How to Improve Maintenance

“I’ve been in maintenance management for a long time. But it seems that the toughest part of my job now is actually making improvements in the way we do maintenance. And it’s not getting any easier. If anything, it is a lot tougher to get support for improving maintenance now than it was ten years ago. How can we really improve maintenance?”

Great question—especially after last month’s column on the difference between maintenance management and asset management. After you’ve wrapped your mind around those two different yet closely related approaches, you still have to get back to the basics of improving maintenance. Asset management systems will not work without efficient and effective maintenance work processes.

Activities versus Improvement
A reminder before we get too far into this discussion: Be careful not to get maintenance activities confused with maintenance improvement. Merely doing something differently or implementing a new maintenance program does not necessarily mean that maintenance will improve. Here are a few real-life maintenance improvements gone wrong … and gone right.

New preventive maintenance (PM) procedures were developed and deployed for critical equipment in the plant—the most detailed, best-looking PM work instructions that have ever been seen in the plant. The new PMs all got scheduled and performed on time. But the new PMs did not make any sustainable improvement in equipment performance and reliability. The PM development activity was considered a success, but neither maintenance nor reliability was improved.

A thorough reliability centered maintenance (RCM) program was started. A failure modes and effects analysis (FMEA) was performed leading to a comprehensive maintenance improvement action plan, but they struggled with the action items, dragging on for months, and the equipment did not become more reliable. Many RCM experts tell us that implementation is where most RCM programs fail.

Operators were involved in basic equipment lubrication as part of Total Productive Maintenance (TPM) development. Lube stations were set up, visuals were developed, and training was provided. This activity was a genuine improvement—maintenance resources were freed up because lubrication related failures were reduced, equipment effectiveness was improved, and operator productivity was increased.

Kitting spare parts for maintenance jobs and PMs put everything together before the maintenance work is scheduled and assigned increasing maintenance productivity (wrench time). Parts are removed from inventory, held in limbo in the kits, and store-room inventory is replenished. But when the kits don’t get used, kitted parts go missing because of emergencies, and unused parts don’t get re-stocked. Maintenance improvement has really not occurred. Maintenance costs have actually increased.

It is often very easy to get excited about developing and deploying new maintenance activities and work diligently on those activities for months or years. But has maintenance really improved? Implementing maintenance activities in the hopes of improving performance often misses the mark.

Maintenance improvements should be observable and measurable. For example, not only is maintenance more efficient (takes less time), it should be more effective (improved equipment performance and reliability) and more cost effective (reduced maintenance cost per unit produced) than
the former maintenance activities. Work often becomes easier, equipment runs better, and maintenance costs are lower—results you can see and measure.

**Launching Maintenance Improvements**

Getting back to the question: *How can we really improve maintenance?* Let’s start by answering three basic questions.

**First, we must ask “why improve maintenance? Why change?”** Identify the benefits, the business case, the fundamentally compelling reasons for improving maintenance—the sense of urgency.

**Second, we have to ask “what’s getting in the way of actually improving maintenance?”** Attitudes, work culture, environment, resources (people, money), skill shortages, training, myths, and misunderstanding can stall improvements. Determine the root causes of these barriers or specific failure modes of an improvement activity.

**And third, how do we address the specific root causes of the barriers and re-focus on the compelling business case for improving maintenance?** This is the launching pad for improving maintenance: What maintenance improvement activities to deploy, where and when, and how to measure the results.

**Getting Started**

Most of us who have been working in and around maintenance for years, or even decades, know intuitively why we need to improve maintenance. We know what needs to be done. We know who needs to do it. We even know where to start.

It’s when we get to actually improving maintenance, the “how” and “when” parts of the journey, the boots-on-the-ground part of making sustainable gains, that our plans can begin showing immediate improvement or start unraveling. It is more than just timing. It’s about focused and purposeful deployment, not merely implementing new and improved maintenance activities.

Reflect back on your answers to the three basic questions: Why improve maintenance, what is getting in the way, and what are the root causes of these barriers? Not only is this the launching pad for improving maintenance but also the basis for securing the authority to do what needs to be done. **Never underestimate the power of a compelling business case for change.**

Shifting from maintenance “activities” to improved maintenance “results” is a pivotal point between immediate improvement and unraveling plans. Compare the following typical maintenance “activities” versus the “results” and “failure modes” commonly associated with maintenance improvement. (Caution: Because maintenance is the least defined of all industrial activities. cut me some slack on the definitions used here.)

**Preventive Maintenance:**

**Activity:** Periodic cleaning, inspection, replenishment, replacement, adjustment, calibration.

**Results:** Reduced unplanned downtime and trouble calls, improved equipment reliability

**Failure modes:** Inaccurate, incomplete, or vague work instructions; lack of training or accountability to follow instructions; sub-standard replacement parts
Predictive or Condition-Based Maintenance:
Activity: Technology used to identify deteriorating conditions (vibration, infrared, oil condition, etc.), performing maintenance based on real-time data

Results: Prioritized and optimized planned corrective maintenance action before functional failure.

Failure modes: Improper data collection; insufficient analysis, reporting and trending; lack of timely corrective action; deferring recommended maintenance interventions

Reliability-Centered maintenance:
Activity: A structured analysis of equipment functions, failure modes, causes, and effects to identify risk mitigation actions

Results: Equipment failures addressed in a preventive manner; risks reduced; reliability improves

Failure modes: Analysis paralysis, incomplete or inadequate action item implementation

Maintenance Management (computerized or not):
Activity: Organizing and coordinating maintenance work processes and resources

Results: Efficient and effective deployment of maintenance resources, equipment repair and maintenance histories, improved equipment performance and reliability

Failure modes: Lack of defined and integrated maintenance work processes, software and system functionality a priority versus desired maintenance work processes, limited end user input

Lifecycle Asset Management:
Activity: Organizing and coordinating lifelong equipment cost and performance from acquisition through decommissioning/disposal phases

Results: Longer equipment life; improved equipment performance and reliability; lowest total cost of ownership

Failure modes: “Lowest cost” project or procurement budget goals, no operability or maintainability reviews, RCM analysis not utilized, little or no standardization of components or controls

Total Productive Maintenance (TPM):
Activity: Organization-wide and high-involvement approach to improving equipment effectiveness

Results: Major equipment-related losses are eliminated, improved equipment effectiveness (OEE), lower operating and maintenance costs
**Failure modes:** Lack of focus on eliminating major equipment-related losses, over-emphasis on operator-performed maintenance, limited interdependent application of five basic pillars of TPM

**Maintenance Planning and Scheduling:**
*Activity:* Reviewing work requests to develop (or identify) appropriate work plans, procedures, parts and supplies, contract work, estimated labor hours and duration, and then expedite needed resources; scheduling the work when the required resources and the targeted equipment are available

*Results:* Efficient and effective labor utilization and job completion, minimal interruption, lower cost

*Failure modes:* Undervaluing the importance of job planning and assuming that supervisors will plan the work as well as schedule and assign people, not using standard job plans with estimated hours and other required resources as a basis for planning, and outdated job plans and procedures

**Maintenance Training:**
*Activity:* Training programs, classes, vendor training, apprenticeships, on-job coaching/training (OJT)

*Results:* Improved maintenance efficiency and effectiveness, improved equipment performance and reliability, improved workplace safety

*Failure modes:* Generic craft skills and knowledge training, little or no equipment and task-specific training, informal or unstructured OJT, seniority versus job-performance requirement based, not provided to operators; no performance demonstration or qualification

**How to improve maintenance?** Three points:
1. Focus on sustainable results.
2. Deploy the right maintenance activity to address the compelling business case.
3. Beware of the know failure modes of the chosen maintenance activities.

There are many proven maintenance activities that, when properly deployed will assure consistent and sustainable results. In this era of skills shortages and ever-tightening productivity improvement goals, make sure the time and energy you and your organization spend on maintenance activities leads to solid results.