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# Measuring Performance:

More than Just Picking A Number

by Terry Wireman



## Performance Indicators or Performance Management – Which one is the focus for Your Company?

**In** most organizations, the focus is on the numbers. The numbers may take the form of industry benchmarks, internal benchmarks, a corporate mandated number, or just a manager's own personal perception of a number. In these cases, it becomes a matter of managing to achieve a number, not necessarily managing a successful business.

The same is true in managing maintenance and reliability today. Managers may find a presentation, an article, or even a book that highlights certain numbers as goals for a maintenance/reliability organization to achieve. A particular number will usually become the focus for the manager, as it may be related to a current problem in the department or plant. This number then becomes the goal for the organization to achieve. It becomes the base for all management MBO's, scorecards, and incentive plans.

The entire maintenance/reliability organization is mobilized to achieve the "magic number". Unfortunately, this number was derived from an outside source, without understanding the impact of the maintenance and reliability function within the company. The attempt to reach this number has a negative effect on the overall maintenance and reliability function and the total performance of the company's assets.

The desire to manage to a number is one of the largest pitfalls to developing performance indicators. What, though, is the underlying cause of the problem? It is not the lack of desire of the maintenance and reliability organization to perform. It is the fact that few executives understand the maintenance and reliability functions well enough to develop the proper performance indicators to manage maintenance and reliability.

## Linked Indicators

Maintenance and reliability are such complex organizational functions that there is no one indicator that can be used to determine their effectiveness. This realization will eliminate the trap of using performance indicators to manage to a number. Achieving success in designing indicators for managing maintenance and reliability is dependant on understanding the maintenance and reliability business sufficiently to be able to link it to corporate goals and objectives and develop tiered indicators that connect functional performance to overall business performance. It is this lack of understanding of the maintenance and reliability business that contributes to the failure of most of the performance indicator systems. For example, a sample business management flow is pictured in figure 1. While this is a typical flow used to manage other business functions, it is rarely used in a disciplined fashion to manage maintenance and reliability. Consider this: How often are items 1 and 2 properly

## Managing The Business

1. Understand and Communicate the Maintenance and Reliability Business Goals and Objectives.
2. Determine the criteria for success in achieving the Goals and Objectives and how this supports the Corporate Business Objectives.
3. Develop the Performance Management System to link functional activities to the success criteria.
4. Compare specific performance indicators to the Performance Management System goals.
5. Highlight any deviations or negative trends.
6. Determine the root casue for the deviation or negative trend.
7. Develop a plan to correct the deviation or negative trend.
8. Implement the corrective plan.
9. Measure the success of the corrective plan (the impact on the specific indicator).
10. Begin again at Step 4 - (Continuous Performance Management).

Figure 1 - Steps to Manage the Maintenance and Reliability Business.

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understood, communicated, and tracked in most companies? This leads directly to the issue of how clearly the maintenance and reliability strategies are understood throughout the company.

## Developing the Maintenance and Reliability Business

In figure 2, the steps necessary to develop the maintenance business are highlighted. As with any other business, these steps begin by defining why the “business” exists. This begins by establishing the goals and objectives of the maintenance business. The goals and objectives of the maintenance organization determine the type of maintenance organization that is established. If the goals and objectives are progressive and the maintenance organization is recognized as a contributor to the corporate bottom line, variations on some of the more conventional organizational structures can be used. Typical goals and objectives include:

1. Maximize Production
2. Identify and Implement Cost

### Reductions

3. Provide Accurate Equipment Maintenance Records
4. Collect Necessary Maintenance Cost Information
5. Optimize Maintenance Resources
6. Optimize Capital Equipment Life
7. Minimize Energy Usage
8. Minimize Inventory On Hand

While these goals do not form a comprehensive, all-inclusive list, they highlight the impact that a proactive maintenance organization can have on a company and its assets. Maintenance can be - and should be - more than a “fix it when it breaks” function. Unless the maintenance organization works with a proactive list of goals and objectives, its effectiveness will always be compromised and, therefore, sub-optimized.

## Organizing to Execute the Business Plan

Maintenance organizations may be considered in two different models. The first is geographical. The second is by the reporting structure.

maintenance organization, one must give the plant size and organizational geographical structure careful consideration. If one uses the wrong geographical structure, excessive staffing may be required to properly service the equipment. For instance, if a central organization is used to service a large plant, the travel time to get to the equipment and the resulting downtime may create havoc, with production schedules constantly disrupted.

## 2. Reporting Structures

Another way to look at maintenance organizations is to consider their reporting structures. Maintenance organizations can use a variety of structures, including:

- a. The Maintenance-Centric Model
- b. The Production-Centric Model
- c. The Engineering-Centric Model

Whatever the structure of a maintenance organization—and structure does vary from organization to organization—it must have the proper focus. Maintenance is a technical discipline. Maintenance personnel are the stewards of the technology in a plant or facility. If the maintenance organization does not have a technical focus, the assets and equipment will be sub-optimized. Therefore, if maintenance is sacrificed to achieve short-term production goals or to support engineering construction projects, the maximum return on investment in the existing assets is never achieved. This situation weakens a company’s competitive position in its marketplace. If any organizational redesign is proposed for maintenance, both short-term and long-term issues must be examined.

## 3. Roles and Responsibilities

In order for maintenance organizations to be effective, certain roles and responsibilities must be defined and assigned. While it is beyond the scope of this material to consider all possibilities, the following are general guidelines that can be used. Although an organization may not use each of the individual job titles listed in this section, each of the task lines must be assigned. Thus, an orga-

## Designing The Maintenance and Reliability Business

- 1. Develop the Business**
  - A. Vision Statement
  - B. Mission Statement
- 2. Organize to Execute the Business Plan**
  - A. Geographical and Reporting Structures
  - B. Roles and Responsibilities
  - C. Determine Staffing Levels
- 3. Develop a Performance Management System**
  - A. Determine linkage necessary to connect the Maintenance and Reliability Business with the Corporate Business Objectives (Profitability)

## 1. Geographical Organizations

Organizations can be structured geographically in three basic ways:

- a. Centralized Organization
- b. Organization by Area
- c. Hybrid Organization

Which is the best arrangement? The rules of thumb are that central organizations are more effective in smaller, geographically compact plants; area organizations usually perform well in midsize plants; and combination organizations are best for large plants. When developing any

Figure 2 - Steps to Develop Maintenance and Reliability Business

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nization may not specifically have a first-line maintenance foreman or supervisor who has a responsibility for each individual line item. Nevertheless, the line-item task descriptions are essential if maintenance is to be managed and, ultimately, the company's assets cared for .

### First-Line Maintenance Foreman or Supervisor

The following tasks are typically the responsibility of a first-line (or front-line) maintenance foreman or supervisor:

1. Directs the maintenance work force and provides on-site expertise.
2. Ensures that work is accomplished in a safe and efficient manner.
3. Reviews work planning and scheduling with the planner.
4. Ensures quality of work.
5. Ensures equipment availability is adequate to meet the profit plan.
6. Works with plant or production supervision to ensure first-line maintenance is being performed by operators.
7. Verifies the qualifications of hourly personnel and recommends training as needed.
8. Enforces environmental regulations.
9. Focuses downward and is highly visible in the field.
10. Champions proactive maintenance vs. reactive maintenance.
11. Administers the union collective bargaining agreement.
12. Monitors the CMMS.
13. Implements preventive and predictive maintenance programs.

### The Maintenance Planner

Another individual in a maintenance organization is the Maintenance Planner. The maintenance planner is different from a supervisor or foreman. Whereas the supervisor manages the maintenance craft workers, the planner provides logistic support to them. The following are the typical responsibilities for a Maintenance Planner:

1. Plans, schedules, and coordinates

2. Develops a weekly schedule and assists the maintenance first-line maintenance foreman or supervisor in determining job priorities.
3. Ensures that the CMMS software data files are complete and current.
4. May assist with stores and purchasing

5. Identifies, analyzes, and reviews equipment maintenance problems with maintenance engineering.
  6. Assists in educating operations or facilities personnel in maintenance management.
- Maintenance Engineer**

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The following tasks are typically the responsibility of the Maintenance Engineer:

1. Ensures that equipment is properly designed, selected, and installed based on a life-cycle philosophy.
2. Ensures that equipment is performing effectively and efficiently.
3. Establishes and monitors programs for critical equipment analysis and condition monitoring techniques.
4. Reviews deficiencies noted during corrective maintenance.
5. Provides technical guidance for CMMS.
6. Maintains and advises on the use and disposition of stock items, surplus items, and rental equipment.
7. Promotes equipment standardization.
8. Consults with maintenance craft workers on technical problems.
9. Monitors new tools and technology.
10. Monitors shop qualifications and quality standards for outside contractors.
11. Develops standards for major maintenance overhauls and outages.
12. Makes cost-benefit reviews of the maintenance programs.
13. Provides technical guidance for the preventive and predictive maintenance programs.
14. Monitors the competition's activities in maintenance management.
15. Serves as the focal point for monitoring performance indicators for maintenance management.
16. Optimizes maintenance strategies.
17. Responsible for analyzing equipment operating data.

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and maintenance engineers are properly educated and trained.

5. Takes responsibility for planning, cost control, union activities, vacation planning, etc.
6. Has responsibility for delegating assignments to the appropriate personnel.

#### 4. Maintenance Organization and Staffing

In this age of downsizing, organization and staffing are among the most critical issues affecting maintenance. How is the maintenance organization staffed? While companies have tried many different staffing formulas over the years, the only perennially successful one is staffing the maintenance department based on work backlog.

##### Backlog Management

A maintenance work backlog is the amount of work currently identified as needing to be performed by the maintenance department. This amount of work is measured in hours. Many have tried to measure back log by the number of work orders, percentage of production hours, etc., but these measures ultimately never work. The only true measure of backlog is based on hours of work to be done. When calculating the backlog, it is necessary not only to know the hours of maintenance work needed, but also to understand current work force capacity.

The goal should be to maintain the backlog in the two-to-four-week range. If the backlog begins to increase or trend above four weeks, then more resources should be added. From the formula, one can see that there are three options for resources. A company can contract out more work, its employees can work more overtime, or it can hire more employees. Conversely, if the backlog begins to trend or drop below two weeks, the company can reduce resources that are required to perform the work. The company could reduce the amount of outside contract work, reduce the amount of craft overtime, or ultimately reduce the size of the maintenance work force. If the backlog is calculated weekly and tracked annually, seasonal trends and other spikes can be clearly seen. By reviewing these types of records, a manager can ensure that the department is properly staffed.

##### Maintenance Staffing Options

Staffing is an important component of any maintenance organization. Four methods are commonly used to staff the maintenance organization.

1. Complete In-House Staff
2. Combined In-House/Contract Staff
3. Contract Maintenance Staff
4. Complete Contract Maintenance



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This is not a no-brainer decision. There is not a one-size-fits-all answer. The answer will come but it should be approached with an open mind and a great deal of research.

Developing a comprehensive maintenance/asset management business is a fundamental step in developing a performance management system. If the strategy is not defined, then what does the performance management system measure? Companies need to dedicate proper resources to insure that the strategy is clearly defined and approved, before any attempt to develop performance indicators for maintenance/asset management is undertaken.

### Performance Management – A Sample

When an organization has the proper alignment between the business process it is measuring/ managing and the indicator system, data linkage can be developed between the process and the corporate business objectives. This is illustrated in figure 3. If the corporate indicator, such as Total Cost to Produce is increasing, (producing a red light in the stoplight) there should be a contributing indicator for maintenance, such as Maintenance Cost to Produce. If this indicator is also increasing, then it may be contributing to the increase in the Total Cost to Produce.

Just knowing the maintenance cost is increasing is not sufficient. There needs to be an additional level of detail that examines the cause of the increase. For example, if the maintenance efficiency (perhaps productive, or wrench, time) was trending down, this would drive the maintenance cost upward. This would be addressed in the efficiency and effectiveness tier. If the cause was lower maintenance efficiency, then one would need to investigate the indicator further.

The issue could involve proper planning ratios or even proper supervisor ratios. If the planner to technicians ratio is outside the 15-20:1 or the supervisor to technician ratio is out of the 8-12:1 range, then the problem with lost efficiency could be a tactical or deployment issue. Conversely, it could also be any change that has recently occurred in organizational structures, such as going

from a centralized organizational structure to an area organizational structure, without proper justification. This change could result in excessive travel time, resulting in lost productivity.

Finally, the resulting lost productivity could have a root cause in a maintenance function, such as the preventive maintenance pro-

gram. If the PM program is out of compliance, resulting in an increase in equipment breakdowns, the additional reactive work could also be the cause of lost maintenance productivity.

### Conclusion

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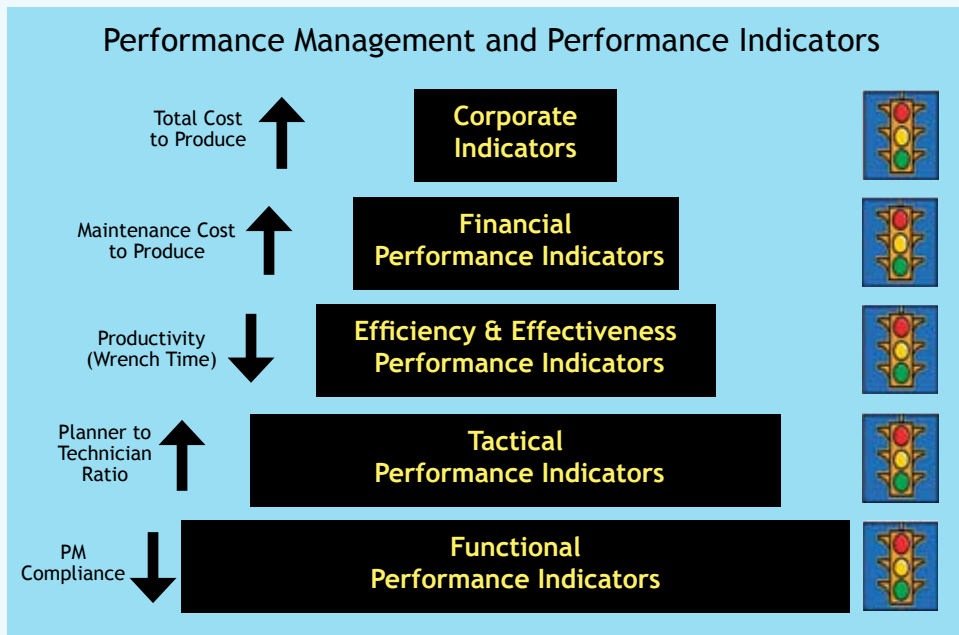


Figure 3 - Relationship between Performance Management & Performance Indicators

requires that all aspects of the business be tracked by performance indicators. These indicators, when properly structured and properly monitored can provide a wealth of

information that will allow for proper management of the business. While it may seem like a numbers game, it is proper evaluation of the right performance indicators that lead

to effective performance management. The data collection adds no value unless the business is properly managed, based on the data. If organizations today are to optimize their maintenance and reliability businesses, they must change their focus from performance indicators to performance management.

*Terry Wireman is Vice President and a member of the Vesta Advisory Board. For over two decades, he has been specializing in the improvement of maintenance management and reliability. Mr. Wireman helps customers develop "World Class" maintenance and reliability policies and practices. As an international expert in maintenance management, he has assisted hundreds of clients in North America, Europe, and the Pacific Rim to improve their maintenance effectiveness. In addition, he has authored twelve books and numerous white papers and articles related to maintenance management process and technology.*

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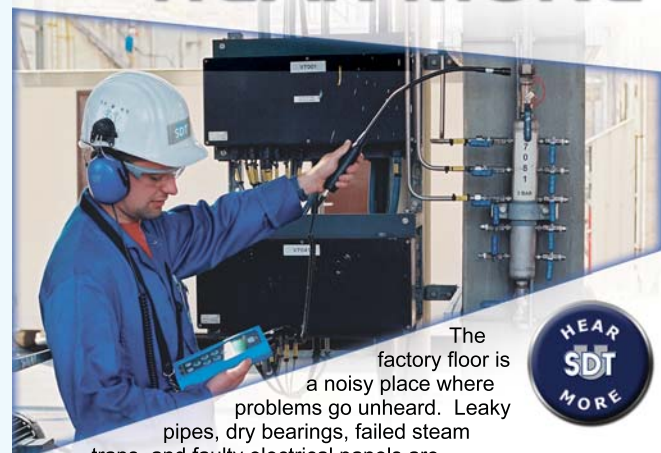
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