Manufacturing Approach to Reliability Excellence

By Darrin Wikoff, CMRP

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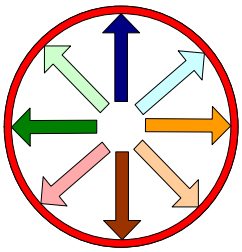
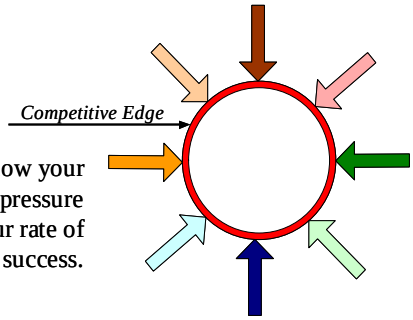
As a consultant, I have the privilege of working with some of the finest business leaders throughout the world. What makes these managers successful is their innate ability to grow the competitive edge outwards to gain market share, increase revenues, and build value within their community and industry. Their competitive edge is determined by the business' ability to leverage *best practices* to apply positive pressure against external competitors.

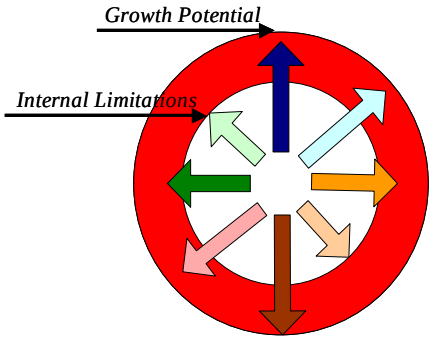


Leveraging "Best Practices" throughout your business applies pressure outwards to achieve positive growth…



Inferior practices allow your competitors to apply pressure which retards your rate of growth and success.

What enables these individuals to be successful is in knowing how to recognize the internal pressures of their own business, which limits their growth from achieving full potential.



As growth is measured as a collective and equal rate of improvement throughout the entire business, retarded by the slowest rate of improvement in any one department, division, or function, so to is achieving ***Reliability Excellence***. For an organization to achieve *Excellence*, a common focus and rate of change must be developed, not only within Maintenance, but equally within Operations, Engineering, Materials & Procurement, and other functions operating within the same business, regardless of business unit physical boundaries.

Competition…The Need for *Excellence*

What drives businesses to aspire to *Excellence*? Is it the result of having too small of a to do list? Is it because management has a taste for a new flavor of the month? Or is it because the business leaders are trying to gain an advantage over the competition? The answer is obvious, competition.

Until the early to mid 1990s, businesses were competing with adversaries within their own industry and within their own country, even within their own state. Now, however, leaders of middle to large businesses are faced with globalization, a somewhat nasty but realistic word at political parties. Businesses in almost every industry must now compete on a global playing field as we are no longer competing to be the low cost supplier within the United States or North America. Now, businesses are compared against suppliers of those same products from Southeast Asia, Australia, and the Middle East.

As the age of global markets becomes stronger and more prevalent, many businesses have felt the external pressures that push against their competitive edge, reducing the sphere around them. As a result, leaders within these businesses, over the past ten years have been slashing the very practices and processes which allowed them to extend their edge in the first place, trying to regain their advantage by cutting what was perceived to be non-value added. Were these practices and process truly non-value adding? Or, had they simply been exposed as such by the collapsing sphere or competitive edge?

To compound the ill affects of the slash and burn strategy, businesses pressured by external competitors often turned inwards on themselves by allowing silos of improvement to form, creating more internal, competitive pressures which again slow the rate of growth. Today, it is not uncommon to see an organization that has several competing improvement processes underway at the same time, each with a different and independent set of objectives. What is most puzzling about these initiatives is that they typically utilize the same intellectual resources. At some point they will inevitably utilize the same system and data resources, creating competition internally for priority of resources. As these internal silos compete, pyramids are formed and boundaries or divisions are established that reduce the business' ability to regain control of their competitive edge. What results is more slashing, cutting, and burning, except this time it's the very resources which the business has relied upon to construct its own pyramids.

Turning the Corner

To stop the slash and burn snowball effect, companies must realign their business by leveraging the learning and benchmarks which their competitors have used to apply pressure against them. These learning's are universally referred to as Best Practices. By way of these *best practices*, the business must audit itself and develop a business transformation plan to steer each function within the business towards a common set of goals & objectives.

Reliability Excellence…Pushing the Edge

This article is intended to illustrate the need to expand reliability improvement initiatives beyond the maintenance realm in order to effectively manage assets, systems, and processes within the manufacturing business.

Interesting Statistics

Over the past fifteen years, studies have been performed which suggest that **maintenance** contributes to as low as **17%** of all problems affecting asset, system, or process reliability. This is an alarming figure as most businesses that are involved in reliability improvement initiatives today have only engaged the maintenance organization. This practice, as defined by the competitive edge, is not a model for achieving a successful rate of growth, nor *Excellence*. An analysis of poor reliability root causes in the steel industry illustrates the need for a Manufacturing Approach to *Reliability Excellence*®:

> **23% Operations** due to a lack of capacity planning, improper operating procedures, and/or Operator error
> **22% Engineering** due to improper design to support maintainability and function, and poor management of configuration changes or modifications
> **15% Sales/Marketing** due to unrealistic order specifications, quantities, and/or delivery dates
> **12% Materials & Procurement** due to insufficient inventories, poor vendor selection, and materials not fit for service
> **11% Plant Management** due to contradicting management philosophies which breakdown the internal business processes, such as, work prioritization

The Manufacturing Approach

Our focus at first must be upon the business philosophies and principles which will guide the improvement initiative towards achieving the desired rate of growth and *Excellence*. One aspect of the business philosophy should be a manufacturing approach to scheduling in order to support asset management within a single, centralized function. Additionally, these governing principles should ensure that management is aligned through a common set of goals and objectives upon which performance measurements can be developed and monitored. From these goals and objectives, the business must define the required operating parameters for each production process; commonly know as the desired functional capacity.

Next, we must focus upon the three greatest reliability inputs, that of Operations, Engineering, and Maintenance. Based on the desired functional capacity, each department must assess the level of maintainability looking first at the initial designed function, standards of operation, and

maintenance requirements found within the Equipment Maintenance Plan (EMP) and backlog. From these inputs, the business is then able to develop a comprehensive asset management strategy geared towards achieving the business objectives. These three business departments must then identify the organizational structure required to support the asset management strategy, ensuring alignment with the overall business philosophies.

Recognizing the fact that we have now partnered Operations, Engineering, and Maintenance in regards to asset management, we must shift our focus towards work standardization to ensure that the strategy is achieved at the most economical level. The processes by which we perform work provide the greatest opportunity to reduce inefficiencies, defects, or wasteful expenditures resulting from poor judgment or lack of training. Work control processes exist within each function of the organization, such as, Operations, Maintenance, Engineering, Materials Management, and Sales/Marketing. Although each process is independently defined, all work control processes should be fully integrated to ensure overall performance improvement. The work control process should be formally defined and charted to effectively illustrate those steps that are required to perform work efficiently and on a consistent basis. Each step within the work control process should be sufficiently defined to eliminate ambiguity or confusion, ensuring a repeatable process. The flow of information within each work control process should be binary with rigid data control throughout. To optimize the efficiency by which work is performed, accountability and responsibility for each step within the process must be provided, again illustrating the cooperation between Operations, Engineering, and Maintenance.

As a result of the work standardization efforts, obvious links will have been made to align the supporting functions of reliability with the overall asset management strategy. The most common linkage is that of Materials & Procurement. As work is to be carried out, by way of preventive or predictive maintenance, Operator Care routines to clean, inspect, and detect, or through engineering efforts to modify or upgrade existing assets and materials must be effectively managed to support the identified activities at the optimum economical level. We must also focus on those processes and practices that support the asset management strategy indirectly, such as, cost distribution and budgeting, sales and/or marketing, industrial relations and human resources, and business administration, all of which limit the business' ability to achieve ***Reliability Excellence®*** if not aligned by a common focus. For example, a budgeting process which is activity-based, developed from the asset management strategy, is far more supportive of the *Excellence* model than one which arbitrarily restricts costs within each function based on a fixed percentage of last years expenditures, or worse, as a fixed percentage of a long-range budget (3-4 years), as is typically the case in the power industry. Equally problematic is a Sales/Marketing process that routinely commits to product delivery terms, which require operating practices outside of equipment parameters, failing to recognize the defined functional capacity, and disregarding existing Maintenance and Operating schedules within the asset management strategy. What typically results is a loss of downtime availability to complete the scheduled reliability improvements.

To maintain the common focus towards expanding the business' competitive edge, performance must now be monitored based on the overlying business principles. To avoid the "place-the-blame" atmosphere within your organization, performance dashboards must be linked to the work control processes which illustrate the accountability within each function of the

organization and ensure that performance measures are meaningful and provide valuable data for improving your business. One truly effective method of monitoring organizational performance is Overall Equipment Effectiveness (OEE). As we learned from the root-cause studies, reliability is a business effort, each function within the business plays a part in eliminating the defects and inefficiencies which cause losses in asset availability, production rates, and the quality of product produced. OEE is the tool for measuring the effects of these losses as they relate to the business objectives. The OEE metric also illustrates how well each function within the business is cooperating to meet the desired performance. Take for example the availability portion of the OEE metric. Through a centralized, manufacturing-based scheduling process, asset utilization becomes the overall focus, ensuring each week that the highest level of utilization is achieved based on the unified plans of the business. Compliance to the master schedule, at this point, is merely fundamental. Deviations to the schedule are easily identified by losses in asset availability.

In addition to OEE, performance should be monitored based on the cost of ensuring reliability, as is commonly reported in costs per product-units-produced, however, care should be taken to again tie these metrics back to the value adding work processes that support the business philosophies. In this instance, an organization might link maintenance labor costs to a process metric of Direct Labor Utilization, driven by the planning and scheduling work control processes. In doing so, the business could eliminate delays in the work process that directly increase the cost of performing maintenance.

Finally, to sustain the desired growth rate, ever-expanding the competitive edge, the business must empower a committee or focus team to monitor the defined performance metrics and develop the action plans required to support the business goals and objectives. To lead these continuous improvement efforts, the business must align the role of the Reliability Excellence Facilitator within the management team. This role should be tasked with assessing the gaps within current processes and developing the Master Plan to drive improvements as appropriate within each function of the business. The Reliability Excellence Facilitator should be given the authority to select process improvement teams and assign activities consistent with the overall plan. As is the case with most safety improvement programs, the committee or focus team must have the full support of the business to implement the change process, effectively altering human behaviors that are inconsistent with business philosophy, and manage the improvement activities within existing resource levels.

Summary for Success

Transforming your business to achieve a higher competitive advantage is a monumental objective within any industry. Your ability to succeed is directly related to your level of management commitment, determination, and focus on results. The business which has incorporated ***Reliability Excellence*®** as a fundamental business philosophy will recognize the full potential of their competitive edge well before those who continue to look at reliability as only a maintenance thing.

Critical Success Factors

- Business Philosophies & Principles defined to leverage *best practices*
- Transformation Plan developed to align each function within the business towards a common set of goals & objectives
- Supportive Change Management Strategy in place that aligns the responsibility for improvement within the management team
- Performance Monitoring Program utilized to measure progress towards achieving business goals & objectives
- Asset Management Strategy that partners Operations, Maintenance, Engineering, and other supporting functions to achieve the desired levels of reliability
- Work Control Processes defined for standardization and elimination of non-value added activities or tasks
- Sustainability Model that empowers a committee or focus team with the authority to continually improve based on the business needs

For more information on "Manufacturing Approach to Reliability Excellence" contact Darrin Wikoff at DWikoff@lce.com, or Life Cycle Engineering at www.LCE.com.