

The Hazards of Heavy Lifting

DBS Canada repairs mobile mining gearbox for iron ore application

Matthew Jaster, Senior Editor



David Brown Santasalo's range of shovel and dragline transmissions for the mobile mining industry are available as complete assemblies or as replacement components.

A rope shovel is a bucket-equipped machine used for digging and loading earth or fragmented rock. Rope shovels are a type of rope/cable excavator, where the digging arm is controlled and powered by winches and steel ropes, rather than hydraulics. In mining applications, the rope shovel distributes materials such as iron ore into larger-than-life dump trucks. David Brown Santasalo (DBS) Canada delivers an extensive range of gear systems for shovels, draglines and other surface mining equipment.

Last year, DBS Canada's manufacturing facility in Montréal completed the repair of a mobile mining gearbox for a customer in the iron ore industry. This was a huge achievement for DBS Canada. The 27-ton gearbox required a complete refurbishment, consisting of new bronze bearings and roller bearings, renewed housing bores, new gears and pinions with DBS optimized geometry.

Heavy Mobile Equipment

"We're always focused on critical gearboxes," said Steven Bednarchuk, technical sales support, DBS Canada, "and we're well known for making really good gear repairs, for instance, on stacker reclaimers in the iron ore industry."

Bucket wheel reclaimers are large machines used in material handling, particularly in mining and bulk material storage. There are various types, including bridge-type and boom-type bucket wheel reclaimers, which are suited for different applications such as coal, iron ore and other bulk materials.

"These bucket wheel gear drives are very complex units, and our customers don't want to risk anything or cut corners when it comes to the quality and viability of the equipment," Bednarchuk said. "Since we have the capability to manufacture our own products and we're very meticulous about the tear-downs and analysis of our units, we have a very good nonreturn rate. The gearbox comes out of our facility almost brand new."

For Related Articles Search

off-highway

at geartechnology.com

The DBS Canada team gains a deeper understanding of these applications with each new project. “Our end goal is to ensure these repairs are done right the first time,” Bednarchuk said. “The equipment’s condition coming in for repair has proven that these markets have not been served very well for a long time. Many shortcuts were taking place—particularly in the gearboxes operating the boom on the rope shovels.”

Like many heavy industrial applications, weight distribution during assembly and disassembly remains a critical challenge. The weight of the large gears and components are removed/added 1 by 1, thus shifting the center of gravity/weight around of the crowd unit, making it dangerous to work on because it wants to tip over.

Meeting strict deadlines can also be a challenge in these industrial applications.

“A short timeframe is requested, but it’s in the customers best interest to make sure the gearbox rebuild or refurbish is done correctly,” Bednarchuk said. “We’re honest about what needs to be done within the gearbox system and the timeframe it may take. All the gears in this application, for example, needed to be replaced.”

Cracks that were detected within the enclosure by Non-Destructive Testing (NDT) were also restored. Once complete, DBS conducted a spin test performed with vibration analysis, to ensure the gearbox repair was delivered to the highest standards, ready to return to operating the electric rope shovel.

“Ultimately my emphasis was on quality. Also, the fact we were going to spin test the unit gave the customer additional protection. These were steps our customer did not receive in the past. Typically, the unit was simply put together, sent to the site and installed,” Bednarchuk said.

Without spin tests or vibration analysis, a mining customer could discover faults or anomalies after the installation resulting in weeks of additional downtime.

Enhanced Product Portfolio

David Brown acquired Unigear—based in Montreal—in 2012. Today, DBS Canada provides key gearbox services and support across several industries including mining, oil and gas, cement, metals, power generation, rail and more with an emphasis on quality, reliability and longevity.



The DBS Canada team responsible for rebuilding the rope shovel gearbox. Left to right: Kerolos Boulos, Paulo Rodrigues, Steven Bednarchuk, Patrick Morin and George Rodrigues.

The acquisition of Unigear provided David Brown with wider access to many of these strategic industry segments coupled with local capability to manufacture and service industrial gear products for the North American market. Thanks to a combination of customer relationships, experience, skills and precision gear manufacturing equipment, DBS Canada offers localized service and support throughout the region.

The company’s global work in heavy mobile equipment—particularly in areas like Chile and Australia have been extremely valuable for DBS Canada.

“They have all the drawings; all the technical knowledge and engineering support we need to better assist our customers here in Canada,” Bednarchuk said.

From Refurbish to Rebuild

Being a gear manufacturer, DBS has gear grinders on-site. “As these projects come into the shop and we find superficial micro-pitting on the gear teeth, we can kiss grind the gears and renew the integrity of the components. This can save our customers a lot of money,” Bednarchuk said.

“We invited the customer into the shop so they could better understand the repairs needed,” Bednarchuk said. “These gearboxes are known to be the weak link in the system because they work so hard in the application. Our focus on the project led to the customer sending us another high value gearbox for additional repair services.”

The Power of Predictive Maintenance

Everyone is banking on predictive maintenance and hoping to stay ahead of critical failures in mining, off-highway and processing applications.

Bednarchuk sees predictive maintenance, sensors and IIoT taking a much larger role in gearbox applications.

DBS has their own software for predictive maintenance, known as *GearWatch*. The software ensures the gearbox is running effectively and will warn the customer if something is not working correctly, signs of deterioration, etc. It measures, records and analyses data, reporting changes in measured parameters in real time, 24/7 via the internet. Not only does it measure changes within the gearbox, but it can also monitor a full range of equipment including motors, hydraulic systems and bearings.

Real time information transmission enables quick recognition of problems, meaning fast corrective action is taken before downtime occurs. The system is constantly observing process parameters and equipment operation online.

Labor shortage is everywhere. The future of gearbox production is going to be customers looking at drop-ins more than anything else, according to Bednarchuk.

“They want to eliminate the work onsite due to the lack of time, knowledge and available engineering expertise. This is the direction the industry is heading. These drop-in units where everything has been rebuilt and they’re simply plug and play. The customer can install the unit and not worry about it.”

dbsantasalo.com