



2003 User Conference Summary

The 2003 Ledet Users' conference held in May was an opportunity to get together and share some best practices with some of our clients. The User Conference was based on our view of what it takes to get a large organization to change. Winston Ledet Sr. shared a theory of organizational change that includes three stages and three processes that drive this change. The first stage is unfreezing the organization. The second stage is focused on making the change and the final stage is refreezing the organization at the new level of performance. To accomplish the change, the organization needs a process for articulating the business driver, a process for leading the effort, and a method for empowering the workforce. TMG workshops have always been our tool for empowerment. At the users' conference we wanted to share best ideas about other complementary empowerment tools as well as approaches for leadership and developing the business case. As part of that effort we did a benchmarking session with all participants, and we shared progress on two new tools that we have developed: the Leadership Forum Series and Dynamic Benchmarking.

During the users conference, participants were able to share best practices. For example, Warren Burgess shared the story of the Andrew Platform and how they went from 55% efficiency to over 95% efficiency. He also shared some of the lessons learned including breaking down defects into smaller components that teams could handle. Gary Peline from Honda shared Honda's practice of confining the action teams to four hours in duration. This shorter duration accelerated the improvements and minimized the time between learning and implementation for them. The goal of sharing these best practices was to come up with ideas that the participants could work on across company lines to help everyone. One group at the User's Conference worked on creating a "Universal Translator" to

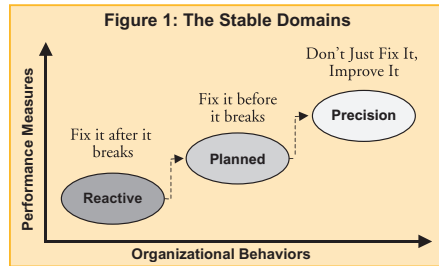
Skipping Domains

For years now, we have shared our framework that describes how organizations can transform from reactive to world-class in reliability by moving through three distinct Stable Domains. The concept was first created within DuPont when modeling was being done to understand the just completed "Best-of-the Best" benchmarks. The underlying question was "Why do organizations stay in one mode of behavior and performance in spite of frequent and large efforts to move up to higher levels of performance?" The Stable Domains chart (Figure 1) was an attempt to explain the data that was being gathered and the collective experience of the team.

Traditionally in reliability, the view is that you move through these domains sequentially as they are presented on the chart. However, we are frequently asked, as we were recently at a conference, "Can you skip the planned domain and is that the right thing to do?" For several years now, we have been able to answer that question with a strong "Yes" based on direct results at clients. Pursuing the Precision Domain first has distinct advantages and actually makes achieving elements of the planned domain easier. This article will describe the Stable Domain framework, the results that we have seen at clients and the results that we get with various scenarios in our Dynamic Benchmarking simulation.

Stable Domains

Many of you have seen a version of Figure 1 before in one form or another. The idea



is that the vertical axis represents overall manufacturing performance in terms like throughput, OEE, MTTF or similar measures. The horizontal axis is the nature of the work that goes on. The bubbles represent the Stable Domains or expected performance for a given set of behaviors. The three pictured here, Reactive, Planned and Precision described almost all of the data points that were observed in the original benchmark. While there is a range of performance within each domain, the next domain up is universally better in terms of overall performance. It is very hard to move out of the domain because the culture, operating rules, and history all work to reinforce the current domain. The space between the domains can only be inhabited for short periods of time because this space implies rule breaking. The space between domains represents all of the partial initiatives and programs that are simply not complete enough or strong enough to reach escape velocity. The old rules win and the organization falls back to what they know.

The Sequential Approach

One of the key problems with making the jump from the Reactive Domain to the Planned Domain is that there are so many pieces that have to be done correctly to

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Public Workshop Calendar

Throughout the year, The Manufacturing Game® holds workshops for the general public at various universities and/or professional organizations across the country.



Lean Management and TPM Expo and Conference

**Manufacturing Game Workshop
28 October 2003 - Nashville, TN**

To register and for more information, please visit the Productivity Inc. web site www.lean2003.com or call (800) 394-6868

Additional workshops for 2003 may be announced at a later date.

Please visit our web site: www.manufacturinggame.com

Conferences of Interest



**International Maintenance Conference (IMC)
7-10 December 2003
Clearwater, FL**

For further information call IMC at (239) 985-0317 or visit their website at www.imc-2003.com

**National Plant Engineering and Facilities Management Show and Conference Reliability Pavilion
23-26 February 2004
Chicago, IL**

To register and for more information, visit their website: www.manufacturingweek.com

Project Value Game

Please visit our web site: www.practicefields.com/pvg.html for dates of public workshops

have the desired impact. First there must be plannable work, which means some combination of a good inspection regime and identified PMs. Creating these requires analytical effort and training and produces no direct results unless the rest of the system is working. Next, there must be a planning system. The planning system is what really drives greater efficiency by ensuring the right people, tools and parts are at the job at the right time. This reduces wait times, travel times and wrench time per job. It also improves safety and the chance that the work is done right the first time. Planned work, if done right, can be 30-50% more efficient than reactive work. Developing planning is also a major undertaking that has little payback without the other elements of the system. There also needs to be a scheduling system that coordinates the operations and maintenance functions. The best plans in the world are worthless if confusion between operations and maintenance keeps them from being executed. Scheduling systems are not as difficult to set up as the previous two but require significant time commitment to sustain. All of these systems benefit significantly from computerized maintenance management, which often requires expensive and time consuming upgrade, training or replacement as part of implementation. Any weak link in this planning chain and the whole system produces poor results.

To make matters worse the equipment seldom cooperates with these efforts. Remember, that the whole reason for the transition was that the organization desired to get out of the reactive domain. So, while time is being spent training inspectors, buying and installing new monitoring equipment, selecting planners, training planners, conducting scheduling meetings and upgrading computer systems, the equipment continues to fail. This puts further stress on the organization and creates a temptation to cut corners or abandon certain aspects of the system. This has been the history of organizations attempting to move from Reactive Domain to Planned Domain for at least two decades. It is not that it can't be done as many organizations have succeeded; it is just that it is very difficult, requires perseverance and a

clear vision to get through the rough patches.

Skipping (temporarily) the Planned Domain

The precision domain is not about doing the same work more efficiently. It is about doing less work. In skipping the Planned Domain and shooting first for the Precision Domain, the goal is to quickly eliminate avoidable defects through small redesigns of equipment and process and by changing the behaviors of the people operating and maintaining the equipment. Efforts to get into the precision domain can take the form of Reliability Centered Maintenance (RCM), Total Productive Maintenance (TPM) or other quality initiatives like Six Sigma or Reliability Engineering. These can also be huge undertakings that consume significant organizational time. However, they can benefit from the fact that defect elimination efforts can often stand alone. If an RCM team determines the likely failure modes, and takes action to eliminate several key failures, that benefit does not depend on what other teams are working on.

To skip the Planned Domain, the defect elimination efforts will need to be approached differently than in an organization where there are good planning systems.

- Defect elimination efforts should not use the formal work system to get things done. Those systems will be focused on elevating reactive work and will generally kill any proactive defect elimination activities. Small teams that have direct responsibility and accountability for results are the key.
- Defect elimination should be action oriented with a very short time frame. The focus should be on eliminating work and not too much on process. Time will be limited due to the reactive nature of the site. Consequently, the organization cannot pursue long-term projects. We have always set a cap of 90 days but many of our clients are having even greater success limiting teams to weeks or days.
- In many cases, operations will be an important source of defects so it is critical to have them not only involved but also leading the process. Their defects are often the easiest to eliminate and provide quick payback.

Client Experience

We have had a number of clients pursue this Precision-Domain-First strategy. The two biggest successes have been the Premcor refinery in Lima, Ohio and the Michelin truck tire plant in Spartanburg, South Carolina both of which have been presented earlier in this newsletter. In both cases, the total amount of work dropped dramatically as small teams eliminated defects. Within a year, the total cost of maintenance had fallen while production throughput and waste had improved dramatically. Neither plant spent any appreciable time on planning systems during the early part of the implementation.

Results from Dynamic Benchmarking

We can also simulate the two scenarios in our new Dynamic Benchmarking tool. We ran the traditional Planned Domain first scenario on a client with 75% reactive work. The scenario entails upgrading the quality of their CMMS system and data from a "1" to a "4" on a 5 point scale, doubling the number of planners, elevating planned work to be at the same level of priority as reactive, doubling the equipment with PMs and upgrading the skills of the inspectors considerably. By taking a system approach and putting all of the elements in place, 70% of the work is planned by the third

year and performance does improve. After three years earnings are up by \$14 million, although they are actually down by \$8 million in the first year – remember perseverance!

The Precision-Domain-First scenario uses the same starting point for the plant but leaves all of the planning systems in their current state and focuses on team based improvement efforts and a serious effort at root cause training. This approach would be much closer to TPM than say RCM or Six Sigma (our last newsletter dealt with Top-Down vs. Bottom-Up defect elimination). The results are a \$38 million improvement in earnings after three years, which is almost 3 times the Planned Domain result. More impressively even the first year results are slightly positive so there is less chance of management losing their nerve.

Circling Back to Planned

Just because skipping the Planned Domain seems to be an effective strategy does not mean that there is no value in it. It is simply a matter of sequence and timing. In fact, our experience has been that getting into the Planned Domain is significantly easier from the Precision Domain.

First the amount of work, especially break-in work falls dramatically. At Lima pump repairs went from 600 annually to under 100. Planned work is more likely to get done in this environment. Second, the

organization has more time. The Precision Domain will often eliminate 30-60% of the work. The big challenge is often what to do with all of the people that previously did repair work. At Michelin, they dramatically redeployed shift mechanics because they simply were not needed for emergency repair work. These resources can be shifted to higher value added tasks like planning, inspecting, data analysis and training.

In the Dynamic Benchmarking model, a focus on the Precision Domain for two years followed by a systematic effort to move into the Planned Domain results in an additional \$3 million or 10% improvement over the Precision Domain alone.

Conclusions

The Stable Domains are a useful framework for thinking about reliability performance improvement but it would be a mistake to assume that the Planned Domain is always the best first step simply because it is the next better domain. The Precision Domain can offer quicker paybacks and does not require the investment or coordination of the Planned Domain as long as you design your defect elimination program to exist in a reactive environment. Once gains have been made into the Precision Domain, the efficiency of the Planned Domain adds additional value and is actually easier to achieve.

Connecting Lean to Reliability

By: Robert Williamson

Bob has over 30 years experience implementing TPM, lean and reliability systems at more than 250 companies. He is an award-winning author and is a principal and founder of Strategic Work Systems (www.suspitcrew.com) a consulting, training and supplies company for world-class manufacturing.

You've probably heard about the concepts of lean manufacturing and the lean organization over the past few years. What is now known as lean is, for the most part, based on the proven models of the Toyota Production System.

When many of today's business leaders interpret "lean" as "downsizing," they make the mistake of reducing headcount in their

organizations to make them leaner from a staffing perspective. That is not the intent of "lean."

What lean is?

A fundamental characteristic of a lean organization or lean manufacturing is the systematic identification and elimination of waste to reduce manufacturing or operating costs.

Many forms of waste are targeted, including wastes associated with overproduction, transportation, motion, inventory, processing, defects, and waiting. Unreliable equipment also represents a significant waste: extra inventory (safety stock) to compensate for breakdowns; extra (backup or in-line spare) equipment; processing delays due to unplanned downtime or inefficient performance; defective materials produced due to breakdowns; waiting for information, parts, and materials to make the needed repairs; or waiting caused by inefficient

(slower) equipment operation. Eliminating equipment-related wastes or losses is fundamental to achieving the goals of lean. Total Productive Maintenance (TPM) is the element of the Toyota Production System that focused on eliminating equipment-related losses, or wastes in ways that improved throughput, reduced defects, and reduced maintenance costs.

What lean isn't?

If the organization's leadership assumes that lean means fewer people and begins reducing headcount without eliminating, or at least reducing, the equipment-related waste, the cost spiral begins. We have seen it happen time and time again. With fewer people to respond to equipment problems or to perform the required preventive maintenance, the equipment performance levels and reliability suffer even more. This approach can actually

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link defect elimination to common initiatives like Six Sigma, TQM, TPM and Lean Manufacturing. In the end, participants gained a common understanding of the challenges in implementing wide spread defect elimination and they learned about new approaches and tools to help deal with those challenges.

We thank all of our participants for their attendance and participation at the conference and we look forward to the opportunity to work with our clients in future conferences.

increase the manufacturing or operating costs rather than reducing them.

Techniques for becoming lean.

Begin by focusing the organization on identifying the types, reasons, and root causes of waste that have a direct and immediate impact on the business performance. For equipment-related wastes, be sure to involve the people who are closest to the problems: maintenance and reliability (repairs and prevention), operations/production, purchasing/stores (repair parts), engineering/technical (design and modification). Identify and eliminate the causes of poor performance using formal problem identification and root cause analysis methods.

Identify action items to correct and eliminate the root causes of poor equipment performance. Keep in mind the roots of productivity: equipment, work processes, and people. Look at the equipment conditions and data. Look at the work processes and procedures used to operate, maintain, document changes, control quality, communicate, and schedule anything to do with the targeted equipment. Consider the people who directly, and indirectly, affect the performance of the equipment – their qualifications, training, and numbers.

Leading the lean journey.

What then are the essential elements of becoming lean in a manner that is sustainable?

- 1) Articulate a clear, compelling, and urgent reason to change.
- 2) Provide Cross-Functional leadership.
- 3) Communicate and role model the new vision and the strategies.
- 4) Break down barriers to making the necessary improvements.
- 5) Engage the people closest to the top priority problems.
- 6) Leverage the successes and key learnings.
- 7) Help everyone in the organization understand the connection between the improvement activities and results with the vision.

Lean organizations must have reliable equipment, whether in manufacturing or facilities operation. Reliable equipment requires focused, decisive leadership. Today's business leaders must develop and apply these fundamental understandings of improving organizational performance. Those of us in maintenance and reliability roles can help organizations become lean by targeting equipment-related wastes and keeping our business and labor leaders informed of the results.