Acoustic monitoring of machines and systems

Detailed view of the sound sensor.
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Defective or incorrectly installed components in large machines and systems can lead to their failure. This makes final assembly inspection and quality monitoring during operation all the more important. Often the assembly personnel are entrusted with this testing task if they have good hearing and long experience. However, human hearing is rather subjective: it gets tired after a certain amount of time and ambient noise can have a negative effect. Fraunhofer IZFP has developed the "listening" sensor system "AcoustiX" as a more reliable alternative.

Errors or irregularities in the equipment cause characteristic vibrations. AcoustiX can capture and evaluate these sound patterns quickly, automatically, and reliably. Unlike conventional monitoring systems, AcoustiX does not require extensive adjustment or calibration.

Algorithms reliably detect faults

The sound data is constantly recorded with acoustic sensors or microphones and then analyzed and logged. Information about the functionality of the system is available within a few minutes. The medium-term aim of further development is exact fault localization and detailed determination of the type of fault. The underlying algorithms can be integrated into existing test systems and adjusted to satisfy customer requirements.

Industrial application

AcoustiX is already in use at John Deere for the permanent final assembly inspection of the cutting units of combine harvesters and is currently being transferred to other series applications. In the future, the system is intended to be used for monitoring autonomous large machines or evaluating the quality of assemblies on test benches.

Signal evaluation reveals faults in the system.
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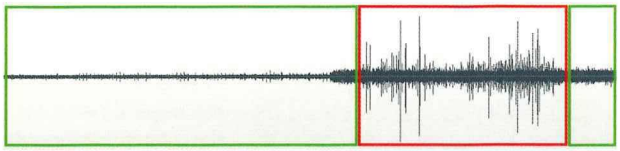

The sensor system inspects the rotating cutting unit of a combine harvester for defective vibrations by means of structure-borne sound sensors and microphones.
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■ Contact:
Sabine Poitevin-Burbes
Phone +49 681 9302-3869
sabine.poitevin-burbes@izfp.fraunhofer.de
Fraunhofer Institute for Nondestructive Testing IZFP
Campus E3.1
66123 Saarbrücken
Germany
www.izfp.fraunhofer.de

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