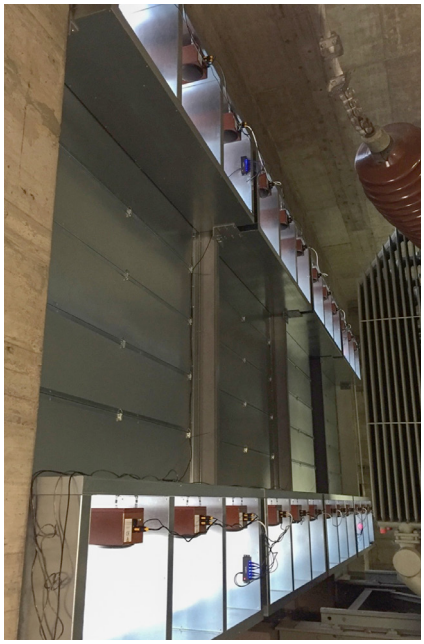
ACTIVE NOISE CONTROL

Innovative | Easy to install | Effective



- Significant attenuation of low frequence tonal noises in multiple applications.
- Cost-effective solution thanks to a system of individually operating sources.

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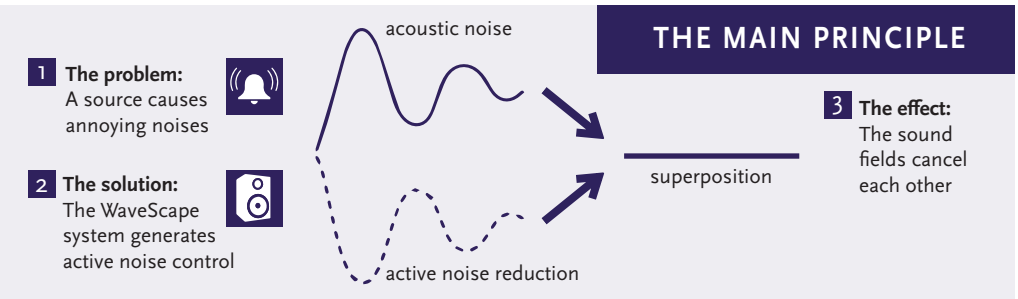


Task: Attenuation of noise transmission in ducts with large cross sections
The upper cutoff frequency f_g depends on the duct's cross section. An attenuation with a single counter-noise source (secondary source) requires propagation of plain sound waves. Room modes must not occur inside the duct.

In order to attenuate higher frequencies it is necessary to divide the duct's profile into sections which are equipped with a secondary source. Acoustic coupling between each of the active noise reduction systems leads to unstable behavior of the whole setup. Taking this acoustic coupling into account, connection between every single active noise reduction system is required to achieve stable operation.

Overall design's effort exponentially increases with the size of the duct's cross section and with the upper cutoff frequency required. A limit regarding economic efficiency for active noise control usage is rapidly reached.

Solution: local acting active noise reduction systems with cardioid directionality
A non-reflective termination due to emission of directed anti-noise prevents positive feedback of secondary sound between the systems. Thus, multiple devices can be operated independently inside the single duct sections. A connection is not necessary. Overall design effort only linearly increases with the duct's cross section and the upper cut off frequency.

The devices can be produced in large quantities. Coordination or calibration is not required. The application of these distributed, local acting active noise reduction systems is very efficient for many applications where attenuation of low and medium frequencies is required. In these cases active noise reduction is an economic alternative to conventional passive noise reduction methods.

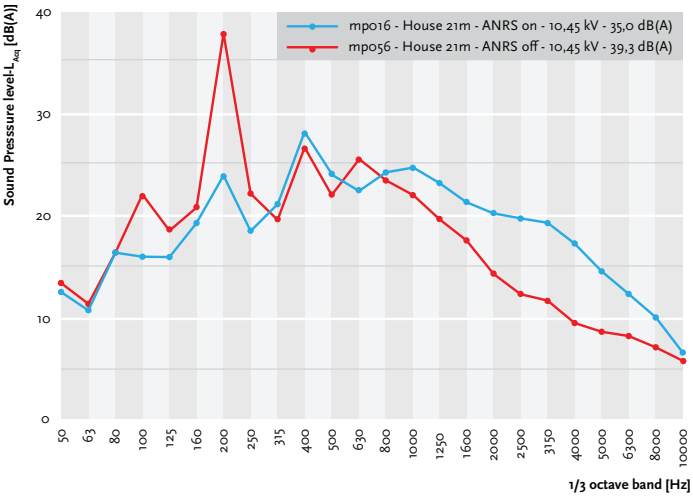
APPLICATION EXAMPLE

Reduction of noise transmission at a transformer station
Behind weather protection louvres 24 active noise reduction systems are placed on a shelf system inside the transformer station.

At a distance of 21 meters, an attenuation of the sound pressure level by 7dB at 100Hz and 15dB at 200Hz is measured.

Inside the transformer station significant influence of the active noise reduction systems on the sound pressure level at different measurement locations can be determined. Due to the cardioid directionality of each system a nearly non-reflective termination is achieved at the weather protection louvers.

Read more about this project on www.merford.com.



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