

Aaron Gibbs, ASGCO, USA, discusses improvements and maintenance to belt conveyors that can help reduce total cost of ownership and improve safety.

SAFETY BY DESIGN

We continue to see more stringent regulations in the bulk material handling industry. Air quality, house-keeping requirements, spillage control and safety continue to influence the need for cutting edge technologies to maintain and increase production requirements. For port facilities, whether deepwater ports or inland waterways, 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 marine environments at port facilities and bulk loading terminals, helping clients to focus on their primary purpose of moving cargo to global markets.

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 dry bulk handling facilities. To illustrate some of the solutions recently provided by ASGCO, this article will focus on identifying various problems along with discussion on the solutions provided, as well as the client's perspective on performance improvements.

Conveyor handling challenges

The goal at all bulk handling facilities is to get the cargo loaded as safely and efficiently as possible. Production rates must be met or improved. Demurrage is not an attractive option. Whether post panamax size vessels are used or river barges are being loaded, the goal remains the same.

Common problems are fugitive materials and rust. Fugitive materials can come from many sources in a

belt conveyor operation. One source of fugitive materials 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 in a marine



Figure 1. A Skalper with E-Z Torque® tensioner installed on the head pulley for maximum belt cleaning performance.



Figure 2. The tail pulley is buried in material.



Figure 3. Ordinary training idler tied off with a rope causing material build up on the support frame work and belt edge damage from friction and pressure.

environment, 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 construction eliminate the rust issue, but 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, as shown in Figure 1 (which was taken at a major North American port facility).

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 house-keeping 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 dry bulk 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 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 fatalities 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 rate their belt modulus at 1 – 1/2 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 man 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 bulk material was where it belonged: on the belt.

Moving forward

In the world of bulk material 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 that additional measures 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, the result is fugitive material ending up on the ground, along the walkways or in the water. There is new technology that the company is providing to aid in belt tracking to ensure that the corrective measures take place quickly, effectively and safely. The ASGCO Tru-Trainer patented system is now employed at many port facilities and terminals 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 bulk handling conveyor system. A device in use that shortens the life of the conveyor belt carries an economic penalty for the owner of the 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 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 bulk handling 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 3). 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. A particular 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 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.

ASGCO continues to provide innovative and proven technologies to the dry bulk industry. Production can be improved safely, and safety improves the bottom line. **DB**



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