



Train and *Maintain*

AARON GIBBS, ASGCO MANUFACTURING INC., US, DISCUSSES BULK CONVEYOR MATERIAL HANDLING TRAINING, MAINTENANCE AND DESIGN.

In today's fast-paced world, society and industry are in a constant state of change. Asset optimisation has never been more critical in everyday activities at home and at work.

Conveyors are the lifeline to any coal-fired power plant's productivity. Consistent training, knowledgeable instruction and reliable services on the latest technologies in the bulk material conveyor industry will ensure an incident and injury free workplace, while maintaining a productive, reliable workforce. All of these are essential to any material handling system and the

employees who maintain and are responsible for them.

ASGCO has just completed its third year of Conveyor Training 101 classes with over 50 companies from seven countries. A total of over 200 people have attended, ranging from plant maintenance mechanics to mine superintendents, engineering firms to distributor salesmen. In the two day "hands-on" class, each team spends the morning in a classroom discussing the most common conveyor problems and safety issues, such as mistracking, spillage and dust, and the effects they can have on a conveyor system's

productivity. The remainder of the day is spent in the conveyor training room, installing components on a full size working conveyor. Experienced staff will show the group the basics of conveyor components and the ease of installing and maintaining ASGCO conveyor components to maximise overall conveyor efficiency and safety. The training course can be developed to meet particular conveyor needs.

The training programme focuses on proper conveyor maintenance, conveyor belt tracking, conveyor safety, and transfer point design and engineering.



3-DEM™ designed transfer chute on a bi-directional coal yard belt at a major power plant.

- Plough or scraper in front of tail pulley: is it operational?
- Conveyor guards: are they compliant?
- Conveyor belt:
 - Tracking properly?
 - Splice condition?
 - Cover condition?

The preceding list should be used as a guide when inspecting the conveyor while empty. Numerous items in this list contain the words “clean” or “operational”. Cleanliness is key to any efficient conveyor system. Pulleys or idlers that have buildup on them will cause tracking problems, as will pulleys that have some of the rubber lagging worn off. Scrapers, ploughs and self-trainers must be operational to perform their tasks. Belt damage, pulley damage and tracking problems will result if these accessory pieces of hardware are not maintained.

Belt running empty

The conveyor should be turned on and run empty. The purpose of this is to walk the conveyor, while running empty, to check for any tracking problems. Before any adjustments are made to correct a tracking problem, the system will need to be inspected under running conditions when loaded, because empty belts and

loaded belts do not necessarily track the same way.

Belt running loaded

The next step in the inspection process is to run the belt in a loaded condition. The preceding list should be used as a guide when inspecting the conveyor while it is running and to make notes of any changes.

Maintaining a clean system is very important. A conveyor system with carry back on the return side is the single biggest reason that conveyor belts, return idlers and pulleys are replaced and structure is worn through. Material buildup on the belt and hardware causes tracking problems that will lead to edge damage, which in turn leads to belt and idler replacement. It is important to use scrapers on the head pulley and ploughs in front of the tail pulley to prevent damage in maintenance planning.

A dual or multiple scraper system on the head pulley is the most common way to eliminate product carry back. A water spray on the belt cover along with scraper blades will effectively remove most products from sticking to the cover. Belt wash boxes are also an effective fully contained system to help in the reduction of carry back.


Product buildup on return side pulleys is a major concern. If a belt is not

effectively clean on the return run, then any bend pulleys or head snub pulleys that come into contact with the carry side of the belt will accumulate product. All return side pulleys that come in contact with the carry cover can be lagged with soft rubber vulcanised to the pulley. The constant flexing action of the soft lagging will cause material to fall off and reduce accumulation. Ceramic lagging is also used in many mining applications on the snub and bend pulleys because of its excellent wear characteristics in contrast to rubber lagging.

Another major component of the conveyor running efficiently is to ensure the conveyor belt is tracking properly, especially before it comes around the tail pulley and through the load zone. Off-centre loading due to the belt not tracking properly causes material spillage in the loading section, as well as mistracking of the conveyor belt on the entire troughing side of the system.

Conveyor transfer point design

ASGCO provides complete transfer point design using 3-DEM™ chute and transfer point design software. This software integrates computer aided design (CAD) and Discrete Element Methods (DEM) as a design tool to increase the efficiencies of conveyor bulk material handling transfer points. 3-DEM is a revolutionary way to handle granular and particulate material problems through computer simulation. Combined with years of bulk material handling knowledge, the company can provide a virtually dustless transfer point, while ensuring productivity.

The new chute/transfer point can incorporate a new adjustable material deflector or hood insert, or a complete remodelling of the entire top and bottom of the transfer point. The head chute or hood will direct the material down through a lower spoon section, in the same direction of belt travel and centered on the belt. The adjustable spoon bottom chute ensures that the material is soft loaded at approximately the same speed as the receiving conveyor, as well as designed to eliminate any flow restrictions that would cause the potential for buildup. 

Conveyor belt maintenance

Conveyor belt maintenance includes not only proper care of the belt itself but also care and maintenance of the frame and accessories. The first step in the process is to design an inspection form to encompass all aspects of each conveyor.

Belt shut down and empty

The conveyor belt must be inspected when the system is shut down and

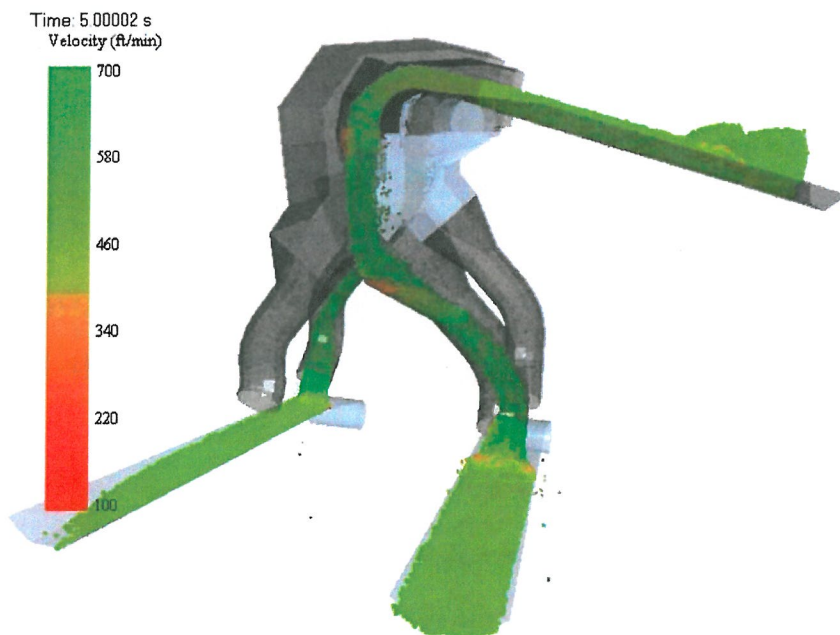
empty. This allows the opportunity to check for any damage to the belt, splice and all components on the system. The conveyor should be locked out and tagged out while making this inspection or when conducting any maintenance work on the conveyor system. Rubber belt damage should be repaired using the hot vulcanised repair method or the cold vulcanised repair method. Mechanical splices should only ever

be used as an emergency fix and not as a long-term solution. Belt fabrics that are exposed to the weather or to product contamination should be properly cleaned, dried and then covered with new rubber. These repairs are critical to prevent moisture from penetrating the belt and breaking down the cover adhesions and to prevent product contamination from abrading the carcass and breaking down the adhesions. The splice can also be inspected and, if damage is visible, it is suggested that it be repaired or replaced. This is also a good time to walk the conveyor and check the following components:



Inspecting the return side of the conveyor system.

- Tail pulley:
 - Is it free from buildup and trapped material?
 - Is it damaged?
 - Is the conveyor belt centered over tail pulley?
- Skirting in the loading area.
- Impact bed or impact idler damage.
- Slider bed: is it clean and smooth?
- Carrying side idler damage.
- Carrying side self trainers: are they operational and not tied off?
- Secondary loading stations:
 - Skirting.
 - Impact bed or impact idler damage.
- Tripper frame damage.
- Tripper discharge pulley: is it clean?
- Tripper bend pulleys: are they clean?
- Head pulley and/or drive pulley:
 - Is it clean?
 - Check for worn lagging.
 - Re-lag drive pulley if rubber is old, worn, smooth and hard.
- Head pulley cleaner or scraper: is it operational?
- Head pulley snub: is it clean?
- Return idlers: are they clean and turning freely?
- Bend pulleys: are they clean?
- Take-up: is it clean?
- Return side self trainers: are they operational and not tied off?
- Damage to return side frame due to mistracking.



3-DEM™ simulation of the new transfer point.