A Study on Effective Total Productive Management With Reference To Micro Polyester Lamination

Arvindhan. G[1], Krishna Prasad.G[2], Krishnasamy.T[3]
[1, 2] Dept of management
[3]Assistant professor, Dept of management
[1, 2, 3] Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu.

Abstract- *TPM is a cost-effective technique through this technique it is possible to maintain the plant, machinery/equipment and tools in productive state in least cost. Well maintained machines leads to productivity. With the company the TPM quality policy is to consistently provide superior quality products and services, surpassing customer expectations on time at affordable prices. Globalization is the new success mantra for every business. Organizations want to create their global image, through their product performance in global market. The rules of global market not decided by any Govt. or any governing agency. It is the rule of market which rule on everyone who is involved in globalization. Market oriented, customer oriented, quality products, customized product etc are the terms used in global market. No one predicate the future, but one can guess for what there is future and answer to this question is quality, speed, least cost, innovation etc. Organization excel themselves to achieve these can survive otherwise there is no hope. Organization realized the importance of quality systems and started enjoying the benefits of quality systems. The main objective is that to study the roles of various people involved in the TPM and to identify tangible and intangible benefits of TPM. For this a sample of 150 was collected from the respondents were percentage analysis, regression, Kruskall Wallis and Rank correlation were used a tools to analyze the data. The conclusion is that the TPM is effectively implemented with the organisation and further slight changes has to be made which leads to cost effectiveness towards the company.*

Keywords- Total Productive Management, Effectiveness and Micro Polyester Lamination

I. INTRODUCTION

Total Productive Maintenance (TPM) is a process or technique. This technique was first introduced by Japanese in 1952. This is an extension to TQM. TPM is a well-defined and organized program which eliminates the losses caused by break-down of machines and equipment's by identifying and attacking all causes of equipment break downs and system down time. TPM is a cost-effective technique through this technique it is possible to maintain the plant ,machinery/equipment and tools in productive state in least cost. Well maintained machines leads to productivity. There is relation between cost of maintenance and cost of quality. We can't think quality outputs without quality inputs and one of the important input is TPM. Cost incurred to maintain equipment is consider as a quality cost. It is possible to achieve stated quality through conscious efforts put by everyone who is directly or indirectly involved in the production and maintenance system by implementing TPM technique. Europeans and Americans thought that production is low status work and maintenance has below status than production because maintenance does not take part directly in revenue generation rather it is treated as system overhead. But Japanese has proved that production and maintenance has high status. Productivity encompasses cost, quality, quantity, efforts, time, rework, scrap, working environment and competitiveness of the organization. Every manufacturing organization wants to achieve productivity and TPM plays major role in it. This study is concerned with the assessment of TPM as tool to improve organization's performance. In a competitive environment, organization require a significant competitive advantage. Implementation of quality system is used to get competitive edge. Total productive maintenance (TPM) is one of the important pillar of quality systems. TPM can be considered as the medical science of machines. TPM is a maintenance program which involves newly define concept for maintaining plants and equipment's. The goal of TPM program is to markedly increase production while, at the same time, increasing employee morale, job satisfaction. TPM helps to hold emergency and unscheduled maintenance to a minimum. Maintenance is the set of activities performed to keep machines working. It is remedial action to restore the equipment to its specified condition. Number of parameters determine the quality of production but proper maintained machine is one of the important parameter which determine quality of production. Cost incurred to maintain the machines vary from organization to organization and machine to machine. But the cost of maintenance after break down is no doubt more than the cost of maintenance if done periodically. TPM helps to improve quality, delivery schedule, and production quantity. Quality is multi-dimensional, but reliability is the key component of quality. Product reliability

is the top priority of manufacturing units. Equipment problems and breakdowns have a direct effect on production cost, production quality and production schedule. There are various types of machine maintenance viz. breakdown maintenance, periodic maintenance, preventive maintenance, corrective maintenance, predicative maintenance etc which one is good, it has number of criteria and organizations used any one or permutation combination of two or more maintenance methods as per the need of the system. Total productive maintenance (TPM) is a change management approach that has considerable impact on the internal efficiency of manufacturing organizations. TPM is an organization-wide strategy to increase the effectiveness of production environments, especially through methods for increasing the effectiveness of equipment. TPM is considered by many writers to be an indispensable contribution to lean production supporting just-in-time (JIT) manufacture and total quality management (TQM), and has been shown as an essential pillar alongside JIT and TQM for companies seeking world-class manufacturing status. This method gives lot of advantages to the organization in monetary and nonmonetary terms. The basic concept of TPM is zero loss concept means zero breakdown, zero defects and zero accidents. TPM is also known as totally painted machine. Another long form is Taking pride in our Machine and this is the basic philosophy behind TPM technique. Using this philosophy, ownership of machine assigned to the operator and after some period operator feels this is my machine and I must maintain it. They treat maintenance as a routine everyday activity of production. Special time allocated for machine maintenance, which leads to high equipment and labour productivity without compromise with stated quality. Apart from reducing maintenance cost and keep machine in working state. There are number of benefits which organization can enjoy for long time if organization implement TPM. It is the philosophy through which organization can go into continuous improvement mode in all the activities. This activities lead to productivity and competitiveness of individual to groups, machine to plant and overall complete organization. Organizations having these two characteristics can sustain growth without having fear of survival.

II. NEED OF THE STUDY

The problem is that TPM is a tool for the organization to maintain specified quality and to create environment in which each employee, each task and each process has a scope for improvement and when the organization develop continues improvement culture it effect on quality , productivity and competitiveness of the organization that is possible to achieve through total productive maintenance.

OBJECTIVES OF THE STUDY

- To analyse the perception of employees towards Operations and process within the company.
- To ascertain the acceptance of employees towards quality process with maintenance schedules.
- To evaluate the barriers of TPM within the company.
- To analyse the satisfaction of employees towards their job and based human factors.

SCOPE OF THE STUDY

This research study mainly focuses on Total Productive Maintenance and its impact on organization performance. It is an empirical investigation. In this study Jenntex was selected in which TPM is implemented. The researcher has studied four sectors in overall companies performance. Through purposive sampling method(Non probability sampling) organization are selected from the company. The scope of the study is related to the operations of the representative company during the year 2021.

III. RESEARCH METHODOLOGY

Type of Research: The study was descriptive in nature.

Data and sources of data: The data was collected through two different sources

Primary data: The primary data was collected through survey method were scaling point was used for the study were Poor was given 1 and Very good-5

Secondary data: The secondary data was collected through Journals, websites and Articles.

Time period covered: The time period covered for the study was from January 2021- April 2021.

Population & Sample Size: Out of 260 employees working with the company 150 was taken as sample size of the study.

Sampling Technique: Random sampling was used as type of sample for the study.

Statistical tools used: Frequency analysis, One way Anova and Linear regression model

IV. LIMITATIONS OF THE STUDY

- The sample size is restricted to 150.

- There may be a bias in collection of primary data from the respondents.
- The study period is limited to six months.

ANALYSIS AND INTERPRETATION

Demographic variables	Particulars	Frequency	Percent
Gender	Male	104	69.3
	Female	46	30.7
	Total	150	100
Age	18 to 25 years	30	20
	26 to 35 years	32	21.3
	36 to 45 years	70	46.7
	Above 45 years	18	12
	Total	150	100
Educational Qualification	Primary school education	39	26
	Secondary school education	30	20
	Under graduation	35	23.3
	Post-graduation	46	30.7
	Total	150	100
Marital status	Married	25	16.7
	Unmarried	125	83.3
	Total	150	100
Number of members in family	1--3	31	20.7
	4--6	62	41.3
	7--9	40	26.7
	Above 9	17	11.3
	Total	150	100
Income level	Below 10000	15	10
	Rs.10000-2000	24	16
	Rs.20001-30000	21	14
	Rs.30001-40000	53	35.3
	Above 40000	37	24.7
	Total	150	100
Experience	1 year	29	19.3
	1-3 years	36	24
	3-5 years	50	33.3
	Above 5 year	35	23.3
	Total	150	100

The above table shows about the demographic variables of the respondents were out of 150 respondents the gender male 69.3%, female 30.7%.20.0% are from the age group between 18 to 25 years, 21.3% are from the age group between 26 to 35 years, are from the age group between 46.7%, are from the age group between 36 to 45 years, 12.0% are from the age group above 45 years. 26.0%, have completed their primary school education, 20.0% have completed their Secondary school education, 23.3% have completed their under graduation and 30.7% have completed their post-graduation. 16.7% are married and 83.3% are unmarried. 20.7% are having 1-3 members, 41.3% are having 4-6 members, 7-9 members 26.7%, and 11.3% are having above 9 members. 10% are earning below 10000, 16.0% earring between Rs.10000-2000, 4.0%, earring Rs.20001-300001, 35.3%, earring Rs.30001-40000 and 24.7% are earning above 40000. 19.3% are having experience upto 1 year, 24.0% are having between 1-3 years, 33.3% are having experience 3-5 years, and 23.3% are having above 5 years.

The perception of employees towards Operations and process within the company

Particulars	N	Mean	SD
V1	150	2.64	1.348
V2	150	2.75	1.317
V3	150	2.76	1.288
V4	150	3.03	1.292
V5	150	2.44	1.212
V6	150	2.78	1.394
V7	150	2.65	1.362
V8	150	2.47	1.299

The respondents agree towards considering themselves a technician with sufficient practical experience (2.64), sufficient number of skilled employees in the production area (2.75), agree towards operation reports completed by the employees (2.76), communication process to and from the control room available throughout the plant (2.44), sufficient training on the operational aspects of the factory (2.78), sufficient lighting, particularly night lighting, at the plant (2.65), and also agree towards external electrical power cuts having an effect on the factory (2.47). The employees disagree towards regularly inspecting control and monitoring devices and equipment's (3.03).

Comparison between demographic profile (gender and marital status) and the perception of employees towards Operations and process within the company

Demo graphic variables	Particulars	N	Mean Rank	Chi-Square	Asymp. Sig.
Gender	Male	104	73.51	0.717	0.397
	Female	46	80.00		
	Total	150			
Marital status	Married	25	88.76	2.814	0.093
	Unmarried	125	72.85		
	Total	150			

Ho1: There is no relationship between demographic profile (gender and marital status) and the perception of employees towards operations and process within the company

There is a relationship between gender (0.397) and marital status (0.093) and perception of employees towards operations and process within the company.

Comparison between demographic profile (age, educational qualification, number of members in family, income level, experience) and the perception of employees towards Operations and process within the company

Demo graphic variables	Particulars	N	Mean	SD	F	Sig
Age	18 to 25 years	30	2.58	0.542	1.298	0.277
	26 to 35 years	32	2.66	0.468		
	36 to 45 years	70	2.72	0.479		
	Above 45 years	18	2.84	0.392		
	Total	150	2.69	0.482		
Educational Qualification	Primary school education	39	2.71	0.445	0.805	0.493
	Secondary school education	30	2.76	0.476		
	Under graduation	35	2.59	0.564		
	Post-graduation	46	2.71	0.451		
	Total	150	2.69	0.482		
Number of members in family	1-3	31	2.59	0.476	1.453	0.230
	4-6	62	2.66	0.524		
	7-9	40	2.76	0.415		
	Above 9	17	2.86	0.460		
	Total	150	2.69	0.482		
Income level	Below 10000	15	2.40	0.453	2.787	0.029
	Rs.10000-20000	24	2.61	0.536		
	Rs.20001-30000	21	2.60	0.518		
	Rs.30001-40000	53	2.77	0.447		
	Above 40000	37	2.80	0.439		
	Total	150	2.69	0.482		
Experience	1 year	29	2.55	0.341	1.579	0.197
	1-3 years	36	2.65	0.458		
	3-5 years	50	2.79	0.542		
	Above 5 year	35	2.71	0.502		
	Total	150	2.69	0.482		

There is a significant difference between income level (0.029) and the perception of employees towards Operations and process within the company. There is no significant difference between age (0.277), education qualification (0.493), Number of members in family (0.230), and Experience (0.197) and the perception of employees towards Operations and process within the company.

Income level

The respondents who are earring income below 10000 (2.40), earning between Rs.10000-Rs.20000 (2.61), earring between Rs.20001-30000 (2.60), earring between Rs.30001-40000 (2.77), and earring above 40000 (2.80) agree towards the perception of employees towards operations and process within the company.

V. FINDINGS

- Most of the respondent's male.
- Maximum of the respondents from the age group between 36 to 45 years.
- Most of the respondents from the age group between 36 to 45 years.
- Maximum of the respondents marital status are unmarried.
- Most of the respondents are having 4-6 members in their family.
- Maximum of the respondents income level Rs.30001-40000.
- Most of the respondents are having experience between 3-5 years.

Perception of employees towards Operations and process within the company

The respondents agree towards considering themselves a technician with sufficient practical experience (2.64), sufficient number of skilled employees in the production area (2.75), agree towards operation reports completed by the employees (2.76), communication process to and from the control room available throughout the plant (2.44), sufficient training on the operational aspects of the factory (2.78), sufficient lighting, particularly night lighting, at the plant (2.65), and also agree towards external electrical power cuts having an effect on the factory (2.47). The employees disagree towards regularly inspecting control and monitoring devices and equipment's (3.03).

Comparison between demographic profile and the perception of employees towards Operations and process within the company

Income level

The respondents who are earring income below 10000 (2.40), earning between Rs.10000-Rs.20000 (2.61), earring between Rs.20001-30000 (2.60), earring between Rs.30001-40000 (2.77), and earring above 40000 (2.80) agree towards the perception of employees towards operations and process within the company.

Acceptance of employees towards quality process with maintenance schedules

The employees strongly agree towards system for recording maintenance of equipment and machinery (1.83), program for the inspection of machinery and equipment with the company (1.99), receiving training in inspection procedures equipment and machinery (1.78) and written reports on the process of inspection submitted (1.92). Meanwhile, the employees disagree towards availability of spare parts (2.93).

Barriers of TPM within the company

The respondents strongly agree towards barriers related to cultural resistance (1.95), failure to allow sufficient time for the evolution (1.70) and agree towards barriers related to lack of communication (2.05).

Satisfaction of employees towards their job and based human factors

The respondents agree towards being happy with their work (3.55), included in recreational activities organized by the factory (3.32), sufficient monthly salary in the plant (3.47) and receiving other benefits from their work (3.65).

Comparison between demographic profile and satisfaction of employees towards their job and based human factors

Gender

Male respondents (75.85) have high level of satisfaction towards their job and based human factors.

Age

The respondents who are from the age group between 18 to 25 years (3.43), between 26 to 35 years (3.31), between 36 to 45 years (3.61), Above 45 years (3.51) agree towards satisfaction of employees towards their job and based human factors.

VI. SUGGESTIONS

- Top management needs to create an environment that will support the introduction of TPM. Without the support of management, skepticism and resistance will kill the initiative.
- The company can launch a formal education program. This program will inform and educate everyone in the organization about TPM activities, benefits, and the importance of contribution from everyone.
- The organisation can create an organizational support structure. This group will promote and sustain TPM activities once they begin. Team-based activities are essential to a TPM effort. This group needs to include members from every level of the organization from management to the shop floor. This structure will promote communication and will guarantee everyone is working toward the same goals.
- The company can develop an early equipment management program. Apply preventive maintenance principles during the design process of equipment.
- The fir can conduct training to improve operation and maintenance skills. Maintenance department will take on the role of teachers and guides to provide training, advice, and equipment information to the teams.

VII. CONCLUSION

The conclusion is that the TPM is effectively implemented with the organisation and a further slight change has to be made which leads to cost effectiveness towards the company.

REFERENCES

[1] Almeanazel, O. T. R. (2010). Total productive maintenance review and overall equipment effectiveness measurement. *Jordan Journal of Mechanical and Industrial Engineering*, *4*(4).

[2] Blanchard, B. S. (1997). An enhanced approach for implementing total productive maintenance in the manufacturing environment. Journal of quality in Maintenance Engineering, 3(2), 69-80.

[3] Ljungberg, Õ. (1998). Measurement of overall equipment effectiveness as a basis for TPM activities. *International Journal of Operations & Production Management*, *18*(5), 495-507.

[4] Singh, K., & Singh Ahuja, I. (2014). Effectiveness of TPM implementation with and without integration with TQM in Indian manufacturing industries. *Journal of Quality in Maintenance Engineering*, *20*(4), 415-435.

[5] Van den Hout, W. B., Tijhuis, G. J., Hazes, J. M. W., Breedveld, F. C., & Vlieland, T. V. (2003). Cost effectiveness and cost utility analysis of multidisciplinary care in patients with rheumatoid arthritis: a randomised comparison of clinical nurse specialist care, inpatient team care, and day patient team care. *Annals of the Rheumatic Diseases*, *62*(4), 308-315.