

OBJECTIVE ASSESSMENT OF DIFFUSIVITY IN ROOMS AND ITS RELATION TO OTHER ACOUSTICAL MEASURES

Abstract

Acoustic diffusers are one of the key elements in architectural acoustic design. The shape, placement and combination with absorbers along with the physical characteristics of the room such as the volume, size, and geometry make a complex design scenario full of variables and dependencies. This research demonstrates the tendency of academic and professional groups toward understanding and solving design problems associated with the use of different type of diffusers in architectural spaces and yet there are many details and areas of research, which remain to be addressed.

The Prediction of sound scattering reflections with the help of computer modeling is one of the most recent areas of research. The existence of different modeling techniques in which long computational processes and high performance computers are utilized, underscores a dilemma that must be dealt with. A dilemma that makes the prediction so difficult to analyze. The accuracy of such a long process is also worthy of consideration.

This study intends to develop a sound diffusion and scattering prediction software that simulates the acoustical environment of a laboratory measurement to predict scattering and diffusion coefficients of parametrically designed Schroeder, fractal and volumetric diffusers. Then a scale model of the case studies will be measured in laboratory environment to be compared with the prediction results.

The modelled diffusers will also be placed in a small room to investigate the behavior of reverberation time in room in relation to diffusion and scattering coefficients. In another word, this research is an investigation to observe whether diffusion and scattering coefficients are related to the application of diffusers in a real room and if those measures influence other acoustics events of the room such as reverberation, clarity, strength, etc. At the end author hopes to develop a new acoustic measure to quantify diffusivity in rooms.