

Extension Pins

Current certifications for the listed crane types are not voided, and AEP’s are not required, when removing and installing extension pins and boom angle pins provided the pins are load tested and certified with the crane. OEM instructions shall be followed when installing or removing these items. Other requirements may apply. See Appendix E, paragraphs 6.4 and 7.3 for additional information.

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select all that apply.** From the list below, select the tests that may be performed on category 2 and 3 cranes.

A. Hoist Drive Test
B. Operator Test
C. Component Travel Test
D. Static Load Test
E. Dynamic Load Test

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

A. Before starting any testing
B. While performing the CCIR
C. As soon as the AMISR is complete
D. During the no-load operational test

3. **Select the best answer.** Hooks may remain in service as long as measurements indicate the throat opening has not increased more than 10 percent from the base measurement.

A. True
B. False

4. **Select the best answer**. 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. Static
B. Dynamic
C. Loss of power

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. 2" vertical, 3" lateral
C. 5" vertical, 8" lateral
D. 12" vertical, 12" lateral

6. **Select the best answer**. Load tests for jibs, pillars, pillar-jibs, monorails, davits, and/or fixed overhead hoists are the same as for bridge cranes.

A. True
B. False

7. **Arrange in sequence**. Place the following emergency hoist drum brake no-load test steps in the correct sequential order by writing the number on the line adjacent to the step.

A. ____ Verify brake applies
B. ____ Reconnect
C. ____ Lower at slow speed
D. ____ Disconnect motor encoder
E. ____ Repeat

8. **Select all that apply**. Identify the actions that may be taken to mitigate the risks associated with controlling the motion of the bridge, trolley, and load during a loss or power event.

A. The operating characteristics of the crane under a loss of power shall be determined by operational field testing with test load and recorded
B. Station trained personnel at each disabled hoist brake in case the drum brake fails to stop the test load
C. Instructions shall be posted in the cab or on the pendant controller to warn the operator of this characteristics and any necessary precautions
D. The certifying official shall make a determination that the operating characteristics are within acceptable limits of safety for operations under loss of power
E. None of the listed items above apply

9. **Select the best answer.** You are performing a section 7 load test on a mechanical load brake. The test load is lowering while the holding brake is in the released position. You instruct the operator to place the controller into the neutral position. The load brake does not stop the test load, but prevents the test load from accelerating. What follow-up action shall be taken to evaluate this condition and why?

A. Cut the main power to de-energize all functions
B. Immediately redo the test to see if it can be repeated
C. Contact the OEM or engineering to ensure the load brake is operating as designed
D. Observe lowering of the load to ensure safe landing

10. **Select the best answer to fill in the blanks.** Current certifications for the listed crane types are _____, and AEP's are _____ when removing and installing extension pins and boom angle pins, provided the pins are load tested and certified with the crane.

A. not voided, not required
B. not required, required
C. voided, required
D. voided, not approved

Summary

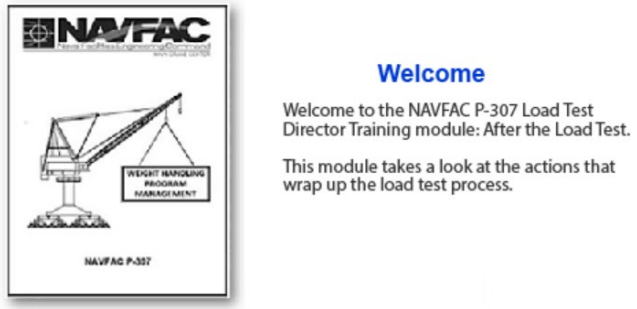
Congratulations. You've completed the Testing Category 2 and 3 Cranes training module. This module, the last of the three crane testing modules, presented information on the load and no-load testing procedures and requirements for various types of crane components and configurations included in categories 2 and 3. Also discussed was how Appendix E is further broken down into sub-groups of these categories which can be found in Sections 6 and 7. Section 6 focuses on bridge, overhead traveling, gantry, cantilever gantry, and semi-gantry cranes as well as portable gantries and A-Frames with fixed overhead hoists. Section 7 addresses jib, pillar, pillar-jib, and monorail cranes, in addition to davits and fixed overhead hoists. Next you will see a short presentation on the expected actions following the completion of a load test.

NOTES

AFTER THE LOAD TEST

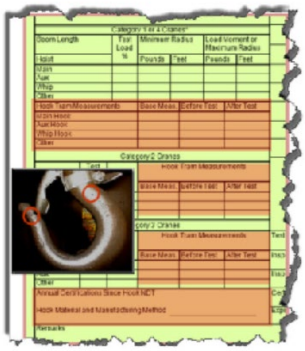
Welcome

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



Learning Objectives

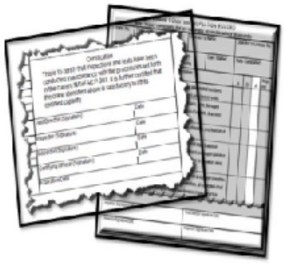
Upon successful completion of this module you will be able to describe the follow-up inspections, re-test and re-inspection actions, documentation and certification requirements, and expected posting and filing activities that complete the certification process.



Post Test Inspections

After the test, check all hooks for hook throat spread. Measure between the tram marks and compare the new measurement to the baseline measurement. Any hooks showing an increase in the throat opening by more than 5%, or ¼“, or as recommended by the hook OEM, from the base measurement shall be discarded. In addition to checking the hooks for throat spread, the condition inspector shall carefully post-inspect the items identified in the “after” or “A” column of the CCIR in the same manner as described in the Condition Inspection training module. Look for any damage that may have occurred during the test. If a major deficiency is found after the load test, it shall be corrected, and a selective load test shall be performed, if required by NAVFAC P-307, paragraph 4.4.2.1, to test the components corrected. When a selective load test is performed, a condition inspection shall be performed on all items on the CCIR that experienced greater than normal loading to ensure that the load test has not caused any damage.

Documentation



Upon completion of all tests and inspections the following shall be performed:

1. A record of any retesting discussed on the previous screen shall be recorded in the "Remarks" portion of the CCIR.
2. The hook tram point measurements and the number of hook NDT annual certification periods shall be validated and recorded on the Certification of Load Test and Condition Inspection form.
3. The CCIR and the Certification of Load Test and Condition Inspection form shall be signed and dated by the inspectors and the test director.

Note: A Certification of Load Test and Condition Inspection shall be signed by the test director, inspection personnel, and the certifying official within 60 days of the performance of the load or no-load test or the condition inspection and test shall be re-performed.

Certification

The certification package shall be submitted to the certifying official for approval and signature. The date of the certifying official's signature is the official certification date, from which the certification expiration date is determined. The crane shall not be returned to service prior to obtaining the certifying official's signature. Completed records are filed in the crane's equipment history file. The certification card, tag, or paperwork shall be posted in the crane cab, on the control station, or in a conspicuous location near the crane.

Knowledge Check

The next several screens contain questions relating to the covered material. Check your comprehension of the course content by answering these questions.

1. **Select all that apply**. Upon completion of all tests and inspections, the following shall be performed---

A. The CCIR and the Certification of Load Test and Condition Inspection form shall be signed and dated by the inspectors and the test director
B. A record of any retesting shall be recorded in the "Remarks" portion of the CCIR
C. The hook tram point measurements and the number of hook NDT annual certification periods shall be validated and recorded on the Certification of Load Test and Condition Inspection form
D. None of the listed items above need to be performed

2. **Select the best answer**. Within what length of time shall the Certification of Load Test and Condition Inspection be signed by test director, inspection personnel, and the certifying official (to avoid rework)?

A.15 days
B. 60 days
C. 90 days
D. 30 days

3. **Select all that apply**. What are the consequences of not signing the Certification of Load Test and Condition Inspection within the specified amount of time?

A. None
B. Re-perform the test
C. Re-perform the MISR
D. Re-perform the condition inspection

4. **Select the best answer.** The date of the certifying official's signature is the official certification date from which the certification expiration date is determined.

A. True
B. False

5. **Select the best answer**. Completed records are filed in the crane's equipment history file. Where shall the certification card, tag, or paperwork be posed at the crane?

A. In a conspicuous location of or near the crane
B. On the controller
C. In the crane cab
D. All of the listed answers above are correct
E. None of the listed answers above are correct

Summary

Congratulations. You've completed the After the Load Test training module.
This module discussed the follow-up inspections, re-test and re-inspection actions, documentation and certification requirements, and expected posting and filing activities that complete the certification process. Next, you will be required to complete a few scenario based exercises that will challenge your knowledge and understanding of the materials presented in this training course. Good luck.

NOTES

LOAD TEST CALCULATION EXERCISES

Welcome

Welcome to the NAVFAC P-307 Load Test Director Training module: Load Test Calculation Exercises. This module allows you to apply the knowledge you've learned in this course to scenario based practical examples.

Learning Objectives

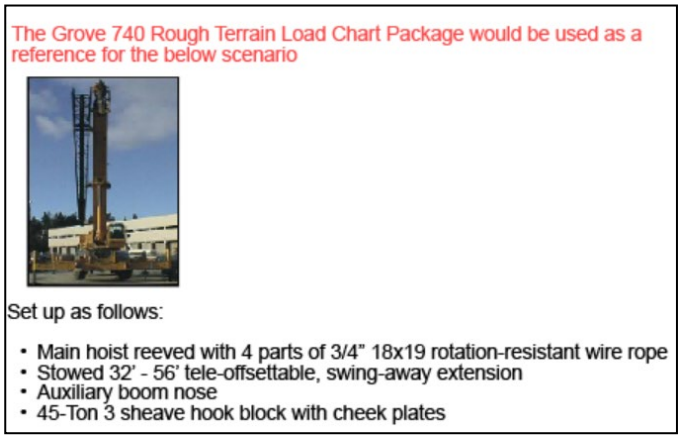
Upon successful completion of this module you will have demonstrated your ability to apply the knowledge learned in this course by correctly identifying and calculating the values for items such as boom length, radius, line pull, test load, test load deductions, and test weights by answering the questions asked in each of the 3 load test calculation exercises.

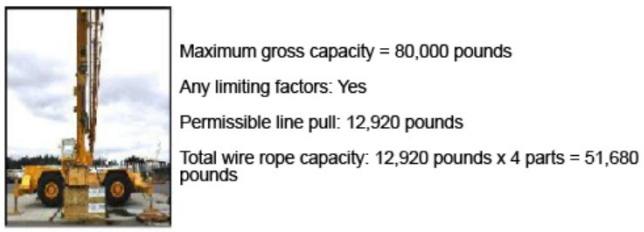
Calculation Exercise References

The Load Test Calculation Exercises will require you to have the load chart packages available for reference. These documents can be found in the Reference area and can either be printed or saved to your computer. These load chart packages may be needed again during the final exam.

Configuration

The next 5 screens provide an example of how the exercises may be completed. This screen describes the crane configuration that will be used for this example. The applicable load chart package should be used to help determine the correct values when answering the questions. In this example you would need the Grove 740 rough terrain load chart package.



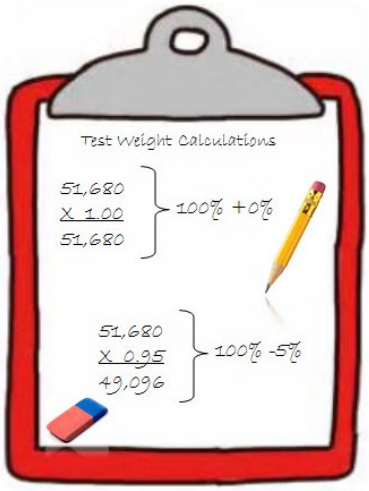


Considerations

Listed here are some of the items that need to be considered when determining values such as maximum gross capacity, limiting factors, line pull, parts of line, etc.

Calculations

Recall from previous training that the nominal test load for a non-third party mobile crane such as this Grove RT 740 is 100% +0%/-5% of the rated capacity, as configured.



To calculate the maximum test load (or 100% + 0%), multiply the rated capacity of the crane by one.

To find the minimum test load (or 100% -5%) multiply the maximum weight by 0.95.

As you see, in this example, the calculations show a maximum test load of 51,680 lbs. and a minimum test load of 49,096 lbs.

Deductions

These deductions come directly from the load chart and include: an 846 lb. tele-off-settable extension, a 143 lb. auxiliary boom nose, and a 1095 lb. hook block. The total weight of deductions, not including rigging gear, is 2,084 lbs.

Deduct:

- Stowed tele-offsettable extension _____ 846 lbs
- Auxiliary boom nose _____ 143 lbs
- 45-ton 3-sheave hook block w/cheek plates __1,095 lbs
- Total _____ 2,084 lbs
- Maximum Test Weight _51,680 lbs - 2,084 lbs = 49,596 lbs
- Minimum Test Weight _ 49,096 lbs - 2,084 lbs = 47,012 lbs

Note: The values shown above do not include the weight deductions for any rigging gear. See training modules "Pre-Test Preparations / Weights and Rigging" and "Crane Testing: General / Tests" for additional information.

To determine the test weight values, these deductions are subtracted from both the maximum and minimum test load values as follows: The maximum test weight value equals the maximum test load value of 51,680 lbs. minus the equipment deductions value of 2,084 lbs. resulting in 49,596 lbs.

Similarly, the minimum test weight value equals the minimum test load value of 49,096 lbs. minus the equipment deductions value of 2,084 lbs. resulting in 47,012 lbs.

Note that these values do not take into account the weight deductions of any rigging gear.

Total Test Load

When calculating the test load and test weight values, remember to include the weight of all rigging gear. On some cranes, the weight of excess wire rope may also be considered a deduction.

Calculation Exercises

There are 3 exercises: one involving the Grove RT 740 hydraulic crane load chart package, one using the Grove RT 865 load chart package, and one requiring the Linkbelt 108 lattice boom truck crane load chart package. You will need all 3 load chart packages.

- This exercise presents questions based on information normally found in a load chart package
- Read each question carefully. Research the appropriate values in the applicable load chart. Determine the correct answers. Select the corresponding answer and check correctness.
- In many cases, the weight of rigging gear and excess wire rope must be considered when calculating deductions, for simplicity, these will not be deducted in these scenarios unless otherwise specified.
- Select the appropriate load chart package on the References topic or screen (Grove RT 740, Grove RT 865, or Link Belt HC 108) to answer the various exercise questions. You will need all three. These PDFs can be printed or saved.

Exercise 1: Grove 740 Rough Terrain Hydraulic Boom Crane Questions and Answers

Set-up: this crane is configured with a 35’ to110’ power boom, a 45 ton 3-sheave hook block with cheek plates, reeved with 6 parts of line (permissible line pull of 12,920 pounds), a 32-foot normally stowed extension, and a 7.5-ton headache ball reeved over the auxiliary boom nose.

1. What is the gross capacity for this crane as configured on outriggers with the boom fully retracted at minimum radius?

A. 67,400 pounds
B. 80,000 pounds
C. 77,520 pounds
D. 56,500 pounds

2. What is the capacity-limiting factor?

A. Wire rope line pull
B. Boom capacity
C. Outriggers
D. Hook block

3. Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?

A. 62,150 lbs. - 65,257 lbs.
B. 88,000 lbs. - 92,400 lbs.
C. 74,140 lbs. - 77,847 lbs.
D. 73,644 lbs. - 77,520 lbs.

4. What is the sum of the equipment deductions for this crane as configured?

A. 2,222 lbs.
B. 2,422 lbs.
C. 1,707 lbs.
D. 2,237 lbs.

5. After equipment deductions, what is the minimum and maximum range for the test weights?

A. 71,718 lbs. - 75,425 lbs.
B. 85,578 lbs. - 89,978 lbs.
C. 71,222 lbs. - 75,098 lbs.
D. 59,728 lbs. - 62,835 lbs.

6. What is the boom length and radius for the load moment test?

A. 60’ boom, 35’ radius
B. 110’ boom, 100’ radius
C. 50’ boom, 10’ radius
D. 60’ boom, 15’ radius

7. What is the minimum and maximum test load range for the load moment test? (Do not include any deductions.)

A. 36,300 lbs. - 38,115 lbs.
B. 63,910 lbs. - 67,105 lbs.
C. 1,969 lbs. - 2,067 lbs.
D. 16,578 lbs. - 17,578 lbs.

8. What is the minimum and maximum test load values for the auxiliary hoist on this crane? (Do not include any deductions)

A. 12,274 lbs. - 12,920 lbs.
B. 16,500 lbs. - 17,325 lbs.
C. 13,835 lbs. - 14,527 lbs.
D. 15,000 lbs. - 15,750 lbs.

9. What is the boom length and maximum radius for the auxiliary hoist test? (No on-rubber capacity required)

A. 110’ boom, 45’ radius
B. 35’ boom, 35’ radius
C. 110’ boom, 35’ radius
D. 35’ boom, 10’ radius

Exercise 2: Grove 865 Rough Terrain Hydraulic Boom Crane Questions and Answers

Set-up: The crane is configured with a stowed 35’ to 60’ tele-extension, an auxiliary boom head, a 65 ton 6-sheave hook block without cheek plates, and a 10-ton headache ball. It’s reeved with 10 parts of line with a permissible line pull of 12,920 pounds. Only use on-outrigger capacities with outriggers fully extended.

1. Considering the limiting factors, what is the maximum gross capacity of this crane as configured?

A. 129,200 pounds
B. 130,000 pounds
C. 105,000 pounds
D. 126,721 pounds

2. What is the limiting factor?

A. Boom capacity
B. Wire rope line pull
C. Outriggers
D. Hook block

3. Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?

A. 139,393 lbs. - 146,362 lbs.
B. 143,000 lbs. - 150,150 lbs.
C. 115,500 lbs. - 121,275 lbs.
D. 122,740 lbs. - 129,200 lbs.

4. What is the sum of the equipment deductions for this crane as configured?

A. 3,615 lbs.
B. 25,191 lbs.
C. 3,279 lbs.
D. 24,873 lbs.

5. After equipment deductions, what are the minimum and maximum values for the test weights?

A. 119,461 lbs. - 125,921 lbs.
B. 139,721 lbs. - 146,871 lbs.
C. 112,221 lbs. - 117,996 lbs.
D. 136,114 lbs. - 143,083 lbs.

6. What is the boom length and radius during this test?

A. 40’ boom, 10’ radius
B. 125’ boom, 110’ radius
C. 45’ boom, 10’ radius
D. 40’ boom, 30’ radius

7. What is the boom length and radius for the load moment test?

A. 60’ at a 20’ radius
B. 75’ at a 25’ radius
C. 100’ at a 30’ radius
D. 65’ at a 25’ radius

8. What is the minimum and maximum test load values for the auxiliary hoist on this crane? (Do not include any deductions)

A. 12,274 lbs. - 12,920 lbs.
B. 16,500 lbs. - 17,325 lbs.
C. 13,835 lbs. - 14,527 lbs.
D. 15,000 lbs. - 15,750 lbs.

Exercise 3: Link Belt 108C Lattice Boom Truck Crane Questions and Answers

Set-up: This crane is configured with 120’ of boom, a 50 ton block reeved with 4-parts of 3/4” wire rope (16,800 pounds rated load), a 30‘ jib at 0º offset and an 8.5-ton headache ball. On-outrigger capacities only.

1. What is the maximum gross capacity of this crane as configured?

A. 31,200 pounds
B. 100,000 pounds
C. 3,300 pounds
D. 20,600 pounds

2. What is the capacity limiting factor?

A. Tipping capacity
B. Wire rope capacity
C. Structural capacity
D. Hook block capacity

3. Prior to any equipment deductions, what are the minimum and maximum test load values for testing this crane to full capacity as configured?

A. 29,640 lbs. - 31,200 lbs.
B. 110,000 lbs. - 115,500 lbs.
C. 3,630 lbs. - 3,811 lbs.
D. 22,660 lbs. - 23,793 lbs.

4. What will the boom angle and radius be during the test?

A. 68.2º angle, 60’ radius
B. 39.5º angle, 120’ radius
C. 76.2º angle, 40’ radius
D. 77.6º angle, 30’ radius

5. What is the sum of the equipment deductions for this configuration?

A. 2,595 lbs.
B. 3,125 lbs.
C. 2,475 lbs.
D. 1,250 lbs.

6. What is the radius for the load moment test?

A. 40’ radius
B. 35’ radius
C. 45’ radius
D. 50’ radius

7. What will be the minimum and maximum test weight range for the job?

A. 9,500 lbs. - 10,000 lbs.
B. 20,300 lbs. - 21,505 lbs.
C. 8,800 lbs. - 9,240 lbs.
D. 6,600 lbs. - 6,930 lbs.

Summary

Congratulations. You’ve completed the Load Test Calculations Exercises training module. This module allowed you to test your knowledge, skills and abilities to derive the pertinent information from the load charts of various cranes and to calculate the proper test load and test weight values. This completes the content presentation portion of this course. Next, you will be provided a summary of the course and its objectives. Following the course summary you will have the opportunity to test your knowledge by taking the final exam.

NOTES

COURSE SUMMARY

Welcome

Welcome to the NAVFAC P-307 Load Test Director Course Summary module.

Course Summary

Congratulations. You've completed all the course materials. This training course provided information found throughout the NAVFAC P-307 manual but more specifically it covered information found in Section 4 and Appendix E.

As an introduction to safe crane testing, you were provided an overview of the NAVFAC P-307 Weight Handling Program Management Manual followed by a general understanding of the purpose of the Navy's crane certification program and the people and paperwork needed to safely test Navy cranes. Equipped with this information, and recognizing the fact that safety is the most important aspect of crane testing, you then acquired knowledge that allows you to not only identify what preparations are needed for safe crane testing but also the ability to explain why certain preparations are necessary and why such a high level of safety is compulsory.

This included establishing a safe test area, knowing your test team members and their responsibilities, conducting team briefings, identifying whether or not testing is required and if so which tests, accurately calculating test load and test weight values for different types of cranes and configurations, and correctly performing and documenting inspections and tests.

You learned specific load and no-load testing procedures and requirements for the various types of crane components and configurations found in all categories of cranes. You were repeatedly reminded throughout this training that when you execute your weight test tasks and duties, you should refer directly to the NAVFAC P-307 manual or your local procedures for exact wording and requirements.

Thank you for taking the time to improve your knowledge and ability to test cranes safely, to improve the safety of the Navy's weight handling program, to improve the safety of your work environment, and ultimately, to improve the safety of the people who work with and around the equipment you test. Next you will be provided an opportunity to test the knowledge you gained from this training. A minimum score of 80% is required to pass the final exam. Good luck.

NOTES

Naval Facilities Engineering Command
NAVY CRANE CENTER

LOAD TEST DIRECTOR COURSE EVALUATION SHEET

Student Name: _____ Command: _____

Course Title: _____ Date: _____

Instructor: _____

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_____