



Case study

Wireless real-time liner wear monitoring improves productivity, safety and profitability

WearSense™ enables real-time condition-based liner wear management and intelligence.

A common asset maintenance problem across the mining and metals industry is the predictive maintenance of wear liners. Traditionally, the erosion of wear liners could only be measured by ultrasonic thickness measurement or by manual inspection during shutdowns – a costly process in terms of lost production, inventory cost and worker safety risk.

Customer examples – manual maintenance costly and inefficient

Sometimes the issue is the type of liner material or how it is used. In one example, a Metso Outotec customer had issues with holes being worn in their train load-out chutes. Due to the location of the chute the only way to assess liner wear was a shutdown and manual inspection, however the type of liner material being used also made it difficult to measure the liner thickness using conventional ultrasonic testing (UT).

For another customer, the chromium carbide wear liners in their coarse ore stockpile hoppers also prevented accurate thickness measurement ultrasonically. In one instance, they planned a liner changeout based on information from UT measurements only to discover that there was still more than 50% of the wear material remaining. Not only did this represent significant wastage in liner material and unnecessary costs associated with the shut required to replace the liner, but also a substantial loss in production from a shutdown that could have been delayed for at least a year.

Challenges

- Reliability of wear liner thickness measurement
- High shutdown costs and safety risks

Solutions

- Continuous wireless thickness measurement
- Predictive maintenance of wear liners

Benefits

- No manual inspections or ultrasonic testing
- Increased uptime and safety
- Reduced inventory costs

Real-time thickness measurement – no inspection required

A wear liner monitoring system that is reliable for all liner materials and designs, and that can provide continuous monitoring without shutdowns, can significantly reduce the costs and risks associated with wear liner maintenance.

The WearSense wear monitoring system can be fitted to all metallic and ceramic wear liner materials, anywhere and independent of the attachment system used.

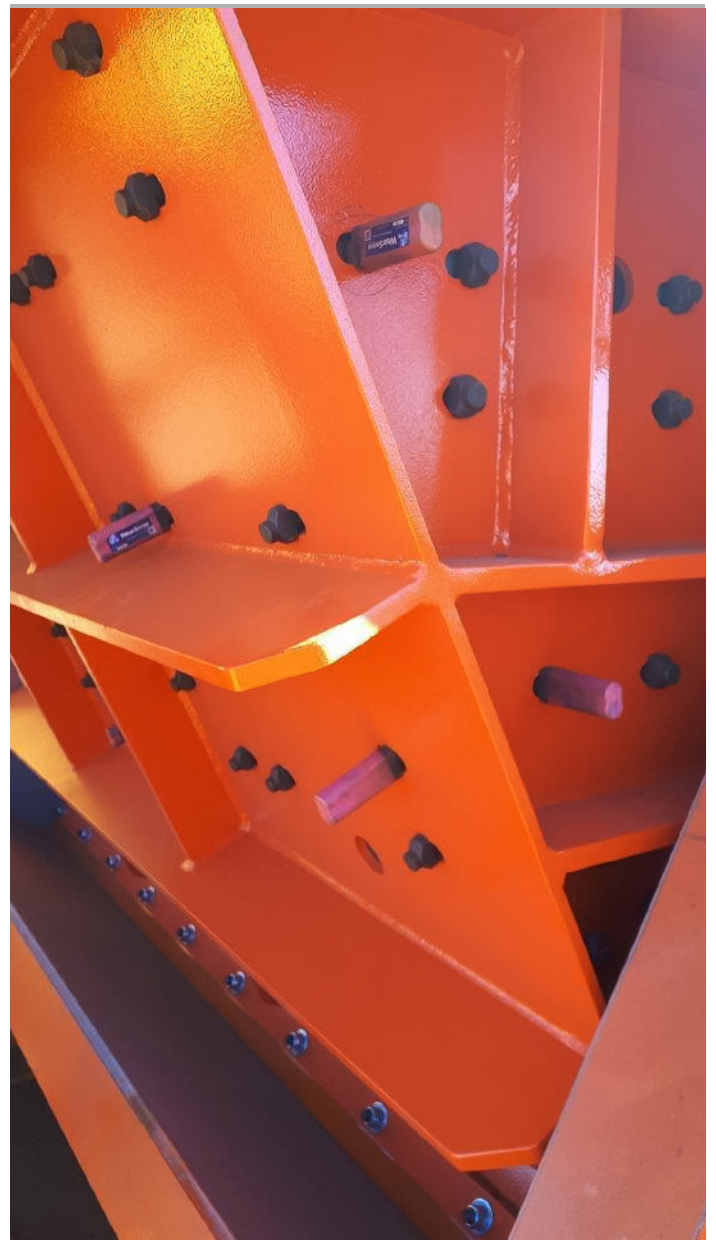
The system monitors liner wear in real time and provides prediction of the wear liner's remaining life. Being completely wireless and battery powered, the wear sensors are suitable for both mobile and fixed plant liner applications. The WearSense sensor is inserted through the liner to the wear surface, with data from the sensors wirelessly transmitted to a nearby receiver and gateway.

For wear liners that are secured using bolts that pass through the liner (such as tapered, or oval head bolts) it is also possible to incorporate the sensor probe directly into the fastening system, which can simplify the sensor installation even further. This approach is particularly effective when combined with the Metso Outotec proprietary Taper-T one-sided attachments, however it is flexible enough to be applied to any fastening system.

WearSense gives an indication of the current liner thickness at each sensor location. Alerts can be set based on remaining liner thickness, and both historical thickness and an estimate of future thickness can be visualised.

Reduced downtime, reduced labour cost, greater safety

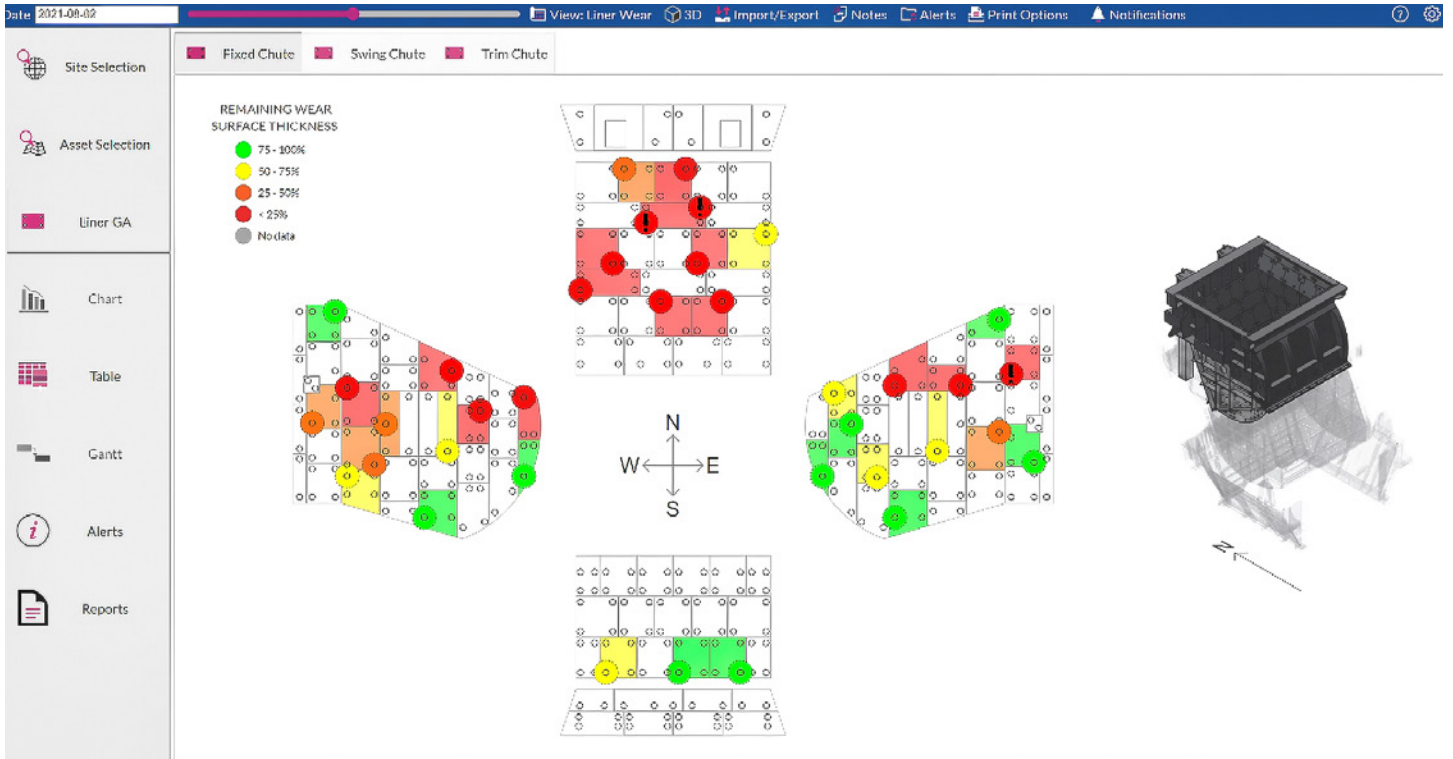
WearSense is designed to reduce maintenance downtime and labour costs by providing a real-time forecast of expected liner change-out timing, providing detailed information about problem areas that could cause delays or shutdowns. This enables accurate planning of shutdowns for wear liner maintenance, while also reducing inventory costs, and improving safety by reducing exposure to confined spaces, hot works, and working at height.



The train loadout chute prior to installation, showing the installed wear sensors

Wear sensor installed in a coarse ore stockpile





Screenshot from the WearSense web app showing the wear after the chute had been in service for some time.

Customer #1 – improved safety, reduced inventory

For the customer with the problem liners on its train load-out chutes, the WearSense system has enabled the company to monitor the liner thickness without needing to shut down production or conduct manual inspections. Removing the need for manual inspections has increased safety significantly, with no working at height or confined space access required. Information provided by WearSense enables the client to selectively change only the worn liners, which reduces inventory costs and minimises the shutdown duration.

Customer #2 – potential damage prevented

As part of a replacement liner package the second client installed a WearSense monitoring system to provide continuous thickness monitoring. The system allowed the company to start predicting the estimated end of life for the liner soon after it was installed. Accelerated wear was also identified – wear that was completely unforeseen based on the past liner performance. Using this information, the client was able to place an order for the long lead-time replacement liner and plan the shut well in advance. In this instance, the advanced warning provided by WearSense prevented potential damage to the underlying asset, which could have resulted in an unscheduled shut for remedial repairs while waiting on a replacement liner to be manufactured.

