THE CRANE CORNER

Navy Crane Center Technical Bulletin

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A WORD FROM TOPSIDE

Tim Blanton

The September 2014 edition of "The Crane Corner" discussed the challenges facing the Navy's weight handling program due to the loss of experienced personnel and the large influx of new personnel into the program, some of whom have no previous weight handling experience. This concern is being validated by our evaluation teams and field representatives as activities struggle to train and mentor these new employees. It is also obvious that this issue is not just isolated to weight handling, but also applicable to other trade crafts, which may or may not be associated with weight handling. Additionally, the scope of the problem varies widely as some large activities, faced with a significant increase in workload, are hiring thousands of workers, including hundreds in the weight handling program. In comparison, at smaller activities, where the hiring of weight handling personnel is only in the single digits, this smaller number could still account for half or more of their entire weight handling equipment program.

The previous article focused on training that was required for new personnel. Additionally, the article discussed several actions being taken at various activities to strengthen their training programs. This current article focuses on the "hands-on" training, and the importance of ensuring your activity has established guidelines and processes/procedures which provide for risk mitigation during practical training. At several activities, our evaluation teams have observed a high number of personnel out in the field in various phases of their training. In some cases, it was obvious that the training was of little value, and in other cases, we saw examples where personnel under-instruction were not being adequately monitored. Remember, the trainers/mentors are influencing the workforce of our future, and as such, are establishing the standards and expectations of our program.

For these reasons, we are providing some insights to training newly hired personnel. The thoughts below assume the employee has no experience in weight handling, has completed any applicable safety training, and is outfitted with the required personnel protective equipment. For employees with varying levels of experience, the concepts below should be tailored based on the background and experience level of the employee. For all phases of training, trainers/mentors should be selected from those who share the highest standards and expectations.

- **Observation**: It is important that new employees understand the scope of work they will eventually be performing. New

Inside This Issue

employees should spend at least one week in small groups (e.g., 3-4 personnel) with a qualified mentor/trainer to observe various evolutions in their discipline (rigging and operations, maintenance, etc.). The mentor, hopefully hand selected from those that exhibit high standards, should ensure the employees stay out of harm's way while briefing them on the evolutions in progress and how they (the new employee) tie into the Command's mission. Do not underestimate the value of teaching new employees how their specific job will add value to the command's mission and more importantly, how it benefits our Navy.

- **Basic Skills**: Early in their training, new employees need to learn the basic trade skills needed for their job. This phase should include both classroom and hands-on practical training (in a controlled environment). In many instances, activities are discovering that existing training (developed for employees with some level of experience) is not sufficient to train inexperienced employees. As a result, increased accidents and equipment maintenance deficiencies are occurring. It is important to identify abnormalities (accidents and equipment maintenance deficiencies) while they are minor in nature. In today's environment of a high percentage of new employees, it is increasingly important to be self-critical, self-reporting, and self-correcting, thereby creating a culture of continuous program feedback and improvement. Developing adequate skill-based training is obviously hampered by budget and resources limitations. For this reason, activities in the same geographical regions are highly encouraged to share training resources where available. For both basic skill training and practical and advanced skill training, you are encouraged to share mock-up resources. Again, it is critical that personnel assigned to train and mentor new employees are strong role models who exhibit the highest standards and expectations.

- **Practical and Advanced Skills**: In this phase, new employees are infused into work teams for on-the-job training during actual production work. In some cases, we have observed negative training where employees are assigned to a team or project, only to be used for running errands and support roles. A better approach is to assign the trainee to a specific qualified employee, so that all aspects of the job can be learned and appreciated. This way, the trainee can work side by side with the qualified employee during procedure or process reviews, briefings, staging tools for the work, performing the actual work, documenting of deficiencies/workmanship errors/process improvements, securing the worksites, returning tools and cleanup, and conducting turnovers (as needed). Additionally, this approach provides for continuous direct control of the trainee. For this reason, again, the activity should attempt to assign instruction trainees to those personnel who exhibit the highest standards (notice the trend here!). Periodically, the employee should be rotated to work under other employees for additional learning opportunities. We highly recommend that this phase of training be structured to ensure trainees, over time, are exposed to and learn the various roles and specific techniques required to perform their job. To accomplish this, some activities have developed practical factors books or qualification cards. In addition to NAVFAC P-307 and activity-required written examinations, knowledge checkouts and final oral boards can also be used to bolster training.

Bottom line, there are many ways good training can be provided and activities are encouraged to "think out of the box" when it comes to new and innovative ways to conduct training. However, there are also many "wrong" ways to conduct training. As with your existing employees, it is critical that you demonstrate appreciation for new employees. Ensure they are engaged in training opportunities, that they understand their role in supporting the Command and the Navy's

mission, and most importantly, they are not subject to negative training (standing around idle, being assigned to employees who exhibit poor attitudes and do not exhibit the desired standards, and/or being assigned work above their skill level). ■

CRANE SAFETY ADVISORIES AND EQUIPMENT DEFICIENCY MEMORANDA

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

CSA 222 – CRACKS IN VESTIL ADJUSTABLE HEIGHT ALUMINUM PORTABLE GENTRY CRANES

Background:

A. The purpose of this CSA is to inform activities of possible crack formation in the cast upper mounting bracket of Vestil Adjustable Height Aluminum (AHA) Portable Gantry Cranes. An activity reported cracks in the aluminum casting that connects the gantry girder to the A-frame upright of multiple Vestil AHA-2 portable gantry cranes.

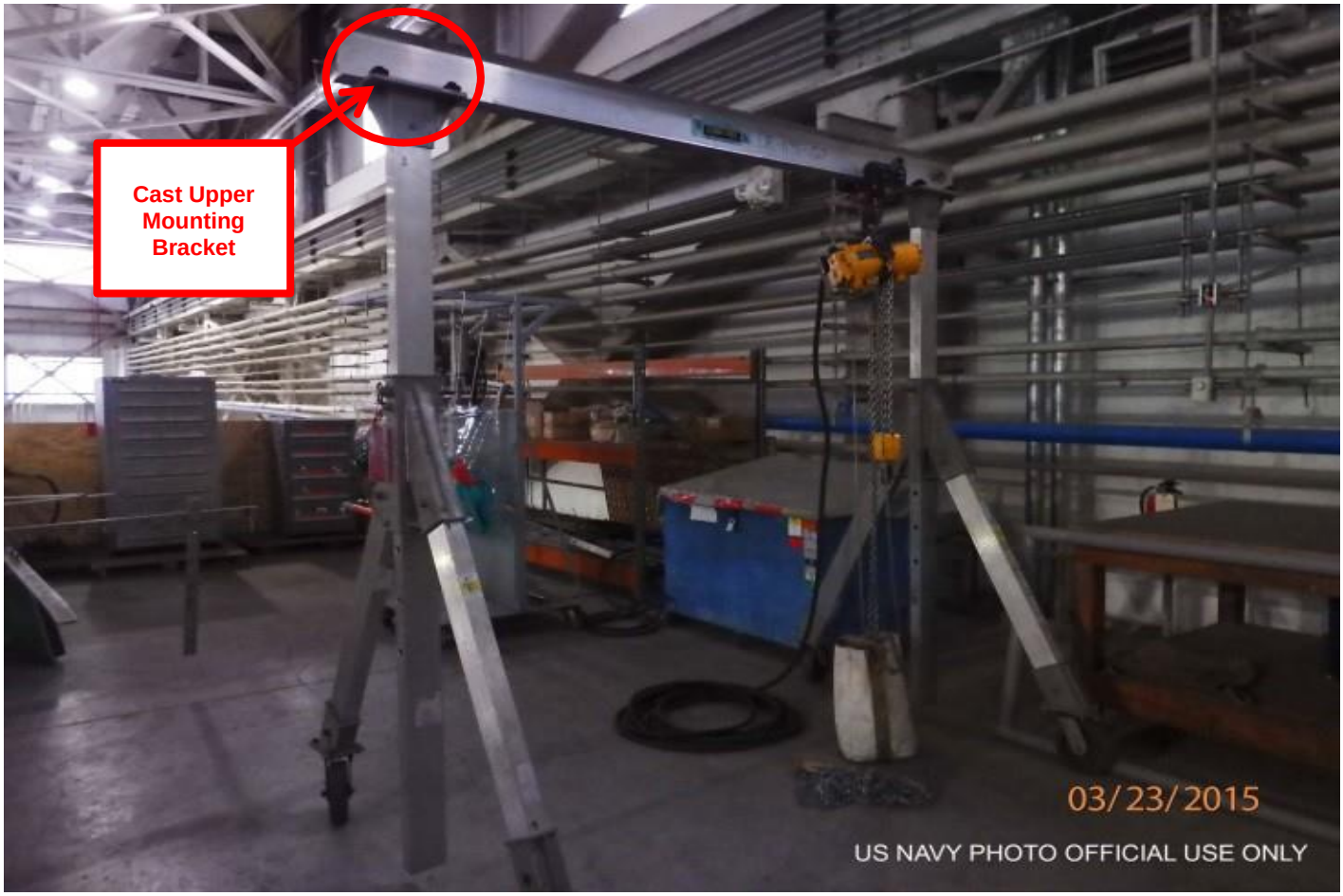
B. The original equipment manufacturer (OEM), Vestil Manufacturing maintains these cracks form when the casting is subjected to stresses caused by traveling the crane while loaded, which is prohibited by the OEM operating instructions. During 2014, the OEM modified the design of these cranes by eliminating the bracket and welding a mounting plate with reinforcing gussets to the upright.

Direction:

A. Within the next 30 days, activities shall inspect Vestil AHA Model Portable Gantry Cranes of all heights and spans that were manufactured with a cast aluminum bracket connecting the girder to the uprights for cracks in the cast aluminum bracket. This includes Vestil models AHA-2 (1-ton), AHA-4 (2-ton), AHA-15 (1500-pound), and could also include other custom models manufactured by Vestil. Activities shall also inspect the aluminum cast Y bracket connecting the legs to the upright assemblies. Any cranes found to have cracks shall be removed from service.

B. Activities finding cracks in the bracket shall either discard the equipment or replace the brackets and uprights with OEM manufactured replacements. The replacement parts feature welded construction and are available only as pairs of uprights. These parts are not warranty replacements.

C. Any cranes identified as having cracks shall be reported to the Navy Crane Center.



Vestil AHA Gantry With Aluminum Cast Upper Mounting Brackets

Vestil AHA Gantry with Welded Uprights

Cracks in Cast Upper Mounting Brackets

CSA 208A – ACCO WRIGHT-WAY HOIST MOTOR COUPLING DESIGN CHANGE

Revision:

The purpose of this revision is to clarify the identification of the redesigned coupling addressed in CSA 208. CSA 208 stated the newly designed coupling was identifiable by having a chamfered bore end. While some new couplings have a chamfer on the inner diameter of the keyway end, this chamfer is not present on all new couplings. However, the new coupling can be verified by the presence of a chamfer on the inner diameter of the spline end of the coupling as discussed in Section 3 of this CSA. This CSA supersedes CSA 208.

Background:

A. The purpose of this CSA is to notify activities of a change in the hoist motor coupling design for Wright-Way hoists.

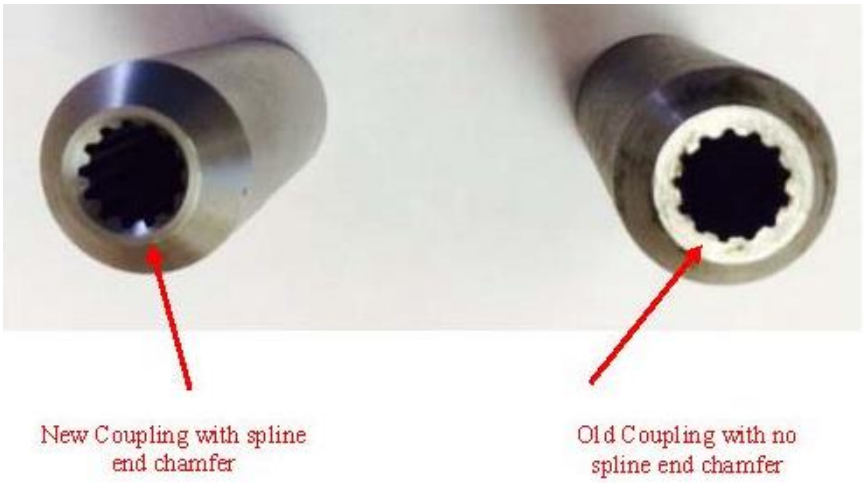
B. An activity reported a damaged hoist motor coupling on a 2-Ton Wright-Way electric wire rope hoist manufactured in 1990. Damage on the coupling was at the keyway, and there were no indications of misalignment between the gear box and motor on the damaged hoist.

C. According to the original equipment manufacturer (OEM), the motor coupling and key assembly, part number 67928, was modified in 1980. It should be noted that prior to 1985, the key that was supplied with the motor did not have a part number. It is now identified as 67927. The part number for the coupling itself is identified as 61721.

D. Although the damaged hoist was manufactured in 1990, the coupling on the hoist is consistent with couplings manufactured prior to the 1980 design change.

Direction:

Prior to or during the next certification requiring a load test by NAVFAC P-307, activities shall verify that the redesigned motor coupling and key, part number 67928, is installed on all Wright-Way hoists. The new coupling design can be identified by the presence of a chamfer on the inner diameter of the spline end of the coupling. The older design is un-chamfered in this area. Hoists found to have the un-chamfered design shall replace the motor coupling and key. Hoists shall be corrected, load tested, and recertified in accordance with NAVFAC P-307. Activities shall keep the work order for the coupling and key in the history file for the life of the crane.

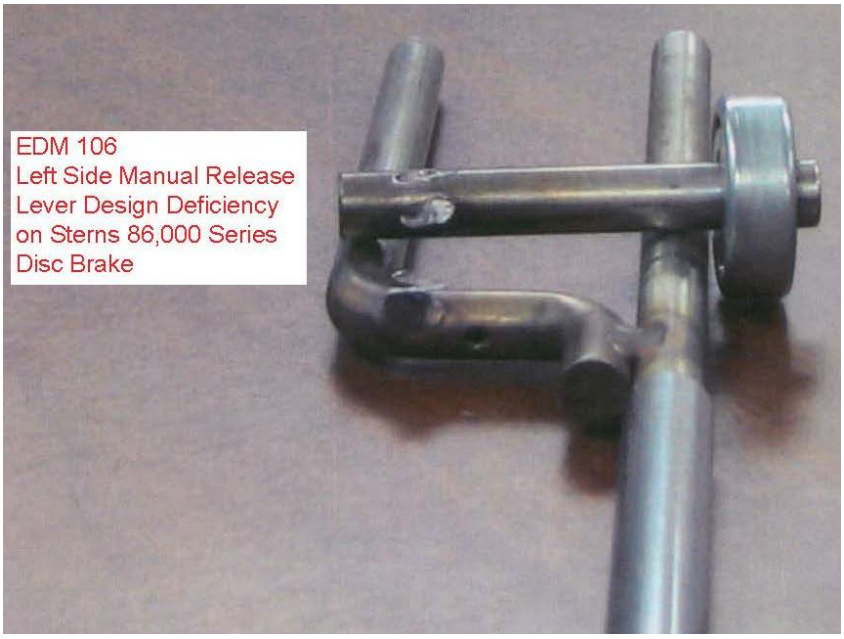


EDM 106 - LEFT SIDE MANUAL RELEASE LEVER DESIGN DEFICIENCY ON STEARNS 86,000 SERIES DISC BRAKE

A. The purpose of this EDM is to inform activities of a design deficiency on the Stearns 86,000 series brake left side manual release lever (P/N 8-146-663-00). The Stearns 86,000 series brake is a 500-1,000 foot pound capacity brake typically installed on motors of 75 hp or higher. The investigating activity determined the weld connecting the roller pin to the pull rod failed, thereby preventing manual release of the brake. The brake continued to function normally otherwise.

B. The pin is welded to the pull rod with two welds located at the end furthest from the roller. When the rod is pulled, the roller engages a mechanism that disengages the brake. The roller exerts a force on the weld which, over time, resulted in failure of the weld. The right side manual release lever is a mirror of the left, except that additional and larger welds connect the roller pin to the pull rod. The right side lever weld design was changed approximately 18 years ago and is used on 81,000 and 82,000 series brakes.

C. The original equipment manufacturer (OEM), Stearns-Rexnord, is redesigning the affected welded connection on the left side manual release lever to match the right side and will retrofit their parts inventory. The OEM will replace failed left side manual release levers at no cost when upgraded parts are available. Due to low production volume and infrequency of the failure, the OEM has no plans to issue a service bulletin on this issue. ■



WEIGHT HANDLING SAFETY BRIEFS

The Navy Shore WHSB is intended to be a concise and informative, data driven, one page snapshot of a trend, concern, or requirement, related to recent / real time issues that have the potential to affect our performance and efficiency. The WHSB is not command specific and can be used by your activity to increase awareness of potential issues that could result in problems for your weight handling program. The WHSB can be provided directly to personnel, posted in appropriate areas at your command as a safety reminder to those performing weight handling tasks, or it can be used as supplemental information for supervisory use during routine safety meetings. Through data analysis of issues identified by accident and near miss reports, and taking appropriate actions on the information we gain from that analysis, in conjunction with effective communication to the proper personnel, we have the tools to reduce serious events from occurring. As we improve the Navy Weight Handling safety posture, we improve our performance, thereby improving our efficiency, resulting in improved Fleet Readiness!

When Navy Shore Weight Handling Safety Briefs are issued, they are also posted on the NCC's web site at: http://www.navfac.navy.mil/ncc.

This Weight Handling Safety Brief (WHSB) is provided for communication to personnel who perform weight handling operations involving the use of shackles. Navy Crane Center has received several accident or near-miss reports relative to improper installation and use of shackles. This brief reiterates the requirements for their proper use.

Navy Shore Weight Handling Safety Brief

Title: SHACKLE USE AND REQUIREMENTS

Target Audience: Riggers, Operators (all Crane Categories)

#1

ASME B30.26-1.9.4 (a): The screw pin shall be fully engaged and tight, and the shoulder should be in contact with the shackle body.

Fully Engaged Shoulder Contact (Tight)

#2

ASME B30.26-1.8.4 (g): Shackles shall be removed from service if damage such as incomplete thread engagement is visible and shall only be returned to service when approved by a qualified person.

Incomplete Thread Engagement

Data analysis indicates a negative trend in understanding the proper installation and use of shackles. Shackle pins were identified as "not fully engaged" with thread exposed and pin shoulders having no contact with the shackle body. Many times these conditions were discovered during the post-use inspection, i.e., after the load was landed.

The old practice of backing-off on the shackle pin was, at one time, accepted. It no longer is. Industry standards have changed (i.e., ASME B30.26) and subsequently so have the rigging gear manufacturer's allowable use criteria. Supervisors and users must understand this newer practice and comply with requirements.

NAVFAC P-307, paragraph 14.8 invokes ASME B30.26 criteria for selection, use, and maintenance of rigging hardware, including shackles. Although ASME B30.26 criteria is invoked, section 14.8 also provides general inspection, marking, and use criteria. Skill and knowledge of these criteria by rigging gear users shall be validated prior to assigning related tasks.

Incomplete thread engagement or inability to seat the shoulder may indicate a bent shackle bow, incorrect pin-to-shackle match, or some other defect. Stop! Remove the gear from service.

PRE-USE INSPECTION OF SHACKLES; Screw pin shall be fully engaged and tight and the shoulder in contact with the shackle body. (picture #1)

RESULT OF WEAK PRE-USE INSPECTION; Damaged or loose shackle pins can back out and present the potential for damage to synthetic slings and webbing lashing due to contact with sharp shackle pin threads when the load is lifted. Failure of the rigging configuration can damage equipment or injure personnel. (picture #2)

1 May 2015

SAFETY

Navy Crane Center 15-S-04

This Weight Handling Safety Brief (WHSB) is provided for communication to personnel who operate a mobile crane. Navy Crane Center has received several accident or near miss reports that identified various problems associated with the improper stowage of a mobile crane's hook block prior to the crane being traveled. This brief reiterates the requirements for properly securing the hook block with tie-backs to reduce the chances of equipment damage or injury from a free swinging block during travel of a truck, cruiser, or crawler crane.

Navy Shore

Weight Handling Safety Brief!

Title: MOBILE CRANE TIE-BACKS

Target Audience: CRANE OPERATORS, CRANE RIGGERS, AND SUPERVISION

When moving a truck, cruiser or crawler crane from job sites, be sure the hook and block are properly secured to the crane's carrier frame to reduce the chances of equipment damage or personnel injury from a free-swinging hook block. The following is provided for the consideration and use of tie-backs...

- A weak-link connection shall be used to secure the hook block to the crane. The breaking strength of the connecting piece shall be less than the rated load of the hook block's wire rope as reeved. This allows the tie-back to act as the weak-link and break before any additional strain is placed on the equipment.
- When securing the hook block, raise it just enough to take up the slack. Do not over tighten.
- Ensure there are adequate clearances.
- Tie-back gear does not have to be certified. Each piece of tie-back gear, including OEM padeyes, should be marked "tie-back only" to minimize the potential of getting mixed up with certified rigging gear.
- When securing the hook blocks for highway travel, add a back up (stronger) tie-back to prevent free swinging in the event of weak link failure.

9 June 2015

SAFETY

Navy Crane Center 15-S-05

WEIGHT HANDLING TRAINING BRIEFS

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

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

This Weight Handling Training Brief (WHTB) is provided for communication to Navy shore weight handling program personnel who are involved in rigging loads. This brief discusses the requirements for use of flat synthetic lashing during rigging operations.

Navy Shore Weight Handling Training Brief!

Title: FLAT SYNTHETIC (NYLON) LASHING

Target Audience: Riggers, Crane Operators (all categories), and their Supervisors

In this picture, synthetic (nylon) lashing is used to rig the load and to create the lift point to which the chainfall is attached. Clove hitches are tied on each vertical-horizontal intersection to help maintain positioning and configuration. Approved Chafing material is used to protect the synthetic lashing from damage (cutting, tearing, breaking). Ensure your hook or shackle is large enough to properly seat all the parts of lashing in a safe manner (avoid overcrowding).

One definition of lashing is: wire rope, synthetic rope, or synthetic webbing (without permanent end fittings) that is used for wrapping and securing around and/or through an object to provide a point or points from which to lift (NAVFAC P-307, 14.12). The use of flat synthetic (nylon) lashing offers advantages such as ease of use, flexibility, lightweight yet strong, and the ability to use knots instead of clamps or clips. Flat synthetic lashing is safe when used properly (and protected) in accordance with training and established requirements.

Serious consequences such as equipment damage or personnel injury can occur when synthetic lashing is used incorrectly.

Supervisors should provide periodic proficiency training to personnel for knot tying and lashing methods for the loads that are lifted at the activity. The knots and hitches most used with lashing are square knots backed up with half hitches, clove hitches, and bowlines. Personnel should be familiar with these knots when lashing a load.

Section 14.12 of NAVFAC P-307 provides specific requirements for the use of Lashing. These requirements must be followed to ensure adequate safety.

Personnel responsible for rigging the load shall be trained per the requirements of NAVFAC P-307.

There are benefits of using synthetic lashing in certain rigging operations. However, improper use of the lashing can negate those benefits by just one slip of an improper knot, or by an unprotected corner or sharp edge!! Be trained and follow all requirements for its use!

19 May 2015

Training

Navy Crane Center 15-T-02

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS
SECOND QUARTER FY15

For the second quarter of FY15, 47 crane accidents were reported. Of the 47 accidents, 15 were considered significant (overload, dropped load, injury, two block, power line contact, or derailment). Significant accidents are accidents that have the potential to result in substantial cost or injuries and may require a more detailed investigation. Through the second quarter, crane accident totals are down by 11 percent for the fiscal year while significant accidents are down by 52 percent as compared to the same period last year. In addition, 16 rigging accidents were reported for the second quarter. For the fiscal year, rigging accident totals are up 12 percent; however, significant rigging accidents are up 166 percent (16 vs 6). Of the rigging gear accidents to date, 39 percent involved some form of an injury. Contractors reported a total of nine crane and rigging gear accidents, including two significant accidents.

INJURIES

Accidents: Five injuries were reported in the second quarter of FY15, and all occurred during rigging operations. Four of the five injuries occurred as a result of an employee being struck by a load or rigging gear.

- A nylon sling connected to an overhead pad eye was cut during a load test, causing a chain hoist that was connected to the sling to fall and hit a sailor on the head.
- A rigger's left index finger was broken requiring multiple stitches when a rotor being installed shipboard shifted, wedging his finger between the rotor and an adjacent ladder.
- A synthetic sling being used as a holdback for a sea water valve slipped, causing an injury to a rigger's hand.
- An employee suffered a knee injury when a synthetic sling attached to a shipboard pump slipped which allowed a pump to shift and strike the employee.
- A rigger received a finger injury when a valve being installed shifted in the rigging and made contact (pinch point) with the rigger's hand.

Lessons Learned: Improper rigging was the common theme identified during a review of these accidents. Often, it comes down to taking a few extra minutes to ensure the load is properly rigged. Loads should always be rigged to prevent the load from falling out of the rigging and that chafing material is used to prevent damage to nylon slings. When using slings in a sweeping configuration under a load, the slings should be secured in place to prevent inadvertent shifting or movement of the load. A load that has sharp edges can easily cut unprotected synthetic slings. If synthetic slings are used to lift loads with sharp edges, NAVFAC P-307 requires chafing protection material be of sufficient thickness and strength to prevent sling damage. Additional information on the requirements of chafing material is identified in Paragraph 14.7.4 of the P-307.

DROPPED LOADS

Accidents: There was one dropped load accident reported during the second quarter. A steel plate slipped from the plate clamp and fell back into the shipping crate. A piece of liner material between the plate and clamp obstructed the contact between the plate and clamp causing the plate to slip from the jaws of the clamp.

Lessons Learned: Plate clamps rely upon friction as a lifting mechanism. Improper seating or use increases the likelihood of an accident. It is critical to ensure there are no obstructions between the load and jaws of the clamp and that contact is sufficient. Additionally, when choosing to utilize plate clamps for lifting, ensure adherence to all original equipment manufacturer recommendations.

OVERLOADS

Accidents: There were nine overload accidents in the second quarter, twice as many as compared to the first quarter. All of the accidents were rigging gear overloads. Two sill assembly slings were overloaded on two separate occasions as a result of the ship's pitch and roll caused by wave action on the ship. A lift fixture was overloaded when the chain fall used to apply the test load was operated too quickly. A plenum cover handling sling was overloaded when the cover was hoisted prior to all the hold down restraints being disengaged. A shipboard pad eye and equipment test rig was overloaded when the rigger performing the test misread the test gauge and applied excessive loading on the pad. A swivel hoist ring was overloaded to failure while positioning a cofferdam for shipment. Scaffolding used as an attachment point for rigging gear was overloaded during removal of a motor from a crane during maintenance. One of two chain slings connected to lifting points on a concrete block was overloaded to failure at the mechanical coupling link. A sling was overloaded while being pre-tensioned for removal of a bolted platform from an enclosure.

Lessons Learned: The overloads reported during the first quarter primarily occurred as a result of lack of attention to detail during and prior to the operation. NAVFAC P-307, Section 10, identifies that the rigger-in-charge (RIC) is responsible for overall control and safety of the lift including knowing the weight of the load and ensuring the load is properly rigged. Part of that responsibility includes ensuring the load is free to lift and identification of binding conditions when present. Lifts that require binding controls must be treated as complex lifts and require additional controls. Section 10.5 of P-307 provides specific details on methods to prevent overload when a binding condition exists. If a lift cannot be performed safely due to conditions that cannot be controlled (wind/wave action), stop and inform supervision.

DERAILMENT

Accidents: A dock crane derailed when it traveled through an improperly positioned rail switch. Three of the crane's trucks were derailed. Fortunately, the event resulted in no damage.

Lessons Learned: P-307, Section 10.2.1.3, discusses the responsibilities of the crane walker, including the responsibility to ensure the crane rail switches are properly aligned. Crane team

back-up could have prevented this accident and is always necessary when critical actions are dependent upon one individual. P-307, Section 10.15, identifies that traveling a crane with a suspended load is hazardous and discusses the importance of supervisors ensuring crane walkers are aware of crane rail restrictions. A pre-job brief should include a discussion of items like traveling through rail switches in an effort to help avoid complacency.

NEAR MISSES

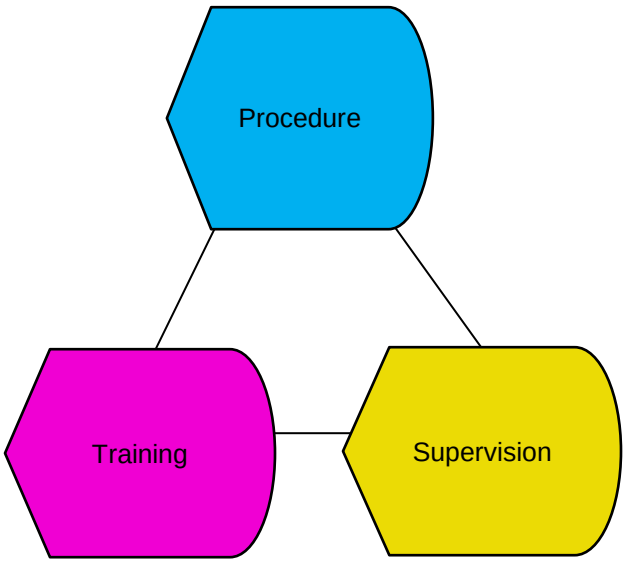
Accidents: To date, near miss reporting has outpaced FY14 reporting by 52 percent. Much of this increase is attributed to an increase in rigging near miss reports. Of this quarter's near miss reports, nearly half identified improper rigging. Improper rigging was a major contributor during accidents that result in injury and dropped loads during the second quarter. Five instances of inadequate chafing material were identified that could have resulted in dropped loads. Gear inspection issues were also reported during the quarter and if gone unnoticed, definitely increases the likelihood of an accident considerably. Thirty-one percent of crane near misses involved instances of improper operation that resulted in crane miss-spools. Additionally, side loading or miss-spools resulted in six crane accidents in which the crane's wire rope required replacement.

Weight handling program managers and safety officials should review the above lessons learned with personnel performing weight handling functions and share lessons learned at other activities with all weight handling program personnel at your activity. Contracting officers should share this information with their weight handling representatives and ensure that all contractor accidents are thoroughly investigated to identify probable causes and corrective actions needed to prevent recurrence. Activity commanding officers are encouraged to implement a weight handling monitoring program in order to collect metrics and analyze data in order to determine areas requiring increased oversight. Navy weight handling programs perform critical work required for helping maintain fleet readiness, and your help is essential for achieving that work while eliminating significant weight handling accidents. ■

TIP OF THE SPEAR
(Notable Evaluation Items)

A common theme from recent editions of "The Crane Corner" is the high attrition rate of experienced personnel from the Navy's weight handling program and the subsequent inflow of new personnel with minimal to no weight handling experience. The primary focus of the articles has been toward bolstering initial and refresher training, including a strong emphasis placed on creating practical realistic mock-ups that simulate actual job conditions. However, training only comprises one of the three available avenues for mitigating the increased risk due to lower experience levels, the other two being supervision and processes/procedures. Together, these three core aspects can be applied to any job or task. These aspects form the three "pillars" recognized in the industrial work model (as developed from the NAVSEA 08 nuclear work model), which, instead of relying solely on potential technical improvements, approaches risk mitigation by focusing on people-based resources. The basic idea behind the model is that whenever one of the three pillars becomes weak, one or both of the other two must be strengthened to compensate for the weakness.

Applying the industrial work model to the current situation of high attrition rates in the Navy's weight handling program, effective supervision and detailed technical work procedures are essential to mitigate the increased risk potential. In light of the training gaps recognized at several sites, which are expected to take substantial time to correct, long-standing work procedures and current supervision oversight plans need to be reviewed to ensure the current methods will enable the less experienced workforce of today (more susceptible to problems) to achieve success. During several recent evaluations, deficiencies with technical work documents (procedures) and procedural compliance (supervision not enforcing expected standards) were noted, indicating further strengthening of these two pillars will be necessary to avoid potential increases in accident severity and equipment breakdowns.



Another lesser known but just as critical component to the work model is oversight (above that performed by supervision) and quality assurance. Looking at the model above, think of oversight and quality assurance as dotted lines to the three pillars. Oversight and quality assurance provide the input to measure the effectiveness of the three pillars by identifying deficiencies affecting work execution, whether they be associated with training, supervision, or procedures. It is at this level where effective program management is essential to perform a detailed analysis of the collected data to determine where the gaps are and which pillars must be strengthened. However, the analysis performed is only as valuable as the quality of the data being input, making it imperative that quality oversight is performed. Oversight is necessary at all activities and not limited to larger activities with a dedicated resource within the weight handling group. At smaller activities, oversight is made up of Navy civilians in management roles (if applicable), Division Officers/Directors, Department heads, collateral duty safety personnel, or other personnel utilized to provide oversight on a full or part-time basis. At larger activities, additional resources may be available, such as senior Navy civilian management, quality assurance personnel, accident prevention teams, and full-time safety personnel. In either case, the ultimate goal is to provide valuable data through documented monitoring, internal audits, and outside assessments.

The items detailed below are examples where the application of principles from the industrial work model would potentially alleviate these concerns and their effect on the activity's overall risk potential.

Example 1: As discussed in a previous tip of the spear article, an activity had recently invested considerable effort into the development of better training mock-ups. However, activity management and other oversight personnel had not conducted any deck plate level reviews of training and missed an opportunity to identify shortcomings in the training, including infrequent

use of the mock-ups. In this instance, the activity had recognized that training had to be improved (i.e., a weakened pillar) but did not effectively utilize oversight and quality assurance to ensure the corrective actions were having the desired effect.

Example 2: An activity, in the midst of hiring a large number of new employees, was at the point where they were infusing the new personnel into actual work for on-the-job training. The activity was providing these new individuals with basic skills training; however, the processes and procedures used to control the "under-instruction" employees were insufficient for training the high number of people being introduced into the workforce. In this instance, although initial training (one pillar) was being strengthened, existing processes and procedures for oversight of training (another pillar) were not sufficient to support the overall burden of training the personnel.

Example 3: At many activities, new mechanics are being introduced into equipment maintenance and inspection. However, many activities are also identifying that existing technical work documents provide insufficient detail for less experienced personnel. In this instance, another pillar (training) has been weakened but it will take time for a more robust training program to be developed and implemented. As a result, even though the existing processes/procedures pillar wasn't necessarily deficient, the overall strength of the model was affected and activities should bolster this pillar to prevent overall declining work performance and affect change (improvement) at a faster rate.

Example 4: At these same activities (and probably your activity), the third pillar (supervision) has also been weakened due to attrition of experienced supervisors. Although many new, and typically less experienced, supervisors will bring in a fresh perspective, years of experience cannot be recaptured overnight. In this instance, the supervision pillar is temporarily weakened and has to be supported by increased oversight and quality assurance (external component of the work model). ■

COLLECTOR BAR SELECTION AND CLEANING SHOE USE

An activity reported the misalignment and dislodging of collector shoes on a bridge crane due to vibration caused by rust buildup on the conductor bar surface contacting the collector shoes. The conductor bar system being used was steel and was designed for indoor use. However, even though the crane was located inside a hanger, it was exposed to outdoor/corrosive environments because of the hanger doors being kept open for extended periods of time. Due to this corrosive environment, a conductor bar system for outdoor use such as those fabricated from a non-corrosive material like copper, aluminum, or stainless steel may have been a better choice. In this specific instance, replacement of the conductor bars was not an immediate solution, so in order to remove the contamination from the conductor bars, the activity planned to periodically use original equipment manufacturer (OEM) provided cleaning collector shoes.

In addition to the example above, other activities have reported the use of OEM provided cleaning collector shoes to periodically clean conductor bar systems from carbon deposits, corrosion, and other unwanted buildup. The application and frequency of the use of these collector cleaning shoes varies from manufacturer to manufacturer. However, these cleaning shoes are made of abrasive material and are designed only for periodic temporary use and are to

be replaced with standard collector shoes once their purpose has been satisfied. At no point should abrasive cleaning shoes be used continuously for long periods of time.

In summary, when inspections (see NAVFAC P-307, Appendix D, and Item 21) identify corrosion issues or other unwanted buildup on collector bars or when procuring new equipment, activities should ensure that they are using a collector bar in the environment for which it was designed. Additionally, activities should identify if collector cleaning shoes are an option to be included in their servicing specification (see NAVFAC P-307, paragraph 2.5) for periodic cleaning of the conductor bars installed in their facilities. It is recommended that the collector bar OEM always be contacted for guidance on specific products and applications.

UPCOMING OPPORTUNITY TO REVIEW AND COMMENT ON NAVFAC P-307

On July 2, the Navy Crane Center sent the draft of the NAVFAC P-307 2015 revision to activities for review and comment. Activities have until August 31 to submit comments. The Navy Crane Center will be holding several meetings at various locations in the fall of 2015 to discuss comments, take questions, and explain the 2015 revisions.

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.

WEIGHT HANDLING PROGRAM SAFETY VIDEOS

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

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

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

"Take Two" Briefing Video provides an overview on how to conduct effective pre-job briefings that ensure interactive involvement of the crane team in addressing responsibilities, procedures, precautions, and operational risk management associated with a planned crane operation.

Safe Rigging and Operation of Category 3 Cranes provides an overview of safe operating principles and rigging practices associated with Category 3 crane operations. New and

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

All of the videos can be viewed on the Navy Crane Center website:
http://www.navfac.navy.mil/navfac_worldwide/specialty_centers/ncc/about_us/resources/safety_videos.html

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