

MECHANICAL AND AUTOMOTIVE ENGINEERING

MONITORING OF HYDRAULIC COMPONENTS

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Task

The aim of the development work was an effective monitoring of hydraulic test stands with the help of different methods.

Until now, it is necessary to do regular maintenance checks, even if there is no fault in the system. Using the developed system, a more cost-efficient and condition-based maintenance shall be possible.

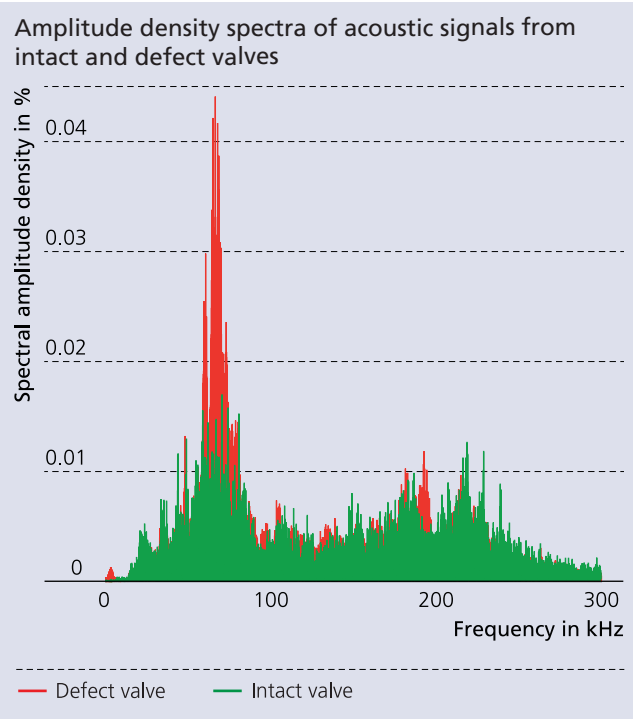
Method

The focus of the method is the monitoring of the valves, in particular the servo valves, using structure-borne sound sensors. By means of oil flow, acoustic structure-borne sound signals are generated in a very broad frequency spectrum between 10 kHz and 500 kHz, which characterize the hydraulic processes. Changes in the state of perfused components, e.g. due to the abrasion of valve cones, lead to varying signal properties. Features, which are suitable for the monitoring of hydraulic components, can be extracted from the envelopes of time signals and the amplitude spectrum.

Hard- and software

The hydraulic monitor consists of digital modules that can process two channels of high-frequency acoustic signals with a possible sampling rate of up to 4 MHz and 4 channels of low-frequency variables, such as temperature, flow volume, pressure and valve control current.

The data collection and transmission to the PC is based on a microcontroller within the measurement device. The measurements can be executed continuously or at defined time intervals.



1 Test stand for monitoring hydraulic components.

2 Servo valves with acoustic sensors.

