



THE CRANE CORNER

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A WORD FROM TOPSIDE

Sam Bevins

The first quarter results for Navy crane accidents for fiscal year (FY) 2010 were very encouraging with a 10 percent reduction in total accidents and a 70 percent reduction in significant accidents (injuries, two-blockings, overloads, and dropped loads) from the same time period in FY 2009. As we approach the mid-year mark, accident numbers have been rising close to the levels of last year. Fortunately, none of the reported accidents have met the classification thresholds of OPNAVINST 5102.1D. Our focus on reporting every event that meets our more inclusive NAVFAC P-307 accident definition continues to help minimize the big ones from happening.

Our mutual overall goal is ZERO crane and rigging accidents. One very powerful tool that is being utilized at more and more Navy activities is a documented surveillance program. Supervisors frequently provide oversight of weight handling operations and they occasionally see something being done incorrectly and remedy the situation on the spot. This helps the immediate crane team, but without documenting and sharing the issue with the rest of the activity the opportunity for general awareness and improvement is lost. By documenting potentially unsafe acts, missed steps in lifting and handling processes, better and safer ways to perform the lift, defective equipment, etc., and sharing this information activity-wide, all weight handling personnel can become aware and improve overall activity safety.

Activities with high tempo crane and rigging operations have developed teams of experienced peers (operators/riggers/safety personnel) to observe crane and rigging operations. These “accident prevention teams” (APTs) have identified and documented numerous process, performance, and equipment deficiencies, in addition to identifying process improvements. As programs have matured, management, supervision, and the APTs are becoming more proficient at identifying and documenting “tangible” deficiencies (deficiencies that could prevent crane accidents, such as those related to crane team performance during a lift, rather than simple items such as a shackle with an expired inspection). Surveillance data should be used by supervision and management to ensure that all crane teams and lifting and handling personnel are aware of the issues so that they can carry this new knowledge to their particular assignments. The databases of surveillance findings should also be used to identify trends and can be “predictors” of future events that can result in accidents, which may call for a safety stand down or other management intervention. Senior weight handling managers should also get out on the “deckplate” and observe crane and rigging operations to enforce the standards and mentor their personnel in how to identify “tangible” deficiencies.

An effective, documented crane and rigging surveillance program has proven to be a proactive means of identifying problems before accidents occur and an effective method of sharing this information so that the issues can be rectified activity-wide. Regardless of the size of your weight-handling program, a surveillance program that documents deficiencies, missed steps/shortcuts, process errors, and other potentially unsafe actions...and shares this information with all...will help drive crane and rigging accidents to ZERO and keep them there. ■

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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 non-load bearing or non-load controlling parts.

CRANE SAFETY ADVISORIES (CSA)

CSA 191, Crosby O-319 Chain Nest Hook Connecting Pin Failure

The purpose of this CSA is to alert activities of the failure of a chain-connecting pin on a 1.7-Ton Crosby O-319 Hook and Swivel Assembly (chain nest hooks) as shown in Crosby Catalog Cut "Replacement Hooks for Chain Hoists."

A. The fractured chain-connecting pin was found subsequent to a 125 percent load test on a 1-Ton chain hoist. The Crosby O-319 chain nest hooks were used by the activity as replacements blocks for 1 and 2-Ton chain hoists. Thus far, subsequent inspection has found five additional 1-Ton chain hoists with the Crosby O-319 chain nest hooks that have cracked or fractured chain-connecting pins. There have been no cracked or fractured chain connecting links for the chain nest hooks used with 2-Ton chain hoists found thus far.

B. The manufacturer has been notified of this incident and is being shipped two of the questionable chain nest hooks for their analysis.

Direction:

Pending further evaluation, activities shall immediately remove all Crosby O-319 and O-318 chain nest hooks from service. All chain-connecting pins shall be visually inspected for cracks or fractures and results reported back to Navy Crane Center. Activities shall also report total inventories of Crosby O-319 and O-318 chain nest hooks. Further guidance and results of the failure analysis will be provided as a revision to this CSA.

Crosby Catalog Cut "Replacement Hooks for Chain Hoists" can be viewed as Attachment 1 under CSA 191 on the Navy Crane Center website at <<https://portal.navfac.navy.mil/ncc>>. From the homepage, click the CSA/EDM/SAFETY MSGS tab for links to all CSAs.

CSA 192, Possible Premature Fatigue Failure of Front Axle Beams on Grove Mobile Crane Models TMS 700E, 800E, and 900E

A. Manitowoc Crane Care has issued product improvement program G09-104D detailing a condition of the tooling holes on the front axle mounts of Grove model TMS 700E, TMS 800E, and TMS 900E mobile cranes being welded shut. Welding of the tooling holes may result in a premature fatigue failure of the front axle beams. Additionally, Manitowoc Crane Care Product Improvement Program G09-104D provides instructions on machine ride height adjustment.

B. Due to the critical nature of this product improvement plan, Navy Crane Center has decided to issue this crane safety advisory. Activities are reminded of paragraphs 2.2.2 and 10.3.1 of NAVFAC P-307, which, requires activities to contact the OEM or authorized distributor for supplemental service and safety information applicable to their cranes, and, if practical, be added to the OEM's distribution list for such information.

Direction:

Within 30 days, activities with Grove model TMS 700E, TMS 800E, or TMS 900E mobile cranes are to follow the instructions in Manitowoc Crane Care Product Improvement Program G09-104D. Replacement of the front axle beams may be required if the front axle mount tooling holes are found welded shut. Upon replacement of the front axle beams, activities shall adjust the machine ride height following the instructions provided in Manitowoc Crane Care Product Improvement Program G09-104D. Contact Manitowoc Crane Care with any questions concerning the attached product improvement program or crane applicability.

Manitowoc Crane Care Product Improvement Program G09-104D can be viewed as Attachment 1 under CSA 192 on the Navy Crane Center website at <<https://portal.navfac.navy.mil/ncc>>. From the homepage, click the CSA/EDM/SAFETY MSGS tab for links to all CSAs.

EQUIPMENT DEFICIENCY MEMORANDUM (EDM)

No EDMs have been issued since the September 2009 edition of The Crane Corner. ■

**NEW STANDING CRANE ALTERATION
FOR REPLACEMENT OF WIRE ROPE SWAGED END FITTINGS**

The Navy Crane Center has updated the Standing Crane Alteration for replacement of wire rope swaged end fittings.

Standing Crane Alteration N3258A-10-001 is available on the Navy Crane Center website at <<https://portal.navfac.navy.mil/ncc>>. From the homepage, click the CraneAlt tab and scroll to the bottom for links to this and other useful Standing Crane Alterations ■

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS FIRST QUARTER FY10

The purpose of this message is to disseminate shore activity weight handling equipment (WHE) accident and near miss lessons learned to prevent repeat accidents and improve overall safety.

NAVFAC P-307 requires commands to submit to the Navy Crane Center (NAVCRANECEN) a final accident report (including corrective/preventive actions) within 30 days of an accident, regardless of severity or type. This reporting requirement includes rigging gear accidents (gear covered by section 14 of NAVFAC P-307 used by itself in a weight handling operation) and other unplanned occurrences with lessons to be learned. In addition, contracting officers are required to forward to NAVCRANECEN reports of all contractor accidents, including contractor caused accidents with Navy owned cranes. In order to allow NAVCRANECEN adequate time to react to negative or undesirable accident trends, activities shall provide an initial notification of all crane and rigging gear accidents within 3 days of the occurrence with the facts known at that time. For accidents involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or other major damage to the crane, load, or adjacent property NAVCRANECEN should be notified as soon as practical but not later than 24 hours after the event. Forward all notifications and accident reports to: nfsh_ncc_accident@navy.mil

For the fourth quarter of FY09, 66 Navy WHE accidents (54 crane accidents and 12 rigging gear accidents) and 10 contractor crane accidents were reported. Eighteen of the 54 Navy WHE crane accidents were significant (overload, dropped load, two block, or injury). Some of the more significant crane and rigging accidents this quarter are discussed herein.

TWO BLOCK

Accident: Two of the four significant crane accidents were two blocking accidents. A two-block occurs when over-hoisting by direct hoisting or indirectly by lowering the boom or telescoping the boom so that the hook block and the upper sheave assembly or trolley / hoist frame come in contact resulting in possible damage to the structure or parting of the hoist line and dropping the load. The two blocking accidents were caused by improper operation of the crane and lack of attention to the position of the crane hook in relation to the limit switches. In both accidents, the operator failed to pay attention to the hook as it approached the limit switch.

Lessons Learned: While stowing the hook after operation or testing the upper limit switch, the operator must pay attention to the location of the hook block. Using a slow hoisting speed when in close proximity of a limit switch will provide the operator time to stop and avoid two-blocking if there is a failure of the limit switch. Never rely on safety devices, such as limit switches, to stop the hoist.

CRANE COLLISION

Accident: An operator was traveling a pendant controlled bridge crane with a suspended load near one end of the bridge beam when the opposite end of the bridge beam collided with a stationary scissor lift that was occupied by a person performing maintenance on the building. The crane operator had focused all of his attention on the suspended load and was not attentive to the entire operational envelope while traveling the crane. The contact between the bridge beam and scissor lift caused the lift to tip slightly. There were no injuries but the results could have been much worse.

Lessons Learned: This accident can be attributed to the operator not ensuring that the operating envelope of the crane was clear before engaging functions of the crane. Operators should be aware of obstructions and personnel working in the area and ensure the crane's operating envelope is clear prior to crane operation or movement. A contributing factor was the lack of communication between the contractor operating the scissor lift, the crane operator and his/her supervision, and the facility manager. The investigation revealed that the contractor did not notify any shop personnel that they were working in the area. Work control procedures should be developed for any work performed within a crane operating envelope. Maintenance managers and/or contracting officers must ensure the appropriate activity WHE manager is made aware of work being accomplished. Where work must be performed within the crane operating envelope, appropriate measures, such as lockout/tagout, temporary rail stops, barricades, etc., must be taken to preclude collision.

DAMAGED LOAD

Accident: A crane crew and ship's force were tasked to work together to remove a fiberglass fairing plate from the ship. Ship's force informed the crane crew that there was an OEM lifting device designed for lifting the plate, but the rigger in charge (RIC) chose instead to lift the equipment with flat nylon lashing through holes in the plate. While the crane was lifting the equipment, the attachment point on one side failed, dropping the side of the plate into the water.

Lessons Learned: The RIC did not stop and evaluate the use of the OEM lifting device that ship's force noted. The RIC should have stopped and notified supervision of the situation. When available, the OEM lifting device should be used to safely lift the load.

Accident: A contractor was lifting a large steel enclosure when one of the four shackles broke through the flame cut hole in the steel structure. The other three lifting points held the load. The shackle was intact and still connected to the rigging assembly.

Lessons Learned: The investigation determined that the lift plan did not provide a sufficient level of detail. A lift plan with specified lift points, which provide adequate load bearing capability for the structure to be lifted, would have prevented this accident. Ensure the lifting points are adequate to support the load. Know the weight of the load and rigging gear specifications. Locate the load's center of gravity and utilize rigging sketches where applicable.

DROPPED LOAD

Accident: A component was being lifted from the horizontal to vertical position utilizing an up righting/tilt fixture on a pier in preparation to place the component on a ship. The component was allowed to go 10 to 15 degrees past the vertical position, causing the component to come free from the uprighting/tilt fixture and swing out with sufficient momentum and lack of control to allow the component to impact the pier. NAVCRANECEN MSG 112031Z DEC 09 refers.

Lessons Learned: The investigation revealed that the crane hook was not aligned over the load and did not have adequate tension in the hoist to maintain control of the load as the component was near vertical. Personnel assisting in lifting operations should be located such that they can ensure appropriate alignment of crane hoist, boom, and swing functions as components are lifted from horizontal to vertical or lowered from vertical to horizontal positions. Additionally, the utilization of load indication devices should be utilized whenever possible to aid in lift safety.

More than half of the Navy crane accidents in this reporting period (21 of 38) occurred with no load on the hook, including the two-block accidents noted above. Operator and crane team attentiveness cannot stop when the lift is completed. Situational awareness by all personnel involved is required whenever the crane is in an operational mode.

Effective planning, teamwork, communication, situational awareness, and operational risk management (ORM) as detailed in OPNAVINST 3500.39B are all good tools for reducing the risk of an accident. Good job planning and communication go hand in hand. A training video called "Take Two" that discusses the importance of good planning, communication, and ORM is now available on the Navy Crane Center website for your use.

Weight handling program managers and safety officials are to review the above lessons learned with personnel performing lifting and handling functions and consider the potential risk of accidents occurring at your activity. This is also a good time to reinforce the principles of ORM. Our goal remains ZERO crane accidents. ■

2011 WEIGHT HANDLING CONFERENCE

The Navy Crane Center (NAVCRANECEN) is planning another Navy Weight Handling Conference for the spring of 2011 in the Virginia, Hampton Roads area. The purpose is to share weight handling equipment (WHE) improvement initiatives and safety practices, as well as discuss related issues with the goal of further improvement in WHE safety, maintenance management, engineering, operations, and training. All Navy shore activities and shore based operational units with WHE are invited to attend and participate. Activities interested in making a presentation should contact NAVCRANECEN at 757-967-4042. Conference information will be posted on the NAVCRANECEN web site, <https://portal.navfac.navy.mil/ncc> as it evolves. ■

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. ■

Operational Risk Management 5-Step Process

- Identify hazards
- Assess Hazards
- Make Risk Decisions
- Implement Controls
- Supervise (Watch for Changes)

INSPECTION OF CRANES USED IN PILE DRIVING OPERATIONS

A contractor recently had an accident during pile driving operation. The crane had a 110' x12"x 12" concrete pile in the leads when a loud pop sound was heard. The leads dropped straight to the ground and the boom recoiled backwards, striking the boom stops. The leads followed the boom, overcoming the boom stops, and both the boom and leads fell backwards over the centerline of the crane. Luckily, no personnel were injured.



Upon investigation, it was found that modifications to the boom for attachment of the pile driving leads were not properly engineered or approved by the crane OEM or a qualified person. Two brackets were welded to the underside of the crane boom and the pile driving leads were attached to these brackets with a pin. The brackets were welded to a non re-reinforced section of boom chord. The boom chord failed in the bracket attachment area causing the accident described above.

Inspection of the crane prior to operation on a Navy facility, per the P-307 appendix P, did not reveal any problems with the pile driver lead attachments. No documentation was received or requested on the attachments. They appeared to be in good condition.

Pile driving attachment points should be inspected by Navy personnel prior to operating to ensure the connection method has been documented and approved by the crane OEM, pile driving attachment OEM, or a professional engineer.

Attachment point of the leads to the underside of the boom chord. The chord material was not properly sized to handle the loading. ■



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.

Load Testing Mobile Cranes at Naval Shore Activities provides load test personnel guidance on properly testing mobile cranes per NAVFAC P-307.

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.

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

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