

# Implementating Total Productive Maintance In Jamna Auto Industry Malanpur

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## ABSTRACT:-

A fundamental component of world class manufacturing is that of the total productive maintenance (TPM), which has been recognized as one of the significant operation strategy to regain the production losses due to equipment inefficiency. TPM process it self undergoes continuous improvement Thomas Observes that "in highly technical, rapidly changing environment, traditional TPM Methodologies will have to be adapted to provide earlier returns if it is to become a viable means for improvement " TPM used as tool to improve reliability involve the workforce in equipment are improve the maintenance function and overall cleanliness and safety. The aim of the paper is to study the implementation of the TPM program in industries. Through a case study of implementing TPM in an Jamna Auto industry And when we compare previous month data before implementing TPM and after implementing TPM data then finally we find out reduction in the maintenance cost and improve quality performance of product.

**Key words:-** Eye rolling machine, maintenance program, six big losses

## 1.Introduction

What is TPM? – Kaizen introduces the idea that employee expertise generates improvements. TPM stands for total productive maintenance. TPM is first developed in Japan and Japanese say, "to discover the mountain of possibilities". it is team based preventive and productive maintenance and involve every level, from top executive to the floor operator. A great amount of companies find, that in spite of the large improvements in the productivity in last years, there is still a big potential to be better in utilizing the machine tools. TPM covers all departments such as the planning department, the user and the maintenance department. The successful implementation of TPM in the industry to approach and practice TPM; support and improvement, providing empowerment and incentives, promoting cross functionality and team work. TPM is an

excellent work philosophy that really gains in the productive process. Under TPM, machine operators carry out routine maintenance such as checking water, oil, coolant and air levels. This may involve some training of machine operators. Through operator training to do simple maintenance on machines will promote ownership and more attention to detail. The actual maintenance teams should as a result of spending less time doing routine maintenance is in a position to concentrate on more urgent machine breakdowns. TPM should promote better team working in the workplace, as the operators will be helping the maintenance team with their tasks. It is continuous improvement process. The goal is to reduce emergency and unscheduled maintenance.

## 2. Goal of TPM

1. Obtain minimum 90% OEE (Overall Equipment Effectiveness)
2. Run the machines even during lunch.
3. Operators in a manner, so that there are no customer complaints.
4. Reduce the manufacturing cost by 30%
5. Achieve 100% success in delivering the goods as required by the customer.
6. Maintain an accident free environment.
7. Achieve zero breakdown and zero defects

## 3. STEPS OF TPM IMPLEMENTATION

### STAGE A (PREPARATORY STAGE):-

STEP 1 - Announcement by Management to all about TPM introduction in the organization.

STEP 2 - Initial education and propaganda for TPM.

STEP 3 - Setting up TPM and departmental

STEP 4 - Establishing the TPM working system and target

STEP 5 - A master plan for institutionalizing

### STAGE B ( INTRODUCTION STAGE):-

This is a ceremony and we should invite all. Suppliers as they should know that we want quality supply from them. Related companies and affiliated

companies who can be our customers, sisters concerns etc. Some may learn from us and some can help us and customers will get the communication from us that we care for quality output.

**STAGE C (IMPLEMENTATION):-**In this stage eight activities are carried which are called eight pillars in the development of TPM activity. Of these four activities are for establishing the system for production efficiency, one for initial control system of new products and equipment, one for improving the efficiency of administration and are for control of safety, sanitation as working environment.

**STAGE D (INSTITUTIONALISING STAGE):-** By all their activities one would have reached maturity stage. Now is the time for applying for PM award. Also think of challenging level to which you can take this movement.

### 3.1 Pillars of TPM

**3.1.1 Pillar 1-5S:-**TPM starts with 5S. Problems cannot be clearly seen when the work place is unorganized. Cleaning and organizing the workplace helps the team to uncover problems. Making problems visible is the first step of improvement.

Japanese Term	English Translation	Equivalent 'S' term
Seiri	Organization	Sort
Seiton	Tidiness	Systematize
Seiso	Cleaning	Sweep
Seiketsu	Standardization	Standardize
Shitsuke	Discipline	Self – Discipline

**3.1.2 Pillar 2 - JISHU HOZEN (Autonomous maintenance):-**This pillar is geared towards developing operators to be able to take care of small maintenance tasks, thus freeing up the skilled maintenance people to spend time on more value added activity and technical repairs. The operators are responsible for upkeep of their equipment to prevent it from deteriorating.

**3.1.3 Pillar 3 – KOBESTU KAIZEN:-**"Kai" means change, and "Zen" means good (for the better). Basically kaizen is for small improvements, but carried out on a continual basis and involve all people in the organization. Kaizen is opposite to big spectacular innovations. Kaizen requires no or little investment.

**3.1.4 Pillar 4 - Planned Maintenance:-**It is aimed to have trouble free machines and equipments producing defect free products for total customer satisfaction. This breaks maintenance down into 4 "families" or groups which were defined earlier.

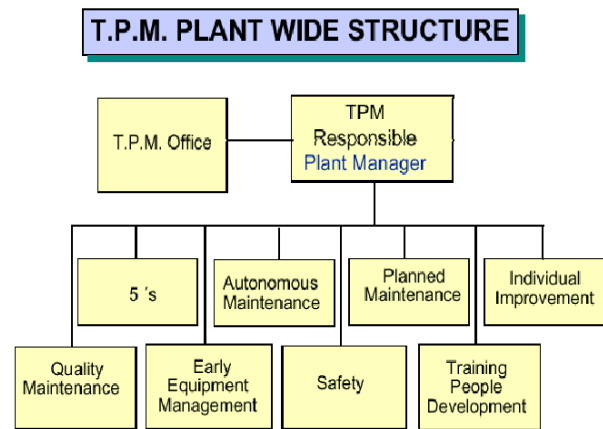
1. Preventive Maintenance
2. Breakdown Maintenance
3. Corrective Maintenance
4. Maintenance Prevention,

With Planned Maintenance we evolve our efforts from a reactive to a proactive method and use trained maintenance staff to help train the operators to better maintain their equipment.

**3.1.5 Pillar 5 - Quality Maintenance:-**It is aimed towards customer delight through highest quality through defect free manufacturing. Focus is on eliminating non-conformances in a systematic manner, much like Focused Improvement. We gain understanding of what parts of the equipment affect product quality and begin to eliminate current quality concerns, and then move to potential quality concerns. Transition is from reactive to proactive (Quality Control to Quality Assurance).

**3.1.6 Pillar 6 – Training:-**It is aimed to have multi-skilled revitalized employees whose morale is high and who has eager to come to work and perform all required functions effectively and independently. Education is given to operators to upgrade their skill. It is not sufficient know only "Know-How" by they should also learn "Know-why".

**3.1.7 Pillar 7 - Office TPM:-**Office TPM must be followed to improve productivity, efficiency in the administrative functions and identify and eliminate losses. This includes analyzing processes and procedures towards increased office automation.



**Figure 1: – Organizational TPM Structure**

### 3.1.8 Pillar-8- Safety, Health and Environment Target:-

1. Zero accident,
2. Zero health damage
3. Zero fires.

In this area focus is on to create a safe workplace and a surrounding area that is not damaged by our process or procedures. This pillar will play an active role in each of the other pillars on a regular basis.

A committee is constituted for this pillar which comprises representative of officers as well as workers. The committee is headed by senior vice President (Technical). Utmost importance to Safety is given in the plant. Manager (Safety) is looking after functions related to safety. To create awareness among employees various competitions like safety slogans, Quiz, Drama, Posters, etc. related to safety can be organized at regular intervals.

### 4. MAINTANCE PROGRAM:-

The seven steps of autonomous maintenance are

1. Initial cleaning: Clean to eliminate dust and dirt mainly on the body of the equipment: lubricate and tighten; discover problem
2. Countermeasures at the source of problems: Prevent the causes of dust, dirt and spattering of liquids; improve those parts of equipment that are hard to clean and lubricate; reduce the time required for cleaning and lubricating.
3. Cleaning and lubrication standards: Establish standards that reduce the time spent cleaning, lubricating and tightening(specify daily and periodic).
4. General inspection: Follow the instruction manual; quality circle members discover and correct minor equipment defects.
5. Autonomous inspection: Develop and use autonomous inspection check sheets
6. Orderliness and tidiness: Standardize the individual workplace control categories; thoroughly systemize maintenance control:  
Inspection standards for cleaning and lubricating  
Cleaning and lubricating standards in the workplace.  
Standards for recording data  
Standards for parts and tool maintenance.
7. Fully autonomous maintenance: Develop a company policy and goals for maintenance; increase the regularity of improvement activities. Record the mean time between failures(MTBF), analyze the results and design countermeasures.

### 5. IMPACT FACTER OF IMPLEMENTATION TPM:-

- Management improvement participation (leadership)
- Organizational infrastructure.
- Craft and culture of collaboration and co operation.
- Linking TPM to business strategy & Linking TPM to quality.
- Project prioritization and selection Employee Training & understanding of TPM methodology.
- Linking TPM to customers & employees & to create empowerment and authority at all levels.
- Spreading of TPM in production, Design, Marketing and all Depts. Of industries including health, office and safety Depts.

### 6. DIRECT BENEFITS OF TPM:-

1. Increase in productivity and OEE(overall Equipment Efficiency)
2. Reduction in customer complaints.
3. Reduction in the manufacturing cost by 30% 4. Satisfying the customer's needs by 100%  
Reduced accident.
5. Better utilized work area.
6. Reduce inventory level in all parts of Supply chain.
7. Reduction number of file

### 7. INDIRECT BENEFITS OF TPM:-

1. Higher confidence level among the employees
2. A clean, neat and attractive work place.
3. Favorable change in the attitude of the operators.

### 8. BIG SIX WASTES WHICH ARE BEING ELIMINATED BY TPM:-

- 1.Set up & adjustment - Due to exchange of die in molding machines, presses, and so on
- 2.Breakdown - Equipment failure
- 3.Idealing & minor stoppages - Due to the abnormal operation of sensors, blockage of work on chutes
- 4.Reduced speed - due to discrepancies between Specified and actual speed of equipment.
- 5.defects - due to scrap and rework
- 6.Start up - reduced yield

## 9. DATA ANALYSIS:-

Jamna auto industries Limited is ISO-9001 certified company, there are 750 employees. There are 104 machines

available. The main product of the company was conventional leaf spring and parabolic leaf spring which was made up of eight machines.

The study has been carried out on two machines first is parabolic machine and second one is eye rolling machine have selected because this are oldest machine there efficiency and performance were very low & also unsafe because of 100% air cleaning. These are most expensive machines with high maintenance cost, supply improper coolant and lack of skilled workers. After selection of machine data collection have been carried out. Data collected for the past four months. The operation is based on the three shifts per day every shifts is for eight hours the planned down time per shift 15min at the end of each shift for cleaning and tidying up the work area.

The following data for the last four months was calculated and analyzed for eye rolling machine

1. Breakdown time
2. Setting time
3. Tool change time
4. No operator time
5. Now power time
6. No air time

The following action carried out during observation of eye rolling machine in jamna auto industries limited and after the implementing of TPM. The following results are shown.

Down time for conventional leaf spring (Nov11 to April 12)

	Before TPM				After TPM	
	Nov	Dec	Jan	Feb	Mar	April
Month/losses						
Electric fault	80	95	92	85	50	45
Belt drive problem	90	95	92	105	02	02
No operator	15	10	05	05	01	0
No power	22	10	11.5	08	02	0
No air	20	05	10	15	01	1
Hydraulic oil leakage	102	105	110	112	45	50

**Table 9.1 Down time(Nov11 to April 12)**

During the research program in Jamna auto industries limited the data collected for past four months machine wise before TPM and after implementation of TPM in Jamna auto industries two months data are Given as Table 9.1

Before implementing TPM past four months data take out jamna auto industry at training time and after implementing TPM in jamna auto industry take readings and compare the data before and after implementing TPM and finally reduce down time of a machine

### 9.2. Quality performance:-

To calculate the quality performance, from the data available it was found that the quality rate is 96%. The quality rate the scrap details are summarized in the table 9.2

Quality performance% = Good pieces/total pieces made ×100

Quality rate performances(%)data collected from Jamna auto industries Limited for the last four months for conventional leaf spring which is given in table are as follows:

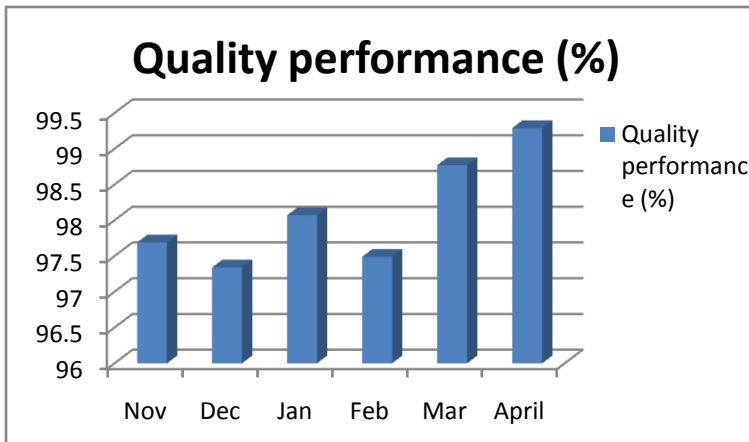
Quality performance% Calculation for conventional leaf spring in machine cell-I (EYE ROLLING MACHINE): TARGET = 140000 (NO. OF PIECES/MONTH)

The data last four months in machine cell-I (EYE ROLLING MACHINE) before TPM and after implementation of TPM in Jamna auto industries two months data are Given as follows

Table 9.2 Quality rate and rate detail for conventional leaf spring

	Before TPM				After TPM	
	Nov	Dec	Jan	Feb	Mar	April
Months						
Total pieces made	114000	120000	119000	121000	125000	128000
Good pieces	113646	116808	115513	117962	123462	127091
Rejected pieces (no's)	353	3192	3486	3037	1537	908
Quality performance (%)	97.69	97.34	98.07	97.49	98.77	99.29

**Table9.2Quality rate and rate detail for conventional leaf spring (Nov11-April 12)**



## 10. RESULT:-

From the proper implementation of TPM the company has finally achieves following:

- With implement the TPM then finally reduce the down time for a machine.
- After implementing the TPM then we achieve the Reduce the equipment failure.
- Quality of the product is improved after the implementation of TPM.
- Reduction in defective products.

## 11. CONCLUSION:-

Today as we are moving towards 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 we found total productive maintenance (TPM) is one of the best tools for making our industries competitive and effective in the field of maintenance. TPM can be maintenance philosophy prevents the failure of the organization. During the research program in Jamna auto industries limited the data collected for past four months before TPM and after implementation of TPM in Jamna auto industries two month data show that electrical fault, belt drive problems, operator, power and air, oil leakage etc are reduce after implementation of TPM. Finally we achieve reduce a down time of a machine and also improving quality performance. The main objective of this paper understand TPM concept and to generate awareness among the budding technologies about TPM.

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