

[Maintenance Tips - April 2004](#)

Motor Testing Tip

The L10 listing of bearing life represents the minimum life, or life that 90% of a group of bearings will survive until fatigue. This does not, however, represent the 'service life,' or the life as a result of outside forces. The majority of premature bearing failures come from the result of: Faulty mounting; Improper lubrication; Contamination; Improper handling; and, Improper maintenance. The best methods for improving and measuring bearing life in an electric motor include proper installation and maintenance of the motor, including alignment, belt tensioning and lubrication, and monitoring the condition of the bearings through vibration, motor current signature analysis and other supporting technologies.

Tip provided by ALL-TEST Pro, A Division of BJM Corp. Tel: 860.399.5937

www.alltestpro.com

[Enter here for an All Test 31 Motor Tester Giveaway](#)

Ultrasound Tip

Slow speed bearings best monitored at higher frequencies. Monitoring slow speed bearings using vibration analysis can prove challenging but in the ultrasonic range valuable data is available. Defect modulations on slower rpm installations are random, unpredictable, and often too small to affect typical accelerometers. Not so in the ultrasonic range where minor rubbing and impacting excite piezo-crystals and provide ultrasound inspectors with valuable information about the state of the bearing and its lubrication. Be patient when monitoring slow speed bearings. Set your ultrasonic meter to Peak Hold or Max Value and take 8-10 second samples. Because of the nature of this application the actual modulation may not be obvious at every rotation. By taking longer data samples you stand a better chance of catching more defects.

Use the raw ultrasonic signal to view time waveform and/or spectra. We've been able to pick up broken teeth or even gear mesh issues by listening, measuring, and analyzing in the ultrasonic range.

This tip supplied by SDT North America

www.sdtnorthamerica.com

1-800-667-LEAK (5325)

[More Ultrasound Resources](#)

Actuate Reporting Tips for Maximo®

Actuate is one of the most powerful reporting tools available to the Maximo User, but it can be complex and difficult to deploy. As a result of its advanced technical architecture, Actuate is now a developer tool as well but it requires both Actuate and Maximo expertise for effectively presenting key asset data in an actionable, user friendly, and efficient

manner. You can request tips from Synterprise Global Consulting in conjunction with MGI can help you save time and deliver greater report efficiency as they combine Maximo and Actuate expertise. There is no cost for this information.

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[Request Actuate Reporting Tips for Maximo® \(386k pdf\)](#)

Alignment & Vibration Tip

Magnetic Center

When performing an alignment on a machine train with a motor fitted with a sleeve bearing, it is important to account for the magnetic center of the motor. Failure to do so can cause excessive vibration and premature failure of motor components and the shaft coupling. If the motor has recently been rebuilt it should come from the motor shop with a magnetic centerline scribed on the shaft. To properly set the shaft coupling gap do the following:

- Determine the correct coupling gap based on the manufacturer's recommendation. (Note, we refer here to the proper installation gap size and its tolerance, not the alignment gap tolerances for angularity.)
- Identify the correct scribe mark on the shaft that represents magnetic center.
- Measure the distance between the scribed mark and the outside bearing housing lip. In the case that the magnetic center scribe mark falls inside the motor housing while at rest, scribe a mark in the rest position. While the machine is un-coupled run the motor and estimate the difference between the newly scribed mark and the magnetic center mark.
- This is the distance that will need to be compensated for when setting the coupling gap.
- Set the coupling gap according to the manufacturer's recommendation minus the distance measured for the magnet center correction if the mark is outside the bearing housing. Add the difference if the mark is inside the bearing housing.
- This will provide the proper coupling gap under the normal running condition.
- Avoid excessive vibration problems with your sleeve bearing motors by following these simple steps.

Tip provided by LUDECA, INC.

Distributor of alignment and vibration analysis instruments

<http://www.ludeca.com/>

Tel: 305-591-8935

[More Alignment Resources](#)

Root Cause Analysis (RCA) Tip

RCA IS A THOUGHT PROCESS: RCA is not a technique that is more applicable in one industry as opposed to another. The nature of the failure should be irrelevant to a good RCA methodology. This is because the common denominator of all failure investigations will be that PEOPLE must analyze what went wrong. True RCA is the thought process that the human mind will use to solve any undesirable outcome in a very disciplined and methodical manner. From making ships to candy bars, or from delivering package to babies, a good RCA methodology will be applicable in all situations.

Tip provided by the Reliability Center Inc. Tel: (804) 458-0645

www.reliability.com

[More Root Cause Analysis Resources](#)

Basics of Oil Analysis e-Book

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Maintenance Tips

Importance of Preventive Maintenance

In many organizations today, it is difficult to convince management of the importance of a sound preventive maintenance program. It is helpful to detail the impact that the preventive maintenance program will have on existing initiatives within a company. For example, the following are a sampling of initiatives in companies that may be impacted.

- * ISO, OSHA, EPA, PSM, etc.
- * Total Quality Management
- * Just In Time
- * Capacity Constraints

- * Redundant Equipment
- * Energy Consumption
- * Usable Asset Life

In considering the regulatory programs, almost all of the regulatory agencies have some requirements for documentation or equipment servicing that is supported by the preventive maintenance program. From overhead crane inspections to ladder safety, almost all of the regulations are impacted by the PM program.

Total Quality Management relies on equipment that will perform to specifications. Without a sound preventive maintenance program, the equipment will not be capable of producing a consistent quality product.

Just in time depends on equipment that is reliable. Without a good preventive maintenance program, breakdowns are sure to occur, which will disrupt the flow of production and cause late deliveries to customers.

Capacity constraints are also produced when equipment is unreliable. If an organization does not have a sound preventive maintenance program, equipment either experiences breakdowns or reduced efficiency. This lack of production will create bottleneck equipment in the manufacturing flow. This is overcome by reducing the overall capacity rating of the process or purchasing redundant assets.

Redundant Equipment is often used to overcome capacity constraints when companies don't have effective PM programs. Instead of maintaining the existing equipment, companies purchase additional assets to "insure" they can meet production quotas. If they use financial indicators, such as return on net assets, their indicators show a poor rating. An effective preventive maintenance program would help to eliminate the need for redundant assets.

Energy consumption is another area that is impacted by a good preventive maintenance program. Well maintained equipment requires 5 to 10% less energy to operate than poorly maintained equipment. Companies that have implemented steam trap/ steam leak reduction programs have seen considerable energy savings. Air leak reduction programs have also produced considerable savings at many plants. These savings alone can help companies justify improvements to their preventive maintenance programs.

Usable Asset Life is still another area impacted by an effective preventive maintenance program. Studies have shown that well maintained equipment may last up to 40% longer than poorly maintained equipment. This problem can be discovered if a close examination is made of equipment replacement policies. If equipment is replaced, simply because it is worn out, and not a major upgrade in technology or functionality, it is likely an effective PM program would have enabled the equipment to have a longer service life.

While the above list is not all of the business arguments for having a complete and effective PM program, it can help organization get started on the path to PM success.

Tip provided by By Terry Wireman

GenesisSolutions

www.GenesisSolutions.com

Tel: (203) 431-0281

[More Maintenance Resources](#)

Full Day Workshops on Key Maintenance Subjects

Learn from maintenance and reliability authors and experts in day-long workshops at the Maintenance and Reliability Technology Summit (MARTS) scheduled for May 24-27, 2004 at the Donald E. Stephens Convention Center in Rosemont (Chicago), IL.

Pre-Conference Workshops, Monday, May 24
Process Reliability Paul Barringer, P.E.

Participants will learn how to use Weibull probability plots of daily production output in a quick and easy big-picture assessment of reliability losses.

Practical Lubrications for Industrial Facilities Heinz Bloch

This workshop will describe the lube selection strategies, cost justifications, and application methods that best assure high equipment reliability and profitability. Learn how companies have systematically upgraded the lube area of most of their process machines.

The Manufacturing Game Winston Ledet

This strategic simulation of a manufacturing plant is a tool for engaging the workforce in defect elimination, giving participants a bird's eye view of a facility. Actions launched as part of a workshop have typically resulted in 40 percent fewer failures and a third lower costs.

Maintenance Planning & Scheduling "Doc" Palmer

This workshop covers the theory and vision of maintenance planning and scheduling, as well as the nuts and bolts of how it works. It allows class participants to take specific practices home to their own organizations.

Introduction to Vibration Analysis Scott Dow

Participants will be introduced to the basic theory of vibration amplitude, frequency, trends, and spectrums, with special emphasis on the practical aspects of these subjects. The workshop includes case study exercises.

Cause Mapping-Effective RCA Mark Galley

Attendees will learn how this systems-based approach is used to effectively analyze, document, communicate, and solve complex problems in their businesses. This workshop covers the basics of identifying cause-and effect relationships.

RCM-Gateway to World Class Maintenance "Mac" Smith

Participants will hear a definition of the four principle features of reliability centered maintenance and the nine essential steps to achieving a successful RCM program. The speaker then will describe his view of the five key steps required to achieve a world class maintenance program.

Post-Conference Workshops, Thursday, May 27

Lean Maintenance - Robert Williamson

This workshop will help participants understand the basics of Lean Manufacturing and Lean equipment management. Participants also will learn how to create and lead an equipment reliability vision that will guarantee success.

Benchmarking Best Practices Terry Wireman

This presentation will define the benchmarking process and cover such issues as how to conduct a benchmarking project, some traps to benchmarking, and the type of benchmarking that works best for maintenance. The presentation also will explore the differences between benchmarking and performance indicators.

The Reliability Game Dennis Belanger

This interactive board game is designed to teach participants how to make the transition from a reactive to a proactive maintenance environment. Participants will learn to "follow the money" and further their understanding of the business decisions behind reliability.

Benchmarking Lubrication Programs John Marino

This workshop will focus on what it takes to implement a successful lubrication program, including what you need to know when specifying and buying fluid lubricants and greases.

Lean Planning and Scheduling Wayne Walker

Effective implementation of planning and scheduling best practices actually enhances the Lean process. Just as it is important to map out the process of efficient work cells, it is important to map out the process flow between the work teams and maintenance. This mapping process will be illustrated.

Using ODS Testing to Improve Reliability Tom Murphy

This presentation will explain Operating Deflection Shapes (ODS). Participants will learn how to identify prime candidates for an ODS test, the basics of phase measurement, and how to make an effective model. Case histories will illustrate the process.

Who Took the MM Out of My CMMS? Dave Bertolini

This presentation focuses on identifying and inputting maintenance management data back into computerized maintenance management systems, which may have been lost through updates, upgrades, and reimplementations, thus enabling sound maintenance decisions based on data rather than a gut feeling.

Workshops begin at 8 a.m. and end at 3 p.m. Lunch is included with the workshop fee of \$295. Attendees will receive a significant package of course materials including, in some cases, the workshop leader's hardcover book.

Register now -- seating is limited.

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