

An Exploratory Study for Implementing and Understanding Total Productive Maintenance in Manufacturing Sector, Vadodara

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Abstract

In today's global economy, the survival of companies depends on their ability to rapidly innovate and improve. As a result, an increasing search is on for methods and processes that drive improvements in quality, costs and productivity. In this backdrop Total Productive Maintenance (TPM) which is one of the key concepts of Lean Manufacturing, challenges the view that maintenance is no more than a function that operates in the background and only appears when needed. Total Productive Maintenance is often defined as "productive maintenance involving total participation". It brought an opportunity of global competition where effective and sustainable performance of the corporate became key to organizational success. In such a scenario, human resource (HR) offers competitive advantage to meet the demands of contemporary business. The present study undertaken at manufacturing sector of Vadodara city, Gujarat. The aim of the study is to know the employee perception towards Total Productive Maintenance (TPM) and provide suggestive measures for effective implementation. Sample covers 50 middle level employees in manufacturing units, Vadodara, Gujarat. The findings of the present study for TPM mentioned that in organization it is a successful pillar and helps in achieving zero breakdown, zero accident, and zero losses by involving one and all in the organization.

Keywords: Challenges of TPM; Measures of TPM; Total Productivity Maintenance.

Introduction

In today's global economy, the survival of companies depends on their ability to rapidly innovate and improve. As a result, an increasing search is on for methods and processes that drive improvements in quality, costs and productivity. In today's fast changing marketplace, slow, steady improvements in manufacturing operations will not guarantee profitability or survival. Companies must improve at a faster rate than their competition if they are to become or remain leaders in their industry. Total Productive Maintenance is a complex. Long term process which must be sold to the workforce as a legitimate

improvement methodology. Today, with competition in industry at an all time high, Total Productive Maintenance may be the only thing that stands between success and total failure for some companies. It has been proven to be a program that works. It can be adapted to work not only in industrial plants, but in construction, building maintenance, transportation, and in a variety of other situations. Employees must be educated and convinced that Total Productive Maintenance is not just another "program of the month" and that management is totally committed to the program and the extended time frame necessary for full implementation. If everyone involved in a Total Productive Maintenance program does his or her part, an unusually high rate of return compared to resources invested may be expected.

Total Productive Maintenance is often defined as "productive maintenance involving total participation". To be effective, however Total Productive Maintenance must be implemented on a company wide basis. Unfortunately, some firms abandon Total

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Productive Maintenance because they fail to support workers fully or involve management. According to Total Productive Maintenance principles, the responsibility for optimizing equipment lies not just with the maintenance department but with all plant personnel. The goal of the Total Productive Maintenance program is to markedly increase production while, at the same time, increase associate morale and job satisfaction. Total Productive Maintenance brings maintenance into focus as a necessary and vitally important part of the business. It is no longer regarded as a non-profit activity. Downtime for maintenance is scheduled as a part of the manufacturing day and, in some cases, as an integral part of the manufacturing process.

As Total Productive Maintenance activities begin to yield concrete results which is improving the working environment, minimizing breakdowns, improving quality, reducing set-up and change over times and so on, workers become motivated, involvement increases and improvement suggestions proliferate. People began to think Total Productive Maintenance as part of their day to day jobs making Total Productive Maintenance a way of life for all people. Total Productive Maintenance helps operators understand their equipment and widens the range of maintenance and other tasks they can handle. It enables them to make new discoveries, acquire fresh knowledge and enjoy new experiences. It strengthens motivation, engenders interest in their work and concern for equipment and fosters the desire to maintain equipment in top peak condition.

Objective of the study

The Following are the objective of the study:

- To understand the Effective Implementation Criteria of Total Productive Maintenance
- To study Employee's opinion towards Total Productive Maintenance.
- To suggest measure to an industries for

effective implementation of Total Productive Maintenance.

Sample

The study covers with sample of 50 middle level employees in manufacturing units of Vadodara, Gujarat., The branch managers and departmental managers constitute middle level. They are responsible to the top management for the functioning of their department. They devote more time to organizational and directional functions. In big enterprises, there may be senior and junior middle level management. Their activities include, assigning of jobs and tasks to various workers. They guide and instruct workers for day to day activities, they are responsible for the quality as well as quantity of production etc.

The scoring pattern

On the Five-Point Scale there are five choices for each statement that is 5-Strongly agree, 4-Agree, 3-Neutral, 2-Disagree and 1-Strongly disagree. There are 20 statements that comprises with eight factors and they are promotion of Total Productive Maintenance (TPM), Support & Guidance, Co-ordination, Training Programmes, Initiatives, Management of Total Productive Maintenance, Satisfaction level and Quality circles.

Data analysis and interpretation

Aim of the researchers is to know how organization promoted Total Productivity Maintenance. From the data it positively make out that employee opined that organization do promote such practice. Total Productive Maintenance is an integrated approach towards maintenance functions in organisation. The objective of Total Productive Maintenance is to create an active participation of all employees in maintenance and production functions, including operators; therefore special committees are formed at every level to promote Total Productive

Table 1.1: Promotion of Total Productive Maintenance Effective Criteria

Sr. No	Promotion of Total Productive Maintenance	Agree	Disagree	Neutral
1	Promotion by Organizations	48 (96)	-	2(4.0)
2	Integrated With Production	39(78)	2(4.0)	9(18.0)
3	Information by organization is easily timely and available	39(78)	3(6.0)	8(16.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Maintenance.

It is needed that whenever new practice emerged it is duty of an organization to aware and aid to their employee. In this organization it is found that employee do get support and guidance for Total Productive Maintenance practice. The team gets a chance to discuss the improvements implemented, as well as discuss support needed to continue improving.

Whenever any new practices are being introduced in the organization it is needed that its objectives should be thoroughly made understood to all the employees in the hierarchy. The present table shows that organizations do coordinate with reference to policies and objectives and also coordinates with different departments.

For successful implementation of Total Productivity Maintenance (TPM) all employees should be well versed with the usage of Total Productive Maintenance systems. The table shows that organization arranges training programmes on regular basis for the all employees. Human Resources are developed to operate and maintain equipment and optimal performance. Developing internal champions for the change process, and these "change agents" will make the difference in implementation, by owning the change. Training, development, and coaching will take these employees to new personal levels and

Table 1.2: Support & Guidance One of the Criteria of Total Productive Maintenance

Sr. No	Support & Guidance	Agree	Disagree	Neutral
1.	Support & Guidance for Total Productive Maintenance practice	36 (72.0)	-	14 (28.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Table 1.3: Coordination another Important Factor of Total Productive Maintenance

Sr. No	Coordination	Agree	Disagree	Neutral
1	Coordination with policy & objective	36(72.0)	2(4.0)	12(24.0)
2	Coordination with head & other units	39(78.0)	3(6.0)	8(16.0)

Figure in parenthesis indicates percentage. Source Field Investigation

take your Total Productive Maintenance process to the new heights.

Jitkar (2004) commented on Total Productive Maintenance that many tools such as employee's empowerment, benchmarking, documentation etc. are used to implement and optimize Total Productive Maintenance. Employees must be well trained to take corrective action and a long range out look must be accepted as Total Productive Maintenance may take a year or more to implement and is an on- going process.

The annual results of Total Productive Maintenance activities are considered in formulating goals, objectives, and plans for coming years. The table shows that organizations takes an initiative in formulating plans, implementing 5's, considering the suggestions arising out of meetings etc. that boosts the employees morale and satisfaction level. 5's is a great preparation activity for Total Productive Maintenance. It is fairly easy to implement and generally does not require a lot of maintenance resources. It can help show visible results and demonstrate that change is possible with in the current environment. According to Wireman (1991) one of the important requirements for the success of Total Productive Maintenance is that it requires a consistent and repeatable methodology for implementation, as there is no single correct method for implementation of Total Productive

Table 1.4: Training Programmes an important step towards Total Productive Maintenance

Sr.No	Training Programmes	Agree	Disagree	Neutral
1	Training Programmes are Organized Regularly	41(82.0)	1(2.0)	8(16.0)
2	Improve process & System	28(56.0)	10(20.0)	12(24.0)
3	Human Resource are Developed	36(72.0)	4(8.0)	10(20.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Table 1.5: Initiatives an effective component of Total Productive Maintenance

Sr.No	Initiatives taken by organizations	Agree	Disagree	Neutral
1	Results are considered to formulate plans	30(60.0)	4(8.0)	16(32.0)
2	Suggestions arising out of Meetings	28(56.0)	8(16.0)	13(26.0)
3	Operators take Initiative & Interest	40(80.0)	3(6.0)	7(14.0)
4	5's is Implemented	33(66.0)	1(2.0)	16(32.0)
5	Efforts are made to Apply Total Productive Maintenance	37(74.0)	1(2.0)	12(24.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Table 1.6: Management of Total Productive Maintenance one of the successful pillar

Sr. No	Management of Total Productive Maintenance	Agree	Disagree	Neutral
1	Total Productive Maintenance pillars & techniques are appropriately applied	29(58.0)	6(12.0)	15(30.0)
2	Total Productive Maintenance budgets	35(70.0)	2(4.0)	13(26.0)
3	Total Productive Maintenance is successful in achieving zero breakdowns	31(62.0)	8(16.0)	11(22.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Maintenance programme *Bamber et al. (1999)*.

The success of Total Productive Maintenance depends on the effective management of Total Productive Maintenance, so for that suitable pillars / techniques are applied, Total Productive Maintenance budgets are drawn and managed meticulously and all these leads to zero breakdowns, zero accident and zero losses by involving one and all. According to Nakajima, (1989) study Total Productive Maintenance helps equipment and organization to attend zero breakdowns, zero stoppage, and increase availability and reliability as well. Through Total Productive Maintenance the resources available at all level work closely to achieve desire goal.

The table shows that employees are fully satisfied with the functioning of the Total Productive Maintenance activities in the

Table 1.7: Satisfaction Level an indicator towards effective implementation of Total Productive Maintenance

Sr. No	Satisfaction Level	Agree	Disagree	Neutral
1	Functioning of Total Productive Maintenance in the organization.	38(76.0)	6(12.0)	6(12.0)

Figure in parenthesis indicates percentage. Source Field Investigation

Table 1.8: Quality Circles outcome of Total Productive Maintenance

Sr. No	Quality	Agree	Disagree	Neutral
1	Quality circles working effectively	33(66.0)	5(10.0)	12(24.0)
2	Quality circles problem	26(52.0)	5(10.0)	19(38.0)

Figure in parenthesis indicates percentage. Source Field Investigate

organization. Folts (1988) said that equipment improvement team works on the problem arising in the functioning of the equipments. By taking the time to find out the root of the failures, rather than just fixing the symptoms, they were able to solve the problem, and in the years to come the problem was completely eliminated. That success showed a lot of people in the company that Total Productive Maintenance can make everyone's daily life easier as well as improving productivity.

The members of quality circles meet on regular basis to see the effective working of quality circles, and to discuss the problems and solve it promptly. Quantify the improvements in Total Productive Maintenance process by documenting improvements in parts cost, equipment efficiency, quality, and reduced oil consumption

Concluding remarks

The literature highlights the contributions of various Total Productive Maintenance implementation initiatives for accruing strategic benefits for meeting the challenges posed by global competition. Total Productive Maintenance has emerged as a key competitive strategy for business organizations in the global marketplace. An effective Total Productive Maintenance implementation program can focus on addressing the organization's maintenance related problems, with a view to optimize equipment performance.

In a nutshell, the organization strives hard to promote the Total Productive Maintenance tools, techniques and activities in the organization along with the help, support, guidance and information, so required, is easily and timely available. The Quality Circles are working effectively in the different

departments of this organization where they meet regularly and fruitfully to solve/ prevent the problems whereby important suggestions arising out of the meetings are noted and implemented as early as possible. Training programmes are organized regularly and all the employees are included to attend them especially, "5-S" technique forms an important consideration which is implemented in each and every area of the organization. Finally, Total Productive Maintenance is successful in achieving zero breakdowns, zero accident and zero losses by involving one and all in the organization.

Thus in order to get fruitful advantages of Total Productive Maintenance it should be made a part and parcel of the organization and should be followed at regularly. Moreover Total Productive Maintenance should be integrated to all areas and activities which are performed in the organization.

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