

# Implementation of Modern Tools and Methodology at Workshop for Improvement in Production and Quality Outcomes

Arun Raddi

*Department of Mechanical Engineering  
Angadi institute of technology and management, Belagavi, Karnataka, India*

Prof. Girish Athanikar

*Department of Mechanical Engineering  
Angadi institute of technology and management, Belagavi, Karnataka, India*

**Abstract-** The goal of this paper is to evaluate the offer of aggregate profitable support (TPM) towards enhancing the assembling execution in A Small scale industry. The relationship among different TPM usage degree and assembling act enhancements have been approved and assessed by utilizing general hardware viability (OEE). The report concentrates on the imperative commitments of TPM usage towards the achievement variables like top administration association and authority, TPM execution activities, customary support rehearses and towards influencing change in the assembling execution of A Small scale industry. The review demonstrates that engaged TPM usage over an era can contribute towards acknowledgment of huge assembling execution enhancements. The report highlights the considerable capability of TPM usage start which influences the hierarchical execution change. The achievement of A Small scale industry through proactive TPM use has been assessed; basic TPM achievement variables are distinguished for upgrading the viability of TPM usage program in the organization.

**Keywords –** TPM, 5S, Autonomous Maintenance, Kaizen, Planned Maintenance, Quality Maintenance

## I. INTRODUCTION

TPM is a new way to deal with upkeep which promotes autonomous maintenance by operators through day-to-day activities involving total workforce, optimizes equipment effectiveness and eliminates breakdowns. The manufacturing industries have experienced an unpredictable change over the most recent three decades, including quick changes in item and process advancements, client desires, administration approaches, provider states of mind and additionally focused conduct. In present fast - changing market, slow improvements in manufacturing operations do not give guarantee of sustained benefit or survival of an organization. Consequently the firm needs to enhance at a fast rate contrasted with its rivals, in the event that they need to remain pioneers in industry. In such a scenario We planned and executed the experiment with using the modern management tools to improve overall development of the industry in terms of productivity, Quality, And moral values of the employees. This paper is the total summarized content of the whole experiment and project implementation.

## II. PROPOSED METHODOLOGY

### *2.1 PILLARS OF TPM*

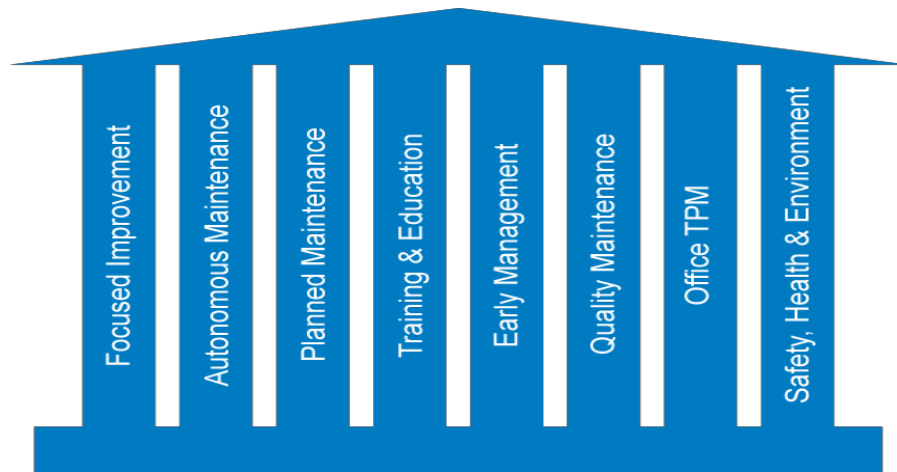


Figure 1. Pillars of TPM

All the contents of the TPM pillar illustrate the methods of implementation of TPM and by which the overall improvement of the organization takes place. Is illustrated as bellow

## 2.2 5S

TPM begins with 5S. It's a systematic approach of housekeeping for achieving a quiet environment at the work place making the employees commit sincerely to implement and practice housekeeping. Problems can't be clearly visible when the work place is unorganized. Organizing and cleaning the workplace helps team to uncover problems. Identifying problems is the first move of improvement. 5S is a foundation before the application of TPM

5S elaborates with the following 5 steps

1. Seiri – Sort
2. Seiton – Set in order
3. Seiso – shine
4. Seiketsu – standardize
5. Shitsuke – Sustain

All tools were randomly stored leading to searches and wastage in time

Tool rack was created in the central location of the shop floor. A smaller tool rack is also placed near the machine


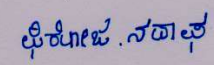
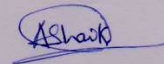
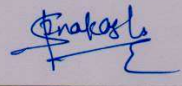
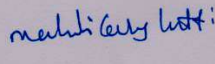
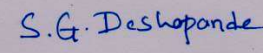
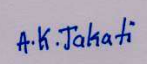

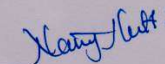



Figure 2. Before and after picture of 5S implimentation

**ARYA TECHNOCRATS WORK FORCE TRAINING FORMAT**

SUBJECT: Training on 5-S & Kaizen  
 TRAINER: Arun. Raddi

DATE: 10/03/18  
 11:20 am

EMPLOYEE NAME	SIGNATURE
Shashidhar. Hadlimani	
Firoz. Nadaf	
Anand. Naik	
Prashant. Karagatti	
Mallikarjun latti	
Sachin. Deshpande	
Abdul. Khadir	
Aniruddha. Bimbar	
Nagaraj. Hatti	
Pradeep. Maggad	

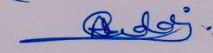
(Arun. Raddi)  


Figure 5. Training Format Of 5S implementation

### 2.3 Autonomous maintenance

the objective is to keep up the machine in a decent condition. The exercises are exceptionally straightforward in nature. This incorporates visual assessment, cleaning fixing of extricated jolts, greasing up, and so forth. AM arrangements are-unstopped operation of types of gear, by active employee participation removing the defects at source and making operators to operate as well as maintain other equipments. Sequences in AM are as follows: take counter measures, preparation of employees, fix tentative AM standards, general inspection i.e. initial cleanup of machines, lubrication, Tightening etc

SI No.	CHECKS	DAILY	WEEKLY	MONTHLY
1	Telescopic cover cleaning	YES		
2	check cleanliness of tools	YES		
3	Spindle nozzle coolant pressure	YES		
4	Y axis guide way cleanliness			YES
5	Y axis guide way telescopic covers & lubrication			YES
6	Check the condition of X axis Bellow			YES
7	Magazine & pockets cleanliness	YES		
8	Clean chips below the magazine	YES		
9	Clean tool recognitions sensors			YES
10	ATC gear box oil level			YES

Table 2.3.1. Autonomous maintenance check list

### 2.4 Quality Maintenance

QM activities' to set equipment conditions that prevent quality defects, based on this basic concept of maintaining ideal equipment, to maintain perfect quality of products is achieved. The condition is checked and measured in time series to the extent that measured values are within std values to prevent defects. The advancement of measured esteems supposedly predicts capability of deformities happening and to catch counter measures a long time some time recently. QM arrangements are without deformity condition and control of supplies, focus of avoidance of defects at source, in-line detection and separation of defects quality preservation activities to support quality promise, focus on Poka-Yoke also, successful execution of administrator quality affirmation.

### 2.5 Training

The workers must be prepared to accomplish the 4 periods of abilities. The point is to create a plant brimming with specialists. The different periods of abilities are stage 1: don't have the foggiest idea, stage 2: knows the hypothesis however can't do, stage 3-can do yet can't educate and stage 4-can do and instruct. Preparing strategies are centered around enhancing information, methods and aptitudes and furthermore framing a preparation situation for the self-discovering that depends on necessities, preparing program incorporates devices and evaluation and so on going for representative recovery, preparing to dispense with worker weariness and make their work pleasant. Preparing targets are accomplished and maintained downtime by the need of men at zero deformities on basic machines, accomplishing

and managing zero misfortunes which is because of absence of abilities and goes for 100% investment in recommending plans.

### 2.6. Office TPM

Office TPM should begin after triggering 4 diverse pillars of TPM i.e. (AM, Kaizen, PM, and QM). Office TPM is to be taken after to propel gainfulness, viability in definitive limits and to recognize, discard hardships. Office TPM reports 12 important disasters they are correspondence misfortune; preparing misfortune; sit without moving misfortune; cost misfortune that incorporates into territories like promoting, acquirement, accounts, deals unmistakable to high inventories; office gear breakdown; set-up misfortune; exactness misfortune; time spent on recuperation of data; non openness of correct on line stock status; correspondence station breakdowns like phone and fax lines; client grumblings as a result of co ordinations; and costs caused on crisis dispatches/buys. Advantages of office TPM are inclusion of everybody in supporting capacities for focusing on better used work put, better plant execution, diminish dreary work, lessened administrative costs, diminished stock related passing on cost, reducing in no. of reports, yield of people in solid limits, diminishing in breakdown of the work environment equipment, decreased customer protests in perspective of collaborations, reduced costs as a result of energetic dispatches/purchases, lessening work and immaculate, beautiful work put.

### 2.7. Safety, Health and Environment

In this place focus must be in making a secured circumstance and range that is not destroyed by our methodology or techniques. This will accept a red hot part in when stood out from substitute sections on predictable commence. Security, well being and condition points are zero flames, zero mishap and zero well being harm. A board is built up for this column, which incorporates illustrative of specialists and also officers. The group is led by senior VP (specialized). Most noteworthy significance for well being is given at the plant. Chief (wellbeing) takes care of parts identified with security. To make awareness among representatives a few rivalries like show, security mottos, blurbs, test, and so on identified with wellbeing must be organized at normal interims.

## III. FORMULAS OF CALCULATION

- (a) Percentage of quality =  $(\text{Total components produced} - \text{Defected components}) / \text{Total components produced}$   
 Defected component =  $\text{Total breakdown} \times \text{Component produced per hour}$
- (b) Availability rate =  $(\text{Net loss} / \text{Total good hours}) \times 100$
- (c) Performance rate =  $[\text{Net loss} - (\text{Management loss} + \text{Start up loss})] / \text{Net loss}$   
 OEE =  $(\text{Performance rate}) \times (\text{Availability rate}) \times (\text{Quality rate}) \times 100 \%$

## IV. RESULTS AFTER TPM

Before TPM implementation on 2018		After TPM implementation on 2018	
Month	Total Loss	Month	Total Loss
January	62.95 Hrs	April	41.44 Hrs
February	81.41 Hrs	May	26.90 Hrs
March	62.52 Hrs		

Table 3.1. Losses before and after TPM

Before TPM implementation on 2017-18		After TPM implementation on 2018	
Month	OEE	Month	OEE
December	60.52%	March	75.65%
January	66.44%	April	80.06%
February	70.81%		

Table 3.2 OEE before and after TPM

## V.CONCLUSION

An assembling capacity has been broke down and concentrated the TPM execution issues, the way took after and key benefits acknowledged from OEE subsequently of TPM usage. It can be comprehended that OEE on machine shop has demonstrated a dynamic development which is an indication of diminishing in improve, increment in gear accessibility, dismissal and increment in rate of execution. Accordingly, general profitability of business additionally expanded. OEE esteem is moving and with the pass of time results will be great and may achieve a world class OEE estimation of 85%-90%. TPM has been broadly known in assembling condition. This proactive upkeep technique added to assembling execution enhancements which are highlighted by different scientists. Through TPM prepare center the quality and costs were enhanced impressively by decreasing and limiting hardware plummet and disappointments. Cost of repairs and improve decreased as a result of extremely restricted items dismisses because of gear disappointment. Henceforth, the general viability of gear enhanced fundamentally. Moreover, hardware decrease was annihilated as the gear worked proficiently.

## REFERENCES

- [1] Ahuja, I.P.S. & Khamba, J.S. (2007). An evaluation of TPM implementation initiatives in an Indian manufacturing enterprise. *Journal of Quality in Maintenance Engineering*, 13(4), 338-52.
- [2] Ahuja, I.P.S. & Khamba, J.S. (2008a). An evaluation of TPM initiatives in Indian industry for enhanced manufacturing performance. *International Journal of Quality & Reliability Management*, 25(2), 147-72.
- [3] Thun, J.H. (2006). Maintaining preventive maintenance and maintenance prevention analysing the dynamic implications of total productive maintenance. *System Dynamics Review*, 22(2), 163- 179.
- [4] Ahmed, S., Hassan, M.H. & Taha, Z. (2005). TPM can go beyond maintenance: excerpt from a case implementation. *Journal of Quality in Maintenance Engineering*, 11(1), 19-42.
- [5] Dal, B., Tugwell, P. & Greatbanks, R. (2000). Overall equipment effectiveness as a measure for operational improvement: A practical analysis. *International Journal of Operations & Production Management*, 20(12), 1488-502.
- [6] Ahuja, I.P.S. & Khamba, J.S. (2008b). Justification of total productive maintenance initiatives in Indian manufacturing industry for achieving core Total Productive Maintenance: A Case Study in Manufacturing Industry *Global Journal of Researches in Engineering Volume XII Issue VI Version I*
- [7] Bhadury, B. (2000). Management of productivity through TPM. *Productivity*, 41(2), 240-51.
- [8] Leachman, C., Pegels, C.C. & Shin, S.K. (2005). Manufacturing performance: evaluation and determinants. *International Journal of Operations & Production Management*, 25(9), 851-874.

- [9] Eti, M.C. Ogaji, S.O.T. & Probert, S.D. (2004). Implementing total productive maintenance in Nigerian manufacturing industries. *Applied Energy*, 79(4), 385-401.
- [10] Gupta, R.C., Sonwalkar, J. & Chitale, A.K. (2001). Overall equipment effectiveness through total productive maintenance. *Prestige Journal of Management and Research*, 5(1), 61-72.