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Statement Of Results For Sound Transmission Loss Tests Performed By Acoustics Laboratory At RMIT University On Behalf Of Polyphen.

At the request of Polyphen, transmission loss tests were performed on a sample of 100mm thick Polyphen with 0.6mm Colourbond steel facing on both sides. The test was performed at the Applied Physics Acoustics Laboratory at RMIT University on the 17th of May 2007. The procedure used to determine the transmission loss of the samples involved the installation of the sample under test across the utility aperture cut into the side of the reverberation chamber located at the Applied Physics Acoustics Laboratory at RMIT University. The reverberation chamber thus becomes the receive room of volume 199.9m^3 with the transmit side of the aperture enclosed by a 6.7m^2 MDF box featuring no parallel walls. The purpose of the tests was to provide indicative results of transmission loss of the sample across the aperture. At the request of the Client, the results for the sample were compared to analogous results for a 13mm plasterboard section and with 2mm lead sheet. This comparison is presented in Appendix I.

The Transmit Box was constructed from 32mm thick MDF with acoustically sealed access points to the speaker and microphone contained inside the box. The nominal dimensions of the aperture are 1020mm x 1110mm, with a nominal interior volume of the box of 6.7m^3. The sample under test was fastened to the aperture with 6 clamps pressing on a metal outer frame as depicted in Figure III. The sides of the sample were reinforced with butyl rubber and tape to ensure a good acoustic seal between the edges of the sample and the sample mount/aperture.

Incoherent, broad-band random noise is fed to the loudspeaker mounted in the enclosed volume of the Transmit Box. A calibrated stationary microphone is placed in the enclosed volume of the box. In each one-third octave band of centre frequency 100Hz to 5000Hz, the mean sound pressure level in the Receive Room (Reverberant Chamber) and the Transmit Box is found by the use of a microphone connected to a Bruel & Kjaer Pulse System Real Time Analyzer. A total of 8 microphone positions were measured in the Receive Room and a total of 4 in the Transmit Box. The positions were chosen to be as statistically independent as possible as outlined in Section 8.3 of AS1191. These conditions were fully met by the 8 measurement positions in the Receive Room but were not possible to be completely met by the 4 positions measured in the Transmit Box. The signals from both of the rooms is temporally averaged over a sampling time of 64 seconds. The transmission loss is determined through the subtraction of the measured levels

between the send or transmit box from the Receive Room (reverberation chamber) with a correction for the absorption of the receive room. The transmission loss is calculated from:

$$Transmission\ \ Loss = P_{Send} - P_{\mathrm{Re}cieve} + 10\log(\frac{S}{A})$$

where S – Surface Area of Receive Room (meters sq – m^2)
A – Absorption Area of Receive room (Sabine m^2)

The measurement of the absorption area of the receive room (the reverberant chamber) is based on the methods outlined in AS ISO 354 - 2006,"Measurement of sound absorption in a reverberation room.

Sample Description:

Sample: The test panel is made up of:

100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel. The sides of the sample were acoustically sealed with tape and butyl rubber.

Figure I: Cross-section of 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel:

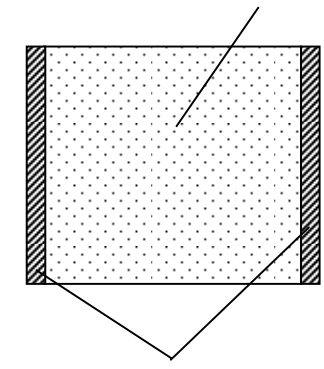


Figure II: Photograph of cross-section of 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel.

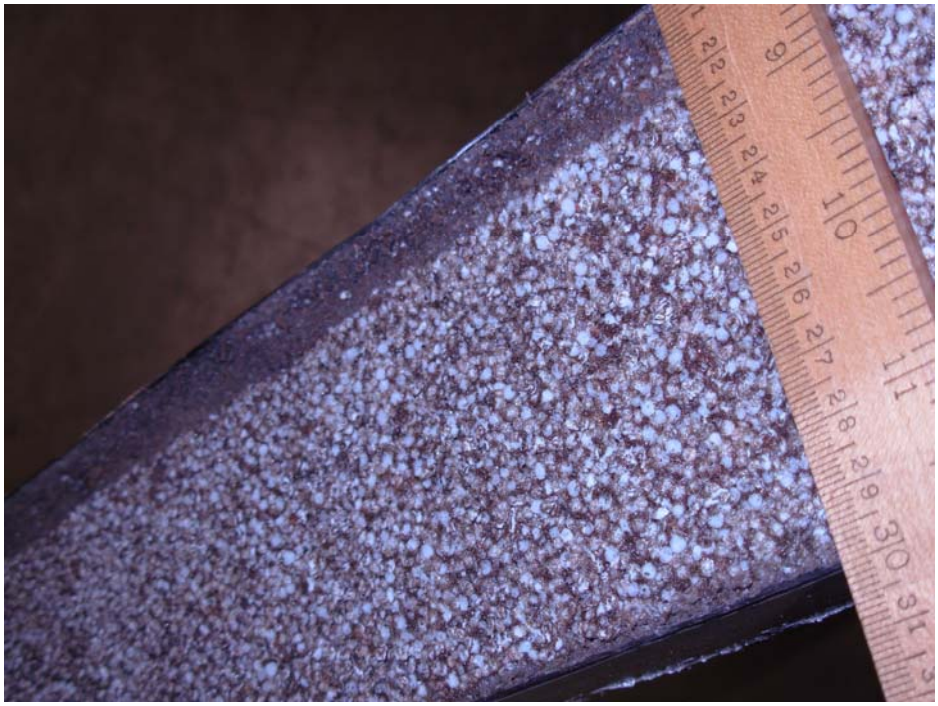


Figure III: 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel mounted into the Utility Aperture of the Reverberation Chamber for testing.

Test Conditions:

Sample - Test Conditions

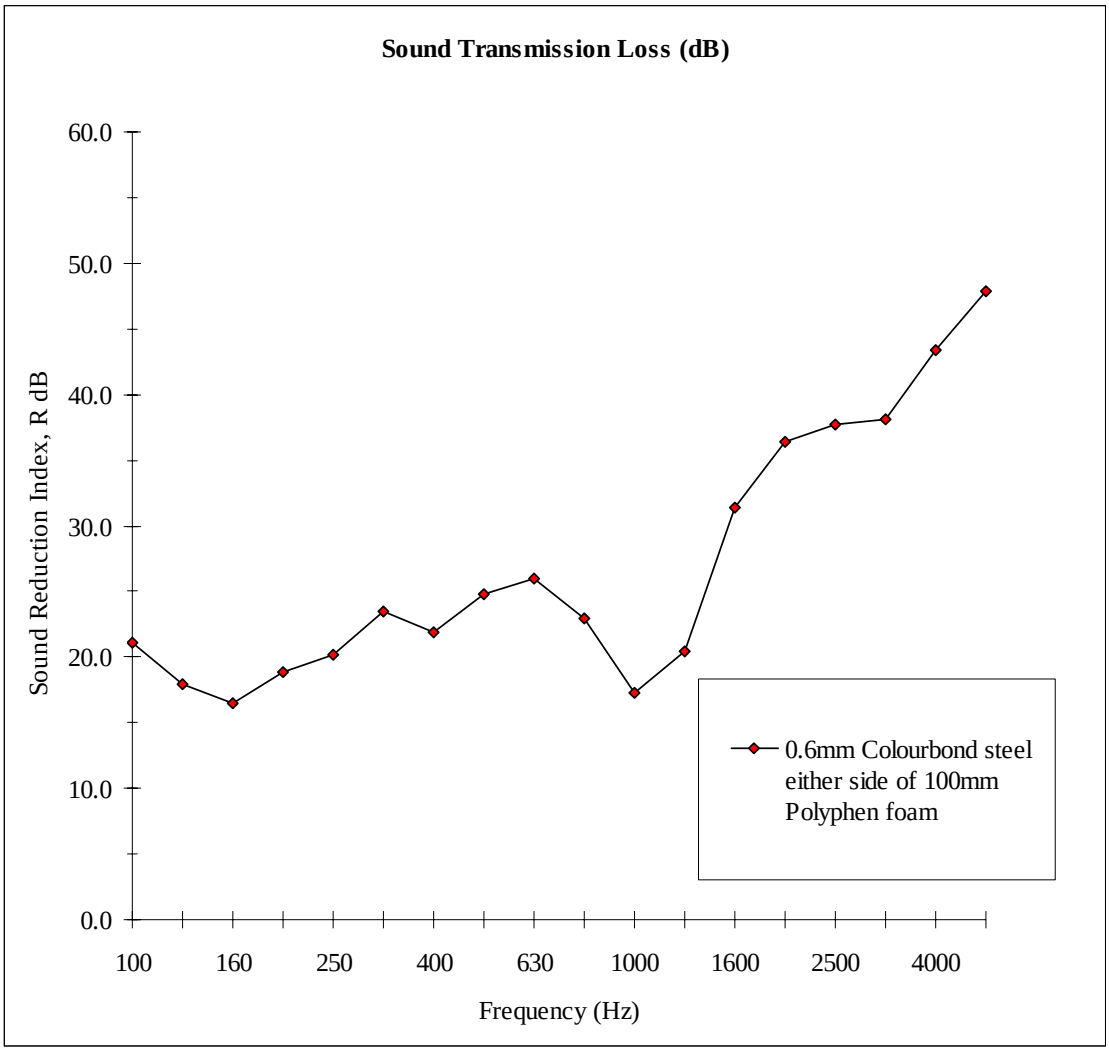
Temperature:	Receive Room	: 20.8^{0}C.
	Send Room	: 20.8 ^{0}C.
Humidity:	Receive Room	: 62%.
	Send Room	: 62%.
Sample Surface Area:	1.13 m^2	
Room Volumes:	Receive room	: 199.90 m^3.
	Source room	: 6.73m^3.
Date of Test:	17/5/2007	

Results:

Table I: Results of transmission loss tests on the sample in tabular form.

Frequency (Hz)	Sound Transmission Loss – 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel (dB)
100	21.2
125	17.9
160	16.5
200	18.9
250	20.1
315	23.5
400	21.8
500	24.8
630	26.0
800	23.0
1000	17.2
1250	20.4
1600	31.4
2000	36.5
2500	37.7
3150	38.1
4000	43.3
5000	47.8

Chart I: Results of sound transmission loss tests on the 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel in Chart Form.



Yours Sincerely,

John Watson
Technical Officer
RMIT, Department of Applied Physics

Appendix I: Comparison of 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel with 13mm plasterboard and 2mm Lead Sheet.

Frequency Hz	Sound Transmission Loss – 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel (dB)	Sound Transmission Loss – 13mm Plasterboard (dB)	Sound Transmission Loss – 2mm Lead Sheet (dB)
100	21.2	16.0	22.3
125	17.9	12.7	20.7
160	16.5	21.3	14.1
200	18.9	20.5	26.4
250	20.1	19.8	28.4
315	23.5	20.7	25.7
400	21.8	21.2	25.0
500	24.8	21.6	19.9
630	26.0	24.5	23.1
800	23.0	25.0	23.8
1000	17.2	26.5	26.3
1250	20.4	27.3	28.0
1600	31.4	27.4	29.9
2000	36.5	26.5	33.0
2500	37.7	26.0	35.4
3150	38.1	24.2	38.8
4000	43.3	26.1	40.2
5000	47.8	28.5	39.6

Chart II: Comparison of 100mm thick Polyphen and one layer each side of 0.6 mm Colourbond Steel with 13mm plasterboard and 2mm Lead Sheet in Chart Form.