THE CRANE CORNER

Navy Crane Center Technical Bulletin

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A WORD FROM TOPSIDE

Sam Bevins

As we approach the summer months, I again ask weight handling managers and supervisors to place a special focus on safe crane and rigging operations. For June through August 2005, we saw a 40 percent increase in crane accidents from the same time period in each of the three previous years. We need to reverse this trend. Thus far this fiscal year, 97 percent of crane accidents were attributed to human factors, and inattention was the most often cited principal human error.

With the added distractions associated with the warmer weather, maintaining a sharp focus on the critical job at hand during weight handling operations will be challenging. Surveillance of lifting and handling operations by experienced personnel has proven to be an effective tool in accident prevention. During surveillances, look for warning signs of complacency or taking shortcuts, and include operations where there is no load on the hook.

More than one-third of the accidents reported this year occurred with no load on the hook. Consider a preemptive safety awareness briefing to reinforce management's expectations for adherence to safe lifting and handling requirements and practices. Recognize safe practices and achievements where warranted.

The principles of Operational Risk Management (ORM) should now be standard practice for each and every weight handling operation. Increased safety awareness by all personnel involved in weight handling operations and consistent application of ORM principles will help prevent crane accidents. As an example, our most recent "crane corner" (available on our web site at http://portal.navfac.navy.mil/ncc) emphasized the importance of the proper use of chain hoists used in rigging configurations of crane lifts. All too often accidents have occurred when a component of the chain hoist snagged another object. Attention to detail and ORM can prevent these accidents.

Ensure all personnel involved in the weight handling program understand our comprehensive crane and rigging gear accident definitions and report all events that meet those definitions. Our philosophy of reporting, and learning lessons from, the small events to help prevent more serious events has shown itself to be effective. Recently, a Navy activity experienced a crane accident when the boom of a locomotive crane contacted 115KV overhead power lines while the crane was in transit, without a load, across the activity.

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Operational Risk Management 5-Step Process

- Identify Hazards
- Assess Hazards
- Make Risk Decisions
- Implement Controls
- Supervise (Watch for Changes)

The accident resulted in a temporary loss of power throughout the activity. Fortunately, no one was injured. The next time we may not be so fortunate.

While the crane was traveling, the attention of the crane team, including the operator, was on ground- level obstructions. Unplanned contact is our most common type of crane accident and the focus of the crane team was on avoiding this hazard. However, the first step in effective Operational Risk Management (ORM) is to identify all potential hazards to the particular crane operation. This risk assessment must take place for every crane operation and not just those where a load is to be lifted. The set-up of a mobile crane involves risks such as those involved in the deployment of a swing-away jib, where each step of the process must be followed correctly. Additionally, the shutting down of a mobile crane when lifts are completed involves risk, particularly when safety devices are bypassed to stow the boom. As I noted above, the movement of cranes through congested areas involves the risk of collision. The operation of cranes during the operator's pre-use inspection also involves risk, such as when checking limit switches and lowering the hooks for inspection. This is just as true for small shop cranes as it is for our large portal and mobile cranes.

Last year, 4 of every 10 crane accidents at Naval Activities occurred with no load on the hook. Most were minor but the accident noted above highlights the potential for much more serious consequences.

Usually, for critical lifts and complex lifts, ORM is performed and the crane team is attentive and alert to the operating environment and to potential hazards. This does not always occur with repetitive operations and those that appear to be routine. However, every crane operation has a degree of risk. Identifying those risks, maintaining awareness of them, and properly mitigating them will prevent accidents. As I noted above, the next time we may not be so fortunate. Let's eliminate the "next time" by practicing effective ORM as we drive toward our mutual goal of ZERO accidents.

ENGINES IN LONG-TERM STORAGE

The modern internal combustion engine consists of a wide array of mechanical and electrical systems that must function correctly and in harmony with one another for optimum efficiency. The failure of any single component can be anything from a minor inconvenience to total engine failure. One such failure occurred at an activity where the diesel engine on a mobile crane seized. The engine OEM was called upon to determine the cause of failure and they determined that a wrist pin was frozen to the cylinder connecting rod. The crane had been in storage for an unknown amount of time and the engine components had become dry, causing the wrist pin and rod connection point to overheat and seize together.

Storage of any engine for long periods of time without run time can be detrimental to the engine and there are a number of failure possibilities. The above is just one example of what may occur. Some residual oil will remain in an engine for extended periods of time but the amount of oil remaining may not be adequate to properly lubricate the engine. The time period for the engine to become deprived of oil depends on many factors such as type and weight of the oil, humidity and temperature conditions, and internal clearances and design of the lubrication system. The engine OEM may have guidelines on extended storage times and preparations as well as start-up procedures and should be contacted for further information.

Starting an engine on a regular basis (the general rule of thumb is every 60-90 days) will help ensure engine components are properly lubricated and help prevent the accumulation of water both in the oil and the fuel system.

There are a few general guidelines to follow before an engine is started after an extended period of time, though the engine OEM will have more specific rules for a particular engine model and should be contacted. The engine oil should be drained and flushed before initial start-up since the oil may have started to break down or

water and other contaminants may have accumulated. The oil should then be filled with the OEM recommended type, weight and amount.
The engine may also be turned over without starting which will enable the oil pump to circulate oil into the engine components. This can be accomplished in a number of different ways and the engine OEM will be a good source of further information.

Before placing any mobile crane into storage, the crane and engine OEMs should be contacted so that the correct storage procedure may be obtained and followed. This would also be applicable to any crane that is not utilized for long periods of time, including floating and portal cranes. Numerous other components such as hydraulics, batteries and electronics, and wire ropes are also affected by long term storage and must also be evaluated.

REGULATE YOUR AIR

Compressed air supply pressures, both static and operating pressures, can vary at any facility based upon the system design and system load. Regulating proper air supply to pneumatic hoists, particularly portable pneumatic hoists, can often be overlooked. Maintaining proper air supply at the hoist is important for several reasons. Air supplied at pressures less than recommended by the OEM can result in the hoist brake dragging, leading to high wear on brake components and sluggish hoisting performance. Air supplied at pressures greater than recommended by the OEM can result in higher motor speeds, leading to accelerated wear to hoist components such as seals, motor vanes, valves, and brake surfaces. Increased acceleration of the load can also lead to greater dynamic forces imposed upon the hoist.

OEM recommended operating air pressures can be found either in the owner's manual or on the hoist nameplate data. Air supply lines, fittings, air regulators, filters, and lubricators should always be sized and installed based on OEM recommendations to ensure proper hoist performance.

CRANE SAFETY ADVISORIES AND EQUIPMENT DEFICIENCY MEMORANDA

We receive reports of equipment deficiencies, component failures, crane accidents, and other potentially unsafe conditions and practices. When applicable to other activities, we issue a Crane Safety Advisory (CSA) or an Equipment Deficiency Memorandum (EDM). A CSA is a directive and often requires feedback from the activities receiving the advisory. An EDM is provided for information and can include deficiencies to non-load bearing or non-load controlling parts.

CRANE SAFETY ADVISORIES

CSA-159: <u>Link Head Bearing Failure on a Westmont 100-Ton Floating Crane Band Brake</u>. A plain bearing came out of a link head causing the hoist band brake to become inoperative on a Westmont 100-ton floating crane. During the pre-use check an operator noticed that the link head on the starboard auxiliary hoist band brake was detached from the connecting plain bearing. The plain bearing is a SKF GE35 TESB-2RS/Vl008, has an interference fit (outer race) with the bore in the link head and is held to an eccentric shaft (inner race) with a nut and washer. The plain bearing connects the band brake to the operating hydraulic piston through a link head and eccentric shaft. The operating piston causes the eccentric shaft to rotate, opening the band brake. The interference fit between the link head and plain bearing failed, allowing the link head and attached band brake to slide laterally, which effectively disengaged the band brake. The Hagglunds hydraulic motor is a series BA-43. Hagglunds drives installation and maintenance manual Viking/EN323-18 has an illustration of the brake assembly and identifies the part numbers as eccentric shaft 16 or 17, link head 29 or 29A, and the plain bearing 30. This brake arrangement is used for both the auxiliary and whip hoists (two brakes per hoist). The main and luffing hoists have similar arrangements but a connecting plate prevents any bearing movement.

Visually inspect the plain bearing and brake assemblies on the auxiliary and whip hoist drives of Westmont 100-ton floating cranes for evidence of the plain bearing disengaging from the link head. Inform crane operators and inspectors of this failure and include a visual inspection of this assembly during the operator's pre-use check. The assemblies are in plain view and will not result in any substantial inspection time. Report any findings to Navy Crane Center. Discussions with Hagglunds drives for a permanent solution are ongoing and will be disseminated through revisions of this CSA or mandatory crane alterations.

CSA-160: Auto Crane PR/PRX 3203 Series Load Chart. The PR/PRX series crane has an OEM published crane rating of 10,000 ft-lbs and 3200 lb maximum capacity. Values listed on the load chart exceed the OEM published crane rating of 10,000 ft-lbs. The current load chart values were incorrectly based on a crane rating of 10,500 ft-lbs. The OEM has indicated that the use of the crane at the 10,500 ft-lbs crane rating will not result in equipment damage. The OEM has revised the load chart to reflect a final crane rating of 10,000 ft-lbs and a maximum capacity of 3200 lbs.

Activities are directed to contact the OEM and obtain the correct load chart for 3203 PR/PRX series cranes. After receipt of the new load chart, the crane’s' certification shall be revised to reflect the reduced values. The cranes shall be load tested and certified to the new load chart values at the crane's next regularly scheduled load test.

CSA-161: Stearns Hazardous Location Brake. Government-industry data exchange program (GIDEP) Safe-Alert identifies a potential safety problem with Stearns hazardous location brakes that may lead to the inadvertent engagement of the manual release arm. The component in question is the manual release spring (Stearns P/N 8-059-701-00). A broken manual release spring may allow the manual release arm to vibrate into a position where it could interfere with the setting of the brake (little or no brake torque development). The manual release spring is common to Stearns hazardous location 70-UH, 70-UHF, 67,000, and 77,000 series brakes with an external manual release. These brakes have been obsolete for over 30 years and the release spring (as a replacement component) has been obsolete for approximately 10 years.

Activities are directed to identify and remove the manual release spring (Stearns P/N 8-059-701-00) and manual release arm (Stearns P/N 8-146-701-01) from the Stearns hazardous location brakes identified above. Activities may elect to replace the brake as part of long term corrective action. Removal of the manual release spring and arm or replacement of the brake shall be documented on a crane alteration request with Navy Crane Center approval.

CSA-162: Samsung Isolation Transformer Tap Connection Failure. A luffing hoist isolation transformer tap connection on a Samsung portal crane failed. It was determined that a loose connection on a tap caused overheating and arcing which eventually led to melting of the transformer tap and failure of that tap connection.

The probable cause of this failure was improper tightening of the tap connection during initial installation and a failure to detect this during subsequent inspections.

The failed tap connection consisted of a fastener assembly that included a split lock washer. The isolation transformer OEM indicated that use of the lock washer is satisfactory and that the connection shall be tightened until the lock washer is flattened.

The isolation transformer OEM states that the transformers should be periodically inspected for loose connections. The check should include a de-energized "tug" test for movement of the conductor lug or fastener assembly and that any connections that are found loose should be retightened.

Activities shall perform a visual inspection and de-energized "tug" test on all isolation transformer tap connections on Samsung portal cranes for evidence of loose connections, overheating, scorching, or charring. If any of these conditions are found, the connections shall be disassembled, cleaned, retightened, and the condition reported to the Navy Crane Center. Activities shall also verify that lock washers are in place in the tap connection fastener assembly and that these connections are tightened to the point where the lock washers are flattened.

Activities shall ensure that during future annual inspections, all inspections recommended by the OEM are performed on all isolation transformers on Samsung cranes including a de-energized "tug" test.

CSA-163: Crane Operations in the Vicinity of Overhead Transmission Lines. Ref (a): NAVFAC P-307, June 2003 and Ref (b): OPNAVINST 3500.39A. Recently, a crane accident occurred when a locomotive crane boom contacted 115KV overhead power lines while the crane was in transit. No injuries resulted from this accident; however it caused a significant power outage at the facility. The consequences could have been much worse. Personnel involved in the operation (the supervisor and senior crane operator) were aware of the overhead lines. Neither individual discussed the potential risks associated with these obstacles with the rest of the crane team during the pre-job brief. During transit, the attention of the crane team was focused on the lower areas of the crane operating envelope. No one person on the team was assigned the specific task of ensuring the ten foot limit of approach (minimum required clearance for cranes in transit between the equipment and the power lines) specified in Figure 10-3 of NAVFAC P-307 reference (a) was maintained.

Power line contact is the largest single cause of fatalities associated with cranes. Check for power lines before setting up or operating cranes. Establish and maintain required clearances at all times. Consider all wires and electrical equipment to be energized.

Management shall ensure crane teams are aware of crane travel restrictions within the facility and emphasize special hazards associated with operating in the vicinity of overhead transmission lines. The preferred alternative when operating in the vicinity of overhead lines is to have the power line de-energized and visibly grounded. If this is not possible and if any part of the crane (including the fully extended boom of a telescoping boom crane) or load could approach the clearance distances noted in reference (a) NAVFAC P-307 during a proposed operation, the following steps shall be taken:

An operator supervisor or rigger supervisor shall visit the site, assess potential hazards, establish procedures to safely complete the operation, and properly brief the crane team on the procedures.

The clearance distances noted in reference (a) NAVFAC P-307 shall be maintained. For long span lines, lateral movement due to wind shall be considered in assessing whether the minimum clearance should be increased.

A rigger whose sole responsibility is to ensure that the established minimum clearances are maintained shall be in constant contact with the operator.

No one shall be permitted to touch the crane or the load unless the above noted rigger indicates it is safe to do so. Personnel permitted to touch the crane shall use protective equipment rated for the voltage.

Tag lines for load control, when required, shall be of a non-conductive type.

These rules shall be followed even when the crane is equipped with insulators or sensors for detecting high voltage. This paragraph does not apply to insulated shore power cables.

Everyone involved with the operation (supervisor, rigger-in-charge, crane riggers, crane walker, and operator) is responsible for ensuring the crane operating envelope remains clear of all obstructions and for conducting operations in a safe manner. Every team member is responsible for recognizing potential problems and for making all team members aware of them. In all operations, the operator shall remain alert because the person directing the operation may not see all hazards. Any team member who observes a potentially unsafe operating condition shall immediately stop operations and notify the rigger- in -charge.

Reference (b) OPNAVINST 3500.39A describes the process of operational risk management (ORM) with the purpose of establishing ORM as an integral part of naval operations, training, and planning in order to optimize operational capability and readiness. Activities should utilize the methodology of ORM in the planning, preparation, and execution of all WHE lifts.

Direction: Activities shall consider the potential risks of incidents such as this and apply lessons learned to prevent similar incidents. Equipment travel routes must be reviewed for potential hazards such as overhead obstructions using risk mitigation methods to eliminate or administratively control noted hazards. Ensure personnel are aware of route restrictions and associated administrative controls, risk mitigation methodology, and the requirements for working near overhead power lines. Activities are reminded that reference (a) NAVFAC P-307, section 10, provides operational safety information.

SECOND QUARTER FY06 ACCIDENT REPORT

The Navy Crane Center disseminates crane accident lessons learned to prevent repeat accidents and improve overall crane safety. NAVFAC P-307 requires commands to submit to the Navy Crane Center a final, complete accident report (including corrective and preventive actions) within 30 days of an accident, regardless of severity or type. This reporting requirement includes rigging gear accidents, i.e., gear covered by section 14 of NAVFAC P-307 used by itself in a weight handling operation. In addition, contracting officers are required to forward to the Navy Crane Center and the host activity reports of all contractor accidents including contractor caused accidents with Navy-owned cranes.

For the second quarter of FY06, 64 Navy weight handling equipment (WHE) accidents (53 crane accidents and 11 rigging gear accidents) and 2 contractor crane accidents were reported. Significant Navy accidents this quarter included one injury, five dropped loads, one overload, and two two-blockings.

INJURY

Accident: A rigger was injured when caught between the load and a roof handrail. The crane team was tasked to lift and install a component into a building through the building's roof hatch. In anticipation of the lift, the crane crew briefed and monitored wind conditions, which earlier in the shift had delayed the start of the lift. When wind conditions subsided to a satisfactory level, the roof hatch cover was removed and the lift into the building was completed without incident. During the re-installation of the hatch cover, an unexpected gust of wind caught the suspended hatch cover and blew it against a rigger, pinning the rigger between the hatch cover and a section of handrail. The cover was immediately removed from the rigger by the remaining crane crew, placed in a safe condition, and emergency procedures initiated. The injury consisted of slight bruising to the upper torso.
Lessons Learned: Wind conditions must be monitored constantly and considerations given to the effects of wind on the load. During the lift, adequate restraints must be utilized to control the load from any potential effects of the wind. In addition, riggers must never place themselves between the load and another object if it is possible for the load to move and create a pinch point.

DROPPED LOADS

Accident: A pallet jack dislodged from the lift slings and dropped to the deck of a ship. The pallet jack was rigged using two synthetic slings with the bite of the synthetic slings placed in the crane hook and four eyes of

the slings attached to the pallet jack. To accommodate uneven lift points on the pallet jack, the rigger shortened one sling by taking a round turn around and over the crane hook. This configuration placed four sling eyes downward. Two of the synthetic sling eyes were shackled to the manufacturer provided lift points on the counterweight end of the pallet jack. The remaining two sling eyes were shackled to manufacturer- provided lift links. The lift links were then inserted into slots on the front of the pallet jack frame to provide a four point lift configuration. The pallet jack was hoisted and transferred shipboard. As the pallet jack was lowered to the deck, the two forward lift links detached from the lift slots allowing the pallet jack to roll within the rigging and drop to the deck of the ship. The manufacturer's provided lift links are designed to be held into position by upward force exerted by the lift slings when hoisted. Due to the location of the counterweight on the pallet jack, the center of gravity is not centered within the four lift points, requiring adjustments of the rigging gear to accommodate for this condition. The rigging arrangement utilized by the rigger did not allow for equalization of the four lift points to capture the center of gravity;, therefore, the forward lift links were only partially loaded, and dislodged from the slots.
Lessons Learned: Personnel must understand the proper rigging arrangements required to lift unusual shapes and items with undetermined centers of gravity. Riggers should stop and seek assistance when difficulties arise and not utilize unapproved lift techniques.

Accident: While attempting to lift and transport a 75 pound ship's hull valve from a truck to a work station using a category 3 crane, the valve rotated within the rigging gear and dropped to the shop floor. Shop personnel had used a nylon sling in a basket configuration around the valve body in an attempt to lift the valve from the truck bed. The basket configuration used did not provide a positive method to secure the valve within the rigging. Local rigging guidance for lifts of components without lift fixtures was not followed.
Lessons Learned: Management must ensure that personnel perform as trained and established guidelines are followed.

Accident: An 8000 pound boat being lifted from the water slipped from the rigging back into the water. Rigging personnel were assigned to lift a shuttle boat from the water to perform maintenance. The approved lift assembly for this class of boat, which uses deck mounted pad eyes to lift the boat, was not available. Therefore, the rigging team used a locally approved rigging configuration employing a spreader beam and two synthetic web slings placed in a basket configuration, however hold backs, to ensure the rigging under the boat did not slip, were not used. As the boat was lifted, but prior to clearing the water, the boat inclined stern down causing both lift slings to completely slip off the boat hull causing the boat to slide back into the water. Although this lift was identified as a complex lift, the lift was not properly planned, briefed by supervision, or properly controlled. Additionally, the investigation revealed that the crane operator was not completely satisfied with the planning and lift process but did not stop and voice his concerns to other team members or to supervision.
Lessons Learned: Activities should ensure that complex lifts plans are reviewed and approved by appropriate personnel. Crane personnel must perform per the approved plan and comply with any local requirements as well as those for complex lifts in NAVFAC P-307. Any doubts as to the safety of a lift must be raised to the rigger -in -charge (or to supervision) and resolved prior to starting the lift.

Accident: Test weights dropped when a sling being tested was severely overloaded. Crane shop personnel were weightload testing a single 7/16" diameter 6x19 steel core wire rope sling for a U.S. Air Force Activity. Shop personnel were provided an Air Force technical manual as a guide for the test. The technical manual requires a 200 percent load test of rated capacity annually for slings used to handle aircraft and engines. The sling being tested was labeled "USAF 2 Mar 99 6,520 lbs. J/H/H Co." The test personnel incorrectly identified the 6,520 pounds as the rated load of the sling. Actually, this was the load used to initially test the sling. Therefore, an incorrect test load of 13,040 pounds was used for this test. The test weights were lifted and while suspended, the hand tucked sling eye attached to the crane hook unlayed and the sling and test weights dropped approximately four inches to the deck.
Lessons Learned: Activities must ensure that instructions provided to rigging personnel provide the correct technical requirement for the work to be performed. Riggers must read, understand and follow these

requirements. When questions arise or there is confusion over the information provided, the rigger must stop and get the issue resolved prior to continuing. Personnel must maintain a questioning attitude and provide forceful backup to other team members. When using unfamiliar standards and equipment, test directors and riggers may need to do a "sanity check" to ensure test loads and procedures make sense. Finally, when performing load tests on slings with eyes formed by hand tucked splices, use a tag line to ensure the sling body does not rotate, since the splice could unlay and pull out and drop the load.

Accident: A mobile crane was dropped when two of the four synthetic slings utilized parted. A mobile crane was to be lifted off a ship; however a multitude of errors caused an accident. The load was thought to weigh between 48,000 and 50,000 pounds. The actual weight of the load was 58,400 pounds. A complex lift plan was not developed, the four -point lift was not sized based on either pair of diagonally opposing legs carrying the entire load, and no chafing gear was used between the slings and the sharp edges of the load.
Lessons Learned: CSA-153 provides procedures for proper use of synthetic slings. Management must ensure that personnel perform as trained, that all applicable requirements and guidance from CSAs are provided to (and understood by) crane team personnel, and that proper lifting and rigging procedures are in place, briefed and enforced.

OVERLOAD

Accident: A bridge crane was overloaded during a two-crane complex lift of a propeller shaft and its container. Two 70,000 -pound capacity bridge cranes were used with a rigging arrangement consisting of four legs with a load indicating device (LID) installed in the two legs attached to what was identified as the heavy end of the container. The crane attached to the heavy end was expected to have a load of 61,000 pounds, and the other crane was expected to have a load of 57,000 pounds. The crane with the LID was to be limited to a stop point of 64,000 pounds. When it was noted that the LID was set in kilograms, it was changed to pounds, and showed a reading of 3,000 pounds without a load attached. Neither the crane team nor the engineer on- site recognized this as an operational characteristic of this type of load cell, and decided to zero out the LID. While this did not contribute to the overload, it does indicate a lack of knowledge of the particular equipment used. The lift plan called for the lifting of the heavy end first, followed by the lifting of the other end. In addition, although the rigger -in -charge had used the hoist's microdrive function on a previous similar lift, he elected not to use the microdrive for this lift. When the load was hoisted approximately one-half inch above the floor, hoisting was stopped to check the brakes. At this point the engineer and rigger supervisor noticed a LID reading of approximately 75,000 pounds. The rigger supervisor had the load lowered back to the floor to achieve a safe condition. The engineer questioned the validity of the LID readout, so he reset the load cell and digital readout in an attempt to verify its accuracy. In doing so, he did not preserve the accident scene.
Lessons Learned: During planning for a complex lift, management must ensure that all variables are taken into consideration such as the initial pick of the load off the floor, unevenness of the floor, potential deflection of the load, how the location of blocking or cribbing under the load will affect the lift, lifting speed, etc. Additionally, all personnel must be trained in recognizing an accident or suspected accident and immediately stop operations when safe to do so and preserve the scene.

TWO-BLOCKINGS

Accident: A category 3 air hoist was two-blocked while lifting shop material. The air hoist design incorporates an internal slip clutch, in lieu of a limit switch, as an operational safety device to prevent two-blocking damage. The hoist was being used to lift shop material inside a propeller shop. During one of the lifts, the operator discovered that the hoist would not function because the hoist block was jammed into the upper sprocket assembly (i.e., two-blocked). Investigation revealed that it was common practice for operators to rely on the slip clutch as a means to stop hoisting. The investigation also revealed that the sling used by shop personnel was too long for the intended lift. Consequently personnel focused on the load and were not aware of or did not notice the distance from the hoist block to the upper sprocket assembly.

Lessons Learned: Personnel should not rely on operational safety devices as a means to control crane movement. Additionally, personnel must remain aware of the entire lift envelope not just the load lifted. Slow the hook speed when approaching the limit of hook travel and stop hoisting prior to the hoist block contacting the operational safety device.

Accident: While securing a mobile boat hoist, a hydraulic control upper limit switch was damaged. The boat hoist design incorporates hydraulic control upper limit switches that stop upward movement of the boat lift beam to preclude two-blocking. When the lift beam is placed in its stowed position, there is only 3 to 4 inches of clearance to the limit switch actuators. The design of the limit switches is such that, if the operator does not stop the upward movement of the lift beam prior to contacting the limit switch actuator plungers, or the upward movement of the lift beam is not at the slowest possible speed when the plunger is contacted, damage to the limit switch will occur. Special operating instructions have been issued, including positioning of watch standers during the stowing process, however the problem has recurred. The activity has identified poor design of the hydraulic control upper limit switch assembly and slow reaction of the hydraulic actuator as the root cause.
Lessons Learned: The operator is responsible to ensure that hoisting near the upper limit of travel is done at slow speed. To minimize the risk of two-blocking, activities should ensure that the design of operational safety devices are satisfactory for their intended use or take appropriate action to modify them.

SIGNIFICANT RIGGING GEAR ACCIDENT

Accident: One to three 1-ton rainfalls were overloaded while rigging and moving a pump and motor assembly in-hull. The rigger-in-charge (ric) briefed the team that the weight of the assembly was approximately 4,500 pounds, and that it would be lifted in two sections. The individual weights of the pump (2,200 pounds) and the motor (2,300 pounds) were not addressed at the brief nor discussed with the riggers by the supervisor, work leader, or rigger-in-charge. After a crane lowered the pump to the ship's lower level, the pump was transferred to two 1-ton chainfalls and drifted close to the pump's foundation. The pump was then transferred to a 1-ton chainfall so that a wire rope sling could be installed to hold the weight of the pump. The riggers then drifted and suspended the motor in the same fashion to install two wire rope slings to support its weight. It was at that time a shipyard auditor noticed a label plate on the pump indicated a weight of 4,860 pounds. The auditor questioned if that was the total weight of the assembly or the weight of the pump itself. Management was notified and an investigation begun.
Lessons Learned: Management must ensure that riggers are informed of correct weights, and that significant aspects of the job to be performed are thoroughly briefed.

SIGNIFICANT CONTRACTOR ACCIDENT

Accident: A contractor employee was injured when he fell through a floor grating. Contractor employees were removing demolished pipes and valves from the lower level of a pump house with a chain hoist and slings. After hoisting a valve to the upper level, two employees were moving the valve across metal floor grating which became dislodged (grate interlocking devices were not installed) and one of the employees fell approximately 12 feet landing on his left shoulder. The required fall protection equipment (body harness, lanyards and anchors) was on- site, but was not used.
Lessons Learned: Management must ensure that the necessary compliance oversight of contractor performance is provided, and that contractor’s' work and safety procedures are in place and enforced while working on naval shore activities.

Weight handling program managers and safety officials are encouraged to consider the potential risk of accidents occurring at your activity similar to those highlighted above and apply the lessons learned to prevent similar accidents. OPNAVINST 3500.39A, Operational Risk Management, Ref c prescribes methods for assessing hazardous operations which should be used in the planning and preparations of all the lifts.

E-mail submission of reports of accidents, unplanned occurrences and near misses is encouraged. The e-mail address is m_lstr_nccsafety@navy.mil. The reports must include a complete and concise situation description, corrective and preventive actions, probable cause and contributing factors, and an assessment of damage. For equipment malfunction or failure include specific description of the component and the resulting effect or problem caused by malfunction or failure.

SHARE YOUR SUCCESS

We are always in need of articles from the field. Please share your sea stories with our editor *m_lstr_cranecorner@navy.mil*

NAVFAC P-307 JUNE 2006 EDITION

NAVFAC P-307 has been revised as the June 2006 edition. This revision incorporates appropriate crane safety advisories and requests for clarification or revision issued/received over the past three years.

Revisions include the following (some of which have cost-avoidance potential):

- Biennial certification is now in effect for jib, pillar, and pillar-jib cranes, monorails, boat davits (which have been added in this revision), and fixed hoists. This eliminates the condition inspection and certification process in the non-load test year (although the maintenance inspection is still required annually).
- Adjustments to return hoist brake settings to established ranges will not require a load test provided certain conditions are met.
- For portable manual hoists covered by section 14 and appendix d, disassembly is required every six years at a minimum. This may eliminate more frequent but unnecessary disassembly now being performed at some activities.
- Nondestructive testing (NDT) is no longer required for hooks on manual hoists on category 2 and 3 cranes. Also, if either the hoist mounting hook or the load hook is configured to not be disassembled (on any category of crane), then the NDT will be performed on the accessible portions of the assembled hook.
- With some exceptions, stability testing of mobile cranes may now be done at any radius below the stability line noted on the load chart.
- Clarification is provided on the operator's daily check. The operational check is required only once per shift. And if a hoist on a multiple-hoist crane will not be used, the daily check is not required for that hoist.
- Clarification is provided on lifts of submerged objects. Some of these lifts need not be treated as complex lifts.
- A working leader may now supervise lifts exceeding 80 percent of the capacity of the crane's hoist.

All changes are identified in the change synopsis. Navy shore activities shall be in full compliance with the changes identified within one year.

NAVFAC P-307 is available for download from http://portal.navfac.navy.mil/ncc. The Navy Crane Center will not be issuing printed copies. Within the next few weeks, printed copies will be available for ordering. For DOD and DOD contractors, printed copies may be ordered from the Naval Logistics Library, https://nll1.ahf.nmci.navy.mil. A public key infrastructure certificate is required. Customer service phone number is (877) 418-6824. For others, printed copies may be ordered from Naval Inventory Control Point, 700 Robbins Avenue, Philadelphia PA 19111-5098, (215) 697-2626. The stock number for an 8 1/2 by 11 inch sized manual is 0525-LP-105-2371.

“WE’VE MOVED”!

The Navy Crane Center has moved to Portsmouth, VA. Our new Mailing address is:

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