

# Register Today!

## QUALITY TRAINING

Phone (704) 333-9011

Fax (704) 333-1728

email:

[cbenton@technicalassociates.net](mailto:cbenton@technicalassociates.net)

2009

## SEMINAR SCHEDULE

Full Day Wed-Thur

May 27 - 28; Charlotte, NC  
Sept 9 -10; Charlotte, NC

## SEMINAR FEE

Vibration Overview For Managers \$795.00

**Discounts:** A \$100 discount will be given on the seminar fees for early payments or written purchase orders received at least 30 days prior to the seminar beginning date.

**Payment:** Registration should be made at least two (2) weeks prior to the Seminar beginning date by company check, credit card, or a copy of the Purchase Order.

**Cancellation Policy:** No fee will be charged for any cancellations made **two weeks prior** to Seminar beginning date. Cancellations after this date, but before the Seminar begins will be charged a **\$250 cancellation fee**. No refund is available after the Seminar begins.

TECHNICAL ASSOCIATES  
OF CHARLOTTE, P.C.

347 N. CASWELL ROAD, CHARLOTTE, NC 28204, Ph: 704/333-9011, Fax: 704/333-1728

2009

## Technical Associates Vibration Overview For Managers



Technical Associates Of Charlotte, P.C.

347 North Caswell Road Charlotte, N.C 28204, U.S.A.  
TELEPHONE: (704) 333-9011 FAX: (704) 333-1728

[www.technicalassociates.net](http://www.technicalassociates.net)

SPECIALISTS IN PREDICTIVE MAINTENANCE,  
MACHINERY DIAGNOSTICS, AND  
VIBRATION REDUCTION

# VIBRATION OVERVIEW FOR MANAGERS

This two day seminar is a proven benefit to managers, engineers and technicians considering establishing or currently involved in vibration condition monitoring programs. Instruction provides proper guidelines, database setups and recommends the condition monitoring expertise required to implement a truly effective PdM program. This seminar also defines objectives and provides the critical steps required to establish a quality program. Cost savings justification methods are given, along with how to monitor a program's continuing effectiveness.

## Seminar Overview:

### What Is Vibration and How Can it be Used to Evaluate Machinery Condition?

- Introduction
  - What is Vibration Frequency and How Does it Relate to a Time Waveform?
  - What is Vibration Displacement?
  - What is Vibration Velocity?
  - What is Vibration Acceleration?
  - What is Vibration Phase?
- What is a Vibration Spectrum? (Also Called an "FFT" or "Signature")
- When to Use Displacement, Velocity or Acceleration
- How Much is Too Much Vibration?
- What is Overall Vibration?
- Understanding Phase and its Applications
  - Definition of Phase
  - How to Make Phase Measurements
  - Using Phase Analysis in Vibration
  - Diagnostics

### Introduction to Vibration Instruments:

- Instrument Comparisons
- General Capabilities of Each Vibration Instrument Type
  - Overall Level Vibration Meters
  - Swept-Filter Analyzers
  - FFT Programmable Data Collectors
  - Real-Time Spectrum Analyzers
  - Instrument Quality Tape Recorders

## Overview of Various Vibration Transducers and How to Properly Select Them:

- Introduction
- Types of Vibration Transducers and Their Optimum Applications
  - Accelerometers
  - Velocity Pickups
  - Non-Contact Eddy Current Displacement Probes
  - Selection Criteria for Transducers
- Mounting of Transducers
  - Transducer Mounting Applications

## Role of High Frequency Enveloping (HFE) and HFD in Detecting & Tracking Certain Faults

- HFE includes the following (listed in alphabetical order):
  - Acceleration Enveloping
  - Amplitude Demodulation
  - PeakVue
  - Shock Pulse
  - Spike Energy

## Use of Vibration Signature Analysis to Diagnose Machine Problems:

- Use of Vibration Signature Analysis
  - Mass Unbalance
  - Eccentric Rotors
  - Bent Shaft
  - Misalignment
  - Natural Frequencies and Resonance
  - Mechanical Looseness
  - Tracking of Rolling Element Bearing Failure
    - Stages Using Vibration and High Frequency Enveloping and Demodulated Spectral Techniques
  - Introduction to Gear Problem Detection
  - Introduction to Electrical Problem Detection
  - Belt Drive Problems

## The Predictive Maintenance Program from the Manager's Perspective:

- Predictive Maintenance Conceptual Overview
- Maintenance Program Levels - Descriptions, Objectives and Goals
- Justification, Costs and Savings

- Personnel Qualifications
- Training Required
- Advice to Those Beginning a Program

## Philosophical Guidelines for Gleaning the Most from a Plant's Investment in PdM Technologies:

- Reliability Based, Proactive Maintenance
- Benchmarking
- Quality Applied to Predictive Maintenance
- Operating Deflection Shape Analysis (ODS)
- Synchronous Time Averaging Applications

## Setup and Implementation of a Predictive Maintenance Program:

- Introduction
- Maintenance Philosophies
  - Run to Failure
  - Preventive Maintenance
  - Predictive Maintenance
- Selecting Optimum Machinery
- Selecting PdM Monitoring Techniques
- Establishing Alarms
- Set Up PdM Database
- Collect Baseline Measurements and Adjust Alarms (as required)
- Store Data
- Compile PdM Reports
- Follow-up Surveys at Fixed Intervals
- Perform Vibration Signature and/or Phase Analysis
- Correct Faults and Document
- Training
- Monitoring Effectiveness
  - PdM Trackable Variables
  - Monitoring "Machine Condition Rating"
  - PdM Cost Savings Case History
  - Potential Electrical Savings from PdM Program

## Case Histories

### Prerequisites:

No prior experience in vibration analysis or condition monitoring is required. The purpose of this seminar is to introduce the student to each of these techniques.