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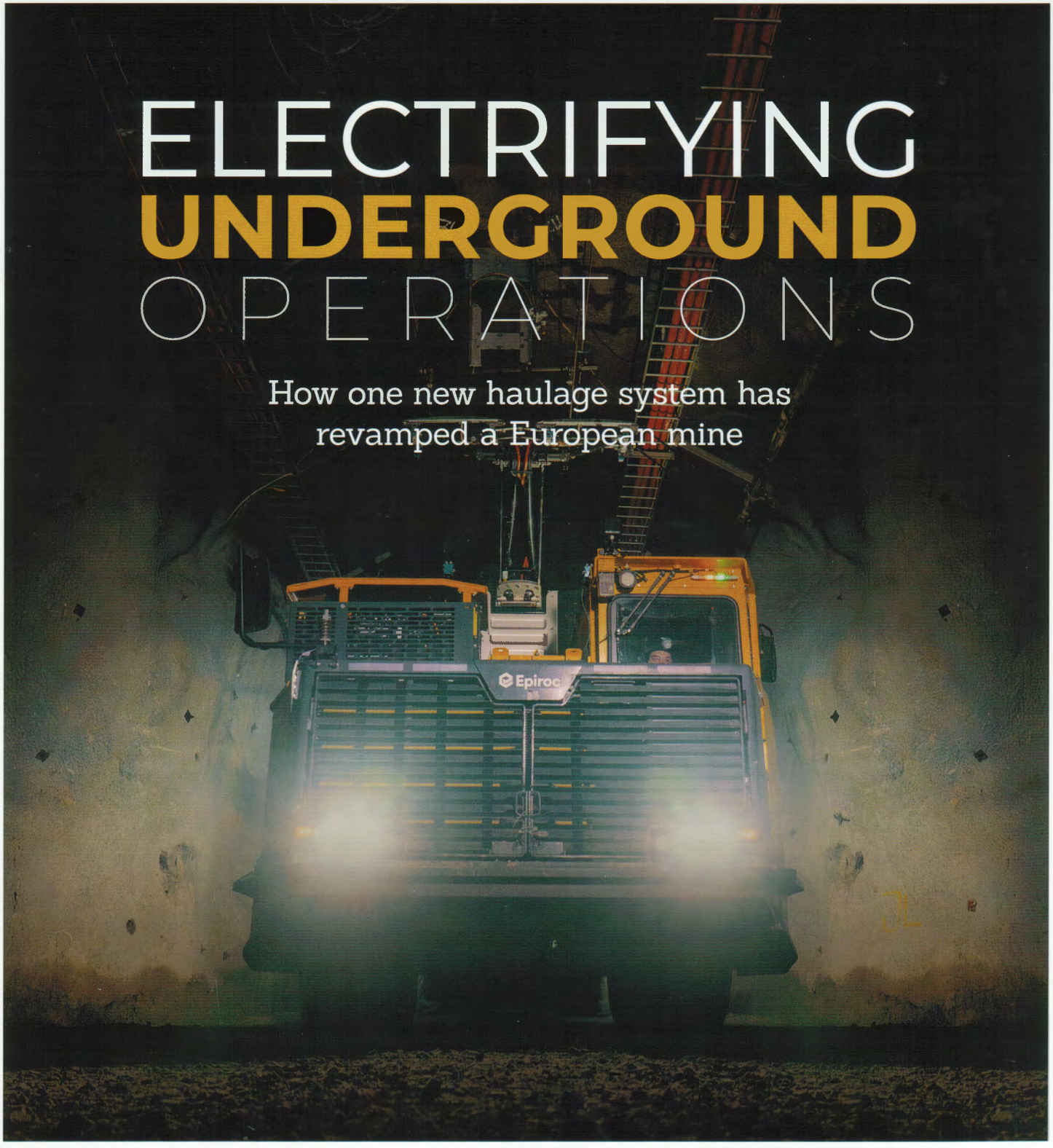
ELECTRIFYING UNDERGROUND OPERATIONS

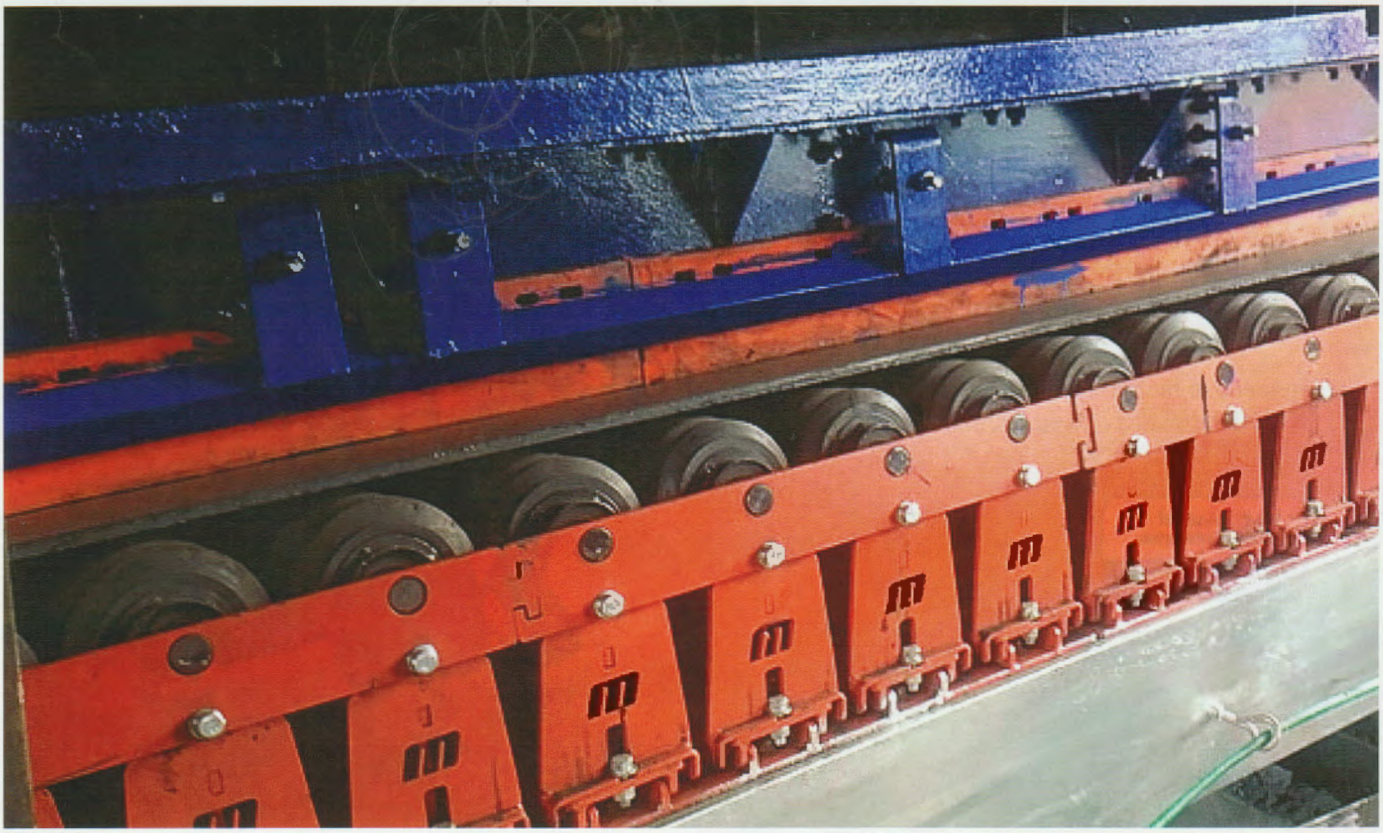
How one new haulage system has revamped a European mine



PUNISHING CARGO
An innovative upgrade for raw material conveyance

BANGING THE DRUM
Explore one new surface mining machine's clever design

AN AI FRONTIER
How voice recognition technology is tackling worker fatigue



Martin Engineering's high-speed cradle helps reduce spillage

PUNISHING CARGO

Dave Mueller from Martin Engineering explains how the company has transformed the conveyance of raw materials

Mined and quarried hard rock punishes conveyor belts and system components. The demand on these systems can lead to premature equipment wear and excessive downtime. Owing to the varying needs of different applications, raw material is often transported and processed by the end customer. So, beyond the needs of mines and quarries, bulk handlers like ports, cement producers and power plants need heavy-duty conveyors to receive raw materials before loading them onto vessels or sending them to the crusher.

SUPPORTING THE BELT

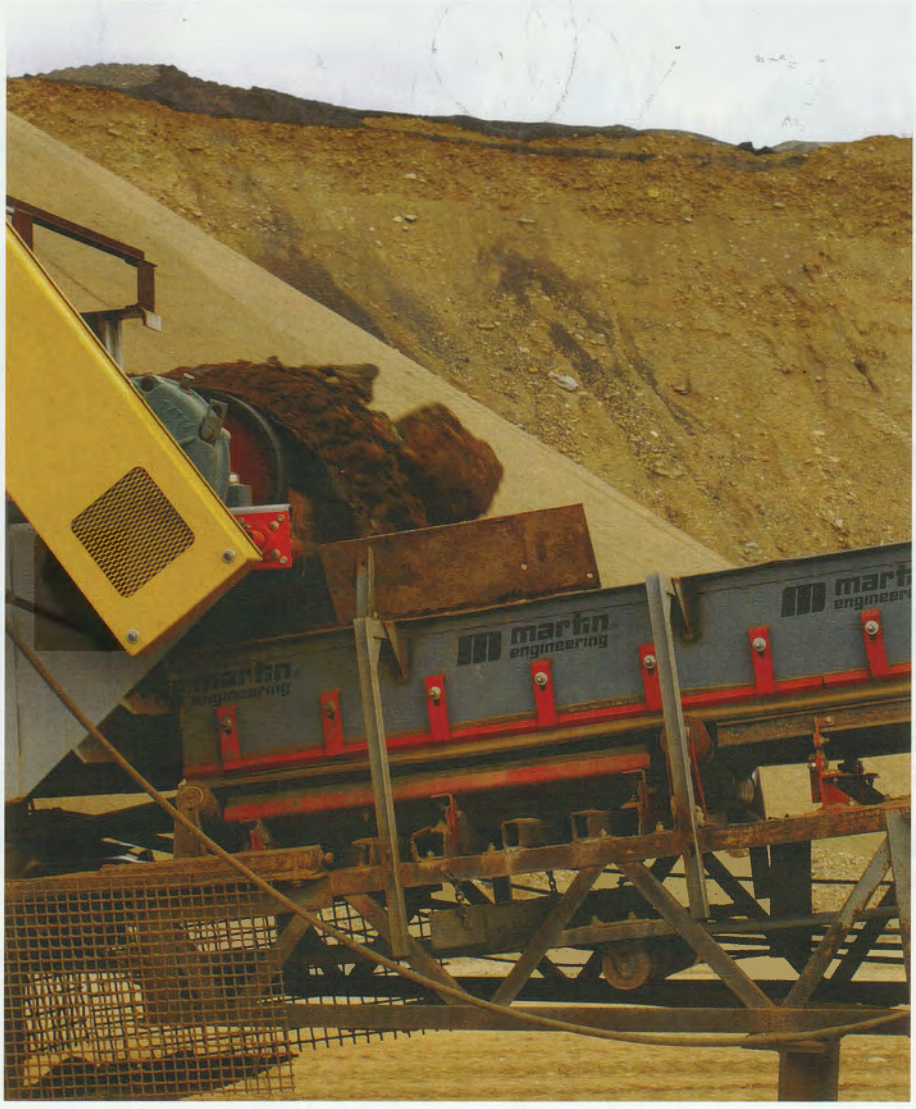
The force of loading can warp impact idler rollers and the bearings inside, but there are ways to avoid this. One is by restricting the drop height or slowing the descent of heavy bulk material from a direct impact on the conveyor belt. Operators have found that controlling material loading extends the life of the belt and the conveyor support structure. Another way to extend equipment life is to properly and completely support the belt in the loading zone using a cradle.

To help in this respect, bulk handling specialist Martin Engineering devised a heavy-duty impact cradle to support the belt and absorb the impact of loaded material in a consistently sealed environment. Impact cradles are specially designed with a top layer of slick ultra-high-molecular-weight polyethylene (UHMW) molded to a base of impact-absorbing styrene-butadiene rubber (SBR). The belt slides across them easily with little friction while the bars give enough shock support that the belt is not damaged from precise hits on sharp edges. By eliminating the gaps between idlers, skirting creates a tight seal against bars, further reducing the amount of fugitive dust and spillage for more compliant and safer operations.

Belt speeds above 650fpm (3.3mps) can exceed the limits of impact cradles. For higher-speed conveyors, a specially designed heavy-duty high-speed cradle with four trac-mounted idlers closely spaced to eliminate belt sag can support material impact without excessive drag. Innovative upper connector brackets link idlers throughout the load zone, allowing them to work in tandem as a unified structure. The elastomer bar suspension is engineered to match the CEMA rating specific to the application by absorbing shocks from impact.

SEALING THE TRANSFER

For extra heavy-duty applications,



Large material outdoor transfer

wearliners can deplete quickly and may need extra protection. A product called the canoe liner is made from durable urethane molded around a rugged steel plate to absorb impact and abrasion. It is an engineered urethane strip molded directly around a protective steel plate. The protective plate being integrated directly into the urethane liner is unique to Martin Engineering and prevents material from fouling the space between the urethane and the steel causing delamination. Separation tests have shown it delivers superior shielding of the skirt sealing system and skirtboard over other designs.

CONCLUSION

Conveyor design engineers recommend taking a holistic view of the system and choosing solutions that address the causes of downtime and workplace hazards from loading to discharge. Investing in modern technology that provides a longer equipment life, better results, and a greater return on investment (ROI) over the long term leads to higher production and a lower cost of operation. •

For more information visit www.martin-eng.com

Mine in Witbank, South Africa

A coal mine in Eastern South Africa producing 3.4 million tons (3.1 million tonnes) of coal per year was experiencing heavy spillage and system damage along the length of a main conveyor. Impact idlers allowed excessive belt sag, causing high volumes of spillage. Dust, fines fouled idlers, and rocks were being lodged between the belt and the skirt, resulting in unscheduled downtime due to frequent equipment failures. Labour was diverted for cleanup, further raising operating costs.

Technicians from Martin Engineering South Africa recommended the installation of seven High-Speed Impact Cradles. The specially designed idlers exceed the operating limits of typical impact bar-type belt support cradles. The rolling components minimise friction on the belt and maximise the life of the belt support structure. Low-friction polyurethane Martin ApronSeal Single Skirting was also installed to contain material and retain a tight seal on the running belt, further reducing spillage.

Six months after the installation, the volume of spillage has been reduced considerably, and the sealing system remains durable because no material is trapped beneath the seal. The lack of fugitive material has mitigated wear and tear on components and reduced the amount of labor needed for cleanup, maintenance and replacement of broken equipment. The project was so successful that the customer is converting 14 more transfer points.