Chapter 3

Crane Crew Supervisor

Topics

1.0.0 Crane Crew Supervisor Responsibilities

To hear audio, click on the box. 

Overview

In minutes, a crane can easily lift and place a load weighing several tons. Major tasks involved in any construction or ship-loading operation are the handling of supplies, the driving of piles, and the excavation of materials. Most of these tasks are performed by equipment belonging to the lifting and loading family called cranes. With their various attachments, such as hook block, clamshell, dragline, and pile driver, cranes provide safe and efficient accomplishment of assigned tasks when operators use them properly and demonstrate the same respect for the crane as they should any other labor-saving device; however, the first time you bend the rules or take shortcuts, disaster is waiting to happen.

The Crane Crew Supervisor plays a major role in ensuring that any crew that prepares, assembles, operates, or works with or around cranes are well trained in both safety and operating procedures. This chapter describes the demanding responsibilities of the Crane Crew Supervisor, which include selecting crew members, preparing for lifts, educating themselves and others in crane safety and ensuring that crane and rigging gear certifications are kept current.

Objectives

When you have completed this chapter, you will be able to do the following:

1. Identify the responsibilities of the Crane Crew Supervisor concerning lift preparation, crane safety advisories, crane and rigging gear certification, and crane incident/mishap investigation and reporting.

Prerequisites

None

This course map shows all of the chapters in Equipment Operator (EO) Advanced. The suggested training order begins at the bottom and proceeds up. Skill levels increase as you advance on the course map.

Well Drilling Supervisor and Operations		EO ADVANCED
Asphalt Plant Supervisor and Operations		
Concrete Batch Plant Supervisor and Operations		
Crusher Supervisor and Operations		
Quarry Supervisor and Operations		
Project Supervisor		
Crane Crew Supervisor		
Air Detachment Equipment Supervisor		
Transportation Supervisor		

Features of this Manual

This manual has several features which make it easy to use online.

- Figure and table numbers in the text are italicized. The figure or table is either next to or below the text that refers to it.
- The first time a glossary term appears in the text, it is bold and italicized. When your cursor crosses over that word or phrase, a popup box displays with the appropriate definition.
- Audio and video clips are included in the text, with italicized instructions telling you where to click to activate it.
- Review questions that apply to a section are listed under the Test Your Knowledge banner at the end of the section. Select the answer you choose. If the answer is correct, you will be taken to the next section heading. If the answer is incorrect, you will be taken to the area in the chapter where the information is for review. When you have completed your review, select anywhere in that area to return to the review question. Try to answer the question again.
- Review questions are included at the end of this chapter. Select the answer you choose. If the answer is correct, you will be taken to the next question. If the answer is incorrect, you will be taken to the area in the chapter where the information is for review. When you have completed your review, select anywhere in that area to return to the review question. Try to answer the question again.

1.0.0 CRANE CREW SUPERVISOR RESPONSIBILITIES

Figure 3-1 shows the organization of the Naval Construction Force (NCF) Crane Program. The Company Commander (A6), functioning as Crane Certifying Officer, appoints key personnel in writing, including the Test Director, Inspector/Mechanic, and Crew Supervisor.

The selected Crane Crew Supervisor is normally an Equipment Operator first class (EO1) and the best crane operator available within battalion-wide assets. He or she will control and manage the unit's Weight-Handling Equipment (WHE) Program.

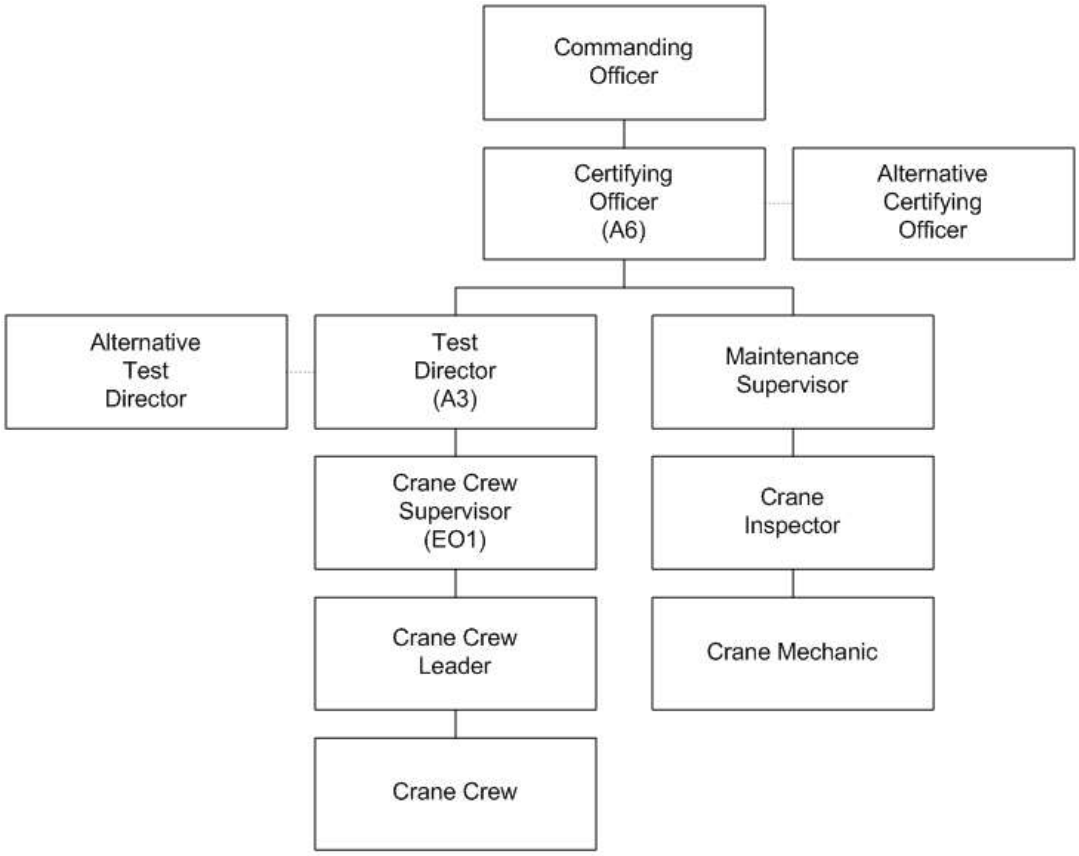

Figure 3-1 – Crane Program organization.

1.1.0 Crane Crew

To provide adequate training, the Crane Crew Supervisor identifies who will serve on the crane crew, including rigger, at the beginning of the homeport period. Construction tasking requiring crane support and the number of cranes assigned in the TAB A often dictate the size of the crane crew.

During the homeport period the Crane Crew Supervisor should be aware of and review all construction tasking that requires crane support. Knowledge of crane operations enhances the supervisor's ability to plan properly to meet construction tasking. Proper planning means selecting the correct number and types of crane lifts, assigning the correct type of crane needed to accomplish the task, selecting the correct rigging gear, and assigning a competent crew to perform the lift. Additionally, if any special skills are required to perform any of the tasking, the Crane Crew Supervisor should know that special training can be coordinated through the battalion training department with the Naval Construction Training Center (NCTC), Port Hueneme, California, or Gulfport, Mississippi.

1.1.1 Qualifications

Only personnel who have demonstrated maturity, sound judgment, and above average mechanical abilities and coordination are assigned as crane operators and riggers on a crane crew. These individuals must possess valid licenses for the type of crane to be operated.

1.1.2 Crane License Program

To obtain a crane license, applicants must have the appropriate sections of the Crane Operator License Application (*Figures 3-2* and *3-3*) completed and signed by the company commander or company chief. Additionally, applicants must meet the minimum physical requirements in accordance with the criteria established in U.S. Department of Transportation, Federal Highway Administration, Motor Carrier Safety Regulation, 49 CFR 391, Section 41-43.

Read the PRIVACY ACT STATEMENT on reverse before completing this application

APPLICATION FOR CRANE OPERATOR LICENSE

PART I - APPLICATION

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

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

6. DESCRIPTION OF EQUIPMENT LICENSE REQUESTED

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

7. STATEMENT OF QUALIFYING EXPERIENCE

8. DESCRIPTION OF CRANES APPLICANT IS CURRENTLY LICENSED TO OPERATE

9. SPONSOR'S STATEMENT OF APPLICANT'S READINESS AND/OR PREPARATORY TRAINING FOR TEST

(NOTE: The sponsor can be either a qualified instructor or licensed operator)

Signature _____

Sponsor

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

FROM:

TO:

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

Signature _____

Title _____

Department, Division or Shop Supervisor

(OVER)

Figure 3-2 – Crane Operator License Application (front).

PART III - ACTION ON SUBJECT APPLICATION

FROM:
TO:

DATE

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

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

Signature _____

Title _____

PART IV - LICENSE ACTION

FROM:
TO:

DATE

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

☐ The applicant has failed his physical examination.

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

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

Signature _____

Title _____

PRIVACY ACT STATEMENT

This statement is provided in compliance with the provisions of the Privacy Act of 1974 (PL-93-579) (N00011 C02) which require that Federal agencies must inform individuals who are requested to furnish information about themselves as to the following facts concerning the information requested.

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

Figure 3-3 – Crane Operator License Application (back).

Applicants are also required to attend the General Crane Safety course, which is offered at Naval Construction Training Centers (NCTC), Port Hueneme, California, and Gulfport, Mississippi. Operators who need to renew their crane license must take the online General Crane Safety refresher course at Navy Knowledge Online (www.nko.navy.mil).

Applicants must take a written test to ensure that they are thoroughly familiar with crane safety regulations. This testing is the direct responsibility of the Crane Certifying Officer. Test questions should include those featured in Appendix H of *Management of Weight Handling Equipment*, NAVFAC P-307 as well as questions specific to the type of cranes used by the unit. To pass the written test, the minimum required percentage of correct answer is 70 percent.

Prior to taking the performance test, applicants are thoroughly trained on the operations of the type of crane for which the license is to be issued. The applicant can operate that type of crane only under the direct observation of a licensed operator.

The Crane Certifying Officer may be assisted in administering performance tests by the Crane Test Performance Examiner. The basic requirements for performance tests are set forth in Appendix K of NAVFAC P-307. These requirements include the pre-operation inspection, operating the controls, accuracy, and the lifting and handling of heavy loads. Additional test requirements are developed for the specific type of cranes used by the unit. Performance tests are graded as satisfactory or unsatisfactory. Subsequent make-up tests test only those items that were incorrectly performed.

After passing the written and performance tests, the operator is issued a crane operator license (*Figure 3-4*) signed by the Crane Certifying Officer. The license will indicate the specific make, model, capacity, and attachments the operator is qualified to operate, for example: Link-Belt HTC-8640, 40 ton, HYD, Hook Block. The crane operator license is valid for two years.

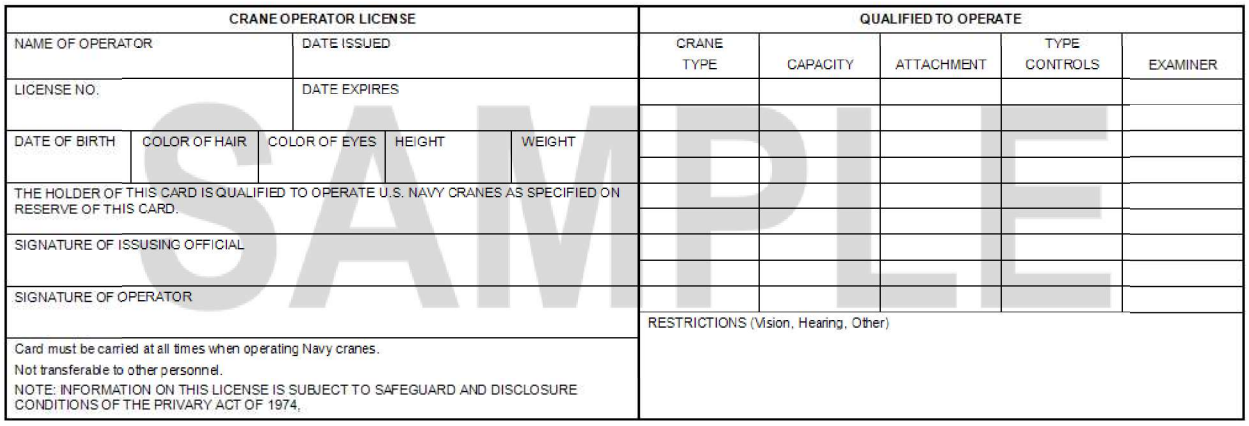

Figure 3-4 – Crane Operator License.

The Crane Operator License Record (*Figure 3-5*) is a detailed record of the operator's current license qualifications. It includes the dates of issuance and expiration, types of crane, date of examination, dates of revocation, medical restrictions, and operator's birth date.

CRANE OPERATOR LICENSE RECORD			SPECIAL REQUIREMENTS FOR		
			VISION	HEARING	OTHER
LICENSE NO.	NAME	DATE OF BIRTH			

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

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

Figure 3-5 – Crane Operator License Record.

The Crane Operator License Record is maintained by the License Examiner for inclusion in the operator's license jacket. At a minimum, each license jacket consists of the following:

- Application for crane operator license
- Operational and safety training pertinent to licenses
- Copy of current crane operator license by type
- Written tests
- Performance tests
- Crane operator license record by crane type

1.2.0 Lift Preparation

Prior to conducting any crane lift, the Crane Crew Supervisor visually inspects the lift site for stability. The importance of crane levelness cannot be overemphasized. As shown in *Table 3-1*, lifting capacity is greatly reduced each degree the crane is out of level.

Table 3-1 – Crane capacity lost by crane out of level.

BOOM LENGTH and LIFT RADIUS	Chart Capacity Lost When Crane Out of Level By		
	1°	2°	3°
Short Boom, Minimum Radius	10%	20%	30%
Short Boom, Maximum Radius	8%	15%	20%
Long Boom, Minimum Radius	30%	41%	50%
Long Boom, Maximum Radius	5%	19%	15%

During the inspection, the Crane Crew Supervisor identifies the route of travel and possible hazards, such as overhead transmission lines. As shown in *Table 3-2,* all parts of the crane, including boom, load line, and load, must maintain a minimum distance of ten feet from any power line. The distance increases five feet for each 150 KV.

Table 3-2 – Clearance of electrical transmission lines.

NORMAL VOLTAGE, KV (PHASE TO PHASE)	MINIMUM REQUIRED CLEARANCE, FT
Operation Near High Voltage Power Lines	
0 to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1000	45
Operation in Transit with No Load and Boom or Mast Lowered	
0 to 0.75	4
Over 0.75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1000	20

The Crane Crew Supervisor uses the results from the inspection to complete a Crane Lift Checklist (*Figure 3-6*).

CRANE LIFT CHECKLIST

DATE _____

1. Location of lift: _____
2. Supervisor responsible for lift: _____
3. Crane Operator: _____
4. Rigger(s)/Helper(s): _____
5. Lift: _____
   a. Description of lift: _____
   b. Weight of load to be lifted (in lbs.): _____
   c. Is weight estimated? Yes _____ No _____ By Whom: _____
   d. Can weight be verified? Yes _____ No _____ If no, contact Crane Certifying Officer for further instructions.
   e. Is the load non-symmetrical? Yes _____ No _____ If yes, follow the procedures in the NCC crane rigging course manual (show calculations on the reverse side of the checklist).
6. Crane(s) assigned to lift: _____
   a. USN#: _____
   b. Certified capacity (in lbs.): _____
   c. Rated capacity (in lbs.) _____ at _____ FT. boom
7. Is travel route safe and free of obstacles? Yes _____ No _____
8. Have travel permits been obtained (if required)? Yes _____ No _____
9. Have operators and riggers been briefed on the operation/lift sequence? Yes _____ No _____
10. Has the crane been inspected for stability? Yes _____ No _____ If no, explain. _____
11. Has the crane operating area been inspected? Yes _____ No _____ If no, explain. _____
12. Have slings and other hardware being used been inspected? Yes _____ No _____ If no, explain. _____
    a. List the type, size, and capacity with ID number of the rigging gear and hardware. _____
13. Is the capacity of slings based upon the sling angle at which the sling will be used? Yes _____ No _____

Figure 3-6 – Crane Lift Checklist.

The Crane Crew Supervisor is responsible for conducting pre-lift meetings. At a minimum, meetings should include the rigger(s), crane operator(s), and tag lineman (if the lift requires one). To ensure that the crane crew understands the required procedures for the lift, the supervisor should discuss all aspects of the lift with them, including rigging gear, personal protective equipment, escorts, set up, and time to conduct the lift.

Beyond pre-lift meetings, deployed units conduct bi-weekly meetings to discuss topics such as crane operations, general safety, minimum rigging procedures, and upcoming lifts. These meetings are attended by the Certifying Officer, Test Director, Crew Supervisor, Operators, and Riggers.

1.2.1 Complex Lifts

Lifts are classified as either complex or non-complex. According to NAVFAC P-307, complex lifts are those with moderate to high level of risk involving the following:

- Hazardous materials, such as poisons, corrosives, and highly volatile substances. This does not include materials such as volatile substances, acetylene, propane, diesel fuel, or gasoline in cans, or tanks that are properly secured in racks or standards designed for lifting and transporting by crane.
- Large and complex geometric shapes.
- Lifts of personnel.
- Lifts exceeding 80 percent of the capacity of the crane's hoist planned for use.
- Lifts of submerged or partially submerged objects.
- Multiple cranes or multiple hook lifts on the same crane, except for bridge or gantry cranes with hooks coupled together and specifically designed for simultaneous lifting.
- Lifts of unusually expensive or one-of-a-kind equipment or components.
- Non-routine operations, difficult operations, sensitive equipment, or unusual safety risks.

First Naval Construction Division (1NCD) further defines complex lifts as those involving the following:

- Lifts when the load weight is 75 percent or more of the rated capacity of the crane at any radius.
- Lifts that require the load to be swung or placed out of the operator's view.
- Lifts made with non-routine or technically difficult rigging arrangements.
- Any lift the crane operator believes should be complex.
- Any load that the actual weight cannot be confirmed by the shipping document.

1NCD has established a standard operating procedure (SOP) for complex lifts. As outlined in the SOP, prior to making a complex lift, the Crane Crew Supervisor must prepare a Complex Lift Plan (*Figure 3-7*) with the assistance of the Operator, Rigger, and Test Director. All personnel involved in the lift review and sign the plan, including the Crane Certifying Official. A copy of the plan is provided to the Commanding Officer. Both the Crane Test Director and Crew Supervisor must be present to supervise complex lifts.

COMPLEX LIFT PLAN

CRITERIA – THESE ARE LIFTS WITH MODERATE TO HIGH LEVELS OF RISK.

Load to be lifted from : Main Hook _____ Aux Hook _____

Whip Hook _____ Jib _____

Radios required for the job? Yes _____ No _____

Description of object to be lifted: _____

_____

Weight of object: _____ Height of object: _____

Total weight of rigging gear: _____

Total weight of object (including rigging gear): _____

Planned radius _____ Maximum operating radius allowed _____

Crane USN _____ SWL of crane at planned radius_____

SPECIAL CONDITIONS THAT LIFT PERSONNEL NEED TO BE AWARE OF:

Is weight being lifted from water? Yes _____ No _____

Is the load waterlogged? Yes _____ No _____

Operator's Name: _____

Lead Rigger's Name: _____

Crane and Rigging Supervisor on site: _____

Certifying Official's Name: _____

Certifying Official's Signature: _____

Calculations to determine unknown weight to be lifted: _____

_____

Figure 3-7 – Complex Lift Plan.

For complex lifts, if the weight of an object to be lifted must be estimated, and the estimate exceeds 50 percent of the rated capacity of the crane at any radius of the lift, the weight should be verified by weighing the object with calibrated equipment (crane load-indicating devices are acceptable providing that they are within certification) or by performing and documenting an engineering evaluation/calculation.

Additionally, all radii of the proposed operations must be verified by actual measurement or by operating the crane with an empty hook (dry run) through the lift evolution and verifying the radii. For lifts exceeding 75 percent of rated capacity, the radii must be verified by actual measurement using a tape measure or hand-held electronic instrument—and not by relying solely on the crane radius indicator.

Supervisors must also verify that the load to be lifted is within the crane manufacturer's allowable load for all measured radii, including appropriate deductions for hook block, ancillary equipment, etc. These distances must not be exceeded during the actual lift. If a load cannot be placed where originally planned, supervisors must verify the radius and allowable load of the new set-down location prior to placing the load.

Equipment that may be lifted should be weighed and stenciled with the weight in pounds, unless otherwise marked. Containers, sixcons, sand hoppers and the like which may contain material should be marked with both the empty and full weights. Unless the container can be physically verified as empty or can be weighed, for the purposes of lifting, it should be considered as full.

When lifting from the water, crane crew personnel should carefully note the condition of the load and should compute contained water or waterlogged objects as part of the load. When the load leaves the water, the crane takes on the added load as its buoyancy is lost. Surface tension/adhesion may contribute to part of the load. The load should be lifted very slowly at the point where it begins to leave the water until completely clear of the water to avoid dynamic loading of the crane. A waterlogged load or a load lifted from water or mud should never be handled until the crane and rigging team have jointly agreed on its weight and a complex lift plan has been completed and signed.

The weight of material to be lifted should always be carefully calculated in advance: no chances should be taken as a result of a quick estimate. Crane Supervisors should ensure that crane crew personnel are trained in the proper methods of calculating material weights and provided all necessary material weight tables and calculating devices to assist in achieving this requirement.

Hydraulic cranes, unlike friction cranes, do not all have load rating based on stability. In most cases their rating depends on strength and hydraulic pressure limits. Therefore, the hydraulic crane operator who waits for signs of tipping as a warning of an overload condition will often bend the boom, exceed the pressure limits, or cause severe damage to the machine before any signs of tipping occur.

Prior to operating a crane on a pier, wharf, or quay wall, crane crew personnel should have copies of engineering studies, which impose load limitations. The load limit information is necessary to determine a crane safe-lifting capacity and proper setup. The operator should also verify the allowable loading authorized on that facility.

1.2.2 Pre-start Inspections

The Crane Crew Supervisor is responsible for ensuring daily inspections are performed and documented. The Crane Operator's Daily Checklist (ODCL) (*Figure 3-8*) is used for this purpose. The ODCL is described in great detail in Equipment Operator Basic, Chapter 21 Cranes.

CRANE OPERATOR'S DAILY CHECK LIST

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

OPERATORS

LEGEND

S = SATISFACTORY U = UNSATISFACTORY NA = NOT APPLICABLE

	1 WALK AROUND CHECK	S	U	NA
a	Safety Guards and Plates			
b	Carrier Frame and Rotate Base *			
c	General Hardware			
d	Wire Rope *			
e	Reeving *			
f	Block *			
g	Hook *			
h	Sheaves or Sprockets *			
i	Boom and Jib *			
j	Gantry, Pendants, and Boom Stops *			
k	Walkways, Ladders, and Handrails			
l	Windlocks, Stops, and Bumpers			
m	Tires, Wheels and Tracks			
n	Leaks			
o	Outriggers and Stabilizers *			
p	Load Chain *			
q	Area Safety *			

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

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

	4 OPERATIONAL CHECK	S	U	NA
a	Area Safety *			
b	Outriggers and Stabilizers *			
c	Unusual Noises			
d	Control Action *			
e	Wire Rope or Chain *			
f	Brakes and Clutches *			
g	Boom Angle/Radius Indicator *			
h	Limit Switches *			
i	Emergency Stop *			
j	Other Operational Safety Devices *			
k	General Safety Devices			
l	Fleeting Sheaves			

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

SUPERVISOR'S SIGNATURE

DATE

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

REMARKS

Figure 3-8 – Crane Operator's Daily Checklist.

As detailed, the first operator of the day signs the ODCL after completing the entire checklist. Items with an asterisk are either load-bearing or load-controlling parts or safety devices which must be thoroughly inspected for deficiency. Depending on the condition of the item, the operator reports his or her observation by checking the appropriate column: “S” for satisfactory, “U” for unsatisfactory, and “NA” for not applicable.

For any unsatisfactory item, the operator must describe the deficiency in the “Remarks” block on the ODCL. If that item has an asterisk, the operation of that particular crane must be suspended and the operator is required to notify the Crane Crew Supervisor, unless the item has previously been identified and reviewed and continued operation has been authorized by activity engineering organization.

Subsequent operators review the initial ODCL and sign it after performing an operational check. At the end of the day, the ODCL is turned in to the Crane Crew Supervisor.

1.3.0 Standard Operating Procedures

The Crane Crew Supervisor and Test Director have the responsibility of ensuring the crew is familiar with the following SOPs established by 1NCD.

- Adverse Weather Conditions
- Anti-Two Blocking
- Bypassing Safety Devices
- Complex Lifts
- Crane Incident/Mishap Investigation and Reporting
- Crane Licensing
- Crane Safety Advisories
- Crane Operator Making a Lift
- Crane Tag-Out Program
- Determining Load Weights
- Lubrication and Data Specification for WHE
- Movement/Position the Crane
- Operating in the Vicinity of Overhead Transmission Lines
- Operator Inspections of Category 1 Cranes
- Lifting Personnel Aloft
- Pre-lift Meetings and Plans of Action for the Lift(s)
- Rigging Inspection
- Rigging Movement and Settings of Crane Loads (General)
- Securing Cranes
- Use of Outriggers
- Wire Rope Use

- Weight Handling Equipment Procedures Index

The SOPs for adverse weather conditions, anti-two blocking, and bypassing safety devices must be maintained in the cab of each crane. Copies of SOPs are available on the 1NCD's portal.

1.3.1 Adverse Weather Conditions

The SOP for adverse weather conditions defines adverse weather as, but not limited to, the following climatic conditions:

- Snow
- Ice
- Wind
- Rain
- Lightning

When an operator observes an adverse weather condition, he or she must cease operations and notify the Crane Crew Supervisor for resolution.

When operating in winds exceeding 20 mph, the operator must reduce the crane capacity by 50 percent; however, if winds exceed 30 mph, all crane operations are ceased. The boom should be retracted, lowered, and secured.

The local weather source/advisory should be used to obtain wind speeds on the job site. The safety chief should have access to this information. Additionally, the operator should observe the effects of the wind on surrounding elements such as the movement of the trees, smoke, and flags. The wind speed factor should be considered the same whether the wind is constant or in gusts.

In the event of a hurricane/typhoon warning condition, all cranes should be fueled and secured for emergency action during the recovery stage. All cranes should be secured away from overhead transmission lines and trees to prevent damage to the crane during the storm.

Operating in rain is authorized provided good visibility is maintained; however operating in the presence of lightning is prohibited.

Operations should not resume until the weather has cleared and conditions are deemed safe by the Crane Crew Supervisor.

1.3.2 Anti-Two Blocking

The SOP for anti-two blocking provides guidelines to prevent two blocking, and ensures the safety of personnel when working around or near crane operations.

Two blocking is when the hook block comes in contact with the upper sheave block during hoisting of the hook or lowering the boom. Two blocking is dangerous because it can result in damaging the crane, parting the hoist lines, and dropping the load.

Some cranes are equipped with hoist limit switches that prevent over travel of the hook block and the possibility of two blocking by cutting off power automatically at or near the limit of travel for the crane movement. However, operators should not rely solely on such a device to prevent potential hazards. Additionally, hoist limit switches and their respective systems function differently across cranes; therefore, it cannot be presumed that knowledge of one system indicates adequate knowledge of another system. The Crane Crew Supervisor must ensure the operator fully understands the function of the

hoist limit switch featured on the crane he or she is to operate. Only the Crane Crew Supervisor can authorize bypassing the limit switch, and therefore must remain on site to monitor the operation.

Prior to operating cranes without hoist limit switches, the Crane Crew Supervisor should brief the crew on the proper operations and procedures to prevent two blocking. The operator and rigger in charge are to monitor the movement of the hook block and boom to ensure two-blocking does not occur. The signalman provides the signal to “slow hoist” when the hook block comes within ten feet of the boom.

1.3.3 Bypassing Safety Devices

The SOP for bypassing safety devices establishes responsibilities for controlling the bypassing of safety devices on cranes.

Safety devices affect the safe load-lifting and handling capability of equipment such as interlocks, limit switches, overload indicators with shutdown capability, emergency stop switches, radius-indicating devices, and locking devices.

The Crane Crew Supervisor controls the usage of keys for safety device bypassing and is responsible for removing the key(s) from cranes that do not require a key to lower the boom into the boom rest from traveling. On cranes that require a key, a placard or tag with approximately one half inch lettering should be posted in the cab in the operator’s view, informing the operator that the bypass key will only be used for securing the boom into the boom rest.

If the safety device has to be bypassed for any reason other than for the pre-operational check, the operator must receive authorization from the Crane Crew Supervisor. All requests for bypassing safety devices are recorded by the operator on a Crane Operator’s Safety Bypass Log which is kept in the crane’s cab. At a minimum, the log includes the date, time, operator’s name, safety device bypassed, reason for bypassing the safety device, and the name of the Crane Crew Supervisor who gave the approval.

1.4.0 Crane Safety Advisories

The Navy Crane Center (NCC) receives reports of equipment deficiencies, components failure, crane and rigging accidents, and other potentially unsafe conditions and practices. When applicable to units, the NCC will issue crane safety advisories (CSA) and equipment deficiency memorandums (EDM). Generally, a CSA is a directive and often requires feedback from the unit receiving the advisory. An EDM is provided for information and can include deficiencies to non-load bearing/load control parts.

For each applicable CSA issued by NCC, units are required to perform the correction actions, tests, inspections, measurements, etc., and report back to the NCC as directed.

The Crane Crew Supervisor should do the following:

- Access the NCC's web page monthly to check for CSA.
- For records, download and copy CSAs or EDMs.
- Inform the Certifying Officer immediately of any CSAs/EDMs received from the NCC.
- Correct and document any deficiencies noted on the CSA/EDM.
- Notify the NCC of action taken within 48 hours of completing corrections.

- Upon receipt of faxed copies of CSAs, sign and date the cover sheet and fax it to the NCC within five working days to confirm receipt, and include amplifying comments.
- Document receipt, date replied to the NCC, action taken, and date action was completed on the CSA log.

1.5.0 Crane Certification

On an annual basis, every crane is inspected, tested, and certified. Annual certification is based on condition inspection and load test as prescribed in NAVFAC P-307.

The purpose of the condition inspection is to ensure that the overall structural, mechanical, and electrical components of the crane have been maintained in a safe and serviceable condition and are functioning properly. By controlled operation with prescribed test loads, the purpose of the load test is to ensure that the crane is capable of safely lifting and moving the rated load through all design. These inspections and tests are performed by the crane inspector under the direction of the Test Director.

1.5.1 Condition Inspection

A condition inspection, conducted by sight, sound, and touch, is performed before, during, and after the load test. A Crane Condition Inspection Record (CCIR) (*Figure 3-9*) is used to record the results of the inspection, which is not intended to be as detailed as a maintenance inspection. Each item list on the CCIR is marked satisfactory or unsatisfactory.

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

Item No.	Item Description	B	D	A	Insp/ Init.
1	Inspect structural components for damaged or deteriorated members, and for evidence of loose and missing fasteners and cracked welds.				
2	Inspect wire rope for wear, broken wires, corrosion, kinks, damaged strands, crushed or flattened sections, condition of sockets, dead end connections, and for proper lubrication.				
3	Inspect hooks for cracks, sharp edges, gouges, distortion, and freedom of rotation.				
4	Inspect hoist brakes and clutches, and rotate brakes on floating cranes for condition, wear, proper adjustment and proper operation. Spot check horizontal movement brakes and clutches for condition, wear, proper adjustment and proper operation.				
5	Inspect controls and control components for condition and proper operation.				
6	Inspect motors for condition and proper operation.				
7	Inspect limit switches for condition and proper operation. (Hook lower limit switch inspections/verifications may be performed at the maintenance inspection in lieu of the CCIR. Annotate in Remarks block if performed at the maintenance inspection.)				
8	If load test is performed, inspect load indicators, load warning devices, and load shutdown devices for condition and working accuracy as specified in Appendix C or D as applicable. (This may be performed at the maintenance inspection in lieu of the CCIR. Mark N/A if performed at the maintenance inspection.)				
9	Inspect mechanical equipment (shafts, couplings, gearing, bearings, etc.) for condition and proper operation.				
10	Inspect sheaves for condition and evidence of loose bearings and misalignment.				
11	Inspect wheels, axles, and trolley rails (as applicable) for uneven wear, cracks, and for condition and evidence of loose bearings and misalignment.				
12	Inspect load chains and sprockets for condition and proper operation.				
13	Verify capacity chart or hook load rating data is in view of operator and/or rigging personnel.				
14	Inspect operator's cab for cleanliness and operation of equipment.				
15	Inspect machinery house for cleanliness, proper safety guards, warning signs, and storage of tools and equipment.				
16	Verify proper operation of indicators, indicator lights, gauges, and warning devices.				
17	Verify current inspection of fire protection equipment.				
18	Verify that pressure vessel inspection certificates are posted and current. (See UFC 3-430-07 or appropriate document for test procedures.)				
19	Inspect outriggers, pads, boxes, wedges, cylinder mountings and level indicators for condition and proper operation.				
20	Inspect tires, crawler tracks, travel, steering, braking, and locking devices for condition and proper operation. (Applies to mobile cranes, boat hoists, rubber-tired gantry cranes, and certain category 4 cranes.)				
21	Verify accuracy of radius and/or boom angle indicator as specified in Appendix C.				
22	Inspect pawls, ratchets, and rotate locks for proper engagement and operation of interlocks.				
23	Inspect tanks, lines, valves, drains, filters, and other components of air systems for leakage and proper operation.				
24	Inspect reservoirs, pumps, motors, valves, lines, cylinders, and other components of hydraulic systems for leakage and proper operation.				

25	Inspect engines and engine-generator sets for condition and proper operation.				
26	Inspect counterweights and ballast for condition and evidence of loose and missing fasteners.				
27	Verify barge compartment (voids) cover bolts are installed.				
28	Verify accuracy of list and trim indicators against design data or previous test data.				
29	Inspect rotate path assembly and center pin steadiment/support assembly for condition and proper operation.				
30	Inspect slewing ring bearings for condition and proper operation.				
31	Inspect travel trucks, equalizers, and gudgeons for condition and proper operation.				
Remarks:					
Inspector Signature/Date:		Test Director Signature/Date			

Figure 3-9 – Crane Condition Inspection Record.

In the event that major deficiencies are identified during the inspection, the deficiencies are to be corrected prior to starting or completing the load test. Corrective action should be properly documented. If a major deficiency is found after the load test, it should be corrected, and a selective load test should be performed to test the component(s) corrected. When a selective load test is performed, a condition inspection should be performed on all items in the CCIR that experienced greater than normal loading to ensure that the load test has not caused any damage. A record of this retest should be recorded in the "Remarks" portion of the CCIR.

1.5.2 Crane Test Procedures

Cranes are tested in accordance with *NAVFAC P-307(Management of Weight Handling Equipment)*. Test results are entered on the Certification of Load Test and Condition Inspection (*Figure 3-10*).

Activity		Building/Location			
Crane No:	Type	OEM's Rated Capacity Main ____ lbs ____ feet Aux ____ lbs ____ feet Whip ____ lbs ____ feet		Certified Capacity (If different from OEM's rated capacity, explain in "Remarks") Main ____ lbs ____ feet Aux ____ lbs ____ feet Whip ____ lbs ____ feet	

☐ Annual Certification ☐ Biennial Load Test ☐ Biennial Certification

☐ Interim Recertification (Reason _____)

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

___ ___ ___ ___ ___ ___ ___ ___

Category 1 or 4 Crane*

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

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

Category 2 Cranes

Hoist	Test Load %	Pounds	Hook Tran Measurements		
			Base Meas	Before Test	After Test
Main					
Aux					
Other					

Category 3 Cranes

Hoist	Test Load %	Pounds	Hook Tran Measurements		
			Base Meas	Before Test	After Test
Main					
Aux					
Other					

Certification

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

Test Director (Signature) Date

Inspector (Signature) Date

Inspector (Signature) Date

Annual or Biennial Certification Since Hook NDT

Certifying Official (Signature) Date

Expiration Date

Remarks

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

Figure 3-10– Certification of Load Test and Condition Inspection.

When mobile cranes are tested, a certification supplement form is also used (*Figure 3-11*).

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

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

Crane No.

Lattice Boom Crane		
Boom Length (Feet)		
On Outriggers	Test Load	Radius
Min. Radius		
Max Radius		
On tires (Stationary)	Test Load	Radius
Min. Radius		
Max. Radius		

On Tires (Pick and Carry)
(Describe configurations and list test loads/radii)

Telescoping Boom Crane			
On Outriggers	Test Load	Radius	Boom Length
Min. Radius Boom Retracted			
Max. Radius Boom Extended			
Max. Radius (Boom 50% Extended)			
On Tires (Stationary)	Test Load	Radius	Boom Length
Min. Radius			
Max. Radius (Boom 50% Extended)			

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

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

Figure 3-11 – Supplement for Mobile Crane Tests.

The Certification of Load Test and Condition Inspection is signed by the Crane Test Director, Inspector, and Certifying Officer upon successful completion of the inspection and load test. It is valid for one year from the date of signature of the Certifying Officer. The original copy of the certification is filed in the unit safety office. Another copy is kept in an accessible, protected container on the crane. A third copy is placed in the crane history jacket. As shown in *Figure 3-12*, the certification expiration date is stenciled in three-inch letters on the operator's side of the revolving house. The Crane Crew Supervisor ensures that only cranes with current certificates are assigned to crane operations.

Figure 3-12 – Date of certification on crane.

The crane test procedures are contained in Appendix E of NAVFAC P-307. This information is entered on the Certification of Load Test and Condition Inspection.

1.5.2.1 No-Load Test

1.5.2.1.1 Hoist(s)

- Raise and lower each hook through the maximum possible working distance of hook travel.

⚠ CAUTION ⚠

After lowering hook, ensure wire rope is packed tightly on the drum prior to proceeding with load tests to prevent wire rope displacement and crushing.

- Run each hoist block into the limit switch (where installed) at slow speed.
- Run each hoist block beyond the limit switch by using the bypass switch (where installed).

1.5.2.1.2 Boom

- Raise and lower the boom through the full working range.

- Raise the boom into the upper limit switch (where installed). Raise the boom past the boom upper limit switch using the bypass switch (where installed).
- Test the lower limit switch (where installed) by the same procedure prescribed for testing the upper limit switch.
- Extend and retract telescoping boom sections the full distance of travel.

1.5.2.1.3 Other Functions

Other functions including swing shall be operated through a minimum of one cycle (one full revolution of major components).

1.5.2.2 Load Test

The load test consists of basically two parts, a maximum load test and a stability load test. The following test sequence is time and cost effective. The sequence may be varied by the activity.

1.5.2.2.1 Maximum Test Load for the Main Hoist

⚠ CAUTION ⚠

Lift the test load only high enough to perform the required tests.

- Static Test. Raise the test load to clear the ground with boom at minimum possible radius and hold for 10 minutes without boom and load hoist pawls (dogs) engaged. Rotate load and hook to check bearing operation. Observe for any lowering that may occur, which may indicate a malfunction of boom or hoisting components, brakes, or outriggers.

  For telescoping boom cranes, tests 5.5.1.a through d, Appendix E of NAVFAC P-307shall be performed with boom fully retracted. If the size of the test load precludes a full 360 degree rotation of the hook, perform the hook rotation test with the boom fully extended as part of the hydraulic component slippage test.

NOTE

Due to the number of layers of wire rope on the drum, some cranes may not be able to lift the test load per the OEM's load chart. If the crane has the same maximum capacity at extended boom length(s), perform the test with the boom extended. If the crane cannot lift the test load, check the OEM's allowable line pull for the particular model hoist and layer of rope. If allowable line pull (available torque) is the limiting factor, reduce the test load based on the allowable line pull limitation and perform the required test. Certify the crane based on the reduced test load (i.e., certified capacity is test load divided by 1.10). If the crane cannot lift the reduced test load, verify that the system hydraulic pressure and relief valves are set within OEM specifications. If the settings are within specification, contact the OEM.

- Dynamic Test. Raise and lower the test load at normal operating speeds.
- Hoist Brake. Test ability of the brake to control and stop the load. Test the ability of the brake to hold and lower the test load with the friction clutch disengaged, if applicable. (Do not lower test load in free-fall mode if the OEM permits lowering in this mode with light loads only.)
- Boom Operation. Operate the boom from minimum radius to maximum radius for the load applied. Repeat the test in the opposite direction.

- Hydraulic Component Slippage. Lift the test load at minimum radius and allow time for fluid and component temperatures to stabilize. Hold the load for 10 minutes without use of controls by the operator. There shall be no significant lowering of the load, boom, or outrigger beams due to components or systems malfunction or failure during the test. If boom deflection will cause the load to exceed the allowed radius, and the crane OEM confirms that this deflection is not abnormal for the crane model, this test may be performed at a larger radius. The boom length, radius, load, and OEM correspondence shall be documented in the equipment history file.

NOTE

- The significance of any lowering shall be evaluated by the activity engineering organization depending on operating requirements and safety.
- For cranes not equipped with telescoping booms, this test may be performed in conjunction with the static test noted above. For telescoping boom cranes, a different test load is usually required. Test telescoping boom cranes at the maximum boom length allowed by the wire rope as reeved (all telescoping cylinders shall be at least partially extended). Also observe for boom deflection and twisting.
- For cranes without lockable outriggers, this test shall be performed on both sides of the crane. For telescoping boom cranes, the static test of 5.5.1.a, Appendix E of NAVFAC P-307 will satisfy this requirement for the outrigger test over the other side.
- For cranes equipped with outrigger locking devices but where activity operating procedures permit operation without the use of the locking devices, this test shall be performed over both sides of the crane with the locking devices disengaged.

1.5.2.2.2 Stability Test

The test load shall be established based on the boom length and radius determined below.

- Boom Operation. Raise and lower the boom through the full working range for the length of boom extended and radius as determined below. Visually observe for smooth operation. Test boom brake for proper operation.
- Rotation. At slow speed, rotate left and right the maximum rotation allowed by the OEM at the radius as determined below with boom and load hoist pawls (dogs) engaged where applicable. Apply brake periodically during rotation. Brake shall demonstrate its ability to stop the rotating motion in a smooth, positive manner. Where brakes are designed for holding only, operate controls by plugging to stop rotation then apply brake. For cranes with outrigger locking devices and where such devices are used in operation, this test shall be performed with the locking devices engaged. For cranes with front outriggers/stabilizers, stop rotation with the boom over the front outrigger/stabilizer and hold the load for 10 minutes. There shall be no significant lowering of the outrigger/stabilizer.

NOTE

- These tests shall be done over the side of the crane. Stability testing of mobile cranes can be extremely hazardous, particularly with long booms and with jibs attached. To minimize the hazard, perform the tests in the following configurations:

- For telescoping boom cranes, these tests shall be performed with the boom extended approximately halfway between fully retracted and fully extended. (For example, if a boom has a retracted length of 40 feet and ratings for eight feet increments of extension to a fully extended length of 96 feet, the mid point between fully retracted and fully extended is 68 feet. Since this length is not on the load chart, test the crane with a boom length of 64 or 72 feet.) However, if the rated load for maximum radius for that boom length is not governed by stability (e.g., below the bold line) select the first longer increment of boom length where stability governs. If no ratings are governed by stability, perform the test with the maximum boom length.
- For all cranes test at any radius below the stability line (for the hydraulic telescoping boom length selected - see paragraph 5.5.2 a of Appendix E of NAVFAC P-307) where the weight of the test weights hanging from the hook are equal to or greater than the weight of the deductions. If no ratings are governed by stability, perform the test at the maximum boom length where the weight of the test weights hanging from the hook are equal to or greater than the weight of the deductions. For example, for a crane with configuration deductions (load block, jib, hook, etc.) of 6,000 pounds, test at a radius where the weight of the test weights hanging from the hook will be at least 6,000 pounds.
- When lifting test loads, always lift the load well within the maximum radius and slowly boom down to the pre-measured radius (as determined above) 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 outrigger may become light (start to raise up within the outrigger pad) and the outrigger pad may clear the ground during this procedure (with the boom positioned over the opposite corner) depending on the make and model. Generally, this is normal and not an indication of tipping. However, the activity shall verify with the crane OEM that a crane exhibiting this condition is safe for use.

1.5.2.2.3 Auxiliary and Whip Hoist

Test load shall be based on the maximum rated capacity for the hoist to be tested. For telescoping boom cranes, tests shall be performed with the boom fully extended or until 2 wraps of wire rope remain on a grooved hoist drum or 3 wraps of wire rope remain on a smooth hoist drum.

- Static Test. Raise the test load to clear the ground and hold for 10 minutes. Observe for any lowering that may occur, which may indicate a malfunction of hoisting components or brakes.
- Dynamic Test. Raise and lower the test load at normal operating speeds.
- Hoist Brake. Test the ability of the brake to control and stop the load. Test the ability of the brake to hold and lower the test load with the friction clutch disengaged, if applicable.

1.5.2.2.4 Ancillary Equipment

For cranes that will use ancillary equipment or alternate configurations (swing-away jibs, power pinned fly sections, manual extensions, jibs at variable offsets) using ancillary equipment procedures per section 3, load tests are required. Test load shall be based on the maximum rated load for the equipment or as limited by wire rope line pull if the

equipment is not fully reeved. For jibs with variable offset angles, test at the greatest offset used. Record each test configuration and test load on the certification supplement form, shown earlier in *Figure 3-11*.

NOTE

- For multiple boom sections installed in lattice cranes, testing of all possible boom insert combinations is not required. Perform a static and dynamic load test at the maximum and minimum boom lengths anticipated for use during the certification period.
- For multiple reeving configurations testing of all possible reeving configurations is not required. Perform a static and dynamic load test for both an even and odd number of line parts (if both an even and odd number of line parts are to be used during the certification period) using a test load and reeving configuration that produces the maximum allowable line pull for the wire rope.
- For cranes that will be re-reeved to use alternate hook block(s), static and dynamic load tests, at the maximum capacity the block(s) will be used, are required for each hook block and dead end connection to be used.
- For cranes with multiple counterweight configurations, testing of all possible counterweight combinations is not required. However, all counterweights that will be used during the certification period must be tested in some combination during the annual load test.

1.5.2.3 Free Rated Load Test

Check the stability and operation of crane, carrier, wheels, tires, tracks, brakes, etc., under load by performing the following tests, when lifting without outriggers and/or traveling with the load are permitted at the activity for the type of crane being tested.

⚠ CAUTION ⚠

Ensure all “on rubber” lifting requirements established by the OEM are complied with. Attach taglines to the load to control oscillation. For cranes with outriggers, extend outriggers and maintain minimal clearance (3 to 4 inches) above ground. Test personnel shall stand clear of tires during load tests.

NOTE

No static test is required. Not applicable to mobile cranes temporarily mounted on barges. Some cranes have different ratings for stationary lifts and for traveling with a load. Each allowable configuration shall be tested. See section 11 of Appendix E of NAVFAC P-307, for allowable free rated capacities. Because capacities for over the side lifting are limited to 60 percent of OEM capacities, testing over the side is not required.

- Maximum Free Rated Load. Hoist maximum free rated test load at minimum possible radius over the rear (or over the front as required by the OEM). Slowly boom down to the maximum radius for the load. With boom and load hoist pawls (dogs) engaged where applicable, complete the following two steps.
    - Rotate through the appropriate working arc.
    - Travel a minimum of 50 feet with test load over the rear (or front as required by the OEM) with the boom parallel to the longitudinal axis of the crane carrier.

- Stability Test. Repeat step "a" with a test load corresponding to the radii determined as follows: For telescoping boom cranes, test with the boom approximately halfway between fully retracted and fully extended but do not exceed OEM's boom length limitation for lifting on rubber. For all boom types, see paragraph 5.5.2, note 1.b, Appendix E of NAVFAC P-307for determination of radius, but ensure test is performed in the stability region of the load chart. If no ratings are governed by stability, no stability test is required.

⚠ CAUTION ⚠

When lifting test loads, always lift the load well within the maximum radius and slowly boom down to a pre-measured radius. Lift the test load only high enough to perform the required tests. View *Figure 3-13* for demonstration of load test.

Figure 3-13—Load Test

1.5.2.4 Test after Change or Repair of Tires

For cranes with "on rubber" lift capability, in lieu of a load test the following test may be performed after change or repair of tires. The crane shall be traveled (with no load on hook) a minimum of 100 feet, forward and reverse, with the counterweight positioned over the corner of the crane with the affected tire (if allowed by the OEM) and with the boom at minimum radius or as required by the OEM.

1.5.3 Battalion Equipment Evaluation Program

The Battalion Equipment Evaluation Program (BEEP) requires that the incoming Crane Crew Supervisor and all certification personnel arrive at the deployment site prior to the main body to recertify any crane that is within 45 days of certification. During BEEP turnover, all slings are checked to ensure certification is up to date and pile drivers and extractors are operationally tested.

1.6.0 Rigging Gear

Per NAVFAC P-307, each piece of rigging gear is given an initial load test and inspection. Gear must withstand the load test for a minimum of two minutes (10 minutes for hoists, cranes, and crane-supporting structures) without deformation.

1.6.1 Master History Record Card

The Crane Crew Supervisor is responsible for maintaining documentation of initial load tests and inspections. He or she maintains a Master History Record Card (*Figures 3-14* and *3-15*) per each piece of rigging gear and ensures the records are retained on site.

MASTER HISTORY RECORD CARD GENERAL PURPOSE RIGGING EQUIPMENT

ITEM NAME AND SIZE (TYPE, CLASS, ETC)	RATED CAPACITY LOAD TEST	MFR'S RECOMMENDED MAXIUMUM TEST WEIGHT

THIS CARD IS USED TO RECORD BASE (ORGINAL) DIMENSIONS OF GENERAL PURPOSE RIGGING EQUIPMENT.
ONLY ITEMS APPLICABLE TO BE PARTICULAR PIECE OF EQUIPMENT NEED TO BE COMPLETED.
THE RESULTS OF ALL INSPECTIONS/TEST ARE TO BE RECORDED ON THE RESERVE SIDE.

		ORGINIAL			1ST REPLACEMENT			2ND REPLACEMENT		
ITEM	DESCRIPTION	MEAS.	SIGNATURE	DATE	MEAS.	SIGNATURE	DATE	MEAS.	SIGNATURE	DATE
1. HOOKS	THROAT HOOK									
	A. UPPER HOOK									
	B. LOWER HOOK									
2. CHAIN	A. LENGTH (5-LINK SECTION)									
	B. ULT. BREAKING STRENGTH									
	C. CHAIN LINK DIAMETER									
	D. ROCKWELL "C" HARDNESS									
	E. OVERALL LENGHT									
3. WIRE ROPE FIBER, NYLON OR WEBBING	A. TYPE									
	B. NO. STRANDS/LAYER									
	C. ORIGINAL DIAMETER/WIDTH									
	D. LENGTH									
	E. BREAKING STRENGHT									
4. FORGED FITTINGS	A. SIZE									
	B. TYPE									
	C. CERT. OR EYEBOLTS									

REMARKS/SPECIAL REQUIREMENTS

EQUIPMENT CUSTODIAN (SIGNATURE)

Figure 3-14 – Master History Record Card (front).

MASTER HISTORY RECORD CARD GENERAL PURPOSE RIGGING EQUIPMENT

RECORD/OF INSPECTION/TESTING

DATE	PURPOSE	S	U	**SIGNATURE	REMARKS

**THE DESIGNATED CRANE TEST DIRECTOR OR THE CRANE CREW SUPERVISOR VERIFIED BASED ON PERSONAL OBSERVATIONS OR CERTIFIED RECORD.

Figure 3-15 – Master History Record Card (back).

1.6.2 Rigging Equipment Status Board

The Crane Crew Supervisor also maintains a Rigging Equipment Status Board (*Figure 3-16*) that records each piece of rigging gear in the unit's inventory.

Item Name/ Size	ID Number	Capacity SWL	Test Load Date	Status

Figure 3-16 – Rigging Equipment Status Board.

On an annual basis, each piece of rigging gear inspected. Gear that successfully passes inspection is issued a certification. Inspection criteria can be found in NAVFAC P-307 and Equipment Operator Basic, Chapter 22 Rigging Operations. General criteria are as follows:

- Wire rope and slings (wire or fiber) should not be used for rigging purposes when showing evidence of excessive damages in the following areas: abrasion, corrosion, lack of lubrication, kinking, flat spots, crushing, damaged splices, core protrusion, reduction in diameter, bird caging, heat damage, etc.
- Broken wires in wire rope slings and hoists should condemn the equipment if there are more than ten broken wires in one lay length, five broken wires in an individual strand in one lay length, or two broken wires within one lay length from the end fitting.
- Chains used for slings and rigging purposes should be condemned when showing excessive damage in the following areas: corrosion, twisting, bending, gouging, abrasion, cracks, elongation, etc. Never use chains for rigging purposes without first knowing and complying with their Safe Working Load (SWL).
- All hooks should be condemned for use if showing any damage in the following areas: deformation, twisting, bending, cracks, broken latches, and any increase in hook throat opening. The allowable tolerance for all forms of hook damage is zero.

- All shackles should be condemned for rigging purposes if showing any of the following damages: deformation of any kind, cracking, bending, twisting, stretching, spreading, and missing cotter pins. Any shackle pins that were not originally supplied by the manufacturer are prohibited. Never use any shackle if the SWL is unknown. Only shackles with the SWL embossed by the manufacturer will be used.
- All dead-end fittings, swaged (pressed), spelter ed (poured), wedge and socket type, should be condemned for use if showing the following damages: deformation, bent ears, cracking, twisting, elongated holes, incorrect pins, incorrect wedges, missing cotter pins, etc. The use of wedge and socket end fittings in the rigging of general-purpose cranes is strictly governed and must comply with reference (a) at all times. Wedges and sockets are strictly prohibited for use when handling all ammunition.
- All eye bolts, pad eyes, spreader bars and beams, and load adapters should be condemned for use when showing the following damages: twisting, bending, cracking, damaged welds, and any other form of deformation. Always ensure all pad eyes or any other forms of attachment points are adequate to carry their share of the load.

All unsatisfactory rigging gear including wire rope, slings, shackles, pad eyes, hooks, and related hardware will be immediately removed from service and reported. If appropriate, any unsatisfactory rigging equipment should be destroyed to prevent future use. Experience has shown that unsatisfactory rigging gear may inadvertently be placed back into service at a subsequent date if it has not been destroyed or rendered useless.

1.7.0 Crane Incident/Mishap Investigation and Reporting

The vast majority of crane mishaps are the result of operator error, ineffective teamwork, and individual responsibility in recognizing and correcting potential problems (e.g., unsafe acts and conditions). Reducing losses resulting from damage or injuries starts by investigating each incident and mishap, and identifying "why it happened." All crane incidents and mishaps are thoroughly investigated and an in-depth analysis conducted in order to promulgate "lessons learned" and prevent future similar occurrences.

The Crane Crew Supervisor plays an important role in recognizing a crane incident versus a crane mishap, and in reporting crane mishaps.

1.7.1 Crane Incident

A crane incident is any unplanned event (including "near misses" and non-operational motor vehicle-related events) involving a crane or a member of the crane crew. Although some incidents may initially seem inconsequential, potentially serious consequences can ultimately result. When in doubt as to whether or not an event is an “incident,” crane crew members are advised to report it to the Crane Crew Supervisor.

1.7.2 Crane Mishap

A crane mishap occurs when any one or more of the six elements in the crane envelope fails to perform correctly during crane operation, maintenance, or testing resulting in the following:

- Personnel injury or death
- Material or equipment damage

- Dropped load
- Derailment
- Two blocking
- Overload
- Collision

Even if no damage or injury occurred, crane crew members are required to report the mishap to the Crane Crew Supervisor.

NOTE

Crane component failure such as motor burnout or gear tooth failure may be classified as a crane incident if it causes additional damage (e.g., dropped boom or dropped load).

1.7.3 Crane Envelope

There is a "crane operating envelope" around any operating crane that incorporates the following six basic elements:

- Crane
- Operator
- Rigger(s) and crane walker(s)
- Rigging gear between the hook and the load
- Load
- Crane-supporting structure

1.7.4 Notification and Reporting

In the event of a crane incident or mishap, the crane crew is required to stop all operations, activate the emergency response system (in case of fire or medical necessity), and immediately notify the Crane Crew Supervisor.

The Crane Crew Supervisor should contact the mishap investigator, inspector, and the Commanding Officer through appropriate chain-of-command. The Crane Crew Supervisor should secure the scene and immediately perform an on-site investigation which includes collecting evidence, interviewing witnesses, and taking photos.

The NCC must be notified by fax, phone, or email as soon as possible but not later than 24 hours after a mishap involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or any other major damage to the crane, load, or adjacent property.

Based upon evidence, a Crane and Rigging Gear Accident Report (*Figure 3-17*) is prepared and a copy is forwarded to the NCC within 30 days of the mishap. Photos taken at scene of material/property damage should be attached to the report. The NCC will review accident reports and issue CSAs and “lesson learned” as appropriate.

CRANE AND RIGGING GEAR ACCIDENT REPORT

Accident Category ☐ Crane Accident ☐ Rigging Gear Accident

From:	To: Navy Crane Center Bldg 491 NNSY Portsmouth, VA 23709 Fax (757) 396-1772
UIC	

Activity	Report No:

Crane No:	Category:	Accident Date:	Time: hrs

Category of Service ☐ SPS ☐ GPS	Crane Type:	Crane Manufacturer:

Location:	Weather:

Crane Capacity:	Hook Capacity:	Weight of Load on Hook:

Fatality or Permanent Disability? ☐ Yes ☐ No Material/Property Cost Estimate:

Report to NAVSAFECEN? ☐ Yes ☐ No

Accident Type:

☐ Personal Injury ☐ Overload ☐ Derail ☐ Damaged Rigging Gear

☐ Load Collision ☐ Two Blocked ☐ Dropped Load ☐ Damaged Crane

☐ Crane Collision ☐ Damaged Load ☐ Other Specify _____

Cause of Accident:

☐ Improper Operation ☐ Equipment Failure ☐ Inadequate Visibility

☐ Improper Rigging ☐ Switch Alignment ☐ Inadequate Communication

☐ Track Condition ☐ Procedures Failure ☐ Other Specify _____

Chargeable to:

☐ Crane Walker ☐ Rigger ☐ Operator

☐ Maintenance ☐ Management/Supervision ☐ Other Specify _____

Crane Function:

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

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

If yes, list Accident Report Nos.:

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

Preparer:	Phone and email	Code	Date

Concurrences:

	Code	Date
	Code	Date
Certifying Official (Crane Accidents Only):	Code	Date

Figure 3-17 – Crane and Rigging Gear Accident Report.

Summary

This chapter discussed the responsibilities of the Crane Crew Supervisor, from selecting qualified, licensed crew members, preparing for complex lifts, and familiarizing crew members with standard operating procedures (SOPs) established by First Naval Construction Division (1NCD). In addition, this chapter discussed the role the Crane Crew Supervisor plays in tracking and documenting crane safety advisories issued by the Naval Crane Center (NCC), ensuring current certification of cranes and rigging gear, as well as investigating and reporting crane incidents and mishaps.

Review Questions (Select the Correct Response)

1. Who functions as the Crane Certifying Officer?

   A. Company Officer
   B. Company Commander
   C. Operations Supervisor
   D. Maintenance Supervisor

2. **(True or False)** The Company Officer appoints the Crane Crew Supervisor in writing.

   A. True
   B. False

3. Who is directly responsible for the testing of crane operators?

   A. Company Officer
   B. Company Commander
   C. License Examiner
   D. Crane Certifying Officer

4. To pass the written test, the minimum required percentage of correct answers is _____ percent.

   A. 70
   B. 75
   C. 80
   D. 85

5. For how many years is the crane operator license valid?

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

6. **(True or False)** The Crane Operator License Record is a record of the operator's current license qualifications.

   A. True
   B. False

7. The distance that must be maintained between a crane and an overhead transmission line increases five feet for each _____ KV.

   A. 125
   B. 150
   C. 175
   D. 200

8. Who is responsible for conducting the pre-lift meetings?

   A. Company Commander
   B. Certifying Officer
   C. Crane Crew Supervisor
   D. Operator

9. According to NAVFAC P-307, a complex lift exceeds _____ percent of the capacity of the crane's hoist planned for use.

   A. 70
   B. 75
   C. 80
   D. 85

10. Prior to making a complex lift, what document is prepared by the Crane Crew Supervisor?

   A. Crane Lift Checklist
   B. Complex Lift Plan
   C. Complex Lift Record
   D. Crane Lift Checklist

11. Besides the Crane Certifying Officer, who else must be present at complex lifts?

   A. Company Officer
   B. Company Commander
   C. License Examiner
   D. Crane Crew Supervisor

12. Who receives the ODCL at the end of the day?

   A. Company Officer
   B. Company Commander
   C. Crane Crew Supervisor
   D. Certifying Officer

13. Which SOPs are maintained in the cab of each crane?

   A. Adverse weather conditions, complex lifts, and anti-two blocking
   B. Adverse weather conditions, anti-two blocking, and bypassing safety devices
   C. Anti-two blocking, complex lifts, and crane safety advisories
   D. Anti-two blocking, bypassing safety devices, and complex lifts

14. Crane operators must reduce the crane capacity by 50 percent when operating in winds exceeding _____ mph.

   A. 20
   B. 35
   C. 30
   D. 35

15. **(True or False)** Operating a crane in the presence of lightning is permitted.

A. True
B. False

16. On a crane, what switch prevents over travel of the hook block and the possibility of two blocking?

A. Anti-two blocking
B. Hoist limit
C. Power off
D. Boom limit

17. Who authorizes the bypassing of the limit switch?

A. Rigger
B. Operator
C. Tagline man
D. Crane Crew Supervisor

18. Who controls the usage of keys for safety device bypassing?

A. Company Officer
B. Company Commander
C. Crane Crew Supervisor
D. Certifying Officer

19. Who issues crane safety advisories and equipment deficiency memorandums?

A. NCC
B. NAVFAC
C. 1NCD
D. NCF

20. **(True or False)** An EDM is a directive and often requires feedback from the unit receiving the advisory.

A. True
B. False

21. **(True or False)** The purpose of the load test is to ensure that the overall structural, mechanical, and electrical components of the crane have been maintained in a safe and serviceable condition and are functioning properly.

A. True
B. False

22. When is the condition inspection performed?

A. Before load test
B. During load test
C. After load test
D. Before, during, and after load test

23. Upon successful completion of the condition inspection and load test, who signs the Certification of Load Test and Condition Inspection?

A. Test Director, Inspector, and Crane Mechanic
B. Test Director, Crane Mechanic, Certifying Officer
C. Test Director, Inspector, and Crane Crew Supervisor
D. Test Director, Inspector, and Certifying Officer

24. The Certification of Load Test and Condition Inspection is valid for one year from the date of the signature of the _____.

A. Test Director
B. Certifying Officer
C. Crane Inspector
D. Crane Crew Supervisor

25. During BEEP turnover, any crane that is within _____ days of certification is recertified.

A. 35
B. 40
C. 45
D. 50

26. Who is responsible for maintaining documentation of initial load tests and inspections?

A. Crane Crew Supervisor
B. Collateral Equipment Custodian
C. Inspector
D. Certifying Officer

27. **(True or False)** The occurrence of two blocking is considered a crane incident.

A. True
B. False

28. Within how many hours after a mishap must the NCC be notified?

A. 24
B. 48
C. 72
D. 96

29. After a mishap, a Crane and Rigging Gear Accident Report is forwarded to the NCC within how many days?

A. 10
B. 20
C. 30
D. 40

Additional Resources and References

This chapter is intended to present thorough resources for task training. The following reference works are suggested for further study. This is optional material for continued education rather than for task training.

Equipment Operator, Advanced, NAVEDTRA 104080, Naval Education and Training Professional Development and Technology, Pensacola, FL, 1993.

Equipment Operator 1, NAVEDTRA 10641-H1, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1986.

Equipment Operator 3 & 2, NAVEDTRA 10641-J1, Naval Education and Training Program Management Support Activity, Pensacola, FL, 1984.

Management of Weight Handling Equipment, NAVFAC P-307, Naval Facilities Engineering Command, Navy Crane Center, 2006.

Naval Construction Force (NCF) Equipment Management Instruction, COMFIRSTNCDINST 11200.2, Department of Navy, First Naval Construction Division, 2006.

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