MINESENSE TECHNOLOGIES LTD.

A SHOVELSENSE CASE STUDY

About ShovelSense

ShovelSense technology helps mine operators route ore from waste and waste from ore on a bucket-to-bucket basis, with data that unlocks new intelligence about the orebody. Using a set of robust high-speed X-Ray fluorescence (HSXRF) sensors installed on cable and hydraulic shovels and front-end loaders, ShovelSense scans the mineral content of the bucket to assess the grade of the material within. The FMS is automatically notified in real-time to redirect loads to the mill or the waste dump. Valuable data collected by ShovelSense can be used to map orebodies at much higher resolution, increasing recovery, life-of-mine, and driving continuous improvement in efficiency, productivity, and sustainability.

MINESENSE HELPS THE COPPER MOUNTAIN MINE RECOVER MORE ORE AND PROGRESS TOWARD ENERGY EFFICIENCY GOALS

Copper Mountain Mine, British Columbia, Canada

Since installing the MineSense custom ShovelSense Solution on two shovels and a loader for less than 6 months in 2020, ShovelSense technology has helped Copper Mountain Mining recover 1,555 truck loads of economic copper ore from waste and reject 380 truck loads of non-economic waste rock saving over $4 million and reducing energy intensity per tonne of copper produced. In addition, the high-resolution grade and location data collected by ShovelSense has identified previously unmapped rich stringer veins.

Results

Ore from Waste

ShovelSense diverted and recovered 1,555 truck loads (~342,000 tonnes) of economic copper ore from waste at Copper Mountain Mine, saving C$3.6 million and improving ore recovery by 4%.

Waste from Ore

ShovelSense rejected 380 truck loads (~84,000 tonnes) of non-economic rock/waste rock at Copper Mountain Mine, saving C$440,000 and reducing dilution by 1%.

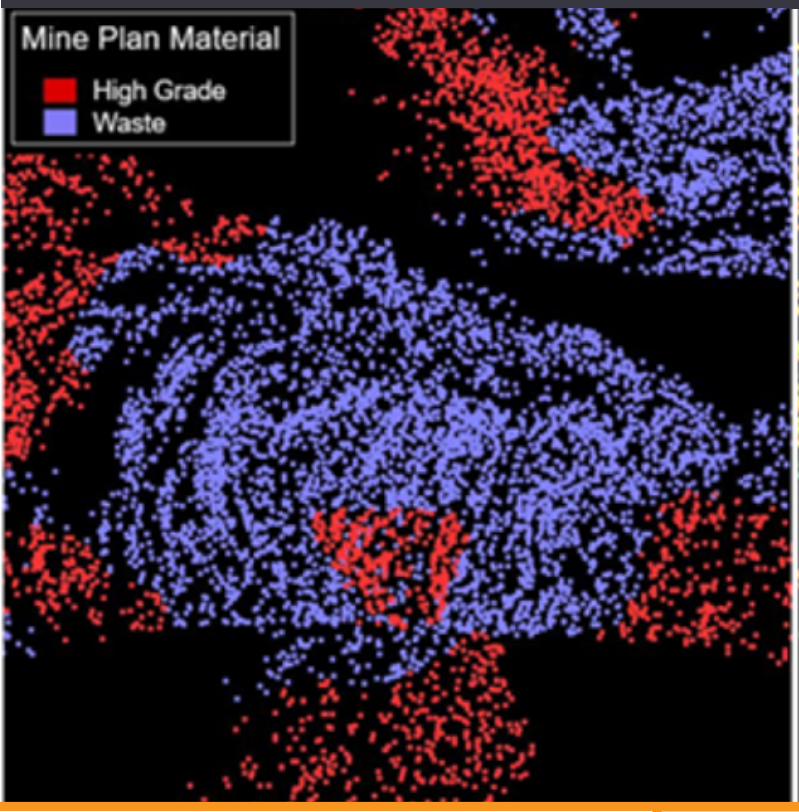
Energy Savings

ShovelSense reduced the energy intensity – the amount of energy per unit of copper – at Copper Mountain by reducing the volume of waste going through the mill.

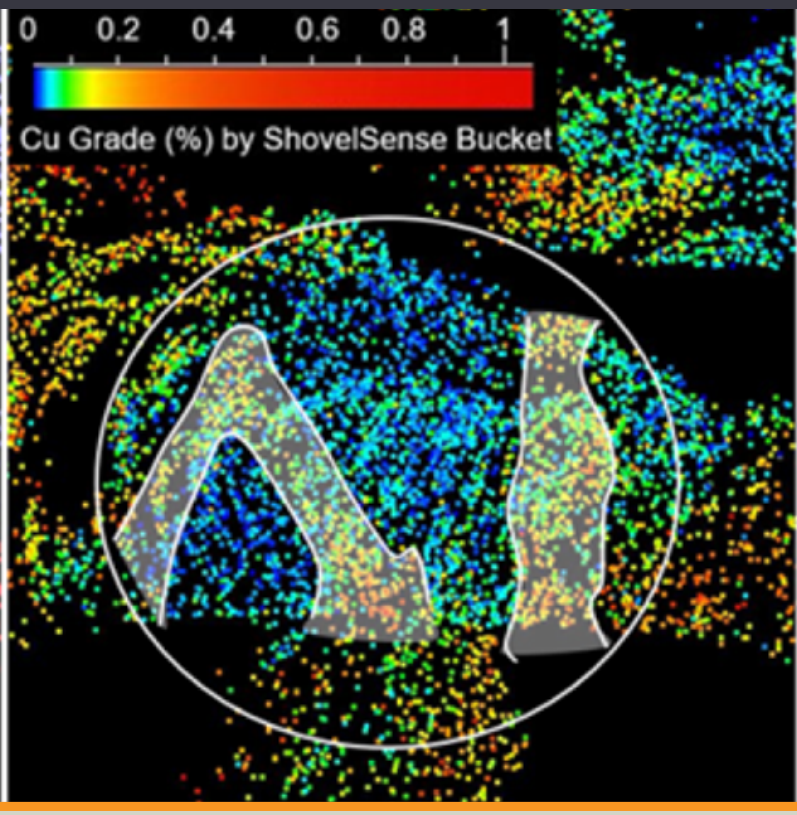
New Resources Identified

Modelling single bucket grades and locations revealed high-grade stringer veins not identified in the mine plan.

Mine Plan



Stringer Veins Identified



Challenge

Every orebody is unique. Copper Mountain is a structurally complex, alkalic porphyry copper-gold system mined since 1927 with over 30 years of mine life remaining. The ore body is well understood, but large blocks of rock 10x10 metres are labeled as 'ore' or 'waste' based only on widely spaced blast hole assays. Semi-vertical higher-grade stringer veins or barren dykes that cut through the orebody are either missed entirely or not adequately delineated by blast hole samples. In addition, blast movement can shift thousands of tonnes from waste to ore or ore to waste. This creates the need to understand the direction and size of the shift that can be capital and labour intensive. Currently this results in volumes of waste being sent to the mill and valuable ore to the waste dump, driving operating costs and energy intensity upward.

"Our partnership with MineSense is delivering value in many ways. The ShovelSense technology increases our energy and production efficiency with every bucket, and with that, our sustainability performance. The high-resolution data captured by MineSense feeds directly into our long-term mine planning and has improved our life of mine."

- Don Strickland, Chief Operating Officer, Copper Mountain Mining Corporation, June 2021

Solution

Copper Mountain, a conventional open-pit truck and shovel operation, partnered with Minesense for a trial to install the ShovelSense system on a Hitachi EX5500 shovel. Based on the successful trial data, Copper Mountain chose to install ShovelSense on two more machines, a Komatsu WA1200 loader and a Komatsu PC8000 loader. By the end of November 2020, all three systems were fully operational and generating valuable data at Copper Mountain.

"Where ShovelSense has really made an impact is in correcting blast shift..."

- Joe Hunter, Chief Mine Engineer, Copper Mountain Mining Corporation, May 2021

Benefits of the ShovelSense System

EFFICIENCY - Ore from waste and waste from ore

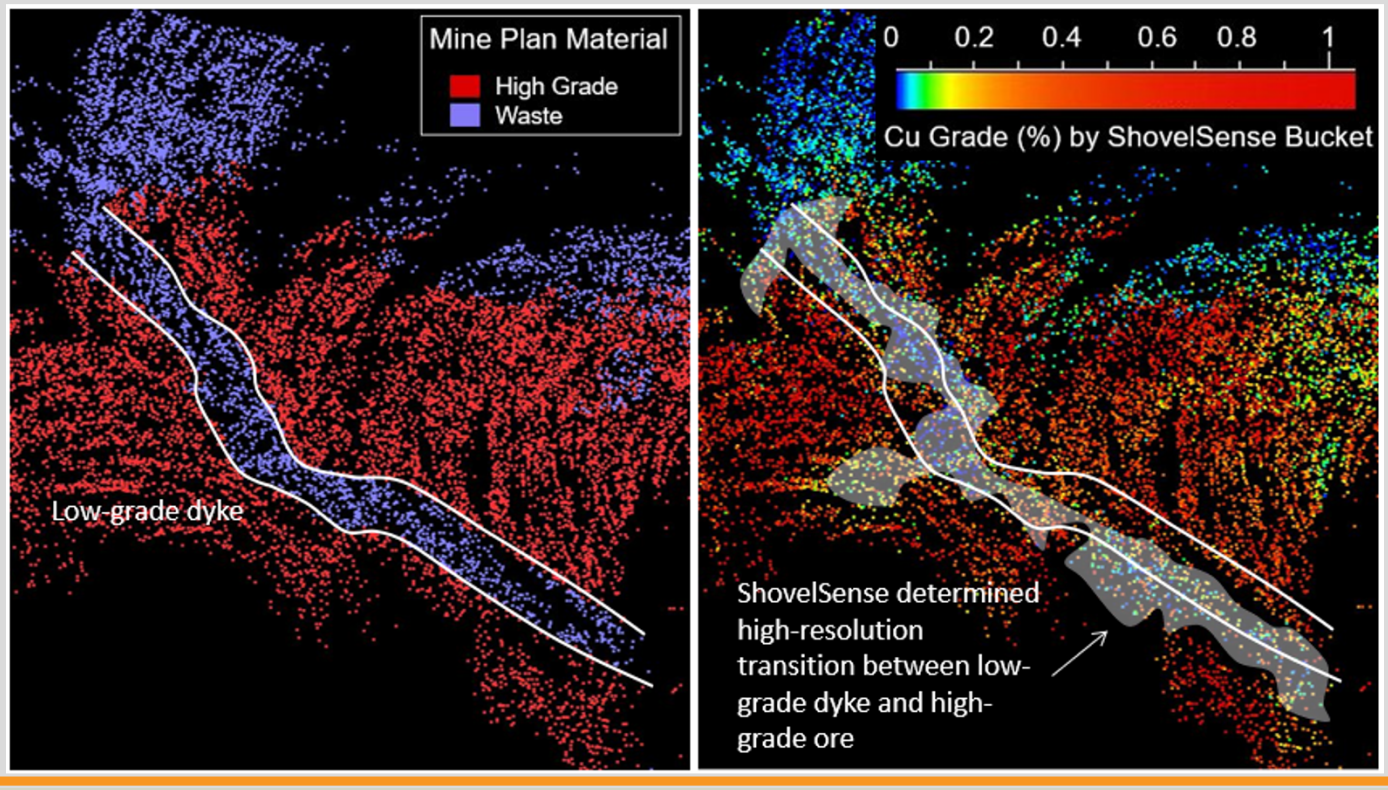
Real-time grade data integrated into the existing fleet management system that automatically diverts high-grade and waste trucks when ShovelSense grades deviate from the mine plan.

PROFIT - Ore feature visualization and value creation

Over time, high-resolution grade and bucket location data collected by ShovelSense has identified high-grade stringer veins that were not identified in the mine plan and mapped ore properties to improve mill performance. Modelling of bucket grades also reveals blast movement and internal dilution not accounted for in the mine plan. Grade data also identifies high grade ore within barren dykes.

SUSTAINABILITY - Increasing efficiency to improve sustainability performance

MineSense technologies are helping Copper Mountain Mine meet its Sustainability goals. With ShovelSense-supported ore sorting, the site uses fewer water and energy resources to extract and process each unit of copper.



About MineSense

MineSense Technologies is a pioneer in digital mining solutions, providing real-time ore and waste characterization and ore body knowledge for mines. With a fast, scalable, and robust mineral sensing platform, the System provides precise grade control and ore routing decisions at the point of extraction, maximizing resource conversion and metal recovery. MineSense creates transformational value by supporting sustainable performance in the reduction of water, energy and reagent use, while increasing revenue. Headquartered in Vancouver, Canada, with global commercial operations, MineSense services sites worldwide, offering support through its Field Services, Remote Monitoring, and Data Science teams.

Learn more at **www.minesense.com** Contact us at **info@minesense.com**