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# TAKING A REAL-WORLD LOOK AT CONVEYOR SAFETY

Why next-level improvements can only be made through a series of changes involving key people in an organization

BY **TODD SWINDERMAN & DANIEL MARSHALL**

**M**ining engineers have spent decades attempting to design, install and maintain belt conveyor components that control fugitive materials to improve the working environment, reduce accidents and increase productivity.

Why? It is estimated that 85 percent of belt conveyor maintenance and production problems are related to fugitive materials like dust, spillage and carry-back. Accordingly, a similar percentage of conveyor safety issues arise from these same fugitive materials.

The number of workplace injuries has taken a steep decline over the last century, but we have reached a point of diminishing returns. To achieve the next level of improvement in reducing conveyor accidents, the approach to these complex systems must change – including the way conveyors are specified, designed, purchased, operated and maintained.

It's been observed that there are five root causes of workplace injuries and fatalities that lead directly to an increased release of fugitive materials. These fugitive materials result in scenarios that encourage workers to potentially react unsafely.

The five root causes are a production-first culture, low-bid purchasing, designs that are needlessly complex,

overregulation and understaffed or undertrained personnel

## **PRODUCTION-FIRST CULTURE**

When the focus is on production at the cost of all else, it's no wonder workers take risks to keep conveyors running.

Corporate slogans touting workplace safety and environmentalism become a smoke screen for what workers really see: production comes before safety.

Obviously, the reason a company operates mines and processing plants is production. To counter the hypocrisy, corporations would be better off admitting up front that production is the focus. A better and more realistic goal would be: 'production done safely.'

## **LOW-BID PURCHASING**

Poor management culture starts in the boardroom, where decisions on capital expenditures are typically based on feasibility studies that only consider direct costs as identified by conventional accounting practices.

Historically, purchasing decisions are almost universally based on a low-bid process. The details are left to be resolved as operating costs (and often maintenance expenses), and they are not thoroughly considered in the engineering

or construction phases.

In the long run, the cost of "buying cheap" can get very expensive. A low-bid system often fails to deliver the required production capacity while posing greater hazards to workers.

In fact, low-bid designs often turn out to be the costliest because they can generate significant expenses for subsequent modifications because of issues discovered during trials and start-up. Instead, the focus should be on lowest cost over the life of the system.

## **NEEDLESSLY COMPLEX DESIGNS**

Complexity does not necessarily improve safety. Simple designs are often harder to realize, but the extra design time required to simplify the operation and maintenance of conveyor components that directly affect production and cleanliness has an enormous payoff.

Unfortunately, the same benefits are almost impossible to incorporate in low-bid designs due to the intersection of the customer perception that those benefits "cost too much" and the supplier's need to "win the bid."

## **OVERREGULATION**

Industry groups and associations, standards-writing organizations, countries, states and cities have issued thousands of pages of performance-based safety regulations.

In many cases, rules within a country contradict each other or are not applicable



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to the industry to which they are enforced. The effort required for suppliers to comply with the myriad of rules is immense, and these efforts are often negated by the varying opinions of a multitude of inspectors.

Conforming to the complicated assortment of regulations and passing opinion-based inspections becomes problematic at best. But it seems clear that countries with specification-based standards have lower fatality rates.

### UNDERSTAFFED OR UNDERTRAINED PERSONNEL

The lack of adequate funding for maintenance is epidemic in the bulk materials handling industry.

Millions of dollars are spent on components, yet these investments are often made without the added maintenance budget needed to keep the components in a sound and safe operating condition.

Generally, the size of a maintenance crew is based on mean time between failure for major pieces of equipment. This is based on the illogical conclusion that workers can maintain all the minor components of the system in their “spare” time.

### PRODUCTION DONE SAFELY

Most equipment is not designed for easy inspection or safe maintenance.

As a result, during scheduled production outages – which are becoming shorter and less frequent in the false belief that running “flat out” increases production – the maintenance of minor components must often be deferred due to access conflicts, lack of time or budgetary constraints. This further reduces components’ functionality, often to the point where they become both useless and unrepairable.

Conveyor systems are powerful and designed to be rugged and durable to deliver near-constant operation. A belt can be dragged across piles of dirt or inoperative idlers for extended periods of time, as long as the major functions are kept running.

If the components critical to maintaining a clean and safe work environment

were made service-friendly and installed with adequate access, much of the beneficial maintenance could be done safely while the conveyor is in operation.

While most maintenance workers are skilled technicians, they rarely understand the conveyor holistically. Conveyors are complex, integrated systems. A change to one component will often have unintended consequences for others, affecting the rest of the system.

Without a complete understanding of how conveyors are designed and the components selected, maintenance becomes an exercise in finding the longest-lasting Band-Aids to treat the symptoms rather than solving the root causes. Before long, an accumulation of bad choices in treating symptoms results in a system that cannot operate at maximum efficiency.

Treating symptoms shortens component life and results in the need for increased spare parts. This, in turn, increases the need for maintenance labor.

### SAFETY PAYS

A conveyor improvement investment would rarely be justified on safety alone, and current financial analyses do not include safety in a meaningful way.

The industry has reached a point where engineering controls, additional regulations and protective equipment are no longer sufficient to continue the trend of improving safety. Instead, the way conveyor systems are addressed must be changed.

The change must include the way conveyor components are specified, designed, purchased, operated and maintained.

Ultimately, an altered way of looking at accidents financially, a change in design methodology and a change in purchasing methodology will allow conveyor operators to create safer environments, increase efficiency and achieve the goal of “production done safely.” **P&Q**

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