

How an Unsolvable Problem became a ‘Concrete’ Safety Solution for the Customer and KIRK Applied Engineering Services

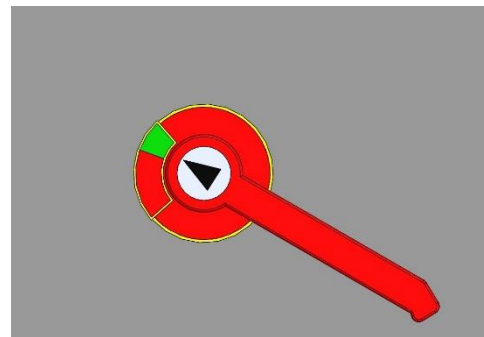
Trapped key interlock solutions can be implemented into a wide range of industrial operation and maintenance processes. With a **trapped key interlock solution** for new equipment or retro-fit into existing equipment and processes, it is important that the provisions for implementing the trapped key interlock solution are reviewed and properly assessed for the proper installation of the interlocks and to ensure the maximum functionality of the solution.

In many cases, once the review of the process, equipment, and provisions are complete, it is recognized that interlock provisions are not properly provided. Or, due to the end user’s processes, additional provisions are required based on their procedures, to ensure the appropriate sequence of safety operation is defined. In some cases, there may not be any interlock provisions at all. So, what is an end user to do in this case? How do they properly implement a trapped key interlock safety solution and ensure the safety of their workers and assets?

A Circular Problem

An industrial concrete company was looking to implement a trapped key interlock safety solution for the operation and maintenance of their mixers. While they recognized the overall sequence of operations for safely accessing the mixers; isolate power and allow for run-down time of residual energy before accessing the mixer, they identified that their existing equipment may not provide provisions for interlock mounting.

Their current molded case breaker had a rotary handle and not a molded case breaker switch handle. A molded case breaker handle typically allows for a clear path of engagement with a trapped key interlock bolt, providing a physical barrier once power is disconnected. There were no provisions for this rotary handle, therefore no immediate way to ensure power isolation: the initiating step in the safety procedure.



3D CAD Model of customer's equipment

The company began discussing their options. A padlock provision was provided on the rotary handle for a lockout tagout solution. While a **padlock** provision is a recognized standard of safety, the company wanted to ensure the solution provided a defined sequence of operations and eliminated human error. They also discussed the option of replacing the current breaker with a new breaker equipped with a switch handle equipped with interlock provision. However, this option was more costly than budget

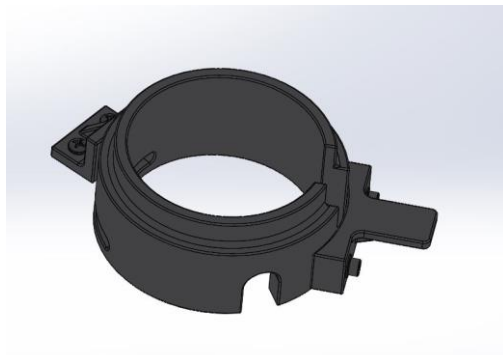


would allow and would cause more downtime for the mixer. They were looking to implement the trapped key interlock solution quickly and without any further loss of time and resources.

They contacted KIRK Applied Engineering Services to remedy their solution and ensure a trapped key interlock safety solution could be implemented without error.

Mixing Old & New Ideas to Cement a Proposal

The **KIRK Applied Engineering Team** partnered with the company to understand the full application and need for the trapped key interlock solution. Understanding the full scope of operations required to operate the mixers helped to ensure all potential hazards or points of power isolation had been accounted for in the final solution. Together, it was determined that not only was a solution to interlock the rotary handle needed, the result needed to include a product that could monitor run-down time for the mixer prior to safe access to be confirmed.



3D CAD Model of proposed solution for a custom collar

A custom designed product was proposed for the rotary handle to allow engagement with an interlock bolt. The KIRK Applied Engineering Services team worked with the customer to receive images of the existing equipment. From these images the KIRK Applied Engineering Services team was able to create technical drawings with specific dimensions. Once the customer reviewed the initial drawings and they had been approved by all parties, the KIRK Applied Engineering Services team was able to provide a 3D rendering of the solution, a custom collar for the rotary handle. The customer was able to use this 3D printed collar in the field to ensure fit and installation prior to final manufacturing of the part.

A Solid Safety Solution

With everyone in agreement on an approved solution, the full trapped key interlock solution was able to be implemented. KIRK Applied Engineering Services provided the customer with a **custom manufactured collar for the rotary handle** that would engage with a **Type F isolation bolt interlock**. This would ensure the isolation of power. From here, the released key would engage with a **TYPE TDKRU** unit. This unit provides a pre-set time delay, ensuring all residual energy is dissipated prior to releasing the access key. The released access key could now be taken to the **Type DM** on the mixer hopper door. Once the access key was engaged with the Type DM, a key for the Type PPS was released. The **Type PPS** was the control power for the mixer lid winch, ensuring that only once the power had been isolated and the access lock released, could the winch then be powered to open the mixer lid.



Workers were now ensured that they were accessing the mixer with fully isolated power and no residual energy to put them in harm's way.



KIRK Applied Engineering Services custom collar solution, installed on customer's equipment, with Type F interlock for power isolation.



KIRK Type TDKRU time delay unit to ensure residual energy is completely dissipated.



KIRK Type DM installed on mixer – it is now safe to access mixer and perform maintenance.

Team members of KIRK were able to be present for the installation of the final solution, assist in training for operators, and answer questions on site. Since the implementation of the first solution, the company continues to implement this same solution on their mixers across 30 manufacturing plants. They continue to work with **KIRK Applied Engineering Services** on new applications that require trapped key interlock safety solution and partner with us to design custom solutions where needed. Ensuring the safety of their workers and assets is imperative at their plants and they recognize that unique safety procedures require working with a team of safety experts that can help to design solutions that meet their unique needs.

