

Justifying the Cost of an Online Reliability System

Written by MT Staff
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The decision to invest in online reliability monitoring has always been an expensive proposition. Getting approval to purchase these systems requires cost justification. Evaluating return on investment (ROI) is related to equipment criticality, failure mode, frequency of occurrence, and downtime penalty cost.

Costs associated with online reliability monitoring systems, including materials, labor, and overhead, can approach \$100,000. But the benefits of such a system become apparent when a sudden equipment failure leaves a facility searching for ways to prevent the same circumstance.

Many questions arise when trying to justify online continuous monitoring:

- What equipment should be permanently instrumented?
- What operational factors should be considered?
- Is online the right technology to use?
- How much profit correlates to "detectable" downtime?
- How should the capital be sourced?
- How should ROI be evaluated?

Applications for monitoring

Online condition monitoring is considered a justified solution for these operational applications:

Critical to process: Comparing the potential cost of a lost piece of equipment in terms of lost downtime is an excellent way to justify system expense and compute the time frame for ROI. For example, a process pump is not expensive; however, its impact on production time may be identified as \$140,000/hr. Therefore, the value of one unplanned failure would justify a \$60,000 online system. ROI would be realized by avoiding only one unplanned failure.

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Rapid failure history: Route-based data collection is sufficient for most machinery, with the average collection interval 30 days. There are some machines that will exhibit problems and propagate failure on the order of hours. For example, a cracked inner race fault propagates very quickly. Early discovery is critical and 30-day collection intervals are insufficient to capture the fault.

Quality control: Another feature of online monitoring is real-time feedback on product quality. For example, on a roll process, chatter between rolls and nips can cause variations in the thickness of the rolled product, producing a "bar" pattern on the sheet. This fault is commonly known as barring.

Operating with a known fault: The first phase behind any fault is discovering the fault exists. The next question is, "How much time do we have before we must shut down" or "Can we make it to the next outage?" Trending the fault condition can reveal information important to ultimate time before failure.

Operating beyond original design: Most processes are running near capacity. It is the current trend to increase output capacity by 10-15 percent. This often puts equipment just beyond design specifications. Sometimes, this means running into a resonance speed. Condition monitoring identifies how close the unit is to ultimate performance.

A major goal of a business is to show a profit. Online system capital can be justified through careful consideration of production downtime faults along with production impact and payback time. The accompanying box shows how to calculate the cost of unplanned downtime vs the cost of an online reliability system. **MT**

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