

Economic Benefits of a Properly Implemented Predictive Maintenance Program

a white paper presented by

MaintainIT

Improving a facility's equipment reliability is a formidable business challenge.

Facilities today, whether large or small, commercial or general industry, must move toward a more aggressive proactive approach to equipment reliability. In a reactive mode of maintenance, your equipment is controlling you and your maintenance dollars. This type of work environment has a long list of hazards or outcomes that can eventually determine your facility's existence.

So everyone agrees that it makes sense to adopt a culture and develop work practices that support a proactive approach to equipment reliability.

So where do you start? Who is responsible for the implementation? What are the indicators for success? These are just a few questions you ask when you are given the task.

When beginning research of reliability improvement, you can be overwhelmed with the hundreds of reliability programs on the market. These programs include work philosophies, such as autonomous maintenance, TPM, JIT, RCM and failure analysis.

There are also endless suggestions listed on the Internet, various maintenance technology magazines, "best practices," and then... consultants. In addition, there are numerous reliability tools, such as wireless monitors, smart sensors and a multitude of equipment monitoring technology gadgets.

While all of these programs and technology gadgets have their place – in whole or in part – they must be implemented in a planned, timely and money contiguous fashion.

So, again, where do you start?

MaintainIT has taken the integrated approach of supplying predictive maintenance techniques for over a decade. While the majority of service contractors offer "tactical assaults," MaintainIT combines technologies and a "full blown" integrated predictive program.

This white paper is based on actual experiences of MaintainIT, the integration of this program with clients' in-house programs, and the positive results achieved

from these mergers. The results include raising productivity, employee moral and equipment ownership.

Predictive Maintenance is a condition-based philosophy of inspecting both facility and production equipment in hopes of minimizing and identifying potential failures before they occur. Predictive maintenance techniques include inspections made on equipment with the aid of such tools as vibration analysis, infrared scanning, ultrasonic inspections, stroboscope inspections, oil analysis, temperature trending and various motor testing applications.

The ultimate goal of predictive maintenance is "cost avoidance." That is, identify a looming failure before it occurs. Thus, a repair can be performed on a "scheduled" downtime versus an unscheduled and costly downtime.

Important note: predictive maintenance does not always prevent failures, but identifying wear and maintenance needs does reduce many unscheduled failures, thus saving large sums of money for the client.

The various tools or inspection techniques of predictive maintenance have been in use on a global basis for several decades. These inspection techniques have been proven repeatedly to be very effective, with a growing list of success stories from all sectors of industry. However, it is estimated that over 50% of all reliability programs are not producing the ROI that is anticipated.

In general terms, reliability programs make good financial sense. If implemented in a controlled and integrated fashion, you should see the benefits almost immediately. Even if the benefits are small, they are the beginning of larger positive events. The majority of failures are the result of a series of events.

Attacking the smaller events, such as a minor oil leak, will often prevent larger and more costly events. Basic questions you should ask bi-annually, no matter if you perform your predictive program in-house or have it contracted out are:

- How effective is our current predictive program?
- How efficient are we in responding to predictive findings in regard to corrective actions?
- What is our cost avoidance total to-date?
- Are we getting the most out of the programs?
- Other than maintenance, who is involved with the program and how?
- Are we updating the various predictive databases as repairs or made?

If your predictive program has not positively affected your maintenance bottom line dollar or if the program has not assisted in generating more products out the door, is the initiative worth the investment?

Predictive maintenance programs, including work programs, such as spare parts, preventive maintenance plans, etc. are only one piece of the pie. It is unlikely one program will result in sustainable positive results.

Positive results come when you integrate these techniques with existing programs and departments such as:

- Quality programs
- TPM
- CMMS system
- Storeroom and spare parts program
- Upper management and the operations department
- Documentation and publication plant wide
- Safety and internal audits

An example of positive results with integration of techniques occurred recently when MaintainIT was commissioned to facilitate a project to improve the overall maintenance and equipment reliability at an axle stamping facility. This facility produces large truck axles. This automated process and the large hydraulic equipment involved proved to be a daily challenge to both production and maintenance departments. The process to produce these axles in the simplest form requires that high heat be applied to steel banks and then using a hydraulic press to press them into an axle half. The two halves are then welded together to form the beginnings of a large truck axle.

Our primary goals in this project were to improve equipment reliability by reducing the number of unscheduled breakdowns, to set the stage for the corporate-wide TPM mandate, and to increase the number of axles halves produced daily. This project was designed to be integrated with various other existing departments and work processes. Traditional maintenance projects usually do not include such integration.

During the first phase of the project, MaintainIT performed a maintenance and production audit. This audit included documenting all activities in the press area, which will be referred to as our "pilot area." The assessment lasted approximately two weeks and included the collection of data from all departments associated with the pilot area. This included, but was not limited to:

- Production Planning and Scheduling
- Maintenance Planning and Scheduling
- Maintenance Technicians and Production Operator Interviews
- Managers and Supervisor Interviews
- Reviewing Existing Equipment Reliability Programs (that were in place)
- Reviewing Past and Current Equipment Failures and General Downtimes
- Vendor-supplied Raw Materials Information
- Spare Parts and Storeroom Efficiency

- Interfacing of Quality Audits and Regulations
- Manpower Availability and Resources

The initial assessment is a vital part of any maintenance and operation improvement project. The objective of the assessment is to give the auditor a strong understanding of the process, day-to-day activities, and most importantly, documenting the concerns of the people assigned to the production areas. The results of the assessment will be the foundation (the reference book) for the new improvement project.

From the assessment data, a list of findings was compiled. These findings or concerns covered a wide range of issues from equipment problems, design problems, people problems and procedure problems. Each finding was prioritized as to importance. From the list of findings, conclusions and recommendations were made.

The pilot area was then subdivided into three sections. Each section had approximately 10-15 equipment items to be reviewed. Each section had a review team consisting of a cross section of people, including mechanics, productions operators, TPM trainers and others.

Each team was issued an equipment review packet to validate, update or develop on such items as:

- Equipment nameplate Data
- Develop immediate repair action list
- Current preventive maintenance plans
- Identify predictive maintenance applications
- Review spare parts
- Identify any training needs
- Develop operator surveillance route
- Develop lubrication program and routes

A steering committee was assembled to monitor, track and document the improvement project. The team members represented a cross section of the plant and included:

- Production Supervisors
- Production Operators
- Production Management
- Maintenance Management
- Maintenance Mechanics
- Plant Engineering
- Quality Department
- CMMS Technician
- TPM or CIP Personnel

Weekly meetings were held and attendance by everyone was encouraged. Along with the weekly meeting, status reports were made and published on the site-wide television screen located in the cafeteria. With the diversity of the steering committee, all activities from the management side, operators and maintenance side were reviewed and acted upon as one body.

The integration and implementation of existing and new information resulted in an increase in production and better communication between departments which also improved employee morale.

The increase in production more than justified the implementation of the program and the cost of the program. The economic benefits of this predictive and preventive program was recognized by the client and the client's employees. The program resulted in an increase of production of 18-20% per day.

If this white paper was of interest to you and you would like to learn more about MaintainIT, please contact:

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