TRANSMISSION OF NOISE VIA DEFLECTION HEAD FLANKING PATHS IN LIGHTWEIGHT PARTITIONS

Ben F Burgess, Associate, RPS, Birmingham UK

1. INTRODUCTION / ABSTRACT

This paper provides further information and expansion on a ñPoster Presentationò prepared for the Institute of Acoustics 40th Anniversary Conference in October 2014. Although the poster presentations are necessarily brief and concise, the following is intended to add some detail for those with an interest in the topic.

It is common on modern education schemes that the soffits of teaching spaces are left ëexposedô to make use of the temperature regulatory effect of the bare concrete (so called ôthermal massõ). Whilst this is an accepted part of the cooling strategy for the building, it creates conflict with the required detailing of lightweight partition heads. Plasterboard partitions are required to move with the natural deflection of a building in order to prevent damage and cracking, and so are typically detailed with a 15-50mm gap in the boarding where the head meets the underside of the soffit or slab above.

The gap at the head of the partition represents an inevitable weakness in terms of airborne flanking sound. On ôtraditionalô schemes where a ceiling is provided, the gap is above the ceiling line, and therefore is somewhat ôprotectedô from this phenomenon. However, on schemes with exposed soffits, RPSô research indicates that (without proper treatment) this exposed deflection head detail can be detrimental to in-situ airborne sound insulation, potentially resulting in failed pre-completion tests.

This paper will outline the magnitude of the problem, investigate the possible mechanisms of the issue and provide several bespoke solutions to what is becoming an increasingly common problem in the field of building acoustics on education schemes.

2. THERMAL MASS

Thermal mass within buildings is commonly defined as the property of the mass of an element which allows it to store or release heat, ñflattening outò natural fluctuations in temperature.

An element with thermal mass is typically considered most effective when it is shielded from solar gains but is directly influenced by heat generated by the buildings occupiers / users. Therefore it is most commonly specified for use in schemes with a high internal occupancy.

Classroom situations, with around 30 students per 56m^2 classroom, plus teachers, represent a perfect example of a situation where the efficacy of this strategy can be evidenced. Similarly, an exposed concrete soffit represents a suitable surface which is exposed to heat generated by occupants and associated activities, but is not prone to solar gains.

These properties are commonly harnessed in schools seeking to use an exposed concrete soffit to reduce overheating during the summertime. In this instance, the higher external temperatures and radiant heat load from occupants and activity during the daytime cause the ambient internal air temperatures to rise within the classroom. However, some portion of this increased temperature is absorbed by the exposed concrete to the soffit above, thereby reducing the overall temperature increase internally.

At the end of the day, when the occupants leave, the external temperature begins to drop and the ambient air temperature within the classroom falls. At this point, the slab can release the heat stored within, and bring the ambient air temperature within the classroom upwards, providing that there is sufficient airflow across the slab for this to occur. To facilitate this, windows in naturally ventilated schemes are sometimes automated in support of this strategy.

3. DEFLECTION HEADS

Buildings inevitably move. This includes vertical movement in the floors (and therefore soffits) of concrete floor slabs. Some of this deflection will be as a result of dead load (i.e. the slight downward ósaggingô movement of a slab between its structural supports, and some due to live load (e.g. a class of 30 students moving around above).

Whilst this deflection should generally be imperceptible, it is necessary to design any lightweight partitions to permit this movement. The required movement zone varies on the construction of the soffit above and the properties of the associated structure, but would typically be in the 15-50mm range.

Plasterboard is brittle, and any unwanted movement is liable to crack the board ï at the very least damaging the decoration of the partitions, and potentially impinging on the integrity of the partitions from an acoustic, fire and structural/robustness perspective.

The movement required is typically provided by fixing the metal head track of the partition through plasterboard or timber which spans the soffit horizontally. For example, 2no. 12.5mm thick boards would create a 25mm deflection zone. The vertical boarding to the partitions is then stopped some 25mm short of the soffit above. No fixings are made through the vertical metal studwork into the head track, and fixings for the vertical boarding are stopped circa 100mm short of the partition head to prevent this.

When the surface above the partition moves downwards (either live or dead load) the head track of the partition slides downwards sympathetically, inside the studwork. The boarding and studwork does not move, but is cut sufficiently short (the ódeflection zoneö) to allow the movement.

4. SOUND TRANSMISSION

The performance of lightweight partitions is predicated on the arrangement of plasterboard and studwork which provides two reasonably ómassiveô elements (the boards themselves) either side of a stud which forms the cavity. When insulation is used within the cavity (which prevents reverberant sound build up between the internal faces of the boards) the performance is maximised. Increasing the massiveness of the boards (i.e. using a sound-resistant board with a higher density) provides a further benefit.

This mass-cavity-mass arrangement is effective, and the levels of performance typically required in school schemes are usually comfortably provided by the correct combination of dense plasterboard, studwork and insulation. Depending on requirements, it is sometimes necessary to add resilience (e.g. in the form of a resilient bar or stud) or even to de-couple each leaf of the partition by using a twin frame studwork arrangement.

For example, RPS have considerable evidence of the following construction (when correctly detailed and installed) being suitable to achieve the $D_{nT(Tmf,max),w}$ 45 dB requirement between standard teaching spaces under BB93:

- 2 x 12.5mm sound-resisting plasterboards (Ó10.5kgm^{-2} per board)
- 70mm óCô stud
- 50mm mineral fibre insulation
- 2 x 12.5mm sound-resisting plasterboards (Ó10.5kgm^{-2} per board)

As discussed above, the combination of dense plasterboard and an insulated cavity is sufficient to prevent the passage of sound between two classrooms and (correctly detailed) this construction often returns test results somewhat in excess of the $D_{nT(Tmf,max),w}$ 45 dB criterion.

The deflection head zone is formed by continuous fillets of plasterboard or timber and therefore does not benefit from the sound insulation properties afforded by a cavity, has no resilience and is certainly not de-coupled. On this basis, airborne sound is much more easily transmitted through the open deflection head zone at the top of the partition, being carried through by the fillets or timber.

5. BENEFIT OF CEILINGS

On ‘traditional’ school schemes, it is typical that a lay-in-grid ceiling with absorptive tiles is provided in standard classrooms, both to control reverberation and to provide access and mountings for services and luminaires.

Flanking transmission via ceilings is rated as a $D_{nf,w}$ value (the weighted, normalised flanking path level difference) and in the instance of ceiling tiles essentially describes the level difference between two open, calibrated spaces each ‘capped off’ with a ceiling.

The $D_{nf,w}$ of ceilings varies depending on the specification of the ceiling tiles and the penetrations in the ceiling for luminaries, grilles, etc. however the typical baseline values for standard thickness tiles vary from around $D_{nf,w}$ 20-25 dB (Class A tiles) to 33-37 dB (Class C tiles).

Regardless of the tile specification, it is clear that any ceiling will afford a certain degree of ‘protection’ to the flanking path via the deflection zone when compared with a modern education scheme which is making use of thermal mass, and therefore has no ceilings at all.

6. IMPLICATIONS AND TEST RESULTS

Tests were carried out on a sample scheme which included exposed pre-cast concrete soffits (for thermal mass) with the reverberation control being provided by free hanging rafts. The particular scheme under test was a large academy and contained a considerable number of classrooms requiring $D_{nT(Tmf,max),w}$ 45 dB. The partition construction for walls requiring this rating was:

- 2 x 12.5mm SoundBloc boards
- 70mm ‘C’ stud
- 50mm mineral fibre insulation
- 2 x 12.5mm SoundBloc boards

6.1 First Tests

Tests were carried out on several ‘classically’ constructed partitions. The installation appeared solid and followed best practice guidelines. The 25mm deflection head zone was neat, but visible and unfilled. The partitions were fully built, skimmed and finished in the usual way. The only unusual factor was the deflection zone being exposed.

The first round of early, indicative mock-up testing was interesting in terms of the consistency of results. Every single partition tested achieved $D_{nT(Tmf,max),w}$ 42 dB. The main contractor investigated several means of improving the performance including covering socket boxes, filling data cable penetrations, boarding over glazing which formed flanking paths and checking mastic seals to partitions.

The results of the re-tests were clear – all re-tests also achieved $D_{nT(Tmf,max),w}$ 42 dB. The repeatability of the results pointed to a consistent construction and installation technique, but some regular flaw in the in-situ performance.

The RPS engineer attending site believed the primary issue to be flanking noise via the deflection zone, with an audible upper-mid-high frequency ‘hiss’ travelling over the top of the partitions. Examination of the graphs of airborne sound insulation showed an incredible consistency to this phenomenon, with the weakness being centred around the 1600-2000Hz zone.

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 12 March 2013

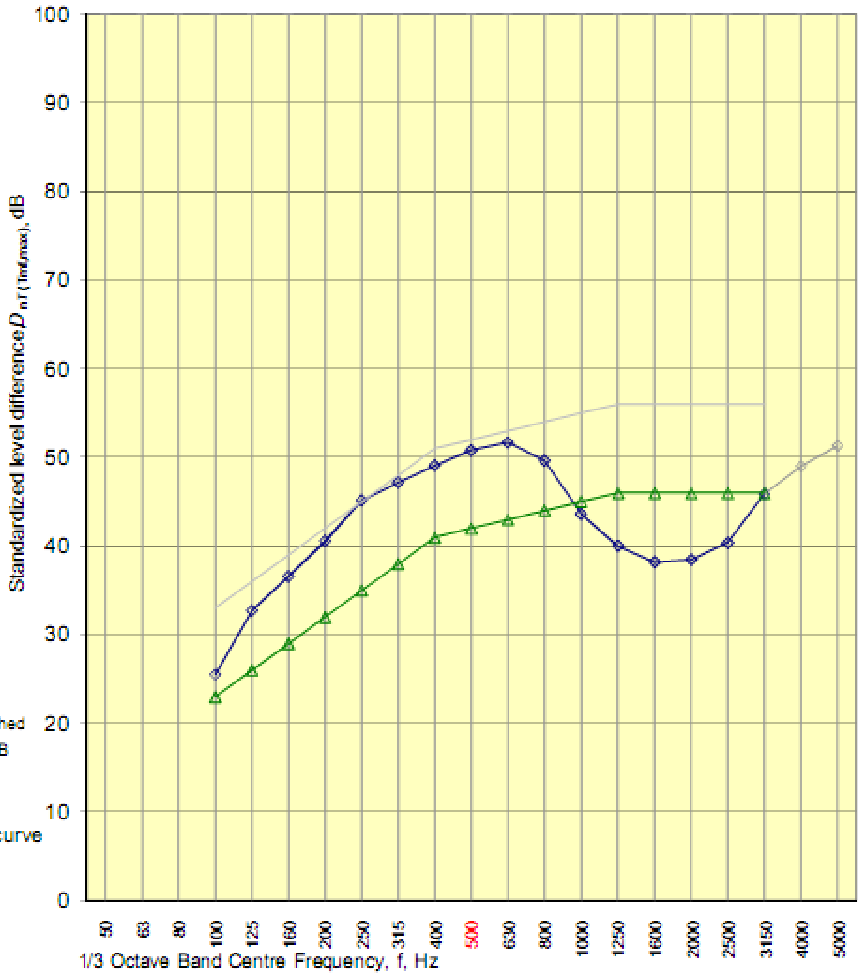
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 196 m^3
Receiving room volume: 196 m^3
Element area: 27 m^2
Element tested: Wall

Development: [redacted]

Test: Test Room with double boarded windows

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**25.5**
125	**32.7**
160	**36.6**
200	**40.5**
250	**45.2**
315	**47.2**
400	**49.1**
500	**50.8**
630	**51.7**
800	**49.6**
1000	**43.6**
1250	**40.0**
1600	**38.2**
2000	**38.5**
2500	**40.4**
3150	**45.9**
4000	49.0
5000	51.3



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: -10

Rating according to ISO 717-1 & BB93

$D_{nT\,(Tmf,max),w}$ = 42 (-1; -2) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

UKAS TESTING 4120

Person in Charge of Test:	C J Biggs DipIOA MIOA
Results checked by:	B F Burgess Dip IOA MIOA
UKAS test reference:	B6460-130312-03-A

UKAS number 4120

v:21P

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 12 March 2013

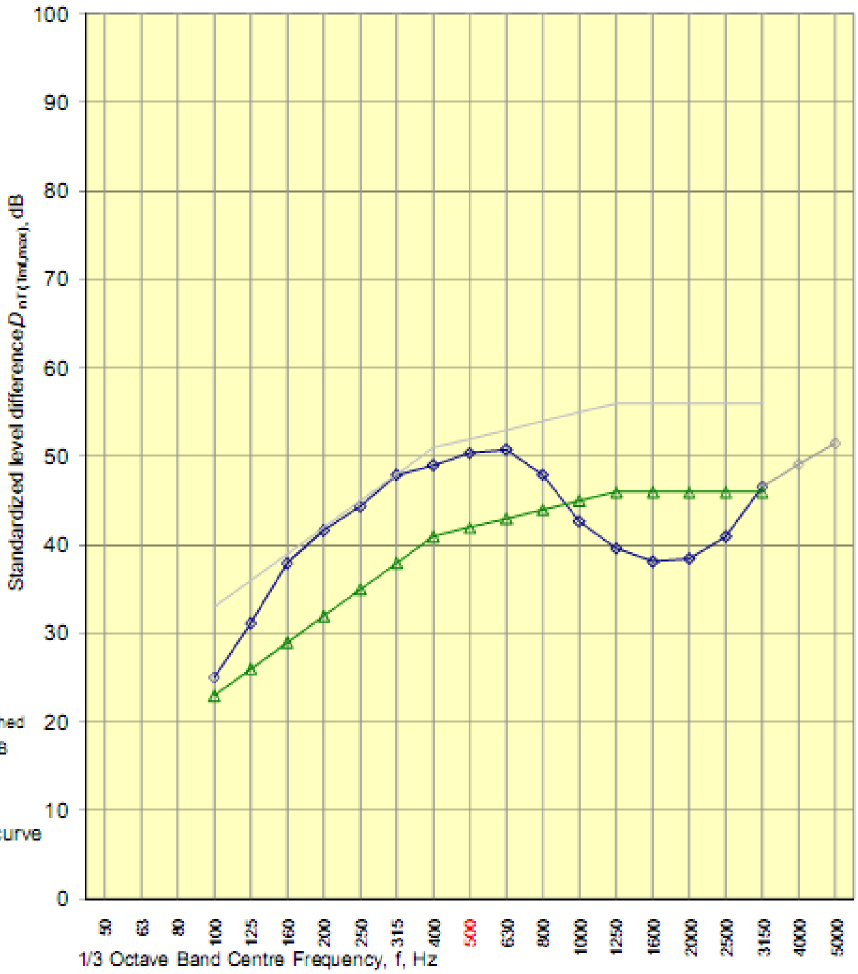
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 196 m^3
Receiving room volume: 196 m^3
Element area: 27 m^2
Element tested: Wall

Development: [redacted]

Test: Test Room with data tray holes blocked

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**25.0**
125	**31.2**
160	**38.0**
200	**41.7**
250	**44.4**
315	**47.9**
400	**49.0**
500	**50.4**
630	**50.8**
800	**47.9**
1000	**42.7**
1250	**39.7**
1600	**38.1**
2000	**38.5**
2500	**41.0**
3150	**46.6**
4000	49.1
5000	51.5



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: -10

Rating according to ISO 717-1 & BB93

$D_{nT\,(Tmf,max),w}$ = 42 (-1; -2) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

4120

Person in Charge of Test:	C J Biggs DipIOA MIOA
Results checked by:	B F Burgess DipIOA MIOA
UKAS test reference:	B6460-130312-02-A

UKAS number 4120

v21P

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 12 March 2013

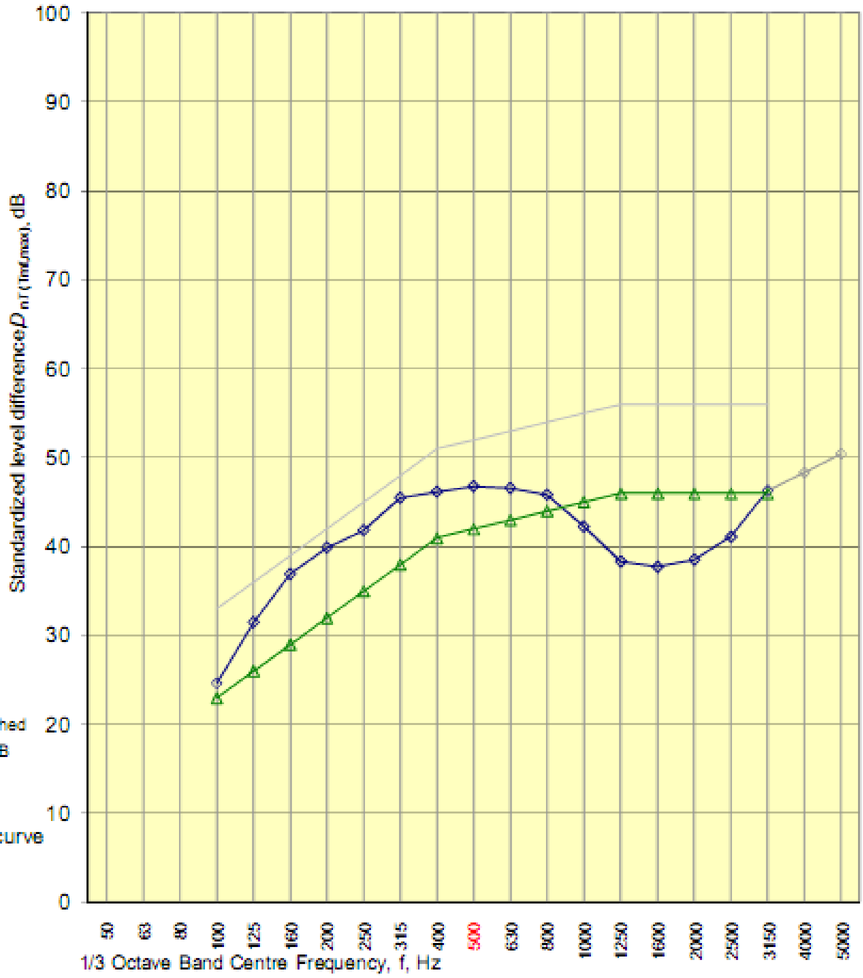
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 196 m^3
Receiving room volume: 196 m^3
Element area: 27 m^2
Element tested: Wall

Development: [redacted]

Test: Test Room with remedial measures

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**24.6**
125	**31.5**
160	**36.9**
200	**39.9**
250	**41.9**
315	**45.5**
400	**46.2**
500	**46.8**
630	**46.6**
800	**45.9**
1000	**42.3**
1250	**38.3**
1600	**37.8**
2000	**38.5**
2500	**41.1**
3150	**46.3**
4000	48.3
5000	50.4



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: -10

Rating according to ISO 717-1 & BB93

$D_{nT\,(Tmf,max),w}$ = 42 (-2; -3) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

UKAS TESTING 4120

Person in Charge of Test: C J Biggs DipIOA MIOA
Results checked by: B F Burgess DipIOA MIOA
UKAS test reference: B6460-130312-01-A
UKAS number 4120

v:21P

As can be seen from some of the graphs of airborne performance provided above, there is a clear and distinct dip in performance at 1600-2000Hz, directly attributable to the weakness introduced by exposing the deflection zone.

7. REMEDIAL MEASURES / SOLUTIONS

7.1 Stuffing loose-fill partition roll into the deflection zone - $D_{nT(Tmf,max),w}$ 48 dB

RPS worked alongside the main contractor to investigate a number of potential solutions to the issue. The quickest and easiest was to stuff the deflection zone with loose-fill mineral fibre insulation.

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 12 March 2013

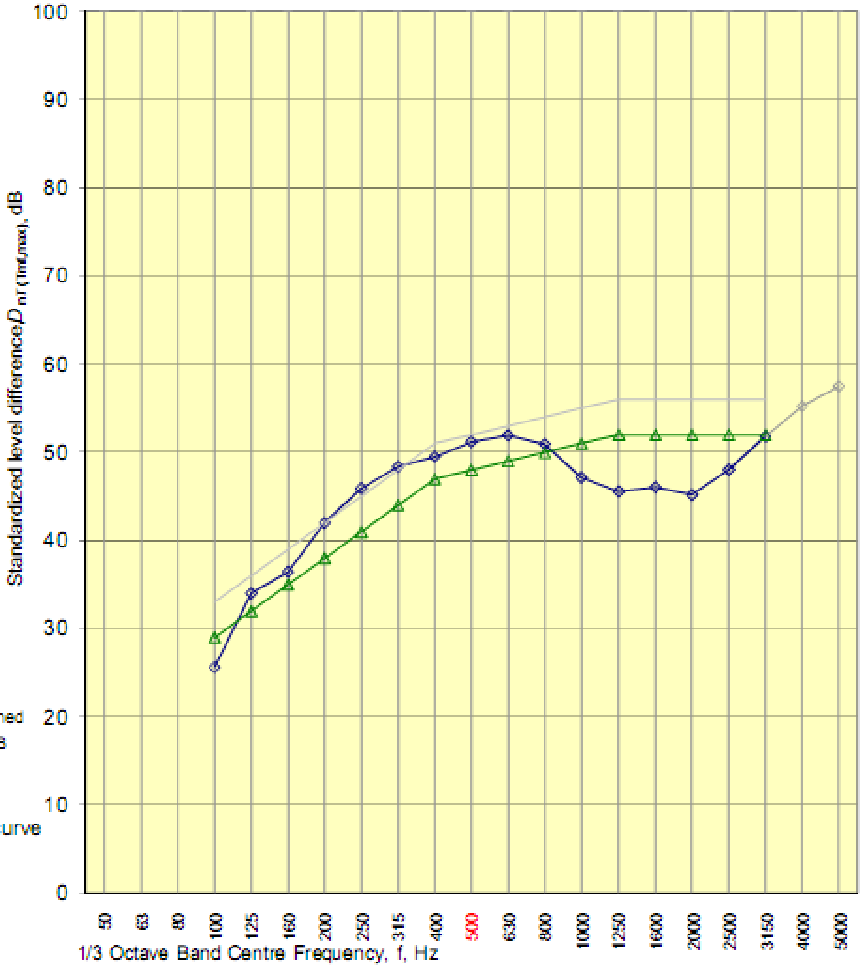
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 196 m^3
Receiving room volume: 196 m^3
Element area: 27 m^2
Element tested: Wall

Development: [redacted]

Test: Test with insulation at the gap of head detail

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**25.6**
125	**34.0**
160	**36.4**
200	**42.0**
250	**45.9**
315	**48.4**
400	**49.5**
500	**51.2**
630	**51.9**
800	**50.9**
1000	**47.1**
1250	**45.6**
1600	**46.0**
2000	**45.2**
2500	**48.0**
3150	**51.8**
4000	55.2
5000	57.5



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: -4

Rating according to ISO 717-1 & BB93

$D_{nT\,(Tmf,max),w}$ = 48 (-2; -5) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

UKAS TESTING 4120

Person in Charge of Test: C J Biggs DipIOA MIOA
Results checked by: BF Burgess DipIOA MIOA
UKAS test reference: B6460-130312-05-A
UKAS number 4120

v:21P

As can be seen from the graph, the addition of the insulation provided a clear ósmoothing outô of the dip at 1600-2000hz and this simple measure alone improved performance by 6 dB, taking the result from a fail by 3 dB to a pass by 3 dB.

The advantages of this solution are the cost, convenience and ease of installation. It is believed that the low-density nature of partition insulation means that the roll should compress under deflection conditions, and that there will be no reduction in the capacity of the detail for movement.

Aesthetically it cannot be ignored that the detail is plain ugly! In the academy it was seen as being suitable for research / demonstration / temporary purposes only.

7.2 Cutting Hilti putty pads and fitting into the deflection zone - $D_{nT(Tmf,max),w}$ 51 dB

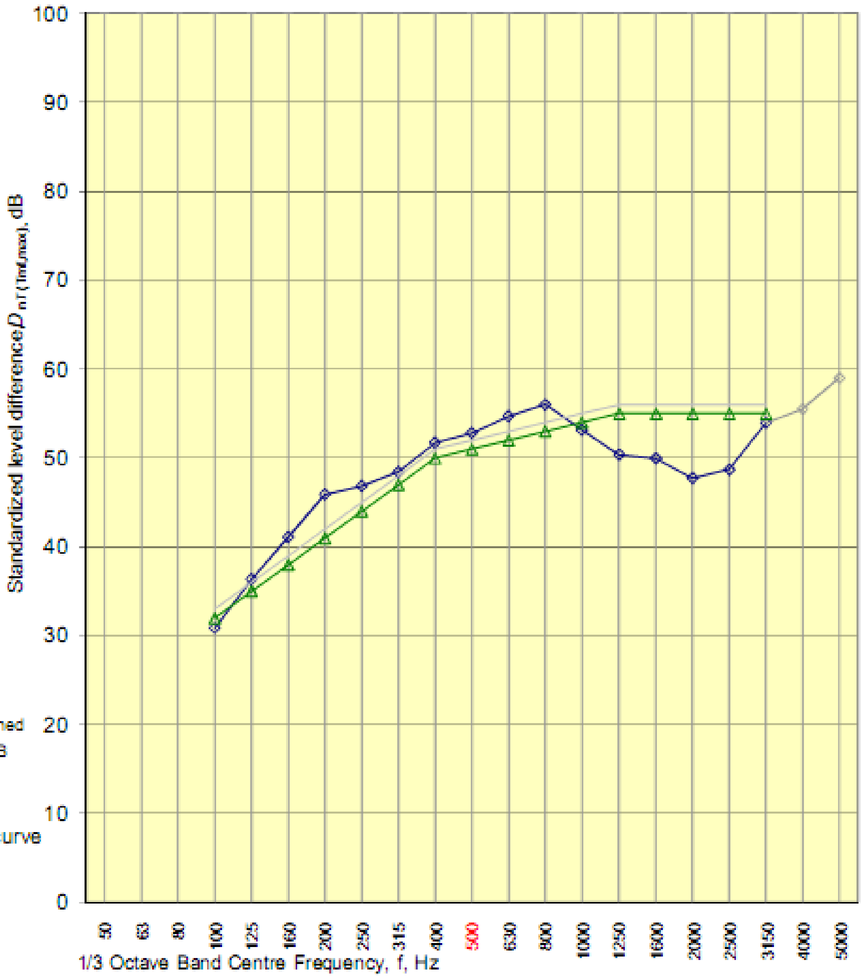
Hilti putty pads are a type of intumescent plasticine which is normally applied to socket boxes in party walls for fire and acoustic protection. The contractor had some spare putty pads and therefore cut these into 25mm deep strips and fitted them into the deflection zone. The standard Hilti product is red, although white alternatives (more aesthetically pleasing) are available.

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 13 May 2013
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 197 m³
Receiving room volume: 197 m³
Element area: 27 m²
Element tested: Wall
Development: [redacted]
Test: F1-048 Classroom to F1-049 Classroom (with putty pads)

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**30.9**
125	**36.4**
160	**41.1**
200	**45.9**
250	**46.8**
315	**48.4**
400	**51.7**
500	**52.8**
630	**54.7**
800	**56.0**
1000	**53.1**
1250	**50.4**
1600	**50.0**
2000	**47.7**
2500	**48.7**
3150	**54.0**
4000	55.5
5000	59.0



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: -1

Rating according to ISO 717-1 & BB93

$D_{nT(Tmf,max),w}$ = 51 (-1; -4) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

Person in Charge of Test:	C J Biggs DipIOA MIOA
Results checked by:	BF Burgess DipIOA MIOA
UKAS test reference:	B6460-130513-03-A

UKAS number 4120

v:22A

As can be seen from the graph, this solution provided a further "flattening out" of the 1600-2000Hz dip, and correspondingly improved performance further, i.e. by 9 dB!

This solution had the advantage of appearing very neat (in fact imperceptible when a white putty pad was used) and returned a massive increase in on-site performance. However, putty pads are a comparatively expensive product and the labour involved in cutting a 200m square into 25mm strips makes this strategy prohibitive as a design solution.

7.3 Acoustic mastic in the deflection zone - $D_{nT(Tmf,max),w}$ 51 dB

A rapidly applied and very effective solution was to simply fill the 25mm deflection zone with a continuous bead of non-hardening acoustic mastic (white, to match the partition).

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 22 May 2013

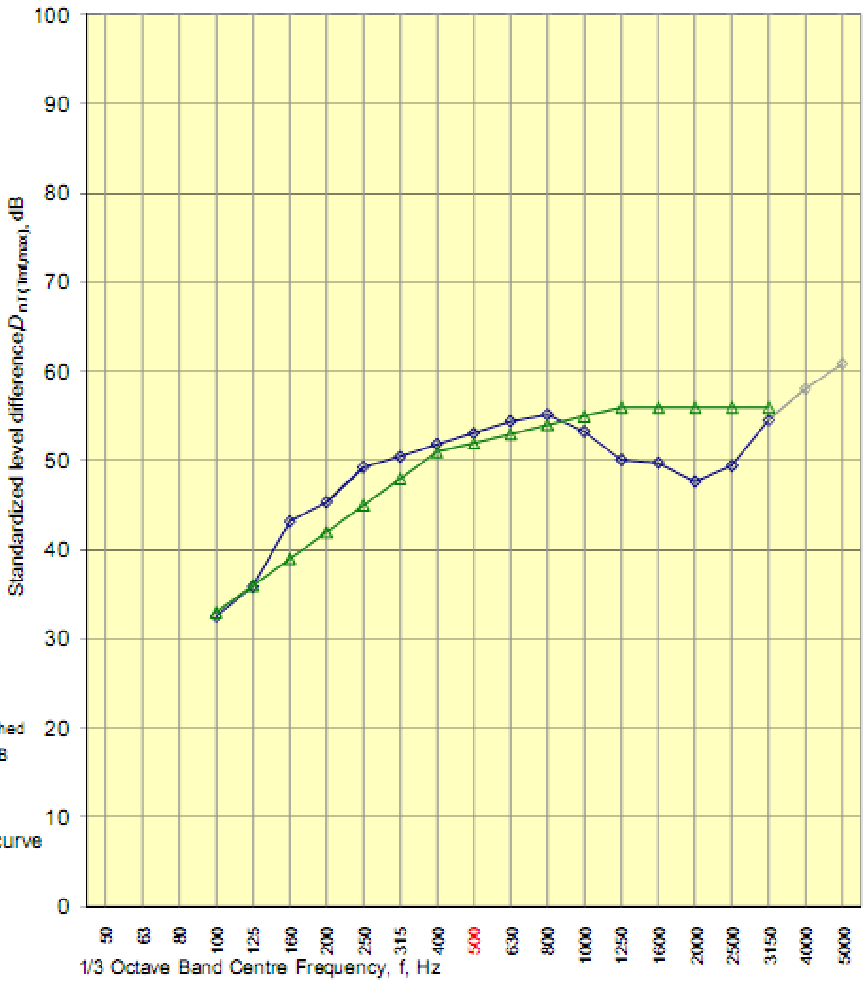
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 197 m^3
Receiving room volume: 197 m^3
Element area: 27 m^2
Element tested: Wall

Development: [redacted]

Test: F1-048 Classroom to F1-049 Classroom (mastic)

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**32.5**
125	**35.9**
160	**43.2**
200	**45.4**
250	**49.3**
315	**50.5**
400	**51.9**
500	**53.1**
630	**54.4**
800	**55.2**
1000	**53.3**
1250	**50.1**
1600	**49.7**
2000	**47.7**
2500	**49.4**
3150	**54.5**
4000	58.1
5000	60.9



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: 0

Rating according to ISO 717-1 & BB93

$D_{nT\,(Tmf,max),w}$ = 52 (-2; -4) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

4120

Person in Charge of Test: C J Biggs DipIOA MIOA
Results checked by: BF Burgess DipIOA MIOA
UKAS test reference: B6460-130522-00-A
UKAS number 4120

v:22A

The mastic provided a very similar ósmoothingô of the 1600-2000Hz dip as the putty pad solution, however the overall performance increase was higher again ï a full +10 dB over the untreated partitions. It is hypothesised that this is likely due to the semi-liquid nature of the mastic (when applied) facilitating a further sealing of any tiny gaps/cracks/holes/joints etc.

The mastic solution was very quick, comparatively inexpensive and extremely effective. However, RPS have doubts over the long term performance of the deflection zone under this solution ï although cured mastic has a certain degree of innate compressibility, it is considered likely that it may limit the full range of movement designed into the floor / partitions and was therefore not carried forward as a design solution.

7.4 Timber batten cloaking head detail - $D_{nT(Tmf,max),w}$ 52 dB

An architecturally neat solution was to fix a timber batten (with a ‘quirk’ out in it for aesthetics) to the soffit, cloaking the deflection zone. Whilst this represents a fairly dramatic solution, the results were impressive.

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 23 October 2012

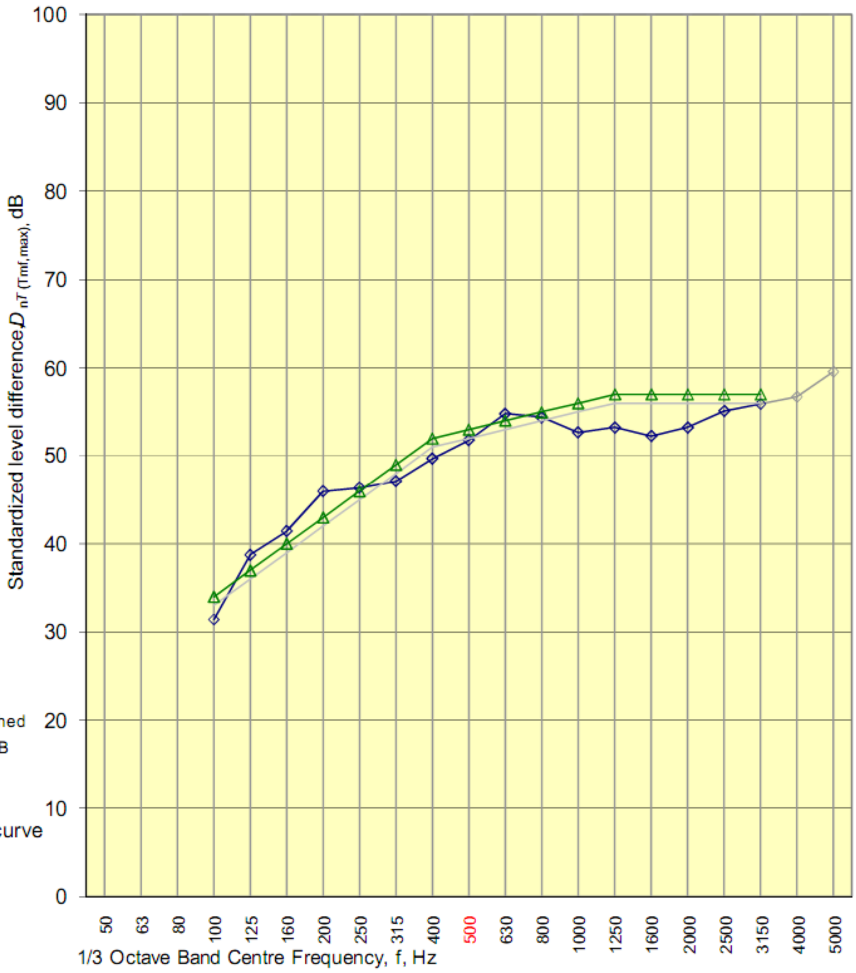
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 182 m^3
Receiving room volume: 198 m^3
Element area: 23 m^2
Element tested: Wall

Development: [redacted]

Test: G70 Maths to G69 Maths (timber batten)

Frequency (Hz)	D_{nT} (dB)
50	#N/A
63	#N/A
80	#N/A
100	**31.4**
125	**38.8**
160	**41.5**
200	**45.9**
250	**46.4**
315	**47.1**
400	**49.7**
500	**51.8**
630	**54.8**
800	**54.4**
1000	**52.7**
1250	**53.2**
1600	**52.3**
2000	**53.2**
2500	**55.1**
3150	**55.9**
4000	56.7
5000	59.6



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: 1

Rating according to ISO 717-1 & BB93

$D_{nT(Tmf,max),w}$ = 53 (-1; -5) dB
$T_{mf,max}$ = 0.8 s

Evaluation based on field measurement results obtained by an engineering method

UKAS TESTING 4120

Person in Charge of Test:	C J Biggs DipIOA MIOA
Results checked by:	M J Pimlott BSc (Hons) AMIOA
UKAS test reference:	B6490-121023-01-A

UKAS number 4120

v.21P

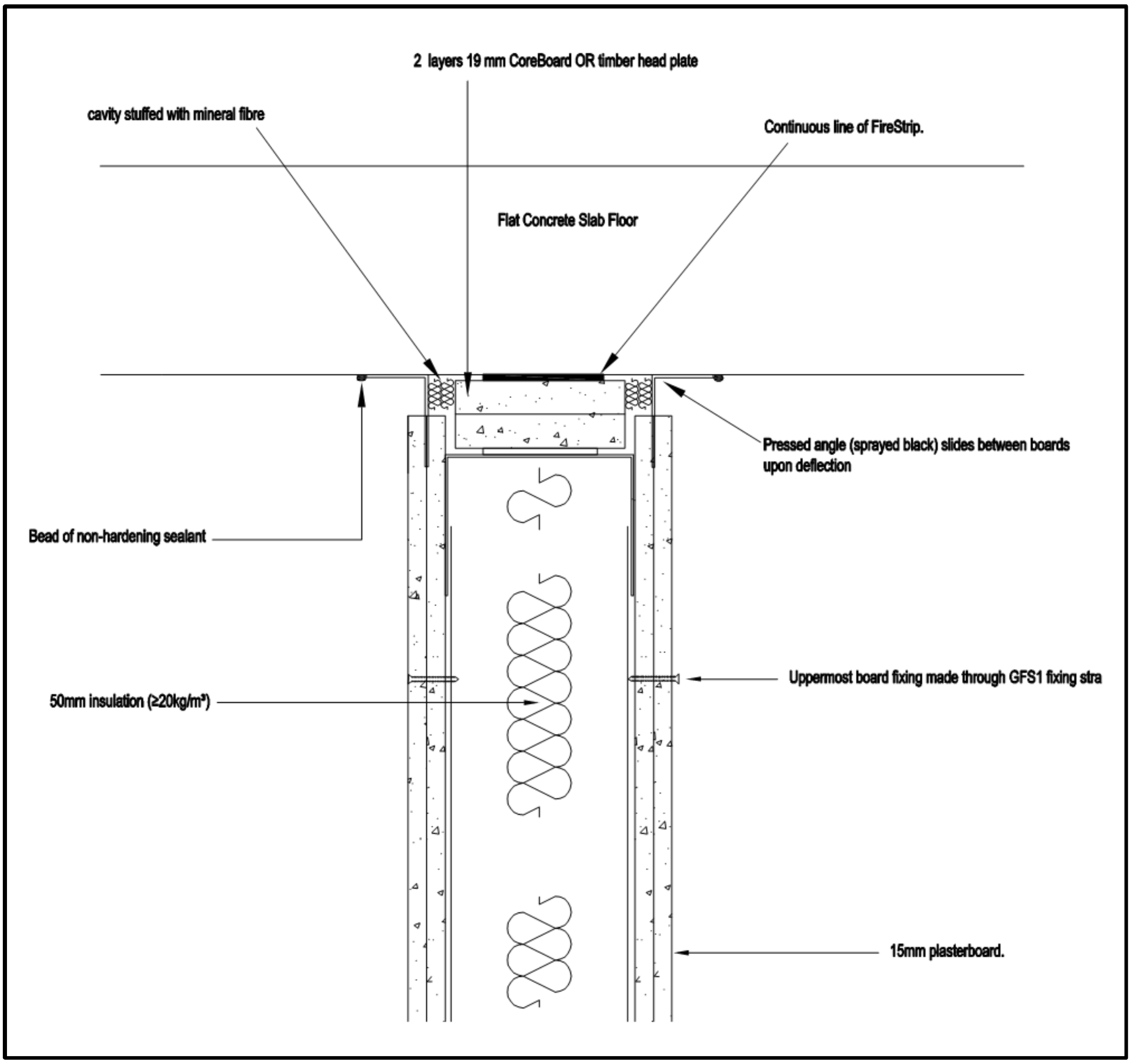
As can be seen from the graph, the timber virtually eliminated the high frequency performance dip and led to an overall jump in performance by 11 dB providing an excellent improvement in performance compared to the required $D_{nT(Tmf,max),w}$ 45 dB.

Compared to some of the other options, the timber batten was an expensive and time consuming solution, but the aesthetic and performance cannot be denied. As the batten is fixed to the soffit, there is no restriction on movement.

7.5 Pressed angle trapping partition roll into the deflection zone - $D_{nT(Tmf,max),w}$ 50 dB

The final solution decided upon was a combination of a number of principles. All of the various ideas implemented were effective in terms of consistently improving performance to levels where passes were achieved.

The órolled-outô solution therefore was primarily determined by speed of installation, cost to the contractor and the aesthetic finish. The detail below illustrates the standard detail developed through this process.



In this instance a thin-gauge pressed aluminium angle is fixed to the concrete soffit after the first layer of board is fixed. Loose-fill partition roll is trapped behind the angle in the deflection zone.

Upon deflection, the angle moves with the soffit, and the leg of the angle slides downwards between the two layers of board. If the angle is sprayed (or factory powder-coated) black or white the aesthetic finish can be excellent. The costs involved with the product components and the installation are minimal.

Performance-wise this detail has been found to consistently provide in-situ performances above the necessary $D_{nT(Tmf,max),w}$ 45 dB criterion, with the average performance being approximately 50 dB. The following graph illustrates an example:

Standardized level difference according to ISO 140-4
Field measurements of airborne sound insulation between rooms

Client: [redacted]
Date of test: 26 March 2014

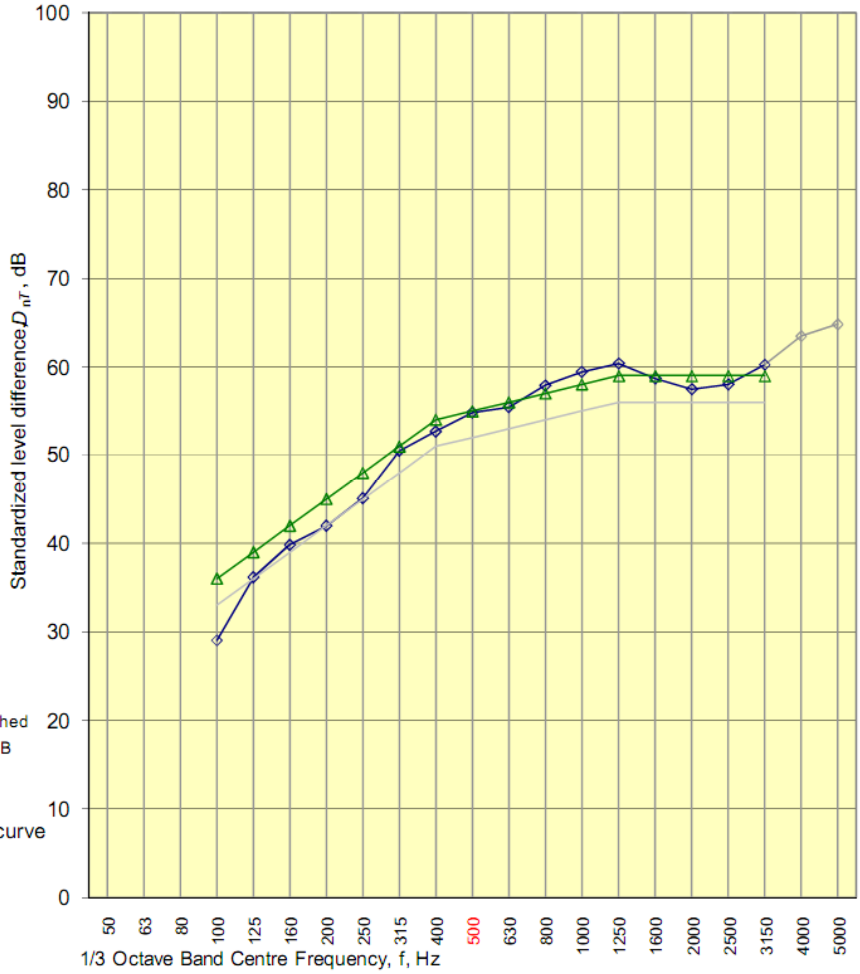
Description: Airborne Sound Insulation between adjacent spaces

Source room volume: 181 m^3
Receiving room volume: 181 m^3
Element area: 24 m^2
Element tested: Wall

Development: [redacted]

Test: 17 KS2 Classbase to 18 KS2 Classbase

Frequency (Hz)	D_{nT} (dB)
50	#N/A ‡
63	#N/A
80	#N/A
100	**29.0**
125	**36.2**
160	**39.8**
200	**42.0**
250	**45.1**
315	**50.5**
400	**52.7**
500	**54.8**
630	**55.5**
800	**57.9**
1000	**59.5**
1250	**60.4**
1600	**58.7**
2000	**57.5**
2500	**58.0**
3150	**60.2**
4000	63.5
5000	64.8



Key:
‡ limit of measurement reached
Δ deviation greater than 8 dB

D_{nT}
Reference curve
Ref: 3

Rating according to ISO 717-1

$D_{nT,w}\,(C;C_{tr})$ = 55 (-2; -8) dB

Evaluation based on field measurement results obtained by an engineering method

Person in Charge of Test:	M J Pimlott BSc (Hons) AMIOA
Results checked by:	S F Cumming Bsc (Hons)
UKAS test reference:	B7143-140326-01-A

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v.22A

Note – the above graph is for an education scheme designed to the new 'Priority Schools Building Program Acoustic Design Standards' document, and is therefore assessed to $D_{nT,w}$ rather than $D_{nT(Tmf,max),w}$…the performance in $D_{nT(Tmf,max),w}$ would be approximately 2 dB lower.

As can be seen from the graph the introduction of the pressed angle detail almost eliminates the high frequency dip in performance altogether and ensures that the partition sails through the pre-completion test.

8. CONCLUSIONS

Removing ceilings and exposing the deflection head zone to make use of thermal mass on education schemes uncovers a previously-hidden weakness in partition airborne sound insulation performance. It is believed that this is primarily due to the lack of mass, resilience and cavity benefits associated with the deflection zone.

If left untreated, the reduction in performance is sufficient to mean that the partition may fail pre-completion tests, even if well-built and appropriately specified.

A number of treatment options are available, and essentially doing ánythingô is effective. However the occurrence of this detail on education schemes is very high, and therefore the chosen solution must be aesthetically pleasing, cost-effective and quick / easy to install.