



Sound standards

Noise complaints have reached a crescendo, but tougher sound insulation standards mean the writing is on the wall for the building industry. **Steve Davidson** reports.

Our towns and cities are noisier than ever before. Busier roads and airports, smaller urban subdivisions, apartment living: all are contributing to a noise epidemic that's sweeping Australia.

Dr John Davy, an acoustics specialist at CSIRO Building Construction and Engineering, says noise complaints have skyrocketed in recent times.

'In Melbourne's City of Yarra, noise complaints more than doubled between 1999 and 2000, following a change in

residential density guidelines,' Davy says. 'In Sydney, police and councils are called to tens of thousands of noise complaints a year, mostly relating to rowdy neighbours.'

Even peaceful Tasmania has a noise problem, with nearly half the environmental complaints made each year relating to excessive noise. No city is immune.

Davy and his colleagues believe that countering environmental noise requires revamping the Building Code of Australia (BCA).

'Our sound insulation regulations weren't devised to cope with our modern lifestyle and the associated noise levels,' Davy says.

'Today's home entertainment systems, with their powerful amplifiers, can produce decibel-rich noise that can easily escape through the windows, walls and floors of typical modern homes and units.'

'The tendency to rip up carpets and other floor coverings to expose hard wooden floors, for health or fashion reasons, and the increasing use of ceramic tiles, also lead to noisier surroundings.'

Adding to the problem is the tendency of apartment developers to 'build down' to the sound-insulation requirements of the BCA, which are among the most lenient in the developed world.

The current acoustical provisions in the code are based on those adopted by New South Wales in 1974. These, in turn, were based on the lowest standard applying in the United Kingdom at the end of World War II.

Raising the standard

Urban noise falls into two categories: internal noise, which comes from inside the building via a common wall, floor or ceiling, and external noise, which emanates from outside the building through the building façade. Only internal noise is regulated by the BCA.

Internal walls are rated using a special index of the reduction in decibels that

Increased air traffic is one of the more obvious causes of the urban noise epidemic - generating more than 100 decibels.



Left: Noise barriers such as this can reduce sound entering buildings, but what about noise from adjacent dwellings in attached apartments, motels and hostels? Building regulations have not kept up.

Right; Scientists working on noise reduction in an anechoic chamber — one free of echo and reverberation.

occurs when noise passes through it. That is, the capacity of the wall to 'soak up' decibels. This is called the weighted sound reduction index.

The minimum allowable rating according to the BCA is 45 decibels. A wall with this rating reduces the loudness of sound to 1/23rd of that on the source side. But this level is now inadequate.

Floors can be noisy too, but are not dealt with in the BCA, which still assumes the use of carpet and underlay.

The Australian Building Codes Board, which maintains the BCA on behalf of governments, has been looking at recommendations made by the Association of Australian Acoustical Consultants to 'beef up' the code's sound insulation provisions.

The association proposed that minimum airborne sound insulation for walls, floors and ceilings should be increased, from a weighted sound reduction value of 45, to 50 decibels. This is a value high enough to partly insulate a dwelling against the racket made by a large television or music system.

Recommendations were also made in relation to impact sound levels for floors and walls, sound insulation of waste pipes, and a new quantitative impact sound insulation test for walls.

A sound compromise?

The board responded early this year with proposed changes to the BCA that reach a compromise between reasonable building cost and good acoustic performance.

'There is no magical but affordable sound insulation material,' Davy says.

'Ideally, sound insulation in buildings requires large mass, little air leakage, wide wall cavities, preferably with sound absorption material in the cavity (to deaden reverberation), and vibration-isolated construction. This means that high-performance sound insulation is expensive.'

The proposed moderate changes to the BCA are estimated to add an extra 1–2.5% to the cost of constructing attached



dwellings. What's more, the extra thickness of walls, floors and ceilings would mean that 3% fewer dwellings could be fitted on a development site. This translates to many dollars. A new townhouse will typically cost \$1000 extra. Nationally, the proposal is estimated to cost \$115 million a year.

On the other hand, industry should make some savings due to less litigation and less need for remedial work.

Certainly, strengthening building regulations will be an important counter to the growing problem of urban noise pollution. It may not mean people make less din, but it should mean that less of it is heard!

The earliest the proposed changes will take effect is January 1, 2002, depending on the level of adverse comment attracted by the draft proposals.

More about noise reduction

Davy JL (2000) The regulation of sound insulation in Australia. Acoustics 2000, Putting Science and Technology to Work, *Proceedings of the Australian Acoustical Society Annual Conference*, 15–17 November 2000, pp 155–160.

Proposal to Change the Sound Insulation Provisions of the Building Code of Australia (RD2001/02). Regulatory Impact Statement. May 2001. Australian Building Codes Board.

Insulation science

SOUND insulation relates to the loudness of the sound, the acoustic performance of the dividing barrier (such as a wall) and the background noise level on the receiving side of the barrier. Background noise is important. For instance, a block of apartments in a quiet suburb will need better sound insulation between units than one on a busy road because noises are more noticeable.

In Australia, sound insulation is measured in 18 or more different sound frequency bands and from these a single value is calculated. This is called the 'weighted sound reduction index'. A wall with a weighted sound reduction value (Rw) of 50 reduces 'standard' internal noise by 50 decibels at 500 hertz (musically speaking, at upper C).

To put this in perspective, noise levels in excess of 85 decibels, averaged over an eight hour working day, are regarded as dangerous in the workplace, while one-off exposure to 115 decibels can damage a person's hearing. A large jet airliner flying low overhead might produce about 106 decibels, roughly equivalent to a loud rock band up close.