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WES NOISE CONTROL PTE LTD

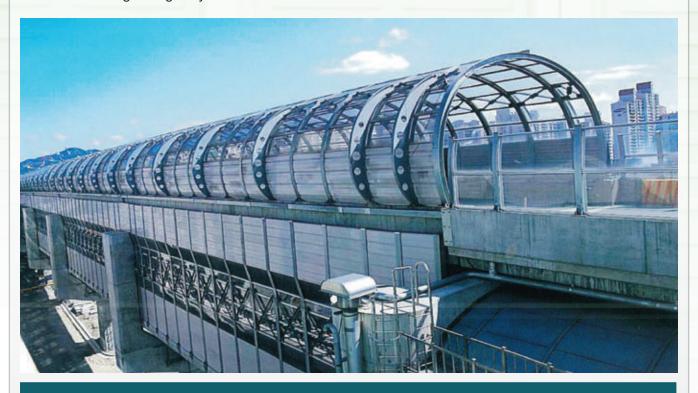
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Permanent Aluminium Noise Barrier Korean Tunnel Type Noise Barrier

Introduction

New roads and rail systems in emerging in modern cities bring about an increase in traffic flow and speed of vehicles. This causes an increase in noise emission levels and has brought about a rising number of civil complaints by residents dwelling near the affected areas.

Through research and development, we are able to propose the most ideal solution to control noise emission levels along these areas. The Tunnel Type Noise Barrier effectively reduces noise produced by vehicles travelling on highways and rails.



▲ Exterior view of noise barrier tunnel along section of Cheongdam Bridge, Korea



▲ Interior view of noise barrier tunnel along Cheongdam Bridge



▲ Noise barrier tunnel at Cheonan East-West Highway

Permanent Aluminium Noise Barrier

Korean Tunnel Type Noise Barrier





▲ Interior view of noise barrier tunnel with colourful panels decorated along the sides.

▲ Entrance of a noise barrier tunnel.



▲ Interior view of noise barrier tunnel along Sihwa Over-Bridge



▲ A closer view of the roofing of the noise barrier tunnel at Jangam Residential area in Uijeongbu City, Korea.

Features and Advantages of Tunnel Type Noise Barriers

- It is the most ideal noise reduction solution for areas with high-rise buildings.
- The extent of the length of the noise barrier tunnel significantly affects the amount of noise reduction.
- Shapes, structures and form of the tunnel can be customised according to the topographic conditions.
- Construction methods include noise barrier type and canopy type.
- Application is versatile and aesthetic design elements can be added to beautify the structure.

Permanent Aluminium Noise Barrier Korean Tunnel Type Noise Barrier



▲ Overview of noise barrier tunnel in South Korea. Specially designed frames were added to the ends of the tunnel to aesthetically enhance the structure.





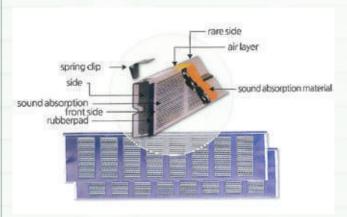


▲ Various views of the noise barrier tunnel in South Korea. The customised design adds beauty to the otherwise simple looking structure.

Permanent Aluminium Noise Barrier

Korean Tunnel Type Noise Barrier

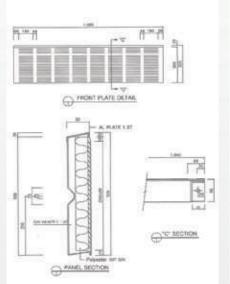
The Aluminium Noise Barrier is the most commonly used noise reduction panels. It's high durability and performance makes it ideal for most application conditions.

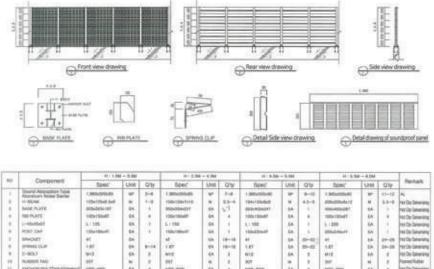




▲ The breakdown view of the Aluminium Noise Barrier panel

▲ Constructed panels along the side of the road for effective noise reduction.





▲ Technical specifications and drawings of the Aluminium Noise Barrier panels.

Features and Advantages of Aluminium Noise Barriers

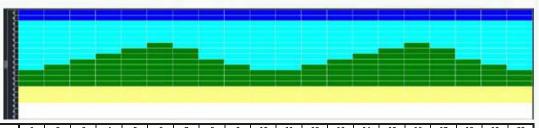
- It is the most commonly used agent for noise reduction.
- It is made of aluminium and has gallery type sound absorption panels.
- It is an excellent and economical material.
- With powder coating method, the panels comes in diversed colours that can display a variety of images
- The material also has excellent noise reduction properties.

Made in Korea

Color Pattern (Type A) - Height 10m



Colored panels can be arranged into beautiful murals by drawing inspiration from scenic backdrops.



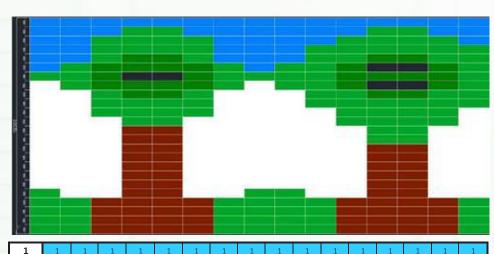
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																				
2																				
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	3	1	1	1	1
8	1	1	1	1	3	3	3	1	1	1	1	1	1	1	3	3	3	1	1	1
9	1	1	1	3	3	3	3	1	1	1	1	1	1	3	3	3	3	1	1	1
10	1	1	3	3	3	3	3	3	1	1	1	1	3	3	3	3	3	3	1	1
11	1	3	3	3	3	3	3	3	3	1	1	3	3	3	3	3	3	3	3	1
12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
13	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
14	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
16	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
17	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
19	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
1	9	8	7	6	5	4	5	7	8	9	9	8	7	6	5	4	5	7	8	9	136
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	40
3	3	4	5	6	7	8	7	5	4	3	3	4	5	6	7	8	7	5	4	3	104
4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	60
5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	60
Total	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	400

No	COLOR
1	No.2 BLUE
2	kW BLUE
3	T/GREEN(KJ)
4	WHITE
5	IVORI

P.E.B. Noise Barrier (Super Galum Steel Type) Made in Korea

Color Pattern (Type B) - Height 12m



1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	2	2	1	1	1	1	1	1	2	2	1	1	1
3	1	1	2	2	2	2	1	1	1	1	2	2	2	2	1	1
4	1	1	2	2	2	2	1	1	1	2	2	2	2	2	2	1
5	1	1	2	3	3	2	1	1	1	2	2	3	3	2	2	2
6	1	2	3	3	3	3	2	1	2	2	3	6	6	3	2	2
7	2	2	3	6	6	3	2	2	2	2	3	3	3	3	2	2
8	5	2	3	3	3	3	2	5	2	2	3	6	6	3	2	5
9	5	5	2	3	3	2	5	5	5	2	2	3	3	2	2	5
10	5	5	2	2	2	2	5	5	5	2	2	2	2	2	5	5
11	5	5	2	2	2	2	5	5	5	5	2	2	2	2	5	5
12	5	5	5	2	2	5	5	5	5	5	2	2	2	5	5	5
13	5	5	5	4	4	5	5	5	5	5	5	2	2	5	5	5
14	5	5	5	4	4	5	5	5	5	5	5	2	2	5	5	5
15	5	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5
16	5	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5
17	5	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5
18	5	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5
19	5	5	5	4	4	5	5	5	5	5	5	4	4	5	5	5
20	2	5	5	4	4	5	5	2	2	5	5	4	4	5	5	2
21	2	2	4	4	4	4	2	2	2	2	4	4	4	4	2	2
22			4	4	4	4	2	2	2	2		4	4	4	2	2
23	2	2	4	4	4	4	2	2	2	2	4	4	4	4	2	2
24	2	2	4	4	4	4	2	2	2	2	4	4	4	4	2	2

No	COLOR
1	No.2 BLUE
2	L/GREEN(WT)
3	T/GREEN(KJ)
4	BROWN(HI)
5	WHITE
6	TRANSPARENT

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
1	6	5	2	1	1	2	5	6	5	3	2	1	1	2	3	4	49
2	6	7	6	6	6	6	7	6	8	11	7	8	8	6	10	8	116
3			3	4	4	3					3	3	3	3			26
4			4	12	12	4					4	10	10	4			60
5	12	12	9			9	12	12	11	10	8			9	11	12	127
6				1	1							2	2				6
TOTAL	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	384

Made in Korea

LTA – Thomson-East Coast Line, Marine Terrace Station, Contract No. T308 (12m High Noise Barrier)





▲ Beautiful, decorative noise barrier panels separates residential buildings from the nearby construction and noisy traffic.

Made in Korea



▲ The noise barrier reduces noise pollution from sites next to residential blocks.







▲ Decorative noise barrier panels help to obsure unsightly construction installations from residents.

Made in Korea

LTA – Thomson-East Coast Line, Xilin Station, Contract No. T313 (12m High Noise Barrier)





▲ Colourful and decorative noise barrier lined the site for the new Xilin Station along the Thomson-East Coast Line.

Made in Korea

HDB - Bedok N5 C19 Project (12m High Noise Barrier)



▲ Project for the Housing & Development Board of Singapore (HDB).



▲ P.E.B. noise barrier wall surrounding a large construction site in front of residential blocks.

Made in Korea

MOH – Woodlands Health Campus / Community Hospital Project (12m High Noise Barrier)









▲ P.E.B. noise barrier wall erected along Woodlands Drive 17 surrounding the construction site for the new Woodlands Health Campus.

Made in Korea

National University Hospital (NUH)
– 5 Storey Medical Clinic Facilities Building Project (6-8m High Noise Barrier)







▲ P.E.B. noise barrier panels are essential to locations that are undergoing upgrading works and noise reduction is critcal. For example, within hospital premises.

Made in Korea

PUB - ABC Waters at Serangoon Reservoir Project (6m High Noise Barrier)



▲ P.E.B. noise barrier erected around residential buildings to shield them from construction noise generated by the upgrading works along the reservoir banks.





▲ Project for the Public Utilities Board of Singapore (PUB). ABC Waters Programme site along Serangoon Reservoir.

P.E.B. Noise Barrier (Super Galum Steel Type) Made in Korea



▲ P.E.B. noise barrier panels separate the construction site and residential area along the reservoir.







▲ Joints and clamps are used to secure the framework.

Made in Korea

New Additional of Proton Therapy at Biopolis Drive Project (6-8m High Noise Barrier)



▲ P.E.B. noise barriers provide effective noise control for upgrading works along Biopolis Drive.





▲ Panelled doors for access to work sites provide effective noise reduction at the same time.

P.E.B. Noise Barrier (Super Galum Steel Type) Made in Korea

Centrium Square Project (formerly known as Serangoon Plaza) along Serangoon Road (4m High Noise Barrier)





▲ P.E.B. noise barrier installed on concrete barrier.

Made in Korea

HDB-Buangkok N9 Project (6m High Noise Barrier)



▲ P.E.B. noise barrier panels are also presentable and pleasant looking.



▲ A strong framework of support poles are used to hold the P.E.B. noise barrier panels in place for an effective and lasting solution to noise reduction.

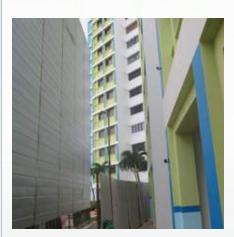
Made in Korea

PUB-Stamford Diversion Canal Project (8m High Noise Barrier)



▲ An overview of a noise barrier wall from the interior of work site.

LTA-Thomson Line, T205, Woodlands South Station (10m High Noise Barrier)



➤ 10-metre high noise barrier wall erected next to residential blocks.



P.E.B. Noise Barrier (Super Galum Steel Type) Made in Korea

JTC - Extension of road, drain and sewer works at Woodlands Avenue 4 (9m High Noise Barrier)





▲ P.E.B. noise barrier panels erected along sites where extensive upgrading works are carried out.

Made in Korea

Mayfair Gardens/ Mayfair Modern at Rifle Range Road (6m High Noise Barrier)





▲ P.E.B. noise barrier reduces the noise pollution from massive construction site next to exisiting residential buildings.

Made in Korea

SP-Cable Entry Shaft/Kallang Basin 230kV Substation Project (8m High Steel Noise Barrier)



▲ P.E.B. noise barrier panels installed around the substation to control noise pollution generated noisy machines.

5 Storey Residential Flats at Carpmael Road (9m High Noise Barrier)



▲ 9m high P.E.B. noise barrier wall erected around the work site reduces noise pollution to surrounding residential buildings.

Made in Korea

Features

- Noise has become one of the biggest environmental problems.
- Steel Noise Barrier is designed to effectively reduce noise for construction site.
- It also prevent tiny debris from blasts and ensures safety for the residents and pedestrians.
- It improves the beauty of work environments, with no deformation or rust.
- It's advanced techniques and materials result in stability and simple installation.
- Super Galum consists of 3 combinations: Aluminum 55%; Zinc 43.4%; and Silicon 1.6%. Able to last for many years without rusting.

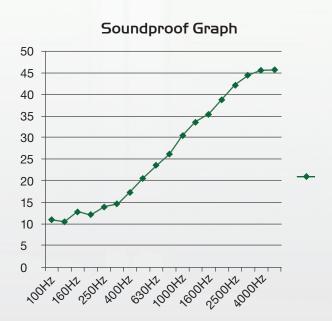
A. Specification

Name	Size(mm)	Weight	Description
Steel Noise Barrier	1980 x 500 x 30mmT	10kg.	Front Panel : S.G (T0.47mm) Back Panel : S G (T0.47mm) Sound Absorbing Material : Polyester (24kg/m³)

B. Lab Test Report No. 2012-030 dated 2012.03.25

Freq. (Hz)	Soundproof Coefficient (dB)	Freq. (Hz)	Soundproof Coefficient (dB)
100	11.0	800	26.2
125	10.6	1000	30.5
160	12.9	1250	33.7
200	12.2	1600	35.5
250	14.0	2000	38.8
315	14.7	2500	42.3
400	17.4	3150	44.6
500	20.6	4000	45.6
630	23.5	5000	45.7





Made in Korea

Product Description & Specification

The P.E.B. Noise Barrier is the first panel that helps to effectively reduce construction noise, thus making work sites more environmentally friendly.

Not only does it help to reduce construction costs, it also serves to beautify building sites and surrounding areas.

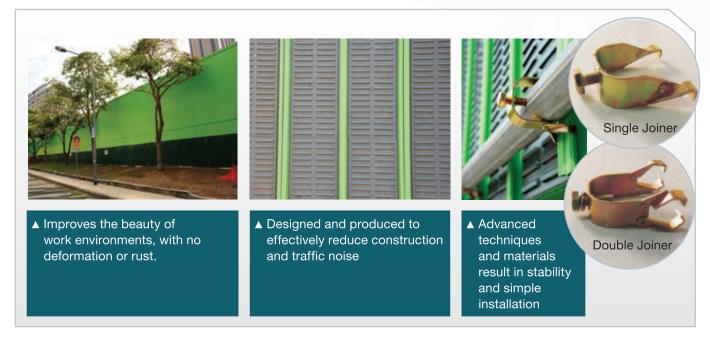
Designed and produced to the highest standards, the P.E.B Noise Barrier has established itself as the industry choice for improving work and noise conditions at construction areas.

- Its genuine flat surface is beautiful as it is and allows customers to freely feature corporate images or big-size graphics using wrapping sheets on its surface.
- Its lighter weight easily allows for quick installation and dismantling, reducing work-time and effort.
- Advantages include high tensile and bending strengths, as well as incombustibility.
- The color of the panel can be freely selected in production.
- It can be used almost permanently as the weak point of deformation by external pressure or exposure to salt and moisture is improved. It is an environmentally friendly product which can be recycled.
- This panel is designed to reduce the noise of construction sites using an independently developed sheet structure.
- Completely non-flammable.

Specification

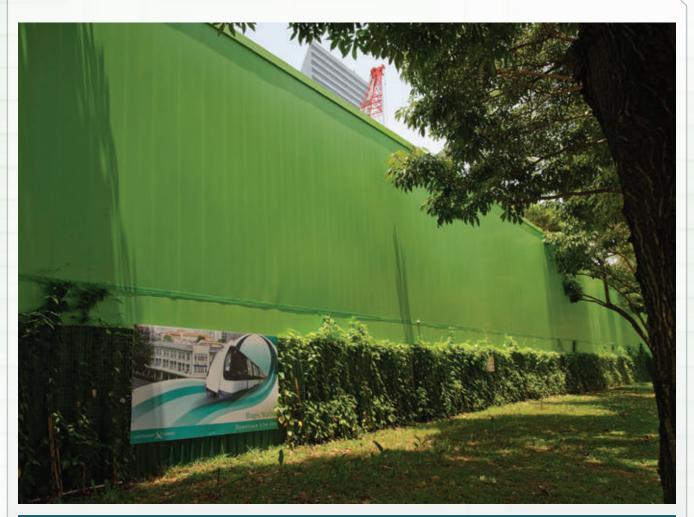
Name	Thickness (mm)	Width (mm)	Length (mm)	Weight (kg)
P.E.B. Noise Barrier Panel	34	500	2000 – 6000	5.4 – 16.2

Features



Made in Korea

LTA-DTL, Tan Quee Lan Street



▲ The panels can be integrated with other elements on the site, resulting in a more natural and pleasant work environment.



▲ A complete view of the main pipes and assistant pipes from the interior of work site at Tan Quee Lan Street.

Made in Korea

LTA-C1590, Jurong East Street 21



▲ An overview of the completed P.E.B. noise barrier wall at Jurong East; the panels effectively reduce noise produced at work sites right next to residential dwellings.



▲ P.E.B. noise barrier panels are a proven and welcome addition to sites that are situated in residential areas.

Made in Korea

LTA-DTL-2, Tan Kah Kee Station



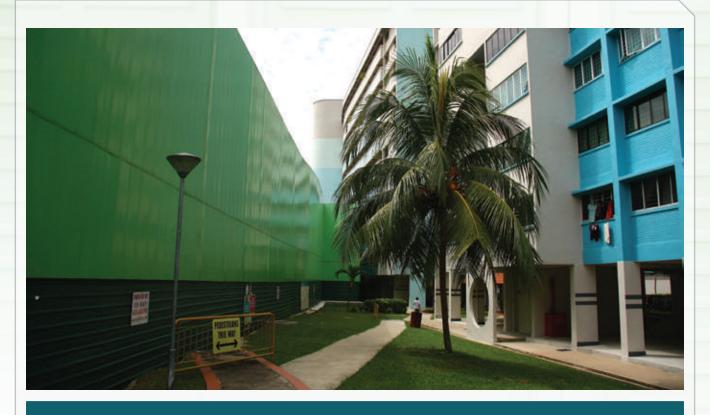
▲ An overview of the P.E.B. noise barrier wall at Duchess Road, site for the future Tan Kah Kee station which is situated right next to Hwa Chong Institution.



▲ P.E.B. noise barrier effectively reduces the noises produced at work sites right next to noise sensitive buildings.

Made in Korea

LTA-DTL-3, Bedok Town Park Station



▲ Fitting right in along residential areas that are adjacent to work sites.



▲ P.E.B. noise barrier panels at work, improving the environment of residents next to construction works.

Made in Korea

LTA-DTL-3, Singapore Expo



▲ Workers installing the P.E.B. noise barrier panels while the exterior is decorated with pleasant looking greenery.



▲ Workers installing the P.E.B. noise barrier panels. One of its many advantages is its ease of installation.

Made in Korea

Nanyang Technological University (NTU), Singapore



◄ P.E.B. noise barrier panels can also be installed directly within building corridors to effectively reduce exterior noises.





◄ Exterior view of building with all of its corridors covered with P.E.B. noise barrier panels

Made in Korea

LTA-Circle Line, C823



◄ P.E.B. noise barrier installed around noisy generators along Old Airport Road for MRT Circle Line (C-823).

Greenridge Primary School



▲ Installation works for P.E.B. noise barrier begins at Greenridge Primary School at Bukit Panjang.



◄ P.E.B. noise barrier installed at Greenridge Primary School at Bukit Panjang



▲ The advantages of P.E.B. noise barrier at work, providing noise and dust protection from school upgrading site.

Made in Korea

Other Installations of P.E.B. Noise Barrier Panels



▲ P.E.B. noise barriers can be installed around individual machines to reduce noise emission.



▲ P.E.B. noise barrier panel used on crane at work site near to commercial buildings at Bugis Street.

Made in Korea

Other Installations of P.E.B. Noise Barrier Panels

For smaller-scale projects and locations, P.E.B. panels are once again the best choice for convenience, noise reduction and effectiveness.



▲ P.E.B. noise barrier panel. Noise reduction from tower crane.



▲ P.E.B. noise barrier panel. For Generator, Welding Set, Air Compressors, Engine Pump and other Noisy Equipment on site.



▲ P.E.B. noise barrier installed around noisy generators.

Portable Noise Barriers

Portable Noise Barrier (PVC Type) | Optimised Flexibility and Efficiency

The flexibility of the Portable Noise Barrier helps to reduce noise on generators, air compressors and other noisy equipment and allows effective and easy customisation to any required sizes.



Size: 2m (L) x 2m (H)





Portable Noise Barriers

Portable Noise Barrier (Super Galum Steel Type)

The flexibility of the Portable Noise Barrier helps to reduce noise on generators, air compressors and other noisy equipment and allows effective and easy customisation to any required sizes.

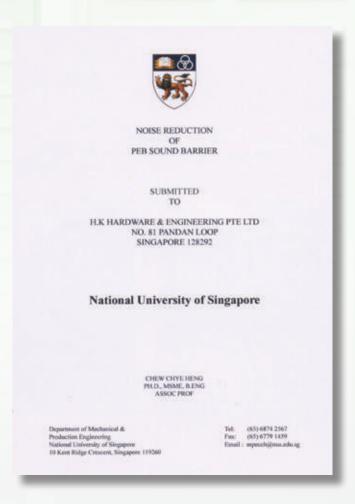


Size: 2m (L) x 3m (H)



Situ Noise Measurement Test Report

Noise Reduction of P.E.B. Noise Barrier



Background

H.K Hardware & Engineering Pte Limited carried out an in situ noise measurement to determine the Noise Reduction of the P.E.B. Noise Barrier. Photos 1 and 2 show the P.E.B. Noise Barrier erected in front of Block E, Greenridge Primary School. Noise measurement was conducted on 19th May 2001 at about 1.30 pm. The noise reduction obtained at each octave band could not be compared to the result of the transmission loss obtained from the laboratory test. The ambient noise at the measurement location was rather high. Reflections from other blocks in the school also affected the noise level at Block E. Flanking path between the P.E.B. Noise Barrier and the end wall (as shown in Photo 2) would increase the noise level behind the P.E.B. Noise Barrier. However, the noise reduction obtained in this field test would be more indictative of the actual reductions in actual installation. To obtain reliable indicators of the noise reductions, the noise levels in front and behind the P.E.B. Noise Barrier were recorded simultaneously. The octave band levels were obtained by simultaneously analysing the two recorded signals.

Instructions

- B&K Type 2230 Precision Integrating Sound Level Meter (2 Nos.)
- Sony PC208A 8-channel Digital Tape Recorder
- HP 23560A Dynamic Signal Analyzer

P.E.B. Noise Barrier (PVC Type) Situ Noise Measurement Test Report

Result

Figs. 1 and 2 show the $\frac{1}{3}$ octave band spectra of the noise measured just outside and inside the P.E.B. Noise Barrier. Both were located at about 1.5 m from the ground and about 1 m from the Noise Barrier. The sound levels in each 1/3 octave band are as shown in Table 1.

Table 1: 1/3 octave band sound pressure levels

1/3 octave band frequency, Hz	Outside Barrier facing construction site, dB	Inside Barrier, dB	Noise Reduction		
100	77.1	65.8	11.3		
125	74.3	61.3	13.0		
160	75.5	61.4	14.1		
200	71.8	58.9	12.9		
250	69.8	59.3	10.5		
315	67.4	56.4	11.0		
400	66.8	58.3	8.5		
500	67.0	56.3	10.7		
630	67.5	54.8	13.7		
800	64.1	53.8	10.3		
1000	66.2	52.5	13.7		
1250	67.7	48.2	19.5		
1600	67.5	48.1	19.4		
2000	70.6	48.7	21.9		
2500	70.8	49.3	21.5		
3150	74.3	52.8	21.5		
4000	76.6	53.0	23.6		

To obtain a better understanding of the significance of the noise reduction, Table 2 provides an indicator of the perceived change in loudness due to the reduction.

Table 2: Perceived change in loudness

Change in sound level, dB	Change in perceived "loudness"
3	Just perceivable
5	Noticeable
10	Twice (or I)as loud
15	Large change
20	Four (or 1/4) as loud

Conclusion

From Table 1, the P.E.B. Noise Barrier was shown to have reduced the noise from the construction site by about 15 dB(A), a very significant noise reduction.

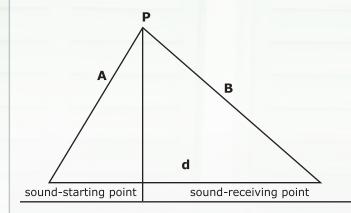
Technical Information

P.E.B. delivers the best result through leading-edge materials and research

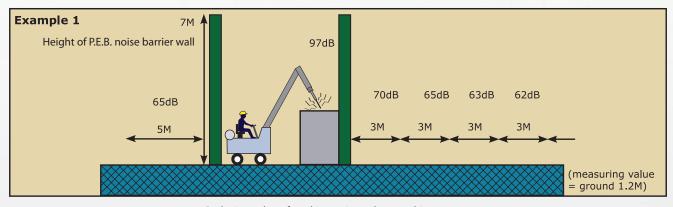
Classified drawing of noises in everyday lives (permeating loss dB)

To get dB loss value for δ (see below)

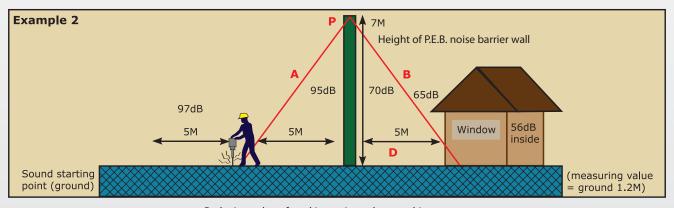
(= A = b-d) δ is to get a difference diffracted by setting up the soundproofing wall. The larger P, the higher soundproofing effect, so the soundproofing wall should be selected in the point of getting larger of δ . (It is every effective to install the wall in the near side of approaching sound-starting point or sound-receiving point)



140 130 120 110 100 90	- Intolerable noise: airplane sound, factory, turbine sound
80 70	- Activity time, ringing phone, car sound, clock or blower etc.
60 50	- Rest: natural conversation, fan sound, etc.
40 30 20 10 0 -0	- Sleeping: swing leaves, whisper



 \bullet Reducing value of working noises when crushing concrete



• Reducing value of working noises when crushing concrete

Inflatable Type Noise Barrier

Made in Korea



▲ Lightweight and easy to set up.

Available Size:
6 m (Length) x 6 m (Height)
Straight Type

▲ The temporary inflatable noise barrier can be effectively folded up for storage or transportation.



▲ The temporary inflatable noise barrier can be set up quickly and effectively in areas where the heavier and bulkier panels are not desired.

Japan Sound Proof Sheet



▲ Japan Sound Proof Sheet is lightweight and quick and easy to install. An ideal choice for temporary or short term projects.









▲ Japan Sound Proof Sheet is also fire retardant.



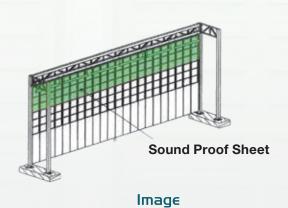
▲ Japan Sound Proof Sheet can also be lined over building facets to contain noise emission.

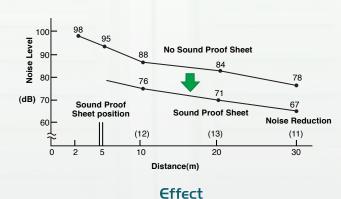
Japan Sound Proof Sheet





▲ Japan Sound Proof Sheet has excellent sound insulation qualities.





Product Features

- ► Fire Retardant Material
- ► Excellent Sound Insulation Effect

Product Characteristics

Standard Size:

1.8 x 3.4 metres

Weight:

550g/m² (Light) 1200g/m² (Heavy)

Available color:

Grey.

