Additional 250m Rail Damper KTL and TKL

The 3rd generation Multi-Directional Tuned Mass Damper (MDTMD) is now installed on Kwun Tong Line (KTL) and Tseung Kwan O Line (TKL) in December 2015 for 250m operation tracks. MDTMD is the best damper in the world as for retrofitting railway noise mitigations. It is designed to provide >100g (gravitational force) mounting force to the rail at both vertical and lateral directions in order to maximise the damping effect. Trackside noise reduction of **3 to 4dB(A)** are generally provided.

In addition, MDTMD is the only rail damper capable to slow down corrugation growth, thus also slowing down the rise in noise level due to rail corrugation growth. Combining the above effects, measured saloon noise levels from a previous damper site show reduction of **up to 6.5dB(A)**[Ref :1]. It is maintenance free and no need to be removed during rail grinding.

The 4th generation MDTMD is at the final design stage and will be available in 2016 which aims to achieve **5dB(A)** trackside noise reduction for resilient trackform (FST, high-attenuation baseplate, etc.) and **guarantee minimum 3dB(A)** trackside noise reduction for various types of trackform.

Ref : 1 Wilson Ho, Banting Wong, Dragon Tsui, Calvin Kong "***Reducing Rail Corrugation Growth by Tuned Mass Damper***", the 11th International Workshop on Railway Noise (IWRN11), 2013.

Staff Exchange with Sustainable Acoustics in the UK

Further to the 3-month training (Mar to Jul 2015) in Sustainable Acoustics Limited in the UK, Wylog Wong (WAL R&D Division Leader) has shown significant improvements in both operation and development of WAL. As a result, WAL will continue the Staff Exchange Program in 2016 and extend the training period to 6 months with Sustainable Acoustics Limited in the UK.

WAL would like to invite other companies to join the Staff Exchange Program. Intereseted parties please contact Wylog Wong at wwong@wal.hk

Sustainable Acoustics

WAL Weekly Seminar Schedule

WAL weekly seminars are established to serve HK acoustics industry by providing a platform for sharing technical knowledge and connecting professionals in the industry. This seminar is open for all professionals in the industry. Anyone interested are welcome to join. Please contact Mr. Peter Wong at peter.wong@wal.hk for more details.

	Topics	Presenter
27 Jan 16	Technical training - FEA Basics and application	Banting Wong & Cindy Cheung
2 Feb16	BEAM PLUS	Thomas Tse
17 Feb 16	RT Project Sharing	Cindy Tam

WESPAC Conference, Singapore

Mr. Dennis Chan (Singapore leading Contractor) and officer from NEA watching the SilentUP installation video.

Delegation from Singapore LTA and guests from Hong Kong EPD

Wilson Acoustics and ***Acoustics Innovation*** have presented 2 papers in Western Pacific Acoustics Conference **(WESPAC)** in Singapore from 6 to 9 December 2015, and exhibited 2 inventions, i.e. **SilentUP** Retractable Noise Barrier and Multi-Directional Tuned Mass Damper (**MDTMD**). Wilson Ho and Yasir Naveed delivered their presentations "***Noise Attenuation along Construction Tunnels***" and "***Retractable Noise Barrier***" respectively.

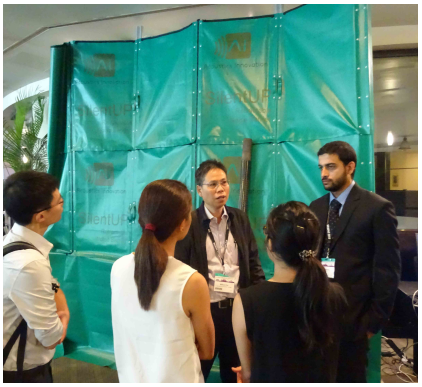
Around 250 professionals attended our booth and showed great interest in our inventions, inculding external guests such as the Land Transport Authority (LTA), National Environment Agency (NEA), Gammon Construction Singapore and SHAMA Technologies. We are thankful for their attendance and participation.

Railway Noise Control by MDTMD, Exhibition in WESPAC

Two samples of 2nd and 3rd generations of MDTMD were exhibited. MDTMD is an invention of Hong Kong and has been installed in 3 perational MTR lines in Hong Kong. It provides superior performance :

- Slow down corrugation growth and increase rail life
  72% corrugation reduction at 80mm wavelength, and
  45% overall reduction at board-band wavelength (10mm to 160mm)
- Guarantee 3dB(A) noise reduction for retrofit installation,
- Rail grinding without removal of MDTMD

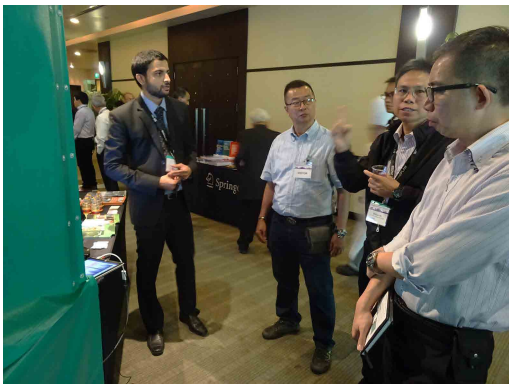
Construction Noise Control by SilentUP, Exhibition in WESPAC



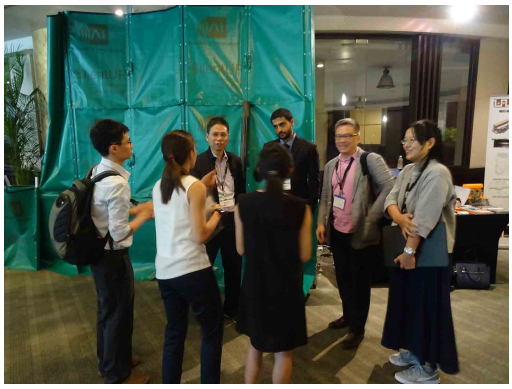
A full scale sample of SilentUP (3x4m) was showcased. SilentUP is also an invention of Hong Kong. Easy installation and no foundation are the major characteristics. It can be erected up to 10m high without using any machines. The erection process is quiet and hence suitable for nighttime installation.

Two types of panels, Type A (solid panel) and Type B (flexible panel), can be installed to the carbon fiber tube structure to suit different site requirements. Type B was exhibited at WESPAC and received great appreciation from Authorities, Construction Contractors and professionals from the Western Pacific Region.

Visitor's photos in WESPAC Exhibition

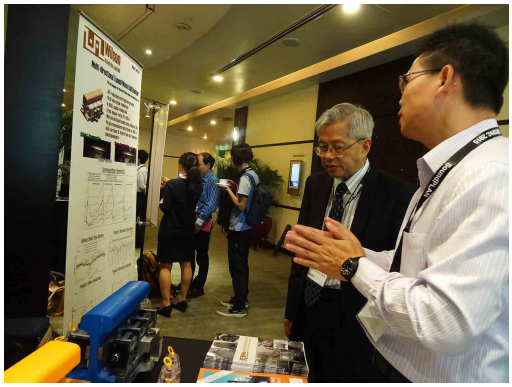


Presenting SilentUP to leading contractors of Singapore



Discussion with LTA and EPD staff

Explaining benefits and characteristics of the barrier's lightweight structurre to LTA personnel

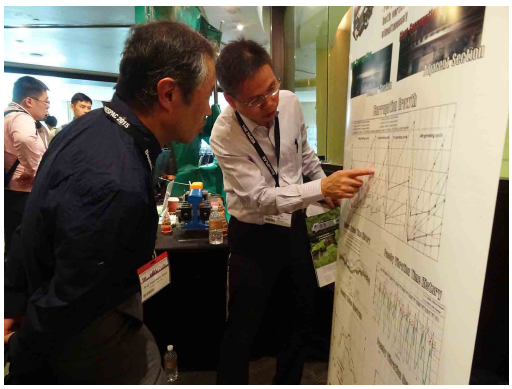


Explaining Rail Damper tune mass damping properties to our visitors

Special thanks to Dennis (Singapore leading Contractor) for visiting our booth as an external guest

Visited by Mr. Lester Chan, Environmental Manager from LTA

Visitors showed great interest in barrier and damper. Souvenirs were also distributed



Showing the effect of MDTMD in suppressing corrugation growth via field data

Published Paper Review

Over a decade, Wilson Acoustics Limited has published over twenty papers in international conferences, journals and magazines to share in the research findings. The papers brought us many inquiries from all over the world.

Starting from this issue, we would like to introduce a new session for review of our published papers in the last session of each newsletter. Major findings of the publised paper wll be summarised in 1 or 2 pages with the help of tables and figures. 12 published papers have been shortlisted for the coming reviews as follows :

1. Wilson Ho, Morgan Cheng and Ken Wong, ***Noise Attenuation along Construction Tunnels***, The 12th WESPAC, 2015
2. Wilson Ho, Yasir Naveed, ***Silent Up Retractable Noise Barrier***, The 12th WESPAC, 2015
3. Wilson Ho, Banting Wong, Po-Lai Tam and Ting Cai, ***Tuned Mass Damper Optimization Using FEA***, The 22nd International Congress on Sound & Vibration (ICSV22), 2015
4. Wilson Ho, Ting Cai and Banting Wong, ***Analytical Study on Railway Corrugation Growth Control by Tuned Mass Damper***, The 21st International Congress on Sound and Vibration, 2014
5. Wilson Ho, Morgan Cheng, Jinhao Cao and Ken Wong, ***Noise Insulation for Operable Blast Cover***, The 21st International Congress on Sound and Vibration, 2014
6. Wilson Ho, Banting Wong, Dragon Tsui, Calvin Kong, ***Reducing Rail Corrugation Growth by Tuned Mass Damper***, The 11th International Workshop on Railway Noise (IWRN11), 2013
7. Wilson Ho, Cai Ting and Banting Wong, ***Dynamic Model of Resilient Booted Sleeper and Rail Damper***, The 20th International Congress on Sound & Vibration (ICSV20), 2013
8. Wilson Ho, Banting Wong, Calvin Kong and Richard Kwan, ***Vibration Isolation Performance of Isolated Slab Track***, Acoustics 2012 Hong Kong
9. Wilson Ho, Eddy Ng and Banting Wong, ***Public Address System Design in Railway Stations,*** 5th Cross-strait Many Cities Symposium on Acoustics, 2012
10. Wilson Ho, Issac Chu, Etienne Barabger and Richard Kwan, ***Noise Control for 24-hour Rock Drilling in Urban Area,*** The Acoustics 2012 Hong Kong conference and exhibition, 2012
11. Wilson Ho and Banting Wong, ***TBM Groundborne Noise Prediction Models,*** Tunneling Journal April/May 2010, pp28-32.
12. Wilson Ho, Alan Crockett and Andy Raine, ***Measurement and Prediction of Groundborne Noise and Vibration from a Tunnel Boring Machine***, Technical Acoustics, Vol.25 No.6, December 2006

1st Paper Review - Noise Attenuation along Construction Tunnels

Wilson Ho and Morgan Cheng cooperated with Mr. Ken Wong and Mr. Ricky Tse of (Nishimatsu Construction Co.) published this paper in the 12th Western Pacific Acoustics Conference (WESPAC) in Dec 2015.

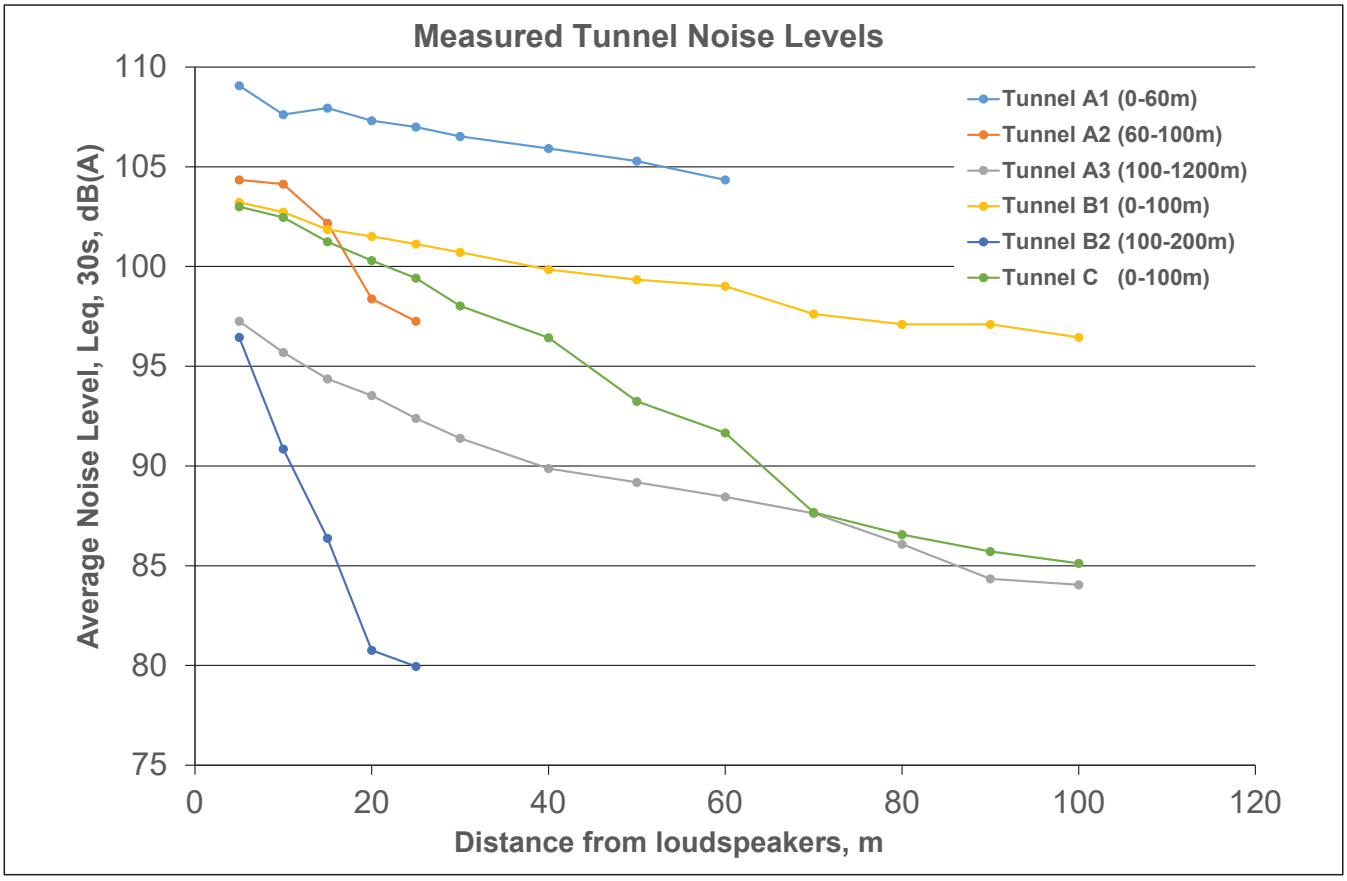
The paper presented noise attenuation measurements of 6 tunnels sections in 3 MTR drill and blast tunnel contracts, SIL C902 main tunnel (Tunnel A1, A2 & A3), KTE C1001 main tunnel (Tunnel B1 & B2) and KTE C1001 adit tunnel (Tunnel C). Typical sections of the 3 tunnels are shown below:

Tunnel A3 (Typical tunnel section of SIL C902 main tunnel)

Tunnel B1 (Typical tunnel section of KTE C1001 main tunnel)

Tunnel C (KTE C1001 adit tunnel)

The measurement results were compared with two prediction models. The noise attenuation rate along 6 tunnels sections are shown in the Figure and Table in next page. 1/3 Octave band spectrum were also analysed for in-house database.



Tunnel Noise Attenuation Rate, dB (A)/100m			
	Prediction results		
Tunnel section	Prediction Model 1 $\Delta SPL = 1.4 \times \frac{P\ \alpha}{S}$	Prediction Model 2 $\Delta SPL = 4.34 \times \frac{1 - \sqrt{1-\alpha}}{1+\sqrt{1-\alpha}} \times \frac{P}{S}$	Measured results
Tunnel A1 (0-60m)	4.7	3.7	7.8
Tunnel A2 (60-100m)	10.0	9.0	17.8
Tunnel A3 (100-1200m)	**4.7**	**3.8**	**3.2**
Tunnel B1 (0-100m)	**5.9**	**4.7**	**6.8**
Tunnel B2 (100-200m)	4.3	4.0	14.5
Tunnel C (0-100m)	**21.8**	**20.0**	**20.2**

1. Tunnel A1, A2 & B2 have non-uniform property with scaffoldings, therefore the measured attenuation are signficantly higher than predictions.
2. Noise attenuation for long tunnel (>1km) tends to be over-predicted. This leads to underpredicted noise levels at tunnel portal.
3. Low-frequency noise attenuation rate is more uniform along the entire tunnel, while high-frequency noise attenuation rates gradually less at long distance (1/3 Octave spectrum were also analysed for in-house database).
4. Wave-guide effect does appear in construction tunnels.
5. With the measurement report to verify the tunnel noise attenuation, Construction Noise Permits (CNPs) were granted from the Authority and the tunnel construction has become a continuous 24 - hour operation to efficiently complete a tight-scheduled construction program.