WORLD COAL®

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Worldwide Application Expertise
for Coal Power and Mining

TERRASOURCE® GLOBAL
Handling a World of Materials

ASGCO®, USA, introduces improvements to belt conveyors that use the company's principal of safety by design to achieve lower total cost ownership.

More stringent regulations continue to appear in the coal handling industry. Air quality, house-keeping requirements, spillage control and safety continue to influence the need for technologies to maintain and increase production requirements. The demands placed upon coal handling conveyors require constant vigilance. That being said, ASGCO® is continuing to provide proven solutions and new technologies that promote production and improve the bottom line in coal-fired power plants and other coal producing facilities, helping clients to focus on their primary purpose of loading and unloading material, such as coal, onto conveyor belts. In theory, this process is easy: build conveyors and chutes that carry the coal. However, many problems can occur in just transferring coal from one conveyor to another. Chute blockage, excessive wear, material leaking from the loading point, belt mistracking at the tail pulley and conveyor chutes leaking coal are just a few of the challenging problems.

Production done safely is achievable. Production rate increases will result when using the proper technologies and 'safety by design' to increase throughput and minimise maintenance problems or frequency. Recent upgrades and improvements have solved many of the problems that are typical in coal handling facilities. To illustrate some of the solutions recently provided by ASGCO, this article will focus on identifying various problems, along with discussion of the solutions provided, as well as the client's perspective on performance improvements.

Solving the problem

The goal at all coal handling facilities is to get the coal loaded as safely and efficiently as possible. Production rates must be met or improved; demurrage is not an attractive option.

Fugitive material

A common problem is fugitive material. Fugitive material can come from many sources in a belt conveyor operation. One source of fugitive material is material being carried back on the return side of the conveyor belt. Belt cleaners are employed at the head pulley location in primary, secondary and also tertiary locations. In order to achieve maximum performance with minimal maintenance, the standard stainless steel construction of the ASGCO Skalper® series belt cleaners provides longer life for the support and tensioning mechanisms. Not only does the stainless steel E-Z Torque® tensioner allow for automatic adjusting of the blade tension, it also comes with an external wear indicator. As a results, there is no longer a need to look inside the head chute to check for blade wear, thus eliminating a potential safety concern. They are also available with external serviceability capabilities to eliminate confined space entry issues and reduce routine maintenance time required for inspection and service. This example of safety by design lowers the total cost of ownership, while improving belt cleaner performance (Figure 1).

External serviceability

External serviceability has become an integral component when it comes to eliminating worker entry into the chute box for safer replacement, easier maintenance and reduced downtime. Conventional wear liners have historically been installed inside the chute, but the ASGCO External Skirtboard Wear Liner System can be placed on the outside, improving skirtboard sealing and preventing spillage. Installed and accessible from the outside of the conveyor transfer point means never having to enter the confined space to service the internal liners (Figure 2). This also allows for easy inspection of the liner condition when evaluating, replacing or just adjusting the skirtboard rubber seal.

The result is excellent performance with fewer labour hours and a lower cost of ownership. Removal and replacement used to be a tough job that could require multiple workers and days of scheduled downtime. With this design, ASGCO were able to cut the installation and service time, while reducing risk and improving safety.

Figure 1. Skalper® with E-Z Torque® tensioner installed on the head pulley with external blade wear indicator and external serviceability capabilities.

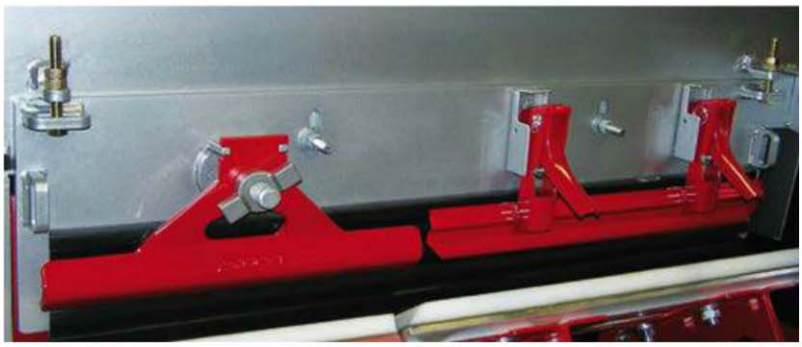

Figure 2. External adjustable bolt-on system allows for ease of adjustment and safe removal.

Conveyor transfer points

Another source of fugitive materials and a major source of spillage and dust is the transfer point of a belt conveyor system. Along with the housekeeping issues and the expense of handling the bulk material twice, regulatory and safety issues are big factors.

Safety first: the most common source of injuries comes from slips, trips and falls. The highest rate of incidence in the employment sector is among maintenance personnel performing routine maintenance tasks or cleaning up around the conveyors. The highest rate of incidence by location is at the terminal pulley locations, which are located at the transfer points. Fatalities have even occurred on conveyor belts that have been properly locked out, tagged out and tested out due to stored energy in the belt itself – which is in essence like a big rubber band under tension.

A worker cleaning up spillage around a tail pulley buried in fugitive material (Figure 3) needs to be aware of the stored energy in these systems. There have been recorded incidents in which a worker has suffered crushing injuries and even been killed when tension is relieved as the tail pulley breaks free after fugitive material locking it in place is removed during cleanup operations. Many belt manufacturers

Figure 3. The tail pulley is buried in coal.

Figure 4. Ordinary training idler tied off with a rope causing material buildup on the support frame work and belt edge damage from friction and pressure.

rate their belt modulus at 1.5% to 2% stretch under tension. On a 600 ft belt for instance, the instantaneous belt movement resultant from tension release can easily pull both the personnel and the tool he is working with into the tail pulley causing injury or death.

Policies, procedures and PPE do not prevent these tragedies. Guarding can help, but it can be removed. Training can help, but it must be applied. The simple answer is to eliminate the problem at the source. The ASGCO Flo-Controlled transfer point has been employed at port facilities, resulting in cleaner, safer operations, while improving throughput and resulting in improved production, safer operations and a lower total cost of ownership for a healthier bottom line. Improved flow and proper containment improves overall performance of the system and the morale of the employees. ASGCO Flo-Controlled Chute™ technology was employed at a terminal facility where full respirators were required before the installation. Spillage was everywhere. After the installation was completed, no respirators were required and the coal was where it belonged: on the belt.

Belt tracking

In the world of coal handling, conveyors are a dynamic piece of equipment. Conditions are constantly changing. There is no such thing as a 'perfect conveyor' in the real world. Continued use, and abuse in some cases, caused by the rugged environments they exist in, takes a determined maintenance effort. In many instances, the conveyor system or the belt itself requires additional measures to be taken to correct or prevent fugitive materials and spillage resulting from misalignment. Whether the structure sinks, a dozer runs into the framework, constantly changing environmental conditions. Or belt damage is the cause and the result is fugitive material ending up on the ground or along the walkways.

There is new technology that ASGCO is providing to aid in belt tracking to ensure that the corrective measures take place quickly, effectively and safely. The ASGCO Tru-Trainer® is now employed at many coal facilities and mines around the world. These training devices are quick acting, effective

and have no roller guides or 'ears' that can damage the conveyor belt, which is by far the most expensive component on a coal handling conveyor system.

There is no support mechanism required under the tracking device for material to build up on, as is common with all other styles of training idlers available. The safety by design with the ASGCO Tru-Trainer relies on a self-activating internal pivot that does not need side guide rollers to influence the belt travel. The elimination of areas where fugitive material can build up resolves a regulatory compliance issue. The Tru-Trainer belt tracking devices are frequently installed before the load zone on the return side of the belt to ensure that the belt is centred under the load being discharged onto the belt at the transfer point. They can also be used on the carrying side with no belt edge contact. As anyone who has worked around coal conveyors can attest, it is not uncommon to see ordinary training idlers tied off with a rope to ensure that the belt receives maximum influence (Figure 4). This is a tremendous safety hazard for employees working near the conveyor. This old belt training technology can frequently result in belt edge damage from friction and pressure, as well as delamination of the belt carcass, which is the tension member responsible for carrying the load.

Figure 5. Tru-Trainer® tapered troughing idler reacts to keep the belt centred with no belt edge contact to create friction.

Figure 6. Modular style Impact Cradle Beds consist of a heavy frame with removable (slide-in or slide-out) sides for ease of installation and maintenance.

Another fugitive material issue in coal handling facilities is the fact that some coals can be plagued by combustible dust issues. Heat from friction can be a source of concern. The ASGCO Tru-Trainer has no belt edge contact to create friction. The desire to keep the system running at maximum production output can be achieved safely and with a lower total cost of ownership. The Tru-Trainer conveyor belt tracking idler employs a quick action pivot design, which is non-damaging to the belt and reacts immediately, if the conveyor belt begins to drift off centre, eliminating the need for side guides or ropes. It is always reacting to keep the belt centred. Its stainless steel internal pivot that is perpendicular to the plane of the belt, its rubber covered shell and tapered ends (Figure 5) helps actuate the trainer belt immediately as the belt moves off centre. It does not wait, like conventional trainers, for the conveyor belt to walk over to 90° sensor rollers and then have the belt react.

Sprains and twists

Ergonomics contributes to 15% of work related injuries in the form of sprains and twists. ASGCO's modular Impact Cradle Beds (Figure 6) slide out from the side in segments, making them easier to handle and requiring both less time and fewer people to service. Since the average cost to an employer for these type of injuries is US$13 000 according to government statistics, safety pays for the company, as well as the maintenance worker who expects to go home and enjoy his family. WC