BULK TERMINALS *international*

SUMMER 2020

THE OFFICIAL MAGAZINE OF THE ASSOCIATION OF BULK TERMINAL OPERATORS

TAKING CARE

What steps is the industry taking to support seafarers?

LOADED QUESTIONS

How innovative loading systems meet the challenges of the pandemic

CEREAL THRILLERS

Why grain exports went up as countries locked down

abto
ASSOCIATION OF BULK TERMINAL OPERATORS
bulkterminals.org

BE PREPARED

Automation in conveyor belt cleaning is just one of the innovations streamlining systems at terminals, while advances in atomised mist technology are keeping vast areas clean and safe

As part of moves to boost innovation in advanced technologies for conveyors and other bulk material handling applications, Martin Engineering has developed a belt cleaner position indicator that monitors the blade, tracking and reporting remaining service life.

The intuitive Martin N2 Position Indicator (PI) monitors primary belt cleaner blades, notifying service technicians and plant operations personnel when re-tensioning or replacement is required and/or when abnormal conditions occur.

The PI can be part of a new installation or directly retrofitted to existing mainframes that use the company's replacement blades. Managers and service technicians can quickly access info on any networked cleaner via cell phone.

With approximately 1,000 operating systems currently in service and installations continuing daily, the technology has been embraced by bulk material handlers in a wide range of industries and applications. Designed in-house by the engineering team at Martin's Center for Innovation (CFI), the

MANAGERS AND SERVICE TECHNICIANS CAN QUICKLY ACCESS INFO ON ANY NETWORKED CLEANER VIA CELL PHONE

N2 Position Indicator is produced solely in company-owned facilities to ensure the highest standards for quality control. In fact, the firm also engineered and built the proprietary equipment used to manufacture the new devices.

"There are no annual maintenance fees and no add-on charges for mobile phone access," confirms Martin Engineering global marketing director Brad Pronschinske. "Most customers using our cleaner blades can take advantage of this technology."

Position indicators can be mounted anywhere from 3-800m from the cellular gateway, and the robust, sealed construction means it is virtually immune from damage. Up to 50 units can be monitored by a single gateway connecting to the internet, usually located at the highest point in the plant, where the cell signal is strongest. The system does not require a mobile link for each PI, instead communicating via radio frequency from each sensor to the gateway.

Operating independently of any plant communications infrastructure, the small physical size and low power requirements deliver a projected battery life of two years. The self-contained model was developed by Martin in order to minimise the dependency on in-plant resources. Only the gateway requires a constant 110V power point.

The device eliminates the need for manual inspections by giving technicians precise information, delivering critical real-time intelligence and reducing exposure to moving conveyors, improving both efficiency and safety. Maintenance planning is simplified by having detailed information available on demand, allowing service personnel to deliver and install replacement wear parts during scheduled outages. Alerts are provided automatically, for example if a blade change is required.

"This capability is a true enabler, bringing a number of benefits," observes Pronschinske. "Belt cleaner inspection time is basically eliminated, as maintenance personnel no longer need to physically view the cleaner to determine the tension or wear status," he says. "It also reduces the time workers need to spend near the moving conveyor, helping to minimise the potential for accidents."

Pronschinske describes the innovation as a game-changer in the industry, with a positive impact on productivity, operating costs and safety. Relying on actual operating conditions instead of human judgement to monitor blade wear and tension for optimal cleaning performance, the indicator maximises the blade's usable surface area and reports with certainty when a blade is nearing the end of its useful life.

Delivering instant, continuous feedback while eliminating guesswork – tracking the individual performance and status of each cleaner – the detailed history also provides a maintenance log with service dates and work performed.

DANGER ZONES

Recognising the hazards that surround a conveyor is another area that Martin Engineering is keen to highlight. The conveyor is a very powerful system and given the number of potential danger zones it represents, "the entire system should be considered a hazard", the company believes.

© 2020 MARTIN ENGINEERING

"In most applications, a conveyor belt moves at a relatively constant speed, commonly running somewhere between 0.5 and 10m per second . An Olympic sprinter has a reaction time of about 0.18 seconds when poised at the starting line and totally focused on the race. If this athlete becomes tangled in a conveyor belt travelling 1.5m per second , the person would be carried 0.27m before even realising what has happened," the company says.

A "regular" worker would need a longer time to react in such circumstances, the company claims, and as most conveyors are engineered with the ability to start remotely, the system may go from dormant to active at any time at the push of a button, catching someone unaware.

© 2020 MARTIN ENGINEERING

"When a conveyor belt is moving, there will usually be more tension on the carrying side," observes Martin Engineering process engineer Dan Marshall. "If the conveyor is merely stopped and de-energised, that tension may remain in the belt in the form of stored energy."

Marshall says that a system under tension will always try to approach equilibrium; that is, it will try to release the energy. This release will likely come in the form of a pulley slip, which occurs when the belt slides around the head pulley to equalise the tension. The distance the belt will move is proportional to the amount of tension stored and the belt's modulus (elasticity), possibly several feet. If a worker is on the belt or close enough to be pulled in during this sudden release of energy, injuries or death can occur.

"There's a simple rule of thumb regarding conveyors: if it's moving, don't touch it," Marshall says. "The most common way to prevent inadvertent contact is with suitable guarding that renders the moving components inaccessible." For maintenance or repairs, procedures for lockout/tagout/blockout/test-out should always be followed when working on a stationary conveyor, and systems should be equipped with anti-rollback devices on the head pulley.

BELT CLAMPS CAN BE AS SMALL AS TWO BARS OR AS LARGE AS A GIANT VICE. © 2020 MARTIN ENGINEERING

Many of the moving parts on a conveyor belt system are rotating components. These parts include idlers, drive shafts, couplings, pulleys and speed sensors. Items rotating at a high speed pose the risk of entanglement or entrapment. "All moving machine parts should be guarded with adequately constructed, properly installed, functioning and well-maintained guards," says Marshall.

There are many pinch points on a conveyor, components that the belt touches or comes near, including drive pulleys, snub pulleys, idlers, stringer, chute walls and deflectors. If a worker's limb travels with a conveyor belt, it will meet one of these components.

THE PINCH POINT BETWEEN THE BELT AND A CARRYING IDLER IS ONE OPPORTUNITY FOR AN ENTRAPMENT INJURY. © 2020 MARTIN ENGINEERING

"Effective fixed guards should be absolute in their protection; workers should not be able to reach around, under, through or over the barrier separating them from moving components," Marshall adds.

Many of the fatalities around conveyors have happened when a worker was cleaning fugitive material from the structure or components of a conveyor system. The process of cleaning may put a worker in proximity to a very dangerous machine.

CLEANUP BRINGS WORKERS WITHIN CLOSE PROXIMITY OF A MOVING CONVEYOR. © 2020 MARTIN ENGINEERING

Airborne dust, too, can cause numerous health risks, ranging from material build-up in the lungs to explosions. While it is virtually impossible to prevent all fugitive material from escaping a conveyor structure, taking practical steps to minimise it as much as possible helps reduce the dangers it can introduce. When clean-up is necessary, performing the job while the conveyor is running should not be an option. Operators concerned with the cost of lost production from stopping a conveyor to clean need only consider the consequences of an accident to confirm the wisdom of this rule, the company says.

Until recently, the engineering of belt conveyors to carry bulk materials hadn't changed much over the past half-century, despite the fact that virtually every requirement for safety, regulatory compliance and production performance has been raised during that time. Standards continue to tighten and industry best practices now often exceed government requirements.

"Using these new and emerging technologies, even poorly performing conveyors often don't need to be replaced or rebuilt, but merely modified and reconfigured by knowledgeable and experienced technicians installing the right modern equipment," Marshall concludes. "

"Specialised conveyor training and trusted resources from global suppliers are helping to raise operator awareness to make conveyor systems cleaner, safer and more productive."

ATOMISING ATTACK

At a time when viruses are headline news everywhere, methods for wide-area suppression of surface-borne microbes such as coronavirus is a serious consideration for both private industry and public works.

The World Health Organization (WHO) differentiates cleaning with disinfecting by defining cleaning as "the removal of visible dirt or particles," whereas disinfecting "refers to specific measures taken to control, deactivate or kill infectious agents, such as viruses and bacteria".

A study testing the effects of SDCs on infectious viruses (Ebola) conducted by the School of Engineering at Tufts University in Massachusetts found that "the use of just 0.5% chlorine solutions with a 15 minute exposure time is effective in reducing transmission risk". When distributing the proper mixture and dosage to an area during low traffic times, property owners can significantly mitigate the potential risk.

Atomised mist technology disperses millions of tiny treated water droplets over a wide area to achieve effective coverage. It is currently being utilised for the safe and consistent distribution of Surface Disinfectant Cleaners (SDCs) over work sites, busy foot traffic areas and communal spaces. At the forefront of this effort is BossTek's DustBoss line of industrial misting cannons, a family of high-powered machines originally designed for large-area dust control.

"The challenge is protecting workers and the public in outdoor spaces by the most effective means possible, using technology that requires the least amount of human contact," says Mike Lewis, vice president of sales at BossTek.

"Sending crews of people out on a regular basis to clean publicly-accessed