THE CRANE CORNER

Navy Crane Center Technical Bulletin

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A WORD FROM TOPSIDE

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Effective asset management must continue to be a strong focus area in the Navy's weight handling program. A key asset management strategy is to establish an "ownership culture" at all Navy shore activities. Prudent asset management will continue to be a focal point of our weight handling program reviews, not only with respect to material assets, but with personnel resources as well. Many activities are already reviewing their weight handling asset requirements and streamlining resources where feasible. Continual review is not only encouraged, but necessary, to achieve the "cost-conscious readiness" demanded by today's operating tempo.

During FY 2007 compliance reviews, our teams have identified that some activities need to intensify their review of lifting and handling requirements and evaluate alternatives available to meet their lifting and handling needs. Crane inventory reductions and other alternatives could provide significant cost savings and mitigate the inherent safety risk associated with lifting and handling operations.

As highlighted in the June 2007 edition of the Crane Corner, mobile crane accidents constitute a significant share of all reported crane accidents (37 percent for FY 07 through June 2007) and inherently have a greater potential for serious accidents than most other types of cranes. Recent program reviews have identified that some activities have excess mobile cranes or have redundant mobile crane capabilities if tenant or host activity command resources were shared. At activities where mobile crane utilization is low, local contractor resources are usually available that can provide complete crane services or can provide leased cranes, which could be significantly more economical than the cost of ownership. Other benefits of this "right sizing" approach could be realized if the crane is a "one of a kind" asset requiring crane specific parts, training, and operator qualifications.

Shop crane utilization should also be reviewed. Do the numbers of required lifts justify the number of cranes in service? Is there a tendency to keep cranes in service just because they may be needed for some unforeseen lift? Have process changes eliminated the need for specific cranes? We cannot afford to keep unneeded cranes in service.

Equipment assets should not be the only focus of your continual reviews. Our audit teams have identified some activities that have a disproportionate number of operators for their respective crane inventories and production needs. Having an excessive number of operators reduces performance proficiency, increases cost, and increases the risk for crane accidents. With regard to category 3 cranes, this problem is further compounded by the fact that category 3 crane operators are normally managed by production or other non-lifting and handling cognizant departments, whose primary task is not lifting and handling driven. For this reason, it is imperative that certifying officials and personnel that manage and oversee the weight handling program proactively review this area for improvement. Navy shore activities have made significant strides in weight handling asset reduction in the past few years. I am certain more can be done. We owe it to our Navy to continue a cost-conscious approach in our lifting and handling programs as well as continue driving toward our mutual safety goal of zero accidents.

Inside This Issue

2008 NAVY WEIGHT HANDLING CONFERENCE SAFETY AND RELIABILITY

The Navy Crane Center is planning to host a three-day weight handling equipment (WHE) conference during the fall of 2008 in the Norfolk, VA area. The purpose is to share WHE improvement initiatives and safety practices as well as to discuss common issues with the goal of further improvement in WHE safety, maintenance management, engineering, operations, and training.

All Navy shore activities and shore based operational units with WHE are invited to attend and participate. The basic format of the conference will be presentations and selected working group meetings. Action items from working group meetings will be assigned for subsequent review and resolution. Topics may include: WHE accident review and prevention initiatives; risk management; new technologies; care and use of synthetic slings; mobile crane safety; best practices; acquisition; floating cranes; Lean Six Sigma efforts in weight handling; contractor crane safety; crane drives and controls. Proposed agenda items from these or other WHE topics are welcome.

For planning purposes, request interested activities respond with approximate number of attendees. Also, indicate if interested in making a presentation on initiatives or issues of particular interest. Responses are requested by 30 November 2007.

Responses by email can be sent to nfsh_ncc_crane_corner@navy.mil. Information will be posted on the Navy Crane Center web site as it becomes available: https://portal.navfac.navy.mil/ncc.

OIL ANALYSIS ON NAVY CRANES

A quality oil analysis program can help extend the life of both lubricants and machinery, help determine when internal components are worn or require replacement, and reduce maintenance costs. It can also detect the presence of other fluids (water, fuel, coolant, etc) in the oil that may indicate problems with other systems. Three areas on cranes with a potential oil analysis benefit are gearboxes, hydraulic systems, and diesel engines.

Oil analysis can be used to help determine the condition of the lubricant as well as the machinery components. Consistency of the sampling method and the tests performed on the sample are important for the program to have any added value. Test reports should not be glanced at and filed away, but should be studied for understanding and compared to previous test reports and test reports for sister cranes.

An analysis of hydraulic oil on the hoist hydraulic systems of category 1 cranes is now required per NAVFAC P-307 2006 edition. This also includes the boom hoist and telescoping functions. This analysis inspects the hydraulic fluid for contaminants that can easily foul hydraulic components. It also can determine the condition of the hydraulic fluid and indicate wear of the hydraulic pumps and components.

Engine oil analysis is not required by NAVFAC P-307 though some activities are utilizing this to extend oil change frequencies and as a check on the diesel engine. The analysis can detect glycol (a product in engine coolant), fuel dilution, soot, and water within the engine oil. Any of these contaminants in engine oil could cause premature engine failure.

Activities are encouraged to actively review and analyze the data collected through oil analysis. It is important to remember that an oil analysis report shows more than when to change the oil. Close monitoring of particle

levels, sizes, and material can indicate wear and lead to the replacement of parts (gears, bearings, pumps, and seals) before failure.

There are several on-line and classroom training classes (www.noria.com, and www.lubricantsuniversity.com), and available publications (www.lube-tips.com, www.practicingoilanalysis.com, and www.machinerylubrication.com) to help realize the benefits of a quality oil analysis program.

CRANE SAFETY ADVISORIES

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 ADVISORY

CSA 172, Structural Failure of a 2-Ton Engine Lift (Portable Floor Crane)

An activity reported the structural failure of a portable floor crane during load test. The floor crane was being tested to 125 percent of the 2-ton capacity with the boom fully retracted and the front legs fully extended. Neither the operating instructions manual nor the floor crane marking was clear on the proper leg extension position for each corresponding boom position. The base buckled in the general area of the upright. The 2-ton capacity floor crane is manufactured by Shinn Fu Company of America Inc (OEM) and distributed by Mac Tools Inc (Model No. EC3000) and Omega Lift Equipment (Model No. 44020).

The OEM has stated that the correct loading of the floor crane is to match the boom length with a corresponding leg extension. For example, if the boom is extended for ½-ton capacity, then the legs should be extended all the way out to the corresponding line marked on the leg extension. Accordingly, if the boom is retracted for the 2-ton capacity, then the legs should be retracted to the corresponding line marked on the leg extension. The OEM has clarified the operating instructions manuals and boom extension/leg extension markings.

Activities with Mac Tools Inc (Model EC3000) or Omega Lift Equipment (Model 44020) 2-ton capacity floor cranes manufactured by Shinn Fu Company of America shall contact the OEM (888.332.6419) for marking instructions and updated operating instructions manual.

THIRD QUARTER FY07 ACCIDENT REPORT

The purpose of this report is to disseminate shore activity weight handling equipment (WHE) accident and near miss lessons learned to prevent repeat accidents and improve overall safety.

NAVFAC P-307 requires commands to submit to the Navy Crane Center a final, complete accident report (including corrective/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 and other unplanned occurrences with lessons to be learned. In addition, contracting officers are required to forward to the Navy Crane Center reports of all contractor accidents, including contractor caused accidents with navy owned cranes.

Due to the untimely delay in obtaining information related to crane and rigging gear accidents, an advance change notice will be issued to NAVFAC P-307 that will require an initial notification to the Navy Crane

Center of all crane and rigging gear accidents within three days of the occurrence. This change is necessary to allow the Navy Crane Center adequate time to react to negative or undesirable accident trends. Accidents involving a fatality, in-patient hospitalization, overturned crane, collapsed boom, or other major damage to the crane, load, or adjacent property will continue to require a Navy Crane Center notification as soon as practical but not later than 24 hours of the event.

For the third quarter of FY07, 58 Navy WHE accidents (48 crane accidents and 10 rigging gear accidents) were reported. Eighteen of the 48 crane accidents were significant (overload, two-blocking, dropped load, or injury). During the months of May and June, the Navy weight handling community experienced 42 percent of the total significant crane accidents reported this fiscal year. The most alarming increase in the number of significant crane accidents occurred in the area of category 3 crane use. During the third quarter, the Navy experienced 16 category 3 crane accidents of which 10 were considered significant. Seven of the 10 category 3 significant accidents involved crane capacity overloads or injuries occurring during the handling of the load. Some of the more significant crane accidents this quarter are discussed herein.

CRANE OVERLOAD

Accidents: (1) During load testing of a 1/2-ton hoist, the test weights for a 1-ton crane were used, resulting in an overload. (2) While raising the block on a 1-ton hoist, the block hook contacted an I-beam. Even though the block was between floor and waist height, the operator did not notice the contact and continued to raise the block. Consequently, the hook was bent and the beam was damaged. (3) A 1/2-ton hoist was overloaded while lifting a beam located in a binding area. A dynamometer was in place to monitor the load weight but there was no established stopping point contrary to NAVFAC P-307. The operator did not raise the load slowly to ensure that is was free from binding and as a result, the load bound on a vertical stanchion. The dynamometer indicated a load weight of 2,500 pounds. Even had the load been free, the crane was still overloaded as the beam was subsequently determined to weigh 1,450 pounds!

Lessons learned: These mishaps exemplify a lack of job planning and situational awareness by those involved. Management must ensure that personnel perform as trained and do not deviate from the established procedure without supervisory and/or engineering approval. Even the most common or repetitive lifting and handling operation can go wrong without proper planning and execution.

PERSONAL INJURY

Accident: Caught between a fixed object and the load. A shop apprentice, working without any assistance, was operating a category 3 crane to reposition a component on a worktable. The component weighed approximately 500 lbs. Part of the repositioning process involved rotation of the component from a horizontal position to a vertical position. While lifting the component with the crane, the operator used his other hand to guide the component. When the component reached the top of the rotation, the load centered itself below the hook, over rotated toward the worktable, caught, and fractured the apprentice's thumb. The apprentice was a qualified cat 3 operator but was not experienced in the process of rotating a load. In another case, a worker sustained a severe finger injury when her finger was caught between rigging and the hook. The operator was in the process of removing the rigging gear from the hook of a category 3 crane. While her hand was in the vicinity of the hook to remove the rigging gear, she began to raise the block via a pendant controller. Her finger was caught between the block and the rigging gear, resulting in serious injury.

Lessons learned: Some tasks require more than one person to safely accomplish. This should be determined and the necessary help should be obtained prior to starting the work. The rotation of a component is usually more difficult than a straightforward lift. Make sure that assigned personnel are adequately trained and experienced for the job assignment. Avoid placing your hands in danger zones that are likely pinch points.

Weight handling program managers and safety officials are to review the above lessons learned with personnel performing lifting and handling functions and consider the potential risk of accidents occurring at your activity. OPNAVINST 3500.39b prescribes methods for assessing hazardous operations, which should be used in the planning and preparations of all WHE lifts. With the added distractions associated with the warmer weather, maintaining a sharp focus on the critical job at hand during weight handling operations is 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. Approximately 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.

E-mail submission of reports of accidents, unplanned occurrences and near misses is desired. The e-mail address is nfsh_ncc_accident@navy.mil. Per chapter 12 of NAVFAC P-307, the report 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 the malfunction or failure.

WHE MAINTENANCE AND TEST EFFICIENCIES

Recent revisions to NAVFAC P-307 included changes that allow for reduced maintenance, inspection, and/or testing, which can reduce the labor and down time for weight handling equipment. The changes were derived from user feedback, which demonstrated that the changes could be made without sacrificing the integrity of the maintenance and test program. The following are some of the efficiency opportunities:

All category 2 and 3 cranes may now be load tested biennially instead of annually as originally required.

Jib, Pillar, Pillar Jib, Monorail, Boat Davit Cranes, and Overhead Hoists may be certified biennially instead of annually. This eliminates a condition inspection and certification process in the interim year (although a maintenance inspection is still required on an annual basis).

Inspection disassembly for chassis travel brakes on mobile cranes was extended from every "C" inspection to every second "C" inspection. Inspection disassembly for brakes on category 2 and 3 crane hoists that also have mechanical load brakes or self-locking worm gears was extended to every sixth annual inspection.

Portable manual and powered hoists, even if permanently assigned to a specific location, may be treated as section 14 equipment vice category 2 or 3 hoists. This eliminates hook and nut NDT and some of the documentation requirements required for category 2 and 3 hoists. Also, the hook and nut NDT requirements have been eliminated for permanently mounted manual hoists.

The crane condition inspection form has been revised to eliminate unnecessary redundant inspections.

The requirement to test mobile cranes at intermediate outrigger positions has been eliminated. Installing and removing outrigger pins or removable counterweights on mobile cranes no longer require NCC approved/controlled procedures.

Brakes found outside of established ranges may be readjusted without load test provided the conditions of paragraph 3.4.2.2.2 are met.

These are some of the recent changes that allow for more efficient maintenance and testing without sacrificing safety. Of course, NAVFAC P-307 has always allowed selecting the frequency for type "A" and "C" maintenance inspections based on engine operating hours instead of the calendar month basis. With low usage

equipment, this may eliminate type “A” inspections and allow the type “C” inspection frequency to be relaxed from one to three years.

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