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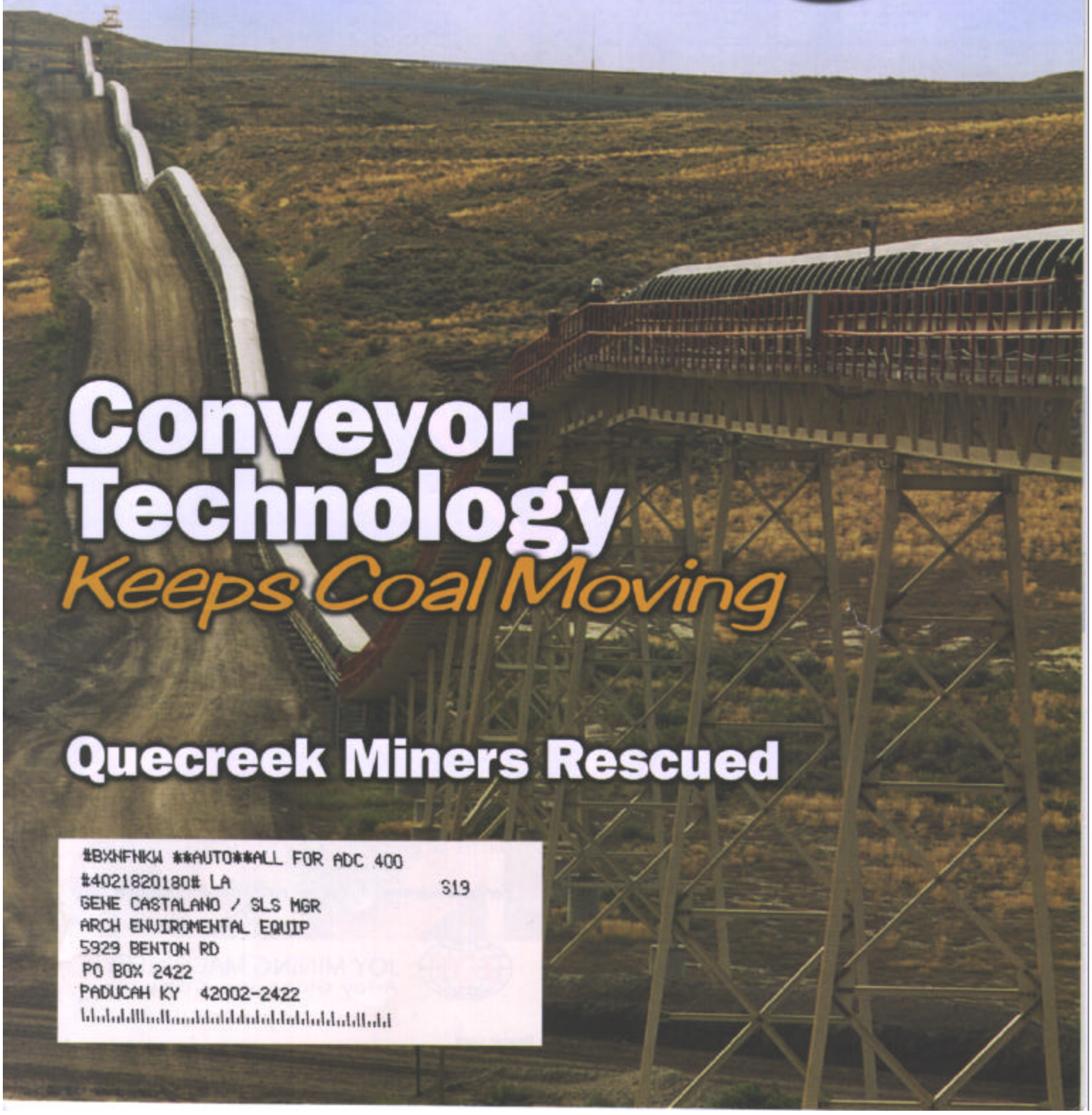

Conveyor Technology *Keeps Coal Moving*

Quecreek Miners Rescued

Belt Accessories Buckle Down to Business

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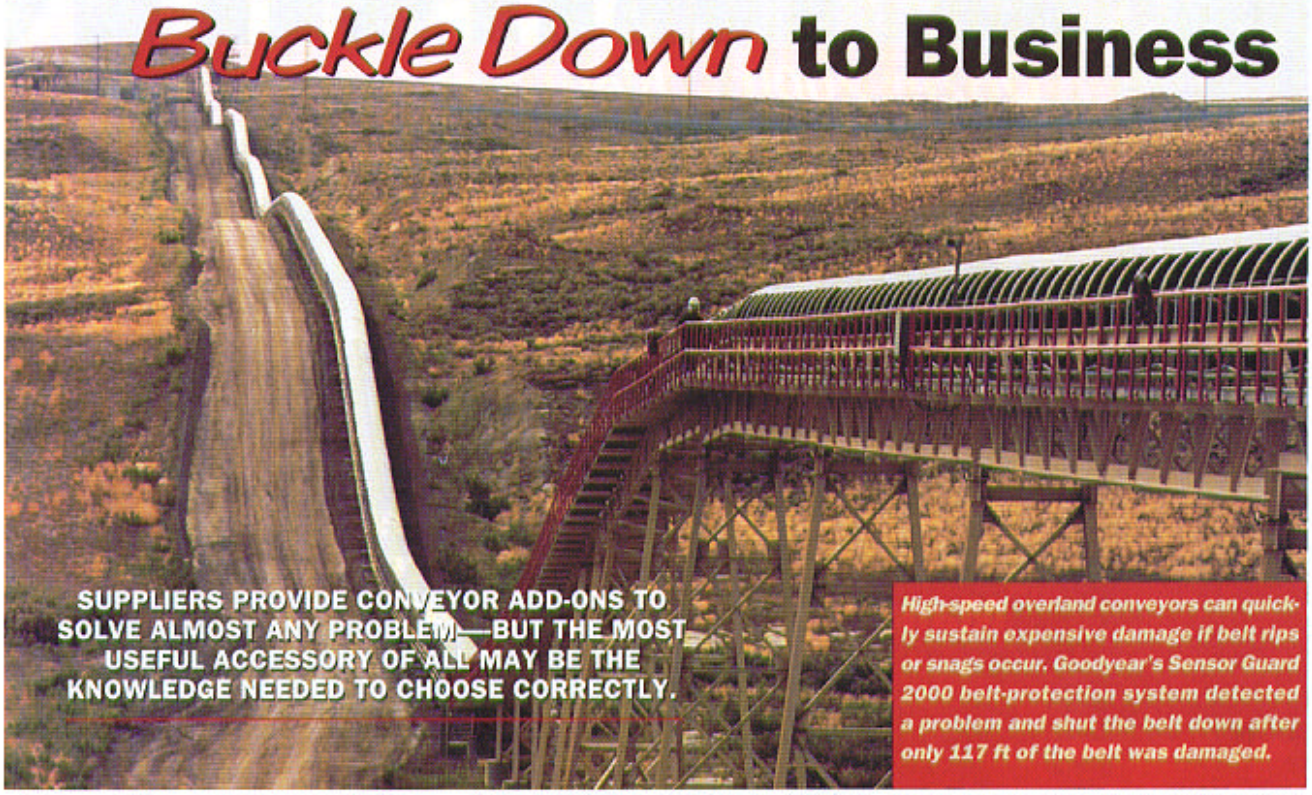
/ WESTERN EDITOR



SUPPLIERS PROVIDE CONVEYOR ADD-ONS TO SOLVE ALMOST ANY PROBLEM—BUT THE MOST USEFUL ACCESSORY OF ALL MAY BE THE KNOWLEDGE NEEDED TO CHOOSE CORRECTLY.

High-speed overland conveyors can quickly sustain expensive damage if belt rips or snags occur. Goodyear's Sensor Guard 2000 belt-protection system detected a problem and shut the belt down after only 117 ft of the belt was damaged.

One of the more active areas of mine-equipment innovation and design is in the field of conveyor system accessories, which can range from relatively simple bolt-on devices to complete conveyor monitoring and management systems. Where the motors, drives, and belting materials that comprise the main body of conveyor infrastructure are designed and purchased primarily to increase capacity and productivity, the wide variety of conveyor accessories available in today's market generally target improved safety, reliability, and energy efficiency in conveyor operations.

A good example of an accessory designed for improved conveyor efficiency is the Energy Saving Idler (ESIdler) and Super ESIdler from Stephens-Adamson, a subsidiary of Metso Minerals. Both units feature two pivoting center rolls in a front/back orientation in place of the single center roll used on conventional belt idlers. Combined with two conventionally angled side rolls, the unique design of the ESIdler is claimed to lower the overall rolling resistance of the belt and material over the idler—and thus reduce the capital investment required for belting, drives, and structure as well as the power needed to run the conveyor.

According to the company, the ESIdler also offers a more efficient troughing idler design, with the belt load more equally distributed between the center and side rolls than conventional idlers. The unit can easily be retrofitted to existing conveyors simply by removing the center roll, installing the center-roll pivot frame, then reinstalling the existing center roll plus a new roll in the pivot frame.

A number of conveyor component suppliers have determined that, in a business environment which rewards efficiency and punishes higher-cost coal producers, perhaps the most valuable conveyor accessory of all is information—an understanding of how to squeeze the most value out of the selection, operation, and maintenance decisions faced by any mine that moves bulk materials by belt. Conveyor system and accessory suppliers, in addition to offering a constantly updated line of accessory products, are making it easier to find and apply that information through improved Web site design, along with on-line and/or printed selection and maintenance guides for specific products.

Flexco, for example, is well-known for its mechanical belt-splicing systems as well as a wide range of conveyor accessories and replacement parts, which include the Eliminator line of head pulley precleaners, secondary cleaners, and cleaner accessories; the PT Max belt trainer and Persuader belt positioner; and Deflector V-series and diagonal belt plows. The Illinois-based company recently added a safety and task training program to its Web site (www.flexco.com) to help mine and industrial safety managers provide task-specific training for conveyor maintenance procedures. Downloadable materials provide overview descriptions of each task, along with guidelines for recommended procedures plus a short review quiz designed to improve information retention. The four tasks initially addressed by the program include conveyor lockout/tagout procedures; proper belt clamping methods for mechanical splice installation; belt cutting; and skiving, or removal of the top cover for countersinking mechanical splices flush with the belt surface.

Martin Engineering, another major supplier in the conveyor accessories market, recently introduced BOCO, a new line of self-adjusting conveyor load-zone skirting. Almost concurrently, the company released a new edition of its non-commercial book on the causes and cures for fugitive material to improve belt conveyor operations.

Titled *FOUNDATIONS 3: The Practical Resource for Total Dust & Material Control*, the 216-page, hardbound book is available for $30 from the company by phone, mail, or online order (Martin Engineering, One Martin Place, Neponset, IL 61345; telephone: 309/594-2662 Ext. 448; or foundations3-@martin-eng.com). A summary of the book's contents is available for review on the company's Web site.

BOCO, Martin Engineering's latest product, is designed to "float" on the belt and self-adjust to maintain an effective seal without maintenance. Supported on pressure arms between two steel plates, the system's rubber sealing strip rises and falls with fluctuations in belt travel. The rubber sealing strip is available in lengths up to 300 feet (ft) to allow installation as one continuous strip along the load zone. Martin says it has designed BOCO skirting to fit on any belt, providing an effective seal on conveyors with as little as1.25 inches of free area on each side of the belt. The skirting system has a wear life of 5.5 inches, and when worn, the sealing strip can be replaced without tools.

Goodyear Engineered Products has published a 72-page booklet which presents specifications and application data for its surface conveyor belting lines. *Goodyear's AboveGround Conveyor Belt Guide* also contains details of belt cover compound and service capabilities, a belt selection guide, and sections on belt installation, maintenance, and troubleshooting.

Primarily a belt manufacturer, Goodyear also markets a very useful conveyor accessory, the Sensor Guard 2000 rip detection system. Although the Sensor Guard 2000 is neither new (it was introduced in the mid-1980s) nor technically an accessory—as it requires installation of a special belt material to function—it and other similar systems from other manufacturers continue to save mines from thousands of dollars of potential belt damage and loss of production by shutting down a conveyor before a snag or a malfunction rips a belt beyond repair.

Goodyear's system uses closed-circuit sensor loops embedded in the belt, monitored by electromagnetic detectors placed at high potential damage points. As the conveyor moves, these loops pass over the detectors which generate output pulses. If the belt begins to rip, a sensor loop is also cut. As this cut loop passes over a detector, no pulse is generated. The lack of pulse is recognized by the control unit, and the belt automatically shuts down to minimize further damage.

At Bridger Coal Co.'s mine at Point-of-Rocks, Wyo., a 42-inch-wide Goodyear Flexsteel conveyor belt stretches 7,500 ft to supply 30,000 tons of coal daily to a nearby power plant. When a jagged metal post became lodged in the belt and sliced 117 ft of it, the Sensor Guard system limited damage by sensing the tear and stopping the conveyor system. According to Goodyear, similar accidents have been prevented at a number of U.S. coal mines, as well as at hardrock mines around the world.

Arch Environmental Equipment's Conveyor Management System (CMS) takes a different approach to belt monitoring and protection. Arch Environmental's CMS uses a modular concept in which components are interconnected by a multistrand cable that also acts as the familiar emergency-stop pull rope seen at most modern conveyor installations. Using this approach, says Arch, eliminates the need to install conduit and extra wiring.

Arch's CTS pull cable is a high-tensile, steel-braided cable that provides the physical means to stop the conveyor, while six internal conductors serve as the electrical and control wiring for the entire system when connected to the company's CTS 2000 head end control unit, a programmable control box with internal fault diagnostics. The HECU controls and monitors the conveyor's interconnected safety and belt protection devices, a number of which are offered by Arch including belt misalignment monitors, belt tear detectors for various applications, and blocked-chute detectors.

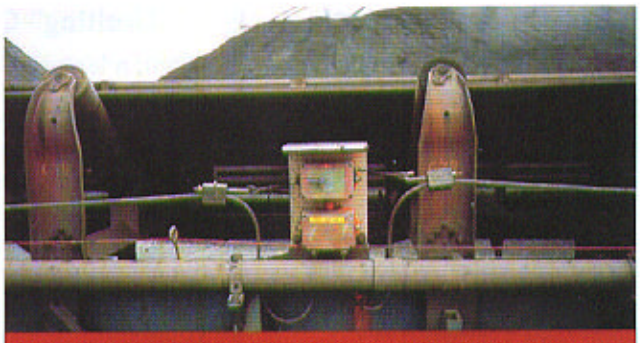
In addition, the HECU provides a man-machine interface by means of an LCD display, a fail-safe interlock to the motor control center, and the capability to transmit information such as conveyor faults to the motor control center. Each fault condition is identified and displayed by name and type on the display.

For belts that already have been damaged, Devcon's Flexane belt repair kit is a ready-to-use, off-the-shelf solution for making fast, permanent, emergency repairs. Each kit contains two units of Flexane 80 putty (enough to cover up to 188 inch^2 at a thickness of 1/4 inch), an applicator, cleaner, and two kinds of primer. Flexane 80 putty is a 100% solids urethane compound that is resistant to impact, abrasion, vibration, expansion, and contraction. According to Devcon, it is easy to mix, trowels on smoothly, and cures to a tough, medium-hard rubber (Shore A 87). It can be used at service temperatures up to 120° F wet and 180° F dry.

Devcon's FL-10 primer removes surface contaminants or oxidation, ensuring a high-strength bond between the putty and metal surfaces. FL-20 primer cleans and prepares rubber, wood, fiberglass, or concrete surfaces, ensuring Flexane adhesion. FL-30 primer is designed for use on plastics.

In one instance, a primary haul conveyor received a 1/4-x 1/4-inch gouge along the entire 3,000-ft belt from a dropped chute. Before applying the Flexane materials, the damaged area was roughened using a grinder with a wire wheel attachment. The surface was then chemically cleaned and FL-20 primer was applied and allowed to cure or dry for 15 minutes. Flexane 80 Putty was applied to the damaged or gouged area, then smoothed and contoured using a putty knife, for a successful repair. CA

The BOCO load-skirting self adjusts to prevent spillage.



CTS pull cable provides a physical means to stop the conveyor.