Managing Maintenance As A Business

Software Technologies, Inc.

Why Manage Maintenance?

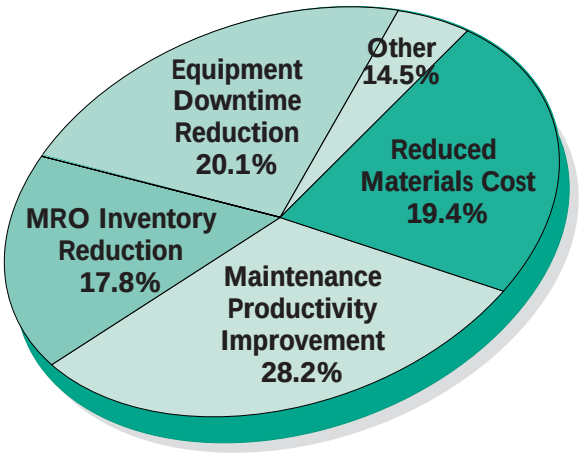
Maintenance costs continue to capture the attention of senior management as the investment and reliability in assets become increasingly greater. Over the past twenty years, we have witnessed the recognition of maintenance as essential to the core business operations. However, most companies fail to adequately define the role and operation of maintenance within the business enterprise. Experience suggests that in many cases, maintenance continues to be a cost of doing business, and as such, treated just like any other budget line item — it increases or decreases as a percentage with disregard to impact on operations or what is truly needed. So why should we manage maintenance as a business? The answer is quite simply, because it is a business; in fact, it is a service business.

Looking at today's enterprise we see that direct costs have become identifiable and manageable as a result of management's focus and attention. To this end, numerous business processes, systems, policies and procedures have been implemented to assist in this endeavor. However, we also find that maintenance costs are becoming a larger percentage of the total cost of conversion (excluding direct materials). For example, one company recently identified their maintenance cost as in excess of 40% of their total cost of conversion, representing a significant opportunity for improvement.

So why should we manage maintenance as a business? The answer is quite simply, because it is a business; in fact, it is a service business.

The real question still remains as to how we approach managing the maintenance function. All too often the answer to this question is to strictly implement a Computerized Maintenance Management System (CMMS) without considering the required, complimentary processes. This becomes the panacea for the effective and efficient use of maintenance resources. Many managers accept the philosophy that the system is the solution and fail to recognize that the real solution is in the process. But, how can one define the right processes without first defining the why and the where? Doing things right or doing the right things!

The benefit opportunities associated with sound maintenance management have been identified and documented for years. Unfortunately, over the last twenty years, few companies have realized these benefits. In a recent study focusing on maintenance management benefits conducted by the management consulting firm of A.T. Kearney the conclusions ring all too familiar:



Additionally, benefits accrue in the areas of reduced spare parts obsolescence, reduced maintenance overtime and improved quality. In a recent poll conducted by The Copley Consulting Group, CMMS users were asked to articulate the benefits of maintenance management. Most respondents concluded it was *all* the information that was collected which was of value. Asked what was done with *all* this

information, there were differing views. Do the words "information overload" mean anything? What was concluded from this exercise was the fact that the focus clearly was on implementing a CMMS and the information by-product. The benefits, however, could not be achieved without defining and implementing the requisite business processes and using the CMMS as the enabler or tool as a facilitator.

Perhaps if we briefly examine where we have been regarding maintenance management, it will enable us to adequately define where we are going, and how we are going to get there.

As we will realize, without having an accepted maintenance strategy, our maintenance management approach may not yield the desired or expected outcomes.

Prior to 1970, there was little focus on identifying and managing the maintenance function. The primary focus was on direct manufacturing, operations and materials; generally, maintenance was looked upon as a cost of doing business. During the period from 1970 to 1980, there was more focus on documenting maintenance as it relates to preventive maintenance and equipment uptime. Also during this time, there were initial attempts to define and establish business processes supportive of maintenance as a business further enhanced by the development of computer tools. Maintenance planners and schedulers were becoming necessary to properly organize the maintenance function. As we moved into the mid 1980's there was an increasing focus on preventive maintenance as well as predictive maintenance. The concept and practice of Total Productive Maintenance (TPM) began to receive attention and become implemented which involved the self directed work force. Finally, as we sit here today, we are refining the concepts of event driven and reliability centered maintenance achieved through self directed work teams. The practices of rationalizing inventories and designing for maintainability are becoming realities. So, where do we go from here? Before we go anywhere, let's determine what we want this maintenance business to be. Or what do I want to be?

Determining a Maintenance Philosophy

It is probably safe to say that most people think of the maintenance function as:

- Fixing things that break
- Keeping things looking good or
- Keeping things from breaking

These thoughts are not necessarily inappropriate. However, if we are to structure our maintenance business we should ask some additional questions such as:

- Do we staff and supply to only address breakdowns?
- What is the cost of equipment downtime?
- How much time is needed to perform routine recurring maintenance activities?
- Should we be focusing on activities to reduce breakdowns or should we just let the thing break?

It is interesting to debate the merits of preventive (PM) versus predictive maintenance (PDM) as to where a maintenance focus should be. It is worth noting that either one is better than none at all. There is a certain truth to the fact that a PDM program may be more cost effective due to the fact that the equipment is being maintained when it needs to be rather than when it's time to. If you accept this rationale, then why do many of us change the oil in our cars every 3000 miles rather than when an oil test would reveal when to change? The point of this example is to demonstrate that biases exist which must be addressed in order to properly determine the direction of the maintenance business.

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If the automobile manufacturers were to provide us with an idiot light to signal us of the oil condition, would we still be so inclined to take the car out of service before we had to? Just as in this example, when attempting to define the role of maintenance management, it is essential that the needs of the maintenance customer be addressed and satisfied.

Let's define the maintenance customer as the individual or group who requests maintenance services. Take a moment to identify the maintenance customers in your enterprise. In most cases the maintenance customers are production departments, facilities, operating departments and administrative groups. Each maintenance customer may have unique expectations and requirements regarding maintenance. If one would attempt to reach a consensus it would be that all customers desire timely quality service at a fair price. Value! No different from what we would expect from the mechanic for our car or the teller in the bank. Maintenance provides a service!

Ask yourself this question: If the maintenance customers were to pay for only what they receive, what would they pay? If the answer to this question is "Whatever it costs," there is a real problem!

Understanding the needs and expectations of the maintenance customer is critical to establishing the maintenance business processes. Ask yourself this question: If the maintenance customers were to pay for only what they receive, what would they pay? If the answer to this question is "Whatever it costs," there is a real problem! Service businesses are discovering that customers do have limits when it comes to timeliness and costs but there is no compromise when it comes to quality. Take an extreme but real example: You are about to undergo open heart surgery and you have a choice of the surgeon to perform the operation. You can choose an experienced doctor who has performed the procedure hundreds of times, or you can choose a doctor who has only performed the operation several times. The highly experienced doctor charges twice what the alternate doctor charges. Whom would you select? Note that you, the customer, are not willing to compromise on the quality of work and as a result you most likely would select the more experienced doctor. However, if we were to now say that the operation is a simple operation such as a hangnail removal, are you willing to pay twice as much? In an effort to address the cost issue, the medical and insurance communities have come up with Diagnostic Related Groups (DRG) for reimbursement and billing. Considering this example, are maintenance customers willing to pay for whatever it costs or are they willing to pay for the value they receive?

Defining a Mission

As in any business, the maintenance business should have its own mission that reflects how the business will address the needs of its customers. The need for a mission statement is embodied in a guiding premise relating to the purpose of maintenance activities. The mission statement is the basic statement of the reason for the business' existence that distinguishes one business from other similar businesses. It defines the basic product or service and the primary customer groups.

Defining the service in a maintenance business is not as simple as it appears. Not only is the type of service necessary to define, but also the time frame in which the service will be provided. In attempt to define the types of services let's consider the following:

- Is the equipment regularly available to perform planned/routine maintenance activities?

- Will the cost to shut down the equipment be less than the cost of failure (breakdown)?
- Is equipment downtime a problem?

In one sense, the answers to these questions can lead us to organize merely for demand maintenance at a given response level. For the seasoned professionals, this was usually addressed through MOD (Maintenance On Demand) Squads. Staffing requirements in this situation are clearly different from those involving significant levels of deferred maintenance activities. Thus, the mission statement should reflect this type of service in addition to a delivery time frame. Clearly, this must be consistent with customer expectations. If the maintenance customer expects immediate service, regardless of what needs to be done, then the maintenance staffing requirements must reflect the higher cost of doing business in this fashion. It also challenges maintenance managers to identify alternatives such as outside resources to supplement full time staff. If the maintenance business mission is highly focused on proactive maintenance activities, then an additional set of objectives, priorities and resources are required.

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Who should develop the maintenance business mission? Not maintenance! To be meaningful and credible, the mission statement must be formulated by the customers in concert with maintenance. Usually this can be done with key customers and a representative from maintenance. The risk is that the mission ends up being too general. It is important to be as specific as possible so, ultimately, the business focus can be maintained. As the foundation on which all maintenance goals and objectives will be built, the mission statement is the critical element in developing an effective maintenance strategy.

Determining the Business Objectives

As in any business endeavor, objectives must be established. Surprisingly, these objectives can be classified into long-term and short-term objectives or goals. These goals should represent more specific targets or results the business wants to achieve. The goals are derived from and must be focused on fulfilling the business' mission.

Long-term goals and objectives:

- Indicate desired outcomes for a fairly long period of time
- Should be accomplished in more than one year or more than one decision cycle
- Are more specific than the Mission Statement but less specific than short-term goals

A decision cycle is the time it takes a decision to reach full implementation. An example of a long-term goal might be to achieve World Class Maintenance status. Of course, this assumes that one of the activities would be to define the criteria for world class. Additional long-term goals might be:

- Profitability or Cost Management
- Productivity
- Competitive Position
- Employee Development
- Employee Relations
- Technological Leadership

In conjunction with long-term goals, short-term objectives must be established to ensure that the maintenance business is on the right track in fulfilling its mission. Short-term goals typically:

- Provide specific detailed target results
- Are results the business intends to generate during the next decision cycle
- Can be accomplished within one year

Examples of short-term goals are:

- Overtime reduction of 2%
- Implementation of a PM or PDM program for a specific area or group of equipment
- Implementation of a training program for a specific craft or trade
- Implementation of a work order system within a given area or for a specific trade
- Implementation of an inventory management program

As you can see, the short-term goals must be very specific with a defined result or ending point. It should be noted, however, that short-term goals also must reflect the fulfillment of the mission statement.

Organizing the Maintenance Business

Knowing what the maintenance business is in business for enables the business to organize for success. Traditionally, maintenance organizations have taken on several different structures. In centrally organized maintenance operations, all functions ultimately report to a single professional. This structure is very effective in an environment involving similarly skilled tradespeople and defined service areas, even though the service areas may be geographically far apart. This maintenance structure is common among facilities, education, hospitality, service and health care industries. This type of organization can yield rapid response (a requirement within these industries) with minimal resources.

A decentralized maintenance organization may involve deployment of resources to specific areas as well as different reporting relationships. For example, in a manufacturing facility with multiple production departments, the maintenance resources report to the production department and not to the maintenance department. In this case, although rapid response is achieved, there may be inefficient use of resources on an enterprise level. In an attempt to address the latter, a hybrid maintenance structure can be employed. That is, specific resources operating in a decentralized fashion with common resources operating in a centralized fashion. In our example, this would involve the specifically trained maintenance trades or specialists to report to the respective production areas. Broad skilled trades (electricians, pipefitters, etc.) would report to a central maintenance organization responsible for the assignment and deployment to the requesting production departments. In this way, rapid response while minimizing total resources is achieved.

Outsourcing maintenance activities may occur in total or in part. For example, custodial activity in many industries is an outside or external

resource. In some cases, the entire maintenance activity is provided by an external resource (evident in facilities maintenance). In cases of outsourcing or extremely large hybrid structures, an oversight maintenance management group may exist to continuously monitor and evaluate maintenance performance.

The structure of the maintenance organization should periodically be reviewed to assess whether it is satisfying the business mission. As new technology is deployed, self directed work teams implemented, and non-value added activities minimized, there can be reason to reorganize the maintenance function. As in any business, customers demand that the business be well managed and controlled to ensure quality and cost effectiveness. In these changing times, organizations must be flexible and that requires innovative leadership. Moreover, leadership characteristics must embrace the entrepreneurial spirit to provide the best possible value.

Measuring the Maintenance Business Performance

In most businesses, success is easily measured by looking at the bottom line; but, what's the bottom line in the maintenance business? To better understand how to evaluate maintenance business performance, it's helpful to examine how businesses generate profits. Quite simply, businesses generate profits by providing goods and/or services at minimum cost and sold at a fair market price. Obviously, revenues generated from sales must exceed the costs. It is important to note that the customer determines the fair market price. In the maintenance business, the customer pays for value; price is part of the value equation along with quality and timeliness. So, as we look at the maintenance business, price is something that cannot be ignored. For example, if internal electricians are charged to the department at $45.00 per hour and the comparable skill for an external resource is $30.00 per hour, it will not take long before outside electricians are being used.

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It has been presented that customers demand value. Price, quality and timeliness are the components of value. Therefore, our performance measures should reflect how the maintenance business is providing value to its customers. Also, the maintenance business must develop internal performance measurements to assess its health. First, the external measurements.

Timeliness can be measured by average time to respond for a certain class of maintenance activities. Many maintenance operations have set goals for responsiveness given the nature of the work. For example, for emergency work, a goal might be to respond within one hour. For normal corrective maintenance activities it might be one week. Again, these goals are established in concert with the customers. It has also been discovered that the type of work may not be the only determining factor; in many cases, the equipment may determine a response time frame. For example, a breakdown in an operating room air filtration system is significantly more important that a breakdown of a hospital bed. Thus, our response goals are dependent upon not only the nature of the work but the equipment as well. The average time to respond can be calculated by capturing the elapsed time between request receipt and the commencement of work. Once calculated, this measurement is indicative of how well maintenance is satisfying customers' expectations of timeliness.

Schedule compliance is another means of monitoring customer timeliness expectations. In this metric, the scheduled start date or promise date of the work order is compared to the actual start date. Again, a simple calculation of actual versus promised; either it was started on time or it wasn't. Again, customer communications and managing expectations are paramount.

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Quality of work is not as easily measured as timeliness. However, quality can be measured through customer complaints, work review and repeat work. If the customer is not satisfied, it is hoped that the dissatisfaction will be acknowledged in some form. In many cases, the customer is required to sign a completed work slip accepting the quality of the work performed. Although this is a satisfactory form of acceptance, has satisfaction truly been measured? Perhaps the best way to ensure quality is through a work review program where supervisory personnel review the quality of the work performed. These are formal programs that when properly conducted can provide valuable feedback regarding customer satisfaction and employee skills. A rating system is typically employed which recognizes the quality of the work and level of customer satisfaction. Finally, if a particular work activity is frequently being requested it may be indicative of a multitude of problems. Remember, in the eyes of the customer, if it keeps breaking, it's because it was not fixed and therefore is a maintenance responsibility.

Price is always a topic for debate. How many times have you heard "If I had known it was going to cost that much, I wouldn't have done it!" or "What do you mean it cost $490 to replace that bulb!". Customers do not like surprises. Customers demand fair pricing. Admittedly, in most internal maintenance operations the customers find out what it costs after the fact and not before. It is amusing that as private citizens we would not have someone perform any work without having some idea as to what it might cost, and then, we may even attempt to mitigate or negotiate. In the internal maintenance business, how often are estimates provided? Are there established hourly rates for providing service for both labor and materials? How do these rates compare with external rates? Determining price performance is addressed largely by comparing the book rate versus the actual rate. The book rate is a blended average of hourly labor rates inclusive of benefits, whereas the actual rate is calculated by taking total labor dollars, including benefits, and dividing by the hours of direct activities (actual work time). The book rate is a quick comparison to the outside rate whereas the actual rate reflects utilization and rate.

Satisfying the customer is essential to any business success, but a healthy business ensures continued success. There has been much published about maintenance performance metrics so they will not be elaborated on, but to name a few:

- Preventive Maintenance Compliance
- Schedule Compliance
- Inventory Turns
- Inventory Accuracy
- Inventory Level
- Backlog Size
- Backlog Severity
- Breakdown/Emergency Analysis
- Work Distribution
- Scheduled vs. Non-Scheduled
- Equipment Effectiveness

Managing maintenance as business involves managing expectations and balancing costs and service. Identifying maintenance cost drivers is an important factor in the cost and service balancing act. Maintenance costs are largely attributable to labor, materials and contract services. Material costs can effectively be managed and controlled through inventory management practices, procedures and policies. Thus, we can reduce the volatility of the balancing act by concentrating on labor and contract services. What drives labor cost is simply a matter of supply and demand. The demand portion is determined by the amount of work needing to be performed and when it needs to be performed. Understanding this will determine the supply side of the equation. Time to revisit our mission statement! Is the maintenance business mission to provide resources when needed or is it to accomplish the work when resources are available? Each response yields a different set of requirements. Therefore, "how much" and "when" are critical drivers. Is there a seasonality to demand? Are there periodic shutdowns? Are there slow periods or accessible periods for maintenance? Can the existing work force be supplemented with contract labor? The real cost drivers can easily be determined once everyone agrees on the mission.

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Strategies for Success

In a study conducted by E.I. DuPont de Nemours & Company, a comparison of American maintenance business strategies to other countries was made. The highlights:

- Japan and Europe use substantially more contractors than the United States
- Japan spends less to maintain its investment and its productivity is higher
- Japanese companies have less stores investment with higher turnover than European or U.S. companies

A similar study conducted by General Motors Advanced Engineering Group found the following:

- More than half of all maintenance performed by those surveyed was reactive whereas the world class perception was that only 18% should be reactive
- Preventive maintenance activities account for one third of the effort with world class at just under 50% of all activities
- Predictive maintenance averaged only 13% of maintenance activities with world class at 35% of all activities

Should these findings be alarming? Perhaps. On the other hand, what's right for one company may not be right for another. There are some basics that can be applied and have proven to be successful. These include:

- Pre-planning and scheduling of work
- Improving parts and material availability
- Implementing self directed dispatching based upon a meaningful priority system
- Identifying and establishing a meaningful backlog comprised of corrective, routine preventive and predictive work
- Identifying, managing and deploying spare parts and materials

These are just some of the proven strategies and techniques for a successful maintenance business. It should be noted that emphasis on any strategy or technique should be driven from the maintenance mission and its objectives. The decision to utilize more or less contractors should be a decision based upon the goals of the business and customer requirements. Some environments lend themselves more to contract services than others. There is no single answer and no single strategy other than first deciding the purpose of the business.

Effort is Noble… But It's Results That Count

All too often, the concept of maintenance management is thought of as synonymous with computerized maintenance management systems; that by implementing a computerized maintenance management system, results will magically appear. Long before computer systems, there were successful businesses because attention was paid to customers and the implementation of effective business processes to provide goods and/or services to those customers. To achieve success in managing the maintenance business, identification, development and implementation of core business processes is essential. CMMS is only a tool to support the processes. No matter how big or small the maintenance function, there is no substitute for basic process implementation. Ask yourself, if you can not define the basic processes, how can appropriate application software be selected? After all, one of the basic covenants of effective maintenance planning is determining the right tools for the job based upon the work and tasks to be performed. For those who have implemented a CMMS, which came first, the system or the process?

Managing the maintenance business presents the challenge of operating most service type businesses. Striking the fine balance between service and cost demands the best practices supported by the best tools. The effort required to implement a computerized system does not translate to results; effort put forth in the implementation of the right processes will yield results. In the final analysis, it's results that count.

Striking the fine balance between service and cost demands the best practices supported by the best tools.

EPAC Software Technologies - A Corporate Philosophy

History has proven that merely purchasing a system solution does not guarantee success. While other software developers have measured their achievements strictly by units sold, EPAC Software Technologies is re-defining the shared vision of success from the viewpoint of both solution provider and customer organization. Committed to providing customers with focused solutions to address mission critical business needs, EPAC Software Technologies has embraced experience, practicality and vision in product development and implementation so that our customers realize tangible benefits and value which defines success.

By understanding the synergistic relationship between software and end user we develop intuitive and robust software solutions to address specific critical business requirements.

EPAC Software Technologies develops simple, scalable technology solutions that provide end-to-end functional capabilities coupled with professional support. Timely and concise training, education, and consulting are fundamental components to our comprehensive system solution.

We understand that implementing software systems frequently requires significant cultural and operational changes be made within an organization. EPAC Software Technologies strives to comprehend the dynamics of change unique to each customer we serve. By combining compelling software with our experienced team of system integrators, EPAC Software Technologies delivers solutions that get results.

EPAC Software Technologies is headquartered in Andover, Massachusetts, and has a regional office in Dayton, Ohio, and Providence, Rhode Island. In addition to direct sales, EPAC Software Technologies distributes technology solutions through a network of value-added resellers (VARs) throughout the United States.

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About The Author

C. Paul Oberg is President and Chief Executive Officer of EPAC Software Technologies, Inc., a leading developer and integrator of Computerized Maintenance Management Systems. A Certified Management Consultant, Mr. Oberg has significant experience in operations improvement, productivity improvement, manufacturing/distribution management, Total Quality Management and the design and implementation of manufacturing systems.

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