



PdM-203: Precision Field Balancing

Abstract

The subject of field balancing is often surrounded by mystery and confusion. This practical seminar addresses the subject of balancing by presenting a simple step-by-step methodology and removing common misunderstandings and misconceptions. Various methods for balancing rotors are discussed including single plane, multiple plane and no-phase techniques.

While some vector theory is covered in order to understand the balancing process, the main focus is on the effective utilization of modern data collectors to field balance rotors. Emphasis is placed on the techniques required to achieve precision balance in the minimum number of runs and therefore the shortest possible time. Step by step procedures for detecting, analyzing and correcting unbalance are provided along with information on preventing unbalance. Details of special techniques required for overhung and other difficult rotors are also included.

Instrument-specific step-by-step procedures are included for all common data collectors. Over 50% of this seminar consists of hands-on activities.

Seminar Duration

The standard duration of this seminar is 24 hours. Seminar can be customized to meet specific client needs.

Who should attend?

This seminar is designed primarily for maintenance, engineering, technical support and management personnel whose job functions involve precision field balancing of rotating machinery.



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Associated Task(s)

1. Given a machine with a confirmed unbalance problem, using your specific instrument determine corrections needed, make balance corrections, and confirm resolution of the problem.

Seminar Objectives

Upon successful completion of the seminar, the student will be able to:

1. Explain the benefits of precision maintenance and key components of a precision mentality.
2. Explain the following maintenance philosophies, including the role each plays in an overall machinery reliability improvement process:
 - A. Breakdown/Corrective
 - B. Preventive Maintenance (PM)
 - C. Condition-based / Predictive Maintenance (PdM)
 - D. Precision Maintenance
3. Explain common symptoms and causes of machinery unbalance.
4. Explain the adverse effects of unbalance on machinery vibration, bearing life, and energy consumption.
5. Using proper terminology, explain the common types of unbalance that are found on industrial machinery and how these types of unbalance are quantified.
6. Explain and demonstrate how to construct and utilize vector diagrams to determine corrections for unbalance problems.
7. Explain and demonstrate how to perform each of the following major steps of a balancing task:
 - A. Planning and Pre-balancing
 - B. Equipment Setup
 - C. Balance Program Operation



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Seminar Outline

- 1.0** Introduction
- 2.0** Reliability Concepts
- 3.0** Sources of Excessive Vibration
- 4.0** Vibration Fundamentals
- 5.0** Terminology
- 6.0** Severity
- 7.0** Phase Acquisition
- 8.0** Unbalance vs. Misalignment Analysis
- 9.0** Unbalance Introduction
 - 9.1 Sources of Unbalance
 - 9.2 Types of Unbalance
 - 9.3 Lag Angle
 - 9.4 Specifying Unbalance
 - 9.5 Force Due to Unbalance
 - 9.6 Estimating Trial Weight
- 10.0** Vector Diagrams
- 11.0** Single Plane Balance ...vector method
- 12.0** Single Plane Balance ...program method
- 13.0** Two Plane Program Method...
- 14.0** Static Couple Derivation/ Overhung
- 15.0** Field Balancing Activities
- 16.0** Conclusions



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