The ADVANCED Team, Inc.

Predictive and Corrective Maintenance Solutions

Services * Consulting * Training

PdM Services

Vibration Analysis
Thermography
Oil Analysis
Leak Detection

Integrated PdM programs

Machinery Alignment

Roll Parallel (Tram & Level)
Extruder Barrels
Thermal Growth
Shaft Alignment

Other Services

Precision Balancing
Training Classes

ADVANCED customers include:

Automotive Products
Performance Friction Corp.
Borg-Warner
GKN Driveline

Chemicals
Dow Corning
Emory Oleochemicals
Giles Chemical

Electrical Components
Eaton
Electrolock
Isovolta

Engineering/R & D
Pro Engineering & Manufacturing
Rolls Royce
Danaher Motion
DyneSystems

Extrusion Remanufacturers
Advanced Feedscrews
Reiloy/Westland Corp.
Welex

Food & Beverage products
Miller Brewing
Mars Snackfoods
Clorox/Glad Manufacturing
Kroger

Healthcare
Baxter
Mission Hospital

Lumber & Construction Materials
Jeld-Wen
Guardian Industries
Owens Corning
Columbia Forest Products
Mannington Mills
Certainteed/Saint Gobain

Nonwovens
Freudenberg Spunweb
Bonar

Packaging
Berry Plastics
Pactiv
Sigma Plastics
Graphic Packaging
Printpack
Sonoco

Paper
International Paper
Domtar
Jackson Paper

Plastics
Trex
Sterilite
Crumpler Plastic Pipe
Next Generation Recycling

Rubber & Petroleum
Marathon-Ashland
Firestone Building Products
Goodyear Tire and Rubber

Steel
Aleris
Severstal

Tape & Adhesives
Intertape Polymer Group
Arjobex America
JPS Composites

Wire & Cable
Alcan Cable
CommScope

Woven Fabrics
AstenJohnson
Ahlstrom
Gold Toe Moretz

Predictive Maintenance Services

The objective of Predictive Maintenance is to regularly monitor, measure, and track selected parameters or operating performances of equipment in order **to identify problems prior to failure**. A "Predictive" Maintenance program should be an extension of a good "Preventive" Maintenance program.

Consider this excerpt from the U.S. Deptartment of Energy:

U.S. Department of Energy - Energy Efficiency and Renewable Energy Federal Energy Management Program:

Past studies have estimated that a Predictive Maintenance Program can provide a savings of 8% to 12%. If a facility currently relies on a reactive maintenance approach savings opportunities of 30% to 40% could be realized. The following industrial average savings have resulted from initiation of a predictive maintenance program:

- ***Return on investment: 10 times***
- ***Reduction in maintenance costs: 25% to 30%***
- ***Elimination of breakdowns: 70% to 75%***
- ***Reduction in downtime: 35% to 45%***
- ***Increase in production: 20% to 25%***

Advantages of Predictive Maintenance Programs:

- ***Provides increased component operational life and availability***
- ***Allows for preemptive corrective actions***
- ***Results in decrease in equipment and/or process downtime***
- ***Lowers costs for parts and labor***
- ***Provides better product quality***
- ***Improves worker and environmental safety***
- ***Raises worker morale***
- ***Increases energy savings***
- ***Results in an estimated 8% to 12% cost savings***

Vibration Analysis

Vibration Analysis is the foundation of all Predictive Maintenance Programs. It is a nondestructive testing technique that is utilized to monitor and trend particular rotating equipment with the aid of an FFT spectral analyzer. In addition to condition monitoring, this technology allows us to determine problematic issues such as:

- Bearing degradation
- Unbalanced components
- Structural support issues
- Rotational problems
- Alignment concerns
- Resonance
- Electrical problems
- Overall bearing condition
- Design flaws
- Mechanical looseness

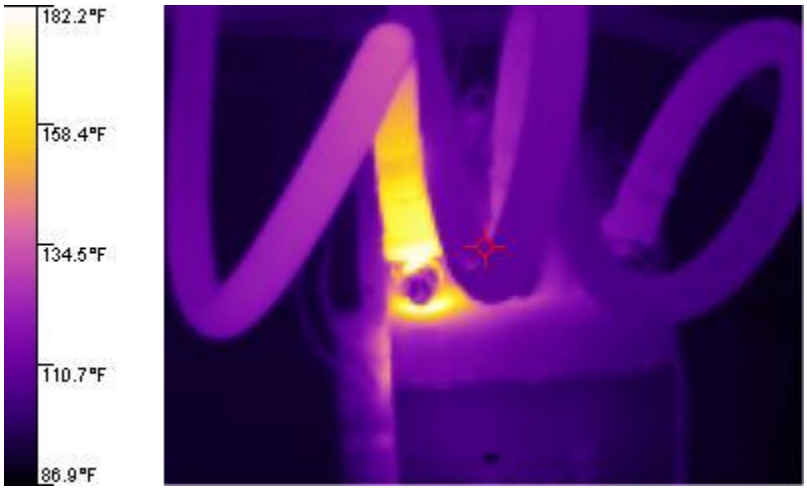
We can arrive at your site to perform a detailed vibration analysis on one machine or on all the equipment in your plant! We utilize state of the art measurement equipment and years of experience to provide the best service possible to our customers. Most importantly, the professional who collects the data will be the same professional that performs the analysis, issues a report on the findings and recommends any improvements.

If a severe defect or a safety issue is identified while we are on-site, you will be notified of the problem prior to our personnel leaving the site. If the problem is imbalance or misalignment, your ADVANCED service professional is capable of correcting the problem. This is just another way we provide the superior service capabilities you need to help keep your plant up and running at peak efficiency.

Infrared Thermography

Infrared technology consists of using a portable, infrared camera to capture thermal images. These images allow for analysis of temperature deviations on critical components and motor control centers. Infrared scanning allows identification of thermal discrepancies and aids in the determination of the following detrimental conditions:

- Loose electrical connections
- Corrosion and dirt build up that induces high resistance joints
- Unbalanced electrical loads
- Mechanical and Process problems due to heat
- Leaks and inconsistencies about the roof of a facility
- Improper Mechanical installation/repair



The ADVANCED Team is Certified in Thermal/Infrared Thermography in addition to being trained in NFPA 70E regulations for Infrared Thermography Inspections of energized components.

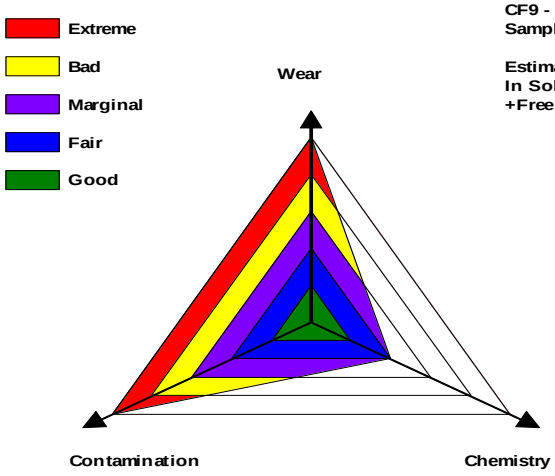
Oil Analysis

"Tribology" is one of the oldest forms of non-destructive testing of machinery. Oil samples are taken from equipment and tests are conducted with resulting values compared to those of clean, reference oils. Industrial oil analysis should include more than vendor-supplied spectral and chemical analysis. Wear and particle debris analysis is more reliable. Oil analysis is performed on various types of equipment such as: **gearboxes, hydraulics, and bearings**. Testing the current condition of lubricants will determine the following:

- Suitability for continued use (additive depletion & viscosity)
- Presence of machine wear debris (metal particulate)
- Presence & identification of contaminants (water, dirt, process material)
- Confirmation that the correct oil is being used in each machine
- Need for further maintenance testing

Benefits of an Oil Analysis Program:

- Predict potential machine failures before they occur
- Extend oil change intervals (change oils based on condition rather than time)
- Detect abnormal machine or lubricant conditions with routine oil analysis & trending of results
- Extend oil life with contamination control practices and filtering as needed



CF09 - CF09-EHRT
CF9 - CF09-EHRT
Sample Date: 20-JUN-08

Estimated total water content 0.0000%
In Solution 0% +Emulsified 0%
+Free 0% = 100%

Condition: High Ferrous debris content

Recommendations: Flush reservoir and change oil at next scheduled shutdown, visually inspect gearbox for wear or damage. Have oil analyzed again within 30 days.

Ultrasonic inspections

Ultrasonic testing is a very cost-effective predictive technology. It is utilized to pinpoint sources of ultrasonic energy with a hand-held ultrasonic "gun." Typical uses are:

- Compressed air and gas leak surveys
- Steam trap assessment
- Electrical arching & Corona discharge
- Bearing inspection routes on support machinery
- Lubrication routes - poor lubrication can be detected

Temperature monitoring

Monitoring and trending changes in motor and bearing temperatures provide an early indicator of machine failure.

Stroboscopic analysis

This technique utilizes a portable strobe light to inspect for wear on rotating equipment such as couplings and V-belts.

Integrated Predictive Maintenance Programs

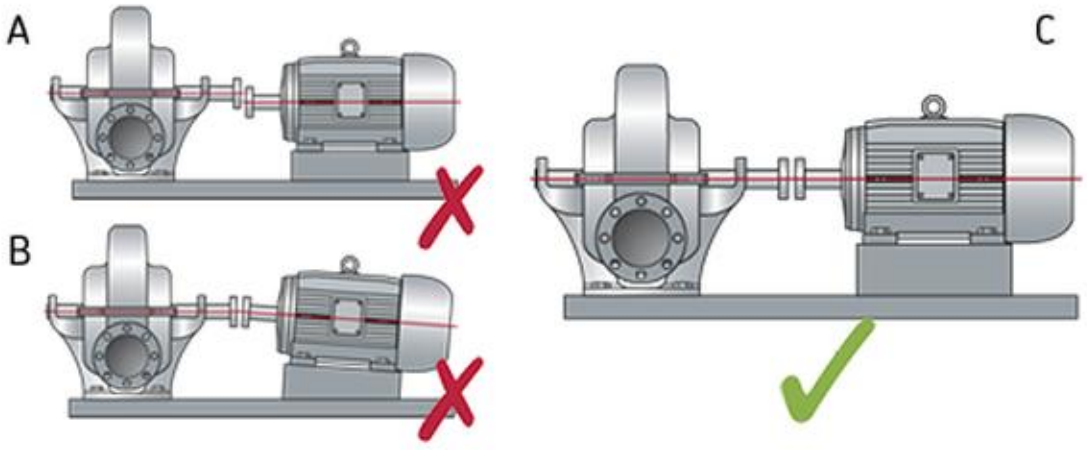
The ADVANCED Team provides customers with service offerings that allow for combining two or more Predictive Maintenance Technologies into a scheduled PdM Program. Some of our customers choose to have us to provide all of their Predictive Maintenance needs!

Machinery Alignment

Laser Shaft Alignment

The ADVANCED Team aligns a variety of machinery. We utilize lasers and optics to precisely align pumps, fans, generators, turbines, motors, gearboxes, machine trains, sheaves/pulleys, extruders, platens, presses, machine tools, web processes, etc.

No matter what the equipment is or how the driver is coupled to the driven unit, precision alignment will have a positive impact on the operational life of the bearings, couplings, seals, shafts, etc. and may even reduce the power consumption of the system. This is true whether the system has a coupling, universal joint or belts...**It should be precisely aligned**.



Utilizing the accuracy of state of the art laser measurement systems, shaft alignments can be quickly measured, aligned and documented, and your process will benefit from reduced downtime, and reduced repair costs.

OL2R Dynamic Alignment

Measurement of the true positional changes in machinery alignment from "off-line-to-running" are the standard for machinery that has a differential in operating temperatures for the different components.

OL2R or "off-line-to-running" measurements quickly and accurately show the total **change in machinery alignment that results from**:

- Thermal changes
- Dynamic machine loading
- Pipe strain
- Rotor torque
- Speed, etc.

The result is an accurate set of Cold Alignment Targets that will allow the machine or machine train to operate at **optimum alignment under *normal* operating conditions**. These measurements can typically be carried out in less than one day. Additional time may be required to properly align the machines following the data collection. OL2R or “off-line-to-running” is a non-intrusive, safe and economical way to get the proper cold alignment targets for your machinery.

Roll Parallel/Web Process Laser Alignment

Precise measurements of web process and machine geometry for flatness, straightness, squareness, level, parallelism, and bearing centers are critical for the efficiency of any process line.

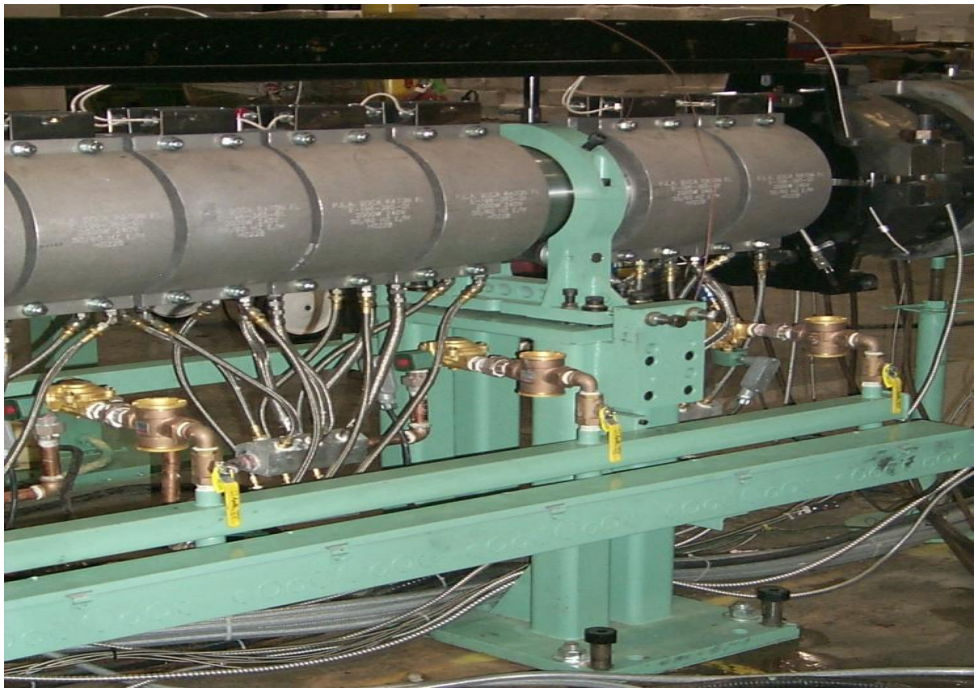
Paper, Steel, Fabric, Aluminum, Tissue, Film, Non-wovens, Plastics, Glass, Laminates, Printing...**ANY WEB PROCESS benefits from precision alignment of the rolls**. Precision roll parallel measurements and alignment help prevent:

- Product wrinkles
- Tracking problems
- Tear-outs
- Operator aggravation
- Baggy (loose) edges
- Excessive tension
- Bearing overload
- Production headaches

Often, the production speed can be increased following precision laser roll alignment. The speed, accuracy and reproducibility of the laser alignment system outperform optics, piano wires, etc. Measurements are taken in less time than is required by other methods and are documented as they are taken. **Live adjustments allow for quick positioning of the rolls.**

Extruder Barrel Laser Alignment

Proper alignment of Extruders can extend the life of extruder barrels and feedscrews by precisely positioning the extruder barrel to coincide with the gearbox output center of rotation. The feedscrew should accurately mate to the thrust shaft of the gearbox while being properly centered within the barrel.



Extruders are critical to the plastics industry. Proper alignment of the extruder barrel is imperative for the long life of the barrels and screws. The ADVANCED Team's **unique extruder measurement system allows quick and precise measurements of the barrel relative to the gearbox center of rotation**. A laser transmitter is installed on the output shaft of the gearbox and adjusted to represent its center of rotation.

Positional adjustments are made "live". Typically, the barrel can be aligned to within 0.001" of the OEM or customer specification, horizontally and vertically, with respect to the gearbox output shaft!

Other Services

In-Place Dynamic Balancing

In-place, dynamic balancing of rotating equipment reduces bearing load and increases machine life. It is proven that precision in-place dynamic balancing leads to:

- increased machine life
- lower vibration
- increased seal life
- greater Mean Time Between Failures

Unbalance currently accounts for nearly half of all machine failures. The ADVANCED Team service personnel utilize state of the art technology and experience to precisely balance rotating elements. Following the balancing procedure, a complete vibration analysis of the machine may identify any other problems that exist with your machine's components such as:

- Bearing Defects
- Looseness
- Gear Wear
- Misalignment
- Couplings
- Belts and Pulleys
- Bent Shafts
- Foundation Degradation

A comprehensive report detailing what was found, what was done and the machine's reliability condition is provided. Additional recommendations may also be included to further help you improve the machine's condition.

The bottom line, **if your machines are properly aligned and balanced the likelihood of a failure has been reduced**, sometimes by as much as 90%.

Machinery Alignment, Vibration & Balancing Training

The ADVANCED Team is passionate about transferring our knowledge base to others. Whether at your plant or at one of our facilities, that passion is prevalent in our training classes. We provide manufacturer specific or generic, precision alignment, balancing, and vibration analysis training.

The ADVANCED Team, Inc. is uniquely qualified to train your personnel. ADVANCED Training classes are conducted by service personnel, not by someone trying to sell you more equipment. We know how the alignment equipment truly works...not just how to give an expanded demonstration. Our experience covers virtually all of the alignment products available today. Dial Indicators, Single Laser Measurement Systems, Reflected Beam Measurement Systems and Dual Laser Measurement Systems.

We believe that proper use of an alignment tool requires a lot more than knowing what button to push. Our courses are filled with hands-on training and offer solutions to real world problems. Of course, the word "Alignment" covers a lot of ground. The ADVANCED Team is proud to offer **beginner and advanced courses** in:

- Basic Machinery Alignment and Correction
- Shaft Alignment
- Geometric Measurement
- Extruder Barrel Alignment
- Roll Parallel, (tram)
- Straightness
- Bearing Centering

The ADVANCED Team

We would welcome an opportunity to help you and your facility solve problems, have more reliable equipment, a better trained staff and increased profit! CBM, Kaizan, Lean, PM, PdM, RCM, Six-Sigma, TPM, TQM, and other quality assurance and production driven programs can be very effective, but confusing and frustrating at the same time. Let us help you realize the benefits. Take advantage of the knowledge and passion that is a fundamental strength of The ADVANCED Team.

Sincerely,

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