CASE STUDY 2
FLANKING SOUND TRANSMISSION

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

Sounds from neighbouring dwellings can transmit not only directly through a separating wall or a separating floor, but also along adjacent elements, such as external walls and internal floors. Sound which travels in any direction, other than directly through the separating element, is called flanking sound.

Designers should adequately ensure against flanking sound transmission such that it does not undermine the performance of a well-designed separating wall or floor. Here, NHBC's acousticians share some of their experience in helping clients meet the required acoustic performance by controlling flanking sound transmission.

TIMBER SEPARATING FLOOR WITH FLANKING VIA A CAVITY MASONRY EXTERNAL WALL

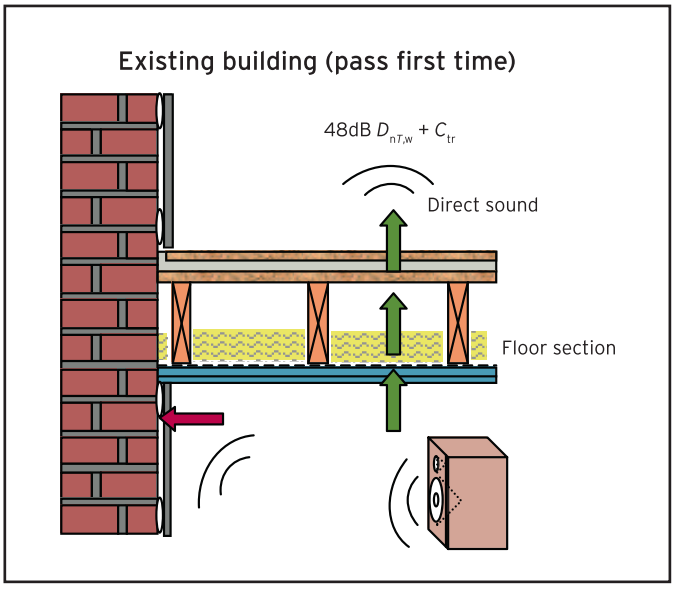
NHBC acousticians carried out pre-completion sound insulation tests in flats which were formed by converting and extending an existing building. The timber separating floor construction was identical throughout the building. The external walls in the existing building comprised solid brick (nominally 300mm thick) and, in the new extension to the rear of the building, the external wall comprised a cavity construction with a brick outer leaf and a 100mm thick lightweight aircrete block inner leaf.

Approved Document E 2003 (ADE2003) states a minimum airborne sound insulation performance standard of 43dB $D_{nT,w} + C_{tr}$ for separating walls or floors between dwellings formed by converting existing buildings. The separating floor test carried out in a section of the original building yielded a result of 48dB $D_{nT,w} + C_{tr}$ (pass) but the test carried out in the new extension to the rear of the building yielded a result of 41dB $D_{nT,w} + C_{tr}$ (fail).

Underweight masonry walls resulted in a failed test

Design guidance contained in ADE2003 recommends that where timber separating floors adjoin continuous masonry walls, the mass of the masonry leaf should be at least 375kg/m^2 (e.g. solid brick or dense concrete block ~200mm thick). Where this mass is not achieved, the underweight masonry walls should be lined with a sound insulating independent panel or wall lining system.

The mass of the solid external wall (existing building) was nominally 500kg/m^2 and the mass of the inner leaf of the cavity masonry external wall (extension to rear) was



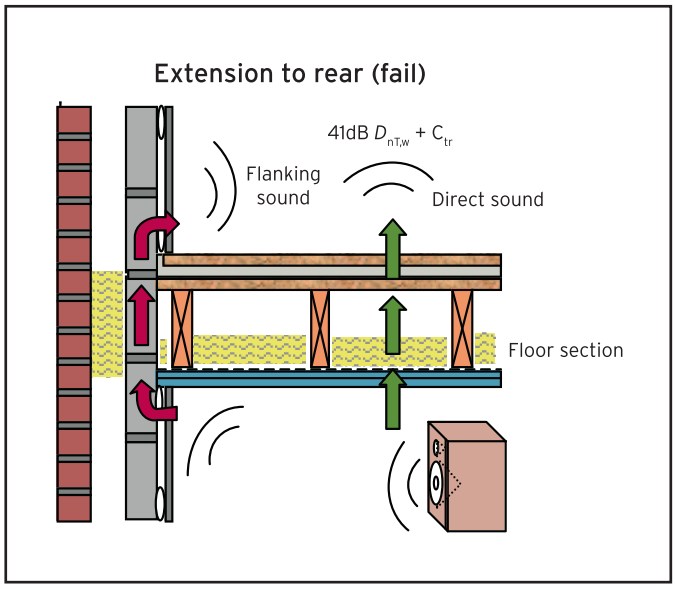
Acoustics and noise control are important factors requiring careful consideration. NHBC can help – for more information, call **0844 633 1000** and ask for **'Acoustics'**, email **acoustics@nhbc.co.uk** or visit **www.nhbc.co.uk**.

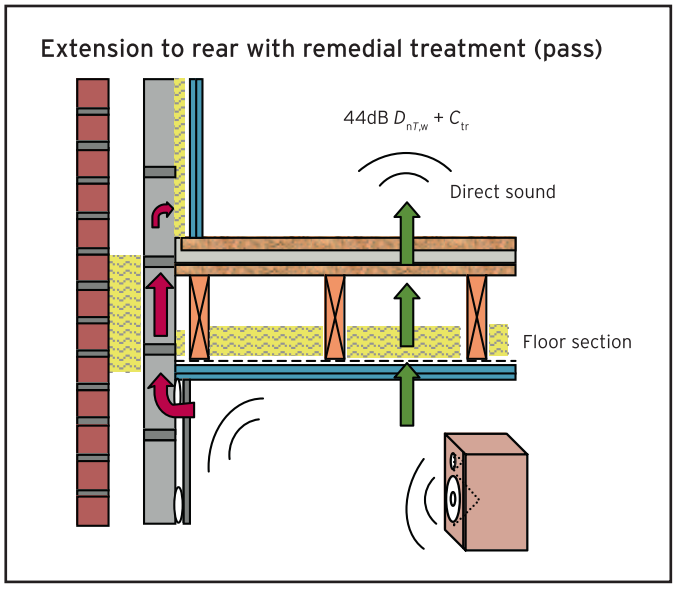
nominally 90kg/m^2. Because the inner leaf of the cavity masonry wall was below the minimum mass recommended in ADE2003, and independent panels had not been used (the wall was finished with plasterboard on dabs), a significant flanking sound transmission path existed, which undermined the performance of the separating floor itself.

Optimal remedial solution found to improve performance

The primary reason for the shortfall was flanking sound transmission via the inner leaf of the external cavity wall. Three of the four perimeter walls around the separating floor comprised the aircrete block, and each was making a significant contribution to the overall level of flanking sound transmission. A section on one of the perimeter walls had fully fitted kitchen units, whilst another contained some windows. To minimise cost and disruption, the builder asked that remedial treatments be optimised if possible. In this instance, our calculations showed that treating the long sections along two of the perimeter walls (that did not contain units) could yield a sufficient improvement in performance. Treatments were therefore applied accordingly and subsequent tests yielded a result of 44dB $D_{nT,w} + C_{tr}$ (pass). The builder was very happy with the outcome, as the speed and quality of the advice provided by NHBC clearly minimised the costs and disruption.

Please note that each situation may require a specific solution; this is an example only.





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