Managing the Maintenance Budget
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One of the primary responsibilities of a Maintenance Manager is to control maintenance spending against a budget, but across organizations and industries, there are profound differences in the way this is practiced. While there are a host of reasons why organizations have differing approaches to developing a maintenance budget, how well developed and successful these efforts are dramatically impacts a business—either positively or negatively. This article provides an overview of some practices that can positively impact your maintenance budget and your organization.

Budget Development – Creating the Foundation
In many organizations, the maintenance budget is a large block of money that is tracked by the accounting department to a specific cost center. The budget is broken out into large blocks for labor, materials, contract services, and other related expenses. However, this approach lacks the definition and clarity to adequately identify excess spending or control costs. Without the ability to evaluate and understand which assets are requiring excessive maintenance spending, controlling cost and maintenance spending becomes very difficult.

It generally falls upon the Maintenance Manager to further define and clarify the maintenance budget. Ideally, the Maintenance Manager will take an approach to identify the maintenance spending against all major assets or smaller groups of assets. By building a maintenance budget to the asset level, the cost impact of maintenance and the performance of individual assets can be closely tracked, allowing bad actors and improvement opportunities to be identified. Computerized Maintenance Management Systems (CMMS) or Enterprise Asset Management (EAM) systems are specifically designed to manage the maintenance budget to the asset level.

In addition, the lack of well-developed work management processes—including job planning, scheduling, and work performance data collection—make it challenging to control costs. Like a camera lens out of focus, a poorly defined maintenance budget makes identifying improvement opportunities difficult, if not impossible.

Where to Start
It is important to recognize that most maintenance costs recur annually, and the development of an accurate maintenance budget to the asset level is an incremental process requiring approximately three years. In the first year, the maintenance requirements of individual assets will be an estimate. The budget for the second year will be refined based on the variances observed and experience gained from the first year. The third year will allow for further refinement and the clear definition of annual improvement opportunities based on the first two years.

In addition, it is important to have a well-defined equipment hierarchy with specific criticality rankings established for each asset. The hierarchy, coupled with a well-defined criticality ranking, allows the maintenance manager to focus maintenance resources dollars on the equipment that is most important to the business. Additional information required would consist of the planned PMs, overhauls, and historical breakdown costs. Costs assigned to an asset typically consist of:

- Labor
- Materials & Parts
- Outside Services

When constructed into a budget, it should be possible to define the monthly costs, annual costs, and total costs of individual assets and maintenance spending.

Simple Hierarchy: Plant - Area - System - Subsystem - Location

	Budget	Actual	Variance
Labor:	$ 8,000	$ 7,500	$ 500
Materials & Parts:	$ 10,000	$ 9,500	$ 500
Outside Services:	$ 2,000	$ -	$ 2,000
Total:	$ 20,000	$ 17,000	$ 3,000

For a business or facility with thousands of assets, the development of a maintenance budget to the asset level can seem like an onerous task. Typically, the first year of budget development is the most time consuming. However, once the budgeting process is established, it becomes significantly easier in subsequent years. The budget for each asset should be constructed by identifying the required preventive maintenance, predictive maintenance, historical corrective repairs, and expected refurbishments.

Following Business Processes – Work identification, approval/planning, and scheduling
The cost-effective execution of maintenance requires that an organization follow structured work management business processes. Work approval is necessary to effectively control spending, and work planning and scheduling add additional value. It can easily be shown that a maintenance work order that is properly planned and scheduled is less expensive and more effective than work that is performed “on the fly” by maintenance craftsmen. Generally, it is three to five times more expensive to execute unplanned and unscheduled maintenance. If work is done as an “emergency” following a catastrophic failure, the impact is even greater at five to ten times the cost of work that is planned and scheduled. If you are having trouble controlling your maintenance spending, one of the first areas to examine is how effectively routine maintenance work is planned and scheduled. In addition, proper work planning and scheduling also dramatically improves the quality of work that craftsmen perform. It is very challenging, if not impossible, to properly maintain equipment without the correct parts, tool, materials, and knowledge. Without these, the cost of maintenance will rise uncontrollably, and without an understanding the cost of maintenance for all assets, a maintenance manager will generally defer maintenance on less-critical equipment to perform high-cost repairs. The net effect is that the condition of all of the assets will deteriorate.

Review – Collect data and review results – bad actors
One of the most effective ways to control the maintenance budget is to identify and eliminate recurring reliability and maintenance problems. To accomplish this, the data on maintenance work performed must be collected and analyzed. The identified “bad actors” should be ranked according to the severity of impact to the business. Root Cause Analysis should then be

applied to eliminate the causes of failures. Bad actors can be grouped into categories and prioritized as follows:

- Availability losses or lost production
- Emergency work
- Repeat failures
- High-cost repairs
- Systemic failures from defective parts or workmanship

It is a good idea to track and Pareto chart the losses in each of these categories and review them on a monthly basis. Without a process in place to collect and analyze equipment, maintenance work, and cost data, an organization cannot improve upon what it is doing. Evaluating spending against the maintenance budget provides significant insight into where improvement opportunities exist. Special attention should be paid to assets with large variances, both over and under budget. A large negative variance can indicate that an asset has exceeded its useful life. Conversely, a large positive variance can indicate that an asset is performing above expectations and represents an opportunity to reduce spending.

Create improvement – Solve problems to the root cause
Once bad actors are identified, efforts should be made to eliminate or reduce their impact. One of the most effective tools to do this is a Root Cause Analysis (RCA). By focusing on and eliminating recurring reliability and maintenance issues, the costs of performing maintenance will naturally be reduced. It is important to keep in mind that reliability and equipment performance problems are rarely solved by changing maintenance activities. The way equipment is designed, purchased, installed, and operated generally plays an equal role in determining how it performs. When performing an RCA, efforts should be made to create cross-functional teams to ensure active participation and support from the other parts of the organization. Without diverse teams, the results tend to focus only on the things that the maintenance organization can control, which rarely solves the problem completely.

Focus on leading indicators – Equipment health/maintenance work performance
In addition to tracking and eliminating bad actors for equipment performance, it is important to focus on measuring the performance of the maintenance department and its work delivery systems. Establishing performance metrics that track how well work is identified, planned, scheduled, and executed is important to control costs and the maintenance budget. Typical performance measures to drive improvement in the maintenance process and control costs include:

- **Total work backlog** – in Man-hours – This is a measure of all of the work in the maintenance system that has to be executed
- **Planned work backlog** – in Man-hours – This is a measure of all of the work in the system that has been planned for execution
- **Percent Planned Work** – This is the ratio of planned work versus unplanned work that is performed within a period of time
- **Percent Scheduled Work** – This is the measure of the quantity of planned work that is placed on a schedule for execution

- **Percent Weekly Schedule Complete** – This is a measure of the quantity of work that is scheduled versus what is actually completed within a designated time period
- **Percent PM and PdM –** This is a measure of the quantity of predictive and preventive maintenance performed versus the total quantity of work in a schedule period

There are many other performance measures that can be added as the maintenance organization matures to track the performance of the maintenance department and specific assets. When establishing performance measures, it is important to focus them on the areas where improvement is needed. Controlling maintenance costs and spending is a function of improving the performance of the maintenance delivery system overall. Simply cutting maintenance spending will not control or reduce costs.

Build a long-range plan to optimize your budget

Maintenance Managers face the continuous need to reduce maintenance spending. In today's business environment, most products reach maturity very quickly in terms of their market position. With the Internet, price and cost information is readily available for any product anywhere in the world. Competitors are able to react very quickly to changes in price and demand. Because maintenance is one of the more controllable costs for any business, there is continuous pressure to control and reduce maintenance costs to trim business expenses. The success of the Maintenance Manager depends on his or her ability to control or reduce maintenance costs while maintaining or actually improving the availably of the equipment. It is impossible to meet this challenge without a long-term, focused plan to improve maintenance performance.

The long-range maintenance plan should identify the areas where the reliability and maintenance organization needs the most improvement. This could include almost anything, but should be based on those items that will improve equipment availability and drive the best return on the maintenance investment to the business. Typical areas for improvement include:

- Work force training
- Improved use of the EAM/CMMS system
- Improved use of predictive and preventive maintenance technologies
- Improved performance metrics tracking
- Improved tools and technologies for the workforce

The long-range plan should also identify the resources and timing required to effect changes or improvements.

Without a long-range plan, the maintenance organization will struggle from year to year with making incremental improvements. The challenge to reduce maintenance as a business expense will persist, and the effect will force the Maintenance Manager to compromise reliability by deferring spending on predictive and preventive maintenance. This will result in a downward spiral of performance and increase spending on reactive maintenance. Ultimately, the Maintenance Manager must choose which direction the organization will take.

Summary

The successful performance of a Maintenance Manager is frequently judged in two ways—how well the equipment performs and how well the Maintenance Department performs against

budgeted spending. It is impossible to simply cut maintenance spending and achieve reliable equipment performance. A well-defined maintenance budget, to the asset level, makes it possible to identify improvement opportunities and create continuous improvement in business performance within an organization's financial constraints.