2D Outdoor Measurement

The Acoustic Camera as a Tool for Sound Source Localization

CHALLENGE

Some residents living close to the Vattenfall power plant in Lichterfelde complained about a repeated wind noise (whistling), which occurs in moderate to strong winds. A precise localization of the sound source has not been unsuccessful yet. The main sound source should be located in order to be able to take effective measures.

SOLUTION

Using the Acoustic Camera, noise sources can be precisely determined and documented in the shortest possible time. In the first step, an overview measurement of the entire power plant is carried out to localize the area of the disturbance. For a more precise analysis of the sound sources found, follow-up measurements are then conducted in close proximity. Based on these measurement results, efficient sound insulation measures can be taken. Subsequent measurements with the Acoustic Camera allow a before-and-after comparison to check the effectiveness of the measures. The power plant can remain in operation during the measurement, requiring no downtime.

BENEFITS

- Fast and easy
- Long distance measurement capability
- Quick insights on-site
- Detailed analysis options
- A to B comparison

MEASUREMENT

Measurement object	Power plant in Lichterfelde
Microphone array	Star48 AC Pro Ring48 AC Pro
Software NoiseImage 4	Acoustic Photo 2D Recorder Interface Spectral Analysis Advanced Algorithms
Data acquisition	Data recorder mcdRec

Within a couple of months, two measurements were conducted. The Acoustic Camera was set up across the vent deck on an oil tank at a height of 23 m. Both times, the Star array was put at the same spot at a distance of 25 m to the objects of interest. Both measurements were conducted during operation of the vents. In the first measurement, the noise sources were analyzed. In the second measurement, the effectiveness of the noise reduction treatments was analyzed.

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RESULTS

During the first measurement with the Star Array in the far field, the surrounding staircase at the chimney can be clearly identified as the main noise source (Figure 1). The spectral analysis shows discrete frequencies indicating a whistling of the wind over the grating structure. Using the Acoustic Camera, it was possible to associate these frequencies with different sound sources at the grating structure of the staircase (Figure 2.1). In order to prevent this flow noise, the customer dammed the stairs with rubber mats.

The follow-up measurement shows the success of this measure. Only one sound source in the upper part of the chimney can be found (Figure 2.2). This remaining sound source comes from the upper staircase, which the customer deemed irrelevant for the acoustic measurements so far. Subsequently, the flow acoustics of the upper stairs were also improved by installing additional rubber mats

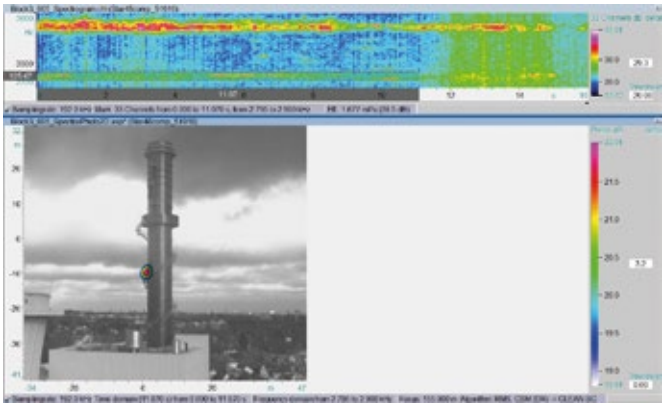

Fig. 1: Result of the overview measurement

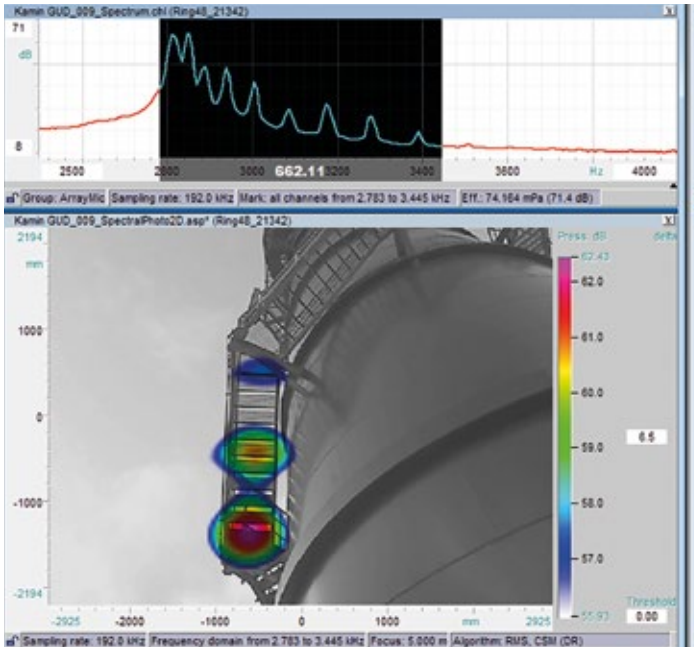

Fig. 2.1: Before acoustic optimization

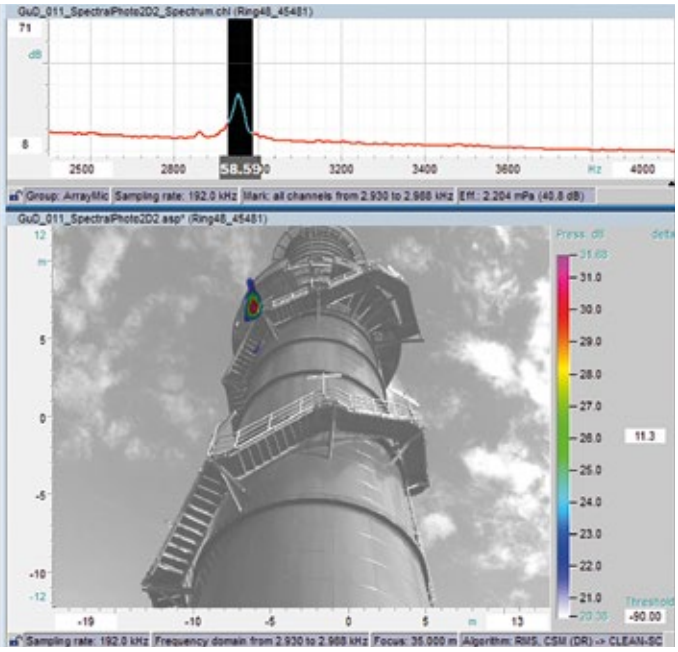

Fig. 2.2: After acoustic optimization

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