THE CRANE CORNER

Navy Crane Center Technical Bulletin

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Editor: (757) 967-3816/DSN 387-3816 / nfsh_ncc_crane_corner@navy.mil

A WORD FROM TOPSIDE

Sam Bevins

Navy shore activities have the opportunity to set a new standard for weight handling safety in terms of crane accident reduction. As we approach the halfway point in Fiscal Year 2011, shore activity crane accident totals are 11 percent lower than last year's low record setting number. We are halfway toward accomplishing a very significant achievement. We still have six months to go, but with proper risk management, we can maintain, or even better, this pace of safety performance. Some actions you can take to achieve this record setting goal are: focused preemptive safety briefs at key times of the year; selecting the proper equipment for the job at hand; ensuring the equipment is in good condition; thorough, interactive pre-lift briefs; following crane team principles; situational awareness by all throughout the lift; and an objective surveillance program by knowledgeable personnel providing constructive feedback on lift operations. In short, this means effective Operational Risk Management. I look forward to reporting this outstanding achievement in crane safety by the shore based weight-handling establishment…in our journey toward our mutual goal of Zero accidents.

Change 1 to the December 2009 edition of NAVFAC P-307 is ready for issuance. This change focuses on four key areas: lifts of ordnance; incorporating the requirements of the recent OSHA change to their standard for cranes used in construction; streamlining the mobile crane test process; and extending the nondestructive test (NDT) periodicities for forged alloy and carbon steel crane hooks.

For ordnance lifts, clarifications were made addressing types of lifts to be treated as complex lifts and the type of load indicating device to use for binding conditions. Also, a supervisor or working leader is required to supervise lifts involving tilt fixtures.

There are a number of new requirements that apply to cranes used by Navy activities that perform construction work, primarily our public works departments. Most of the changes can be found in section 10, and include new rules for crane assembly, ground conditions, safety devices, crane signaling, work area control, lifting of personnel, and working near overhead power lines. We have considered some of these new OSHA requirements to be applicable to all Navy crane operations. Because of the Navy's proven safety record in weight handling, OSHA granted the Navy significant, cost-avoiding exemptions to some of their requirements, including third party certification of crane operators and approvals for proposed crane modifications. Our goal is to maintain that trusted confidence.

The mobile crane load test procedures have been re-written. For better understanding, there are now separate procedures for telescoping boom cranes and lattice boom cranes. Some load tests have been eliminated or combined. For example, the Hydraulic Component Slippage Test and the Stability Test have been combined into the new Load Moment Test.

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Also, as a safety initiative, the nominal test load percentage for mobile cranes, locomotive cranes, aircraft crash cranes, mobile boat hoists, rubber tired cranes, and category 4 cranes is being reduced from 110 to 105 percent.

After an extensive study of fatigue of forged carbon and alloy steel crane hooks, the NDT periodicities are being extended to 8 years for forged alloy steel hooks and 24 years for forged carbon steel hooks. These two types of hooks compose the large majority of hook types used on Navy cranes. Change 1 also allows for consideration of extending these periodicities for hooks making less than 1000 lifts per year and for hooks with OEM rated capacities greater than the certified capacities of the cranes. Finally, NDT of the hook nut is no longer required. These changes represent good cost avoidances for the Navy shore activities.

As noted in a previous announcement, activities should already be in compliance with the OSHA related changes. Activities can take advantage of the mobile crane load test efficiencies and the new hook NDT requirements immediately. As part of our continuous incremental improvement strategy, we continue to seek opportunities for cost avoidances to help the Navy shore activities improve their mission execution effectiveness and efficiency. ■

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 189A – Uncontrolled Lowering While Using the Index Mode of Magnetek Impulse VG+ Series 3 Drives

Revision: The purpose of this revision is to provide additional direction for hoists equipped with Magnetek Impulse VG+ Series 3 drives. Specifically, this revision clarifies that this CSA is only applicable to hoists using Magnatek VG+ Series 3 Version 8001.5c firmware (or earlier) and utilizing the indexing mode feature. Activities that will utilize the indexing mode feature will have to have the firmware upgraded.

Background:
A. The purpose of this CSA is to inform Navy activities of an anomaly in the Magnetek Impulse VG+ Series 3 variable frequency drives indexing mode of operation. Indexing is a feature that allows the motor being controlled to rotate a predetermined distance at a pre-determined speed (frequency). During indexing mode, the brake remains released and the load is held stationary by the motor while awaiting the next index command. Indexing mode is enabled by the operator through a switched input to the drive.

B. While operating the hoist in index mode, an activity was able to create an internal firmware error that allowed internal drive functions to occur out of sequence. This error was caused by the operator quickly returning the controller to the neutral position upon hearing the brakes release while in index mode. This quick action results in the run input being removed from the drive before the no load brake (NLB) start sequence finishes causing the stop sequence to begin. The stop sequence (i.e., load float time, brake set delay, brake failure detection) does not normally start until the index mode is disabled. If the operator again moves the controller to a run state during the brake set delay time, a sequence anomaly occurs which results in the drive operating in a state where neither the NLB start sequence nor indexing is controlling the motor. As a result, the

motor is in a magnetizing current only state, causing the load to drift when the brakes are re-released. Depending on the load on the hook, the load could lower uncontrollably until the drive builds up sufficient torque to control the load, or until the E-stop is pressed.

C. The drive manufacturer has been successful in duplicating this issue and has developed a permanent solution through drive firmware modifications. The firmware change ensures that even if the operator does not hold the run command on long enough to completely finish the NLB start sequence, the control is sequenced over to indexing and ready to index when the run command is again issued. The stop sequence will be initiated when the index command is removed. This firmware modification has been incorporated into VG+ series 3 Version 8001.5d and later firmware revisions.

Direction:
A. Activities shall immediately discontinue use of the indexing mode feature on hoists using Magnetek Impulse VG+ Series 3 Version 8001.5c (or earlier) firmware. Hoists may be returned to service in normal mode once the indexing mode has been electrically disabled (disabling of the index mode shall be documented on an alteration request for NAVCRANECEN approval).

B. Prior to any future utilization of the indexing mode feature, activities shall ensure that the impulse VG+ Series 3 firmware is Version 8001.5d or later. The firmware version can be found by checking drive parameter U1-14. For firmware versions 8001.5c or earlier, contact Magnetek's service department at 800-MAG-SERV (800-624-7378) who will assist in the process for upgrading the firmware. The firmware upgrade must be done through an approved Magnetek dealer. Providing a parameter upload (*.par file) or a list of modified constants and the firmware version will allow the factory to pre-program the replacement control board with identical parameters.

C. Installation of the replacement control board and activation or reactivation of the indexing mode shall be documented on an alteration request for NAVCRANECEN approval. The affected hoist shall be load tested in accordance with NAVFAC P-307.

<u>CSA 195 - Medium Tactical Vehicle Replacement (MTVR) MK36 Wrecker Hoist and Boom Extend Anti-Two Block (A2B) Malfunction</u>

Background:
A. During operational checks of the MTVR MK36 Wrecker Crane A2B limit switch, operating from the truck mounted manual control station with the controller full forward, an activity found that the hoist and boom extend functions do not come to a full stop upon activation of the A2B limit. When the controller is in the full forward position, backpressure that develops in the hydraulic system allows the hoist or boom extend function to continue up at a slow speed that could result in a possible two block condition if the controller is not released.

B. When the same checks are performed from the remote control station, the hoist and boom extend functions come to a full stop upon activation of the A2B limit switch. As observed during operation, when using the remote control station the control valve does not move as far forward as when using the truck mounted manual controller thereby limiting the backpressure developed.

Direction:
A. To avoid a possible two-block condition, the MTVR MK36 wrecker crane shall be operated from the remote control station only until a long-term solution is developed.

B. Assistance from the in-service engineering agent, Naval Facilities Expeditionary Logistics Center has been requested in working with the OEM to determine a solution to the manual control station problem. NAVCRANECEN will disseminate further information as it becomes available in a revision to this CSA.

CSA 196 - Improper Heat Treatment of Retainers on Campbell Quik-Alloy Coupling Links

A. The purpose of this CSA is to inform activities of a potential safety issue with retainers provided with Campbell Quik-Alloy coupling links sizes 9/32", 3/8", and 1/2".

B. Attachment 1 is a product safety alert issued by Apex Tool Group for coupling link sizes 9/32", 3/8", and 1/2" due to a recent discovery that the coupling link pin retainers were not properly heat treated by the supplier. This could result in the retainer having less holding power on the pin allowing the pin to fall out. The suspect retainers were manufactured from April 2009 to September 2010 for 9/32" size, and from January 2010 to September 2010 for 3/8" and 1/2" sizes.

Direction:
A. Activities shall immediately discontinue use of all affected Campbell Quik-Alloy coupling link sizes 9/32", 3/8", and 1/2" for the date codes listed in attachment 1. Contact Apex Tool Group following the instructions given in attachment 1 for replacement of affected coupling link retainers. Removing the coupling link pin to replace the retainer does not require a load test. A load test of the coupling link is required if the entire coupling link (with retainer/pin) is replaced.

ATTACHMENT 1
CSA 196

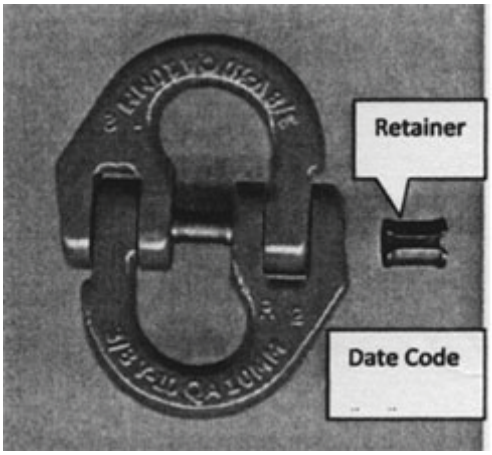
IMPORTANT PRODUCT SAFETY ALERT
DEATH OR SERIOUS BODILY INJURY COULD RESULT
POTENTIAL SAFETY ISSUE WITH RETAINERS FOR CAMPBELL QUIK-ALLOY COUPLING LINKS IN SIZES 9/32", 3/8", AND 1/2".

We have recently determined that Campbell Quik-Alloy Coupling Links, 9/32", 3/8", and 1/2", were shipped to our customers with retainers (a/k/a "snap rings") that had not been properly heat treated by our supplier. This lack of heat treatment could result in the retainer having less holding strength on the pin. This could result in the pin falling out, which would cause the coupling link to separate and any suspended load to fall. A falling load could cause death or serious bodily injury.

In the interest of safety, Apex is replacing all affected retainers immediately, even if the retainers appear to be functioning properly. Apex will replace the retainers free of charge.

The part number and date codes of the coupling links with affected retainers are identified below. The date code is located on the base of the female flange of the coupling link as shown in the picture below. Replacement pin and retainer kits purchased after the dates listed below are also affected by this Safety Alert.

Coupling Link Size/Part Number	Dates Manufactured to Present	Date Codes Involved
9/32"–5779125	April 2009 to Present	R2, R3, R4, R5, R6, S1, S2, S3, S4, S5
3/8"–5779135	January 2010 to Present	S1, S2, S3, S4, S5
1/2"–5779145	January 2010 to Present	S1, S2, S3, S4, S5
9/32" Kit–5784425	April 2009 to Present	N/A
3/8" Kit–5784435	January 2010 to Present	N/A
1/2" Kit–5784445	January 2010 to Present	N/A



The Date Code is located at the base of the female flange and will consist of a letter followed by a number. This photo shows an example of an R2 date code.

FAQ FOR PRODUCT SAFETY NOTICE REGARDING CAMPBELL QUIK-ALLOY COUPLING LINK, SIZES 9/32", 3/8", AND 1/2".

Q: Why is Apex Tool Group/Campbell Chain issuing this Safety Alert?
A: We have recently discovered that retainers (a/k/a "snap rings") in Quik-Alloy Coupling Links were not properly heat treated by our supplier. This reduces the holding power of the retainer on the pin and could cause a risk of the pin falling out of the coupling link. This could cause the coupling link to separate, and a suspended load to fall, which could result in death or serious bodily injury.

Q: When were the affected retainers manufactured?
A: The affected retainers were manufactured from April 2009 until September 2010 (for 9/32" retainers), and from January 2010 until September 2010 (for the 3/8" and 1/2" retainers).

Q: How do I determine if I have purchased products subject to this Safety Alert?
A: The affected product can be identified by the forged date code located below the female flange on the coupling link bodies, as shown in the photo. The date codes on the QA coupling links that may contain the affected retainers are:
9/32"–Date codes R2, R3, R4, R5, R6, S1, S2, S3, S4, S5
3/8"–Date codes S1, S2, S3, S4, S5
1/2"–Date codes S1, S2, S3, S4, S5

Q: Where were the products made?
A: The Quik-Alloy Coupling Links are made at the Apex Tools Group/Campbell plant in Cortland, NY. The retainers were manufactured by a supplier in Manchester, PA.

Q: Should slings that contain Quik-Alloy Coupling Links with the listed date codes be removed from service?
A: Yes, immediately. As a safety precaution, we are recommending that all slings assembled with coupling links that could contain affected retainers be removed from service immediately until the replacement retainers are installed.

Q: Does the sling need to be re-proof tested or re-certified after replacement of the retainer?
A: No, it is not necessary that the sling be re-proof tested or re-certified. The retainer is not a load-bearing part of the coupling link. The load-bearing components of the coupling link were proof tested as part of the manufacturing process.

Q: What is Apex Tool Group/Campbell doing to fix the problem?
A: Meetings have been held with the supplier. All existing and replacement retainers are properly heat treated. All Apex/Campbell warehouse inventory of coupling links have been returned to the Cortland plant for re-packaging with the correctly heat treated retainers. The supplier is implementing additional quality measures as part of its manufacturing process to include not only heat treatment certification, but also certification from supplier's management that all processes have been completed. The Cortland plant is also implementing additional quality verifications as part of its Receiving Inspection process.

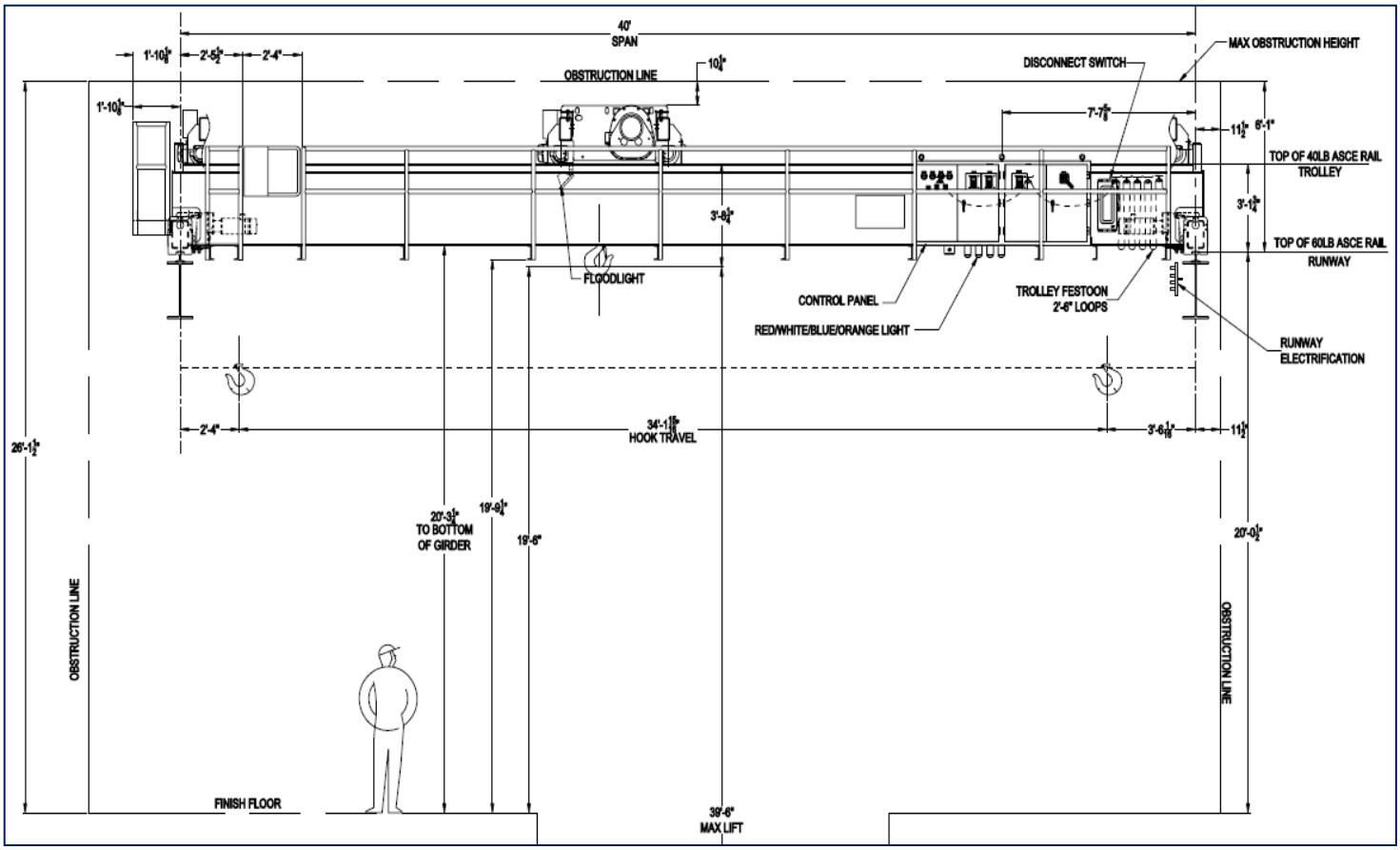
Q: When can I get replacement product?
A: We are working with our supplier to have replacement retainers and Quik-Alloy Coupling Links available as soon as possible. The supplier is heat treating all existing inventory, and is in the process of producing more retainers to meet the demand for the replacement retainers. **As noted above, Campbell strongly urges that all slings assembled with couplings links that could contain affected retainers be removed from service until the replacement retainers are installed.**

EQUIPMENT DEFICIENCY MEMORANDUM (EDM)

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

CMAA 70 CLASS C CRANE

Navy Crane Center Acquisition Department recently accepted a new 15-ton rated capacity, double girder overhead electric traveling bridge crane. The contract acceptance inspection and test were used by the activity as the inspection and load test for crane certification. The new CMAA 70 Class C crane has a 40-foot span with 19-foot 6-inch hook height and features a top running trolley with a packaged hoist, infinitely variable speed electronic drives on all functions, a maintenance walkway on the drive girder, and radio controls. The hoist is designed to access a pit area in the floor for a total lift height of 39-feet 6-inches. The project included new runway conductors for the 75-foot long runway.



250 METRIC TON MOBILE BOAT LIFT

The Navy Crane Center Acquisition Department recently inspected and oversaw acceptance testing of a new 250-metric ton rated capacity mobile boat hoist (MBH). The contract acceptance inspection and test were used by the activity as the inspection and load test for crane certification. The MBH has an inside clear width of 51-feet, a clear height of 32-feet, a 41-foot 6-inch wheel base and has pick and carry capability at its full rated capacity at a speed of 65-feet per minute.

RECENTLY ISSUED CHANGE 9 TO NAVSEA OP 5

Below is an excerpt from the recently issued Change 9 to NAVSEA OP-5. This change aligns NAVFAC P-307 and NAVFAC OP 5 requirements for the use of a load indicating device (LID) during lifts where binding conditions may occur. It also outlines action for ordnance lifts that meet the complex lift requirements of NAVFAC P-307.

There has been some misunderstanding of the two publications with respect to the use of LID's during lifts of ordnance where binding conditions can be expected. This new revision provides appropriate clarification and authorization of LIDs. The wording in bold letters indicates the new wording.

10-6.1. General Requirements for WHE. All WHE shall be:

a. Maintained, inspected, tested, certified, repaired and altered in accordance with NAVFAC P-307 and the following provisions:

(1) WHE at ammunition and explosives-capable piers, including floating cranes, requires third party certification (TPC) prior to loading/unloading cargo vessels. Cargo vessels, as defined in 22 CFR 121.15, are United States Navy (USN) auxiliaries (underway replenishment ships, material support ships); Military Sealift Command (MSC) ships; military ships equivalent to USN auxiliaries/MSC ships, barges, lighters, and commercial vessels.

(2) WHE at ammunition and explosives-capable piers, including floating cranes, do not require TPC prior to loading/unloading vessels not noted in sub-paragraph (1) above, as these loads are defined as ships stores.

b. Operated in accordance with NAVFAC P-307 as supplemented by the following:

(1) Load descent shall be controlled at all times by use of the power-down mode.

(2) WHE that have both power-down and free-fall modes available shall have the free-fall mode disabled or locked out.

(3) Except as noted, ordnance lifts are considered to be a category separate from those described in NAVFAC P-307 paragraph 10.4 (complex/non-complex). These lifts have unique procedures and approved OHE that must be used in addition to the criteria called out in P-307. **Lifts of ordnance involving the use of tilt fixtures; lifts onto/from ships where binding way occur, such as VLS/CLS operations; and lifts as described in subparagraphs 10.4.1 (d) through (i) of NAVFAC P-307 shall be treated by the crane team as complex lifts. For all ordnance lifts, a pre-lift brief shall be conducted to ensure the roles and responsibilities of the crane team and the ordnance handling team are understood and fully coordinated.**

NOTE

Load Indicating Devices (LIDs) that meet the requirements outlined in NAVFAC P-307 are authorized for ordnance lifts.

c. Employed only in accordance with an SOP that:

(1) Has been reviewed by the individual who has met the mandatory training requirements of Paragraph 0-3 of Appendix D.

(2) Addresses the intent of the Crane Team requirements of section 10.2 of NAVFAC P-307.

d. Operated by personnel trained and licensed, when required, in accordance with Sections 6, 7, and 8 of NAVFAC P-307 and assisted by ground/deck personnel that have been trained in communications according to Section 10.6 of NAVFAC P-307.

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS FIRST QUARTER FY11

For the First Quarter of FY-11, there were 26 crane accidents including 10 significant accidents (overload, dropped load, two block, or injury); 9 rigging accidents (5 significant); and 12 reported weight handling near misses. Additionally there were 13 contractor crane accidents (10 significant). The more significant accidents and associated lessons learned are discussed herein.

OVERLOAD RIGGING

Accidents: (a) During installation of a 750-lb propeller, the lifting fixture (or "horse collar") was not installed correctly resulting in failure of the lifting fixture during the lift, and subsequent dropping of the load. (b) While removing a molding flask ring from around a casting, one of three chain falls failed. Investigation revealed that one leg of the lift was bound and the gear was overloaded to failure. (c) Three additional accidents (2 crane and 1 rigging) resulted in overloaded rigging gear. In each of these events, the crane team identified (after completing the lift) that the rigging gear in use had been exposed to loads in excess of the rated capacity of the gear.

Lessons Learned: The above rigging gear issues emphasize the importance of proper planning, as well as proper use. First and foremost the weight of the load must be known. For each configuration, the rigging gear should be appropriately “down rated” accounting for lift angles and D/d ratios, and should be configured such that two legs of a multi-leg sling assembly have the capacity to carry the intended load. Also, if additional forces due to binding are anticipated, a load indicating device must be used and closely monitored to ensure the total load on the gear is within the capacity of the weakest component in the lift configuration. Ensure the gear is correctly installed and the component to be lifted is free and clear.

IMPROPERLY SECURED LOADS

Accidents: Several accidents occurred as a result of the load being improperly secured. While lifting a crate of metal panels, the panels shifted and punched through the crate and fell to the ground. In another instance, a large timber (24,000 lbs, 83 ft long) slipped out of the rigging gear and fell on a nearby building. The timber was supported with synthetic slings in a choker configuration. The foggy “wet” conditions of the day appear to have contributed to the choker slipping off the timber. In yet another instance, during the disassembly of a crane, the rigged load was not secured properly and shifted in the rigging gear as it was being lifted. This resulted in serious injury (broken shoulder) to the rigger.

Lessons Learned: All of these examples involved contracted crane work using non-Navy crane assets and personnel; however the lessons learned are applicable to all weight handling personnel. Improperly secured loads pose serious threats to all personnel and assets. Synthetic slings on a wet and slippery surface do not gain sufficient “purchase” on the load. Pay attention to environmental conditions and use additional lashing as appropriate. For complex shapes, or lifts of multiple items, ensure all components are properly configured, captured, and rigged to account for potential shifting loads. All Navy contracted weight handling work requires oversight controls in accordance with paragraph 1.7 of NAVFAC P-307. This is a responsibility of the contracting officer and the host activity. However, Navy trained weight handling personnel play a vital role in monitoring and promulgating Navy requirements, lessons learned, and safety precautions.

NON-STANDARD LIFTING GEAR

Accident: A "single use bag" made of woven polypropylene was used to transport pre-formed sections of reinforcing bars. While unloading a delivery truck, the bag broke at the seam and the contents fell to the ground.

Lessons Learned: These single use bags are commonly used to transport construction materials such as multiple (smaller) self contained bags of sand or concrete. These bags are intended for single use only from the point of material shipment to the work site and are not intended for re-use or for sharp objects of any kind. Personnel should be aware of these bags and their intended design purpose.

PERSONAL INJURY

Accidents: (a) While attempting to adjust and rotate a suspended load to align for landing, the load rotated and contacted a crane inspector's head, causing a minor cut to his eyebrow. (b) When a rigger started to lift a component with a chain hoist, the component began to slide off the rack and caught the rigger's thumb. (c) While lifting an A-frame from horizontal to vertical, a rigger was holding the load to keep it stabilized. After the frame was vertical, additional riggers were removing load positioning pins at the bottom of the A-frame. During pin removal, the frame shifted and the rigger who was stabilizing the load got his finger caught in a pinch point, which resulted in a lacerated finger.

Lessons Learned: The causal factors of these accidents are somewhat dissimilar but serve as caution for what can result when operational risk management (ORM) is not followed. These injury cases remind us that we work as a team protecting each other from dangerous conditions. They also remind us how prevalent pinch points are in weight handling. A pinch point can best be described as any point where it is possible for a body part to be caught between two moving objects or between a moving and stationary object. Be on guard whenever you put your hands, fingers, toes, or feet "between" anything. By practicing the principles of operational risk management and using situational awareness, pinch point hazards can be recognized and avoided. When pinch points are observed, warn your team members and make every effort to avoid them.

Effective planning, teamwork, communication, situational awareness, and 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 available on the Navy Crane Center website https://portal.navfac.navy.mil/ncc for your use.

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. 

Navy Shore Weight Handling Safety Brief

Title: CRANE OPERATIONS IN FREEZING TEMPERATURES

Target Audience: Personnel Operating/Working with Cranes in Freezing Temperatures

OPERATIONAL RISK MANAGEMENT
1. What can go wrong?
2. What can I do about it?
3. If I can't do anything about the problem, whom do I tell?

Freezing temperatures, snow, and ice can create unique **hazards** in weight handling operations. **Be vigilant** in recognizing and reacting to these potential hazards:

- **Tracks, sheaves, hoist blocks** or other crane components can **become iced up or frozen** which can cause equipment damage.
- Dislodged /**Falling ice hazards** may exist from suspended loads, rigging or crane components .
- Ice on crane platforms or ladders and rail systems can create **slip/fall hazards**. Similar hazards may exist throughout the weight handling operating envelope.

Mitigation Strategies

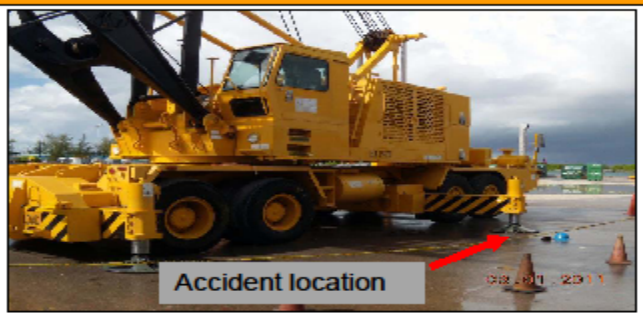
- **Exercise** increased **care and diligence** during pre-use inspections. Frozen or damaged components can increase risks to equipment and personnel. **Focus on** potential **ice hazards** as the boom, block, sheaves and wire rope can become frozen, increasing the chance of creating damage. Always **raise** the **hoists** prior to lowering during the pre-use operational check.
- In advance of cold weather, personnel should **look for** the presence of **areas holding water** and take applicable actions to clear water that may result in unsatisfactory equipment operation due to icing.
- **Practice ORM. Eliminate hazardous walking/working surfaces** when possible. Ensure visibility is not obstructed by ice or snow build-up.
- Prior to lifting a load, **remove excess Ice or snow from the load** that may create an additional hazard during movement. Maintain a clear operating envelope to decrease potential of being struck by falling ice.
- **Adjust your operating pace** so that it is conducive to the weather conditions and the ground crew's ability to stay safely engaged.
- **Be aware** that **loads** are likely to be **frozen to** the ground or **structure** .

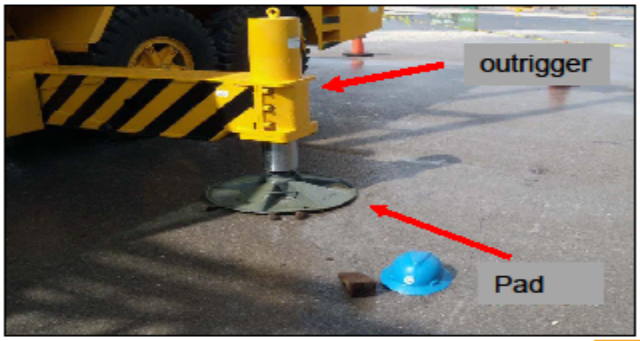
14 January 2011 **SAFETY** *Navy Crane Center* 11-S-01

Navy Shore Weight Handling Safety Brief

Title: CRANE PINCH POINT AWARENESS

Target Audience: Personnel Operating or Working Around Cranes





A crane crew member suffered a serious hand injury when his hand was caught between the pavement and an outrigger pad that was being lowered. The worker's glasses fell from his shirt and rolled directly underneath the outrigger pad that was slowly moving downward. Perceiving the outrigger pad was moving slow enough, he attempted to grab his glasses. The outrigger pad closed down on the pavement and caught four of his fingers in the process.

Direct Cause:

- Failure to avoid the pinch-point hazard.

Lessons Learned:

- **Never** place oneself or allow others to **be in positions where** parts of their **body may become trapped or pinched** between loads, crane components and other objects.
- Operators must **ensure** personnel in the crane's **operating envelope** are **clear** prior to crane operation or movement.
- At all times (including set-up), the crane crew must **establish clear communication** to ensure safe movement of the crane, its components and the load.
- **Application of Operational Risk Management can reduce the potential for accidents.**

31 January 2011 **SAFETY** *Navy Crane Center* 11-S-02

POLE HANDLING SLING

NAVFAC Southwest recently purchased an innovative sling that offers improved friction for gripping power poles of various materials. The light pole handling sling was developed and application tested by a utility company who wanted a sling protection material that also provides superior gripping properties. The company performed lifts in various conditions to ensure the sling performed satisfactorily.

The sling may be used in applications where additional gripping power is needed. However, users must evaluate all conditions to ensure proper sling performance. Poles and other objects will handle differently depending on shape, material composition, and condition (wet, dry, frozen, slippery, etc). The pole must be double wrapped and choked with a sling of sufficient length.

USING GROUND PENETRATING RADAR (GPR) TO DETECT SUBSURFACE VOIDS

Mobile cranes are valuable assets as they are used daily to provide mission support for weight-handling operations for the global Navy. These complex machines rely on an important detail - there must be a firm foundation for the outriggers to support the crane. Subsurface voids could result in a ground bearing breach with potentially catastrophic consequences.

Present day construction professionals' requirements for quick and easy area scans prior to excavating, cutting, coring or drilling, along with new federal requirements for bridge and highway evaluations, have resulted in portable and cost effective subsurface scanning equipment. Using radar with electronic interface connected to display screens or downloading data to a laptop, provides technicians with real time images of subsurface obstacles or voids and could prove to be a valuable tool for mobile crane operations.

Navy Crane Center representatives recently attended a demonstration of an all-terrain GPR cart, shown in the photo, to make a swath across an area of concrete pier deck. The depth and resolution of a scan is dependent on the soil and surface condition in the area, therefore this system has flexibility for various applications with four sizes of Shielded Antennas ranging from 100 - 800 MHz (250 MHz used for the pier) available for placement in the cart, thus reducing the cost of owning or expanding a GPR system. The demonstration swath produced images, similar to the photo below, which showed indications of voids and underground utilities such as water pipe, sewer line, cables, etc. For potential void indications, it was recommended to core drill the larger indication sites for size verification and filling if required.

Detail maps of an area can be generated and saved by downloading multiple swaths using a USB cable and Windows based Object Mapper. The software displays up to 10 GPR profiles at once allowing the user to select indications that could be voids across a large scan area. These selections are automatically posted and visualized on a grid or coordinate system to generate a map in real time providing position and depth information. The maps generated are exportable to CAD, GIS or other software as a .dxf file for display in 3D.

Acquiring this equipment, gaining the adequate training, and field experience may require a coordinated effort with NAVFAC facilities engineers or a geotechnical Contractor to develop and maintain maps for frequent crane setup areas. Setup areas outside of the mapped data base would require coordination to perform a scan before crane set up, but "no voids" could be confirmed on the spot and become a vital part of the Crane Team's lift plan ORM review. ■

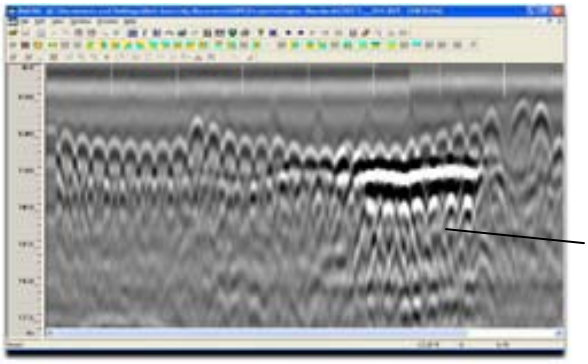


Fig. 1

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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.

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.

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