New DC-AC wheel set upgrade modernizes aging mining trucks and increases fleet productivity

The challenge

Large-scale mining operations rely on haul trucks to move materials to each processing plant. Speed and reliability are essential to the mining industry, so operators have started adopting machinery using alternating current (AC) drive systems, as opposed to the more traditional direct current (DC) equipment.

For example, the Komatsu 830E, one of the most popular mining haul trucks in the industry, recently adopted an AC-powered drive system. The AC units are faster (40 mph compared to 25 mph) and more reliable in challenging conditions. Because they are faster, the haul trucks can deliver significantly more material in a single shift compared to the older units. The AC units are also more fuel efficient, reducing running costs.

However, maintaining these enormous vehicles requires large stocks of spare parts to ensure downtime is kept to a minimum. One of the largest single pieces is a complete wheel set. At a cost of over $1 million per set, they represent a considerable investment and the wait for a new set from the manufacturer can take over 12 months.

The solution

After years of refurbishing wheel sets for the mining industry, Sulzer engineers discovered the measurements of the 787 and GEB25 frames were very similar, so they were able to create a new, cost-effective process to convert old DC units to more modern AC designs.

Sulzer developed a process to use the frame and mechanical components from a 787 wheel set and convert it to AC, so that it could be installed on the latest haul truck with minimal downtime. The motor stator was rebuilt and rewound, the rotor fitted with new bars and a new shaft, while the frame was machined to accommodate a wider gear in the back of the reduction. Using an in-house test bed, the completed component was put through its paces before being shipped to the customer. This new solution enabled mining operations to make use of their old DC wheel sets as spares for their current fleet.

Sulzer's conversion of older DC-powered wheel sets to AC has provided operators with increased parts inventory and reduced downtime

Todd Colbrese, Service Center Manager at Sulzer's Gillette Service Center, explains: "The results of the DC to AC conversions have been successful. Recently, a customer who had been running a converted wheel set for four months returned it to us for a routine inspection, which showed excellent results. We have received considerable interest from other customers, who want to use some of their redundant DC assets to keep their current fleets operational with minimal downtime."

Customer benefit

"The combination of our existing exchange program and this latest solution for the wheel sets means that Sulzer can minimize downtime and maximize both availability and productivity for our customers' assets," Colbrese says.

The Sulzer wheel set exchange program can lower the total cost of ownership of aging mining fleets and empower them to match the performance of more modern equipment. This refurbishment process is significantly more economical than buying new equipment for each fleet.

As noted above, once refurbished, the new AC units are faster (40 mph vs 25 mph) and they are more reliable in challenging conditions, with fewer wearing parts such as brushes. They are also more fuel efficient which leads to higher productivity and less maintenance and fuel costs.

The Sulzer refurbishment process also allows those who have spare DC wheel sets to create AC wheel sets that can be used, while other AC sets are being repaired.

Repair times run approximately one to two months, which of course is preferable over the wait for a new set from the manufacturer that can take over a year.

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