

High Speed Process Monitoring



20,000 rpm

One cutting edge is damaged We know which one

Basics

For a TV display it's clear: the higher the resolution, the better the picture. The same is true for the Optimizer4D – because of its extremely high sample rate it can really measure what otherwise can only be simulated. Tool wear, micro-cracks, temperature changes within the

material. And all this 100 percent in-process. Tool, workpiece and material come into focus.

Optimizer4D monitors your entire production process in real time via acoustic emission analysis. Thereby, it can easily keep track of production parameters and tells you when your process is out of line. The measured data is visualized in a 3D process landscape consisting of time, frequency and amplitude, allowing for a direct analysis. Variations can be identified immediately, opening up the opportunity to fine-tune process parameters just in time.

With this folder, we introduce several best practice examples of the Optimizer 4D to you. It is the new flagship for crack detection, process optimization and tool monitoring available only at QASS in Wetter (Ruhr), Germany.

Machining

The image shows a milling tool with three edges. One of the edges is slightly damaged.

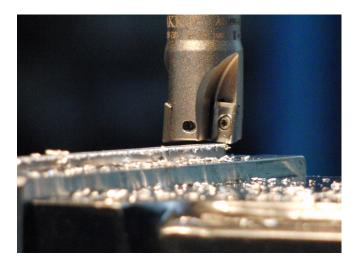
The dull edge produces a different signal than the other two sharp edges. The one "dull" signal is larger and of higher frequencies than the two "sharp" signals. This is representative for an early phase of tool wear that the Optimizer4D can detect. The user is always well-informed about the condition of the tool and can decide (or will be reminded by the Optimizer4D) when to change it.

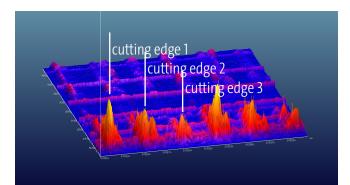
Please note that this is no subsequent inspection method, it's real-time, in-process and nondestructive.

Gear grinding

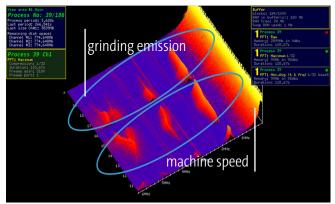
In high precision manufacturing even small faults lead to a mal-

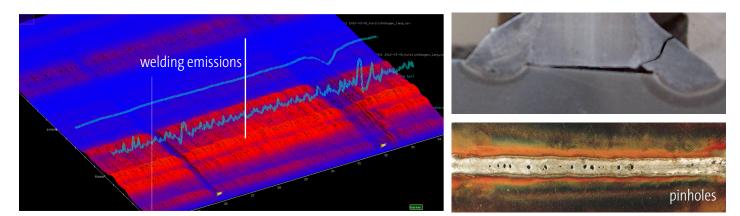
function and therefore to scrap production. This is especially true for grinding. Optimizer4D perceives a standard grinding process as a fingerprint and compares it with every new production cycle to determine deviations - and to stop the process, if these deviations exceed tolerance thresholds.











Welding

Deviations during a welding process are detectable via high-frequency impulses. This applies for weak spots like cold cracks, tiny welding pores, burn-through and splashes during the welding. Additionally, it's possible to evaluate the amount of energy that goes into the process. Even with

laser welding. You receive the quality results during the welding process.

Joining

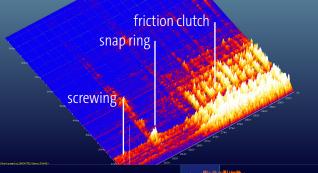
Is every single part assembled? Is no part of the work-piece missing? Does every part fit correctly? Optimizer4D

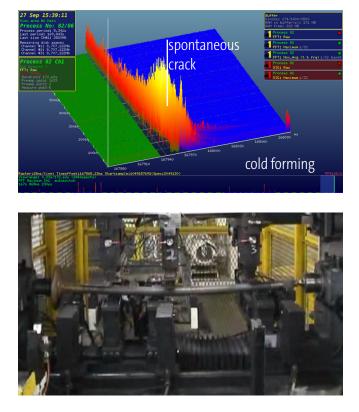
can tell you if everything is okay or not. The signal image depicts the tightening of a screw, combined with a snap ring. The tiny high-frequency signal which shows up just before the screw is tight origins from the snap ring. So, if this tiny signal is missing, you can be sure that the snap ring is missing, too. Simple, thanks to High Speed Process Monitoring. This example is transferable to other, more complex processes.

Crack detection

During joining, cold forming or bending and straightening or similar production processes, cracks can occur in a work-piece or in the tooling. These cracks produce a significant and unique signal. Even cracks in the inside can be detected. Also, Optimizer4D detects cracks that are invisible at the surface of the work-piece. At the very moment it occurs. Safe and reliable.









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QASS is certified according to ISO 9001:2008 ISO 14001:2004

Wire drawing

The closer a production process gets to the limits of material and machine,

the higher the chances for failures. This is the same for wire drawing. You always try to draw as fast as possible. Optimizer4D helps you finding the optimized speed. Leaks of chemical paste, rough surfaces or resonating tools and some types of cracks are detected in real time.

Monitoring of complex processes

Optimizer4D is able to monitor production processes which consist of multiple phases

and tools. For example, during inductive hardening. After the induction phase, a phase of quenching follows. It is possible to monitor the amount of energy which goes into the process and into the work-piece itself. Also, Optimizer4D can evaluate the quenching phase and it can depict the course of action.

Plastic injection molding

Tools for plastic injection molding are expensive and consist of multiple parts. If parts of the tool

get jammed suddenly, the whole tool is in danger. Optimizer4D allows to check if everything went right. It picks up moving and pressing emissions and pulses from the inside of the mold. For example, it is possible to detect whether the ejector is successfully retracted and if the bolts are still running smooth - or not.

