ROI Potentials for an Online Monitoring System

Most would agree that remote access to predictive maintenance systems can conveniently increase plant machinery uptime and increase overall business profitability. The results of a recent survey on Condition Monitoring Systems presented at the Engineering Systems Design and Analysis (ESDA) Conference held in Manchester, UK, show that the majority of respondents cite reducing the number of unscheduled breakdowns and saving money as their primary reasons for implementing condition-based monitoring. But, the report also found that 63% of condition-based monitoring systems are still not connected online.

Used as part of a predictive maintenance program, online condition-based monitoring systems can reduce lost production and overall cost of maintenance as well as provide increased convenience and safety. As advances in technology have reduced component costs, improved designs, and increased competition, the cost of online surveillance systems has dropped considerably. This allows easier financial justification of the investments.

Advances in online condition monitoring systems allow users to install them easily and obtain results within weeks. Minimal costs and almost immediate results are speeding returns on investments.

The following examples highlight two successful online implementations. The first example describes a trial of an online surveillance system in a pulp and paper mill. The second example details results in the steel industry.

24/7 Online Vibration Analysis at a Pulp and Paper Mill

The equipment monitored at this facility was once part of an ongoing portable route, with data collected monthly. Increasing complexity of personnel schedules as well as higher personnel costs led to a decision to outfit a portion of the paper machine with an online surveillance system. Minimal, yet strategic, selection of vibration data locations allowed the equipment to be adequately monitored with only 12 online points.

Benefits Realized Immediately

After installation was complete, this facility immediately realized that an online system can be very quick and easy to configure. Once the sensors and cabling were installed, less than a day and a half was needed to finish connecting the system and build a viable database to capture user-specified data.

A Windows interface facilitated installation by providing an easy-to-use interface for quick setup. It also allows the critical equipment to be effectively monitored online with a small number of sensors and minimal incoming data. Finally and most importantly, health and safety of plant personnel were not jeopardized while collecting critical data.

Within weeks of installation it became evident that two bearings on the machine were failing. Used as a predictive tool the system then enabled maintenance to monitor the bearings’ condition for approximately three months before a
maintenance decision was needed. This process of proactively addressing a maintenance issue before it became a real problem was a profoundly new approach for this facility.

Other benefits stem from availability of critical data throughout the plant LAN, increasing visibility and reliability which eventually built trust in the system. Convenient data collection also is a considerable benefit, as data collected with a portable unit can now be collected at any time – on demand or on a timed basis. Finally, due to its simplicity and low cost, the system can be extended to critical equipment throughout the plant.

24/7 Online Vibration Analysis at a Steel Mill

One of the more critical machines in a cold rolling environment is often the “Z-mill” (Sendzimir mill). The Z-mill is responsible for slowly thinning the steel to a useable thickness and requires multiple passes of the steel before it reaches its desired state. If the Z-mill is not capable of thinning the material, no product leaves the plant.

Major components of the Z-mill at one steel facility are the pair of large spools that feed material into and out of the mill. Each spool is operated by a set of 2000kW variable frequency drive motors, which power a gearbox that in turn drives the spools (similar to the machine shown in the photo below). The reliability of such a motor/gearbox combination is critical to the product output of the steel mill.

By monitoring each motor and gearbox bearing with only one vibration sensor, imminent failure was avoided at this facility. Trend data collected on the gearbox shows that vibration was immediately noted to be quite erratic, fluctuating in and out of alarm status.
Further analysis of spectral data and comparison to previously collected data revealed possible looseness at the motor or gearbox. This analysis was confirmed when the unit was scheduled for inspection and loose bolts were discovered within the gearbox.

The data collected by the online surveillance system would have been difficult to capture with a walk-around instrument. The online data is captured several times each week, allowing erratic behavior to be easily seen and a potential problem assessed. Portable collection – typically at monthly intervals – would have resulted in a higher probability that this problem would have gone unnoticed. Additionally, the Z-Mill thinning process often involves many stops and starts. Logistically, it makes much more sense to use an online surveillance system to capture the needed data when it is available rather than risk the inefficiencies of personnel attempting to capture data at any given time.

It should be noted that the online system responsible for this discovery was installed less than a month before vibration characteristics made the defect obvious.

The cost of the gearbox is estimated at $750,000 and requires a six month lead time. The mill avoided further damage to the gearbox and prevented a potentially major failure that would have resulted in significant downtime and production loss.

**Online Surveillance Systems Enhance Predictive Maintenance**

Online condition monitoring systems provide essential data for performing predictive maintenance. Along with needed data, they also deliver considerable health and safety benefits as plant personnel can avoid dangerous areas. Connection to such systems can be via Ethernet (wired or wireless), which also helps keep plant personnel out of dangerous areas. Online systems can also provide flexibility and expandability, with 16 or 32 channel modules available to tailor a solution for most requirements. Once an online surveillance system is fully installed, the value of the data often leads to rapid return on investment.
About Commtest
Founded in 1989 in New Zealand, Commtest Instruments Ltd (Commtest) is a privately held company whose mission is to bring the benefits of vibration analysis to mainstream industry. Commtest Inc. opened the United States headquarters in Knoxville, TN in 2005. Previously, small and medium sized companies were not able to implement condition monitoring programs due to the high cost of data collection and analyzing equipment. With Commtest’s product line, companies of all sizes can now afford a condition monitoring program and realize the return on investment from equipment optimization.

With a vbOnline® system you can continuously monitor machinery in the most inaccessible environments without disrupting your productivity, and because it is significantly less labor intensive, you increase bottom line profitability. To learn more, please visit us at www.commtest.com.