

The Science of Balancing With Practical Applications



Two days on-site

Customer must provide a suitable presentation area and a digital projector.

Course Agenda

Introduction

Balancing Fundamentals

- Definition of unbalance
- Purpose of balancing
- What causes unbalance and what effect does it have?
- Unbalance and Centrifugal Force
- Rigid rotors defined
- Types of unbalance, their units of measure and correction methods:
 - Static
 - Couple
 - Dynamic
 - Quasi-static
- Specifying a tolerance
- Correction methods
- Jet engine balancing flow:
 - Mass weighing
 - Moment weighing
 - Turbine blade weighing
 - Static balancing
 - Dynamic balancing
- Unbalance and Eccentricity
- Assembly errors and their effects
- Concentricity, eccentricity and, run-out
- Indexing and Biasing
- Plane Separation

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- Dealing with loosely bladed rotors
- Terminology
- Balancing Machines
 - Centrifugal
 - Vertical vs. Horizontal
 - Hard-Bearing vs Soft-Bearing
- Machine set-up
- Tolerances
- Potential errors due to equipment
- Testing and certifying balancing machines
- Class Weights
- Tooling

Machine Demonstrations (optional)

- Vertical (single- and/or two-plane)
- Horizontal

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