



## Predictive Maintenance (PdM) Services

### PREDICTIVE MAINTENANCE SERVICES

MISTRAS provides both advanced & traditional nondestructive testing solutions, including a variety of PdM (Predictive Maintenance) services & complete RBM (Reliability Based Maintenance) services. We can help you assess your current in-house program or develop and implement a program from the ground up, including procedure development, Key Performance Indicator (KPI) definitions, and staff augmentation or formal training of you in-house personnel. We also perform factory, repair shop and on site third party acceptance testing, as well as technical engineering services. We have helped many of our customers' transition their programs into "world class" reliability programs that can be justified based on the programs Cost Benefit Analysis (CBA) and calculated Return on Investment (ROI). We recognize that each of our customers are unique as are their individual businesses and therefore we take a set of industry standard implementation techniques and custom fit them into the day to day operations and maintenance practices that are present onsite.

### IN-HOUSE PREDICTIVE MAINTENANCE ASSESSMENTS, SERVICES AND TRAINING

Our program and technology assessments validate your PdM /RBM program and maintenance practices and benchmark them to world class standards while identifying opportunities for improvements in maintenance and

operations. MISTRAS provides our customers with periodic technology surveys or "one off – Special Testing" services. We can provide permanent onsite program support including full time PdM technicians that are certified to national standards in one or multiple technologies.

Diagnostic techniques can be taught on your plant equipment and you receive PdM training while we solve your machinery problems. Advanced training is also provided to heighten your knowledge of Machine Condition Monitoring with a level of awareness for all predictive technologies.

### INDUSTRIES UTILIZING OUR SERVICES

- Pharmaceutical & other manufacturing Facilities
- Refineries, Chemical Plants & Process Industries
- Paper, Packaging and Printing Industries
- HVAC, plus other Design and Construction Projects
- Nuclear and Fossil Electric Power Plants
- Hydro & Co-Generation Plants
- Breweries, Canning and Bottling Facilities
- Railroads and other Government Agencies
- Hospitals and Office Buildings
- Steel Foundries and Metal Rolling Industries

### ENGINEERING & TECHNICAL MAINTENANCE SERVICES

We implement the latest predictive and proactive technical maintenance services such as:

- Vibration PdM/RBM Walk-Around Programs
- Infrared Thermography Surveys
- Lube Oil Analysis Programs
- Acoustical Testing, Analysis and Design
- Ultrasonic Leak and Bearing Fault Detection
- On-site Dynamic Balancing
- Factory/On-site 3rd Party Acceptance Testing
- Complete Engineering Root Cause Analysis
- Advanced Vibration Testing
- Motor Condition Monitoring
- Sub-Station/Transformer Diagnostics
- Strain Gauge Materials Testing
- Stress Analysis
- Installation of permanent Vibration Sensors and Monitoring Systems

Minimizing downtime and maximizing production guarantee an immediate return on your investment with the expertise of our engineering and technical services.

Here are some typical results:

- Lower your maintenance costs by 50%
- Reduce machinery downtime by 80%
- Increase your production by 25%
- Reduce overtime premiums by 70%
- Lower your PdM setup time 80%
- Increase your profit by 40%

# Predictive Maintenance (PdM) Services

## SATISFIED CUSTOMERS:

- Anheuser-Busch
- Buffalo Air Handling
- Exelon Nuclear
- Exxon Mobil
- FMC BioPolymer
- General Electric
- Imclone
- Rohm & Haas
- Sanofi-Aventis
- TVA
- United States Navy
- US Steel

## PROGRAM IMPLEMENTATION

We have fully developed PdM procedures and guides with a world class program utilizing System Equipment Reliability Prioritization (SERP) along with Failure Modes Effects Analysis (FMEA) and Reliability Center Maintenance (RCM) methods including Root Cause Analysis (RCA). Our senior program consultants have a minimum of 15 years of PdM/RBM program, technology and management experience.

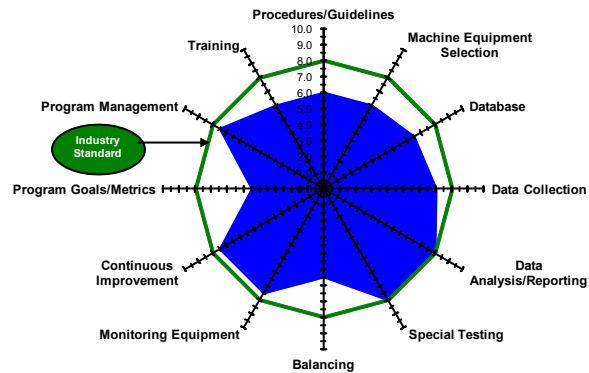
Experts in PdM database construction and management with data collection, exception reporting, analysis & documentation. Our proactive maintenance schedule and special testing and survey adjustments, allow us to objectively direct you to appropriate diagnostic equipment. We are able to assist you with purchasing equipment for the least amount of capital investment and perform a cost benefit analysis of your program

## PRODUCT TECHNOLOGY

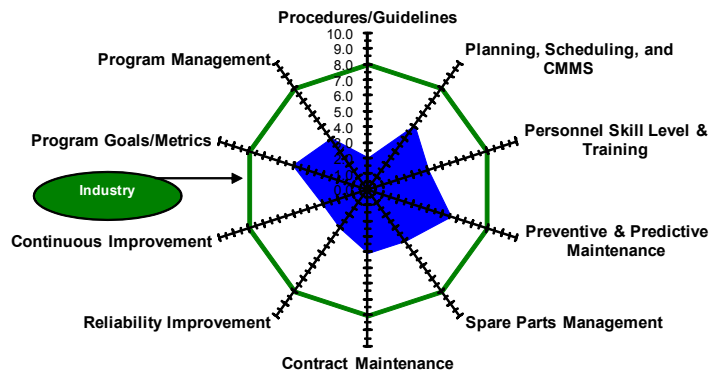
This technology uses vibration sensing products manufactured by our Products & Systems Division under the Vibra-Metrics brand. For over 30 years, we've been manufacturing innovative, patented solutions for the predictive maintenance community, even in the most advanced or demanding applications. We have since grown to offer hundreds of quality products including vibration accelerometers (sensors), data delivery systems and a comprehensive assortment of ancillary products.

Our products are designed to measure accurately and repeatably, providing the most consistent data possible for trending, prediction, prevention and locating machinery deficiencies before they become problems.

## 1 VIBRATION PROGRAM ASSESSMENT



## 2 MAINTENANCE PROGRAM ASSESSMENT



KEY ELEMENTS	VIBRATION PROGRAM	② MAINTENANCE PROGRAM	INDUSTRY STANDARD
Procedures/Guidelines	6.0	2.0	8
Machine Equipment Selection	6.0	-	8
Database	6.5	-	8
Data Collection	7	-	8
Data Analysis/Reporting	8.0	-	8
Special Testing	8.0	-	8
Balancing	5.5	-	8
Monitoring Equipment	7.5	-	8
Planning, Scheduling, & CMMS	-	5.0	8
Personnel Skill Level & Training	-	4.0	8
Preventive & Predictive Maintenance	-	5.5	8
Spare Parts Management	-	4.0	8
Contract Maintenance	-	4.0	8
Reliability Improvement	-	3.0	8
Continuous Improvement	7.5	3.0	8
Program Goals/Metrics	4.5	5.0	8
Program Management	7.5	4.0	8
Training	6.0	-	8
Average	6.7	4.0	8

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