BENCHMARK TRAINING

A best practices training seminar proven to help you improve machine performance and reduce cost.

MACHINERY INSTALLATION ISION



Learn how to establish and sustain a precision maintenance culture for you and your team.

Ask yourself some tough questions:

- **•** Do you have machine break downs?
- Do you know for certain the reasons for these break downs?
- Are you sure that the machine has been installed correctly to an established specification?
- How do you know? Do you keep a record?
- Do you have a tolerances/ specifications not only for shaft to shaft alignment but also for base flatness?

These are just a few issues that we can get you better results.

It has been estimated

that 50% of all rotating equipment will fail prematurely because of mis-alignment. We think that number is inaccurate. At Benchmark, we believe it's more like 90% - and it's not just mis-alignment – it's poor machinery installation practices. It's pipe and coupling stain, twisted bases, softfoot, incorrect key stock, misused hardware and much more!"

CONDITION MONITORING IS AN ESSENTIAL ELEMENT IN A MODERN DAY MAINTENANCE DEPARTMENT BUT BY ITSELF IT WILL NOT IMPROVE YOUR MAINTENANCE EFFORTS. FIND OUT WHAT WILL IN THIS SEMINAR.

UP-Skill your team. Get the right training.



This unique training program is not just about shaft alignment but rather focuses on the identification and resolution of the inherent problems within the machinery installation process. We cover the machinery installation process from pre-installation to commissioning focusing on Precision Maintenance Techniques. We promote the importance of the M.A.A.D. concept.

Measure > Analyze > Action > Document

We use dual-beam laser systems or if requested single beam systems (we can use your system if applicable). We can cover it all and programs can be customized to meet your requirements. Types of alignment covered are shaft and belt alignment as well as geometric measurements including the measurement of straightness, flatness, square, etc. Our programs are very practical and "hands-on" giving the participants a chance to use different techniques to perform alignments and take measurements. Note: this is done at the end of day at public seminars. We use "real world" machines (pumps and motors) at our training centre or on training stands and rigs when at your facility or at a public seminar.

OUR COURSE OBJECTIVES are simple.

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- Establish the importance the machine's installation has on its life expectancy.
- 2 Identify the items that make the correct installation process unachievable.
 - Demonstrate the proper way to install the machine(s) (using Precision Maintenance techniques).
 - Confirm the installation has been done correctly and how to monitor the condition of the machine over it's full life cycle.



P R O G R A M

DAY 1

Introduction

Review of basic maintenance strategies or programs focusing on Condition Monitoring and Precision Maintenance as well as maintenance fundamentals and extending machine life and reliability.

Pre-Installation

Review importance of alignment specifications and tolerances. Examine maintenance & installation fundamentals including hardware, nuts and bolts, torque, shims, key stock, etc. We demonstrate the proper and improper use of these every day items. We use a load cell to measure clamp load and also demonstrate how imbalance is created – an eye opener for many! We demonstrate different methods of finding and correcting strain on machine units including coupling strain, piping strain, twisted and/or distorted machine bases. We finish with a demonstration of a machine base "twist measurement" using a laser shaft system.

Installation

Preliminary alignment techniques i.e. rough- in, straightedge, softfoot, etc. Demonstration of the shaft alignment procedure using dial indicators and the reverse dial method. Basic graphical/modeling methods for mis-alignment giving a pictorial view of the mis-aligned shafts and the many different options for correction. Note: this section is short but important as it demonstrates basic principles behind the laser systems. Demonstration of laser shaft alignment using an Easy-Laser® E710 dualbeam laser system doing horizontal shaft alignment.

O V E R V I E W

DAY 2

Review

We review the previous days topics including the pre-installation and installation process.

Installation (continued)

We start the day with an introduction and demonstrate belt alignment using the visual beam and target method as well as digital belt alignment with a focus on offset and angular measurement. We then introduce and demonstrate geometric measurement principles including the correction of angle and offset. We perform a flatness measurement of a machine base and make the necessary corrections. We continue the installation process with laser shaft alignment. We demonstrate shaft alignment applications such as basic horizontal alignment, restricted shaft rotation, fixed shaft alignment, machine train alignment, etc.

Commissioning & Condition Monitoring

Demonstrations of the best ways to verify that the installation has been done correctly using simple vibration instruments. Demonstrations of a running soft foot check; creating and correcting an imbalance.

Demonstrations & Hands-On

As time permits we demonstrate other geometric applications that measure straightness, square, plumb, parallel, etc.

Available in One-Day Program!



Who should attend?

This training program is designed for all the people who are involved in fabrication, installation, *maintenance and/or repair* of industrial equipment. It is also for the people who have to measure and align machinery i.e. pumps and motors. In today's multi-tasking world we have pipe fitters installing machines and maintenance mechanics installing pipe – so we have developed the program for all!





The Instructor

John Lambert served his apprenticeship in Mechanical Maintenance at Fazakerly Engineering in Liverpool, England.

After emigrating to Canada in 1973, he worked in the Aeronautic Industry and in Fiberglas manufacturing. He has held many positions such as millwright/maintenance

mechanic, maintenance foreman and supervisor as well as training instructor.

As a training instructor he implemented Reliability Centered Maintenance (RCM) and Total Quality Management (TQM) into engineering and maintenance departments.

In 1994 he started his own business Benchmark Maintenance Services Inc. specializing in rotating machinery installation, training, service and equipment sales.

Arcelor Mittal Dofasco (Steel), City of Toronto (Water supply/ treatment) and Ontario Power Generation (Nuclear) are just three companies (industries) where he has trained literally hundreds of tradesmen in each company.

He has conducted training on offshore oilrigs and paper mills, at chemical plants, cement plants and gold mines.

"This training allowed us to perform better and faster alignments using the laser equipment which will give us a longer life cycle for our machines"

Bernie Mullaney, Mechanical Engineer – FMF Cape Scott, Dept. of National Defense



"The training and support from Benchmark has exceeded our expectations. Feedback from our trainees is always positive!"

Neil Vande Pol, Mechanical Training Technician – Ontario Power Generation, Darlington Nuclear

For more information please contact us: 905-509-6522 or toll free at 1-800-598-1117 Email: <u>info@benchmarkpdm.com</u> Web: <u>www.benchmarkpdm.com</u>