NUCLEAR MAINTENANCE & "MANAGEMENT 101"

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This paper discusses four key elements of successful maintenance management. They are the mission, the first line manager role, the work control system, and equipment reliability management. The last three are illustrated in a business formula for asset management.

"It's hard to find the answer, when one does not understand the question." So went a line in a popular science fiction movie series. This phrase is very apropos when one observes the improvement initiatives to revitalize various maintenance programs around the world. Unfortunately, a large number of station line managers, do not understand or have drifted away from the basic foundations of the business of maintenance or more appropriately, asset management.

By necessity, our industry draws and feeds upon its technical expertise and know-how. This powerful professional base underpins the grave nuclear safety mandate entrusted to us. One casualty in this relentless technical drive is business management practices and principles common to other industries. In short, in our effort to sustain technical excellence we often overlook the fundamentals of "Management 101". Again, there are four key elements of successful maintenance management; the mission, the first line manager role, the work control system, and equipment reliability management. Items two, three, and four can be summed as asset management.

When observing maintenance organizations at work for any length of time, it becomes apparent that contrary to the official stated mission, an accurate summary of the perceived (and hence REAL) mission is boiled down to simply, "we fix things". Allow me to place this important distinction in its real perspective. Picture if you will a glass case with a tool bag clad maintainer waiting inside. Some piece of equipment fails in service, and the operational organization breaks the glass to allow the worker to spring forth and correct the discrepancy. After the repair, the worker returns to the glass case and awaits the next equipment-mending event. This is referred to as fire fighting and is in essence, the default mission of most organizations.

In contrast, the real mission of maintenance is to ensure installed station equipment operates when needed, and that equipment malfunctions or deficiencies are corrected in a timely manner and rarely recur.

Oddly enough, the majority of managerial teams did not start out with the intent to become "fixers". What appears to happen is that over time, they are overcome by industry events, incessant personnel and organizational changes, and a reactive fix mentality in symptomatic response to failures of equipment long-neglected by inadequate preventive maintenance. Cementing this mindset, the facility business unit subtly sponsors the notion of being "fire-fighters" as heroic. Rewards are based on being reactive not proactive. When was the last time you heard of someone being recognized for doing a PM? The entire maintenance function is now collectively involved in fixing failures, and usually this is at the expense of setting aside time to plan for long term operational equipment reliability.

The prime reason a business unit uses a maintenance management program is to prevent equipment failure. Where that failure cannot be prevented, the program should be designed to effectively and efficiently restore the failed component to an operable condition. The proactive maintenance function focuses on minimizing corrective maintenance of critical or essential equipment by ensuring the success of preventive or predictive maintenance on that same equipment. Rewards are based more on the scarcity of equipment failure rather than a maintenance rapid response SWAT Team. This preventive blueprint drastically reduces challenges to operational equipment and in turn improves the safety envelope of the operating facility.

Building on the concept of a maintenance mission oriented to prevent failures, the successful management of nuclear maintenance activities should be focused on three critical areas. Each is interlocked and effectively builds on the other. One can institute simultaneous activity on all three, but lasting success is

based on the foundational effect each gives to the previous successor. They include:

1. The first line manager should be mentored and developed as extension of senior management in the field. They are effectively management's clones in the field and carry the fiduciary responsibility to execute corporate policies and procedures.
2. The work management process should be designed to deliver workload to resource to sustain equipment operability. The work control system should control work.
3. The preventive maintenance program should actively and measurably reduce the numbers of corrective activities.

Instead of dissecting each of the above and acknowledging that the reader is intelligent enough to understand those three points, let us examine the cumulative picture from a business perspective. As businessmen and women, our aspiration is to have reliable hardware. Both safety and profitability are satisfied with sound equipment reliability and the processes required getting there. An easy business equation to remember:

Workload + Resources = Equipment Reliability

Workload consists of corrective maintenance, preventive maintenance, predictive maintenance, and betterment programs. Resources addresses man, material, methods, and money. Finally, equipment reliability is the measured feedback to adjust the workload and resources.

Workload has to be viewed in a business perspective of safety and profitability. If you cannot keep the public and your employees safe, you have no business operating. Similarly, doing every PM known-to-man and making every system textbook perfect may make the operation cost prohibitive. A balance has to be met, and that balance has to be by management design not by happenstance.

Corrective maintenance component of workload should rarely happen and when it does it should be by intent. In other words, certain equipment is allowed to run-to-failure. Corrective repairs outside the run-to-failure scenario should alarm management to possible failures of the PM program. The PM program in turn should be based on operating history and periodically adjusted accordingly. Predictive programs take you to the next step of only expending resources when required.

The resource component of the equipment reliability equation acknowledges skilled personnel, materials to support on-going maintenance, procedures and methods for safe and efficient maintenance, and the funding to accomplish all of the above. It is management's task to effectively integrate these four resource factors with the four workload factors, namely, CM, PM, PrM< and betterment.

Lastly some metric needs to be applied toward equipment reliability. Meantime between failures (MTBF) is a common indicator. Applied to specific equipment, management can then adjust workload or resources to achieve high equipment availability. Again, this process is by design not by chance.

This paper sought to succinctly portray the four key elements of successful maintenance management in the new business reality. Those element are the mission, the first line manager role, the work control system, and equipment reliability management. The last three were illustrated in a business formula for equipment reliability.

These are not test reactors, nor will the realities of the new marketplace likely suffer fools for any great length of time. The substance of nuclear maintenance is the premeditated stratagem of adjusting workload and resources to achieve reliable hardware.

To the reader, I share a quote from graduate school; "Every business decision is a prediction. The executive looks for a set of results based on the conditions he/she arranges." Maintenance management or more appropriately, asset management is a business decision.