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Consulting and Training | Reach New Heights

Course Name

Shaft Alignment, Dynamic Balancing Techniques & Measuring Tools

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Sector Name

Mechanical Engineering

Document Type

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Shaft Alignment, Dynamic Balancing Techniques & Measuring Tools

Course Introduction

Machines that have been precision aligned run longer and cost less to run. Alignment greatly affects the life of bearings, seals, shafts, and couplings. Also, unbalance causes fatigue and reduces the life of bearings, and can make looseness and resonance conditions far worse. This course will bring you knowledge and skills in using a vibration analyzer/balancer, or a simple sheet of graph paper and a protractor, and balance a machine, without even having to remove it from the plant. You will learn how to recognize unbalance and set up the balance job for a successful balance.

Reverse-dial method

This course will equip you with the knowledge and skills so that you can use a dial indicator tool or a laser alignment system to precisely align two components together. You will learn how to recognize misalignment and successfully set up the alignment job. After reviewing the important reasons for performing shaft alignment, there will be a discussion about the pre-alignment checks and corrections, including how to identify and correct soft foot. The operation of dial indicators, and the cover the rim-face method and reverse-dial method will also be discussed. The process will be demonstrated and discussed, as well as how calculations are

performed.

Laser alignment systems will be discussed; the benefits, basic theory of operation, and tips and techniques for successful use. And finally, there will be a discussion on how to move the machine and deal with all the problems that you are bound to encounter at some stage. We will also review how to deal with thermal growth and how to approach a larger machine train.

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Target Audience

✓ Automotive Engineer
✓ Boiler Engineer
✓ Ceramics Engineer
✓ Equipment Engineer
✓ High-Pressure Engineer
✓ Marine Engineer
✓ Mechanical Design Engineer
✓ Mechanical Engineer
✓ Naval Architect
✓ Pipeline Engineer
✓ Power Engineer
✓ Rotating Equipment Engineer
✓ Senior Mechanical Engineer
✓ Turbine Engineer
✓ Validation Engineer

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Learning Objectives

- ✓ Have Good Information on how Shaft Misalignment causes Failures in Equipment.
- ✓ Explain how they work and understand how to measure runout on mechanical couplings and machinery shafts.
- ✓ Have an understanding of how to construct and improve their capabilities and skills required to identify and measure misalignments in different machines and their causes, and how to correct or monitor them.
- ✓ Have a detailed understanding of Advanced Time and Frequency Analysis Techniques and have acquired knowledge of Accurate Diagnosis of Antifriction Bearings.
- ✓ Gain Knowledge on measurement & correction, Vertical and Horizontal Plan misalignment, and aligning vertically mounted Equipment.
- ✓ Understand the practices in measuring and correcting “SoftFoot” problems and measuring run-out on Alignment demonstrators.

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Course Outline

✓ 01 DAY ONE

Module (01) Soft Foot Checks and Corrections

- ✓ Different types of Soft Foot
- ✓ Rocking Soft Foot
- ✓ Short Foot - Parallel Air Gap
- ✓ Even Foot
- ✓ High Foot
- ✓ Bent Foot
- ✓ Squishy Foot
- ✓ Induced Soft Foot

Module (02) Importance of Soft Foot

- ✓ Why is Soft Foot Important?
- ✓ Shaft Fatigue
- ✓ Bearing Distortion
- ✓ Impact on the Alignment Task

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Course Outline

✓ 02 DAY TWO

Module (03) Testing for Soft Foot

- ✓ Testing for Soft Foot
- ✓ Taking Soft Foot Measurements
- ✓ Recording Results
- ✓ Using Dial Indicators to measure Soft Foot
- ✓ Correcting Soft Foot
- ✓ Correcting Rocking Soft Foot
- ✓ Shortcut number One: The Casanova

Method 4.3 Short cut number Two: The 80% Rule

- ✓ Using Feeler Gauges
- ✓ Using a "Stair" of Shims
- ✓ More Complex Shim Patterns
- ✓ Detecting and Correcting Induced Soft Foot
- ✓ Mysterious Soft Foot

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Course Outline

✓ 03 DAY THREE

Module (05) The Rim-Face Dial Indicator Method

- ✓ Accuracy Issues 5.2 Setup Problems
- ✓ Axial End-Float 5.4 Rim-Face Measurement Procedure
- ✓ Compensate for Bar Sag
- ✓ Alternative Method
- ✓ Determine the Alignment Corrections
- ✓ Performing the Calculations
- ✓ Computing the Offset
- ✓ Computing the Angularity
- ✓ Computing foot movements
- ✓ Shim calculations
- ✓ Move calculations
- ✓ Example calculations
- ✓ The graphical method

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Course Outline

✓ 04 DAY FOUR

Module (06) The Reverse Dial Method

- ✓ Reverse Dial Procedure
- ✓ Compensate for Bar Sag
- ✓ Performing the Calculations
- ✓ Computing the Offset
- ✓ Computing the Angularity
- ✓ Computing feet Movements
- ✓ Shim and move Calculations

Module (07) Laser Alignment Systems

- ✓ The basic components of a laser alignment system
- ✓ Benefits of laser alignment systems over dial indicators
- ✓ How do laser alignment systems work?
- ✓ Using a Prism - Return Beam Method
- ✓ Beam Splitter - Single Beam Method
- ✓ Twin Emitter/Detector Pairs - Dual Beam Method
- ✓ Using a horizontal beam and a vertical detector

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Course Outline

✓ 05 DAY FIVE

Module (08) Performing Laser Alignment Measurements

- ✓ Performing the measurements
- ✓ The 3:00-12:00-9:00 method
- ✓ Swept measurements
- ✓ Getting the results
- ✓ Aligning spacer shafts or jackshafts
- ✓ What if you can't rotate one shaft?
- ✓ What if the shaft can't be rotated easily?
- ✓ What if you can't rotate either shaft?
- ✓ Limitations of laser systems
- ✓ Backlash
- ✓ Heat, steam, sunlight, water vapor

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Aug. 9, 2027	Aug. 13, 2027	5 days	4250.00 $	UAE , Dubai
March 14, 2027	March 18, 2027	5 days	4250.00 $	KSA , Dammam
May 24, 2027	May 28, 2027	5 days	4250.00 $	UAE , Abu Dhabi
Oct. 19, 2026	Oct. 23, 2026	5 days	4950.00 $	Austria , Vienna

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