THE CRANE CORNER

Navy Crane Center Technical Bulletin

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A WORD FROM TOPSIDE

Tim Blanton

The Navy, in partnership with the Marine Corps and the Coast Guard, recently issued its revised maritime strategy in support of our national, defense, and homeland security strategies, with the key words Forward, Engaged, Ready. At the same time, Commander, Naval Surface Forces (COMNAVSURFOR), in a recent warfighter message to the fleet, noted that "Mishaps and injuries, both on and off duty, are preventable detractors to warfighting. By avoiding them, we directly improve our warfighting readiness."

The Navy Crane Center's mission is closely aligned with these themes.

Forward: Navy shore-based activities, detachments, and operating force units perform vital weight handling operations in strategically important locations around the world including Africa, the Middle East, Europe, and East Asia as well as island enclaves in the major oceans. Navy Crane Center provides reach-back support to these activities in terms of engineering and technical assistance, training and interpretation of requirements, advice on safe lifting and handling, and accident reporting assistance.

Engaged: We maintain continuous engagement with all of the 420+ activities and units that perform weight handling through our evaluation program. Through short visits to the activities, we evaluate their programs, both for compliance to the rules and for vulnerabilities, efficiency, and effectiveness. The on-site evaluation enables us to identify deficiencies and poor practices, work processes that can be improved or performed more safely, excess equipment, staffing issues, and poor contractor operations. One recent development has been a significant loss of experienced weight handling personnel which has resulted in challenges in maintaining required crane availabilities, affecting activity missions. This had led to an increase in contractor support. We must be diligent to ensure our expectations are clearly communicated to and executed by our contractor partners.

Ready: Navy Crane Center procures or provides acquisition assistance for cranes required for ordnance and strategic weapons handling, submarine refueling, ship and aircraft repair, and other services vital to the support of the Navy's mission. In FY14 there were 75 cranes under manufacture for the Navy Crane

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Center with a value of more than $37 million, and we provided acquisition assistance on 52 cranes procured by others. Our engineers participate in numerous standards committees for weight handling equipment design, operation, and life-cycle management.

Additionally, we work closely with industry in ensuring equipment deficiencies are quickly resolved and in the development of new technologies, e.g. we are currently supporting the trial of synthetic hoist rope for mobile cranes.

In his warfighter message, COMNAVSURFOR noted "the human factor of cutting corners and how not following established procedures leads to future problems." He said "it is often the gradual and repetitive nature of small transgressions and breakdowns of discipline that allows corner-cutting behavior to propagate and grow." In the weight handling arena, Navy Crane Center strongly encourages all activities to institute an oversight (monitor) program to self-identify, document, and report these small transgressions and corner cutting. Identifying the skipped steps and unsafe acts early will prevent accidents from occurring, accidents which "cause a loss of focus on our first priority of warfighting." For the first time, the "near misses" reported to the Navy Crane Center have exceeded the number of accidents reported. This is a positive milestone.

Weight handling accidents will happen. Weight handling is high risk. With this in mind, our goal is zero OPNAV-reportable accidents and zero Class A, B, or C. To add to that, we want to eliminate those types of accidents that, though usually minor, have the potential to be more serious and, therefore, which Navy Crane Center has designated as 'significant' (two-block, overload, dropped load, injury, derailment, and power line contact).

As noted above, the Navy Crane Center's mission aligns with our nation's maritime strategy. Safe and effective weight handling is essential to fleet readiness. ■

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.

CSA 212A – MANUAL BRAKE RELEASE LEVERS

Remarks: Revision: CSA 212 directs activities to remove all removable brake manual release levers and store them off the brake. This revision provides clarification as to the types of brake levers to be removed per CSA 212. This revision replaces CSA 212 in its entirety.

Background:

A. The purpose of this CSA is to disseminate information regarding problems experienced from manual brake release levers installed on brakes during operation and to provide additional direction regarding removal of manual release levers.

B. CSA 175 directed activities to remove manual release levers from Cutler Hammer type M brakes. Additionally, CSA 175 recommended activities remove manual release levers for other brakes where the levers were easily removable and re-installable. CSA 175 is hereby cancelled.

C. There have been multiple incidents reported by activities where an installed manual release lever has prevented a brake from setting properly during operations. In one incident, the manual release lever on a hoist brake was found engaged (brake defeated) after becoming bound as a result of jogging the hoist controls. Discussion with the activity stated the lever had not been removed as recommended by CSA 175 due to being considered not easily removable and re-installable at the time; however, as a result of the incident the lever has been removed from the brake and is re-installed solely for testing purposes. In another incident, the manual release lever on a hoist brake was discovered engaged (brake defeated) after a crane accident. Again, the levers had not been removed from the crane as recommended by CSA 175 for various reasons.

Direction:

A. Before or during the next annual or "B" preventive maintenance period, all removable manual release levers for brakes shall be removed and stored off the brake except the following:

i. Release levers of brakes that automatically reset from a manually released state once power is applied do not require removal unless the local engineering organization determines there is an appreciable risk of the lever affecting operation of the brake.

ii. Release levers on travel brakes do not require removal.

B. Brake release levers that are not removable or would require removal of other components beyond non-load bearing covers to remove the lever may be left installed provided any obstructions that may affect proper operation of the brake have been removed. Operations, such as the jogging operation described in the Background that could engage the brake release lever (brake defeated) shall be mitigated through operating restrictions posted at the control station or physical restraint of the brake release lever.

C. Removal of brake release levers is considered a local crane alteration in accordance with NAVFAC P-307, paragraph 4.3.

CSA 218 – POSSIBLE DEFICIENCY WITH EMERGENCY STOP ON TELECRANE F21 AND F24 RADIO REMOTE CONTROLS

Background:

A. The purpose of this CSA is to alert activities of a possible deficiency with Telecrane F21 and F24 radio remote controls. Activities may find the Telecrane model number on the serial number label of the remote control. Telecrane Power Save Safety Notice dated December 2013 documented the possibility of the emergency stop button not functioning properly if the radio remote control has been programmed for power save mode. Pushing the emergency stop button while activated in the power save mode will transmit a shorter than normal radio remote control stop signal. A shorter signal can prevent the transmitted emergency stop signal from reaching the receiver and may require multiple attempts in order for the emergency stop signal to work appropriately.

B. The safety notice was distributed by Intercontinental Technologies Limited (ITL). ITL distributed Telecrane products in the United States; however, ITL is no longer in business and there is no current United States distributor for Telecrane products. The safety notice stated ITL had never offered the power save option on any Telecrane remotes it distributed; however, there still exists the possibility that other vendors or secondary companies could have programmed the controllers to enable the power save mode. Telecrane radio remote controls, models F21A, F21B, F21C, and F21D and other models without power saving mode are not affected.

Direction:

A. Within the next 90 days, activities shall identify all Telecrane F24 and F21 radio remote controls in their inventory and perform the appropriate actions in paragraphs B and C.

B. Activities with F24 radio remote controls shall verify that the power save mode is not activated on these remote controls. The instructions for how to verify if the power save mode is active can be found on the Navy Crane Centers website at https://hub.navfac.navy.mil/webcenter/content/conn/WebCenterSpaces-ucm/path/Enterprise%20Libraries/ncc/Documents/TELECRANE_TEST_MARCH2014.pdf. Activities shall report the number of F24 remote controls they have to the Navy Crane Center. Activities that find the power save mode active shall remove the remote controls from service immediately and contact Navy Crane Center for resolution.

C. Activities with F21 radio remote controls shall contact Navy Crane Center to determine appropriate verifications of the deactivation of the power save mode.

D. Navy Crane Center will provide updated information or direction as a revision to this CSA.

CSA 219 – POSSIBLE DEFICIENCY WITH OMRON RELAY SOCKETS

Background:

A. The purpose of this CSA is to inform activities of a potential deficiency with relay sockets manufactured by Omron Relay & Devices Corporation. The subject relay sockets have the part number PYF08A and are used in combination with Omron type MY2 ice cube relays. It is reported that pin 5 on the potentially deficient sockets may detach due to insufficient crimping and may result in the pin connection in the middle of the socket base becoming disconnected from the conductor screw terminal on the outside of the socket base. These types of relays are most commonly used on cranes that utilize electronic controls.

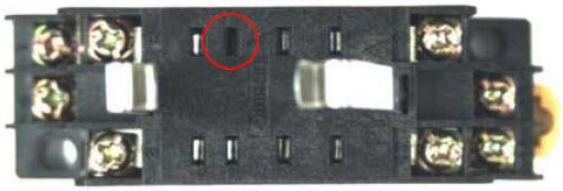
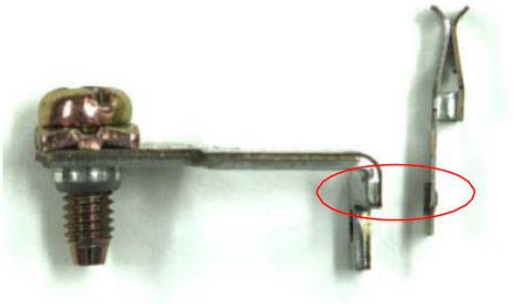
B. An activity reported a failure of an Omron PYF08A relay socket on Meiden bridge travel panel located on a bridge crane manufactured by Nippon Crane. Failure of this relay socket caused a speed point not to operate correctly. Discussions with Omron indicated that these relay sockets were not directly distributed in the United States.

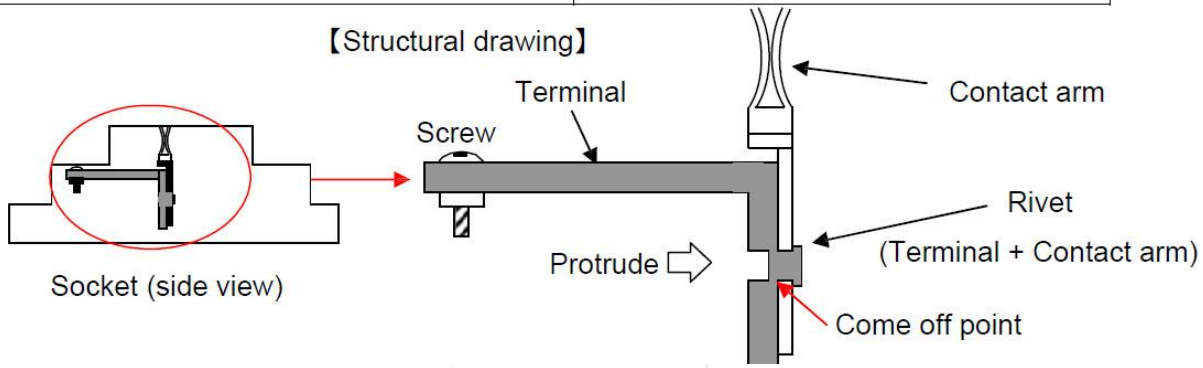
C. Omron has acknowledged the problem with the PYF08A relay sockets and has determined that the problem resulted from improper riveting on specific sockets manufactured between November 2, 1999 and March 8, 2000. The lot #numbers of the deficient relay sockets all end in Y4(XXXXY4) and are as follows: 02Y9, 03Y9, 04Y9, 05Y9, 06Y9, 08Y9, 09Y9, 10Y9, 11Y9, 12Y9, 15Y9, 17Y9, 18Y9, 19Y9, 22Y9, 24Y9, 25Y9, 26Y9, 27Y9, 29Y9, 01Z9, 02Z9, 03Z9, 06Z9, 07Z9, 08Z9, 09Z9, 10Z9, 13Z9, 14Z9, 15Z9, 16Z9, 17Z9, 20Z9, 21Z9, 22Z9, 24Z9, 25Z9, 27Z9, 0510, 0610, 0710, 0810, 1110, 1210, 1310, 1410, 1510, 1710, 1810, 1910, 2010 2110, 2410, 2510, 2610, 2710, 2810, 0120, 0220, 0320, 0420, 0720, 0820, 0920, 1020, 1420, 1520, 1720, 1820, 2120, 2220, 2320, 2420, 2520, 2820, 2920, and 0130. The lot #number can be found stamped on the side of the socket in white.

Direction:

A. For activities located outside of the United States and Europe, prior to or at the next annual maintenance period, activities shall identify if they have any Omron PYF08A relay sockets with the lots #numbers that are identified in the background. Activities that find affected sockets shall obtain replacement relay sockets from Omron and notify Navy Crane Center.

B. For activities located in the United States and Europe, prior to or at the next load test certification (Cat 2 and 3 cranes) or C maintenance period (Cat 1 and 4 cranes), activities shall identify if they have any Omron PYF08A relay sockets with the lots #numbers that are identified in the Background. Activities that find affected sockets shall obtain replacement relay sockets from Omron and notify Navy Crane Center.

Entire photo of socket	Terminal No.5 come off
	



CSA 220 – POTENTIAL FOR IMPROPER ACTIVATION OF HOIST LOWER LIMIT SWITCH ON BUDGIT MODEL BEHC HOIST

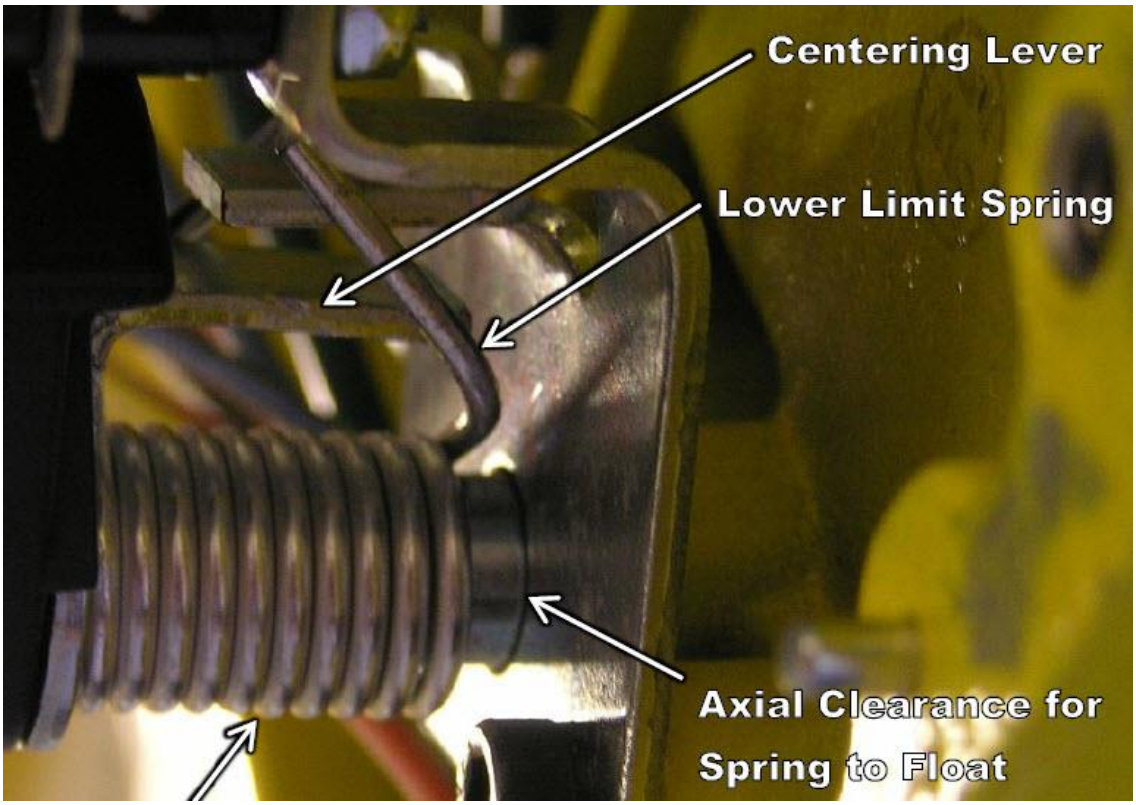
Background:

A. The purpose of this CSA is to inform activities of the potential for the hoist lower limit on Budgit model BEHC chain hoists to remain in the activated position even after exiting the lower limit, restricting the ability to hoist down.

B. The OEM has identified that the original design of the limit switch and shaft assembly (Part Number BH-1850) allowed for excess spring lateral float, which may cause the tab of the spring actuator to slip off the centering lever. This condition will cause the lower limit to remain active even after exiting of the lower limit. The OEM has redesigned the limit switch by lengthening the centering lever within the limit switch assembly to prevent slippage of the spring tab. The

part number for the centering lever, BH-1862, has not changed. This change also affects Yale KELC, Yale KELB, and CM Man Guard hoists which are identical to the Budgit BEHC hoist except for brand name.

Direction: Before or during the next annual preventative maintenance period, activities shall replace the limit switch centering lever (part number BH-1862) on Budgit BEHC, Yale KELC, Yale KELB, and CM Man Guard hoists manufactured before September 24, 2014.



CSA 221 – CLEVELAND TRAMRAIL ARCH BEAM WELDS

Background:

A. The purpose of this CSA is to inform activities of the possibility of weld failure in Arch Beams manufactured by Cleveland Tramrail. Cleveland Tramrail is now owned by Gorbel, Inc. Gorbel has issued a warning of the possible dangers of age and fatigue in the welds of Arch Beams. Arch Beams (also known as castellated beams) may be identified by the half circle cutouts in the web of the beam. The Arch Beams in question can also be identified by the name Cleveland embossed on the web of the beam. Arch Beam track was phased-out of production in 1962 and replaced by Tarca Beams.

B. Navy Crane Center has conducted independent inspections of Arch Beam samples and has found most of the Arch Beam web to bottom flange welds to be of poor quality containing numerous discontinuities. An additional evaluation by another Navy activity of extensive weld inspections of Arch Beams noted various weld discontinuities and cracks that were formed

during fabrication, but revealed no crack propagation from continued use. Based on these inspections, it appears that many of these beams were fabricated using poor weld processes and minimal quality control. Navy Crane Center recommends using AWS B1.1 and AWS B1.10 to assist activities in the identification of defects during weld inspections.

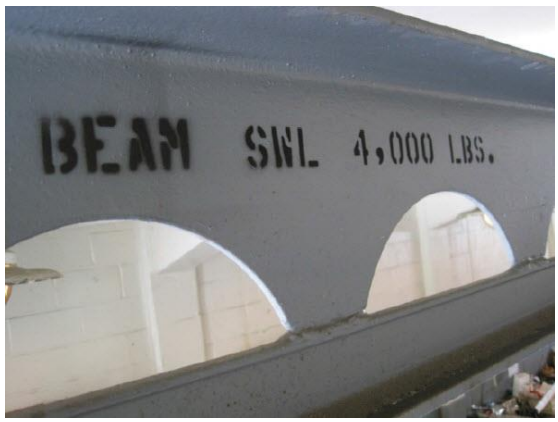
Direction:

A. Within the next 180 days, activities shall evaluate their inventory for Arch Beams manufactured by Cleveland Tramrail. Activities shall report to Navy Crane Center all in-service installations of Arch Beams, including building location and approximate length. Out-of-service Arch Beam locations that are intended to be put back in service at a later date shall also be reported.

B. Activities that have identified Arch Beams manufactured by Cleveland Tramrail in their facilities shall continue to perform a visual inspection of welds during every annual inspection as is currently required by NAVFAC P-307. Prior to Arch Beam inspection, Navy Crane Center recommends removing only the dust and dirt covering the welds (without removing paint) due to the likelihood that the paint on the Arch Beams contains lead and should be treated as such until proven otherwise.

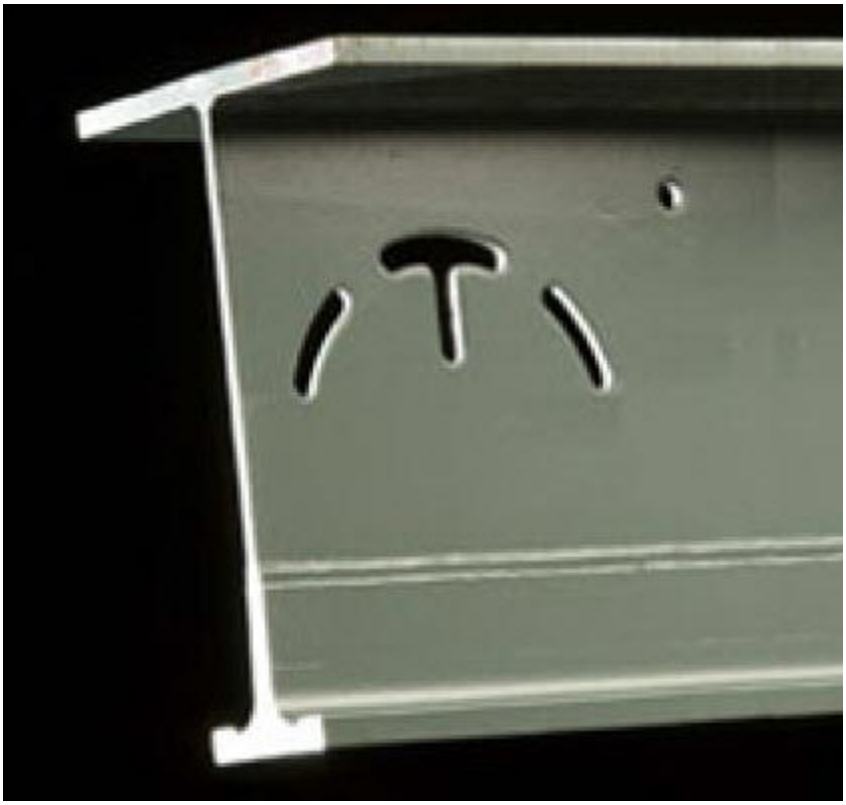
C. During the next annual visual inspection, activities with Arch Beams shall pay special attention to the welds that connect the bottom flange to the web. These inspections shall include the use of 5X magnification on suspect areas. Suspected cracks identified during inspection shall be verified by nondestructive inspection. Any Arch Beam section identified as having weld cracks shall be removed from service and reported to Navy Crane Center. Defects in welds, excluding cracks, are not necessarily rationale for removing the Arch Beams from service; however, the defects shall be documented.

D. Weld repairs to Arch Beams are not authorized due to the unknown carbon content of the steel. The Arch Beam webs were manufactured from ASTM A7 steel and the material specifications at the time of manufacture did not require the control of carbon content. Unsatisfactory sections of Arch Beam shall be removed from service and replaced using the Crane Alteration process. Tarca beam is a direct substitute that will match existing Arch Beam sections that pass inspection.



Tramrail Arch Beam

Tramrail Arch Beam


Gorbel Tarca Beam

EDM 105 – ABNORMALLY NOISY YALE K SERIES HOISTS DUE TO GEAR BOX OIL TYPE

A. The purpose of this EDM is to inform activities of an alternative to the revised oil formulation for the hoist gearboxes on Yale K Series hoists.

B. An activity reported a loud abnormal chattering/grinding noise after replacing the gearbox oil on a Yale K Series hoist with a new oil formulation from the OEM. Replacing the newly

formulated oil with the original OEM oil formulation and exercising the hoist caused the chattering/grinding to subside and hoist operation returned to the original low noise condition.

C. The oil formulation (Part Number 6496850-00) for Yale K Series hoists was revised in 2006. Activity research determined that the new oil provided by the OEM was no longer heavy paraffinic based. After researching other oils available, the activity determined that Gulf Universal Tractor Fluid (UTF) contained the similar properties (heavy paraffinic additives) as the original Yale oil formulation. Gear cases filled with UTF have demonstrated similar performance to the older formula OEM oil and have proven to be a successful substitute to eliminate gearbox chatter in Yale K Series hoists.

D. NAVCRANECEN recommends that activities experiencing excessive chattering or grinding noise on Yale K Series hoists review the type of oil being used in the gearbox and replace with a heavy paraffin based oil with similar properties as the original Yale oil. ■

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. ■

Navy Shore Weight Handling Safety Brief!

Title: "PINCH POINT" AWARENESS AND PREVENTION

Target Audience: CRANE TEAMS AND SHIPBOARD RIGGERS

Examples:

A Rigger became distracted and placed his hand in a "***pinch point***" between the webbing sling and the suspended load that was moving. Wave action against the floating crane could cause the load to rise and lower trapping the riggers hand or fingers. **Never place your hands between the rigging gear and the load**.

Crane Rigger positioned himself in a "***pinch point***" as he signaled the crane to up-right a 20,000 pound tower crane counter weight. If the weight slid toward him he would be crushed.
**Signal the crane from the ground, if the load does slide no one will be injured.

***D*uring** the first quarter of Fiscal Year 2015, **six personal injuries** occurred during rigging operations. Most were "pinch point" related injuries that could have been prevented by properly planning and executing the work and by applying good situational awareness of the work environment.

A "**pinch point**" is any point at which it is possible for a person or part of a person's body to be **caught between a stationary object and a moving object**.

You can minimize the potential for "pinch point" related injuries by;

- Identifying objects in the crane or rigging envelope that move or are capable of moving. Ask yourself, "What will happen if this moves? Will I be in the path of that movement?" Avoid putting your body, hands, fingers, toes, or feet in pinch points.
- Being aware of pinch points created by objects that move and come into direct or close contact with relatively fixed objects (e.g., Loads in close proximity to bulkheads or other fixed equipment, loads that are swept by the rigging, suspended loads near fixed or mobile equipment). Ask yourself, "If this load moves or shifts unexpectedly, will I be in the way?"
- Never placing yourself or any part of your body in a potential pinch point area unless protective measures are provided for such activity. When reaching for an object, consider where your body parts are located. If any are within a pinch point, identify an alternative position out of harm's way.

Note: Shipboard rigging can be a difficult task. The rigging envelope is usually smaller due to work in confined areas. As such, rigging personnel must be extra vigilant in protecting themselves and others from pinch points during load handling or movement!

14 January 2015

SAFETY

Navy Crane Center 15-S-01

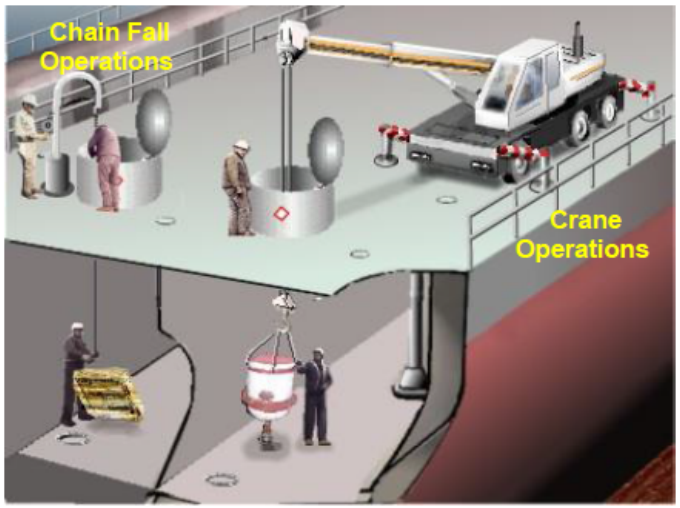
Navy Shore Weight Handling Safety Brief!

Title: Lifting Through Hatches and Other Openings

Target Audience: Rigging Personnel

Potential hazards to consider when lifting through hatches and other accesses:

- Hatch doors and mechanisms, rough hull cuts
- Ladders, railings
- Mechanical and electrical systems (piping, wiring, lighting, panels)
- Utilities and services (air, water, ventilation, welding and gas lines)
- Beams, other equipment or components
- Personnel in locations that may be hazardous (pinch points, falls, etc)
- Noise that affects communication



Notify your supervisor immediately of any intrusions, e.g., ventilation hoses, electrical cables, ship's structure or utilities, into your path or rigging path that can not be mitigated. Maintain a high level of awareness for any intrusions that may appear during the lift evolution.

Accident metrics have identified a negative trend involving rigging gear that was being hoisted from confined or enclosed areas and getting snagged on structure. During these events, the crane was normally hoisting with only the rigging gear on the hook.

Personnel tend to lessen their situational awareness and reduce their attention to the load once the load has been disconnected from the rigging gear. Hoisting the unloaded rigging gear back out of an access requires the same level of attention that was given when lowering the loaded rigging gear into the access. In other words…just because the load has been removed from the hook is no reason to turn your attention away from the lift evolution.

The Rigger in Charge (RIC) should evaluate the rigging path and identify, remove or evaluate all obstructions and possible hang-up points, through the entire rigging path. All personnel involved in the lift shall be briefed.

During the pre-job brief:

- Identify potential interferences and mitigation methods
- Identify the need for increased situational awareness for hazards that may arise during the lift.
- Identify the need to ensure the rigging gear remains clear during removal.
- Discuss the communication method to be used.
- Identify appropriate stopping points.

25 February 2015

SAFETY

Navy Crane Center 15-S-02

Navy Shore Weight Handling Safety Brief

Title: Portable Floor Crane Requirements

Target Audience: All activities with applicable equipment

PORTABLE FLOOR/ SHOP CRANES

Navy Crane Center continues to receive reports of structural failures of portable floor cranes that do not meet the required safety standards. The required standard for portable floor cranes has recently changed as the *ASME Portable Automotive Lifting Devices (PALD)* has been revised to the *Portable Automotive Service Equipment (PASE) 2014*. Activities shall ensure that the ASME PASE 2014 is utilized in procurements and ensure that the equipment received meets the standard. Following are some of the requirements that must be followed by activities for portable floor cranes:

- ***NAVCRANEINST 11450.2, Section 2-9.7 (b):*** Portable floor cranes shall meet ASME PALD *(now ASME PASE)* and manufacturer's recommendations.
- ***NAVFAC P-307, Table 14-1:*** Portable floor cranes shall be load tested to 125% every 2 years.
- ***NAVFAC P-307, Section 14.10:*** Portable floor cranes shall be operated, maintained, and inspected in accordance with ASME PALD (now ASME PASE) and OEM recommendations.
- ***ASME PASE 12-3.1 (PALD, Section 9-3.1) :*** Safety markings shall conform to ANSI Z535 series of standards.
  - (a) Study, understand, and follow all instructions before operating device.
  - (b) Do not exceed rated capacity.
  - (c) Use only on hard level surface.
  - (d) Before moving, lower the load to the lowest possible point.
  - (e) Failure to heed these markings may result in personal injury and/or property damage.

Activities shall ensure that they procure and use portable floor/shop cranes in accordance with ASME PASE or ASME PALD, manufacturer's recommendations, and NAVFAC P-307. Activities shall also ensure that they test portable floor/shop cranes in accordance with NAVFAC P-307.

17 March 2015

SAFETY

Navy Crane Center 15-S-03

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS
FIRST QUARTER FY15

For the first quarter of FY15, 54 Navy WHE accidents, 43 crane and 11 rigging, were reported. Of the 54 accidents, 14 (26 percent) were considered significant (overload, dropped load, injury, two block, or derailment). When compared to the previous quarter, a 30 percent decrease in total accidents and an 18 percent decrease in significant accidents were realized. It is important to note that rigging gear accidents accounted for more than half of the total number of significant accidents and that 73 percent of the rigging gear accidents were significant. Additionally, 75 percent of the significant rigging gear accidents involved injuries. Contractors reported a total of seven crane and rigging gear accidents including two significant accidents.

INJURIES

Accidents: Seven injuries were reported in the first quarter of FY15, increasing from four over the previous quarter. Six of the injuries occurred during rigging operations, and one of the injuries was reported as a Class "C" mishap. While rigging a shipboard generator to its foundation, an assist worker's hand was pinched requiring surgery. A flask shifted in the rigging causing a rigger's finger to get pinched (fracture and laceration) between the load and a stationary object. A mechanic's finger was pinched and cut during rigging work to remove a battery from the ship's battery well. An employee's hand was injured when he got his hand in a pinch point between the load chain and housing of a pneumatic hoist. A rigger cut his finger on a vent on top of a motor when he pulled his hand clear of a pinch point. A mechanic's hand was injured when the hand crank for a portable "A" frame released suddenly (sprung back) and struck the employee on the hand (fracture). A rigger was injured during a rigging evolution to install a fairwater plane linkage assembly when a mechanic thrust the linkage pin through its connection point striking the rigger in the face.

Lessons Learned: Five out of the seven injuries occurred when a body part was caught in a "pinch point." The remaining two injuries resulted when employees were struck by gear or a component attached to the load. A "pinch point" injury occurs when a person or part of a person's body is caught between a stationary object and a moving object. The load is commonly the moving object, but the moving object can also be the rigging gear (hoist). These types of injuries can be prevented by applying risk management techniques during job planning and preparation. As part of job planning and oversight, recognize that a lack of worker experience with the job process or immediate surroundings of the work may increase risk in the performance of the work. Consider team make-up to ensure that there is a proper balance in the experience levels needed to safely perform work. Encourage mentoring and monitoring of those that are less experienced by the more experienced personnel. Situational awareness is essential on the jobsite in order to recognize "pinch points" during weight handling operations, especially when space is restricted. When reaching for an object, always consider the possibility that you may be placing yourself or an extremity in a "pinch point" and stop if necessary. Needlessly placing your hand on components only increases the risk of getting it caught in a "pinch point." Lastly, always use clear and concise communications when commencing any movement of the load or operating the rigging gear.

DROPPED LOADS

Accidents: Three dropped load accidents were reported, and the causes were identified as improper rigging and/or equipment failure. While lifting a piece of plate steel with a non-marring plate clamp, the plate slipped out of the clamp and dropped about one foot onto the shipping pallet. The plate had not been properly cleaned before attaching the plate clamp. The welds on a gas turbine's forward lifting attachment broke, causing the front end of the turbine to drop to the deck. A sling dislodged from a bridge crane hook during an attempt to lift a load from a trailer. Investigation revealed that the rigging gear used imposed an unacceptable sling angle due to not understanding the loads center of gravity which caused the sling to release from the throat of the hook.

Lessons Learned: Activities can prevent these types of dropped load accidents by training personnel to: comply with all original equipment manufacturer recommendations in order to ensure the equipment performs its intended function; inspect the connection point prior to rigging gear installation to ensure there are no foreign materials (oil, grease) that could impact the gear from holding the load; ensure personnel understand the meaning of the load's center of gravity (COG), and that the COG is known or calculated prior to lifting or drifting loads. Additionally, NAVFAC P-307, section 14, requires that all hooks be loaded only in the bowl of the hook. The included angle of the slings shall not exceed 90 degrees unless approved by the activity's engineering organization. No side loading of hooks is permitted. If an equipment failure is the cause of a dropped load action, the cause of the failure must be accurately determined and reported to establish appropriate corrective actions to prevent recurrence.

OVERLOADS

Accidents: Four overload accidents occurred in the first quarter, including three rigging gear overloads and one crane overload. After placing a temporary trailer shipboard, damage on the outside surface of the trailer caused by the rigging gear was identified, and during the accident investigation it was identified that a sling was overloaded during the lift. While rigging a lube oil tank into position, the hooks on two 1/4-ton chain falls were deformed due to overloading. During a lift using a Category 3 crane, the overload shutdown function activated, indicating that the load exceeded the crane's rated capacity. Eye bolts were overloaded when the incorrect pendant length caused increased stress due to the sling angle.

Lessons Learned: The cause of all three rigging gear overload accidents was attributable to improper rigging, and the crane overload was caused by improper operation. In order to prevent these types of accidents, activities should stress the need to pause or "take two" prior to commencing the lift in order to verify that the rigging configuration is correct and that there is adequate safety margin between the weight of the load and the working load limit of the weight handling equipment. Navy Crane Center received multiple near miss reports this quarter, identifying situations where personnel identified that gear was not sufficient for lifting the load. Activities should encourage this questioning attitude and reporting of near miss events that would have resulted in overloads. Choosing the correct sling length is critical in preventing overloads due to increased horizontal stress place on rigging gear. Activities are encouraged to

brief their personnel on the requirements of section 14.7.2.3 of NAVFAC P-307 to ensure personnel understand the method for reducing gear capacity as sling angle is increased.

RIGGING GEAR

Accidents: Accident total was lower this quarter, but it is a concern that 73 percent were significant. Even more concerning is the recent negative trend in personnel injuries as noted above. Navy Crane Center discovered that the majority of the accidents occurred when personnel extremities (primarily hands) were being caught in "pinch points" and issued a weight handling safety brief (WHSB 15-S-1) on 14 January 2015. Weight handling managers are encouraged to evaluate their weight handling programs in the areas of personnel experience and training as well as increasing surveillances/observations. It is important to remember that identification of deficiencies and near misses contributes toward accident prevention and it is noteworthy that there were only 13 rigging gear near misses reported during the 1st quarter. Crane accidents decreased by 25 percent compared to the previous quarter and significant crane accidents edged down slightly, with one injury being reported. Management should continue to focus crane teams on the fundamentals of operation outlined in NAVFAC P-307, Section 10, in order to reduce the percentage of crane and load collisions. The overwhelming majority of crane accidents are consistently attributable to collisions and this quarter was no different.

NEAR MISSES

Accidents: Many activities continue to recognize the importance of reporting near misses. This past quarter, 24 Navy activities reported 49 crane accident near misses, but many activities have still not taken advantage of the benefit from identifying and reporting near misses. Those that have are making a difference by helping their personnel to understand that each near miss was "an accident that was prevented." Again this quarter, the number of crane near miss reports exceeded the total rigging gear near miss reports by a wide margin. Based on the number of significant rigging gear accident reports, managers should encourage all personnel to increase their observations during the performance of rigging operations. Weight handling managers must play an integral and proactive role when it comes to assessing the number of observations being performed and the types of deficiencies identified. Many of the near miss reports this quarter describe anomalies discovered just prior to a lift. These anomalies could have easily led to an accident had the unsafe practice/condition not been observed and acted upon before proceeding with the lift. Report categories included drum miss-spools, load and crane obstructions, uncertified/unapproved equipment, and improper rigging. In each of the reported near misses, excellent situational awareness and proactive involvement of involved personnel resulted in improved weight handling safety.

Weight handling program managers and safety officials should review the above lessons learned with personnel performing weight handling functions and consider the potential risk of accidents occurring at your activity. Navy shore weight handling operations occur in unforgiving high-risk operating environments that require continuous rigorous oversight and compliance with stringent program requirements. Please remind your personnel that no task is so important or urgent that it cannot be performed safely. Suggested areas of focus include both a review of the level of personnel expertise and various stages of personnel training.

TIP OF THE SPEAR
(Notable Evaluation Items)

Program Management

Due to high attrition and an increase in upcoming workload, one large activity hired a high number of personnel, many of whom have little or no rigging experience. However, the activity's training program, particularly with regard to basic rigging practices, had not been developed for inexperienced new hires. Additionally, the in-hull rigging supervisors were lacking experience to oversee the new hires. Management had not provided the necessary oversight in training or during waterfront execution to identify these shortcomings. As a result, the activity had experienced a negative trend in accident severity, with many accidents resulting in injuries.

Although one activity had a very strong operational surveillance program that had led to having one of the lowest crane accident severity rates in the Navy, with regard to maintenance, inspection, and load test, the same activity had only documented a very small number of surveillances. The evaluation team noted that less than one percent of all documented surveillances originated from personnel who perform maintenance, inspection, and tests. Additionally, the activity had submitted several near misses over the past year that were a result of maintenance and inspection workmanship errors (e.g., improperly secured knob that fell from crane, loose bolts on a brake shoe, and excessive condensation in an electrical cabinet due to an improperly adjusted thermostat). A robust maintenance and inspection surveillance plan should provide supervision and management areas where worker performance and training require improvement, which will minimize the likelihood of a significant event from occurring.

Production personnel at one activity had not self-identified any crane accidents, rigging accidents, or near misses in the last three years despite making over 500 lifts per year. Similar to past years, production shop personnel did not identify the one reported 2014 near miss (mis-spooled crane) during crane operations, which was instead identified by the Base Operating Service (BOS) contractor while servicing the crane. The Navy's accident and near miss definitions, as specified in NAVFAC P-307, section 12, are broad in nature to capture minor level events that all Navy activities can obtain lessons learned. A lack of accident and near miss reports is often indicative either of a lack of understanding of NAVFAC P-307's accident and near miss definitions relative to the activity's weight handling operations, poor oversight by supervision, or management's failure to set expectations in this area, or some combination of these. Reporting of these events is indicative of a healthy weight handling program.

Operations

During movement of a steel plate from a plasma cutting table to an outside steel yard, the plate came within three inches of a stanchion due to a lack of communication between the crane operator and the two riggers controlling the load. Contact was avoided by the riggers stopping the load from swinging The risk of this event occurring could have been minimized by the re-positioning of a moveable item (portable fan) in the crane operating envelope to provide additional clearance in the event of a crane team error. Evaluation team prompting was

necessary to have crane team personnel recognize the event as a near miss. Additionally, during movement of the steel plates, there were two instances of the crane hook not being centered over the load, resulting in a side load condition, contrary to NAVFAC P-307, paragraph 10.13.

The height of the lower limit switch on five category 3 cranes was set to place the crane hooks within six inches of the floor. Activity operational personnel stated that this low hook height was not operationally necessary for the work. The evaluation team recommended that the activity determine if additional margin could be added to prevent unplanned contact accidents in the event of limit switch failure or drift.

During the dry run for a complex lift at the dry dock, the rigger-in-charge (RIC) was observed doing work (controlling the load) when other personnel were available. In addition, although an individual was designated to monitor the load indicating device (LID) and stop point values were assigned, the LID was not consistently monitored during the critical part of the lift (passing through the hatch), contrary to NAVFAC P-307, paragraph 10.5. At another activity, during several lifts, the RIC was involved with steadying the load and signaling the crane while other riggers were available.

Maintenance, Inspection, Test, and Certification

With regard to oversight of a BOS contractor, an activity's self-assessment stated that one of the top three concerns was crane maintenance contract performance. However, the evaluation team's review of all 50 performance assessment worksheets (PAWs) that documented the activity's oversight of the BOS contractor for crane work performed over the prior six months did not support this concern. Over 75 percent (39 of 50) the PAWs either documented basic completion of work (i.e., status report) or were complimentary (e.g. "job well done"). Of the 11 PAWs that did document concerns or errors, 5 reported administrative deficiencies and another 5 documented problems with timeliness of completion of repairs but did not discuss problems or causes resulting in the poor timeliness. No PAWs documented workmanship or planning issues that resulted in adverse effects to crane performance or availability.

In some instances, evaluation teams are identifying materials adrift inside electrical panels, which is a very poor work practice and contrary to NAVFAC P-307, appendix D, item number 24. In one instance, the main power and bridge electrical panel for a bridge crane contained a spare part for the panel door latch, a key pad for the drive system, and an electrical schematic. On another crane, a loose electrical schematic (not stored in designated holder inside panel) was found adrift inside another electrical controller.

Following the breakdown of a critical asset at one activity, a replacement component was not available in the spare parts inventory, nor was a reliable source for the switch known, requiring considerable effort to contact the original equipment manufacturer in sourcing a replacement. Spare parts for the cranes supporting critical path work had not been identified as to what parts were necessary to be on hand due to reliability issues or part availability. The activity was encouraged to work with their service provider to develop a critical spare parts list for specific cranes supporting critical path work.

Contractor Cranes

One Public Works Department's contractor crane oversight individual identified that a mobile crane being used to off-load and stage materials in support of antenna tower work lacked a Certificate of Compliance (NAVFAC P-307, Figure P-1) as required by NAVFAC P-307, paragraph 1.7.2.d, and stopped all contractor lifting associated with this contract. Discussions with personnel and site inspection of the tower work identified that the contractor was using utility trucks to raise and lower materials to stage for the work (moving the trucks back and forth using a block and tackle attached to the top of the tower in order to hoist materials up to a height of about 600 feet). A carabiner attached to a truck's bumper was side loaded and there was evidence of damage to the bumper (corresponding to the angle of the carabiner). Per the safety plan, the tag line for the man-basket used in support of the work was also attached to one of the trucks and the truck was actually moved to control the tagline when personnel were in the man-basket. Although 29 CFR 1926.1431 and OSHA directive CPL 02-01-056, which control this type of work, address the use of a tag line to control the personnel platform, the review team recommended evaluating the use of standard controlled lifting and handling equipment for this purpose versus a truck, in the event of vehicle malfunction or vehicle operator incapacitation while lifting personnel.

Engineering

One activity with a large equipment inventory was not developing or tracking crane schedules, maintenance durations, or crane reliability. As a result, it was difficult to identify recurrent crane breakdowns or fully understand the comprehensive status of crane maintenance. This information is critical to determining proper resource allocation in addition to enabling engineering to identify root causes on crane breakdowns to improve reliability and availability. Additional data such as crane usage, equipment hours, and surveillance data should also be tracked and analyzed.

Tracking of corrective actions associated with crane safety advisories (CSAs) was not being adequately performed, contrary to NAVFAC P-307, paragraph 11.8. No codified process existed for evaluation of CSAs or tracking of required corrective actions. The lack of a codified process has led to the activity failing to perform the directives of certain CSAs in the time specified.

Rigging Gear

A multiple leg sling did not have the rated load of each leg, the rated load for the entire assembly, or the sling angle upon which the rated load was based, contrary to NAVFAC P-307, paragraph 14.3.

At one activity, no documentation of initial or periodic inspections was being maintained for the rigging gear inventory, contrary to NAVFAC P-307, paragraph 14.2. Additionally, the proof load test certificate for several shackles did not identify the shackles individually by serial number; therefore, no positive traceability existed to prove that the shackles in question were properly load tested.

Training

At one large activity, the evaluation team's review of initial and continuing training identified a significant disconnect between what is perceived to be and what is actually occurring with regard to training, in particular continuing training. The evaluation team performed an in-depth review of processes and training areas, noting minimal codification of processes, and what was codified was not fully understood or was not being followed by training leaders and their subject matter experts. Additionally, activity management and supervision were not providing sufficient oversight of training and available training mock-ups, although rudimentary, were being underutilized.

Review of category 3 crane training records identified ten operators in two shop areas that exceeded the three-year refresher training requirement, contrary to NAVFAC P-307, paragraph 13.2.5. Both supervisors stated they were unaware of the requirement.

PORTAL CRANE TRAVEL DRIVE ROTATION

The Navy Crane Center has accepted the first three of six portal cranes receiving a modification to their travel drive orientation. The cranes are located in a low lying area which is subject to flooding. Each crane is equipped with 16 travel drives consisting of a motor and gear case. The original design had the motors mounted in a horizontal configuration and approximately one foot off the ground. In 2003, hurricane related flooding caused water damage to multiple travel drive motors. In 2009, a Nor'easter caused flooding above the 25-year flood plain and all 16 travel motors on one crane were damaged. The repair efforts were costly and time consuming. A contract was awarded in August 2013 to relocate the motors to a vertical orientation. The modification includes new gear cases and mounting fixtures – the existing motors and brakes were reused. In the new configuration, the motors are more than two feet off the ground at the lowest point.

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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