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Magnetostrictive sensors provide reliability and durability in harsh environments...

SHM CHOOSES MTS SENSORS FOR HIGH WALL MINING MACHINERY

CARY, NC - (September 22, 2008) -- MTS Systems Corp., Sensors Division is providing its mobile hydraulic magnetostrictive sensors for the SHM high wall mining (HWM) system. The sensors replaced externally mounted pressure switches, infrared switches, and string potentiometers throughout the system because the magnetostrictive technology proved to be more durable and reliable in the harsh mining environment.

“Our engineers did some research on MTS Sensors’ Temposonics® technology in cylinders, and they seemed to be the best option,” said Stewart Myers, engineering manager, SHM, located in Beckley, W.V. “They allowed us to do away with expensive string pots, cable encoders and switches, and the MTS sensors are a better choice because they can be embedded inside the cylinders, making them more reliable and longer-lasting.”

SHM’s HWM system is a self-contained, highly productive, cost-efficient, high wall coal mining system. The system, which is operated and maintained exclusively on the surface, mines parallel entries, rectangular in section and up to 1000 feet or 305 meters deep. SHM’s HWM is the first practical high wall mining system that can mine parallel entries to predetermined depths.

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The HWM is capable of mining coal seams ranging from thirty inches to sixteen feet in thickness and to depths of up to 1,000 feet. The ability to mine this range of coal seam heights is accomplished by fitting interchangeable cutterhead modules to the HWM for low, medium, or high seam mining applications.

Throughout the equipment's original design, externally mounted pressure switches, string potentiometers and infrared switches were providing feedback on position, but were often less than accurate due to harsh operating conditions that caused sub-par performance in components. MTS' RH series and MH series sensors replaced parts in nine different cylinders in the SHM equipment. MTS' sensors utilize magnetostrictive technology to provide the most accurate and reliable results in linear position sensing.

Before the installation of the MTS sensors, the problem areas for equipment operators and technicians were numerous, but were easily addressed with the magnetostrictive sensors:

- The high shock and vibration of the mining environment caused dust and water to seep into the externally mounted sensor originally used in the shear cylinder, requiring quite a bit of maintenance. Maintenance needs have almost been eliminated by using embedded MH sensors instead.
- The steering cylinder, traverse cylinder and PTM cylinder were compromised due to the use of string pots, which often failed in harsh winter conditions. The embedded MH sensors have proven to be reliable in the same conditions.
- The base frame latching cylinders and base frame locking cylinders were crudely detected with pressure switches. The embedded MH sensor provides accurate positive feedback indicating where that cylinder is at any point in time.
- The powerhead latching cylinder was using infrared switches which would often cause a work stoppage so operators could clean off the lens. By replacing the infrared switches with embedded MH sensors, downtime was mitigated and productivity increased.
- The sump cylinder, which strokes 22.5 feet, was using a cable encoder that needed to be replaced once or twice a month because the cable was repeatedly pulled through 22.5 feet and susceptible to water, dust, ice and cable kinks, resulting in high incidence of downtime for maintenance and repair.

“Switching to MTS magnetostrictive sensors may have reduced our cost,” said Myers, “but I know it's saved our customers money, especially in downtime. Downtime on these machines is huge--revenues can be in the tens of thousands of dollars per hour in these machines, so if they go down, it's costly.”

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The MH sensor, which is used in the shear, steering, base frame latching, base frame locking, and powerhead latching cylinders in the HWM, provides rugged housing and built-in electronics, a pressure-proof sensor pipe that protects the internal sensing element, and a position magnet. Along with high shock and vibration ratings, the sensor has 200V/m EMI protection. Designed for cylinders two inches in diameter (or larger), the MH sensor now provides a measuring range of two to 98 inches (50-2500mm) while maintaining high levels of accuracy and repeatability.

The RH sensor, which is used in the sump, PTM lift and PTM traverse cylinders in the HWM, features improved precision, with position sensing resolution as low as 1 micron (0.00004 in). The resolution is factory-or field-adjustable from 1 to 100 mm. A built-in measurement non-linearity correction improves the sensing accuracy to as low as +/-10 mm, depending on the mechanical application package. The R-Series sensor, with current or voltage analog outputs, has options for programmable dual position and/or velocity channels with a maximum velocity range of up to 10 m/sec, (400 in/sec.), and velocity resolution as low as 0.1 mm/sec, (0.004 in./sec.).

For more information on the mobile hydraulic sensors, please contact: Brian Cox, MTS Sensors Division, 3001 Sheldon Drive, Cary, NC 27513; call (919) 677-0100; email brian.cox@mts.com; or visit <http://www.mtssensors.com>.

MTS Systems Corporation is the world leader in magnetostrictive linear-position and liquid-level sensor technology. MTS Systems Corporation is a global operation, with facilities in the U.S., Germany and Japan. In the U.S., the MTS Sensors Division has an ISO 9001 facility manufacturing rugged and reliable liquid-level and linear position sensors based on patented MTS Temposonics® technology. With a strong commitment to research and development, product quality and customer service, the Sensors Division is constantly seeking ways to bring the highest value to customers.

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