

# Australian Mining safetowork

THE FIRST PRIORITY FOR AUSTRALIA'S MINING INDUSTRY

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## Protect your people

*Ensuring the safe handling  
of mining material*

OFFICIAL MEDIA PARTNERS



Material handling ▲ Workplace culture ▲ Fire suppression

## From the outside

MARTIN ENGINEERING BREAKS DOWN ELIMINATING CHUTE ENTRY WITH AN EXTERNAL WEAR LINER.

**T**he wear liner on a belt conveyor transfer point is essentially considered a sacrificial layer.

Removal and replacement is a gruelling job that could require multiple workers and days of scheduled downtime. Conventional wear liners have historically been installed inside the chute, but modern

designs are placed on the outside, improving skirtboard sealing and preventing spillage.

The *Confined spaces code of practice*, an approved code under section 274 of Australia's *Work Health and Safety Act* of 2011, is explicit regarding the dangers of confined spaces, mandating that an "authorised entrant" perform work inside the

chute. An attendant must also stand outside to monitor the safety of the person inside while assisting in the removal of material from the chute. In some cases, a supervisor further oversees the procedure.

The goal of the external design is to significantly cut installation and service time while reducing risk and improving safety. The result is excellent performance with fewer labour hours, no certification for maintenance requirement, and a lower cost of operation.

### RETHINKING CHUTE DESIGN

Previous designs securely welded the wear liner to the inside of the chute, with only the skirt seal located on the outside. The logic behind this conventional design is for the wear liner to protect the skirtboard, which is typically 0.63cm sheet metal and not strong enough to withstand the sustained force and abrasion from bulk material.

Martin Engineering designers instead came up with the idea of raising the chute work about 10.16cm above the belt, out of the way of the material, then putting the wear liner on the outside.

This approach means the material still hits the liner and doesn't damage the chute.

After elevating the chute box above the material flow, a 0.95cm or 1.27cm abrasion-resistant liner plate (AR500) is mounted on the outside of the chute, followed by the skirt seal.

Mounting brackets with jackscrews provides a tight hold, with precision adjustment of the wear liner to reduce spillage. This system closes the gap between the liner and the sealer, thus eliminating abrasion from trapped material without interfering with existing supports.

Images: Martin Engineering



Confined space entry can be very dangerous and requires a permit.

When accompanied by skirting and clamps, the system forms a tight belt seal, delivering outstanding fugitive material control.

### SAFER BY DESIGN

When a conventional wear liner loses its edge, the replacement procedure is what operators describe as an undesirable maintenance assignment. The authorised entrant would go into the chute with a grinder to remove the welds and the sacrificial liner, which may have required a torch to cut away existing material.

This can be extremely dangerous for two reasons.

Firstly, the liner can weigh more than 100kg, and when cut loose it can fall and endanger the people in the confined space of the chute.

Secondly, nearly any dust can be explosive under the right conditions, and having to grind or torch-cut the old liner introduces a spark or open flame. Some companies thoroughly wash out the chute prior to entry to avoid any chance of combustible particulates, making the job even more time-consuming.

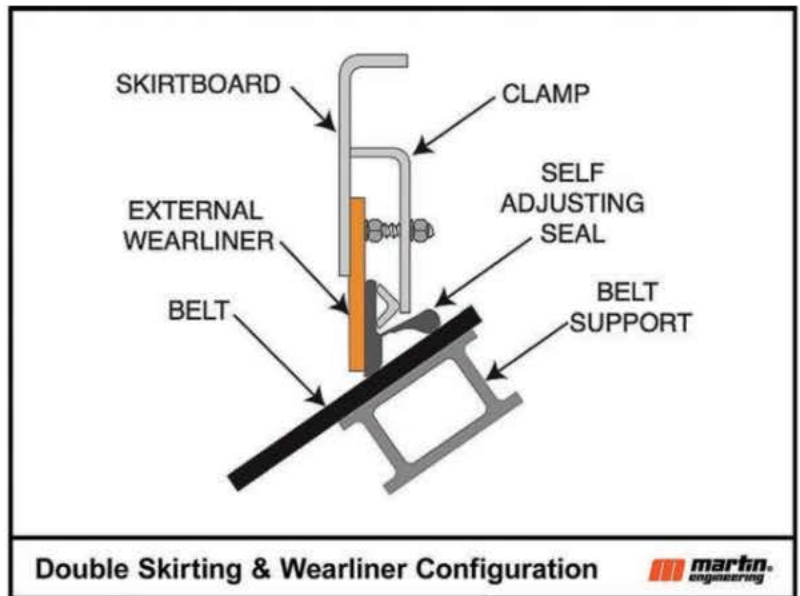
An external liner can be installed and adjusted faster and easier, without the need for a grinder or torch, through the use of special mounting tabs.

Clips for bolting the liner are initially welded in place but do not require removal when the liner wears out. Since work is done from the outside, without any grinding sparks or torch flame, the hazard of explosive dust from tool usage is greatly reduced.

Replacement liners come in a standard length of 182.9cm and Martin Engineering uses laser cutting technology to create the complex geometries necessary for a custom fit.

The new liner is easily retrofitted onto existing equipment – installers simply cut back the chute wall to accommodate the external wear liner.

On new installations, the chute is easily engineered to work with the new liner design, as well as other Martin Engineering components such as dust curtains, track-mounted idlers and cradles.



**Double Skirting & Wearliner Configuration**  
The external wear liner and skirting system improve safety, maintenance costs and equipment life.

### CASE STUDY

An ArcelorMittal port terminal in the US state of Indiana was experiencing excessive spillage, tail-pulley fouling and belt tracking issues with a petroleum coke transfer point on the stacker/reclaimer boom conveyor.

Material spilled from the sides of the chute and piled onto the floor, creating a hazard that required workers to be reassigned from other

duties several times per month to clean, increasing labour costs. Moreover, the spillage was getting onto the return side of the belt and fouling the tail pulley, causing loading and tracking issues.

Operators attempted to remedy the situation by having a new transfer chute built.

However, once installed, operators realised the problem was not with the



vertical chute but the loading zone and settling zone equipment. These were onerous and time-consuming to service, requiring a maintenance team with confined space entry permits, extending downtime and diverting staff from other tasks.

The managers invited Martin Engineering to examine the issue and offer solutions. After conducting a thorough 'walk the belt' procedure, technicians installed external wear liners, ApronSeal double skirting HD (heavy-duty), Trac-Mount idlers, upper and lower trackers, and a V-plow.

The wear liner protects the chute wall against punishing material, as the double skirting forms a seal that rides lightly on the belt, keeping fines from escaping. The wear liners and skirts are externally mounted for safe and easy maintenance, with no confined space entry required.

To retain a true belt path, technicians installed upper and lower tracking technology and 35° idlers that slide out for faster one-person maintenance. To protect the tail pulley, a V-plow was installed to deflect fugitive material on the belt return.

Three Martin technicians and six contractors completed the installation project over two shifts (12 hours and 14 hours). The chute was tested several times and adjusted until the proper trough angle and belt seal were achieved.

After several boatloads, the customer reported that "not a single pellet has hit the deck".

Along with a near-complete elimination of spillage, operators said the tracking issues were resolved and the tail pulley has had no incidents of fouling from return side debris.

Retrofitting the transfer chute with updated equipment improves system performance with no required certification for maintenance, which reduces the number of workers and hours to replace and service, in turn lowering the cost of operation. **E**



Dual skirting design runs the length of the chute and can be flipped for extended life.



Mechanical air cleaners are low maintenance and improve the air quality around the system.