

INFORMATION SHEET

ACOUSTIC PERFORMANCE



CONSIDERATIONS

The information provided below has been taken from the New Zealand Timber Design Guide 2007, published by the Timber Industry Federation and edited by Professor A H Buchanan. To purchase a copy of the Timber Design Guide, visit www.nztif.co.nz

OTHER MATERIALS

In some situations, particle board or wood fibre (MDF) boards may be used to achieve noise control. While the exact properties of these materials vary, it is essentially a matter of retaining surface mass to achieve acceptable acoustic properties.

SYSTEMS AND MATERIAL SUBSTITUTION

It can be tempting to substitute cheaper components or materials for some of those specified in tested system designs. This is most unwise, unless the properties of the materials or components involved are known and understood by the user. Manufacturer's design and test whole systems and certain parts may be critical to acoustic performance.

EFFECT OF AIR GAPS

Because timber may shrink or warp, it is important that any timber partition is constructed by either lapping the wood or using battens at each joint to eliminate air gaps.

An air gap of less than 1 percent in an otherwise solid structure can have a serious detrimental effect on acoustic performance, irrespective of the construction material used.

A 1 percent air gap in a timber fence would mean the noise control reduced from 21 to 14 dB(A). From this example, it can be seen that if a door or window is left open it will affect the resulting sound reduction in any design.

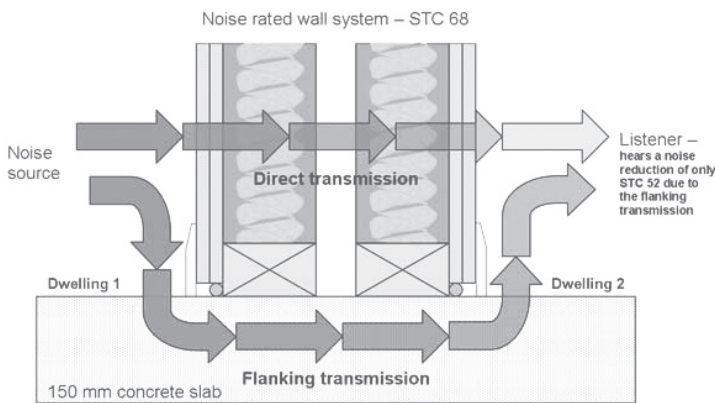
EFFECT OF FLANKING

Flanking (sound that transmits around the partitioning element by some path) is another important consideration when designing a noise control system.

The acoustic performance of a wall, floor or ceiling element can be reduced significantly if a conduit exists for noise to bypass the element, as shown in diagram 1. This often happens when structural connections bridge an acoustic separation, such as blocking between double-stud walls or a continuous floor.

Flanking is also common via adjacent openings (such as doors and windows) or through low-rated ceilings over the top of highly rated walls.

Diagram 1: Problems of flanking noise transmission through a concrete slab



DESIGN WITH SINGLE NUMBER RATINGS

Although the sound transmission class (STC) or Weighted Sound Reduction Index (R_w) value is a good guide to the transmission loss of a particular construction, a change in one of these values does not necessarily mean a uniform increase, or decrease, in the transmission loss at all frequencies.

It depends on the design problem and the frequency of the sound to be reduced whether upgrading of a particular construction will achieve the required acoustic improvements. Single number ratings are a useful guide to the design performance of an acoustic wall or barrier.

SOUND ABSORPTION

Timber is a successful material to use when room acoustics are important and where a soft material is required to protect absorptive materials. It also has good aesthetic and vandal-proof qualities.

Soft fibreglass-type absorptive materials can be protected with a slatted timber facing, leaving 5 to 10 mm gaps between the slats, as shown in diagram 2.

This design minimises the likelihood of any damage to the wall yet allows good sound absorption properties. The final result is a hard-wearing timber surface without the undesirable reflecting properties of many other hard surfaces.

Diagram 2: Construction of a special sound-absorbent panel

