

BEARING VIBRATION ANALYSIS & CONDITION MONITORING TO IMPROVE OPERATION

DATA ACQUISITION SYSTEMS HELP DETECT IMPENDING DAMAGE



The diagnosis of bearing damage in roller bearings is an integral part of servicing and maintenance tasks. Increasingly, technicians rely on condition monitoring systems (CMS) for machine diagnosis in plants and factories to perform bearing vibration analysis. Many CMS systems use vibration measurements to determine operating conditions. Two contrasting approaches exist: the diagnostic, qualitative approach (producing an envelope spectrum); and the quantitative approach (measuring vibration velocity).

The quantitative approach integrates the acceleration time signal into velocity. This velocity is then usually monitored as a sum level. A [Delphin Expert Vibro](#) device can calculate an envelope spectrum from the time signals of acceleration sensors. With this data, users get detailed information on the condition of the bearing (inner and outer rings, cage and ball bearings).

APPLICATION FEATURES:

- Evaluation of vibration velocity V_{eff} according to DIN ISO 10816
- FFT analysis within the device / frequency band monitoring
- Evaluation using envelope spectrum on bearing damage
- Monitoring of vibration levels
- Intelligent recording within the device
- Visualization and analysis using time signal, trend spectrum, FFT cascade, orbit and polar diagrams

FLEXIBLE VIBRATION MEASUREMENT

Vibration measurement is made easy with the Expert Vibro, a data acquisition device for acquiring transient signals and vibrations. The latest [FPGA](#)-based processor technology enables 16 synchronous channels to be processed at high sampling

rates; up to 50 kHz per channel. Meanwhile, the system's 24-Bit A/D converters ensure high precision. Users can switch between voltage measurement, IEPE or shaft vibration sensors.

Users are able to enact flexible triggering via integrated comparators and digital inputs.

Measurement data is spontaneously monitored with digital outputs being switched within msec in the event of limit value violations.



TYPICAL AREAS OF APPLICATION:

- Bearing damage diagnoses
- Envelope spectrums
- Analysis of vibrations in drives
- Analysis of gearing problems
- CMS on roller bearings

PRACTICAL EXAMPLE

Condition monitoring and machine diagnostics are especially important in ship drives. When at sea, the next repair workshop can be extremely difficult to reach. Additionally, bearings in ship drives are usually underwater and therefore difficult to access for diagnostic sensors.

For this reason, acceleration signals are acquired at multiple locations above water and correlated with important process measurement values. Impending damage to the drives can then be detected at an early stage with bearing vibration analysis. Different designs of acceleration sensors are generally used. They feature high threshold frequencies and good resolution.

Envelope spectrums can be portrayed and evaluated using [Delphin ProfiSignal software](#) and the Vibro vibration monitoring option. In this way, users are provided with analysis and monitoring functions, intelligent signal processing, an independent data storage capability and versatile fieldbus connections – all in a single device.

SINGLE SYSTEM FOR MEASUREMENT & ANALYSIS

To make up a pre-processing sequence, users can select filters such as high, low, or bandpass with rectifiers, integrators, differentiators or decimators. Multiple pre-processing sequences are able to run in parallel in order to evaluate an input signal for maximum versatility. A touch display shows users important configuration and measurement data onsite.

Expert Vibro data loggers measure, monitor and record fully independently. Non-periodic signals (for ex. fault detection and diagnosis) can be precisely analyzed. Using its continuous sampling mode, even the smallest of irregularities are recorded. The Expert Vibro system is equipped with its own internal data storage capability (32 GB data logger memory), making it especially reliable and secure. The system also performs fast limit value monitoring of time signals.

For more information on the [Delphin Expert Vibro](#), bearing vibration analysis or to find the ideal solution for your application-specific needs, contact a CAS DataLogger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.