

REVIEW PAPER ON TPM- A KEY STRATEGY FOR PRODUCTIVITY IMPROVEMENT IN MEDIUM SCALE INDUSTRY

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Abstract – TPM is a maintenance program which involves a newly defined concept for maintaining plants and equipment. The goal of the TPM program is to increase production while, at the same time, increasing employee morale and job satisfaction. The results of implementing TPM program in terms of increased plant efficiency and productivity are outstanding. Depending on size, industries are mainly classified into three categories, small, medium, and large industries. Of the entire business population of 3.7 million enterprises, only 24,000 were medium sized (having 50 to 249 employees) and fewer than 7,000 were large (having 250 or more employees). Small businesses, including those without employees, accounted for over 99% of businesses, 45% of non-government employment and (excluding the finance sector) 38% of turnover. In contrast, the 7,000 largest businesses accounted for 45% of non-government employment and 49% of turnover

Keywords:- TPM (total productive Maintenance), PM (Planned Maintenance), OEE (Overall Equipment Effectiveness), JH (Jishu Hozen), KK (Kobest Kaizen), JSA (Job Safety Analysis).

1.0 INTRODUCTION:-

Total Productive Maintenance is an innovative Japanese concept. The origin of TPM introduced in early 1950s, when preventive maintenance was introduced in

Japan. The concept of preventive maintenance originated in the USA. Preventive maintenance is the concept of daily maintenance designed to maintain equipment in good condition and prevent failure through the prevention of machine fails and periodic inspections. Nippondenso was the first company to introduce plant-wide preventive maintenance in 1960.

TPM stands for “Total Productive Maintenance” and builds a close relationship between Maintenance and Productivity, showing how good care of equipment will result in higher productivity. It is a philosophy of continuous improvement. That develops operators to take care of each machine in their supervision.

TPM was introduced to achieve the following objectives:

- ✓ Avoid waste in a quickly changing economic environment.
- ✓ Produce goods without reducing product quality.
- ✓ Reduce costs.
- ✓ Produce a low batch quantity at the earliest possible time.

1.1 Pillars of TPM-

Following are the pillars of Total productive maintenance.

- 1.5S
2. Autonomous maintenance (Jishu Hozen).
3. Kobest Kaizen.
4. Plannend maintenance.
5. Quality maintenance,

6. Training.
7. Office TPM.
8. Safety health and Environment.

1.2 Benefits of TPM

The main benefits of TPM are as follows:

- Increased productivity and OEE (Overall Equipment Efficiency).
- Rectify customer complaints.
- Reduce the manufacturing cost by up to a great extent.
- 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.
- Achieve goals by working as team.
- Horizontal deployment of a new concept in all areas of the organization.
- The workers get a feeling of owning the machine.
- A Safer Workplace.
- Associate Empowerment.
- An Easier Workload.
- Increased Production.
- Fewer Defects.
- Fewer Breakdowns.
- Fewer Short Stoppages.
- Decreased Costs.
- Decreased Waste.

2.0 Literature Review :-

1. IMPLEMENTING TOTAL PRODUCTIVE MAINTENANCE IN MALAYSIAN MANUFACTURING ORGANISATION: AN OPERATIONAL STRATEGY STUDY, One Yoon Seng, Muhamad Jantan Centre for Policy Research, Universiti Sains Malaysia, T. Ramayah School of Management, Universiti Sains Malaysia.

2. To briefly study the literature related to critical success factors (CSFS) of TPM implementation in the manufacturing industry. The main focus is on the role and commitment of top management in supporting the TPM initiative. Effort was made to critically discuss the published research related to CSFs in TPM. (Journal of Engineering Science and Technology Vol. 6, No. 1 (2011) 1 – 16 ©School of Engineering, Taylor's

University) By MANU DOGRA, VSIHAL S. SHARMA, ANISH SACHDEVA, J.S. DUREJA.

3. Management commitment is one of the main issue in TPM implementation and has been discussed in most of the literature related to critical success factors (CSFs), also related to the tangible factors and hierarchical context. (INTERNATIONAL CONFERENCE ON MANAGEMENT, ECONOMICS AND FINANCE (ICMEF 2012) PROCEEDING.) By Adnan Hj. Bakri Quality Engineering Department,

4. Another purpose is to discuss the implementation of the 7-stage autonomous maintenance in industry. In today's global economy an increasing search is on for methods and processes that drive improvements in quality, costs and productivity. TPM has been identified as a best in class manufacturing improvement process, along with the "LEAN" phenomenon that has allowed manufacturing industries to greatly increase their levels of profitability and productivity. (INTERDISCIPLINARY JOURNAL OF CONTEMPORARY RESEARCH IN BUSINESS © 2012 Institute of Interdisciplinary Business Research JUNE 2012 VOL 4, NO 2 By Nazim Baluch, Che Sobry Abdullah, Shahimi Mohtar.

5. INTERDISCIPLINARY JOURNAL OF CONTEMPORARY RESEARCH IN BUSINESS JUNE 2012 VOL 4, NO 2 (TPM AND LEAN MAINTENANCE – A CRITICAL REVIEW By Nazim Baluch and Che Sobry Abdullah)

6. IMPROVEMENT OF OPERATIONAL EFFICIENCY OF EQUIPMENT THROUGH TPM: A CASE STUDY Gaurav Gera, Gurpreet Saini, Rajender Kumar, S. K. Gupta.

7. Overall Equipment Effectiveness Improvement by TPM and 5S Techniques in a CNC Machine Shop Harsha G. Hegde, N. S. Mahesh, Kishan Doss.

3.0 Research Methodology:-

◎ The Aim of this Project is to implement Total Productivity Maintenance on ISO9000 and 14000 Certified Company.

◎ The project contains the combined studies and efforts of Maximum Stage Autonomous Maintenance, Lean Maintenance Phenomenon, Just In Time, Total Quality Management, 3 Step Procedure for the Best Use of skilled labor.

◎ The project can be used to perform analysis and experimentation on machines

and assembly lines to increase the overall productivity.

⊙ This project can be used as study level project But the efforts are being made to implement the project theme on medium Scale manufacturing industry.

⊙ In the next upcoming para we are going to have a look on the detailed use of the methods incorporated in the project.

3.1 KAIZEN

➤ Kaizen is a Japanese word meaning gradual never-ending improvement in all aspects of life. It represents a Japanese approach to improvement and can be interpreted as continuous improvement in all areas. Kaizen is at the heart of quality improvements in Japanese companies.

➤ The approach proceeds in the following steps.

1. Define the area for improvement.
2. Analyse and select the appropriate problem.
3. Identify its causes.
4. Plan countermeasures.
5. Implement countermeasures.
6. Confirm the result.
7. Standardise.

⊙ Also Kaizen can be used to improve the productivity by allowing the employee's participation in this process.

⊙ For this purpose two forms would be developed topic registration form and focused improvement reporting form. These forms would then be submitted to the FI committee .

⊙ This Performa thus will help in analyzing the improvement in terms of its profitability after incorporation of the respective suggestion.

A case study has been taken in a medium scale industry . The case study consists of the interviews and the observations. That is the reason that the both qualitative and quantitative methods are used in the project. The qualitative method is used when interviews are conducted and the quantitative method is used when the data is collected and analyzed. The primary data collected by the company employees. In other words, the primary and secondary data will be used. The deduction approach will be used in this case study project. This approach is helpful when comparing the collected data with the theory. The purpose of the data collection is explained to the

persons involved in the information so that a valid and reliable data can be used in the project. Some Checklists are required for the machine maintenance, it helps for the machine Maintenance data.

Figure 1: Proportion of businesses, employment and turnover in small, medium and large firms.

(Figure 1).

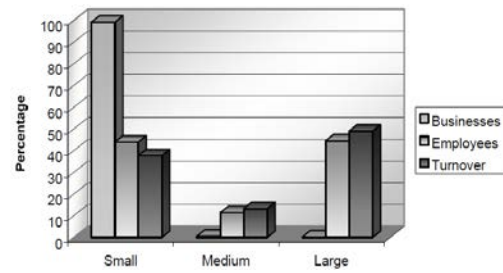


Fig. 1

TPM mainly implemented in large scale industries. but main aim is to trying to implement in medium Scale industries.

A medium enterprise is an enterprise where the investment in plant and machinery (original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O. 1722(E) is more than Rs.5 crore but does not exceed Rs.10 crore.

4.0 Problem Definition:-

⊙ TPM: Out of the whole plant process equipments two main bottleneck equipments were identified and was decided to consider only these two for TPM implementation study.

⊙ Major losses during the production on these equipments were pointed out using a time study approach.

⊙ Using Watches noted down whenever there was a stop or any other situation occurring, which led to idle or stoppage time on equipment.

Implimentation stage.

Overall equipment effectiveness (OEE):-

Overall Equipment Effectiveness (OEE) is viewed as key performance measure in mass-production environments applied to any kind of product. It was introduced by Nakajima [1988] in the context of Total Productivity Maintenance (TPM) and is focused at equipment / machines. Being aggregated metric instead

of many detailed metrics, OEE is experienced as user friendly and clear overall metric and appreciated professionals. According to Huang et report that the concept of OEE is becoming increasingly popular and that it has been widely used as a quantitative tool essential for the measurement of productivity in semiconductor manufacturing operations, because of extreme capacity constrained facility investment. They state that traditional metrics for measuring productivity, throughput and utilization, are insufficient for identifying the problems and underlying improvements needed to increase productivity. OEE is defined as a measure of total equipment performance, that is, the degree to which the equipment is doing what it is supposed to do. Many aspects of OEE have been considered as, states that the definition of OEE does not take into account all factors that reduce the capacity utilization, e.g. planned downtime, lack of material input, lack of labour. Moreover, the available time for operation would be a more appropriate basis for time measurement than the loading time as it was originally used. Similarly, a fixed planned production time and calculates the difference between the actual and planned production time.

5.0 Conclusion :-

Today in the era of globalization, to compete with other worldwide industries like Japan, Korea, China etc. therefore it is necessary to move our industries towards modern trend development in all sectors of industries including maintenance department. So it was found that total productive maintenance (TPM) is one of the best tools for making our industries competitive and effective, in the field of maintenance. While implementing TPM works on major 8 pillars which are (JH, KK, PM, QM, E&T, OT, 5s) It works on methodologies like CLITA, JSA (Job Safety Analysis), PM Analysis for achieving its goal of success. Through this paper is trying to advocate the concept of TPM for Indian approach. The results of implementing an effective program in terms of increased plant efficiency and productivity are outstanding. It is known that a TPM implementation is not a short-term fix program. It is a continuous journey based on changing the work-area, then the equipment so as to achieve a clean, neat,

safe workplace through a "PULL" as opposed to a "PUSH" culture. Significant improvement can be evident within six months, however full implementation can take many years to allow for the full benefits of the new culture created by TPM.

Apparently, successful TPM implementation can achieve better and lasting result as compared to other isolated program because there is an ultimate change in people (knowledge, skills, and behavior) during the progress.

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