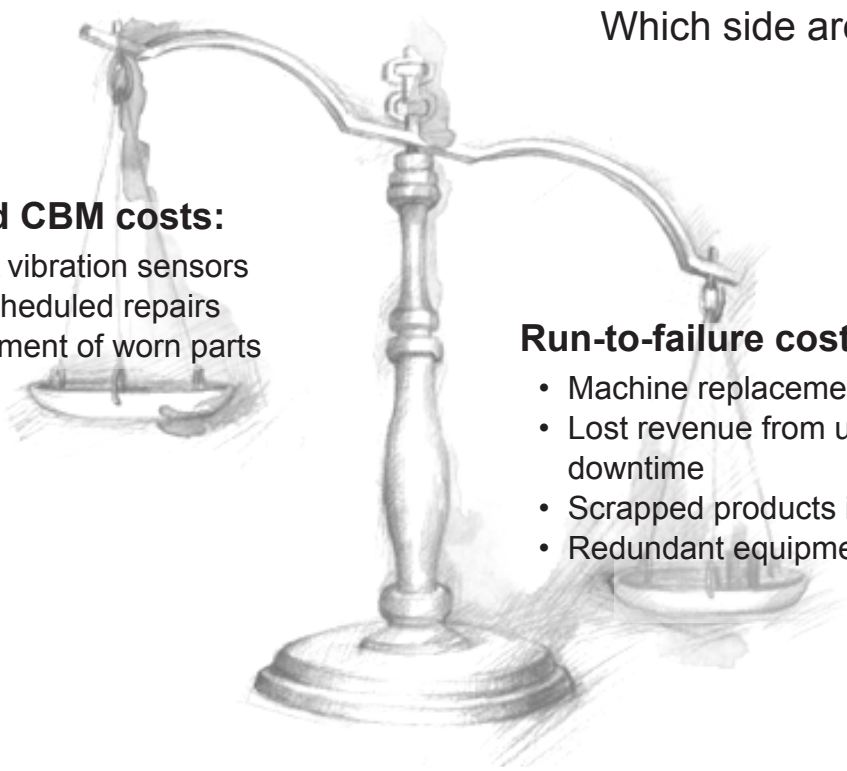
Hidden costs of run-to-failure maintenance

A run-to-failure (RTF) approach to maintenance consumes your budget with hidden costs that erode profits over time. Implementing condition-based maintenance (CBM) techniques saves money and increases efficiency.



Which side are you on?

Simplified CBM costs:

- 4-20 mA vibration sensors
- Minor scheduled repairs
- Replacement of worn parts

Run-to-failure costs:

- Machine replacement or major repairs
- Lost revenue from unscheduled downtime
- Scrapped products in process
- Redundant equipment

Perform maintenance, not costly repairs. Condition-based monitoring provides real-time information on machine health, allowing personnel to detect and correct faults such as looseness and bearing wear before they lead to catastrophic failure. The simplified CBM approach helps users schedule maintenance without interrupting production, and reduces the need for redundant equipment.

Vibration monitoring can provide the earliest warning sign that a piece of equipment (particularly rotating machinery such as pumps, motors, fans, gearboxes and compressors) is developing faults. Using 4-20 mA vibration sensors simplifies CBM by connecting directly to existing plant control systems. Best of all, you don't need a vibration expert to get actionable data!

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RTF cautionary tale: pump misalignment

A boiler feed pump had failed without warning for the second time in eight years. If the plant had performed condition-based maintenance, the pump would have been monitored with four vibration sensors, and the trend data would have shown signs of shaft misalignment long before failure. Instead, the undetected fault overloaded the bearings and caused a complete failure of the pump, collateral damage to the pump and motor, and shut down production. If the misalignment had been corrected, the pump could have continued operating after scheduled maintenance.

The pump was not spared – therefore the boiler was inoperable until repairs could take place. The overloaded bearings had to be replaced, but due to inventory reduction the plant had no replacements on hand when the pump failed. A scramble ensued to locate a supplier who had the hard-to-find bearings in stock and could ship them overnight (at a substantial cost, on top of the cost of the bearings). Replacements arrived the next morning, at which time the pump was repaired, realigned, and put back into service.

The boiler, which usually operated 24/7, was down for a total of 32 hours between 10 AM and 6 PM the following day; the lost production time equated to a revenue loss of $6,000 per hour. At the time the pump failed, $18,000 worth of products in process were ruined and had to be scrapped.

The real cost of RTF maintenance is the expense of a failure times the probability of the failure occurring. This pump had failed an average of once every four years, making the probability of failure 0.25. This plant's total costs for a single machine therefore amount to $223,280 x 0.25 = $55,820.

Breakdown of RTF costs	
$2,000	New bearings and labor to repair the pump (collateral damage)
$10,000	Spared motor swap-out and repair to the original motor (collateral damage)
$280	Laser alignment of the repaired pump
$1,000	Expediting fees and air shipment for replacement bearings
$192,000	Lost revenue from 32 hours of downtime
$18,000	Value of scrapped products in process
$223,280	**Total cost of pump failure**
0.25	Probability of failure
$55,820	**Total RTF maintenance cost**

In contrast, the overall cost of monitoring the pump is the cost of the sensors plus the cost of repairs. (There is, of course, also the expense of the existing control system. Without it, all maintenance is of the RTF variety.)

Breakdown of CBM costs	
$1,300	Four 4-20 mA vibration sensors plus installation costs
$280	Laser alignment of the pump, using 4 hours of labor
$1,580	**Total CBM cost**

Bottom line: the initial investment in CBM results in significant savings – a little goes a long way.

Complete solutions for CBM

Depending on your condition-based maintenance needs, Wilcoxon offers a variety of solutions:

- 4-20 mA vibration sensors to send 4-20 mA data to an iT relay alarm or directly to a control system
- IEPE accelerometers to send dynamic data to an iT vibration transmitter
  - Dynamic data can be output directly to a portable data collector, or conditioned by the transmitter and sent to an alarm or control system as a 4-20 mA signal.

Wilcoxon's product range includes 4-20 mA sensors, accelerometers, alarm modules, vibration transmitters and portable data collectors – everything but the control system. For more information on choosing the best monitoring setup for your application, refer to the application note "Simplified condition-based monitoring" or the technical notes on 4-20 mA applications available in our Resource library.

Or contact us directly:

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