

## ROOM ACOUSTICS

The sound within a room is a combination of direct sound which is emitted from the source and indirect sound, reflecting off hard surfaces within the room. Once emitted from the source, sound waves travel through the air until they reach a boundary surface or other obstacle. When the sound wave hits the surface it will be partly reflected off the wall and back into the room in a new direction and it will be partly absorbed by the surface with the absorbed energy being dissipated as heat.

In some cases reflected sounds can be desirable as they can be used effectively to strengthen the direct sound however reflections can also distort sound and create uncomfortable and ineffective listening or recording environments. Too much reflective sound can cause echo and reverberation within the room. Echo can be described as a delayed repetition of a sound however when these repetitions build up and become inaudible, this is called reverberation.

The reverberation time in a room is the time it takes for the sound to decay by 60 dB. If the reverberation time is too long then it makes speech very difficult to understand and the more difficult it is to communicate or record effectively. If the reverberation time is too short then the room can sound lifeless.

The most reverberant areas are those constructed with hard surfaces because the surfaces do not absorb much of the sound which hits them. In large areas with acoustically hard parallel surfaces, flutter echoes can occur, significantly increasing the reverberation time and reducing speech intelligibility.

The amount of sound energy which is absorbed by a surface is given by its absorption coefficient. A surface which absorbs no sound at all will have an absorption coefficient of 0; this would be a totally reflective surface. A surface which absorbs all of the sound energy which hits it has an absorption coefficient of 1. These are often expressed in percentages and the higher the value the more sound will be absorbed. A plastered masonry wall has an absorption coefficient of about 0.02 or 2%, which means that it absorbs 2% of the incident sound and the rest is reflected back into the room.



The most common method of dealing with problems of echo and reverberation is to absorb them. Applying porous materials to the walls and ceilings will reduce the reverberation levels by absorbing most of the incident sound, therefore reducing the level of sound which is reflected back into the hall.

Soundsorba offer a number of products for use in a wide variety of areas. Please contact us on 01494 536888 or email us at [info@soundsorba.com](mailto:info@soundsorba.com) for advice on the best and most cost effective solutions for your acoustic problem.

All product details are available immediately on our website [www.soundsorba.com](http://www.soundsorba.com).