

Total Productive Maintenance for Increasing the Performance of Equipments and Strategies in Business Development

Pretty Diawati

Politeknik Pos Indonesia, Indonesia.
E-mail: prettydiawati@poltekpos.ac.id

Phong Thanh Nguyen*

Department of Project Management, Ho Chi Minh City Open University, Vietnam.
E-mail: phong.nt@ou.edu.vn

Quyen Le Hoang Thuy To Nguyen

Office of Cooperation and Research Management, Ho Chi Minh City Open University, Vietnam.
Email: quyen.nlhtt@ou.edu.vn

Vy Dang Bich Huynh

Department of Learning Material, Ho Chi Minh City Open University, Vietnam.
Email: vy.hdb@ou.edu.vn

Ali Zaenal Abidin

Universitas Pamulang, Indonesia.

Article Info

Volume 81

Page Number: 1096- 1101

Publication Issue:

November-December 2019

Article History

Article Received: 3 January 2019

Revised: 25 March 2019

Accepted: 28 July 2019

Publication: 25 November 2019

Abstract

To maintain the automation systems there need a huge amount of manual work, in centralization of the plants and in automation companies are making technical progress during large development of advancement. For the attentiveness of manufacturing it is critical tasks to create a strategy for maintain the equipment. For maintaining equipments and plants effectively a maintenance program that includes this concept is known as Total productive maintenance (TPM). In this paper we studied the different aspect of Total productive maintenance in different field for developing a successful business.

Keywords: TPM, manufacturing, equipment, plants.

Introduction

A system that include processes, employees that add business value to an organization, improve and maintain the integrity of production, equipment and safety and quality systems through the machines is consider as total productive maintenance (TPM) system. To avoid delays and breakdowns in

manufacturing processes the total productive maintenance system always focus on keeping all instruments in proper working condition.

Combination of total involvement of employees and preventive maintenance is the significant factor of Total Productive Maintenance (TPM). For maintenance of equipment the TPM is consider as an innovative system that eliminates breakdowns, through day-to-day activities promotes autonomous operator maintenance and optimizes effectiveness. By eliminating the loss and waste that can happen due to speed losses, reduced yield, failure of the equipment, process defects and set up and adjustment with maximum effectiveness use of equipment is the main objective of TPM

TPM Concept

Between Productivity and Maintenance the TPM build a close relationship, it is showing that keeping good care of equipment can give the best outcome in higher productivity. Prevention of possible breakdowns, maintenance of machines and maintaining productivity are the main focus of TPM. Through the machine operate at its optimal level the optimization of machine availability and productivity improvement is the TPM concern.

For machine repair needed time and hidden losses with respect to machine failure everyone in the organization should aware. If a produces inferior products or machine cannot run at full speed for the organization it is considered to be an activity of loss making.

TPM Principles

For improving the equipment reliability there are 8 pillars of TPM mainly focused on preventive and proactive techniques. They are as follows:

- a. Health Environmental conditions should be safe
- b. Maintenance planning
- c. Management of quality
- d. Improvement focus
- e. Training and education
- f. Equipment management or early management
- g. Office and administrative TPM
- h. Autonomous Maintenance

The productivity can be increased with the help of the above pillars.

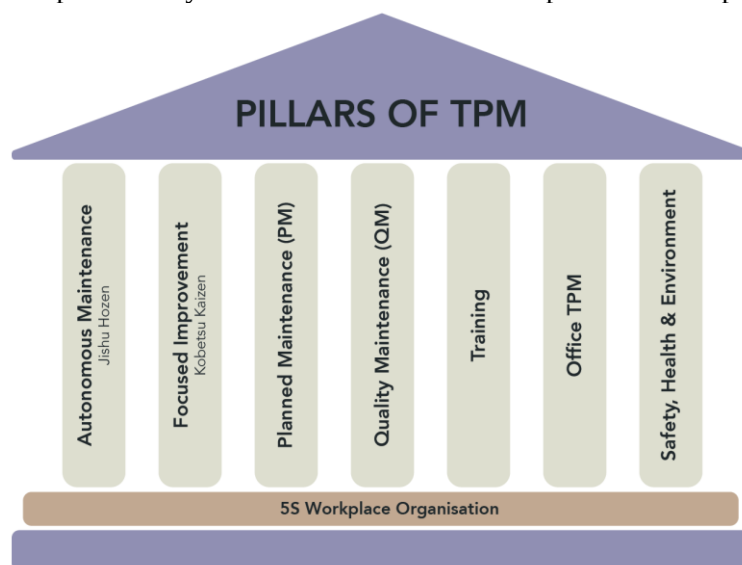


Figure1: Eight pillars of TPM

In an organization steps in introduction of TPM

The steps are described as follows:

1. PREPARATORY:

1. Set the target and TPM working system
2. Propaganda for TPM and initial education
3. For institutionalizing prepare a master plan
4. All about TPM the announcement of introduction done by Management
5. Setting up departmental committees of TPM

2. INTRODUCTION

This is a service and we should welcome all. Providers as they should realize that we need quality stockpile from them. Related organizations and subsidiary organizations who can be our clients, sisters concerns and so forth. Some may gain from us and some can support us and clients will get the correspondence from us that it thinks about quality yield.

3. IMPLEMENTATION

The 8 pillars of TPM development are carried in this step. These pillars are already described above.

For production efficiency establishing the system is the work of four activities, one pillar use for initial control system of new equipment and products, and one is used for sanitation, safety as working environment and improving the efficiency of administration.

4. INSTITUTIONALISING STAGE

The team can reach at the maturity stage by all these activities. At this stage it determines the efficiency of all the members and their contribution. This is a very challenging task.

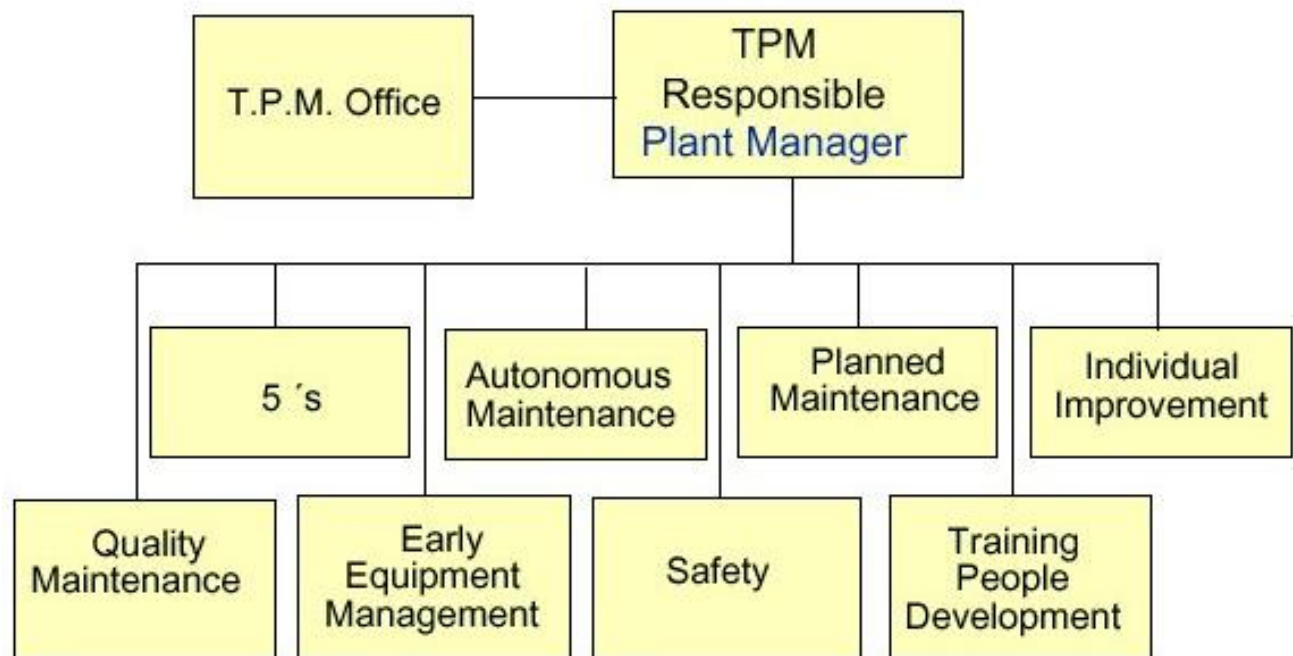


Figure 2: TPM plant wide structure

TPM Implementation

For any business the TPM implementation is a significant factor. It can take several years to fully implement a TPM. In general employee responsibilities, organizational structure of company and production system affected by TPM. For any company the implementation of TPM make worthwhile id the outcome reduced the costs, increased productivity and improved customer satisfaction.

For every business although the implementation of TPM is different but include generally:

- Workforce Education
- In the starting area implement a preventive maintenance program
- Baseline data gathering
- Starting point identification
- Until the other parts of TPM implemented company- wide expand the TPM.

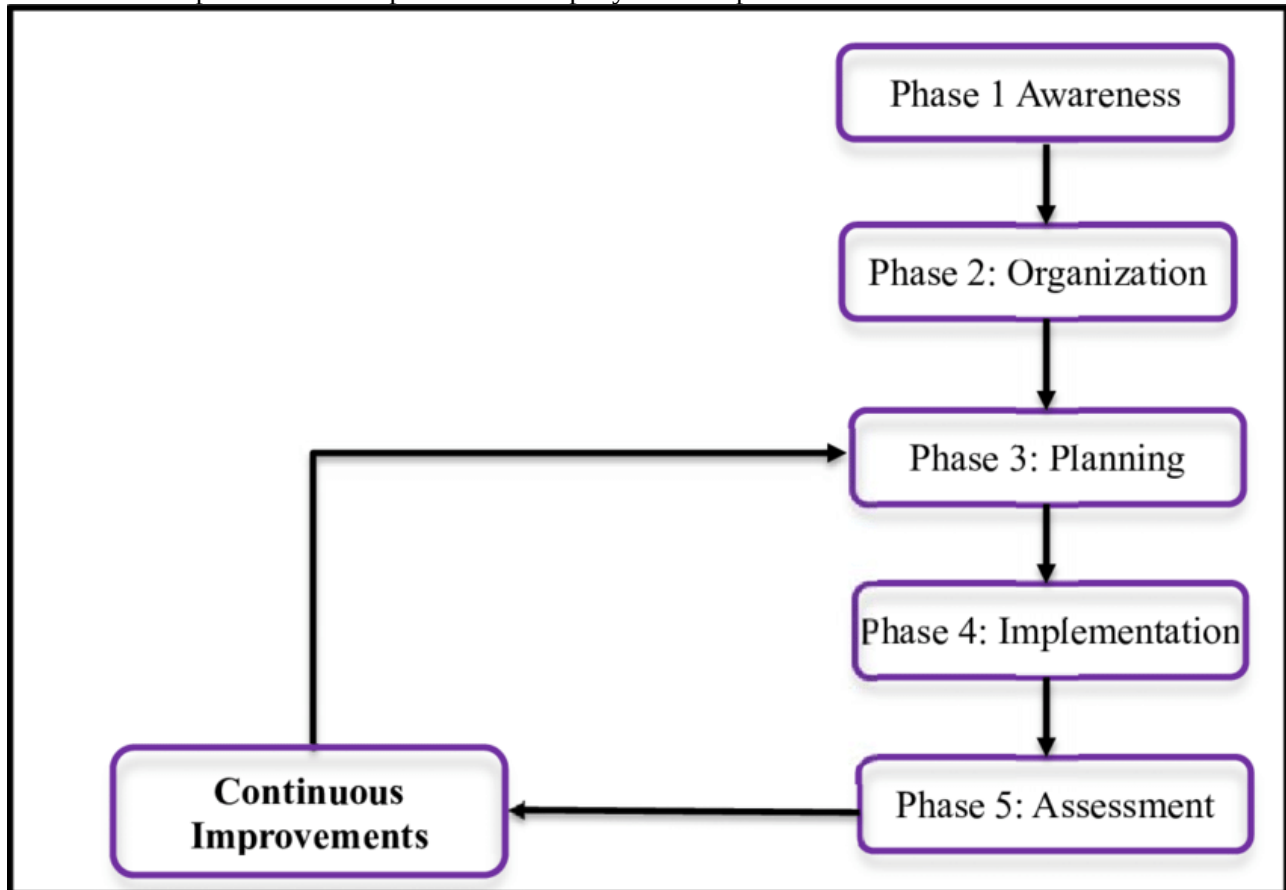


Figure 3: TPM Implementation phases

Benefits of TPM

Some main benefits of TPM are given bellow:

- Follow Pollution Control measures are followed
- Almost 100% satisfy the need of customer
- By working as team achieve the goals
- Experience and knowledge sharing
- Among the employees higher confidence level
- Customer complaints rectified
- Overall Equipment Efficiency (OEE) and productivity increases
- The work place is keeping attractive, neat and clean
- Accidents reduction
- In the attitude of the operators do some favorable modification
- In all areas of the organization horizontal deployment of a new concept
- By up to a great extent reduce the cost of manufacturing

Goals of TPM

The TPM is based on the concept of zero-loss. So it can achieve high flexibility and reliability of equipment through this concept. By minimizing consumables, raw material, wastage of manpower and energy it can also reduce the cost. Through four specific objectives a TPM can accomplished:

- zero breakdowns
- zero defects
- Due to equipment-related operations eliminating waste and failure
- Reducing unscheduled maintenance events and emergency to a minimum

The losses that are responsible for negatively to equipment effectiveness are as follows:

1. Minor stoppages and machine idling
2. Process defects
3. Setup and adjustment time
4. Equipment failure
5. Reduced yield
6. Reduced speed



Figure 4: TPM goals

Conclusion

A system that include processes, employees that add business value to an organization, improve and maintain the integrity of production, equipment and safety and quality systems through the machines is consider as total productive maintenance (TPM) system. To maintain the automation systems there need a huge amount of manual work, in centralization of the plants and in automation companies are making technical progress during large development of advancement. Through the machine operate at its optimal level the optimization of machine availability and productivity improvement is the TPM concern.

References

1. manu dogra, vishal s. sharma, anish sachdeva & j.s. dureja(2016), "Tpm- a key strategy for productivity improvement in process industry". Journal of Engineering Science and Technology, Vol.6, No.1, pp.1-16.
2. https://en.wikipedia.org/wiki/Total_productive_maintenance.
3. Vijay D Kedaria¹, Prof. Vivek A. Deshpande (2013), "Implementation of Total Productive Maintenance Methodology: A Review". International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Vol.3, Issue.4.
4. M. Ncube (2006), "The impact of total productive maintenance (TPM) on manufacturing performance at the Colt section of Daimler Chrysler in the Eastern Cape". Master Thesis, South Africa.
5. Sorabh Gupta, P.C. Tewari, Avadhesh Kumar Sharma, "TPM CONCEPT AND IMPLEMENTATION APPROACH".
6. Ahuja, I.P.S. and Khamba, J.S. (2007), "An evaluation of TPM implementation initiatives in an Indian manufacturing enterprise", Journal of Quality in Maintenance Engineering, Vol. 13No. 4, pp. 338-52.
7. Ahuja, I.P.S. and Khamba, J.S. (2008c), "Strategies and success factors for overcoming challenges in TPM implementation in Indian manufacturing industry", Journal of Quality in Maintenance Engineering, Vol. 14 No. 2.
8. Al-Hassan, K., Chan, J.F.L. and Metcalfe, A.V. (2000), "The role of total productive maintenance in business excellence", Total Quality Management & Business Excellence, Vol. 11 Nos4/5/6, pp. S596-S601.
9. Ben-Daya, M. and Duffuaa, S.O. (1995), "Maintenance and quality: the missing link", Journal of Quality in Maintenance Engineering, Vol. 1 No. 1, pp. 20-6.
10. Blanchard, B.S. (1997), "An enhanced approach for implementing total productive maintenance in the manufacturing environment", Journal of Quality in Maintenance Engineering, Vol. 3No. 2, pp. 69-80.
11. Carannante, T. (1995), "TPM implementation – UK foundry industry", The Foundryman Supplement, Vol. 88 No. 11, pp. 1-34.
12. Chowdhury, C. (1995), "NITIE and HINDALCO give a new dimension to TPM", Udyog Pragati, Vol. 22 No. 1, pp. 5-11.
13. Cross, J. (1988), "Raising the value of maintenance in the corporate environment", Management Research News, Vol. 11 No. 3, pp. 8-11.