INTRODUCING

EMSYS

TECHNOLOGICALLY ADVANCED
RIP DETECTION & MONITORING SOLUTIONS

BELT ASSET MANAGEMENT

ALMEX GROUP

BAM

BELT ASSET MANAGEMENT

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EXECUTIVE INTRODUCTION

Tim Shaw
PRESIDENT & CEO
ALMEX GROUP

The current state of the planet has brought new challenges to our industry never seen before. In particular, COVID 19 has significantly changed how mining operations will run going forward. Risk mitigation and cost avoidance are operational mandates. CAPEX budgets have been reduced or put on hold in uncertain times, shifting the ways equipment is purchased and maintained.

Having a dependable and longer life asset purchase and/or protecting the investment and revenue streams that are in place, are key priorities for limited budgets. Reducing manpower and the dependency on external service providers coming onsite are the new norm.

Rip Detection and Monitoring solutions are a risk mitigation investment in your mining operations to reduce any issues, losses, or accidents as early as possible before that problem becomes harmful, more costly and more difficult to correct. Until now, have been a greater investment than savings and provided data that wasn't reliable.

Almex Group presents our EMSYS Belt Asset Management suite of Rip Detection and Monitoring Solutions, or 'BAM'.

In addition to improvements in design and functionality of the Belt Asset Management Solution offerings, Almex Group offers Insurance and financing options for BAM solutions.

We look forward to working with you to find the right Rip Detection and Monitoring Solution that provides the ROI, avoids catastrophic failures and is a key part of your ongoing monitoring operations you can rely on.

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"The Pandemic will significantly change how mines will operate in the future and will have a drastic effect on operations."

— Tim Shaw, President & CEO

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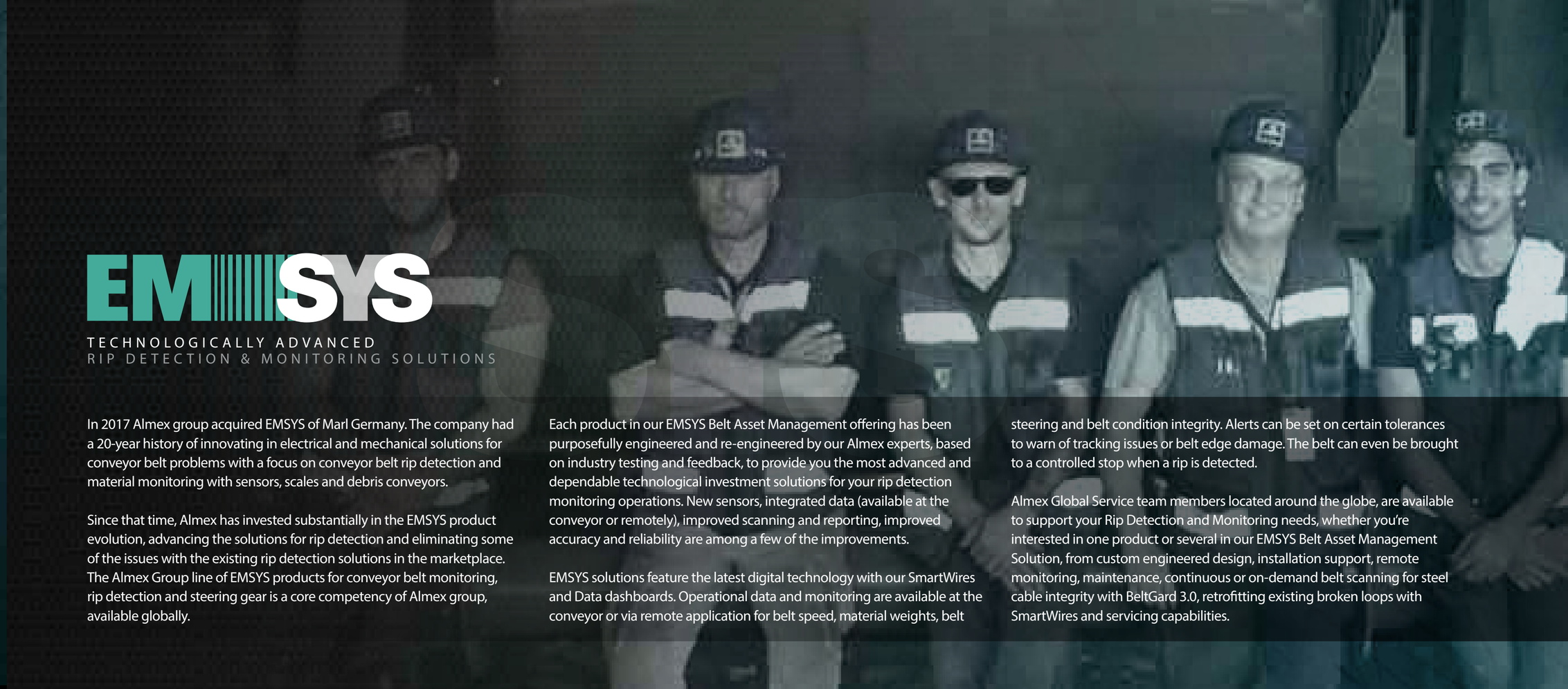
TECHNOLOGICALLY ADVANCED
RIP DETECTION & MONITORING SOLUTIONS



In 2017 Almex group acquired EMSYS of Marl Germany. The company had a 20-year history of innovating in electrical and mechanical solutions for conveyor belt problems with a focus on conveyor belt rip detection and material monitoring with sensors, scales and debris conveyors.

Since that time, Almex has invested substantially in the EMSYS product evolution, advancing the solutions for rip detection and eliminating some of the issues with the existing rip detection solutions in the marketplace. The Almex Group line of EMSYS products for conveyor belt monitoring, rip detection and steering gear is a core competency of Almex group, available globally.

Each product in our EMSYS Belt Asset Management offering has been purposefully engineered and re-engineered by our Almex experts, based on industry testing and feedback, to provide you the most advanced and dependable technological investment solutions for your rip detection monitoring operations. New sensors, integrated data (available at the conveyor or remotely), improved scanning and reporting, improved accuracy and reliability are among a few of the improvements.

EMSYS solutions feature the latest digital technology with our SmartWires and Data dashboards. Operational data and monitoring are available at the conveyor or via remote application for belt speed, material weights, belt steering and belt condition integrity. Alerts can be set on certain tolerances to warn of tracking issues or belt edge damage. The belt can even be brought to a controlled stop when a rip is detected.

Almex Global Service team members located around the globe, are available to support your Rip Detection and Monitoring needs, whether you're interested in one product or several in our EMSYS Belt Asset Management Solution, from custom engineered design, installation support, remote monitoring, maintenance, continuous or on-demand belt scanning for steel cable integrity with BeltGard 3.0, retrofitting existing broken loops with SmartWires and servicing capabilities.

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Current Rip Detection Systems:

Distrusted & High Maintenance

Today's rip detection systems rely on old analog technology utilizing thin wire antennas formed into large panels versus digital technology, which when installed in the conveyor belt are subject to false positive signaling and premature failure via regular conveyor belt wear and tear. The technological advancement and reliability that you would expect in modern day monitoring hasn't existed. These antennae are difficult to troubleshoot if a signal is intermittent from a loose connection, which make them costly to service and replace given their vast footprint in the conveyor belt. Maintenance and service calls often result in continuous adjustments to the system, such as skipping a faulty antenna, which can lead to increased false positive alerts and decreased monitoring capability, defeating the purpose of the system.

Current Systems Problems:

Outdated Technology

Systems are based on the decades-old technology of coiled loops that create a field and read like an AM radio.

- Signals are hard to read
- Receivers are small
- Loops require constant maintenance

Antennas Fail

Design & construction of loops lead to premature breakage and failure.

- Causes false positives
- Leads to lost production
- Loss of confidence

Costly Replacement

The size of the loops requries approximately 4 technicians 6 hours per loop.

- One loop roughly every 50 meters - $$

Proprietary Signals

Loops are designed to work with only one manufacturers' system trapping customers.

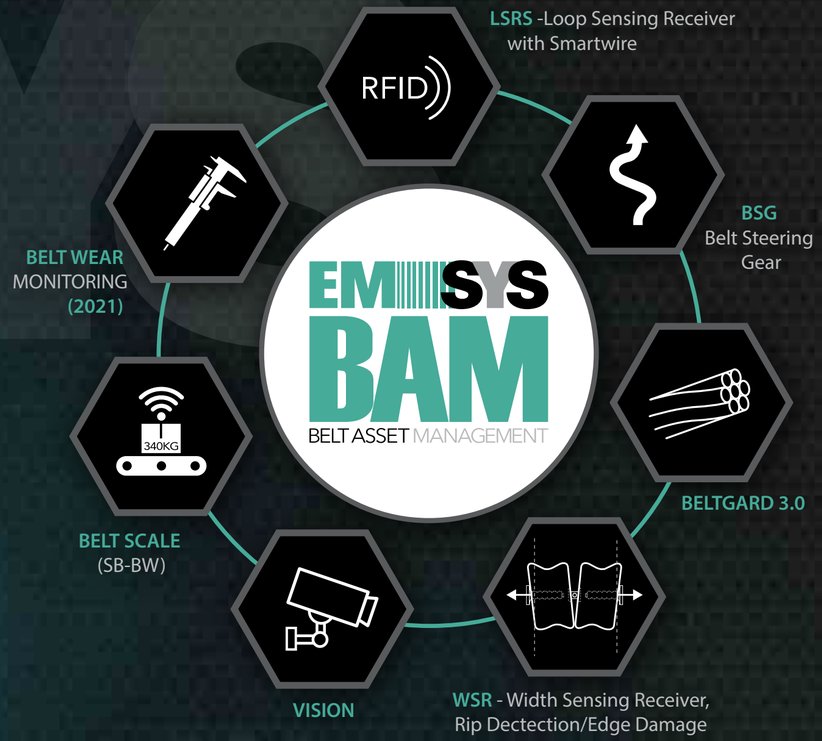
A better Rip Detection Solution is now available.

BELT ASSET MANAGEMENT

bam

verb: (n. acronym)

An investment in the protection, control and monitoring of a conveyor system to achieve a greater conveyor life, higher reliability and ultimately ensure better material production throughput and output.



SMARTWIRE

SmartWires replace outdated analog antennas with RFID tags that are picked up by the LSRS Receiver and Transmitter communications.

SmartWires are constructed of a Kevlar® braided core that is spiral-wound with a silver-coated copper wire. The wires are placed in a zig-zag pattern to eliminate tension and allow the wire to shrink and stretch with the belt. The wire is sewn into place onto a 200-pound breaker fabric strip that is 0.51 mm (2") wide enables easy placement into conveyor belt as it's being manufactured.

rip detection

RUGGED SMARTWIRES WITH **RFID** TECHNOLOGY

The soldered joints and RFIDs are encased in a protective epoxy to ensure the integrity of those joints and tags. Each SmartWire has a power tag and an antenna RFID. The RFID tags can be programed with information such as: Unique id codes to map to the position in the belt, the date of installation, maintenance dates, etc. thereby marking their location in the belt and enabling the location of any alerts from the LSRS system. SmartWires are a 2" wide strip that goes across the width of the belt and take up much less space than traditional loops and antennas.

Many major belt manufacturers now offer SmartWires as a purchase option, ask your belt manufacturer when you place your order.

SmartWires are also available pre-laminated, with rubber gum and cover, as a 45-minute retrofit to update or replace broken or faulty existing rip detection antennas.

SmartWires are warrantied for 3 years from failure and will not impact the performance of the belt or lead to belt failures.

...SmartWires are placed within the belt, during manufacture or as a45-minute retrofit for existing conveyor belts.

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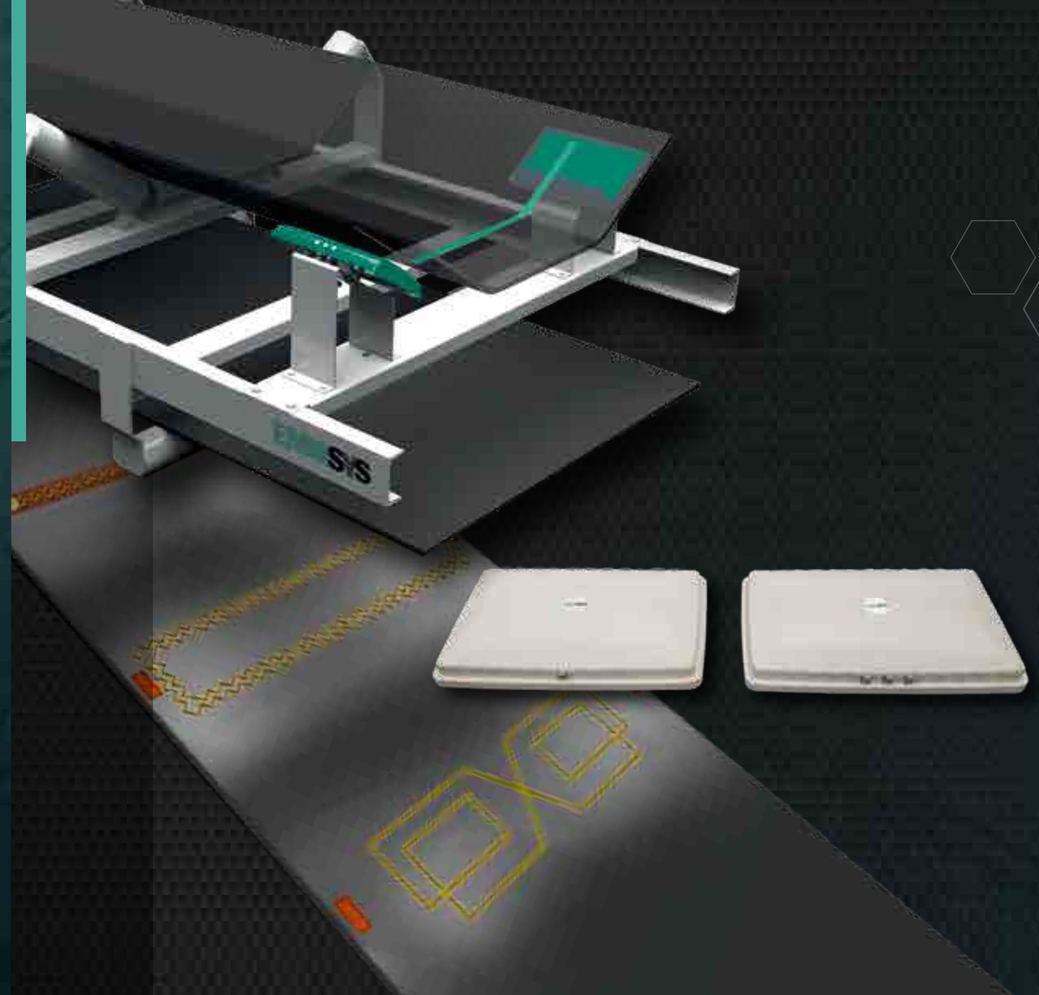
...EMSYS systems can read all other competitors' legacy loop systems.



LSRS (LOOP SENSING RECEIVER WITH SMARTWIRE)

The EMSYS LSRS is a digitally-based solution consisting of a receiver unit, a transmitter unit and RFID 'SmartWires' placed at fixed intervals, i.e. every 50 meters, within the conveyor belt line.

The updated LSRS receiver and transmitter units have both modbus and inductive coil capabilities. The Modbus facilitates the LSRS and SmartWire data transfer and the inductive coil enables reading of competitors' legacy loop systems. The processors have a more powerful data processing are built into the transmitter and receiver units for faster data sampling read rates of the data from the loops.

status

LOOP SENSING RECEIVER WITH SMARTWIRE

These EMSYS LSRS units read a larger area of the belt than competitor receivers. This larger field area facilitates more alert sensitivity and more dependable and consistent data readings and alerts from the antennae, even if the belt misaligned.

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RETROFIT KIT

For an existing conveyor belt with or without an existing rip detection system, Emsys offers a retrofit kit to expedite the insertion of SmartWires.

The Retrofit Kit contains:

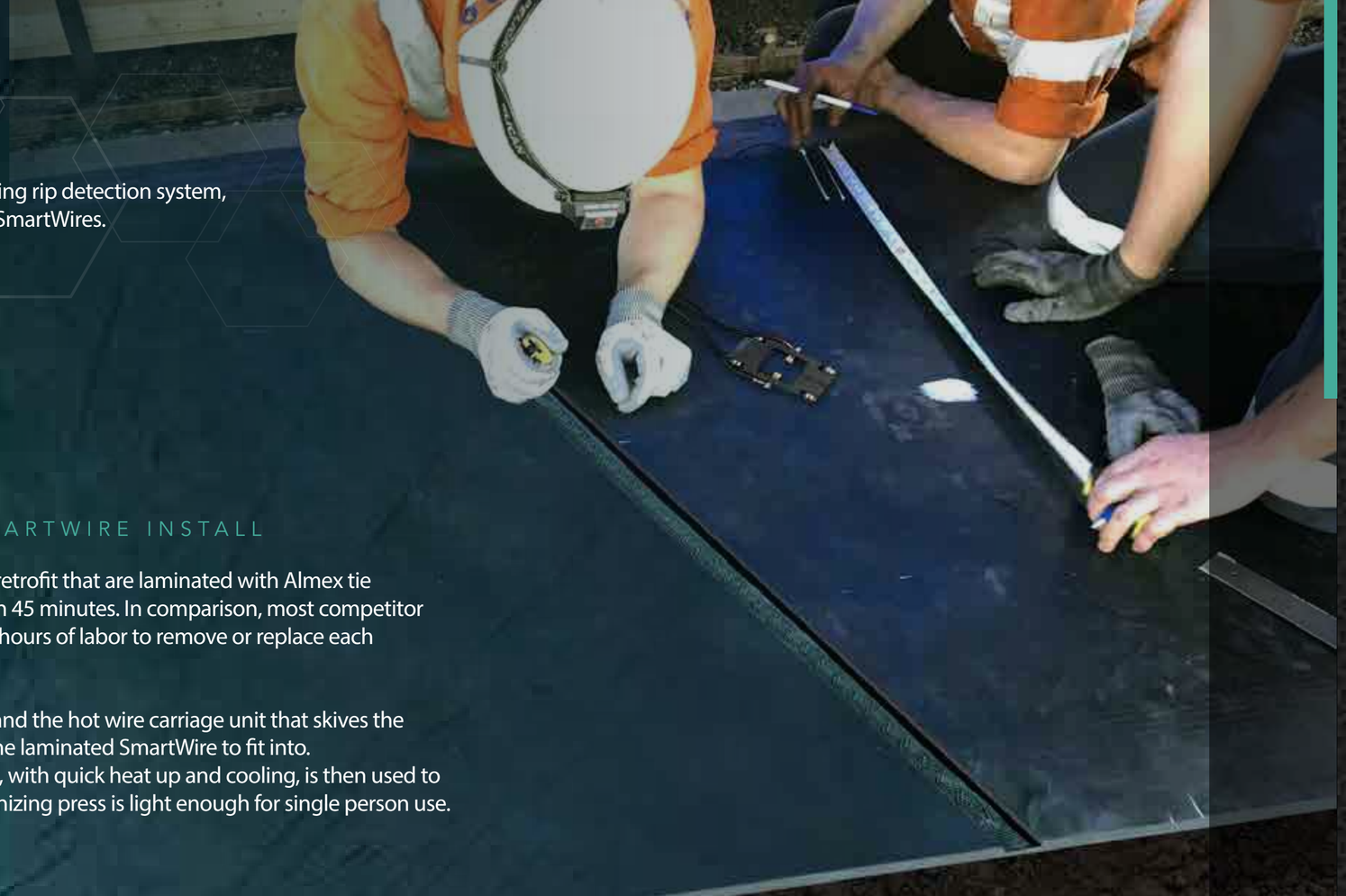
- Control box
- Portable vulcanizer
- Hot wire skiving unit
- Winch

upgrade

ALL-IN-ONE KIT FOR SMARTWIRE INSTALL

The Retrofit kit, together with EMSYS SmartWires for retrofit that are laminated with Almex tie gum and cover stock, can be cooked into a belt within 45 minutes. In comparison, most competitor antennae take up more belt area and can require 6-8 hours of labor to remove or replace each broken loop.

The EMSYS retrofit kit control box powers the winch and the hot wire carriage unit that skives the channel in the belt to the right depth and width for the laminated SmartWire to fit into.
An Almex lightweight and portable vulcanizing press, with quick heat up and cooling, is then used to cook the SmartWire into the conveyor belt. The vulcanizing press is light enough for single person use.



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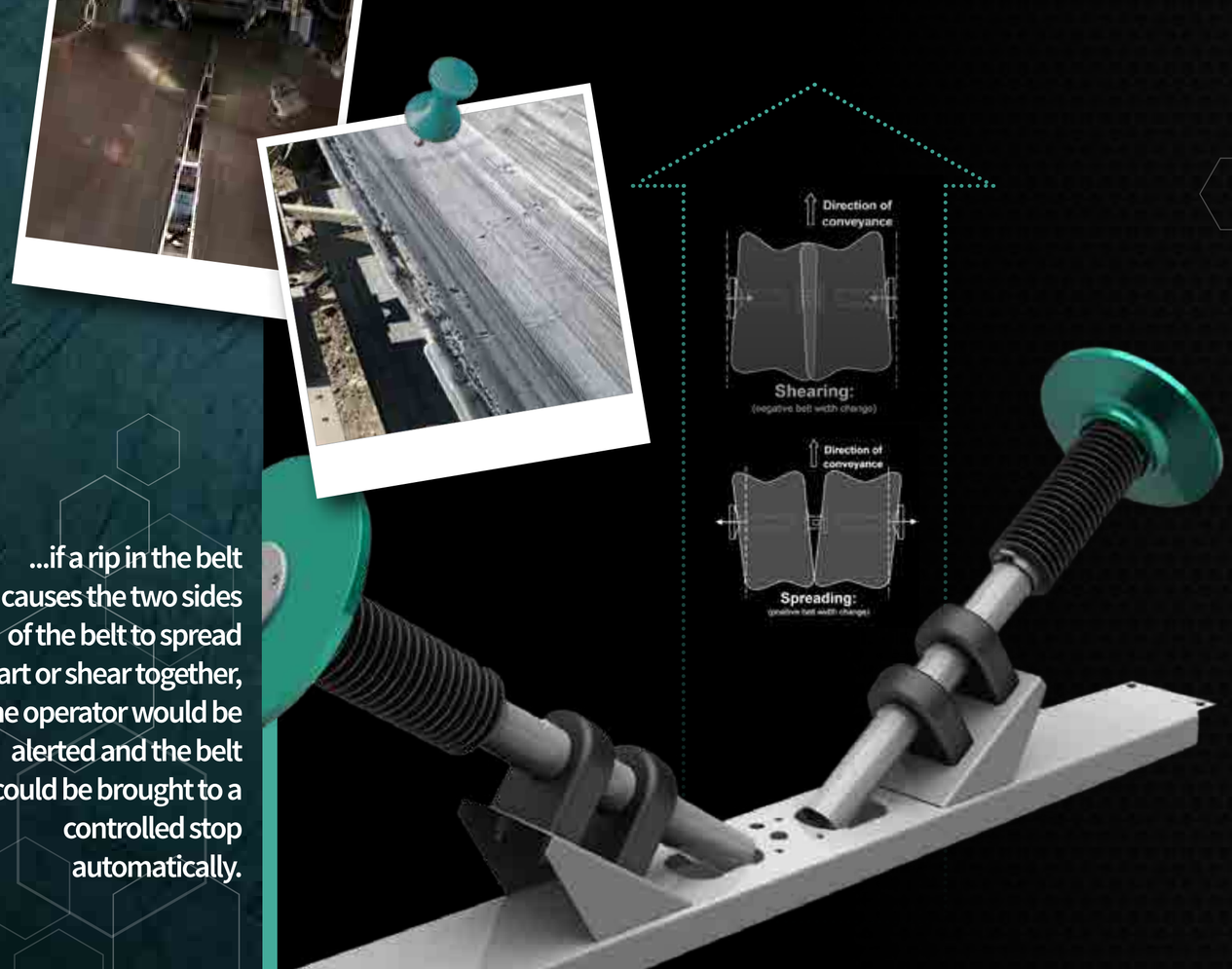

...if a rip in the belt causes the two sides of the belt to spread apart or shear together, the operator would be alerted and the belt could be brought to a controlled stop automatically.

WSR (WIDTH SENSING RECEIVER)

The EMSYS WSR allows the monitoring of any belt type by monitoring the width of the belt compared to a learned baseline and alerting to any changes in that width beyond a given tolerance for a certain distance.

RFID tags are embedded in the belt to provide reference points and then the two telescoping arms read the belt width every few inches. The Conveyor belt is run on a few rotations for the system to map and memorize the entire belts width measurement relative to the RFID tags. Ongoing readings are compared to the baseline and any deviation raises an alert.

The monitoring principle is based on identifying changes in the belt width caused by belt rips. If a rip in the belt causes the two sides of the belt to spread apart or shear together, the operator would be alerted and/or the belt could be brought to a controlled stop automatically.

controlled stop

WIDTH SENSING RECEIVER

This width monitoring approach also detects belt misalignment and edge damage. If there is a tracking issue with the belt from a dog-leg in a splice, a loading zone's impact or general misalignment, the system will issue alerts before the edge damage becomes more severe, helping preserve the life of your conveyor belt and minimize the repair work needed.

The EMSYS WSR can be integrated into an existing monitoring system communication or comes with its own control and display options.

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BSG (BELT STEERING GEAR)

The EMSYS BSG is the most advanced and functionable belt steering system in the industry for steering a misaligned belt onsite or remotely from anywhere in the world via a tablet or smart phone.

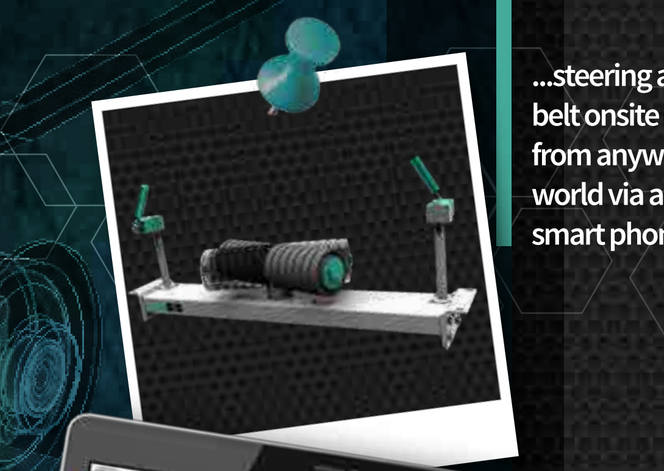
The BSG is the only steering gear on the market that is a permanent piece of equipment for your conveyor. Unlike traditional tracker and trainer idlers that need to be replaced, the BSG is an integrated equipment system with replaceable parts for the wearable components.

EMSYS Belt Steering Gear has an actuator and battery built into the two idlers allowing it to generate a battery charge and to be self-powered with charged battery backup.

re-align
BELT STEERING GEAR

This steering equipment can be placed anywhere along the belt, including overland, and can be paired with idler sets before and after the unit that are steered from the BSG, as required for the size of the belt and the load carried, to realign the belt quickly and efficiently.

The BSG controls provide a real-time data display of belt alignment and can be paired with a video feed for corresponding image support. Alerts can also be set up and received via tablet or smartphone, allowing the operator to correct any belt tracking quickly from anywhere and minimizing any longer-term wear or edge damage caused by ongoing misalignment.



...steering a misaligned belt onsite or remotely from anywhere in the world via a tablet or smart phone.

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BELTGARD 3.0

Damage to Steel Cord Belts isn't always visible to the naked eye. Almex BeltGard 3.0 is a magnetic scanning solution that checks the viability of steel cords and spliced areas in a steel cord belt by taking xray-like imagery to see the cables within the belt.

Individual cord damage details are provided for the entire belt. Critical areas like the splice or where known damage has occurred are checked for integrity and durability.

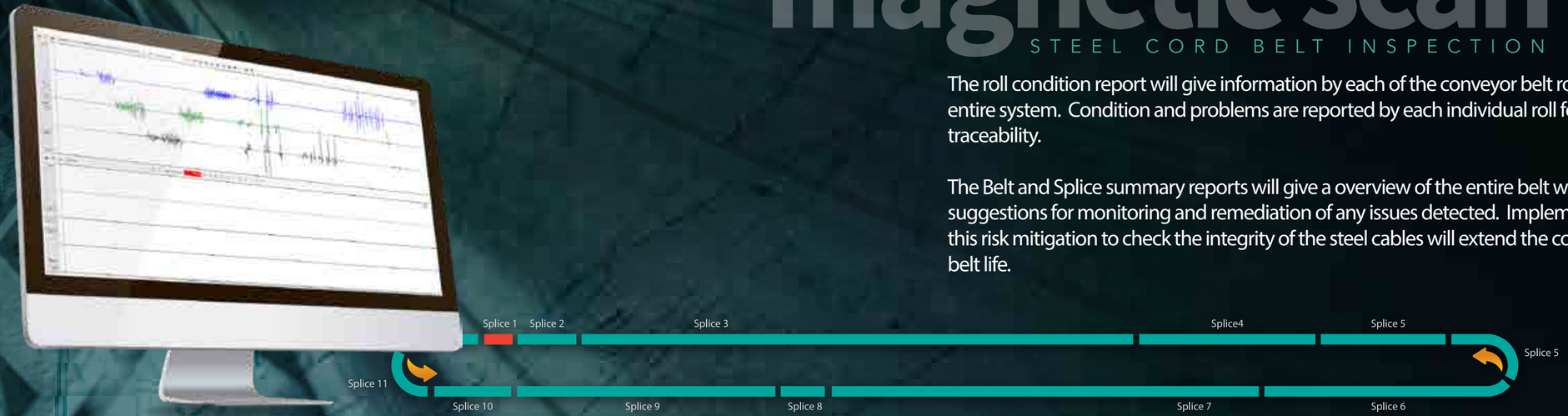
magnetic scan

STEEL CORD BELT INSPECTION

The roll condition report will give information by each of the conveyor belt rolls in the entire system. Condition and problems are reported by each individual roll for easier traceability.

The Belt and Splice summary reports will give a overview of the entire belt with detailed suggestions for monitoring and remediation of any issues detected. Implementation of this risk mitigation to check the integrity of the steel cables will extend the conveyor belt life.

...Almex BeltGard 3.0 is a magnetic scanning solution that checks the viability of steel cords and spliced areas in a steel cord belt.



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...works with an idler to determine the flow rate, totalized amount of material, weight of material and creates load profiles for the conveyor.

BELTSCALE SB-BW

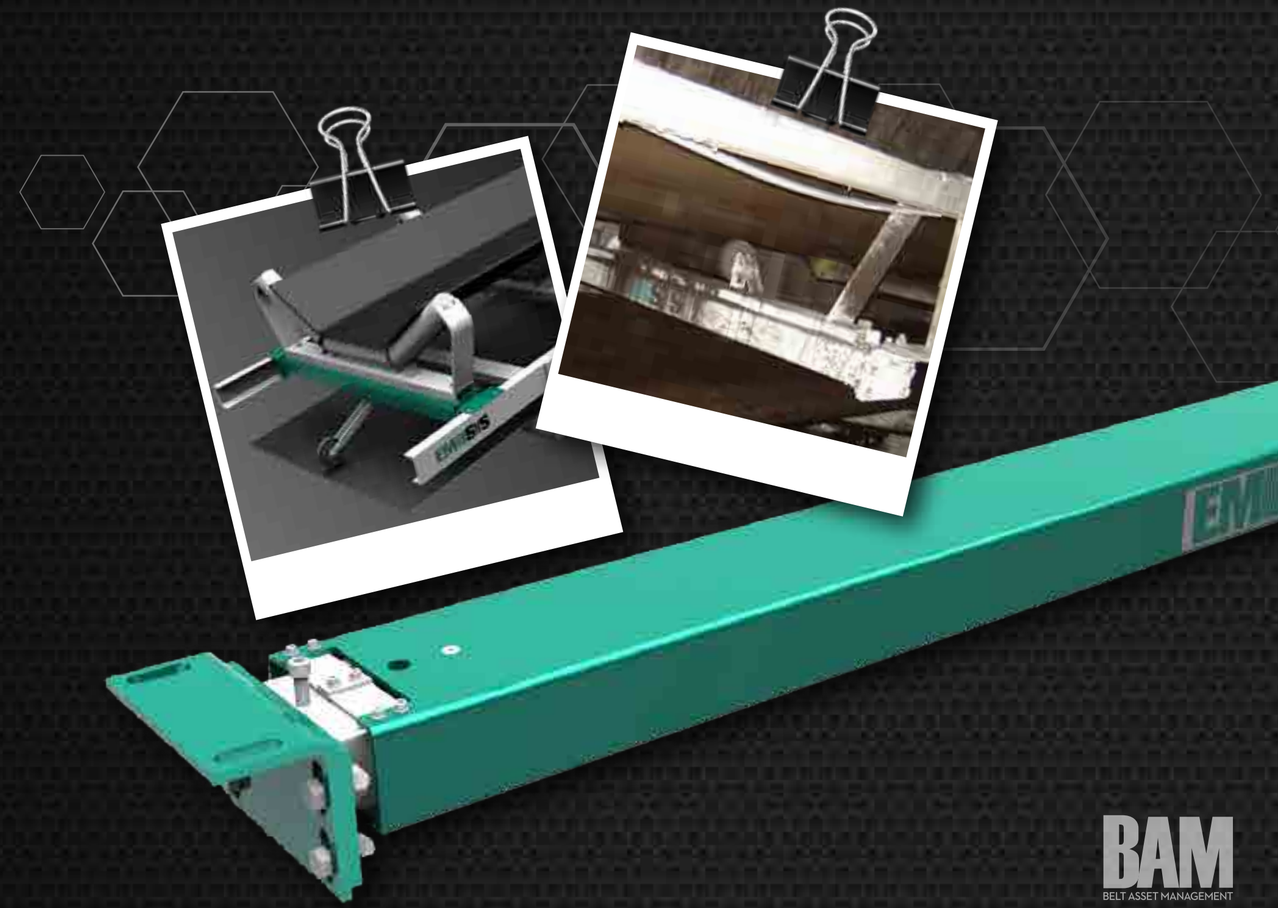
The EMSYS Belt Scale (SB-BW) is a compact and robust weight scale that works with an idler to determine the flow rate, totalized amount of material, weight of material and creates load profiles for the conveyor.

EMSYS Belt Scales are designed for the harsh environments of the mining and other industry sectors. The rugged design and simple installation mean the scales can be integration into existing belt conveyors quickly. The EMSYS Belt Scale (SB-BW) also requires minimal maintenance effort.

load capacity

ALMEX CERTIFIED BELT WEIGHING SYSTEM

The EMSYS Belt Scale also features remote access for convenient and immediate load data and is Atex certified for reliability, accuracy and peace of mind.



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VISION

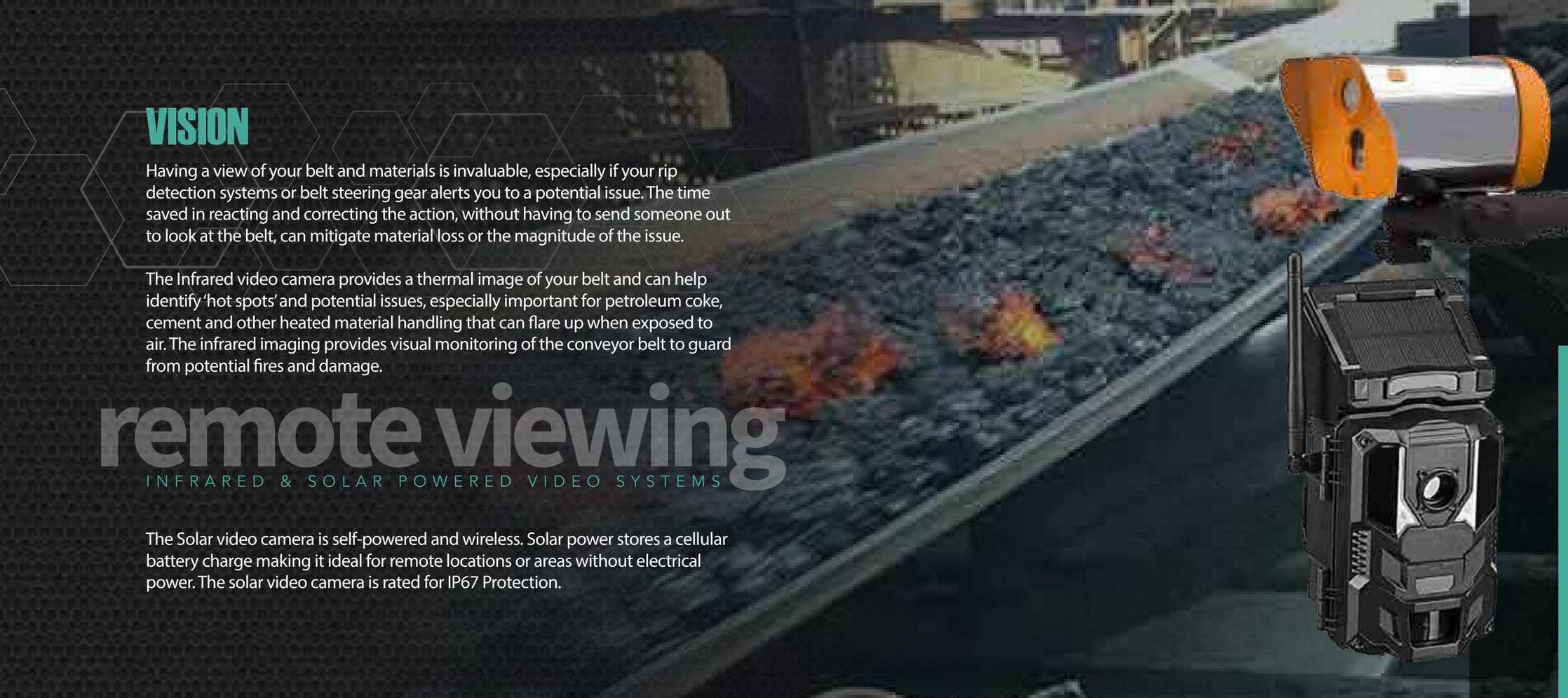
Having a view of your belt and materials is invaluable, especially if your rip detection systems or belt steering gear alerts you to a potential issue. The time saved in reacting and correcting the action, without having to send someone out to look at the belt, can mitigate material loss or the magnitude of the issue.

The Infrared video camera provides a thermal image of your belt and can help identify 'hot spots' and potential issues, especially important for petroleum coke, cement and other heated material handling that can flare up when exposed to air. The infrared imaging provides visual monitoring of the conveyor belt to guard from potential fires and damage.

remote viewing

INFRARED & SOLAR POWERED VIDEO SYSTEMS

The Solar video camera is self-powered and wireless. Solar power stores a cellular battery charge making it ideal for remote locations or areas without electrical power. The solar video camera is rated for IP67 Protection.



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REMOTE MONITORING

EMSYS data readings from all the systems can be viewed individually at a station at the conveyor site and/or integrated with your existing operational management systems to provide consolidated monitoring and reporting control center. This Remote Monitoring can realign belt steering, respond to rip detection alerts or the belt stopping, visually inspect the conveyor (real-time video or thermal imaging), and run BeltGard scans on your steel cable belt from a centralized location.

Centralized monitoring can provide integrated dashboards of data readings and video feeds from multiple EMSYS systems and Alert and notification trees can be setup for EMSYS alerts for Operational staff centrally or working remotely.

...centralized monitoring can provide integrated dashboards of data readings and video feeds from multiple EMSYS systems..

internet

MONITORING & CONSOLIDATED REPORTING

In addition, ALMEX can monitor your system from Atlanta, Georgia, U.S.A., thousands of kilometers away; providing feedback on issues and alerts instead of sending staff out to the site, running BeltGard scans, or as a redundancy measure to your internal monitoring.

All data and video can be wired to the operational control room and/or securely stored in the cloud and sent to phones and tablets via alerts and notification trees as required.

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SERVICE

The EMSYS Maintenance and Service package includes regular onsite maintenance through Almex Global Services staff with expertise in EMSYS systems to perform regular audits and provide recommendations on parts or service and/or perform those services.

maintenance & service

MONITORING & CONSOLIDATED REPORTING

Maintenance & Service also can include:

EMSYS BELT WARRANTY

EMSYS Solutions and Maintenance work with your belt warranty to extend the life of your conveyor belt.

SYSTEM UPGRADES

If the system is kept under the maintenance contract, then Almex can supply the new upgrades for software included in the contract price.

ONSITE MAINTENANCE

An EMSYS technician will come to site at least 2 times per year to inspect the system; more if there are technical issues.

EXPANDABLE

Inclusion of the integration of additional EMSYS modules planned that will be integrated to the existing system.

...the EMSYS Maintenance and Service package includes regular onsite maintenance through Almex Global Services staff with expertise in EMSYS systems

CONVEYOR BELT INSURANCE

EXTEND CONVEYOR BELT LIFE

Conveyor belts represent a large capital investment in your mining operation, help protect that investment and mitigate damage or extend having to replace the belt with Almex insurance.

System Performance Insurance Packages:

Level 1
Single System
$100,000

Level 2
Single System
Multiple or Redundant Systems
$100,000

Level 3
Single System
Multiple or Redundant Systems
Remote Monitoring & Maintenance
$200,000

Level 4
Single System
Multiple or Redundant Systems
Remote Monitoring & Maintenance
Extended Years
$250,000

... Almex can provide a conveyor belt insurance plan to help protect and extend the useful life of your conveyor belt.

insurance

FINANCING

Almex can provide financing options for your EMSYS purchase, moving the cost from a capital expense (CAPEX) to an operational expense (OPEX).

opex

1-3 YEAR REPAYMENT PLANS

Work with your Almex Staff member to determine the needs for and the financing options available for those equipment and service selections, in 12-24 and 36 month repayment schedules.

...Almex can provide financing options for your EMSYS purchase, moving the cost from a capital expense (CAPEX) to an operational expense (OPEX).

REFERENCES / INSTALLATIONS

Rio Tinto

FIRST QUANTUM MINERALS LTD.

CHALCO

ANTAPACCAY

MURRAY ENERGY CORPORATION

Select List of References Only. Contact Almex for further references

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