

## About the Seminar Leader:

John C. Robertson is a lead reliability engineer with 46 years of experience as a mechanical engineer in plant maintenance, including experience in the start-up and operation of fossil- and nuclear-fueled power plants. Besides specializing in vibration analysis, shaft alignment, power balancing, and precision maintenance, he is a knowledgeable root-cause analyst. He has provided condition-based maintenance instruction and hands-on training for more than 25 years.

# Condition Monitoring I: Applied Vibration Analysis and Balancing

*Stop machine problems before they strike – and boost your operating efficiency by up to 80%.*

## What You Can Expect From This Seminar

Machine breakdowns – which can be annoying, financially catastrophic, and even dangerous – can be avoided. Condition-based maintenance is the key.

You'll learn first-hand – using equipment in the classroom – how to detect, diagnose, and correct machinery problems. You'll gain expertise in vibration analyses, single- and two-plane balancing techniques, laser shaft alignment, and more. After the seminar, you'll have the confidence and expertise to resolve those machinery problems that you used to consider major headaches.

– **John C. Robertson, Seminar Leader**

## Seminar Content

### DAY 1 AM

- Basic machine vibration analysis
  - Vibration: an indicator of a machine's operational condition
  - What is vibration?
  - Causes/effects of vibration on machinery
  - Maintenance philosophies, compared
  - Vibration analysis: backbone of predictive maintenance
  - Creating a vibration analysis predictive maintenance program
  - Other applications of vibration detection/analysis
- Vibration characteristics
  - Vibration frequencies; their impact on machines/components
  - Demonstration: vibration signatures and amplitude; phase angle analysis; resonance determination

### DAY 1 PM

- Data acquisition/processing
  - Selecting machinery to be monitored
  - Checking/logging vibration after installation
  - Data diagnosis; fault-finding exercises
  - Recognizing operating-speed faults

### DAY 2 AM

- Dynamic unbalance
  - Demonstration: machinery reaction to four types of unbalance
  - Fundamentals of balancing
  - Demonstration: single- and two-plane balancing techniques

### DAY 2 PM

- Shaft misalignment
  - Correct methods for setting/pouring machinery foundations
  - 5-step shaft-alignment procedure
  - Effects/consequences of soft-foot conditions in rotating-machinery baseplates
  - Demonstration/discussion: finding/correcting soft-foot conditions
  - Demonstrations:
    - Reverse dial indicator graphical method for shaft alignment
    - Laser shaft alignment
- Oil analysis lab reports: diagnostic tool
  - Complements: vibration/lube oil analysis
  - Understanding/using analysis reports
  - Effects of poor lubrication
  - Greasing anti-friction bearings using vibration
- Review/summary/discussion

## Who Should Attend

Maintenance supervisors, training managers, and technicians; operators; plant/maintenance managers; reliability and plant/facility engineers; and those involved in reliability/maintenance improvement.

## How To Get the Most From This Seminar

Bring unresolved equipment problems (they may be resolved in class discussions) and your own diagnostic equipment, if possible. Come prepared to participate and ask questions.

THIS SEMINAR IS ALSO AVAILABLE  
ON SITE AT YOUR PLANT.

Call 937-229-4632 for information.

[www.competitivechange.com](http://www.competitivechange.com)