MIOSHA Fact Sheet

Construction Safety & Health Division

Steel Erection –Setting Columns Using Proper Rigging

Steel erection activities have remained one of the most dangerous occupations in the construction industry. In the 5 year period from 2007 through 2012, MIOSHA investigated 4 fatalities related to steel erection activities.

There are various methods for rigging and setting columns during the steel erection process. When an overhead hoisting device is used to raise a column to the vertical position, the rigging attached to the top of the column must be disconnected. Steel erectors may use "column-setting" devices that are used to disconnect the rigging at the top of the column, typically by pulling on a line attached to the column-setting device from ground level. Using these devices eliminates the need to access the top of the column (e.g., by climbing, ladder or aerial lift platform) to disconnect the rigging. MIOSHA wants to ensure that iron workers are aware of some of the dangers that exist with some column-setting devices.

A column-setting device can be a safe and fast method of releasing the rigging from the top of a column when they are designed and used properly. If not designed and used properly, the device can inadvertently release prior to the column being properly secured. This action can cause the column to fall resulting in serious or fatal injury.

MIOSHA Part 26, Steel Erection

Part 26, Rule 2609 allows an employee to be under a suspended column in the following situations *only*:

- When employees are aligning and connecting the column to the anchor bolts.
- When employees are hooking or unhooking the column from the rigging (only those involved in the process).

When employees are working under a suspended load, Rule 2609 also requires all of the following:

- Columns must be rigged to prevent ***unintentional displacement***.
- Hooks must be equipped with self-closing safety latches or *their equivalent*, to prevent components from slipping out of the hook.
- Loads must be rigged by a *qualified rigger*.

How to Avoid Hazards

Many safety issues must be considered when setting columns with a column-setting device. The qualified rigger must address the following concerns:

- Ensure the device has been designed to carry the load. The device should be designed with a 5 times safety factor by a qualified rigger, a qualified manufacturer, or qualified professional engineer.
- MIOSHA Part 8, Handling and Storage of Materials, Rule 836 (4) states: Special custom designed grabs, hooks, clamps, and other lifting accessories, for such units as modular panels, prefabricated structures and similar materials shall be marked to indicate the safe working loads and shall be proof tested to 125% of their rated load.
- Inspect and evaluate the column-setting device and all other rigging for damage, wear and integrity.
- Use a properly designed lifting device with a means to prevent unintentional release while the column is being lifted, suspended, or connected. This may be accomplished with a self-closing safety latch, a safety device (keeper) to keep the pin intact (when a pin is used), or an equivalent means to prevent the column from coming loose from the rigging.
- Maintain a secure, tight-fitting connection between the device and the column that prevents the column from tipping or shifting. When a pin is used, the length and diameter of the pin must be evaluated.
- Ensure that the D/d ratio is considered in the calculation of the wire rope size and the hook, pin or shackle size used in a column-setting device. The diameter of the wire rope sling (d) must be sized properly with respect to the diameter of the hook, pin or shackle (D) that it will be used with. The D/d ratio will determine if the column-setting device must be de-rated to prevent overloading. Reference Construction Safety Standard Part 8, Handling and Storage of Material and ANSI/ASME standard B-30.9 to provide more guidance.
- *Never* use tapered or damaged pins as a component of a column-setting device.

MIOSHA always recommends that column-setting devices be designed by a qualified rigger, a qualified manufacturer, or a qualified professional engineer.

The key to preventing injuries and fatalities related to the use of a column-setting device is to use only a properly designed and constructed device, follow ANSI specifications and MIOSHA standards, provide good employee training and frequent/thorough inspections of rigging equipment to identify problems.

If you need additional assistance, please contact the Construction Safety and Health Division at 517-284-7680 or the Consultation Education and Training Division at 517-284-7720. Construction Safety Standards and other information can be viewed on the MIOSHA website at www.michigan.gov/miosha.