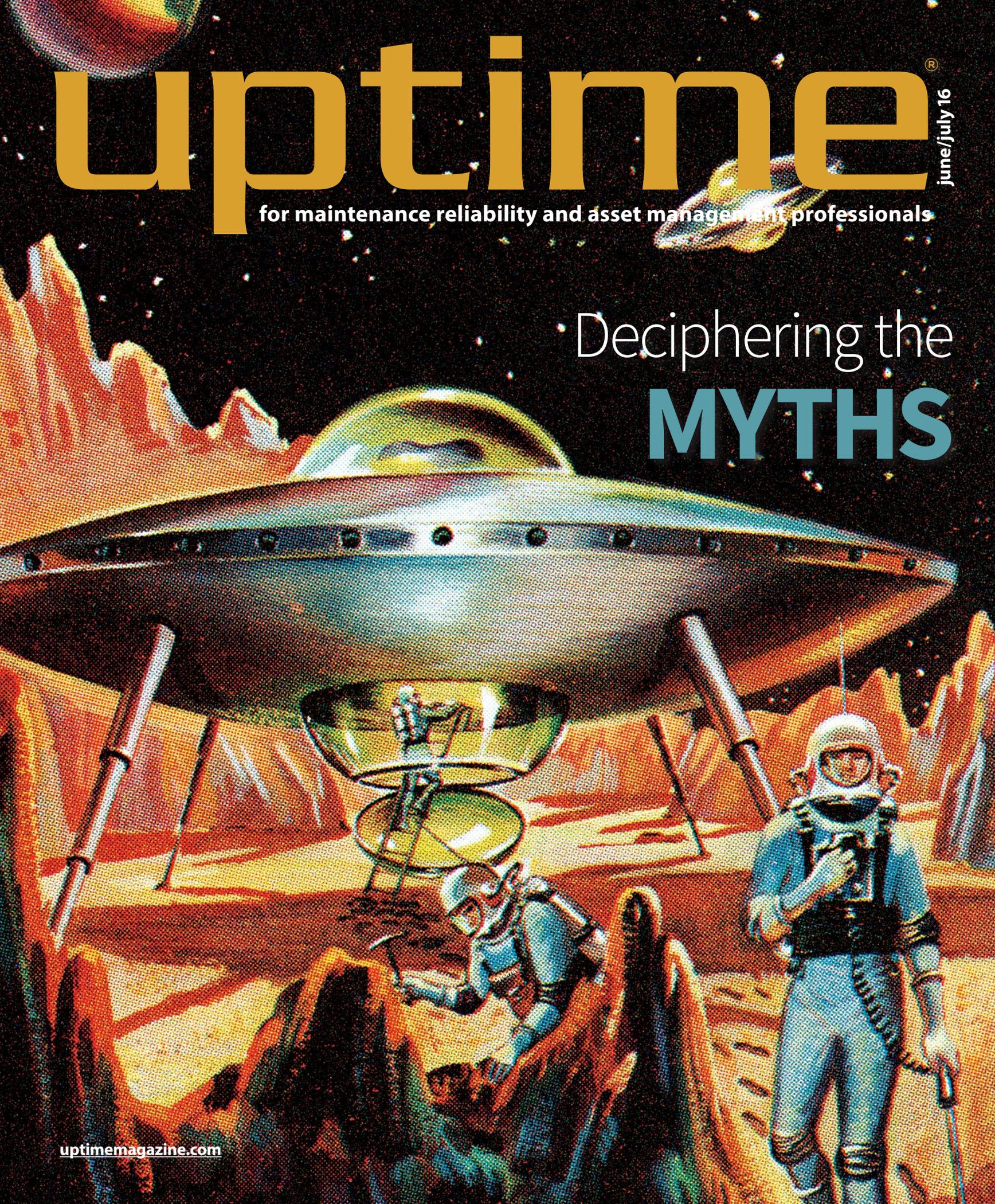


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MYTHS





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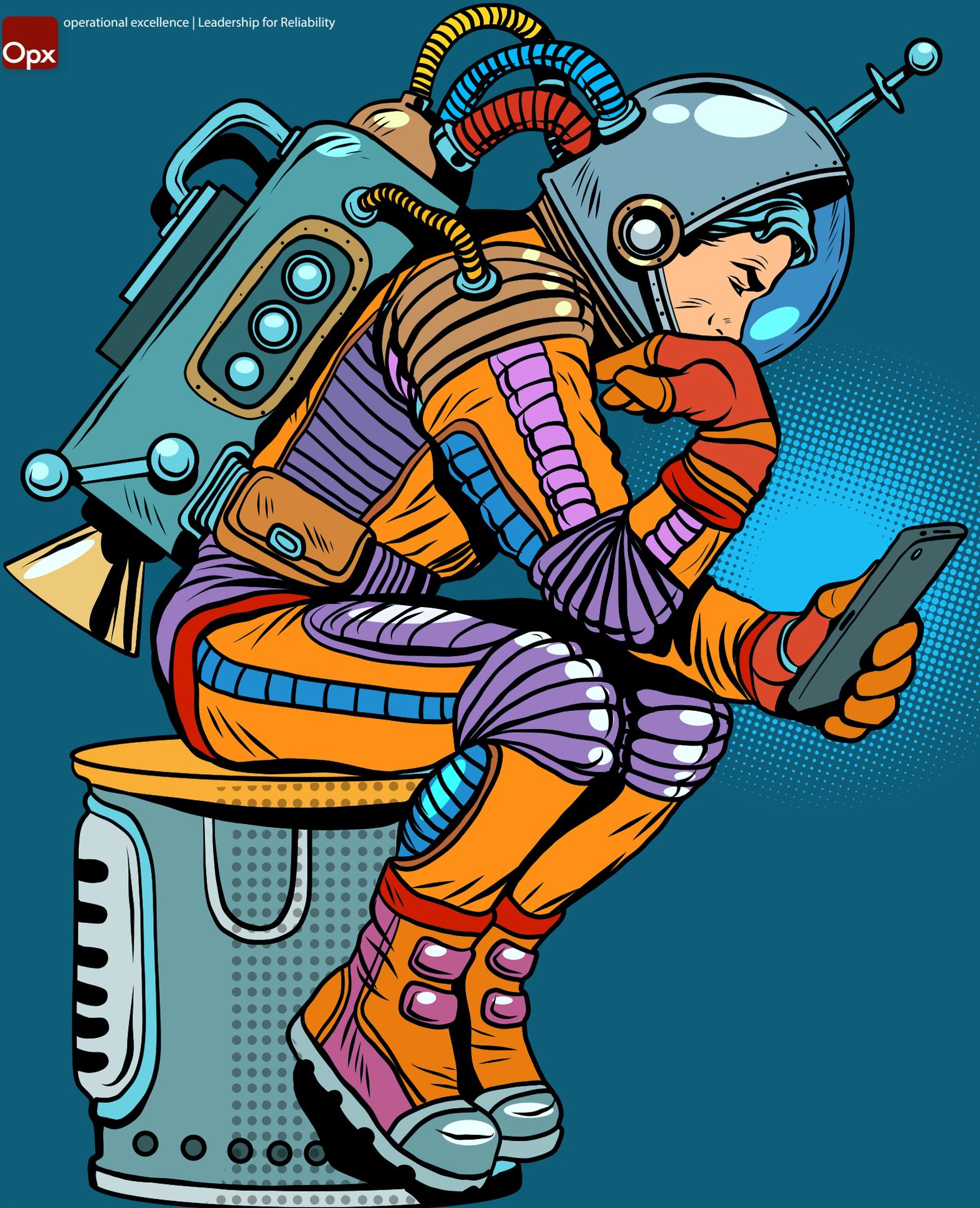
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Deciphering the

MYTHS

Some Observations on Improvement Tools and Strategy

by Ron Moore

It's not easy trying to convince people to use a more comprehensive approach to achieve reliability and operational excellence objectives. Managers need to focus less on maintenance and more on operations, design and procurement. Eliminating the defects in these areas will naturally result in fewer failures, lower costs, higher production and, not surprisingly, a far more efficient and effective maintenance organization. If you focus mainly on maintenance, you will only do work that you shouldn't be doing in the first place more efficiently. But if you focus on the other areas, working as a team aligned to a common purpose while giving an appropriate level of attention to maintenance, you will be far more successful in having a reliable plant. This article attempts to convince people to apply this comprehensive approach by addressing certain myths.

★ Myth #1

Having an excellent maintenance program will provide excellent plant and equipment reliability.

THE REALITY

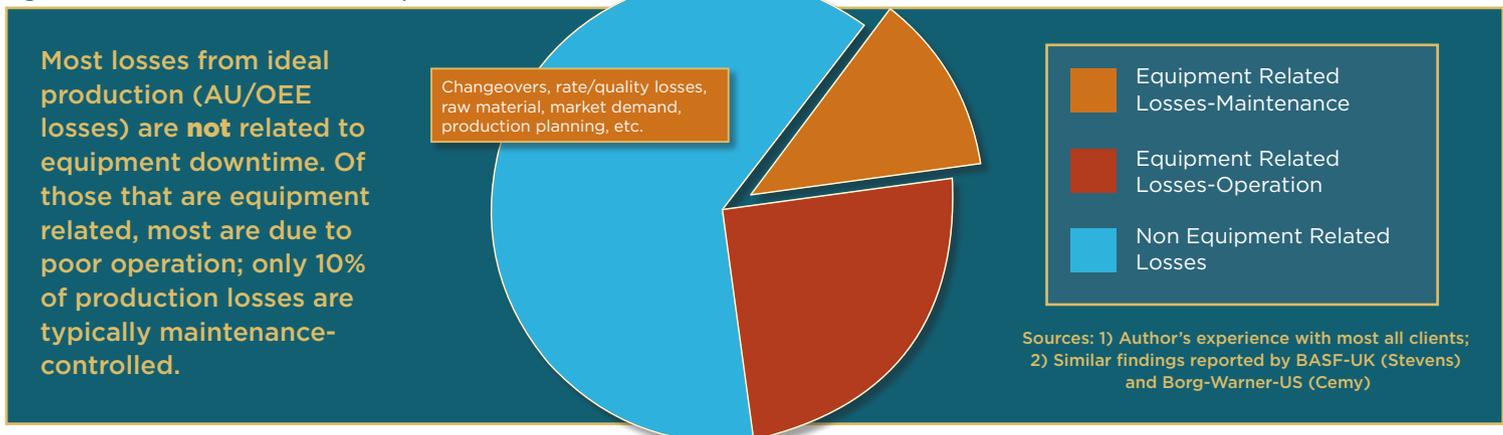
Of course, you need excellent maintenance to take care of the equipment and the best plants do indeed have excellent maintenance programs. However, their reliability was not primarily driven by maintenance. It was driven by an operations-led reliability program, supported by excellent maintenance, with the two functions working in partnership toward operational excellence.

The Society for Maintenance and Reliability Professionals (SMRP) defines reliability as the probability that a plant or equipment will perform a required function without failure under stated conditions for a stated period of time. Although equipment is included in this definition because it is part of the plant's production process, the emphasis should be on the plant's ability to perform, with the equipment being a subset of that performance. Using the plant's performance or operational reliability as measured by asset utilization (AU) or overall equipment effectiveness (OEE), Figure 1 shows the breakdown of losses from ideal that most plants have.

As you can see in Figure 1, 67% of losses from ideal production are not caused by equipment issues, but rather by product and process changeovers, rate and quality problems, raw material quantity and quality issues, production planning, so-called short stops, market demand, etc. Maintenance does not control any of these issues. Moreover, when you do a root cause analysis on the balance of losses, or the 33% related to equipment failures, you typically find that about two-thirds or 22% of them are due to poor operating practices or, in some cases, process or equipment design. That leaves only about 11% of the losses from poor maintenance practices. Maintenance controls very little of the plant's capability to produce quality product in a timely manner. Reliability should be looked upon as plant or process reliability and capability, not equipment reliability or availability. They are very different issues. And you should review your data to see how it compares and act accordingly. Incidentally, in a recent survey of 100 maintenance professionals, only 4% said their reliability program was operations led. What does this imply about their probability of success?

Charlie Bailey, vice president of operations for Eastman Chemicals before his retirement, said it best many years ago: *"Reliability cannot be driven by the maintenance organization. It must be driven by the operating units... and led from the top."* A more simplistic view is: *Expecting maintenance to "own" reliability is like expecting the mechanic at the garage to "own" the reliability of our cars.* Moreover, given the aforementioned data, it bears reinforcing that: *If you focus on maintenance, you will only do more efficiently much work that you should not be doing at all.*

Figure 1: Breakdown of losses from ideal production



Myth #2

Doing reliability-centered maintenance (RCM), root cause analysis (RCA), Six Sigma, or some combination of the three, will solve most problems in operating plants.

THE REALITY

These are all excellent problem-solving and strategy support tools and their use is strongly encouraged. However, while Myth #2 is true in theory, experience shows that it falls far short in practice. Consider the fact that many, if not most, industry experts say that these tools/initiatives either fail completely or fail to deliver the expected result or some initial success 60 to 90% of the time, or have some initial success, and then slowly fade away into oblivion with the organization returning to its original state. Here are some of the reasons why this happens.

- Initiatives using these tools typically involve only about 3-5% of the workforce. Yes, some plants have trained all their people in Six Sigma or some other technique, but afterward, it is not put into practice by the vast majority of them. With the learning half-life of classroom instruction being about a week, that so-called learning is down to nearly zero a month later. As most training experts know, that learning comes from doing what you have been taught and, ultimately, from teaching others. So, if you only have 3-5% of the workforce actively using these tools, what happens to the other 95-97%? It matters little to them. Experience shows the leverage for organizational success is in engaging the 95-97% to do all the little things right and getting them to use simple problem-solving tools to address the problems that trouble them most. If you want to understand the problems with the work, ask the workers. Engaging the entire workforce in process improvement is the key to success.
- It is often difficult to get the right people in the room to do a proper RCM, RCA, or Six Sigma analysis. If you don't have adequate information for the analysis, it is doomed to failure. Or, you may get the analysis done, but it is one that requires additional resources to actually implement its recommendations. According to RCM experts, you need to budget five times the analysis budget to actually get the changes made that will support better performance. Otherwise, the analysis ends up as a book on a shelf, awaiting action that rarely comes.
- Senior level managers in plants (e.g., site managers, production and maintenance managers) change every two to three years. Each new one brings a different perspective and values the tools differently. As such,

this churning of management leads to varying views on what's important, what tools to use and what results are expected, not to mention the dynamic of the management team and the lack of sustainability. Most shop floor people recognize this and become "we-be's," as in, "we'll be here when you'll be gone; you're just another manager passing through." As a result, they are often reluctant to take these initiatives or tools seriously, making them far less successful. Therefore, constancy of purpose is essential.

- Senior executives within a given company will often approve these initiatives, thinking that success will come from them if they just hold people accountable. Unfortunately, these same executives then walk away, having checked off that box and moving on to the next initiative or issue. Achieving reliability and operational excellence through the proper application of tools also requires constancy of purpose, a comprehensive approach and, most importantly, executive sponsorship. That is to say that permission is not the same as sponsorship. Sponsorship requires active engagement in the process, talking about it, demanding it, measuring it, rewarding it and supporting it with appropriate resources. Far too often, executives appoint, for example, a reliability manager and expect reliability to happen. What most have really done is appoint and grant permission, without all the other attributes previously noted. Eventually, the reliability manager gets frustrated and quits, or asks for a transfer, only to be replaced by another who, unless the individual is really resilient, will likewise leave after a couple of years.

Myth #3

Appointing a reliability manager will assure reliability and operational excellence.

THE REALITY

This is no more likely than appointing a safety manager to assure safety. Like safety, reliability requires active engagement by everyone – leadership, management, supervisors, shop floor and contractors, and by all functional groups working in cross-functional teams to eliminate the problems causing the extra costs, lost production and safety hazards.

The safety manager cannot make the plant safe. This person can support plant safety with tools, training, facilitation, measures, etc. Safety is everyone's responsibility. Likewise, the reliability manager cannot make the plant reliable. This individual can support reliability with tools, training, facilitation, measures, etc. But reliability is everyone's responsibility. More importantly, even critically, reliability is the foundation of safety because an unreliable plant is less safe. Data demonstrates that a reliable plant is a safe, cost-effective and environmentally sound plant. Executives should adhere to this mantra and support engaging everyone in practicing reliability accordingly. As noted previously, executives typically provide permission, not genuine sponsorship, and that is a huge mistake. Permission will not result in the desired outcome of a reliable, safe and cost-effective plant.

Myth #4

Total productive maintenance (TPM) is mostly about getting operators involved in maintenance.

THE REALITY

While operator care tasks are an integral part of TPM – which, by the way, should be called total productive manufacturing according to author and founder of the TPM system Seiichi Nakajima – it is far more than operators doing preventive maintenance. TPM is, according to workplace educator Bob

Williamson, the original equipment improvement process in the Toyota Production System and it is comprehensive. The basic principles of TPM are:

- Maintenance is about maintaining plant and equipment functions; that is, preventing breakdowns by eliminating defects that create the process and equipment failures. Unfortunately, in U.S. and western companies, maintenance is too often about repairing equipment, that is, "fixing stuff" after it breaks. But Masaaki Imai, an organizational theorist known for his work on quality management, had it right when he said that the 5S methodology is a prerequisite for doing TPM. Klaus Blache, director of the Reliability and Maintainability Center at the University of Tennessee, also notes that properly implementing 5S first will double the probability of a successful lean manufacturing effort.
 - In western cultures, when equipment is new, it is as good as it will ever be. In a so-called TPM culture, when equipment is new, it is as bad as it will ever be, or said differently, the current state of the equipment is always its worst state, relative to its future. You are going to constantly improve it.
- TPM calls for measuring all losses from ideal production capability (e.g., 24-7), or overall equipment effectiveness. Knowing all losses from ideal helps prioritize resources and analysis so the focus is on managing actual losses, not any specific number. If you manage your losses, OEE will be what it is optimally supposed to be.
- TPM calls for restoring equipment performance to a like-new condition or better. Half fixes and patches are discouraged. TPM calls for training and developing people to improve their job skills so they can eliminate defects and variation using improved skills and knowledge.
- TPM calls for new equipment management and *maintenance prevention in the design*. If you eliminate or facilitate stopping the defects and failure modes in the design, life is so much easier.
- TPM calls for the effective use of planned, preventive and predictive maintenance, making the work more efficient and effective.
- And finally, TPM calls for operator care and involvement in maintaining equipment, that is, avoid the defects and failure modes, or monitor them so you can detect them early and manage them. But, TPM is more than just operator care, it is all the aforementioned integrated into a comprehensive approach.

Myth #5

Planning and scheduling are nearly the same and better planning will improve reliability.

THE REALITY

Planning and scheduling are often used interchangeably, however they are totally different functions. As manufacturing excellence consultant Bill Schlegel observed, it should be called planning, *then* scheduling. Planning is about developing the work scope and identifying the resources, parts, tools, etc., while scheduling is about identifying a time slot when the resources are available to actually do the work that has been planned. They are two separate functions and should be treated as such.

Moreover, better planning will not improve reliability substantially. So many organizations focus on improving planning and scheduling, and that's not a bad thing. But, if you eliminate the defects that create the work, then the planning becomes so much easier to do and to improve. Of course, you need good planning and scheduling to effectively manage the assets, much the same as accounting needs a good accounting system to manage finances. But, having a good accounting system won't do you much good if you can't close the orders and deliver the product that drives the business. And having a good planning and scheduling system won't do you much good if you're overwhelmed by reactive, unplanned work!

Myth #6

Asset management is about doing better maintenance management.

THE REALITY

Asset management is about managing all the assets, people, processes and, of course, physical assets to create value for the organization. It, too, requires a comprehensive approach that incorporates more than just managing physical assets. Specifically, it includes the business requirements of the assets over the coming 5-10 years and the roles of production, operations, design, capital projects, procurement, stores and, of course, maintenance. The key is to clearly define each role in managing all the assets to minimize losses and risks, and most importantly, add value to the organization. All the functional areas must be aligned to the strategy and goals, and work together to that end.

THE APPROACH TO TAKE

All these myths beg the question: What approach should you take? A recommendation, though not perfect, is provided in Figure 2.

At the top of the figure, the inverse triangle begins with long-term thinking, while recognizing the need to survive in the short term. Next is process mapping where value is added or waste is incurred, followed by continuous engagement of employees and suppliers in improvement. Once you have this in reasonable condition, then move on to tools.

It is strongly recommended to begin with kaizen principles, such as using 5S to help detect and eliminate defects and establish discipline and order; having standard work to assure consistency in work processes; having managers and supervisors "go and see" where the problems are and how they can help remove these problems and obstacles for their people; implementing quick changeovers to minimize production downtime; using visual systems to help make it easy for the shop floor to detect problems; and, in general, implementing waste elimination practices and continuous improvement through structured improvement time or kaizen events. The first few steps provide organizational readiness and capability, which is a culture of discipline and basic care, along with long-term thinking and engagement of all employees. Experience shows that if you apply so-called kaizen tools first, you will solve a lot of problems directly and simply, and allow the more advanced tools to be more focused on the difficult problems. By doing so, these tools will be more sustainable for your continued success.

Next, use TPM principles for measuring and, most importantly, managing all losses from ideal. TPM also should be used for operators taking care of their equipment and assuring consistency of operation; effective preventive and predictive maintenance and planning and scheduling; restoring equipment performance to like new or better when doing maintenance; maintenance prevention in the design stage; and continuous training and learning.

Once these are embedded into the organization, you're more likely to be ready to apply and sustain the results of some of the more advanced tools, like Six Sigma, RCA and RCM. Doing these first without organizational readiness and discipline will more likely lead to their failure, as experienced by 60-90% of the people who did so. Finally, if you do all this well, you're far more likely to have excellence in supply chain performance.

CONCLUSION

Experience shows that it's essential to have reliability and operational excellence led from the top. Executive sponsorship is essential, and recall

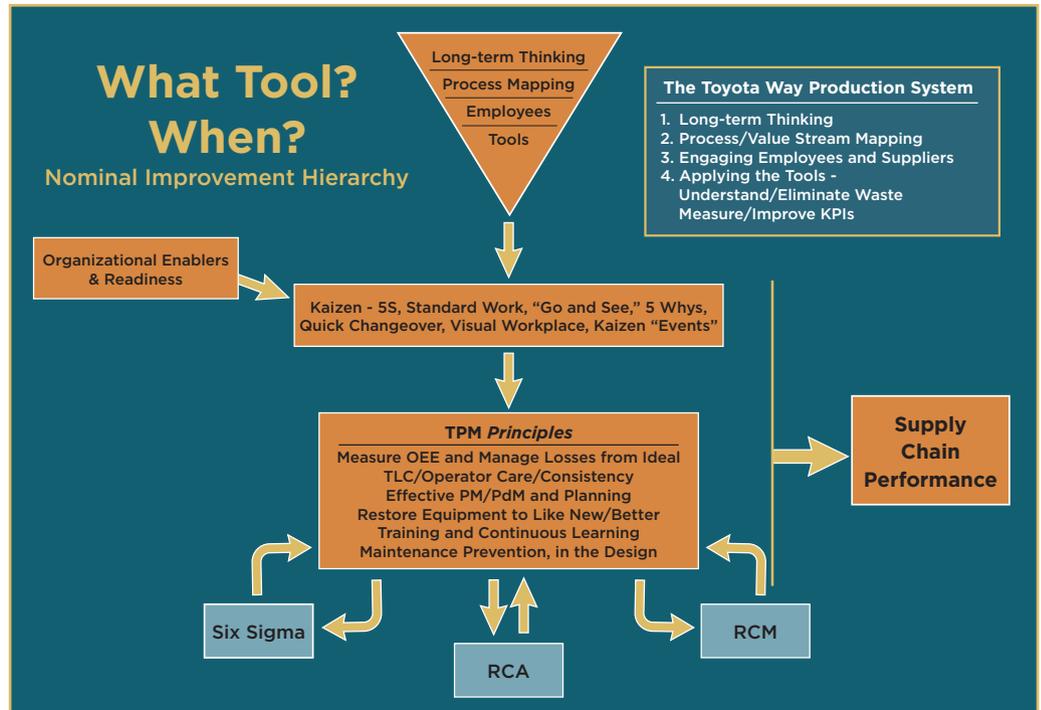


Figure 2: Improvement tool hierarchy

that simple permission is not sponsorship or leadership! You must have a good production and maintenance partnership, which includes clear goals and expectations that are reasonably achievable. To support this partnership, there must be shared KPIs for reliability and business results in the annual management appraisal and bonus system. And finally, and as important as all the rest, you must have a shop floor engagement process for defect elimination, including a support structure, the use of cross functional teams and structured improvement time.

Hopefully, this helps in getting you thinking about using a more comprehensive approach to achieve your reliability and operational excellence objectives.



Ron Moore is the Managing Partner for The RM Group, Inc., in Knoxville, TN. He is the author of "Making Common Sense Common Practice – Models for Operational Excellence," "What Tool? When? – A Management Guide for Selecting the Right Improvement Tools" and "Where Do We Start Our Improvement Program?" (www.reliabilityweb.com/bookstore) and "Our Transplant Journey: A Caregiver's Story" and "Business Fables & Foibles" (www.Amazon.com), as well as over 60 journal articles.

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