

Erosion Monitoring of Buried Tailing Lines

In-service, erosion monitoring of buried pipeline infrastructure of a mining operation



Overview

A solution was sought to monitor erosion caused by ore tailings from a mining operation in South America.

The subsequent wall-loss has the potential to cause failures and loss of containment, resulting in lost productivity, and damage to nearby population and environment.

The operator suspected that the wall loss rate was not linear and so sought to collect data at increased frequency, between outages, to allow wall loss rate to be correlated with specific process conditions, without the cost and time of digging and exposing the buried pipes.

The Challenge

There were a number of challenges around the deployment which required a flexible monitoring solution.

- Monitoring of erosion events was required to link to process events up-stream to enact preventative measures and schedule repair.
- The expense in exposing and inspecting the buried sections of the tailing lines meant that traditional, hands-on inspection solutions were not viable.
- Robust sensors were required to be buried and accessed manually by survey teams, without the need to expose the tailing lines themselves.



The Solution

- 38 HotSense™ DE sensors were installed using integrated high-strength magnetic fixings, along with epoxy coupling, for a robust and low-profile deployment.
- HotSense™ DE sensors were chosen due to their low-cost, high-accuracy and precision measurements to allow for reliable erosion trending.
- HotSense™ sensors were paired with Ionix Measurement Hubs at ~100m intervals to allow quick and simple measurements to be collected from easy-to-access connection points. The data from the Measurement Hubs was collected using commercially available thickness gauges.
- The sensors were composite wrapped for added protection and electrical isolation from the ground.



Execution

- The system solution was successfully deployed during a small excavation period, comprising 38 sensors across several kilometres of piping.
- The Measurement Hub is conveniently positioned on a 2-inch raised pole, up to 15m from the sensors. All cabling from the sensors and thermocouples will be routed through the raised pole and are terminated in the measurement hub enclosure. This is a simple and cost-effective means of acquiring measurement data therefore reducing time on site and therefore costs.
- By implementing our solution, clients can gather dependable and consistent data to support erosion management programs and risk-based inspection (RBI) while assets remain in service, eliminating the need for excavations. This approach enhances productivity, improves operational safety, and reduces operating costs.

Key deliverables

- Frequent, consistent and high-quality wall thickness data collection now enables the customer to **maximise availability and avoid the need to expose any buried lines – expected payback < 1 year.**
- Process and Production engineers have access to integrity data at key locations allowing **optimisation of erosion prevention strategies and process parameters** to be made, allowing profitable decisions to be made based on measurable data.
- Maintenance and Turnaround planners can make informed decisions on repair and replacement, **optimising maintenance project costs and planning.**

- Easily accessed Measurement Hubs enables wall thickness data to be collected as often as required from remote locations.
- Installation during a planned excavation run allowed benefits and savings to be realised immediately.

A – HotSense Dual Element Transducer
B – Thermocouple
C – Probe Sealing Kit
D – Pole Mount Enclosure
E – Sonowall Thickness Gauge & Thermocouple Reader (Not Pictured)
F – Data transfer to PC

