# WI 202 - Vibration Analysis Category – 1 Training (In compliance to ISO 18436-2)

Approved Training Organization by BINDT (British Institute of Non-destructive Testing) to run Vibration Analysis Level – 1 Course.

## Recommended for

It is recommended that level 1 candidate have at least a secondary school science or technical qualification, or its equivalent. Vibration analysis personnel must be able to manipulate simple algebraic equations, and be familiar with the operation of personal computers. In addition the candidate who have completed formal or on-the-job training on machine knowledge, covering machinery and components, various condition monitoring techniques for a minimum period of six months.

## Course objective

The use of the Vibration Analysis method in condition monitoring and diagnosis of faults in machinery and structures has become a key activity in predictive maintenance programmes for many industries. The effectiveness of this technology depends on the capabilities of individuals who perform the measurements and analyze the data.

## Prerequisite:

Industrial exposure with minimum of 6 months experience with condition monitoring tools.

## Course description

Designed for maximum class participation. A combination of overhead presentations, video tapes, and written tests are used to have participant interest and encourage participation and understanding. This includes group exercises and practical evaluation of the attendees.

### Principles of Vibration

- Basic Motion
- Period, Frequency
- Amplitude: Peak, Peak-to-Peak, rms
- Parameters: Displacement, Velocity, Acceleration
- Units, Unit Conversions
- Time and Frequency Domains
- Natural Frequency, Resonance, Critical Speeds

### Signal Processing

- FFT Application
- Averaging: Linear, Synchronous Time, Exponential
- Dynamic Range

## Data Acquisition

- Instrumentation
- Transducers Sensor Mounting, Mounted Natural Frequency
- Fmax, Acquisition Time
- Proximity Sensor Conventions (API)
- Test Procedures
- Computer database upload/download
- Recognition of poor data

## Condition Monitoring

- Computer data base set-up
- Alarms set-up: Narrowband, Envelope
- Alternate Technologies:
  Lubrication management, Infrared Thermography and Motor current analysis
- Acoustic emission Fault recognition

## Fault Analysis

- Spectrum Analysis, Harmonics, Sidebands
- Mass Unbalance
- Misalignment
- Mechanical Looseness
- Bearing Defects: Rolling Element, Journal
- Bearing defects: methods of detection [includes shock pulse]
- General fault recognition

## Equipment Knowledge

- Electric Motors: Generators and Drives
- Pumps, Fans
- Compressors
- Reciprocating Machinery
- Rolling Mills, Paper Machines and other equipment
- Machine Tools
- Structures, Piping
- Rolling Element Bearings
- Gearing
- Couplings, Belts

## Acceptance Testing

- Test procedure

## Training Examination

## Course length

5 Days (Minimum of 36 hours)