

The Physical Components of Noise and Vibration of Rail Transit and its Effects including Control Measures

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Abstract

Noise pollution generated by transport is acknowledged to be a major environmental problem. The use of environmental noise barriers, already widespread in Europe and the USA is now becoming increasingly important, changing the face of our road and railway networks and this in large urban areas is regarded as a growing problem of communities and there are various factors that contribute to increase of noise levels in urban areas.

One of the factors is the increase in urban population, which contributes to high traffic volume combined with increased intensity. In most urban areas, the corridors are developed in a proximity where people live and work, which led to limited space and thus increase the number of high-rise buildings. This type of settlement created a dense environment in urban areas, thus increasing the traffic volume. Numerous countries have implemented new technologies to control noise pollution in urban areas. For example, low noise generating engines, changes in quality of vehicle tires and changes in road material and these technologies have proven to reduce the noise on individual scale and as the overall noise pollution in urban areas is still increasing because of increasing traffic volume.

It is of great importance that noise modelling software on multiple noise scenarios and must be able quickly and reliably to turn these models into noise maps and these maps are used to assess and monitor the influence of the noise effects as well noise maps can be helpful in planning and decision-making processes for reducing the noise pollution.

With the speedy development of urban mass transit system, more and more environmental concerns are focused on the vibrations from underground trains. Vibrations can arise from the passage of trains inside the tunnel and spread through the tunnel and surrounding soil into nearby buildings. Ground-borne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne

vibration (other than train) are buses on rough roads and construction activities such as blasting, pile-driving and operating heavy earth-moving equipment.

Vibrations in buildings associated with rail network operations can cause disturbance and complaint in a similar manner to noise. It needs to be considered at the infrastructure planning stage as is difficult to mitigate retrospectively.

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