An Introduction to Total Productive Maintenance (TPM)

By Venkatesh J

http://www.plant-maintenance.com/articles/tpm_intro.shtml

What is Total Productive Maintenance (TPM)?

It can be considered as the medical science of machines. Total Productive Maintenance (TPM) is a maintenance program which involves a newly defined concept for maintaining plants and equipment. The goal of the TPM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction.

TPM brings maintenance into focus as a necessary and vitally important part of the business. It is no longer regarded as a non-profit activity. Down time for maintenance is scheduled as a part of the manufacturing day and, in some cases, as an integral part of the manufacturing process. The goal is to hold emergency and unscheduled maintenance to a minimum.

Why TPM?

TPM was introduced to achieve the following objectives. The important ones are listed below.

- Avoid wastage in a quickly changing economic environment.
- Producing goods without reducing product quality.
- Reduce cost.
- Produce a low batch quantity at the earliest possible time.
- Goods send to the customers must be non defective.

Similarities and differences between TQM and TPM:

The TPM program closely resembles the popular Total Quality Management (TQM) program. Many of the tools such as employee empowerment, benchmarking, documentation, etc. used in TQM are used to implement and optimize TPM.Following are the similarities between the two.

- 1. Total commitment to the program by upper level management is required in both programmes
- 2. Employees must be empowered to initiate corrective action, and
- 3. A long range outlook must be accepted as TPM may take a year or more to implement and is an on-going process. Changes in employee mind-set toward their job responsibilities must take place as well.

The differences between TQM and TPM is summarized below.

Category	TQM	ТРМ
Object	Quality (Output and effects)	Equipment (Input and cause)
Mains of attaining goal	Systematize the management. It is software oriented	Employees participation and it is hardware oriented
Target	Quality for PPM	Elimination of losses and wastes.

Types of maintenance:

1. Breakdown maintenance:

It means that people waits until equipment fails and repair it. Such a thing could be used when the equipment failure does not significantly affect the operation or production or generate any significant loss other than repair cost.

2. Preventive maintenance (1951):

It is a daily maintenance (cleaning, inspection, oiling and re-tightening), design to retain the healthy condition of equipment and prevent failure through the prevention of deterioration, periodic inspection or equipment condition diagnosis, to measure deterioration. It is further divided into periodic maintenance and predictive maintenance. Just like human life is extended by preventive medicine, the equipment service life can be prolonged by doing preventive maintenance.

2a. Periodic maintenance (Time based maintenance - TBM):

Time based maintenance consists of periodically inspecting, servicing and cleaning equipment and replacing parts to prevent sudden failure and process problems.

2b. Predictive maintenance:

This is a method in which the service life of important part is predicted based on inspection or diagnosis, in order to use the parts to the limit of their service life. Compared to periodic maintenance, predictive maintenance is condition based maintenance. It manages trend values, by measuring and analyzing data about deterioration and employs a surveillance system, designed to monitor conditions through an on-line system.

3. Corrective maintenance (1957):

It improves equipment and its components so that preventive maintenance can be carried out reliably. Equipment with design weakness must be redesigned to improve reliability or improving maintainability

4. Maintenance prevention (1960):

It indicates the design of a new equipment. Weakness of current machines are sufficiently studied (on site information leading to failure prevention, easier maintenance and prevents of defects, safety and ease of manufacturing) and are incorporated before commissioning a new equipment.

TPM - History:

TPM is a innovative Japanese concept. The origin of TPM can be traced back to 1951 when preventive maintenance was introduced in Japan. However the concept of preventive maintenance was taken from USA. Nippondenso was the first company to introduce plant wide preventive maintenance in 1960. Preventive maintenance is the concept wherein, operators produced goods using machines and the maintenance group was dedicated with work of maintaining those machines, however with the automation of Nippondenso, maintenance became a problem as more maintenance personnel were required. So the management decided that the routine maintenance of equipment would be carried out by the operators. (This is Autonomous maintenance, one of the features of TPM). Maintenance group took up only essential maintenance works.

Thus Nippondenso which already followed preventive maintenance also added Autonomous maintenance done by production operators. The maintenance crew went in the equipment modification for improving reliability. The modifications were made or incorporated in new equipment. This lead to maintenance prevention. Thus preventive maintenance along with Maintenance prevention and Maintainability Improvement gave birth to **Productive** maintenance. The aim of productive maintenance was to maximize plant and equipment effectiveness to achieve optimum life cycle cost of production equipment.

By then Nippon Denso had made quality circles, involving the employees participation. Thus all employees took part in implementing Productive maintenance. Based on these developments Nippondenso was awarded the distinguished plant prize for developing and implementing TPM, by the *Japanese Institute of Plant Engineers* (JIPE). Thus Nippondenso of the Toyota group became the first company to obtain the TPM certification.

TPM Targets:

P
Obtain Minimum 80% OPE.
Obtain Minimum 90% OEE (Overall Equipment Effectiveness)
Run the machines even during lunch. (Lunch is for operators and not for machines!)

Q
Operate in a manner, so that there are no customer complaints.

C
Reduce the manufacturing cost by 30%.

Achieve 100% success in delivering the goods as required by the customer.

S

Maintain a accident free environment.

М

Increase the suggestions by 3 times. Develop Multi-skilled and flexible workers.

Motives of TPM	Adoption of life cycle approach for improving the overall performance of production equipment.	
	Improving productivity by highly motivated workers which is achieved by job enlargement.	
	 The use of voluntary small group activities for identifying the cause of failure, possible plant and equipment modifications. 	
Uniqueness of TPM	The major difference between TPM and other concepts is that the operators are also made to involve in the maintenance process. The concept of "I (Production operators) Operate, You (Maintenance department) fix" is not followed.	
TPM Objectives	Achieve Zero Defects, Zero Breakdown and Zero accidents in all functional areas of the organization.	
	2. Involve people in all levels of organization.	
	3. Form different teams to reduce defects and Self Maintenance.	
Direct benefits of TPM	Increase productivity and OPE (Overall Plant Efficiency) by 1.5 or 2 times.	
	Rectify customer complaints.	
	3. Reducethe manufacturing cost by 30%.	
	 Satisfy the customers needs by 100 % (Delivering the right quantity at the right time, in the required quality.) 	
	5. Reduce accidents.	
	6. Follow pollution control measures.	
Indirect benefits of TPM	Higher confidence level among the employees.	
	2. Keep the work place clean, neat and attractive.	
	3. Favorablechange in the attitude of the operators.	
	4. Achieve goals by working as team.	
	5. Horizontaldeployment of a new concept in all areas of the organization.	
	6. Share knowledge and experience.	
	7. The workers get a feeling of owning the machine.	

OEE (Overall Equipment Efficiency):

$OEE = A \times PE \times Q$

A - Availability of the machine. Availability is proportion of time machine is actually available out of time it should be available.

A = (MTBF - MTTR) / MTBF.

MTBF - Mean Time Between Failures = (Total Running Time) / Number of Failures. MTTR - Mean Time To Repair.

PE - Performance Efficiency. It is given by RE X SE.

reduced because it is running at reduced speed.

<u>Rate efficiency (RE)</u>: Actual average cycle time is slower than design cycle time because of jams, etc. Output is reduced because of jams <u>Speed efficiency (SE)</u>: Actual cycle time is slower than design cycle time machine output is

Q - Refers to quality rate. Which is percentage of good parts out of total produced sometimes called "yield".

Steps in introduction of TPM in a organization:

Step A - PREPARATORY STAGE:

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

Proper understanding, commitment and active involvement of the top management in needed for this step. Senior management should have awareness programmes, after which announcement is made to all. Publish it in the house magazine and put it in the notice board. Send a letter to all concerned individuals if required.

STEP 2 - Initial education and propaganda for TPM:

Training is to be done based on the need. Some need intensive training and some just an awareness. Take people who matters to places where TPM already successfully implemented.

STEP 3 - Setting up TPM and departmental committees:

TPM includes improvement, autonomous maintenance, quality maintenance etc., as part of it. When committees are set up it should take care of all those needs.

STEP 4 - Establishing the TPM working system and target :

Now each area is benchmarked and fix up a target for achievement.

STEP 5 - A master plan for institutionalizing :

Next step is implementation leading to institutionalizing wherein TPM becomes an organizational culture. Achieving PM award is the proof of reaching a satisfactory level.

STEP 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.

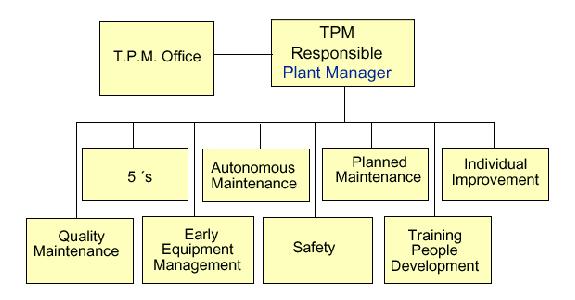
Of these four activities are for establishing the system for production efficiency, one for initial control system of new products and equipment, one for improving the efficiency of administration and are for control of safety, sanitation as working environment.

STAGE D - INSTITUTIONALISING STAGE

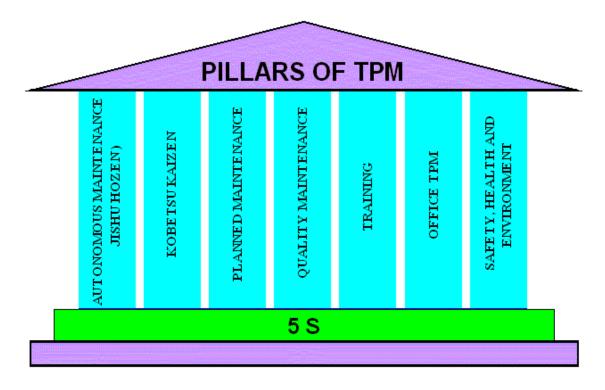
By all there activities one would has reached maturity stage. Now is the time for applying for PM award. Also think of challenging level to which you can take this movement.

Organization Structure for TPM Implementation:

T.P.M. PLANT WIDE STRUCTURE



Pillars of TPM



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	Organisation	Sort
Seiton	Tidiness	Systematise
Seiso	Cleaning	Sweep
Seiketsu	Standardisation	Standardise
Shitsuke	Discipline	Self - Discipline

SEIRI - Sort out:

This means sorting and organizing the items as critical, important, frequently used items, useless, or items that are not need as of now. Unwanted items can be salvaged. Critical items should be kept for use nearby and items that are not be used in near future, should be stored in some place. For this step, the worth of the item should be decided based on utility and not cost. As a result of this step, the search time is reduced.

Priority	Frequency of Use	How to use
Low	Less than once per year, Once per year<	Throw away, Store away from the workplace
Average	At least 2/6 months, Once per month, Once per week	Store together but offline
High	Once Per Day	Locate at the workplace

SEITON - Organise :

The concept here is that "Each items has a place, and only one place". The items should be placed back after usage at the same place. To identify items easily, name plates and colored tags has to be used. Vertical racks can be used for this purpose, and heavy items occupy the bottom position in the racks.

SEISO - Shine the workplace :

This involves cleaning the work place free of burrs, grease, oil, waste, scrap etc. No loosely hanging wires or oil leakage from machines.

SEIKETSU - Standardization:

Employees has to discuss together and decide on standards for keeping the work place / Machines / pathways neat and clean. This standards are implemented for whole organization and are tested / Inspected randomly.

SHITSUKE - Self discipline :

Considering 5S as a way of life and bring about self-discipline among the employees of the organization. This includes wearing badges, following work procedures, punctuality, dedication to the organization etc.

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.

Policy:

- 1. Uninterrupted operation of equipments.
- 2. Flexible operators to operate and maintain other equipments.
- 3. Eliminating the defects at source through active employee participation.
- 4. Stepwise implementation of JH activities.

JISHU HOZEN Targets:

- 1. Prevent the occurrence of 1A / 1B because of JH.
- 2. Reduce oil consumption by 50%
- 3. Reduce process time by 50%
- 4. Increase use of JH by 50%

Steps in JISHU HOZEN:

- 1. Preparation of employees.
- 2. Initial cleanup of machines.
- 3. Take counter measures
- 4. Fix tentative JH standards
- 5. General inspection
- 6. Autonomous inspection
- 7. Standardization and
- 8. Autonomous management.

Each of the above mentioned steps is discussed in detail below.

- 1. Train the Employees: Educate the employees about TPM, Its advantages, JH advantages and Steps in JH. Educate the employees about abnormalities in equipments.
- 2. Initial cleanup of machines:
 - o Supervisor and technician should discuss and set a date for implementing step1
 - Arrange all items needed for cleaning
 - o On the arranged date, employees should clean the equipment completely with the help of maintenance department.
 - Dust, stains, oils and grease has to be removed.
 - Following are the things that has to be taken care while cleaning. They are Oil leakage, loose wires, unfastened nits and bolts and worn out parts.

- After clean up problems are categorized and suitably tagged. White tags is place
 where problems can be solved by operators. Pink tag is placed where the aid of
 maintenance department is needed.
- Contents of tag is transferred to a register.
- Make note of area which were inaccessible.
- Finally close the open parts of the machine and run the machine.

Counter Measures :

- Inaccessible regions had to be reached easily. E.g. If there are many screw to open a fly wheel door, hinge door can be used. Instead of opening a door for inspecting the machine, acrylic sheets can be used.
- o To prevent work out of machine parts necessary action must be taken.
- Machine parts should be modified to prevent accumulation of dirt and dust.

4. Tentative Standard:

- o JH schedule has to be made and followed strictly.
- Schedule should be made regarding cleaning, inspection and lubrication and it also should include details like when, what and how.

5. General Inspection:

- The employees are trained in disciplines like Pneumatics, electrical, hydraulics, lubricant and coolant, drives, bolts, nuts and Safety.
- This is necessary to improve the technical skills of employees and to use inspection manuals correctly.
- After acquiring this new knowledge the employees should share this with others.
- By acquiring this new technical knowledge, the operators are now well aware of machine parts.

6. Autonomous Inspection:

- o New methods of cleaning and lubricating are used.
- Each employee prepares his own autonomous chart / schedule in consultation with supervisor.
- Parts which have never given any problem or part which don't need any inspection are removed from list permanently based on experience.
- o Including good quality machine parts. This avoid defects due to poor JH.
- o Inspection that is made in preventive maintenance is included in JH.
- The frequency of cleanup and inspection is reduced based on experience.

7. Standardization:

- Upto the previous stem only the machinery / equipment was the concentration.
 However in this step the surroundings of machinery are organized. Necessary items should be organized, such that there is no searching and searching time is reduced.
- Work environment is modified such that there is no difficulty in getting any item.
- Everybody should follow the work instructions strictly.
- Necessary spares for equipments is planned and procured.

8. Autonomous Management:

- OEE and OPE and other TPM targets must be achieved by continuous improve through Kaizen.
- PDCA (Plan, Do, Check and Act) cycle must be implemented for Kaizen.

PILLAR 3 - 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. The principle behind is that "a very large number of small improvements are move effective in an organizational environment than a few improvements of large value. This pillar is aimed at reducing losses in the workplace that affect our efficiencies. By using a detailed and thorough procedure we eliminate losses in a systematic method using various Kaizen tools. These activities are not limited to production areas and can be implemented in administrative areas as well.

Kaizen Policy:

- 1. Practice concepts of zero losses in every sphere of activity.
- 2. relentless pursuit to achieve cost reduction targets in all resources
- 3. Relentless pursuit to improve over all plant equipment effectiveness.
- 4. Extensive use of PM analysis as a tool for eliminating losses.
- 5. Focus of easy handling of operators.

Kaizen Target:

Achieve and sustain zero loses with respect to minor stops, measurement and adjustments, defects and unavoidable downtimes. It also aims to achieve 30% manufacturing cost reduction.

Tools used in Kaizen:

- 1. PM analysis
- 2. Why Why analysis
- 3. Summary of losses
- 4. Kaizen register
- 5. Kaizen summary sheet.

The objective of TPM is maximization of equipment effectiveness. TPM aims at maximization of machine utilization and not merely machine availability maximization. As one of the pillars of TPM activities, Kaizen pursues efficient equipment, operator and material and energy utilization, that is extremes of productivity and aims at achieving substantial effects. Kaizen activities try to thoroughly eliminate 16 major losses.

16 Major losses in a organisation:

Loss	Category
 Failure losses - Breakdown loss Setup / adjustment losses Cutting blade loss 	
 Start up loss Minor stoppage / Idling loss. Speed loss - operating at low speeds. Defect / rework loss Scheduled downtime loss 	Losses that impede equipment efficiency
9. Management loss10. Operating motion loss11. Line organization loss12. Logistic loss13. Measurement and adjustment loss	Loses that impede human work efficiency
14. Energy loss15. Die, jig and tool breakage loss16. Yield loss.	Loses that impede effective use of production resources

Classification of losses:

Aspect	Sporadic Loss	Chronic Loss
Causation	Causes for this failure can be easily traced. Cause-effect relationship is simple to trace.	This loss cannot be easily identified and solved. Even if various counter measures are applied
Remedy	Easy to establish a remedial measure	This type of losses are caused because of hidden defects in machine, equipment and methods.
Impact / Loss	A single loss can be costly	A single cause is rare - a combination of causes trends to be a rule
Frequency of occurrence	The frequency of occurrence is low and occasional.	The frequency of loss is more.
Corrective action	Usually the line personnel in the production can attend to this problem.	Specialists in process engineering, quality assurance and maintenance people are required.

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 was 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.

Policy:

- 1. Achieve and sustain availability of machines
- 2. Optimum maintenance cost.
- 3. Reduces spares inventory.
- 4. Improve reliability and maintainability of machines.

Target:

- 1. Zero equipment failure and break down.
- 2. Improve reliability and maintainability by 50 %
- Reduce maintenance cost by 20 %
- 4. Ensure availability of spares all the time.

Six steps in Planned maintenance:

- 1. Equipment evaluation and recoding present status.
- 2. Restore deterioration and improve weakness.
- 3. Building up information management system.
- 4. Prepare time based information system, select equipment, parts and members and map out plan.
- 5. Prepare predictive maintenance system by introducing equipment diagnostic techniques and
- 6. Evaluation of planned maintenance.

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, then move to potential quality concerns. Transition is from reactive to proactive (Quality Control to Quality Assurance).

QM activities is to set equipment conditions that preclude quality defects, based on the basic concept of maintaining perfect equipment to maintain perfect quality of products. The condition are checked and measure in time series to very that measure values are within standard values to prevent defects. The transition of measured values is watched to predict possibilities of defects occurring and to take counter measures before hand.

Policy:

- 1. Defect free conditions and control of equipments.
- 2. QM activities to support quality assurance.
- 3. Focus of prevention of defects at source
- 4. Focus on poka-yoke. (fool proof system)
- 5. In-line detection and segregation of defects.
- 6. Effective implementation of operator quality assurance.

Target:

- 1. Achieve and sustain customer complaints at zero
- 2. Reduce in-process defects by 50 %
- 3. Reduce cost of quality by 50 %.

Data requirements:

Quality defects are classified as <u>customer end defects</u> and <u>in house</u> defects. For customer-end data, we have to get data on

- 1. Customer end line rejection
- 2. Field complaints.

In-house, data include data related to products and data related to process

Data related to product:

- 1. Product wise defects
- 2. Severity of the defect and its contribution major/minor
- 3. Location of the defect with reference to the layout
- 4. Magnitude and frequency of its occurrence at each stage of measurement
- 5. Occurrence trend in beginning and the end of each production/process/changes. (Like pattern change, ladle/furnace lining etc.)
- 6. Occurrence trend with respect to restoration of breakdown/modifications/periodical replacement of quality components.

Data related to processes:

- 1. The operating condition for individual sub-process related to men, method, material and machine.
- 2. The standard settings/conditions of the sub-process

3. The actual record of the settings/conditions during the defect occurrence.

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". By experience they gain, "Know-How" to overcome a problem what to be done. This they do without knowing the root cause of the problem and why they are doing so. Hence it become necessary to train them on knowing "Know-why". The employees should be trained to achieve the four phases of skill. The goal is to create a factory full of experts. The different phase of skills are

Phase 1: Do not know.

Phase 2: Know the theory but cannot do.

Phase 3: Can do but cannot teach

Phase 4: Can do and also teach.

Policy:

- 1. Focus on improvement of knowledge, skills and techniques.
- 2. Creating a training environment for self learning based on felt needs.
- 3. Training curriculum / tools /assessment etc conductive to employee revitalization
- 4. Training to remove employee fatigue and make work enjoyable.

Target:

- 1. Achieve and sustain downtime due to want men at zero on critical machines.
- 2. Achieve and sustain zero losses due to lack of knowledge / skills / techniques
- 3. Aim for 100 % participation in suggestion scheme.

Steps in Educating and training activities:

- 1. Setting policies and priorities and checking present status of education and training.
- 2. Establish of training system for operation and maintenance skill up gradation.
- 3. Training the employees for upgrading the operation and maintenance skills.
- 4. Preparation of training calendar.
- 5. Kick-off of the system for training.
- 6. Evaluation of activities and study of future approach.

PILLAR 7 - OFFICE TPM:

Office TPM should be started after activating four other pillars of TPM (JH, KK, QM, PM). 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. Office TPM addresses twelve major losses. They are

- 1. Processing loss
- Cost loss including in areas such as procurement, accounts, marketing, sales leading to high inventories
- 3. Communication loss
- 4. Idle loss
- Set-up loss
- 6. Accuracy loss
- 7. Office equipment breakdown
- 8. Communication channel breakdown, telephone and fax lines
- 9. Time spent on retrieval of information
- 10. Non availability of correct on line stock status
- 11. Customer complaints due to logistics
- 12. Expenses on emergency dispatches/purchases

How to start office TPM?

A senior person from one of the support functions e.g. Head of Finance, MIS, Purchase etc should be heading the sub-committee. Members representing all support functions and people from Production & Quality should be included in sub committee. TPM co-ordinate plans and guides the sub committee.

- 1. Providing awareness about office TPM to all support departments
- 2. Helping them to identify P, Q, C, D, S, M in each function in relation to plant performance
- 3. Identify the scope for improvement in each function
- 4. Collect relevant data
- 5. Help them to solve problems in their circles
- 6. Make up an activity board where progress is monitored on both sides results and actions along with Kaizens.
- 7. Fan out to cover all employees and circles in all functions.

Kobetsu Kaizen topics for Office TPM:

- Inventory reduction
- Lead time reduction of critical processes
- Motion & space losses
- Retrieval time reduction.
- Equalizing the work load
- Improving the office efficiency by eliminating the time loss on retrieval of information, by achieving zero breakdown of office equipment like telephone and fax lines.

Office TPM and its Benefits:

- 1. Involvement of all people in support functions for focusing on better plant performance
- 2. Better utilized work area
- 3. Reduce repetitive work
- 4. Reduced inventory levels in all parts of the supply chain
- 5. Reduced administrative costs
- 6. Reduced inventory carrying cost
- 7. Reduction in number of files
- 8. Reduction of overhead costs (to include cost of non-production/non capital equipment)
- 9. Productivity of people in support functions
- 10. Reduction in breakdown of office equipment
- 11. Reduction of customer complaints due to logistics
- 12. Reduction in expenses due to emergency dispatches/purchases
- 13. Reduced manpower
- 14. Clean and pleasant work environment.

PQCDSM in Office TPM:

- P Production output lost due to want of material, Manpower productivity, Production output lost due to want of tools.
- Q Mistakes in preparation of cheques, bills, invoices, payroll, Customer returns/warranty attributable to BOPs, Rejection/rework in BOP's/job work, Office area rework.
- C Buying cost/unit produced, Cost of logistics inbound/outbound, Cost of carrying inventory, Cost of communication, Demurrage costs.
- D Logistics losses (Delay in loading/unloading)
 - Delay in delivery due to any of the support functions
 - · Delay in payments to suppliers
 - Delay in information
- S Safety in material handling/stores/logistics, Safety of soft and hard data.
- M Number of kaizens in office areas.

How office TPM supports plant TPM:

Office TPM supports the plant, initially in doing Jishu Hozen of the machines (after getting training of Jishu Hozen), as in Jishu Hozen at the

- 1. Initial stages machines are more and manpower is less, so the help of commercial departments can be taken, for this
- 2. Office TPM can eliminate the lodes on line for no material and logistics.

Extension of office TPM to suppliers and distributors:

This is essential, but only after we have done as much as possible internally. With suppliers it will lead to on-time delivery, improved 'in-coming' quality and cost reduction. With distributors it will lead to accurate demand generation, improved secondary distribution and reduction in damages during storage and handling. In any case we will have to teach them based on our experience and practice and highlight gaps in the system which affect both sides. In case of some of the larger companies, they have started to support clusters of suppliers.

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.

Conclusion:

Today, with competition in industry at an all time high, TPM 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 TPM 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 TPM program does his or her part, an unusually high rate of return compared to resources invested may be expected.

Copyright 1996-2005, The Plant Maintenance Resource Center . All Rights Reserved.

Revised: Thursday, 20-Oct-2005 23:37:47 CDT

Privacy Policy