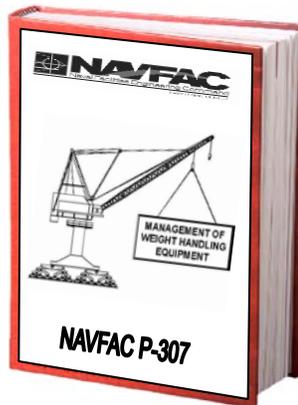




Navy Crane Center



NAVFAC P-307 Training

LOAD TEST DIRECTOR

WEB BASED TRAINING STUDENT GUIDE

NCC-LTD-02

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
<https://portal.navfac.navy.mil/ncc>

TABLE OF CONTENTS

INTRODUCTION TO NAVFAC P-307 TRAINING 9

 WELCOME 9

 PURPOSE AND SCOPE 9

 GETTING THE MOST OUT OF THIS COURSE 9

 NAVIGATING THROUGH THIS COURSE 10

 REFERENCE AREA..... 10

 EXAM DIRECTIONS 10

 KNOWLEDGE CHECKS..... 11

 FILL-IN-THE-BLANK..... 11

 DRAG-AND-DROP 11

 MULTIPLE CHOICE – SINGLE ANSWER..... 12

 MULTIPLE CHOICE – MULTIPLE ANSWER 12

 TRUE AND FALSE..... 12

 FEEDBACK 12

 READY TO BEGIN..... 12

INTRODUCTION TO LOAD TEST DIRECTOR..... 15

 WELCOME 15

 LEARNING OBJECTIVES..... 15

PURPOSE AND PROCEDURES 17

 PURPOSE OF LOAD TESTING WEIGHT HANDLING EQUIPMENT 17

 TEST DIRECTOR RESPONSIBILITIES..... 17

 TEST DIRECTOR QUALIFICATIONS 17

 TEST DIRECTOR TRAINING 17

 WHO APPOINTS THE LOAD TEST DIRECTOR? 18

 WHEN LOAD TESTS ARE NECESSARY 18

 RE-CERTIFICATION 18

 SELECTIVE LOAD TESTS 19

 SELECTIVE LOAD TESTS (CONT.)..... 19

 REVIEW AND SUMMARY 19

 PURPOSE AND PROCEDURES MODULE EXAM..... 23

RECORDS AND REQUIREMENTS..... 25

LOAD TEST DIRECTOR STUDENT GUIDE

BEFORE THE LOAD TEST..... 25

RESEARCHING RECORDS..... 25

CRANE CONDITION INSPECTION REPORT (CCIR)..... 25

SELECTING THE TEST SITE..... 25

PREP TEST SITE 26

MAKING THE TEST SITE SAFE..... 26

TEST WEIGHTS 26

TOTAL TEST LOAD..... 26

STAGING THE WEIGHTS 26

TEST TEAM BRIEFING 26

COMMUNICATIONS..... 27

TESTING PRECAUTIONS 27

FINAL CHECKS BEFORE THE TEST 27

RECORDS AND REQUIREMENTS SUMMARY 27

RECORDS AND REQUIREMENTS MODULE EXAM 29

LOCKOUT/TAGOUT 31

 PURPOSE OF LOCKOUT/TAGOUT..... 31

 WHO IS AFFECTED? 31

 WHEN IS LOCKOUT/TAGOUT REQUIRED? 32

 POTENTIAL HAZARDOUS ENERGY 32

 ENERGY ISOLATING DEVICES 33

 LOCKOUT..... 33

 TAGOUT 33

 DEVICES REQUIREMENTS..... 33

 PROCEDURE OVERVIEW 34

 PREPARING FOR LOCKOUT/TAGOUT..... 34

 EXECUTING LOCKOUT PROCEDURES..... 35

 SPECIAL CONSIDERATIONS 36

 APPLYING DEVICES 36

 APPLYING TAGOUT DEVICES 37

 PERFORMANCE BY GROUP..... 37

 RE-ENERGIZING THE EQUIPMENT AND SYSTEMS 37

LOAD TEST DIRECTOR STUDENT GUIDE

REVIEW AND SUMMARY 38

LOCKOUT/TAGOUT MODULE EXAM..... 40

CONDITION INSPECTION..... 43

 INSPECTIONS 43

 DETERMINING CRANE CONDITION 43

 INTERIM RE-CERTIFICATION 44

 INSPECTION SAFETY 44

 CRANE COMPONENTS..... 44

 HANDLING DEFICIENCIES 44

 MINOR DEFICIENCIES 45

 MAJOR DEFICIENCY..... 45

 REPLACEMENT PARTS 45

 RE-INSPECTION..... 45

 DEFERRAL OF WORK..... 45

 EQUIPMENT HISTORY FILE 46

 REVIEW AND SUMMARY 46

 CONDITION INSPECTION MODULE EXAM 48

LOAD TEST CALCULATIONS..... 50

 SAFE LIFTING CAPACITY 50

 CONSEQUENCES OF OVERLOADING 50

 ADDITIONAL CONSIDERATIONS 50

 LOAD TESTS 51

 EXAMPLE: CRANE CONFIGURATION..... 51

 MAXIMUM LOAD TEST CALCULATIONS 51

 TEST LOAD SPECIFICATIONS 52

 TEST LOAD DEDUCTIONS 52

 VIGILANCE 52

 READING THE LOAD CHART – *LOAD MOMENT TEST*..... 53

 CONSIDERATIONS..... 53

 EXAMPLE 53

 LOAD TEST CALCULATION EXERCISES..... 54

 EXERCISE 1 55

LOAD TEST DIRECTOR STUDENT GUIDE

EXERCISE 2 58

EXERCISE 3 60

CALCULATION EXAM REFERENCES 62

LOAD TEST CALCULATIONS MODULE EXAM 64

LOAD TEST TEAM..... 67

ACCIDENTS OVERVIEW 67

ACCIDENT DURING A LOAD TEST..... 67

ACCIDENT DURING A LOAD TEST..... 67

ACCIDENT DURING AN AUDIT 67

ACCIDENT DURING A FREE-RATED LOAD TEST..... 67

TEAMWORK..... 67

LOAD TEST TEAM PURPOSE 68

TEST TEAM MEMBERS 68

ALL TEAM MEMBERS 68

LOAD TEST DIRECTOR 68

CRANE OPERATOR 68

CONDITION INSPECTOR..... 69

RIGGER-IN CHARGE AND RIGGER RESPONSIBILITIES 69

CRANE WALKER..... 69

REVIEW AND SUMMARY 69

LOAD TEST TEAM MODULE EXAM 71

LOAD TESTING CATEGORY 2 AND CATEGORY 3 CRANES..... 73

GENERAL TEST REQUIREMENTS 73

CERTIFICATION OF LOAD TEST 73

ANNUAL HOOK INSPECTIONS 73

HOOK MEASUREMENTS..... 74

INSULATED LINK INSPECTION AND TEST..... 74

OET LOAD TESTS 74

NO LOAD OPERATIONAL TEST 74

NO-LOAD OPERATIONAL TEST..... 74

EMERGENCY HOIST DRUM BRAKE 74

STATIC LOAD TEST..... 75

LOAD TEST DIRECTOR STUDENT GUIDE

PRIMARY AND SECONDARY BRAKE 75

DYNAMIC LOAD TEST..... 75

LOAD BRAKE TESTING 75

LOSS OF POWER TEST..... 75

EMERGENCY HOIST DRUM BRAKE TEST 75

TROLLEY AND BRIDGE LOAD TEST 76

TROLLEY AND BRIDGE LOSS-OF-POWER TEST 76

JIB, PILLAR AND PILLAR-JIB TESTS..... 76

SUMMARY 76

LOAD TESTING CATEGORY 2 AND CATEGORY 3 CRANES MODULE EXAM 78

LOAD TESTING CATEGORY 1 CRANES..... 79

PORTAL CRANE NO-LOAD TEST..... 79

PORTAL CRANE LOAD TEST: NOMINAL TEST LOAD..... 79

PORTAL CRANE LOAD TEST: REQUIREMENTS 80

PORTAL CRANE HOIST LOAD TEST 80

TRAVEL AND ROTATE LOAD TESTS 81

PORTAL CRANE TEST WRAP-UP 81

MOBILE CRANE LOAD TESTS..... 81

PRE-TEST PREPARATION 82

MOBILE CRANE TESTING..... 82

NO-LOAD TESTS FOR MOBILE CRANE..... 83

MOBILE CRANE LOAD TEST..... 83

TELESCOPIC COMPONENT SLIPPAGE TEST 84

OUTRIGGER/STABILIZER COMPONENT SLIPPAGE TEST..... 84

“ON-RUBBER” (FREE RATED) LOAD TEST..... 85

TEST PROCEDURE FOR CATEGORY 4 CRANES..... 85

SPECIAL MOBILE CRANE TEST PROCEDURES 85

AUXILIARY HOOKS AND ANCILLARY EQUIPMENT 86

BOAT HOISTS..... 86

BARGE-MOUNTED MOBILE CRANES..... 86

FLOATING CRANE LOAD TESTS..... 87

TESTING WHE NOT USED FOR LIFT-CRANE SERVICE 87

LOAD TEST DIRECTOR STUDENT GUIDE

SPECIAL TESTING SITUATIONS 87

AFTER THE LOAD TEST..... 88

CHECKING HOOK THROAT SPREAD..... 88

DOCUMENTING THE TEST 88

COMPLETING THE CERTIFICATION PROCESS 88

SUMMARY AND REVIEW 88

LOAD TESTING CATEGORY 1 CRANES MODULE EXAM 90

LOAD TEST DIRECTOR COURSE EVALUATION SHEET 93

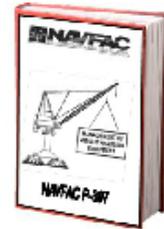
[INTRODUCTION TO NAVFAC P-307 TRAINING](#)

[WELCOME](#)

Welcome to Navy Crane Center's NAVFAC P-307 training. The next few screens provide information that will be helpful when taking these courses. Please pay close attention as this information can add greatly to a positive training experience.

[PURPOSE AND SCOPE](#)

NAVFAC P-307 training courses provide basic, fundamental, trade related information for the operation, rigging, maintenance, inspection, and testing of weight handling equipment (WHE) at Navy shore activities. These courses will acquaint personnel with Navy requirements to safely perform WHE related tasks. By design, these courses reinforce and enhance existing knowledge and provide a base upon which to develop experienced, competent personnel through on-the-job training. Completing a NAVFAC P-307 training course will not, in itself, produce a professional, knowledgeable, safe worker from someone who is inexperienced or lacks familiarity or skill with the subject. NAVFAC P-307 courses do not provide hands-on training nor will they qualify personnel to perform a specific function, task or assignment. It is therefore incumbent on the command, activity or organization to provide additional training to develop safe, competent personnel. NAVFAC P-307 supports this goal by providing Section 13 training courses and Appendix N knowledge and competency requirements. Above all, think safety and act safely. The goal is safe performance of WHE operations with zero accidents and injuries. Operational Risk Management should be employed in every weight handling decision, including training billet assignments. Organizations must ensure selection of competent, knowledgeable personnel for training billet nominations and subsequent WHE duties.



[GETTING THE MOST OUT OF THIS COURSE](#)



Pay close attention to the narrations and information provided on each screen. There may be information in the narration that is not shown on the screen. And vice-a-versa, there may be information on the screen that is not contained in the narration. Replay narrations and screen content as often as needed by clicking on the topic title or the tab title, as applicable.

Complete all knowledge checks and module quizzes to help re-enforce your understanding of the material covered.

NAVIGATING THROUGH THIS COURSE

As you navigate through this course, you will find several helpful tools and features that will facilitate your learning. This interactivity enables you to easily navigate and access various training aids and tools using the following buttons:

- The topic list, if present (on the left), displays the topics within the module. Topics can be selected by clicking on the title.
- The navigation buttons (top right) look like arrow heads and allow you to move forward to the next screen or backward to the previous screen by clicking on the arrowhead pointing to the right or left, respectively.
- The 'home' button (top right) returns you to the main module menu.
- The 'reference' button (top right) allows you to view various references, documents, or pictures provided to support your learning experience.
- The 'view narration' link (lower left on the content screen) allows you to view a text version of the audible narration.



REFERENCE AREA

Some courses require you to refer to other documents when completing the modules, exercises, quizzes and final exams. These documents are available in the reference area and can be copied to your computer or printed. Certifying Official, Load Test Director and General Crane Safety are three such courses and require you to have the load chart or certification packages handy. Note that the reference button is not



available when taking the final exam. Student guides, a glossary of terms, pictorial representations of equipment, and videos are also available from the

reference area.

EXAM DIRECTIONS

When taking exams, keep the following in mind...some questions require multiple answers and have check boxes next to the choices. Single answer questions have circles next to the choices. Look for defining words within the questions and answers such as: increase/decrease, square feet/cubic feet, all/except, and less than/greater than. Some exams require additional materials. For example, Category 1 Crane Safety and Load Test Director require the use of the load chart packages and Certifying Official may require the bridge and/or mobile crane certification packages, all of which are located in the Reference section. If you score less than 70% on a module quiz, review the necessary content, and return to take the



quiz again. You can go back and review any content prior to taking a quiz or final exam. You can review and change your answers any time before you select the 'Score Exam' button. A score of 70% or higher is required to pass. The final exam score will be recorded in the Navy eLearning system and on your completion certificate. If you fail a course, you can re-enroll and retake the course.

KNOWLEDGE CHECKS

These courses use various types of questions to help you retain the material presented.



As you proceed through each topic, you will be asked questions in the form of knowledge checks. The knowledge checks will help you prepare for the module quizzes and final exams. When you have successfully completed all topics and modules you may take the final exam. Question types include...

- Fill in the Blank
- Drag and Drop
- Multiple Choice - Single Answer
- Multiple Choice - Multiple Answer
- True/False

Let's look at each one...

FILL-IN-THE-BLANK

This is a 'fill-in-the-blank' type question. Type the correct answer in the space provided. In the lower left corner of the screen, note the item showing: "Tries-remaining". This indicates the number of tries the assessment software will allow you to attempt to answer a question correctly.

Knowledge Check - Fill in the Blank

Type your response to the following question:
The correct answer is NAVFAC P-307

Q: Naval activity guidance for inspection, testing, and use of rigging gear is found in the:

Tries Remaining: 1

Knowledge Check - Drag and Drop

Q: Select the name and drag it to the correct picture. Check your answer when you have dragged the names to the correct locations.
You will have 5 tries this time.



Truck Mounted Articulating Boom
Commercial Truck Mounted
Pedestal Mounted Commercial Boom
Mobile Crane

DRAG-AND-DROP

This is a 'drag-and-drop' type question. Simply match the term to the appropriate picture or symbol. "Click & hold" the left mouse button on the term and drag it to the picture it describes; release the button. Repeat for each item.

MULTIPLE CHOICE – SINGLE ANSWER

This is a 'multiple choice – single answer' type question. Note the circles next to each answer choice. You are only allowed to select one answer. Choices may be very similar so select the BEST answer to the question.

Knowledge Check - Multiple Choice/Single Answer



Select the best answer to the following question and click the "Check" button. ...
The correct answer is NAVFAC P-307

The basic operational and rigging safety requirements for Cat 3 crane operations are identified in the...

- NAVFAC P-409
- NAVFAC Crane book
- NAVFAC P-307
- NAVFAC Learning Pamphlet

Check

Tries Remaining: 1

Knowledge Check - Multiple Choice/Multiple Answer



Select all that apply to the following question and press the "Check" button.
All are correct except "Maintain curriculum standards for NCC"

The purpose of the NAVFAC P-307 is to:

- Provide standards for crane operations and rigging.
- Maintain curriculum standards for NCC.
- Ensure safe crane and rigging operations.
- Ensure optimum service life.
- Maintain safety and reliability.

Check

Tries Remaining: 1

MULTIPLE CHOICE – MULTIPLE ANSWER

This is a 'multiple choice – multiple answer' type question. Note the squares next to each answer choice. From the list of answer choices, select all that correctly answer the question.

TRUE AND FALSE

This is a 'true/false' type question. The circles next to each answer choice indicate that only one answer can be selected - chose either true or false.

Knowledge Check - True/False



Training can be found in Section 14 of the NAVFAC P-307.
The correct answer is False

- True
- False

Check

Tries Remaining: 1

FEEDBACK

Upon completion of the training, or at any time during the training, please feel free to provide feedback to Navy Crane Center on how to improve or better deliver this presentation. Include suggestions such as: current WHE accidents, near misses, trends (with narratives and pictures); content changes, additions, deletions; other topics; clarifications, corrections; delivery methodologies.

Navy Crane Center
Norfolk Naval Shipyard, Bldg. 491
Portsmouth, VA 23709-5000

757-967-3803, DSN 387 (general)
757-967-3832/33, (training)
757-967-3808/3799 (fax)

nfsh_ncc_training@navy.mil (email)

Contact information is provided on the screen and in the student guide. You can come back to this screen at any time prior to passing the final exam. After passing the final exam, the course will roll up, your information will go to "My Transcripts", and the course content no longer be available. However, you may still refer to the student guide for contact information or you can go to the Navy Crane Center's training web page and provide feedback via the links found there.

READY TO BEGIN

You are now ready to begin your training. Navigate back to the main module menu, select the next module, and begin your training. Good luck.

NOTES

INTRODUCTION TO LOAD TEST DIRECTOR

WELCOME

Welcome to the Load Test Director Course. The following topics will be discussed during this training:

- The purpose for load testing
- The responsibilities and qualifications for load test personnel
- Records and requirements
- Lockout/Tagout
- Condition Inspections
- Load Test Calculations
- Load Test Teams
- Load testing Category 1,2, and 3 cranes

LEARNING OBJECTIVES

Upon successful completion of this course you will be able to: explain the purpose and procedures 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 load test weights, and identify the load test team members and their responsibilities.

Course Learning Objectives

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

1. Explain the purpose and procedures for testing Navy cranes
2. Explain the necessary preparations for conducting a safe load test
3. Identify the required tests for different types of cranes
4. Correctly perform and document a condition inspection
5. Accurately calculate load test weights
6. Identify the load test team members and their responsibilities

PURPOSE AND PROCEDURES

PURPOSE OF LOAD TESTING WEIGHT HANDLING EQUIPMENT

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



Test Director Responsibilities:



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

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

TEST DIRECTOR RESPONSIBILITIES

The test director ensures the load test is done safely and efficiently. Crane load tests are overload conditions, requiring extreme caution and control.

TEST DIRECTOR QUALIFICATIONS

Test directors must be qualified to oversee and direct load tests. They must be trained according to NAVFAC P-307, technically competent and knowledgeable, and understand the duties of other test members as described in P-307 appendix N. The test director is designated, in writing, by the certifying official of the naval activity.



TEST DIRECTOR TRAINING

The load test director must have the required training and background to perform a load test safely and efficiently. The load test director will know the operational characteristics of the weight handling equipment being tested and the components being tested. The load test director also knows how to interpret load charts and proper crane communications, including, hand signals.

WHO APPOINTS THE LOAD TEST DIRECTOR?

The certifying official, appointed by the commanding officer of the activity, designates in writing all test directors and condition inspectors.



WHEN LOAD TESTS ARE NECESSARY

Certifications, for all cranes, are valid for one year from the date of the signature of the certifying official. The certification process shall include a condition inspection and appropriate tests. For category 1 and 4 cranes, the annual tests shall include a load test. Category 2 and 3 cranes, which are in a quadrennial load test program, shall be inspected, operationally tested (without load), and certified annually however, a load test shall be performed at every fourth annual certification, as a minimum. The crane certification shall indicate when a crane is in the quadrennial load test program. When the adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test for verification of satisfactory work performed, recertification is required. To determine if a load test is required, the component's impact on holding strength shall be assessed. If holding strength could be affected by the work performed then a selective inspection, load test, and recertification shall be performed. Inspection and testing shall fully ensure the work has been performed correctly and that the crane operates properly. If an inadvertent overload exceeds 110% (105% for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber tired gantry cranes, and category 4 cranes) of the certified capacity, a load test is required (along with the condition inspection) for recertification. Where only distinct portions of the equipment are affected, only those portions need to be inspected and tested.

RE-CERTIFICATION

WHE certifications are good for one year unless voided. Re-certification requires a condition inspection. Depending on the type of crane, a load test is required at every annual or quadrennial certification. Certification is void whenever the rated capacity is exceeded, except during a load test. Selective load tests and re-certification may be required after an adjustment, repair, disassembly, replacement, or alteration of load-bearing and in some cases load-controlling components. Load-controlling components, such as the rotate function on a floating crane, may require load testing to verify satisfactory work. Some exceptions apply for brake adjustments and certain disassembly and reassembly procedures.

[SELECTIVE LOAD TESTS](#)

Selective load tests for interim re-certification are required when adjustment, repair, disassembly, alteration, or replacement of a load bearing part, load controlling part, or operational safety device requires a load test to verify the work performed. A selective load test is limited to components in an affected system. When load tests are performed, they shall include applicable portions of both the static and dynamic tests of appendix E.

Note: For certain mobile cranes refer to other tests such as the 'maximum certified capacity test' or the 'load moment test' in lieu of the static/dynamic tests for applicable test requirements.



[SELECTIVE LOAD TESTS \(CONT.\)](#)

Disassembly or repair to the holding brake of a hoist requires both a static and dynamic test for the affected hoist system. Some repairs may be excluded from a selective load test.

[REVIEW AND SUMMARY](#)

Click the buttons on the screen to review the information covered in this module.

Purpose and Procedures Summary

- *What is the purpose for load tests?*
- *When are Load Tests Required?*
- *What are the Responsibilities for the Test Director?*
- *What are the Qualifications for the Test Director?*

What is the purpose for load tests? The reason we load test cranes 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.

When are load tests required? Load tests are required annually for category 1 and 4 cranes. Category 2 and 3 cranes that are in a quadrennial program shall be load tested at every fourth certification, as a minimum. The certification shall indicate the crane is in the quadrennial program.

What are the responsibilities of the test director? The test director coordinates test team responsibilities, directs the test, ensures the safety of personnel and equipment, and documents the load test.

What are the qualifications for a test director? The test director shall be technically competent and knowledgeable, understand the duties of other test members, trained in accordance with NAVFAC P-307 requirements, and be designated in writing by the certifying official.

NOTES

PURPOSE AND PROCEDURES MODULE EXAM

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

1. Which of the following statements best describes the purpose of load testing cranes?
 - A. to ensure that the crane is designed according to industry standards
 - B. so that navy activities can be sure the equipment will not fail when in use
 - C. to see if the equipment will fail under capacity loads
 - D. to ensure that the equipment is capable of safely lifting and moving rated loads through all design motions

2. To verify satisfactory repair of a load bearing part _____.
 - A. a load test is required
 - B. a load test is not required
 - C. a load test is performed at the discretion of the load test director

3. When a brake is adjusted to within the manufacturer's tolerances _____. Assume the brake meets the criteria of NAVFAC P-307 section 3.4.2.2.2 a, b, c, and d.
 - A. a load test is required
 - B. a load test is not required
 - C. a load test is performed at the discretion of the load test director

4. When only one load bearing component in a hoist is affected _____.
 - A. a load test is required
 - B. a load test is not required
 - C. a load test is performed at the discretion of the load test director

5. Which of the following is not a responsibility of the load test director?
 - A. coordinates team member activities during test
 - B. directs or controls the load test
 - C. checks test weight calculations
 - D. performs the post inspection of the crane
 - E. completes the paperwork for the test

6. Which of the following is not a requirement to become a load test director?
 - A. technically competent
 - B. trained according to the P-307
 - C. certified by OSHA
 - D. designated in writing by the certifying official of the activity
 - E. knowledgeable of team member responsibilities

LOAD TEST DIRECTOR STUDENT GUIDE

7. During the annual certification of a category 1 crane _____.
- A. a load test is required
 - B. a load test is not required
 - C. a load test is performed at the discretion of the load test director
8. Load test directors must be trained and knowledgeable on which of the following?
- A. NAVFAC P-307 load test requirements
 - B. interpretation of OEM load charts
 - C. crane safety
 - D. calculation of weight for load tests
 - E. all of the above
9. After disassembly of most load bearing parts _____.
- A. a load test is required
 - B. a load test is not required
 - C. a load test is performed at the discretion of the load test director

RECORDS AND REQUIREMENTS

BEFORE THE LOAD TEST

Before starting the load test, research the crane history file to examine previous condition inspections, tests, and certification records.



RESEARCHING RECORDS

The first step in preparing for the load test is researching the crane's records.

Look at previous inspections and certification records. Review OEM manuals to include: load rating charts, procedures for changing crane configurations and erecting ancillary devices, and instructions for setting up outriggers.

CRANE CONDITION INSPECTION REPORT (CCIR)

To determine a crane's condition, a Crane Condition Inspection is performed and documented before, during, and after the load test.



CRANE CONDITION INSPECTION RECORD					
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	Inspector Initial
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If load test is performed, inspect load indicators, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the CCIR. Mark tick 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 approvals for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFG 3-20-07 or appropriate document for test procedures.)				
19	Inspect outriggers, jacks, blocks, wedges, spider mountings and level indicators for condition and proper operation.				
20	Inspect lines, traveler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, boat hoists, submersed gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C.				
22	Inspect jacks, ratchets, and rotate locks for proper engagement and operation of ratchetlocks.				
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 (locks) cover bolts are installed.				
28	Verify accuracy of tilt and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin steadiness/support assembly for condition and proper operation.				
30	Inspect steering/ing bearings for condition and proper operation.				
31	Inspect travel tracks, equalizers, and guideposts for condition and proper operation.				
Remarks:					
Inspector Signature/Date:			Test Director Signature/Date:		



SELECTING THE TEST SITE

Selecting a suitable test area is important. Considerations include sufficient room, adequate support, and traffic. Test sites must always be secured.

PREP TEST SITE

Preparing both equipment and personnel are part of test site preparations.



MAKING THE TEST SITE SAFE



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

TEST WEIGHTS

Test weights must be accurately weighed, measured and labeled.



TOTAL TEST LOAD

Total test loads must be calculated for specific cranes and specific tests.

STAGING THE WEIGHTS

Prior to the load test, all rigging gear, test weights, and test load calculations need to be inspected and verified.



TEST TEAM BRIEFING

After the pre-test preparations are complete and the test is ready to begin, the Load Test Director will conduct an interactive Test Crew Briefing.

COMMUNICATIONS

Clear communication is vital to the safety of personnel and equipment during a test. The communication method and a designated signal person must be established. It should be emphasized to the test team that anyone can give an emergency stop signal and anytime communication is lost during the test, the operator is to automatically stop operations.



TESTING PRECAUTIONS

During the test, normal operating speed shall be used. Rated equipment speeds do not need to be attained. The emphasis shall be placed on the ability to safely control loads through all motions at normal speed. Use extreme caution during the tests. These tests are overload tests that may cause failure. Personnel must stay clear of suspended loads and out of areas where they could be struck by a falling hoist assembly or boom. Finally, raise the test weights just high enough to perform the test. For mobile cranes this will help to prevent the crane from tipping if problems arise.



FINAL CHECKS BEFORE THE TEST

- Is the 'Pre-Test' portion of the CCIR complete?
- Have all safety concerns been addressed?
- Has an ODCL been completed?
- Are personnel briefed and ready to go?



RECORDS AND REQUIREMENTS SUMMARY

The Records and Requirements module discussed how to prepare for a load test by researching history files, OEM manuals, and other pertinent documents related to the crane. It introduced the Crane Condition Inspection Record, or CCIR, and stated that inspections were to be performed before, during, and after a load test. Test sites need to be prepared and made safe prior to beginning a load test. Evaluate all conditions and erect barriers as needed. The required test weight must be calculated for each crane and test. Rigging gear and test weights need to be staged and inspected. Prior to starting the load test, conduct an interactive brief with all test team members and re-brief any time a new member joins the team.

NOTES

[RECORDS AND REQUIREMENTS MODULE EXAM](#)

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

1. Pretest team briefings shall include which of the following items?
 - A. communication methods
 - B. specific test procedures
 - C. individual job assignments
 - D. traffic control
 - E. all listed items

2. A briefing for new test team members shall be done...
 - A. once at the beginning of a test
 - B. only if the test director deems it necessary
 - C. any time a new member joins the team
 - D. only when a turnover cannot be given by the replaced member

3. Which of the following are important steps in preparing for a successful crane load test?
 - A. research the crane history file
 - B. perform a Crane Condition Inspection
 - C. select a suitable test site
 - D. calculate and select test weights
 - E. all of the above

4. The total test loads for mobile cranes must be calculated using which of the following formulas?
 - A. 1.20 times the rated capacity, +5, -0% tolerance
 - B. 1.25 times the rated capacity, +5, -0% tolerance
 - C. 1.05 times the rated capacity, +5, -0% tolerance
 - D. 1.10 times the rated capacity, +5, -0% tolerance

5. Which one of the following is not an important test site consideration when selecting a suitable area?
 - A. has sufficient room for the set-up and test
 - B. has permanent barriers to keep people out
 - C. has minimal vehicle and pedestrian traffic
 - D. provides adequate support for the test

6. The OEM crane manual should provide all of the following information about a mobile crane except...
 - A. the load rating chart
 - B. load test calculation sheets
 - C. procedures to erect ancillary devices
 - D. crane outrigger set-up instructions
 - E. procedures to change crane configuration

7. The primary purpose of the Crane Condition Inspection is best described by which of the following statements?

- A. to identify changes in condition during the test
- B. to find any damage resulting from the test
- C. 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
- D. to ensure the crane is in good condition before the test

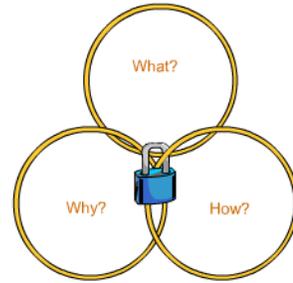
8. A Crane Condition Inspection for most cranes must be done at which of the following frequencies?

- A. before the load test only
- B. before, during, and after the load test
- C. after the load test only
- D. only during the load test

LOCKOUT/TAGOUT

PURPOSE OF LOCKOUT/TAGOUT

The purpose of the lockout/tagout system is to control hazardous energy and prevent injury to personnel. Lockout procedures are a principle means of controlling energy hazards. A lockout procedure is a set of safe work practices and rules that if followed greatly reduce or control the hazards associated with work that will be performed by the worker and safeguard the work from coming into contact with an uncontrolled energy source.



Lockout /Tag-out system:
Controls hazardous energy
Prevents personnel injury resulting from:

- Unexpected energization
- Unexpected startup
- Unexpected release of stored energy

Scroll over each point.
What is the Lockout Tag-out system?
Why is it necessary?
How is Lockout Tag-out put in place?

[Show All](#)



blocks the flow of energy from a power source to a piece of equipment and keeps the power source blocked.

in accidents resulting from unexpected start up or energizing of equipment.

who may be affected

- Disconnect and remove energy
- "Lockout" and "tag-out" energy
- Ensure energy does not affect workers during service or maintenance

WHO IS AFFECTED?

Affected employees are those who use the equipment or system that is about to be locked out or tagged out, or works in the area. An affected employee has no authority to perform or remove lockout/tag-out devices or tags. Authorized employees are the only employees who can perform lockout/tagout. They perform lockout or tag-out to safely service or maintain equipment.



Affected employee:

- Uses or operates the equipment
- Works in the area
- Has **NO authority** to perform or remove Lockout /Tag-out Devices

Authorized employee:

- Authorized employees are the only employees who can perform Lockout/ Tag-out
- Performs lockout or tag-out to safely:
 - service or
 - maintain equipment

WHEN IS LOCKOUT/TAGOUT REQUIRED?

Lockout/tagout procedures are required when the safety of personnel may be affected by positive energy flow.

When is Lockout / tag-out Required?



When is Lockout / tag-out Required?

Lockout / Tag-out procedures are required when any:

- guard or safety device is removed or bypassed
- body part is placed in a point of operation
- unprotected body part is placed in a panel with exposed electrical conductors
- associated danger zone exists during operation

Exceptions:

- Minor tool changes
- Minor adjustments
- Minor servicing
 - Normal to production operations
 - Routine
 - Repetitive
 - Integral to production

Minor Adjustments:

Adjustment to an engine that requires the engine to be running. i.e. Adjusting idle rpm

Minor Servicing:

Lubrication

POTENTIAL HAZARDOUS ENERGY

Hazardous energy may include all of these sources around your workplace.

Hazardous Energy

- Electrical
- Pressurized liquids and gases
- Hydraulic
- Pneumatic
- Kinetic Energy
- Potential Energy

Kinetic Energy...

Blades, belts, and fly wheels.
Energy that keeps object moving after power supply is cutoff.

Potential Energy...

Raised loads
Counterweights
Springs
Capacitors
Accumulators

ENERGY ISOLATING DEVICES

Energy-isolating devices disconnect or shut down the energy source to the equipment that must be serviced.

Energy-isolating Devices

Acceptable Energy-isolating Devices

Any device used to block or isolate energy such as:

- Manually operated circuit breaker
- Manually operated switch when:
 - Disconnects load conductors from all ungrounded supply conductors
 - No pole can be operated independently
- Disconnect switch
- Line valve

Unacceptable Energy-isolating Devices

These devices are **Not Acceptable** as energy isolating devices:

- Push buttons
- Selector switches
- Other control circuit type devices

Why are these examples Un-acceptable?

Because they can be operated by anyone. They do not lock out without attaching additional devices.

LOCKOUT

The preferred method to prevent hazardous energy from injuring personnel is lockout. Lockout means locking an energy isolating device in a safe position.

Lockout

What is Lockout?

Locking an energy isolating device in a safe position

- Locked "Off" or disconnected position
- Ensures equipment cannot be operated

When is Lockout used?

Devices?

Energy Isolation Devices shall be locked unless:

- It is not capable of being locked
- The employer can demonstrate that the use of a tag-out system will provide the same protection as a lock.

Devices:

- Only be used for controlling energy
- Provided by the employer
- Only Authorized Employees can perform Lockout/Tag-out

TAGOUT

Tagout is to place a tag on an energy isolating device.

Tagout

What is Tagout?

Placing a tag on an energy isolating device:

- identifies who is working on equipment
- indicates equipment may not be operated

When is Tagout used?

When an energy isolating device is not capable of being locked out

Devices?

Standard throughout the facility

- clearly and uniquely marked
- identifiable

DEVICES REQUIREMENTS

Lockout/tagout devices must meet these requirements.

Lockout devices are:

- Only used for controlling energy
- Provided by the employer
- Standard throughout the facility
 - clearly and uniquely marked
 - identifiable
- Labeled to identify the person installing the device
 - only one person can use the device
 - only removed by the person who installed the device
- Substantial
 - prevents removal
 - durable

PROCEDURE OVERVIEW

The lockout/tagout system includes three fundamental procedures: Preparing for the lockout/tagout, executing the lockout/tagout and re-energizing the equipment or systems.

Lockout/tagout Procedures

Preparing for Lockout/Tag-out

- **Notify** affected employees
- **Prepare** for shutdown
- **Shut** down the equipment

Executing Lockout/Tag-out

- **Isolate** the equipment
- **Apply device:** the lockout or tag-out
- **Relieve** stored energy
- **Verify** isolation

Re-energizing equipment or systems

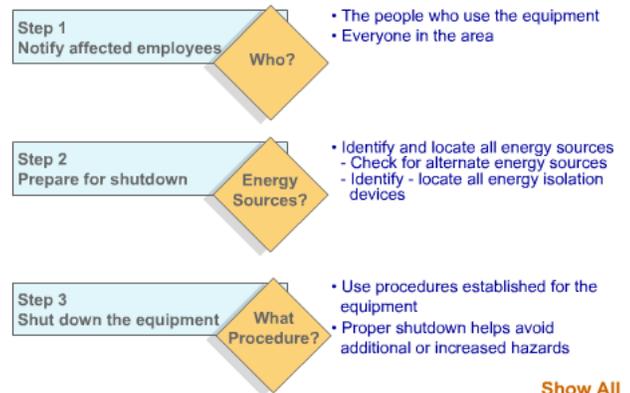
- **Prepare** site for re-energizing
- **Ensure** safety of personnel
- **Remove** devices
- **Issue** warning

PREPARING FOR LOCKOUT/TAGOUT

There are three steps in preparing for the lockout/tagout.

Lockout / Tag-Out Procedures

Preparing for Lockout / Tag-out (3 Steps)



Show All

Step 1: Notify Affected Employees

- The people who use the equipment
- Everyone in the area

Step 2: Prepare for Shutdown

- Identify and locate all energy sources
- Check for alternate energy sources
- Identify - locate all energy isolation devices

Step 3: Shut Down the equipment

- Use procedures established for the equipment
- Proper shutdown helps avoid additional or increased hazards

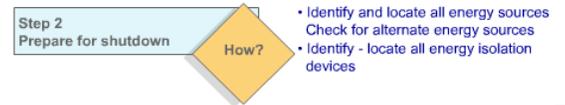
EXECUTING LOCKOUT PROCEDURES

There are five steps when executing lockout procedures.

Execute Lockout/Tag-out

Executing Lockout/Tag-out (5 steps)

Page 1 of 3

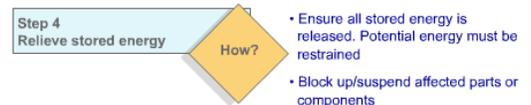
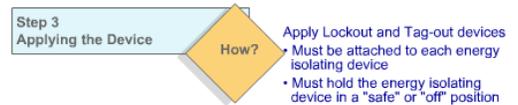


Next Page ▶

Execute Lockout/Tag-out

Executing Lockout/Tag-out (5 steps)

Page 2 of 3



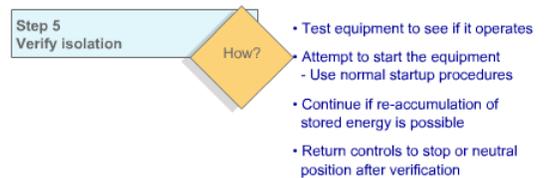
◀ Previous Page

Next Page ▶

Execute Lockout/Tag-out

Executing Lockout/Tag-out (5 steps)

Page 3 of 3



Note: Although at this point you have met the requirements for lock-out/tag-out, additional safety requirements may need to be followed prior to the start of work (i.e., arc flash requirements)

Execute Lockout/Tag-out

Step 1: Isolate the Equipment

- Lockout or shutdown all energy sources

Step 2: Prepare for Shutdown

- Identify and locate all energy sources
Check for alternate energy sources
- Identify - locate all energy isolation devices
- Identify and locate any stored energy

Step 3: Applying the Device

- Apply Lockout and Tag-out devices
- Must be attached to each energy isolating device
- Must hold the energy isolating device in a "safe" or "off" position

Step 4: Relieve Stored Energy

- Ensure all stored energy is released. Potential energy must be restrained
- Block up/suspend affected parts or components

Step 5: Verify Isolation

- Test equipment to see if it operates
- Attempt to start the equipment
- Use normal startup procedures
- Continue if re-accumulation of stored energy is possible
- Return controls to stop or neutral position after verification



SPECIAL CONSIDERATIONS

Review and follow all special considerations when applying the lockout/tagout devices.

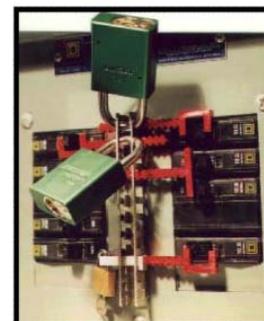
Special Considerations



APPLYING LOCKOUT DEVICES

The lockout device must ensure that it holds the isolating device in a safe or off position.

Applying Devices



Attach each energy isolating device in a "safe" or "off" position

APPLYING TAGOUT DEVICES

If only tagout is used, for example no locking device, the tag must be attached so that it clearly indicates that operation or movement of the energy isolating device is prohibited. It must be attached at the same point where a lock would have been attached.

Applying Tag-out Devices

- Tag-out devices must:
- Clearly indicates operation is prohibited
 - Same point a lock would be attached
 - If Tag cannot be attached directly to the energy isolating device:
 - Attached as close as safely possible
 - Immediately obvious to anyone attempting to operate the device



PERFORMANCE BY GROUP

When lockout/tagout procedures must be performed by more than one person, each worker is required to attach their own personal lockout/tagout out device. One person shall be responsible to oversee the procedure.

Performance By Group

- Each person attaches their own device
- One person takes overall responsibility



RE-ENERGIZING THE EQUIPMENT AND SYSTEMS

The final procedure in the lockout/tagout system is to re-energize the equipment or systems. There are four steps to accomplish this.

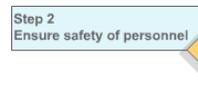
Re-energize

Re-energize Equipment (4 steps)

page 1 of 2



- Remove all non-essential items
 - Tools
 - Unused or replaced parts
- Ensure equipment components are operationally intact
- Verify controls are in neutral



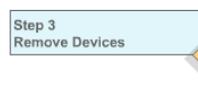
- Notify all "Affected Employees"
- Ensure personnel are in a Safe position or removed from the area

Next Page ▶

Re-energize

Re-energize Equipment (4 steps)

page 2 of 2



- Remove Lockout/Tag-out Devices
 - Removed by Authorized Employee that attached the device
- Remove any blocking or lashing



- Warn Affected Employees the equipment is about to restart

◀ Previous Page

Show All

Re-energize

Step 1: Prepare Site for Re-energize

- Remove all nonessential items
 - Tools
 - Unused or replaced parts
- Ensure equipment components are operationally intact
- Verify controls are in neutral

Step 2: Ensure safety of personnel

- Notify all "Affected Employees"
- Ensure personnel are in a Safe position or removed from the area

Step 3: Remove Devices

- Remove Lockout/Tag-out Devices
 - Removed by Authorized Employee that attached them
- Remove any blocking or lashing

Step 4: Issue Warning

- Warn Affected Employees the equipment is about to restart



REVIEW AND SUMMARY

Review the summary for lockout/tag-out systems.

Lockout / Tag-out Review

Purpose:

- **What, Why and How**

Procedures:

- **Preparing** for Lockout / Tag-out
- **Executing** Lockout / Tag-out
- **Re-energizing** equipment and systems

Purpose of Lockout / Tag-out

What:

The lockout procedure blocks the flow of energy from a power source to a piece of equipment and keeps the power source blocked.

Why:

Every year people are killed in accidents resulting from unexpected start up or energizing of equipment.

How:

- Notify all employees who may be affected
- Disconnect and remove energy
- "Lockout" and "tag-out" energy
- Ensure energy does not affect workers during service or maintenance

Preparing for Lockout/Tag-out

- **Notify** affected employees
- **Prepare** for shutdown
- **Shut** down the equipment

Executing Lockout/Tag-out

- **Isolate** the equipment
- **Prepare** for shutdown
- **Apply device:** the lockout or tag-out
- **Relieve** stored energy
- **Verify** isolation

Re-energizing equipment or systems

- **Prepare** site for re-energizing
- **Ensure** safety of personnel
- **Remove** devices
- **Issue** warning

NOTES

[LOCKOUT/TAGOUT MODULE EXAM](#)

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

1. Which of the following does not meet the requirements for a lockout device?
 - A. provides caution against energizing
 - B. substantial enough to prevent easy removal
 - C. equipment cannot be operated until device is removed
 - D. locks source in the "off" position

2. Who must be notified before a lockout/tagout procedure is started?
 - A: affected employees
 - B. everyone who uses
 - C. all people in the area where the work is to be done
 - D. all listed personnel

3. Who is authorized to remove lockout or tagout devices?
 - A: the authorized employee who installed the device
 - B. all operators of the equipment
 - C. anyone authorized to fix the equipment
 - D. affected employees
 - E. only the worker's supervisor

4. When performing the lockout/tagout procedure, before you relieve stored energy you must...
 - A. verify isolation
 - B: relieve stored energy
 - C. apply the lockout and/or tagout device

5. From the following list, select the one that is responsible for applying locks or tags to machinery, equipment, or systems?
 - A: only the worker's supervisor
 - B. affected employee
 - C. authorized employee

6. Who must be notified before re-energizing equipment that has been locked out or tagged out?
 - A. all who use the equipment
 - B. everyone in the work area
 - C. affected employees
 - D. all listed personnel

7. The purpose of lockout/tagout is to prevent personal injury when performing work on crane systems. Which one of the listed work items does not require lockout/tagout?

- A. performing routine minor adjustments and/or lubrication
- B. aligning an unguarded drive train coupling
- C. replacing electrical breakers
- D. repairing pressurized gas or liquid lines
- E. replacing a seal on a boom cylinder

8. When performing the lockout/tagout procedure, the last step performed is to...

- A. verify isolation
- B. notify affected employees
- C. shut down the equipment
- D. apply the lockout or tagout device
- E. relieve stored energy

9. When performing a lockout/tagout procedure, the first step is to...

- A. notify affected employees
- B. apply the lockout or tagout device
- C. shut down the equipment
- D. relieve stored energy
- E. verify isolation

10. Which of the following is required when an employee places any part of their body into an area where the unexpected re-energizing or release of stored energy from machinery could result in injury while performing of work?

- A. no action
- B. lockout
- C. tagout

LOAD TEST DIRECTOR STUDENT GUIDE

CONDITION INSPECTION

INSPECTIONS

Condition inspections are performed in accordance with NAVFAC P-307 requirements.

NAVFAC P-307 Directive:
 Section **2, 3, and 5**
 Crane Condition **Documentation**

Consist of:

Observing the functioning of parts and components:

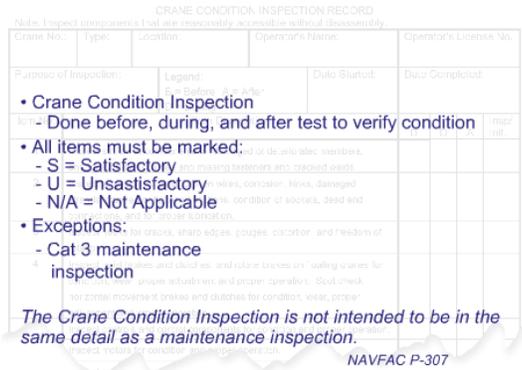
- before,
- during and
- after operation

Performed by:

- Sight,
- Sound
- Touch
- Instrumentation,
- Non destructive Testing
- Dis-assembly (as required)

DETERMINING CRANE CONDITION

To determine the crane condition, a crane condition inspection is performed and documented before, during, and after the load test.



CRANE CONDITION INSPECTION RECORD
 Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.:	
Purpose of Inspection:		Legend: B = Before A = After D = During	Date Started:	Date Completed:	
Item No.	Item Description	B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If load test is performed, inspect load indicators, load warning devices, and load shutdown devices for condition and working accuracy as specified in appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the CCIR. Mark N/A if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				

Item No.	Item Description	B	D	A	Insp/ Init.
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFGC 3.430-07 or appropriate document for test procedures.)				
19	Inspect outriggers, pads, bows, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, boat hoists, rubber-tired gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in appendix C.				
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.				
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				
25	Inspect engines and engine-generator sets for condition and proper operation.				
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.				
27	Verify barge compartment (voids) cover bolts are installed.				
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect intake path assembly and center pin straddlers/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:			

INTERIM RE-CERTIFICATION

The Crane Condition Inspection Report or CCIR is completed to record the condition of the crane before, during and after an interim load test for re-certification.

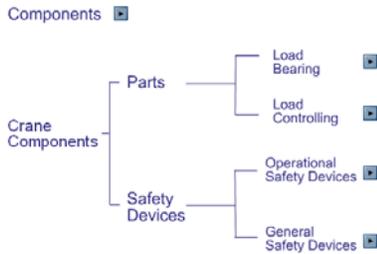
CRANE CONDITION INSPECTION RECORD
Note: Inspect components that are reasonably accessible without disassembly.

Crane No.:	Type:	Location:	Operator's Name:	Operator's License No.:
Purpose of Inspection:	Legend:	Date Started:	Date Completed:	
<ul style="list-style-type: none"> • Selective Tests - May need engineering evaluation 	<ul style="list-style-type: none"> S = Before A = After D = During 	<ul style="list-style-type: none"> • Minor deficiencies - May be deferred 	<ul style="list-style-type: none"> • Major deficiencies - Must be corrected • Unsatisfactory - Items noted in Remarks 	
Item No.:	Item Description:	Inspector:	Inspector's License No.:	Inspector's Signature:
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.			

INSPECTION SAFETY

The primary emphasis during condition inspection is safety!

Crane Components



CRANE COMPONENTS

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

HANDLING DEFICIENCIES

The Crane Condition Inspection Report or CCIR outlines the minimum inspection requirements. Each item shall be marked S for satisfactory, U for unsatisfactory, or NA for not applicable. An item marked unsatisfactory on the CCIR may affect the load test.

CRANE CONDITION INSPECTION RECORD
Note: Inspect components that are reasonably accessible without disassembly.

Operator's Name:	Operator's Location:	Operator's Name:	Purpose of Inspection:		
License:	License:	Base Status:	Date Completed:		
Legend:					
B = Before	A = After				
D = During					
Item No.	Item Description	B	D	A	Inspr./Int
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

All items must be marked:
S = Satisfactory
U = Unsatisfactory
NA = Not Applicable

MINOR DEFICIENCIES

Minor deficiencies are defects to equipment, other than load controlling parts, load bearing parts, or operational safety devices, which do not affect the safe operation of the crane.

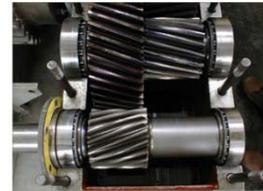


MAJOR DEFICIENCY

A major deficiency involves a load bearing part, load controlling part or operational safety device that affects the safe operation of the crane.

REPLACEMENT PARTS

When a critical component is replaced, the replacement must be identical to those of the OEM design.



RE-INSPECTION

Re-inspection is required following adjustment, repair, or replacement of a load-bearing part, load-controlling part, or safety device.

DEFERRAL OF WORK

Some crane deficiencies involving load-bearing and load-controlling parts and operational safety devices can be recorded and the corrective actions can be deferred to a later date. Technical justification for deferral shall be provided. Each deferral and justification shall be in writing and shall be filed in the equipment history file.

EQUIPMENT HISTORY FILE

The History File is an important part of equipment maintenance. For each crane, the activity establishes and maintains an individual equipment history file.

Note: Inspectors shall not engage in calculated risks or depend on their judgment alone where there is a doubt in their mind regarding a questionable condition of LB, LC, or OSDs. Questionable conditions of LB, LC, or OSDs 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.



REVIEW AND SUMMARY

When performing a condition inspection, observe components before, during and after the test. Observations can be made with instruments or non-destructive testing methods, as well as by sight, sound, and touch. While performing a condition inspection, your primary focus should be safety. Inspection requirements are contained in NAVFAC P-307 main body, appendixes, and on the Crane Condition Inspection Record form itself. Begin all inspections at the crane's history file; it will contain all historical documentation for any repairs, testing, deficiencies, and alterations regarding the crane.

NAVFAC P-307 defines Condition Inspection Requirements

The Condition Inspection

Consists of:

- observing the function of components before, during, and after operation

Performed by:

- sight, sound, touch, instrumentation, and non-destructive testing

Primary emphasis:

- Primary emphasis during a crane condition inspection is on safety.

Requirements:

- NAVFAC P-307 outlines the minimum inspection requirements

History File:

- Contains all documents from table 5-1 of NAVFAC P-307
- Must be available for audit

NOTES

CONDITION INSPECTION MODULE EXAM

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

1. Which of these items are included in a crane inspection?
 - A. listening to components when they run
 - B. disassembly of components as required
 - C. NDT of certain components as required
 - D. looking for leaks, cracks, loose or broken parts
 - E. all of the above

2. A cut in the sidewall of a tire on a crane with a free rated load chart would be considered a...
 - A. minor deficiency
 - B. major deficiency and must be addressed prior to further load testing and/or certification
 - C. major deficiency but need not be repaired until the next maintenance cycle

3. The condition inspection is performed...
 - A. only after the load test
 - B. only before the load test
 - C. before, during, and after the load test

4. Questionable conditions should be referred to the...
 - A. maintenance inspector
 - B. engineering activity/certifying official
 - C. OEM
 - D. crane mechanic

5. Defects that do not affect safe operations of the crane are considered...
 - A. optional safety devices
 - B. minor deficiencies
 - C. major deficiencies

6. A crane equipment history file is created for...
 - A. only cranes that have deficiencies and/or require maintenance
 - B. all cranes

7. NAVFAC P-307 outlines which of the following requirements for crane inspections?

- A. type of inspections
- B. frequency of inspections
- C. methods of inspections
- D. all of the above

8. Where would you find inspection requirements for a Navy owned crane operating on a naval activity?

- A. MIL-HDBK 1038
- B. NAVFAC P-307
- C. NAVSEA Crane Quality Manual
- D. OPNAV 51100-23

9. The crane condition inspection is performed with the same detail as the maintenance inspection.

- A. True
- B. False

LOAD TEST CALCULATIONS

SAFE LIFTING 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 safe lifting capacity based on each of these variables. Gross capacity is the value shown on the OEM load chart for a particular radius. Net capacity is the value shown on the load chart minus deductions. To determine net capacity you must subtract the applicable deductions from gross capacity.

Note: The total weight of the load is from the hook down to include rigging gear and the load to be lifted.



CONSEQUENCES OF OVERLOADING

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

ADDITIONAL CONSIDERATIONS

Test personnel shall remain fully alert to wind, other weather, and visibility conditions that may jeopardize the safe performance of tests. Lift the test load only high enough to perform the required 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. When rotating, do not perform any booming. 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. Ensure all "on rubber" lifting requirements established by the OEM and activity are followed when lifting loads "on rubber" (free-rated capacity). Attach taglines to the load to control oscillation. Extend outriggers and maintain minimal clearance (3 to 4 inches) above the ground. Test personnel shall stand clear of tires during "on rubber" load tests.

LOAD TESTS

The load test consists of a maximum certified capacity test and a load moment test.



Other test may be required. In some cases, these tests may be combined. Additionally, a maximum line pull test is required for cranes that use multiple reeving configurations. Other tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures (AEPs) during the certification period. The sequence may be varied by the activity. For cranes with multiple reeving configurations, the maximum line pull test ([paragraph 5.4.2.4.a](#)) should be performed first.

EXAMPLE: CRANE CONFIGURATION

This screen describes the configuration of the crane used for this practice exercise: This is a forty-ton rough terrain hydraulic crane with an extendible boom. It has a main hoist reeved with 4 parts of 3/4 inch 18X19 rotation resistant wire rope. There is a stowed 32' to 56' tele-off-settable swing-away extension. The auxiliary boom nose is attached as is a 45 ton 3 sheave hook block with cheek plates. The Grove RT-740 Rough Terrain Crane Load Chart Package should be used as a reference for this exercise.

MAXIMUM LOAD TEST CALCULATIONS

These calculations will help you determine the maximum capacity of the crane as configured. Review the calculations and their results. Mobile cranes are tested at 105% of rated capacity, as configured. The actual test load shall be within +5 -0% of the nominal test load. First, determine the maximum capacity of the crane as configured. Using the load chart information, find the gross capacity for the 35' boom, on outriggers, at 360°. At a 10' radius, the chart shows a gross capacity of 80,000 pounds.



Next, determine 'limiting factors'. The load chart lists the permissible line pull at 12,920 pounds per part. The main hook block is reeved with 4 parts. Finally, multiply the line pull by 4, for a total of 51,680 pounds.



TEST LOAD SPECIFICATIONS

The nominal test load for a mobile crane is 105% +5 -0% of the rated capacity, as configured. To calculate the weight for the load test, multiply the rated capacity of the crane by 1.05 to find the minimum amount of test weight needed. Multiply the minimum amount to test weight by 1.05 to determine the maximum weight for this test.

TEST LOAD DEDUCTIONS

The deductions are subtracted from both the minimum weight and maximum weight.

Remember to add the weight of all slings and rigging gear to your test weight!

Deduct:

- Stowed tele-offsettable extension __ _____
- Auxiliary boom nose _ _ _ _ _ _____
- 45 ton 3 sheave hook block _ _ _ _ _ _____
with cheek plates
- Total _____
- Minimum Test Weight _____
- Maximum Test Weight _____

TOTAL TEST LOAD

When calculating the test load to be used, remember to include the weight of all rigging gear that will be suspended by the crane hook. On some cranes the weight of excess wire rope may also be considered a deduction.

VIGILANCE

Shown here are cranes being load tested under controlled conditions with professional test directors and qualified operators. Yet, mistakes were made.

There is no margin for error. Testing can be extremely hazardous, especially with long booms and with jibs attached. To minimize the risks, perform the tests with boom about half way between minimum and maximum.



LOAD TEST DIRECTOR STUDENT GUIDE

35' - 110' 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 (68)	68,000 (59.5)	58,100 (74)	44,000 (72)							
12	67,400 (57)	62,700 (59)	53,700 (71.5)	44,000 (72)							
15	58,500 (50)	54,500 (51)	48,050 (57.5)	41,550 (71.5)	35,600 (74.5)	33,000 (77)					
20	44,500 (44.5)	43,500 (52)	39,400 (51)	33,550 (58.5)	30,500 (70.5)	26,500 (73.5)	25,000 (75.5)	22,150 (77.5)			
25	33,500 (28.5)	33,000 (41.5)	32,400 (54)	27,750 (56)	25,200 (61)	23,800 (65.5)	21,950 (68.5)	20,400 (71.5)	18,500 (73.5)	16,500 (75.5)	
30		28,500 (27)	25,500 (46)	23,300 (55)	21,050 (61)	20,400 (65.5)	19,300 (68.5)	17,550 (71.5)	16,750 (73.5)	15,750 (75.5)	
35			20,300 (18.5)	20,000 (40)	17,950 (33)	17,400 (45)	16,400 (52.5)	15,050 (57.5)	14,100 (61.5)	13,100 (65.5)	12,000 (68)
40			16,000 (24)	15,850 (41.5)	15,500 (50.5)	15,050 (57)	14,100 (61.5)	13,100 (65.5)	12,000 (68)	10,800 (71.5)	10,000 (73.5)
45				12,250 (33)	13,000 (45)	13,000 (52.5)	12,300 (57.5)	11,450 (61.5)	10,600 (65.5)	9,500 (68)	8,350 (71.5)
50				9,720 (21.5)	10,350 (38.5)	10,750 (47.5)	10,800 (53.5)	10,000 (58.5)	9,500 (62)	8,350 (65.5)	7,410 (68.5)
55					8,300 (31)	8,710 (42)	8,170 (49.5)	8,300 (54.5)	8,350 (58.5)	7,410 (61.5)	6,550 (65.5)
60						6,850 (29)	7,150 (38)	7,350 (45)	7,640 (51)	7,410 (55.5)	6,550 (61.5)

READING THE LOAD CHART – LOAD MOMENT TEST

The load moment test boom length can be determined by using the load chart...using the shortest boom length where all sections are partially extended but not less than 50% percent total powered boom length. This does not include power pin flies or jibs (or latching section of boom length).

CONSIDERATIONS

For the purpose of this test, load moment is the product of capacity multiplied by radius. Cranes equipped with multiple boom modes must have multiple load charts checked to ensure the maximum load moment is selected. For telescoping cranes, the boom length is the shortest length where all sections are partially extended, but not less than 50% of the maximum boom length using the crane's load chart or working range diagram (not including power pin flies or jibs).

The maximum radius is the radius that creates the maximum load moment and allows the test load to safely clear the outriggers/stabilizers/carrier through the complete swing range. (Note: "safely clear" means with the load at the lowest raised level to clear obstructions and not be lifted over any crane component). The next screen will provide an example and further explanation.

EXAMPLE

First, determine the mid boom length. Using the load chart from two screens back, we see we have 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' boom length column, we start with a 20' 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' radius with 60' of boom indicates a capacity of 33,550 pounds. Using the formula 'capacity x radius', we can now determine the load moment for this radius. Repeat this step for the next several radii, i.e., 25', 30', 35', and so on until we get to the radius where the calculated load moment 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. For example:

- 33,550 lbs x 20' = 671,000 ft lbs (of force or load moment)
- 27,750 lbs x 25' = 693,750 ft lbs
- 23,330 lbs x 30' = 699,000 ft lbs
- 20,000 lbs x 35' = 700,000 ft lbs
- 15,850 lbs x 40' = 634,000 ft lbs

In this example, we see that 700,000 ft lbs is the maximum load moment.

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

- Multiply 20,000 pounds by 1.05 (or one-hundred-five percent) to obtain the minimum test load of 21,000 pounds.
- Multiply 21,000 pounds by 1.05 to obtain the maximum test load of 22,050 pounds.

So, our set-up for this load moment test is: 60 feet of boom at 35 feet of radius, with a test load between 21,000 pounds and 22,050 pounds.

To avoid an inadvertent overload, do not forget that the weight of your rigging gear should be figured into the weight of the test load.

[LOAD TEST CALCULATION EXERCISES](#)

References:

[Grove_740_RT_Crane_Load_Chart_Package.pdf](#)

[Grove_865B_RT_Crane_Load_Chart_Package.pdf](#)

[Linkbelt_108_Latticeboom_Truck_Crane_Load_Chart_Package.pdf](#)

Load Test Calculation Exercises



Use the course Reference Button and follow the link to print the Load Chart Packages for these exercises:

- Grove RT-740
- Grove RT-865
- Linkbelt HC-108

To launch Load Test Calculations exercises, click on the link below.

NOTE: The configuration used in this exercise is different than the configuration used in the Test Load Example.

After you have completed the calculations exercise, close the exercise window and continue with this module.

[Launch Load Test Director Calculations Exercise](#)

EXERCISE 1

Grove RT 740, rough terrain hydraulic, reeved 6 parts of line, 45 ton 3-sheave hook block w/cheek plates, stowed 32-56 foot Tele-extension, aux boom nose, and 7-1/2 ton headache ball. No on-rubber capacity required. Assume at least 20' radius is required to safely clear fully extended outriggers.

[RT-740 document](#)

1. Considering the limiting factors, what is the maximum gross capacity of this crane as configured?

- 67,400 pounds.
- 80,000 pounds.
- 77,520 pounds.
- 56,500 pounds.

2. What is the capacity-limiting factor?

- Parts of line
- Boom capacity
- Outriggers
- Hook Block

3. What will be the test load (minimum & maximum) to test this crane to full capacity as configured?

- 62,150 lbs. to 65,257 lbs.
- 88,000 lbs. to 92,400 lbs.
- 74,140 lbs. to 77,847 lbs.
- 81,396 lbs. to 85,465 lbs.

4. What are the deductions for this crane as configured?

- 2,222 lbs.
- 2,422 lbs.
- 1,707 lbs.
- 2,237 lbs.

5. After deductions, what is the range for the test weights of the test load (minimum & maximum)?

- 71,718 lbs. to 75,425 lbs.
- 85,578 lbs. to 89,978 lbs.
- 78,974 lbs. to 83,043 lbs.
- 59,728 lbs. to 62,835 lbs.

6. What is the boom length and radius for the Load Moment Test?

- 60' boom, 35' radius
- 110' boom, 100' radius
- 50' boom, 10' radius
- 80' boom, 15' radius

7. What will be the Load Moment Test load?

- 36,300 lbs. to 38,115 lbs.
- 63,910 lbs. to 67,105 lbs.
- 1,969 lbs. to 2,067 lbs.
- 21,000 lbs. to 22,050 lbs.

8. What will the auxiliary hoist test load be (minimum and maximum) for this crane?

- 13,566 lbs. to 14,244 lbs.
- 16,500 lbs. to 17,325 lbs.
- 13,835 lbs. to 14,527 lbs.
- 15,000 lbs. to 15,750 lbs.

9. What is the boom length and maximum radius for the auxiliary hoist test?

- 110 feet, 25 foot radius
- 35 feet, 35 foot radius
- 110 feet, 35 foot radius
- 35 feet, 10 foot radius

EXERCISE 2

Grove RT 865B, rough terrain hydraulic, stowed 35-60 ft. Tele-extension, auxiliary boom head, 65 ton 6 sheave hook block w/o check plates, 10 ton headache ball, reeved 10 parts on main hook. On outrigger capacities only, outriggers fully extended. Assume at least 20' radius is required to safely clear fully extended outriggers.

[Grove RT 865B document](#)

1. Considering the limiting factors, what is the maximum gross capacity of this crane as configured?
 - 129,200 lbs.
 - 130,000 lbs.
 - 105,000 lbs.
 - 126,721 lbs.

2. What is the limiting factor?
 - Boom capacity
 - Parts of line
 - Outrigger capacity
 - Hook Block

3. What will be the test load (minimum & maximum) to test this crane to full capacity as configured?
 - 139,393 lbs. To 146,362 lbs.
 - 143,000 lbs. To 150,150 lbs.
 - 115,500 lbs. To 121,275 lbs.
 - 135,660 lbs. To 142,443 lbs.

4. What are the deductions for this crane?
 - 3,615 lbs.
 - 25,191 lbs.
 - 3,279 lbs.
 - 24,873 lbs.

5. After deductions, what is the range for the test weights of the test load (minimum & maximum)?

- 132,381 lbs to 139,164 lbs.
- 139,721 lbs. To 146,871 lbs.
- 112,221 lbs. To 117,996 lbs.
- 136,114 lbs. To 143,083 lbs.

6. What will be the boom length and radius during the maximum capacity test?

- 40' boom, 10' radius
- 125 foot Boom, 110 foot radius
- 45 foot Boom, 10 foot radius
- 40 foot Boom, 30 foot radius

7. What is the boom length and radius for the load moment test?

- 60 feet at a 20 foot radius
- 75 feet at a 25 foot radius
- 100 feet at a 30 foot radius
- 65 feet at a 25 foot radius

8. What will the auxiliary hoist test load be (minimum and maximum) for this crane?

- 13,566 lbs. - 14,244 lbs.
- 16,500 lbs. - 17,325 lbs.
- 13,835 lbs. - 14,527 lbs.
- 15,000 lbs. - 15,750 lbs.

EXERCISE 3

Linkbelt® HC 108C, lattice-boom truck, 120 ft. of boom, 50 ton block, 3/4" wire (16,800 lbs. rated load) reeved 4 parts. Equipped with a 30 ft jib at 0° offset and with a 8½ ton headache ball. On-outrigger capacities only. Assume at least 20' radius is required to safely clear fully extended outriggers.

[Linkbelt HC 108C](#)

1. What is the maximum gross capacity of this crane as configured?

- 31,200 lbs.
- 100,000 lbs.
- 3,300 lbs .
- 20,600 lbs.

2. What is the capacity-limiting factor?

- Tipping capacity
- Wire rope capacity
- Structural capacity
- Hook Block capacity

3. What will be the test load (minimum & maximum) to test this crane to full capacity as configured?

- 32,760 lbs. to 34,398 lbs.
- 110,000 lbs. to 115,500 lbs .
- 3,630 lbs. to 3,811 lbs.
- 22,660 lbs. to 23,793 lbs.

4. What will the boom angle and radius be during the test?

- 81.7° angle, 10' radius
- 15.2° angle, 120' radius
- 78.6° angle, 20' radius
- 77.6° angle, 30 foot radius

5. What are the total deductions for this configuration?

- 2,595 lbs.
- 3,125 lbs.
- 2,475 lbs.
- 1,250 lbs.

6. What is the radius for the Load Moment test?

- 35' radius
- 40' radius
- 45' radius
- 50' radius

7. What will be the load test range (minimum and maximum) for the jib?

- 10,500 lbs. to 11,025 lbs.
- 13,200 lbs. to 13,860 lbs.
- 8,800 lbs. to 9,240 lbs.
- 6,600 lbs. to 6,930 lbs.

[CALCULATION EXAM REFERENCES](#)

[Grove_740_RT_Crane_Load_Chart_Package.pdf](#)

[Grove_865B_RT_Crane_Load_Chart_Package.pdf](#)

[Linkbelt_108_LatticeBoom_Truck_Crane_Load_Chart_Package.pdf](#)

Calculation Exam References



*This exam requires references.
Please obtain these references before taking the exam.*

*Use the course Reference button.
Follow the links to print the load chart packages for these cranes:*

- *Grove RT-740 Rough Terrain Crane*
- *Grove 856B Rough Terrain Crane*
- *Linkbelt 108 Lattice-Boom Truck Crane*

*These load chart packages are PDF documents and
once opened can be printed.*

The Reference button is not available during the exam.

NOTES

LOAD TEST CALCULATIONS MODULE EXAM

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

1. At what percentage of the rated load is a mobile crane tested at?
 - A. 110% +5% - 5%
 - B. 125% +0% - 5%
 - C. 105% +5% - 0%
 - D. 125% +5% - 0%

2. The weight of rigging hardware is not added to the weight of the load because it is deducted from the capacity of the crane, resulting in net capacity?
 - A. True
 - B. False

3. The weight of which of the following must be deducted from the gross capacity of a mobile crane to determine net capacity?
 - A. hook and block
 - B. auxiliary boom nose
 - C. stowed jib
 - D. boom

4. The boom length for the load moment test on a hydraulic crane is based on...
 - A. test load safely clearing fully extended outriggers
 - B. minimum boom length
 - C. at least 50% of maximum boom length
 - D. all boom sections partially extended

5. For reference, use the Grove 740 Rough Terrain Crane Load Chart Package.

After deductions, what is the range for the test weight of the test (minimum and maximum)?

 - A. 78,974 lbs to 83,043 lbs
 - B. 59,728 lbs to 62,825 lbs
 - C. 71,718 lbs to 75,425 lbs
 - D. 85,578 lbs to 89,978 lbs

LOAD TEST DIRECTOR STUDENT GUIDE

6. For reference, use the Grove 865B Rough Terrain Crane Load Chart Package.

What is the boom length for the load moment test?

- A. 85 feet
- B. 65 feet
- C. 105 feet
- D. 55 feet

7. For reference, use the Grove 108 Lattice-Boom Truck Crane Load Chart Package.

What will be the test load (minimum and Maximum) for the load moment test? (Assume the test load will safely clear the outriggers at minimum radius.)

- A. 110,000 lbs to 115,500 lbs
- B. 3,630 lbs to 3,811 lbs
- C. 32,760 lbs to 34,398 lbs
- D. 22,660 lbs to 23,793

LOAD TEST TEAM

ACCIDENTS OVERVIEW

Most accidents are caused by inattention, poor judgment, overconfidence, and hurrying to finish the job. Many accidents happen without a load on the hook. Many happen at the end of the shift. Since the majority of crane accidents result from human error, they can be avoided!

ACCIDENT DURING A LOAD TEST

This accident happened during a load test. Could this happen during your load test?



ACCIDENT DURING A LOAD TEST

This accident happened during a load test. Even though this accident did not result in injuries, it did result in extensive and expensive damages.

ACCIDENT DURING AN AUDIT

This accident happened during an audit. Review this accident. How could it have been avoided?



ACCIDENT DURING A FREE-RATED LOAD TEST

This accident happened during a free-rated load test. Fortunately, no one was in this car. How could this accident have been avoided?

TEAMWORK

Each year, crane accidents take a heavy toll in lives, serious injuries, and property and equipment damages. As a test director, you must take every precaution to make sure your crane tests are safe! Safe crane testing is the result of effective teamwork.





LOAD TEST TEAM PURPOSE

Every person involved in the crane test must work as a team member to prevent crane accidents. The crane test team uses the team concept to help ensure that all cranes are tested safely without injury to personnel or damage to property or equipment.

TEST TEAM MEMBERS

Crane Load Test Teams are made up of members with specific skills and responsibilities. The size of the crane team will vary according to the needs of the job.



ALL TEAM MEMBERS

While individual members each have responsibilities, all team members are responsible for stopping the test whenever safety is in question! Team members work together to safety test a crane without injury to personnel or damage to property or equipment.

LOAD TEST DIRECTOR

The Load Test Director has the overall responsibility of the load test. Those responsibilities include both planning and directing the load test.



CRANE OPERATOR

The crane operator's primary responsibility is the safe operation of the crane.

CONDITION INSPECTOR

The condition inspector assists the test director.



RIGGER-IN CHARGE AND RIGGER RESPONSIBILITIES

The rigger-in-charge and riggers have varied responsibilities focusing on the rigging aspects of the load test. They include: assisting the crane operator with the pre-use check, selecting and inspecting rigging gear, calculating test loads, staging and rigging test weights, providing signals to the crane operator, and conducting the operation in a safe manner.



CRANE WALKER

While the basic team consists of the test director, inspector, operator, rigger-in-charge, and riggers...the load test director may appoint a crane walker.

REVIEW AND SUMMARY

Safe crane testing is the result of effective teamwork. Review team members roles and responsibilities.

Load Test Director's Responsibilities:

- Plan the test:
 - Double check weight calculation
 - Choose communication methods
 - Ensure proper rigging is used
- Direct the load test:
 - Keep test area clear
 - Coordinate Team Member Activities

Condition Inspector's Responsibilities:

- Assist the test director
- Perform crane inspection:
 - before testing
 - during testing
 - after testing
- Complete the CCIR
- Watch for potential problems
- Stay in position to stop testing

All Team Members have Responsibilities:

- Support the Team Goal of Safe Crane Testing
- Support the Team
- Keep Test Director Informed
- **Stop** tests whenever safety is questioned

Crane Walker's Responsibilities:

- Assist with pre-use check
- Observe potential obstructions
- Stay in position to stop testing
- Help keep people and vehicles out of test area

Crane Operator's Responsibilities:

- Safe operation of the crane
- Perform pre-use check
- Move only as signaled
- STOP whenever safety is questioned

Rigger-in-Charge and Rigger Responsibilities:

- Assist operator with the pre-use check
- Select and inspecting gear
- Stage and calculating test weights
- Safely rig test loads

NOTES

[LOAD TEST TEAM MODULE EXAM](#)

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

1. Which of the following conditions would result in stopping the load test?
 - A. a person or vehicle entering the test area
 - B. track switches are not aligned properly
 - C. an object is found on the tracks
 - D. all of the above

2. The load test director is responsible for...
 - A. selecting the equipment to be tested
 - B. ensuring the rigging gear is used for the test is checked
 - C. obtaining and following engineering diagrams

3. Which of the following is a member of the load test team?
 - A. rigging supervisor
 - B. crane operator
 - C. activities director

4. While each member of the test team has defined responsibilities, all have shared responsibilities as well. Each member must...
 - A. attend the pre test briefing
 - B. keep the load test director informed of conditions affecting the tests
 - C. stop the test whenever safety is in question
 - D. all of the above

5. The load test director is responsible for keeping the test team safe.
 - A. True
 - B. False

6. The load test director is responsible for verifying the...
 - A. cargo to be load tested
 - B. certification of the crane
 - C. calculations of the load test weight

7. The crane team concept is used in crane testing to ensure that all crane load tests are executed without...
 - A. injury to personnel
 - B. damage to property
 - C. damage to equipment
 - D. all of the above

LOAD TEST DIRECTOR STUDENT GUIDE

8. Planning all aspects of the load test is the responsibility of (the)...

- A. engineering
- B. individual Navy activities
- C. load test director
- D. rigging supervisor

9. The crane test team consists of these members except (the)...

- A. rigging supervisor
- B. condition inspector
- C. rigger-in-charge
- D. crane operator
- E. crane walker (as required)

10. The crane test team consists of these members except (the)...

- A. crane walker (as required)
- B. crane maintenance mechanic
- C. crane operator
- D. rigger-in-charge
- E. condition inspector

11. The method of _____ used during the load test is the responsibility of the load test director.

- A. calculation
- B. rigging
- C. communication
- D. operation

LOAD TESTING CATEGORY 2 AND CATEGORY 3 CRANES

GENERAL TEST REQUIREMENTS

All cranes and hoists must be tested following the requirements found in NAVFAC P-307 Appendix E: Crane Test Procedures.



CERTIFICATION OF LOAD TEST

All test results shall be recorded on the Certification of Load Test and Condition Inspection form.

CERTIFICATION OF LOAD TEST AND CONDITION INSPECTION

Activity		Building/Location			
Crane No.	Type	DEM's Rated Capacity			
		Certified Capacity			
		If different from DEM's rated capacity, explain in "Remarks"			
		Main _____ lbs. _____ feet			
Aux _____ lbs. _____ feet		Main _____ lbs. _____ feet			
Whip _____ lbs. _____ feet		Aux _____ lbs. _____ feet			
Whip _____ lbs. _____ feet		Whip _____ lbs. _____ feet			
<input type="checkbox"/> Annual Certification <input type="checkbox"/> One/Annual Load Test		Appendix "C" Applies Crane Test Procedure Paragraphs (where applicable sub-paragraphs)			
<input type="checkbox"/> Annual Recertification (Reason: _____)					
Category 2 & 3 Cranes*					
Boom Length	Test Load %	Minimum Radius		Maximum Radius	
		Pounds	Feet	Pounds	Feet
Main					
Aux					
Whip					
Other					
Hook Trunk Measurements		After Hook		After Test	
Main Hook					
Aux Hook					
Whip Hook					
Other					
Category 2 Cranes				Hook Trunk Measurements	
Hook	Test Load %	Pounds		After Test	
		After Hook	After Test	After Hook	After Test
Main					
Aux					
Other					
Category 3 Cranes				Hook Trunk Measurements	
Hook	Test Load %	Pounds		After Test	
		After Hook	After Test	After Hook	After Test
Main					
Aux					
Other					
Annual Certification: Since Hook NDT		Curriculum Official (Signature)		Date	
		Expiration Date			
Remarks					
<small>* For mobile cranes, list all test loads and configurations (e.g., over radius/over boom, outreach/struck, lift on track, travelling, etc.) if necessary, see figures 2-2.</small>					

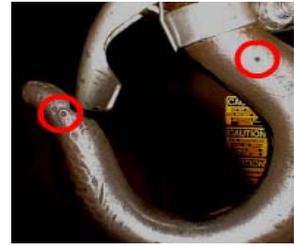


ANNUAL HOOK INSPECTIONS

Annual hook inspections are performed to ensure hooks are capable of safely lifting and moving loads.

HOOK MEASUREMENTS

Hook measurements are used to identify stretch.



INSULATED LINK INSPECTION AND TEST

Insulated link inspections and tests are required before load tests for cranes and hoists so equipped.

OET LOAD TESTS

The load test on an overhead electric traveling, or OET crane, tests the integrity and function of crane components through a series of tests.



NO LOAD OPERATIONAL TEST

The no-load test proves all crane functions for proper operation.

NO-LOAD OPERATIONAL TEST

The no-load testing procedure may vary for specific cranes.

EMERGENCY HOIST DRUM BRAKE

For cranes equipped with emergency drum brakes, simulate a fault.



STATIC LOAD TEST

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



PRIMARY AND SECONDARY BRAKE

Follow this procedure for cranes that are equipped with primary and secondary brakes.

DYNAMIC LOAD TEST

Perform a dynamic load test on each hoist by hoisting and lowering the test load using normal operating speeds and watching for smooth operation.



LOAD BRAKE TESTING

Test the mechanical load brake, when equipped and accessible.

LOSS OF POWER TEST

The loss of power, or panic test, is designed to test a hoisting unit's ability to stop the load if power fails during a lift.



EMERGENCY HOIST DRUM BRAKE TEST

After testing the other holding brakes, test the emergency hoist drum brake, when equipped, with a 100% test load +5%/-0%.

TROLLEY AND BRIDGE LOAD TEST

When traveling the bridge and trolley, watch for proper clearances. A minimum of three inches of vertical clearance and two inches of lateral clearance shall be maintained.



TROLLEY AND BRIDGE LOSS-OF-POWER TEST

For each bridge or trolley, without automatic brakes, test the crane's ability to stop under loss of power.



JIB, PILLAR AND PILLAR-JIB TESTS

Perform the no-load and load test on jib, pillar, and pillar-jib cranes following this procedure.

SUMMARY

Review this summary of Load Test Director - Load Testing Category 2 and Category 3 Cranes.

Load Testing Category 2 and Category 3 Cranes

Summary and Review

- General Load Test Procedures
- Load Test Procedures for Cat. 2 and 3 WHE
 - Bridge, Wall, and Gantry cranes
 - Jib, Pillar Jib, Monorail, and Fixed Hoists

NOTES

[LOAD TESTING CATEGORY 2 AND CATEGORY 3 CRANES MODULE EXAM](#)

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

1. When testing electrically powered cranes, we need to prove that the crane will come to a safe stop in the event of a power failure.

- A. True
- B. False

2. Which item below is not included on the Certification of Load Test and Condition Inspection?

- A. crane weight
- B. hook tram measurements
- C. test paragraph numbers
- D. crane identification
- E. calculated load weights for each hook

3. Where a hoist is equipped with primary and secondary brakes, each brake must be individually tested to support the load for...

- A. 2 minutes
- B. 5 minutes
- C. 6 minutes
- D. 10 minutes

4. Any safety device on a crane must be included in the inspection and tested for function.

- A. True
- B. False

5. Hooks showing an increased throat opening (from base line) _____ must be replaced.

- A. of more than 5%
- B. of more that 10%
- C. of more than 15%
- D. that can be seen with the naked eye

6. A no-load operational check is the start of every load test.

- A. True
- B. False

7. During the static portion of the load test, which item below are you not checking?

- A. brake slippage
- B. hoist speeds
- C. hook bearing/rotation

LOAD TESTING CATEGORY 1 CRANES



PORTAL CRANE NO-LOAD TEST

1. Perform the no-load test on a portal crane to check all functions. Check all hoist and boom primary upper and lower limits. Check secondary upper and lower limits (if installed) by carefully moving the boom or hoist slowly through each primary limit switch, using the limit switch bypass, continuing into the secondary limit switch. Check emergency brakes on wire rope drums where installed, by simulating a fault.

2. Check the boom drum pawl for proper engagement with ratchet gear and limit switch. Check the pawl limit switch, if installed, for operation. Some pawl limit switches allow the hoist to raise but not lower. Others cut out both directions. Check that the boom hoist motor shuts off, the brakes engage, and indicator lights operate correctly. Check the rotation lock. Engage the rotation lock and inspect to ensure full engagement. Check that the rotation lock limit switches (clockwise and counterclockwise) prevent rotation. Operate the rotation lock bypass (clockwise and counterclockwise) and ensure proper operation. Use only enough power to check operation of bypass. Limit switches may be operated manually to check for correct operation in lieu of engaging rotation lock. Ensure rotation lock is disengaged prior to continuing to the next step of this test. Check rotation. Rotate clockwise and counterclockwise with boom at minimum radius.



3. The no-load test for portal cranes also includes no-load travel and dead-man controls. With the boom over the front, centered between the crane rails, and with the boom dog engaged, travel in one direction a minimum of 50 feet. Repeat with the boom rotated over the opposite end. Dead-man controls are tested by engaging each controller at the slowest practical speed and releasing the dead-man control. Power to the control should be interrupted and the motion should stop.

PORTAL CRANE LOAD TEST: NOMINAL TEST LOAD

The nominal test load for a portal crane is 125% (+5/-0%) of rated capacity.



PORTAL CRANE LOAD TEST: REQUIREMENTS

The load test for portal cranes includes the following special requirements in addition to the standard tests in Appendix E. Variable rated cranes shall be tested at the maximum radius for the load. The stability test is for 'balanced deck design' cranes only. 'Balanced deck design' cranes are portal cranes with large diameter roller assemblies and center pin assemblies. This test is done during the static and dynamic load test observing for clearance between the rollers and the upper and lower roller rails. If no clearance is observed, stability is satisfactory. If clearance is observed, follow the specific procedure outlined in Appendix E. Main and boom hoists, rotate, and travel load tests are performed using the maximum test load for the crane. For the boom hoist tests, the test load and radius shall produce the maximum line pull. This may require a different test load. Typically, this is done at maximum radius for maximum load.



PORTAL CRANE HOIST LOAD TEST

1. Hoist and boom static test:

Raise the test load to clear the ground and hold for 10 minutes. Do not allow pawl (dog) to carry the load. Observe for lowering of the test load, which may indicate equipment malfunction. If either hoist has primary and secondary holding brakes, where each brake is designed to individually hold the load, additional tests shall be performed in lieu of a single 10 minute hold test. 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.

2. The hoist foot brake and boom foot brake tests (hydraulic or mechanical), are designed to test the ability of the foot brakes to stop the lowering motion. In both tests, hoist the test load a few feet above the ground. For the boom test, have the boom near maximum radius. Lower the test load at slow speed with controller in the first control point. Apply the foot brake. The lowering motion shall stop. These tests are not applicable to load-sensitive reactor type hoist controls. The hoist loss of power and boom loss of power tests, or 'panic' tests, are designed to test the reaction of the applicable hoisting unit in the event of power failure during a lift. In both tests, hoist the test load about 10 feet above the ground. For the boom test, have the boom near maximum radius.

Lower test load, for the hoist panic test, or the boom, for the boom panic test, at slow speed and, with controller in the slow lowering position, disconnect the main power source by pushing the main power stop button, then return the controller to neutral position. The test load or boom shall stop lowering when the controller is placed in the neutral position. These tests are only done on cranes with powered down hoists. Cautions apply (see Appendix E) and may require engineering involvement.

TRAVEL AND ROTATE LOAD TESTS

The rotation test is done at maximum radius, rotated left and right, 360 degrees, if possible, or 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 travel test with the boom over-the-side is conducted with the boom at maximum allowable radius and positioned perpendicular to the crane rails as in NAVFAC P-307 Appendix E.



With the boom dog engaged, travel in one direction a minimum of 50 feet. Repeat with boom on opposite side where space and conditions permit.

CAUTION: Use very slow travel speed to ensure track and supporting foundation are sound and the travel area is free of obstructions. The travel test with the boom over-the-front is done in the same manner over each end of the crane. In each travel test, operate the controller through normal operating speeds. The crane shall accelerate, decelerate, and stop smoothly.

PORTAL CRANE TEST WRAP-UP

Test auxiliary and whip hoists and emergency drum brakes using the maximum test load for the maximum radius of the crane. Repeat the stability test variable rated cranes.



MOBILE CRANE LOAD TESTS

Specific Category 1 cranes covered are locomotive, crawler, cruiser or rough terrain, truck, and crash. Category 4 cranes included in this procedure are commercial truck-mounted, articulating-boom cranes and all cranes mounted on automotive truck chassis.

PRE-TEST PREPARATION

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

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

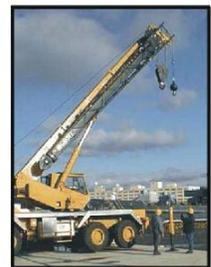
Special Precautions: Test personnel shall remain alert to wind, weather, and visibility conditions that may jeopardize the safe performance of the tests. When lifting test loads always lift the load over the side of the crane, well within the maximum radius and slowly boom down to the pre-measured radius stopping at least once to test the



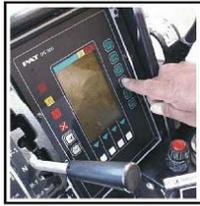
effectiveness of the boom brake. Lift the test load only high enough to perform the required tests. A crane's outriggers may become light and the outrigger pad may clear the ground during testing, depending on the make and model. This is most likely to occur when the boom is positioned over the opposite corner. One outrigger lifting off is normal and not an indication of a loss of stability, however, if two outriggers exhibit this condition simultaneously the activity shall verify with the crane OEM that the crane exhibiting this condition is safe for use.

MOBILE CRANE TESTING

The nominal test load shall be 105% of rated capacity for the crane's configuration considering reeving, boom length, etc. The rated capacity shall be the capacity shown on the posted load chart. The rated capacity may be limited by wire rope line pull or parts of line if the crane is not fully reeved. The test load must include the weight of, or deduction values for the hook, block, slings, and ancillary lifting devices and for some cranes, excess wire rope.



NOTE: Deductions shall be subtracted from the nominal test load in order to determine the test weights required. Follow OEM load chart instructions for deduction values. Ancillary equipment such as a swing-away extension or jibs shall be tested during the annual load test.



[NO-LOAD TESTS FOR MOBILE CRANE](#)

Test all functions through their full range of motions. Check all limit switches and bypasses where applicable. Check load moment indicator (or LMI) functions and all no-load data such as radius, boom length, etc. Check anti-two block device function. Raise each hoist block into the limit switch (where installed) at slow speed. Ensure the anti-two block alarm operates or the hoist is disabled in accordance with the OEM's operating instructions. If the crane is equipped with control lockouts (also known as function limiters or kickouts), carefully ensure all additional functions that could also two block the hoist are disabled (e.g., telescope out, boom down) 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 telescoping boom fully. Hydraulic fluids should be brought up to normal temperature before the load test.

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.

[MOBILE CRANE LOAD TEST](#)

The 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 tests are required for cranes that use ancillary equipment with Ancillary Equipment Procedures (or AEPs) during the certification period. Excessive layers of wire rope on the drum, on some cranes, may prevent lifting the test load. If the crane cannot lift the test load, check the OEM's allowable line pull for the particular model hoist and layers of rope. If allowable line pull or available torque is the limiting factor, reduce the test load and adjust rated capacity based on the allowable line pull limitation, and perform the required test. The crane will then be certified based on the reduced test load.



Maximum Certified Capacity test and Load Moment test instructions can be found in NAVFAC P-307, Appendix E, sections 5.4 and 5.5.

HYDRAULIC COMPONENT SLIPPAGE TEST

Check for hydraulic component slippage during all phases of load testing. Allow time for fluid and component temperatures to stabilize. Load Moment Test Configuration:

- Boom length - shortest length where all sections are partially extended, by not less than 50 percent total powered boom length (or latching section boom length).
- Maximum radius - the radius that creates the maximum load moment that will safely clear the outriggers/stabilizer/carrier through the complete swing range.
- The test load shall be 105 percent of OEM load chart capacity at this boom length and radius.



Note: For the purposes of this test, load moment is the product of capacity multiplied by radius. Cranes equipped with multiple boom modes must have multiple load charts checked to ensure the maximum load moment is selected.

TELESCOPIC COMPONENT SLIPPAGE TEST

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



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. Be aware, especially on truck cranes, as the load is rotated over the front of the crane that the flex in the crane will relax, bringing the load closer to the crane. No booming functions should be performed during crane rotation, therefore, if it is anticipated that the load will come too close to the crane, the test shall be performed at the next radius on the load chart. Hold the load with the boom positioned over (or near as allowed by OEM) each outrigger/stabilizer for 5 minutes (holding over the center front outrigger/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





“ON-RUBBER” (FREE RATED) LOAD TEST

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

TEST PROCEDURE FOR CATEGORY 4 CRANES

Articulating boom machines shall be tested in accordance with NAVFAC P-307 Appendix E. This procedure follows the mobile crane pre-test preparation and test load criteria. For conventional boom machines, follow OEM test procedures. Where no procedures are provided by the OEM, procedures must be developed by the activity engineering organization using Appendix E as a guide. The test director must thoroughly review the crane’s set-up requirements and allowable working quadrants. Many Category 4 cranes require that the tires are NOT free of the ground when properly set up on outriggers or stabilizers. Test category 4 cranes at 105% unless the crane manufacturer prohibits overload testing. When the OEM prohibits overload testing, down-rate the crane to allow the 105% load test at the original rated capacity.



SPECIAL MOBILE CRANE TEST PROCEDURES

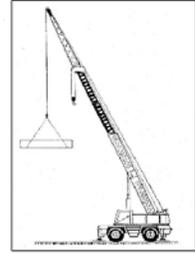
Special testing procedures are required after change or repair of tires. For cranes with on rubber lift capability, travel the crane with no load on the hook, a minimum of 100', forward and reverse, with the counterweight positioned over the affected tire, and the boom at minimum radius or as required by the OEM. Use this method only when allowed by the OEM. Use extreme caution moving a crane with the boom off center and at a minimum radius. Some mobile cranes may become unstable in this position, especially when traveled over uneven surfaces.



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

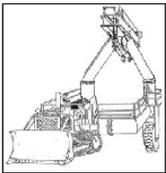
AUXILIARY HOOKS AND ANCILLARY EQUIPMENT

Test all hoists with the boom fully extended for telescoping boom cranes or until three wraps of wire rope remain on the hoist drum. Test ancillary equipment, such as swing away jibs, power pinned fly sections, manual extensions, etc., at the greatest offset for jibs with variable offset angles.



BOAT HOISTS

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



Static Test: Raise the load approximately 1 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.

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

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

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

BARGE-MOUNTED MOBILE CRANES

Mobile cranes certified for shore use may be temporarily mounted on barges and must be tested and re-certified. Barge stability calculations must be done and reduced load charts, based on maximum list and trim, shall be established by the activity engineering organization.

These must be approved by the certifying official. The certifying official shall prescribe the test conditions and precautions, such as, limit of wind velocity, list, trim, etc. The following conditions, as a minimum, shall be adhered to. A marine list and trim indicator shall be installed in the operator's cab. Maximum list and trim shall not exceed three degrees under test conditions. The crane carrier shall be secured to barge deck padeyes or connectors with tie-downs at each crane outrigger or corner. Tie-downs shall have some slack when the crane is fully raised on outriggers.



The crane shall be load tested and re-certified on the barge using 105 (+5/-0) percent of the reduced load chart capacities.

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

FLOATING CRANE LOAD 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° from the centerline of the barge. Hold for 10 minutes with brake applied. See NAVFAC P-307, Appendix E for instructions.



TESTING WHE NOT USED FOR LIFT-CRANE SERVICE

Locomotive, crawler, truck, and cruiser cranes that are used for clamshell, dragline, magnet, pile driving, or other non-lift crane work shall be tested at the maximum safe working load permitted for the wire rope being used. Test in all working motions, except travel. Attachments such as buckets, magnets, etc., may be removed for testing wire rope. No test is required after reassembly. Retesting is not required when an end attachment is changed from the original connection such as changing from clamshell to dragline during the certification period.



SPECIAL TESTING SITUATIONS

Special situations may require special tests. Newly acquired and previously used locomotive, truck, cruiser, crash and crawler cranes may require stability testing and calibration for two reasons: when the manufacturer's load chart and stability data are no longer available; when the acquiring activity suspects that previously performed alterations may affect stability. In addition, all locomotive, truck, cruiser, crash, and crawler cranes are tested for stability after alterations are performed that affect the original stability ratings. Stability testing is done to the industry standard, SAE J765, Crane Load Stability Test Code.

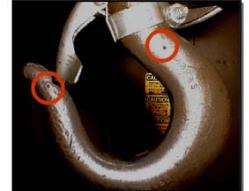


[AFTER THE LOAD TEST](#)

After the test, check all hooks for throat spread, complete and sign the Crane Condition Inspection Record and complete and sign the Certification of Test and Inspection Record.

[CHECKING HOOK THROAT SPREAD](#)

After the test, check all hooks for hook throat spread; measure between the tram marks. Compare to the baseline measurement. Replacement criteria require discarding any hooks showing an increase in the throat opening of more than five percent from the base measurement.



[DOCUMENTING THE TEST](#)

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

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

[COMPLETING THE CERTIFICATION PROCESS](#)

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

[SUMMARY AND REVIEW](#)

This lesson covered testing procedures for the following types of equipment:

- Portal Cranes
- Floating Cranes
- Mobile Cranes

This lesson also covered special test situations such as:

- Testing cranes mounted on barges.
- Testing cranes used for other than lift-crane work.
- Testing cranes that have been altered affecting stability or capacity.

NOTES

LOAD TESTING CATEGORY 1 CRANES MODULE EXAM

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

1. When a mobile crane is equipped with outriggers, the outriggers must be used to take most of the weight of the crane off the tires.

- A. True, it is not required to completely unload the tires from the ground
- B. False, the tires and crane must be completely supported by the outriggers

2. The auxiliary and whip hoists on a portal crane are tested in the same manner as the main hoist.

- A. True
- B. False

3. When performing a stability test on a portal crane with a balanced deck design, a measurement is taken...

- A. at the roller path, between the rollers and the roller path surface (race)
- B. from the boom tip to the ground, measured at no-load and at full load
- C. between the ground and a mark on the test weights
- D. between the travel wheels and the rails
- E. stability tests are not required for portal cranes

4. Portal cranes are load tested at what percentage of their capacity?

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

5. When working with mobile cranes, free rated capacity means:

- A. the amount of weight which may be lifted, without the use of outriggers
- B. a weight that can be lifted and rotated 360 degrees while on outriggers
- C. a weight that can be lifted and rotated over the sides only, on outriggers
- D. the amount of weight which will cause instability, on outriggers
- E. none of the above

6. A boom foot brake test is performed with the boom near...

- A. maximum radius
- B. the ground
- C. minimum radius

7. Which of the following is not tested as a mobile crane?

- A. truck
- B. locomotive
- C. cruiser (rough terrain)
- D. crash
- E. wall crane



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 _____