



Case Study

ICL Boulby upgrades Magnetic Separators with Bunting Overband Magnets

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ICL is making significant upgrades to their magnetic separators at their mine in North Yorkshire, England. The company has decided to replace an existing single air-cooled Overband Electromagnet with four modern ElectroMax Overband Magnets that have been designed and built by Bunting-Redditch.



ElectroMax Plus Overband Magnet

The ElectroMax Overband Magnets are a major improvement over the previous model, providing a more efficient and effective way to separate magnetic materials from non-magnetic materials. This upgrade will help ICL improve their mining operations, resulting in higher quality minerals and a more efficient production process.

Bunting-Redditch is a trusted and experienced provider of magnetic solutions, and their expertise in designing and building the ElectroMax Overband Magnets will ensure that ICL's upgrade is a success. With this upgrade, ICL is taking a proactive approach to improving their mining operations and ensuring that they

remain competitive in the marketplace.

ICL Boulby is the largest employer in the East Cleveland and the North York Moors National Park and will continue to be part of the region's economic and social landscape for decades to come. In 1968, ICL Boulby, then known as Cleveland Potash, started underground mining of potash and salt. By 2017, the mining company had mined 1 million tonnes of polyhalite at Boulby.



ElectroMax Plus with armoured belt

The project to upgrade the magnetic separators at Boulby started in May 2023 when Bunting's Technical Sales Engineer, Tom Higginbottom, undertook an onsite review of the existing installation. Material transported on three (3) feed conveyors converged onto one conveyor where the in-situ Overband Electromagnet, installed many years previously, was failing to capture some tramp ferrous metal including small bolts and heavy steel bars. The tramp metal damages processing equipment such as crushers and screens, resulting in significant repair costs and costly production downtime.

In operation, Overband Magnets sit over conveyors to magnetically attract and remove tramp ferrous metal from the mined material. A heavy-duty rubber belt rotates around two large pulleys mounted either side of the central electromagnetic block and transports captured ferrous metal away from the magnet face and into a separate collection area.

The underground location of the Overband Magnet meant that any replacement had to be air and not oil cooled. Even the switchgear had to be oil-free.

Bunting's applications engineers assessed the project and compared new designs of air-cooled Overband Magnets with the installed unit. At a suspension height of 450mm, the new Overbands would have over double the Gauss, the unit of measurement of magnetic induction, also known as magnetic flux density.

However, the Force Density Factor, which relates to the rate of change in Gauss and the ability to lift a ferrous metal part, was over four (4) times higher.

Bunting's engineers concluded that the optimum solution was to install four (4) air-cooled ElectroMax-Plus Overband Magnets instead of a single large unit.

Three (3) of the ElectroMax-Plus Overband Magnets would remove tramp ferrous metal on the three (3) feed conveyors, with the fourth replacing the existing Overband where the conveyors merged the material into a single stream.

The suspension height of all four (4) ElectroMax-Plus Overband Magnets (model EMAX-X-140) is between 400 and 450mm across a 1400mm wide conveyor belt. Each Overband weighs 3.3 tonnes and measures 950mm long, 1641mm wide (with the motor to drive the self-cleaning belt), and 764mm high. The ElectroMax Overband Magnets also feature bearing rotation sensors, belt tracking switches, and bespoke guarding.

“Working closely with the engineering team at ICL Boulby and understanding the application and installation was the key to determining the best solution,” explained Tom Higginbottom, Bunting’s Technical Sales Manager.

The order for all four (4) ElectroMax Overband Magnets was placed in September 2023 with delivery agreed for January 2024.