THE CRANE CORNER

Navy Crane Center Technical Bulletin

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A WORD FROM TOPSIDE

Tim Blanton

Over the past year, our evaluation teams and field representatives have noted a significant loss of lifting and handling experience and a consequent increase in hiring, which has resulted in a much less experienced workforce. In many instances, the turnover rate has been so high that the majority of personnel in the weight handling program have fewer than four years of experience. For example, in just the last six months, one activity hired 95 personnel (over 15 percent of the entire lifting and handling workforce). Unfortunately, at this same activity, this combination of factors resulted in a significant personal injury (partial loss of a finger and multiple surgeries to correct damage to a rigger's hand) when a heavy timber fell nearly seven decks onto a rigger's hand. The investigation identified numerous factors, which contributed to the event, including the brief amount of time the rigger had been employed by the activity (four months) although the individual had five years of rigging experience in the public sector.

Although this lack of experience is a Navy-wide problem (across the board from worker skills, to supervision, to management depth), the inherent risks of lifting and handling make the inexperience in this area a much greater vulnerability. A more in-depth look at the overall issue presents additional challenges, which must be mitigated. To understand the significance of the issue, it is important to go back and review the events that shaped it. In the early to mid-1990s, many Navy activities were affected by Defense Base Realignment and Closure (BRAC) commission decisions, including the closure of several major shipyards. During this period, hiring freezes/restrictions went into effect to accommodate many of the displaced workers and many training and mentoring programs that educated new employees were disbanded. As a result, in the mid to late 2000s, there was a significant gap in the experience level of workers and many less experienced workers were becoming supervisors. In the last few years, budget constraints and sequestration resulted in additional hiring freezes. Over the past several years, our evaluation teams have observed many activities operating with an overly lean workforce, compounded by vacancies and gapped billets in the weight handling program supervisory and management structure.

However, over the past year, due to increasing workloads and the easing of hiring restrictions, as noted above, our evaluation teams have noticed a significant increase in hiring and supervision/management turnover. As would be expected with the significant influx of new hires, new employee experience varies widely from seasoned journeyman already working to

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NAVFAC P-307 requirements down to personnel with NO experience in weight handling at any level. In the past, as a minimum, personnel would have weight handling experience from outside industry or would be trained and mentored using a formal program. This is no longer the case, and as such, activities need to evaluate their existing training requirements to ensure they are sufficient (in terms of quality and capacity) to meet their current training needs. As stated in NAVFAC P-307, paragraph 13.2, NAVFAC P-307 training courses "are designed to reinforce and enhance existing knowledge for journeyman level personnel in the Navy weight handling program". Additionally, the courses "are designed to provide a minimum coverage of each subject and do not include hands-on applications". The referenced paragraph goes on to state that in addition to completion of the required courses, personnel shall not perform their duties until they are qualified by their supervisors. Lastly, the paragraph states that additional training (e.g., hands-on) to enhance specific skills is encouraged and that such training is available from naval shipyards, other naval activities, and commercial resources.

In response to these challenges, several activities have made a significant investment to reinvigorate their training programs. Puget Sound Naval Shipyard and Intermediate Maintenance Facility has developed a new employee training plan intended to enhance the training process for new hires. Portsmouth Naval Shipyard has developed a formal individual development plan (IDP) which is focused on succession planning and provides current employees the knowledge and skills to succeed at higher positions in the organization. Naval Facilities Engineering Command Southwest (NAVFAC SW) has developed several continuing training modules geared toward specific processes and has also utilized mock-ups to strengthen the knowledge level of current employees. With regard to mock-ups, in addition to NAVFAC SW, several other activities have developed mock-ups to improve training provided to new and existing employees.

In closing, nearly every Navy activity, from the smallest (with only a handful of cranes) to the largest (with hundreds of cranes), has been affected by past events, workforce shaping, budget constraints, and sequestration. It is critical that activity weight handling program managers constantly review their training and mentoring for adequacy and revise and upgrade training and personnel development as required, ensuring their weight handling programs continue to perform at a high level to support the fleet and meet strategic commitments. ■

CRANE SAFETY ADVISORIES AND EQUIPMENT DEFICIENCY MEMORANDA

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

CSA 211 – WATER FOUND IN VOIDS BENEATH THE MACHINERY HOUSE ON CRAFT PORTAL CRANES

Background:

A. The purpose of this CSA is to inform activities with Craft portal cranes of the potential for water trapped within the voids beneath the machinery house and to provide guidance for inspecting those voids.

B. Two activities have reported water found in the voids beneath the machinery house deck on Craft portal cranes. In both cases, minor corrosion was found within the voids. The voids beneath the machinery house are located between the two main girders of the machinery house and the box girders that support the three-hoist drum foundations; they are approximately 18 inches deep. Craft drawing 501.7 – Rotating Frame indicates the location of the void spaces beneath the machinery house deck.

Direction:

A. All activities with Craft portal cranes are requested to perform borescope inspections of the five void spaces beneath the machinery house deck at or before the next "B" preventative maintenance period. Inspection locations shall allow for adequate determination of water depth and level of corrosion of each void area.

B. Activities shall notify Navy Crane Center, In-Service Engineering (Code 03), with the results of the inspection of each Craft portal crane. Where indications of water are found, the notification shall include water depth, level of corrosion, and any apparent causes for water in each of the voids. Navy Crane Center will provide additional guidance based on the results of the inspections.

CSA 212 - MANUAL BRAKE RELEASE LEVERS

Background:

A. The purpose of this CSA is to disseminate information regarding problems experienced with manual brake release levers and to provide additional direction regarding removal of manual release levers.

B. NAVCRANECEN Portsmouth VA 021600ZNOV07 directed activities to remove manual release levers from Cutler Hammer type M brakes. Additionally, the message recommended activities remove manual release levers for all other brakes where the levers were easily removable and re-installable. The message is hereby cancelled.

C. There have been multiple incidents reported by activities where a 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 NAVCRANECEN Portsmouth VA 021600ZNOV07 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 NAVCRANECEN Portsmouth VA 021600ZNOV07 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 of the brake. Removal of brake release levers is considered a local crane alteration in accordance with NAVFAC P-307, paragraph 4.3.

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 above, 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.

CSA 213 – FAILURE OF Y CONNECTOR ON A DAYTON PORTABLE GANTRY A-FRAME CRANE

Background:

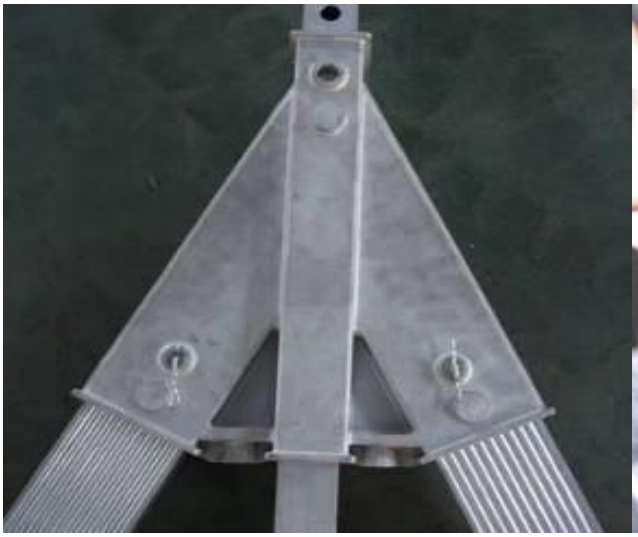
A. An activity reported that the Y connector on a Dayton Model 4EER4 portable gantry/A-frame crane cracked during a load test. The Y connector reinforces the legs of the gantry. The crack was approximately four inches in length which allowed the load to drop 1 to 2 inches. The activity failed to add the weight of the hoist and trolley to the total weight being tested and therefore the test load was exceeded by 63 lbs. The activity successfully completed a static load test with this weight but as they started to move the crane (with load) for a travel test, the Y connector failed. Moving the crane with a suspended load is not in accordance with the OEM's instructions.

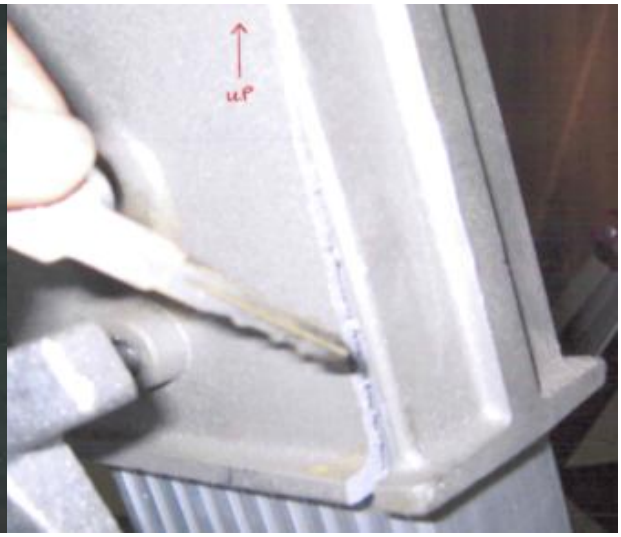
B. The OEM did not believe that the crack in the Y-connector should have occurred with such a small overload. The OEM said that moving the crane with a suspended load over cracks in the pavement or an uneven rolling surface may have caused additional unwanted stress on the Y connector. The OEM Operating Instruction and Parts Manual states: "to never attempt to move gantry while loaded".

C. The OEM stated that as a result of continuous improvement, a design change was made to the Y connector in August, 2012. This new design has more material in the Y-connector with a greater cross section profile that will provide more strength.

Direction:

A. Activities shall replace the Y connector with the new design on Dayton models 4EER2, 4EER3, 4EER4, 4EER5, 4EER6, 4EER7, 4EER8 at or prior to the next annual maintenance inspection (Category 3 cranes) or periodic inspection (equipment covered by Section 14 of the NAVFAC P-307). Activities shall contact their local Grainger representative for replacement of this part. A local Grainger representative can be found at www.grainger.com and clicking on the "find a branch" link. Activities are reminded that traveling a portable gantry/A-frame crane is only permitted when allowed by the gantry/A-frame OEM. Understanding and complying with OEM requirements is vital for safe operation.





CSA 214 - CHAIN BOLT DEFICIENCY ON INGERSOLL RAND 1-1/2 METRIC TON CHAIN HOIST

Background:

A. The purpose of this CSA is to inform activities of a potential deficiency with the chain bolt on Ingersoll Rand 1-1/2 metric ton manual chain hoist. While performing inspection and load testing on an Ingersoll Rand MCH5-015 manual chain hoist, an activity discovered the chain bolt, which secures the load chain to the lower hook, had a smaller diameter than the chain bolt in their other MCH5-015 manual chain hoists. The smaller chain bolt diameter measured 8 mm vs. the 9 mm diameter bolt in the other hoists. Although the smaller bolt had not failed, visual examination revealed minor surface indications resulting from load tests or general use.

B. The OEM was contacted to determine if the shared part number 71490692 shown in Ingersoll Rand Parts, Operations, and Maintenance Manual Form MHD56028 Edition 8 October 2013 and Ingersoll Rand Parts, Operations, and Maintenance Manual Form MHD56012 Edition 8 July 2004 is the correct part number for the chain bolt on the 1-1/2 metric ton MCH5-015 and VL2-015 hoists. Ingersoll Rand responded that part number 71490692 was incorrectly listed in both manuals and issued Ingersoll Rand Service Bulletin, IL2014-002, Revision 0, 30 June 2014 to provide the correct part number, 71492201, for a 9 mm diameter bolt. Although Ingersoll Rand Service Bulletin, IL2014-002, Revision 0, 30 June 2014 addresses both the MCH5-015 and VL2-015 hoists, Edition 10 (issued January 2014) of Ingersoll Rand Parts, Operations, and Maintenance Manual Form MHD56012 Edition 8 July 2004 corrected the part number to 71492201 for the VL2-015 hoists.

Direction:

A. Before or during the next annual preventive maintenance period, or next inspection and load test for section 14 hoists, activities shall measure the subject chain bolt on Ingersoll Rand MCH5-015 and VL2-015 manual chain hoists to confirm a bolt diameter of 9 mm and replace with part number 71492201 if necessary.

CSA 215 - POSSIBLE DEFICIENCY WITH CROSBY A-342 AND A-345 MASTER LINKS AND MASTER LINK ASSEMBLIES

Background:

A. The Crosby Group has discovered that a small percentage of A-342 Master Links (sizes 2", 2¼", 2¾", and 3") and A-345 Master Link Assemblies (sizes 2", 2¼", and 2¾") may fail prior to the intended design factor of 5. There have been no field failures reported but Crosby has identified failures during overload testing. Crosby has issued a safety alert to inform its customers of this issue. Crosby's safety alert is only applicable to Master Links and Master Link Assemblies matching the sizes and associated Product Identification Codes (PIC) shown in the table below. The PIC is a three-digit code located on the straight and flattened column portion of the link.

Direction:

A. Activities shall remove from service and inspect all A-342 Master Links and A-345 Master Link Assemblies that match the size and PIC codes identified in the table below within the next 15 days. The inspection shall identify if the Master Links and Master Link Assemblies match the sizes and PICs covered by this CSA and Crosby's safety alert. Master Links and Master Link Assemblies found to not be covered by the safety alert may be placed back into service.

B. Master Links or Master Link Assemblies identified as being covered by this CSA and Crosby's safety alert shall be inspected by Crosby prior to returning to service. Activities shall contact Crosby to arrange for return and inspection. If return is not feasible, activities can arrange with Crosby for an on-site inspection. For more information concerning the return of this equipment, contact Crosby at 1-800-772-1500 to receive a Return Goods Authorization (RGA). Do not return equipment without the RGA.

C. Table of Master Links and Master Link Assemblies from Crosby Safety Alert:

- 2" A-342 CT PN 1261433 PIC 5NB, 5NE, 5NF, 5NG, 5NH, 5NI, 5NK, 5OB
- 2 ¼" A-342 PN 1014422 PIC 5NB, 5NC, 5ND, 5OB, 5OC
- 2 ½" A-342 PN 1014468 PIC 5NB, 5NC, 5ND, 5NE, 5NF, 5OB, 5OC,5OD
- 2 ¾" A-342 PN 1014440 PIC 5NC, 5ND, 5NE, 5NF, 5OB, 5OC, 5OD
- 3" A-342 PN 1014486 PIC 5NB, 5NC, 5ND, 5NE
- 2 ¼" A-345 PN 1014845 PIC 5NB, 5NC, 5ND, 5OB, 5OC
- 2 ½" A-345 PN 1014855 PIC 5NB, 5NC, 5ND, 5NE, 5NF, 5OB, 5OC,5OD
- 2 ¾" A-345 PN 1014864 PIC 5NC, 5ND, 5NE, 5NF, 5OB, 5OC,
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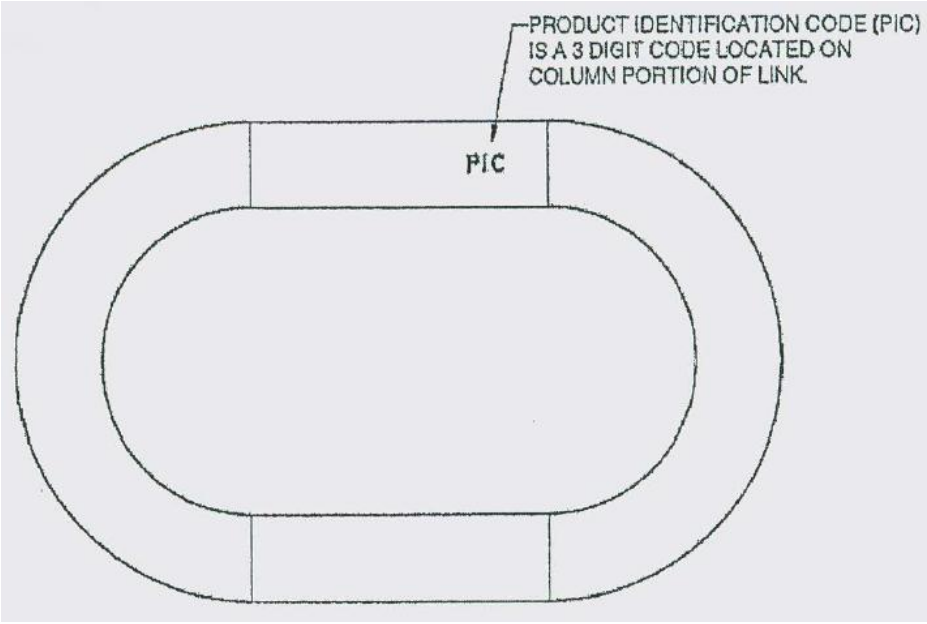

EDM 104 - POTENTIAL FOR BINDING OF AMERICAN DRILL BUSHING STAINLESS STEEL SWIVEL HOIST RINGS

Background:

A The purpose of this EDM is to inform activities of the potential for binding of American Drill Bushing (ADB) stainless steel swivel hoist rings. This binding will limit the ability of the hoist ring to rotate freely and will limit the ability of the bail to pivot through its full range of motion.

B. ADB has identified that the original design tolerance for the dowel pinhole location on the hoist ring body was too close to the center, which allowed the pins to extend slightly into the inner diameter of the body. This condition can cause the end of the pins to contact the bushing during rotation causing galling along the bushing sleeve which limits the ability to rotate freely. The location of the dowel pin hole could also cause binding, preventing the bail from pivoting freely through its full range of motion. In 2006, the ADB's Engineering department documented the issue and improved the design of the swivel hoist ring. ADB has stated that the deficiency, if present, would only limit the functionality of the hoist ring and was not detrimental to the safety of the products.

Direction:

A. During pre-use inspection or use of ADB stainless steel swivel hoist rings, Navy Crane Center recommends that activities be alert for any indications of binding during rotation of the swivel hoist ring or pivoting of the bail. For ADB hoist rings found not to function properly Navy Crane Center recommends that the hoist ring be removed from service and the activity contact ADB on their contact page found at www.americandrillbushing.com for further information and instruction. The affected ADB stainless steel hoist ring model numbers are 29001, 29002, 29003, 29004, 29005, 29006, 29007, 29008, 29009, 29320, 29321, 29322, 29323, 29324, 29325, 29327, 29812, 29814, 29816, 29818, 29820, and 29821. ■

P-307 QUESTIONS AND ANSWERS

Question:

NAVFAC P-307 Condition Inspection Item 7; Appendix C, Item 70; Appendix D, Item 29; and Appendix E, paragraphs 6.1.1.b and 7.1.1.b are not consistent or clear enough in how to test the hoist backup upper limit switches. The referenced paragraphs require the hoist backup upper limit switch to be tested but do not specify how the switch is to be tested. There have been recent verbal reports that hoist backup upper limit switches have not been completely tested.

NCC Response:

For portal and floating cranes, NAVFAC P-307, Appendix, E, paragraph 2.1.1.d specifies testing of the hoist backup upper limit switch by raising the hook slowly into the backup limit switch. For Category 2 and 3 cranes, P-307 does not specify testing of the switch by raising the hook (or block) into the switch. Consequently, there are reports of some testing being performed by manually activating the switch. This type of testing would ensure the switch circuitry is functioning but would not necessarily ensure that the switch activates at a level that would actually prevent two-blocking. Therefore, it is not considered a complete test of the switch.

To completely test the hoist backup upper limit switch on Category 2 and 3 cranes, the switch shall be tested by bypassing the primary upper hoist limit switch and using the block to activate the backup upper hoist limit switch at the slowest possible speed. This testing is applicable to all of the above referenced paragraphs.

The intent of this requirement is to test the hoist backup upper limit switch completely (that is, activating the switch as designed and ensuring all components and circuits perform as designed) once during the maintenance inspection, condition inspection, and test (no-load or load) cycle. The condition inspection, item 7, will be revised during the upcoming revision to NAVFAC P-307 to reflect similar wording that exists regarding the hook lower limit switch, that is, that the hoist backup limit switch may be tested during the maintenance inspection in lieu of the condition inspection. The other referenced paragraphs will be revised for clarification as well.

Until the next revision to NAVFAC P-307 is issued, Navy activities are advised that, for cranes with hoist backup upper limit switches that have not been tested in the manner noted above, activities are not required to remove their cranes from service, but shall ensure that these limit switches are tested as noted above at their cranes' next regularly scheduled certification.

Question:

Please clarify NAVFAC P-307, paragraph 6.1.2. Do the requirements for certification or licensure of contractor personnel operating Navy owned cranes engaged in construction apply to bridge cranes permanently installed in facilities?

NCC Response:

The intent of NAVFAC P-307, paragraph 6.1.2 is to require contractors to meet 29 CFR 1926 subpart CC requirements for Navy cranes used in construction activities. As noted by 29 CFR 1926.1438, permanently installed overhead, gantry, and wall cranes used in construction are covered by 29 CFR 1910.179 and not 29 CFR 1926.1400 and therefore do not require additional certification or licensing beyond P-307, paragraph 6.1.1. This will be clarified in the upcoming revision to P-307. 

WEIGHT HANDLING SAFETY BRIEF

The following Weight Handling Safety Briefs (WHSBs) are provided for communication to personnel who perform weight handling operations or support diving related weight handling operations. Several recent reports of accidents or near misses were the result of personnel working under suspended loads. In addition, recent weight handling accidents or near misses highlight the complexities and additional risks associated with performing weight handling in an underwater environment where visibility and/or communication may be impacted and where work often involves blended crane teams. These briefs reiterate some important jobsite actions or measures that are necessary to prevent personnel from working or walking under suspended loads and to minimize the risk associated with diving related weight handling operations.

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 WHSBs are issued, they are also posted on the Navy Crane Center's web site at: http://www.navfac.navy.mil/ncc.

Navy Shore Weight Handling Safety Brief!

Title: Weight Handling and Dive Operations

Target Audience: Weight Handling Program Personnel Supporting Dive Ops

Recently there has been a negative trend in lifting and handling involving Navy diving operations.

- While removing a submerged filtering screen from a ship's hull, a diver's umbilical line was threaded through the pull chain of a chain fall being used in the removal. As the crane raised the screen, the diver's umbilical line was being drawn tight. Fortunately this condition was identified and the lift stopped before any damage or injury resulted.
- While setting up a pier side mobile crane, the crane's outrigger pad was inadvertently placed on top of an energized electrical cable which was providing electrical power to the diver's breathing air compressor. The electric cable shorted and power to the compressor was lost. Fortunately a backup breathing system activated, thus avoiding potential injury.
- During a crane lift a diver's hand was pinched between lifting slings as he attempted to keep a load from rotating during a crane lift.

Diver support work is higher risk, involving complex / blind lifts with blended teams. It can involve multiple divers with critical support systems. This work requires personnel to be diligent of their work to include:

- Ensure that pre-job briefings thoroughly detail risks associated with this work. Establish clear expectations and ensure that the roles and responsibilities of each team member are clearly understood.
- Establish and maintain clear and precise communications for crane and load control. In the event that communications are lost or become unclear, **STOP**.
- Operate the crane slowly and deliberately. No sudden or unauthorized moves of the crane or load.
- Understand, minimize, or eliminate effects of harbor traffic or pier side work interferences. Establish and maintain an adequate clear zone for your work.
- Remain diligent, alert and fully focused; do not become complacent or allow others to distract you.
- If there are questions or concerns, **STOP**, and bring your concern to the appropriate individual.
- **Remember, divers rely on you to perform your job as if their lives depend on it.**

19 June 2014

SAFETY

Navy Crane Center 14-S-04

Navy Shore Weight Handling Safety Brief!

Title: WORKING UNDER THE LOAD OR IN THE FALL ZONE

Target Audience: ALL PERSONEL WORKING AROUND CRANES

A cardinal rule for anyone involved in weight handling is that you do not place yourself or anyone else in danger by working under a suspended load or by passing a suspended load over anyone!

- The Navy shore weight handling program has rigorous standards and requirements to ensure safe crane and rigging operations. When you deviate from these standards and requirements you can create unsafe conditions.
- Annually, we safely make millions of lifts with cranes and rigging gear. However, data shows that the Navy shore community averages about 20 accidents per year involving loss of control of the load. Most recently, a worker was injured when he was struck by a falling load that had slipped out of its rigging. This person had deviated from established standards and requirements by placing himself under a suspended load…in the load's fall zone. The fall zone is that area into which one would reasonably expect the suspended materials to fall in the event of equipment or gear failure.
- Fortunately, injuries from dropped loads don't occur often. We, as a community, recognize the potential of this type of accident and typically keep people clear of the fall zone. Even so, this brief serves as a reminder that dropped loads can and do occur. It is your job to minimize the potential by following established standards and requirements.

Do not get under a suspended load!

- Personnel shall remain clear of the fall zone except when actively engaged in rigging or unrigging the load or when the load is being attached to or removed from another object. Once the load is hoisted, rigging personnel shall stand clear of the fall zone!
- There are times when it may be necessary for personnel to reach under a static (not in motion) suspended load for a short duration to install or remove coverings, make attachments, position supports, etc. In this case, the only body parts allowed under the load are the arms and hands. However, even this should be avoided if there are any other alternatives, such as setting the load in a stand.
- See section 10.7 of NAVFAC P-307 for specific requirements.

Never place yourself or others, or allow others to place themselves, in the fall zone!

13 August 2014

SAFETY

Navy Crane Center 14-S-05

WEIGHT HANDLING TRAINING BRIEFs

The following Weight Handling Training Briefs (WHTBs) are provided for communication to Navy shore weight handling program managers. These briefs are a part of a series of briefs that discuss the weight handling "Safety Triangle." The Safety Triangle is used to demonstrate the progression of a healthy weight handling accident prevention program. The first brief focuses on the base (or foundation) of the triangle where weight handling program deficiencies, trends, and minor events are identified and corrected before they result in a more serious event. Just as the pyramids of Egypt have lasted thousands of years with a solid foundation, a healthy weight handling accident prevention program needs a solid foundation. This foundation is built (and broadened) by proactively and routinely, capturing and reacting to deficiencies at the lowest level via workplace observations/surveillance and through near miss reporting. The bottom of the triangle is the area where activities find and correct minor deficiencies and events before the deficiencies or events find them in greater severity. The next three briefs describe how this foundation is developed through an effective surveillance program, which includes determining the root causes of deficiencies that are identified by surveillance. The final brief addresses the Switch Theory, which explains the value of intervention and correction of identified unsafe acts or process omissions.

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

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

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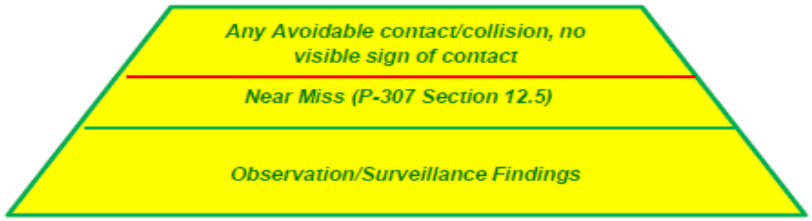
Navy Shore Weight Handling Training Brief!

Title: Building a Strong Foundation to the Safety Triangle

Target Audience: Navy Shore Weight Handling Program Managers



DOES YOUR WEIGHT HANDLING ACCIDENT PREVENTION PROGRAM HAVE A STRONG/ HEATHY FOUNDATION?

Any good accident prevention program will have a **strong foundation**. A strong weight handling accident prevention program foundation consists of three healthy blocks.

- Observation/Surveillance program. Needs buy-in from the deckplate workers all the way through management. Everyone must recognize the importance of documenting findings for causal analysis and process improvement and subsequent implementation of actions to continuously improve.
- Near Miss Data. This provides a 'second-chance-opportunity' and demonstrates that your process is working by finding the deficiency before "it finds you." A thorough look at near miss and human factors of why an event almost happened can provide many lessons learned.
- 'Avoidable contact/collisions' and "No visible sign of contact" type accidents. While they are accidents by NAVFAC P-307 definition, it does not necessarily mean your program is unhealthy. The goal of the accident definition is not to have avoidable contact during a lift or during movement of the crane. Ensure your goal is NO CONTACT and not just "no damage", and the health of your program will show.

All the above are learning/reinforcement opportunities that keep safety continuously in the forefront. Any activity with a critical internal look at their weight handling practices will significantly reduce the potential of an accident, regardless of the number of deficiencies, as long as they are **looking**.

30 June 2014

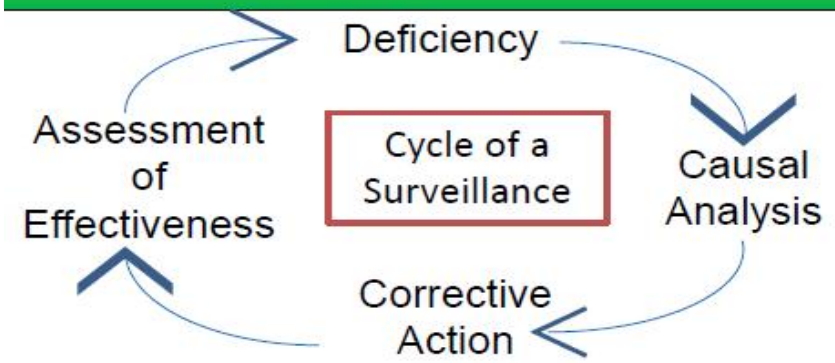
Training

Navy Crane Center 14-T-2A

Navy Shore Weight Handling Training Brief!

Title: Surveillance Cycle

Target Audience: Navy Shore Weight Handling Program Managers



A healthy surveillance program is much more than just performing an observation. There are four parts to an effective surveillance program.

Deficiency Identification. A deficiency is a deviation from the standard. All parties must recognize the importance of performing the job to the standard. When the standard is not met write it down. **Gather the data.**

Causal Analysis. Understand and evaluate why performance is not per the standard. Sometimes it is equipment, sometimes engineering, but ultimately each finding is based on the element of **a human factor**.

Corrective Action. The method put in place to feedback to the workforce how to change the human factor that is not meeting the expected standard. It is incumbent that the actions address the **"why"** and not just the deficiency itself.

Assessment of Effectiveness. Must be done to validate the corrective actions. Sometimes the actions put in place do not have the desired effect. Without follow up the repeatability of the deficiency will happen that much sooner.

Deficiencies are always out there. As the graphic shows, a surveillance program is a cycle. How well you perform each stage determines how effective your surveillance program will be. A healthy program is one where causal analysis drives the right corrective actions that are so effective the deficiency goes away completely or has a much longer half life before reoccurrence.

Navy Shore Weight Handling Training Brief!

Title: Gathering Surveillance (Observations) Data

Target Audience: All Navy Shore Weight Handling Program Personnel

Surveillance/Observation is the act of watching or listening to someone or something to prevent or correct an act or to gain information.

It is natural to want to fix a deficiency on the spot and think that it has been fixed and won't happen again, but….

WRITE IT DOWN (Document It!)

In order to have an effective weight handling surveillance (observation) program, there must be documented findings which can be used to identify trends (behaviors).

In addition to actual deficiencies, it is also good practice to write down things (findings) that seem questionable, may not be the best practice, or may be recommendations for improvement. Bottom line, if it doesn't seem "right", or could be done safer, easier, or more efficiently, write it down so that it can be assessed.

Deficiencies and poor practices may be repeated if the data is not collected for assessment and if corrective actions are not taken.

28 July 2014

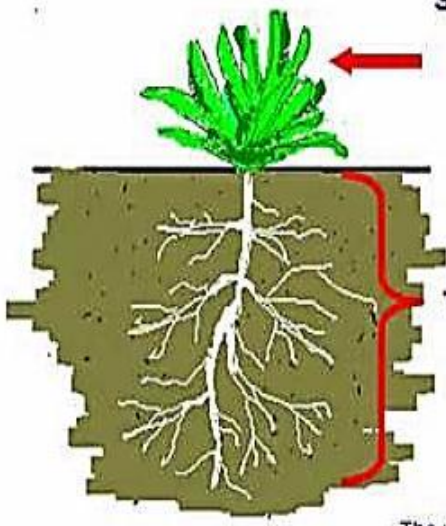
Training

Navy Crane Center 14-T-02C

Navy Shore Weight Handling Training Brief!

Title: Causal Analysis
Target Audience: Navy Shore Weight Handling Program Managers

Root Cause Analysis Basics



Symptom of the problem.
"The Weed"
Above the surface
(obvious)

The Underlying Causes
"The Root"
Below the surface
(not obvious)

The word root, in root cause analysis, refers to the underlying causes, not the one cause.

Anyone can write down deficiencies. It's what you do with the written down information that leads to success.

In analyzing data it is important to identify what is tangible (deficiencies which can lead to an accident, equipment breakdown, equipment malfunction, etc.).

Once tangible data is segregated and sorted, then you need to ask 'why?' This is not a cursory 'why', but looking deeper than just the act itself.

In deficiencies involving a human factor, the decision (ex. disregarding a warning or alarm) for the act itself, preconditions (ex. excessive surrounding noise affects communication) that exist, a supervisor (ex. operator selected not proficient) role, and the organization (ex. lifts not engineered correctly) itself could all be partially embedded in the 'The Root'.

In trying to root out a deficiency, the response must kill the root not just pull the weed.

Weight Handling Training

Navy Shore

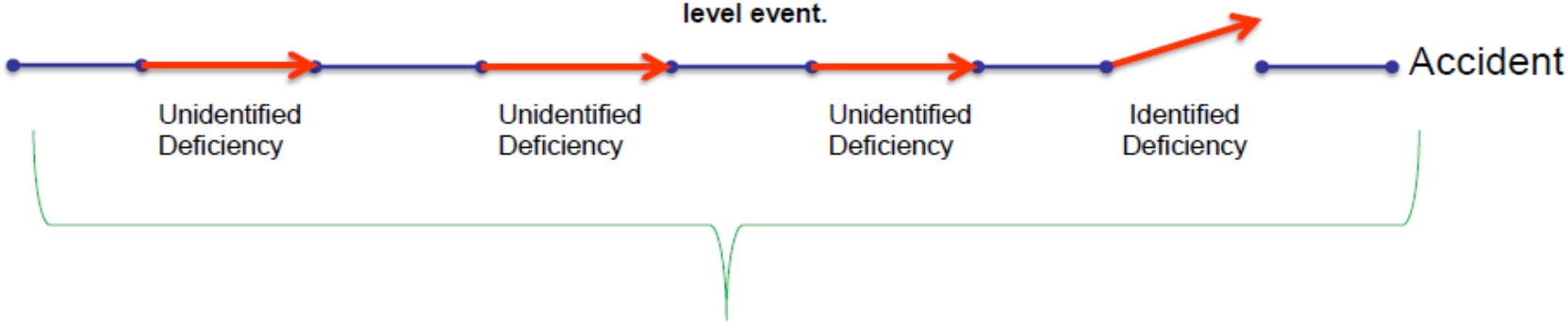
Brief!

Title: Switch Theory

Target Audience: Navy Shore Weight Handling Program Managers

Switch Theory

Data proves that accidents occur based on multiple unchallenged deficiencies that line up to result in a higher level event.



Just **one** identified **deficiency,** which may be very minor in nature, can open the switch circuit to prevent an accident. During an accident investigation or critique, everyone will be looking back and trying to identify the switches that were closed.

Instead of looking back, lets get out on the deckplate and **open** those **switches** by finding and documenting the **tangible deficiencies**.

Navy Shore Weight Handling Training Brief!

Title: Human Factor of Unsafe Actions

Target Audience: Navy Shore Weight Handling Program Managers

There are four levels of human factors to consider when performing causal analysis. The first human factor is the decision that led to the 'unsafe act' itself. Sometimes the 'unsafe act' is not an action but a lack of action.

There are two types of decisions that can cause an unsafe act.

Errors: They can be unintentional acts or they can be based on a mis-step in judgment or perception.

Violations: Willful disregard for a rule or regulation

During Causal Analysis this question must be answered "What was the final decision that caused the unsafe act?"

Navy Shore Weight Handling Training Brief!

Title: Preexisting Human Factors Affecting Deficiencies
Target Audience: Navy Shore Weight Handling Program Managers

The second human factor for causal analysis is preexisting conditions. When a decision was made for an action, or lack of action, there are always preconditions that prompted that decision.

Some examples of preconditions to consider are:

Environmental

- Physical - vision restricted, working during hot summer hours or exposed to elements in the winter, loud noises
- Technological – the design of equipment is not user friendly

Condition of Individual

- Inattention, confusion, distractions
- Complacency, overconfidence, outside work stressors
- Medications, a medical condition occurs during operation
- Perception of production pressure - "get it done at all cost"

Personnel

- Poor Coordination/ Poor Communication/ Poor Planning
- Self-imposed – alcohol, lack of rest, poor nutrition

You can't work on the decision until you know "What preconditions affected the decision?"

25 September 2014

Training

Navy Crane Center 14-T-02G

SUMMARY OF WEIGHT HANDLING EQUIPMENT ACCIDENTS
THIRD QUARTER FY14

The purpose of this message is to disseminate and share lessons learned from select shore activity weight handling equipment (WHE) accidents, near misses, and other unplanned occurrences so that similar accidents can be avoided and overall safety can be improved.

For the third quarter of FY14, 79 Navy WHE accidents (59 crane and 20 rigging), were reported. Of the 79, 17 (22 percent) were considered significant (overload, dropped load, injury, two block, or derailment). The total number of accidents reported increased from the previous quarter by 33 percent, but the number of significant accidents remained nearly the same. The overall increase was primarily driven by a spike in the number of load and crane collisions reported during the quarter. Contractors reported a total of eight crane and rigging gear accidents for the second consecutive quarter, including three significant accidents.

INJURIES

Accidents: Four injuries were reported, including two in which personnel extremities were caught in pinch points. Both of the pinch point accidents resulted in lost work days and one was reported as a Class "B" mishap as defined by OPNAVINST 5101.1. A mechanic sustained a severe injury to his index finger when his finger was caught between a crane's wire rope drum flange and guard bar. A rigger's finger was fractured when his finger was caught between the load and a permanent ship's structure. An operator injured his shoulder when he manually positioned a load due to the trolley function being inoperable. A mechanic suffered a minor injury when the hand chain of a chain hoist struck her head.

Lessons Learned: Personnel must ensure they remain clear of pinch points at all times. When maintenance requires personnel to access a pinch point or rotating machinery, personnel should ensure equipment is properly isolated (lockout/tagout) prior to proceeding. Pinch point injuries are the most common type of injuries we see in the weight handling community. Managers and supervisors are strongly encouraged to stress the importance of remaining clear of pinch points during classroom/tool box training. One injury occurred as a result of an operator attempting to position a crane when the crane's trolley function was inoperative. Instead of tagging the crane out of service until repaired or replaced, the activity allowed the crane to remain in operation. Personnel safety must always take precedence and it is important to remember that the efficiency of mission execution is significantly improved when injuries are prevented.

OVERLOADS

Accidents: Eight overload accidents were reported (five crane accidents and three rigging accidents). A floating crane was overloaded when an incorrect test weight was used to test the boom function. A Category 3 crane was overloaded due to incorrect identification of the load’s weight. The whip hoist of a portal crane was overloaded while removing a component from the flight deck of an aircraft carrier. During removal of gas management support equipment from a

ship, the rigging gear was overloaded due to binding conditions. A manufacturer-provided lifting eye bolt was overloaded during the down-righting of a motor into a shipping crate.

Lessons Learned: NAVFAC P-307 identifies guidelines for conducting lifts safely and requires the rigger-in-charge and crane operator to know the weight of the load prior to commencing the lift. The weight is required to be verified if it is estimated to exceed 50 percent of the capacity of the hoist or 80 percent of the capacity of the rigging gear, platform/skid, below-the-hook lifting device, etc. The weight shall be verified by performing an engineering evaluation or using a local procedure approved by the certifying official or activity engineering organization. Alternatively, a load indicating device (LID) shall be used. LIDs shall also be used where overloading of the crane or rigging gear is possible due to binding conditions. Rigging gear shall be properly sized to safely lift the load.

DROPPED LOADS

Accidents: There were three reported dropped load accidents. While lowering a ship's component onto a wooden shipping skid using a bridge crane, the load shifted and parted a synthetic sling, causing the load to fall to the deck. While rigging a coupling onto a submarine, a swivel hoist ring threaded bolt snapped (failed due to bending) at the attachment area causing the coupling to slide off the shipping skid and damage the face of the coupling. While lowering a nose section of a shape, the nose section slipped from the rigging and dropped onto the transfer cart.

Lessons Learned: These accidents occurred as a result of improper rigging, ranging from incorrect gear selection to incorrect gear installation. One of the accidents resulted when a synthetic sling was cut during a lift, allowing the load to drop. NAVFAC P-307, Section 14, requires the use of chafing protection where there is the possibility of the sling being cut and the chafing protection material shall be of sufficient thickness and strength to prevent sling damage. Swivel hoist rings shall be used with threaded holes where they can be installed with the shoulder flush to the face of the mounting surface. It is critical that the OEM recommended installation torque be applied if using an attachment bolt.

TWO-BLOCK

Accidents: There were two reported two-block accidents. The hoist wire rope on a Category 4 boom truck was damaged when the hoist block was hoisted through the anti two-block counterweight. In another accident, an air hoist was two-blocked, causing the load chain to fail and the hook to drop to the floor.

Lessons Learned: In both of the reported two-block accidents, the cause of the accident was identified as improper operation and could have been prevented if the operators were attentive to the location of the blocks and operated in a slow and controlled manner. Additionally, for the crane two-block, damage was discovered during an inspection for an unrelated malfunction that occurred during operation. The anti two-block feature was discovered inoperable and it was concluded that the crane was damaged as a result of being two-blocked. Two-block accidents have the potential to result in significant damage and/or personnel injury. It is vital that all safety

features are tested properly and operators are trained to approach limit switches at slow speed. Operations should not commence unless all of the identified safety devices are working properly. If a device is not working properly or stops working properly, stop operations and remove the crane from service.

The Navy's crane accident and near miss definitions, as specified in NAVFAC P-307, are broad in nature to capture minor level events from which Navy activities can obtain lessons learned. Reporting of these events is indicative of a healthy weight handling program. Overall, reported weight handling accident totals have increased by 13 percent as compared to the same period during FY13. The increase is primarily a result of a rise in the number of crane and load collision related accidents. There has been a 43 percent increase in the number of crane and load collisions over the same period of FY13. Overall, these types of accidents represent 48 percent of the total to date. Rigging accidents reported during the same period have remained relatively steady. Activities should continue to focus on a proactive approach to accident prevention and remember that the goal is to prevent accidents that result in injuries and significant damage. Identification of minor accidents contributes valuable lessons learned that can be shared with the weight handling community to prevent more significant accidents from occurring.

Activity observations (surveillances) remain an effective tool to help ensure personnel are focused and taking their time during weight handling operations. The findings from these observations can be utilized to assess areas of weakness or times when personnel focus has diminished so that corrective action can be implemented. A key to having an effective observation program is ensuring that supervisors are providing feedback to all personnel along with encouraging all weight handling professionals to identify deficiencies as well. Additionally, observations contribute directly to the identification of near misses and prevention of accidents. Remember that a near miss is a situation where an accident was avoided by mere chance or where intervention prevented a sequence of events that would have resulted in an accident. The number of near miss reports submitted during the third quarter of FY14 increased by 19 percent. Twenty-five different activities submitted at least one near miss report. The data submitted indicates a need for improvement with regard to crane maintenance and inspection. Several near miss reports identified missing fasteners, loose bolts, and improper installation of components that had the potential to result in accidents. One crane was found to have a miss-adjusted hoist interlock switch, which allowed the hoist to have excess rollback during hoisting. An increase in gear inspection deficiencies, ranging from improper gear selection to unauthorized gear, was also identified. Lastly, crane miss spools and side loading conditions are also areas requiring activities to increase their focus. Nine near miss reports identified crane miss spools and three crane accidents occurred as a result of side loading and subsequent miss spooling of the crane.

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. The most significant area requiring immediate attention concerns injuries that have occurred as a result of personnel extremities being caught in pinch points. Activities should take the time to brief their personnel regarding recent injuries that have resulted due to this issue and in the area of communication while operating equipment or moving a load,

especially when personnel are not in the line of sight of the individual controlling the movement. 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.

Tip of the Spear
(Notable Evaluation Items)

Program Management

Weight handling program leadership, at some activities, is not identifying the lower level issues which are aligning to result in significant accidents. At one activity, no improvement in accident severity in the past year was noted and actions taken to date have had no effect at reducing their accident severity. Two other activities experienced significant overload accidents. The major contributor to the high accident severity rates was the lack of a robust internal weight handling surveillance program. Weight handling program managers and supervision must set the standard with regard to the conduct of surveillances so that management expectations and standards are clearly communicated to the workforce.

At some activities, the evaluation teams noted issues with being able to keep cranes in service which is starting to affect the activities' ability to meet their critical mission in support of fleet readiness. At one activity, two contract mobile cranes had to be utilized to supplement the workload due to the high number of critical cranes out of service. At another activity, this has resulted in instances where operations personnel were required to use an alternate crane that was not best suited for the required lifts.

Evaluation teams identified numerous activities that have not reported any crane or rigging accidents or near misses in years. The Navy's crane accident and near miss definitions, as specified in NAVFAC P-307, are broad in nature to capture minor events and unsafe acts from which Navy activities can obtain lessons learned. The evaluation team notes that reporting of these events is indicative of a healthy weight handling program. The lack of crane or rigging accidents and near miss reports can be indicative of a lack of understanding of accident and near miss definitions.

Operations

At two activities, the evaluation team identified examples where the rigger-in-charge (RIC) was overly involved in work, hampering his ability to maintain overall control of the evolution. In both cases, sufficient personnel were available to perform the work without needing to involve the RIC.

At some activities, the local pre-operational checklist form used to record the crane operator's monthly inspection for bridge cranes was missing several applicable inspection items.

At many activities, there were numerous instances of Category 3 cranes with the hoist block stowed in the upper limit switch. NAVFAC P-307 provides instructions for stowing the hook block.

Maintenance, Inspection, Test, and Certification

At one activity, several cranes were out of service with electrical deficiencies and had remained out of service due to the lack of personnel with in-depth electrical knowledge needed to troubleshoot and repair the identified deficiencies. Examples include:

- Hoists intermittently would not raise or would raise only in low speed and would not accelerate. Troubleshooting was attempted by inspection personnel but the cause could not be determined.

- An inspector identified that the auxiliary hoist of a bridge crane would not operate due to the hoist drum brake not releasing. Troubleshooting was conducted but the problem could not be identified and resolved.

- An inspector identified that the auxiliary hoist of a bridge crane would not operate.

- The hoist function of a monorail crane was inoperative.

Contractor Cranes

At one activity, two contractor cranes did not have a certificate of compliance (NAVFAC P-307, figure P-1) at the crane and one of the P-1s at the contractors office did not have all of the attributes (i.e., did not identify a contracting officer's point of contact or phone number, prime contractor/phone number, contact number, nor the ASME standards for the rigging gear and attachments).

Engineering

At one activity, several breakdowns (most of a repetitive nature) were identified with inadequate engineering evaluations of the root causes. Examples include:

- A crane experienced four low tension cable reel faults within a two-month period. A blown fuse within the cable reel motor was found after each occurrence. The root cause was first identified as the torque adjustment potentiometer being set too low, even though it was set in accordance with the manufacturer's settings. In two subsequent occurrences, engineering focused on simply replacing the blown fuse with limited troubleshooting. Finally after the fourth occurrence, engineering identified the fuse was marginally sized for the cable reel motor amperage rating, which appears to be the true root cause.

- A crane experienced three occurrences of inoperative travel function due to water that turned to ice in the travel gearboxes and brakes, preventing the drive wheel from rotating. After engineering had responded and evaluated the third occurrence, the post inspection evaluator identified that two particular brakes had plugs installed in the drain holes of the covers, preventing water from escaping.

- A crane experienced three occurrences of inconsistent hoist operation within a two-month period. The first resolution was to replace a faulty potentiometer within the controller joystick; however, this repair was not consistent with the problem identified, as the abnormal operation occurred only in one direction. After the third occurrence, engineering identified that the hoist encoder was failing, resulting in inaccurate feedback to the hoist drive.

Rigging Gear

At one activity, there were numerous proof load tests, re-inspection documentation, and equipment marking deficiencies, as well as damage to gear that was available for use in the gear room.

At another activity, the crane operator performed a visual inspection of a synthetic sling with Velcro chafing gear attached. The crane operator slid the chafing gear down as far as it would go; however, he did not remove the chafing gear to perform a complete visual inspection of the sling.

SHARE YOUR SUCCESS

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

WEIGHT HANDLING PROGRAM SAFETY VIDEOS

Accident Prevention, seven crane accident prevention lessons learned videos are available 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.

Note: ***"Load Testing Mobile Cranes at Naval Shore Activities"*** is currently being updated to address the revised load test procedures in the December 2009 edition of NAVFAC P-307.

All of the videos can be viewed on the Navy Crane Center website: http://www.navfac.navy.mil/ncc.

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We want your feedback on the Crane Corner.
Is it Informative?
Is it readily accessible?
Which types of articles do you prefer seeing?
What can we do to better meet your expectations?

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