



Drum Silencer

System for Reducing Tunnel Blasting Sound

FUJITA

Daiwa House Group®

Outline

The blasting sound, produced when tunnels are excavated, includes ultra-low frequency sounds. Usually, sound insulation doors are installed at a tunnel entrance to cut the sound. However, sound insulation doors cannot sufficiently reduce sounds in the 10-20 Hz range, even if the door weight is increased by adding concrete. Although these strong ultra-low frequency sounds are inaudible to humans, they are transmitted through the doors, and can cause vibrations in glass windows and fittings in houses near the tunnel.

A "Drum Silencer" sound absorption system with sound insulation doors can reduce ultra-low frequency sounds produced by blasting in mountain tunnel excavation. The layout of the drums can be changed depending on working conditions within the tunnel, because the sound absorption effect of the system can be obtained regardless of installation location and layout. In addition, the durability of the system is very high and repeated uses are possible.

Characteristics

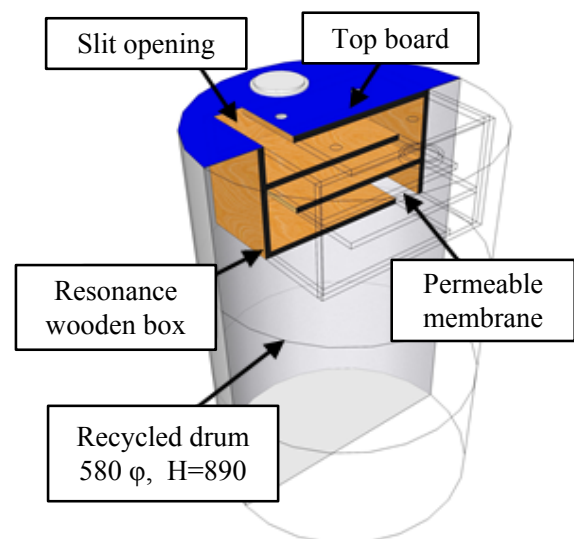
- (1) In the drum, sound waves that pass through the slit opening vibrate the air within the resonance box, changing vibration energy to heat energy.
- (2) By installing 200 drums in a tunnel, the targeted ultra-low frequency sound level (around 20 Hz) can be reduced by 80%.
- (3) The light and downsized "Drum Silencer" can be installed at the early stages of tunnel excavation when the installation space is tight, and the drums can be installed by only one worker.
- (4) The system utilizes recycled drums, and the system is useful in both efficient use of recycled materials and improving sound environment.

Track record

- (1) Japan General Highway Route No.115, Enbuchi Tunnel Project
(Fukushima Prefecture, Client : The Tohoku Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism in Japan)
- (2) Takamatsu Expressway, Tsuda Tunnel Project (Kagawa Prefecture, Client : West Nippon Expressway Company Limited)
- (3) Japan General Highway Route No.45, Taro Section Road Project
(Iwate Prefecture, Client : The Tohoku Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism in Japan)



Actual installation of the Drum Silencer System



Schematic diagram of a drum