

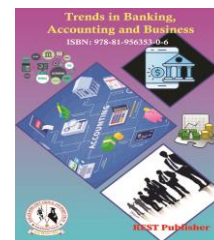


Trends in Banking, Accounting and Business

Vol: 3(1), 2024

REST Publisher; ISBN: 978-81-956353-0-6

Website: <https://restpublisher.com/book-series/tbab/>



A Study on Implementation of Total Productive Maintenance with Reference to Titian Company Limited Jewellery Division at Hosur

***N. Aswiya, Kousik Prasad S**

Adhiyamaan college of Engineering (Autonomous), Hosur, Tamil Nadu, India.

*Corresponding Author Email Id: aswiyaniaz25@gmail.com

Abstract: *The purpose of this paper is to evaluate the contributions of Total Productive Maintenance (TPM) initiatives in reducing equipment breakdowns, increase equipment reliability and improve productivity. It is also termed as Total Productive Maintenance. TPM concept is based on segregating activities of production into eight pillars specifically and support the business to achieve high targets and maintain competitiveness in the market with high precision making. Implementation of these concepts will result in increased equipment utilization and life, reduced work stoppages and machine slowdowns, closer adherence to production and delivery schedules as well as increased employee morale. The Total Productive Maintenance (TPM) concept addresses these goals. The aim of TPM is to keep the plant and equipment at its highest productive level through the cooperation of all areas of the organization. The data collected and used in this study were secondary through questionnaire. Correlation, T-Test and percentage method are the tools used and derived the results over the project. This project is solely based on production unit of jewellery under Titan Company Ltd. (Jewellery Division), Hosur.*

Keywords: *Total productive maintenance, Preventive maintenance, Overall equipment efficiency, Total quality management.*

1. INTRODUCTION

Productivity refers to the activity of production level calculated with the output from production process divided by time taken for production. All the industry involved in production process require to maintain optimum level of productivity to increase sales and maintain market rate in a competitive world. Productivity can be achieved by various ways, and it can also be affected by different causes especially raw material availability and sourcing, machine breakdowns, demand, brand value, etc., Total Productive Maintenance or Total Productive Maintenance (TPM) is a concept which is popular in production activity originated in Japan. It builds a close relationship between Maintenance and 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 focuses on reduction of machine breakdown and time taken to repair which ultimately supports production from the maintenance point of view. While it may seem unachievable to achieve zero defects, zero breakdowns, and zero accidents, today thanks to TPM management, the approach is getting manufacturers closer to making this dream reality. It emphasizes preventive and proactive maintenance to maximize the productivity and lifespan of any equipment. And this is achieved by empowering its employees to take the responsibility to handle such equipment.

2. OBJECTIVES

To understand the causes behind the low productivity in the manufacturing unit involved in Jewellery making.
To study the overall efficiency and performance to make analysis of improvement.
To identify the error occurring situations in various departments of production and rectify them.
Implementation of TPM process to improve the productivity and keep the situations easily handled by the workers with the help of other departments.
Improvisation of regularity in checking and maintaining the machines along with the consideration of its condition, depreciation, etc.,
To suggest the best practices required to maintain the machines and teach the workers about the machines' drawback and make them handle the situation hassle-free.

To reduce MTTR (Mean Time To Recover) and increase MTBF (Mean Time Between Failure)

3. SCOPE OF THE STUDY

The scope of a study on operational manager productivity can encompass various aspects related to the effectiveness and efficiency of operational managers in achieving organizational goals. TPM is an approach which benefits production process by reducing breakdown time and other processes which improves productivity from the side of maintenance of machines and its run-time. It suggests various methods to improve the level of productivity and maintain a better quality by addressing the issues which were the common causes for production. Linkage of KPI (Key Performance Indicator)- KMI (Key Management Indicator)- KAI (Key Activity Indicator) helps to understand the real-time implementation and suggests the areas to focus and improve the level of maintenance. Preparation of Timeline sheets for all the machines based on the maintenance requirements throughout the year helps in tracking the activities to be done and also remains the workers to catch up the process. Preparation of One Point Lesson (OPL) sheets create a way to understand the machines simpler and faster by educating the new employees involving in production activity, resulting mean time to understand the machine. Preparation of Know-Why sheets brings-up the idea towards understanding the most possible causes which were the reasons for machine break-down and analyse the root cause during the time to make decisions faster.

4. LITERATURE REVIEW

Mohapatra., (2006) has conducted a study on Japanese Management Practices and its adoption in the select units of the Indian manufacturing industry. The study focused on Kaizen, TPM, Poka-Yoke, 5S, Kanban, Quality circles, and TQM. Further, data was collected from existing documents, observations, and interviews by employing correlation and descriptive study. The study found that Japanese practices like Kaizen was given importance, followed by 5S, TPM, and others. The statistical results reveal that there is a significant relationship between production and JMP. Hence it suggested adopting JMP to improve the overall growth of the organization. Gajendran., (2011) has examined the impact of TPM to enhance the OEE and productivity of select units of the engineering industry. The study carried out to identify significant losses incurring during the production process and performance measurement of TPM. Further, it identified that TPM exists in both tangible and intangible context in the manufacturing system. The study suggested that TPM implementation is a drastic need to enhance the performance of productivity and other management aspects of an organization. Maheswaran & Mahendran., (2014) have revealed how quality can improve by employing TPM and TQM. The study carried out on pillars of TPM and TQM provides a basement to contribute towards the overall quality of the unit of production in the manufacturing system. The result reveals that the application of these pillars helps in enhancing the quality of the product. Sharma & Singh., (2015) have portrayed how 5S practice of Japan have impacted on the TPM and its components to find out the relationship between 5S practice and TPM activities. The results indicated that 5S practices had made an impact on the different pillars of TPM directly or indirectly. Hence 5S practice has been recognized as an essential tool for evaluating the overall performance of TPM. The study suggested that the 5S practice considered as a basement for successful TPM implementation. Soraphon Kigsirisina et al (2016) stated that, Nowadays, many water treatment plants face the problems of equipment breakdown and water loss during water production process. To decrease water loss and enhance equipment effectiveness and reduce equipment breakdown, the Eight Pillar Strategy of TPM is used. Failure rate (FR), availability (A), performance efficiency (PE), quality rate (QR) was determined by evaluating equipment effectiveness through Overall Equipment Effectiveness (OEE). The proposed 17 steps for OEE, NEE and PC evaluations are shown in this paper. To get higher chlorinator effectiveness and lower water loss, paper study might be a good approach for other water treatment plant.

5. RESEARCH METHODOLOGY

Research methodology is a structured and scientific approach used to collect, analyze, and interpret quantitative or qualitative data to answer research questions or test hypotheses. A research methodology is like a plan for carrying out research and helps keep researchers on track by limiting the scope of the research. Several aspects must be considered before selecting an appropriate research methodology, such as research limitations and ethical concerns that may affect your research.

Statistical tools used:

In this project, the research methodologies used are,

1. Percentage Method.
2. F Test.
3. Chi Square Test.

6. DATA ANALYSIS

➤ Percentage Method

Percentage method is used to identify the ratio of respondents from various departments to derive the results for the research made.

TABLE 1

| Department | No. of Respondents | Percentage |
|-----------------------------|--------------------|-------------|
| Refining | 8 | 12% |
| Alloying | 11 | 16% |
| Casting | 15 | 22% |
| MMC- Machine Made Chain | 7 | 10% |
| MMJ- Machine Made Jewellery | 9 | 13% |
| Maintenance | 17 | 25% |
| TOTAL | 67 | 100% |

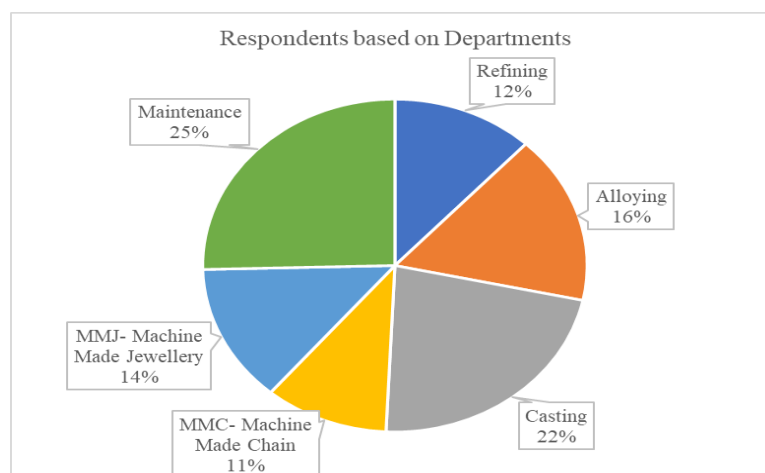


FIGURE 1

➤ T Test

Relationship between the training received by employees and their understanding on TPM's effectiveness in Production.

TABLE 2

| T-Test: Two-Sample Assuming Equal Variances | | |
|--|-------------------|-------------------|
| | <i>Variable 1</i> | <i>Variable 2</i> |
| Mean | 13.00 | 1.80 |
| Variance | 206.00 | 4.20 |
| Observations | 5.00 | 5.00 |
| Pooled Variance | 105.10 | |
| Hypothesized Mean Difference | 0.00 | |
| df | 8.00 | |
| t Stat | 1.73 | |
| P(T<=t) one-tail | 0.06 | |
| t Critical one-tail | 1.86 | |
| P(T<=t) two-tail | 0.12 | |
| t Critical two-tail | 2.31 | |

TABLE 3

| | <i>Satisfied</i> | <i>Neutral</i> | <i>Dissatisfied</i> |
|--------------------|------------------|----------------|---------------------|
| Fully Implemented | 1 | | |
| Partly Implemented | 0.936766 | 1 | |
| In Planning | -0.05109 | -0.39736 | 1 |

Correlation: Calculation of Correlation between the Level of TPM implementation and Level of handling the issues became easier after implementation.

Interpretation: The Correlation between Level of implementation of TPM and easiness in handling issues affecting productivity shows that the areas where implementation is done partly or in full has higher level of satisfaction (i.e., 93.68%) and the areas where the implementation is in planning process, the negative correlation (i.e., -5%) is arrived which represents there is dissatisfaction in easiness of handling the issue.

7. FINDINGS

1. Majority (i.e., 99%) of the Respondents are Male.
2. It is found that majority of employees were in the age of 30-40 based on the responses.
3. More than 90% of respondents were married.
4. Most of the respondent's highest education qualification were Diploma (67%) followed by Professional degree (25%).
5. Most of the departments are in requirement in implementation of TPM.
6. Separate training was provided regarding Implementation of TPM to all the employees who were directly involved in production.
7. To the most extent, TPM is effective, and the set goals were achieved to the max.
8. It is clearly understood that attention towards Implementation of TPM affects the regular routine work of employees.
9. Machine Breakdown repair time has reduced to the optimum level and intervals between breakdown has been increased.

8. SUGGESTIONS

TPM should be implemented in a step-by-step manner with regular monitoring. Allocation of time should be done to reduce affecting work time of employees. Some of the employees might need more clarity on the concepts of TPM and its implementation process. It's better to implement TPM as early as possible to identify the real-time changes that help to compare department-based effectiveness. Regular communication with each other in a department regarding production will increase better involvement.

Daily KYT (Know Your Trouble) discussion will bring positive changes in overall productivity.

9. CONCLUSION

The objective of the study is to understand the requirement of changes in production process and implementation of TPM in production of Jewellery in TITAN COMPANY LIMITED (JEWELLERY DIVISION) to improve the level of productivity and optimization of time spent on machine maintenance. From the study, in overall aspects, the effectiveness of TPM is highly possible and brings visible changes towards positive environment. Thus, it is understood that TPM must be implemented for a long term which improves the standards in production and can be used in other production processes for better results.

REFERENCES

- [1]. <https://www.titancompany.in/business-division/jewellery-division>
- [2]. https://www.researchgate.net/publication/239430038_Total_productive_maintenance_Literature_review_and_directions