WE 250 - Rotating Equipment 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.

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 coastdown 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.

Considerable time shall be dedicated to hands-on practical sessions, taking vibration data and simulating machinery faults including unbalance, misaligment, losseness, bent shaft, rubbing and bearing damage.

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 (static) and two-plane (dynamic) 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

Considerable time shall be dedicated to hands-on practical sessions, taking vibration data and simulating machinery faults including unbalance, misaligment, losseness, bent shaft, rubbing and bearing damage.

Static and couple balancing

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

Hands-on training

- Practical demonstration of machine unbalance using a Rotor Kit.

Course length

2 days