Nidec
All for dreams

Case study
Shovel Drive System Upgrade
Western United States

Shovel modernization to improve mine production and machine availability

Project Summary

Client: Western U.S. Coal
Application: Electric Shovel Drive System Upgrade Mine

Nidec's role

Nidec Industrial Solutions provided the electric drive control system, programmable controller, new armature controllers, field supplies, Allen-Bradley Control Logics PLC, new operator chair and controls, MineView Diagnostic system, installation, commissioning, start up, and training.

The Challenge:

The customer needed to extend the life of their $20 Million excavator for the next 20 years. The electronics (firing circuits/drive controller/PLC) had become obsolete and diagnostics were minimal. The existing analog controls were based on a card rack/connector/wire wrap topology. Not only were the components obsolete but card rack connections had become unreliable and intermittent with age.
Better diagnostics would reduce the excessive electrical downtime, improve mechanical reliability, optimize operator productivity, and improve coal production.

To reduce project cost and minimize installation time, the power electronic component (SCRs, Diodes, Inductors, Capacitors) along with the associated fusing and bus bars were retained. It was deemed that these components were not obsolete and replacements were readily available in the marketplace. The firing circuit/drive controller/PLC replacement only approach was specified by the client.

After evaluating several options, the customer selected Nidec Industrial Solutions to provide the upgrade.

The Solution:

The solution was to install a proven Nidec Industrial Solutions control system.

Scope of Supply:

Nidec firing modules, field supplies, pulse transformers, Allen-Bradley PLC, operator chair with joysticks, 3 HMI displays, MineView diagnostic system, installation, commission, start-up and training.

The Result

Production was improved due to faster diagnostics and digital repeatability, which reduced electrical downtime. Gear wear was also reduced due to more precise and repeatable control. Nidec also added the ability to access the machine data remotely using Nidec's MineView diagnostics. This reduced electrical downtime because the maintenance personnel could see what was occurring on the machine in real time. After an operator fault or notification, maintenance could immediately review what occurred on the machine just prior to the notification. The shovel is typically located 2 miles from the maintenance shop. With the use of MineView diagnostics, the electrical personnel can troubleshoot on their way to the machine, saving 10 to 15 minutes transit time. Technicians can also look at the machine diagnostics via a smart phone. This allows access to information about the machine in real time, anytime or anywhere, including during production meetings.

Shovel Drive Control System