

A Vision of Enterprise Reliability

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Table of Contents

Background 3

What would a high performance, highly reliable organization look like? 3

How would it behave? 3

What skills would it require? 5

What would the systems look like? 5

What type of results would be achieved? 6

How would it measure performance? 7

How would they get there from where they are? 8

What are the key enablers? 9

How would they sustain the results? 9

How would they change the culture? 9

What needs to be different?..... 10

Background

What is the ultimate vision for enterprise reliability? If you're like me, occasionally you find yourself drifting off into a day dream. One of the recurring day dreams I've been having for the last 10 years involves this question. I often lapse into deep thought about how all of this reliability and maintenance stuff is supposed to work and what an organization has to do to really make it hum.

This paper and presentation will explore the questions above and others in an attempt to illustrate what it takes to create the ultimate reliable enterprise. My objective is to stimulate your thinking and generate some discussion. I probably won't cover all of the bases, but hopefully I'll get your creative juices flowing.

To gain a broader prospective, I asked Emerson consultants to give me their ideas and thoughts on what the future might look like. I received some interesting responses, and as you might expect, they run the gamut from strategic to cultural to technical. I have incorporated their ideas into this paper, so without further delay, let's start the discussion.

What would a high performance, highly reliable organization look like?

The consensus of our group is that the organization of the future will be structured to optimize the reliability of the enterprise in a manner that eliminates plant-driven initiatives and fully leverages data and technical decision making across the company. Today, most organizations take shipping costs, plant efficiency, capacity constraints, etc. into account when leveraging the portfolio/fleet, but they do not consider the impact of reliability (or unreliability). Truly managing assets across the enterprise will create game-changing results.

We will see the role of a chief reliability officer (CRO) established on equal footing with the CFO and COO. The CRO will be responsible for maximizing shareholder value through the optimization of assets across the enterprise. Additionally, the CRO will be the corporate steward of enterprise assets and master data. This person will lead the development of the enterprise reliability standards and drive the implementation of corporate standards across the enterprise and down to the sites.

The CRO will also be responsible for enabling enterprise-level investment decisions across the portfolio based on life-cycle asset value. Currently, operating assets in a portfolio often receive disproportionate levels of investment due to plant autonomy, serial acquisitions without integration, strength of plant manager, etc. If this is done too much, then it stands to reason that shareholder value will be jeopardized or end up as sub-optimal.

Corporations of the future will have a reliability team, as opposed to steering committees and ad-hoc groups that are continually bouncing new people in and out. The team will include financial, technical, and administrative personnel as well as experts in organizational behavior, and it will have a budget that can be used to ensure the balanced funding of initiatives across the enterprise. This team will be directly responsible for the performance of all enterprise assets including budgets.

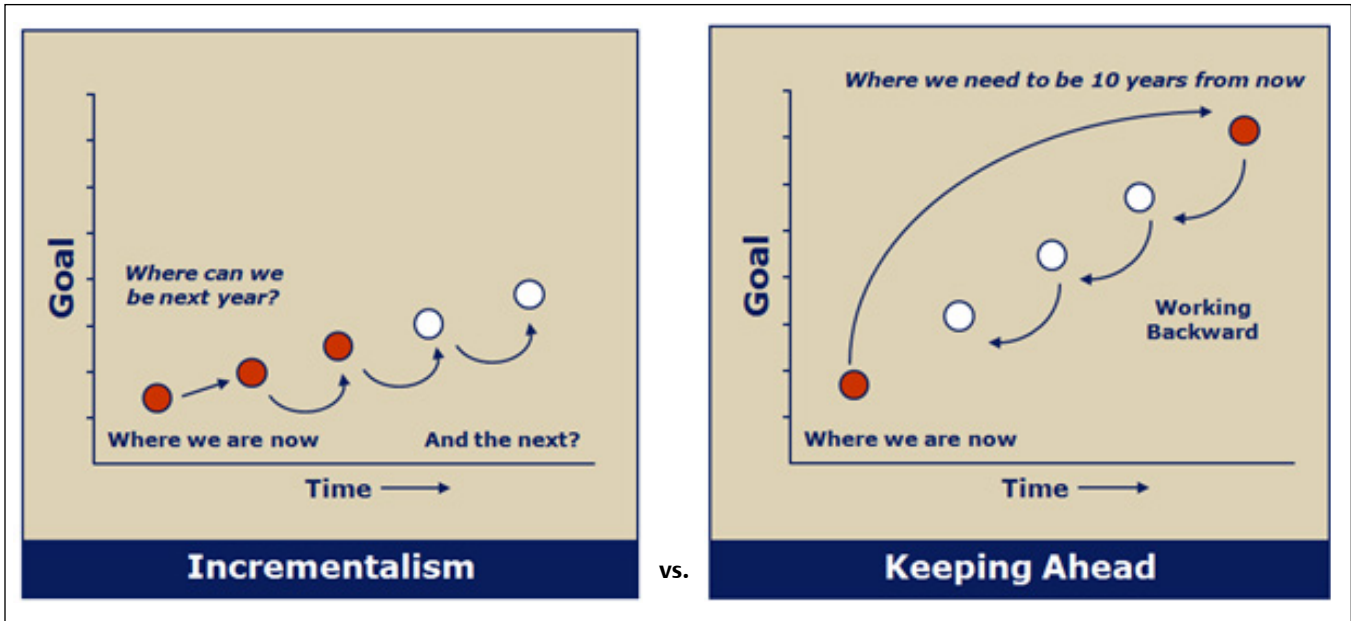
The future organization will also leverage technology, automation, and engineering information to make solid data-based decisions. Consistency, standardization, and common practices will be the rule, and the corporate team will be staffed with experts who understand the assets and can create the best technical solutions.

How would it behave?

Long-term, sustainable financial performance would be valued over short-term or quarterly gains, and performance incentives would be properly balanced to encourage the right behaviors and ensure long-term success.

A mind set of total cost or life-cycle cost would be prevalent, encouraging long-term thinking about issues such as new construction, acquisition, divestiture, or expansion.

The organization would build and execute long-term (10+ year) reliability improvement plans and goals, replacing the short-term incremental approach to performance improvement that exists today. Additionally, the organization would have clear long-range targets and work backwards to figure out what has to be done to achieve those targets. Longer-range thinking will greatly increase reliability and shareholder value.



From a cultural perspective, companies will stop reinforcing negative behavior with the wrong type of incentives. Situations with conflicting objectives, such as corporate maintenance inventory value reduction efforts that are not tied into reliability improvement efforts, will disappear.

Companies will stop the practice of pitting plants against one another, which results in wasted effort, time, money, and resources. All efforts will be focused externally on things that provide value to the shareholders, improve the company performance, support the sustainability of performance, and minimize risks.

Organizations will move toward ego-less communications as employees become less territorial and more willing to share information with people in other areas.

Communication has to flow constantly so the changes one party makes are immediately understood and taken into account by everybody else in the system. The ideal company operates as a single unit, but this cannot be achieved as long as individuals feel the need to protect their territory. A major change in culture must occur within the companies of today before effective integration can be achieved. This change is usually thought of as something that has to happen on the production floor, but in reality, this change has to occur through every level of the company.

Changes cannot be limited to just shifting patterns of communications; they must address the motivators that drive people to act the way they do. Companies cannot look at individual achievements as the primary measure of a person's effectiveness within a collective, nor can they pit one division against another in an attempt to build a culture of competition. This behavior promotes silos and shuts down communications.

Such changes within an organization will result in a unique workplace—one with a well thought out reward/benefit system and a communication process that bridges the natural silos that exist in most companies.

What skills would it require?

At the corporate level and throughout the organization a balanced mix of business/financial knowledge and technical knowledge will be required. Leaders will have to do their homework to create this balance. Business personnel will have to understand much more of the technical aspect of maintenance and reliability to ensure that they are making sound decisions, and technical people will have to understand the world of ROI, ROA, business cases, balance sheets, etc.

What would the systems look like?

All systems will be aimed at enabling enterprise-level investment decisions amongst the enterprise portfolio based on life-cycle asset value. Integration, standardization, and flexibility will be the name of the game. A paradigm shift will be required for corporate organizations, and most maintenance and reliability departments will focus on data management. High quality, usable asset-performance data enabled by integrated systems will be highly valued and considered a competitive advantage. In fact, considerable resources will be focused on leveraging that data. Contrast that to the current situation where very little integrated information exists, and if it does, it doesn't exist across the enterprise because no one is tasked with using the information, collecting accurate information will be considered a key part of the job for all people in the organization.

Information that can be rolled up across the enterprise will be required. Live dashboards that provide instantaneous status on the true health of the assets will be the norm, and all decision making will be based on highly accurate real-time information

There will be a lot of automation. Organizations will trust technology and not need to shut down equipment for manual inspections and time-based parts replacements. All work will be driven by the actual condition of the asset. Technology will enable the control of most systems to be primarily handled at the plant or operations manager level through automation. Any operator function that can be automated will be, and process shutdowns due to operator error, mistakes and inconsistencies, and non-conformity to standards will become virtually non-existent.

In the future, companies will automate the simple things that are still being done by hand today. For example, when new assets arrive on-site a "smart tag" provided by the manufacturer will automatically link the asset to the asset management and operations management systems. The "smart tag" will insert the equipment into the hierarchy and populate all of the information such as class/sub, BOM data, specifications, spare parts, drawings, etc. The addition of a new asset will trigger a validation and finalization of the RCM/FMEA-driven maintenance strategy to ensure it complies with corporate reliability standards. All appropriate procedures and monitoring points would then be set up in the integrated system.

In addition, the "smart tags" will contain the tools and sensors required to monitor the equipment from all aspects, including operational performance, vibration, heat signature, amp load, oil analysis, etc. All of this information will travel wirelessly to the maintenance application where an expert system will determine up-to-the-minute asset health, tie in with the business systems, and generate corrective work based on the condition of the asset in real time. The typical time-based overhaul/PM will be non-existent.

The CMMS system will be a 3D graphical representation of the entire company's asset complement. Speaking the asset name will pull up a graphical interface that provides all the business and technical information on the asset and all related assets throughout the organization. Based on the type and the location of the asset, the CMMS will forecast the life of the equipment in real time, continually changing based on failures, scheduled maintenance, industry historical data, time in service, etc. This information will feed inventory stock levels, revenue forecast models, supply chain, scheduling, and all other applicable areas of the EAM.

In essence, the asset will use tools to determine when it is time to repair or replace. Based on the rate of repair and other factors, the system will also re-engineer itself for optimal performance. It will look at the failures and how they relate to normal wear and tear, asset physical location, and application. If the equipment is wearing prematurely, the system will offer suggestions to correct the oversight in engineering.

All of this automation will generate savings in every aspect of the EAM. With the maintenance cost at a minimum and the revenue flow tightly forecasted, companies will benefit tremendously from a higher profit margin.

Data and information will be integrated across the organization:

- Production capabilities will be understood by sales.
- Impacts on production due to asset health issues will be fully communicated by maintenance.
- Difficulties holding quality tolerances should be shared immediately with maintenance and with sales.
- Changes in the operational characteristics of a machine that will result in an increase or decrease in the repair parts required will be transmitted to procurement, so stores can adjust their min/maxes or purchasing practices as necessary.

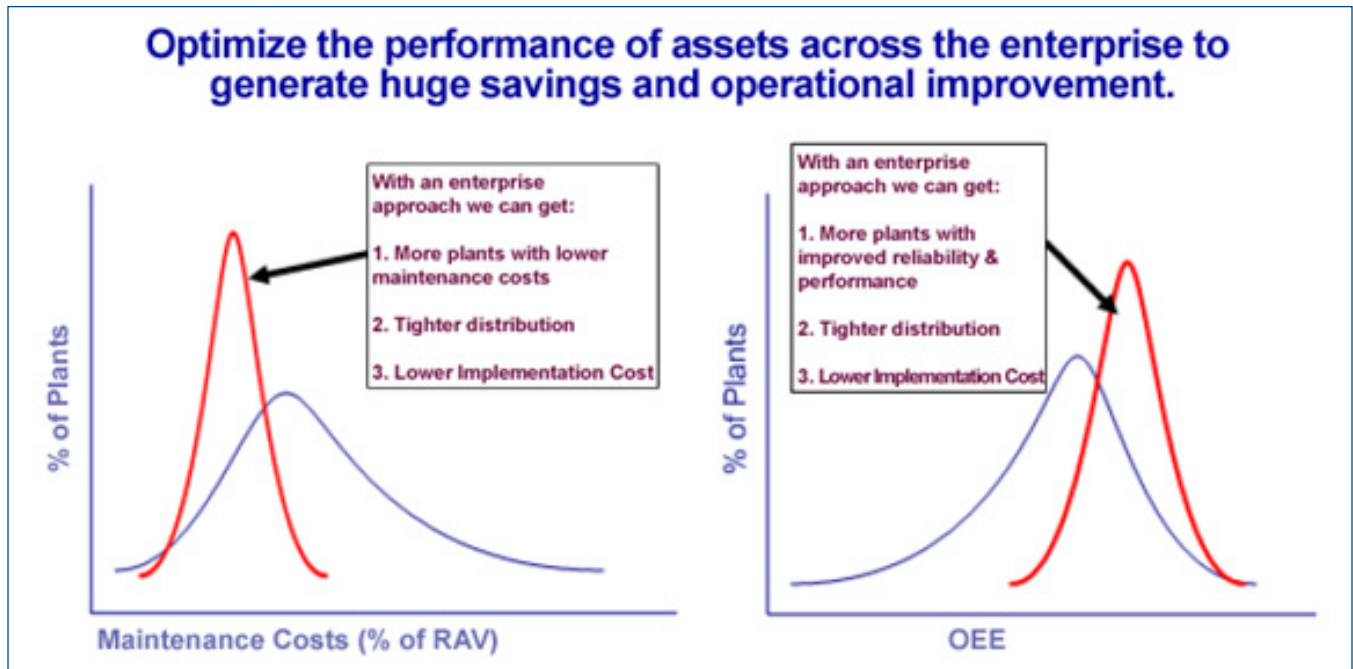
What type of results would be achieved?

Based on the ineffectiveness, laziness, and negligence that I have witnessed over my 25+ years in this business, I can confidently say that there is more opportunity than most people realize. Businesses are often comfortable if they are making money, and in many cases the organization spends a lot of time patting itself on the back for doing a good job and then sitting back as if it is done as opposed to asking, "How good can it be?" What can be done to get even better? In order to correct this, the current pay structures need to be torn out and incentive-based compensation structures rolled out as far into the organization as possible. These structures need to clearly allow people to see a significant share on the upside of the business. When people make the same amount of money no matter how they perform, there's not much incentive to really "go above and beyond."

If companies start taking advantage of 80% of the opportunity available, they will see ground-breaking results! Organizations will stop making the same mistakes over and over at each plant, and operational efficiencies and manufacturing reliability will go through the roof. Costs structures will be half (or less) of what they are today. True supply chain integration with customers will be achievable and unnecessary waste and scrap will be eliminated. Overnight shipping costs will all but disappear for maintenance parts (FedEx may need to find another source of revenue!). On-hand maintenance parts inventories will be cut by 2/3rds, and capital expenditure to prematurely replace existing capacity due to failed or worn out assets will be significantly reduced.

How would it measure performance?

Performance will be measured through a balanced set of metrics, again, across the enterprise as opposed at the tactical plant level. Measurement processes that enable an organization to focus on optimizing the overall fleet performance through the standardization of practices, processes, and equipment, thereby getting more of the plants to perform at the top levels, will be prevalent.



While overall performance is driven by individual plant performance, the difference will be that corporate will be measured on their ability to tighten the performance distribution curve and shift it in a favorable direction.

Of course, the information required to measure this performance will be available and properly configured to achieve the desired results. Foundational data will be consistently applied and set up in accordance with corporate standards. Maintenance and reliability systems will be operated and maintained the same way at all plants, so accurate enterprise performance measurements can easily pulled.

Personal rewards will be tightly linked to enterprise performance. Locally, at individual plants, the management team will be rewarded for overall business results as well as their level of compliance with corporate standards and their contribution toward continually improving the overall enterprise performance.

Maintenance performance will be measured in a way that evaluates the economic value an enterprise is able to extract from the profit in return for the higher availability, higher reliability, and increased quality.

KPIs will need to take into consideration things such as the ability to work with other departments or joint successes with another department. This will force upper management to go beyond the methods they have used in the past and create new ways to measure performance. The old performance metrics will have to be abandoned.

The plant performance will also be instantaneously available to the marketing and corporate management teams. This information will be combined with the enterprise's entire fleet and will allow the corporation to make well informed enterprise-level business decisions, based upon current profitability and market demand. The output from online monitoring will enable profitability to be determined relatively accurately at any time it is requested. This will also be supported by input from the sales and marketing organization, so both sides of the business are in synch.

How would they get there from where they are?

A significant change in focus must occur. Primarily, companies must start to manage their assets as a portfolio. This will require a change in the organizational structures of companies. Can anyone say, Chief Reliability Officer? Organizations will need to develop the ability to share expertise across the enterprise as opposed to holding it close to the vest. They will need to leverage their commonality and minimize things that unnecessarily don't fit the mold of standardization.

It all starts with the development of a long-term roadmap that is the framework for the future state of the enterprise. This roadmap will outline the concepts, models, and requirements for the organization for:

- Organization Structure
- Technology
- Funding
- Equipment and Engineering Standards
- Reliability Principles
- Data Standardization
- Maintenance and Reliability Best Practices
- Measurements
- Training
- Skill Requirements
- Roles and Responsibilities

This is not necessarily a comprehensive list, but it should give you an idea of what we're talking about. The roadmap will also outline the steps required to achieve the plan and the funding plan to support the plan.

Without a clear vision, it will be very difficult for everyone to understand what they need to do.

What are the key enablers?

The key enablers include a vision, an integrated plan to achieve the vision, the right structure to support the plan, the right resources to achieve and sustain the plan, and the right funding to acquire the resources.

There also needs to be a well-communicated transition from old to new, not only for measuring progress, but for the process by which this transition is to happen and how it is going to be measured and maintained. Employees need to be trained, and everyone needs to understand the process before a change is attempted.

Organizations must recognize that creating a reliable asset base across the enterprise is not simply a maintenance or technology project. It must be recognized that it is about engaging the people, integrating the business processes, and utilizing the data and technologies to improve business performance. Key elements include:

- Leadership commitment and involvement
- Incorporation of change management
- Adequate resources and time
- Training and re-training

How would they sustain the results?

All pieces of the puzzle have to be assembled with a long term-focus. Here are a few things to think about:

- Create compensation programs that reward executives for building a solid foundation and producing real value, and tie it to profitability and actual business growth. The windfall rewards should only kick in if the business performance is sustained. Stop making executives obscenely rich for running a company into the ground at the shareholders' expense. Create reward systems that value long-term, relentless drive and improvement.
- Build an organization that values learning and sharing information.
- Ensure that systems are installed that enable quick and easy access to the information needed to make good decisions, and make sure that there is an organization in place to aggressively utilize this information.
- Require energetic and aggressive compliance to the standards while also making sure the standards bar is always being raised.
- Train the organization to have the skills needed to succeed, including math, finance, engineering, and maintenance. Stop assuming people have these skills or will pick them up. I've run into too many managers and leaders who can't read a balance sheet.

How would they change the culture?

The most difficult part of trying to enact significant change is having the resolve to see the company through the inevitable rocky transition time. People not only fear, but fight change. Some people will be so resistant to change that they will have to be let go. Unfortunately, the ones most resistant to change are the experiential mainstay of the company and the people that have been using the old systems for so long that they can't imagine any other system working. There needs to be a greater and opposite force in place to make change happen. If senior management doesn't have the true resolve to see it through, it will not happen.

Some specific requirements are:

- A STRONG executive sponsor that sees the value and makes everyone aware of the reason for the effort and that it WILL be followed.
- A STRONG in-the-trenches champion that handles the tactical aspects of the effort. Ideally, this is someone who is well respected by others in the organization.
- A STRONG effort to address the cultural aspects of any change required to implement the new/changed business processes.
- A STRONG effort to include all departments/staff that will be affected by the new/changed business process in the definition process of the project goals. Those affected should be made part of the process and not feel they are having something forced down their throats after the fact. I have seen this work, even when related to union issues/pushback.

What needs to be different?

Everything! For some companies, everything needs to be different—from the senior leadership on down. However, for many companies, it really comes down to changing the way they think about enterprise asset management; they need to actually manage the assets across the enterprise. Bring maintenance and reliability into the corporate world with the understanding that it is a key enabler for everything that happens in a company because nothing works out very well if the assets don't run reliably. Other management programs like Lean, Six Sigma, Kan Ban, etc. fall apart if the assets don't run reliability.

Stop playing games to make a quick, short-term buck, and run our companies like we're really in it for the long haul...like a true owner!

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