

Fundamentally Rethinking Maintenance and Reliability

For decades, industry has come up with many innovations designed to improve maintenance and reliability processes: preventive maintenance, computerized maintenance management systems (CMMS), planning and scheduling, numerous predictive/condition-based maintenance methods, reliability-centered maintenance, total productive maintenance, autonomous maintenance, life-cycle equipment decision making and much more. We have all learned that programs-of-the-month come and go on regular cycles, each being the silver bullet designed to outdate all other practices. Unfortunately, as common as these programs are, they rarely work and are rarely sustainable unless they intentionally focus on compelling business results and demonstrate a tangible return-on-investment to the bottom line. Sure, these improvement programs all promise an ROI based on proven, logical strategies. But what many don't address are the essential culture changes to not only embrace the new methods but to sustain and then improve on them.

There is growing discussion about maintenance skills shortages and the need to train more maintenance and reliability technicians and other M&R professionals. And we **do** need to train more. We **do** need to use new and proven maintenance methods that lead to lower cost operations with more reliable equipment. We need to fundamentally re-think our M&R strategies as we approach this “perfect storm” of skills shortages, which is a result of growing retirements, labor shortages (new workers seeking jobs other than maintenance and manufacturing), lack of vocational-technical training programs in our schools, and a college-educated workforce promoted by our social/academic community. Fundamental rethinking maintenance and reliability might be easier for smaller, newer businesses that do not have the legacy of maintenance “fixing things that break” by anyone who can carry tools with minimal on-the-job training. Businesses decision-makers who perpetuate that maintenance is an overhead-cost, indirect-service, repair organization will struggle with maintaining their competitiveness. This is especially true in equipment-intensive, capital-intensive businesses.

So where should we start in this fundamental rethinking of maintenance and reliability? First, in most instances, maintenance is not really an industry that must improve its performance to grow business and customers or prevent lost revenues. Yes, maintenance does produce capacity for the operation to produce revenues at lowest possible cost. But maintenance cannot do that alone. To view maintenance as an industry sets the stage for a blocking assumption: We can operate fairly autonomously to improve our performance. Many, if not most, of the reasons that equipment does not do what it is intended to do is outside the direct control and responsibility of the maintenance organization. For example, we have all seen very effective preventive maintenance (PM) programs die on the vine because we do not have access to the equipment at the right time for the right duration with the proper spare parts. In such a case, the PMs are outside the control of the maintenance group.

To fundamentally rethink M&R requires us to admit that we are partners or joint owners of asset reliability because (again) maintenance cannot do that alone. The maintenance group is generally part of a larger business organization rather than an autonomous, stand-alone business. For a manufacturing, utility, transportation, or facility business to be successful (market responsive, agile, low cost, and profitable), their assets (equipment and facilities) must perform as intended the first

time, every time. This means the business organization must focus on improving **all** groups that affect their asset performance and reliability.

So what other groups within the larger business organization have a direct impact on equipment performance and reliability? Consider these ten for starters:

Business organization or functional area	Actions that affect equipment performance and reliability
Design engineering	Sets the stage for life-cycle cost, reliability, operability, maintainability, and price
Installation, startup, commissioning (project team)	Make decisions, take actions that might result in a successful project but hamper long-term reliability by the operations and maintenance part of the business
Procurement/purchasing	Control costs, vendors and suppliers often low bid priority; substitution decisions; preferred suppliers
Process engineering and control	Setup and change operating parameters that impact component life-cycle and reliability
Quality control	Implements standards and devices that the equipment may not have been designed to deliver or function with
MRO parts and supplies	Aside from the initial acquisition - parts and supplies maintained in proper quantities in fit-for-service conditions with acceptance testing/inspection
Operations	Think abuse: Either through ignorance (untrained workforce), intentional damage, or decisions that ask the equipment to do something that it was never designed to do
Maintenance and reliability	Routine & scheduled PM, PdM, standard job plans, best practice procedures, equipment history, performance data acquisition and analysis, RCFA, etc. Think abuse here too: Either through ignorance (untrained workforce), intentional damage, or decisions that shortcut proven work methods
Human resources/personnel	Hiring the right people with the aptitude, ability, and attitude; retaining them with competitive wages, benefits and policies; assuring that they are trained to perform jobs accurately and safely...
Safety and environmental	Modify the equipment in ways that may affect cost, operability, maintainability, and reliability in the spirit of regulatory compliance

How can a maintenance organization be responsible for improving equipment performance and reliability without fully engaging the other 90 percent of the organization described above? Does this explain why many maintenance improvement programs have failed to deliver sustainable results? The sooner our business decision-makers truly understand how an equipment intensive operation generates revenue and profits the more competitive their operations will be. On the surface, it does not seem too difficult to understand. But it is easy to see why there is a disconnect when you consider the amount of time business decision-makers typically spend dealing with equipment performance cause-and-effect improvement compared to the glitzy programs swirling around out there. Today, there is considerable attention given to improvement programs continuing the program-of-the-month syndrome in many cases: lean, 5S, visual workplace, six sigma, continuous improvement, high-performing work teams, etc.

Decision makers unite: If only we could have our plant managers, general managers, executives, and board of directors, company owners think inside the box and discover what truly affects asset performance and reliability. Then encourage them to take focused and decisive leadership action to focus the typically separate groups' activities on eliminating equipment losses and problems in a

cross-functional team approach. The leadership behaviors we see in NASCAR Nextel Cup teams should serve as a model. If their equipment (racecars) are performing poorly and are unreliable, their costs increase and they lose races and sponsors—equivalent to losing markets and customer revenues because of higher costs and unreliable on-time delivery.

Where should we begin the process of fundamentally rethinking maintenance and reliability? On the surface, it seems logically simple: **An equipment-intensive operation must have reliable equipment to compete. Maintenance, being less than 10 percent (or so) of the organization, cannot overcome equipment problems that originate from the other 90 percent of the organization. If we expect maintenance to do it alone, then we are liable to become a highly reactive, repair-based operation with increasing interruptions, costs, and lost revenues. If we want to make our plant (or facility or utility) a more desirable place to work, we must all focus on eliminating equipment problems.** Ponder that thought for a while...

In a work culture where everyone who directly and indirectly affects equipment performance and reliability focuses on preventing and even eliminating equipment problems, there is less finger-pointing, less blame, less frustration. And fewer maintenance technicians, maintenance specialists, and reliability technicians will fall prey to the “fixing things fast” syndrome. In reality, with less equipment problems and more reliable equipment, more true maintenance work can be accomplished with fewer people than in a highly reactive maintenance environment.

Procedure-Based Maintenance Training: Now it is time to beat the **training** drum as loud as I can. Without formal structured training, workers at any level are left up to their own devices or assumptions to figure it out. This is **not** a good way to operate a competitive, safe, environmentally friendly, profitable business—be it a manufacturing plant; commercial, residential, resort, medical or academic facility; or utility (electricity generation, water treatment, waste water treatment, telephone). Unfortunately, many organizations have given training a short shrift. Years of downsizing and cost cutting have taken their toll. For example, experience has shown that detailed, procedure-based operations training results in error-free production. However, maintenance training is based on the assumption of proficiency in a skilled trade or craft, with little use of detailed procedures. This worked in the days of sound apprenticeship training under the guidance of a master craftsman. Today, without apprenticeship training and without mentoring under the tutelage of master craftsmen, how can we expect our maintenance workforce to be proficient and effective using outdated craft-based approaches to completing their assigned tasks? Now is the time to use procedure-based maintenance—those same procedures used to train and qualify our maintenance technicians and mechanics. Get away from “figuring things out” to following the proper procedure. In an advanced manufacturing environment, in a reliability utility, in a first-class facility, this makes sense. Do this and we can open up the door to many more people to enter maintenance and reliability as a career.

Public Schools: Now is the time to focus on two tracks in our public schools as in generations past: academic/college-bound and career/technical education. Both can be accomplished in our school systems, as in the past. Educate and train students for post-secondary success—be it at a college, university, technical school, or on the job. Teachers, counselors, and academic leaders must reflect on the success rate of their graduates. What is wrong with 50 percent of high-school seniors going

on to four-year colleges or universities, 40 percent going on to post-secondary technical school, and 10 percent going to work?

Business and industry must implement various programs or initiatives to attract students' attention while they are still in high school. Co-op programs, apprenticeship programs, and school/work programs introduce students to the world of work while they are in a position to think about making career decisions. Business and industry must actively share behind-the-scenes activities with the community, schools, teachers, students, and parents. Participating in school advisory committees, career days, and field trips will contribute to a successful operation.

Partnerships for Reliability: Maintenance and reliability professionals must master “partnering” skills in the workplace. Communicating the causes of poor equipment performance and equipment-related losses without blaming can go a long way to improving organizational performance. Collaborating on countermeasures that eliminate the root causes of poor equipment performance and contributing to best-practices procedures will lead to world-class levels of reliability.

Now is the time to fundamentally rethink maintenance and reliability as a core business process in equipment-intensive operations. Create a partnership, a team that abhors unreliable and poor-performing equipment and facilities. Much of our future pivots on a precarious pinpoint axis of reliability. How much longer can the maintenance organization alone control this balance?

© 2006

Robert M. Williamson
Strategic Work Systems, Inc.
Columbus, NC 28722
RobertMW2@cs.com
www.swspitcrew.com