DIGGING INTO DRAGLINE DATA

Using an online data monitoring tool to improve safety and production from pit to processing.

By Todd Schools
Multi-million-dollar, mammoth draglines can stand 22 storeys tall, scoop up 240 tons of earth in one bite and dump it 200 yards away in half a minute. There is no doubt they are a vital piece of equipment in the mining process. However, the daily interaction between man and large machinery creates an environment of ongoing risk. Add to that the unexpected shutdown of a dragline and the result is a real threat to both personnel safety and production goals.

The severe duty motors and complex gearboxes typically required to operate a dragline puts it at constant risk of breakdown. Something as common as sweeping a wall can break teeth in the gearbox and stop production. Keeping spare parts on hand costs too much; and, if a hoist or swing motor goes out, a crane will be needed – and at least one entire shift – to replace the part. The time, effort and money spent to secure the parts and expertise to quickly fix the dragline are far less than the value of lost production time, which at least will run into the thousands of dollars, but most often runs in the millions. But personnel are pressed to move quickly and quick repairs increase the likelihood of mistakes and introduce new issues that could have been avoided in the first place.

The good news is that the impact of a failure can be significantly reduced by monitoring the condition of key dragline components, such as the crowd, hoist and swing drives (used to rotate the dragline left or right). Hoist motors and gearing, propel motors and gearing, motor generator sets and blowers may all be monitored, as well. Traditional periodic data collection methods are of some value, but this can place personnel in harm’s way as data must be collected on an operating dragline under special test conditions. And periodic methods can easily miss problems that can quickly unfold between collection times.

When a dragline is in operation, the arc of the swing may be approximately 90 degrees or so. It then stops, dumps the load, and returns in the opposite direction. All of this is done in less than a minute; therefore, the window for manual data collection is short.

At one of the world’s largest fertilizer companies, three draglines are in use 24/7 in its phosphate mine, producing more than 7 million tons of phosphate products per year. The mine was using traditional “walk-around” data collection and monitoring. But walk-around monitoring was time consuming, required travel to the dragline and sharing the road with large haul trucks. After driving to the mine to collect data, technicians were often told to come back later because of other priorities, so data wasn’t collected on a regular basis. Often the reading times were planned during high production periods, which meant interrupting production for at least 1.5 hours per month per dragline. Manual collection meant boarding the dragline and collecting data around operating equipment, which provided inconsistent data.

Managers at the phosphate mine were looking to increase dragline availability and to use reliability as a key business differentiator. They quickly determined that vibration analysis would provide the most information relative to the overall health of the mine’s assets because vibration analysis could monitor the many bearings and gearings on the dragline.

Once mine management decided to focus on vibration technology, they had to consider the implementation hurdles.

To read more about the switch from manual collection to automated data monitoring methods, see www.emersoncanada.ca.

Manually collecting data on draglines can present a safety challenge. Switching to an automated data monitoring method is a solution.