

Sound fields at a glance

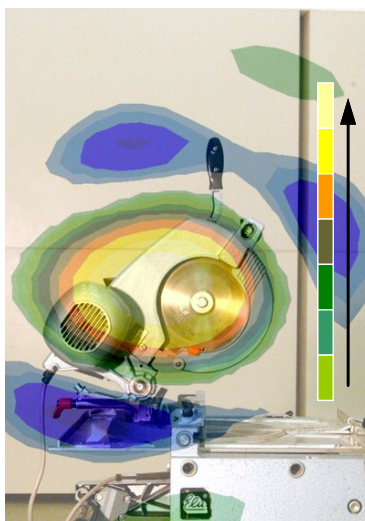
Localisation and analysis of sound sources and acoustic weak points with new measurement technique



96 high-precision microphones combined on an array and connected to an analyser.

Instrumentation

Under the designation of »acoustic holography« a measurement procedure is implemented that allows the precise localisation and analysis of sound sources even of complicated machines, devices and components. 96 high-precision microphones combined on an array and connected to a 96 channel analyser deliver information about the spatial distribution of generated sound fields. The crucial noise source among many others is tracked down in the same way as the acoustic characteristics of impulsive noise source, for example. Instead of lengthy analysis, coloured sound field maps are available immediately after the measurements have been completed. Dominant sound sources or sound transmission paths are identified at a glance and may be assessed at the same time.



Sound field snap-shot of a circular saw bench. The colour gradient shows the sound pressure variations at 1150 Hz.

Mode of operation

The simultaneous and synchronised recording of all microphone signals allows determining the sound field in an adjustable plane close to the measured object by means of the analysis software. The important part thereby is that all microphone signals are recorded with their correct phase relation. The frequency range is determined as a first order approximation by the amount of microphones, their spacing and the total size of the array. For high quality results the measurements are preferably conducted under free field conditions. Such rooms are available at IBP. But also in other rooms these conditions can be adjusted accordingly to deliver good measurement results.

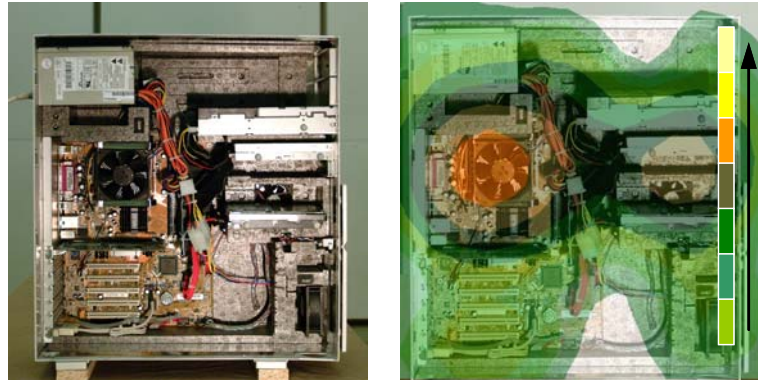
With a high dynamic range it is possible to determine the sound field characteristics sound pressure, particle velocity, sound intensity and sound power.

Fields of application

Technical Acoustics, e.g. localisation of sound sources and acoustic weak points of machines and devices as well as fans, engines and building services equipment.

Left:
Side view of an opened PC equipped with several fans (front inlet, power supply, processor).

Right:
The sound pressure distribution (1/3-octave resolution) at 800 Hz clearly shows the dominant sound source: the processor fan.



Building Acoustics, e.g. detailed acoustic analysis of walls, doors, windows and multi-functional facades as well as ceiling systems (impulse and impact sound behaviour) and installations.

Musical Acoustics, e.g. sound sources (musical instruments) with special time dependent sound characteristics

Left:
Fundamental tone of a string with sound radiation around the area of the bridge.

Right:
4. partial tone of the same string with pronounced localisation of two sources with opposite phase at the upper and lower end of the body.



Offer

The IBP offers investigations in the laboratory but also measurements at objects on site. As result you obtain the identification and a detailed analysis of the present sound sources. This often is the first step towards a successful noise control.

Use the acoustic near-field holography for your projects and developments. You save time and improve the acoustic quality of your products.

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