THE CRANE CORNER

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Navy Crane Center Technical Bulletin

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Inside this issue:

A WORD FROM TOPSIDE

Tim Blanton

I often state that one of my greatest fears as the Navy Crane Center Director is to have a Navy weight handling program fatality on my watch. Keep in mind that the last Navy fatality was nearly 27 years ago. Over the past six months, there have been several events that demonstrate the seriousness of the industry we work in every day. Our program attempts to share lessons learned from all similar aspects of industry when we can. Last fall, a Navy Chief Petty Officer was killed when he was struck by a forklift in transit (Weight Handling Program Bulletin (WHPB) 20-20). This winter, a rigger was seriously injured at a private company performing work under a Navy contract when the crane's hook caught on a structure and sprang free (WHPB 21-05). Most recently, I am sad to say, a worker died as a result of injuries at a private company performing work under a Navy contract when he was crushed between a scissor-lift and another structure. Although none of the above events occurred during Navy weight handling operations, you can easily relate that events like these could occur during the higher risk work that you do on an everyday basis.

Closer to home, since January, two separate NAVY weight handling program significant maintenance errors had the ability to result in the same end as the events discussed above. In both instances, personnel unfamiliar with the crane's design removed the crane's hoist gearbox upper cover (casing), resulting in uncontrolled lowering of the hook. Fortunately, no personnel were beneath the hook during these events although personnel had been in the immediate area just prior to both events.

As stated in our recently issued Safety Message (copied in this edition of The Crane Corner), hazardous energy can take many forms, including gravitational forces, hydraulic pressure, spring tension, and electric charge. Some are more obvious than others, such as releasing the cap on a pressurized hydraulic system or removing a fully compressed spring. But others may not be as clear, such as the forces maintaining position within a gear set. This has been made all too clear from two recent incidents involving uncontrolled lowering of loads while performing hoist gearbox work. Hoist gearbox covers often provide gear/shaft retention within the gearbox and removal of this cover when components are unrestrained may result in movement and potential dislodgement of the gears. The engagement of hoist brakes in this situation will not prevent uncontrolled lowering of the block or boom. Again, we were lucky as in both instances, there was no personnel injury but the effects of the release of stored energy were overlooked and resulted in significant damage to crane internal components and impact to mission capabilities.

Lockout/tagout is a safety process to secure potentially hazardous energy in machinery, equipment, or systems. It requires that hazardous energy be isolated and rendered inoperative to prevent uncontrolled release of energy, prior to beginning maintenance or repair work. Steps to isolate equipment include: identification of energy sources, isolation of those sources, and locking and tagging of those sources to prove that the equipment isolation is effective or has reached a zero energy state. I must reinforce here that gravitational force is a potential hazardous energy force that you must consider. Original equipment manufacturers' maintenance and servicing manuals for requirements, guidance, and safety precautions must be consulted when working on systems with potential energy hazards. When guidance, precautions, or requirements are unclear or unavailable, procedures must be developed, preferably in consultation with the engineering organization.

When it comes to lockout/tagout procedures to control hazardous energy, it is all too easy to overlook all forms of potential energy and simply focus on the electrical hazards present during maintenance, inspection, and testing of weight handling equipment. We are surrounded by electrical systems on a daily basis and for anyone who has received an electrical shock in your personal life, the hazards are obvious. Even training within our programs focuses primarily on electrical systems and the importance of ensuring personnel safety when entering electrical panels but control of hazardous energy extends well beyond electrical systems, especially in the weight handling community.

We should not rely on passive safety systems to prevent personnel injury or equipment damage, but be fully engaged in the programs, such as lockout/tag out, to provide proactive protection to personnel and equipment. I challenge you to help reverse the course of recent failures of hazardous energy control for the protection not only of the equipment, but the safety of yourself and your coworkers.

TIP OF THE SPEAR
SECOND QUARTER FY21 EVALUATION SUMMARY

Due the ongoing restrictions in travel and concern for the health of our personnel, as well as that of activity personnel, all evaluations in the second quarter of FY21 continued to be performed remotely. Reviews 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. Navy Crane Center (NCC) performed advance visits to naval shipyards , Norfolk, Puget Sound, and Pearl Harbor and observed numerous weight handling operations. Since the reviews did not cover all areas of an activity's weight handling program, the overall grade of satisfactory could not be provided.

54 Navy activities were given program reviews. For the first half of FY21, 103 program reviews were performed.

REVIEW ITEMS

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 (avoidable collision with no damage), 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 22 of the reviews. A self-critical self-assessment, backed up by documented metrics, is a sign of a forward-looking mature weight handling program.

A lack (or very low number) of reported lower order crane or rigging accidents and near misses was indicative of failure to recognize these events, particularly at activities with higher operational tempos. Identification and reporting of such events has been shown to minimize the potential for significant accidents. Reviews of 10 weight handling programs identified this condition.

Common Review Items (three or more items):

- Lack of monitor program or established program that needs improvement or does not cover all program elements – 40 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 – 22 items.

- Lack of (or low number of) lower order crane or rigging accident reports and near miss reports – 10 items.

- Local weight-handling (WH) instruction/SOPs non-existent or inadequate – 9 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 Navy NCC, locally required training not taken, training course score less than 80 percent, non-Navy eLearning (NEL) certificates) – 9 items.

- Lack of, ineffective, or insufficient crane replacement/modernization plan – 6 items.

- Unrecognized/unreported accident, near miss, or unplanned occurrence (including damaged gear not investigated for cause) – 5 items.

- Poor oversight of contractor responsibilities (maintenance, test, operations) – 5 items.

- Lack of leading metrics/metrics not being properly analyzed – 4 items.

- No procedure for tagging equipment with known deficiencies and/or tagging equipment that is out of certification – 4 items.

- Poor maintenance planning and/or execution (parts not tagged/bagged, hazardous materials not properly stored, work documents not available, lubrication not per schedule, lack of long-range maintenance schedule, components not reassembled properly, activity deficient in structural bolt installation, missing screws, personal protective equipment not utilized) – 4 items.

- Internal audit issues (no audit program, not finding issues, not on schedule, overly thorough-hindering effectiveness, lack depth of analysis, responses not required to audit findings) – 3 items.

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

- Inspection and certification documentation errors – 3 items.

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS FIRST QUARTER FY21

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 first quarter of FY21, 44 Navy weight handling accidents (33 crane and 11 rigging) were reported, as compared to 65 in the fourth quarter of FY20. Three OPNAV class 'C' reportable accidents were reported (two crane and one rigging). Significant rigging accidents increased from 2 to 6 in the first quarter, while significant crane accidents decreased from 13 to 8. As discussed in paragraph 8, near miss reporting decreased significantly in the first quarter, indicating a lack of oversight and sensitivity to lower level issues and could be contributing factors to the higher number of OPNAV reportable events.

Four contractor significant accidents were reported, including two instances of a two-block condition, one pinch-point violation resulting in a personal injury, and one dropped load. In addition, weight handling contractor oversight personnel reported 8 crane and rigging near misses, a decline from the 11 reported in the fourth quarter FY20. In an effort to increase awareness of contractor crane oversight and share lessons learned, two weight handling program briefs (WHPBs), Oversight of Contractor Weight Handling Operations (WHPB 21-01) and Contractor Weight Handling Accidents and Near Misses (WHPB 21-02), were issued.

INJURIES

Four injuries were reported, two each during crane and rigging operations. This is an increase in the quantity (from two in the fourth quarter) as well as severity with one crane and one rigging accident being OPNAV C reportable. During installation of a shipboard battery, the battery released from the lifting attachment and fell on the foot of a rigger, resulting in lost workdays. A rigger suffered a back injury when the tagline to the load rendered causing the rigger to fall back to the deck, also resulting in lost workdays. A worker strained their back when trying to steady an aircraft rotor that had slipped from the lifting adapter and fell to the shop floor. An assist rigger received a minor head injury while positioning a grate within a blast booth.

Lessons Learned: Investigation into the dropped battery identified that contrary to the written procedure for removing the battery well hatches, a rigger, under direction of supervision, decided to manually pull the battery over 6 inches to allow another rigger to close the battery well hatch. When the rigger pulled on the battery, the collar slipped off the end of the davit arm, causing the battery to fall approximately 12 inches onto the rigger's foot. Additional lessons learned for this accident are included in paragraph 5. In the event of the tagline rendering, the activity investigation identified that the tagline was not properly attached to a solid structure and while manipulating the load to obtain proper orientation, the supporting structure on which the tagline was attached flexed and the tagline released. The minor back injury related to steadying of the aircraft rotor was the result of the component not being rigging in accordance with the written procedure. The activity investigation of the assisting rigger's minor head injury cited time constraints as the reasoning for deviation. The riggers did not adequately clear the operating envelope of movable obstructions and did not obtain the approved rigging configuration for the material handling equipment being used.

DROPPED LOADS

Four dropped load accidents were reported, one crane and three rigging. While this is a decline from the eight reported in the fourth quarter, one rigging accident was OPNAV reportable (see paragraph 4 for the foot injury). While securing the whip hoist headache ball on a mobile crane, the headache ball struck the deck. While lifting a steel traffic plate using a sling and swivel hoist ring attached to a forklift, the swivel hoist ring pulled out of the plate and the plate dropped (six inches) to the ground. During removal of a component, the lashing slipped and the component flipped in the rigging, resulting in a dropped load and subsequent damage to the component.

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: The battery released from the lifting attachment due to the set screws not being the proper material or style and only one versus two set screws was used for each davit collar. Investigation determined that the rigging team lacked experience in this specific work and they, along with supervision, did not understand the requirements of the written procedure or hold an adequate briefing. For the uncontrolled lowering of the whip hoist event, during direction from an instructor to the trainee to "dog everything" or (secure the crane), the operator trainee did not properly secure the whip hoist drum lock, resulting in the uncontrolled lowering of the whip hoist. The activity's investigation identified that the instructor (licensed operator), while on scene, was not in position to recognize the operator controls and avert the accident.

The activity's investigation into the dropped traffic plate identified several factors including the rigger did not conduct an adequate inspection of the load resulting in failure to identify the corroded and stripped threads prior to installation of the swivel hoist ring and the rigger utilized improperly sized swivel hoist rings (which were not properly seated or torqued). In the event involving the ship's component that slipped in the lashing, the activity identified that the rigging configuration utilized deviated from the written procedure and created an unbalanced lift. In addition, supervision did not conduct job-site checks prior to the lift and the rigging team did not conduct a brief.

OVERLOADS

Four overload accidents were reported, two each during both crane and rigging operations, as compared to three in the fourth quarter. A synthetic sling was overloaded during a lift to remove a swing arm from a submarine dome ring lifting harness. The hoist overload limiter on a bridge crane activated during an attempt to lift a salvaged flight simulator, indicating a potential crane overload. A lift sling was overloaded during a lift of an aircraft horizontal stabilizer. During a load test of ship's handling gear, the capacity of the gear was exceeded.

Lessons Learned: The team did not recognize the potential binding situation during removal of the swing arm and failed to install a chain hoist or dynamometer in the rigging configuration. During a dual hoist lift of a salvaged flight simulator, the rigging configuration resulted in an unbalanced load resulting in activation of the hoist's overload limit switch. The rigging team lifting an aircraft horizontal stabilizer did not recognize the repair manual instruction for removal of a component prior to lifting. This resulted in the total load weight exceeding the weight listed in the instruction. During the evolution to load test multiple single and one double-leg test handling devices, the rigger misinterpreted the procedure and applied the full test weight to a single leg of the double-leg device.

TWO-BLOCK

One two-block accident occurred in the first quarter compared to four in the fourth quarter FY20. A mobile crane was two blocked during operations to secure the crane for travel.

Lessons Learned: While securing the crane, the crane operator was not aware of the positioning of the whip headache ball in relation to the boom tip. The assigned signal person was not watching the whip hoist headache ball as it was raised and did not give the proper stop signal until the two-blocking occurred. The activity conducted a safety stand down on practices during and immediately after crane operations to include securing the crane with the use of a signal person. The importance of maintaining visual acuity and signaling responsibilities of the riggers and operators within the operating envelope of a crane at all times, and especially with an unloaded hook was stressed in WHPB 21-05 (Operations Without a Load).

NEAR MISSES

Activities reported 60 near misses (47 crane and 13 rigging) in the first quarter. This was a substantial decline from the 111 crane and rigging near misses reported in the fourth quarter of FY20. The level of near miss reporting is indicative of the level of oversight, a major contributor to reducing the occurrence of significant accidents. Navy Crane Center (NCC) issued WHPB 20-26, Decline in Near Miss Reporting, to encourage activities to hold the line on near miss reporting. NCC continues to recognize activities for reporting lessons learned through near misses, i.e., those where personal intervention prevented accidents, by issuing WHPBs 20-21, 20-23, 20-25 and 21-03.

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 most reports, inadequate pre-job planning, inadequate pre-lift briefings and a lack of supervisory oversight were determined to be contributing factors. Your assistance is needed to provide management and supervisory oversight and to identify issues at the lowest possible level to achieve the goal of zero significant accidents. I encourage you to also challenge other weight handling professionals to continue, and all others to join, in their efforts on educating the workforce to self-report deficiencies via the monitor program. This will increase the opportunities to share lessons learned throughout individual activities as well as with the Navy's weight handling community. 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 201A FAILURE OF JOHNSON DS 3018 CALIPER BRAKE ACTUATOR SPRING GUIDES

1. Revision

A. Revision: CSA 201 provides information and direction concerning failure of Johnson Industries caliper brake actuator spring guides. This revision provides additional information and direction for DS 3040 caliper brakes. This CSA supersedes and cancels CSA 201.

2. Background

A. The purpose of this CSA is to alert activities to the failure of the Johnson Industries model DS 3018 and DS 3040 caliper brake actuator spring guides. Three different activities have experienced failure of a spring guide on their Westmont 60-Ton portal crane whip hoist caliper brake, and most recently a spring guide failed on the luff hoist caliper brake. The spring guide failure is fail safe with respect to the overall operation of the brake; the brake sets upon spring guide failure.

B. Previous investigation had shown that failures of DS 3018 caliper brakes spring guides occurred on spring guides in excess of 200,000 cycles. Most recently, failure occurred on the DS 3040 caliper brake with approximately 97,000 cycles. The spring guide is of a similar design between to the DS 3018, DS 3040, DS 1050D, DS 3025D, DS 2050 and DS 1050 caliper brakes. These caliper brakes are installed on Samsung, Amclyde, Craft and Westmont portal cranes and may be utilized on other cranes. The caliper brakes on the Westmont 60-ton portal cranes are frequently cycled as they act as both emergency brakes and secondary hoist holding brakes. The caliper brakes on Samsung, Amclyde and Craft cranes act as emergency brakes only.

3. Direction

A. Based on the number of cycles to failure, activities with Johnson model DS3018, DS 10150D, DS 3025D, DS 2050 and DS 1050 caliper brakes shall remove hoists from service and replace spring guides before reaching 125,000 cycles. Activities with Johnson model DS 3040 caliper brakes shall replace spring guides before reaching 75,000 cycles. Spring guides for DS 3040 caliper brakes that are currently over 75,000 cycles shall be replaced no later than the next B PM.

4. Upon completion of ongoing failure analyses, a revision to the CSA will be published.

CSA 242 – INABILITY OF CRANE WIRELESS CONTROLLER BOX EDGE GUARD TO PREVENT INADVERTENT OPERATION OF CRANE

1. Background

A. An activity reported the edge guard on a crane wireless controller box did not prevent inadvertent operation of a crane when an operator leaned over the controller box resulting in uncontrolled movement of the crane. During lifts governed by NAVSEASSYSCOM (NAVSEA) 0989-030-7000, Lifting Standard, and for lists of higher level radioactive material per NAVSEA 0989-043-0000, Commissioned Surface Ship General Reactor Plant Overhaul and Repair Specification; NAVSEA 0989-037-2000, Commissioned Submarine General Reactor Plant Overhaul and Repair Specification; and NAVSEA 0989-049-6000, Prototype General Reactor Plant Overhaul and Repair Specification, crane controls must prevent uncontrolled lowering if the operator becomes incapacitated or the engineering activity shall take the action necessary to prevent this occurrence (i.e., control interlocks, a back-up operator, etc.).

B. After further investigation by the activity, Navy Crane Center and NAVSEASYSCOM conclude the edge guard around the top of the control box does not satisfy the requirements of NAVSEA 0989-030-7000, NAVSEA 0989-043-0000, NAVSEA 0989-037-2000 and NAVSEA 0989-049 -6000 for preventing uncontrolled lowering during operator incapacitation.

2. Direction

A. Upon receipt of this CSA, activities performing lifts per NAVSEA 0989-030-7000, or lifts of higher radioactive materials per NAVSEA 0989-043-0000, NAVSEA 0989-037-2000 and NAVSEA 0989-049-6000, shall not relay on the edge guard of a wireless controller box to prevent uncontrolled lowering due to operator incapacitation. An additional "deadman"-type switch or a backup operator shall be utilized.

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

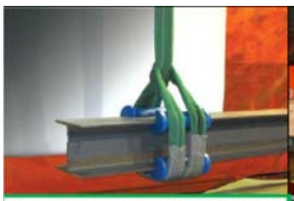
Weight Handling Program

Brief

Title: The "ABCs" of Sling Protection

Target Audience: Weight Handling Program Personnel

When using slings, keep in mind the "ABCs" of sling hazards: Abrasion, Bearing, and Cutting.



Riggers must be trained in recognizing the different damage types and determining what protection methods, materials, and components are required to adequately protect slings.

Use the Proper Materials for Sling Protection

- **Abrasion:** Can occur when the sling is in contact with rough surfaces, such as concrete pipe. The sling protection shall be suitable to accept the abrasion without being destroyed.
- **Bearing:** As the sling contact width decreases, the pressure increases and sling protection material may be severed. When required (e.g., small diameter pin with multiple highly loaded slings), the calculation for determining a sling protection's resistance to bearing failure shall be obtained from the sling OEM and varies according to the material, radius, and pressure.
- **Cutting:** Slings wrapped around corners and edges have the potential to fail. This is the primary cause of reported synthetic sling failures. Soft protective materials (canvas, fire hose, leather straps/gloves) do not ensure adequate protection from cutting and shall not be used. The sling must be completely blocked from contacting the load edge with a hard material, such as split piping sections or special rounded shoes (see illustrations). Sling OEMs also provide products that protect slings from sharp corners or edges. Activities should contact the OEM for availability of such products.

Note: Also, ensure the rigging configuration is stable and slings cannot slide off the sling protection.

1 December 2020 | Navy Crane Center | WHPB 20-24

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 FE PWD SASEBO** – While preparing to lift a loaded pallet, the riggers identified a defect (crack) in the pallet prompting the lift to stop.
- **TRF KINGS BAY, GA** – The pre-lift inspection of a submarine sail racetrack work platform showed significant frame rust and defective (indented) rollers/wheels that could potentially become detached from the frame when lifted.
- **PEARL HARBOR NAVAL SHIPYARD & IMF** – Removal of a towed array cover was stopped when the load indicating device read out reached the briefed stopping point. At this point the riggers identified hidden fasteners attaching the cover to the boat.
- **PEARL HARBOR NAVAL SHIPYARD & IMF** – A lift was stopped when the supervisor identified that the swivel hoist rings were incorrectly oriented and could have resulted in a side pull if the lift continued.

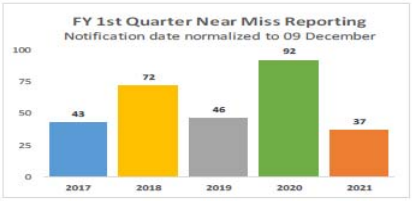
10 December 2020 | Navy Crane Center | WHPB 20-25

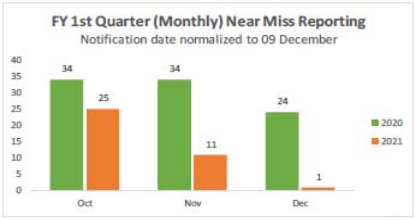
Navy Shore Weight Handling Program Brief

Title: Decline of Near Miss Reporting

Target Audience: Navy Shore Weight Handling Program Personnel

NCC has identified a **declining trend** in near miss reporting. NCC recognizes the efforts of the Navy's weight handling program professionals in reporting near misses and encourages all weight handling professionals to **Hold the Line**. In FY20, near miss reporting increased substantially across the Navy's weight handling community and year end totals reached an all-time high. However, early FY21 near miss totals indicates that near miss reporting has declined.





- As stated above, near miss reporting for 2020 was commendable and speaks volumes to each contributing command and re-enforces their commitment to improving the Navy's weight handling program. However, there has been a **recent decline** in near miss reporting beginning in the first quarter of FY21.
- Why report a near miss? By **focusing on and learning from minor events**, it is possible to reduce the probability of a significant accident. To date in the first quarter of FY21, 10 out of 37 near misses identified that a potential significant event was prevented (dropped load, overload, two blocking or injury).
- Each report provides an opportunity to **share lessons learned**, and increase awareness to all of an activity's weight handling personnel; instead of lessons remaining with the individuals performing the work.
- **ALL** personnel should be **encouraged** to recognize and report weight handling program deficiencies and potential near miss events. This starts with activities training all weight handling program personnel on the importance and expectations of a strong monitor "observation" program to help reverse this trend.

15 December 2020

Navy Crane Center

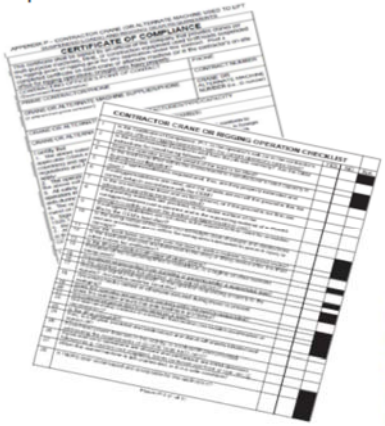
WHPB 20-26

Navy Shore Weight Handling Program Brief

Title: Oversight of Contractor Weight Handling Operations

Target Audience: Contracting Officer Representatives and Oversight Personnel

If you're involved in contract management or oversight of contractors performing weight handling related work, this brief is for you! Personnel providing oversight are required to complete the Navy Crane Center's Contractor Crane Awareness course (NCC-CCA-03) provided on Navy eLearning (NeL). As an alternative for NAVFAC employees, completion of the NAVFAC 40-hour Costruction Safety Hazard Awareness Training course will fulfill this requirement.



The Certificate of Compliance (NAVFAC P-307, Appendix P, Figure P-1) includes:

- **All safety devices** and operator aids are enabled and function properly.
- **Signal persons** used in construction work are qualified in accordance with 29 CFR 1926.1428 (or host nation equivalent requirements).
- **Riggers are qualified** in accordance with NAVFAC P-307, section 11.1.k.
- **All site personnel are trained** to not stand under a load or in the fall zone of a suspended load unless specifically allowed by USACE EM 385-1-1.

Note: *For construction contracts, UFGS-01 35 26 and USACE EM-385-1-1 may be followed in lieu of NAVFAC P-307, paragraphs 11.1.a through 11.1.g , 11.1.j through 11.1.m, and appendix P, Figures P-1 and P-2.*

Minimum frequencies for periodic oversight (using NAVFAC P-307, Figure P-2 or equivalent EM 385-1-1 form for construction contracts:

- Operational oversight is required **at least once every 30 days.**
- When operations include **critical lifts**, oversight shall be increased to at least **once every 14 days**.

The degree of and frequency of oversight shall be based upon overall level of risk.

19 January 2021

Navy Crane Center

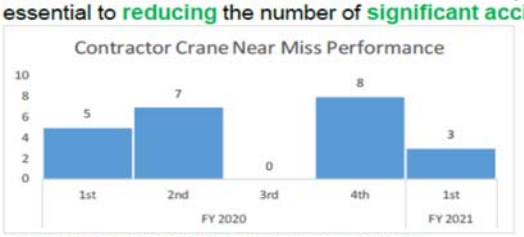
WHPB-21-01

Navy Shore Weight Handling Program Brief

Title: Contractor Weight Handling Accidents and Near Misses

Target Audience: Contracting Officer Representatives and Oversight Personnel

Contracting officer representatives and personnel who oversee contractor weight handling operations play a vital role in ensuring the safe operation of contractor weight handling equipment as discussed in WHPB 21-01 (Oversight of Contractor Weight Handling Operations). A review of FY20 contractor crane accidents identified a **significant accident rate of 45%,** which is well above the Navy's significant crane accident rate of 23%. In addition, the number of contractor crane reported near misses remains low. **Robust oversight** is essential to **reducing** the number of **significant accidents** during contractor weight handling operations.



As identified in NAVFAC P-307 paragraph 11.2.b , contracting officers shall notify the Navy Crane Center, by email (m_nfsh_ncc_accident@navy.mil), of serious accidents as soon as possible, preferably within 8 hours of notification by the contractor. For all other accidents, notify no later than 3 working days after the accident. The contracting officer (or designated weight handling representative) shall sign all contractor accident and near miss reports, to signify satisfaction with the investigation and proposed corrective actions.

Why report a near miss? Each report provides an opportunity to share lessons learned, and by focusing on the minor event, it is possible to reduce the probability of a significant accident. **Oversight personnel** should **encourage contractors to recognize and report** near miss events. FY20 contractor near miss lessons learned include the following:

NAVFAC HAWAII - An oversight representative intervened and prevented a contractor crane rigger from using a defective sling to lift an air conditioning unit.

NAVFAC HAWAII - A load of roofing material lifted by a contractor crane had unsecured wood located on the top of the load.

NAVFAC SOUTHEAST - A load was improperly rigged with nylon rope (not approved for lifting) and signaled by an individual not qualified as a rigger or signal person.

NAVFAC NORTHWEST - Government oversight personnel observed the operator leaving the cab of a mobile crane with a load that was not properly secured/supported.

21 January 2021 | **Navy Crane Center** | WHPB 21-02

Navy Shore Weight Handling Program Brief

Title: Crane and Rigging Lessons Learned – January 2021

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 and lower threshold crane accidents (contact with no damage, not even scrapped paint), which can be used for lessons learned at all activities. Well done to the following activities that identified and reported these near misses, where intervention prevented potential accidents:

- **NORFOLK NAVAL SHIPYARD** – While raising the hook to put tension on the rigging configuration, the rigger-in-charge (RIC) noticed that one of the four chain hoists had twisted and stopped the lift.
- **PORTSMOUTH NAVAL SHIPYARD** – A lift of a stage rack was stopped when the rigger identified a section of staging was not properly secured inside the rack.
- **PUGET SOUND NAVAL SHIPYARD & IMF** – A supervisor stopped the rigging operation of an electrical cabinet and prevented damage due to inadequate sling protection.
- **NSWC CRANE DIVISION (2)** – A lift was stopped when the operator realized the load was still attached to the foundation. Additionally, during another lift, an observer intervened when an employee walked into the travel path of a moving load and was not challenged by the operator.
- **TRF BANGOR** – During pre-rigging checks, the rigging team identified that a swivel hoist ring was not properly tightened.

2 February 2021 | **Navy Crane Center** | WHPB 21-03

Navy Shore Weight Handling Program Brief

Title: Category 3 Non-Cab Operated Crane Safety Course on JKO

Target Audience: Contracting Officers and WHE Program Managers

Category 3 Non-Cab Operated Crane Safety, USN-NCC-C3CS-04.2, is now available on JKO

The training course can now be accessed at the web address below:

https://jkodirect.jten.mil/Atlas2/page/login/Login.jsf

Users can log into JKO using a Common Access Card (CAC), or User Name and Password provided upon Sponsor and Account Approval

The NAVFAC P-307 **CATEGORY 3 NON-CAB OPERATED CRANE SAFETY** training course, **USN-NCC-C3CS-04.2**, is now available on Joint Knowledge Online (JKO). **USN-NCC-C3CS-04.2** is the only Navy Crane Center training course hosted on JKO at this time.

- **USN-NCC-C3CS-04.2** provides the Navy requirements for the safe operation of Category 3 non-cab operated cranes. Upon successful completion of this course, students will be able to: identify crane and component types, complete a crane pre-use inspection, determine load weights, load weight distribution, and sling angle stress, identify proper selection and use of rigging gear, identify proper crane communication methods, and identify crane and rigging accidents.
- As noted in NAVFAC P-307, paragraph 7.2, all Navy Crane Center (NCC) training courses are available on Navy eLearning (NeL) at https://www.aas.prod.nel.training.navy.mil/
- **JKO allows other Department of Defense Commands, Government Agencies, and Government Contractor personnel without a CAC** to request access to training with sponsor approval. Request a JKO account by selecting the "Non-Government Personnel / Sponsored Account Registration" link at the bottom right of the Login screen to initiate the request. The **sponsor must be a U.S. Military or Federal Government Civilian** and must have an email address that ends in .gov, .mil, ndu.edu, nps.edu or dodea.edu to validate the account. Personnel with a CAC should continue to access NCC training via NeL as normal.

4 February 2021 | **Navy Crane Center** | WHPB-21-04

Navy Shore Weight Handling Program Brief

Title: Risks Associated with Unloaded Hook Operations

Target Audience: Weight Handling Program Personnel

Recently a **rigger was seriously injured** at a private company performing work under a Navy contract when **the crane's hook caught on a structure and sprang free** striking the individual. Although no injuries resulted, Navy activities have reported similar events relating to movement of hooks with no load prior to or directly following a lift. Those events, which had the potential to cause significant damage and severe personal injury, show a need to reinforce safe and controlled crane operations from set-up to stowage. **Do not lower your guard at any time a crane is in operation.** All personnel involved in the operation must remain vigilant until the operating envelope is completely disestablished and adhere to the requirements and responsibilities identified below.

RECENT REPORTED EVENTS

- During removal of rigging gear after installing a logistic escape trunk (LET) enclosure, a 9-ton lever hoist hook snagged the LET and spread the hook.
- A crane's hook came in contact with a fence when the operator inadvertently left their foot on a control pedal.
- During no load operation, the main hook block on a Category 2 crane struck the crane's swing gate to the boarding platform.
- The unloaded hook block of a bridge crane contacted the mast of a forklift during removal of the forklift's mast.
- The main hook block of a mobile crane struck the boom during operation to secure the crane for transit.

Requirements & Responsibilities

- The signal person is responsible for communicating **ALL** crane movements to the operator. Communications shall be in accordance with NAVFAC P-307, paragraph 10.7.
- Only one signal person shall communicate with the crane operator at a time (except for the stop and emergency stop signals).
- The operator shall only make crane movements when directed to do so.
- If communication is lost, the operator shall stop operation until communication is re-established. The operator shall stop any time operations are judged to be unsafe, or if personnel are positioned in hazardous locations.
- Pre-job briefs should be specific and discuss specific hazards, to include personnel positioning and responsibilities.
- The rigger-in-charge has overall control of the operation and is responsible for coordinating the activities (to include positioning) of other team members.

9 February 2021 | **Navy Crane Center** | WHPB-21-05

Navy Shore Weight Handling Program Brief

Title: Near Miss Lessons Learned – February 2021

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 and lower threshold crane accidents (contact with no damage, not even scraped paint), which can be used for lessons learned at all activities. Well done to the following activities that identified and reported these near misses, where intervention prevented potential accidents:

- **NAVFAC FAR EAST (PWD SASEBO)** - Two separate lifts were stopped due to the slings not being seated correctly in the crane hook. Synthetic sling use criteria is contained in NAVFAC P-307, paragraph 14.7.4. Improper use of synthetic slings can easily result in severe weight handling events.
- **NAVFAC SOUTHWEST (SAN DIEGO)** - A lift to place a shipboard component pier-side was stopped by supervision when it was recognized that the rigger-in-charge was not positioned in-hull to monitor inexperienced riggers resulting in improper rigging gear attachment.
- **NSWC CARDEROCK DET MEMPHIS** - An operation to relocate a component was halted due to the load being too close to other obstructions (poor risk mitigation).
- **TRIDENT REFIT FACILITY KINGS BAY GA** - Rigging work to position a component was stopped when the rigger identified that a wiring harness was not connected correctly and would interfere with installation.
- **PWD VENTURA COUNTY** - A lift to remove a hydraulic cylinder from a wood pallet was stopped when the riggers noticed that gauges attached to the cylinder were wedged between the planks of the pallet.

25 February 2021 | **Navy Crane Center** | *WHPB 21-06*

Navy Shore Weight Handling Program Brief

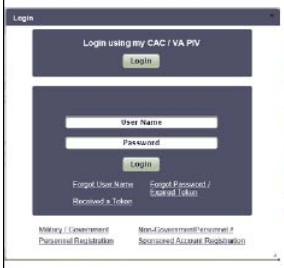
Title: Category 2 Crane Safety Course on JKO

Target Audience: Contracting Officers and WHE Program Managers

Category 2 and Cab Operated Category 3 Crane Safety, USN-NCC-C2CS-03.2, is now available on JKO

The training course can now be accessed at the web address below:

https://jkodirect.jten.mil/Atlas2/page/login/Login.jsf



Users can log into JKO using a Common Access Card (CAC), or User Name and Password provided upon Sponsor and Account Approval

The NAVFAC P-307 **CATEGORY 2 and CAB OPERATED CATEGORY 3 CRANE SAFETY** training course, **USN-NCC-C2CS-03.2**, is **now available** on Joint Knowledge Online (JKO) along with the Category 3 Non-Cab Operated Crane Safety training course, USN-NCC-C3CS-04.2.

- **USN-NCC-C2CS-03.2** provides crane operators with Navy requirements for the safe operation of Category 2 and Cab-Operated Category 3 cranes. Upon successful completion of this course, students will be able to: understand crane types and components, complete an Operator's Daily Checklist (ODCL), determine load weights, load weight distribution, and sling angle stress, identify proper selection and use of rigging gear, explain the crane team concept, identify proper crane communication methods, and identify crane and rigging accidents.
- As noted in NAVFAC P-307, paragraph 7.2, all Navy Crane Center (NCC) training courses are available on Navy eLearning (NeL) at https://www.aas.prod.nel.training.navy.mil/
- **JKO allows other Department of Defense Commands, Government Agencies, and Government Contractor personnel without a CAC** to request access to training with sponsor approval. Request a JKO account by selecting the "Non-Government Personnel / Sponsored Account Registration" link at the bottom right of the Login screen to initiate the request. **The sponsor must be a U.S. Military or Federal Government Civilian** and must have an email address that ends in .gov, .mil, ndu.edu, nps.edu or dodea.edu to validate the account. Personnel with a CAC should continue to access NCC training via NeL as normal.

10 March 2021 | **Navy Crane Center** | *WHPB-21-07*

Navy Shore Weight Handling Program Brief

Title: Increase in Events during Under Instruction Operations

Target Audience: Weight Handling Program Personnel

An increasing number of accidents and near misses have occurred during under instruction (UI) operations. NAVFAC P-307, Table 7-1 identifies courses which provide basic, fundamental trade related information for the qualifications necessary to conduct Navy weight handling operations. These courses reinforce and enhance existing knowledge for journeymen level personnel and provide a base upon which to develop less-experienced personnel through on-the-job training and mentoring. It is incumbent on the activity to evaluate and further develop the proficiency of less-experienced personnel.

OPERATOR IN TRAINING (OIT)

The OIT:
- Should **operate only under the direct observation and continuous supervision** of a licensed operator mentor (LOM), and
- **Cannot perform complex lifts.**

The LOM:
- Should be an experienced operator who **possess the knowledge, training, and experience** necessary to direct the OIT.
- **Retains full responsibility** for the safe operation of the crane, and
- Should not perform other tasks that detract from monitoring the OIT.

The OIT's Supervisor:
- Should assess the OIT's progress in operation without loads and gradually permit lifting loads of increasing size and weight.

NOTE: In some instances, the OIT's unfamiliarity with the crane's controls contributed to the event. It is critically important that the LOM ensure that the OIT is familiar with the crane's controls.

Recent Events

- While training on a Category 4 crane, the OIT's improper operation resulted in the hoist wire rope coming out of the boom sheave, damaging the rope.
- An OIT inadvertently extended the boom of a mobile crane without direction.
- While a UI rigger was signaling the installation of the forward Logistics Escape Trunk (LET) house, the LET house nearly struck a section of shipboard staging.
- The hook of a crane collided with a pierside Conex box during no-load operation by an OIT.
- The administrative control limit on the sling angle of rigging gear used to lift a valve was exceeded during a UI lift.

RIGGER TRAINEE

The Rigger Trainee:
- Should only perform rigging operations under **direct observation** of a qualified rigger until all training and qualification elements have been met.

The knowledgeable supervisor, manager, or designated activity representative:
- **Must** validate satisfactory completion of required training and adequate knowledge and/or skill in the areas listed in **P-307 Appendix N, paragraph 1.5.**

18 March 2021

Navy Crane Center

WHPB 21-08

Navy Shore Weight Handling Program Brief

Title: Near Miss Lessons Learned – March 2021

Target Audience: Weight Handling Program and Crane Oversight Personnel

During the 2nd quarter of FY21, Navy weight handling near miss reporting has shown a positive upward trend; however, both crane and rigging near miss reporting lags FY20 performance. NCC commends activities for their efforts and continues to stress the importance of oversight and the identification and reporting of near miss events which can be used as lessons learned to improve weight handling performance. Well done to the following activities that identified and reported these near misses, where intervention prevented potential accidents:

- **SRF YOKOSUKA** – A lift of a ship's component was stopped when the rigger identified two fasteners still installed, anchoring the load to the foundation.
- **NAVAL FOUNDRY AND PROPELLER CENTER** – Testing of a load test adapter assembly was halted when supervision identified that the synthetic slings were bunched on the crane hook.
- **PORTSMOUTH NAVAL SHIPYARD** - A lift of a propulsion shaft was stopped when the work leader recognized the synthetic sling started to shift away from the sling protection.
- **PEARL HARBOR NAVAL SHIPYARD** - Travel of a portal crane was halted when the crane walker identified improperly secured ship support hoses protruding into the crane travel zone.
- **NAVFAC SOUTWEST (SAN DIEGO)** - Removal of an engine was stopped when the supervisor identified a fastener still installed on the foundation plate and that sling protection was inadequate.
- **TRF KINGS BAY** – A supervisor identified a light cord protruding from the ceiling into the travel path of a bridge crane requiring an emergency stop of the crane to avoid contact.

23 March 2021

Navy Crane Center

WHPB 21-09

Navy Shore Weight Handling Program Brief

Title: Control of Mechanical and Gravitational Energies

Target Audience: Maintenance, Inspection, Engineering, Supervision and Management

In recent months, three maintenance errors resulted in the uncontrolled lowering of hoist blocks and the release of stored energy during hoist gear case and hoist brake maintenance. Fortunately, there were no personnel injuries; however, the most recent event resulted in the loss of an extremely critical crane for an extended period of time due to significant damage to the main hoist gear box. It is vital that personnel understand and mitigate the risks associated with accomplishing this type work.

Recent Events

- *The top half of a main hoist gear case was removed without lowering and securing the hoist block. Upon removal, a gear lifted with the cover in turn separating from the gear train, resulting in the hook block falling uncontrolled to the shop floor.*
- *While performing work on another gear case, workers did not adequately secure the hoist drum, resulting in the uncontrolled lowering of the hoist block causing a mechanic to attempt to replace the gear case cover to stop the lowering of the hoist block.*
- *During maintenance of a motor/brake, a hoist gear slid out and caused the drum to free spin and the hook block to lower uncontrollably to the ground. The maintenance team did not recognize that the gears were not captured and there was a potential for them to be removed with the cover.*

⚠ WARNING **Identifying Hazardous Energy on the Worksite** **⚠ WARNING**

Here are some examples of the types of questions you need to **ask yourself** prior to starting the work.

- What could happen if I disassemble a component without control measures in place?
- Is stored (mechanical, gravitational, hydraulic, or pneumatic) energy present in the component to be worked (e.g. elevated components, rotating gears or flywheels, hydraulic and pneumatic systems)?
- Before I start work, are there any additional measures (e.g., second brake, tie back, or bar in the drum,) that I must employ to release or contain stored energy to prevent uncontrolled movement of the hoist, boom, or rotate assembly, etc.?
- As a supervisor assigning the job, is there special PPE, briefings, tooling, guarding, training or procedures, supervision, etc., needed to mitigate the risks? Procedural reviews should **always** include the original equipment manufacturer's instructions!

1 April 2021 **Navy Crane Center** *WHPB 21-10*

Navy Shore Weight Handling Program Brief

Title: Near Miss Lessons Learned – April 2021

Target Audience: Weight Handling Program and Crane Oversight Personnel

Navy weight handling near miss reporting continues to trend upward and marked improvement was noted over the past month. NCC commends activities for their efforts and continues to stress the importance of oversight and the identification and reporting of near miss events which can be used as lessons learned to improve weight handling performance. Well done to the following activities that identified and reported these near misses, where intervention prevented potential accidents:

- **NMCPAC CWD UNIT INDIAN ISLAND** – A supervisor noticed incorrect alignment of the lifting sling assembly and halted the evolution prior to execution of the lift avoiding possible damage to the sling assembly.
- **NAVFAC FAR EAST (YOKOSUKA)** – A lift of scaffolding was stopped when it was recognized that outrigger cribbing for the mobile crane was incorrect.
- **PORTSMOUTH NAVAL SHIPYARD** - Potential damage to a propulsion shaft was avoided when the supervisor stopped the shaft from being set down on inadequate blocking.
- **NAVFAC EURAFCENT (ROTA)** - Lifting of a shipboard load was stopped when the rigger identified that the lifting strong back was not properly attached by ship's force.

CONTRACTOR CRANE NEAR MISS

- **NAVFAC SOUTHEAST (FORT WORTH)** - Government oversight personnel intervention was required during a contractor crane lift of a building's HVAC system. Discrepancies included worksite congestion, lack of a lift plan, incorrect weight of the HVAC unit, and failure of the workers to recognize and remove fasteners securing the old HVAC unit to its foundation.

15 April 2021 **Navy Crane Center** *WHPB 21-11*

FESTOON COMPONENTS

Festoon hardware consist of several components that support the power and control cables for safe and reliable operation of the crane. Care is required during initial installation and subsequent maintenance and adjustment to ensure that damage does not result during operation. Hardware components may include the tow trolley, tow bar, cable trolley, tow webbing, and shock cord assembly. These components reduce stress on the festoon power and control conductors or cable.

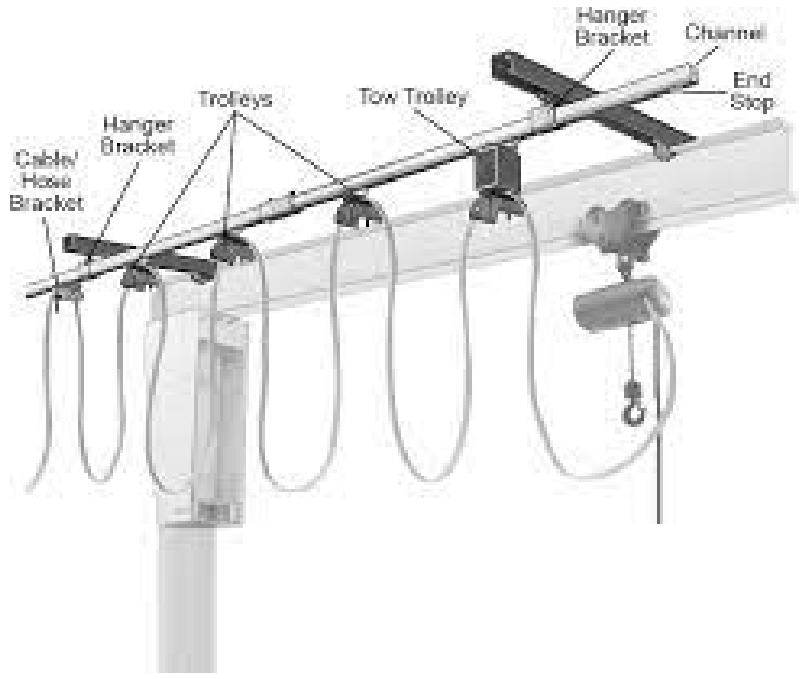
- The tow trolley provides an area to interface with the tow bar. The tow bar, fixed to the crane, engages the tow box to move the festoon system. The tow bar should be centered top to bottom in tow box that allows the crane or hoist to move up and down and not cause any damage.

- The cable trolley (support saddle) is the device that carries the festoon cable down the track. Flat cable arrangements should be such that larger conductor size cables (power cables) are on top of the stack when placed on the support saddle, which provides a large bend radius for the larger power cables. With a combination of flat and round cables, place large round cables on the outer most positions of the cable saddle.

- The tow webbing is for both high speed and outdoor applications to reduce the shock and pulling tension on the electrical cable. Tow webbing is not necessary on all systems. The tow webbing is installed on top of the electrical cable and is held in place with the saddle on the cable trolley. The tow webbing for the power side of the festoon system webbing is three inches less in length than cables per loop.

- The shock cord assemblies are shorter than tow cables, are used in pairs, and are spring loaded acting as shock absorbers to limit undue stress when the festoon trolley begins to move.

After performing maintenance or repair, it is important to ensure festoon hardware is re-attached correctly. This includes, but is not limited to, ensuring festoon cable loops do not extend low enough to come into contact with obstructions, cable is properly secured to not allow excess movement of components, all fasteners are properly secured, festoon cables are arranged free of twist, and suitable strain relief is provided/maintained.



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, preuse 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.