

TPM – Total Productive Maintenance

An introduction

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What is Total Productive Maintenance (TPM) ?

- the medical science of machines
- a maintenance program which involves a concept for maintaining plants and equipment.
- increasing production
- increasing employee morale and job satisfaction

TPM history

- Toyota used to improve its global position (1950s)
- After TPM suppliers and customers were involved
- this next methodology was called lean manufacturing

TPM - deterioration prevention

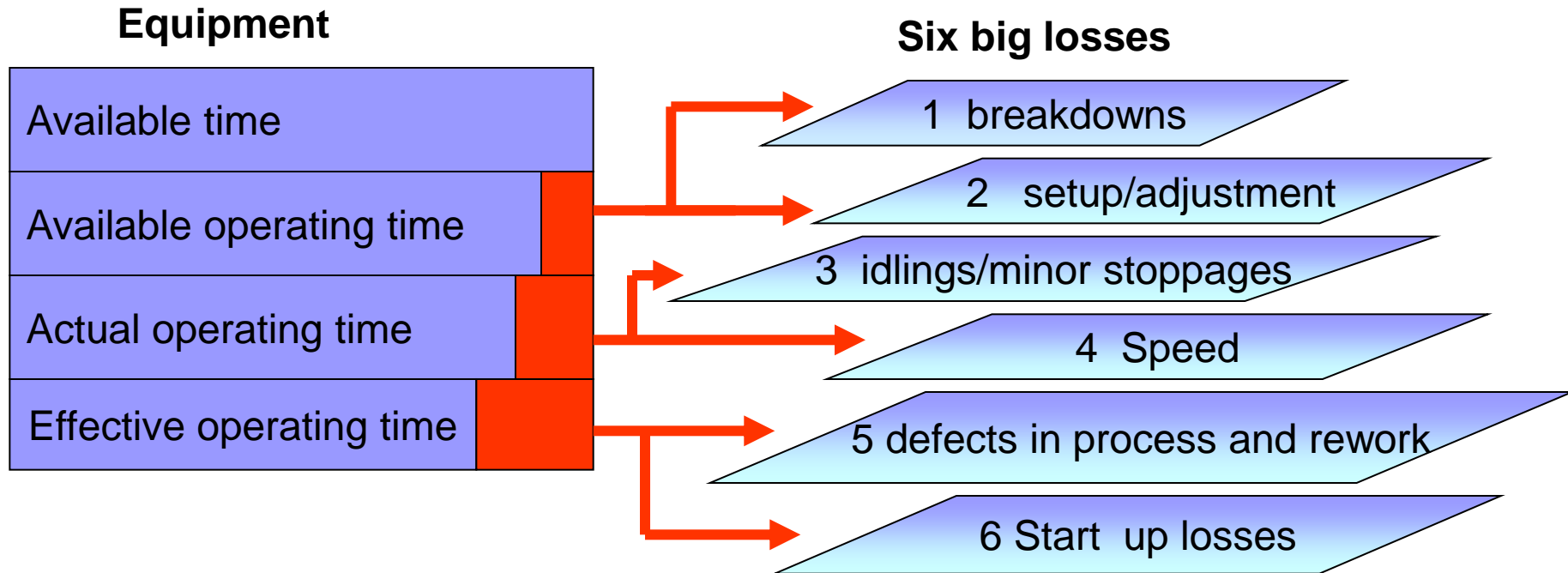
- approach that aims to identify issues as soon as possible
- plan to prevent any issues before occurrence

- ❖ zero error, zero work-related accident, and zero loss

Why TPM ?

- 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

How can TPM eliminate loss?



Introduction of TPM into the organization

■ Step A – Preparation

- **Announcement by Management**
- **Initial education**
- **Setting up TPM**
- **Establishing the TPM working system**
- **A master plan for institutionalizing**

Introduction of TPM into the organization

■ **STEP B - INTRODUCTION**

- inviting suppliers and customers to the conception
- Communication for quality output

Introduction of TPM into the organization

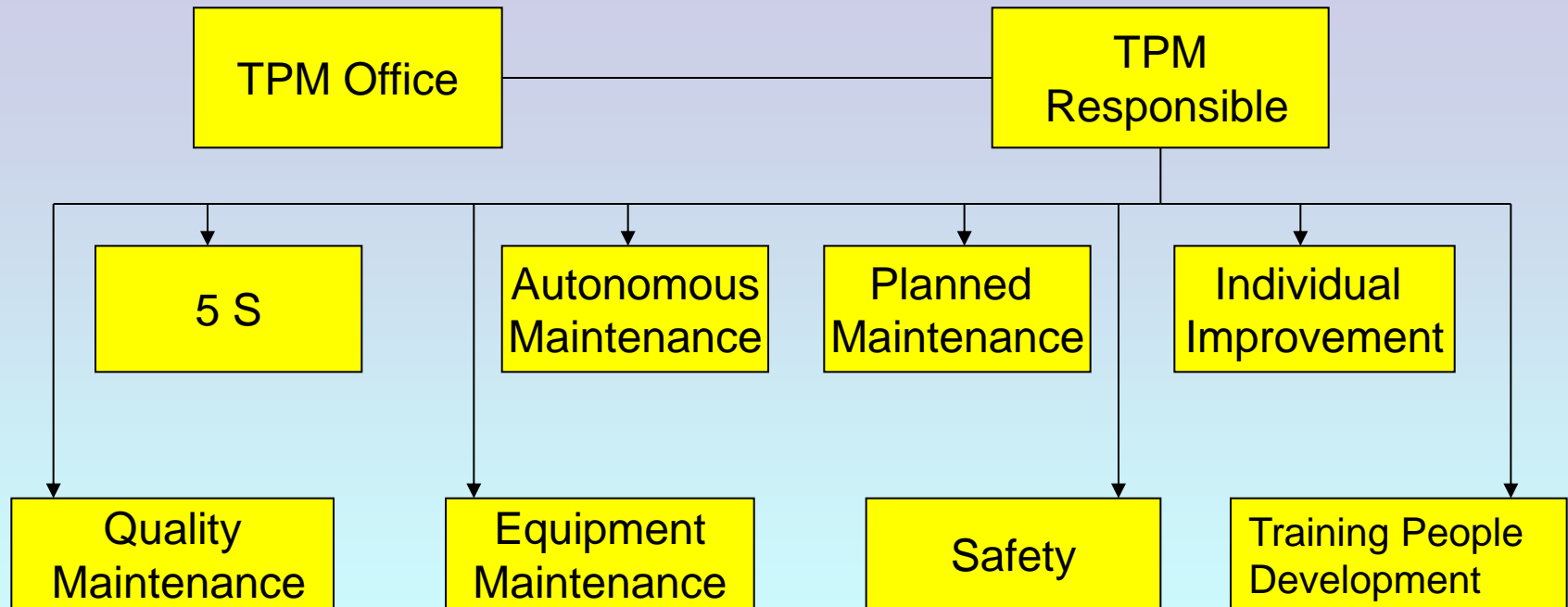
■ STAGE C – Implementation

8 activities/8 pillars in the development of TPM

- establishing the system for production efficiency
- initial control system of new products and equipment
- improving the efficiency of administration
- control of safety
- sanitation of working environment

Introduction of TPM into the organization

■ Stage D - Institutionalising



Pillars of TPM

- Improve Overall Equipment Effectiveness
 - application of Total Productive Maintenance's (TPM) 8 Pillars

Pillars of TPM

SAFETY, HEALTH AND ENVIRONMENT

Office TPM

Training

Quality Maintenance

PLANNED MAINTENANCE

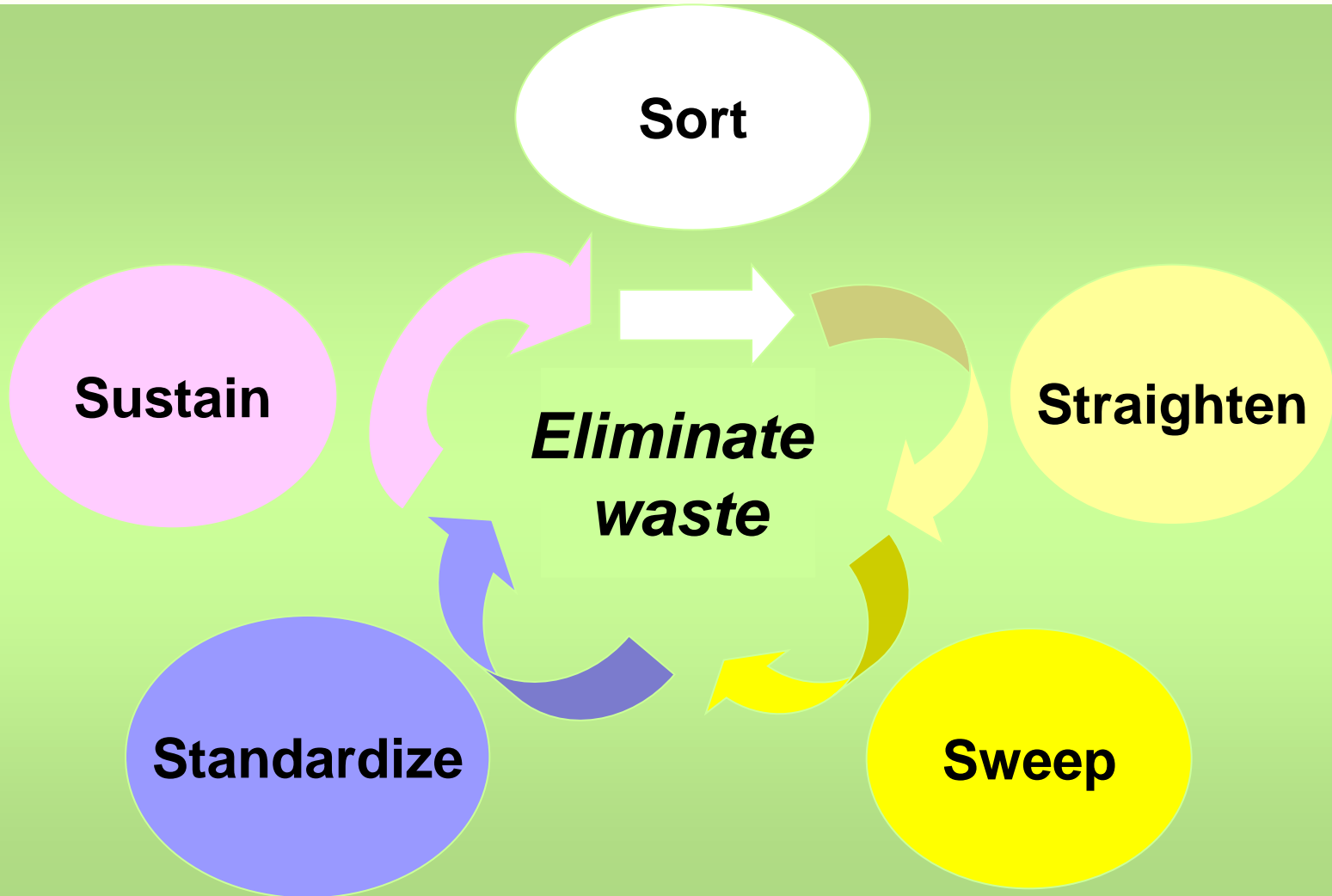
Kaizen

JISHU HOZEN

Autonomous maintenance

5 S

TPM starts with 5S



[Pillar 1-5s]

SEIRI - Sort out

This means sorting and organizing the items as

- critical
- important
- frequently used
- useless

[Pillar 1-5s]

SEITON - Organise

- Each items has a place, and only one place
- To identify items easily, name plates and colored tags has to be used.

[Pillar 1-5s]

SEISO - Shine the workplace

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

[Pillar 1-5s]

SEIKETSU - Standardization

- standardization for keeping the work place / machines / pathways neat and clean
- implementation for whole organization and testing / Inspection randomly

[Pillar 1-5s]

SHITSUKE - Self discipline

- Considering 5S as a way of life
- self-discipline among the employees of the organization
 - wearing badges
 - following work procedures
 - Punctuality
 - dedication to the organization

[Pillar 2-JISHU HOZEN]

Autonomous maintenance

- developing operators to be able to take care of small maintenance tasks
- skilled maintenance people spending time on more value added activity and technical repairs

[Pillar 2-JISHU HOZEN]

Policy

- uninterrupted operation of equipments
- flexible operators to operate and maintain other equipments
- eliminating the defects at source through active employee participation
- Stepwise implementation of JH activities

[Pillar 2-JISHU HOZEN]

Targets

- Increase use of JH by 50%
- Reduce oil consumption by 50%
- Reduce process time by 50%

PILLAR 3 - KAIZEN

- "Kai" means change
- "Zen" means good – better
- kaizen is for small improvements
- carried out on a continual basis
- a very large number of small improvements are more effective in an organizational environment than a few improvements of large value

PILLAR 3 – KAIZEN

Policy

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

PILLAR 3 – KAIZEN

Target

Achieve and sustain zero losses with respect to

- minor stops
- measurement and adjustments
- defects
- achieving 30% manufacturing cost reduction

PILLAR 4 - PLANNED MAINTENANCE

- trouble free machines and equipments producing defect free products for total customer satisfaction
- 4 groups of maintenance

PILLAR 4 - PLANNED MAINTENANCE

groups of maintenance

- Preventive Maintenance
- Breakdown Maintenance
- Corrective Maintenance
- Maintenance Prevention

PILLAR 4 - PLANNED MAINTENANCE

Policy

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

PILLAR 4 - PLANNED MAINTENANCE

Six steps of implementation

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

PILLAR 5 – QUALITY MAINTENANCE

- customer delight through highest quality through defect free manufacturing
- focus on eliminating non-conformances in a systematic manner
- Transition is from reactive to proactive (Quality Control to Quality Assurance)

PILLAR 5 - QUALITY MAINTENANCE

Policy

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

PILLAR 5 - QUALITY MAINTENANCE

Target

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

PILLAR 6 - TRAINING

- multi-skilled revitalized employees
- performing all required functions effectively and independently
- Training the employees to achieve four steps of skills

PILLAR 6 – TRAINING

different phases of skills

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.

PILLAR 6 – TRAINING

Policy

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

PILLAR 6 – TRAINING

Target

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

PILLAR 7 - 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
 - identify and eliminate losses
 - analyzing processes and procedures towards increased office automation
 - twelve major losses

PILLAR 7 - OFFICE TPM

twelve major losses

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

PILLAR 7 - OFFICE TPM

How office TPM supports plant TPM

- supporting the plant, initially in doing Autonomous maintenance (Jishu Hozen) of the machines
- Initial stages machines are more and manpower is less, so the help of commercial departments can be taken, for this
- Office TPM can eliminate the lodes on line for no material and logistics.

PILLAR 8 - SAFETY, HEALTH AND ENVIRONMENT

Target

- Zero accident,
- Zero health damage
- Zero fires.
- active role in each of the other pillars on a regular basis

Conclusion

- TPM may be the only thing that stands between success and total failure for some companies
- proven to be a program that works
- can be adapted to work not only in industrial plants, but in construction, building maintenance, transportation



Questions