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Technical Report

Attention:	Mike Schock	Reference	60W-09-0084 - TNT - 840103-3
Company:	Formcraft Pty Ltd	Date:	10 November 2009
Facsimile:	+61 8 93534162	Pages:	6
Email:	mike@formcraft.com.au	Project No.:	60W-09-0084
From:	Benjamin Hillion	Reviewed	Robert Connolly

Dear Mike Schock

Sound Insulation Performance of Intertenancy Wall

VIPAC Engineers & Scientists Ltd (ViPAC) has been commissioned by Formcraft Pty Ltd to predict the sound insulation performance of its proposed intertenancy wall 'FormPro 270'.

In summary, the expected sound insulation performance from this construction, in the absence of flanking, is as follows:

- Airborne: ($R_w + C_{tr}$) = 59 dB
- Impact $L_{n,w}$ =51 dB

Yours sincerely,

VIPAC ENGINEERS & SCIENTISTS LTD

Benjamin Hillion

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Project Engineer
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1. CONSTRUCTION DETAILS

The 'FormPro 270' construction details are understood to be as follows:
One layer of 10mm SoundCheck plasterboard fixed with standard CSR stud adhesive to one layer of 60mm fire retardant polystyrene (26kg/m³) either side of 150mm reinforced concrete cast in-situ.

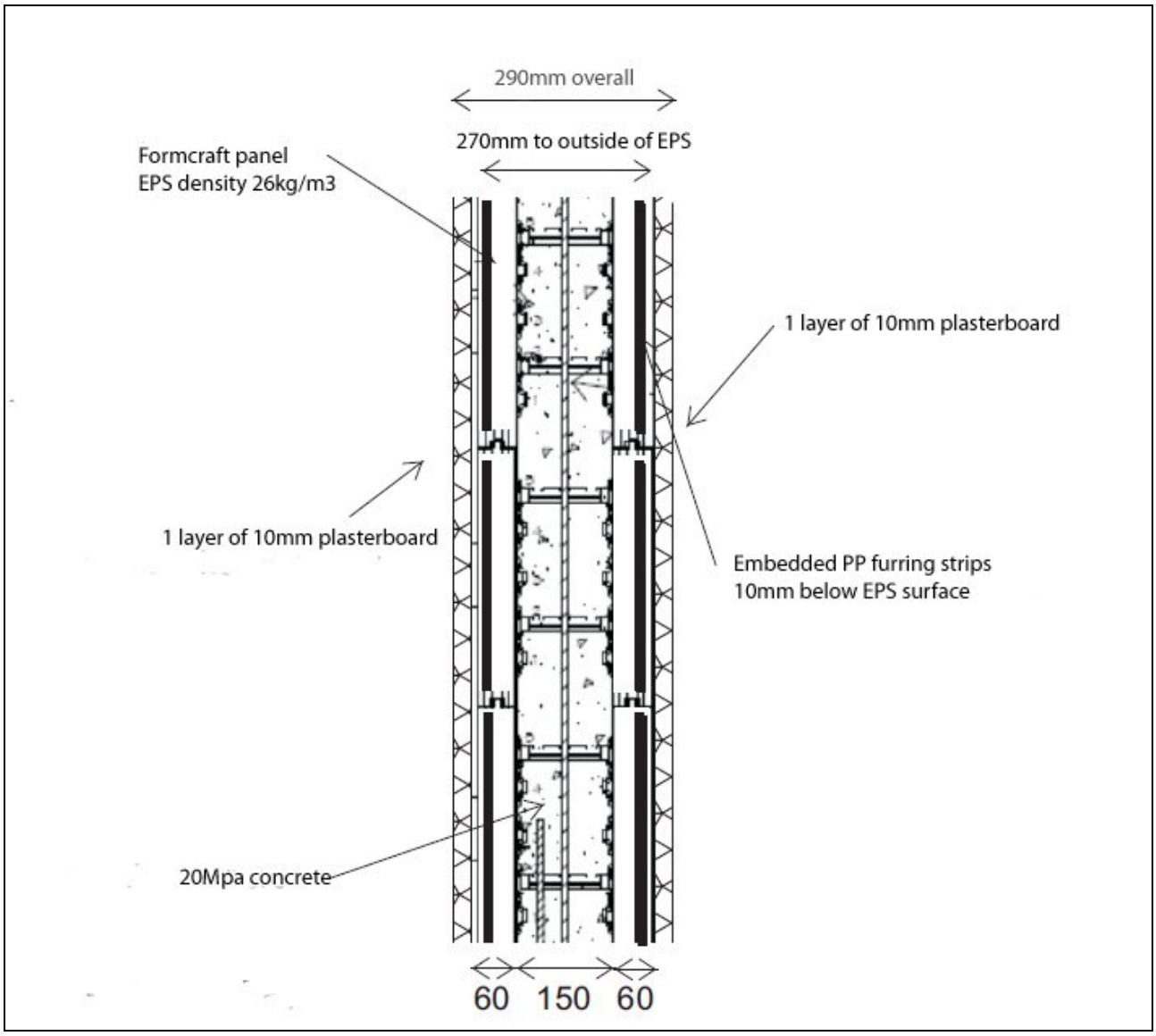

Figure 1: section view of FormPro 270 wall

2. SOUND INSULATION PERFORMANCE

Based on the construction details above ViPAC has estimated the airborne sound insulation performance of the 'FormPro 270' intertenancy wall to be as follows:

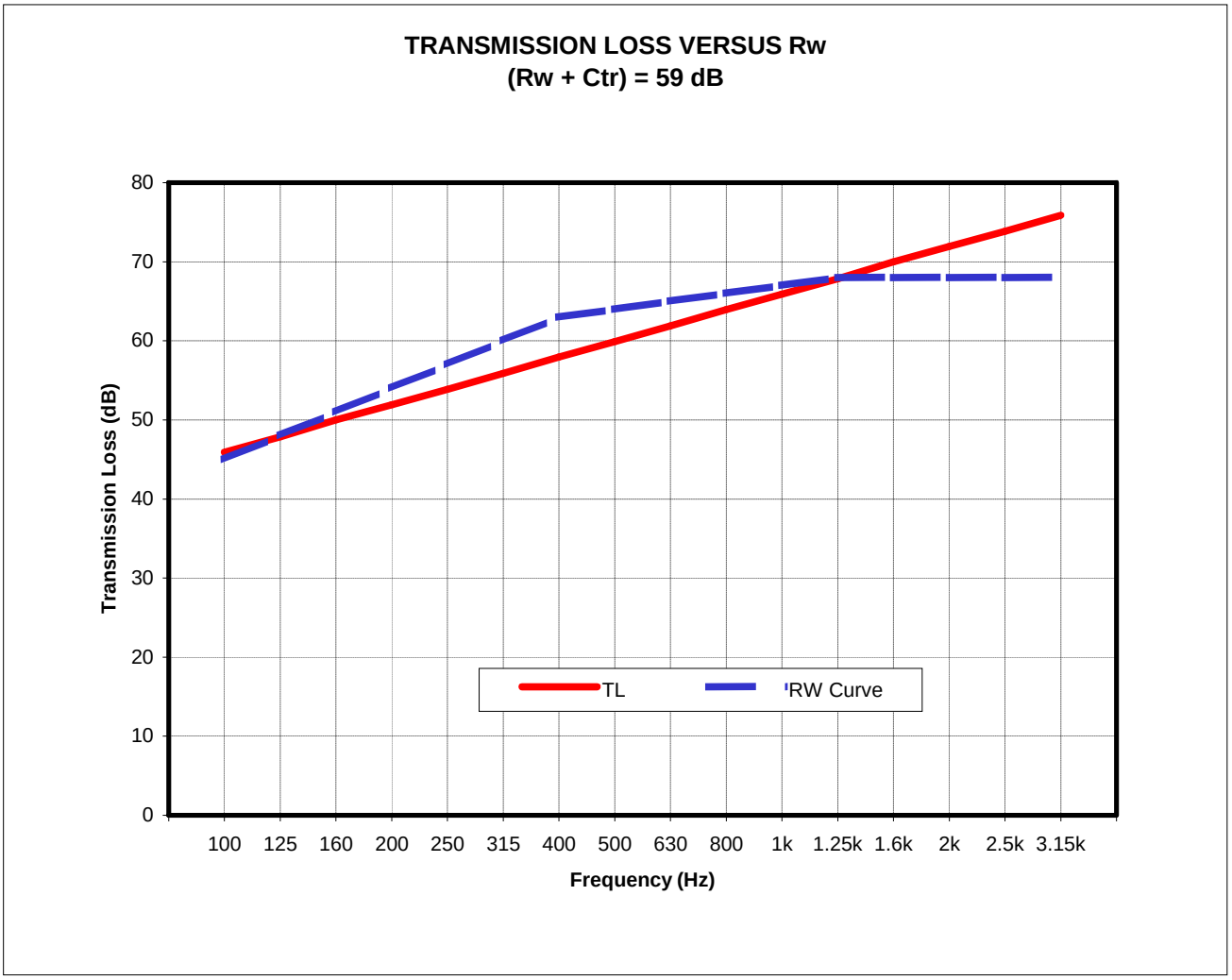

Figure 2: Graph of predicted airborne transmission loss of 'FormPro 270' wall against frequency

Given the results in Impact sound Pressure levels from Report ref. ALA05-082-la entitled '*Determination of the Wall Impact Sound Rating Formcraft Insulated Concrete Wall Tested to 2004 BCA Specification F 5.5'* the impact sound insulation performance of the 'FormPro 270' wall is not expected to be lower than that of the tested wall. This is due to the fact that the building elements making up the construction are the same, and the variation in the overall mass is minimum (from 50mm to 60mm layer of polystyrene, and from 13mm to 10mm layer of plasterboard). Since no resilient layer has been introduced, the impact sound insulation performance of the 'FormPro 270' wall is not expected to be increased either.
The predicted sound insulation performance of this wall is therefore expected to be as follows.

Partition	R_w (dB)	C_{tr} (dB)	(R_w +C_{tr}) (dB)	$L_{n,w}$ (dB)
FormPro 270 wall	64	-5	59	51

Table 1: Predicted airborne and impact sound insulation performance of the 'FormPro 270' wall

Given good workmanship, there is no reason why this construction would not be capable of meeting the minimum airborne sound insulation performance prescribed by table 3.8.6.1 of BCA for separating walls between adjacent dwellings (class 1).

According to '*Acoustics 2002 - Innovation in Acoustics and Vibration Annual Conference of the Australian Acoustical Society 13-15 November 2002, Adelaide, Australia, MEASUREMENT OF THE IMPACT SOUND INSULATION OF WALLS*', the minimum impact sound insulation measured on a 90mm brick-70mm cavity- 90mm brick wall was 57dB, $L_{n,w}$. This is 6dB less effective than the 51dB, $L_{n,w}$ predicted for the FormPro 270 wall (The lower the $L_{n,w}$, the more isolating to impact noise a partition is).

If you have any queries regarding this memorandum, please do not hesitate to contact us.

Yours faithfully,
Vipac Engineers & Scientists Ltd

Benjamin Hillion
Project Engineer

Reviewed By

Rob Connolly
Manager WA

Appendix A. Glossary

Airborne sound

Sound that arrives at the point of interest, such as one side of a partition, by propagation through air.

D_w : Weighted Difference Level

D the Difference Level = (S - R) where S is the Source room levels and R is the Receiver room levels). Then Dw is a single integer number found from comparing the D-spectrum with the 'standard' curves for airborne and impact insulation and the unfavourable deviation is 32 dB. The value of the reference curve at 500Hz is taken as the Weighted Difference Level, D_w This is considered to be approximately equal to the A-weighted level difference which would be observed if normal speech was used as the test signal.

D_{nT} : Standardized Level Difference

For airborne sound transmission. Similar to the Dn, but this index corrects the measured difference to a standardized reverberation time of 0.5 seconds. This RT value is often cited as approximately average for a medium sized, carpeted and furnished living room. It does not require detailed and accurate knowledge of the dimensions of the test rooms.

$D_{nT,w}$: Weighted Standardized Level Difference

For airborne sound transmission. A single number quantity which characterises the airborne sound insulation between rooms, calculated from the DnT.

$D_{nT,w + Ctr}$:

A single quantity which characterises the airborne sound insulation between rooms using spectrum no 2 as defined in BS EN ISO 717-1 - see also C - Spectrum Adaption Term and Ctr.

Sound Insulation

The capacity of a structure (e.g. a partition such as a wall or a floor) to prevent sound from reaching a receiving location. Sound energy is not necessarily absorbed; impedance mismatch, or reflection back toward the source, is often the principal mechanism.

Sound Transmission Loss (TL)

Of a partition, in a specified frequency band, ten times the common logarithm of the ratio of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The quantity so obtained is expressed in decibels. The reduction in sound level when sound passes through a partition or ceiling system.

Sound Transmission Class (STC)

A single-number rating (defined in ASTM E413), calculated using values of sound transmission loss. It provides an estimate of the performance of a partition in terms of airborne sound insulation in the 125Hz to 4kHz frequency range. In instances where a noise source has significant sound energy below 125Hz(e.g. aircraft, music, road traffic, machinery) STC is regarded as inadequate to fully quantify sound insulation and D_w or R_w may be used as an alternative.

Sound Reduction Index (measured in Laboratory Conditions), R

Of a partition, in a specified frequency band, the fraction of the airborne sound power incident on the partition that is transmitted by the partition and radiated on the other side. Unlike R', R is measured in a laboratory.

Sound Reduction Index (measured in situ), R'

Of a partition, in a specified frequency band, the fraction of the airborne sound power incident on the partition that is transmitted by the partition and radiated on the other side. Unlike R, R' is measured in situ.

Weighted Sound Reduction Index (measured in situ), R'_w

A single-number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies (typically from 125Hz to 3.15kHz) - based on the field measurement of R'.