

Vibration Analysis Level I certification Course

Vibration Analyst Training as per ASNT SNT TC 1A Guidelines & Certification

Vibration Analysis level 1 course is intended for maintenance professional who are exposed to industrial Plant & machineries, new to vibration monitoring & analysis. The course focuses on single channel data collection & analysis for predictive maintenance (PdM) program. A foundation is established for in-depth understanding of accurate data collection, spectrum waveform analysis. This course will help to gain knowledge of vibration time waveform & vibration Phase. This course will give clarity on maintenance fundamentals like CBM, CM, Condition Assessment, PdM, PM & will clear all misconceptions about condition monitoring.

Course Content:

Maintenance Strategies

- Reactive Maintenance
- Preventive Maintenance
- Predictive Maintenance
- Prescriptive Maintenance

Condition Monitoring

- What is condition monitoring?
- Different techniques of CM
- Trend Analysis
- Maintaining records of readings

FMEA (Failure Mode Effect Analysis)

Principle of Vibration

- Introduction to vibration Measurement
 - What is vibration
 - What Causes vibration
 - Vibration & Machine Life
 - When condition of Machine deteriorates
 - Causes of Mechanical failure
- Introduction to Time Waveform
 - What is Time Waveform?
 - Effect of higher & lower Frequency
 - RMS, Peak & Peak – Peak
 - Multiple Frequencies in Time Waveform
 - Frequency – Time Relationship

- Introduction to FFT Spectrum
 - What is spectrum, how it forms
 - What does FFT mean
 - Vibration Frequencies
 - Vibration amplitude
 - Vibration displacement
 - Vibration Velocity
 - Vibration Acceleration
 - Conversion of Measurement Parameters
 - Spike energy
 - Complex Vibration

Data Acquisition

- Measurement of vibration
- Mounting of Sensors on Machine
- What are routes & how to create them
- When to use displacement mode
- When to use velocity mode
- When to use Acceleration Mode
- Practical Measurement
- RMS Value
- Vibration Phase Measurement & Significance of phase
- Phase Measurement technique
- Vibration Transmitter- Accelerometer
- Types of accelerometers
- Accelerometer Mountings
- Transducer Mount Usable Frequency range
- Need to be consistent

Vibration Analyzer & Signal processing

- Vibration Meters & analyzer – brief introduction
- Types of vibration Analyzers
- Selection of Fmax for
 - Rolling Element bearings
 - Sleeve Bearings
 - Gear Boxes
- Selection of number of Spectral Lines
- Spectral Averaging – Why it is important & how to set it

Vibration Analysis

- Need of Vibration Analysis
- Determining Machine History
- Determining Machine Details
- Probing study
 - Defining importance of probing study
 - Different probing Studies
 - Piping Strain
 - Soft Foot Condition
 - Shaft bent Condition
- Obtaining Radial & Axial Spectrum
- Defining Spectral Parameters
- Identifying Problem Component based on FREQUENCY
- Identifying problem Component based on AMPLITUDE
- Reducing the list of Possible problems based on Frequency
- Comparing Tri-axial Data
- Comparing Radial readings
- Comparing Radial readings with Axial readings
- FFT of Square Waveform
- FFT of Saw Tooth Waveform
- FFT of Spike Pulse
- Multiple Harmonic Vibration Frequencies
- Side band frequencies

- Determining Directional & Non-directional Vibration
- Comparing Horizontal, Vertical & Axial Data
- Comparing Horizontal & vertical Phase Readings
- Multiple Radial Amplitude Measurement
- Diagnosing Common Faults
 - Unbalance
 - Bent Shaft
 - Kink or bent close to bearing
 - Shaft Bow
 - Misalignment
 - Looseness
 - Eccentricity
 - Resonance
 - Resonance Bump test
 - Defective Roller Element
 - Vibration due to Aerodynamic problems
 - Vibration due to Hydraulic problems
 - Induction motor Problems
 - Gear Problems
 - Drive Belt Problems.