Leica GPS machine guidance systems boost Texan brown coal mining productivity

Thanks to a new GPS-based machine guidance system supplied by Leica Geosystems, The North American Coal Corporation has achieved significant savings in annual operating costs at its San Miguel Lignite Mine in South Texas.

The San Miguel Lignite Mine, south of San Antonio, has served as one of several test sites for Leica's new Dozer 2000 GPS machine guidance system. The Dozer 2000 is a satellite-based, machine guidance system that permits a bulldozer operator to control the vehicle and blade precisely without the need for survey stakes.

Investment amortised in under one year

According to Doug Darby, Operations Manager for North American Coal at the San Miguel Lignite Mine, the company expects to save as much as $200,000 annually. These savings are generated by eliminating the need for survey staking in pond, road and drainage construction, reducing rehandle in spoil grading, subsoil and topsoil respread, and improving dragline bench height control. "We estimate that we can save some $56,000 on each machine by achieving a 5% reduction in rehandle caused by cutting too deep," said Darby. "We expect to save as much as $72,000 per machine by reducing dragline rehandle by 3% due to better control over bench height. The Dozer 2000 system is an excellent investment. We project to have payback in less than 24 months on the initial four units. As we investigate other uses of the grade control and guidance system, the payback could well drop below one year."

Graphically unambiguous, easily understood information

The Dozer 2000 system uses signals from the U.S. Global Positioning System (GPS) to determine the position of the vehicle with centimetre-level accuracy in real time. Position data from a vehicle-mounted Leica GPS receiver is fed to an AutoCAD-based engineering software package running on a ruggedised touch-screen computer in the vehicle's cab. The computer clearly displays the vehicle's position and movement in relation to a predetermined design surface and guides the operator with graphic instructions for left/right steering and cut and fill values.

"Dozer 2000 is designed to assist the operator by providing real-time navigation information and easy-to-follow instructions for steering and blade control in the cab," stated Rod Eckels, business director for Leica's OEM GPS systems. "The system uses intuitive graphic displays to show cut and fill values between actual position and design surface. The operator can select cross-section and forward/backward views, plus other useful displays."

Darby reports that the system has been very well received by machine operators at the San Miguel Mine, due to its easy-to-follow graphic displays and its proven accuracy. "We are accomplishing finish grade work that is accurate to within ±2 inches with a machine that has a 13 feet high and 25 feet wide blade – all without the use of survey stakes," he said.

Leica Geosystems' Dozer 2000 steers the bulldozer simply and precisely. The driver has a real-time graphical display of all control data, e.g. cut and fill differences.

21 systems already in the field

"The Falkirk Mining Company, a wholly owned subsidiary of The North American Coal Corporation, installed two Dozer 2000 systems for evaluation in 1998. We now have 21 systems in service throughout North American Coal managed mines," said Darby. "We will continue expanding our use of this advanced technology in 2000."

The San Miguel Lignite Mine is the lowest cost supplier of lignite in the state of Texas. The company produces over 3 million tons of lignite annually.

North American Coal is the eighth largest coal mining company in the United States, with seven mining operations in 5 states and 1000 employees. It is a subsidiary of NACCO Industries, Inc.