



# GRINDING CIRCUIT OPTIMISATION

Minera Centinela, Antofagasta, Chile

## PROJECT OBJECTIVE

IntelliSense.io was selected to optimise the operation of an energy-consuming Semi-Autogenous Grinding (SAG) milling process at Minera Centinela, part of Antofagasta Minerals, by delivering Industrial IoT technologies to provide a solution for optimising energy consumption.

## CHALLENGES

- Ore hardness increases as mines become deeper, which requires more energy to reduce the particle size.
- Harder ore types increase the energy needed to reduce the particle size required to adequately liberate enough of the valuable metal.
- An inefficient control of a SAG mill's internal charge impacts energy efficiency.
- Any increase in ore hardness decreases throughput, increases energy consumption and accelerates liner and grinding media wear rates.
- The Minera Centinela SAG mill is one of the largest in the world (40' diameter, 22,380kW power draw).
- The SAG mill consumes nearly 80 percent of the mine's total energy consumption.

## BENEFITS

- Increased downstream stability, recovery and throughput
- Real-time optimisation routines to reduce energy consumption
- Expected optimised liner wear rate
- Delivers a simulation environment to test optimal operational scenarios without disrupting production

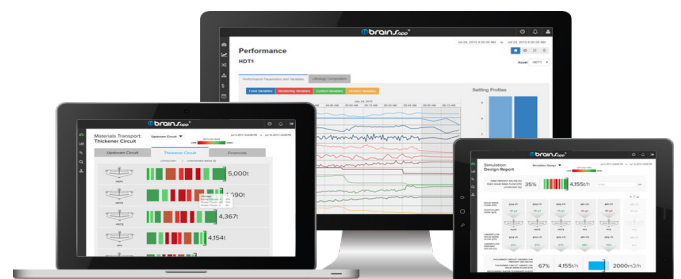


## INTELLISENSE.IO SOLUTION

**Sensors** - Measure and monitor the charge in the SAG in real time, by deploying innovative, robust, weather hardy acoustic sensors combined with power management techniques to maximise battery life. The new wireless charge sensor hardware uses state-of-the-art, energy harvesting technology ensuring long term battery life, which increases data reliability and reduces operational disruption.

**Simulation Software** - Live simulation of the SAG mill utilising existing operations and new sensor data delivers insights on the charge model properties and wear rate. The simulator is used to test the impact of process optimisation opportunities, resulting in the delivery of continuous optimisation. A variety of advanced statistical methods are used to identify patterns in process bottlenecks and deliver predictions on future system performance under various load conditions. The simulator allows operators to test set point changes offline to take the risk out of implementing.

**Optimisation Software** - A material model categorizes and tracks the material from geological models through transportation and blending. Financial metrics are correlated with the material model to determine optimal particle size distribution for recovery. Insights provide opportunity for proactive rescheduling to ensure continued operation at the maximum possible productivity and efficiency rates.



**NO CAPEX. NO SOFTWARE. JUST INSIGHT.**