Machine Guard & Cover Co.
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Physical Point Guarding at a Hydroelectric Facility

Project Scope

Machine Guard & Cover, Co. was tasked to design, manufacture and install physical point guarding at a hydroelectric power station after an employee was injured performing standard maintenance operations.

An access ladder used by employees daily to access the shaft pit is located within eight inches of the four foot turbine shaft which rotates at ninety rpm. A physical, rigid guard that would protect employees from this hazard without interfering with the shaft or daily maintenance operations was requested. Timing was critical: from order to installation was scheduled for ninety days maximum.

Plastic Selection for the Turbine Shaft Guard

This location requires a fire resistant plastic, therefore Kydex-T was selected as it has a Underwriters Laboratory fire resistance rating of Std. 94 V-0, 5V.

Using plastic instead of sheet metal ensured that all components of the modular assembly weighed no more than thirty pounds. As the turbine location has limited space, using these lightweight components will allow maintenance staff to remove the guard easily when required without lifting equipment.

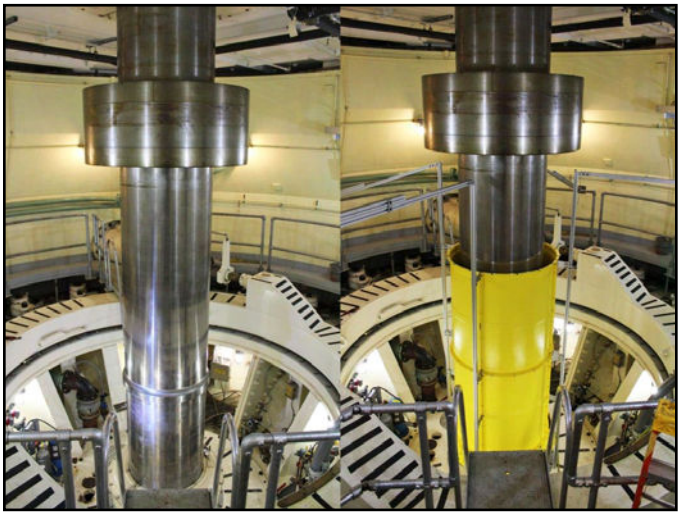
Assembly and Installation of the Shaft Guard

To support the Kydex-T plastic panels and to prevent deflection of the guard into the shaft should it be struck, an extruded aluminum frame was installed. These off-the-shelf components provided the strength required while keeping installation costs low and allowed for future onsite modification if required. Although the guard itself was rigid enough to be self supporting, this additional strength added additional strength and eliminated the possibility of deflection into the turbine shaft.

Panels were connected to each other using captured fasteners. Missing or loose hardware in this location would be unacceptable and potentially costly should a fastener fall into the turbine. Following the B11.19 guidelines for fasteners, button head socket cap screws were selected.

Onsite Installation and Training

Installation of the first guard was completed within several hours. While being installed, Machine Guard & Cover, Co. technicians trained the onsite maintenance staff how to install guards for the seven remaining locations.



Project Completion

Daily maintenance tasks can now be performed easily and safely after the shaft guard installation. Additionally, the entire project to guard sixteen large turbine shaft guards was completed on time and within budget.

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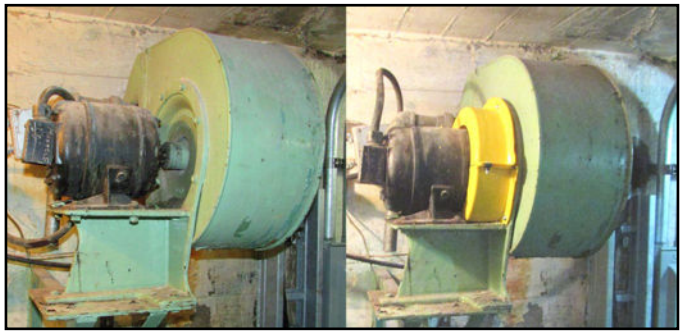
Point at Area Guarding for Lock Gear Locations

In addition to physically guarding the turbine shafts, other locations required a combination of point and area guarding.

A simple point guard were the rotating shafts between a motor and covered fan assembly was installed.



This seemingly small location is still a hazard that must be covered as loose clothing or a belt from a safety harness could become entangled.

Where a simple point guard could not cover a very large gear, an area guard was used. This also had the benefit of keeping a narrow hallway from becoming even more confined.

Using a "gotcha stick" gap measuring device, the distance to hazards directly behind the mesh was measured. The size of the openings in the mesh combined with the distance to the hazard locations required additional point guarding for several locations.

Coupling Covers for Valve Galleries

The coupling covers in the valve galleries at the hydroelectric facility were another location requiring physical point guarding. The pumps were using an older design of coupling cover guards that left wide gaps on each end of the bent sheet metal guard.

Using stock parts manufactured from 3/16" black ABS plastic, these locations were quickly and cost effectively updated to a newer design that eliminated gaps.

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