



# Safety in Motion

## Conveyor-system safety tips from design to operation and maintenance

BY ANDRÉ VOSHART

**C**onveyor systems are used in industrial workplaces to move goods from one spot to another. However, when objects are in motion, injuries can happen. According to the Ontario Ministry of Labour, while conveyor-related injuries occur less often than other types of injuries, they tend to be more severe.

In Ontario, between 2005 and 2008, two workers died and 48 were seriously injured, according to Workplace Safety and Insurance Board (WSIB) statistics. Ministry inspectors take a “zero tolerance” approach to any contraventions found under Ontario’s Occupational Health and Safety Act and its regulations, and every province has similar legislation in place.

“We want everyone to be aware of the guarding and lockout hazards involving conveyor systems, and need to make sure all measures are in place to prevent injuries,” Ontario Labour Minister Peter Fonseca said last fall as the province geared up for a blitz on conveyor hazards. “At the end of the day, workers should return home safe and sound to their families.”

One guy who knows conveyors is Paul Eckert, president of Eckert Machines, which provides machinery and solutions for a range of food processing applications. He says conveyor manufacturers, such as Dorner, Commercial, Olney, A&K and Vanmark, have all taken great pains to incorporate operator safety into their product designs.

One of the most common hazards, he says, include catch points or pinch points, such as unguarded drives or tensioning systems and open access where pulleys and belts meet, “an easy and seemingly irresistible place for fingers or loose clothing to go,” Eckert says.

One top solution is proper guarding. “Well-designed and constructed guards will be easy to use, and will enable easy and thorough access for sanitation and maintenance,” Eckert says. “And then they will be easy to return to their normal operating position. A well-designed guard, if left off the machine, is totally useless.”

This is critical. In Ontario, during last year’s conveyor inspection blitz, the government said its inspectors would check for pinch points and other hazardous locations lacking guarding devices on conveyors. Guarding is typically

required in locations such as power transmission interfaces, nip points, shear points (where a moving conveyor part meets or passes near a stationary point such as a wall) and spill points (where material could spill from a conveyor).

When it is necessary to open or remove guards, workers must follow lockout procedures to prevent injury from the conveyor starting. Lockout procedures typically involve bringing the machine to a complete stop and disconnecting all its power sources. Blocking is an extra step that must be carried out to prevent the conveyor belt from moving under its own power due to tension on the belt.

Additionally, while maintenance or cleaning personnel working on running conveyors is often necessary, “in many cases, proper lockout procedures would greatly improve worker safety,” Eckert says. As well, it can be problematic when guards are removed and not replaced: “The original conveyor may be well-guarded, but if the guards are too cumbersome or difficult to open or remove and replace for cleaning and maintenance access, many operators will simply leave them off.”

Additionally, conveyor adjustments must be able to be made easily. A poorly adjusted conveyor presents risks by misdirecting product or creating conditions that will lure an operator to reach in to fix something: a ripe opportunity for accidents.

### Lack of Conveyors

“It is surprising how many times one sees simple conveying functions being handled manually,” Eckert says. “This can result in personal safety risks, and even such longer-term injuries as carpal tunnel or other such muscular/skeletal strains.”

If targeting for inspection, provincial inspectors will check that workers are not exposed on an ongoing basis to things such as repetitive work, forceful exertions such as heavy lifting and carrying, awkward postures and vibrating equipment that can affect the bones, joints, ligaments and other soft tissues.

A solution is to use conveyors wherever possible to handle such repetitive tasks as well as tasks that would put personnel into too-close contact with other moving parts. “This will reduce labour cost, reduce personnel safety risk and often helps to ensure a more reliable and consistent feed or take-away in the process,” Eckert says.

## Designs on Safety

Another issue is poorly designed conveyors, which may be too fast, too slow, too big, too small, built with the wrong materials or have poor transitions for product to enter or leave conveyor. "All of these design issues potentially lead to an operator trying to help by sticking his hand in where he shouldn't and then ... accidents happen, production stops, everyone loses," Eckert says. Overloaded conveyors can cause problems, too, as systems originally designed for one product or capacity are tasked with larger workloads.

These problems can be solved with an upfront investment in system design. When looking to adopt a new conveying system, Eckert lists several things a plant manager must consider when settling on the right solution:

■ **Design for the application:** Rather than trying to make a one-size-fits-all solution, tailor the conveyor to the application at hand. A conveyor is an integral part of any system. Design based on the product and production's current needs, with a clear eye on what the future growth might be.

■ **Leave room to expand:** Never design a conveyor to only handle the volume you need now. If the solution is already maxed-out on its load capability, it will soon enough fall behind and potentially become a safety risk. Originally designed for one product or capacity, many conveyors are moved or lines are changed — and products and capacities change without consideration for the inevitable strain on the original conveyor.

■ **Use the right materials:** Steel, aluminum, stainless steel and plastics all have their strengths and limitations. Often, the



ABOVE: Dorner Series 7400 and 7600 conveyors are designed for high sanitation requirements.

LEFT: Dorner LPZ conveyors provide configuration options that combine distance and height in one unit.

product or plant environment will dictate to a certain extent which material is most suitable. In a food plant, cleanliness of design and construction are very critical: surfaces must be fully accessible for thorough cleaning and easy maintenance. The same standards apply in pharmaceuticals and many other clean-room environments.

■ **Create smooth transitions:** Ensure the transitions are seamless to and from conveyors to ensure steady product flow and to ensure operators will not have to intervene to keep production going. Let it do the heavy lifting so operators can concentrate on ensuring steady production of quality product.

■ **Factor maintenance and cleaning into design:** Ensure both maintenance and cleaning can be easily done so that the conveyor will perform at its optimum and safest level.

■ **Guard properly:** Use proper guarding on all moving parts and pinch points where applicable.

However, Eckert cautions there is no one set solution for all conveying applications. "Look at the whole picture and be sure to understand and appreciate that the conveyor is a machine and a tool," he explains. "Design it properly and it will work for you. If you don't take the time to do it right up front, it will cost much more in the long term." **PEM**

*André Voshart is the editor of PEM.*

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