You don’t have to know vibration to benefit your process

Even if you aren’t a vibration expert, you can monitor critical machinery vibration levels using sensors and transmitters that run on common 4-20 mA loops
Machinery health monitoring

• Critical to every plant’s reliability program, regardless of your process
  – Pharmaceutical
  – Food and beverage
  – Brewing
  – Water and wastewater
  – Petrochemical
  – Pulp and paper
  – Power generation

Wilcoxon has experience working with manufacturers in these businesses
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Machine monitoring is a vital part of maintenance programs that reduce costs and downtime.

Using preventative and predictive maintenance technologies to track machine health is a proven industry best practice. By monitoring machinery health, outages and downtime are reduced, and you save money.

Maintenance indicators can be examined through vibration analysis, oil analysis, infrared (thermal) monitoring, motor circuit evaluation, and ultrasonic monitoring.

Maintenance indicators are used to examine machines while they are running. Without interfering with a machine’s normal operation, you can effectively estimate the machine health.
Why choose vibration data

Vibration monitoring has been one of the anchors of predictive maintenance technologies, because it can detect several causes of machinery fault

- You can use vibration monitoring to detect
  - Shaft misalignment
  - Rotor imbalance
  - Gear failure
  - Bearing faults

Trending vibration data allows you to monitor machinery and detect these faults, even if you aren’t a vibration expert
Benefits of vibration trending

Trended data is obtained during loop-powered monitoring and provides 4-20 mA output that indicates overall machine health with no analysis required.

- Provides converted output of raw vibration data into 4-20 mA data which can be integrated with your plant DCS/PLC.
- This pre-processing allows operators to focus on trends in the data.
- Trended data can give useful advanced warning (1 month to 3 months) of equipment failures.
- Simple alarm limits can be set.
- Spectral data is usually available as well, and can be accessed to diagnose problems.
4-20 mA data addresses your needs

You already have PLC / DCS network installed. You are already taking data points on pressure, temperature or maybe flow. Now you can also get vibration data.

- Budgets continue to be squeezed
- “Do more with less” = mantra of today’s business environment
- Minimize complex analysis – operators can focus on trends in the data, you don’t need to be a vibration expert
- Variety of options
  - Loop powered sensors can output 4-20 mA data and also make dynamic vibration data available
  - Vibration transmitters can use your existing sensor infrastructure to trend raw vibration data
  - Sensors and transmitters interface with vibration alarms or your existing PLC or DCS for immediate notification of extreme vibrations
What’s needed – starting new vibration trending program

- Wilcoxon Loop Powered (LPS®) are available in configurations for virtually every use
- Our dedicated team will help you determine which sensors are best for your application
- Mount sensors to machines at
- Use simple shielded, twisted pair cable – similar wiring for other 4-20 mA devices – to wire sensors to a PLC or DCS analog input
- LPS output is based on overall vibration, you don’t have to be a vibration expert to interpret the data
Where do the sensors mount

4-20 mA Loop Powered Sensors for vibration trending
mount at the bearing location

- Horizontal mounting is preferred for pedestal supports
- Axial mounting may be sued at the thrust bearing location
- Wilcoxon application guides offer detailed mounting information
How do the sensors mount

Loop Powered Sensors require a permanent mount on the machine to generate consistent measurements and provide data for trending

- Cementing pad on machine surface
- Drill and tap on machine surface
Who analyzes the data

Sample trended data from a 4-20 mA LPS®

- Data “analysis” is not necessary
- Trend of vibration provides guidance for millwrights or mechanics
- Vibration changes indicate machines requiring attention
- Contact Wilcoxon to discuss your needs and application, and to also determine if detailed vibration analysis is necessary
When is maintenance required

Since 4-20 mA data does not have to be analyzed by an expert, there are general guidelines on when maintenance should be performed

• When vibration changes are gradual, maintaining a more frequent watch over the machine will usually suffice
• Use a sensor so that the baseline is ~15% of full scale. An increase by 2.5x the baseline requires immediate attention
• ISO 10816, *Mechanical vibration – evaluation of machine vibration by measurements on non-rotating parts*, is a guideline that advises typically acceptable vibration levels

<table>
<thead>
<tr>
<th>Vibration Velocity in/sec. peak (mm/sec. r.m.s.)</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
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<td>D</td>
<td>C</td>
<td>D</td>
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<td></td>
<td>C</td>
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<td></td>
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<td></td>
<td>C</td>
</tr>
<tr>
<td>0.63 (11.2)</td>
<td>C</td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>0.45 (7.1)</td>
<td>B</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>0.35 (6.1)</td>
<td></td>
<td>A</td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>
Simplified condition monitoring

- Trended data can be used for critical assets when no vibration monitoring program exists, or for the balance of plant machinery that is not currently being monitored.
- The ability to trend data on motors, pumps, fans and gearboxes allows you to maximize your resources.
- It’s not a new concept, but it’s a very practical and cost-effective approach.
What’s the cost impact

Depending on your needs and specific application, your cost per monitoring point – including a 4-20 mA LPS® sensor with a 64-foot cable and sensor connector, may be as low as $363.
Can LPS sensors® withstand harsh plant environments

- Wilcoxon’s LPS sensors are hermetically sealed and use cases machines from 316L stainless steel
- Cables and connectors recommended for use with LPS sensors use materials with superior chemical resistance
- All LPS sensors are rated for continuous use up to 85°C (185°F)
- All LPS sensors are Helium Leak Tested to ensure a true hermetic seal, providing you excellent MTBF
What about special applications

- FM, CSA, SIMTARS and ATEX certification are available
- LPS sensors are available with intrinsically safe and explosion proof ratings
- Top exit, side exit, integral cable, stainless steel braid are just some of the many options available with the LPS series
- Dual-output of temperature and vibration data is offered
- If you have a special application which requires special certification, let us know the details you need
Control your process with simple vibration monitoring

- Wilcoxon’s TLC (Total Lower Cost of Ownership) offers you a way to monitor your process with vibration monitoring, even if you aren’t a vibration expert.
- Wilcoxon has a global reputation for providing the best industrial sensors on the market.
- Some of our customers are the leaders in their market – you know them by name.
Wilcoxon Sensing Technologies

For more information, please contact us:

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