# WAL Insight

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Wilson Acoustics Limited


# WAL Railway Noise & Vibration Consultancy Service

## Content



## Contact


**Wilson Acoustics Ltd.**

**Building Acoustics Team**
Morgan Cheng (852) 2637-0603
mcheng@wal.hk

**Construction Team**
Dragon Tsui (852) 2637-0623
dragon.tsui@wal.hk

**Railway Team**
Peter Wong (852) 3421-1533
peter.wong@wal.hk

**Acoustics Innovation Ltd.**
Wylog Wong (852) 2702-2007
wylog.wong@aihk.hk


*Wilson Acoustics Limited (WAL) was formed in 2005 in order to serve a work order from HMMH USA for railway noise and vibration consultancy of Kowloon Southern Link (KSL). The job was to predict the acoustic stiffness and vibration isolation efficiency of a new type **Floating Slab Track** (FST) that had not been used before. Due to the excellent quality of our consultancy report, we got double-pay on the consultancy fee. Thus, this service has been the core strength of WAL from day one, and we are involved in noise control works for most railway lines in Hong Kong.*

*In addition to the Hong Kong projects, WAL also provide railway noise and vibration consultancy service outside Hong Kong, including :*

***Wheel Damping Measurement for Malaysia KVMRT Ph.1***

*Acoustic consultancy for integrated systems including trains, tracks, civil structures and interfaces, throughout the design, construction, test and commissioning.*

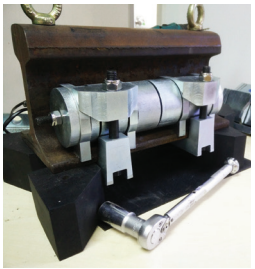
***Borehole impact tests for Taiwan Taoyuan (TTY) International Airport MRT***

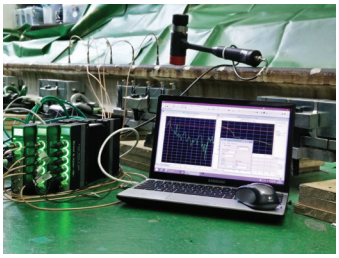
*Re-designed vibration isolation trackform for 51Km alignment and conducted hammer impact tests to determine the soil mobility at 13 locations.*

***Curve Noise Measurement for MTR Long Hua Line (Shenzhen)***

*Conduct noise measurement and assessment for noise mitigation design for passenger trains, engineering rolling stocks and on-track machines .*

# Invention of Multi-Directional Tune Mass Damper (MDTMD)





*We have invented the best performance rail damper (MDTMD) in the world. Design targets are to achieve > 5 dB(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.*

*We've set up in-house facilities with a 6 meter long rail for damper testing. FEA model was used to analyse the rail vibration mode for damper design optimization.*

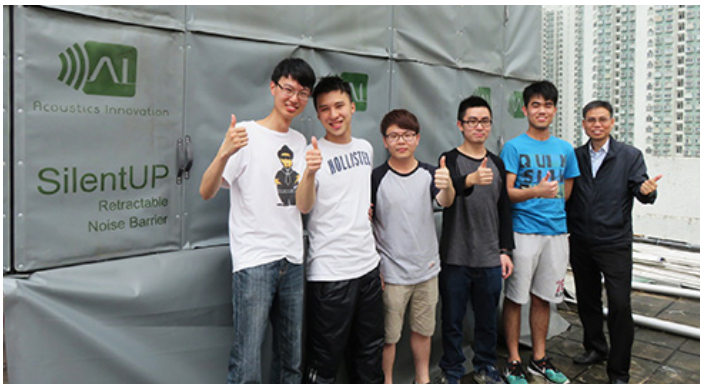
# WAL pioneers QPME Consultancy Service

*WAL is collaborating with the AV Technology ( British Notified Body ) to provide Quality Powered Mechanical Equipment (QPME) noise measurements to facilitate certification process by Environmental Protection Department (EPD) according to European standard for newly manufactured machines (less than 6 years).*

*We are pleased that Mr. Alan Matthews from AV Technology ( British Noti¬fied Body ) visited Hong Kong during 16-18 Mar 2016 for the audit of WAL measurement procedure.*

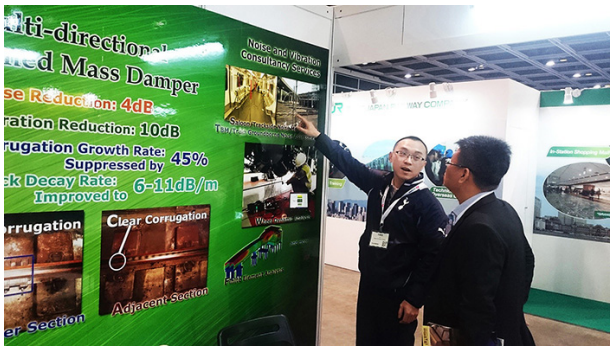
# IVE Student Internship 2016

*WAL's mission is "To nurture young engineers to develop their best talents".*
*Over the past 5 years, we cooperate with Universities and IVE to provide enriching work experiences to their students.*


*In spring 2016, 5 IVE students complete the student internship and trained in different areas including building acoustics, railway noise, and construction noise and acoustics panel design.*
*We wish them a bright future and hope they become a valuable asset for the acoustics industry.*

# MDTMD in AsiaPacific Rail 2016

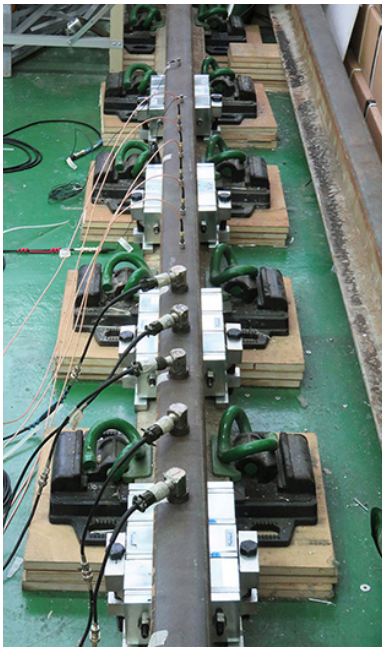




WAL exhibited 2nd and 3rd generations of Multi Directional Tuned Mass Damper (MDTMD) rail damper in Asia Pacific Rail 2016 in Hong Kong from 22 - 23 March 2016.

Around 150 professionals attended our booth and showed great interest in our inventions, including Hong Kong MTRC, Hong Kong Tramways, Singapore SMRT, Singapore SBS, London Underground, Bangladesh DMTC, Vietnam Railways and India Jaipur Metro. We are thankful for their attendance and participation.

MDTMD has been installed in 3 operational MTR lines in Hong Kong. It provides superior performance, even for retrofit installation :

- 3 - 6 dB(A) noise reduction ( guarantee ≥ 3 dB(A) )
- Reduce maintenance cost by supressing 45% corrugation growth rate
- Rail grinding without removal of MDTMD



# WAL Seminar Schedules

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.

| Date | Topics | Presenter |
|---|---|---|
| 05/06/16 | ISO 2631 | Peter Wong |
| 22/06/16 | RT Project Sharing | Cindy Tam |

3nd Paper Review -

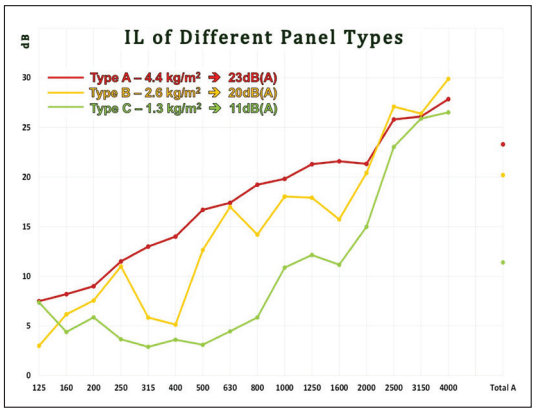
# Retractable Noise Barrier for Construction Noise Control

Wilson Ho and Yasir Naveed

*This paper was presented at the Western Pacific Acoustics Conference (WESPAC) in Singapore on 9 December 2015. SilentUP Retractable Noise Barrier is a product of Acoustics Innovation which is the R&D division of Wilson Acoustics.*

*The paper and the presentation discussed Hong Kong's noise control regulations and importance of a retractable noise barrier in modern context including* ***construction works and open air music events****. It also describes structural components, different types of panels and various patented technologies incorporated in SilentUP.*

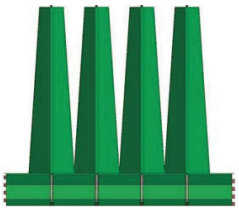
*SilentUP has 3 types of panels to suit different site conditions. No concrete foundation construction is required.*



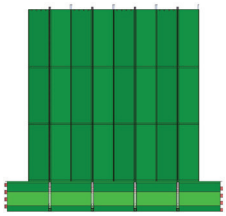

| Parameters | Type A | Type B | Type C |
|---|---|---|---|
| Surface Density (kg/m²) | 4.40 | 2.60 | 1.30 |
| Height (m) | 1.20 | 1.80 | 2.00 |
| Length (m) | 1.35 | 1.35 | 1.35 |
| Noise Reduction (dB(A))* | 23 | 20 | 11 |

* Tested with white noise source playback

*Video of barrier under typhoon signal No. 1*



*Partially opened position due to occasional gust*



*Normal Closed position*

*6.5m high SilentUp Type B Barrier*

*3m high SilentUp Type C Barrier*


*5m high SilentUp Type B Barrier*

*SilentUP is a lightweight and easily relocatable noise barrier for temporary/short-lived noise sources. It can be installed up to* ***10m*** *high by people without using any machines. In order to maintain structural stability in heavy winds, a few novel technologies have been developed and implemented.*

*One such technology is the patented* ***Automatic Wind Load Relieving Mechanism*** *which controls the barrier's surface area relative to wind speed in orthogonal direction. Under normal wind conditions, the barrier remains static and provides noise insulation.*

*Occasionally, as wind speed increases above 35kph, the panels automatically open partially and allow passage of wind thus reducing the surface area of barrier in orthogonal contact with wind and keeping the barrier safe. This mechanism reduces structural loading requirement on SilentUP by ~1/10 of conventional noise barriers.*

*Once the wind speed returns to less than 35kph, the panels return to closed position automatically with good gap sealing. No human input is required. According to a study, wind speed of 35kph or above occurs once or twice in a month only in urban areas of Hong Kong.*

*Major contractors in Hong Kong, including Vinci Construction, Leighton Contractors, Chun Wo Construction, etc., have selected SilentUP of up to 7m height in order to achieve statutory Acceptable Noise Level at Noise Sensitive Receivers during the "restricted hours" in various construction sites. A* ***10m*** *high version has been tested and ready for site use. It shows promising prospects for urban noise control worldwide.*