

Trolley-assist trucks with new AC drive system

Higher Speed and Lower Emissions

The Siemens Mobile Mining Equipment team has developed a new IGBT AC drive system for heavy haul trucks with a trolley-assist option. This latest-generation electrical-drive system for trucks with payloads of 260 tons and larger boasts improved fuel efficiency, so it is gentler on the environment and saves on operating costs. When using the trolley-assist capability, ROI can be achieved in one to three years.

New Siemens IGBT drive systems are currently being used to power the recently announced Komatsu 860E-1K truck, with other development projects planned for the future. After successfully testing the prototype systems in the harsh mining environments of Arizona and South Africa, Siemens and Komatsu have introduced the 860E-1K, an electric-drive rigid-frame truck.

Specifically developed for the rugged demands of the mining industry, the new drive system has been designed to withstand higher vibrations and a wider range of altitudes with a temperature spectrum of -40°C to $+60^{\circ}\text{C}$. The truck's low-emission engine qualifies for EPA Tier 2 certification. EPA Tier 2 regulations for engines above 751 hp (560 kW) encompass the most stringent emissions standards in the world for large surface-mining equipment.

By offering the option for a factory-installed trolley-capable system, mining operators can save fuel and prolong the life of the truck's diesel engine. The Siemens trolley-assist system can be used on either 1,600 or 1,800 volt lines and enables trucks to draw the electricity required for the AC wheel motors in much the same way as conventional railway systems. Loaded travel on uphill grades typically accounts for 70 percent to 80 percent of a truck's total fuel consumption. Speed on an uphill grade is normally limited by the diesel engine's horsepower. However, a truck can climb faster if it can get additional power by connecting to an overhead electric line. The engine simply idles, thereby reducing fuel consumption by an astonishing 95 percent. In addition to saving fuel, noise and emissions are reduced to almost zero and very little heat is emitted.

The drive system can travel at a maximum speed of 64.5 km/h with a 35.52:1 final gear ratio and is powered by the latest Siemens control package. The unique liquid-cooled IGBT AC drive system from



The new Siemens drive system will power the recently announced Komatsu 860E-1K truck

Siemens provides advanced features and a smooth application of torque and traction. In contrast to conventional DC systems, the AC wheel motors have no brushes or commutators subject to maintenance and wear. This significantly reduces costs and has the added side effect of increased availability due to less scheduled maintenance.

With engine operating and maintenance costs tied directly to fuel consumption, trolley assist lowers the cost per ton because the time between engine overhauls may double or more. ■

Author
Walter Köllner
Contact
mining@siemens.com