

Keeping your belts up and your costs down

How keeping conveyors running and clean helps keep coal-fired power plants in operation

By Mark Stern and Andy Marti

If the turbine is the heart of the coal-fired power plant, the boiler/furnace is the stomach, and the belt conveyors are the esophagus, keeping the power source well supplied. Without the belt conveyor system, the fuel does not get where it needs to go, when it needs to get there. And of course, if the systems are not working as they should, there are consequences in production output and cost.

A key to plant efficiency is keeping those coal-handling conveyors running at peak (or at least effective) levels. But like all mechanical systems, a belt conveyor runs more cleanly, safely and productively when it receives effective maintenance. This maintenance provides timely intervention to keep performance levels at plant standards and avoid unscheduled, production-crippling outages. Effective maintenance requires proper planning, proper information and effective and safe labor.

Continuing concern about coal dust

One issue affecting coal-fired power plants is the worry about hazards from coal dust leading to fire and explosion. These concerns have now been brought more sharply into focus by the current OSHA Combustible Dust National Emphasis Program (NEP). Issued March 11, 2008, OSHA Instruction CPL-03-00-008 calls for the inspection of workplaces that create or handle combustible dusts. In areas where combustible dust accumulations constitute a deflagration, explosion or other fire hazard, the NEP calls for issuing citations under 29 CFR 11910.22. OSHA announced it will issue citations for the presence of combustible dust if the accumulations exceed 1/32 of an inch deep, (the thickness of a standard paper clip), cover at

least 5 percent of a room's total area (or 1,000 sq. ft.) and are combustible.

In short, the problems from the creation, escape, or accumulation of coal dust are now multiplied by the increased possibility of regulatory citations, fines and shutdowns, making it imperative that plants prevent the escape of coal dust. A key to minimizing the release of dust in coal handling is the proper maintenance of the conveyors and corresponding components, including belt cleaners, transfer point seals, dust curtains, dust suppression systems and dust collection systems. Proper adjustment and timely replacement of belt cleaners, for example, will minimize the problems with carryback releasing coal dust all along the conveyor runs.

Contract maintenance

As plants reduce their staff and as senior employees "age out" of many companies, some plants now entrust some or all of their conveyor equipment installation and maintenance work to outside contractors. Utilizing contractors allows plant personnel to focus on the plant's core activities. This tactic keeps the management of maintenance in the hands of the plant, while "spinning off" the actual labor.

The types of contractors prevalent in the bulk material handling industry can be categorized as general and specialty. Both have merit and will bring value to a plant if they are utilized properly and the plant understands the limitations of each.

A general contractor is willing to perform, or at least bid on, almost any task and has a general understanding of many





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things in the plant. The firm might have become the local expert in certain plants or types of equipment. But a contractor might not be skilled in all aspects or components of the conveying system.

On the other hand, specialty contractors are experts in certain areas or components. They are often either directly

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employed by a manufacturer or have been trained and certified by the manufacturer. This training affords them the skills and knowledge necessary to properly install or maintain specific equipment more efficiently than a general contractor. These specialty/niche contractors should be willing to offer performance guarantees on the workmanship and products or components they supply.

Contracting spillage cleanup is another area in which an outside contractor can help free up plant personnel. Using contract labor for cleanup chores in a plant might actually help identify the root cause of the spillage because this work will show up as an expense. This makes it more visible as a problem, rather than hiding it in the general plant operating cost. As this cost becomes more identifiable, it might lead to a change in operating procedures or be used to justify the upgrade or replacement of existing components or systems.

The information gap

A key ingredient in keeping your conveyor system running well is knowing what is in the system. This means knowing more than the belt widths on Conveyors A1 and 2B. It is understanding what the conveyor's capacities and limitations are, and what subsystems and components are included.

One factor that multiplies the cost of maintenance is the time required to find information about what to do. The difficulty in tracking down parts and procedures significantly reduces "wrench time" – or the amount of time that maintenance workers are actually working on equipment. Experts report that the average "wrench time" of the maintenance workforce across all industries is about 35 percent. Surveys show that two hours a day are wasted by repairmen looking for technical information, and three hours a day are consumed by maintenance planners searching for information or parts to make needed repairs.

To improve the worker productivity of maintenance departments, faster access to accurate and more-detailed information is needed. A centralized information source is also of value to the suppliers, consultants and engineering firms when projects are considered or priced out. Having this information available in one central location makes it easily available for these projects

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Building a file of information

A file or database of the various components and subassemblies in place on the coal-handling conveyors should be created. This file should include the various manuals, parts lists and other documents associated with the components included in the coal handling system. Items such as manufacturer’s part numbers and date of installation are valuable in ascertaining when service is required and what procedures should be done when that interval comes around.

There should be one central repository for this information. This can be a file cabinet or, more often now, some form of electronic database that holds or links to the various documents, specifications and supplier Web sites. The information should be made available from one source, so there are not separate and potentially contradictory files. The decision about where that file or database is housed, whether within the coal-handling operation or in the maintenance office, is a plant decision, but with the availability of electronic networks, this information can easily be shared. With a shared library, the information is also available to other departments, even those off-site, such as a corporate engineering group.

There are suppliers who can perform this information gathering and organizing service for a plant, perhaps as part of their maintenance offering or a separate service. They will compile and keep these references in a database. This service might be particularly useful if the records of existing conveyor systems are out of date. And with a broader base of experience on equipment and information sources, these services should be able to track down supplier information that might be otherwise be unavailable.

Inspecting conveyors and components

Routine inspections can extend the life of the belt and conveyor components by keeping minor, easily corrected problems from turning into major and costly headaches. In the best operations, maintenance workers routinely “walk” the conveyor system looking for indications of potential trouble. It is important that the worker assigned to



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walk the conveyors is unencumbered, so he/she can be safe and efficient during the inspection tour. Many plants have shovels or other clean-up equipment positioned at locations along the belt, so the belt walker will not need to carry those items on the journey. But the maintenance “walker” should have the gear



needed to make small adjustments important to the life of the equipment and the efficiency of the operation.

It is important that the conveyor “walker” not settle for what is standard operating procedure – the SOP or accepted practice. The maintenance worker must not accept the problems as normal, but instead look for opportunities to improve operations and results.

Find out more about walking the belts in this month's Energy-Tech e-newsletter.

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Safety during maintenance activities

Conveyor inspection and maintenance can pose significant risks to employees because these activities bring the worker into close proximity with the conveyor system under potentially dangerous conditions. The worker is exposed to moving belts, rolling components and pinch points, all in an environment that is commonly dirty, distracting and noisy. The best approach to safety is a training program that develops a healthy respect among the engineers, operations personnel and maintenance staff for the power of the conveyor and the risks inherent in its operation.

It is important that only competent, well-trained personnel, equipped with proper test equipment and tools perform conveyor maintenance. In some cases, it is advantageous to

perform specific maintenance chores while the belt is in operation. Safety regulations in some plants recognize this need, citing that “only trained personnel who are aware of the hazards” may perform these tasks. Training for these procedures is often available from suppliers of the systems.

The dollars and sense of maintenance

The goal is to provide maximum conveyor availability through quality work with minimal disruption to the production routine. Ironically, plants that cut corners or “skimp” on maintenance and cleaning activities for their conveyors and other systems can end up paying more over the long term in terms of environmental problems and service costs to cope with fugitive material in their plant. Maintenance trainer and “guru” David T. Geaslin noted that ignoring needed maintenance and operating until breakdown occurs will increase the cost to roughly the square of the cost of the original part. He called this the “Inverse Square Rule for Deferred Maintenance.” He also noted that when the invoice cost for parts and labor to repair a fail part are divided into the cost of the total event, the ratio is roughly 15-1. The key to minimizing these unscheduled and costly downtimes is efficient maintenance before a system fails.

Efficient and effective maintenance lowers costs, not just for the maintenance department, but the total operation. It produces benefits in operating efficiency, system availability, and ultimately the plant's bottom line.

Depending on the plant's size, a 1 percent difference in system availability for a coal-fired power plant could be worth \$1 million to \$2 million dollars in annual revenue. An unscheduled conveyor outage or a component failure that decreases generating availability by even 1/10 of 1 percent is a significant loss.

In coal-fired power plants, efficient fuel handling on belt conveyors is essential to plant productivity. Maintenance that is properly planned with the proper information, and performed safely and effectively, will keep those coal handling systems available.



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