Shaft Alignment and Rotating Equipment Balancing Training Course



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Sharm El-Sheikh

4100 € (Per Person)

Ref: #INM6033_277734

Course Introduction / Overview:

This course provides a comprehensive and in-depth exploration of precision shaft alignment and dynamic balancing, two of the most critical components in any effective machinery reliability and predictive maintenance program. Poor alignment and unbalance are leading causes of premature bearing failure, seal damage, increased vibration, and excessive energy consumption in rotating equipment. This program moves beyond basic procedures to instill a deep understanding of the underlying principles, diagnostic techniques, and corrective actions required to achieve optimal machine performance. As detailed in John Piotrowski's seminal "Shaft Alignment Handbook", mastering these skills is fundamental to extending asset life and reducing operational costs. BIG BEN Training Center has designed this training to be intensely practical, equipping participants with the ability to diagnose complex issues like soft foot and thermal growth, and to apply both traditional and modern techniques, including laser alignment and field balancing. This course is an essential investment for any organization committed to enhancing its asset management strategy, improving operational efficiency, and fostering a culture of proactive maintenance.

Target Audience / This training course is suitable for:

- Maintenance Technicians and Supervisors.
- Mechanical Engineers and Technologists.
- Reliability Engineers and Specialists.
- Millwrights and Industrial Mechanics.
- Predictive Maintenance (PdM) Technicians.
- Rotating Equipment Engineers.
- Plant and Facility Managers.
- Machinery Installation and Commissioning Teams.

Target Sectors and Industries:

- Manufacturing and Industrial Production.
- Oil and Gas Exploration and Refining.
- Power Generation and Utilities.
- Petrochemical and Chemical Processing.
- Mining and Mineral Extraction.
- Marine and Shipbuilding.
- Pharmaceuticals and Food Processing.
- Governmental sectors such as Public Works and Defense.

Target Organizations Departments:

- Maintenance and Reliability.
- Engineering and Technical Services.
- Plant Operations and Production.
- Asset Management and Integrity.
- Quality Assurance and Control.
- Facilities Management.
- Capital Projects and Commissioning.

Course Offerings:

By the end of this course, the participants will have able to:

- Master various shaft alignment techniques including dial indicator and laser methods.
- Perform comprehensive pre-alignment checks, including soft foot and pipe strain correction.
- Calculate and compensate for thermal growth in machinery alignment.
- Understand the fundamental principles of static and dynamic unbalance.
- Apply single-plane and two-plane balancing techniques to rotating equipment.
- Interpret balancing tolerances according to industry standards like ISO 1940.
- Utilize basic vibration analysis to diagnose unbalance and misalignment.
- Develop and implement a systematic procedure for alignment and balancing tasks.
- Document and report alignment and balancing results effectively for maintenance records.
- Troubleshoot complex machinery problems related to alignment and balance.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive and experiential, ensuring that participants not only learn the theory but can confidently apply it in real-world scenarios. This course blends expert-led instruction with practical, hands-on learning principles. The curriculum incorporates detailed case studies of actual machinery failures caused by misalignment and unbalance, allowing participants to analyze root causes and discuss preventative strategies. Group workshops and collaborative problem-solving sessions are a core component, encouraging attendees to share their experiences and develop diagnostic skills in a supportive environment. The program emphasizes practical application through simulated exercises that cover everything from soft foot correction to interpreting laser alignment readings and performing balancing calculations. Our instructors facilitate an engaging learning atmosphere where questions are encouraged, and continuous feedback is provided to reinforce key concepts. This approach ensures a deep and lasting understanding of precision alignment and balancing, empowering participants to return to their workplace with immediately applicable skills.

Course Agenda (Course Units):

Unit One Fundamentals of Machinery Alignment

- The Importance of Precision Alignment in Machinery Reliability.
- Consequences of Misalignment on Machine Components.
- Understanding Parallel and Angular Misalignment.
- Introduction to Alignment Tools and Terminology.
- Pre-Alignment Checks and Machine Preparation.
- Identifying and Correcting Soft Foot Conditions.
- Recognizing and Mitigating Pipe and Conduit Strain.

Unit Two Dial Indicator Alignment Methods

- Principles of Rim and Face Alignment.
- Step-by-Step Procedure for Rim and Face Measurements.
- Understanding and Applying the Reverse Dial Indicator Method.
- Graphical Plotting Techniques for Alignment Calculations.
- Mathematical Calculations for Alignment Moves.
- Common Errors and Troubleshooting in Dial Indicator Alignment.
- Practical Exercises and Simulations with Dial Indicators.

Unit Three Laser Shaft Alignment Systems

- Principles of Operation for Laser Alignment Systems.
- Advantages of Laser Alignment over Traditional Methods.
- Setting Up and Operating a Laser Alignment System.
- Interpreting Digital Readouts and Graphical Displays.
- Features such as Thermal Growth and Machine Train Alignment.
- Generating and Understanding Alignment Reports.
- Hands-On Practice with Modern Laser Alignment Equipment.

Unit Four Principles of Dynamic Balancing

- The Theory of Unbalance in Rotating Machinery.
- Distinguishing Between Static and Dynamic Unbalance.
- Causes and Effects of Unbalance on Machine Health.
- Understanding Balancing Terminology and Concepts.
- Introduction to Balancing Tolerances and ISO Standards.
- Vibration Signatures Associated with Unbalance.
- The Relationship Between Balancing, Alignment, and Vibration.

Unit Five Practical Balancing Techniques and Reporting

- Methods of Balancing: Single-Plane and Two-Plane.
- The Vector Method for Balancing Calculations.
- Step-by-Step Field Balancing Procedures.
- Selecting Appropriate Trial Weights and Locations.
- Using Vibration Analyzers for Balancing Data Collection.
- Final Documentation and Creating a Balancing Report.
- Review of Course Concepts and Final Q&A Session.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

What unique qualities does this course offer compared to other courses?

Beyond immediate cost savings from reduced failures, how can a proactive alignment and balancing program fundamentally shift an organization's maintenance culture from reactive to predictive?

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This course distinguishes itself by treating shaft alignment and equipment balancing not as isolated mechanical tasks, but as interconnected pillars of a comprehensive asset management and reliability strategy. While other courses may focus solely on the procedural steps of using specific tools, this program delves deeper into the diagnostic and analytical reasoning behind the procedures. Participants learn to think like reliability specialists, understanding the root causes of failure and the subtle interplay between alignment, balance, and vibration. We emphasize the critical pre-alignment steps, such as resolving soft foot and pipe strain, which are often overlooked yet are fundamental to a successful outcome. The curriculum provides a balanced perspective, giving equal weight to both traditional dial indicator methods and modern laser systems, ensuring graduates are versatile and can adapt to any situation or available equipment. Furthermore, the course integrates an introduction to vibration analysis, empowering technicians to not only perform corrections but also to verify the effectiveness of their work and diagnose underlying issues. The focus is on building problem-solving skills and a holistic understanding of machine dynamics, creating true experts rather than just tool operators.