



CASE STUDY: AM SOLUTIONS™ | COAL-FIRED BOILER ASH CONVEYOR

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 United States, 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 mechanical packing.

Under standard operation, packing is a maintenance-intensive sealing method. Braided 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 abrasive nature 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.

When the packing failed abrasive ash slurry leaked out of the conveyor's enclosed compartment, contaminating the four adjacent pillow block bearings (two on each shaft) and causing them 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 \$5,000 a year. Bearing failures could eventually result in damage to the shaft, which would require the shaft assembly to be changed, potentially costing 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.

FACTS AT A GLANCE

Challenge: A coal-fired power plant required a new sealing solution for its ash conveyor because:

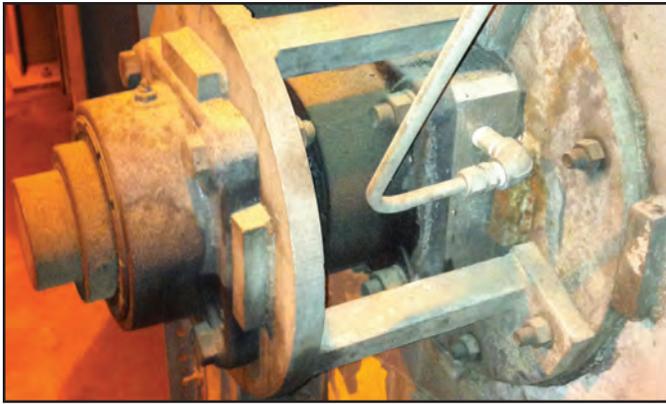
- Existing packing required constant monitoring and adjustment
- Packing failed and allowed leakage of abrasive ash slurry
- Contamination from the ash slurry shortened bearing life to six months
- Ash slurry that leaked onto the floor created a safety hazard

Solution: Inpro/Seal® Am Solutions™ shaft seals:

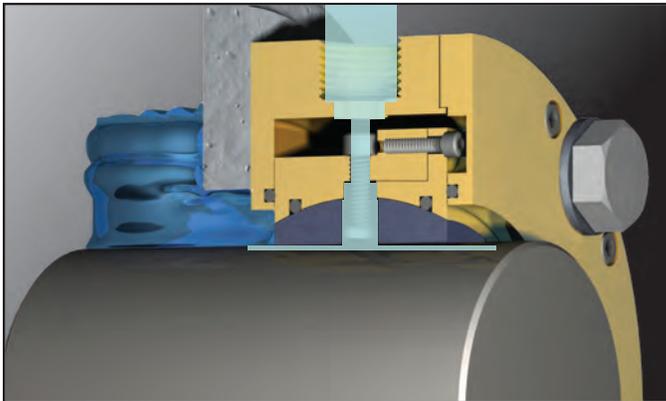
- Provide a maintenance-free, permanent seal to prevent ash slurry from leaking
- Eliminated bearing and seal replacements costs
- Prevented lost time injury and high cost incidents
- Were custom-engineered for retrofit without expensive application modifications



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An AM Solutions shaft seal permanently eliminates ash slurry from leaking out of a coal-fired boiler ash conveyor.



The AM Smooth Bore design uses air to create a barrier on the shaft that keeps product in the vessel and contamination out.

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.

INPRO/SEAL PROVIDES PERMANENT SOLUTION

The power plant addressed the leakage by replacing the mechanical packing with Inpro/Seal AM (Air Mizer®) Solutions™ shaft seals. Two installations were made in May 2011 and after a year of problem-free operation, two more followed in May 2012.

AM Solutions shaft seals are maintenance free non-contacting, non-wearing shaft seals designed to last the lifetime of the equipment. Unique Air Mizer technology prevents leakage by directing small amounts of air, or inert gas, through a high-precision clearance around the shaft. Positive 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. AM Solutions shaft seals can fully articulate to accommodate shaft movement and misalignment while maintaining the seal's effectiveness.

For the power plant's ash conveyor, Inpro/Seal utilized a custom engineered AM Solutions AM Smooth Bore design to fit the 4.4375" (113.7 mm) shafts and existing bolt hole pattern of the packing gland. Manufacturing was timed so the seals were ready for installation during scheduled downtime. The installation itself was simple: the packing glands were removed, the 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.

SUCCESS SUMMARY

Since installation, the AM Solutions shaft seals have eliminated ash slurry leakage, with zero required maintenance. By providing a permanent sealing solution, Inpro/Seal 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.