CASE STUDY 4

WALL LININGS AND ACOUSTIC PERFORMANCE

NHBC Acoustic Services

NHBC ACOUSTIC SERVICES

RANGE OF SERVICES
- Pre-planning consultancy
- Design advice on layout and specification
- Traffic/plant noise surveys
- Pre-completion sound testing
- Noise at work surveys
- Post-occupancy investigations
- Sound insulation testing

PROJECTS
- Dwellings (new build and conversion)
- Hotels, student halls, care homes
- Schools, offices and other non-residential

ENGLAND AND WALES
- Part E
- PPG24
- Code for Sustainable Homes

SCOTLAND
- Section 5
- PAN 1/2011 (PAN 56)

NORTHERN IRELAND
- Part G
- EcoHomes
- BREEAM
- BB93

The acoustic performance of a masonry wall or floor is primarily determined by its mass, the isolation between its components and its junctions with flanking elements. However, the wall linings can also play a vital role, and in some cases, lining workmanship may determine whether a wall passes or fails a pre-completion sound insulation test (or gains the required credits under schemes such as the Code for Sustainable Homes). Recent investigations by NHBC Acoustic Services, to help some clients with poorer performing plots, have demonstrated the effect that plasterboard and its fixing method to separating and flanking elements can have on acoustic performance.

STANDARDS

Guidance on the fixing of plasterboard to masonry walls is contained in BS 8212:1995: Code of practice for dry lining and partitioning using gypsum plasterboard. Adherence to this standard is requested by most plasterboard manufacturers, and is a requirement in NHBC Technical Standards.

SITE INVESTIGATIONS

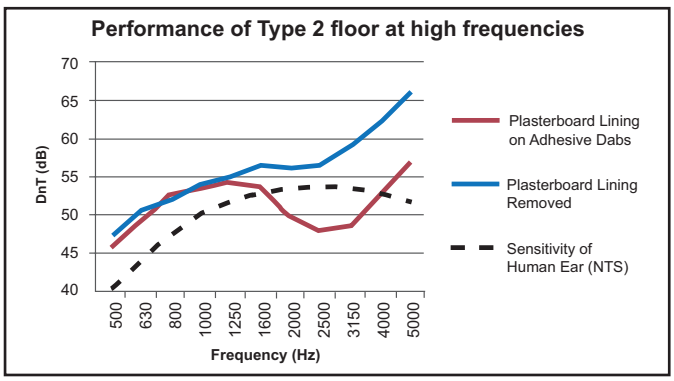
NHBC's acousticians recently attended new build homes where the performance of separating elements was falling short of the desired performance standards in some areas of the development. Results from two of these investigations are summarised below and overleaf:

Case 1: Masonry separating floor with masonry cavity external walls

A prestigious development where some party floors only marginally achieved the minimum performance requirements of Approved Document E (2003) and where there were also major complaints by some residents. During tests, significant flanking sound transmission via the inner leaf of the external walls was noted, at high frequencies.

As part of the investigation, the plasterboard lining was removed (such that the blockwork was fair-faced) and before further works carried out, re-tests performed. The single figure performances improved by 2dB to 3dB and, at frequencies where the ear is most sensitive (1kHz to 5kHz), the sound insulation performance improved by nearly 10dB.

The graph below shows the sound insulation performance of the floor, with and without plasterboard linings to the perimeter walls. The elevation of the dotted line (not to scale) indicates frequencies at which the ear is most sensitive. The largest improvements occurred at such frequencies thus indicating that (subjectively)



Acoustics and noise control are important factors requiring careful consideration. NHBC can help. For more information, please call **0844 633 1000** and ask for **'Acoustics'**, email **acoustics@nhbc.co.uk** or visit **www.nhbc.co.uk/acoustics**.

a room without the linings would sound better that one with the linings.

Case 2: Masonry solid separating wall on a heavy masonry floor

A development where the party wall performance varied significantly across the site and resulted in a number of test failures. Flanking transmission was found to be suitably controlled; however, large distances between adhesive dabs, resulted in a resonant 'drumming' and hence a poorer performance at low frequencies. Walls in which the dab spacing was significantly smaller, had a 5dB to 6dB improvement over walls where dabs were sparsely distributed.

DISCUSSION

In both the above (and other) recent examples, it was found that, in the poor performing plots, the plasterboard was not fixed in strict accordance with BS8212.

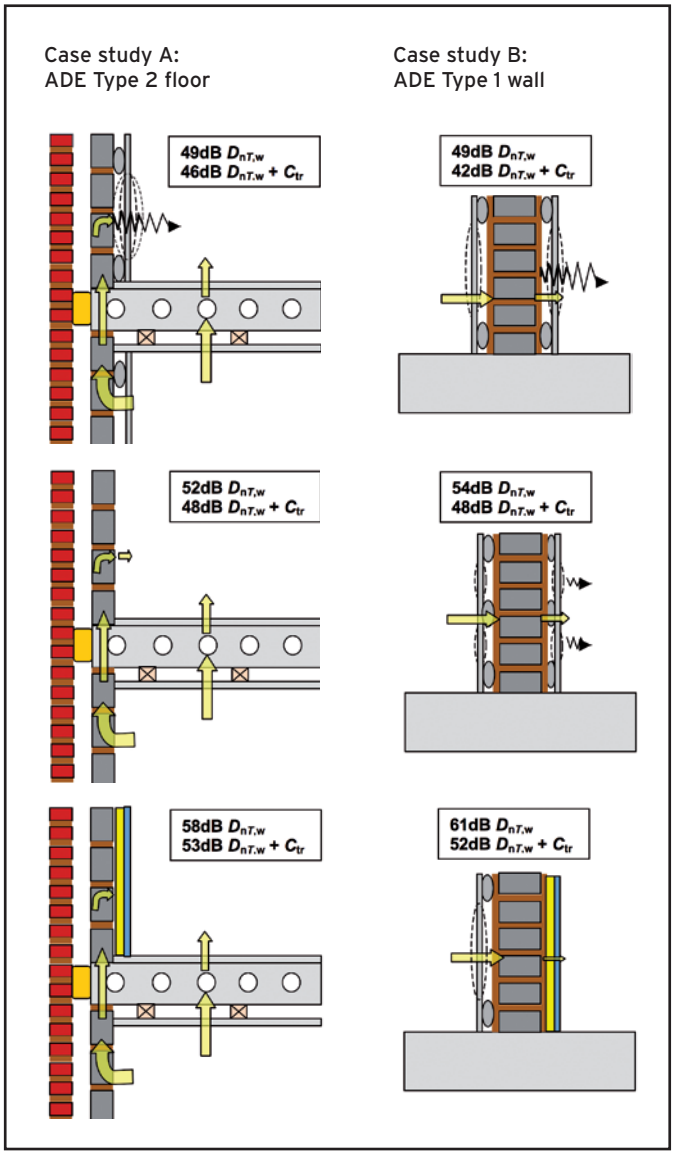
BS8212 requires that for a 12.5mm plasterboard sheet of 1,200mm width: (i) adhesive dabs should make contact with at least 20% of the plasterboard, and (ii) at least three virtually continuous vertical lines of dab, with horizontal centres no less than 600mm, are adhered to each board. A typical best practice dab pattern is shown in the BS8212.

An example of poorly spaced adhesive dabs is shown in the picture (top right). Due to the physical properties of plasterboard, some degree of resonance will nearly always occur; however, the level of resonance of the plasterboard, and hence the overall performance, can be dramatically affected by the fixing of the plasterboard.

On the right are diagrams illustrating the constructions described in the two cases above and they show some of the sound transmission paths as well as the associated test results.

In both examples, extra improvements in acoustic performance were achieved by applying insulated, rather than standard, plasterboard wall linings.

If you have a site with sound insulation problems, contact NHBC's acoustic consultants for the best advice.



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