Owner various mining companies in the USA and Canada
DSI Unit DSI Ground Support Inc., Salt Lake City, UT, USA
DSI Scope Development of a highly corrosion resistant coating for the Omega Bolt ®

Development of Corrosion Protection for Omega Bolt ®

R&D Activities in Northern America

The Omega Bolt ® is a relatively new product for mining and tunneling. The tubular anchor is named after the Greek letter "Omega", which it closely resembles in shape. A longitudinally welded steel tube is "roll-formed" into the shape of an Omega during production and then sealed at both ends with welded-on ferrules.

During installation, the Omega Bolt ® is inserted into the pre-drilled and cleaned borehole. Afterwards, water is pumped at high pressure into the interior cavity through the inflation ferrule. The hydrodynamic pressure of the water causes an expansion of the anchor. The Omega Bolt ® deforms to match the irregular shape of the borehole. After installation is complete, the deformed bolt maintains its installation pressure on the rock surface providing rock mass compression or ground support.

The Omega Bolt ® System combines rapid bolt installation with high strength capacity. Due to their flexibility of deformation, Omega Bolt ®s are especially suited for use in seismically active mining regions or in highly fragmented ground because of their ability to link multiple weak strata layers together and to continually conform to the existing conditions of the installation ground.

The advantages of Omega Bolt ®s quickly convinced customers of their viability. However, customers had high requirements with regards to efficient corrosion protection in mines with difficult rock conditions. Following their customers' requirements, DSI Ground Support Inc. developed a special coating that serves as corrosion protection for the Omega Bolt ®.

The necessary deformation flexibility was a special challenge during the development of this coating. The coating had to be developed in such a way as not to form cracks during the expansion of the anchor during water injection. At the same time, the coating had to be thin enough to avoid an "over coating", e.g. to avoid the coating delaminating along the length during the expansion process.

In addition, the newly developed coating had to function in a variety of environments. DSI selected an epoxy based powder for acidic environments and a high zinc content for basic environments. The coating was baked on after being applied to the anchor. The result was a thin, strong and simultaneously elastic coating that insures adhesion during expansion due to installation pressure.

DSI Ground Support tested the performance of the new coating in several mines near Elko in the state of Nevada, USA. Mine owners in the test mines were excited by the new, efficient multipurpose corrosion protection. The thin coating does not interfere with installation and proved to be durable even when installed by industrial mining equipment. In addition, tests proved resistance to highly corrosive environments. Consequently, the high strength coating offers multi-purpose protection for the Omega Bolt ®.

All of the tests of the new coating for the Omega Bolt ® were carried out to the utmost satisfaction of the clients. As of today, the new Omega Bolt ® System with multi-purpose corrosion protection is available in all standard sizes.

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