

## Vibration Transmission across Junctions of Walls and Floors in an Apartment Building: An Experimental Investigation

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**Abstract :** The perception of sound radiated from a building floor is greatly influenced by the rooms in which it is immersed and by the position of both listener and source. The main question that remains unanswered is related to the influence of the source position on the sound power radiated by a complex wall-floor system in buildings. This research is concerned with the investigation of vibration transmission across walls and floors in buildings. It is primarily based on the determination of vibration reduction index via experimental tests. Knowledge of this parameter may help in predicting noise and vibration propagation in building components. First, the physical mechanisms involving vibration transmission across structural junctions are described. An experimental setup is performed to aid this investigation. The experimental tests have shown that the vibration generation in the walls and floors is directed related to their size and boundary conditions. It is also shown that the vibration source position can affect the overall vibration spectrum significantly. Second, the characteristics of the noise spectra inside the rooms due to an impact source (tapping machine) are also presented. Conclusions are drawn for the general trend of vibration and noise spectrum of the structural components and rooms, respectively. In summary, the aim of this paper is to investigate the vibro-acoustical behavior of building floors and walls under floor impact excitation. The impact excitation was at distinct positions on the slab. The analysis has highlighted the main physical characteristics of the vibration transmission mechanism.

**Keywords :** vibration transmission, vibration reduction index, impact excitation, experimental tests

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