

**“Condition Monitoring & Predictive Maintenance” Training
Program
(English Material)**

Course Length: 20 Hours @ 5 days

Part 1

Fundamentals of vibration analysis :

- Sources of machine vibrations
- Types of vibration signals
- Forced vibrations, General considerations
- Damped vibrations
- Response of second order systems to harmonic and random excitations.
- Multi degrees of freedom systems(rotating machine systems)
- Frequency and time domain analysis.
- Resonance analysis
- Critical speed analysis
- Torsional vibration analysis

Part 2

vibration measuring equipment and analysis

a Sensors

- Contactless- transducer
- Velocity pickups.
- Accelerometers
 - Applications
 - Consideration and operation-
 - limitations
 - Installations and specifications

b Measuring amplifiers

c Filters

d FFT analyzers

Computer Aided Vibration Testing (CAVT) System
 Managing condition monitoring

Part 3

Techniques and tools used for on condition monitoring for rotating machines

- Human and visual techniques
- Oil And Wear Debris Analysis
 - Types
 - Filter wash out
 - Magnetic plug
 - Dielectric
 - Ferrography
 - Spectrographic
 - Physical
- Noise measurements
- Temperature Measurement And Thermograph
 - Scanning infrared thermal cameras
 - Theory and practical uses- electromagnetic spectrum
 - Differential surface temperature measurement
- Vibration analysis
- Non sounded techniques

Part 4

General types of on condition monitoring as a tool for machine health control.

Mechanical and electrical fault diagnosis of rotating machine and troubleshooting

- Unbalance
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- Misalignment
- couplings
- Resonance
- Critical speed
- Bearing failures
- Gears
- Electric motor

Real case studies and worked example

(about 15 case studies covers the different machinery faults)