

Emerson's Online Machinery Health Monitoring helps phosphate mine protect critical assets, avoid downtime and repair costs

RESULTS

- Cost savings of \$5,832,000 per year based on 36 hours of availability gain due to direct time savings during data collection.
- Improved reliability and had a savings of \$1.3 million in cost avoidance during one eight-hour downtime event.
- Safety has been improved, because technicians no longer collect data manually on a moving/operational dragline.



APPLICATION

Online Machinery Health Monitoring of three draglines in a phosphate mining operation.

CUSTOMER

A phosphate mine in the Mid-Atlantic area has three draglines that are in use 24/7. The mine is part of the world's largest fertilizer company by capacity and produces the three primary crop nutrients: potash (K), nitrogen (N), and phosphate (P). The mine produces – 6.0 million tons phosphate rock, 1.2 million tons phosphoric acid, 0.3 million tons purified acid, 0.1 million tons phosphate feed per year.

CHALLENGE

The mine needed best-in-class vibration monitoring solutions and predictive maintenance capability to be installed on vital heavy-duty draglines at the phosphate mine. The team needed to improve its ability to identify equipment issues early and safely, allowing adequate time to plan repairs, while minimizing costly downtime. Technicians had to be on the moving dragline, collecting data around moving components and nip points in a manual process that took 1.5 hours per dragline per month. Traditional periodic monitor presented a different set of challenges. Reliability technicians would drive miles out into the mine, which required communication with mine traffic coordinator because they used the same roads as the huge ore transport trucks.

Two online vibration monitoring solutions were installed on vital heavy-duty draglines at the phosphate mine. The online solutions are in addition to an online solution installed on a third dragline at the site several years ago.

The subsequent Predictive Maintenance capability has improved overall production through avoiding unplanned downtime, minimizing monitoring costs, and reducing machinery repair costs.

The ore transport operators have multiple, large blind spots. Radio communication with the traffic coordinator is mandatory. Then, upon arrival at the dragline, measurements must be taken while in operation. The technicians are working around moving equipment in a constantly changing environment. Technicians were frequently asked to delay their readings or come back at a later time to finish, because reading times were frequently planned during expected high production rate periods.

SOLUTION

Emerson's online monitoring capabilities allowed the mine's reliability department to overcome these challenges:

- A cellular system allows them to send all data back to their existing server; technicians evaluate from their desk; an e-mail alarm alert system was implemented.
- Technicians stay out of harm's way. The data is collected using a permanently mounted data collection system that now takes 15 minutes to complete versus the previous data collection time of 1.5 hours. This conservatively increases availability 1 hour per month per dragline.
- Data collection can be as frequent as necessary and simple to undertake. It can be initiated from the reliability office while in communication with the dragline operator.
- Virtually seamless; production is never affected by data collection.

Additionally, real-time machinery health feedback is now available, allowing for improved decision making, earlier detection of problems, and thus equipment protection.

The site now has all three major draglines with an online solution. This has helped to increase availability and helped them to plan repairs in advance, and helped them meet their goal of non-interrupted mining/ore production.

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