7 DAYS TO BETTER EQUIPMENT RELIABILITY

BY: RICKY SMITH, CMRP, CMRT, CRL

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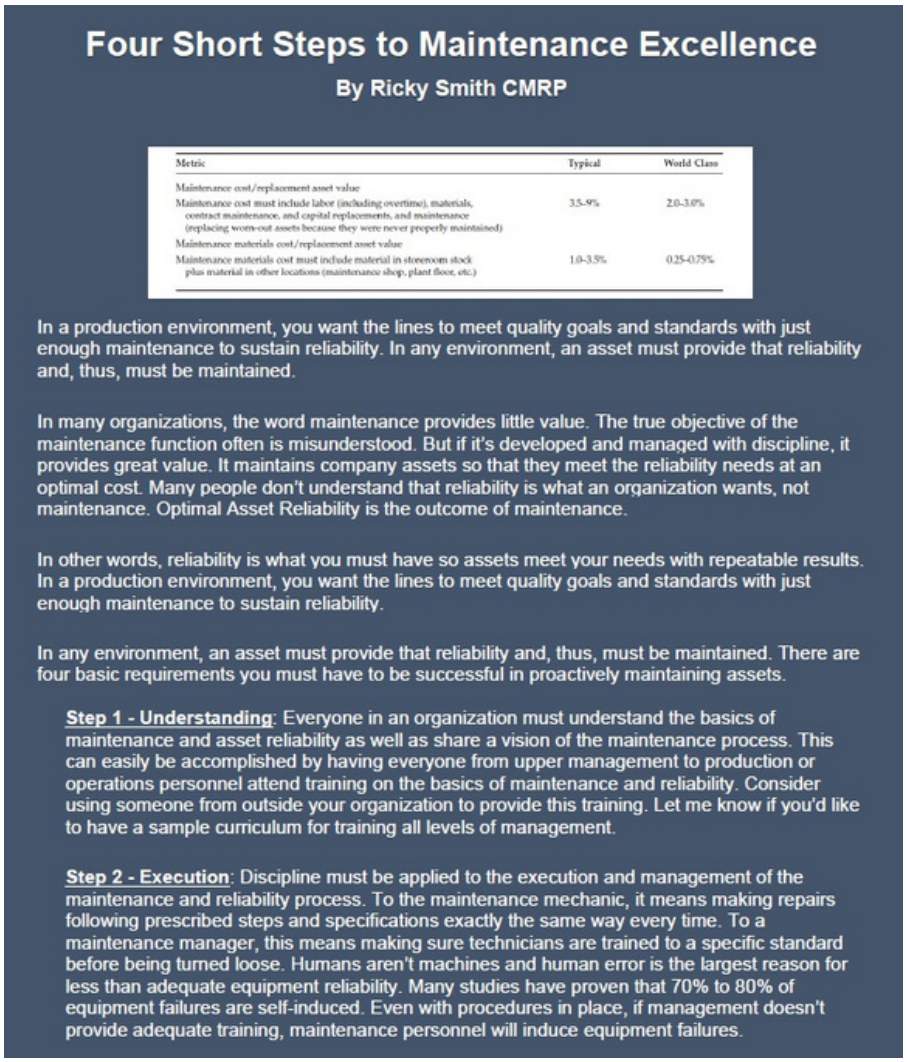
By Ricky Smith CMRP

Does it seem like every day it is the same old thing and even though you try your best to make improvements in equipment reliability, they never seem to stick? I know the feeling, and it is frustrating. What if you (as a Maintenance Leader) could improve equipment reliability in seven days? I know what you are thinking: “it will never work”. The following seven-day schedule lays out an approach for improving your equipment reliability that you can use in your facility. Give these ideas a chanceto succeed and you will be amazed with the results.

Pre-Work (the right knowledge is critical to change)

Meet with all of your supervisors, planners, engineers, and key maintenance personnel. Let them know what is happening and that you want this to be a department effort to improve everyone’s lives. Use the following article, “Four Steps to Maintenance Excellence” to open discussion then post this document around the plant for all to see.



Four Short Steps to Maintenance Excellence

By Ricky Smith CMRP

Metric	Typical	World Class
Maintenance cost/replacement asset value		
Maintenance cost must include labor (including overtime), materials, contract maintenance, and capital replacements, and maintenance (replacing worn-out assets because they were never properly maintained)	3.5-9%	2.0-3.0%
Maintenance materials cost/replacement asset value		
Maintenance materials cost must include material in storeroom stock plus material in other locations (maintenance shop, plant floor, etc.)	1.0-3.5%	0.25-0.75%

In a production environment, you want the lines to meet quality goals and standards with just enough maintenance to sustain reliability. In any environment, an asset must provide that reliability and, thus, must be maintained.

In many organizations, the word maintenance provides little value. The true objective of the maintenance function often is misunderstood. But if it's developed and managed with discipline, it provides great value. It maintains company assets so that they meet the reliability needs at an optimal cost. Many people don't understand that reliability is what an organization wants, not maintenance. Optimal Asset Reliability is the outcome of maintenance.

In other words, reliability is what you must have so assets meet your needs with repeatable results. In a production environment, you want the lines to meet quality goals and standards with just enough maintenance to sustain reliability.

In any environment, an asset must provide that reliability and, thus, must be maintained. There are four basic requirements you must have to be successful in proactively maintaining assets.

Step 1 - Understanding: Everyone in an organization must understand the basics of maintenance and asset reliability as well as share a vision of the maintenance process. This can easily be accomplished by having everyone from upper management to production or operations personnel attend training on the basics of maintenance and reliability. Consider using someone from outside your organization to provide this training. Let me know if you'd like to have a sample curriculum for training all levels of management.

Step 2 - Execution: Discipline must be applied to the execution and management of the maintenance and reliability process. To the maintenance mechanic, it means making repairs following prescribed steps and specifications exactly the same way every time. To a maintenance manager, this means making sure technicians are trained to a specific standard before being turned loose. Humans aren't machines and human error is the largest reason for less than adequate equipment reliability. Many studies have proven that 70% to 80% of equipment failures are self-induced. Even with procedures in place, if management doesn't provide adequate training, maintenance personnel will induce equipment failures.

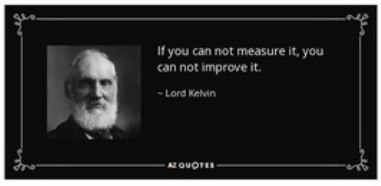
Step 3 - Structure: Preventive maintenance must be defined, managed and executed as a controlled experiment. If you find you're performing preventive maintenance on equipment that continues to fail, you're doing reactive maintenance. Define your PMs based on a formal work identification process that maintains reliability using RCM, FMEA, etc. Some organizations have been successful with a PM program that was developed on the basis of someone's experience or an OEM's recommendations.

Step 4 - Measurement: To paraphrase Deming, you can't manage what you don't measure. Managing the maintenance and reliability process requires leading and lagging key performance indicators. Every level in the organization must be able to look at some simple measurement that tells them about their particular score in the game. For example, an operator manages the reliability process by performing inspections on their equipment and reporting problems before they create partial or total functional failure. If an operator isn't engaged in the maintenance of their equipment, failure will occur. A maintenance manager manages using KPIs such as PM compliance. If PMs aren't completed on time, failure will occur. This concept seems simple, but many people don't want to know the score in the game because they fear bad numbers. Well, the number is the number, whether you measure it or not.

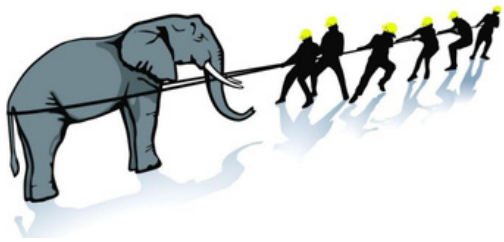
One method of knowing the score of Maintenance Excellence is a KPI dashboard: a set of KPIs that reveal how one's area of responsibility is functioning in the world of maintenance and reliability. A simple KPI dashboard for a maintenance manager might include PM compliance, scheduled compliance, percent of planned work, mean-time-between-failures of critical assets, rework, and budget compliance. An operator might have a KPI dashboard that includes PM compliance, MTBF and the number of breaks in the maintenance schedule. So you see, the dashboard shows performance data for an area of responsibility and it can reveal problems before they affect capacity, cost or quality.

Follow these four steps to get you started on the path to a true world-class maintenance operation. Each step is simple; however, each takes time, money and a certain amount of discipline. Ignore them at your own risk. They've been proven for more than 40 years and have been applied by some of the greatest companies in the world. I wish you success in your endeavor. Let me know if you have any questions or need advice at rsmith@worldclassmaintenance.org.

In addition, create a Maintenance Dashboard unless you have one in order to ensure everyone knows the current score in Maintenance and allows you to MEASURE THE IMPACT OF YOUR ACTIONS.



I once learned from a wise man that one man cannot pull an elephant by yourself, however if everyone pulls on the rope equally, as such we can pull the elephant around wherever we wish. Tomorrow, all hands need to be on the rope.



TIP: For the seven days, bring in donuts each morning and coffee. This will help everyone This will help everyone be more receptive to the concepts that will be introduced to them.

Day 1

This is the first day of the rest of your life, so let's make a difference beginning today. Have the donuts ready and coffee for everyone. Bring in all day shift maintenance personnel: planners, storeroom personnel, engineers, supervisors, all of the maintenance crews, and leadership.

Let them know you are going to implement a program titled "7 Days to Better Equipment Reliability". In front of everyone, post a simple sign that reads "7 Days to Better Equipment Reliability". Tell them this is a journey and not a race; don't worry they are going to be excited about these seven days.

The first day, you want to focus on a simple task. Ask everyone to begin focusing their efforts on performing MAINTENANCE TO SPECIFICATIONS, today and until the earth as we know it ends.

Post a banner in the shop that resembles the banner shown in Figure 1.

MAINTENANCE: "Maintenance involves functional checks, servicing, repairing or replacing of necessary part, devices, equipment, machinery, building infrastructure, and supporting utilities to specifications"

Figure 1: Our New Approach

Remind everyone that they are to perform all work to specification. If a specification is not known, make sure they know to ask their supervisor or engineer for assistance. Also, tell them to keep in mind that they cannot maintain equipment that is not maintainable.

In front of your department, ask everyone if they agree with the "Guiding Principles of Maintenance" (shown in Figure 2). State each one for everyone to reflect on.

Principle 1: We will always repair equipment back to a maintainable condition.

Principle 2: We will ensure that we do not make errors in the work we execute; we are not afraid to ask for help and will not rush the work when equipment reliability may be compromised.

Principle 3: When we perform Preventive Maintenance, we will ask ourselves, "Did I perform the inspection to a level that I know the equipment is left like new or maintainable?" If not, we will write a work order to come back later and correct.

Principle 4: We will close out all work orders completing all of the required fields to standard.

Figure 2: Guiding Principles of Maintenance

NOTE: To follow Principle 4, you may need to develop a standard for closing work orders, with good data your metrics are useless.

After this meeting, you must be seen in the field all day, helping people with problems and understanding the true challenges your team faces. Never correct them unless the task will damage equipment or injure personnel. (You can take care of your paperwork after the first shift leaves.)

As the maintenance staff is leaving, thank them for their work and shake each person's hand, including your management team. Your management team is critical to success, and they must begin acting as a team with you as their leader.

I know you are thinking this will be one heck of a day, but feel-good knowing that success never comes easy. Simple rewards such as a mechanic smiling when he or she leaves work should be enough reward for you.

Day 2

Gather everyone for a ten-minute meeting in the morning. (Don't forget the donuts!) Discuss the "7 Habits of a Highly Effective Technician" and ask if everyone agrees and is there any Habit that should be added.

Ask how many of them are with you on this journey to Maintenance Excellence. Notice that a new word is introduced, "Maintenance Excellence". You are slowly changing the culture in your facility.

All maintenance supervisors, managers, reliability engineers, and mechanical engineers should be on the floor assisting maintenance personnel who are having problems grasping the concepts laid out on Day 1. No negative talk, this is a time of reflection, calmness, and assistance.

When this meeting is over, you must be seen in the field all day just like on Day 1.

Your leadership team will likely be feeling uncomfortable at this time. Take them to lunch; no talking business allowed. Listen to what your leadership team is telling you and do not react, think about what they are telling you. If one person is a problem on the leadership team, take them in your office and talk to them in a calm voice. Think of yourself as a psychologist: good listener, no directive, no threats. Calmness is the key.

Again, as the maintenance staff is leaving, thank them for their work and shake each person's hand.

As Day 2 ends, you will probably be stressed, but don't give up yet! Remember, it's a journey that will lead to great results.

Day 3

Ask the Leadership Team to walkthrough the plant and identify wasteful activities which results in problems for both Maintenance and Production.

Maintenance Gemba Walk

The Maintenance Gemba Walk is an opportunity for Maintenance Staff to stand back from their day-to-day tasks to walk the floor of their workplace to identify wasteful activities.

Examples:

- Maintenance Leadership (once week), with a few maintenance techs to identify problems with equipment, ie. Grease oozing out of bearings, vibration on the floor, electric panels not closed, etc.
- Maintenance Leadership (once a month/quarter), with the storeroom manager and maintenance planner to identify problems in the storeroom, ie. Lack of security in storeroom, used parts in place of where new parts should be, rebuilt items not sent out for rebuild, etc.
- Maintenance Leadership (once a quarter), with Production Leadership (and once a year with Plant Manager) to identify problems with production and maintenance practices, ie. Production personnel not operating the equipment to specification, maintenance personnel standing around waiting for scheduled equipment to shut down, storeroom in chaos (high value components not stored to specifications, etc.)


Operating to Specs?

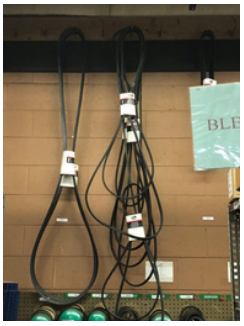

New Coupling Installation?


Used Motor in Storeroom?


Plant Spil?I

Remember, we are on a seven-day journey; I hope you warned your spouse or significant other that long days may be part of these seven days.

During the walkthrough, look at how spare parts are stored, ask what the stock-out percentage is, and find out if the storeroom is performing PMs on large bearings and electric motors. Also identify parts that are not stored properly, such as V-belts, used motors, etc.



At the end of the walkthrough, ask the storeroom manager how long it would take to correct all of the problems that your team noted.

Let him or her know that you do not expect success overnight; however, you would like to see a plan within three days for the easy fixes. Assign a Reliability or Maintenance Engineer to be the coach for the storeroom. If you do not own the storeroom, you should take the necessary

measures to pull it under your control. Most of the stuff in the storeroom is maintenance; the value may be higher for production, but the volume is maintenance.

Afterwards, do not take a break, go straight back to the practice: “All Hands on Deck”. The main focus is helping people do the right work at the right time, along with closing out work orders correctly with all of the fields completed.

As with the previous days, as the maintenance staff is leaving, thank them for their work and shake each person’s hand.

Day 4

Stay in your office until everyone goes to work then go about your normal day and meetings. Sit down with your engineers, supervisors, and planners after lunch to discuss what is working and what is not working. If there is a problem, ask the team for a solution. Go with their idea, even if you do not like it, as long as the idea is legal and ethical.

Set up a small group inside of your team to focus on work order close out and metrics you want to track. Ask the group to identify 4 Key Performance Indicators (KPI) that they want to measure. Make sure the KPIs will drive the correct behavior. Also, ensure that the inputs in your maintenance software will give you the outputs you want. Establish a Standard Operating Procedure (SOP) for work order close out. This should include a RACI Chart similar to the one illustrated in Figure 3 that defines roles and responsibilities.

Tasks	Maint Supervisors	Maint Analyst	Maint Planner	Maint Technician	Maint Manager	Rel Specialist	CMMS Proj Engr
Inputting Failure Data	A	C	I	R		C	C
Work Order Completion	R	C	C	C	A	I	I
Work Order Close Out	C	R	C		I	I	A
QA of Failure Data Input	C	R	I	C	I	C	A
Analyze Failure Records	C	C	I	C	A	R	I
Maintenance Strategy Adjustments	C	I	I	C	A	R	R
Implementing New Strategies	R	I	R	C	A	I	I

Responsibility	“The Doer”
Accountable	“The Buck Stops Here”
Consulted	“In the Loop”
Informed	“Kept in the Picture”

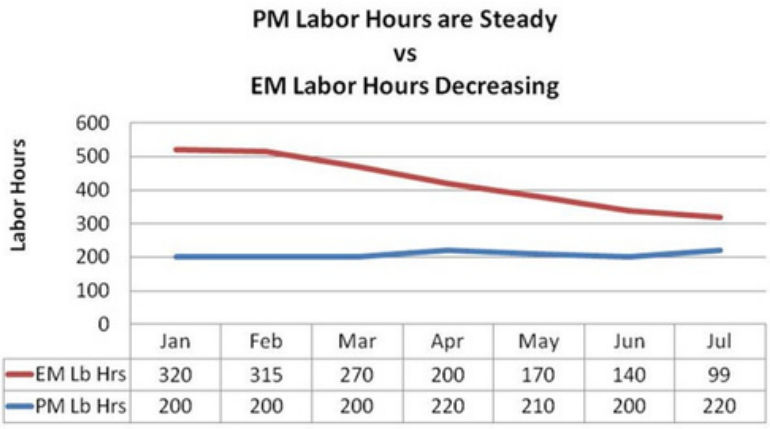
Figure 3: Maintenance Crew KPI RACI Chart

Once again, as the maintenance staff is leaving ask a few of them (3-4) to stay for a minute or two and ask them how things are going. You may have to make an adjustments based on what you learn. Give them each a high quality 6” electronic caliper and shake their hands, looking them in the eye, smile, and say “thank you” sincerely.

Day 5

Host a short meeting with your maintenance and leadership team and tell them what a great job they are doing. Use some examples that you or your staff have seen of their great work.

Give each member of the maintenance and leadership team a pack of M&Ms (make sure you have a variety of flavors and enough for everyone) to distribute to the staff in their department.
Ask your team working on KPIs to begin producing the four chosen KPIs even if they are not 100% accurate. Post them on large line graphs where everyone can see. People understand line graphs, numbers do not mean anything. If the number looks bad or has high variation, consider it acceptable because this is where you truly are.



	Jan	Feb	Mar	Apr	May	Jun	Jul
EM Lb Hrs	320	315	270	200	170	140	99
PM Lb Hrs	200	200	200	220	210	200	220

Day 6

Have a meeting with all of the maintenance team, including leadership. Ask the plant or site leader to say a few words (5 minutes) about their hard work and dedication in the past few days.

Next, you, as the maintenance manager, should tell everyone that from today on we will step up the professionalism to a new level. The team will use the torque wrenches on all fasteners, electrical and mechanical. After torquing the fastener to the prescribed level, they should use a paint marker to mark the fastener across the nut and threads of the fastener. This will validate that the fastener has been torqued to standard, and if the torque value changes, you will see the paint on the threads cracked.

Day 7

Bring in your maintenance crew for Day 7 and ask if anything changed in the past six days. Find out if the group believes they are moving toward Maintenance Excellence. List the successes and the mistakes. Make this a fun experience.

Conduct a Maintenance Assessment with key stakeholders. Based on the gaps you find create a plan with, “Short Term Wins” and “Long Term Sustainment” (post for all to see) and monitor progress of the plan and make adjustments as needed.

Maintenance Master Plan

At the end of Day 7, state to everyone that your facility is the best and we will all prove it. Point out that they have already mastered the simple tasks they were challenged with and succeeded in moving towards Maintenance Excellence.

Finally, remember that if it were easy, everyone would be doing it. The smiles on your maintenance techs' faces will show you that it is all worth it. Good luck implementing these ideas within your facility and understand that deviating from this plan at any point could result in failure to achieve your goals.

I would like to know how this program works for you. If you use the approach described here, please let me know what results you see. If you need ideas or more information, send me an email at rsmith@worldclassmaintenance.org.

#1 Software for Maintenance & Reliability Teams

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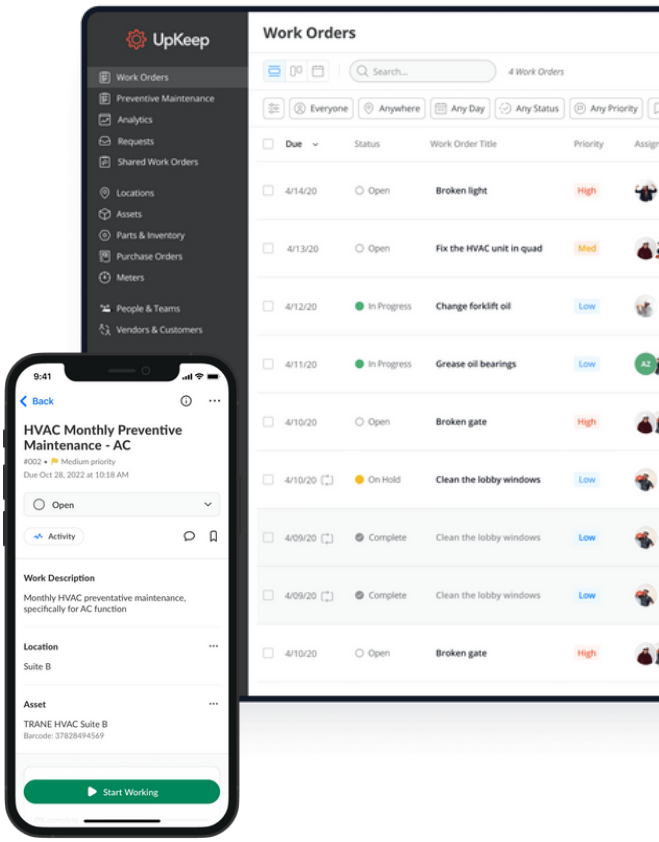

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The Maintenance Community Coalition was founded on the belief that working together will benefit everyone within our community

Committed to helping each other thrive in our individual professional journeys by sharing resources and expertise, granting scholarships, hosting events, and unlocking knowledge – always at no cost.

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