



SCANDINAVIAN ACADEMY
For Training and Development

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Course: Advanced Vibration Analysis

Code	City	hotel	Start	End	price	Hours
361	Beirut (Lebanon)	Hotel Meeting Room	2025-01-19	2025-01-23	3050 €	25

Introduction

An application oriented programme for industry, which aims to convey the latest thinking and best practice of machinery vibration monitoring and analysis via lectures and case studies. Industrial case study examples are used throughout the programme to emphasise key points and to underline the relevance and applicability of the topics being addressed.

The programme gives a detailed treatment of the detection, location and diagnosis of faults in rotating and reciprocating machinery, using vibration analysis.

Objectives

Participants attending the programme will:

- Have a detailed understanding of the measurement and characteristics of vibration signals, and the ways in which vibration data can be stored and represented.
- Have acquired a knowledge of vibration-based fault detection and diagnostic techniques, and the practical implementation of these techniques.
- Have the knowledge to assess accurately machinery conditions, and to make detailed and reliable diagnoses for a range of common machinery and component types.

Training Methodology



Participants will learn by active participation during the programme through the use of programme materials, software demonstrations, hands-on experience of vibration analysis software tools, group exercises, and discussions of “real life” case studies in their organisations.

Who Should Attend?

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Seminar outline

Vibration and its Measurement

- Components of a vibration signal
- Vibration transducers
- Overall and spectral vibration
- Monitoring point location
- Transducer mounting
- Common symptoms
- Time and frequency domains
- Frequency domain instrumentation
- Fast Fourier transforms
- Displacement and proximity probes
- Transducer selection
- Calibration, care and maintenance

Vibration Symptoms of Common Machine Faults

- Looseness issues
- Signal distortion
- Harmonic content
- Inter-harmonics
- Static and dynamic balancing of rigid rotors
- Types of imbalance
- Measurement set-ups
- Single and two-plane balance procedures
- Misalignment
- Distinction between angular and lateral effects
- Case studies



Vibration Based Fault Detection

- Vibration level classification
- ISO standards
- Peak and RMS levels
- Dynamic range
- Use of FFT analysers
- Constant percentage bandwidth spectra
- Automated CPB spectrum comparison
- Spectral zoom
- Case studies

Vibration Based Fault Diagnosis

- Time domain averaging
- Crest factor
- Sampling, digitising and aliasing
- Frequency and phase response
- Band selectable analysis
- RMS and linear averaging
- Real time bandwidth and dynamic range
- Case studie

Fundamentals of Bearing and Gear Vibration

- Calculation of bearing frequencies
- Pulse trains and line spectra
- Loaded element modulation
- Trending fault development
- Gear wear
- Toothmesh harmonics
- Ghost components
- Gear fatigue
- Modulation effects
- Bent shafts and gear misalignment
- Case studies



The Scandinavian Academy for Training and Development employs modern methods in training and skills development, enhancing the efficiency of human resource development. We follow these practices:

- **Theoretical Lectures:**

- We deliver knowledge through advanced presentations such as PowerPoint and visual materials, including videos and short films.

- **Scientific Assessment:**

- We evaluate trainees skills before and after the course to ensure their progress.

- **Brainstorming and Interaction:**

- We encourage active participation through brainstorming sessions and applying concepts through role play.

- **Practical Cases:**

- We provide practical cases that align with the scientific content and the participants specific needs.

- **Examinations:**

- Tests are conducted at the end of the program to assess knowledge retention.

- **Educational Materials:**

- We provide both printed and digital scientific and practical materials to participants.

- **Attendance and Final Result Reports:**

- We prepare detailed attendance reports for participants and offer a comprehensive program evaluation.

- **Professionals and Experts:**

- The programs scientific content is prepared by the best professors and trainers in various fields.

- **Professional Completion Certificate:**

- Participants receive a professional completion certificate issued by the Scandinavian Academy for Training and Development in the Kingdom of Sweden, with the option for international authentication.

- **Program Timings:**

- Training programs are held from 10:00 AM to 2:00 PM and include buffet sessions for light meals during lectures.