Impact of TPM implementation on organizations' competitiveness

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Competitiveness means ability and willing to solve the problem using available knowledge and technology. In today's environment almost all the organizations are trying to be competitive and manufacturing organization is not exception to it. On the contrary it is the need of an hour to have competitiveness which give an added advantage to the organization for survival , sustain and grow.

Competitiveness is a continues process and we need to develop that kind of culture in the organization to be competitive. New tools , new technologies, new methods , new experience leads to new competitiveness.

Total Productive Maintenance(TPM) is a tool to make organization more competitive. It is said that what we sow, that we can reap. It indicates that your input will determine your output. To get quality output we need to use quality inputs. One of the important input in manufacturing unit are machines. Initially all machines performing well or as per the standardisation mentioned by the machine manufacturer.But later on all machines needs proper maintenance. Proper maintained machine is one of the important parameter which determine quality of production. Cost of machine maintenance after break down is no doubt more than the cost of maintenance when done periodically. Maintenance affects on quality, delivery schedule, and production quantity. Quality is multi-dimensional , but reliability is the key component of quality. Product reliability is the top priority of manufacturing units. Equipment problems and breakdowns have a direct effect on production cost , production quality ,production schedule and dispatch schedule. To get rid of machine maintenance and to improve competitiveness of the organization TPM is the solution. This paper is focus on tpm and competitiveness and how tpm helps to stay competitive.

Keywords : TPM ,Competitiveness

Introduction :

TPM is a innovative Japanese concept. The Nippondenso was the first company to introduce plant wide preventive maintenance in 1960. Nippondenso of the Toyota group became the first company to obtain the TPM certification. Nippondenso which already followed autonomous maintenance became problem as more maintenance personnel were required so the management decided that the routine maintenance of equipment would be carried out by the operators. So that the maintenance crew went in the equipment modification or improving reliability. This leads to maintenance prevention . This means preventive maintenance along with maintenance prevention gave birth to productive maintenance. TPM can be considered as a medical science of machines. The main objectives of TPM are avoid wastage, producing

quality goods, reduce cost, produce low batch quantity at the earliest possible time. Goods send to the customers must be non defective. Machine maintenance stem evolved from breakdown maintenance up to predictive maintenance. But TPM is a final solution to all these types of maintenance. Companies that implement TPM will not only be able to enhance their maintenance practices but also improve their manufacturing performance. Seiichi Nakajima, vice-chairman of the Japanese Institute of Plant Engineers (JIPE), the predecessor of the Japan Institute of Plant Maintenance (JIPM), promoted TPM throughout Japan and has become known as the father of TPM. JIPE as follows : TPM originated from the fields of reliability and maintenance, a pair of closely related disciplines that have become standard engineering functions in many industries. The primary objective of these functions is to increase equipment availability and overall effectiveness. TPM is a strategy to improve maintenance, equipment efficiency and productivity. TPM seeks involvement from all departments and levels right from senior executives to plant floor workers. The ultimate objectives of TPM are zero breakdowns, zero product defects and zero accidents.

Objectives :

- To study TPM concept.
- To study TPM as a tool to stay competitive

Significance of the topic:

Competitiveness means an ability of a firm to offer products and services that meet the quality standards of the local and world markets at prices that are competitive and provide adequate returns on the resources employed or consumed in producing them. TPM is known as a tool to stay competitive. TPM implementation is continues process which is not only useful for machine maintenance but also create a new culture in the organization. This pull culture gives competitive advantage to the organization. In global competition to survive and sustain growth, organization must have capability to cope up with any situation by producing product which have competitive advantages. Competitiveness should be the culture of organization. Implementing TPM definitely contribute a lot for competitiveness. Competitiveness, Re-engineering and TPM are the synonyms. TPM is a tool which gives competitiveness to the organization. Hence manufacturing units realized the importance of TPM implementation. TPM implementation is key to competitiveness of the organization.

Historical development of TPM :

There have been four major periods of maintenance management:

1. Reactive maintenance : Prior to 1950 the maintenance system focus on defining reliability requirement or preventing equipment failure. Failed to consider the reliability and availability of entire system.

2. Preventive maintenance :From 1950 onwards the maintenance system mainly focus on how to prevent failure and reduce repair time. It also focus on economic efficiency of maintenance as well equipment replacements.

3. Productive maintenance : Since 1960 the importance of reliability, maintenance, and economic efficiency in plant design was recognized by manufacturing units. Productive maintenance has three key elements: maintenance prevention, which is introduced during the equipment-design stages; maintainability improvement, which modifies equipment to prevent breakdowns and facilitate ease of maintenance; and preventive maintenance, which includes periodic inspections and repairs.

4. Total Productive maintenance : In the late 1980s TPM was introduced in the United States. TPM is designed to maximize equipment availability, effectiveness (improving overall efficiency) . TPM provides comprehensive company-wide approach to maintenance management. JIPM has emphasized the importance of maintenance and has awarded over 450 preventive-maintenance prizes to companies that have achieved a high level of success with TPM implementation.

Definition and concept of TPM :

TPM stands for “Total Productive Maintenance” and builds a close relationship between Maintenance and Productivity, showing how good care and up-keep of equipment will result in higher productivity. It is a philosophy of continuous improvement that creates a sense of ownership in the operator(s) of each machine as well as in their supervisor. It is a process of maintenance management that empowers the organization with a progressive, continuous philosophy of enabling all manpower resources to work together to accomplish the mutual goal of manufacturing efficiency.

Methodology designed to ensure that every machine in a production process always performs its required task and its output rate is never disrupted. Pioneered by the Japanese Firm Nippondenso, a manufacturer of automotive components and a member of the Toyoto group.

Modern manufacturing requires that the organizations, that want to be successful and to achieve world-class manufacturing, must posses both effective and efficient maintenance. One approach to improve the performance of maintenance activities is to implement a Total Productive Maintenance (TPM) system **(Hermann, 2000)**. Today, the competition has increased dramatically. Customers focus on product quality, delivery time and cost of product. Because of these, the company should introduce a quality system to

improve and increase both quality and productivity continuously. Total productive maintenance (TPM) is a methodology that aims to increase the availability of existing equipment, hence reducing the need for further capital investment. Investment in human resources can further result in better hardware utilization, higher product quality and reduced labour costs **(Chan, et al., 2003)**.

According to **Roberts (1997),** the TPM program closely resembles the popular Total Quality Management (TQM) program. Many of the tools such as employee empowerment, benchmarking, documentation, etc. used in TQM, are used to implement and optimize TPM. **Williamson (2000)** suggest that Total Productive Maintenance is the equipment and process improvement strategy that links many of the elements of a good maintenance program to achieve higher levels of equipment effectiveness. The five key elements of TPM include:

1. Improving equipment effectiveness by targeting the major losses.
2. Involving operators in the daily, routine maintenance of the equipment.
3. Improving maintenance efficiency and effectiveness.
4. Training for everyone involved.
5. Life-cycle equipment management and maintenance prevention design.

The ultimate goals of TPM are zero equipment breakdowns and zero product defects. The other important goal is the total elimination of all **six major losses**, including breakdowns, equipment setup and adjustment losses, idling and minor stoppages, reduced speed, defects and rework, spills and process upset conditions, and startup and yield losses.

TPM a tool to stay competitive :

In maintenance system we had experienced the past all machine maintenance methods. Considering all these methods we came to know that no one method is best suited to maintain machines. TPM fulfills all the needs and objectives of the machine maintenance to achieve organization's objectives. Every manufacturing organization expect production without breakdown, rework and accident. The cost of production should be less. Products must reach at customer end without delay. To achieve these stated objectives TPM is the only solution. These are all the tangible benefits of TPM. Intangible benefits are improve competitiveness ,create ownership and loyalty among employees toward machine, satisfied customer. Because customer got quality product in least cost at right time. The ultimate goals of TPM are zero equipment breakdowns and zero product defects. The other important goal is the total elimination of all six major losses, including breakdowns, equipment setup and adjustment losses, idling and minor stoppages, reduced speed, defects and rework, spills and process upset conditions, and startup and yield losses.

The main benefits of TPM are as follows:

- Increased productivity
- Reduction in manufacturing cost
- Satisfy the customer's needs by almost 100% (Delivering the right quality, right quantity and at right)

- Reduce accidents.
- Follow pollution control measures.
- Higher confidence level among the employees.
- Keep the work place clean, neat and attractive.
- Favorable change in the attitude of the operators.
- Share knowledge and experience.
- The workers get a feeling of owning the machine.

Therefore, it is very much necessary to implement TPM in order to run any organisation efficiently in today's highly competitive business environment.

Conclusion :

TPM is a tool to stay competitive. TPM is capable to bring a machine back to original condition or even better. It is also known as survival strategy of the organization. TPM implementation is not short-term fix program but it is continuous journey based on changing the equipment, work area. It is helpful to achieve a clean, neat, safe workplace through pull work culture. Successful implementation of TPM gives better and lasting results, there is change in people's knowledge ,skill and behaviour . TPM develop the new pull work culture which helps to keep organization competitive.

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