

Predicts Remaining Life of any Critical Equipment

CBMi is monitoring equipment as large as 3,500 horsepower as shown in the photograph in Figure 5. The motor in the center has a pump attached to each end of the main shaft.



◀ Figure 5.
3,500 HP
Pump Being
Monitored by
CBMi

Return on Investment

In addition to the cost savings obtained by reducing event severity, as illustrated above, there are other potential economic advantages to the CBMi Real-Time Monitoring System. These advantages include extending equipment life by making maintenance decisions based on actual condition rather than on a conservative routine schedule specified by the manufacturer. One customer has extended the period between major overhauls to twice that of the recommended time. Their history with CBMi enabled them to make this decision in confidence.

More importantly, in the case of critical processing equipment, the cost of lost production and service interruption resulting from a major breakdown may far exceed the savings in the cost of repair. These factors should certainly be included in the return-on-investment evaluation for the CBMi Real-Time Monitoring System.

Lastly, if CBMi is replacing or supplementing manual testing of equipment, one should factor in savings from reduced hands-on test work and associated documentation activities.

*Photographs and data provided courtesy of
Dalton Utilities, Dalton, Georgia.*



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CBMiTM_i

Actual Cases of Failure Detection

*Real-Time Monitoring System
for Critical Machine and
Process Health Management*



*Complete Cost-Effective System that Gives
Plant Operators Advance Warning of
Potential Machinery Failures*

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CBMiTM

Actual Cases of Failure Detection

CBMi is a cost-effective intelligent monitoring system that takes condition-based maintenance to a new level of sophistication. Impact Technologies incorporates years of research in condition-based monitoring and maintenance into effective algorithms that sense impending failures of equipment at an early stage. This prognostic detection gives maintenance personnel the most lead time possible to schedule the proper maintenance to avoid catastrophic failures.

CBMi continuous monitoring has significant advantages over periodic manual testing with portable units as the system finds faults that can be easily missed by monthly or weekly manual testing. Many faults progress in a matter of days or hours into a complete failure that may be catastrophic. With early warning of an impending failure provided by CBMi, operators can shut down or decrease loading on equipment to have it repaired at minimal cost and interruption to the process.

Advanced Vibration Monitoring & Analysis

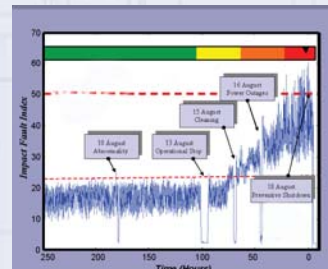
Example 1: An example of a fault on a large centrifuge shows the fault progression to take place over three days. Figure 2 shows the fault progression along with the alarm levels and color-coded status levels shown to the operator via a SCADA interface.



◀ Figure 1. Large Centrifuge used for Separating Solids and Water

This fault is similar to failures that the customer experienced before CBMi was installed. In those instances the repair costs were about \$40,000. With CBMi, the damage was limited to the faulty bearing (Figure 3) with a repair cost of approximately \$13,000.

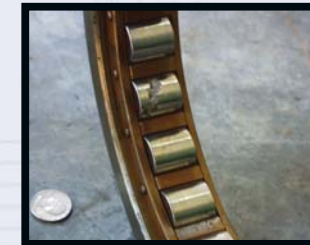
Traditional vibration protection is set at high levels to trip the machine in the case of major



▲ Figure 2. Centrifuge Fault Data Illustration

Prevented Catastrophic Bearing Failures

problems. Lower thresholds cause more false alarms and unwanted stops. CBMi's advanced prognostic analysis can help find problems earlier, while reducing nuisance alarms.



◀ Figure 3. Early stages of Spalling of a Large Roller Bearing. Two Other Rotors Showed Similar Damage.

Example 2: Another example illustrating a fast fault progression is shown in Figure 4. In this case a large motor had a faulty bearing that moved to an alarm in a matter of hours. The CBMi system sensed the incipient fault 200 minutes in advance. As a result the customer shut down the machine, preventing the high level of damage to the rotor and stator that the customer had experienced in the past.

▶ Figure 4. Data Showing Progression of Motor Fault

