

Save Time With Operator-Based Maintenance

John L. Ross, Jr, Senior Consultant with Marshall Institute Inc.

Could you use an extra 50 to 100 maintenance technicians? If so, what would you do with them? Maybe they can be used to enhance your preventive maintenance (PM) program. Here's how.

I will admit that outwardly it would be controversial to suggest indiscriminately eliminating 20 percent of your existing preventive maintenance task! No kidding — literally hit the delete key on your computer and say good-bye to 1/5 of your work. I will further submit to you, that after having done so, there will be no noticeable change in your equipment performance, positive or negative. Such is the state of our preventive maintenance systems.

Our computerized maintenance management systems (CMMS) are literally clogged with irrelevant and unnecessary PMs, and yet we continue to commit thousands of hours per year (ergo thousands of dollars) to performing work that really has no value. What's worse is that much of this work is yoked on the backs of our shrinking maintenance staff. Is there a better way?

Before we explore a better approach, we need to agree on some fundamentals about our preventive maintenance strategy.

- Who, in our organization can perform a PM:
 - maintenance technicians
 - operators

- What are the activities generally addressed in a PM:
 - inspection
 - adjustment
 - testing
 - calibration
 - rebuilds (checks performed during a component rebuild)
 - replacements
 - servicing (e.g. oil, grease)

- What should each singular PM task address:
 - what to do
 - how to do it
 - what is the acceptable criteria
 - what should be done if the condition is found to be unacceptable
 - are there any particular safety precautions

- With what frequency should PMs be performed:
 - daily

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- weekly
- twice monthly
- monthly
- quarterly
- semi-annual
- annual

There is one more significant point. Ideally, we would like our maintenance craftspeople to be involved in higher functions, certainly beyond merely “fixing” things after they break. In fact, the role of those in maintenance is to “maintain” things and not necessarily to fix things after they break. In a similar manner, our operators should chiefly be involved in the production of our product. They need to make sure process parameters are in line and netting positive product quality. However, with both maintenance technicians and operators, all need to be earnest players in our efforts to maintain equipment reliability.

Operators As Technicians

As an industrial nation, we seem to be coming full circle on operator based preventive maintenance. The old chestnut of “I operate it, you fix it” is no longer helping to establish our competitive edge in a global market. Like the farm boys who moved to the city during America’s industrial revolution, our operators have the aptitude and the capability to aid in equipment reliability. During the migration from farm to city, many of our factory production workers took part in or completed maintenance tasks of various complexity. Somewhere along the line of our manufacturing evolution, we passively dumbed-down our operators and voided their input to maintaining the very equipment they spent all day operating.

Today’s operators are smarter and more capable than ever before, not only in terms of formal academic achievement, but relative to interest and desire to be part of the solution. Yet, we often haven’t considered how to fold this emergence of “intelligentsia” into our formal preventive maintenance strategy.

Most probable in our factories is that we don’t even have a formal preventive/predictive maintenance strategy. Do you have a policy written down and communicated to all team members? Are you effectively completing 100 percent of our preventive maintenance tasks, and do you review each PM task annually to determine its continued relevance to our overall effort? Is your PM program a living program in which you constantly adjust the frequencies to maintain that sweet spot?

It’s often said the result of a predictive maintenance task is a data point on a trend chart. The result of an *inspection type* preventive maintenance task is either nothing (that is to say that everything checks “good”), or a corrective maintenance work order. There is a general rule of thumb for how often a corrective maintenance work order should be generated to determine if your frequencies are correct. Use this as an example:

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- 7-day or 14-day PMs should have a 1:6 to 7 ratio. That is to say, for every 6 to 7 times that particular PM task is accomplished, there should be 1 defect noted on a corrective maintenance work order.
- 30-day PMs should have a ratio of 1:3.
- 90-day PMs should have a ratio of 1:4.
- Semi-Annual and Annual should have a ratio of 1:1.

To be clear, a *defect* is a detraction from the norm and *is not* a component failure. Furthermore, Dale Blann, Marshall Institute, Inc. CEO, advises the frequency for a PM task should not be based on the mean-time-between-failure of a component, but rather on how long you have between detecting a defect on that component and its subsequent failure.

So, where do operators fit into the matrix of preventive maintenance? One idea that is growing ground swell support, and admittedly one that has a significant chance of being “doable,” is assigning 30-day or less PM tasks to your operators and freeing our technical staff for higher functions. Most assuredly, as I travel the country consulting with manufacturing entities on their adoption of *Total Productive Maintenance/Total Process Reliability*, this subject is always addressed.

Perhaps not all 7, 14, and 30-day PMs are transferrable to operators, but consider those that are simple inspection, minor adjustment, replacement, or servicing tasks. Generally these tasks are simple and quickly completed with hand tools or a grease gun. Designing and utilizing single-point lesson plans and standard task charts and lists are all that are needed to provide adequate training.

Involving our operators in the completion of routine preventive maintenance tasks nets us benefits in many categories. To name a few: involvement, additional “eyes” on the equipment, and ownership.

Imagine the level of involvement you’d reach by having each operator in your plant complete three preventive maintenance tasks a day. These can range from the simplistic “look at gauge and confirm it is indicating in range,” to replacing filters, or applying grease and oil. With each operator completing three of these 1-5 minute PMs each day, you’ve built in the involvement factor.

Utilizing Ownership

We know that by performing effective PMs on time, and at a 100 percent completion rate, we have a better chance of catching small issues before they become tomorrow’s catastrophic failure. Our army of newly enlisted operators, trained by single point lesson plans or standard work sheets, are now contributing to our effort to put more eyes on the equipment and detect these fledgling failures. Remember Dale Blann’s point that a PM frequency is based on how long before we see the defect until the failure.

Ownership flourishes when we combine responsibility with authority. If either of these are missing, we most likely will not experience true ownership. Including the operators in the design of our operator-based PM strategy and in the development

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of teaching aides increases chances of developing a sense of ownership.

We need to couple the PM strategy with our work order flow process to ensure corrective work requests are promptly addressed. Can you imagine the pride generated from an involved operator finding a potential failure, notifying the appropriate agency, and getting the issue corrected in time? Now imagine this occurring hundreds of times a month in your plant. The gains are exponential!

The prescription for implementing a formal operator based preventive maintenance system is not simply to move all the 7, 14, and 30-day PMs from maintenance to production. First, our existing PM tasks need vetting through a preventive maintenance optimization (PMO) process. This process will align our PM strategy with our downtime causes based on severity, detectability, and the number of occurrences. Completing a PMO cycle on your PM tasks will separate the wheat from the chaff, much as I described earlier in suggesting the indiscriminate elimination of 20 percent of PM tasks.

From that point, we work with a cross-functional team of operators and maintenance personnel to determine what tasks best fit into the model for operator-based PMs. It is from this point that we develop our single-point lesson plans and our standard work sheets to augment and formalize the training of our operators.

By tracking the usual key performance indicators (KPIs) we ensure PMs are being accomplished completely and on time. I would suggest the following KPIs as a minimum:

- OEE (overall equipment effectiveness)
- % PM Completion
- # CM (corrective maintenance) work orders generated from PMs
- Priority 1, 2, 3 CM completion rate

At minimum, we want to have an OEE in excess of 65 percent, a 100 percent PM completion rate, corrective maintenance work orders generated at a rate suggested in an earlier paragraph, and we want all corrective work completed within 45 days from detection. These values are provided as a general starting point.

Having our operators actively and completely involved in our preventive maintenance strategy will only truly bare fruit if we passionately engage our skilled technicians in higher functions.

Too Much Time On Your Hands

Let's assume, for purpose of discussion, that through the power of PMO, you've literally eliminated 20 percent of your preventive maintenance tasks. Of the 80 percent that are left, the majority of the 7, 14, and 30-day tasks are transferred to the operator corps. That leaves only the very complex 7, 14, and 30-day PMs, along with the quarterly, semi-annual, and annual events to be assigned to our maintenance personnel. Without debate, you have freed up considerable time for

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our skilled labor. What will you do with this windfall of man-hours?

I suggested at the beginning of this article that we want our maintenance personnel involved in higher functions, and not simply fixing things when they break. We will have to address the corrective work orders being generated from the operator-based PM activities, but beyond that, there are many proactive maintenance functions that we've ignored over time that we can now address.

We can apply some of our excess skilled labor man-hours toward working with stores to verify spare parts inventory and work on the disposition of obsolete parts. Our skilled work force can become engaged with engineering on the next level of equipment modification to work in an effort to build-in or increase maintainability and reliability. Our skilled personnel can work with equipment improvement teams to articulate problems and indentify potential root-causes and corrective actions. Likewise, we can now schedule our technicians to complete predictive tasks and work with planners to fine-tune corrective plans or project work.

These proactive activities net us the largest gains in the not-so-distant future. These gains and others are made possible by freeing up time on the skilled side of our work force, and engaging our mounting production force in the initial inspection and service or our equipment through operator-based preventive maintenance.

How about your place — could you use an extra 50-100 “maintenance technicians”?

John L. Ross, Jr, Ph.D., is a Sr. Consultant with Marshall Institute Inc., an international maintenance and reliability consulting and training company based in Raleigh, NC (919-834-3722; www.marshallinstitute.com [1]). Dr. Ross has more than 22 years of experience in maintenance and manufacturing, including work with the Air Force, consumer goods manufacture, and steel manufacture, and may be reached at jross@marshallinstitute.com [2].

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