Don't Let Chain Hoist Safety be Your Weakest Link

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Paul Smith was only trying to be helpful. As he finished loading engine fasteners from the bustling and noisy work floor to an awaiting hoist, he stood next to a railing and placed his hand atop the load in an effort to balance it and prevent it from moving. He had done this many times before.

At the same time, the hoist operator thought he heard someone tell him to pick up, and he began to lift the load. Within seconds, Paul's hand was trapped between the product and the railing, crushing his hand and breaking his fingers.

In a second hoist-related accident, the consequences were even more severe. An overhead hoist moving along a monorail failed and dropped its load. The load fell on a plant employee walking directly beneath the hoist, killing the employee instantly. An investigation revealed human error as the cause of the fatal accident.

Accidents like this become part of the Bureau of Labor Statistics' Census of Fatal Occupational Injuries, which tracks occupational injuries related to cranes, derricks, hoists and hoisting accessories. In many cases, investigations reveal that accidents like these can be prevented by following safe hoist practices established by hoist manufacturers, the Hoist Manufacturers Institute (HMI) and ANSI/ASME (American National Standards Institute/American Society of Mechanical Engineers).

Unfortunately, human error remains the most common cause of hoist and crane accidents. Consequently, careful training of hoist operators must emphasize safe operating procedures that go beyond those procedures required to operate the hoist. Too often, hoists are loaded beyond their capacity or loads are not balanced. Other times, people walk beneath a load or fail to communicate with the operator using predetermined signals. As these scenarios indicate, the consequences can be devastating, but they are avoidable.

The operator/chain-hoist connection

Overhead chain hoists are standard pieces of equipment in most industrial settings. Large chain hoists have a capacity of 5 to 10 tons, or more. These hoists typically employ electric- or air-powered motors. Smaller chain hoists can be manually powered, with operators grasping and pulling continuous hand chains to operate them.

No matter what the power source, a normally safe hoist in the hands of an untrained operator or an employee who ignores safe operating practices represents a potential workplace hazard. The rules for safe operation of chain hoists generally apply to all types of hoists. Furthermore, they are grounded in the ability of the

operator, and others in the vicinity of the hoist, to exercise common sense, to follow directions and procedures, and to anticipate the motions and actions that will occur as a result of operating the hoist controls.

The first case mentioned above was an accident waiting to happen. Paul Smith not only ignored the common-sense practice of not placing a hand atop a load, but he also did it adjacent to a railing. And, although the operator thought he heard the instruction to lift, he did not wait for the appropriate signal before beginning to lift the load, thus setting the accident in motion.

The second scenario highlights two problems: employees walking directly beneath hoists and the failure to report maintenance problems. In this case a hook that was damaged on the previous shift resulted in the hook's failure.

Safe hoist operation

There are many aspects to safe hoist operation, but the most important is knowledge about the hoist, the load, and about safe operating practices and the training and communication that support that knowledge.

Safe hoist operation begins with proper hoist selection. The hoist must be matched to the application, and hoist capacity is of primary importance. It is critical that the hoist selected has a capacity that exceeds the weight of the load. Make sure the hoist's load chain is long enough to reach the load. Consider a powered hoist if the load has to be lifted a long distance or lifted repeatedly.

Operator qualification is also important. In addition to good hand/eye coordination, depth perception and spatial orientation, a good operator should exhibit a willingness to perform maintenance operations and demonstrate safe work habits.

Operator training is critical to safety and should be specific to the type of hoist the operator will be using, including information about lift capacity as well as inspections and maintenance, slip clutches, load limit devices, braking mechanisms and wear limits.

Training should also include a discussion of balanced lift points and safe rigging practices. Slings or other attachments should be seated in the saddle of the hook, and hook latches should be present and functioning properly. The hoist's load chain should never be used as a sling. Instead, be certain the chain is straight and properly seated in the load sheave and, unless the hook is specifically designed for point loads, avoid tip loading.

Loads should always be lifted slowly at first to make certain everything is seated and operating properly. They should also be lifted vertically, avoiding the temptation to side pull a load, which places additional stress on the hoist and risks uncontrolled load swings. Avoid using the hoist's travel limits to stop operation. These limits are usually not designed for regular everyday usage they are intended for emergency use. When the hoist is coupled to a trolley, care should be exercised to prevent crashing the trolley into the end stops on the beam. This increases stress

on the hoist and will cause dangerous load swings. Jogging the hoist's motor should be minimized as this will generate heat in the motor's windings, which could lead to motor failure.

Communication is another aspect of hoist safety that should be emphasized, particularly in noisy environments where lifting operations require a hoist operator and a signal person (normally the rigging or hookup person) to use hand signals or voice communication. Hand signals should be documented and posted by the hoist owner and agreed upon by the hoist operator and the signal person. Furthermore, the operator should only respond to hand signals from the designated signal person, regardless of who gives them, except to obey a stop signal. Effective voice communication requires that the operator and the signal person must be able to hear each other to ensure that the signals for hoist operation are clearly communicated, understood and executed.

Before giving the signal to lift a load, operators need to be aware of their surroundings, making sure they have a solid foundation for executing a manual lift and that they and others are clear of the load before lifting. They also need to communicate their intention to begin lifting to employees in the immediate vicinity of the lift, and to pay close attention to the task at hand, never leaving a load unattended or suspended.

Inspection and maintenance

OSHA requires that all hoisting equipment be regularly inspected according to standards set by the individual manufacturer and ANSI. Daily, frequent and periodic inspection routines should be a regular part of hoist operation. Inspection should include an examination of the chain for wear, twists, excessive dirt, broken links, and proper lubrication. Hooks should be inspected for deformations, cracks, damage, and properly operating latches.

Daily inspections should be conducted by the operator, while frequent and periodic inspections should be conducted by qualified inspectors at intervals determined by the severity and length of hoist usage. It is the hoist inspector's responsibility to alert maintenance workers of an inspection's findings. Hoists that do not pass inspection need to be tagged "Out of Service" and removed from the hoisting area.

In addition to inspections, regular, ongoing maintenance is critical to hoist safety. This can help prevent any lost-time accidents resulting from hoist failure and should prolong the life of the hoist. For more detailed information about hoist safety and maintenance, see ANSI/ASME standard B30.16 and related publications available from the HMI (affiliated with the Material Handling Industry of America). Contact ASME at 800-843-2763 or www.asme.org; contact HMI at 1-704-676-1190 or at www.MHIA.org.

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