whitepaper

Improving structural integrity management in mining

Asset: Mining conveyor belt
Application: Digital Structural Integrity

Vale S.A is a Brazilian multinational mining company, and one of the largest mining companies in the world. Always concerned about how it's possible to bring more safety and reliability, Vale has invested in Open Innovation programs to search for high-end solutions to improve their processes.

Through an Open Innovation initiative, Vale launched the challenge of **Management and Control of Anticorrosive Protection in Ore Handling Assets**. The idea of the project was to start by making a POC (Proof of Concept), that relies on testing a solution in a short period of time. Therefore, the project was successfully concluded in just 3 months.
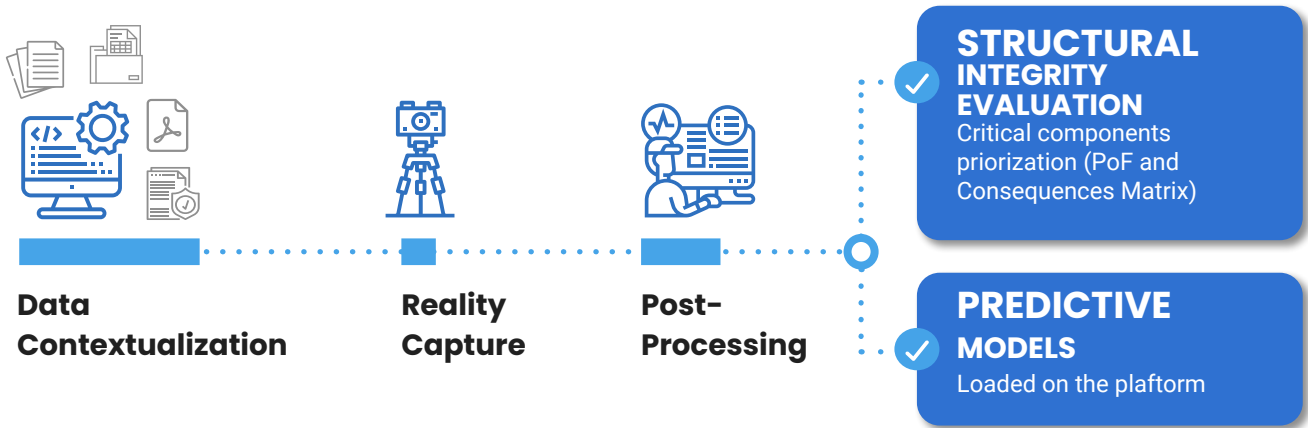
OBJECTIVES

- Control over the structural integrity and risk management by using predictive maintenance

- Operation relevant data centralization in one platform

- Budget forecast regarding inspection and maintenance activities

CHALLENGES

- Data diffused in multiple spreadsheets and documents, aggravated by decentralized information regarding structural integrity.

- Lack of historical data or data on the degradation state of the assets

- Necessity of people on the field to identify and classify anomalies, such as corrosion.

How the Digital Structural Integrity application was employed

STRUCTURAL INTEGRITY EVALUATION
Critical components priorization (PoF and Consequences Matrix)

PREDICTIVE MODELS
Loaded on the plaftorm

Data Contextualization

Reality Capture

Post-Processing

It started with the receipt of operational data, as 3D engineering models, technical drawings, documents and spreadsheets for structural management, treated and contextualized that data on the platform In less than 30 days.

Next an asset integrity specialist went to the field and conducted the reality capture, by collecting field photos.

Those images were processed by Vidya's AI Machine Vision, a technology that identifies and classifies structural anomalies automatically. This classification is customized according to the client's standards, and then they are validated by Vidya's engineering team.

As output, the system delivers dashboards and reports with information as **Affected area by corrosion and total area to be painted.**

All of the anomalies data is 100% mapped and tracked, since it is associated with their respective components on the asset.

Further it enables budget forecasting powered by Artificial Intelligence, being a cutting edge tool for accuracy and costs reduction on maintenance.

Besides, the Vidya team set up analytics models with:

Risk matrix information

Information regarding risk levels to evaluate the corrosion

CDS (Corrosion Degradation State) is an algorithm developed by Vidya that predicts corrosion degradation.

PROJECT RESULTS

○ **USD 1,000,000.00** **on Downtime production savings.**

By **reducing in 2 days the downtime** of the plant during the project, it was possible to avoid unexpected shutdowns due to the predictive maintenance and failure predictions.
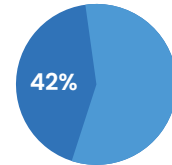
Instead of having to perform unplanned actions on the equipments, the team was able to properly plan the field works.

○ **86%** 👤👤👤👤👤👤👤👤 **reduction of people on the field**
Safety improvement and risk reduction

○ **75%**
Savings on time to reach information

75%
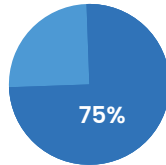
○ **42% M/H**
Reduction in Maintenance Planning

42%

○ **Reduction** of emergency maintenance purchases.

○ **Maintenance strategy** driven by data and machine learning