

# Theoretical and Experimental Vibration Analysis Applied to Machine Elements Health Diagnostics

## Training Program

(March 26 - 27), 2009

Venue: **BEST WESTERN THE PRIDE HOTEL**

5 University Road, Shivaji Nagar, Pune - 411 005, India

Hall name : " Crystal"

Phone : +91-20 - 25534567, 25530444

### Organized By:

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**Invited Lecture By: Prof. Rajiv Tiwari, Dept. of Mechanical Engineering, IIT Guwahati, India**

### Introduction

Vibration is a universal phenomenon in all dynamic systems. Engineers worldwide try to mitigate vibration when undesirable. This training program is aimed at providing a comprehensive coverage to vibration phenomenon, its physics and measurement techniques and details on how to use the vibration signature from a machine to diagnose defects and also an insight into solving vibration problems. After completing the training program you will be able to measure and analyse vibration data to identify defects and will be able to solve vibration problems effectively.

### Who should attend:

Design engineers  
Testing engineers  
Quality engineers  
Field Engineers  
Faculty members from educational institutions  
Mechanical and Instrumentation engineering students

## **Training Program Topics**

### **A. Basics**

- a) Periodic Motion and Oscillations
- b) Single and Multi Degree of Freedom Systems
- c) Prerequisite Physics
- d) Vibration Parameters
- e) Vibration to Noise Journey
- f) Linear Scales vs. Logarithmic Scales
- g) Filters
- h) Initial Discussions on Frequency Analysis
- i) Time Domain Vs. Frequency Domain Analysis
- j) Vibration Sources:
  - i. Rotary Motion
  - ii. Reciprocating Motion
  - iii. Random Excitation - Road Transport

### **B. FFT Spectrum Analyzer**

- a) What is spectrum
- b) Operation of a Spectrum Analyzer
- c) Sampling Techniques

### **C. Vibration Measurement Transducers**

- a) What Parameters to Measure

### **D. Advanced Signature Analysis Techniques**

### **E. Elementary Problem Diagnosis as Applicable to Various Machine Elements**

- a) Gears
- b) Rolling Element Bearings
- c) Electrical Motors
- d) Pumps
- e) Compressors
- f) Engines
- g) Couplings

### **F. Vibration Isolation**

### **G. Vibration Limits & Standards**

## **Vibration Measurement Hardware & Software - Display & Demonstration:**

***Kistler Corporation***

***National Instruments***

**Principal Faculty:**



**Rajeev Dubey (M. Tech. – IITK, 1993), Managing Director,  
Quantum Age Tech Solutions Pvt. Ltd**

**Paper Publications:** “Hermetic Compressor Noise Control...”, Intl. Cong. On Sound and Vib., Adelaide, Australia, 1997

**Key Achievements:** Tyre tread noise simulation algorithm, noise and vibration control of in operation compressors, gears, pumps, etc. and contribution to the development of design methodologies for low noise and vibration mechanical systems

**Experience:** 15 years, Noise and vibration (simulation, measurement and control), Development of algorithms for noise and vibration signature analysis for defect identification, FEA, CFD, Consultancy on product design

**Earlier Training Programs Conducted For:** Apollo Tyres, L&T, L&T Chiyoda, CEAT, Crompton Greaves, Hero Honda, GE, Vulcan Gears, Mahindara & Mahindra, etc., Vibration Training Program 2008 at Vadodara, India

**Invited Lectures:**



**“Accelerometer Technology, Selection Criteria and  
Demonstration”**

**Kuno Marschall, MIES, MSc, Kistler Corporation**

Kuno Marschall has more than 20 years working experience in test and measurement. After graduating from the University of Wuppertal, Germany in 1981 with a Masters Degree in Mechanical Engineering he worked for more than 10 years as an application engineer for destructive material testing machines and systems. In his current position he is the Managing Director of Kistler Instruments Pte Ltd, Singapore as well as Technical Adviser for Asia. He has been involved in numerous measurement projects with customers in Asia and abroad and is conducting regular training courses on Instrumentation for engineering measurements.

**“Challenges Associated with High Channel Vibration  
Measurement Systems”**

**Tarun Gupta, B.Tech.- IITK, MBA-XLRI, National Instruments,  
India**

Worked on several ATE and high Channel Data Acquisition Systems like Structural Test Systems for Aircrafts at HAL and HALT for GTRE Engines



**"Experimental estimation of bearings and seals rotordynamic  
parameters "**

**Prof. Rajiv Tiwari, Dept. of Mechanical Engg., IIT Guwahati**

**Paper Publications:** More than 60 journal and conference papers on vibrations and bearing design.

**Consultancies:** ISRO, Trivendrum; Combat Vehicle R&D Establishment, Chennai; Tata Bearings, Kharagpur; Lafarge Cement, Meghalaya; Skoda Power, Czech Republic.

**Organization of Symposium & Courses:** National Symposium on Rotor Dynamics (NSRD-2003), Five day course on Rotor Dynamics in year 2004, 2005 and 2008.

**Key Position:** Research officer at University of Wales Swansea, UK during Jan-Dec 2001

**Research Interest:** Vibrations, Rotor Dynamics, Signal Processing & Identification in Rotating Machineries, Rolling Element Bearing Design and Analysis, Active Magnetic Bearings.

## Vibration Training Program 2009

### Registration Form

(Please Fill in Capital Letters)

**Program Fee:** Rs. 20,000/- (Rs. Twenty Thousand Only) \*

### Registration Categories and Discounts \*

**Regular:** Individual Professionals and people working with an organization

A. 25% discount for registrations received before March 15, 2009.

B. 10% discount for registrations received after March 15, 2009 but before March 22, 2009.

**Faculty Member:** 40% discount

**Student:** 50% discount

**Program fee payable in advance in the name of "Quantum Age Tech Solutions Pvt. Ltd." by demand draft or by "at par cheque" payable at Vadodara, Gujarat, India**

NAME :  
TITLE :  
DEPARTMENT :  
ORGANIZATION :  
CATEGORY OF PARTICIPANT: REGULAR / FACULTY MEMBER / STUDENT (PLEASE ✓ MARK)  
ADDRESS :  
PHONE :  
FAX :  
EMAIL :

### PAYMENT DETAILS:

DD / CHEQUE NUMBER :  
AMOUNT :  
DATE :  
BANK :

\* Service Tax @ 12.36% is additional to the training programme fee

### **For queries related to training programme contact:**

Rajeev Dubey

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Email: rajeev@qagetech.com

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**Quantum Age Tech Solutions Pvt. Ltd.**

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