

Maintenance Excellence Assessments

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Abstract

How does your company and plant stack up in their pursuit of Maintenance Excellence? This paper presents an Excel-based self assessment tool that can help you quantitatively evaluate your performance in eight key areas. Below each quantitative measure is a qualitative description of the kinds of activities a plant or company might be doing if they were achieving Maintenance Excellence. In this way, a facility or company can readily judge their progress and the actions suggested to further improve their performance.

History

The Maintenance Excellence Assessment process that is the subject of this paper has been used dozens of times at dozens of plants across the world. It had its origination six years ago when a need arose to quantitatively assess a plant's maintenance performance. At the time, the known tools were qualitative and quite subjective depending on who was doing the interviewing and who was being interviewed. At the same time, it was impractical to perform an objective self assessment using a qualitative tool.

To set the standard appropriately lofty, we chose the quantitative measures to be among the best of industry; i.e., Maintenance Excellence. At the same time, we included qualitative suggestions as to the types of activities leading maintenance organizations might be involved. The combination of the quantitative and the qualitative measures made it feasible to now perform a self assessment. Every effort was made to make the tool industry neutral. Nonetheless, it's important to note industries such as the nuclear and the airline industries with high risks and high exposure will do well given their likely full implementation of Reliability Centered Maintenance, rigorous P/PM, and Root Cause Failure Analysis systems.

The tool itself is MS Excel-based and is easily adapted to changing technology and techniques. It has also worked well as an effective means of performing a non-threatening self assessment. Most of all, it's quick and easy!

Assessing Performance

Historically, maintenance assessments have been right up there with a root canal at your favorite dentist. Let's face it, unless you're at the top of the heap, it can be an awfully humbling experience. When the boss and the boss's boss are involved, assessments also tend to bring on new performance expectations. For the average maintenance department already in a fire-fighting mode, all the "help" and attention can be downright threatening.

Corporate politics, sanity, and self preservation aside, it's important for all of us to have an accurate assessment of where we stand. Otherwise, it's like a world without speedometers. Some are going to go fast. Some are going to go slow. Some will go even slower. As a result, frustration will increase and safety, progress, and efficiency will suffer. Even worse, imagine a world without speedometers but still having speed limits and twice the number of police officers to help point out the errors of your ways. Similar problems would exist in a life without scoreboards and scorecards. Think about watching the NBA finals in an arena with no scoreboard. Just imagine playing the best round of golf of your life while beating Tiger Woods in the US Open, and not having a scorecard to prove it. Sure, your friends say! Running a maintenance department without metrics and assessing your performance can lead to the same type of frustrations and unbelievability.

It's human nature to want to know how we're doing. Likewise, from a business perspective, it's important to know you're getting better. Even more important is to understand how we're doing relative to the competition. After all, whether it's sports or business, most of us have an inherent desire to "win."

Our Maintenance Excellence Assessment tells us how we're doing in our pursuit of Maintenance Excellence. It let's us know if we're getting better. It also gives us a good feel for how we're doing relative to the competition. Most of all, it let's us know if we're winning the game!

The Assessment Tool

We chose eight major categories for the Maintenance Excellence Assessment tool. The categories run from Safety to Financial Control. As is the case in manufacturing, scoring is heavily weighted toward safety,

bottom line performance, planning, and predictive/preventive maintenance. If a facility does well in these areas, they will “pass” the assessment.

The eight major categories are Safety; Organization, Involvement, and Training; Bottom Line Performance; Planning and Scheduling; Financial Control; Predictive/Preventive Maintenance; CMMS; and a Misc. category. Three categories, Safety, Bottom Line Performance, and Preventive/Predictive Maintenance make up two thirds of the total score.

Several quantitative measures; i.e., numerical Key Performance Indicators or metrics, can be found in each of the eight categories. Each of these measures have four levels of performance shown: Improvement Needed, Average, Good, and Maintenance Excellence. To promote

improvement to Maintenance Performance levels, the scoring is non-linear and weighted toward Maintenance Excellence. Performance below industry standards (Improvement Needed) generates 0 points. Average performance is worth 1 point and Good performance is worth 5 points. Achieving Maintenance Excellence for a particular Key Performance Indicator is worth 10 points.

For illustrative purposes, a copy of the Safety Section can be seen in Figure 1. As you can see, to achieve Maintenance Excellence in the safety area, a maintenance organization would have an OSHA Total Incident Rate of 0.00 for the last five years, no injuries of any kind for 10 years, resolve over 95% of their safety work orders the day they are submitted, and achieve a score of 20 (out of 25) on their weekly 5S+1 scan.

	Improvement Needed (0 Pts)	Average (1 Pt)	Good (5 Pts)	Maintenance Excellence (10 Pts)
OSHA Total Incident Rate (Last 60 Months)	> 5.0	2.01 to 5.0	.01 to 2.0	0.00
Consecutive Days w/ 2 or less Injuries	< 90	90 Days to 2 Years	2 Years to 10 Years	> 10 Years
Same Day Resolution Safety WO's	< 50%	50 to 80%	81 to 95%	> 95%
Average 5S+1 Scan (25 Possible)	< 10	10 to 15	16 to 20	> 20

Figure 1 – Example of the Safety Quantitative Section of the Maintenance Excellence Assessment Tool

Below the quantitative section for each category are a number of qualitative comments indicating the types of activities the best are performing. The following are from the safety category and are indicative of the qualitative comments found in the other categories.

- All Safety work orders are completed that day or the equipment is shut down until steps are taken to ensure safe operations can be resumed
- Anyone is empowered to shut down a piece of equipment they feel is unsafe
- 5S+1 and Visual Workplace techniques are routinely applied to the shop and plant work areas to improve safety, eliminate clutter, reduce motion, and improve organization
- Same-day cross-functional investigation of incidents and near-misses ... published database of events and follow-up actions
- Effective daily safety meetings at the start of each shift led by mechanics and attended by all maintenance hourly and salaried employees
- As appropriate, HECIP's and MSDS's are associated in the plant's CMMS with each piece of equipment and are available/printed with each work order.

Similarly, the Planning and Scheduling Quantitative Section can be seen in Figure 2. Planning and Scheduling Qualitative comments include the following:

- Before incorporating into a proposed schedule, each work request is evaluated for safety, parts needs, skill requirements, equipment training,

interface issues, drawing needs, in-house troubleshooting expertise, engineering involvement, vendor assistance, rental equipment needs, tools required, permit needs, etc. ... jobs are then kitted prior to giving them to mechanics

- Costs and resource impacts are provided upfront to customers and maintenance leadership to assist them in approving and then prioritizing their maintenance needs
- Priorities and schedules are set by customers the week before with input (cost, downtime

requirements, resource impact, practicality, impact on other work, etc.) from maintenance staff ... schedule is developed with customers to incorporate production, project, and other non-maintenance needs ... concerted effort is made to synchronize work with other business requirements

- Interruptions, breakdowns, and/or emergency break-ins to the agreed schedule are few and are tracked and scrutinized by the plant and corporate leadership groups.

	Improvement Needed (0 Pts)	Average (1 Pt)	Good (5 Pts)	Maintenance Excellence (10 Pts)
% Planned Work	<50 %	50 to 80%	80 to 95%	> 95%
# of Mechanics per Planner	25 (Or no Planners)	18 to 25	12 to 18	< 12
Work Schedule Provided to Customers	Not Provided	Daily to < 3 Days	3 or More Days	Preceding Week
% Walk-In/ Unscheduled Breakdown Work	> 50%	10 to 50%	2 to 10%	< 2%

Figure 2 – Example of the Planning and Scheduling Quantitative Section of the Maintenance Excellence Assessment Tool

Results

Results are graphically displayed showing the facility's Percent of Maintenance Excellence Achieved for each of the eight categories. This helps the plant to readily understand where their greatest areas of opportunity might lie. From the graphical result, the plant can refer back to the qualitative comments for the category in question to determine the kinds of activities they should undertake to improve.

During the tool's six year history, the average score has been roughly 30%. For comparison purposes, the low has been 4% and the highest score was 86%. The low score

was in a plant that has since been closed. The score of 86% was in a plant universally acknowledged as World Class. A number of plants have scored in the 70's.

On average, we've seen about a 10 percent per quarter improvement when there's been a concerted effort by the facility to improve. One maintenance organization improved from a score of 50 to 72 in a year ... and added several million dollars to the bottom line in Overall Equipment Effectiveness (OEE) and productivity credits in the process.