

Design strategies for façade of the naturally ventilated tall building for acoustic comfort related to railway noise in Mumbai

Pooja Sheetal Sunil Dawalkar* & Roshni Udyavar Yehuda Rachana
Sansad's Institute of Environmental Architecture, Mumbai
dawalkarpooja@gmail.com

11th to 15th November, 2018

Abstract : Buildings located next to railway tracks in Mumbai city are regarded as lucrative real estate properties especially because of proximity to a suburban railway station. Because of adequate open space available in front of the building façade facing the railway tracks, such facades receive adequate light and ventilation. However, this also means living with the noise pollution caused by the noise of trains. Residents of such buildings eventually become accustomed to the menace even though it may have long-term consequences on their health and well-being. Development control regulations across cities in India promote the availability of open spaces as well as provision of adequate light and ventilation. But these regulations have not addressed the issue of noise pollution nor provide design guidelines to address them. The aim of this research was to develop strategies for designing acoustically appropriate façade for naturally ventilated high rise buildings to address the railway noise in Mumbai. The research methodology involved in this study of the railway noise at source and at receiving end i.e., in naturally ventilated high rise buildings exposed to railway noise. This included studying and analysing the sound levels at the receiving end at different horizontal and vertical angles to the source of noise using decibel meters. Noise levels were recorded in these locations during day and night. Sound frequencies were also noted during the daytime. A study and analysis of daytime noise levels in 1-hour duration at a particular location were conducted and a study and analysis of the difference in sound levels at a particular location due to the position of the horn on the train were also undertaken. Further analysis involved comparison and evaluation of noise levels with acoustical comfort standards, the study of sound principles related to railway noise and its control in buildings, the study of technology, materials and systems related to controlling of railway noise. The research showed that the noise generated by the horn of the train is most significant i.e., around 80 dB (A) and above. This corresponds to the mid-frequency range i.e., from 250 Hz to 2000 Hz. Based on the above work and findings the design strategies were recommended using a ray diagram to reduce the noise levels inhabitable spaces.