THE CRANE CORNER

Sept 2020
107th Edition

Navy Crane Center Technical Bulletin

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

Editor: 757-967-3803/DSN 387-3803 / nfsh ncc crane corner@navy.mil

Inside this issue:

A WORD FROM TOPSIDE

Tim Blanton

First and foremost, I continue to hope that you and your families are safe and healthy, as we remain challenged with the COVID-19 pandemic. With regard to the Navy's weight handling program, I want to take this opportunity to discuss several topics, one of which involved a recent fatality involving material handling equipment. Although the fatality did not involve a weight handling operation, the potential implications for a similar event to happen during weight handling operations are considerable, so it is important to share any lessons learned. We must be open to learning and sharing lessons from all situations. Sadly, this lesson learned comes from a fatality.

- Fatality at Naval Station Norfolk – On Friday, 15 October, a chief petty officer assigned to a tended ship lost his life, leaving behind a wife and two children, when he was struck by a transiting rough-terrain forklift. Weight Handling Program Brief (WHPB) 20-20 (included in this edition of The Crane Corner) provides additional discussion reinforcing several critical tenets when working around equipment. Many of the most serious accidents in weight handling and material handling occur during equipment set-up or upon completion of the job at hand, as watchteam back-up is lost when personnel leave their designated assignments prematurely, or when a thorough plan has not been briefed, including breakdown and removal of gear or equipment.

- FY2020 Crane Accident and Near Miss Summary – As we wrap up FY20 data, accident and near miss metrics identify substantial progress has been made in most areas of focus. Most importantly, despite the pandemic, the number of reported near misses, currently at 385, shattered previous records, topping the previous high of 299 (FY16). The high number of near misses is a strong indicator that monitor program quality (tangible deficiency identification) is also strong as healthy, self-critical monitor programs often result in the increased reporting of near misses. These two factors combined (effective monitor programs and strong near miss reporting) resulted in significant gains in reducing accident severity (number of total accidents that were significant per the NAVFAC P-307 definition), as only 47 significant accidents were reported, down from 65 in FY19. Unfortunately, there is one area where we would like to see more gains, and that is lower threshold crane accident (LTCA) reporting, defined as crane accidents involving avoidable contact with no resulting damage, not even a paint scrape. In FY20, only 30 LTCAs were reported, consistent with previous years. As weight handling professionals, you and I know that minor incidental collisions occur, and occur often. Let's break the mold and mature the program to recognize, stop, document, understand, and correct the LTCAs, thereby improving our efficiency and maturing our safety posture. In FY21, I challenge you to ensure we are identifying and reporting LTCAs as the identification of accidents at this level is a strong indicator of a healthy command climate and a mature weight handling program.

- Dropped Loads and Two-Blockings - Recently, we experienced our first FY21 OPNAV reportable Class C weight handling accident when a battery cell released from the handling gear and fell on and crushed a rigger's foot. Similarly, we have seen a recent spike in two-blocking events (see WHPB 20-22) and it is important to note that the last Navy shore weight handling program fatality was due to a two-blocking event over 25 years ago (1994). The NAVFAC P-307 significant accident definition was developed based on the risks presented by these specific types of events (e.g., dropped loads, two-blocking).

- Personnel Underneath Loads and in Fall Zones – Although Navy-wide accident severity has improved, we continue to see instances of personnel under suspended loads or in fall-zones, either during review of activity monitor program data or during on-site observations by our evaluation teams and by our on-site representatives at shipyards. The ultimate risk (a fatality) can be virtually eliminated by adhering to NAVFAC P-307, paragraph 10.8 regarding personnel under suspended loads and in fall zones. Effective immediately, NAVCRANECEN is taking a firmer stance on violations in this area. As we transition out of COVID travel restrictions to on-site oversight in the coming months, repeated violations of personnel under suspended loads or unnecessarily in fall zones will result in, as a minimum, significant items being identified during NAVCRANECEN evaluations, up to and including suspension of operations when warranted in accordance with SECNAVINST 11260.2B, paragraph 6.a.(2)(b). Some of you may feel that this is an extreme or radical position to take; however, my concern for the health and safety of weight handling program personnel demands this course of action. I am concerned that if the issue of personnel under suspended loads or in the fall zone is not firmly addressed, ultimately, factors will align and we will experience the first Navy weight handling program fatality in over 26 years. I refuse to allow this to happen on my watch and I challenge each of you to take the same approach and refuse to accept personnel taking this unnecessary risk.

In these challenging times, I firmly believe that all of you will do what needs to be done to remain safe, to minimize unnecessary risks, and to continue to identify, document, and correct the lower level issues, thereby sensitizing us to the minor issues and subsequently driving significant accidents down to zero.

TIP OF THE SPEAR
FOURTH QUARTER FY20 EVALUATION SUMMARY

Due the ongoing restrictions in travel and concern for the health of our personnel, as well as that of activity personnel during the COVID-19 pandemic, all evaluations in the fourth quarter were performed remotely and were limited to a review of activity-provided program management information, effectiveness of corrective actions taken since the previous evaluation, and discussions with activity supervision and management. Since the reviews did not cover all areas of an activity's weight handling program, the overall grade of satisfactory could not be provided; however, one program was found marginally satisfactory from the documentation submitted and discussions during the review.

39 Navy WHE programs were given program reviews. Four non-Navy WHE programs were reviewed.

Effective monitor programs result in better recognition of unsafe crane and rigging operations, which in turn result in better recognition of lower threshold accidents (avoidable contact with no damage) and near misses, thus helping to prevent serious accidents. In addition, the monitor program better enables development of a value-added self -assessment.

Many of the activities reviewed showed improvement in their monitor programs, but still have room for improvement, either in identifying the almost inevitable unsafe practices, near misses, and lower-threshold accidents, or in monitoring non-operational functions, such as maintenance, inspection, and testing. Other activities are further behind or have not started this NAVFAC P-307-required function.

Issues with the self-assessment were noted in 18 of the reviews. A self-critical self-assessment, backed up by documented metrics, is a sign of a forward-looking mature weight handling program.

REVIEW ITEMS

Common Review Items (three or more items):

- Lack of monitor program or established program that needs improvement or does not cover all program elements – 22 items.

- Weakness in (or non-existent) activity self-assessments, self-assessments not acted upon, not internally focused, not developed utilizing documented monitor or metrics data – 18 items.

- Training issues, including contractor personnel (training not taken, training weak or not effective, refresher training not taken or not taken within three months of license renewal, lack of inspector training, instructor not authorized by NCC, locally required training not taken, training course score less than 80 percent, non-Navy eLearning (NEL) certificates) – 8 items.

- Lack of, ineffective, or insufficient crane replacement/modernization plan – 8 items.

- Lack of leading metrics/metrics not being properly analyzed – 6 items.

- Lack of (or low number of) lower order crane accident/or rigging accident and near-miss reports –6 items.

- Local WH instruction/SOPs non-existent or inadequate – 6 items.

- Lack of leading metrics/metrics not being properly analyzed – 6 items.

- No procedure for tagging equipment with known deficiencies and/or tagging equipment that is out of certification – 5 items.

- Staffing issues (shortages in critical areas, no succession planning, APT staffing, high turnover of military personnel, inadequate engineering support, total reliance on remote contractor, one person performing too many functions) – 3 items.

- Operator's Daily Check Lists/Operator's Monthly Check Lists ODCL/OMCL documentation deficiencies (including incorrect form used and pre-completed forms) – 3 items.

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS FOURTH QUARTER FY20

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 and efficiency of operations can be improved.

For the fourth quarter FY20, 65 Navy weight handling accidents (51 crane and 14 rigging) were reported, as compared to 74 in the third quarter. The number of significant accidents decreased this quarter compared to the previous quarter from 17 to 14, with no OPNAV class 'C' reportable events. More importantly, for FY20, significant accidents decreased by nearly 20 percent, from 89 in FY19 to 62. OPNAV class 'C' accidents remained the same (4) in FY20. Navy Crane Center (NAVCRANECEN) issued several weight handling program briefs (WHPBs) throughout FY20 to increase awareness of the crane and rigging operating envelopes (e.g., working under suspended loads, pinch points and hand injuries, and lashing and frapping), which can help prevent significant accidents and reduce the risk of personnel injury. Contractor performance did not improve in the fourth quarter, with 10 accidents reported (9 crane and 1 rigging accident), 5 of which were significant accidents. One significant accident resulted in an injury (broken leg) and the other 4 were dropped loads. The overall number of reported contractor accidents decreased slightly in FY20 from 44 to 42; however, significant accidents increased, from 21 to 25, with near miss reporting dropping from 32 to 29.

INJURIES

Two injuries were reported, one each from crane and rigging operations. A beam clamp, utilized as a holdback, was improperly installed and slipped off the beam. As a result, the load swung forward striking a pipe and a light fixture, which dislodged and struck a member of ship's force in the back. A rigger's finger was fractured when it was pinched between a shackle pin and bail during attachment of a dyno-link.

Lessons Learned: The beam clamp detached as the result of lagging preventing the full engagement of the beam clamp. A post inspection revealed that there were two installed pad eyes sufficient to accomplish this rigging evolution. Pre-job planning to include assessment of the lift site, accompanied by thorough pre-lift checks would have prevented this injury. The second accident was the result of personnel placing their hand in a pinch point during the installation of gear, which was an area covered during the third quarter summary and in WHPB 20-13. In both cases, the activities briefed personnel on appropriate use of operational risk management and being attentive during weight handling operations.

DROPPED LOADS

Seven dropped load accidents were reported, six crane and one rigging. While lifting a shore power cofferdam, the cofferdam's gasket and canvas cover fell onto the deck of a moored unit. During positioning of an aircraft afterburner using a gantry mounted chain hoist, the afterburner dropped to the deck causing damage. While down-ending a shape-handling "A" frame using two forklifts, a boom lifting attachment installed on one of the forklifts came off the forks and fell to the ground. During a lift of an aircraft fan module, the lifting pins on the lifting assembly failed causing the module to drop to the deck. While lifting a cradle from horizontal to vertical, a T-block slid out of the cradle and fell approximately one foot to the deck. A spare aircraft wing received damaged when a portable stand moved allowing the end tip of the wing to fall onto the deck. During off-loading of ships force bunks, the load was not properly secured and the bunks fell out of the rigging.

Lessons Learned: In all of the accidents, the activity-identified causes were improper rigging and poor communication. Procedural compliance and equipment failure were also identified. Pre-job planning and interactive briefings accompanied by thorough completion of pre-use inspections and pre-lift checks would have prevented these accidents. In the event of the canvas and gasket falling from the load, the activity identified that the riggers did not inspect the load prior to lifting it. The activity reinforced the requirements of pre-lift checks through interactive discussion with supervisors and rigging and operations personnel. Concerning the damaged afterburner, the activity investigation identified the crane operator's daily checklist and the lifting adapter pre-use checklist were not completed. The pre-planning to down-end the "A" frame using two forklifts did not identify the lift as complex and the ad-hoc plan did not properly account for location of the center of gravity. The activity delivered lessons learned briefings on the specific event and provided refresher training on the identification of complex lifts. The investigation of the dropped aircraft fan module found equipment failure was caused by normal wear and tear, which was not identified during a pre-use inspection. Concerning the dropped bunks, the activity identified that the team was indecisive as to the best method to perform the lift. There was no "take two" brief, and the team did not install frapping to prevent inadvertent movement or shifting of the load. The activity provided training for riggers demonstrating the proper use of frapping and how to conduct a "take two" brief. Because of the growing number of dropped load accidents, NAVCRANECEN issued WHPB 20-19 to share information on proper uses of lashing and frapping.

OVERLOADS

Four overload accidents were reported, three crane and one rigging. A synthetic sling was overload and damaged during offloading of a wire rope spool. Rigging gear used to lift a mobile crane was overloaded when the weight of the crane provided in the lift sketch was incorrect. The lifting slings attached to the whip hoist of a portal crane were overloaded during an attempt to relocate a Conex box. During pre-tensioning of a steel beam using a bridge crane, a wire rope sling failed when the hoist continued to raise due to a malfunction.

Lessons Learned: Three of the four events could have been prevented through adequate pre-planning to determine the actual weight of the load and proper rigging gear selection. The fourth could have been prevented with adequate preventive electrical maintenance and operator awareness of the crane main disconnect switch. Concerning the overloaded and damaged synthetic sling, the rigger-in-charge (RIC) inadequately assessed the working load limit in a choke configuration. The activity mentored the RIC and provided a briefing to supervision on identifying the weak link in the rigging configuration. The overloaded rigging gear in the lift of the mobile crane was the result of an incorrect and unapproved lift sketch

Additionally, the RIC did not verify the weight of the mobile crane prior to lifting. The activity briefed personnel on proper verification of load weight and the required approvals for the associated lift sketch. The investigation of the overload during the Conex box relocation identified the load was not rigged for the gross weight of the Conex box. The action taken by the activity was to implement continuous training refreshers on job planning and complex lift sheets.

TWO-BLOCK

After having no two-block accidents in the third quarter, two were reported this quarter. While stowing a mobile crane boom for transit, the operator lost situational awareness and the hoist block contacted the boom tip sheaves. While conducting a maintenance inspection, the operator retracted the hook block into the boom tip causing significant damage to the hook block and boom tip.

Lessons Learned: Both two-blocking events occurred with the crane's anti two-blocking feature bypassed. Similarly, 80 percent of the two-block accidents reported in FY20 occurred while conducting maintenance evolutions, which required bypassing of the anti-two-block feature. In the event which occurred during stowage for transit, the activity identified the operator lost situational awareness and did not receive the all stop signal. The activity conducted all hands training which included scenario based training on situational awareness with emphasis on distractions during operations and the expected actions to ensure safe crane operations. The two -blocking accident during a maintenance evolution identified that operator proficiency specific to the maintenance evolution and the lack of attentiveness to the hook block positioning resulted in the block making contact with the boom tip. The activity implemented an operational risk mitigation brief specific to this evolution to prevent reoccurrence. NAVCRANECEN issued WHPB 20-21 to provide insight into the lessons learned during these events. Management and supervisors should ensure personnel understand the risk involved when bypassing operational safety devices and that personnel remain situationally aware of the hoist movement, to include stationing additional watch standers to reduce the potential of the hoist block contacting the crane structure.

NEAR MISSES

Activities reported 109 near misses (93 crane and 16 rigging) in the fourth quarter. Total near miss reporting for the year is up almost 30 percent, from 299 in FY19 to 385, and significant accidents have correspondingly declined as noted in paragraph 2. The increase in near miss reporting shows improvement in the level of oversight, a major contributor to decreasing the occurrence of significant accidents. NAVCRANECEN continues to recognize activities for reporting lessons learned through near misses, i.e., those where personal intervention prevented accidents, by issuing WHPBs 20-16, 17, and 18 .

Weight handling program managers, operations supervisors, and safety officials should review the above lessons learned with personnel performing weight handling operations and share lessons learned from other activities with personnel at your activity. In summary, FY20 had many highlights regarding weight handling operational safety including an unprecedented number of reported near misses, a significant reduction of significant accidents, and a reduction in the number of injuries. However, we also had two rigging accidents involving injuries which resulted in lost workdays and we have not been able to gain much traction in lower threshold crane accident reporting, which are accidents involving avoidable contact with no resulting damage, not even a paint scrape. Please continue with your vigilant oversight of weight handling operations and stress the importance of situational awareness and utilizing thorough and interactive pre-job briefs.

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. A complete list of CSAs and EDMs can be found on the Navy Crane Center's web site.

CSA 206 COFFING CHAIN HOIST MODEL LHH 1 TON MANUAL CHAIN HOIST YOKE PIN FAILURE

1. Revision: CSA 206 directs activities to inspect Coffing Model LHH (1/2 ton through 5 ton capacity) manual chain hoist upper hook yoke pin for proper tightness and inspect for loose yoke pin nut. This revision provides additional applicable models and corrects the item number for the upper yoke pin nut. This revision replaces CSA 206 in its entirety.

2. Background

A. The purpose of this CSA is to inform activities of a failure of a Coffing Model LHH 1 ton manual chain hoist upper hook yoke pin due to the hoist being repeatedly operated with a loose yoke pin nut (items 33 and 55 of the LHH operations, maintenance and parts manual).

B. An activity reported the failure of a Coffing Model LHH 1 ton manual chain hoist in which the upper hook separated from the hoist housing. Subsequent investigation discovered that the failure occurred in the threaded portion of the yoke pin because the nut that secures the yoke pin in place was loose. When this connection is loose the yoke pin can move laterally in the hoist housing until the threads of the yoke pin bear against the hoist frame side plate. This reduces the load bearing capacity of the yoke pin. This upper hook yoke pin design is common to Coffing Model LHH (1/2 ton through 5 ton capacity) manual chain hoists.

C. Since the issuance of the original CSA, additional chain hoist models have been identified as having the same upper hook yoke pin and nut design as the Coffing Model LHH. They are Duff-Lynx Model LHH, Little Mule Model LMHA, Milwaukee Electric Model 9503 through 9509 and 9513 through 9519, Dayton Model 2Z633, 2Z554, 4Z806, 4Z807, 2Z55A, 4Z808, 4Z809 and 2Z634, and Yale Model SHA manual chain hoists (all models ½ ton through 5 ton capacity).

3. Direction

A. Prior to the next use, activities shall check manual chain hoist models listed in paragraph 2.D to verify the upper hook yoke pin nut is hand-tight ensuring the hoist frame side plate is not in contact with the threaded portion of the yoke pin.

B. If the yoke pin nut is found loose, activities shall disassemble to the extent necessary to visually inspect the yoke pin assembly and hoist frame side plates for damage. Inspect for bending, cracks, and damage to the threaded portion of the yoke pin, elongation of holes in the side plates, and any damage to yoke pin body. If any damage is detected the hoist shall be removed from service until repaired or evaluated by the local engineering organization. Activities shall contact the OEM with any questions concerning the proper condition and installation of the upper hook yoke pin. To reach the OEM information call 1(800) 888-0985 or use the contact page found at www.cmworks.com.

CSA 239 – BRACKET FAILURE OF OFFSET COUNTER WEIGHT ON KITO ELECTRIC CHAIN HOISTS

1. Background

A. The purpose of this CSA is to inform activities that the support bracket on the motorized trolley can fail and drop the counter weight on KITO electric chain hoists models ERM/ER1M and ER2M. The original equipment manufacturer (OEM) KITO issued a service bulletin, KITO Bulletin No. QA18-006-NY to their customers for inspection of the offset support bracket for damage due to contact with the rail end stops. Repeated contact can fatigue the offset mounting bracket and allow the counter weight to fall from the hoists.

B. Repeatedly contacting the end stops with the trolley is not advised by KITO's operational literature nor a normal action performed by trained/experienced operators. The hoists in question were sold in 1988 through June 2018. KITO sells similar hoists in the United States under the Harrington brand, but Harrington has confirmed that their electric chain hoists do not incorporate a bracket and counter weight on their motorized trolleys.

2. Direction

A. Within 30 days activities shall check for existence of KITO electric chain hoist models ERM/ER1M and ER2M in their inventory and confirm the presence of a supported counter weight if the hoist has a motorized trolley.

Hoists identified as meeting this configuration shall have the offset support bracket inspected for indications of failure.

B. Any hoist with a hoist support bracket showing indications of failure shall be removed from service. KITO shall be notified using the phone/ address contact information shown in KITO Bulletin No. QA18-006-NY. Their engineers will issue an instruction sheet for reorienting the mounting of the counter weight with details for a spacer and longer fasteners if necessary.

C. A hoist with no indication of failure of the offset mounting bracket may remain in service; however, KITO shall be contacted for future reorientation instructions of the counter weight bracket.

D. KITO Bulletin No. QA18-006-NY can be found on the Navy Crane Center website at https://hub.navfac.navy.mil/webcenter/content/conn/WebCenterSpaces-ucm/path/Enterprise%20Libraries/ncc/Documents/CSA/Attach/KITO_Hoist_Bulletin_Ref_A.pdf?lve.

CSA 240 – SWIVEL HOIST RINGS NOT MEETING REQUIRED DESIGN FACTOR

1. Background

A. The purpose of this CSA is to inform activities that certain swivel hoist rings do not meet the required design factor in all orientations. Both American Drill and Bushing Company (ADB) and The Crosby Group Inc. (Crosby) have provided notification that certain ¾-inch thread, 7000-pound working load limit (WLL) swivel hoist rings do not meet the ASME B30.26 required 5:1 design factor for the entire range of motion, but instead achieve a design factor of 4.5:1 for all but vertical orientations.

B. The ADB products with the reduced design factor include: Safety Engineered with part numbers 23102, 23329, 23103, and 23330; High-Vis with part number HV33102; En-Guard with part number EN33102; and Heavy Duty with part numbers 33108, 33168, 33102, 33162, 33103, and 33163.

C. The Crosby products with the reduced design factor include: HR-125 with stock numbers 1016942 and 1016946; HR-1000 with stock numbers 1068034 and 1068038; and HR-1000M with stock number 1068370.

2. Direction

A. Within the next 30 days, all activities are to review their inventory to identify all ¾-inch thread, 7,000-pound WLL swivel hoist rings referenced in paragraph 1.B and 1.C. Affected swivel hoists rings shall be down rated to 6,300-pound WLL or removed from service.

B. While there have been no other reports from manufactures of ¾-inch thread, 7,000-pound WLL swivel hoist rings not meeting the required design factor of 5:1, it is recommended all swivel hoist rings of this size and capacity be down rated to avoid confusion with those affected.

C. Questions regarding the affected hoist rings should be directed to the manufacturer. ADB can be contacted by visiting http://americandrillbushing.com/ and Crosby can be contacted by visiting https://www.thecrosbygroup.com/

CSA 241 – TELEMECHANIQUE TYPE XAC PENDANT PUSHBUTTONS

1. Revision: EDM 101 provides information and direction concerning sticking pushbuttons on Telemechanique XAC pendants. This CSA supersedes and cancels EDM 101.

2. Background

A. The purpose of this CSA is to inform activities of a possible problem involving Telemechanique (now Schneider Electric) XAC pendants (including both XACA and XACB models). There have been several recent reports from activities where XAC pendant pushbuttons had a delayed response returning to the off position when released by the operator.

B. Previous investigation had shown that the sticking pushbuttons might be the result of the protective boots that surround the pushbutton. The protective boots are made of polychloroprene (part number XACB921) and may harden and lose flexibility over time. An alternate protective boot made of silicon that is more flexible (part number XACB922) may be more appropriate for the application. Navy Crane Center previously in EDM 101 recommended activities consider replacing polychloroprene boots, when needed, with silicon boots.

C. Recently, additional reports of sticking XACA pendant pushbuttons revealed that spring returned, 2-speed contact blocks (part number XENG1911) may have been the contributing factor to sticking pushbuttons. Other recent reports of sticking XACB pendant pushbuttons did not yield a root cause to the problem and may be attributed to the respective contact block; however, the components were discarded before final determination could be made. These new reports indicated that the XACA and XACB pendant pushbuttons would not disengage when released. While no visible deformities of the contact blocks were discovered, it is noted the mechanical life of XACA and XACB pendant components is estimated at 1 million operations. This life expectancy is based on average use and normal operating conditions and actual operating life may vary. Activities are reminded that age, use and environment should be considered when developing timelines for parts replacement.

3. Direction

A. Prior to the next use, activities shall check XAC pendants for indication of sticking pushbuttons. If a sticking pushbutton is found it shall be removed from service. Pendants shall be evaluated for determination of the root cause of the sticking button. Affected contact blocks or protective boots shall be replaced prior to returning the unit to service. If no root cause can be determined, the entire pendant shall be replaced prior to returning the unit to service.

B. Any future XAC sticking buttons shall be evaluated per the direction provided in paragraph 3.A. Activities shall update specification data sheets and operator's daily checklist/operator's monthly checklist to reflect this inspection as well as adding a caution tag to the pendant.

WEIGHT HANDLING PROGRAM BRIEFS

Weight Handling Program Briefs (WHPBs) are provided for communication to weight handling personnel. The following briefs were issued during the past quarter.

The briefs are 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. They can be provided directly to personnel, posted in appropriate areas at your command as a reminder to those performing weight handling tasks, or used as supplemental information for supervisory use during routine discussions with their employees. When Navy Shore Weight Handling Program Briefs are issued, they are also posted in the Accident Prevention Info tab on the Navy Crane Center's web site at http://www.navfac.navy.mil/ncc.

Navy Crane Center point of contact for requests to be added to future WHPB distribution is .nfsh ncc crane corner@navy.mil

Navy Shore **Weight Handling Program** Brief

Title: "Good" Crane and Rigging Near Miss Reports

Target Audience: Weight Handling Program and Crane Oversight Personnel

During recent weeks, multiple "good" near misses have been submitted which help prevent accidents. NCC continues to stress the importance of identifying and reporting "good" near misses which can be used for lessons learned at all activities. Well done (Bravo Zulu) to the following activities that identified these recent near misses:

- **SRF Yokosuka** - A lift of an aerial work platform (AWP) was stopped by the accident prevention team (APT) when it was identified that the AWP's upper platform was not locked to the lower structure. An APT is utilized by many activities and consists of one or more personnel who strive to identify deficiencies, near misses, and lower threshold crane accidents. APTs have proven to be a key asset in improving weight handling program operational safety and NAVCRANECEN encourages all activities to consider utilizing this vital asset because of their proven success in preventing accidents.
- **Norfolk Naval Shipyard** - A supervisor identified a loop at the end of a tagline and stopped the lift to prevent the tagline from snagging on ship's structure.
- **TRIREFFAC Kings Bay** - A shop lift of an electrical rotor was stopped when a nearby rigging supervisor identified that the rotor was rigged incorrectly, causing it to lift unevenly.
- **TRIREFFAC Bangor** - Removal of a shipboard component was stopped prior to lifting when it was identified that all the fasteners had not been removed.

21 July 2020 **Navy Crane Center** *WHPB 20-16*

Navy Shore **Weight Handling Program** Brief

Title: "Good" Crane and Rigging Near Miss Reports

Target Audience: Weight Handling Program and Crane Oversight Personnel

During recent weeks, multiple "good" near misses have been submitted which help prevent accidents. NCC continues to stress the importance of identifying and reporting "good" near misses which can be used for lessons learned at all activities. Well done (Bravo Zulu) to the following activities that identified these recent near misses:

- **TRIREFFAC Kings Bay** - Rotation of a portal crane was stopped when personnel identified an obstruction on the crane's rotate platform that would have contacted the crane's ladder.
- **NAVFAC Southwest** - The lift of an aircraft was stopped when personnel identified that the reduction in capacity of the slings due to lift angle was not taken into account.
- **NAVFAC Far East** - A pallet lift was stopped when it was identified that the load was unstable and not properly secured.
- **SRF Yokosuka** - Shipboard rigging to install a component (crankshaft) was stopped when it was identified that riggers were using an incorrect rigging configuration.
- **Pearl Harbor Naval Shipyard** – During lift preparations, the rigging team identified that based on the component drawing, the weight of the load was twice that listed on the label plate.
- **Puget Sound Naval Shipyard** - Removal of a staging tower from a dry dock was suspended when the rigger identified that the tower was still bolted in place.

18 August 2020 **Navy Crane Center** *WHPB 20-17*

Navy Shore

Weight Handling Program

Brief

Title: Crane and Rigging Near Miss Report Lessons Learned

Target Audience: Weight Handling Program and Crane Oversight Personnel

During recent weeks, multiple near misses have been submitted which help prevent accidents. NCC continues to stress the importance of identifying and reporting near misses which can be used for lessons learned at all activities. Well done to the following activities that identified and reported these recent near misses:

- **Puget Sound Naval Shipyard** - A propeller being removed from a shaft started to rotate after removal. Rotation of the propeller could not be prevented due to the tagline handlers being out of position, resulting in the general foreman having to direct the crane to travel to avoid a load collision. Activities should ensure that the number, location/positioning, and specific roles for each tagline handler are discussed during the pre-job brief to ensure tagline personnel are positioned correctly and understand their roles.
- **NAVFAC Hawaii** - A crane lift was stopped when personnel identified a rigger installing shackles that did not have sufficient capacity for the lift.
- **Puget Sound Naval Shipyard** - A rigging operation was stopped when a supervisor observed personnel preparing to use shouldered eye bolts without down rating the capacity.
- **NMC Atlantic Detachment Yorktown** - A crane operator stopped a lift when he observed a worker placed their hand in a pinch point.
- **Portsmouth Naval Shipyard** - After completing a lift, the rigger-in-charge started to signal the crane clear of the load when personnel identified a lanyard still attached to the load and called "stop".

22 September 2020 | **Navy Crane Center** | *WHPB 20-18*

Navy Shore

Weight Handling Program

Brief

Title: Lashing and Frapping

Target Audience: Weight Handling Program Personnel

Recently, NAVCRANECEN received reports of a significant accident and near misses due to the improper use of lashing or frapping. Lashing is typically flat synthetic webbing but can also be wire or synthetic rope. It is used either for wrapping around and securing a load to provide a point from which to lift the load, or for attaching to a structure to serve as a point from which to rig a load. Frapping, also known as "body & soul" or "backlashing", often utilizes the same materials but is used for tightly wrapping the load and rigging gear to keep the load and rigging gear secured and centered.

Figure-1 Lashing

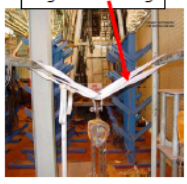

Figure-2 Frapping

❑ **Lashing** - Lashing requirements are specified in NAVFAC P-307, paragraphs 14.4.1.2, 14.12 and table 14-1. Lashing shall not be used as a substitute for standard rigging gear (e.g., slings) when the use of such gear is practical. Other key requirements include:

- ➢ Before being placed in service, a sample must be load tested to failure unless an OEM/supplier's certificate of proof test is provided. Lashing must be marked with its rated load and re-inspection due date. Lashing must also be inspected annually and immediately prior to use, following the same rejection criteria used for slings.
- ➢ Lashing must be securely attached to prevent the object being lifted from slipping out but also installed so as not to damage or crush the object when lifting. Similar to sling requirements, lashing must be used with adequate protection to prevent abrasion, cutting, and bearing damage.
- ➢ The lashing configuration shall be such that at least two parts of lashing support the load and the additional force due to lift angles in the lashing configuration must be taken into consideration to ensure the rated load (or reduced rate load) of the lashing is not exceeded. Additional requirements for securing lashing (e.g., wire rope clips, knots) are also specified in NAVFAC P-307, paragraph 14.12.

❑ **Frapping** - Failure to use frapping when needed or using frapping improperly can easily result in a dropped load even though frapping does not directly support the weight of the load. Per NAVFAC P-307, paragraph 14.15.a, frapping must be used when necessary to ensure the load does not fall out of the rigging, and is especially necessary for loads with a high center of gravity (CG) or for loads where the CG is not at the center of the load. Another common use of frapping is for loads rigged in basket hitches to prevent inadvertent shifting or movement of the load, load components, or slings.

1 October 2020 | **Navy Crane Center** | *WHPB-20-19*

Navy Shore Weight Handling Program Brief

Title: Safe Operations of Material and Weight Handling Equipment

Target Audience: Material and Weight Handling Program Personnel

Recently, a Chief Petty Officer was killed when he was struck by a forklift while the forklift was in transit. Initial investigation notes there is a blind spot associated with this particular type of material handling equipment (MHE), a telescopic material handler. Personnel are reminded that **the lack of complete visibility can exist in weight handling evolutions, including the use of MHE with or without suspended loads**. This is particularly true in environments where large amounts of material, equipment, and people are in close proximity to one another. Blind spots can occur any time an object obscures the visibility and safe movement of the material whether it be via forklift, crane, or truck. For personnel responsible for material or weight handling evolutions, it is absolutely incumbent upon those involved in the evolution to **remove, mitigate, or closely monitor this condition throughout the entirety of the evolution to include a spotter when necessary**. **NOTE: The evolution is not complete, until the equipment being utilized is secured from operation.** **SAFETY** must be the primary concern. **DO NOT** allow complacency or the pressure of operations to cloud your attention to detail and mitigation of any risk to safe operation.

20 October 2020 | Navy Crane Center | WHPB 20-20

Navy Shore Weight Handling Program Brief

Title: Crane and Rigging Near Miss Report Lessons Learned

Target Audience: Weight Handling Program and Crane Oversight Personnel

During recent weeks, multiple near misses have been submitted which help prevent accidents. NCC continues to stress the importance of identifying and reporting near misses which can be used for lessons learned at all activities. Well done to the following activities that identified and reported these recent near misses:

- **Amphibious Construction Battalion One** - The emergency stop button on a mobile boat hoist (MBH) was engaged to prevent the tire of the MBH from contacting dunnage located in the travel path.
- **Portsmouth Naval Shipyard** - While hoisting a platform from a Vertical Launch System tube, the crane team identified that a wood wedge obstructed the tube.
- **Norfolk Naval Shipyard** - Shipboard rigging of a steam pipe was stopped when the supervisor identified that the pipe was lifting unevenly and could fall out of the rigging.
- **Portsmouth Naval Shipyard** - A lift was stopped when the Accident Prevention Team identified dunnage stuck to the bottom of the load that could have fallen off if lifted. This was a good catch and underscores the importance of stopping the lift once the load becomes completely suspended in accordance with NAVFAC P-307, paragraph 10.15. Not only should the crane team utilize this step to ensure the load is properly balanced and that the brake is functioning properly, but also take this time to ensure there are no loose items/debris stuck to the bottom of the load.
- **NAVFAC FAR EAST YOKOSUKA** - After completing the Operator's Daily Checklist (ODCL), personnel found an outrigger locking pin on a mobile crane that was disengaged.

20 October 2020 | Navy Crane Center | WHPB 20-21

Navy Shore Weight Handling Program Brief

Title: PREVENTING TWO-BLOCK ACCIDENTS

Target Audience: Weight Handling Program Personnel

An increasing number of two-blocking accidents have recently been reported. The majority (80%) of two-blocking accidents in FY20 occurred during the performance of maintenance, inspection, or testing. This brief discusses several recent two-blocking events and emphasizes important lessons learned that may help prevent these significant, high risk events.

***Two Block**: is defined as "over-hoisting by direct hoisting or indirectly by lowering 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, parting of the hoist line, and dropping of the load."*

Limit Switch Disabled *Damaged Sheaves*

Note: For cranes that do not provide two-block protection and are not equipped with two-block damage prevention features, NAVFAC P-307, paragraph 10.2.2.3 directs activities to develop crane specific procedures designed to minimize the possibility of two-blocking and provides examples of mitigating actions that should be considered.

- In several instances, two-blocking occurred during evolutions requiring the anti-two-block (A2B) system to be disabled, bypassed, or the crane was not equipped with A2B protection.
  - While conducting a maintenance inspection, the operator failed to reengage the A2B protection following a maintenance evolution and retracted the hook block into the boom tip resulting in significant damage.
  - A category 4 pedestal mounted articulating crane was two-blocked during a pre-load-test operation.
  - During inspection and hoist block activation of a secondary weighted limit, the hoist block contacted the trolley structure.
- Two-blocking has also occurred due to a loss of situational awareness when the A2B was disabled to stow the boom.
  - While stowing the boom of a mobile crane, two sudden and simultaneous loud noises diverted the operator's attention causing the operator to miss an ALL STOP signal.
- Distractions may occur, either visual or audible, while working in industrial or warehouse environments. When distractions occur, the crane operator should stop movement immediately along with the signalperson until situational awareness is regained among the crew.

28 October 2020 **Navy Crane Center** *WHPB 20-22*

Navy Shore Weight Handling Program Brief

Title: Crane and Rigging Near Miss Report Lessons Learned

Target Audience: Weight Handling Program and Crane Oversight Personnel

During recent weeks, multiple near misses have been submitted which help prevent accidents. NCC continues to stress the importance of identifying and reporting near misses which can be used for lessons learned at all activities. Well done to the following activities that identified and reported these recent near misses:

- **NAVFAC Midlant Norfolk** – The work leader stopped a lift when proper torque specifications were unable to be achieved on 1 of the 4 bolts of the lifting attachment.
- **TRIREFFAC Kings Bay GA** – During the post lift check, the supervisor identified a loose staging kick board rail which could have fallen during the lift. This report highlights the importance of inspecting the load prior to the lift as a lesson learned for all activities.
- **Norfolk Naval Shipyard** – Accident Prevention Team (APT) personnel stopped the lift of a motor by production shop personnel when the motor was identified to be rigged improperly with a single pendant.
- **Pearl Harbor Naval Shipyard** – Following an additional thorough walk-through, directed by an oversight observer, the lifting of a sand blast container was suspended when loose debris was identified on the back side of the container.
- **Puget Sound Naval Shipyard** – Shipboard rigging of a distilling unit was stopped when management identified that the sling angle on the rigging would have overloaded the swivel hoist rings.

17 November 2020 **Navy Crane Center** *WHPB 20-23*

STRUCTURAL BOLTED CONNECTIONS

The intent of this article is to explain the difference between general mechanical connections using threaded fasteners and structural connections in accordance with the "Specification for Structural Joints Using High-Strength Bolts". Structural connections require the use of fastener components listed in the specification and there are limitations on the configuration of the joints.

Cranes have many threaded fasteners used for a variety of connecting functions ranging from electrical wire lugs to connecting major structural elements. Each of these connections has specific requirements depending on the application. Design of the threaded fastener components is considered to be in the mechanical engineer's area of expertise.

Structural joints on a crane can be found on overhead bridge cranes at the end-truck to girder connection, cab attachment connections, parts of the walkway connection, elements of ladder connections, and other places. Standard Navy Crane Center acquisition specifications require specific criteria for mechanical and structural joints using threaded fasteners. Normally, structural joints are required to comply with the American Institute of Steel Construction's (AISC) "Specification for Structural Joints Using High-Strength Bolts" written by the Research Council on Structural Connections (RCSC). This specification is part of the AISC Steel Construction Manual.

Cranes have many threaded fastener connections that do not comply with the "Specification for Structural Joints Using High-Strength Bolts". These threaded fastener connections are commonly seen on motor-to-mounting plate connections, gearbox connections, electrical system components, and other ancillary component attachments. The design of these joints is typically done during engineering development of the component. Requirements for these fasteners are included in the installation instructions for the component or are provided by the engineer of record.

The "Specification for Structural Joints Using High-Strength Bolts" is a specification for the design of bolted joints and the installation and inspection of the assemblies of the listed fastener components. This specification is for the design of the joint, but not the fastener components. The design specification makes assumptions based on the known fastener attributes to allow relatively simple calculations for structural joints. The known attributes of the fastener components negate the need for calculation of interaction between fastener components. The use of fastener components other than those listed in the "Specification for Structural Joints Using High -Strength Bolts" could invalidate the assumptions made in the development of the design specification. Other limitations on configuration of a structural joint exist, such as the prohibition of compressible material within the grip of the bolt and allowable slope of material in contact with the bolt and nut. Both conditions could introduce bend stresses in the bolt not considered in the assumptions for joint design.

Recent issues with structural joints include the request to use thread steel plate in lieu of a structural nut as identified in the specification. While this is not uncommon, it does not comply with the "Specification for Structural Joints Using High-Strength Bolts". The design of this type of connection can be allowed with approval from the cognizant engineering authority that is competent in the design of the fastener components. The use of ASTM F3125 grade A325 or grade A490 bolt does not require use of "Specification for Structural Joints Using High-Strength Bolts". A properly designed mechanical joint can utilize various fastener components.

Structural connections using high strength bolts is a subset of broad range of threaded fastener connections. The structural specific specification was produced for structural engineers that are concerned with design of structural joints using high strength bolts. Use of this specification alleviates the need to design fastener components but requires use of listed components and configurations. Mechanical engineers typically understand fastener design and are capable of complex design of fasteners and joint configuration. How do you know if the joint is a structural joint? Look on the drawing, if it is a structural joint the drawing is required to indicate this as well as the type of structural joint.

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 set-up, 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.