

Retrofit Seals Protect Plant Equipment and Personnel

Coal-fired power plants rely on ash conveyor systems to haul ash from their boilers for disposal and allow for continuous coal burning and steam production. At a plant in the western U.S., ash slurry leaking from the conveyor was compounding maintenance costs, creating a safety hazard and putting the plant at risk for costly equipment failure.

The High Cost of a High-Maintenance Seal

To cool ash before disposal, the ash is sprayed with water as it comes out of the boiler. The combination of ash and water creates ash slurry. While the ash conveyor system is enclosed to contain the slurry, there are potential leakage points at the two shafts that drive the conveyor belt. To seal those shafts, the power plant was using packing.

Under standard operation, packing is a maintenance-heavy sealing method. Packing material is wrapped around the shaft and compressed by a gland to act as a seal and keep product from passing through. Contact and movement from the product and the shaft, however, gradually wears the packing down, and the gland needs to be continually tightened to provide an effective seal. Over time, tightening of the gland becomes ineffective and the seal fails. Due to the abrasiveness of the ash slurry, the packing on the power plant's ash conveyor wore at a quicker rate than normal, requiring constant maintenance and failing at more frequent intervals.

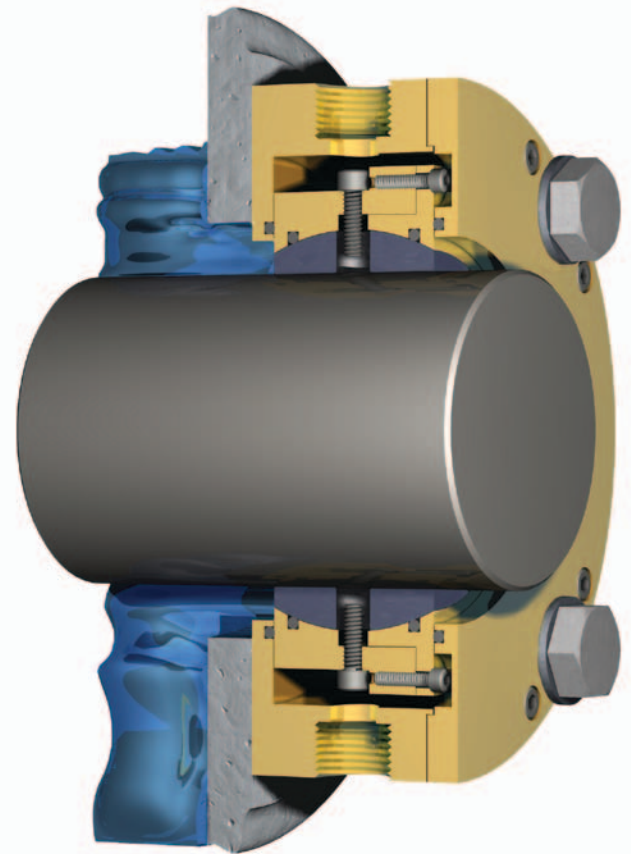
The failure of the packing allowed the abrasive ash slurry to leak out of the conveyor's enclosed compartment and into the four adjacent pillow block bearings (two on each shaft), causing those bearings to fail at approximately six-month intervals. With the packing and pillow block bearings each being replaced every six months, the replacement costs, including labor, added

up to approximately \$5000 a year. If a bearing failure ever resulted in damage to the shaft and the shaft assembly had to be changed, the costs had the potential to rise into the tens of thousands of dollars.

In addition, the heavy leakage that occurred between packing replacements put the plant at risk for

lost time injury, as the leaking ash slurry puddled on the floor. The safety hazard covered a large, high-traffic area, and the chances for a slip/fall incident were unacceptable.

By carefully managing bearing and packing replacements within its regular maintenance schedule, the plant could prevent production losses. The replacement costs and safety hazard, however, made finding an effective sealing solution a high priority.



The smooth bore Air Mizer seal uses air to create a barrier on the shaft that keeps product in the vessel and contamination out.

Air Mizer Provides Permanent Solution

The power plant addressed the leakage by replacing the packing glands with Inpro/Seal smooth bore Air Mizer seals. Two replacements were made in May 2011 and after a year of problem-free operation, two more followed in May 2012.

The smooth bore Air Mizer seal provides a non-contacting, non-wearing seal that is maintenance free and designed to last the lifetime of the equipment. The unique Air Mizer technology prevents leakage by directing small amounts of air through a high-precision clearance around the shaft. Positive



An Air Mizer seal permanently eliminates ash slurry from leaking out of a coal-fired boiler ash conveyor.

pressure is evenly dispersed to prevent dead spots, and the air is sent along the shaft in both directions to stop both ingress and egress of contaminants. The articulating design of the smooth bore Air Mizer can accommodate shaft movement and misalignment while maintaining the seal's effectiveness.

For the power plant's ash conveyor, Inpro/Seal custom engineered the Air Mizer seals to fit the 4.4375-in. shafts and the existing bolt hole pattern of the packing gland. Manufacturing was timed so the Air Mizer seals were ready for installation during scheduled downtime. The installation itself was simple: the packing glands were removed, the Air Mizer seals were slid on, the bolts tightened, the air lines connected, and the seal was ready. The retrofit required no modifications to the conveyor system.

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A Return on Investment

Since installation, the Air Mizer seals have eliminated ash slurry leakage, with zero required maintenance. By providing a permanent sealing solution, the Air Mizer technology has saved the plant on maintenance costs, eliminated bearing replacements, increased safety, and prevented potential high cost incidents. Plant personnel now have peace of mind about the performance of the seals, bearings and ash conveyor.

Headquartered in Rock Island, IL, Inpro/Seal has been providing sealing solutions for more than 30 years. For more information, visit www.inpro-seal.com.

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