Residential Room Assessment

DATA COLLECTION

When inspecting a residential room for assessment, there's a number of things we look for:

- Room dimensions
- Initial measurements
- Background sound levels
- Impact/ airborne noise
- Reverberation
- Room construction
- Photos of the room before treatment/renovations
- Location (close to traffic, under air flight paths etc.)
- These are used to get a solid understanding of how the room sounds and what the main issues are.

ACOUSTICS ANALYSIS

When analysing the room, we can use blueprints, scaled architectural drawings or room structure plans to analyse the room. These, along with images of the space and software-generated remodels, enable us to identify the areas of the space that have the greatest effects and would benefit from improvement. For instance, whether the walls require additional absorption or whether the floors need to be fixed.

We attempt to identify the best suitable solution for each unique situation out of our numerous options for resolving various acoustic concerns. especially considering that every structure has a somewhat different architecture that affects the propagation of sound. The primary goal of this investigation is to determine how sound enters the building, whether through the structure or through the air. These can offer a great deal of information into how to approach the space in order to achieve the greatest results.

SOUND PROPAGATION

Sound propagates in a number of ways, and it's worth knowing the main ways sound travels through a room. Lower frequencies tend to take more space and tend to travel like waves, this can make them harder to control. This is where sound insulation would be required, by insulating the room, we can focus on on getting the low frequencies maintained in the source room. Whereas mid-high frequencies are more direct and tend to travel like rays as they're more direct and easier to control.

Sound Reflection:
Sound reflection is the act of sound bouncing off hard surfaces, this creates the reverberation within a space. A small amount is good for any room otherwise the room can sound dead (which is ideal for only a few purposes, such as studios). These sound waves have the ability to generate from any angle.

Scattering & Diffusion:
Whilst both rely on the sound waves are based on soundwaves being reflected, the difference between scattering and diffusion is based on how the sounds are reflected. Scattering refers to the general act of a non-specular reflection of sound, whereas diffusion refers to how even the non-specular reflections are.

NOISE ANALYSIS

Once we can establish what the sound issues are for the residential room we're inspecting, we look into finding the most effective and efficient way to fix them. The most common acoustic issues we find are:

Impact Noise

Noise can transfer through the building structure, leading to sounds travelling from different rooms in the same building. This can be generated by impacts both purposeful and accidental such as walking, dropping things, or doors slamming etc.

This noise is caused by the impact exciting the structure which then travels through the structure, where other people in other rooms can hear. This can impact the results of residential space if not taken into consideration and could also lead to the room impacting the rest of the building. By limiting how much sound can travel through the building structure, we can limit how much the residential room is impacted and does impact other nearby spaces.

Airborne Noise

Airborne noise transfer refers to the sound moving through the air and not by impact, this could be external noises coming through or someone singing next door. External noises could be traffic, people walking or talking outside, or weather. To analyse airborne noise, we look at the flanking paths between rooms, i.e., other paths beyond the doorway where sound could come through, such as cracks in the wall, power-points or gaps under closed doors.

Background noise (internal and external):

The background noise level is very important for residential spaces. If it is too high, it would create an uncomfortable sonic environment. And if it is too low, it would allow for more sound sources to be audible – i.e., equipment hums and buzzing, noise from adjacent rooms or external noises.

SPECIFICATIONS: WHAT DO THE GUIDELINES REQUIRE?

There are specific ISO and ASNZ standards we follow to ensure the client receives a room that is completed to a reasonable standard. As well as regarding the NCC (National Construction Code), (Building Code of Australia) for new builds and retrofits.

These each require specific measurements, testing methods and results to be completed in order to comply.

The main topics we use standards as guidelines for are:

- Reverberation
- Absorption
- Sound isolation (proofing)
- Background noise levels
- Construction

TESTING

Multiple tests are conducted before and after the construction and installation, these are done to figure out what the issues are, and if they are resolved once the room is completed.

These following tests can be done:

- Impact noise
- Airborne noise
- Background noise levels
- Reverberation test

INSTALLATION: WHAT IS THE PROCESS?

Once we have discovered the issues, we work on modelling treatments that allow the room to meet the criteria.

Depending on the issue, and the solution, the installation can either need professional installation, or can be done by anyone with instructions. However, once it's installed, it may be (but isn't required) tested again to ensure it complies with standard.