FLINT HILLS resources

Lessons Learned

SUBJECT: Contract Employee Hand Injury, Working on Energized Equipment

Marysville, Mi Facility

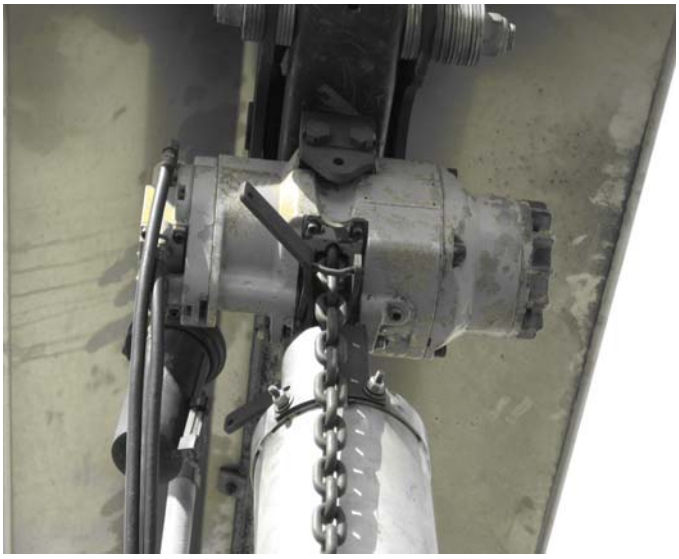
Date: 11-10-2009

DATE OF INCIDENT: September 24, 2009

BACKGROUND

On 09/24/2009 while attempting to reinstall the lift chain into Hoist #4, the involved contractor inadvertently pinched his left thumb between the chain and the chain guide using local controls in an effort to place the chain onto the hoist's sprocket. The resulting injury affected the thumbnail and nail bed, which later required several sutures to close. The site nurse examined the injury immediately following the incident and prior to taking the contractor to Port Huron Hospital's Emergency Room for follow-up care.

INCIDENT DESCRIPTION



- The contract employee and a FHR maintenance technician had removed the unit and chain for service several months prior to the incident. The hoist chain was intact when taken down.
- Following repair, the hoist was then reinstalled on its normal mounting location at the western end of the Polymerization Unit 82 feet above the ground. The lift chain, which had not returned from inspection, was not present when the hoist was mounted.
- On the date of the incident, the contract employee worked with a FHR maintenance technician to reinstall Hoist #4 lift chain.
- Workers utilized a crane lifted man basket to gain access to the unit.
- Once in position, the contractor knelt on the basket's floor looking up into the hoist mechanism, locating the sprocket wheel of the hoist unit.
- Working against gravity, the contractor held the chain rigid in his left hand and "bumped" the local hoist control while pushing the supported chain up into the closed housing.
- The rotating sprocket "grabbed" the first link, causing it to feed into the hoist too quickly for the contractor to react, his left thumb became lodged between the chain and hoist guide resulting in the injury.
- When asked, "What could have been done different to avoid the injury?" The contract employee stated, "The chain should have been installed on a bench in the Shop prior to hanging the hoist!"

At-Risk Behavior:

The At-Risk Behavior in this incident is the failure to recognize a hazard in the form of a pinch point when attempting to feed the chain onto the sprocket.

Desired Safe Behavior:

The Desired Safe Behavior would have been to analysis the task prior to attempting the reinstallation of the chain.

Taproot Root Cause:

- Procedures – Not Followed. Marysville's Hazardous Energy Control procedure requires all sources of active and stored energy to be controlled or released prior to working on any process equipment. Additionally, the manufacturer's manual reads, "It is recommended that all maintenance work on the hoist be performed on a bench in a clean, dust free work area. During the process of disassembling the hoist, observe the following: 1. Turn off air system and depressurize air lines before performing any maintenance. Disconnect air line from hoist". NOTE: OSHA 1910.179 (l) (2) Maintenance Procedure – states that all controllers shall be at the off position and the main or emergency switch shall be open and locked in the open position.

- Training – Task Not Analyzed. The Safe Plan of Action (SPA) conducted on the task failed to recognize the intent of reinstalling the chain with the equipment energized.

- Training – Task Not Analyzed. The SPA further failed to reference the manufacturer's manual for the equipment, which states: "The following steps describe the initial installation of chain on single fall hoists that do not have a chain installed.
    - Remove brake spring and piston housing, brake discs, and brake plates to expose brake driver.
    - From the side of the chain wheel opposite the chain anchor bolt, engage the first link to load chain in the pocket on the chain wheel edge, etc".

  Note - The procedure continues through the installation of the chain and the reassembly of hoist components up to completion.

- Procedures – Situation Not Covered. The current SPA form fails to address the availability of a standard operating procedure, and consideration was not given to reviewing of the manufacturer's manual was available. It should have been consulted.

Contributing Factors:

- Improper Permitting: Permit was issued without locking equipment out.
- While contract employees are not trained in behavioral safety observations, the FHR technician in the basket with him has been trained in behavioral safety observations.
- A second trained C.H.A.M.P.S. observer working on a platform immediately adjacent to the hoist failed to note the hazard.
- The Safe Plan of Action (SPA) completed prior to requesting a work permit focused more on the crane operation than the actual task of reinstalling the lift chain.
- The manufacturer's users manual recommends, "Only allow personnel instructed in the service and repair of this hoist to perform maintenance". Neither worker received training prior to attempting the service of the hoist unit.
- Hoist re-installed without the chain lead to the attempted re-installation of the chain in the field, contrary to manufacturer's recommendations.

Key Lessons Learned:

- 100% Energy Isolation is required for all equipment prior to the commencement of work. Deviation from established procedure requires approval.
- Completing a SPA is only a step in complete pre-job packages, subject matter experts and manufacturer's manuals must be included in all pre-task analysis to ensure all concerns reviewed prior to beginning work.
- A pre-job safety exchange (communication) soliciting input from others within a cross-functional work group sheds light on safety concerns otherwise overlooked.
- If the question "is this safe to do" had been considered, the probable answer would have been "No" and the injury would have been avoided.