

MODERN MINING

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BRELKO 
CONVEYOR PRODUCTS

Conveyor Dust and Spillage: The Importance of Skirtboard Sealing Systems

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Bulk material handling solutions provider, Martin Engineering, designs products around safety, to promote an efficient and clean working environment. Part of this is manufacturing properly sealed conveyor chutes for bulk handling. Latest innovations from the company are the ApronSeal™ Double Skirting for extra sealing in high dust environments and a self-adjusting skirting system with limited maintenance. This article explains some of the issues the older designs experienced; how a sealed environment improves workplace safety; and how skirting can reduce labour costs for cleanup, in turn, lowering the cost of operation.

When tons of transferred bulk material hit a moving belt, three things happen: fines scatter, cargo shifts as it settles and dust becomes airborne. The impact can create turbulent air that seeks the easiest escape from any gap it can find, carrying dust and fines with it. These gaps generally appear on the sides of the enclosure between the chute wall and the belt, and skirting systems address the challenge of containing fugitive dust and spillage.

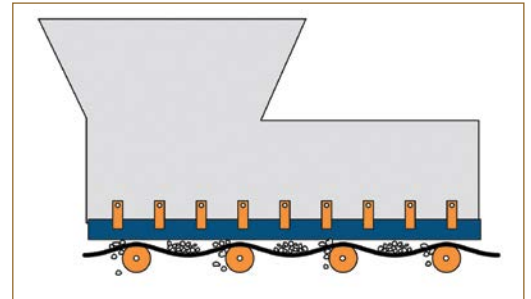
What is a Skirtboard Sealing System?

Usually made from natural or SBR rubber (or specialty formulations for specific applications such as underground mining, food, etc.), the skirting extends down the entire length of the transition enclosure and is generally tapered at the bottom to match the

ApronSeal™ Double Skirting offers a dual seal and can be flipped for extended equipment life.



feature



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Gaps, spillage and entrapment are not always apparent to the naked eye.

trough angle of the belt. It is intended to maintain a seal on the enclosure and help trap any fine particles and dust that are not contained by the wear liners and chute wall.

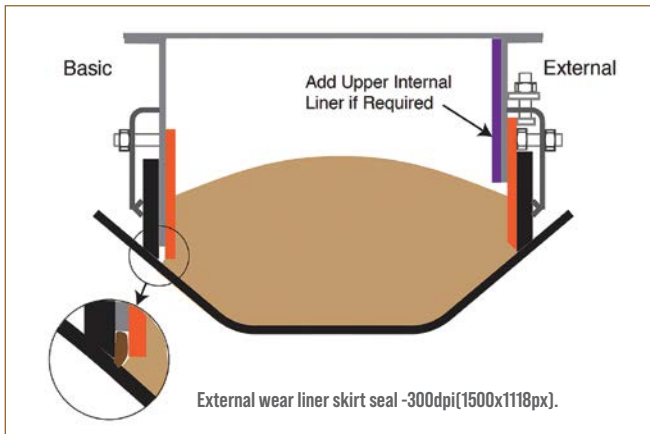
Skirting issues

As the skirt edge loses its seal, gaps are created, which allow material to become entrapped in a 'pinch point'. This causes abrasion that gouges or chafes the surface of the belt down its entire length. Some of the major issues surrounding entrapment include scalloping, when wedged material causes excessive wear, and grooves, where debris collects under the skirt causing friction damage. Regardless of the belt tension, belt sag will create a space for the fugitive dust to escape or for material to become entrapped [see Figure 1]. This is avoided by retrofitting a skirt sealing system, with impact cradles or edge support, rather than rollers in the loading zone.

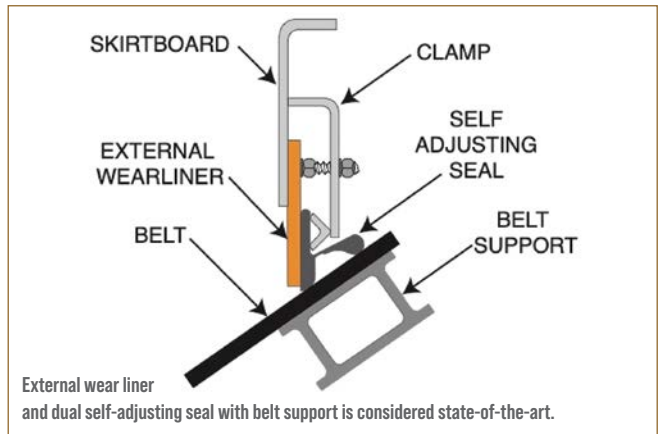
Proper enclosure configuration

Wear liners are typically welded to the inside of the chute wall with the skirtboard attached on the outside using an adjustable clamp system. However, the internal design [Figure 2] can allow some material buildup in the gap between the wear liner and the skirtboard, depending on the size of the aggregate.

External wear liner and skirting configurations place both pieces of equipment outside the chute wall [Figure 3]. Placing the skirt seal and wear liner outside of the chute makes it easier for workers to



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Dust and spillage clog idlers, requiring them to be replaced and raising the cost of operation.

perform adjustments safely. The result is a better seal on the belt and less material entrapment.

Self-adjusting skirting automatically maintains a seal, as the belt path fluctuates due to its design, without the need for adjustment and only periodic inspection. A low-profile skirting assembly should need only 6 in. (152 mm) of clearance for installation and maintenance in small spaces.

Skirting best practices

Since skirts are wear parts, it is important that they are easily installed, adjusted, maintained and replaced to avoid dust and spillage, mitigate downtime, improve workplace safety and reduce the cost of operation. Managers contemplating a capital investment in a skirting and wear liner system should consider:

- ❑ Hiring an outside engineer to design the best system for the application.
- ❑ Installing equipment that features external maintenance.
- ❑ Utilising a skirting strip that extends the entire length of the chute to avoid seams.
- ❑ Choosing skirting material that is free of fabrics, with a lower abrasion resistance than the belt.
- ❑ Installing a self-adjusting system.
- ❑ Choosing the option with the least worker exposure to equipment hazards.

Case Study – Grain Terminal in Brazil Reduces Dust

The Port of Santos in São Paulo is the busiest in Latin America. Operating at Terminal 26, T-Grão manages the import and export of over 3.6 million mt/y of malt, wheat, soy, and maize. Transfer points at T-Grão range between 32-50 feet (10-15 m) in height. The fugitive emissions affected air quality and visibility in the immediate work areas, forcing personnel to wear protective masks when working around any part of the conveyor system. The dust often travelled beyond the site line, sparking complaints. Prior to the chute upgrade, a cleaning crew of 45 workers spent ~24 hours per month on dust and spillage cleanup.

Martin Engineering technicians constructed a longer sealed enclosure with the ability to control airflow and give dust extra space to settle. They added several other critical components, including an external dual seal skirtboard and wear liner system. Impact cradles and slider cradles replaced the idlers to seal gaps in the chute.

Operators immediately observed significant results. As material moved through the system, particulates remained within the enclosure and either collected in the dust bags or settled back into the cargo flow. After a lengthy observation period, operators reported that there had been less downtime for cleanup and maintenance, and improved workplace safety.

By installing modern skirtboards that prevent fugitive material from leaving the loading chute, operators can reduce worker exposure to hazards, minimise labour for maintenance and cleanup, improve equipment and belt life and achieve better compliance. The savings on labour and operating costs alone provide a sound return on investment, but the improvement to workplace safety should be the only motivation needed. ■



The new loading zone featured a sealing system that mitigated spillage and dust supported by dust bags.