DEVELOPMENT OF HIGH-SOUND-INSULATION DOUBLE FLOOR SYSTEM WITH HELMHOLTZ RESONATORS

Investigation into sound insulation characteristics based on two-particle model

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There are a lot of old apartment buildings with thin floor slabs, which cause low ability to insulate heavy-weight floor impact sound. The authors have developed a high-sound-insulation double floor system with Helmholtz resonators, as part of renovation of these buildings. In the present paper, some types of double floor system including the proposed one are simply modeled as one- or two-particle systems, and their vibration characteristics are investigated. Calculation results based on these models clarify the effects of a variety of parameters for the double floor systems, particularly, on the positions of their natural frequencies. The tendencies of the calculation results are in good accordance with those measured in a laboratory. The proposed double floor system greatly improves the insulation performance for heavy-weight floor impact sound, about 10 dB for 63- and 125-Hz octave bands, in a real old apartment building, the slab thickness of which is 110 mm.