



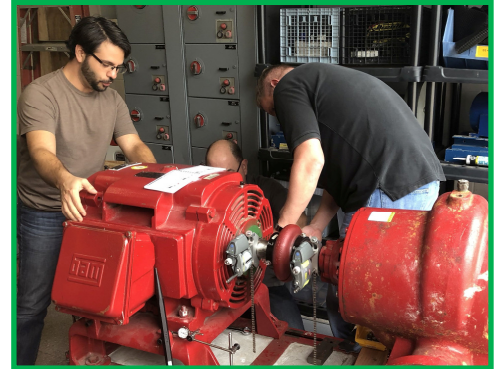
MAINTENANCE TROUBLESHOOTING INTERNATIONAL LLC

TMA-303

Hands-On Training Center: 2860 Ogletown Road, Newark, DE 19711
Corporate Offices & Mailing Address: 2917 Cheshire Road Wilmington, DE 19810
Phone/TXT: 302.593.2698 (Frank) Email: Frank@mttroubleshooting.com
Website: www.mtroubleshooting.com

TMA-303 TOTAL MACHINERY ALIGNMENT: SHAFT, SHEAVE, SPROCKET AND BEARING *(You work on real equipment not table top models)*

The course covers all aspects related to the critical job of alignment of machinery shafts to reduce vibration and extend bearing life. The theory of alignment, bearing alignment, coupling alignment, and sheave alignment is discussed including how to align equipment using taper gauge and caliper, dial indication (both rim and face as well as reverse dial), sheave alignment, and precision laser alignment. The attendee performs alignment using supplied tooling and equipment. The class also introduces using **iPhone alignment**, a technique that allows use of an iPhone coupled with inexpensive dial indicators to allow accurate alignment at 1/10 the cost of a laser. Attendees are invited to bring their own dial indication alignment kits or laser enabled instrumentation to use in class. We provide everything but some people want to learn on their own equipment. We teach and an all. This is the most comprehensive alignment course taught in the country. A lot of our “fly-in” students come particularly to learn the most modern aspects of alignment. The attendee should be able to perform alignment on small to medium industrial equipment after completing the course.



ALIGNMENT THEORY AND PRACTICES OVERVIEW

- Speed governs alignment
- Eli Whitney and interchangeable parts—the history of alignment
- Bearing failures caused by misalignment
- Early alignment methods—Straight edge, feeler gauge and calipers
- Dial indication methods— face and hub, reverse dial
- Laser alignment-wired and wireless
- Alignment tolerances

PRECISION MEASUREMENT

- Using a scale
- Using a vernier caliper
- Using a vernier micrometer
- Using telescope gages

BEARING LIFE AND BEARING IDENTIFICATION

- Series numbers
- Calculating the ID from the number
- Identification of bearings

BEARING ALIGNMENT INSIDE OF THE MACHINE

- Shaft shoulders and unmounted bearings
- Testing using feeler gauges
- Alignment of pillow block bearings

COUPLING ALIGNMENT (SHAFT ALIGNMENT)

- Use of precision shims and Vernier micrometer
- Testing for soft foot and piping strain
- Use of side alignment tools
- Checking for indicator sag

RIM AND FACE ALIGNMENT

- The 4–step method—using dial indicators on the face and hub
- Practicing face and hub on a pump and motor

REVERSE DIAL INDICATION

- Using dial indicators and indicator brackets
- Calculation of reverse dial indication on graph paper
- Practicing reverse dial on pump and motor
- iPhone Alignment—revolutionary new technique that competes with a laser at 1/10 the price

LASER ALIGNMENT

- Using a wired laser to achieve an alignment
- Geometric centering and use of the wireless (BlueTooth) laser
- Checking for soft foot and correcting for coupling backlash

V-BELT and CHAIN ALIGNMENT

- Conventional belting
- Narrow V belting
- Using the straight edge and string methods
- V-belt tensioning using the force deflection method and the percent elongation method
- V-belt groove to groove alignment using a laser alignment tool
- Sprocket and chain alignment—building a chain checking tool
- Timing belt alignment using a laser
- Chain lubrication requirements

CLASS FORMATS AVAILABLE

- MTI Hands-On Center \$1295/person
- ZOOM Interactive (Not offered)
- On-Site (Not offered)

CLASS DURATION

3-days, 22.5 hours of instruction
75% or more hands-on activities
(3) Lasers Available for Students

FREE TOOLS OR BOOKS

0-1” Vernier Micrometer (\$54 value)
6” Taper Gauge (\$145 value)
6” Bearing ID Scale (\$12 value)
Audel Mini-Ref (\$30 value)
Sheave Gauge (\$24 value)
V-Belt Tension Tester (\$45 value)

Class Details: Each student will receive class books, work activity sheets, self-test progress evaluations, as well as questions from the instructor to make sure they understand the material presented. It is expected that an attendee will leave the class with the basic knowledge of the subject and possess new found skills to better equip them when they return to their job. A certificate suitable for framing will be issued to each attendee who successfully completes the course. Students receive \$310 worth of tools and books for FREE. Call, email or check the website for the next time this course is scheduled at the MTI training center. Revised: 12/21/2020