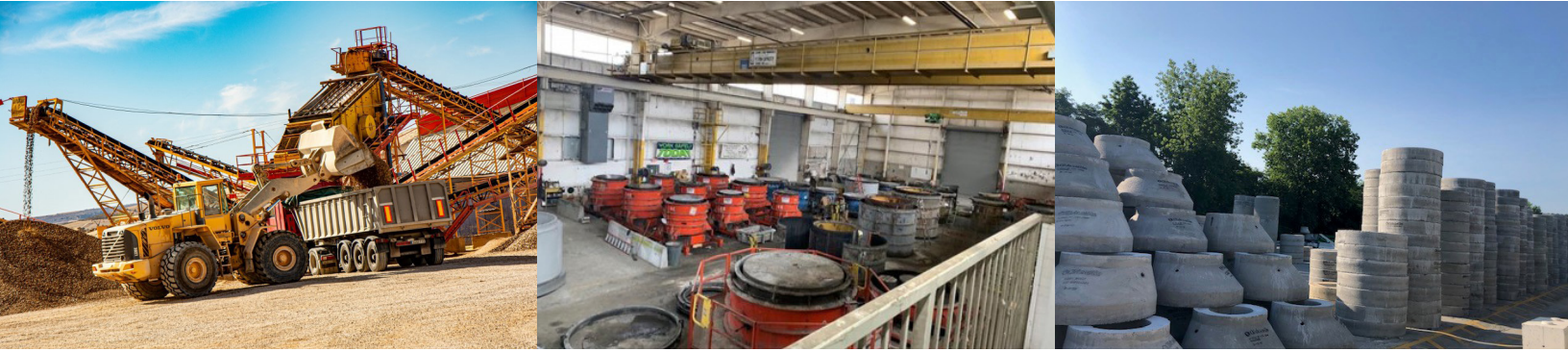


PRECAST CONCRETE INDUSTRY

Trapped Key Interlock Safety Solutions Five Part Application Series



Electrical and Struck-by incidents are rated the TOP FOUR DEADLIEST hazards in the construction industry per OSHA!

Working in the concrete industry introduces safety hazards that place workers in danger and put their lives at risk. To ensure worker safety throughout the cement manufacturing process, several applications require power to be properly isolated and safeguarded to ensure safe access only once hazards have been eliminated.

18% of worker fatalities are within the construction industry

Electrical and stuck-by hazards present themselves in the Precast Concrete Industry. A trapped key interlock solution mitigates these risks by driving a pre-determined sequence of operations that isolates power and guards against areas that may contain energized equipment and moving cranes and or product.

Eliminating the TOP FOUR would save 500 lives in America every year! (Top Four: Falls, Struck-by, Electrocutions, Caught-in/between)

While LOTO provides a visual warning and identifies hazards, a trapped key interlock safety solution physically prevents a specific set of actions from being performed until previous action(s) have been fully completed!

This Precast Concrete series will discuss hazards within specific applications and how trapped key interlock solutions can prevent injury and ensure...

Everyone has the right to be **SAFE** at work!

Applications



Conveyor Systems



Cement Mixer



Hoppers



Block & Tile Production



Overhead Cranes

Gravel Pits: Conveyor Systems Trapped Key Interlock Safety Solutions



40 workplace fatalities and 9,000 injuries a year are the result of conveyor accidents as reported by the U.S. Department of Labor

The extraction or storing of aggregate within a gravel pit serves a variety of purposes across many industries including the concrete & cement industries.

Conveyor systems are an important method in the process of transporting materials across the mine surface, into hoppers, over grating for sorting, and into trucks for distribution to plants and manufacturing facilities.

Conveyor system injuries account for 25% of all worker's compensation claims

The continuous movement of belts, chains, and diverters place personnel working and operating the system at risk. Regular maintenance on these systems is required to ensure efficiencies. Safety processes must be followed to mitigate human error and save lives. The isolation of power prior to entry into the area is the first step in mitigating risk.

Trapped key interlocking systems are recognized by ANSI/ASSE Z244.1 as an Alternative LOTO measure

Trapped key interlock safety solutions ensure a pre-determined sequence of operations each & every time. While LOTO provides a visual warning and identifies hazards, a TKI solution physically prevents a specific set of actions from being performed until previous action(s) have been fully completed!

Common trapped key interlock solution interlocking conveyor system with multiple access points and access doors:



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Step 1: Power Isolation KIRK Type F isolation interlock installed on main breaker for conveyor

Step 2: Multiple Entry Points KIRK Type T transfer interlock for access to multiple hopper access doors

Step 3: Safe Access KIRK Type D access lock installed on hopper doors

Step 4: Controlled Power KIRK Type PPS electromechanical interlock installed on control switch for hopper doors

PROTECT your employees, **PREVENT** accidents, and **PROVIDE** risk control and peace of mind by implementing a trapped key interlock solution that will ensure that...

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The Gravel Pits: Confined Space Trapped Key Interlock Safety Solutions



4.8 million confined space incidents a year are logged with OSHA

The storage of aggregate for various usage can lead to the potential risk to personnel involving engulfment within hoppers (confined space) and loss of materials due to incorrect materials loading. Protecting workers from confined space hazards that can occur during maintenance, cleaning, filling, and unloading of hoppers is critical within a gravel pit.

92 workplace fatalities and 11,000 injuries a year are the result of confined space incidents as reported by the U.S. Dept. of Labor

Interlocking access doors/gates around conveyor systems and hoppers will ensure that entry can only be gained after the power has been isolated and residual energy has ceased. Understanding the access points, partial or full body, will help determine the best interlocking solution to safely manage access to the hoppers and surrounding areas that could pose a confined space hazard.

60% of confined space fatalities are rescuers –Let's change the statistics and enhance your safety!

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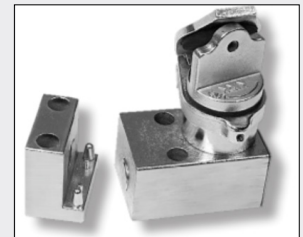
Common trapped key interlock solution interlocking conveyor system with multiple access points and hopper doors to mitigate confined space hazards:



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Step 1: Power Isolation KIRK Type F isolation interlock installed on main breaker for conveyor

Step 2: Multiple Entry Points KIRK Type T transfer interlock for access to multiple hopper access doors

Step 3: Safe Access KIRK Type D access lock installed on hopper doors. A two-cylinder KIRK Type D can be implemented to provide a personnel key to be held by personnel performing maintenance.

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The most common cement mixer hazards: caught-in/between * electric shock * struck by moving elements

Concrete is the most common used man-made material on earth. The uses of concrete range from structural applications to piping, drains, and pavers. Buildings, bridges, roads, and more could not be constructed without this important material.

Assessing and maximizing machine guarding on your cement mixer will mitigate hazards and prevent injuries & fatalities

Concrete mixing plants must perform regular maintenance on mixers to ensure proper working conditions and efficiencies. Maintenance can involve accessing the mixer's entry points for cleaning and servicing of paddles or blades. To ensure work safety, power must be isolated prior to entry of the mixer and at no time during maintenance can power be inadvertently re-energized.

Don't allow an oversight to become a reportable! Let's change the statistics and enhance your safety!

Trapped key interlock safety solutions ensure a pre-determined sequence of operations each & every time. While LOTO provides a visual warning and identifies hazards, a TKI solution physically prevents a specific set of actions from being performed until previous action(s) have been fully completed!

Common trapped key interlock solution for isolating power and accessing mixer:



Step 1: Power Isolation KIRK Type F isolation interlock installed on main breaker for mixer

Step 2: Residual Energy KIRK Type TDKRU time delay unit pre-set to allow for mixer run-down time

Step 3: Safe Access KIRK Type DM access lock installed on mixer lid

Step 4: Controlled Power KIRK Type PPS electromechanical interlock installed on control switch for mixer lid winch

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Coloring * Molding * Curing * Tumbling * Cubing * Palletizing

A production cell for precast concrete block & tile presents many hazards for workers and equipment. Energized equipment, rotating machinery, industrial saws and cutters, pinch points and partial and or full body access points all present opportunity for extremity injuries. Ensuring the proper sequence of safety operations is followed will mitigate the risk of injury.

Extremity injuries are prevalent, accounting for approximately ¾ of all reportable OSHA incidents within this industry

Regular maintenance on the equipment within the production cell is required to ensure efficiencies. Safety processes must be followed to mitigate human error, eliminate risk, prevent injuries to extremities.

Hand injuries account for 20% of all workplace injuries and compensation costs can be as high as \$150k per incident

Trapped key interlock safety solutions ensure a pre-determined sequence of operations each & every time. While LOTO provides a visual warning and identifies hazards, a TKI solution physically prevents a specific set of actions from being performed until previous action(s) have been fully completed!

Common trapped key interlock solution for a block/tile production cell:



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Step 1: Power Isolation KIRK Type PPS isolation interlock installed on control panel for block/tile production cell

Step 2: Residual Energy KIRK Type TDKRU time delay unit pre-set to allow for run-down time on equipment

Step 3: Multiple Entry Points Kirk Type T transfer interlock for sequence control of access keys only after power isolation has occurred

Step 4: Safe Access KIRK Type DM access lock installed on main production cell gate & guarding gates

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A recent 10yr study (2011-2017) of overhead crane incidents revealed 54% of all reportables resulted in fatality

Overhead and gantry cranes are essential for the movement of heavy materials to be efficient, effective, and without harm to personnel. During cement production, heavy pieces of equipment as well as finished precast product requires transportation into holding areas and or trucks for distribution.

This study revealed the following breakdown of hazards: 37% Crushed by Load * 27% Load Drop * 12% Caused by Fall * 11% Crushed or Pinned * 6% Improper or Lack of LOTO * 7% Other

Risks such as caught-in/between, struck-by/against, and/or overloaded or falling materials from a crane can bring serious harm to personnel, product, and equipment. To ensure safety within the area, controlled access points interlocked with crane controls mitigate accidental entry while crane is in operation.

The average cost of a major injury due to an overhead crane incident is \$200k / the average cost for a fatality is \$4 million

Trapped key interlock safety solutions ensure a pre-determined sequence of operations each & every time. While LOTO provides a visual warning and identifies hazards, a TKI solution physically prevents a specific set of actions from being performed until previous action(s) have been fully completed!

Common trapped key interlock solution implementation for overhead cranes:



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Step Step 1: Safe Access KIRK Type DM access interlock installed on any and all access points safeguarding overhead crane perimeter

Step 2: Multiple Entry Points KIRK Type T transfer interlock for sequence control of access keys only after all access points have been locked closed and ready to safely energize overhead/gantry crane

Step 3: Controlled Power KIRK Type PPS electromechanical interlock installed on control switch overhead/gantry crane

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