

On site validation of sound absorption measurements of occupied pews

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Laboratory measurements of sound absorption by audiences are known to be scarcely reliable when applied to actual rooms as a consequence of several problems, among which the different area of the "sample" and the different distribution of the reflected sound may play important roles. When dealing with worship places, characterized by a variable degree of occupation and much lower absorption due to unoccupied seats, things become more complicated as absorption seems to be proportional to the number of occupants rather than to the area they cover (as normally accepted in performing spaces). The combination of these variables has been investigated by taking advantage of laboratory measurements and analysing their application to six churches, where on site measurements of reverberation time were carried out with and without occupation. The results are discussed both in terms of simple prediction formulae (Sabine, Eyring, and Arau-Purchades) and of computer simulations, showing that laboratory measurements may be reliably used in computer simulations (at least in the frequency range from 500 Hz on). At low frequencies greater attention must be paid as the absorption coefficients need to be corrected as a function of the actual distribution of the sound field in the room.

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