THE CRANE CORNER

Navy Crane Center Technical Bulletin

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

A WORD FROM TOPSIDE

Sam Bevins

Navy shore activities had another very safe year in Fiscal Year 2012 (FY12) in the performance of weight handling operations in support of the Fleet. Of the 223 crane and rigging gear accidents reported, only four crane accidents and two rigging gear accidents met the OPNAV Instruction 5102.1 reporting threshold, and all six were Class C mishaps. Well done!

The percentages of accidents that constituted what we call significant accidents (injuries, dropped loads, overloads, and two-block accidents) decreased in both categories of accidents. For crane accidents, 25 percent were significant, as compared to 33 percent last year, while 34 percent of rigging gear accidents were significant, as compared to 40 percent last year. This is an important metric. Although we maintain a wide aperture for reporting virtually all unplanned events, the significant accidents have a greater potential to result in serious injury, large dollar-value damage, and significant delays to Fleet operations. Our mutual goal should be continuous reductions in percentages of significant accidents.

The number of accident near miss events and "deviations from expectation" reported in FY12 was almost double the number reported last year and four times the number reported in FY10. This is a very positive trend. It is common knowledge that for every accident that occurs, there are numerous deviations from expectation that led up to the accident. Catching even one deviation can prevent an accident from occurring. Documenting these can benefit other crane users at your activity, and by reporting significant or commonly occurring ones to the Navy Crane Center, lessons can be shared with other shore activities. I urge all activities to establish a lift observation, or surveillance, program whereby supervisors, managers, and even fellow operators and riggers observe lift operations and document where expectations were not met, such as: skipped steps in the process, load weights not verified, operation without signals, improper signals and miscommunication, loads not properly secured, the rigger-in-charge (RIC) not controlling the crane envelope, the RIC performing work that other riggers should be doing, poor load control, supervisors being distracted, insufficient tagline use or chafing protection, personnel in pinch points or working under a load. There are many more examples. And they are usually not hard to spot. Many are identified and corrected on the spot but documenting them is the key. By documenting these, trends can be detected and corrective actions can be taken activity-wide. Shop managers must be encouraged to "buy into this process. More than 40 percent of the accidents reported were inside production shops. More and more activities are starting these observation programs. This is what has led to the increased number of reports of near misses and unplanned events. Reporting a near miss or unplanned act that could have led to an accident is much less unpleasant than reporting an accident, particularly a serious one.

Inside This Issue

I strongly encourage a culture wherein people instinctively focus on the value of gaining lessons learned from the reporting of ALL unusual events in a weight handling operation to prevent more serious events from occurring. Leadership should encourage this and not negatively focus solely on the number of events reported but on minimizing and eliminating the significant and serious weight handling accidents, which is our true goal. Finally, as crane teams return from extended holiday leave, I urge supervisors and managers to take preemptive actions to heighten the awareness of the teams to the tasks at hand. This also applies to supervisors and managers of in-shop Category 3 crane operators. In some locations, climatic conditions will have changed, presenting new challenges of frigid temperatures, icy walking and working surfaces, and longer hours of darkness. Recognizing these hazards and mitigating them through proper lift planning and communication will help ensure a safe lift. We must continue to remind our folks that no task is so important or urgent that it cannot be done SAFELY. And taking the time to be safe can increase our productive support to the Fleet.

CRANE SAFETY ADVISORIES AND EQUIPMENT DEFICIENCY MEMORANDA

We receive reports of equipment deficiencies, component failures, crane accidents, and other potentially unsafe conditions and practices. When applicable to other activities, we issue a Crane Safety Advisory (CSA) or an Equipment Deficiency Memorandum (EDM). A CSA is a directive and often requires feedback from the activities receiving the advisory. An EDM is provided for information and can include deficiencies to nonload bearing or nonload controlling parts. A complete list of CSAs and EDMs can be found on the Navy Crane Center's web site.

We have had no CSAs or EDMs this quarter.

WEIGHT HANDLING SAFETY BRIEF

The attached Weight Handling Safety Brief (WHSB) is provided for communication to personnel associated with Navy Shore Weight Handling. This WHSB addresses ongoing concerns associated with synthetic sling use and their protection during use. In the past two years, approximately 25 weight handling accidents have occurred that involved the improper use of synthetic slings. Recently, a contractor was seriously injured when a synthetic sling parted during an in-hull rigging operation. It is believed that the sling failed as a result of making contact with a sharp edge on the component being lifted. Synthetic slings can be easily cut at sharp corners or edges. NAVFAC P-307, Section 14, requires chafing protection for synthetic slings where there is a possibility of the sling being cut or otherwise damaged by the load. Proper chafing gear selection, and use, is imperative in protecting slings from damage. Chafing material must be of sufficient thickness and strength to prevent sling damage. With high stresses on slings, soft chafing protection material may not maintain the minimum required radius or provide an adequate amount of protection. Also, ensure the rigging configuration is stable so that slings cannot slide off of the chafing protection material. Synthetic slings are extremely unforgiving if not used in strict accordance with the manufacturer's requirements.

The Navy Shore WHSB is intended to be a concise and informative, data driven, one page snapshot of a trend, concern or requirement related to recent/real time issues that have the potential to affect our performance and efficiency. The WHSB is not command specific and can be used by your activity to increase awareness of potential issues that could result in problems for your weight handling program. The WHSB can be provided

directly to personnel, posted in appropriate areas at your command as a safety reminder to those performing weight handling tasks, or it can be used as supplemental information for supervisory use during routine safety meetings. Through data analysis of issues identified by accident and near miss reports and taking appropriate actions on the information we gain from that analysis, in conjunction with effective communication to the proper personnel, we have the tools to reduce serious events from occurring. As we improve the Navy Weight Handling safety posture, we improve our performance, thereby improving our efficiency, resulting in improved Fleet Readiness!

Navy Shore

Weight Handling Safety

Brief!

Title: Synthetic Sling Use/Protection of Gear

Target Audience: All personnel who use synthetic slings

Rigging operations involving the improper use of synthetic slings is a recurring problem that creates unnecessary risk during weight handling operations. In the past two years, approximately 25 weight handling accidents have been reported *where improper, inadequate, or no chafing material was used.* Recently, a contractor was performing an in-hull rigging evolution when a synthetic sling was likely cut on a sharp edge of the component being lifted/rigged. The event resulted in a dropped load and serious injury to a contractor employee. Synthetic slings are very susceptible to damage and can be easily cut if used improperly.

Listed to the right are several synthetic sling use requirements and considerations:

19 October 2012

- Use synthetic slings per the OEM and ASME B30.9 requirements.
- Chafing protection must be used where there is a possibility of slings being cut or otherwise damaged due to sharp edges, or configurations that could cause damage. Chafing protection material shall be of sufficient thickness and strength to prevent sling damage.
- Ensure the rigging configuration is stable and SLINGS CANNOT SLIDE OFF THE CHAFING protection material.
- Ensure sling capacities are adequate in the configuration used and consider the effects of sling angle stress when slings are used at angles other than vertical.
- Recognize that the edge need not be "razor" sharp to damage and cut the slings. Compression and tension, combined with a "moderate" edge and the sling skipping across the load edge, can result in sling damage.

- Remember, SYNTHETIC SLINGS ARE UNFORGIVING IF USED IMPROPERLY! Follow OEM requirements, and always use adequate chafing material to protect the rigging and load when rigging gear is subjected to hazards. Rigging gear wear protection devices should be selected for the specific conditions of the lift! And always AVOID WORKING UNDER A SUSPENDED LOAD!

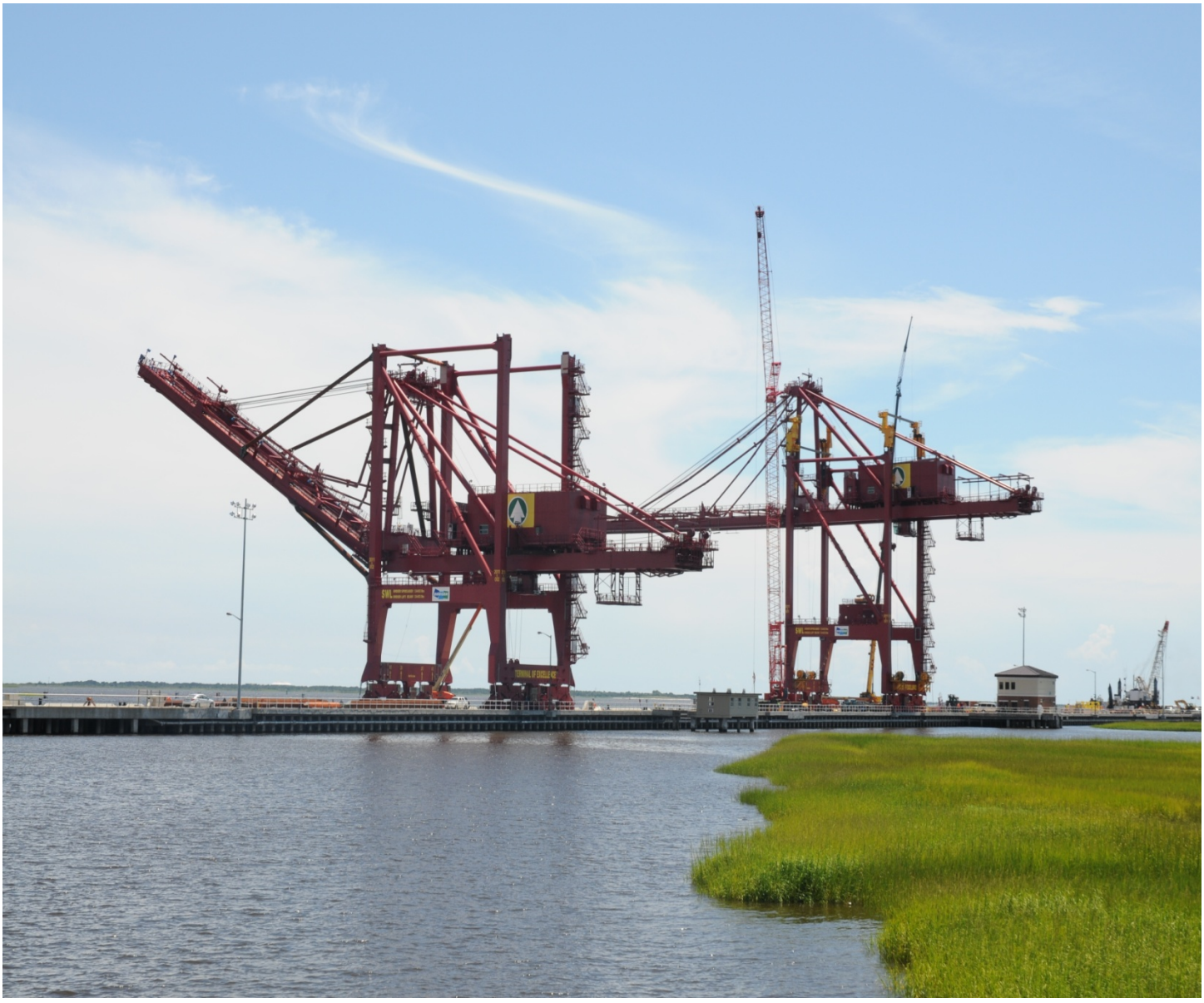
SAFETY

Navy Crane Center 12-S-05

ACQUISITION UPDATES

TWO SHIP-TO-SHORE CONTAINER CRANES

In October 2012, the Navy Crane Center completed the procurement of two state-of-the-art, heavy-lift (60 Long Tons) container cranes with high container throughput capable of servicing the large post-panamax container ships (18 containers across). The cranes run on rails 80 feet apart. The cranes are equipped with a spreader capable of lifting a single 20-foot container, twin 20-foot containers, and a single 40-foot container. The machinery house includes separate rooms for the hoist machinery, diesel generator set, and all electronic equipment. The electronic control room is climate controlled. Entrance and egress to the cranes is available via both a stairway and an elevator. For more information regarding this project, please contact the Navy Crane Center's webmaster.



UPCOMING REVISION TO NAVFAC P-307

The Navy Crane Center will be developing a revision to NAVFAC P-307, Managing of Weight Handling Equipment, in 2013. The current changes will be incorporated and Requests for Clarification, Deviation, and Revision and Crane Safety Advisories and Equipment Deficiency Memoranda written since the last revision will be reviewed for incorporation. Known areas for improvement will be revised and industry and consensus standards will be reviewed for updates. There will be an opportunity for activities to comment on the proposed revisions later in 2013. However, Navy activities are requested to send their specific suggestions for improvement and revision before this comment period, please contact the Navy Crane Center's webmaster.

CRANE ACCIDENT PREVENTION SAFETY CHALLENGE FOR 2013

Good news! The Navy shore community improved its FY12 crane accident prevention performance over FY11! In addition to a reduction in the overall number of weight handling accidents, the severity of the accidents continues to show very positive improvement. Only four accidents met the OPNAV mishap classification thresholds (with zero class A or B). There was also a major reduction in 'significant' accidents (injuries, dropped loads, overloads, and two-blockings). Additionally, many Navy activities have embraced the idea of capturing, and learning from, near miss and other unplanned occurrence events as defined in paragraph 12.5 of NAVFAC P-307. The number of near miss and other unplanned occurrence reports submitted to the Navy Crane Center nearly doubled the FY11 totals. This improvement in safety posture is a testament to the dedication and hard work of those individuals involved in the execution of the Navy's shore weight handling programs around the world. Our challenge will be to continue this positive safety trend in FY13. Our focus on identifying and reporting virtually every unplanned event and treating each event as an opportunity to learn valuable lessons continues to be effective in minimizing serious accidents.

This approach is working. As evidenced by the major increase in reporting of near miss events in FY12, we are seeing incremental progress in raising the sensitivity on the part of activity personnel to report lower level events (near misses and other unplanned occurrences) in addition to those events that meet our comprehensive accident definition. This healthy strategy will continue to improve the safety of weight handling operations over the long term. Our goal is to evolve a culture wherein people instinctively focus on the value of gaining lessons learned from the reporting of all unusual events in a weight handling operation to prevent more serious events from occurring. I challenge each activity to embrace this approach.

Even with the noted improvements in FY12, we cannot rest. Because weight handling is a dynamic and dangerous operation if not performed correctly, we simply cannot let our guard down as there are many more improvements to be realized. Although the Navy shore community experienced a major reduction in significant accidents, there were still over 40 reported crane accidents that involved injury, dropped loads, two blockings or overloads. Accidents classified as such typically have a higher probability of a more severe outcome. FY12 saw a disturbing increase in crane overloads and dropped loads. Over 70 percent of the FY12 crane overloads occurred during testing and maintenance; a time when crane operations are performed in the most controlled environment. On a positive note, the number of overloaded rigging gear accidents dropped by over sixty percent.

Human error is the cause of most accidents. It is imperative that weight handling managers be proactive in reinforcing safety expectations with all hands involved in weight handling operations through appropriate safety stand-downs and increased documented observations of operations. Every potential accident prevented not only improves the safety of personnel but also significantly improves operational efficiency by avoiding the inherent schedule disruption and cost associated with accident recovery actions.

As we approach the holiday season and winter months, I ask weight handling managers and supervisors to place a special focus on safe crane and rigging operations. As we move toward the holiday season, in many regions environmental working conditions will continue to worsen and bring ice, sleet and snow conditions. Frigid temperatures and icy conditions pose significant challenges to your crane teams as they support weight handling demands. Operations in cold weather reduce personnel dexterity and induce additional physical challenges which can lead to accidents. Cranes, barge decks, ground level rails and rail switches can become hazardous for slips, strains and falls. Exterior working surfaces, platforms, walkways and ladders are especially prone to icing conditions and appropriate precautions should be put into place to minimize this risk. Cranes and rigging gear are also affected by the cold weather. Crane sheaves and hoist blocks can become iced up or frozen which can result in improper spooling of wire rope and cause damage to cranes and components. Ice build up on mobile crane booms can also create hazardous conditions.

Harsh environments are not the only threat to safe crane operations. Crane team continuity could change or become undermanned due to end of year leave use. For those working during this period, thoughts can easily shift toward spending well deserved time with families at home. After returning from leave, we have a challenge to safely re-engage in our work. Maintaining an ever sharp focus on the critical job at hand during weight handling operations is challenging, but we cannot expect anything less.

With the holiday season upon us, managers and supervisors should consider conducting increased documented observations of weight handling operations. Look for signs of complacency or inattention. Make sure that the environment is conducive to safe weight handling operations. Make sure that your crane teams have sufficiently planned the task at hand and all involved personnel understand their responsibilities in support of the task. Proactive leadership throughout the command is a powerful tool in ensuring safe weight handling operations. Consider preemptive safety awareness briefings before and after the holidays to reinforce management's expectations for adherence to safe weight handling requirements and practices. Management should consider and address the impact of the vacation/leave on crane teams. Effective planning, teamwork, communication, situational awareness and operational risk management (ORM) are all good tools for reducing the risk of an accident. Good job planning and communication go hand in hand.

Each weight handling accident diminishes support to the fleet. A safe and reliable Navy weight handling program is an essential enabler for fleet readiness. I encourage commanding officers to intensify your efforts to raise the level of safety awareness in your activity's weight handling operations and continue to strive for the goal of zero weight handling accidents. 

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS FOURTH QUARTER FY12

For the 4th quarter of FY12, 49 Navy WHE accidents (35 crane and 14 rigging), and 25 crane and rigging gear near miss or unplanned occurrences (20 crane and 5 rigging) were reported. Of the 49 Navy WHE accidents, 12 were considered significant (overload, dropped load, two block or injury). Nine contractor crane accidents were also reported. Lessons from the significant Navy crane and rigging gear accidents are discussed herein.

Crane or load collisions continued to be the leading crane accident type (36 percent), but decreased in number for the first time in FY12. Prior to performing work, pre-job and lift planning should be performed to identify potential obstructions and hazards. Crane operators and rigging personnel should verify they have a clear travel path prior to crane movement. Pre-job briefs should include discussion to ensure adequate clearances are maintained during all crane operations, and additional personnel should be placed to monitor areas of restricted or poor visibility.

DROPPED LOADS

Accidents: Five dropped load accidents occurred during the 4th quarter. During lowering of a load using a two-part manual chainfall, the load chain was twisted and slipped on the load. During lifting of a cover, a tag line became tangled in a hook causing the hook safety latch to open. As the tag line was tensioned, the load rolled out of the hook and fell to the pier. During lifting of an engine component utilizing a pendant-controlled crane, the operator activated the lower function button on the crane pendant controller instead of the travel function button. As a result, the load contacted a furnace which caused it to detach from the rigging gear, drop to the deck and strike and injure the operator. While lifting a boat from a trailer using a forklift with a lift fixture attached, the lift fixture slid off the blades of the forklift and the boat and lift fixture dropped back onto the trailer. While lifting two vending machines from a pier to the hanger deck of a ship, the load shifted, causing the vending machines to come out of the rigging, strike the pier and fall into the water.

Lessons Learned: Prior to use, hoists must be visually and operationally inspected for damage and proper operation. Load chains should be checked for proper reeving and alignment prior to attachment and lifting of loads. If the load chain is improperly reeved or twisted, the chain may cause damage or come off of the sheave during operation, causing the chain to release and the load to fall. When using lift fixtures on forklifts, the fixtures should be attached securely and tied back to the carrier frame or structure of the forklift to prevent the fixture from sliding off the blades. Loads should always be rigged in a manner that ensures the load will not fall out of the rigging. When using slings in a sweeping configuration under a load, the slings should be secured in place to prevent inadvertent shifting or movement of the load. This is extremely important when lifting loads with a high center of gravity.

INJURIES

Accidents: Four injuries occurred during crane and rigging operations this quarter, including the one noted above. During relocation of a bearing, the nylon lashing around the bearing rendered, allowing the bearing to contact and injure an employee. While stacking weights in support of a mobile crane test, a rigger's hand was injured when the forklift blade rack assembly unexpectedly lowered. Following the removal of a load, the suspended rigging gear was pulled from the rigger's grasp and struck another employee as a result of the bridge crane movement.

Lessons Learned: When using lashing to provide an attachment point for lifting, lashing must be attached tightly enough to prevent the object to be lifted from slipping out or shifting. All personnel involved in rigging evolutions should remain alert and aware of their surroundings at all times. Provide clear warning to personnel in the area of the evolution prior to raising, lowering or moving any load or rigging gear. Personnel should not place themselves or parts of the body (i.e., hands, fingers, arms, etc.) between the rigging gear, load, or other obstructions during movement of the load or tensioning of rigging gear.

OVERLOADS

Accidents: Three of the accidents involved rigging gear overloads. During testing of an overhead rail system, the capacity of a sling used to suspend the test weight was exceeded and the sling was damaged. A one-ton chain fall was overloaded when it was incorrectly used to lift a load of 3,350 pounds. During an inspection of two twin-path alternate yarn round slings, the tattle-tails, or external warning indicators, were discovered missing, which indicates the slings were overloaded.

Lessons Learned: Prior to moving a load, the weight of the load must be known. The job should be planned and proper gear and equipment should be selected. Personnel must ensure the crane and rigging gear have adequate capacity to lift the load in the configuration used. A pre-use inspection of rigging gear is required prior to each lift or use. If any damage is discovered, the rigging gear should not be used and should be returned to the gear room or cognizant organization. A determination of the cause of the identified damage should be made and appropriately reported.

TWO-BLOCKS

Accidents: A two-block accident occurred while securing a mobile crane for travel. The rigger-in-charge was holding down the whip line anti-two-block weighted limit chain which allowed the whip line headache ball to push the two-block limit weight into the sheave and pin, causing damage to the sheave and pin.

Lessons Learned: Personnel must monitor hook clearances at all times and ensure two-blocking, collision or contact does not occur. When inspecting cranes or when bypassing of the upper limit switch is required, the hoist should be raised at the slowest possible speed or inched into the upper limit switch. Operators and riggers should be in a position to monitor the hoist movement and stop movement prior to the hoist or block contacting the crane sheaves, drum or structure.

Weight handling program managers and safety officials should review the above lessons learned with personnel performing weight handling functions and consider the potential risk of accidents occurring at your activity. Contracting officers should share this information with representatives who oversee contractor weight handling operations. This is also a good time to reinforce the principles of operational risk management. Our goal remains zero weight handling accidents. 

P-307 QUESTIONS & INTERPRETATIONS

The questions and interpretations listed below are based on crane program issues that arose and Requests for Clarification, Deviation, or Revision, P-307, figure 1-1.

Question: NAVFAC P-307, Appendix P-2, Item 34 States: "Is chafing gear used to protect slings (especially synthetic slings) and equipment from damage due to sharp corners and edges?" We think this is not a "Yes" or "No" question when rigging configurations do not require chafing. The P-2 checklist only has "Yes" and "No" check boxes.

Answer: Activities shall properly mark each item on the P-2 form checklist utilizing the available "Yes" or "No" checkbox. Where necessary, the activity may add amplifying and/or supplementary information to the "Notes" block on the form to indicate an item was marked as "No" due to non-applicability for the particular evolution or operation, or any other pertinent notes. The Navy Crane Center will consider any necessary clarification in a future revision to NAVFAC P-307.

Question: Clarification is requested on whether a hoist that had been down-rated needs the load-limiting device tested during the load test certification.

Answer: Discussion with the activity noted the load-limiting device cannot be adjusted to less than 131.25% of the crane's certified capacity as required per NAVFAC P-307, Section 11.5. The load-limiting device may remain at the OEM original setting due to the device being non-adjustable. Additionally, the load-limiting device is not to be tested due to the device setting being above 131.25% of the crane's certified capacity. The Navy Crane Center will consider adding clarification to Section 11.5 in a future revision to NAVFAC P-307.

SHARE YOUR SUCCESS

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

WEIGHT HANDLING PROGRAM SAFETY VIDEOS

Accident Prevention, seven crane accident prevention lessons learned videos are available to assist activities in raising the level of safety awareness among their personnel involved in weight handling operations. The target audience for these videos is 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 ensures 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 stand alone, topic driven, DVD format upon request.

Note: ***"Load Testing Mobile Cranes at Naval Shore Activities"*** is currently being updated to address the revised load test procedures in the December 2009 edition of NAVFAC P-307.

All of the videos can be viewed on the Navy Crane Center website:
https://portal.navfac.navy.mil/ncc.

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