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IMPROVING THE SITUATION OF INADEQUATE SOUND INSULATION BETWEEN HOUSES.

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The sound insulation required between two attached dwellings depends on three basic criteria. These are the general background noise level in the area where the dwellings are situated, the noise levels and nature of noise created by the neighbours and the sensitivity of the occupants to the noise from their neighbours.

The U.K. Building Regulations attempt to simplify this situation by setting a minimum standard of sound insulation which should be attained on the basis that if this standard is achieved it will satisfy a good percentage of occupants. Thus, even if this standard were always met there would be a number of dissatisfied people demanding improved sound insulation. The regulations then attempt to simplify the position further by giving a 'Deemed to Satisfy' list of specific constructions which may be used without the need to test whether or not the performance standard is achieved. It is well known that most of the constructions given in this list have a high probability of not meeting the above standard. It is, therefore, true that a high percentage of occupants of attached properties are likely to have some cause for complaint about poor sound insulation and of those, a good number will wish to take remedial action to alleviate the problem. There are also increasingly more cases of buildings, which have previously not been required to meet any sound insulation regulations, being converted into dwellings thus resulting in walls with low sound insulating properties needing to be uprated.

In all situations it is important to ascertain the nature of the problem which may be due to an inherently poor separating wall, poor workmanship, both of these or some form of flanking transmission. Detailed measurements and an examination of the structure may reveal either the path of flanking transmission, which might be eliminated to solve the problem, or that the performance of the separating wall and/or its associated external wall needs to be improved.

There are many ways of increasing the sound insulation of a masonry wall, the most efficient and cost effective employs the principle of erecting a lightweight independent lining adjacent to one face of the wall.

The requirements of the optimum lining are:-

1) It should be capable of providing a reasonable amount of sound insulation in its own right and should therefore have a mass in the region of 20 - 40 kg/m^2.

2) It should be structurally stable when freestanding i.e. fixed only at top and bottom such that there is no mechanical connection between it and the wall surface.

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3) It should be well sealed at the perimeter and at joints between panels.

4) It should be set far enough away from the wall to minimise the effects of mass-airspring-mass resonances. In theory the spacing should be such that the resonance occurs well below 100 Hz but in many cases this is not possible due to practical constraints. The use of a glass fibre mat hung in the cavity between the lining and existing wall has the effect of damping the airspring at resonance thus minimising its influence on the final result. The damping of the airspring also occurs above the resonant frequency resulting in improvements across the whole range.

Typical lining systems include a timber frame, fixed top and bottom only, lined with two layers of 13 mm plasterboard or a free standing double layer of 19 mm plasterboard laminated with a plaster adhesive.

Laboratory measurements have shown good potential improvements in sound insulation provided by these linings. This has been related to site measurements to indicate the effects of flanking transmission on their performance.

In most cases it is found that on site the correct lining can be selected to produce a useful increase in sound insulation. Where necessary, the Performance Standard of the Building Regulations can usually be met following suitable remedial treatment.