Bisalloy Steels

Future Materials
Technology for Competitive Advantage

Reducing maintenance in a tough industry.

When the teeth of a giant earth-moving bucket bite into a stockpile of ore, every component of the bucket is subject to the stresses that come from grinding rock against steel. To reduce the risk of having to regularly replace the complete bucket due to wear, each bucket has replaceable parts, one of which is the bucket liner.

And it's just as well that they exist, because depending on the operating conditions (hardness of ore and moisture content) a liner can last for as little as 8 months. And bucket liners are expensive, with costs ranging from $25,000 to $50,000 (depending on size and type) not to mention costs associated with the maintenance downtime. The hard and fast rule of the mining business is 'time is money' and when millions of dollars are at stake nobody can afford unnecessary downtime for repairs and replacement.

To further understand the wear mechanism of their bucket liner materials and to compare them with fourteen competitors' products, Bisalloy approached Future Materials' facility at Central TAFE WA to conduct a series of wear tests. This is the only wear laboratory in Australia with equipment able to closely reproduce the actual operating environment in the materials handling aspect of the mining industry.

The advantage of wear tests is that instead of having to fit out a whole bucket and test various steels over a period of time, small samples can be compared quickly in a controlled environment. Also the tests can be conducted with the actual wear media that is in the field so iron ore is used if the bucket is going to an iron ore mine.

The Paddle Wear Test simulated impact and abrasive wear conditions under which both hardness and toughness are important factors for improving wear resistance. To understand this will not only help Bisalloy to improve their product quality in making wear plate with improved wear resistance, but will also assist their customers in material selection.

Bisalloy is confident that as a result of the knowledge gained from this test, expectations are that the life of bucket liners will be conservatively extended by a further 10%, with their newly developed high hardness and high toughness wear plate.

Paddle Test

The Paddle Tester is a 'medium impact & wear' testing machine employing a variety of abrasive materials from ores to well defined particles. Custom-formulated wear mediums are used to simulate the actual 'on-the-job' conditions as closely as possible.

The 20x20 mm square test specimens are affixed to the rotating paddles and subjected to low-to-medium impact and sliding abrasion. Visual comparative assessment of the specimens is performed. Volume loss and the materials science aspects of the specimens are assessed.

The test offers the advantage of comparative testing of different materials in the exact same environment under a range of impact velocities with a variety of wear mediums. It is useful for assessing wear resistance of materials used in low-to-medium impact and sliding abrasion conditions as well as for benchmarking.

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