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SOUND INSULATION IN CONVERTED DWELLINGS - THE SOUTHWARK APPROACH

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For a number of years it has been the practice in both Public and Private Sectors to renovate older inner city houses rather than demolish and start from new. Because of disenchantment with tower blocks and large estates this policy of rehabilitation and adaptation has been extensively pursued in Southwark.

In the late 1970's the drawbacks of this policy came to a head on the Grosvenor Park Estate in Camberwell. The housing consists of elegant stock brick terraces on three or four storeys built in the 1850's for single family occupation. The original dwellings were converted into flats to form a total of over two hundred new homes, intended for a mix of tenancies and taking in families with young children and older single people. Many of the tenants were already used to living together, but others were complete strangers often separated by no more than a lightweight stud partition or traditional timber joist floor. Others had kitchens over their neighbour's bedrooms or bedrooms next to uncarpeted communal staircases.

Complaints were received of neighbour's domestic noise. In one flat it was possible to hear cups of tea being stirred in the adjacent flat. Radios and television played at normal volume made life unbearable for neighbour's with different tastes. Intimate details of domestic life were plainly audible and eventually sensational stories of disrupted sex lives reached the national press. One lady complained of the atmosphere of tension and depression these conditions created.

The tenants took the matter to a local law advice centre who employed independent consultants to assess the noise nuisance. Objective sound insulation tests were carried out by acousticians from the South Bank Polytechnic. They found that the untreated floors had aggregate adverse deviations of the order of 250 dB and 180 dB for airborne and impact sound insulation respectively.

Eventually the matter was brought before the Ombudsman. The Council argued that there was no statutory requirements to provide sound insulation and that no other housing authority in London had a policy of providing such insulation. The Ombudsman determined that the complainants had suffered injustice owing to the Council's maladministration of the matter. The Council was particularly criticised for its insensitive allocations policy and for its delay in finding an answer to the inadequate sound insulation.

In fact during the three years prior to the case the Environmental Health Department, in conjunction with the Surveyors and Housing Management Division had been experimenting with various forms of floor treatment to upgrade the sound insulation. They started with simple floor coverings and finally opted for the independent ceiling with a soft finish to the floor above.

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This design was adopted by the Council as the best one and further experience has shown it capable of reliably achieving an acceptable level of performance in Southwark conversions. (See figures 1 and 2).

Many, if not most, conversions are carried out by private developers and Housing Associations and so in early 1983 the Council adopted a planning policy of requiring that dwellings in converted buildings be provided with sound insulation equivalent to that described in Part G of the Building Regulations, 1976. No statutory requirements exist for sound insulation of any dwelling, new ones included, in Inner London. Since then several hundred consents have been conditioned in this way and to date there have been no appeals.

The technical implementation of this policy is carried out by the Environmental Health Department. A guidance note is available illustrating the standard requirements. The condition is so worded that the Council can agree a lower standard if the physical limitations of the building so demand it, for instance in the case of listed buildings with not worthy skirting boards or cornices, or rooms with low ceilings. Considerable work has been carried out to ensure that listed buildings can be adequately sound insulated without effecting these features. Figures 3 to 6 illustrate a number of variant schemes which have been agreed and tested in accordance with B.S. 2750:1956

Finally, should any one be under the impression that conversions can still be implemented without adequate sound insulation then let me draw your attention to the case of Samson V Hodson - Pressinger and another (1981) 3 All ER. The case was heard at the Court of Appeal and it was held that the landlord was liable for the noise nuisance caused by poor sound insulation, if the dwellings are used in the normal way and for the purpose intended. It therefore follows that if these circumstances are capable of being a common law nuisance then they can be remedied by the procedures set out in Sections 58 and 59 of the Control Of Pollution Act 1974.

Let the Landlord beware!

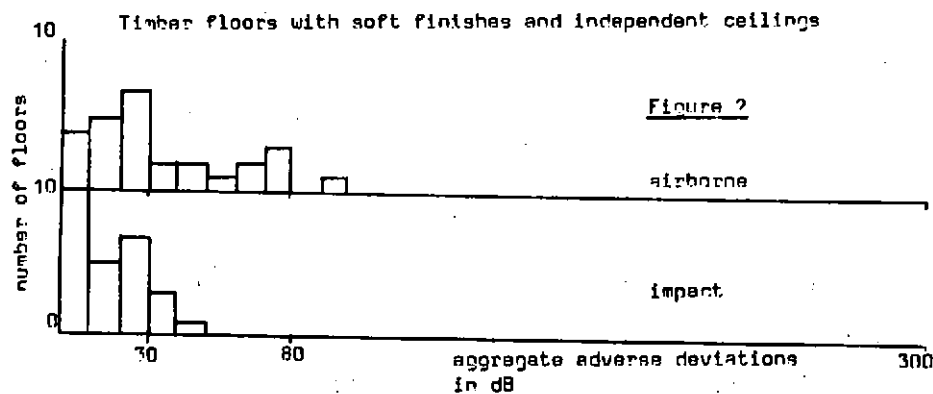
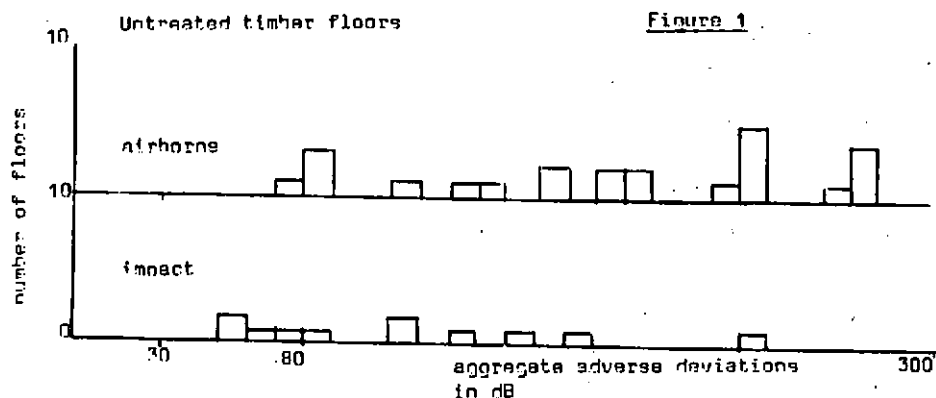
The authors wish to thank the Head of Environmental Health Service of the London Borough of Southwark for his permission to publish this work. We would also like to acknowledge the co-operation and help of Messrs. Fothergill & Nielsen at the Building Research Establishment and our colleagues in the Environmental Health Service and Surveyors Divisions.

The views expressed here are those of the authors only.

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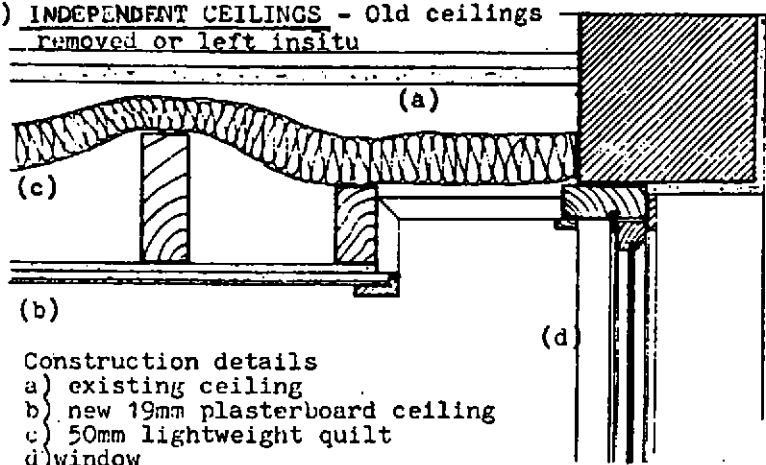
Summary of Sound Insulation Test Results



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3) INDEPENDENT CEILINGS - Old ceilings removed or left insitu



X-section through an independent ceiling with detail for high window head

RESULTS

A) Insitu ceiling retained

Airborne

AAD=21

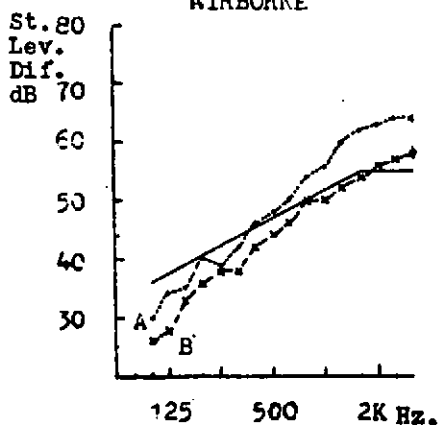
$L_{n,w}=51$

B) Insitu ceiling removed

AAD=62

$L_{n,w}=47$

AIRBORNE



Impact

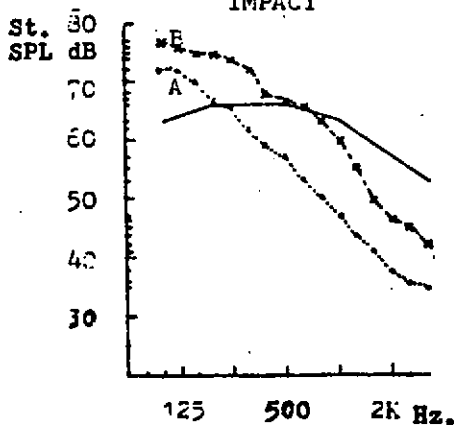
AAD=22

$L_{n,w}=56$

AAD=63

$L_{n,w}=63$

IMPACT

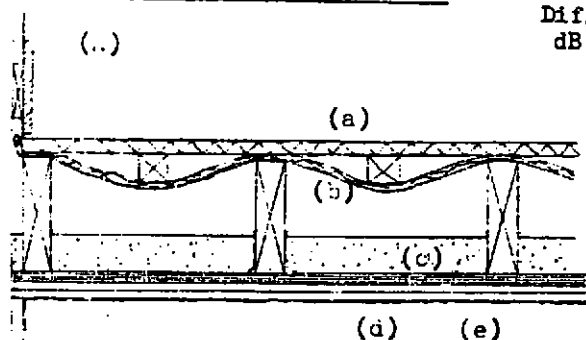


Results to BS 2750:1956 & BS 5821. Average of four floors

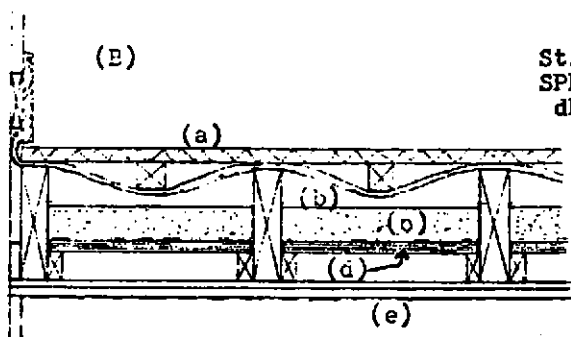
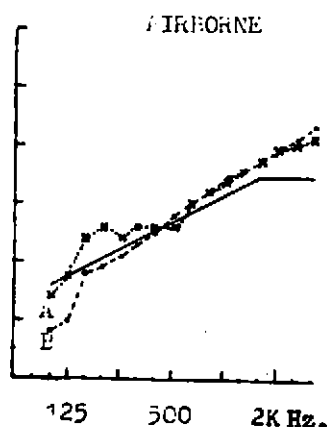
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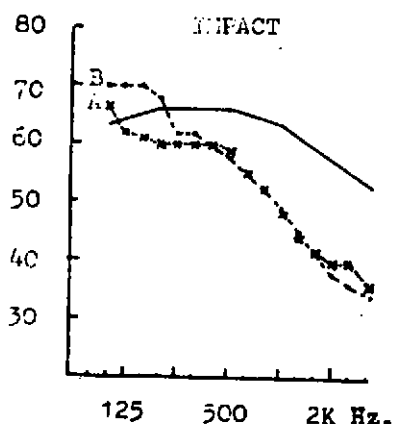
4) 60 mm DRY SAND PUGGING



St.
Lev.
Dif.,
dB



St.
SPL
dB



Construction details

- a) 18 mm T&G chipboard
- b) 25 mm 70kg/m³ quilt
- c) 60 mm dry sand pugging
- d) 9 mm plywood pugg boarding
- e) 25 mm plasterboard

Average of two floors Airborne

- A) $\Delta L=2$ (BS 2750:1956)
- $D_{\text{avg}}=53$ (BS 5821)
- B) $\Delta L=23$ (BS 2750:1956)
- $D_{\text{avg}}=51$ (BS 5821)

Impact

- A) $\Delta L=3$ (BS 2750:1956)
- $L'_{\text{avg}}=51$ (BS 5821)
- B) $\Delta L=20$ etc
- $L'_{\text{avg}}=55$

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5) RAFT FLOORS A) Plasterboard - chipboard

(a)



(b) 80
(c) 80
(d) 70

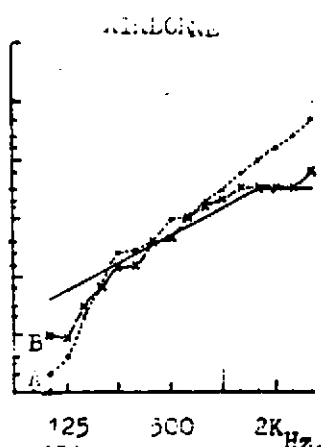
(e) 60
(f) 50

RESULTS

Airborne Impact
AAD=34 AAD=50
L_{ATW}=50 L_{ATW}=61
Average of two floors

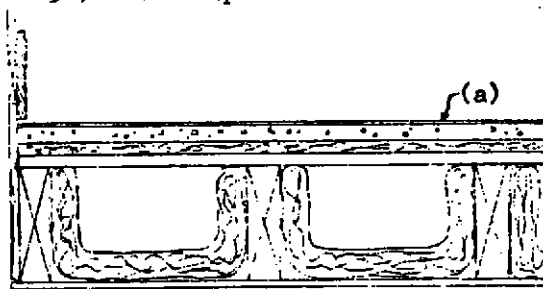
CONSTRUCTION

a) 18mm T&G chipboard
b) 19mm plasterboard plank
c) 35mm 70Kg/m³ Rockwool
d) existing softwood boarding
e) 50mm low density quilt
f) 25mm plasterboard ceiling



3B) 'Cemchip'

(a)



St. 80
SPL dB

70
60
50
40
30

(b) 80
(c) 80
(d) 70
(e) 60
(f) 50

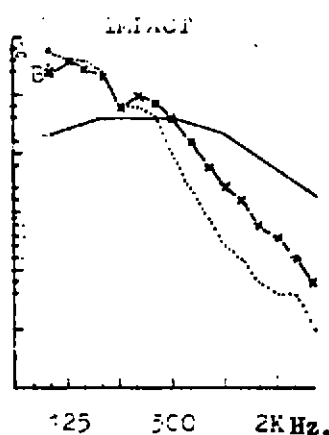
(b) 80
(c) 80
(d) 70
(e) 60
(f) 50

RESULTS

Airborne Impact
AAD=26 AAD=49
D_{ATW}=50 L_{ATW}=61
Average of two floors

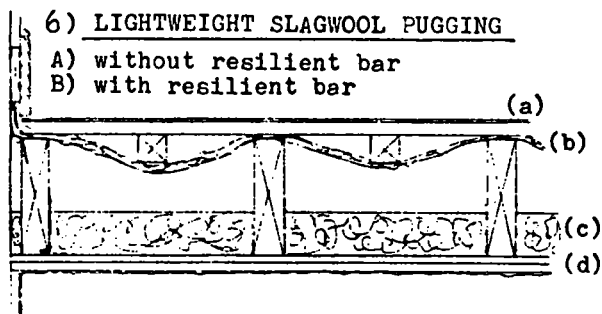
CONSTRUCTION

a) 3mm hardboard
b) 28mm Cemchip
c) 30mm 70Kg/m³ Rockwool
d) existing softwood boarding
e) 50mm low density quilt
f) 25mm plasterboard ceiling



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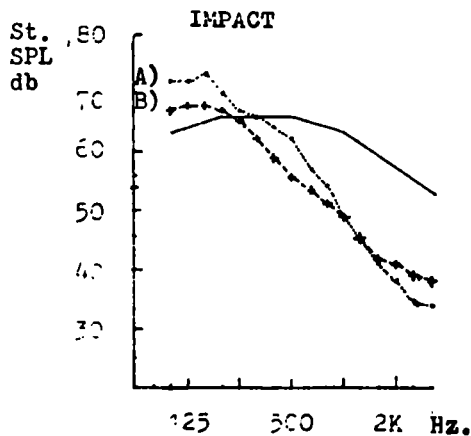
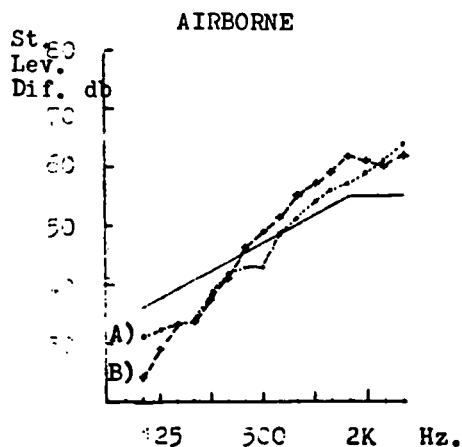
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Construction Details

- A) a) softwood floor boards - 18mm
b) quilt 48 Kg/m^3
c) 150 Kg/m^3 slagwool pugging - 100mm
d) 25mm plasterboard ceiling

- B) As for (A) but with resilient ceiling fixings



Results to BS 2750:1956 & BS 5821 Average of four floors

Airborne

A) AAD=38 $D_{pTW}=49$

B) AAD=43 $D_{pTW}=49$

Impact

A) AAD=30 $L'_{pTW}=58$

B) AAD=12 $L'_{pTW}=59$

