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BRIDGE DAMPER

Innovative noise reduction on steel bridges

Schrey & Veit

Shock, Vibration & Noise Control

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INNOVATIVE NOISE REDUCTION ON STEEL BRIDGES

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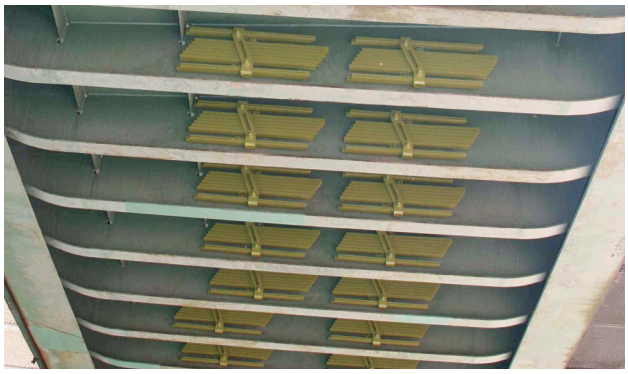
Steel bridges with rails fastened directly to the bridge structure are known to be very noisy since they nearly have no internal damping. The resulting sound emission is clearly perceivable and leads to a high strain of man and environment.

Whereas on resilient track noise emission of passing trains consists of three components (sleeper, rail and wheel) the body of the bridge is another noise source in terms of ballast-free steel bridges. Sleepers are of no importance in this case. Consequently when trains are passing the sound spectrum moves to lower frequencies and the so-called drumming noise appears.



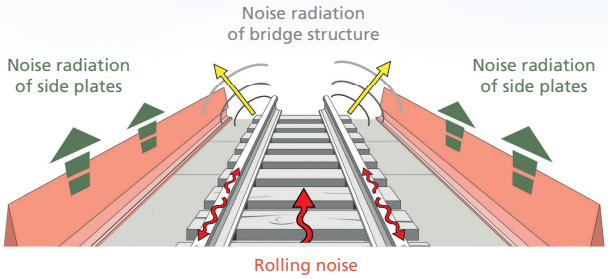
Often the structure-borne noise is more than double the noise emission of railway traffic.

Bridge dampers reduce the noise emission in the lower frequency range considerably. They consist of various vibrating metal plates and are mounted to the cross and longitudinal bridge beam as well as to the horizontal cover plates of the structure.

The drumming noise will be reduced in the range of 20 - 150 Hz.

To achieve maximum noise mitigation it is essential to tune the dampers to the individual vibration behavior of the bridge in question. Therefore precise measurements on the bridge with passing trains must be carried out beforehand.

That way a best possible performance of dampers can be attained, damping different types of trains running at different speeds. Subsequently the data is analyzed and the tuning of dampers is effected by a computer based FEM analysis.



Bridge dampers can be mounted without interfering rail traffic.

For measurements and mounting only a small area beneath the bridge needs to be closed. Depending on the length of the bridge it takes two days and for the installation of the absorbers two to six days.

A maximum noise reduction can be achieved by accompanying measures such as decoupling the rail from the body of the bridge, inserting special rubber pads and by mounting rail dampers on the railway.

Measurements on 15 bridges proved an average noise mitigation of 3 dB – 6 dB(A).

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