Noise and Vibration in Industry

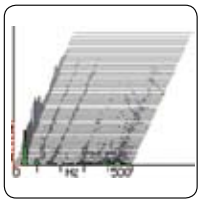
An industry-based introduction to noise and vibration and its application

Introduction to Noise and Vibration in Industry and its application

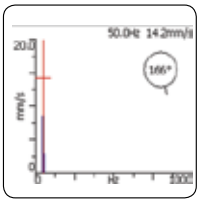
- Would you like to learn more about noise and vibration analysis?
- Could you benefit from applying it to solve real life industrial or manufacturing problems?

SKF have developed a two-day course entitled: 'Noise and Vibration in Industry' to provide you with an in-depth, industry based training on a range of noise and vibration topics.

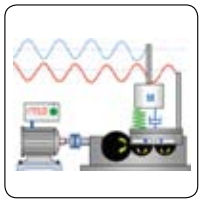
The events are structured to ensure the delegates gain the best balance between coverage of subject matter and practical demonstrations. To enable you to make a valued judgement, an outline of the course is shown opposite:



Waterfall plot



Spectrum and phase



Variable speed machinery

Day 1 – Objectives

Fundamentals

It doesn't matter what product you manufacture or which field of industry you're in, the principles of sound and vibration are the same. This module teaches the basics of noise and vibration. It assumes no previous knowledge and starts from the ground up. At the end of day 1 delegates will understand how to take a basic vibration or noise measurement, and understand why problems might be occurring on their product.

Day 2 – Objectives

Signal analysis and trouble shooting

Introduction to the FFT analyser as a diagnostic tool. This module will explain the 'How?' and 'Why?' of signal analysers. Delegates learn what functionality is available inside an FFT analyser and will be given practical examples and case histories of how they can be used to solve problems. At the end of the day 2 delegates will understand how an instrument can be used to analyse a noise or vibration problem in more detail and offer practical solutions.

Optional evening sessions and application surgery

Experience has shown that most delegates are extremely happy with the course content. Nevertheless, we are sometimes asked for hands-on practice. The lecturers will happily organise practical focus sessions to cover topics in more detail and give advice on individual applications.

Portable course

The FFT is a fundamental tool for noise and vibration analysis. The material covered in the course will apply to the use of any FFT based analyser.




Day 1 – Agenda

8:45 am Coffee and Registration
9:00-9:45 am Introductions

Course structure:

- What is vibration and where does vibration come from?
- Measurement units – acceleration, velocity, displacement
- Which parameter is best to use?
- Amplitude descriptors – peak, peak to peak, RMS, true peak.
- Dealing with impulsive signals.
- The fundamentals and advantages of spectrum analysis.
- Newton's second law of motion.
- Structural parameters – mass, stiffness and damping.
- The relationship between forces and mass, stiffness and damping.
- Excitation methods – self excitation – impact excitation.
- Structural response vs. frequency – the FRF and bode plots.
- The interaction between structures and forces from rotors.
- Magnitude and phase relationship during impact or run up.
- Resonance/mode shapes/operating deflection shapes.
- Uses of the damping value in crack detection.
- The difference between modal testing and bump testing.
- Linear and logarithmic scales.
- Setting limits in accordance with standards ISO, API, BS and IEE.
- How to set limits in the absence of a standard.
- Presenting information – overall reading, linear and logarithmic scales.
- Vibration Transducers – designs and how to select.
- Choosing the correct mounting method.
- Avoiding sources of bad data.

15:15 pm:
The absolute basics of sound:

- What is sound pressure and the decibel?
- Sound pressure vs. sound power.
- The difference between noise and sound.
- What are A and C weighting?
- Sound propagation.
- The practical sound field and its effect on sound quality.
- Addition and subtraction of sounds – coping with background noise.
- Frequency of sound and its effect on sound quality.
- The practicalities of taking a basic noise measurement.

17:00 pm:
Finish of formal sessions. Optional surgery/one-to-one application discussion/hands-on practice.

Day 2 – Agenda

9:00-9:45 am Introductions

Course structure:

- FFT based signal analysis for engineers. (The what, why, and how of the FFT)
- How to acquire good data from an FFT analyser.
- Care and attention check list for setting up instrumentation and sensors.
- Calibration and software integration.
- FFT 'samples' and 'lines of resolution'.
- Windows explained – hanning, flat top, uniform, force/exponential.
- Averaging types – linear, exponential, peak hold and time.
- Cursors – normal, delta power and harmonic.
- Phase measurement for diagnostics.

Dealing with transients, non-stationery signals and variable speed machines:

- Record and post process.
- Cyclic time analysis (CTA).
- Order analysis and bode plots.
- Waterfall maps.
- Colour spectrograms.

Advanced tools for signal detection:

- Synchronous time averaging (STA).
- Enveloping for rolling elements and gears.
- Spectral Emitted Energy (SEE™).
- Harmonic analysis (HAL).
- Machinery diagnostics.
- Fault mechanisms and how they manifest themselves in the noise or vibration signal.
- How to interpret data for a range of machine faults.

17:00 pm:
Finish of formal sessions. Optional surgery/one-to-one application discussion/hands-on practice.

Customer feedback
Following each course we send a certificate of attendance and customer satisfaction questionnaire.

Qinetiq
"Excellent visual aids and good use of methods and media during presentation. Best one-day course for a longtime!"

LucasEPAS
"Excellent. The course was extremely informative".

Rolls Royce
"There has obviously been a lot of preparation and work put into the course. It was nice not to be subjected to any sales pitch during the presentation. The practical demonstrations made the subjects easy to understand".

Course information and to reserve your place

- Payment is by cheque or credit card only and must be made in full before the course commences.
- Cancellation policy: Please note that a charge of 50% of the course fee will be made if less than 2 weeks notice is given and 100% if less than 7 days is given.
- Non attendees will be charged the full course fee.

Money back guarantee
SKF make every effort to ensure that our course content is of the highest quality, but if you are not completely satisfied, SKF will be happy to refund your course fee. In return we would appreciate payment with your order. Places can be reserved but cannot be confirmed until payment is received.

For more information please contact:

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