



Work Execution

WE250 Precision Field Balancing

Recommended for

All condition monitoring specialists, engineers, and supervisors responsible for improving machinery performance and reliability. Those seeking strong practical skills in balancing rotating machinery to precision levels, both in the field and in the shop.

Course objective

To be able to successfully balance common machinery in the field. This includes proper diagnosis of unbalance, assessment of balancing requirements/ methods, data acquisition and balancing procedures, and special considerations for overhung rotors, unusual configurations, and influences of other machinery.

2009 course schedule

March 3–5	Charlotte, NC
April 7–10	Seattle, WA
July 28–30	Myrtle Beach, SC
Nov. 10–12	Charlotte, NC

2009 tuition

Public classes	\$995
On-site	
per class	\$12,995
# people	16
17+ people	\$395 per person

3 days

A written examination is available for this course. Test Fee – \$150 per person. Successful completion of the written exam results in Precision Field Balancing Certification.

Course description

This course emphasizes hands-on balancing exercises using tabletop rotor kits and instruments using optical, laser and strobe light accessories for phase reference. Proper vibration analysis techniques are reviewed to differentiate imbalance from other problems such as misalignment and resonance.

Analysis techniques include typical unbalance signatures (FFT) with phase; bump test, run-up and coast-down tests, and time waveform. Precision balancing techniques can be applied to save balancing time in the field or in a shop-balancing machine.

Case histories are presented to illustrate single plane (static), two-plane (dynamic), and the static and couple approach to balancing rotors of all types.

Vibration analysis—the first step in field balancing

- Fourteen “votes” that confirm unbalance
- Resonance, misalignment and other problems that might “look like”

Unbalance—what balancing technique will be successful?

- Single plane, two-plane, or static and couple approach
- Use amplitude and phase measurements to determine approach
- L/D ratio & rotor response to trial weight can confirm
- Amount and location of trial weight and balancing in one run
- Rotor response, calibration factor and lag angle

Single plane (static) balancing

- Vector diagram solution to help understand single plane technique
- Balancing without phase—3 and 4 circle methods
- Instrument and calculator (computer) solutions
- Combining or splitting correction weights. Two-plane (dynamic) balancing

Two-plane (dynamic) balancing

- Cross effect and the concept of “false” couple
- Two plane solutions, instrument and/or calculator

Static and couple balancing

- When to use this approach
- How to compute—calculator and vector diagram
- What type of rotors respond to this approach

Balancing machines

- Hard bearing versus soft bearing
- Overcoming problems—thrusting, windage, and gross initial unbalance
- Key conventions and compensating for tooling errors
- Balancing tolerances—Navy (Mil Std), API, ANSI, ISO for low speed balancing
- Why specify ounce inches or gram inches rather than mils or in/sec
- Prove rotor balance using the traverse test

Prerequisites

Six months experience using any type of vibration /balancing instrumentation and/or a basic vibration analysis or balancing course. Attendees are encouraged to bring their data collector/analyzer/balancer with accessories in order to participate in the extensive hands-on exercises.

RMI On-line course*

WE150 Balancing basics

Reading material*

MBO2004 Balancing

* On-line learning material at aptitudeexchange.com