

The Effects of Spatial Dimensions and Relocation and Dimensions of Sound Absorbers in a Space on the Objective Parameters of Sound

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Abstract : This study investigated the differences in the objective parameters of sound depending on the changes in the lengths of the lateral surfaces of a space and on the replacement of the sound absorbers that are placed on these surfaces. To this end, three models of room were chosen. The widths and heights of these rooms were the same but the lengths of the rooms were changed. The smallest room was 8 m. wide and 10 m. long. The lengths of the other two rooms were 15 m. and 20 m. For each model, the differences in the objective parameters of sound were determined by keeping all the material in the space intact and by changing only the positions of the sound absorbers that were placed on the walls. The sound absorbers that were used on the walls were of two different sizes. The sound absorbers that were placed on the walls were 4 m and 8 m. long and story-height (3 m.). In all model room types, the sound absorbers were placed on the long walls in three different ways: at the end of the long walls where the long walls meet the front wall; at the end of the long walls where the long walls meet the back wall; and in the middle part of the long walls. Except for the specially placed sound absorbers, the ground, wall and ceiling surfaces were covered with three different materials. There were no constructional elements such as doors and windows on the walls. On the surfaces, the materials specified in the Odeon 10 material library were used as coating material. Linoleum was used as flooring material, painted plaster as wall coating material and gypsum boards as ceiling covering (2 layers with a total of 32 mm. thickness). These were preferred due to the fact that they are the commonly used materials for these purposes. This study investigated the differences in the objective parameters of sound depending on the changes in the lengths of the lateral surfaces of a space and on the replacement of the sound absorbers that are placed on these surfaces. To this end, three models of room were chosen. The widths and heights of these rooms were the same but the lengths of the rooms were changed. The smallest room was 8 m. wide and 10 m. long. The lengths of the other two rooms were 15 m. and 20 m. For each model, the differences in the objective parameters of sound were determined by keeping all the material in the space intact and by changing only the positions of the sound absorbers that were placed on the walls. The sound absorbers that were used on the walls were of two different sizes. The sound absorbers that were placed on the walls were 4 m and 8 m. long and story-height (3 m.). In all model room types, the sound absorbers were placed on the long walls in three different ways: at the end of the long walls where the long walls meet the front wall; at the end of the long walls where the long walls meet the back wall; and in the middle part of the long walls. Except for the specially placed sound absorbers, the ground, wall and ceiling surfaces were covered with three different materials. There were no constructional elements such as doors and windows on the walls. On the surfaces, the materials specified in the Odeon 10 material library were used as coating material. Linoleum was used as flooring material, painted plaster as wall coating material and gypsum boards as ceiling covering (2 layers with a total of 32 mm. thickness). These were preferred due to the fact that they are the commonly used materials for these purposes.

Keywords : sound absorber, room model, objective parameters of sound, jnd

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