

# Mechanical Vibration and Acoustic Noise- Analyses, Diagnostics and Attenuation

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**Kulim Hi-Tech Park**

Conducted by:  
**DreamCatcher Consulting Sdn Bhd**

## **Mechanical Vibration and Acoustic Noise- Analyses, Diagnostic and Attenuation**

### **SYPNOSIS**

This is a course of continuing education for working engineers in technical fields relevant to noise and vibration. It covers the fundamental theories and concepts before bridging to practical analysis and case studies, thus passing complex mathematical modelling and extended programming analysis. This course is designed to help product engineers, reliability engineers and designers concerned with practical aspects of vibration diagnosis and coustics of various engineering systems. The course will provide guidance relevant to equipment design, consideration on dynamics of vibratory systems, the use of computer software, and practical solutions for proactive maintenance improvement.

Moreover, it will emphasize understanding of the relevant phenomena and concepts in order to enable the participants to address a wide range of practical problems insightfully.

The course instructor will draw on his extensive experience to illustrate the subject matter with practical examples.

### **What previous participants say about this course**

Answers to the question 'what did you like most about the course'

- "Actual experiment done by the instructor" - 3 Mar 05
- "The case studies. They give me more clear ideas on the application" - 3 Mar 05
- "The method to reduce vibration" - 3 Mar 05
- "Case study to solve vibration problem" - 6 Jul 05
- "Industrial examples" - 6 Jul 05
- "The design sharing of Dr Lim" - 6 Jul 05
- "A lot of real cases study. The instructor is very experienced" - 31 Mar 08
- "Actual case studies of Vibration Systems/Acoustic. ANSYS Introduction" - 31 Mar 08

### **WHAT YOU WILL LEARN**

- Basic concepts of noise and vibration
- Concepts and techniques for vibration suppression
- Vibration measurement techniques and analysis
- Computer softwares for vibration prediction and analysis
- Noise measurement and attenuation methods
- Practical cases studies to highlight and relate theories, analysis, techniques and real engineering systems

### **WHO SHOULD ATTEND**

- mechanical engineers and designers
- product engineers
- reliability engineers
- shock and vibration test engineers
- HVAC contractors
- automotive engineers
- aircraft maintenance engineers
- construction site noise controller

### **PEREQUISITE**

Technical background or working experience in mechanical, production, civil or environmental engineering disciplines. Although the participants are not required to have in-depth knowledge in this field, some prior acquaintance with basic vibration knowledge and experience should be helpful.

### **COURSE METHODOLOGY**

This course is conducted in a seminar room. Each participant will receive a set of course material.

### **COURSE DURATION**

3 days, 9am - 5pm

### **COURSE STRUCTURE**

#### Day 1

- Introduction to vibration
- Fundamentals of mechanical vibration phenomena
- Free and forced vibration
- Resonance and damping
- Vibration absorption
- Vibration isolation
- Practical vibration systems
- Analytical modal analysis
- Vibration measurement

#### Day 2

- Introduction to finite element method
- FEM softwares for vibration analysis: ABAQUS and ANSYS
- Practical cases of study
- Free Vibration of a Heat Exchanger Lid
- Frequency Measurement and Analysis of a Chlorine Drum
- Vibration Isolation with a Floating Slab for Press Machine

- Vibration neutralizer for Lamppost at Tsing Ma Bridge
- High speed rotating machinery simulation and turbine failure

### Day 3

- Fundamental of noise and acoustics
- Structure-borne vibration and airborne vibration
- Noise measurement
- Practical cases of study
- Noise, vibration and harshness for a traveling vehicle (NVH)
- Noise measurement of loud speakers and subsequent acoustic treatment
- Vibration and structure-borne noise analysis for train viaduct
- Design of plenum system for Light Rail Transport (LRT) vehicles

### **COURSE INSTRUCTOR(S)**

Currently an Associate Professor in Department of Building and Construction, City University of Hong Kong (CityU). Dr. Lim received a B.Eng. degree from Universiti Teknologi Malaysia (UTM) in Mechanical Engineering (Aeronautics) in 1989 and honoured with a best academic performance medal. He was later conferred a M.Eng. degree and PhD from National University of Singapore (NUS) and Nanyang Technological University (NTU), respectively in 1992 and 1995, in Mechanical Engineering. He is currently the Programme Leader of an undergraduate programme in the department. Prior to joining CityU as an assistant professor and later promoted as an associate professor, he held post-doctoral research fellow positions at Department of Civil Engineering, The University of Queensland and Department of Mechanical Engineering, The University of Hong Kong.

Dr. Lim has expertise in vibration of plate and shell structures, dynamics of smart piezoelectric structures and biomechanical engineering. He have published approximately ninety peer-reviewed research papers in international journals, presented more than thirty-five papers at various international conferences including a keynote paper, six invited papers and chairs in five conference sessions, one book chapter, and his published works have accumulated more than 360 self-excluded citations from independent sources. He is currently the Associate Editor (Asia-Pacific Region) for an international journal: *Advances in Vibration Engineering*. He serves in the international advisory committee of various international conferences on vibration, among them the 3rd (2001 USA), 4th (2003 UK) and 5<sup>th</sup> (2005 Germany) *Symposiums on Vibrations of Continuous Systems* attended by vibration experts around the world. He is listed in Marquis Who's Who in the World, *Marquis Who's Who in Science and Engineering*, *Dictionary of International Biography*, a recipient of *International Order of Merit* and a fellow of *International Biographical Society, UK*.

Dr Lim is married with two children. He has spoken and written skills in English, Malay and Chinese languages. He enjoys reading, swimming and sports during his leisure hours.

### **Previous Consultancy Projects**

Apart from teaching and doing applied research in vibration engineering, Dr Lim has been also active in conducting consultancy projects on noise and vibration for local industry. His clients include both private and government departments. Some of the highlights of important consultancy works are:

May 2000: Noise Assessment (Concrete Batching Plant), AMEC-Hong Kong Construction, West Rail, Yuen Long.

June 2000: Noise Assessment for Drilling Equipment, AMEC-Hong Kong Construction, West Rail Contract, Yuen Long and Long Ping Station.

July 2000: Noise Assessment (Concrete Batching Plant), Heng Fai Concrete Limited, Kwun Tong Inland.

Aug. 2000: Vibration and Noise Analysis Alternative Tender Design, Kowloon-Canton Railway Corporation (KCRC) East-Rail Extension.

Sept. 2000: Vibration and Structure-Borne Noise Analysis, Kowloon-Canton Railway Corporation (KCRC) East-Rail Extension C Sheung Shui to Lok Ma Chau Spur Line Alignment and Associated Works.

Nov. 2000: Noise Assessment (for Concrete Batching Plant), Yik Fung Concrete Products Manufactory Limited.

Dec. 2000: Provision of Test Case for Vibration Reduction for Lamp Post at Tsing Ma Bridge and Kwai Chung Viaduct.

Feb. 2001: Assessment and Design of Sound Barrier at Kai Tak Batching Plant.

Oct. 2001: Noise Measurement for Cranes, HK ACE Joint Venture, Siu Hong Station, Tuen Mun, N.T.

Dec. 2001: Noise Measurement for Cranes, HK ACE Joint Venture, Siu Hong Station, Tuen Mun, N.T.

Dec. 2001: Noise Mitigation Study and Subsequent Improvement Work on Light Rail Vehicle System, KCRC, Tuen Mun.

Aug. 2002: Improvement to Chlorine Drum Design, Water Supplies Department.

Sept. 2002: Noise Measurement and Mitigation of Drill-Rigs with Acoustic Shed, China Civil Engineering Construction Corporation.

Feb. 2003: The Performance of Electrically Powered Hold-opn Devices for Fire Rated Doors and the Door Closing Systems, CLP Power

**REGISTRATION FORM  
PUBLIC TRAINING PROGRAM**

<b>Course Title [Code]</b>	<b>Mechanical Vibration and Acoustic Noise- Analyses, Diagnostic and Attenuation</b>		
Duration	<b>3 days</b>	Date	<b>4<sup>th</sup>-6<sup>th</sup> Aug 2010</b>
Venue	<b>Information Technology Centre, Kulim Hi-Tech Park Kulim, Kedah.</b>		
<b>COMPANY INFORMATION</b>			
Company Name / Address			
Contact Person			
Designation			
Tel			
Fax			
E-mail			
<b>PARTICIPANT/S</b>			
No .	Name	Designation	IC Number
1			
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Signature : \_\_\_\_\_ Company Stamp

Date: \_\_\_\_\_

Kindly fax / email your registration form before  
 For further information please call Eunice Ooi/ Celine Chang at 04-6407111/7112  
 Or email : [euniceooi@dreamcatcher.asia/](mailto:euniceooi@dreamcatcher.asia/) [celine@dreamcatcher.asia](mailto:celine@dreamcatcher.asia/) or fax: 04-6407110

