

What is really TPM?

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Introduction

It is possible to find a considerable number of publications and information of research on maintenance of equipment, policies of inspection, repair, etc. The investigation on models and applied statistic to industrial maintenance is extensive. Nevertheless, it exists very little information and investigation on concepts and activities TPM, in special, related to the roll of the manager and the process of organizational change and how develop a new TPM culture.

The publications and the news on the programs TPM that are developed in the companies and the benefits that these companies are reached, increase every day. But, little spreading exists on the operation of the TPM in these organizations, in special, related to the process of renovation of the organization and the creation of new habits and behaviors in the work area. In addition, multiple opinions of interpretation of concept TPM exist, which creates greater confusion. These interpretations go from understanding TPM like an instrument of maintenance, to TPM like a model of participative management.

This document has the intention to identify the fundamental elements of a TPM definition and their implications in the practical actions in an organization. We reviewed some of the most traditional definitions published and identified the significant elements to consider in any definition of TPM.

Definitions

Existing literature on TPM is found mostly in trade journals and practitioner oriented books. Many of the writing on TPM are influenced by the work of Nakajima (1988)

Let us see some of the published definitions:

According to Japanese Institute of Plant Engineers (JIPE), TPM is defined as a team-based maintenance strategy designed to maximize equipment effectiveness by establishing a comprehensive maintenance production system covering the entire life of equipment, spanning all equipment related fields (planning, use and maintenance) and involving every one, i.e. from top management executives to the production floor operators. It describes a synergistic relationship among all organizational functions and thus promotes productive maintenance through motivation management and voluntary small group activities. It requires horizontal type of organizational structure with few authority levels instead of conventional vertical type having too many authorities.

According to the Nakajima (1988), TPM, a relatively new approach to the development of maintenance systems. TPM is a combination of American preventive maintenance and the Japanese concepts of Total Quality Management and Total Employee Involvement.

The 1971 the definition determined by JIPE (The forerunner of JIPM) to disseminate the version of TPM originally implemented by Nippondenso. TPM was defined by JIPE as follows:

TPM is designed to maximize equipment effectiveness (improving overall efficiency) by establishing a comprehensive productive-maintenance system covering the entire life of the equipment, spanning all equipment-related fields (planning, use, maintenance, etc.) and, with the participation of all employees from top management down to shop-floor workers, to promote productive maintenance through motivation management or voluntary small-group activities. (Tsuchiya, 1992, p. 4)

The definition of the JIPM considers the TPM as a maintenance strategy and incorporates the social aspects of the organization, as fundamental part for the development of this strategy.

The concept of TPM includes five elements. These are:

1. TPM aims to maximize equipment effectiveness.
2. TPM establishes a thorough system of PM for the equipment's entire life span.
3. TPM is implemented by various departments in a company.
4. TPM involves every single employee, from top management to workers on the shop floor.
5. TPM is an aggressive strategy focuses on actually improving the function and design of the production equipment.

To quote Nakajima (1988). Further, the word "total" in TPM has three meanings:

1. Total effectiveness. It indicates TPM's pursuit of economic efficiency and profitability which includes productivity, cost, quality, delivery, safety environment, health and morale.
2. Total maintenance. It includes maintenance prevention (MP) and maintainability improvement (MI).It refers to "maintenance-free" design through the incorporation of reliability, maintainability and supportability characteristics into the equipment design.
3. Total participation. Participation of all employees through small group activities, which includes AM by operators. The small group activities promotes planned maintenance (PM) through "motivation management".

The first definition of TPM was confined to the production sector, so this definition can be termed "definition of TPM for the production sector". When TPM was implemented on a company-wide scale, a new definition (Nakajima, 1989) came to be adopted to reflect the new situation

1. TPM aims to create a corporate system that maximizes the efficiency of production systems (overall efficiency improvement)
2. TPM creates systems for preventing the occurrence of all losses on the front line and is focused on the end product. This includes systems for realizing

“zero accidents, zero defects, and zero failures” in the entire life cycle of the production system.

3. TPM is applied in all sectors, including the production, development, and administration departments,
4. TPM is based on the participation of all members, ranking from the top management to frontline employees.
5. TPM achieves zero losses through overlapping small-group activities

Other definitions:

TPM is a notion taken from the TQM concept of zero production defects and applying it to equipment where the aim is to have zero breakdowns and minimal production losses (Tajiri and Gotoh, 1992)

TPM is a scientific company-wide approach in which every employee is concerned about the maintenance and the quality and efficiency of his or her equipment" (Dale and Cooper, 1992, p. 163).

Hartmann (1992) specified many differences between TPM in Japan vs. the United States. He emphasized the need to customize the TPM process to work for the specific manager, in the specific environment, with the specific people. Hartmann indicates that there are country, plant, and management specific aspects of TPM implementation. But a concrete definition does not emerge from which really it is TPM.

Nick Rich (2004) considers that the “TPM has the proven power to break through the learning barriers that have prevented a meaningful optimization of the manufacturing process and up-skilling of operator teams to engage in greater diagnostic improvements related to the assets they control”. This definition of Rich incorporates a new important element within the TPM, the principle of the organizational learning as central support of the TPM.

To the casual observer these approaches there are to emphasis to the classic TPM focus on equipment reliability. To interpret the TPM as a maintenance technique is very common between the instructors in the industry. This approach prevents that an organization can benefit from the profits that can bring the TPM for the development of the organization.

Some organizations not conform to the approach of the TPM suggested by the JIPM use name TPM to renew initiatives of Quality Circles Control or another type of participative management, under the name of TPM, like Total Productive Management, Total Manufacturing Management, etc.

Analysis

The main elements identified in these definitions are:

- Is a company initiative
- TPM is a organizational learning initiative
- People development allows to improve the Global Effectiveness of the Machinery

- The increase of the productivity through the increase of the Global Effectiveness of the Machinery is the result of the TPM activities.
- TPM contributes to create a new culture of productivity
- To create value for stakeholders
- TPM is an initiative for the permanent improvement of the technical and social systems of the company
- TPM provides a comprehensive approach to maintenance management, which can be divided into long-term and short-term elements.

According to the Oxford dictionary, initiative is " the ability to act independently and with to fresh approach " or " to new development or fresh approach to solve a problem ". The TPM in a fresh approach to improve the productivity of the operations of the business and transform simultaneously the form as the organization is managed.

It is a process that takes part the social and technical systems of the organization to improve the capacity competitive of the manufacture equipment and productivity of the company. Socio-technical systems theory (STS) views organizations as consisting of two independent, but linked, systems: a social system and technical system. The social system consists of people and relationships, while the technical system is composed of equipment and process (Ketchum and Trist, 1992). It is impossible to optimize for overall performance without seeking to optimize jointly the correlative independent social and technical system (Emery, 1990).

The TPM has therefore the intention to improve the companies by means of the improvement of the people and the operating systems of the company. In order to create a significant change, the first necessary step consists of changing the mentality of the people so that they participate in the change of the systems and processes. Improving the people and the systems, it will be possible to improve the company and to prepare it so that it can face the new pressures of the market.

TPM provides a comprehensive company-wide approach to maintenance management, which can be divided into long-term and short-term elements. In the long-term, efforts focus on new equipment design and elimination of sources of lost equipment time and typically required the involvement of many areas of the organization. On the short-term, maintenance efforts that are normally found at the plant level of the organization. In the short-term TPM activities include an autonomous maintenance program for the production department and a planed maintenance program for the maintenance department.

Conclusion

TPM is a process of transformation of a company, based on the principles of organizational learning. Beyond a maintenance technique, TPM in a process (or collection of activities, that uses inputs to create outputs of value for the internal or external customers of the company) of change of corporative culture and permanent improvement, to maintain the effectiveness of the equipment through one active implication of all the members of the organization.

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