DAY DESIGN PTY LTD

Consulting Acoustical Engineers

Home Theatres

Good acoustical design eliminates all of those problems and creates the atmosphere desired by the cinema producer. The effort that goes into the acoustics of a modern movie is most advanced. To be properly developed, the movie must be screened and heard in a theatre that is designed to compliment the superb quality of a digital sound system.

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If you lived in a gracious home at Bayview overlooking the sparkling water and gently bobbing yachts on Pittwater, and you had your own swimming pool and tennis court, what more could you want? A Home Cinema. People are more commonly choosing to build their own theatre with advice on sound isolation. This client and his family are delighted with the results and spend many relaxing hours watching their favourite movies on DVD with friends and family.

A good picture on a large screen is important. However, just as important is the sound from a sophisticated sound system. It has a clear and full high fidelity sound that is impressive.

However, it didn't happen by accident. The same sound system in an ordinary lounge room would be a great disappointment. The sound would be booming and muddy. It would be difficult to understand what is being said on the screen, even with the volume turned up high. People in nearby rooms would complain of the high level of noise from the lounge room.

Good acoustics within the home theatre will allow quiet dramatic moments in the movie to be heard with clarity and exciting events to be exhilaratingly loud without disturbing people in other parts of the house.

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Recording Studios

The requirements of a Recording Studio are different to that for a Home Theatre in that noise must be kept outside, rather than being kept inside. However, in both cases the walls must be of massive construction. Heavy brick walls may stop noise, but hard brick internal surfaces have an unfortunate spin off. They cause unwanted reverberation inside the room. To offset that problem, the interior walls must be made sound absorptive by covering them with suitable materials having a balanced spectrum of sound absorption.

Vibration isolation is an added requirement of a Recording Studio. Footfall noise from the control rooms and nearby corridors is designed to be eliminated by a floating floor and carpets.

Day Design uses customised software to model the Recording Studio on computer with soft acoustically lined walls and calculate the room reverberation time. Low-velocity distribution of conditioned air within the Studio and Control Room is also important. The level of noise from the air conditioning must be super silent.

The viewing window has special challenges for the acoustician because it must be of heavy double or triple-glazed construction to isolate sound between the Studio and the Control Room. However, it must not increase the reverberation of either room. The only sound that the Recording Engineer wants to hear in the Control Room is that which comes through the microphones and Hi-Fi loudspeakers.

Day Design has designed the room acoustics for a number of home recording studios and also some professional grade studios such at the Waverley College and Grafton TAFE.

Good acoustics are rarely achieved by chance. When serious problems were apparent in the Carnegie Hall in New York in the early 1930's, Walter Sabine was asked to sort out the problem. He clapped his hands together and noticed that it took a finite period of time for the sound to decay. From this early observation the science of Room Acoustics was developed. The unit for sound absorption is the "Sabine" in honour of Walter Sabine's early research. To achieve "Good Acoustics" in a recording studio, home theatre or video conference centre, it is necessary to have the correct number of Sabines of sound absorption on the ceiling, walls, floor and furniture. It is also necessary to have the sound absorptive surfaces correctly located.

There are two types of sound inside a room. The first is the direct sound from the sound source (person speaking or musical instrument) and the second is the reverberant sound (reflected from the ceiling and walls).

Sound travels through the air at 343 m/s. If a reflected sound reaches the listeners ears within 30 milliseconds of the direct sound it is not perceived as a different sound but tends to reinforce the direct sound. If a reflected or reverberant sound arrives more than 50 milliseconds after the direct sound it is perceived as an echo.

A certain amount of early lateral reflected and reverberant sound is desirable. It gives a room "life" and "warmth". Echoes are most undesirable.

When a sound is reflected from the wall and ceiling, it is possible for the sound in some parts of an auditorium to be distorted by differential absorption. Good acoustical design will ensure that the sound frequency is not distorted and that a balanced spectrum of sound is enjoyed at all locations within the room or studio.

DAY DESIGN PTY LTD consulting acoustical engineers provide quality acoustical advice to architects, planners, engineers, managers, solicitors, insurance companies, councils, government and the general community. Our staff of professional engineers are ready to resolve your acoustical problems.

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