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Impact sound insulation calculation using DIN EN 12354-2

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The guidelines of the European standardization leads to a severe intervention in the existing German concept of standardization in the field of sound insulation in buildings. Therefore in Germany the sound insulation proof shall be carried out according to the simplified calculation model of DIN EN 12354-2. In this research project the instructions of the standard for the calculation of the impact sound insulation in German masonry buildings were checked. Furthermore the data from the informative annex of the DIN EN 12354-2 were compared with measured data.

The impact sound insulation between apartments on top of each other is not only determined by the acoustical quality of the separating element (concrete floor and floating floor) but is also strongly influenced by the acoustical characteristics of the flanking elements of the room beneath. The at present valid calculation model of DIN 4109 (1989) does not explicitly consider flanking transmission. On the contrary the calculation procedure according to the simplified model of DIN EN 12354-2 will in future consider flanking transmission using a correction K depending on the average surface mass of the flanking elements.

In extensive measurements in multi storey dwellings with masonry walls (Calcium silicate , light weight concrete , aerated autoclaved concrete and brick) the normalized impact sound pressure level was measured. Furthermore in some of these buildings structure borne sound measurements were carried out to determine the share of the direct and flanking transmission.

Good agreement between the measured and the calculated is achieved, if the impact sound insulation is calculated using the weighted values from the informative annex of DIN EN 12354-2. The simplified calculation procedure is able to predict the flanking transmission of light weight flanking elements.

The improvement of the impact sound insulation of floors with a lining underneath was not provided in the simplified model, but can be considered now using a correction term K_{FL+UD}. This correction term depending on the surface mass of the floor and the average surface mass of the flanking walls was determined by calculations using the simplified model for airborne sound transmission.

The reduction of impact sound pressure level ΔL_w by additional layers measured in the laboratory has to be reduced by 2 dB when used in the calculation model.

Using the input data from the informative annexes of DIN EN 12354-2 the calculated impact sound reduction is 1 dB higher compared to DIN 4109. The exactness of the prediction depends on the one hand upon the construction parameters of the floating floor and on the other hand on the quality of the craftsmanship. For continuity reasons with the actual standard a safety reduction of 3 dB is proposed. This value should replace the safety reduction of 2 dB in DIN 4109, Beiblatt 1, passage 4.1.1.

Summarizing it is to say that the simplified calculation procedure of DIN EN 12354-2 is applicable for impact sound calculation in typical German multi storey dwellings.