Changing Maintenance Practices to achieve *World Class Maintenance*

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Versión en Español

The maintenance organization of today, like many departments, is under continued pressure to cut costs, show results, and support the mission of the organization. After all, it is a logical expectation from the business standpoint.

The evolving maintenance operation has been charged with supporting the broader efforts of World Class Manufacturing such as Six Sigma, Lean Manufacturing and major quality initiatives. The ability to be successful in that charter lies within the practices and systems that make up the maintenance function. It is not just what we do...it is how well we do it.

In fact, regardless of who does maintenance, whether it is a specialized skilled or multiskilled tradesperson or a highly trained operator/mechanic, solid maintenance practices are the keystone to World Class Maintenance, which leads to World Class operations.

According to Paul Thomlingson, in "Effectiveness Maintenance", the objectives of a good maintenance function are to:

- ***Support operations by keeping production equipment in good condition so that production targets can be met***
- ***Maintain the plant facilities by keeping the plant site and its buildings, utilities, and grounds in a functional, attractive state***
- ***Conduct engineering projects like equipment modifications, construction, installation, and relocation***
- ***Develop a program to carry out its services***
- ***Organize itself to support the equipment maintenance needs of production while conducting essential engineering projects***
- ***Execute its programs while utilizing its resources productively***
- ***Perform quality work***
- ***Anticipate and prepare for future work***

- ***Achieve continued improvement by evaluating performance, taking corrective actions, and measuring progress***
- ***Prepare for future changes by anticipating needs and organizing flexibly***

This would be in addition to conducting those proactive activities to prevent failures from occurring.

Best Maintenance has its foundation in Best Maintenance Practices. Those practices include the following twelve areas:

1. **Leadership and Policy Deployment**
2. **Organizational Structure**
3. **Inventory Control**
4. **Computerized Maintenance Management Systems**
5. **Preventive Maintenance**
6. **Predictive Maintenance**
7. **Planning and Scheduling**
8. **Work Flow**
9. **Financial Control**
10. **Operational Involvement**
11. **Staffing and Development**
12. **Continuous Improvement**

Leadership and Policy Deployment

Let's look at the first of these, Leadership and Policy Deployment. World Class Maintenance relies on leadership providing direction, focus and support. This involves management establishing a clear mission and vision supportive of the organization's direction and goals.

Leadership is also responsible for establishing the policies and expectations that serve to guide maintenance and the total organization in supporting maintenance activities. Once policies are developed, they must be deployed, communicated and monitored.

Part of the responsibility of leadership is to set the framework for maintenance to improve its effectiveness and efficiency. This may often be in the form of a formal improvement effort or program.

Leadership should help to identify and address resource issues that could prevent improvements from taking place. This may often be accomplished through auditing or other forms of monitoring to ensure successful implementation.

Organizational Structure

Maintenance organizational efficiency depends upon many interdependent variables. Some of these include: organizational structure, goals and objectives, communications processes, policies and procedures, work processes (methodologies) and employee systems. Maintenance organizations function at three major levels: *organizational level* (functional and structural relationships), *process level* (work activities) and *job performer level* (individual worker.

The ineffectiveness of one level could negatively impact another level. For example, poorly defined work activities, such as the lack of planning and scheduling, can hinder an individual's performance and attitude.

One element is to develop a process to conceive and communicate the maintenance philosophy including the refined mission, goals, direction, focus, purpose, etc.

An often-used strategy may involve allocating maintenance resources closer to the actual work area such as "zone" or "area" coverage. This maximizes familiarity with the equipment, the operations personnel in that area, and encourages "ownership."

It may or may not include the decentralization of maintenance to partial or full control by operations personnel. Regardless, maximizing productivity and labor utilization is key.

Inventory Control

The purpose of this practice area is to refine the maintenance stores and acquisition process to streamline parts appropriation. It is focused on the right parts in the right place at the right time.

This may involve studying the existing flow of requested parts and improving the process to reduce wasted effort and inactivity. This would involve standardized stores and inventory practices.

Minimizing poor use of the company's assets can be accomplished through many ways. These may include improved turnover, cost control, efficient purchasing practices, judicious inventory counts, vendor stocking, recorded issuances, secured access, staffed coverage, close monitoring of min-max levels and reorder points, as well as minimizing unofficial stocking or "squirreling" of parts can go a long way to ensure best use of spares and materials.

Computerized Maintenance Management Systems

Successful maintenance practices depend a great deal on a robust information system. This involves having a CMMS program that is capable, well supported, and fairly easy to use.

Modules should be consistent with industry standards. These areas included: equipment data management, work-order control, preventive maintenance, inventory control, documentation control, system security, ease of use, reports, user configuration and metrics.

This also includes maximizing the usage of the CMMS capabilities. Although most companies have a CMMS, poor utilization is quite common.

Preventive Maintenance

PM is often defined as "those timed or meter-based service activities used to extend the life of equipment and identify potential problems through inspection and early detection."

PM may include work performed on selected equipment through service contracts, inspections, cleaning activities, testing,

lubrication efforts, and scheduled shutdown service. The most significant activity to occur in PM is inspection, which should lead to early detection and correction.

PM is a major component in moving from reactive to proactive through early detection and early correction.

Predictive Maintenance

A sound description of PDM is "the application of technologies and early detection processes to monitor and detect changes in condition to allow more precise intervention."

PDM may include vibration analysis, shock pulse methods, ultrasonics, thermographic analysis, oil analysis, electrical surge comparisons, coolant analysis, wear particle analysis, and performance trending.

Planning and Scheduling

Planning is devising a process for doing, making or arranging maintenance work. It involves preparing job plans and other resources to enable the craftsperson to perform the work quicker and more efficiently. It often deals with the "what" and "how".

Scheduling is creating a schedule for when the work is to be performed. Where planning dealt with the "what" and "how", scheduling deals with the "when" and "who."

The lack of organized processes and standardized procedures can significantly restrict a maintenance operation from meeting its objectives of servicing the needs of the organization.

The majority of maintenance work can be planned and, for the most part, should be. Increasing productivity or value-added work of maintenance personnel depends a great deal on properly planned activities.

Work Flow

The work order is an integral part of an effective maintenance operation. It serves to:

1. **Identify work**
2. **Request work**
3. **Prioritize work**
4. **Schedule work**
5. **Activate work**
6. **Track work**
7. **Analyze work**

The importance of this paper or electronic document is to allow us to control and monitor work activities. One of the most significant purposes is to analyze work that has been performed to identify costs, losses, and trending of problems.

Financial Control

This practice area deals with the fiscal control procedures of the maintenance organization. It may include budget control,

contractor cost monitoring, and overall labor and material cost control.

It may also include monitoring and affecting decisions on asset repair/replacement.

Operational Involvement

It is becoming rarer to find organizations that have not broadened their level of operator involvement in basic care type activities. The logic includes having operators assume some basic responsibilities such as routine cleaning, lubrication tasks, adjusting/tightening, inspections, and minor repair/replacement.

This may be in the form of Total Productive Maintenance or some other structured process to encourage ownership, involvement and improve equipment reliability.

Staffing and Development

To support the "new" maintenance organization, jobs will have to be redefined to improve efficiency and effectiveness. Traditional views of restrictive job requirements and duties will have to be replaced with more flexibility and higher levels of skills.

People will perform successfully if they are capable, have well defined job roles, know what is expected of them, have the skills and knowledge as well as the tools and resources to perform, and receive feedback and rewards for good performance.

Training and skill development is a key component as it enables people to meet the expectations that face in their changing jobs.

Continuous Improvement

Continuous improvement is best described as constantly striving for better ways to do things. It is creating discomfort with the status quo and striving toward excellence through small, incremental change.

This often involves comparing one's operation to others to find those better ways. This is referred to as benchmarking.

It also involves auditing and monitoring one's activities to reduce the possibility of slippage and not following standards. Reliability's greatest enemy is variation. Finding a consistent process to follow but continuing to look for ways to improve the process is one of the ways good companies become great companies.

Summary

Poor planning, improperly trained staff, unclear goals and objectives, lack of leadership, poor historical records, and inefficient manning can cause work to take longer, cost more, and produce poor results. This outcome is an organization that is inadequately postured to compete effectively.

Solid maintenance practices supports a strong maintenance system geared toward proactive activities involving the total organization. Improving those practices requires patience, management

commitment and dedication, as well as the willingness to make it happen through well-conceived plans and actions.

Measuring these practices is important to see how well they perform. However, the ultimate indicator is how well maintenance enables the rest of the organization to meet its goals and objectives

Please see below a useful table about the benefits of implementing these good practices.

PRACTICE	BENEFITS	EXAMPLE MEASURES
Leadership and Policy Deployment	• Understanding • Management commitment • Priority Focus	• Mission Statement available • Vision Statement available • % Policies developed at plant
Organizational Structure	• Clear roles • Clear reporting relationships • Accountability • Improved Control	• % Craftspeople in Zones • Issue > average on surveys • % Turnover • % Absenteism
Inventory Control	• Less Delays • Fewer losses • Lower costs • Increased uptime	• Turns • Accuracy Level • Service Level • % Downtime due to Parts Outage
Computerized Maintenance Management Systems	• Faster performance indicators • Better historical analysis • Identification of problems	• % Assets entered in CMMS • % CMMS Modules Applied • % Accuracy of Data Input
Preventive Maintenance	• Lower maintenance costs • Longer lifecicle • Less downtime • Early problems identified	• % PM of total activity • % Corrective from Preventive • % PM Schedule compliance • % PM vs. Emergency