APPLICATION NOTE

CAS DATALOGGERS

Structural Monitoring of the Copper Mining Process

dataTaker Helps Keep Copper Mine Operating Safely

Heavy industries place workers and machinery in some of the toughest working conditions. For the safety of both miners and machinery, structural monitoring is essential for identifying any potentially dangerous situations early on by closely monitoring the mine's structure to detect ground movement or subsidence around the mine which could make the structure become unstable. A versatile data logging solution was required to record the different parameters from extensometers and hollow inclusion cells, and this large-scale project necessitated many inputs to adequately monitor conditions throughout the mine. This device would also need the capability to send the data over the Internet as well as locally, be easily expandable as needed, and also had to be durable and reliable enough for extended operation in the mine's hazard-prone environment.

Installation

The mine's management installed 3 dataTaker DT80 Intelligent Data Loggers at key structural points below ground along with 3 dataTaker CEM20 Channel Expansion Modules, one for each logger. This setup gave operators a total of up to 105 analog input channels. The dataTakers were then connected to full bridge extensometers and hollow inclusion cells, then immediately began collecting information on tensile, strain, and rock stress conditions from this extensive sensor array. The monitoring systems were located almost 2 miles from the nearest office, so an RS232 communications link was installed which gave the user the ability to send commands, view real-time data and retrieve logged data from each of the loggers on the network.

Usage

The DT80s could measure and log DC voltage, current and resistance sources in addition to digital signals. Suitable for this large-scale operation, the data loggers' rugged design and construction provided reliable operation even in the mine's extreme conditions, surviving dust, dirt, and more. The data loggers measured at 18-bit resolution and a ±30 V input measurement range with a Dual Channel concept enabling up to 10 isolated or 15 common referenced analog inputs to be used in many different combinations.

High-speed counter inputs, phase encoder inputs, 12 digital channels and a programmable serial sensor channel allowed each DT80 to easily connect to a wide variety of sensors and data measurement sources so that almost any physical value could all be scaled, logged and returned in engineering units or within statistical reporting. Operators could also group sampling, logging, alarm and control tasks within schedules to suit their requirements.

These three data logging systems were spread throughout the mine and their data remotely collected and periodically transmitted using RS-232 communication with the office PC on the surface to provide a highly-accurate analysis of the structure's condition. This analysis was performed using custom software developed by the customer. Overall the mine's data management was greatly simplified, with each DT80 storing up to 10 million data points in user-defined memory so that users could log as much or as little as needed with independent control of schedule size and mode, and overwrite or stop logging once the allocated memory was full. Data transfer via the logger's extensive communications array also included Ethernet, and Modbus support, and a USB memory slot. With this versatile device, operators could archive data on alarm event, copy to USB memory or transfer via FTP.

Benefits

The copper mine's operations benefited significantly following the installation of the dataTaker DT80 intelligent data loggers, primarily through their remote data collection and transmission capabilities via RS232. The dataTakers easily interfaced with both the extensometers and the hollow inclusion cells, and the addition of the channel expansion modules offered enough analog channels to adequately cover the mine's structure, ensuring through structural monitoring that any instability issues were identified increasing the mine's safety record. Additionally, the DT80s and CEM20s continued to log without pause even in the mine's harsh environment.

For more information on dataTaker Data Loggers, structural monitoring or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.