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**SPECIALIST EQUIPMENT 24**  
The mine of the future

*The considerations required for moving the big things*

**Material matters 27**

*A monolithic wear-resistant lining material is proving to be a popular choice*

**Scanning innovation 30**

*The evolution of an advanced scanning solution*

**Better connected 32**

*Overcoming materials degradation of cable couplers due to prolonged ultraviolet exposure*

**SAFETY 34**

**The dangers of dust**

*How air filtration systems can protect both operator and equipment*

**Imaging innovation 36**

*Ex-protected mobile thermal imaging in the mining industry*

**MATERIALS HANDLING 38**

**Pump priorities**

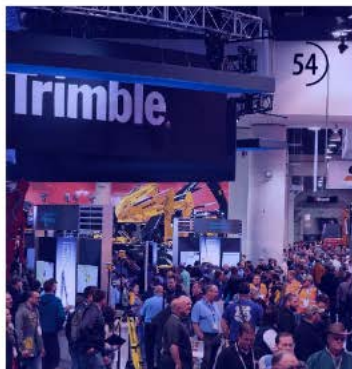
*Particular pumping solutions can truly make a difference in challenging environments*

**Remote revolution 43**

*Bringing a major industrial plant into the 21st century may seem like a daunting challenge. Yet one team has found that early adoption of new technologies can be a fast-track to efficiency*

**Filtration innovation 47**

*A novel approach to dewatering tailings*



**48 Conveyor considerations**

*Transporting material efficiently over long distances with curved belt conveyors*

**50 Sustainable solutions**

*Why sustainability in mining requires a holistic, customer-centric approach*

**52 Contractor is crushing it**

*Swedish firm benefits from cone crusher technology*

**54 EVENT PREVIEW**

**What happens in Vegas...**

*From March 14 to 18, 2023, Las Vegas will once again welcome over 130,000 industry professionals and guests to Conexpo-Con/Agg*



Keeping on top of maintenance at an ageing plant can be a never-ending challenge



**K**eeping conveyor belts running at their best is critical to safe, efficient production – something that's long been recognised by Singleton Birch at its flagship UK lime works, where almost 100 belts move more than 1.3 million metric tonnes of lime products each year.

Feeding all of the site's industrial processes at more than 100 tonnes per hour for 12 hours a day, seven days a week, is a six-conveyor system stretching almost 1.2 miles from the primary crusher at the chalk quarry through to the start of the manufacturing process.

Chalk is notoriously dusty when it's dry, and when there's moisture present the fines are sticky, eventually becoming slurry when things get too wet. That's one reason why the feed conveyors at Singleton Birch are among the most demanding when it comes to maintenance.

Exposed to everything the British weather can throw at them, material carryback and spillage had historically resulted in slippage on drive pulleys and build-up around return rollers. That led to belt mistracking and damage, extra wear on motors and bearings, and even structural issues – a sure-fire route to unscheduled downtime.

## REMOTE REVOLUTION

**Bringing a major industrial plant into the 21st century may seem like a daunting challenge. Yet one team has found that early adoption of new technologies can be a fast-track to efficiency, explains Dave Harasym**

However, for several years Singleton Birch has been on a mission to upgrade the plant using a variety of digital technologies – part of the much-touted fourth industrial revolution, 'Industry 4.0'.

Initially brought on board to train employees on maintaining clean, safe, productive belt conveyors, Martin Engineering has been supporting Singleton Birch to address carryback, spillage and dust issues at the most troublesome transfer points. Today many of the biggest problems have been resolved and the majority of the belts are fitted with Martin's primary cleaners, with many also benefiting from tungsten carbide secondary cleaners.

"We couldn't run without belt cleaners throughout our operation," says Stuart Howden, Engineering Manager at Singleton Birch. "They're our most important defence against carryback, spillage and material build-up, but they also need regular servicing and retensioning, and wear parts need replacing. Yet the design of many areas of the site doesn't always allow for easy inspection or maintenance of belt cleaners."

Nonetheless, Martin's belt cleaner servicing plan Mr Blade – where a technician makes regular visits to inspect, service and replace belt cleaners – had been helping Singleton Birch to stay on top of belt cleaner performance. However, as more and more conveyors were fitted

with belt cleaners, it was becoming increasingly difficult to prioritise which cleaners might need attention, with a significant portion of service time taken up by visiting all of the units and inspecting blades that turned out to be working well.

Fortunately, Martin Engineering was already well on the way to devising a solution using digital wireless technology, and by 2020 was ready for large-scale customer adoption of its pioneering remote monitoring system, the N2 Position Indicator (PI).

### SENSOR SENSIBILITY

Designed for primary belt cleaners that use a polyurethane blade, the N2 PI system employs sensors to track the condition of each belt cleaner and notifies users in real time when servicing is required via the cloud-based mobile app or a PC desktop dashboard. The system eliminates needless inspection visits, reducing the necessity to physically access each belt cleaner unless the system shows that servicing is required or the blade needs retensioning.

It's the ideal solution for large-scale material processing facilities with many difficult-to-access belt conveyors over a wide area.

Singleton Birch was among the first companies worldwide to adopt N2 technology, starting with a trial of half a dozen PIs on key conveyor belts. The PIs are supported by one central cellular 'gateway' through which all the data is communicated to the cloud, where it is collated, analysed and fed to the user-friendly app or dashboard.

"Soon after installation we were able to track performance data on the first belt cleaners fitted with the PI device," says Howden. "Through the app we can clearly see whether each blade is correctly tensioned against the conveyor belt and when it might be nearing the end of its life and will need replacing.

"We can also see if there's an anomaly or potential problem with the cleaner, and we can quickly send a member of our maintenance team to take a look, figure out what's going on and see if they can resolve it. In that respect, N2 is like an

early warning system that's invaluable in helping to prevent unexpected breakdowns or the need for emergency stoppages," he adds.

"If we need a technician to come out and service belt cleaners or replace blades, we can usually coordinate visits to take place when our regular maintenance is scheduled to minimise unplanned downtime. And whoever does the inspection and servicing, whether it's us or Martin, they can go straight to the belt cleaners that the app is telling us need attention.

"Previously it would have taken several days for someone to go around the entire works and inspect, service and replace blades, and record the condition in each case. Now we can do an overall assessment at a glance and prioritise the locations for inspection on a single maintenance visit."

### PATHWAY TO PRODUCTIVITY

With the success of the first N2 PI installations, the number of PIs installed on the site's conveyors was increased to 43, almost half the belts in the plant.





"With a full 12 months of trials under our belts, we've seen a dramatic increase in resource efficiency, with a 50% reduction in maintenance visits, saving time and effort," says Howden.

"And doing belt cleaner maintenance during scheduled stoppages is safer, as we can stop the entire plant to isolate energy sources. Monitoring belt cleaners remotely also helps to keep people away from moving conveyors and reduces the need to enter enclosed dusty environments, helping us improve safety."

"The N2 technology is helping with inventory control, forecasting and budgeting, too. Some belt cleaners wear more quickly than others, and the N2 data collected over time shows how long each belt cleaner is likely to last. As a result, the replacement time can be accurately predicted, so the right number and type of blades can be budgeted for, ordered and stocked. That allows the team to control inventory costs, while helping to ensure that replacement parts are available when they are needed.

"N2 is a clever system that eliminates the need for repeated visits to each conveyor belt – we will never need to go back to doing regular physical inspections of all our belt cleaners. The ability to monitor our belt cleaner blades remotely is a massive performance advantage," concludes Howden. ●

**ABOVE: The position indicator gives advanced warning when a belt cleaner needs servicing**

**LEFT: Installation and set-up of the N2 device is simple**

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