

Condition Monitoring and Machine Diagnostics

A large, stylized vibration waveform in red and green occupies the bottom half of the page. The waveform is complex and jagged, with a prominent peak on the right side. The Kerntech logo, consisting of a small waveform icon followed by the word "Kerntech" in red, is positioned in the lower right area of the waveform.

 **Kerntech**

Condition Monitoring and Machine Diagnostics for Industrial Plants

The engineering firm Kerntech is a flexible service provider. Working in close collaboration with industry as well as with applied research. Our aim is to provide the customized monitoring solutions you need to run your plant safely and efficiently



Fig. 1: Shock tests for the determination of solid borne sound in a nuclear power plant

Fig. 2: Self-contained breathing apparatus training at the fire station

Fig. 3: Strain Gauges application on an vibrating pipeline

Our excellence is

- Vibration and loose part monitoring
- Special measurement and test engineering
- Design, development, and implementation of automatic machinery monitoring, programs for early failure detection, and trend analysis
- Measurement, control, and display systems
- Nuclear-thermohydraulic stability measurements

Loose parts monitoring

Loose parts monitoring

Impact sound measurements on externally accessible components and installations of temporary accessory instrumentation including signal processing:

- Detection of impacts at components of primary and/or secondary circuits (e.g. conduits, steam generators, reheaters, and pumps)

Loose parts monitoring within the pressure vessel of boiling water reactors during power operation for the:

- detection of impacts between fuel elements, instrumentation lances, and the single tubes of the lances

Special measurements

Short-term and flexible measurements with additional or already existing instrumentation. With on-line evaluation and on-site result reporting on the:

- determination of control circuit parameters
- field measurements and documentation of the start up of new or replaced components
- determination of diagnosis parameters to prevent future damage
- determination of fluid resonances in piping systems
- long and short term trend tracking of operating parameters (such as temperature, pressure, flow rate, etc.)

- correlation of physically different signals (neutron flux, pressure, temperature, etc.)

Systems and programming

We offer customized program and system development services for a wide range of measurement and monitoring requirements. For example, this could involve the automatic signalling and supervision of operational parameters.

Measurement and monitoring systems / Automatic monitoring systems

Application-oriented development of vibration and loose parts monitoring systems.

We offer:

- Development and design
- Installation of additional instrumentation
- Realization of special measurements
- Display and visualization of status signals, test results and trend charts
- Integration in existing data networks, maintenance, and remote maintenance systems

Benefits:

- Improved production rate by running the machines at low-wearing conditions
- Avoidance of progressive damage through an early warning system
- Improved informational basis for concerted maintenance tasks

Fig. 2: Run-up test to determine the structure resonance

**Floating Spectra vertical vibration
at the bearing motor side driving shaft of the pump (A10)**

frequency [Hz]

time [s]

APFD Deviation (mm/yHz)

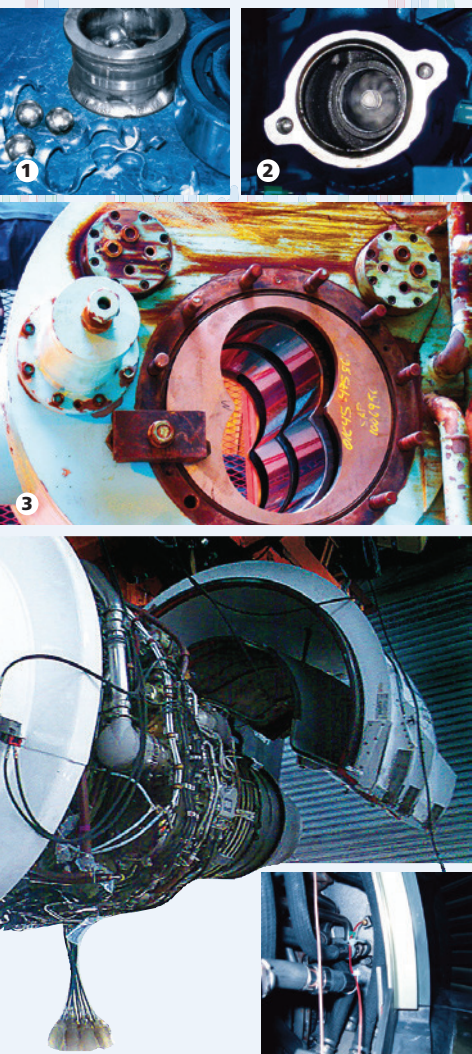
Fig.06

CFM56-7
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sabena

Fig. 1: The bearing diagnosis enables early failure detection of bearings

Fig. 2: Measurement of blade vibrations of turbo chargers

Fig. 3: Vibration analysis of a multiphase pump



Validation and measurement of the natural mode of a CSM-56B engine on MTU test bench

channel vibration analysis is advisable also when excessive pipe vibration is already ascertained. Unlike simple hand held vibrometers, these multi-channel measurements allow for the modal and frequency-selective analyses required to do a technical assessment.

Pipe vibration can be traced back to inhomogeneous flows which cause vibrations at the natural frequency of the pipe. Those vibrations at the natural frequency may lead to high oscillations already by minor excitations. Pipe vibrations may also be caused by pumps, compressors and fluid resonance.

Bearing diagnostics

Defect bearings are one of the foremost reasons for outages of machinery. Supervision of roller bearings can predict oncoming disruptions opening up for preventive maintenance and loss avoidance.

We offer:

- Customized solutions: Regular bearing diagnostic services and supervision through alarm systems
- Development of measuring and analysis systems for continuous supervision; applicable on-site or to the remote maintenance
- Preparation of status reports and expert opinions
- Root cause analysis in case of repeatedly fast-wearing bearings

Benefits:

- Cost reduction: Bearings diagnostics enable the prevention of unexpected and expensive machinery failures. Furthermore, they offer a possibility to reduce premature replacements of bearings.
- Reliability: Undetected bearing defects may cause significant damage. Bearing monitoring, eventually in combination with vibration control, is a way to minimize or obviate risk

Monitoring and diagnosis of pumps

Pumps are critical elements in the operating process of many industrial systems. Our range of services includes what you need to operate pumps safely and efficiently.

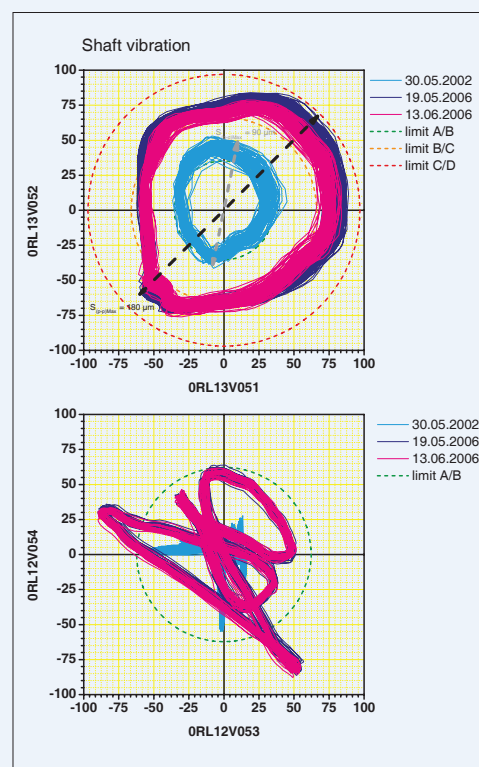
We offer:

- Noise-based detection of cavitation
- Bearing diagnostics
- Trend and long-run monitoring
- Vibration monitoring: Sourcing and measures in case of excessive vibrations

- Mobile stand-by duty: As trouble shooting or continuously to prevent problems
- Multi phase spiral pumps in oil-production industry: we offer on-site vibration measurements on the oilfield
- Chemical industry: Condition monitoring on pumps with magnetic clutches by magnetic field analysis

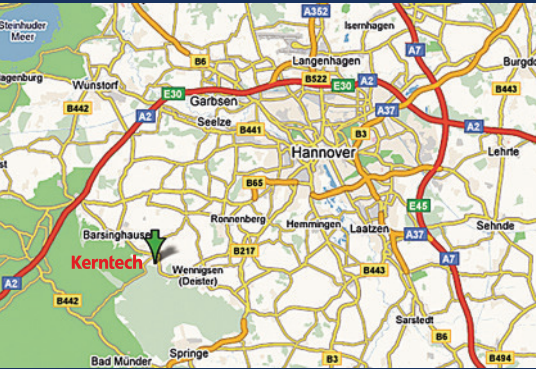
Strain gauges

Strain gauges offer a possibility to analyse the dynamic load on a structure which could lead to deterioration of the component. Thus, the relevant force time history can be determined. Modal and vibration analyses help to determine the natural mode of the components. Based on those measures treatments for vibration level reduction can be established.



Orbits of a feed-water pump with limits according to DIN ISO 7919

How to find us...



Leave the A2 at the AS Bad Nenndorf exit (38) towards Barsinghausen and follow the B65. Leave the B65 and drive straight ahead following the L391. Turn to your right on Nienstedter Straße (L401) after about 3-4 kilometres. Follow this road for approximately 70 meters before turning left in the street Neue Rehre. Leave the Neue Rehre and turn to your left in the Steinradweg. You find your destination on the right side at the Forsthaus.

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In particular we have many years of work experience with:

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MTU
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