

Optimising truck unloading at primary crushers

Customer

Located in northern Chile, 170 kilometres southeast of Antofagasta, BHP Escondida is one of the largest copper mines in the world. The mine faced challenges in optimising the unloading process of trucks at primary crushers. The goal was to increase operational efficiency, reduce unloading times, and improve overall productivity.

Challenge

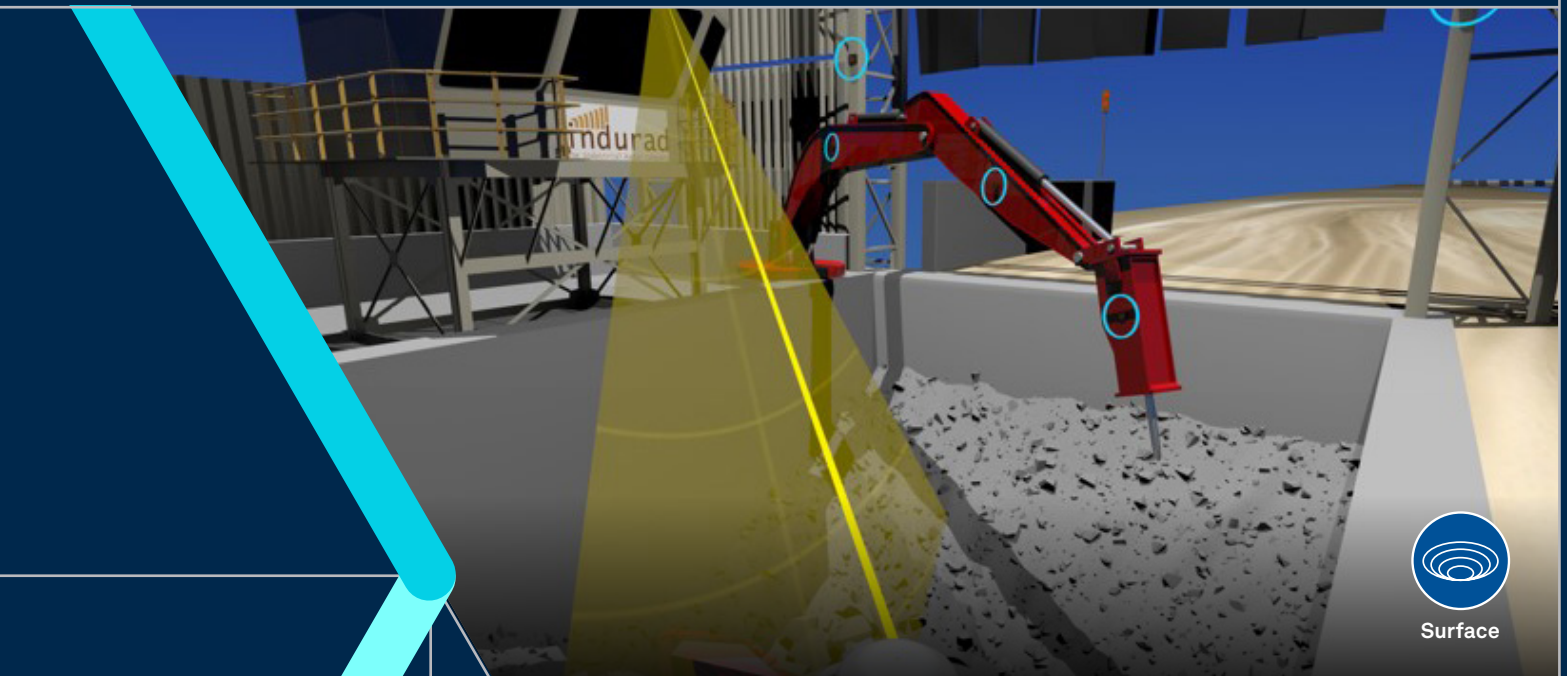
Located at 3,100 metres (10,200 feet) elevation, BHP Escondida faced several challenges, including ensuring the system's reliability in extreme environmental conditions. Minimising false positives of material jams (atollos) in the crusher bowl and maintaining continuous operation without interfering with the loading process were additional obstacles to overcome.

Working together, BHP and Hexagon set out to increase the effective operating time of the primary crusher while decreasing the discharge cycle of primary crushing trucks by automating the mine's traffic light system. By reducing dependence on the crushing operator, the mine hoped to increase primary crushing utilisation through more continuous feeding and to reduce the queuing time for unloading trucks.

Solution

The mine implemented Hexagon's iCrusher. The system works in parallel with operations without interfering with the loading process. The system includes:

- System calibration: Definition of zones and learning to ensure accurate operation
- Instrumentation: Designed for extreme environments (dust, rain, snow, fog) with on/off activation via an on-screen selector switch
- System validation: Observation and generation of a reliability index to ensure system accuracy



Results

By implementing the iCrusher, BHP Escondida saw significant improvements:

- 20% increase in truck unloading rate: Improved response time for the green light, allowing for faster unloading of trucks
- 5% additional benefit in trucks/hour: More accurate measurement and better utilisation of the crusher hopper
- Reduced maintenance: Continuous operation of the crusher and timely alarms for potential jams, reducing wear and tear on the equipment
- Increased safety: The system allowed operators to focus on other tasks, reducing the risk of accidents
- EBITDA increase: The implementation of the Automatic Unloading System in CH3 and CH5 resulted in an actual EBITDA of 14.8 million USD during FY21.
- Lower energy expenditure per tonne: Keeping the crusher operating at optimum levels by discharging just in time decreased energy consumption per tonne.
- Reduced maintenance costs: Continuous operation and intelligent unloading reduced maintenance requirements

The iCrusher at BHP Escondida successfully optimised truck unloading at primary crushers, leading to increased operational efficiency, reduced unloading times, and significant economic benefits. This project demonstrates BHP's commitment to leveraging technology to enhance productivity and safety in mining operations.

Excerpts within this case study were pulled from:

Caso de Exito: Descarga automatica de camiones en chancadores primarios (Success Story: Automatic truck unloading at primary crushers)

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