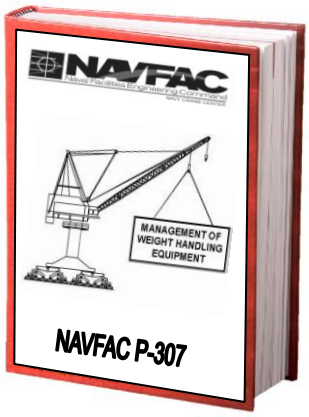
Navy Crane Center



NAVFAC P-307 Training

LOAD TEST DIRECTOR

WEB BASED TRAINING STUDENT GUIDE

NCC-LTD-03

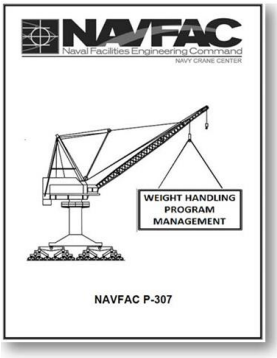
Naval Facilities Engineering Command
Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709-5000
Comm. Phone: 757.967.3803, DSN: 387
Fax: 757.967.3808
http://www.navfac.navy.mil/ncc

TABLE OF CONTENTS

COURSE INTRODUCTION

WELCOME

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.



Load Test Director

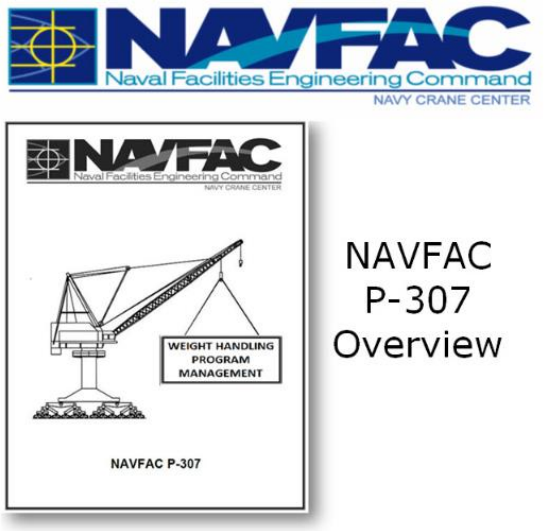
OBJECTIVES

Following a brief explanation on navigating this type of web based training course, you will be required to complete an overview of the NAVFAC P-307 Weight Handling Program Management Manual.

This is followed by detailed information that will allow you to: identify the people, paperwork and purposes for testing Navy cranes, explain the necessary preparations for conducting a safe load test, identify the required tests for different types of cranes, correctly perform and document a condition inspection, accurately calculate test loads and test weights, and identify the load test team members and their responsibilities.

NAVFAC P-307 OVERVIEW SECTION 1-14

WELCOME



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.

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

SECTION 1: GENERAL

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.

Applicability

NAVFAC P-307 applies to Navy shore activities, including Navy activities on joint bases and bases of other military services and agencies; Naval Construction Forces, including the naval construction training centers, and naval special operating units; and fleet activities and detachments that operate shore based weight handling equipment. NAVFAC P-307 meets or exceeds all applicable OSHA requirements for maintenance, inspection, testing, certification, repair, alteration, and operation of equipment.

Equipment

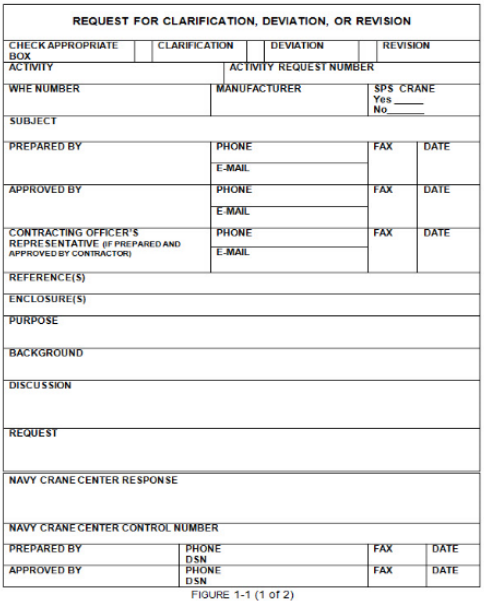
NAVFAC P-307 covers shore-based category 1, 2, 3, and 4 cranes including shore-based barge-mounted cranes. Detailed descriptions of the crane types are contained in Section 1. Illustrations of individual crane types can be found in Appendix B. Rigging Gear is covered in Section 14.

Program

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

Figure 1-1

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



REQUEST FOR CLARIFICATION, DEVIATION, OR REVISION

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

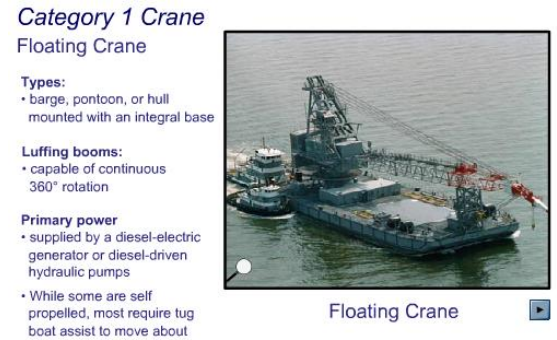
FIGURE 1-1 (1 of 2)

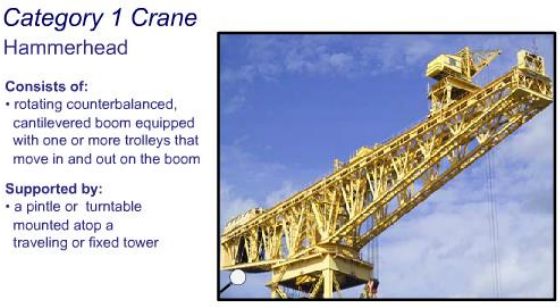
Figure 1-1: Request for Clarification, Deviation, or Revision (RCDR)

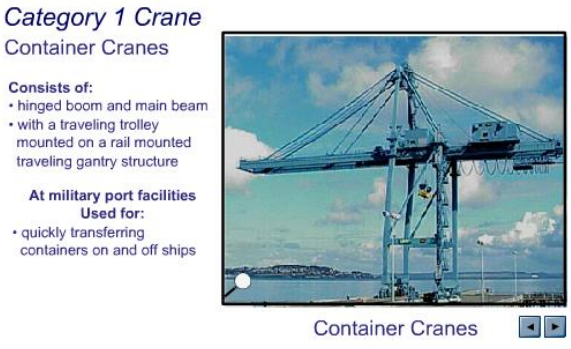
Category 1 Cranes & Examples

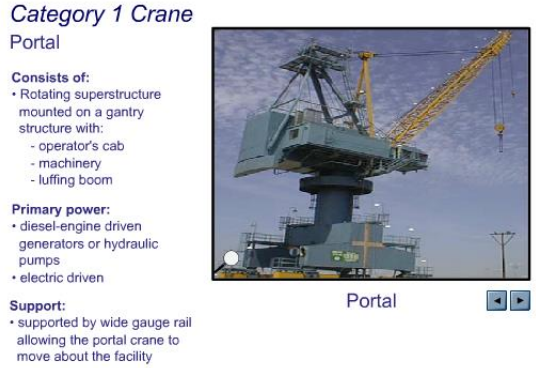
This is a list of some of the more common types of category 1 cranes. Category 1 cranes come in a wide variety of sizes and configurations and include: portal cranes, hammerhead cranes, locomotive cranes, derricks, YD floating cranes*, tower cranes, container cranes, mobile cranes, aircraft crash cranes,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

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









Category 1 Crane
Mobile Crane

Example:
Truck mounted hydraulic Cranes
• most common mobile cranes

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

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

Mobile

Category 1 Crane
Derrick

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

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

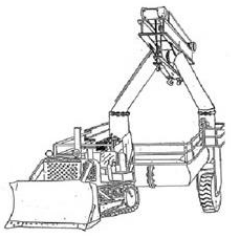
Derrick

MBH

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

LCRU

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



RTG

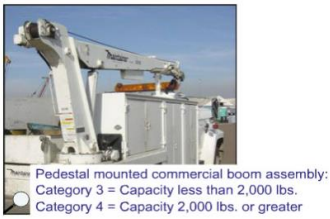
A rubber tire gantry crane may be single beamed or double beamed. Often it resembles a mobile bridge crane with its hoist mounted on a bridge which spans two beams. As shown in the illustration, it may be configured with two hoists mounted on opposing beams which utilize a spreader bar or similar mechanism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

Category 4 Crane Examples

Screen 1, General: Typically, category 4 cranes are independently manufactured boom mechanisms that are subsequently attached to or mounted on commercially available trucks. These cranes are operated independent of the vehicle controls from standard ground control stations and may be powered by the truck engine or a power sending unit. The booms may rotate or articulate. Outriggers or stabilizers shall be used as required. Click on the right and left arrows at the bottom of the slide show window to view each of the 4 screens.

Screen 2, Booms & Mounts: Category 4 cranes have different types of boom configurations such as: telescoping, non-telescoping, and articulating. They may be mounted on flatbed trucks, trailers, stake beds, rail cars, barges and pontoons, or may be stationary mounted on piers, wharves, and docks.

Screen 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.



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

Category 2 and 3 Cranes

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

Capacity

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

EXAMPLES

Category 2 and 3 Cranes

Bridge or OET Crane

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

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

Mobility:
- limited to the area between the runways

Bridge or OET Crane

Category 2 and 3 Cranes

Pillar-Jib Crane

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

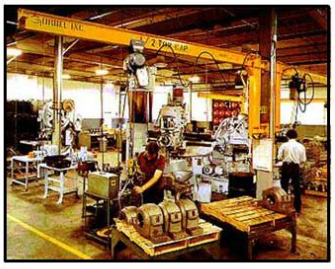
Pillar Jib

Category 2 and 3 Cranes

Jibs

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

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



Jib

Category 2 and 3 Cranes

Trolley Mounted Overhead Hoist

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

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

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

Trolley Mounted Overhead Hoist

SECTION 2: PROGRAM MANAGEMENT

Introduction

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

Topics

Derived from the lessons learned and best practices of several successful weight handling organizations, section 2 offers information to aid your organization in successfully managing its weight handling program. Click on the lower part of the screen to view a list of topics found in section 2 which 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: MAINTENANCE, INSPECTION, CERTIFICATION, EQUIP HISTORY FILE

Introduction

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

Topics

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

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

Section 4 picks up after maintenance and provides the requirements for certifying a crane for use. This includes personnel requirements, certification periodicities, load test requirements, test weights and capacities, the voiding and extending of certifications, considerations for specific types of equipment, and an explanation of the crane condition inspection. Section 4 also addresses third party certification of cranes and equipment used in cargo transfer and floating cranes used in ship repair.

Section 5 is all about documentation and requires an equipment history file to be kept for each crane. It also provides a list of the various documents that must be kept in the history file as well as the lengths of time they must be retained.

Certification Posting

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

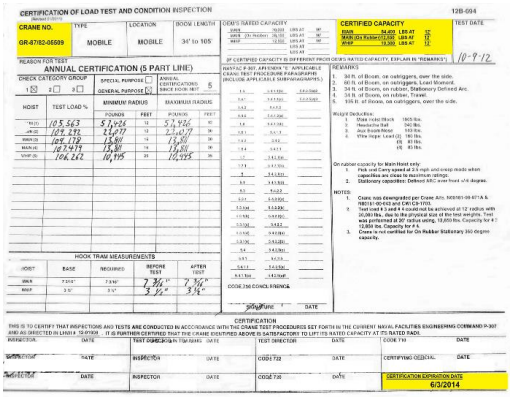


Figure 3-1

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

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.

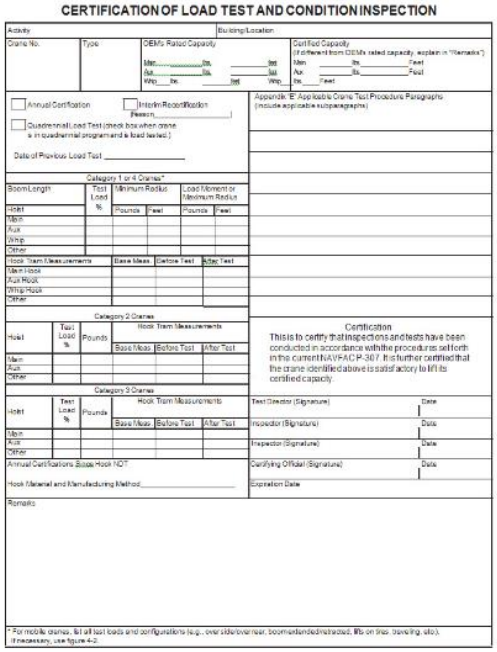

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Figure 4-1

Figure 4-1: CoLTaCI

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.

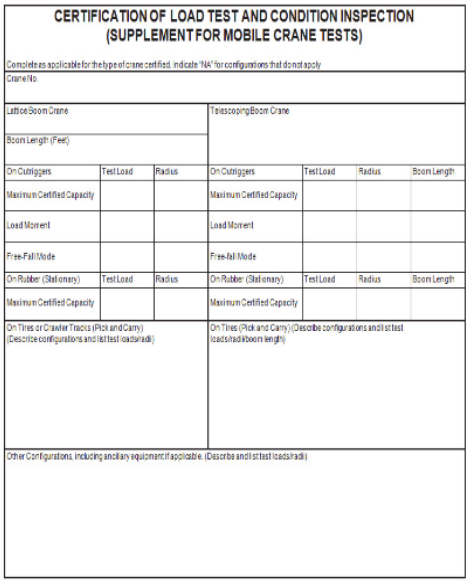

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION
(SUPPLEMENT FOR MOBILE CRANE TESTS)

Figure 4-2

Figure 4-2: CoLTaCI Supplement

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.

Figure 4-3

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

CRANE CONDITION INSPECTION RECORD

Note: Inspect components that are reasonably accessible without disassembly.

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

Item No.	Item Description	B	D	A	Insp/ Init.
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 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, 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)

Figure 4-3: CCIR

SECTION 6: ALTERATIONS AND ENGINEERING

Introduction

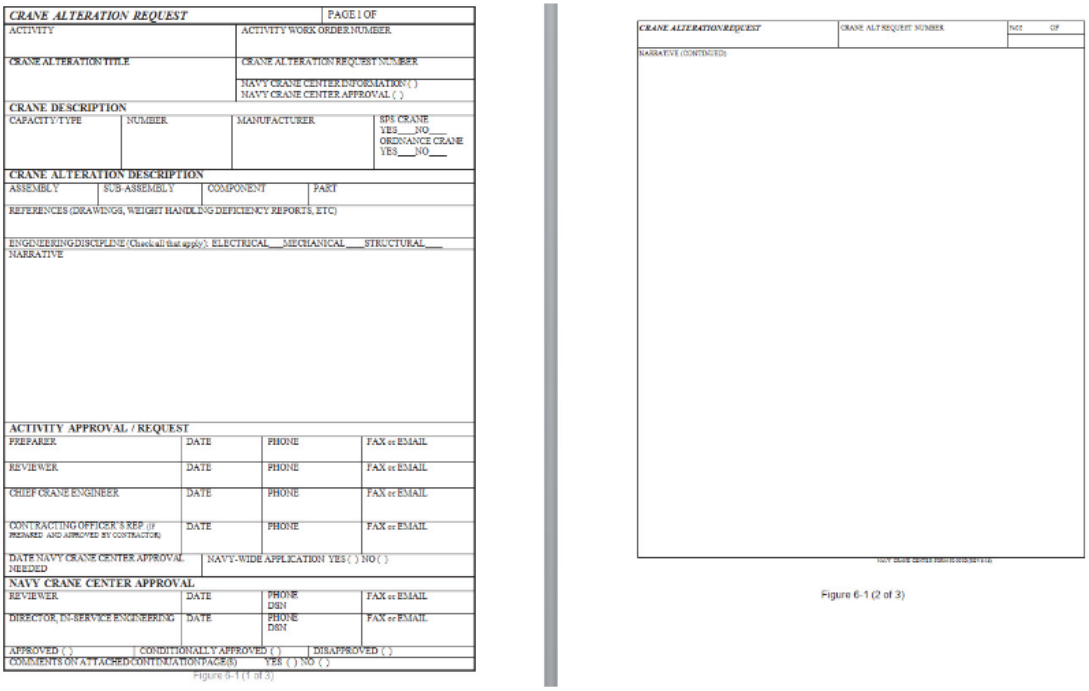
NAVFAC P-307 Section 6 provides requirements regarding the use and processing of the different types of crane alterations as well as engineering reasoning, considerations, and guidance on various other equipment related topics.

Topics

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

Figure 6-1

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



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	SDS 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 ALT REQUEST NUMBER | PAGE OF

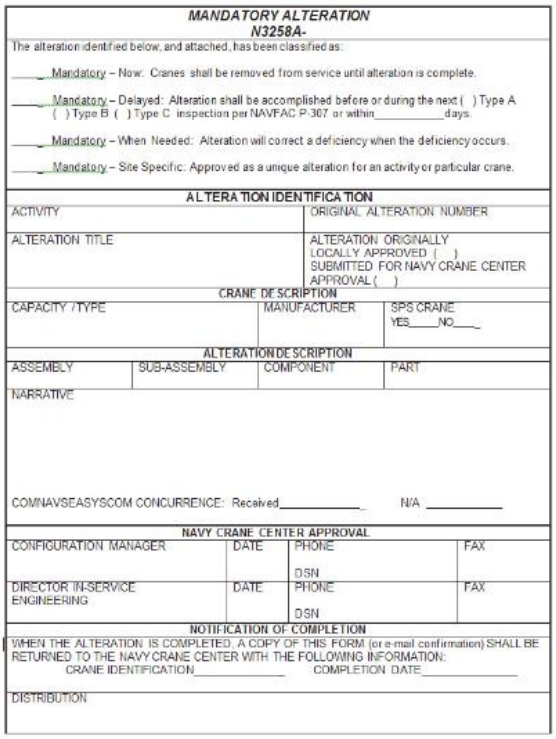
NARRATIVE (CONTINUED)

Figure 6-1 (2 of 3)

Figure 6-1: Crane Alteration Request (CAR)

Figure 6-2

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



MANDATORY ALTERATION
N3258A-

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

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

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

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

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

ALTERATION IDENTIFICATION

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

CRANE DESCRIPTION

CAPACITY /TYPE	MANUFACTURER	SPS CRANE YES____NO____

ALTERATION DESCRIPTION

ASSEMBLY	SUB-ASSEMBLY	COMPONENT	PART

NARRATIVE

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

SECTIONS 7 AND 8: TRAINING, QUALIFICATION, AND OPERATOR LICENSING

Introduction

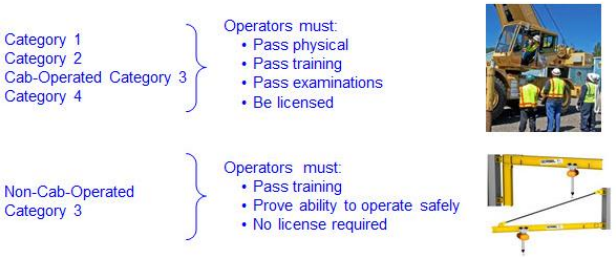
NAVFAC P-307 Sections 7 and 8 provide information on the training, testing, licensing, and competency requirements for personnel who work in a weight handling program managed in accordance with NAVFAC P-307.

Section 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 N E L. Click on the Table 7-1 link below the picture to view Table 7-1. Drag the corner of the window to resize the table.

Section 8

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



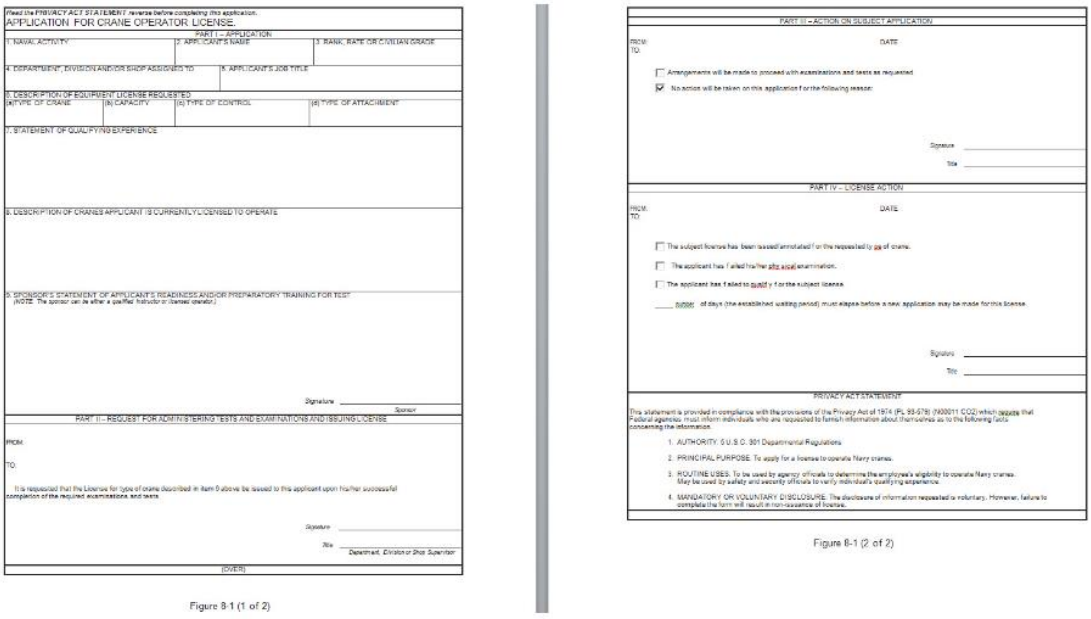
Licenses are not required to operate non-cab operated category 3 cranes. However, training and a demonstration of ability to operate safely are required.

Ops 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

1. NAVAL ACTIVITY | 2. APPLICANT'S NAME | 3. RANK, RATE OR CIVILIAN GRADE

4. DEPARTMENT, DIVISION AND/OR SHOP ASSIGNED TO | 5. APPLICANT'S JOB TITLE

6. DESCRIPTION OF EQUIPMENT LICENSE REQUESTED

(a) TYPE OF CRANE | (b) CAPACITY | (c) TYPE OF CONTROL | (d) TYPE OF ATTACHMENT

7. STATEMENT OF QUALIFYING EXPERIENCE

8. DESCRIPTION OF CRANES APPLICANT IS CURRENTLY LICENSED TO OPERATE

9. SPONSOR'S STATEMENT OF APPLICANT'S READINESS AND/OR PREPARATORY TRAINING FOR TEST
(NOTE: The sponsor can be either a qualified instructor or (license) operator.)

Signature _____ Sponsor

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

FROM:

TO:

It is requested that the License for type of crane described in item 6 above be issued to this applicant upon his/her successful completion of the required examinations and tests.

Signature _____

Title _____ Department, Division or Shop Supervisor

(OVER)

Figure 8-1 (1 of 2)

PART III – ACTION ON SUBJECT APPLICATION

FROM: DATE

TO:

☐ Arrangements will be made to proceed with examinations and tests as requested.

☑ No action will be taken on this application for the following reason:

Signature _____

Title _____

PART IV – LICENSE ACTION

FROM: DATE

TO:

☐ The subject license has been issued/annotated for the requested type of crane.

☐ The applicant has / failed his/her ____ examination.

☐ The applicant has / failed to qualify for the subject license.

____ number of days (the established waiting period) must elapse before a new application may be made for this license.

Signature _____

Title _____

PRIVACY ACT STATEMENT

This statement is provided in compliance with the provisions of the Privacy Act of 1974 (PL 93-579) (7400011 CO2) which requires that Federal agencies must inform individuals who are requested to furnish information about themselves as to the following facts concerning the information.

1. AUTHORITY: 5 U.S.C. 301 Departmental Regulations.
2. PRINCIPAL PURPOSE: To apply for a license to operate Navy cranes.
3. ROUTINE USES: To be used by agency officials to determine the employee's eligibility to operate Navy cranes. May be used by safety and security officials to verify individual's qualifying experience.
4. MANDATORY OR VOLUNTARY DISCLOSURE: The disclosure of information requested is voluntary. However, failure to complete the form will result in non-issuance of license.

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.

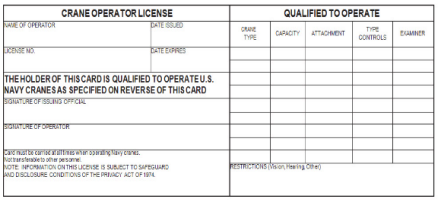


Figure 8-2: Crane Operator License

Figure 8-3

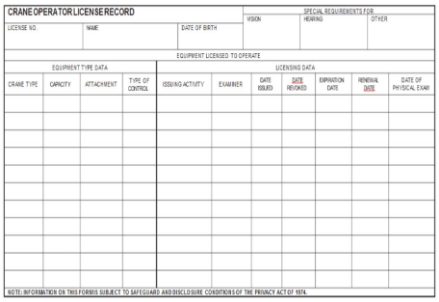


Figure 8-3: Crane Operator License Record

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

SECTION 9: OPERATOR CHECKS

Introduction

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

Operator Checks

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

Figure 9-1

CRANE OPERATOR'S DAILY CHECKLIST

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

OPERATORS

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

1. WALK AROUND CHECK	S	U	NA
a. SAFETY GUARDS AND PLATES			
b. Center Frame and Rotate Base	*		
c. General Hardware			
d. Wire Rope	*		
e. Reeving	*		
f. Block	*		
g. Hook	*		
h. Sheaves or Sprockets	*		
i. Boom and Jib	*		
j. Gantry, Pendants, and Boom Stops	*		
k. Walkways, Ladders, and Handrails	*		
l. Wind Locks, Stops, and Bumpers	*		
m. Tires, Wheels, and Tracks	*		
n. Leaks			
o. Outrigger/Stabilizers	*		
p. Load Chain	*		
q. Knee Safety	*		
r. Danger/Caution Tags	*		
s. Instructions			

2. MACHINERY HOUSE CHECK	S	U	NA
a. Housekeeping			
b. Diesel Engine and Generator	*		
c. Leaks			
d. Lubrication			
e. Battery			
f. Lights			
g. Glass			
h. Clutches and Brakes	*		
i. Electric Motors	*		
j. Auxiliary Engine and Compressor			
k. Danger/Caution Tags	*		
l. Fire Extinguishers			
m. Hoist Drum Parts and Ratchets	*		

3. OPERATOR CAB CHECK	S	U	NA
a. Gauges			
b. Indicator and Warning Lights			
c. Visibility	*		
d. Load Rating Charts	*		
e. Luff/Trim Indicator (Floating Cranes)	*		
f. Boom Angle/Radius Indicator	*		
g. Fire Extinguisher			
h. Level Indicator (Mobile Cranes)	*		
i. Danger/Caution Tags	*		
j. Instructions			
k. Housekeeping			

4. OPERATIONAL CHECK	S	U	NA
a. Knee Safety	*		
b. Outrigger/Stabilizers	*		
c. Unusual Noises			
d. Controls and Control Action	*		
e. Wire Rope or Chain	*		
f. Sprockets and Clutches	*		
g. Boom Angle/Radius Indicator	*		
h. Load Indicators	*		
i. Emergency Stop	*		
j. Other Operational Safety Devices	*		
k. Operational Safety Devices			
l. Reeving Sheaves			

INSTRUCTIONS: Check all applicable items indicated each shift. Suspend any operations immediately upon discovery of 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)

Figure 9-1, the *Crane Operator's Daily Checklist* or O D C L, shall be used to document the pre-use equipment and safety checks. This shall be performed by the operator prior to the first use of the crane each day. The first operator in each subsequent shift shall perform the operational checks of paragraph 9 point 1 point 2 point 1 point 4. All other operators shall review and sign the O D C L and review any tags posted on the crane. For cranes used in construction operations, a complete check shall be performed each shift.

SECTION 10: OPERATIONS

Introduction

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

Operations

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

SECTION 11: CONTRACTOR AND OTHER NON-NAVY OWNED CRANES

Introduction

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

Non-Navy WHE

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

SECTION 12: ACCIDENTS, NEAR MISSES, AND UNPLANNED OCCURRENCES

Introduction

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

Topics

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

Significant Accident

A significant accident is an accident that typically has a greater potential to result in serious injury or substantial property damage. The following accident types are considered significant accidents: injuries (regardless of severity), overloads, dropped loads, two-blocks, crane derailments, 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
- The lift procedure

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

- Personnel injury or death
- Material or equipment damage
- Dropped load
- Derailment
- Two-blocking
- Overload
- Collision

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

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

Rigging Accident

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

- Rigging gear or miscellaneous equipment identified in section 14
- The user of the gear or equipment
- Other personnel involved in the operation
- The load
- The gear or equipment’s supporting structure
- The load’s rigging path
- The rigging or lift procedure

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

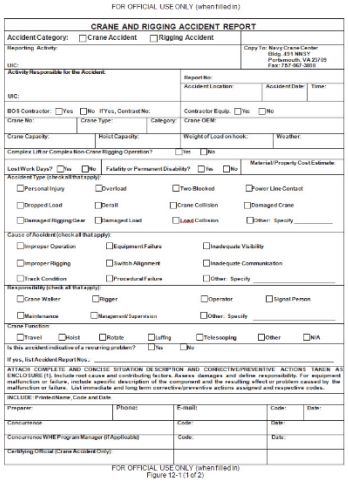
- Personnel injury or death
- Material or equipment damage that requires the damaged item to be repaired because it can no longer perform its intended function. This does not include superficial damage such as scratched paint, minor lagging damage, or normal wear on rigging gear.
- Dropped load
- Two-blocking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

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

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

Figure 12-1

For each suspected accident, activities shall promptly perform an investigation. Activities shall prepare a *Crane and Rigging Accident Report*, figure 12-1 (available on the Navy Crane Center web site), and forward a copy to the Navy Crane Center within 30 days of the accident.



FOR OFFICIAL USE ONLY (when filled in)

CRANE AND RIGGING ACCIDENT REPORT

Accident Category: ☐ Crane Accident ☐ Rigging Accident

Reporting Activity: | Copy To: Navy Crane Center, Bldg. 401 NNSY, Portsmouth, VA 23709, Fax: 757-967-3808

UIC:

Activity Responsible for the Accident: | Report No: | Accident Location: | Accident Date: | Time:

UIC:

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

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

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

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

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 ☐ Tip-off ☐ 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 Conditions ☐ 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? ☐ No ☐ Yes

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.

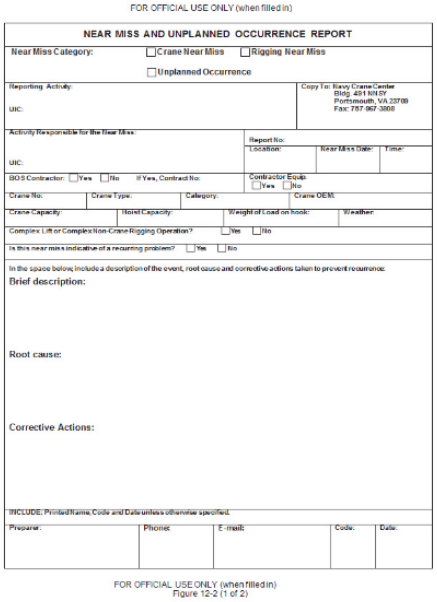
Preparer:	Phone:	E-mail:	Code:	Date:
Concurrence:			Code:	Date:
Concurrence: WHEP Program Manager (If Applicable)			Code:	Date:
Certifying Official (Crane Accident Only):				

FOR OFFICIAL USE ONLY (when filled in)

Figure 12-1 (1 of 2)

Figure 12-1: Crane and Rigging Accident Report

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)

NEAR MISS AND UNPLANNED OCCURRENCE REPORT

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

Reporting Activity: | Copy To: Navy Crane Center, Bldg. 401 NNSY, Portsmouth, VA 23709, Fax: 757-967-3808

UIC:

Activity Responsible for the Near Miss: | Report No: | Near Miss Date: | Time:

UIC:

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

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

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

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

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

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

Brief description:

Root cause:

Corrective Actions:

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

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

FOR OFFICIAL USE ONLY (when filled in)

Figure 12-2 (1 of 2)

Figure 12-2: Near Miss and Unplanned Occurrence Report

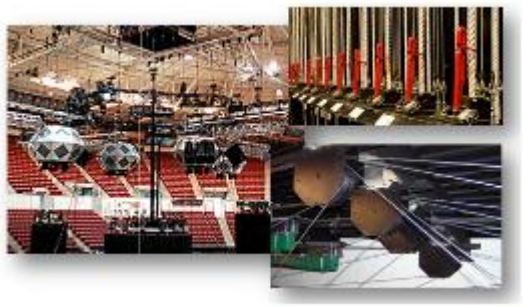
Figure 12-2

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

SECTION 13: ENTERTAINMENT HOISTS

Introduction

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



Entertainment Hoists

Entertainment hoists, as defined in appendix A, shall meet all of the requirements shown regarding design, installation, testing, maintenance, operations and record keeping. If the hoist cannot meet all of these requirements, then the hoist shall be treated as a category 2 or 3 crane.

Section 13 also provides requirements for alterations to entertainment hoists, compliance reviews for existing entertainment hoists, procurement of new hoists, and accident, near miss, and unplanned occurrence reporting.

SECTION 14: RIGGING GEAR AND MISCELLANEOUS EQUIPMENT

Introduction

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

Gear and Equipment

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

Appendix A: Glossary

Introduction

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

Glossary

The glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307 and for improved communications within the Navy's weight handling management program. Roll you mouse over each question below to view three sample definitions found in the glossary.

Appendix B: Types of WHE

Introduction

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

Types of WHE

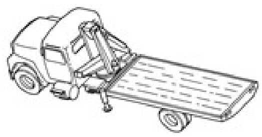
They say a picture is worth a thousand words. If so, Appendix B reads like a novel. It contains close to 50 drawings that illustrate the basic configurations of many crane types found in the Navy's inventory. Like Appendix A, it is intended to improve communication and understanding within the Navy's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

A sampling of Appendix B illustrations is provided below. Test your understanding by correctly matching terms 1 through 7 to the pictured cranes by clicking in the appropriate box.

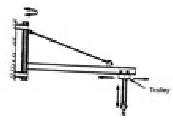
Types of Cranes

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

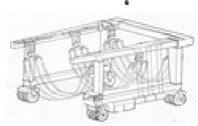
1. Semi-Gantry Crane
2. Rubber-Tired Gantry
3. Commercial Truck Mounted Articulating Boom Crane
4. Jib crane
5. Pillar Jib Crane
6. Mobile Boat Hoist
7. Portal Crane



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



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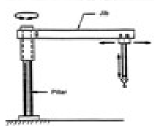

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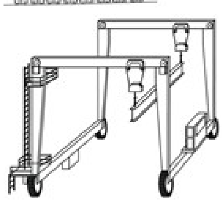
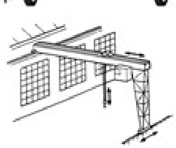
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7



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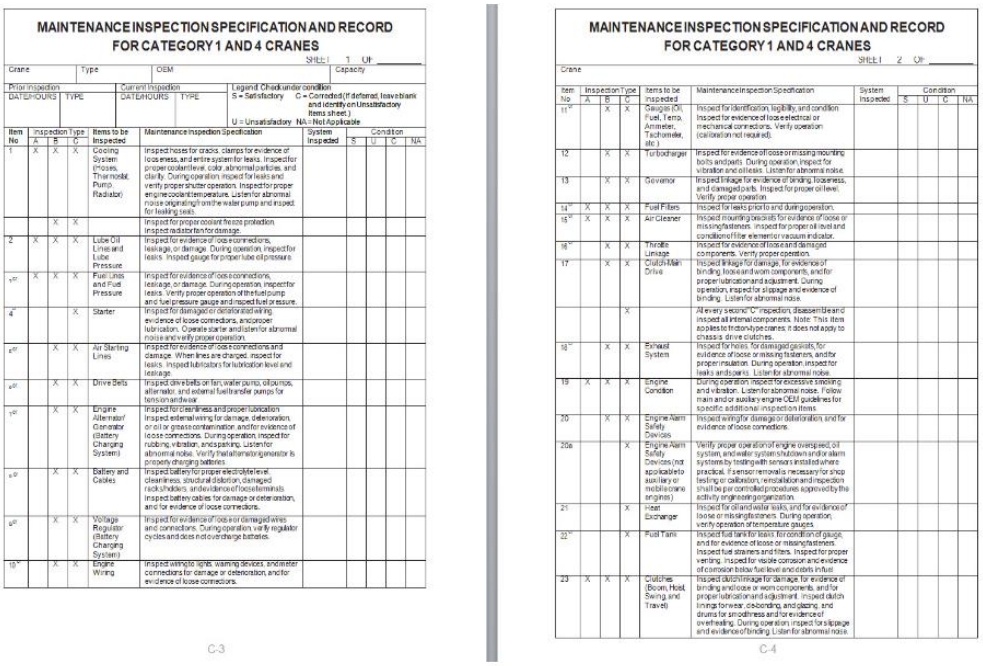
APPENDICES C AND D: MISR AND AMISR

Introduction

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

MISR

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



MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 AND 4 CRANES

SHEET 1 OF _____

Crane | Type | OEM | Capacity

Prior Inspection: DATE/HOURS | TYPE
Current Inspection: DATE/HOURS | TYPE

Legend: Check under condition
S = Satisfactory C = Corroded (If deferred, leave blank and identify on Unsatisfactory Items sheet.)
U = Unsatisfactory NA = Not Applicable

Item No	Inspection Type A	B	C	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	U	C	NA
1	X	X	X	Cooling System (Hoses, Thermostat, Pump, Radiator)	Inspect hoses for cracks; clamps for evidence of looseness, and entire system for leaks. Inspect for proper coolant level, color, abnormal particles, and clarity. During operation, inspect for leaks and verify proper shutter operation. Inspect for proper engine coolant temperature. Listen for abnormal noise originating from the water pump and inspect for leaking seals.					
		X	X		Inspect for proper coolant freeze protection. Inspect radiator fan for damage.					
2	X	X	X	Lube Oil Lines and Lube Pressure	Inspect for evidence of loose connections, leakage, or damage. During operation, inspect for leaks. Inspect gauge for proper lube oil pressure.					
3[1]	X	X	X	Fuel Lines and Fuel Pressure	Inspect for evidence of loose connections, leakage, or damage. During operation, inspect for leaks. Verify proper operation of the fuel pump and fuel pressure gauge and inspect fuel pressure.					
4			X	Starter	Inspect for damaged or deteriorated wiring, evidence of loose connections, and proper lubrication. Operate starter and listen for abnormal noise and verify proper operation.					
5[2]		X	X	Air Starting Lines	Inspect for evidence of loose connections and damage. When lines are charged, inspect for leaks. Inspect lubricators for lubrication level and leakage.					
6[2]		X	X	Drive Belts	Inspect drive belts on fan, water pump, oil pumps, alternator, and external fuel transfer pumps for tension and wear.					
7[2]		X	X	Engine Alternator/ Generator (Battery Charging System)	Inspect for cleanliness and proper lubrication. Inspect external wiring for damage, deterioration, or oil or grease contamination, and for evidence of loose connections. During operation, inspect for rubbing, vibration, and sparking. Listen for abnormal noise. Verify that alternator/generator is properly charging batteries.					
8[2]		X	X	Battery and Cables	Inspect battery for proper electrolyte level, cleanliness, structural distortion, damaged racks/holders, and evidence of loose terminals. Inspect battery cables for damage or deterioration, and for evidence of loose connections.					
9[2]		X	X	Voltage Regulator (Battery Charging System)	Inspect for evidence of loose or damaged wires and connections. During operation, verify regulator cycles and does not overcharge batteries.					
10[3]		X	X	Engine Wiring	Inspect wiring to lights, warning devices, and meter connections for damage or deterioration, and for evidence of loose connectors.					

C-3

MAINTENANCE INSPECTION SPECIFICATION AND RECORD
FOR CATEGORY 1 AND 4 CRANES

SHEET 2 OF _____

Crane

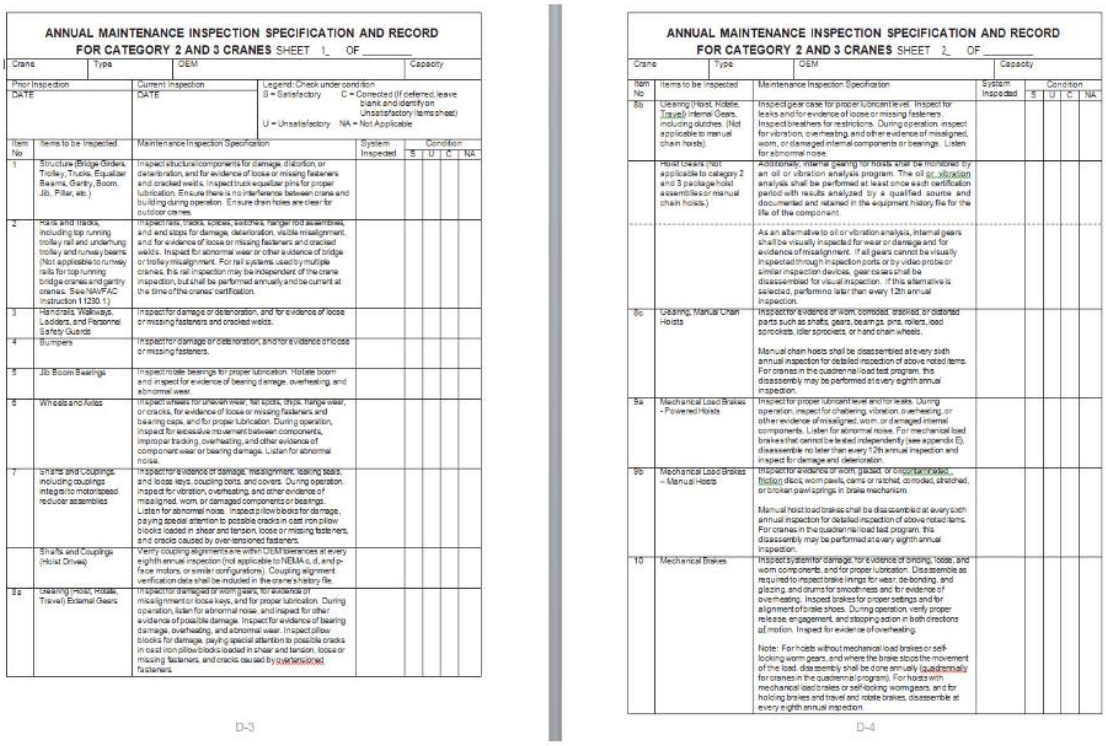
Item No	Inspection Type A	B	C	Items to be Inspected	Maintenance Inspection Specification	System Inspected	Condition S	U	C	NA
11[4]		X	X	Gauges (Oil, Fuel, Temp, Ammeter, Tachometer, etc.)	Inspect for identification, legibility, and condition. Inspect for evidence of loose electrical or mechanical connections. Verify operation (calibration not required).					
12		X	X	Turbocharger	Inspect for evidence of loose or missing mounting bolts and parts. During operation, inspect for vibration and oil leaks. Listen for abnormal noise.					
13		X	X	Governor	Inspect linkage for evidence of binding, looseness, and damaged parts. Inspect for proper oil level. Verify proper operation.					
14[5]	X	X	X	Fuel Filters	Inspect for leaks prior to and during operation.					
15[5]	X	X	X	Air Cleaner	Inspect mounting brackets for evidence of loose or missing fasteners. Inspect for proper oil level and condition of filter element or vacuum indicator.					
16[6]		X	X	Throttle Linkage	Inspect for evidence of loose and damaged components. Verify proper operation.					
17		X	X	Clutch/Main Drive	Inspect linkage for damage, for evidence of binding, loose and worn components, and for proper lubrication and adjustment. During operation, inspect for slippage and evidence of binding. Listen for abnormal noise.					
			X		At every second "C" inspection, disassemble and inspect all internal components. Note: This item applies to friction-type cranes; it does not apply to chassis drive clutches.					
18[7]		X	X	Exhaust System	Inspect for holes, for damaged gaskets, for evidence of loose or missing fasteners, and for proper insulation. During operation, inspect for leaks and sparks. Listen for abnormal noise.					
19	X	X	X	Engine Condition	During operation, inspect for excessive smoking and vibration. Listen for abnormal noise. Follow main and/or auxiliary engine OEM guidelines for specific additional inspection items.					
20		X	X	Engine Alarm Safety Devices	Inspect wiring for damage or deterioration, and for evidence of loose connections.					
20a			X	Engine Alarm Safety Devices (not applicable to auxiliary or mobile crane engines)	Verify proper operation of engine overspeed, oil system, and water system shutdown and/or alarm systems by testing with sensors installed where practical. If sensor removal is necessary for shop testing or calibration, reinstallation and inspection shall be per controlled procedures approved by the activity engineering organization.					
21			X	Heat Exchanger	Inspect for oil and water leaks, and for evidence of loose or missing fasteners. During operation, verify operation of temperature gauges.					
22[7]			X	Fuel Tank	Inspect fuel tank for leaks, for condition of gauge, and for evidence of loose or missing fasteners. Inspect fuel strainers and filters. Inspect for proper venting. Inspect for visible corrosion and evidence of corrosion below fuel level and debris in fuel.					
23	X	X	X	Clutches (Boom, Hoist, Swing, and Travel)	Inspect clutch linkage for damage, for evidence of binding and loose or worn components, and for proper lubrication and adjustment. Inspect clutch linings for wear, co-bonding, and glazing, and drums for smoothness and for evidence of overheating. During operation, inspect for slippage and evidence of binding. Listen for abnormal noise.					

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 A-M-I-S-R and is pronounced “A-mizer”. You can see in the illustration a sample of the many items that must be inspected, the manner or specification in which to perform the inspection, and the acceptance criteria to be used. Local variations of this document may be developed. See section 3 for additional inspection details.



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 rotate bearings for proper lubrication. Rotate boom and inspect for evidence of bearing damage, overheating, and abnormal wear.					
6	Wheels and Axles	Inspect wheels for uneven wear, flat spots, chips, flange wear, or cracks, for evidence of loose or missing fasteners and bearing caps, and for proper lubrication. During operation, inspect for excessive movement between components, improper tracking, overheating, and other evidence of component wear or bearing damage. Listen for abnormal noise.					
7	Shafts and Couplings, including couplings integral to motor/speed reducer assemblies	Inspect for evidence of damage, misalignment, leaking seals, and loose keys, coupling bolts, and covers. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged components or bearings. Listen for abnormal noise. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned fasteners.					
	Shafts and Couplings (Hoist Drives)	Verify coupling alignments are within OEM tolerances at every eighth annual inspection (not applicable to NEMA c, d, and p-face motors, or similar configurations). Coupling alignment verification data shall be included in the crane's history file.					
8a	Gearing (Hoist, Rotate, Travel) External Gears	Inspect for damaged or worn gears, for evidence of misalignment or loose keys, and for proper lubrication. During operation, listen for abnormal noise, and inspect for other evidence of possible damage. Inspect for evidence of bearing damage, overheating, and abnormal wear. Inspect pillow blocks for damage, paying special attention to possible cracks in cast iron pillow blocks loaded in shear and tension, loose or missing fasteners, and cracks caused by over-tensioned 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, Rotate, Travel) Internal Gears, including clutches. (Not applicable to manual chain hoists).	Inspect gear case for proper lubricant level. Inspect for leaks and for evidence of loose or missing fasteners. Inspect breathers for restrictions. During operation, inspect for vibration, overheating, and other evidence of misaligned, worn, or damaged internal components or bearings. Listen for abnormal noise.					
	Hoist Gears (Not applicable to category 2 and 3 package hoist assemblies or manual chain hoists.)	Additionally, internal gearing for hoists shall be monitored by an oil or vibration analysis program. The oil or vibration analysis shall be performed at least once each certification period with results analyzed by a qualified source and documented and retained in the equipment history file for the life of the component.					
		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, performmo 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 lubricant level and for leaks. During operation, inspect for chattering, vibration, overheating, or other evidence of misaligned, worn, or damaged internal components. Listen for abnormal noise. For mechanical load brakes that cannot be tested independently (see appendix E), disassemble no later than every 12th annual inspection and inspect for damage and deterioration.					
9b	Mechanical Load Brakes – Manual Hoists	Inspect for evidence of worn, glazed, or oil-contaminated friction discs, worn pawls, cams or ratchet, corroded, stretched, or broken pawl springs in brake mechanism. Manual hoist load brakes shall be disassembled at every sixth annual inspection for detailed inspection of above noted items. For cranes in the quadrennial load test program, this disassembly may be performed at every eighth annual inspection.					
10	Mechanical Brakes	Inspect system for damage, for evidence of binding, loose, and worn components, and for proper lubrication. Disassemble as required to inspect brake linings for wear, de-bonding, and glazing, and drums for smoothness and for evidence of overheating. Inspect brakes for proper settings and for alignment of brake shoes. During operation, verify proper release, engagement, and stopping action in both directions of motion. Inspect for evidence of overheating. Note: For hoists without mechanical load brakes or self-locking worm gears, and where the brake stops the movement of the load, disassembly shall be done annually (quadrennially for cranes in the quadrennial program). For hoists with mechanical load brakes or self-locking worm gears, and for 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 E: CRANE TEST PROCEDURES

Introduction

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

Jib crane load 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: EXAMPLES OF LB PARTS, LC PARTS, AND OSDS

Introduction

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

LB, LC, OSDs

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

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

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

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

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

APPENDICES G, H, AND I: RESERVED

Introduction

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

APPENDICES J, K, AND L: CRANE OPERATOR BASIC PERFORMANCES TESTS

Introduction

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

Topics

This screen provides descriptions of the content for each appendix. Click on each appendix title to view these descriptions.

Appendix J

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

Appendix K

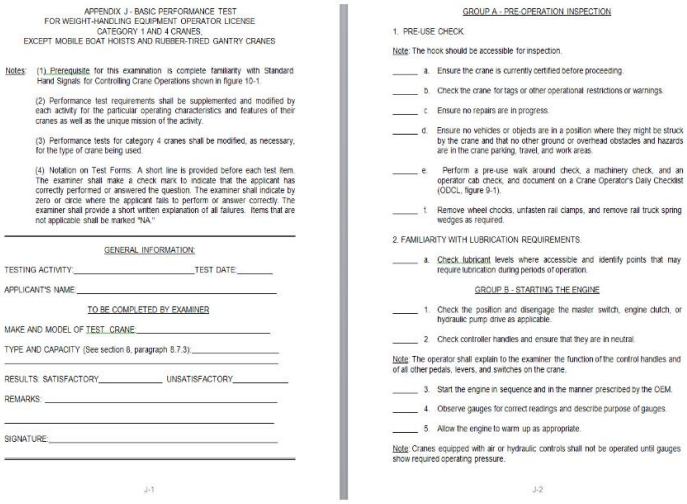
Appendix K provides the basic performance test requirements and instructions for applicants of category 2 and cab-operated category 3 crane licenses.

Appendix L

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

Cat 1&4 PT

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



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

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

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

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

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

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

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

RESULTS: SATISFACTORY_____ UNSATISFACTORY_____

REMARKS:_____

SIGNATURE:_____

J-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

Note: The hook should be accessible for inspection.

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

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

_____ c. Ensure no repairs are in progress.

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

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

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

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

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

GROUP B - STARTING THE ENGINE

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

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

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

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

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

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

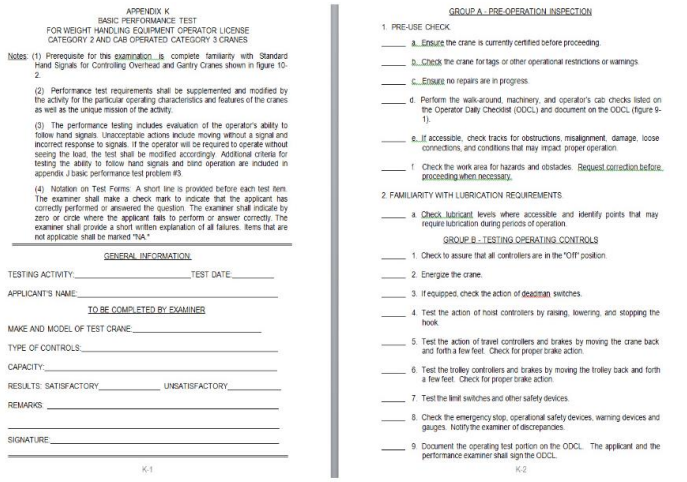
Note: Cranes equipped with air or hydraulic controls shall not be operated until gauges show required operating pressure.

J-2

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

Cat 2 & 3 PT

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



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

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

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

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

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

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

TYPE OF CONTROLS:_____

CAPACITY:_____

RESULTS: SATISFACTORY_____ UNSATISFACTORY_____

REMARKS:_____

SIGNATURE:_____

K-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK

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

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

_____ c. Ensure no repairs are in progress.

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

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

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

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

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

GROUP B - TESTING OPERATING CONTROLS

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

_____ 2. Energize the crane.

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

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

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

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

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

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

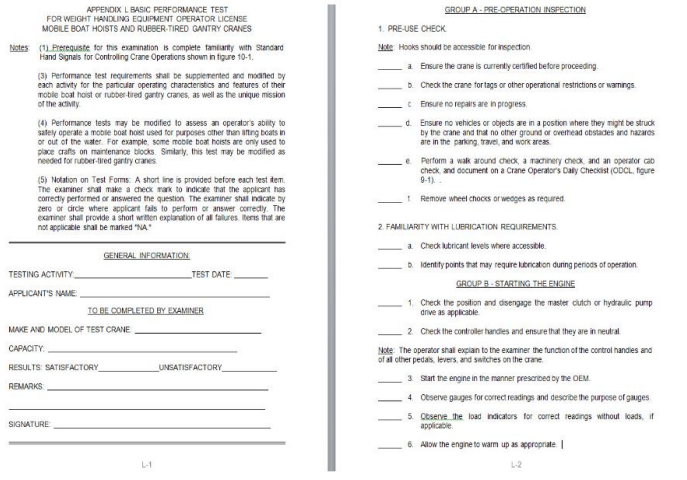
_____ 9. Document the operating test portion on the ODCL. The applicant and the performance examiner shall sign the ODCL.

K-2

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

MBH and RTG PT

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



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

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

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

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

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

GENERAL INFORMATION:

TESTING ACTIVITY:_____TEST DATE:_____

APPLICANT'S NAME:_____

TO BE COMPLETED BY EXAMINER

MAKE AND MODEL OF TEST CRANE:_____

CAPACITY:_____

RESULTS: SATISFACTORY_____UNSATISFACTORY_____

REMARKS:_____

SIGNATURE:_____

L-1

GROUP A - PRE-OPERATION INSPECTION

1. PRE-USE CHECK.

Note: Hooks should be accessible for inspection.

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

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

_____ c. Ensure no repairs are in progress.

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

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

_____ f. Remove wheel chocks or wedges as required.

2. FAMILIARITY WITH LUBRICATION REQUIREMENTS.

_____ a. Check lubricant levels where accessible.

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

GROUP B - STARTING THE ENGINE

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

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

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

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

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

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

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

L-2

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

APPENDIX M: THIRD PARTY CERTIFICATION BY NAVY CRANE CENTER

Introduction

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

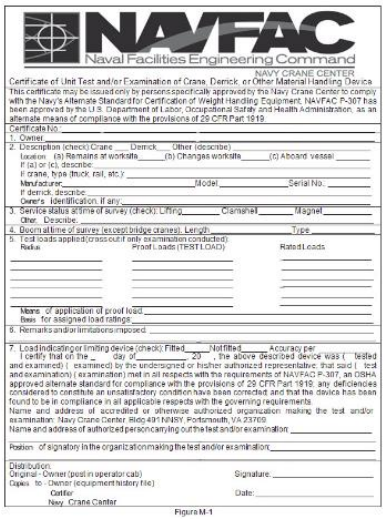
Figures M-1 and M-2

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

THIRD PARTY CERTIFICATE NOTICE OF DEFICIENCIES

Click on either title to view the form. Drag the corner of the pop-up window to resize the form.

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. Forms can be enlarged by dragging the corner of the pop-up window.


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

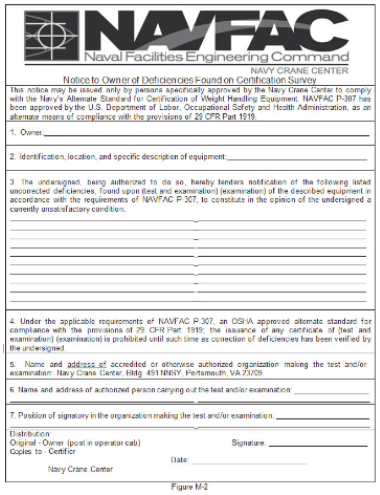

NAVFAC
Naval Facilities Engineering Command
NAVY CRANE CENTER
Notice to Owner of Deficiencies Found on Certification Survey
This notice may be issued only by persons specifically approved by the Navy Crane Center to comply with the Navy's Alternate Standard for Certification of Weight Handling Equipment, 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

Figure M-1 is the *Certificate of Unit Test and/or Examination of Crane, Derrick, or Other Material Handling Device* and is used to indicate a satisfactory third party certification of applicable equipment.

Figure M-2 is the *Notice to Owner of Deficiencies Found on the Certification Survey* and is used to document uncorrected deficiencies found during the third party test and examination.

APPENDIX N: PERSONNEL COMPETENCIES

Introduction

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

Appendix N augments the requirements of sections 1, 3, 4, 7, 8, and 10, all of which discuss personnel qualifications.

Competencies

Listed here are the positions found in Appendix N. You can roll your mouse over each one to view their competency requirements. These are the requirements of NAVFAC P-307. Additional requirements, competencies, skills, and knowledge may be required by individual activities or by other policies, instructions or directives.

- MAINTENANCE PERSONNEL: MECHANIC AND ELECTRICIAN
- INSPECTOR
- LOAD TEST DIRECTOR
- OPERATOR OF NON-CAB OPERATED CATEGORY 3 WHE
- RIGGER
- CRANE WALKER
- CRANE SIGNAL PERSON
- OPERATOR SUPERVISOR
- RIGGER SUPERVISOR
- MAINTENANCE MECHANIC/ELECTRICIAN, INSPECTOR, AND LOAD TEST DIRECTOR SUPERVISOR
- ENGINEER
- CERTIFYING OFFICIAL
- WEIGHT HANDLING PROGRAM MANAGER

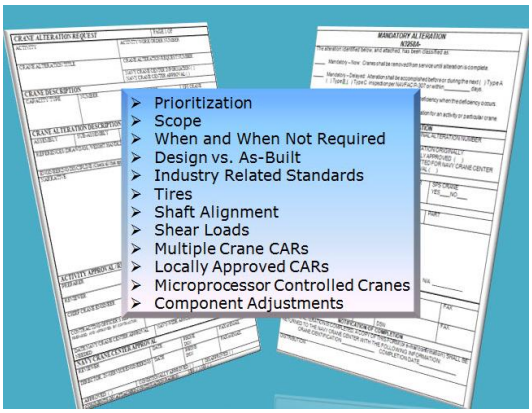
APPENDIX O: ENGINEERING POLICIES AND CRANE ALTERATION GUIDANCE

Introduction

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

Topics

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



APPENDIX P: CONTRACTOR CRANE AND RIGGING GEAR REQUIREMENTS

Introduction

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

Figure P-1

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)

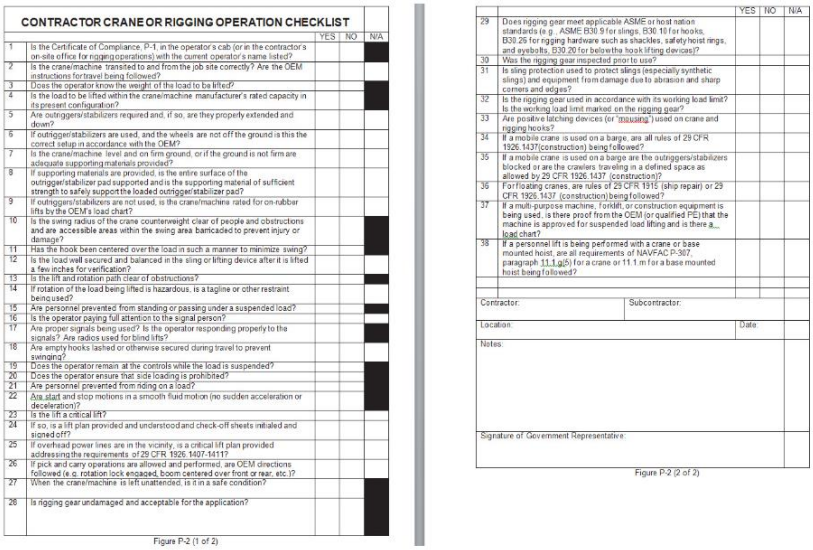
Figure P-1

Figure P-1: Certificate of Compliance

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
- personnel have been trained to not stand under a load or in the fall zone

See section 11 and appendix P for more detailed descriptions of these requirements.



CONTRACTOR CRANE OR RIGGING OPERATION CHECKLIST

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

Figure P-2

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

APPENDICES Q AND R: REFERENCES AND RELATED DOCUMENTS

Introduction

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

Examples

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

Roll your mouse over each title to view a partial list of some of the references and documents.

NOTES

NAVFAC P-307 OVERVIEW QUIZ AND SUMMARY

KNOWLEDGE CHECK

1. Select all that apply.

The overall purpose of NAVFAC P-307 is to…

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

2. Select the best answer.

Which document would you use to request a revision, deviation or clarification to NAVFAC P-307?

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

3. Select the best answer.

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

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

4. Select the best answer.

Sections 3, 4 and 5 provide information on which topics?

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

5. True or False

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

A. True
B. False

6. Select all that apply.

The purpose of the condition inspection is to ensure that…

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

7. Fill in the blank.

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

A. _____ _____

8. Select the best answer.

What section and/or appendix contains information on crane alterations?

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

9. Select the best answer.

What is the category of this crane?

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

10. Select the best answer.

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

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

11. Matching

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

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

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

12. Select the best answer.

Who is responsible for completing, signing, posting, and retaining this (P-1) form?

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

13. True or False

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

A. True
B. False

14. True or False

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

A. True
B. False

15. Select all that apply.

A license is required to operate:

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

16. Matching

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

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

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

17. Select the best answer.

Which form would be used to perform a maintenance inspection on a cab-operated category 3 crane?

A. AMISR
B. MISR

18. Select all that apply.

A crane accident occurs when any of the elements in the crane operating envelope fails to perform correctly resulting in any of the following EXCEPT when…

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

19. Fill in the blank.

Section _____ provides a list of the various documents that must be kept in the history file as well as the lengths of time they must be retained.

A. _____

20. 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. _____ _____

21. True or False

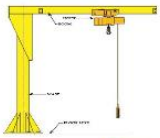
The appendix B glossary provides uniform definitions to aid personnel in understanding key concepts and terminology found in NAVFAC P-307.

A. True
B. False

22. Matching

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

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



A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

23. Select the best answer.

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

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

24. Select the best answer.

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

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

25. Fill in the blank.

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

A. _____ _____ _____ _____ _____ _____

SUMMARY

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.

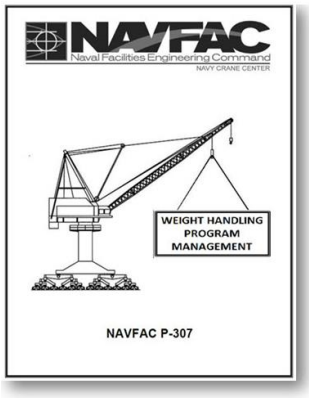
The following screen provides contact information and is the final screen in this overview. Thank you for taking the time to learn more about NAVFC P-307 and the Navy's Weight Handling Program.

Contact

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

LTD CERTIFICATION PROGRAM OVERVIEW

INTRODUCTION



Load Test Director Certification Program Overview

This module introduces two primary activities of the Navy's crane certification program: inspection and testing. The personnel, paperwork, and general process associated with these activities will be presented. Understanding that the safety of personnel and equipment is the cornerstone of any Navy process, engaging in a high quality crane certification program should be the aim of every weight handling management team.

In the field, ensure the correct requirements are followed for each specific situation by paying particular attention to the wording found in NAVFAC P-307 section 4 "*Certification*" and appendix E, "*Crane Test Procedures*".

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.

PRINCIPALS

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.

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. Click on each term to reveal its definition. 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

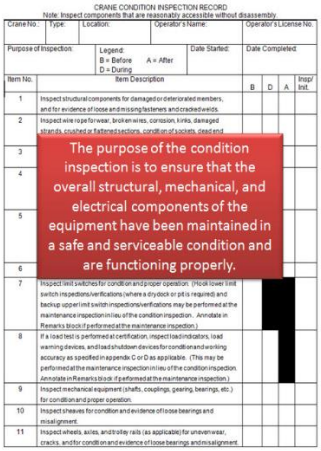
Those parts of WHE that position, restrain, or control the movement of the load (e.g., rotate and travel brakes, clutches), a malfunction of which could cause dropping, uncontrolled shifting, or uncontrolled movement of the load. Crane mounted diesel engines, generators, electrical power distribution 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 devices, and locking devices.

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.

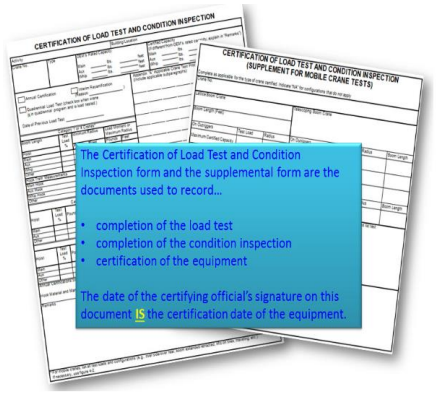


Condition inspections are performed before, during and after the load test in accordance with NAVFAC P-307 requirements. Refer to section 4 and appendix E. The purpose of the condition inspection is to ensure that the overall structural, mechanical, and electrical components of the equipment have been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

PROCESS

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.



Certifications are performed annually.

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 section 4.4 for details.

Load Test

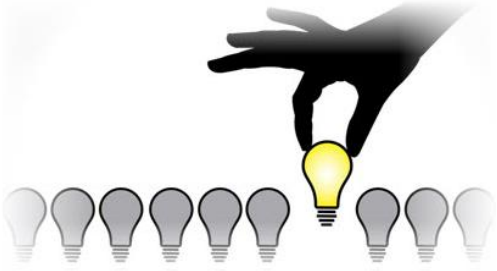
Listed here are five events that require a load test.

- The acceptance of newly procured cranes.
- The annual certification for category 1 and 4 cranes.
- Every fourth annual certification for category 2 and 3 cranes in the quadrennial load test program.
- An inadvertent overload which exceeds 125% of a crane's certified capacity (105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber-tired gantry cranes, and category 4 cranes).
  and
- When an adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed.

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

Selective Load Test

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



To determine if a load test is required, the component's impact on holding strength shall be assessed. If holding strength could be affected by the work performed then a selective inspection, load test, and recertification shall be performed.

The extent of the inspection and testing may be limited, where practical, to those parts and components of systems affected, but shall fully ensure that the adjustment, repair, disassembly, replacement, or alteration has been performed correctly and that the crane operates properly.

When load tests are performed, they shall include the applicable portions of both the static and dynamic tests of appendix E.

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

KNOWLEDGE CHECK

1. Select the best answer.

The _____ ensures that the overall structural, mechanical, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

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

2. Select the best answer.

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

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

3. Select the best answer.

The _____ directs the load test and ensures that it is performed safely and in accordance with NAVFAC P-307 requirements.

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

4. True or False

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

A. True
B. False

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

5. Select the best answer.

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 function 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. True or False

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

A. True
B. False

8. True or False

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

A. True
B. False

9. Select all that apply.

From the items listed below, identify the events that require a load test.

A. 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

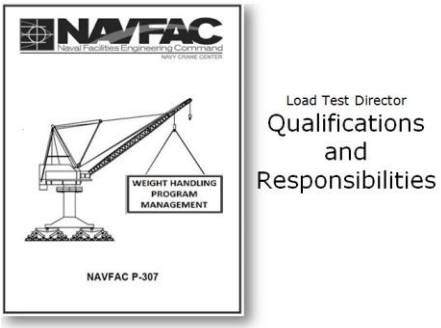
This module introduced two primary activities of the Navy's crane certification program: inspection and testing. It explained the purpose of inspection and testing and introduced the personnel and paperwork associated with these activities which include...the certifying official who is responsible for 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.

NOTES

LTD QUALIFICATIONS AND RESPONSIBILITIES



INTRODUCTION

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

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.

TEST DIRECTOR

Qualifications

Load test directors shall possess the knowledge and experience relevant to a particular crane's operations, component functions, and its maintenance and test procedures to competently load test that crane. They shall understand the duties and responsibilities of all other test team members.

A load test director's qualification is a function of the local activity or command. As a minimum, test directors shall satisfy the training and competency requirements outlined in NAVFAC P-307, section 7 and appendix N. Additional training, such as OEM schools, vendor training, or locally developed competency attributes specific to an activity's equipment and processes should be considered.

Test Directors shall be designated 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.

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.

TEST TEAM MEMBERS

Condition Inspector

The condition inspector(s) 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(s) 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(s) 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(s) 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

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. True or False

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. Fill in the blank.

Load test inspection results are documented on the _____.

A. _____

8. True or False

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

A. True
B. False

9. Matching

Correctly identify each position to its responsibility or qualification by checking the appropriate box adjacent to that position.

1. Observes safety, mechanical, electrical, and structural components
2. Ensures safe travel of the crane
3. Coordinates the activities of team members
4. Signals the crane operator

Test Director	3
Condition Inspector	1
Rigger	4
Crane Walker	2

10. Fill in the blank.

Any _____ can stop testing and operations whenever safety becomes a concern.

A. _____ _____

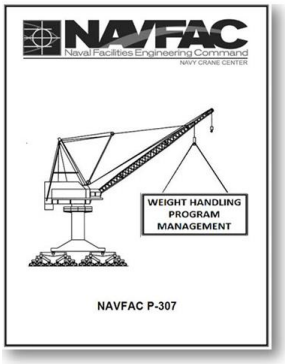
SUMMARY

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

You can now identify the individual load test team members, describe their fundamental training and qualification requirements, and list their basic individual and group responsibilities. This includes the load test director, condition inspector(s), crane operator, rigger(s), and the crane walker.

NOTES

LTD PRE-TEST PREPARATIONS

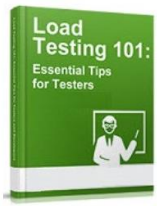


Load Test Director
Pre-Test
Preparations

INTRODUCTION

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.

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.

RECORDS

Research

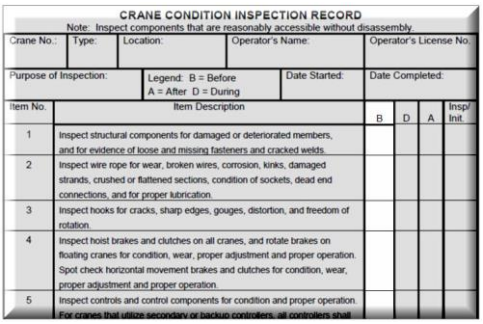
The first step in preparing for a load test is to research the crane's documentation.

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 operations, 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.



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				

This action shall be validated by the load test director by reviewing the CCIR.

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.

Preparation

Once an adequate site has been selected, ensure it is properly prepared to support the test.

The following questions indicate many of the preparatory actions that should be completed. Additionally, they provide a guide for the pre-test briefing discussion points.

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

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

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.

WEIGHTS AND RIGGING

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 I D 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

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 four feet slowly…hoist…hoist…hoist…stop*" or
"*rotate left eight feet slowly…rotate…rotate…rotate...stop*" or
"*trolley west fifteen feet slowly…trolley…trolley…trolley...trolley…stop*."

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

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

1. Select all that apply.

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

A. Select test site
B. Research 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 tes.
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 MISRT findings – after a C PM.

3. True or False

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

A. True
B. False

4. True or False

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 25T. 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 lbs. to 45,620 lbs.
B. 49,550 lbs. to 51,330 lbs.
C. 46,580 lbs. to 49,080 lbs.
D. 52,500 lbs. to 55,125 lbs.

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. Assignments and responsibilities
C. Training schedules
D. Crane Specific characteristics and precautions
E. Traffic control and barricades

7. True or False

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

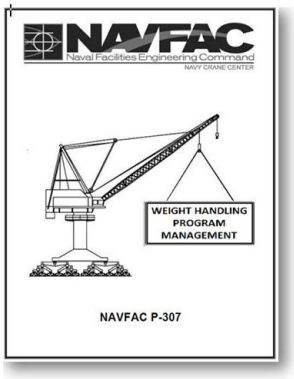
SUMMARY

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.

NOTES

LTD CONDITION INSPECTION

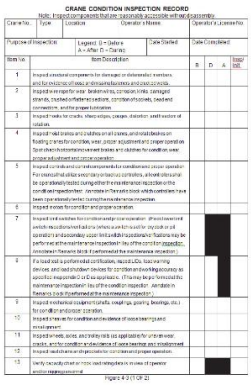
INTRODUCTION

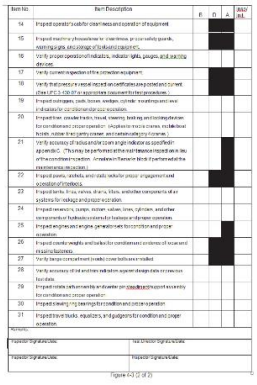


Load Test Director
Condition Inspection

This module takes a closer look at the condition inspection process.

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.


CRANE CONDITION INSPECTION RECORD



INSPECTION

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.

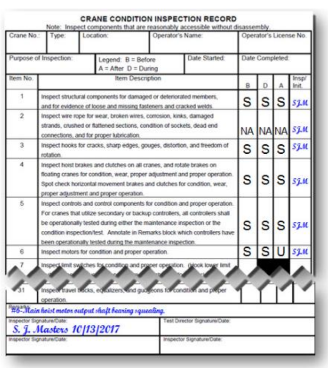
Methods

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".



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.	S	S	S	SJM
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.	NA	NA	NA	SJM
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.	S	S	S	SJM
4	Inspect hoist brakes and clutches on all cranes, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.	S	S	S	SJM
5	Inspect controls and control components for condition and proper operation. For cranes that utilize secondary or backup controllers, all controllers shall be operationally tested during either the maintenance inspection or the condition inspection/test. Annotate in Remarks block which controllers have been operationally tested during the maintenance inspection.	S	S	S	SJM
6	Inspect motors for condition and proper operation.	S	S	U	SJM
7	Inspect limit switches for condition and proper operation. (Hook lower limit				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				

Remarks: #6-Main hoist motor output shaft bearing squealing.

Inspector Signature/Date:	Test Director Signature/Date:
S. J. Masters 10/13/2017	
Inspector Signature/Date:	Inspector Signature/Date:

Where an inspection item is not applicable, the symbol "N A" 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.

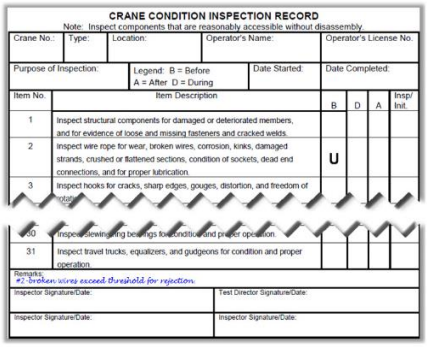
DEFICIENCIES

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.

Unsatisfactory



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.	U			
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				

Remarks:
#2 broken wires exceed threshold for rejection.

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

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 Deficiency

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.

REPAIRS

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

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

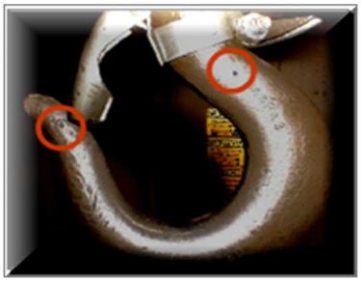
If a major deficiency is found after the load test, it shall be corrected and, if required by paragraph 4.4.2.1, a selective load test shall be performed. A record of the retest shall be recorded in the "Remarks" portion of the CCIR.

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.

HOOKS



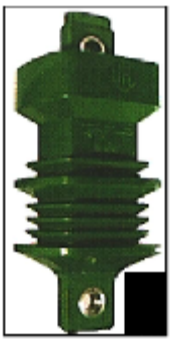
Hook identification and the correct number of hook NDT annual certification periods shall be validated as part of the certification process. See NAVFAC P-307, appendix E, paragraph 1.4.4 for material types and periodicities.

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 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

1. Fill in the blank.

When engaged in the condition inspection and test process, the primary emphasis shall be on ____.

A. _____

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. True or False

The completed CCIR only needs to be signed by the load test director before submitting it to the certifying official.

A. True
B. False

4. Select the best answer.

Your condition inspector identified an unsatisfactory item. A work document was issed and the deficiency corrected. What is required of this work document prior to continue 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 devised
B. general safety devices
C. load construction parts
D. load sharing parts
E. load bearing parts
F. load controlling parts

6. True or False

Replacement load bearing and load controlling parts and safety devise shall be identical to those of the original design.

A. True
B. False

7. 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. _____ _____

8. Select the best answer.

If a major deficiency is found after the load test, it shall…

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

9. Select the best answer.

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”
B. None of the listed answers are correct.
C. 3.5%
D. 5 mm
E. five percent

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 measure. 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

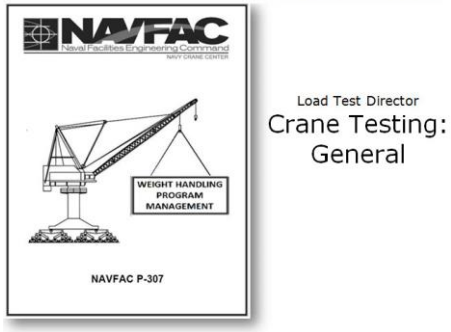
SUMMARY

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.

NOTES

CRANE TESTING 1: GENERAL

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.

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.

SAFETY

Capacity

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

The gross capacity of a crane is that value which is shown on the OEM load chart for a particular radius. The net capacity is the value shown on the load chart minus all deductions. To determine the net capacity, you must subtract all the applicable deductions from the gross capacity.

Overload

Loss of Stability

Structural Failure

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

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

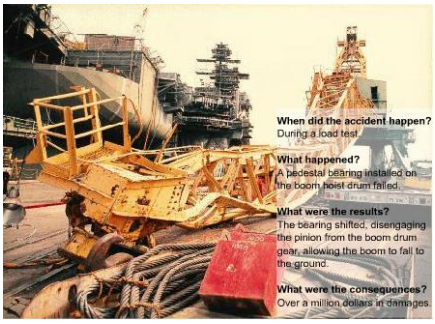
Cranes can fail structurally if the rated capacity is exceeded. Structural failure is not limited to total fracture of a component. It includes hidden or less visible damage such as cracking, bending, or twisting of any component. It is difficult to predict which component in a crane may fail structurally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

The following four screens display examples of why load tests should be performed in controlled areas and why safety should always be the primary focus. When viewing each of these events, ask yourself:

- Could this happen during my load test?
- What factors contributed to the accident?
- How could this have been avoided?

Example 1

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



Possible causes might include poor workmanship, inadequate maintenance and inspection procedures, or improper replacement parts. Can you think of any other possible causes or contributing factors? Can you think of any other possible outcomes or results?

Example 2

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

Possible causes might include inattention, lack of concern regarding the weather, or failure to recognize a potentially hazardous environment. Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions and concerns addressed? Can you think of any other possible outcomes or results?

Example 3

This operator had performed the same operation many times before, except 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 and concerns addressed? Can you think of any other possible outcomes or results?

Example 4

While preparing to conduct a free-rated (on-rubber) load test, the load moment indicator was mistakenly programmed for on-outrigger operations. As the boom was extended and lowered, to reach the test load, the crane overturned. The boom fell across a parked vehicle, which fortunately, had no one in it. No injuries were reported but it did result in extensive and expensive damages.

Possible causes might include complacency, failure to understand or follow proper procedures, or simply inattention to details. Can you think of any other possible causes or contributing factors? Was an interactive pre-test briefing conducted with all pertinent questions asked and answered? Can you think of any other possible outcomes or results?

Vigilance


Shown here are cranes being load tested under controlled conditions with experienced test teams. Yet, mistakes were made. Testing cranes can be extremely hazardous, especially when testing extended long booms with jibs attached. To minimize the risks, perform the tests with the boom about half way between minimum and maximum extension.

Three best practices for improved safety and incident avoidance during testing is to perform a thorough CCIR before-test inspection, an ODCL, and a pre-test brief. Emphasize the importance of the pre-test inspections. During the briefing, question your team about their findings and all other aspects of the test and any potential concerns in their areas of responsibility. Remember, their perspectives are different from yours. Take advantage of this and allow them to share in the brief for the benefit and safety of the team and the crane.

There is no margin for error when testing cranes. Stay vigilant.

Precautions

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

Test personnel shall remain fully alert to wind, weather, and visibility conditions that may jeopardize the safe performance of the test. Attach taglines to the load to control oscillation. Lift the test load only high enough to perform the required tests.

If lifting on outriggers or stabilizers, ensure they are properly extended per OEM instructions and that the crane is level. A crane's outrigger may become light and the outrigger pad may clear the ground during testing, depending on the make and model of crane. This will most likely occur when the boom is positioned over the opposite corner. One outrigger lifting off is normal and not an indication of a loss of stability, however, if two outriggers exhibit this condition simultaneously, the activity shall verify with the crane OEM that the crane exhibiting this condition is safe for use.

If lifting "on rubber", ensure all lifting requirements established by the OEM and the activity are followed. Extend outriggers and maintain a minimal clearance of three to four inches above the ground. Test personnel shall stand clear of tires and outriggers during on-rubber load tests.

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

Teamwork

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

TESTS

General

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

Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations. Tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures (AEPs) during the certification period. The testing sequence may be varied by the activity. For cranes with multiple reeving configurations, the maximum line pull test should be performed first.

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. Click on each of the specific actions to see a detailed description.

- 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.

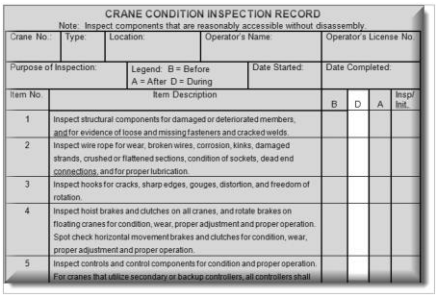
See NAVFAC P-307 section 4 and appendix E for specific tests, applications, and exceptions.

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



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'r 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				

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.

KNOWLEDGE CHECK

1. Select the best answer.

What is the difference between gross and net capacity?

A. The weight of the rope weight
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.

Three best practices for improved safety and incident avoidance include:

A. Thorough before-test CCIR inspection
B. Complete ODCL
C. All of the listed items
D. Detailed pre-test briefing
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. True or False

Responsibilities for safe testing are both individually assigned and team shared however, only the crane riggers area 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. True or False

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

A. True
B. False

9. Select all that apply.

Identify conditions for which test personal shall remain fully alert during testing.

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

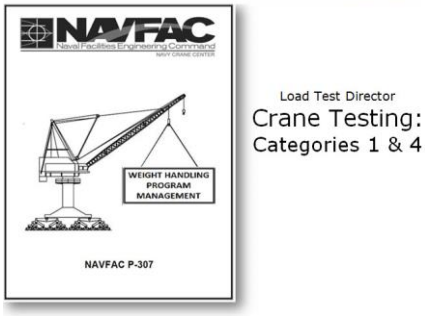
SUMMARY

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.

NOTES

CRANE TESTING 2: CATEGORIES 1 AND 4

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 its 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.

Tests 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.

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

Hoist & Boom

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 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'. After travel stops, and if there are no problems, rotate the boom 180^{o} and travel a minimum of 50' 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 AND FLOATING CRANE LOAD TESTS

General

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 & 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 & 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 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 & Rotate

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’. 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

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.

MOBILE CRANE TESTING (MCT)

Appendix E, Paragraph 5

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.

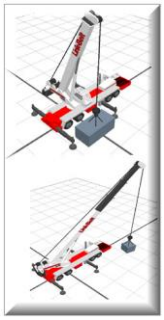
The nominal test load for mobile cranes and category 4 cranes shall be 100% of the rated capacity or 110% for third party certified cranes.

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.

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.

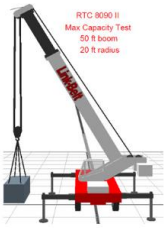
The following screens will provide additional details regarding mobile crane testing. These nine topics are prefixed, in the list on the left, with the abbreviation MCT, which stands for mobile crane testing.

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

General

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.

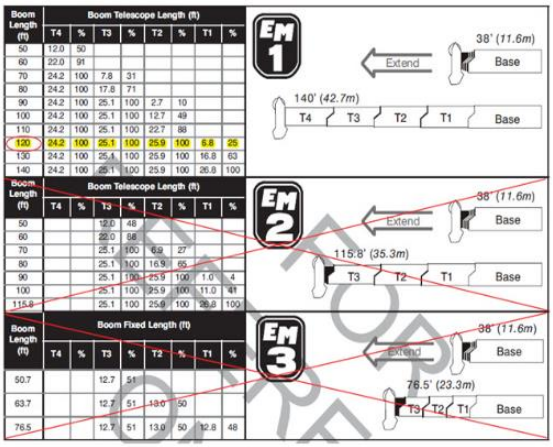
The significance of any lowering shall be evaluated by the activity engineering organization depending on operating requirements and safety.

Outrigger locking device and latching boom telescoping cylinder tests are determined by operating characteristics, local procedures, and appendix E paragraph 5 notes.

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'.



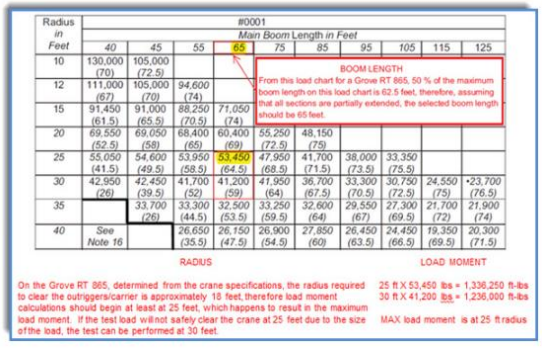
To view examples of cranes with synchronous type booms, click on the Synchronous Booms link. On cranes with synchronized full power booms, all sections extend equally.

To view an example and description on how a sequenced-synchronized boom extends, click on the Sequence-Synchronized Boom link.

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'. Considering the size of the test weight, load moment calculations would begin at 25' and are as follows:

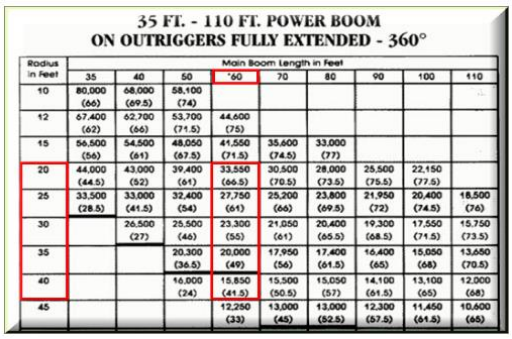
- 25 ft. x 53,450 lbs. = 1,336,250 ft. lbs.
- 30 ft. x 41,200 lbs. = 1,236,000 ft. lbs.

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

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.



35 FT. - 110 FT. POWER BOOM
ON OUTRIGGERS FULLY EXTENDED - 360°

Radius in Feet	Main Boom Length in Feet								
	35	40	50	60	70	80	90	100	110
10	80,000 (66)	68,000 (69.5)	58,100 (74)						
12	67,400 (62)	62,700 (66)	53,700 (71.5)	44,600 (75)					
15	56,500 (56)	54,500 (61)	48,050 (67.5)	41,550 (71.5)	35,600 (74.5)	33,000 (77)			
20	44,000 (44.5)	43,000 (52)	39,400 (61)	33,550 (66.5)	30,500 (70.5)	28,000 (73.5)	25,500 (75.5)	22,150 (77.5)	
25	33,500 (28.5)	33,000 (41.5)	32,400 (54)	27,750 (61)	25,200 (66)	23,800 (69.5)	21,950 (72)	20,400 (74.5)	18,500 (76)
30		26,500 (27)	25,500 (46)	23,300 (55)	21,050 (61)	20,400 (65.5)	19,300 (68.5)	17,550 (71.5)	15,750 (73.5)
35			20,300 (36.5)	20,000 (49)	17,950 (56)	17,400 (61.5)	16,400 (65)	15,050 (68)	13,650 (70.5)
40			16,000 (24)	15,850 (41.5)	15,500 (50.5)	15,050 (57)	14,100 (61.5)	13,100 (65)	12,000 (68)
45				12,250 (33)	13,000 (45)	13,000 (52.5)	12,300 (57.5)	11,450 (61.5)	10,600 (65)

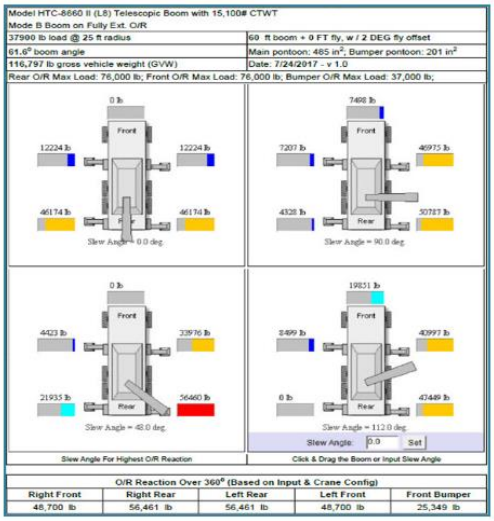
Third, we read the load chart for 60' of boom at 35' of radius and obtain a capacity of 20,000 lbs. Now that we have this value, we can calculate the minimum and maximum test loads to achieve maximum load moment.

- 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



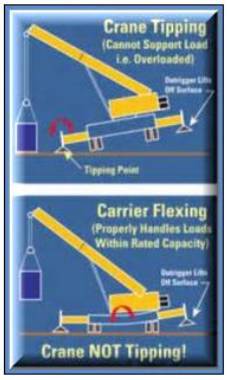
Be aware, especially on truck cranes that as the load is rotated from the side to the front or rear of the crane the flex in the crane will relax; deflection in the carrier will decrease, bringing the load closer to the crane. If it is anticipated that the load will come too close to the crane, select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

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

Structural and Stability

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.

MCT: MAXIMUM LINE PULL TEST

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.

MCT: ANCILLARY EQUIPMENT TESTS

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.

MCT: AUXILIARY HOIST 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.

MCT: ON-RUBBER LOAD TEST

On-Rubber 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

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.

MCT: Category 4 Crane Tests

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 Cranes

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 and observer 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.

MCT: MBH AND RTG TESTS

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’ 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’ 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.

MCT: Barge Mounted Crane Tests

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.

Special Testing Situations

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' 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

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 are checked during this test.

2. Matching

Match each test description (lower left) to its test (upper left) by clicking the corresponding box-number (right of each description).

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

Boom at Max radius, perpendicular to tracks	A. _____
Lower boom, disconnect main power, return controller to neutral	B. _____
Raise load, hold 10 minutes, rotate hook	C. _____
Boom centered and locked, move 50', rotate 180 degrees, move 50'	D. _____
Check emergency brakes on wire rope drums by simulating a fault.	E. _____

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 a 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 lbs., at 20' it's 38,000 lbs., at 25' it's 29,000 lbs., at 30' it's 22,000 lbs., and at 35' it's 17,000 lbs. Which radius provide the maximum load moment?

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

5. True or False

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

7. Fill in the blank.

Category 4 testing shall follow _____ and/or _____ test procedures.

A. _____
B. _____

8. True or False

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

A. True
B. False

9. True or False

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.

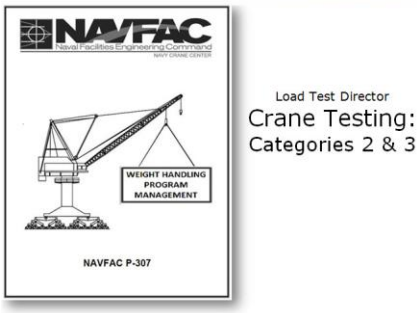
SUMMARY

This module, the second of three discussing crane testing, presented specific information on the different tests and test requirements for category 1 and category 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.

NOTES

CRANE TESTING 3: CATEGORIES 2 AND 3

INTRODUCTION



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. Tests 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.

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.

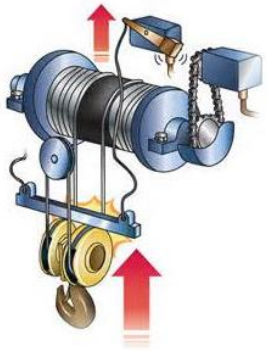
The information provided in this module is for training purposes only. For specific wording and requirements refer to the NAVFAC P-307 manual.

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

General

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



Hoist

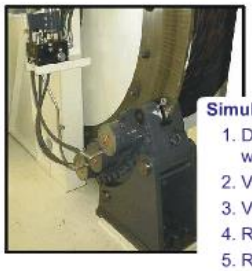
The no-load testing procedure may vary for individual cranes. Generally, raise each hoist slowly through the upper limit switch by using the limit switch bypass. Activate the secondary hoist upper limit switch. Lower and raise each hook through the controller range. Lower each hook into the lower limit switch.

See additional details for limit switches in appendix D, item 29.

Emergency Hoist Drum Brake

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.



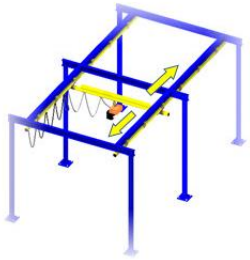
Simulating a Fault

1. Disconnect the motor encoder while lowering at slow speed
2. Verify brake sets
3. Verify hoist power is disabled
4. Reconnect encoder
5. Repeat the test with the drum encoder

Trolley

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



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.

SECTION 6 HOIST LOAD TESTS

Static

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

Holding Brakes

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

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% 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.

SECTION 6 TROLLEY, BRIDGE, GANTRY LOAD TESTS

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.

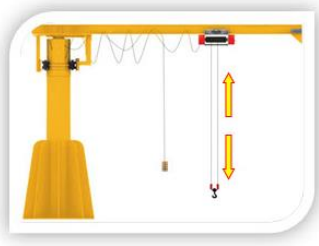
Note: Travel portable gantry and A-frames-with-permanently-mounted-hoists with a load only under specific OEM instruction.

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 NO-LOAD TESTS

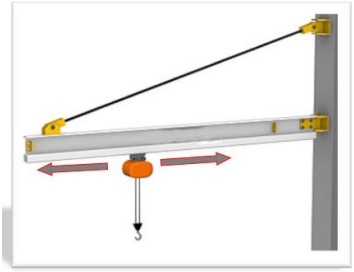


Hoist

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.

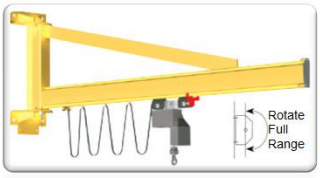
Trolley



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.

Rotate

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



SECTION 7 LOAD TESTS

Static

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.

Load Brakes

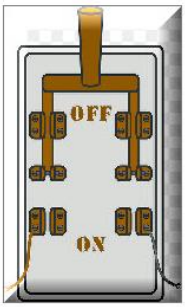
Dynamic test including Dynamic Load Brake: Raise and lower the test load and visually observe smooth control and acceleration between points. Stop the load during hoisting and lowering to verify the brake stops and holds the load.

Mechanical Load Brake: Raise the test load approximately 5'. 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.

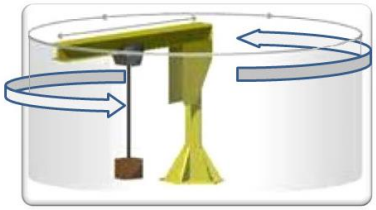
Loss of Power

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.



Trolley

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.



Rotate

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

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. True or False

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

A. True
B. False

4. Select the best answer.

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.

1. Static
2. Dynamic
3. 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. True or False

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

A. True
B. False

7. Ordering

Place the following emergency hoist drum brake no-load test steps in the correct sequential order.

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 disable hoist brake in case the drum brake fails to stop the test load.
C. None of the listed items apply.
D. Instructions shall be posted in the cab or on the pendant controller to warn the operator of this characteristics and any necessary precautions.
E. The certifying official shall make a determination that the operating characteristics are within acceptable limits of safety for operations under loss of power.

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, by 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 OEM or engineering to ensure load brake is operating as designed.
D. Observe lowering of the load to ensure safe landing.

10. 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. _____ _____
B. _____ _____

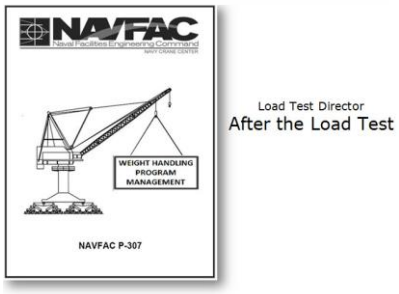
SUMMARY

This module, the last of the three crane testing modules, presented information on the load and no-load testing procedures and requirements for various types of crane components and configurations included in 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.

NOTES

AFTER THE LOAD TEST

INTRODUCTION



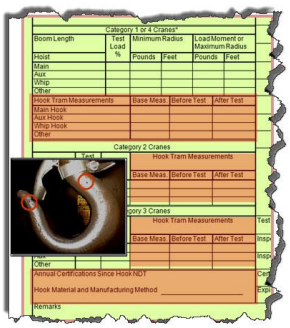
This module takes a look at the actions that wrap up the load test process.

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.

AFTER THE LOAD TEST

Inspections

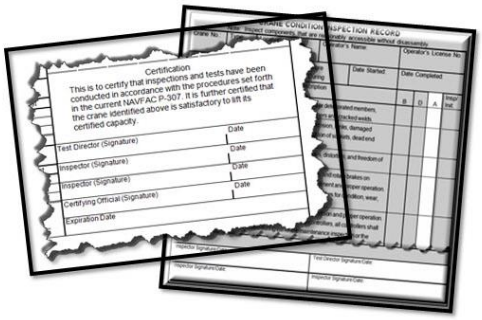
After the test, check all hooks for hook throat spread. Measure between the tram marks and compare the new measurement to the baseline measurement. Any hooks showing an increase in the throat opening of more than 5%, or ¼“, or as recommended by the hook OEM, from the base measurement shall be discarded.



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 component is 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

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 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. True or False

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

SUMMARY

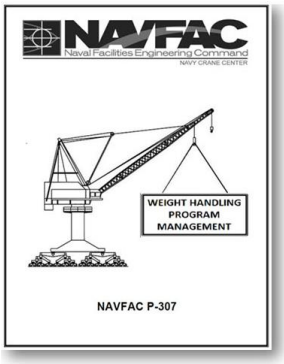
This module discussed the follow-up inspections, re-test and re-inspection actions, documentation and certification requirements, and expected posting and filing activities that complete the certification process.

NOTES

LOAD TEST CALCULATION EXERCISES

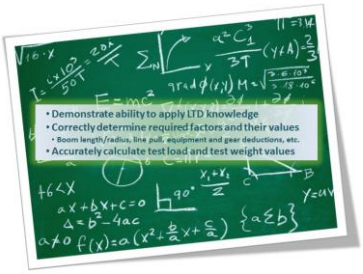
INTRODUCTION

This module allows you to apply the knowledge you've learned in this course to scenario based practical examples.



Load Test Director
Load Test Calculation Exercises

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.



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. The Reference area, or tab, is located in the upper right part of this screen just to the left of the Home tab.

These load chart packages may be needed again during the final exam.

EXERCISE EXAMPLE

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.

Crane to be tested:

A 40 ton, Rough Terrain, Hydraulic Extendible Boom with:

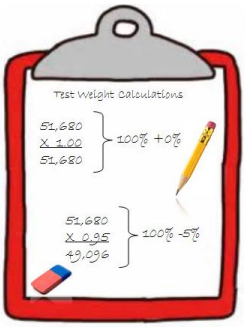
- Main hoist reeved w/4 parts of ¾" 18X19 rotation-resistant wire rope.
- Stowed 32' - 56' tele-offsettable, swing away extension.
- Auxiliary boom nose.
- 45 ton 3 sheave hook block w/cheek plates.

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. Click on the arrows to reveal the values for this example.

- Max Gross Capacity from the load chart is: **80,000 lbs.**
- Any Limiting Factors? **Yes!**
- Permissible Line Pull is: **12,920 lbs.**
- Total Wire Rope: **12,920 lb.**
  X 4
  51,680 lb.

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

The crane equipment deduction values in this example can be viewed by clicking on the arrows next to each item listed on the screen. These deductions come directly from the load chart and include: an 846 Lb. tele-off-settable extension, a 143 lb. auxiliary boom nose, and a 1095 lb. hook block. The total weight of deductions, not including rigging gear, is 2,084 lbs.

To determine the test weight values, these deductions are subtracted from both the maximum and minimum test load values as follows:

Deduct:

- Stowed tele-offsettable extension ___ **846 lbs.**
- Auxiliary boom nose _____ **143 lbs.**
- 45 ton 3 sheave hook block with 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.**

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.

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.

SUMMARY

This module allowed you to test your knowledge, skills and abilities to derive the pertinent information from the load charts of various cranes and to calculate the proper test load and test weight values.

This completes the content presentation portion of this course. Next, you will 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

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. You may need some of the information contained under the "Reference Tab" at the top of the screen. You may need any one of the three load chart packages available under the Reference tab. The Reference Tab is not available during the final exam so you may want to open, print, and or save these documents before you start the exam. A minimum score of 80% is required to pass the final exam. Good luck.

NOTES

NAVFAC
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_____