Journal of Information Systems Engineering and Management
2025, 10(31s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/ **Research Article**

Total Productive Maintenance (TPM) and Industrial Applications: A Review Article

Juan Santos Mejía Casas
Instituto Tecnológico de Nuevo Laredo, TecNM
Email: *juansantos.mc@nlaredo.tecnm.mx*
ORCID: *0009-0001-7124-1341*

ARTICLE INFO

Received: 30 Dec 2024

Revised: 05 Feb 2025

Accepted: 25 Feb 2025

ABSTRACT

Total Productive Maintenance (TPM) is often perceived as an approach exclusive to large corporations, but in reality, it is a cultural practice that extends from household maintenance to industrial applications. This methodology ensures the availability of equipment, significantly impacting lean manufacturing by promoting autonomous, preventive, and planned maintenance strategies. TPM implementation fosters efficiency, cost savings, and organizational synergy, aligning with continuous improvement principles. Companies adopting this methodology benefit from structured maintenance plans, leadership development, and personnel involvement, leading to enhanced productivity and long-term competitiveness.

Keywords: Total Productive Maintenance; Lean Manufacturing; Autonomous Maintenance; Preventive Maintenance; Planned Maintenance; Equipment Availability; Continuous Improvement.

I. INTRODUCTION

We as professionals do important things by forming a culture of prevention and savings at home, but we do not take the time to explain why it is the culture and breakdown of each activity in which we would promote a personal and business synergy, as it has always been commented that we cannot give what we do not have.

We always think that savings equals not spending and in reality it is investing in a plan of constant improvement, living documents because they are always being updated according to new developments, new technologies, new materials and components.

Companies use this tool as one of the pillars of lean manufacturing since it speaks of the availability of the equipment, directly impacting the O.E.E. to complement the business goals.

Companies that implement this methodology rely on fundamental principles such as 5S +1, since having the discipline established and standardized, the order and cleaning process simplifies the detection of areas of opportunity in any company and work.

By carrying the principles of T.P.M. we know that the structure is alive in which we must be in constant updating and improvement process.

II. FUNDAMENTALS

Companies want to be highly competitive and that reflects the needs of our changing markets, which are the main indicators and to give customers what they want in the moments that are required.

That is why some companies see it as a cost not as a growth investment which makes them more competitive and versatile in the markets, if it is difficult since they are not imposed to implement and it is a long-term process, first with the team you have, with methodologies of demerits, preventive, planned, training of personnel for the self-employed, business growth and investment recovered in an average of one year depending on the size of the company, then enter with the analysis of costs benefits to justify new equipment which when keeping them in operation is more expensive than if they are replaced.

This is convincing management of the general commitment of individuals at all levels to ensure that it is carried out throughout the company and with this generate a culture and commitments of workers.

But this must be extremely committed to the senior management to provide support in all aspects.

III. DEVELOPMENT

In order to implement this methodology, we must understand the structure of the T.P.M.

- Which is based on the 5S to be able to carry out the organization and control of the work area that is essential for the application and identification of possible failures and involvement of personnel.
- Subsequently, we must work on the process of educating the general staff so that they understand the process of culture change, always accompanied by their training so that they do not have doubts about what is sought and responsibilities of each individual, give them the training applied with the indications and involvement in the process, as well as the allocation of financial resources and application of these in the areas that are required.

The management of autonomous maintenance is essential since the operating personnel are the ones who have the most contact with the equipment and must feel the sense of belonging of the team and the company.

To carry out maintenance focused on reliability and with this to be able to have the equipment ready for when it is required, together with maintenance projects to improve and replace equipment.

This is based on the preventive and planned maintenance that we will talk about below.

- Leadership and authority are used in an effective way, developing a high level of leadership in the work environment, so that personnel at various levels acquire greater knowledge, achieving greater participation and delegation of functions which are accepted by team members, this makes a release of burdens from management levels and therefore they are more efficient.
- In this implementation process we managed to avoid wasting high-value factors such as:

➢ Intelligence of individuals, making them more participative.

➢ Staff creativity, avoiding the eighth waste which is staff creativity.

➢ Objectivity for problem solving is already focused on the problem to provide a solution without looking for culprits, but focused on solutions.

➢ Positive attitude through effective communication and this improves interpersonal relationships and staff participation.

- We must identify the types of failures or losses of the equipment in order to objectively be able to provide solutions focused on continuous improvement.

➢ Major failures, which are the most affect the availability of the equipment and the reason that was carried out with the effective analysis of the cause.

➢ Adjustment of machinery in model changes to develop a S.M.E.D. This technique will be discussed later at another time.

➢ Minor failures to focus on planned versus actual productivity averages and make improvements to documents.

- The implementation method is based on four points:

➢ Planning which manages the analysis, comparison, goals and coupling with the master production plan for effective maintenance spaces and not the corrective maintenance spaces predominate.

➢ Effective communication, with the announcement of the methodology, its organization, constant training and developing agility of thought.

➢ The implementation is the most notorious since the working groups, the registered education and certification of the staff are established to give way to the continuous improvement projects and the living document with revisions at least once a year for adjustments.

➢ To finally sustain the methodology and extend the concept to all facilities and manage the supply chain of M.R.O. and direct materials in the company to effectively evaluate areas of opportunity.

IV. CONCLUSIONS

This methodology is extremely effective for all types of business, focusing on the costs carried out in the company, to achieve the availability of the productive equipment, which is fundamental in lean manufacturing, giving with this the availability of the equipment to achieve an increase in profit, this is periodic and partial since it cannot be carried throughout the company, a Gantt chart has to be prepared where we give the times and progress gradually of the teams to be used, we know that we must create a synergy in the company and control improvement projects by developing continuous improvements and creating a positive environment in the staff with effective and objective leadership, achieving effective growth in the culture and constant creativity of employees, and with this a real and congruent participation.

Juan Santos Mejia Casas, Industrial Mechanical Engineer, graduated from the I.T.N.L. in 1991

Professor: Economic-Administrative Department.

REFERENCES

[1] Suzuki, T. (1994). *TPM in Process Industries*. CRC Press.
[2] Nakajima, S. (1988). *Introduction to TPM: total productive maintenance*. https://openlibrary.telkomuniversity.ac.id/home/catalog/id/2773/slug/introduction-to-tpm-total-productive-maintenance.html
[3] Kunio, S. (1995). *TPM Team Guide*. Productivity Press.
[4] Shirose, K. (1996). *TPM for Supervisors*. https://openlibrary.org/books/OL8643172M/Tpm_for_Supervisors