



THE CRANE CORNER

September 2016
91st Edition

Navy Crane Center Technical Bulletin

<http://www.navfac.navy.mil/ncc>

Editor: 757-967-3857/DSN 387-3857 / nfsh_ncc_crane_corner@navy.mil

A WORD FROM TOPSIDE

Tim Blanton



Inside this issue:

A Word From Topside	1
Tip of the Spear	2
Summary of Weight Handling Accidents, Third Quarter, FY16	4
Weight Handling Training Briefs	6
Did You Know?	12
Share Your Success	13
Weight Handling Program Safety Videos	13

As we approach the end of fiscal year (FY) 2016, your commendable efforts have resulted in further gains in weight handling safety. As seen in the chart, significant crane accidents continued to decline, OPNAV reportable accidents remained very low, and near miss reporting is at an all-time high. Increased near miss reporting, coupled with an increased number of less significant accidents, demonstrates that many activities have improved accident and near miss recognition and reporting, which is a sign of a maturing weight handling program.

The June 2016 revision of NAVFAC P-307 contains several changes with regard to accident and near miss reporting, including the addition of the definition of significant accident. The goal for each activity should be to report events at the lowest possible level in order to obtain lessons learned and ultimately reduce or eliminate significant accidents. Activities that have initiated weight handling monitor (surveillance) programs, another new requirement in NAVFAC P-307, have become more proactive in identifying near misses. This effort has resulted

in a steady increase in the number of near miss reports over the past few years. Lessons learned from near misses include poor risk mitigation, improper rigging, and inadequate job planning. It is even more important to recognize that many of these would have resulted in significant accidents (overloads and dropped loads) if not proactively identified by weight handling program personnel.

Despite these gains, there is more work to be done. Although near miss reporting has dramatically increased, only 42 of the Navy's 425+ activities with weight handling programs reported near misses in FY2016, and only 9 activities (all of which have established monitor programs) reported 75 percent of the near misses. With regard to accidents, 60 activities reported accidents, indicating that 18 activities reported accidents but had no corresponding near misses. Just as important, a key focus area for FY2017 and beyond is increasing the recognition and reporting of lower threshold accidents.

Navy Crane Accident & Near Miss Trends

	FY 2014-2016 (1OCT – 1SEP)		
	2014	2015	2016
Crane Accidents	206	201	235
Significant Accidents	47	35	32
OPNAV Reportable	4	3	3
Crane Near Misses	167	181	247

(avoidable contact with no damage, not even a paint scrape). Few activities are reporting these types of accidents, and the increased data from these events would provide additional lessons learned to prevent future events.

When accidents do occur, your investigations should account for all of the vulnerabilities within the process or operation that allowed the accident to occur. That is, contributing factors that may or may not have been the root cause, but if properly controlled, would have deterred an accident from occurring. The investigation should also look at supervision's role in the operation, as well as any organizational factors that may have contributed to the event. During the causal analysis phase, identifying environmental conditions, work team interactions, and effects on personnel decision

making and risk avoidance allows the identification of the contributing factors. When all potential factors are reviewed, corrective actions can then be focused toward mitigating not only the root cause, but also the contributing factors. By bolstering personnel based actions, whether through additional training, enhanced detail in processes and procedures, or increased supervision and oversight (or any combination of the three), additional controls can be recognized and implemented to decrease the level of risk and mitigate accident severity potential. As with all corrective actions, implementation of an effective feedback process to analyze and assess compiled data will aid in determining overall effectiveness along with the necessity for continued short-term or additional follow-up actions for your weight handling program.

TIP OF THE SPEAR FOURTH QUARTER FY16 EVALUATION SUMMARY

During the fourth quarter of fiscal year FY16, while all activity evaluations were satisfactory, two concerning trends were noted at a high percentage of activities. Specifically, concerns regarding the lack of, or poor implementation of a monitor (surveillance) program and the poor performance of pre-use checks or simulated lifts were noted at 50 and 43 percent of activities, respectively. Regarding all evaluations for FY16, these same two concerns were noted at 48 and 38 percent of activities, respectively. It is imperative to ensure these concerns are corrected as implementation of a monitor program, a requirement of the June 2016 NAVFAC P-307, will be required by July 2017, and pre-use checks are a fundamental prerequisite to ensure equipment remains in satisfactory working condition prior to performing weight handling operations.

SUMMARY OF PROGRAMS EVALUATED

54 Navy WHE programs and 2 non-Navy programs were evaluated. A revisit was made to an activity in response to an unsatisfactory evaluation the prior year. Some progress was noted with additional actions necessary.

51 Navy programs were fully satisfactory.

3 Programs were marginally satisfactory.

100% satisfactory rate. (100% for all of FY16).

SATISFACTORY CRANES

29 of 32 cranes were satisfactory (91%).
Total for FY16: 156/202 (78%).

REASONS FOR UNSATISFACTORY CRANES

- Improper check of hoist secondary limit switch (two cranes).
- Brakes not checked for settings, wear, adjustment.

EVALUATION ITEMS

Significant Items: 4 evaluations identified significant items, which are listed below.

- Lack of overall compliance.
- Lack of hazard assessment for electrical personal protective equipment.

- Improvement needed in weight handling program management.
- Improved self-critical focus needed in data analysis and assessment.

COMMON EVALUATION ITEMS (FIVE OR MORE ITEMS)

- Lack of surveillance program or established program that needs improvement - 28 items.
- Operator's daily checklists, operator's monthly checklists and simulated lifts performed incorrectly or not performed - 24 items.
- Various unsafe crane and rigging operations observed by the audit team (side loading, unattended load, standing/walking beneath load, operating without signals, poor signaling, pinch points, slings bunched in hooks, load not balanced, no synthetic sling protection, brakes not checked at start of lift, side loading of shackles, trackwalker out of position, swivel hoist rings not torqued, trolley racked to one side, etc.) - 13 items.
- Operators/riggers/test directors lacked essential knowledge (recognizing crane accidents, complex lifts, knowing the weight of the load, how to connect special equipment, etc.) - 13 items.
- Inspection and certification documentation errors - 13 items.
- Crane improperly stowed/secured (hook block in, or too close to, upper limit switch or stowed in path of traffic, machines, etc., power not secured) – 12 items.
- Training issues, including contractor personnel (training not taken; refresher training not taken or not taken within three months of license renewal; lack of inspector training) - 12 items.
- Operator license/file discrepancies (no Objective Quality Evidence (OQE) of performance exam; examiner not licensed; no OQE of safety course; no OQE of operation to waive performance test; course not signed by examiner; course improperly graded; corrective lenses not noted; course not graded; licensed for more than two years; license not in possession of operator; operating with expired license; operating with no license) – 11 items.

- Designation issues (no designation, performance examiner designation not specific, designee not qualified, NAVFAC P-307 not referenced.) – 11 items.
- Weakness in (or non-existent) activity self-assessments – 11 items.
- Expired or non-program gear in use or not segregated from in-service gear - 7 items.
- Lack of (or low number of) lower order crane accident and near-miss reports – 7 items.
- No procedure for tagging equipment with known deficiencies and/or tagging equipment that is out of certification – 6 items.
- Rigging gear/crane structures/other section 14 equipment not in the program or lack documentation - 5 items.
- Local weight handling instruction non-existent or inadequate - 5 items.
- Unrecognized/unreported accidents or near misses (including damaged gear not investigated for cause) – 5 items.



SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS THIRD QUARTER FY16

The purpose of this message is to disseminate and share lessons learned from select shore activity weight handling accidents, near misses, and other unplanned occurrences so that similar events can be avoided and overall safety can be improved.

Accidents: For the third quarter of FY16, 82 Navy weight handling accidents (65 crane and 17 rigging) were reported. Accidents increased by 24 percent from the prior quarter, but despite the increase, the number of significant accidents in the third quarter was nearly the same as the prior quarter. Significant accidents (overload, dropped load, injury, two-block, derailment, or overhead power line contact) are accidents that have the potential to result in serious injuries or substantial material damage or equipment costs and may require a more detailed investigation. In addition to the Navy accident numbers, there were ten crane and rigging gear accidents reported by contractors, and two of the ten were significant accidents, including one injury.

INJURIES

Accidents: There was one injury reported. A rigger suffered a minor laceration to the head while lowering a load into a crate. The load hung up on the side of the crate then suddenly released, causing the hoist block to shift and strike the rigger in the forehead.

Lessons Learned: Supervisors and weight handling personnel must anticipate worst case scenarios and ensure that individuals are well clear of the area in the event that control of the load is lost or a dropped load occurs. The activity's investigation identified the component being lifted caught on the edge of a container as it was being lowered as a result of improper operation. Instead of staying clear when the problem was identified, the mechanic reached toward the load and was struck by the crane's hoist block when the component released from the edge of the container. Personnel must remember to stop if something doesn't look right and always expect the unexpected. Required personal protective equipment must also be used at all times during weight handling operations.

DROPPED LOADS

Accidents: Three dropped load accidents were reported. A heat exchanger suspended from a chain hoist fell to the deck when the rigging gear came out of the hook of the chain hoist. A storage box was dropped onto a trailer when the synthetic sling used for the lift was cut by a support bracket on the storage box. Equipment being hoisted onto a ship fell from a pallet when the edge of the pallet contacted a rigid hull inflatable boat.

Lessons Learned: All of the three dropped load accidents resulted from improper rigging. In the first example, personnel did not ensure the shackle for the dynamometer was properly connected to the chain hoist's hook. Instead, the shackle was installed at an angle and on the point of the hook causing damage to the mousing device and allowing the shackle to come free and drop the load when the load shifted. The second accident was caused as a result of not using the required sling protection to protect against cutting the sling on the load's sharp edge. The last event occurred because the load was not properly secured or lashed. Successful rigging is accomplished by slowing down and performing a thorough visual inspection in order to ensure the load is properly rigged, secured, and protected.

OVERLOADS

Accidents: Five overload accidents were reported including three gear overloads and two crane overloads. A synthetic sling was overloaded and damaged while rotating a propeller shaft. The allowable test load of a crane was exceeded as a result of not complying with procedural requirements when calculating the test load value. A category 3 crane was overloaded when an incorrect test weight was used for the maximum load test. A chain fall was overloaded when a cutting machine being lifted by multiple chain falls lifted unevenly. A two-ton chain hoist was overloaded when a test weight for a three-ton hoist was used for the static test load.

Lessons Learned: The overload accidents this quarter are particularly alarming because three of the five occurred during load testing. Two of the accidents occurred when personnel used test weights that exceeded the capacity required for the test. Accidents during testing operations are infrequent due to the added requirements and procedural controls but lack of attention to detail, complacency, and lack of forceful team back-up and can lead to inadequate inspection of gear and test loads. Supervisors and personnel should guard against these characteristics by ensuring that an interactive brief and careful inspection of the load and rigging configuration is performed prior to the lift.

TWO-BLOCK

Accidents: One two-block accident was reported. A mobile crane was two-blocked when the operator hoisted the block into the boom point sheaves during preparations for crane travel.

Lessons Learned: The investigation of this accident identified improper operation with the main hoist anti two-block limit deactivated as the cause of the accident. The operator lowered the boom and hoisted the main hoist block simultaneously and then lost focus on the main hoist block until it contacted the sheaves. Taking a few extra minutes to operate one function or motion at a time could have helped prevent this accident. Extreme caution must be utilized to ensure personnel remain attentive and that the limits are returned to normal operation once the limit is no longer required to be bypassed. It is important for operators to ensure that when operating near limits, they operate in a slow and controlled manner, paying strict attention to the location of their hoist. Additionally, crane team personnel should be involved in the process to provide crane team back-up and to act as signalers/designated spotters as needed. As a result of this event, the activity took action to strengthen the procedure for this evolution, including a change to deactivate the anti-two-block limit switch as the last step before lowering the boom for stowage.

Accidents: Thus far in FY16, the number of significant rigging accidents has declined by 60 percent and significant crane accidents declined by 14 percent from the previous fiscal year. FY16

OPNAV reportable accidents dropped by 72 percent (2 versus 7) over the same period in FY15. These declines coincide with increases in the number of minor accidents reported, including accidents with no damage, and an increase in near misses. Clearly, some activities recognize the need for an increased focus on identifying less significant events and are capitalizing on the lessons learned from these events by implementing barriers to prevent significant accidents from occurring. Although the trend is moving in the right direction, the numbers are being influenced by only some of the larger activities. In order to achieve the goal of zero significant accidents, all activities must understand and support the concept of reporting events at the lowest possible level and develop a monitoring program that requires observations during in-process weight handling operations. A review of the ten significant accidents identified that personnel did not comply with basic rigging practices, such as using sling protection, and verifying that the load was properly rigged. A simple visual inspection of the load and/or rigging would have prevented the majority of significant accidents this quarter.

NEAR MISSES

The number of near misses has steadily increased over the past few fiscal years and that increase continues in FY16. The number of near miss reports increased by 17 percent in FY16 as compared to the same period in FY15, but again, this number is being driven by fewer activities than is preferred. As discussed above, gains are being made, but in order to continue on the path of improving safety in the weight handling community, more activities must develop a proactive approach toward accident prevention. There was a wide variety of causes relating to the near misses reported in this quarter, including improper rigging, inadequate job planning, and poor risk mitigation. Many of these events could have resulted in significant accidents, such as overloads and dropped loads, if not identified by personnel, managers, and supervisors observing weight handling operations. It makes sense that an increased presence would provide the opportunity to identify additional near miss events and further reduce significant accidents.

Weight handling program managers and safety officials should review the above lessons learned with personnel performing weight handling operations and share lessons learned at other activities with personnel at your activity. Data from the third quarter indicates a continuing decline in significant and OPNAV reportable accidents in FY16, but all activities must continue to be proactive in identifying near misses and minor accidents to ensure we finish the year strong. Understanding that each person is vital to identifying issues is a critical step toward improving program safety and reliability. Leadership is encouraged to continue to stress the importance of being proactive and the need to stop when something is not as expected.

WEIGHT HANDLING TRAINING BRIEFS

The Weight Handling Training Briefs (WHTBs) are provided for communication to weight handling personnel. On 21 June 2016, the new NAVFAC P-307 revision was signed and became available for immediate implementation. Navy Crane Center developed a series of briefs in order to provide some specific details relating to the change.

Similar to the Navy Shore Weight Handling Safety Brief, the WHTB is intended to be a concise and informative discussion of a trend, concern, or requirement related to recent/real time issues that have the potential to affect our performance and efficiency. The WHTB is not command specific and can be used by your activity to increase awareness of potential issues or weaknesses that could result in problems for your weight handling program. The WHTB can be provided directly to personnel, posted in appropriate areas at your command as a reminder to those performing weight handling tasks, or it can be used as supplemental information for supervisory use during routine discussions with their employees.

When Navy Shore Weight Handling Safety or Training Briefs are issued, they are also posted in the Accident Prevention Info tab on NCC's web site at <http://www.navfac.navy.mil/ncc>.

*Knowledge is of no value
unless you put it into
practice.*

Anton Chekhov

Navy Shore Weight Handling Training Brief!

Title: Monitor Program
Target Audience: All Weight Handling Program Personnel



The monitor program is not intended to be used as a punitive or disciplinary tool. It is critical that the program's primary purpose be to identify trends for lessons learned and process improvement. For this reason, never include names of personnel involved with the exception of the observer.

Key words supporting this initiative can be simply stated as:

FIND, FIX, DOCUMENT, TREND

4 August 2016

NAVFAC P-307 2016, paragraph 2.6 requires activities to monitor work, particularly in-progress work, to identify deficiencies, poor practices, process errors, and potential process improvements. NCC evaluation teams have been advocating the use of a monitor (observation or surveillance) program for several years. Activities embracing this concept have seen corresponding gains in performance and safety.

➤ The key concept of the monitor program is to identify and correct minor problems before they result in accidents or equipment breakdowns.

- Although operations, rigging, and maintenance/inspection/load testing of equipment are key focus areas, all program areas (e.g., training and rigging gear inspections) are also required to be included.
- The primary emphasis of the monitor program should be to observe in-process work, e.g., ongoing operations, in-progress maintenance, training performance, load testing, and inspection of a chain hoist.
- NAVFAC P-307 2016 stresses the importance of focusing on the identification of tangible deficiencies, which better drives improvements in performance.
- In addition to observing work, the monitor program is an excellent tool to substantiate concerns of management, validate new processes or changes to existing processes, or to check on the effectiveness of corrective actions.
- The program is based on input from all personnel involved in the weight handling program and should not require additional resources.
- Ensure monitor forms document key information such as date, shift, location, name of observer, etc. and include adequate space so that key information can be captured.
- Be wary of attribute driven forms as they can become easily outdated and actually can hinder the identification of poor practices and process improvements. However, attribute-type forms can be useful for personnel without a weight handling background and to target specific processes or trouble areas.

Training

Navy Crane Center 16-T-02 Module 6

Navy Shore Weight Handling Training Brief!

Title: Crane Replacement and Modernization Plan
Target Audience: All Weight Handling Program Personnel



Just as the Navy has to modernize, the Navy's crane inventory must be upgraded periodically and eventually replaced to keep pace with industry standards, safety, and technology gains. Could you imagine performing some of today's complex lifts with harbor-type cranes from the 1700s or steam cranes from the early 1900s?

10 August 2016

NAVFAC P-307 2016, paragraph 2.7 directs activities with category 1 or 2 cranes, or any critical cranes to develop and maintain a replacement and modernization plan. Critical cranes, as defined in NAVFAC P-307, App. A, are cranes that perform NAVSEA 08 cognizant work, handle ordnance, hot-metals, high value or one-of-a-kind loads, or any crane the absence of which would significantly jeopardize activity mission.

- Ongoing government budget restrictions have significantly impacted the Navy's ability purchase new equipment (or upgrade existing equipment).
- Having a well thought out crane replacement and modernization plan, bolstered by crane reliability and crane maintenance cost data (metrics), improves the chances for reliable, safe, and productive cranes.
- Particularly for high cost cranes, the development of supporting documentation (e.g., white paper) to bolster the plan is recommended.
- The plan must be updated (or validated) annually to ensure mission changes and performance issues have not affected the plan.
- Well-maintained Navy cranes have been known to last significantly longer than cranes in general industry, with mobile cranes lasting 15-25 years, bridge cranes 30-50+ years, and portal cranes up to 50 years.
 - Crane usage (cycles), location, and preservation greatly affect the above timeframes. Crane reliability, the availability of spare parts, and OEM support also have to be considered.
 - For portal cranes, mid-life service life extension programs will typically be required to meet the 50+ year goal. Additionally, large capacity bridge cranes with electronic drives and portal cranes will typically require electronic drive upgrades approximately every 10-15 years.
 - As a rule of thumb, 20 tons is the breaking point for determining whether to replace or overhaul a bridge crane, as overhauls of cranes less than 20 tons are typically more expensive than replacing the crane.

Training

Navy Crane Center 16-T-02 - Module 7

Navy Shore

Weight Handling Training

Brief!

Title: Maintenance Inspections (App. C & D Change Highlights)

Target Audience: All Weight Handling Program Personnel



There were many clarifications and additions to NAVFAC P-307 2016 for the maintenance inspection specification and record (MISR) for category 1 and 4 cranes (App. C) and category 2 and 3 Cranes (App. D). Highlights of these changes are as follows:

- Note 11 (both appendices) allows MISR items annotated by a "σ" symbol to be inspected by a mechanic or an electrician in lieu of an inspector.
- App. C (item 52) / App. D (item 16) - Clarifications and additions for wire rope rejection criteria.
- App. C (item 62) / App. D (item 24) - Clarification for fuse checks - If rating/type is not visible, disassembly (removal) is not necessarily required. See MISR Note 1 for requirements.
- App. C (item 64) / App. D (item 29) - Clarification of requirements for secondary limit switch inspections. Proper functioning of the limit by activating the switch with the block needs to be performed and documented once during the life of the crane/limit switch unless the setting is affected or changed in some way. Subsequent annual checks of secondary upper limit switches can be performed by hand or other means.

Changes based on reported issues

- App. C (item 22) - Check for fuel tank corrosion and debris added.
- App. C (item 48) - Center collector bearing check added.
- App. C (item 51) - Guidance added for polymer (plastic) sheaves and extend/retract sheaves.
- App. D (item 21a) - New requirements addressing reported shocks from non-metallic pendants.
- App. C (items 34, 35, and 61) / App. D (item 25) - Addition of inspections for seals, boots, and guards.
- App. D (item 17) - Additional inspections of chain guide, guide rollers, side plates, and chain container.

Periodicity changes

- App. C and D (Wire Rope Rejection Criteria) - Recommend increased inspection periodicity for specific conditions of wire rope.
- App. C (items 41 and 49) - Now required at "A" PM.
- App. C (item 42) - Clarified that some inspections are now required at "B" PM.
- App. C (item 69) - Addition of travel motor inspection schedule.
- App. D (items 8b, 9a, and 9b) - Periodicity adjusted to align with the quadrennial program.

17 August 2016

Training

Navy Crane Center 16-T-02 - Module 8

Navy Shore

Weight Handling Training

Brief!

Title: 2016 NAVFAC P-307 Revision – Test Loads

Target Audience: All Weight Handling Program Personnel

Crane Test Load Range Calculation Example

With the new requirements, consider the required test load for a 10,000-pound category 3 jib crane:

Nominal test load for this type crane is 125%.

10,000 pounds x 125% = 12,500 pounds

With the upper tolerance now at +0%, the total test load (including the weight of the rigging gear) cannot exceed 12,500 pounds.

In this example, let's assume that the actual test load was rigged to the crane using two shackles (5 pounds each) and two wire rope slings (10 pounds each) for a total of 30 pounds of rigging gear.

The actual test weight could be no larger than 12,470 pounds (12,500 pounds minus 30 pounds). However, as noted on this WHTB, Navy Crane Center recommends sizing actual test loads toward the lower end of the test load tolerance range to prevent inadvertent overloads.

But what about the lower boundary (limit) for the test load?

From above, we have determined that the nominal test load is 125%. The new low end tolerance is the nominal test load, minus 5%. So in this example, the lower test load limit would be:

= 12,500 pounds - (12,500 pounds x 5%)
= 12,500 pounds - 625 pounds
= 11,875 pounds

However, keep in mind that the rigging gear also weighs 30 pounds so the actual test weight itself could be as low as 11,845 pounds.

Paragraph 4.7.1 of the 2016 revision of NAVFAC P-307 contains changes for test load tolerances for all cranes and also changes the nominal test loads for some cranes. While the nominal test load for most cranes remains unchanged (125 percent), there are several significant changes including:

- For mobile cranes, category 4 cranes, mobile boat hoists, rubber-tired gantry cranes, aircraft crash cranes, and locomotive cranes, the nominal test load has been reduced from 105 to 100 percent.
- In compliance with 29 CFR 1919, nominal test loads for third party certified mobile cranes shall be 110 percent of the rated capacity.
- The test load tolerance for all crane test loads has been changed to +0/-5 percent (from +5/-0 percent) of the nominal test load.

As with all lifts, the rigging gear is considered part of the test load. Test weights and rigging gear shall be sized appropriately not to exceed the nominal test load. Navy Crane Center strongly recommends sizing test loads toward the lower end of the test load tolerance range, to provide sufficient margin for the weight of the rigging gear to avoid overloading in excess of the prescribed test load range, a reportable crane accident (See paragraph 4.5.7). Other known deductions (e.g., hook, block, etc. on mobile cranes and category 4 cranes) must be considered as well.

24 August 2016

Training

Navy Crane Center 16-T-02 - Module 9

Navy Shore Weight Handling Training Brief!

Title: Crane Procurement and Design Criteria
Target Audience: All Weight Handling Program Personnel

WHE shall comply with current industry consensus standards at the time of manufacture



Appendix O, paragraph 16 of the 2016 revision of NAVFAC P-307 clarifies how crane design standards affect weight handling equipment (WHE) when the design comes into question or requires evaluation.

- To be considered certifiable to NAVFAC P-307, WHE **shall** comply with the industry consensus standards on design and safety in effect at the time of manufacture (e.g., ASME B30 series, ASME HST series).
- WHE **should** also comply with Navy design standards (e.g., DM-38, UFGS's, NAVCRANECENINST 11450.2, Standing Crane Alterations) in effect for that equipment at the time of manufacture.

NAVCRANECEN does not intend for activities to evaluate cranes to the industry consensus standards in effect at the time of manufacture unless there is some specific reason to do so, or there are significant questions regarding the design.

1 September 2016

Training

Navy Crane Center 16-T-02 – Module 10

Navy Shore Weight Handling Training Brief!

Title: Alterations and Requirements for Microprocessor-Controlled Cranes
Target Audience: All Weight Handling Program Personnel

Paragraph 6.4.5 of the 2016 revision to NAVFAC P-307 contains new requirements, exceptions, and clarifications for the alteration and testing of microprocessor-controlled cranes.



- Activities shall submit a crane alteration request (CAR) for all newly acquired microprocessor controlled cranes not procured or reviewed by Navy Crane Center. **The CAR shall show compliance with CSA 121A and approval is required prior to crane certification.**
- The following are new exceptions to paragraph 6.4.5:
 - Auto-tuning of microprocessor drives may be approved locally if not done in conjunction with troubleshooting or repair of equipment as noted in paragraph 6.4.5.d. New drive parameters shall be documented.
 - Updating of firmware may be approved as a local alteration if the change is provided by the equipment OEM.
- 6.4.5.2 Testing. Motor torque was added to the list of programmable parameter changes requiring a load test for hoist drives. Clarifications provided on forced variables and when a load test is not required.

8 September 2016

Training

Navy Crane Center 16-T-02 – Module 11

Navy Shore Weight Handling Training Brief!

Title: Crane Clearance Area
Target Audience: All Weight Handling Program Personnel



Crane clearance zone infringements should also be considered during crane pre-use checks conducted in accordance with NAVFAC P-307, section 9. The crane team should discuss areas where three feet of clearance cannot be met between the moving crane and structures and how personnel passage will be controlled during operations.

NAVFAC P-307 2016, paragraphs 6.12 and 10.12 were updated to include existing OSHA requirements (29 CFR 1917.45) for employee passage or work in the vicinity of rail mounted cranes.

- If the track areas of these types of cranes are used for passage or for work, a minimum clearance of three feet must be provided between the crane and the structure/obstruction.
- If the required clearance cannot be met, the side of the crane not having adequate clearance must not be used for employee passage and shall be marked and identified as such.
- The requirement was purposely placed in both sections (6 and 12) for a reason. In some instances, these restricted areas (structures or obstructions) are permanent, such as when a crane travels alongside or inside a building. In these instances, the method of marking/identification should be done when the crane is certified (e.g., postings, signage, painted surface indicating employee passage is not permitted). However, in many instances, the situation is dynamic, such as performing operations adjacent to a drydock where the ship's brow, or a similar obstruction intrudes into the crane's operating envelope. In these instances, employee or ship's force passage must be controlled (e.g., momentarily secure the brow, use of track walkers or other designated individuals to control access) to prevent passage within three feet of the operating crane and the structure/obstruction.

14 September 2016

Training

Navy Crane Center 16-T-02 - Module 12

Navy Shore Weight Handling Training Brief!

Title: 2016 NAVFAC P-307 Training Requirements
Target Audience: All Weight Handling Program Personnel



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

Training requirements, which apply to military, civilian, and contractor personnel, have been relocated to section 7. Among the more significant changes: qualification has been better defined, exceptions have been modified and expanded, the examination passing score has been changed, and previous elective courses are now mandatory.

- As in the past, section 7 training courses **do not qualify** personnel to perform work; instead, they provide a base from which to develop personnel qualifications. Activities are required to provide additional training and evaluation to further develop and assess the proficiency of personnel to safety and competently perform weight handling tasks and functions. Personnel shall not perform weight handling work until a knowledgeable individual has validated that all training and qualification requirements have been met.
- Base operating service (BOS) contractor mechanics and electricians now have **90** days (versus 180) to obtain required maintenance training. Additionally, factory trained and authorized technicians are now exempt from section 7 training requirements, to include operations to prove repairs when equipment is located at the repair facility and not a Navy activity.
- The **minimum passing score** for all courses is now **80%**. Personnel who previously achieved scores less than 80% are still considered to be qualified.
- Qualified category 3 (non-cab) crane operators may perform rigging on category 3 cranes. All other rigging requires completion of the Rigging Practices course.
- The Certifying Official and Contractor Crane Awareness courses are now mandatory. Personnel that have previously taken the Contractor Crane Awareness course will be required to retake the course due to significant changes in the requirements and the previous course did not require a final examination. For personnel who have previously taken the Certifying Official course, it is highly recommended they retake the training course once updated.



Online training courses are currently being updated with the latest requirements.

22 September 2016

Training

Navy Crane Center 16-T-02 - Module 13

Navy Shore Weight Handling Training Brief!

Title: Crane Operator Qualification and Licensing
Target Audience: All Weight Handling Program Personnel



Category, Type, and Capacity Dictates Testing Requirements

28 September 2016

The 2016 revision to NAVFAC P-307 consolidated all operator licensing, qualification, and testing requirements into one section (section 8). Major changes include:

- One of the more **significant changes** made to the requirements is the expansion of crane types and capacities for which testing is required (par. 8.7.3.1).
 - With regard to performance tests, for example, if an activity wants an operator to qualify on a hydraulic telescoping boom mobile crane up to 100,000 pounds capacity, a performance test for this type and capacity range is required. If, at a later time, the same operator is to be licensed for the same type of crane up to 200,000 pounds capacity, an additional performance test is required. However, per par. 8.7.3, a performance test for a higher capacity range meets the requirements for all lower capacity ranges of that specific crane type.
 - For specific crane written examinations (par. 8.7.2), operators are now required to pass a written examination for each type and capacity range for which the operator is to be licensed. Examinations shall be locally developed and include questions about the specific operating characteristics and features of activity cranes.
 - For both written examinations and performance tests, the new licensing guidelines are required to be followed when due for renewal following the 1 July 2017 NAVFAC P-307 2016 implementation date.
- For contractors, 29 CFR 1926.1427 (b) or (c) certification (qualification) requirements are now applicable to all contractor personnel (previously only required for crane used in construction) if operating some types of Navy-owned cranes. (par. 8.1.2)
- For non-cab-operated category 3 crane operators, adequate knowledge and skill must be demonstrated to a knowledgeable individual. (par. 8.1.3)
- Cranes used for performance tests must be certified. (par. 8.7.3.5)
- Following an accident, the operator's license shall be suspended when the investigation determines that the operator did not perform correctly. (par. 8.11.2)

Training

Navy Crane Center 16-T-02 - Module 14

Navy Shore Weight Handling Training Brief!

Title: Crane Operator Pre-Use Checks
Target Audience: All Weight Handling Program Personnel

The June 2016 revision to NAVFAC P-307 added several clarifications and revised some requirements for crane operator pre-use checks. Changes of note include the following:



- Requirements for non-cab operated category 3 crane have been revised to require pre-use checks use the applicable checks and exceptions in paragraphs 9.1 and 9.1.2.1, the same paragraphs utilized for cab operated category 2 and 3 cranes. Previously, pre-use checks for these cranes required some pertinent attributes (e.g. controls, brakes, limit switches, etc.) to be checked with minimal detail for the scope and depth of these checks. As noted in prior revisions, the pre-use check of non-cab operated category 3 cranes is not required to be documented. (par. 9.2)
- Clarifications were added in several areas for the walk around check (par. 9.1.2.1.1), including the following:
 - For cab-operated category 2 and 3 cranes with access ladders and walkways, checks shall be performed from the ground, walkways, the cab, and if safe access is provided, from the trolley as well.
 - Crane team riggers are permitted to check attributes for reeving, block, and hook (subparagraphs e., f., and g.) for the operator.
- With regard to the operational check (par. 9.1.2.1.4 (a)), we clarified that it is not expected that all possible areas of travel be checked.
- The requirements for operationally checking lower limit switches have been clarified. (paragraph 9.1.2.1.4 (h)). Additionally, for cranes that have been determined to meet the required criteria and do not require lower limit switch checks, this shall be noted on the crane's pendant/master switch or in the operating instructions. Similarly, the exclusion to check overload clutches or two-block damage prevention features, if applicable, shall be annotated on the applicable crane operator's daily checklist (ODCL) to ensure these features are not checked.

5 October 2016

Training

Navy Crane Center 16-T-02 - Module 15

DID YOU KNOW?

Soft foot can cause premature coupling wear; bearing/seal fit; excessive vibration; and clearance issues (in extreme cases it may cause shaft fatigue). The following are lessons learned that the Navy Crane Center has found on machine installations that may be beneficial to activities in identifying and correcting soft foot conditions.

We all know what soft foot is, right? Soft foot is when we are sitting at a table and the table rocks. The solution is usually a stack of sugar packets or folded up napkins under one leg to make the table stop rocking. Formally, soft foot is the condition caused by poor contact between the feet of rotating equipment and the machine base. Soft foot will distort the machine's frame which can put undue stress on the shaft and upset critical clearances. This distortion will cause the centerline of the shaft to be inconsistent, which will make aligning machines extremely difficult.

There can be several causes of soft foot conditions including:

- Twisted or warped machinery foundations or baseplates.
- Twisted, warped, improperly machined, or damaged machinery feet.
- Improper amount of shims under machine feet.
- Dirt, trash, corrosion, or other unwanted materials under machine feet.
- Dents or other flaws in machine base or machine feet.
- Excessive tension on machine due to jacking bolts warping machine feet.
- Induced soft foot. Induced soft foot is distortion of the machine frame caused by forces external to the rotating machinery. Pipe or conduit strain is typically the main cause of induced soft foot.

The figure below shows three types of soft foot.

Here are few steps to take to minimize and control soft foot:

- Confirm baseplates and foundations are installed and leveled to applicable specifications.
- Ensure foundations and machine feet are clean, de-burred and free from dents, bends, and damage in mounting locations.

- Use clean, flat, corrosion resistant shims.
- Always "mic" your shims, even those from a shim pack. Due to manufacturing processes, shim are not individually checked for thickness and dimensions are not always 100% accurate. Shims 50 mils and thicker are more likely to have variations in size.
- Leave all the foot bolts loose and check for obvious rocking of machine.
- Check one machine foot at a time, using a feeler gauge under each of the feet to determine the necessary shims that are required. Generally, no more than four shims should be stacked under a single machine foot. Full shims can be used or occasionally partial shims may need to be "stair cut" to correct the soft foot condition.
- Once gross soft foot has been eliminated, tighten each bolt in an opposing foot tightening pattern. Continue to use this tightening pattern any time the bolts are tightened.
- Soft foot can be measured a number of ways including dial indicators or laser alignment tools.
- Recheck for soft foot using a smaller feeler gauge, and repeat the process until all feet have been checked and shimmed as needed.

Remember, when performing shaft alignment correcting gross soft foot is the first step in achieving a quality precision alignment. Correcting soft foot to allowable values has the potential to take a lot of time; however, the steps above should minimize the time required, make the overall alignment easier, and provide more repeatable/consistent readings. Minimizing soft foot the first time will ensure rotating equipment operates properly, decrease equipment failure, and extend the life of the machinery.

We are always interested in learning about advances in weight handling equipment. If you have found new technology, please share with our editor nfsh_ncc_crane_corner@navy.mil.



WEIGHT HANDLING PROGRAM SAFETY VIDEOS

Accident Prevention provides seven crane accident prevention lessons learned videos to assist activities in raising the level of safety awareness among their personnel involved in weight handling operations. The target audiences for these videos are crane operations and rigging personnel and their supervisors. These videos provide a very useful mechanism for emphasizing the impact that the human element can have on safe weight handling operations.

Weight Handling Program for Commanding Officers provides an executive summary of the salient program requirements and critical command responsibilities associated with shore activity weight handling programs. The video covers NAVFAC P-307 requirements and activity responsibilities.

Mobile Crane Safety covers seven topics: laying a foundation for safety, teamwork, crane setup, understanding crane capacities, rigging considerations, safe operating procedures, and traveling and securing mobile cranes.

“Take Two” Briefing Video provides an overview on how to conduct effective pre-job briefings that ensure interactive involvement of the crane team in addressing responsibilities, procedures, precautions, and

operational risk management associated with a planned crane operation.

Safe Rigging and Operation of Category 3 Cranes provides an overview of safe operating principles and rigging practices associated with Category 3 crane operations. New and experienced operators may view this video to augment their training, improve their techniques, and to refresh themselves on the practices and principles for safely lifting equipment and materials with Category 3 cranes. Topics include: accident statistics, definitions and reporting procedures, pre-use inspections, load weight, center of gravity, selection and inspection of rigging gear, sling angle stress, chafing, D/d ratio, capacities and configurations, elements of safe operations, hand signals, and operational risk management (ORM). This video is also available in a standalone, topic driven, DVD format upon request.

All of the videos can be viewed on the Navy Crane Center website:

http://www.navfac.navy.mil/navfac_worldwide/specialty_centers/ncc/about_us/resources/safety_videos.html.

SHARE YOUR SUCCESS

We are always in need of articles from the field. Please share your weight handling/rigging stories with our editor nfsh_ncc_crane_corner@navy.mil.

HOW ARE WE DOING?

We want your feedback on the Crane Corner.

Is it Informative?

Is it readily accessible?

Which types of articles do you prefer seeing?

What can we do to better meet your expectations?

Please email your comments and suggestions to

nfsh_ncc_crane_corner@navy.mil