Sandia National Laboratories

Construction News Sense

FACILITIES Management and Operations Center

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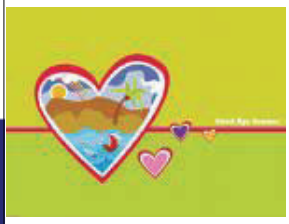


Good Bye **Summer**

DOE Lesson Learned from Savannah River:

Lessons Learned for Facilities with Hoist/Cranes

FMOC has had an extremely busy year for our hoisting and rigging activities. For the most part we have managed those activities well. However, general construction outside of the DOE complex did not have a very good 2007/2008. Crane accidents in locations such as New York City and Las Vegas, NM resulted in several fatalities and extensive damage to the construction sites and to surrounding structures.

As members of a learning organization, we at SNL want to take the time to learn from other events across the nation. If we want to be considered professionals in our industry we must continue to manage our hazards effectively. This crane event is an example of the detail and energy that it takes to maintain a proactive hoisting and rigging program. During recent construction work at the Savannah River Site a Crane Process Operator (CPO) noted that the 2.5-ton hoist block was missing from the remotely-operated Crane. The 2.5-ton hoist is not frequently required for operations and had been out-of-service for an extended period of time. Upon identifying the missing block, the CPO immediately stopped operations and notified Facility Management.

Video surveillance since the last confirmed time the hoist block was in place was reviewed and it was determined that on April 22, 2009 the 2.5-ton hoist wire rope failed, the hoist block disconnected from the crane and the block fell approximately 25 feet onto a canyon vessel. Initial inspection identified some damage to a spare pipe jumper connector, but no adverse damage to the impacted vessel.

Field inspection revealed the wire rope failed in proximity of the wire rope cutter. The NHC operates in a work environment not accessible by personnel, it is equipped with a remotely-operated hydraulic cutting device which can be used to free the crane by intentionally severing the wire rope if the wire rope becomes entangled beyond recovery. The wire rope passes through a sleeve inside which the cutting blade is contained. Even in the retracted position, the cutting blade partially protrudes into the sleeve potentially allowing contact with the wire rope. The initial investigation concluded the wire rope failure may have been prompted by repeated contact with the cutting blade. As the crane travels, the 2.5-ton hoist block sways, causing repeated contact between the wire rope and exposed cutting blade.

An error precursor to consider as a result of this event is that the wire rope is prone to contact the cutting blade during crane operations due to cutter location on the 2.5-ton hoist.

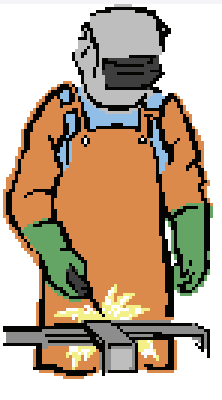
What are some topics that are critical to evaluation of your hoisting and rigging program and initiation of program changes? Here are some examples.

- Crane and rigging inspections are critical to a good Hoisting and Rigging program.
- Cranes and hoists that are only periodically used are vulnerable to these types of events.
- Do you have any cranes and hoists that are used periodically?
- Never underestimate the weight of the load, in this day and age we can find the weight of old equipments and units on the internet or from the manufacturer.
- Do you manage your crane subcontractor adequately?
- How well do you know the ANSI/AMSE B30.5-2004, Mobile and Locomotive Cranes, B30.9-2003, Slings
- Lifting Bars and Spreaders Bars needs engineers stamp for capacity prior to a lift
- Do you have a qualified rigging when lifting?
- Do you understand the “Below the hook devices”

SNL Lessons Learned Program

Welding Lessons Learned

A FMOC contract worker recently experienced an apparent electrical shock of 3-5 microamps. This is an extremely low current. The welder, at 80% of rated current, would have developed approximately 37 VDC max during operation. Although it can be felt, this voltage is well below a value considered hazardous. Because of the high frequency, the shock will travel along the skin surface. The current is inherently limited by the nature of the circuit. The worker was conducting tungsten inert gas (tig) welding activities following the manufactures recommendations.



Tig welding is an arc welding process that uses a nonconsumable tungsten electrode to produce the weld. The weld area is protected from atmospheric contamination by a shielding gas (usually an inert such as argon), and a filler metal is normally used, though some welds, known as autogenous welds, do not require it. A constant-current welding power supply produces energy which is conducted across the arc through a column of highly ionized gas and metal vapors known as plasma.

The ANSI and AWS standards state that the work piece should be grounded unless there is a specific requirement to float the work piece. The manufacturer, Miller, does not include that specific requirement in the manual because they expect welders to follow the standard. (The manual states “If earth grounding of the work piece is required, ground it directly with a separate cable.”) If the table had been properly grounded; much of the stray current would have been shunted to ground, significantly reducing the effect on the worker.

To avoid electric shocks and possible electrocution, personnel should take the following precautions:

- Wear protective clothing and dry, insulated gloves in good condition. (Change as necessary to keep dry)
- Insulate yourself from the workpiece and ground by wearing rubber soled shoes or standing on a dry insulated mat. Do not touch the ground with any other part of your body.
- Use fully insulated electrode holders.
- Do not use worn, damaged, undersized or poorly spliced cables.
- Do not wrap cables carrying current around your body.
- Do not touch an energized electrode with bare hands.
- Turn off all equipment when not in use.
- Use only well maintained equipment. Repair or replace damaged parts before further use.
- Avoid wet working conditions. Even a person's perspiration can lower the body's resistance to electrical shock.

The avoidance of electrical shock is largely within the control of the worker. Therefore, it is especially important that the worker be thoroughly trained on safe welding procedures. Safe procedures must be observed at all times when working with equipment having voltages necessary for arc welding. Some voltages used in welding can be dangerous to life. But, even mild shocks need to be avoided because such shocks may startle the worker and may also be an indication of other problems.

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