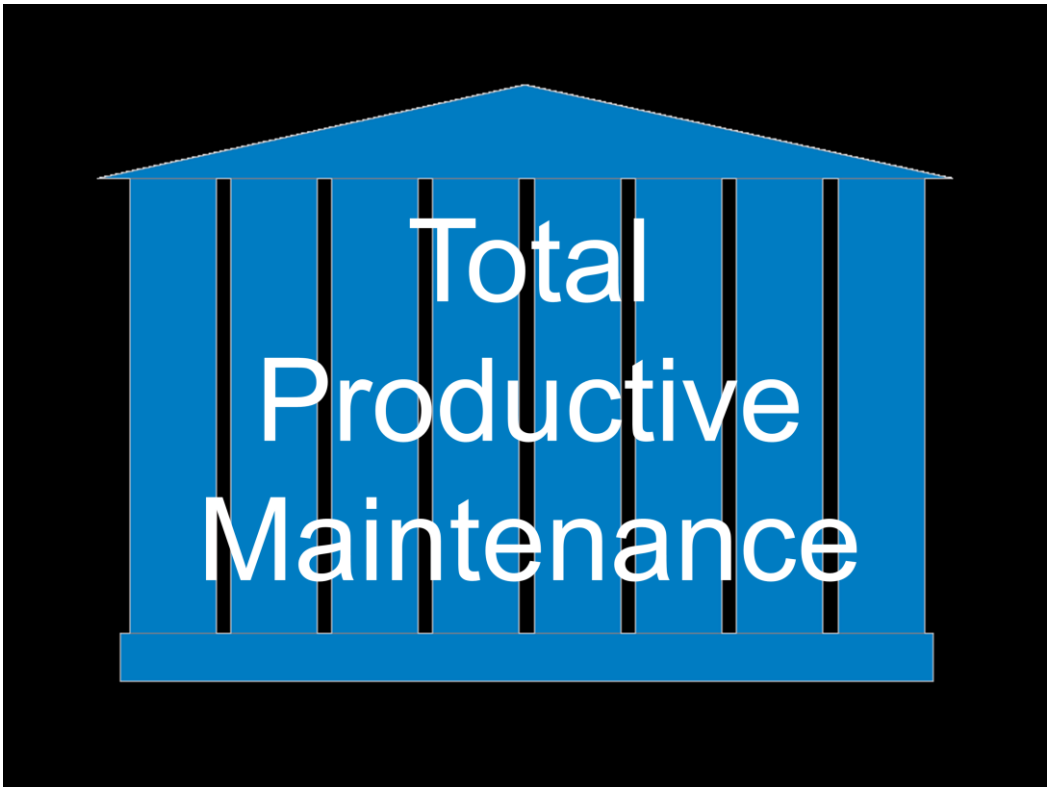


The aim of TPM is to improve corporate culture through the improvement of personnel and equipment systems and the resulting zero-losses manufacturing processes.

So lets review TPM in more detail:

Total

Signifies involvement of all functions and people at all levels of hierarchies.

For successful TPM implementation employees at all functions and levels need to be involved:

- The Directors and Managers
- The Job Specialists
- The Operators
- Involve EVERYONE

Productive

Emphasis on effective and efficient utilisation of all the resources.

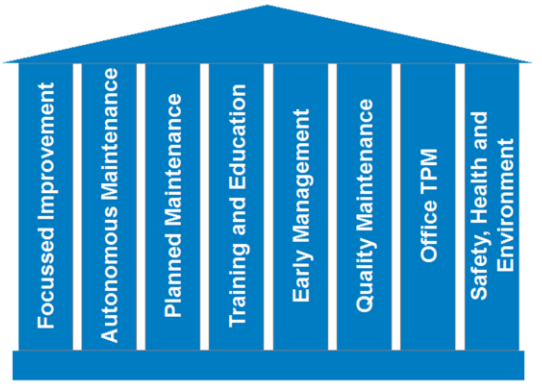
Productive focuses on utilising all resources (Man, Machine, Materials, Methods) to ensure efficient usage to ensure customer requirements are met (effectiveness) and all stakeholder requirements are met (efficiency).

Maintenance

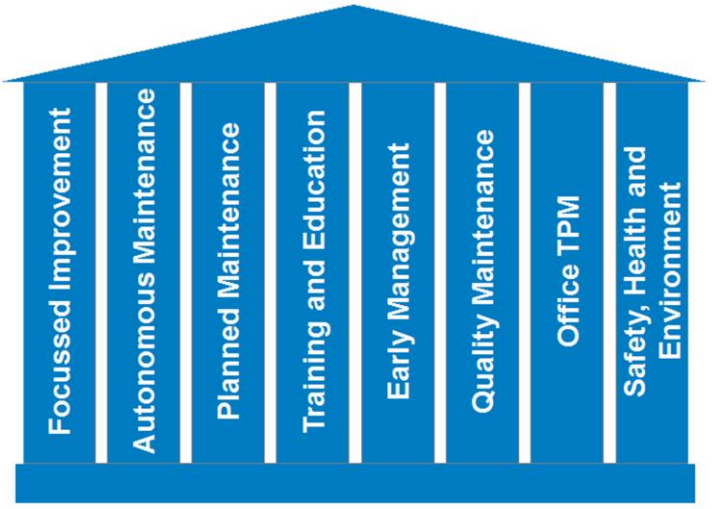
Means keeping man-machine-material system in optimal condition.

It should be stressed that TPM is not just the activities undertaken by the maintenance department!
Many companies who try to implement TPM allocate the project to the maintenance department, rather than a company wide project implemented by top management.
The key word is optimal, which in the dictionary definition states “Most favourable or desirable condition”

The pillars of TPM



TPM is a structured approach



The JIPM TPM model is based on 8 pillars. An organisation implementing TPM can rename pillars to suit their own internal definitions and some organisations have been know to add additional pillars (a common addition is a logistics pillar)

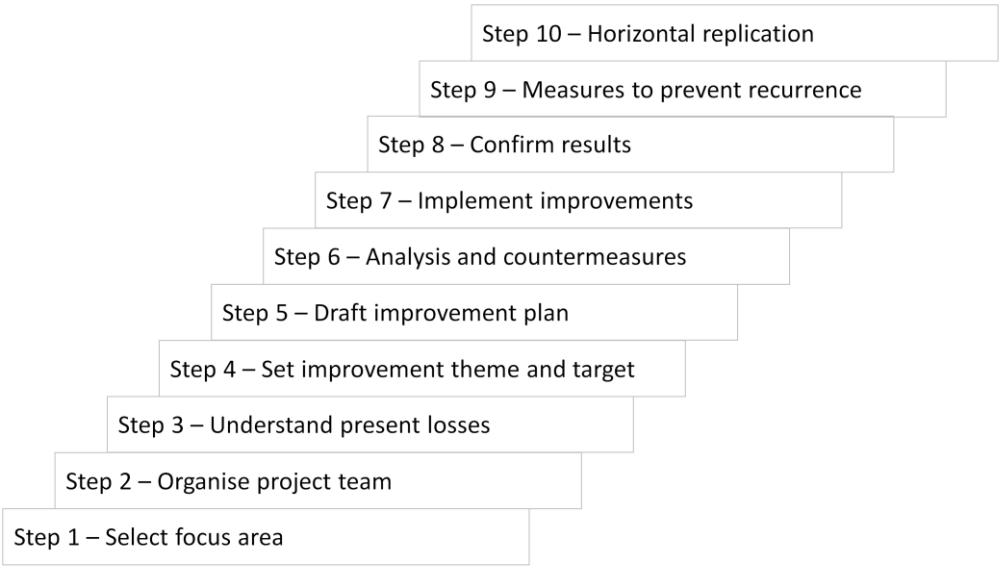
The 8 Pillars of TPM…

- Focused Improvement
- Autonomous Maintenance
- Planned Maintenance
- Training and Education
- Early Management
- Quality Maintenance
- Office TPM
- Safety, Health & Environment

JIPM have defined a structured step by step approach for implementation each pillar.

Focused improvement

The first pillar is focused improvement.
This pillar focuses on Improvement of equipment efficiency via the pursuit of zero loss, and improvement of technical capabilities.



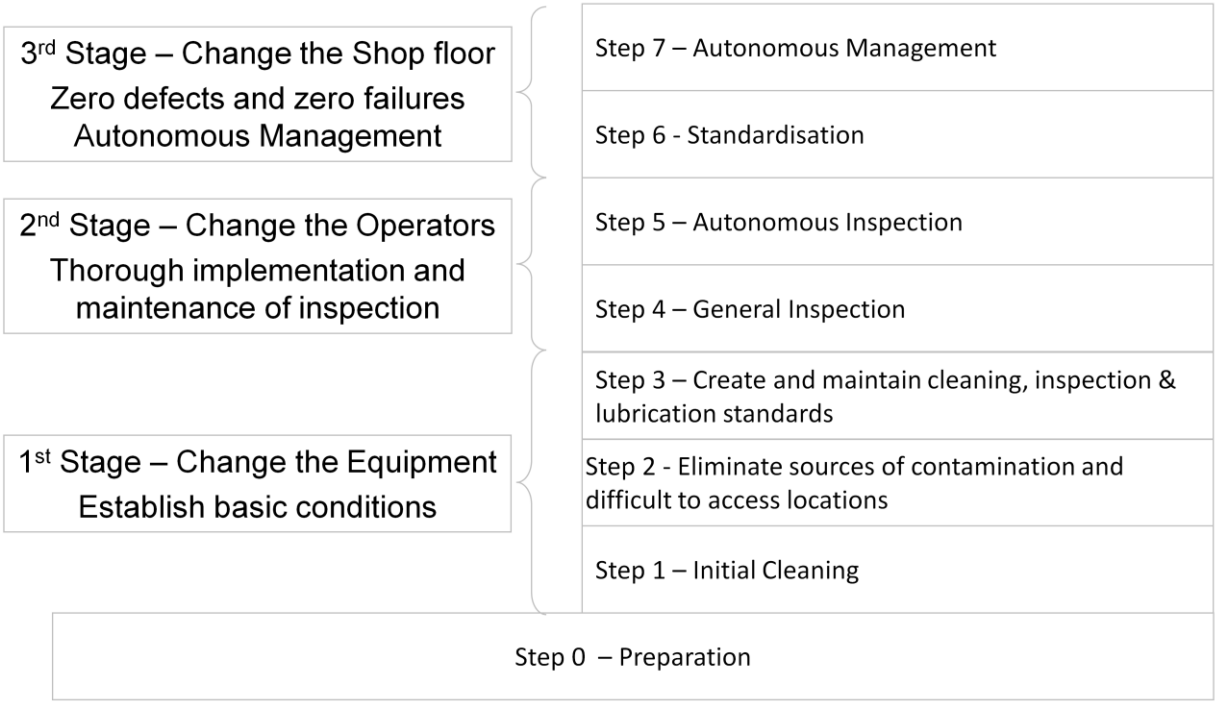
To be in business all companies will have a continuous improvement process to take waste out of processes in an aim to maintain profitability. For TPM focused improvement is a fundamental pillar. JIPM have defined a very structured 10 step process, shown above.

To ensure “focus” it is important that tools such as a loss tree are used to analyse losses and then select improvement projects focusing in the greatest or most problematic losses. Once projects are selected the most appropriate cross functional team can be selected, including operators involved directly in the process.
The team then need to spend time analysing the losses, and then set an improvement target for the project.

A improvement plan can then be developed, and using TPM tools the situation analysed and countermeasures developed.
After improvements have been implemented, results are confirmed and measures taken to prevent reoccurrence.
The improvements made can then be horizontally deployed to other similar processes.
The aim should always be focused on achieving zero accident, zero breakdown and zero defects.

Autonomous maintenance

The second pillar is Autonomous maintenance.
This pillar focuses on setting and maintain basic machine conditions by developing the skills of operators.



Step 0 is focused on preparation. Management, as part of the overall implementation plan, have to communicate the TPM policy and plans to all employees so they understand the principles of TPM and the key roles all employees, in particular the operators will play in the implementation.

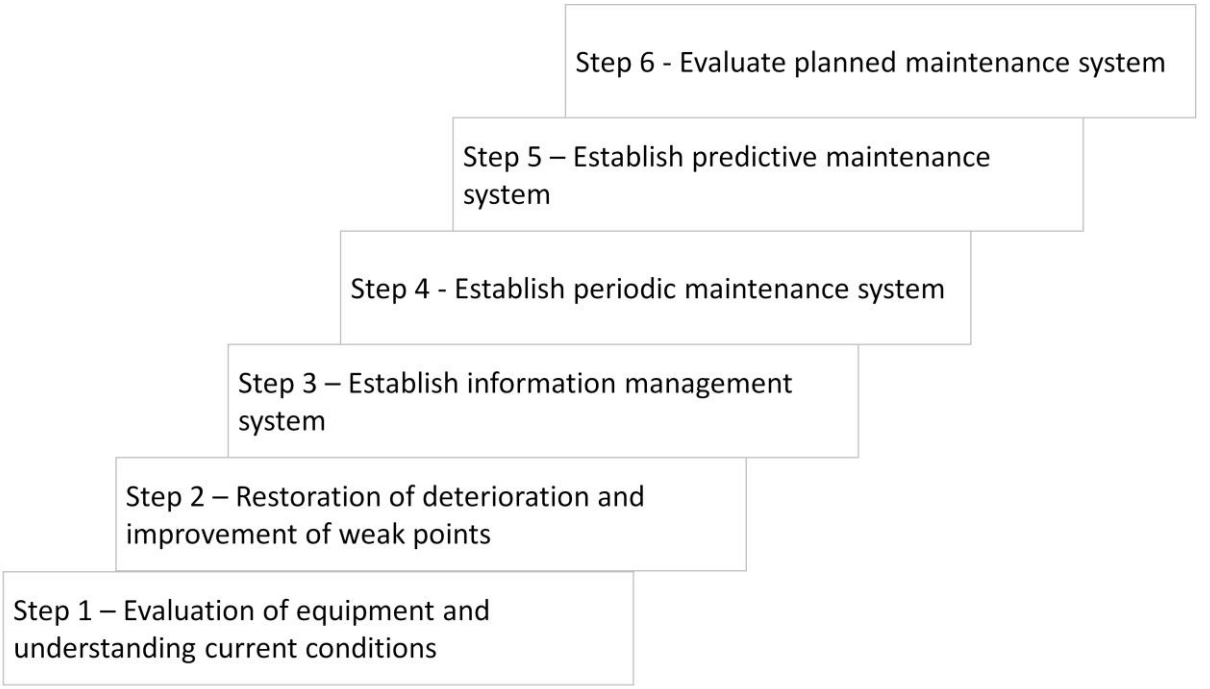
People need to understand that this is not just a quick clean up of the machines, or a 5S programme revamped, but part of a long term commitment by management to invest in up skilling.
The seven steps of AM can be broken down into three main stages.

The fist stage is focused on changing the equipment, and establishing basic conditions. To complete this steps to the standard required can often take one to three years.
The second stage is then focused on changing the operators, by investment in training to enable them to undertake basis maintenance and inspection tasks.
The final stage is focused on changing the shop floor, through standardisation and total autonomous management in the pursuit of zero defects and zero failures

Planned maintenance

The third pillar is planned maintenance.

The focus of this pillar is Establishing plans and a management system to realise zero failure equipment, and prevent failures at minimum cost.



There are 6 steps in the planned maintenance pillar.
Before starting the TPM implementation those people who are involved in maintenance activities need to be assured that this is not about cutting out the role of maintenance and transferring all the tasks to the operators.

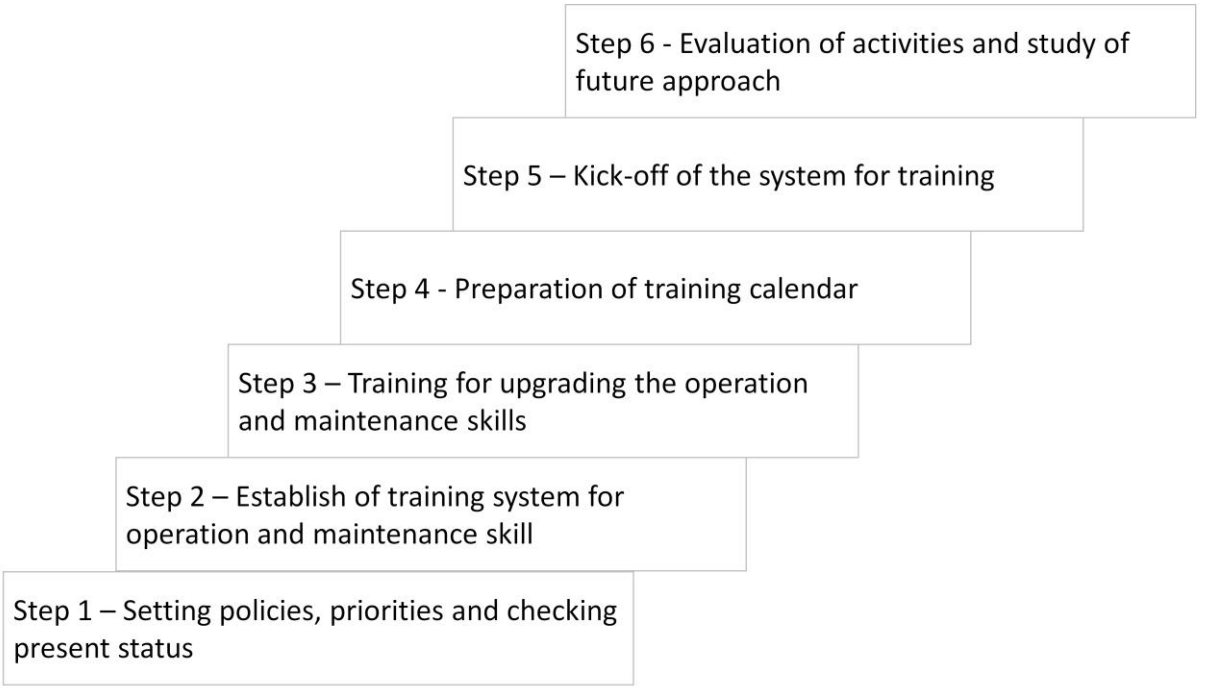
Maintenance will have a key role to play in the TPM programme, assisting in the up skilling the operators to undertaken basic maintenance tasks with the aim of reducing breakdowns. Reduced breakdowns will then mean that the maintenance activity can focus on developing and effective planned and predictive maintenance system.

Training and education

Maintenance trains operators on basic machine knowledge

The forth pillar is Training and Education.

This focuses on establishing systems to systematically foster personnel proficient in equipment and work.



The investment in training and education is fundamental to effective TPM implementation.

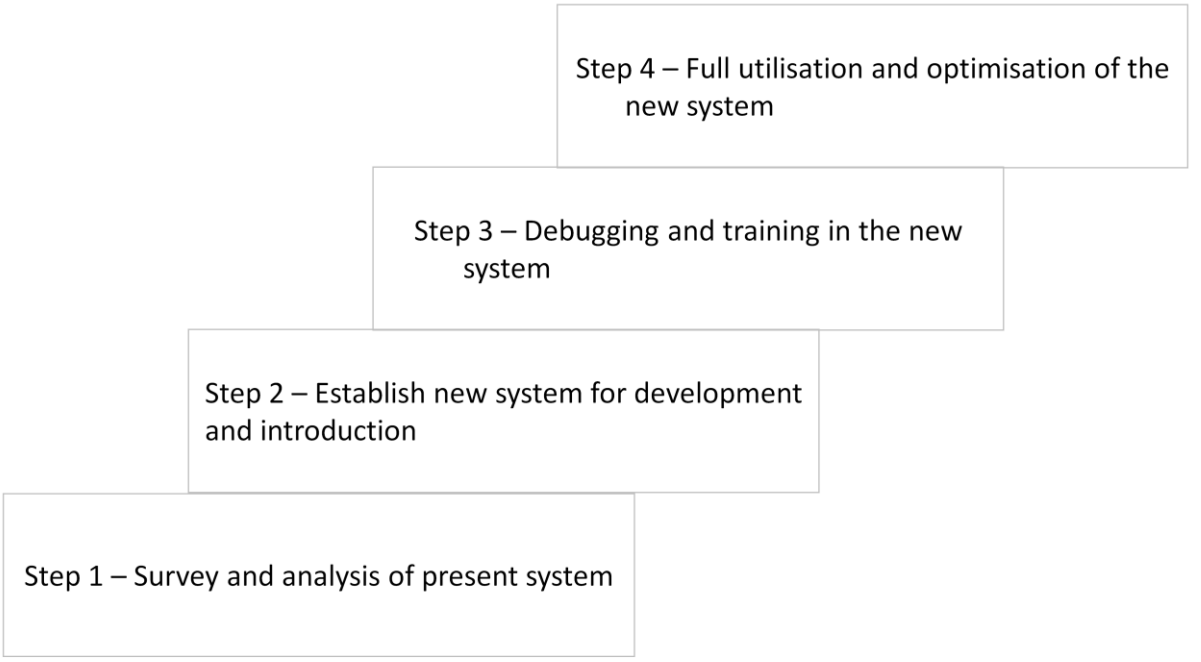
The JIPM model uses 6 implementation steps.
The first fours steps are about evaluating the current status, then establishing a training system, preparing the infrastructure and materials for training and preparing a training calendar.

Step 5 and 6 are then about implementing the training, evaluating the effectiveness and then using this feedback to further develop the system.

Early Management

The fifth pillar is entitled Early Management (sometimes referred to as initial control)

The focus of this pillar is Establishing systems to shorten the development period, and to enable vertical start up.



The early management pillar has four main steps.

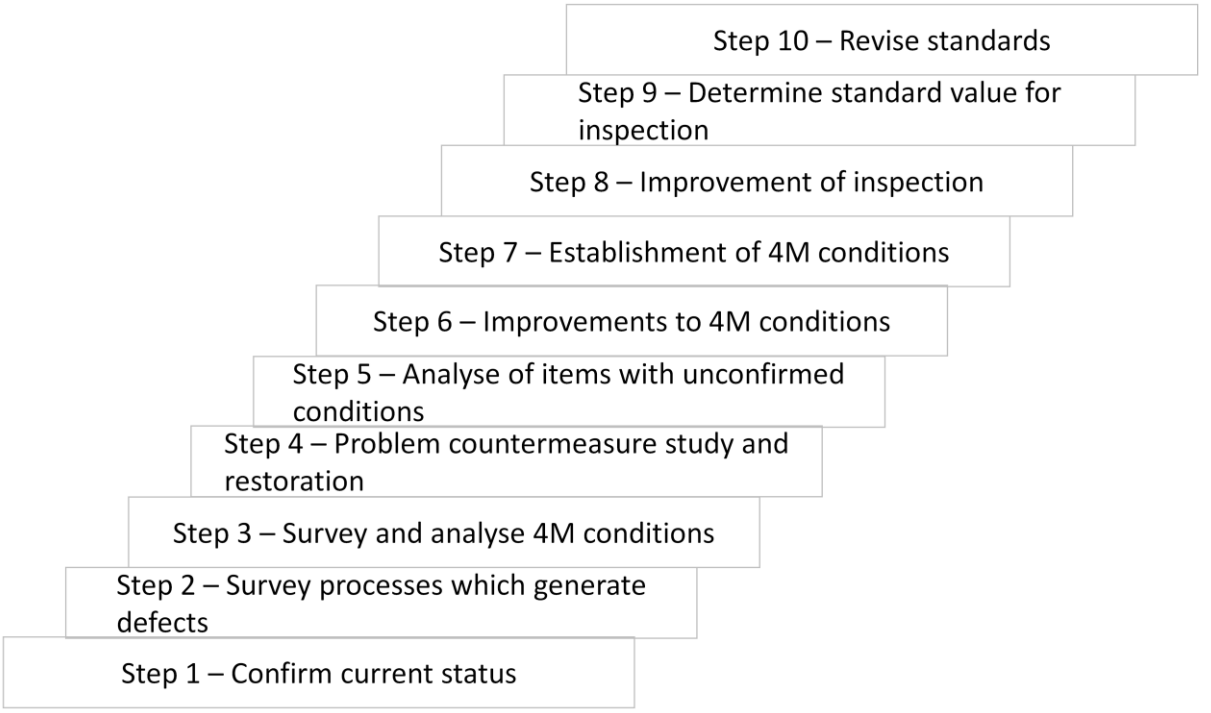
The first step focuses on understand the presentation situation, what are the strengths and weaknesses of the current system for new product or process introduction.

The second step focuses on developing a system, step 3 debugging the system and then step 4 full implementation.

Quality Maintenance

The sixth pillar is Quality Maintenance.

This pillar focuses on Establishing conditions for zero failures to prevent defects, and establishment of systems for maintenance and management.



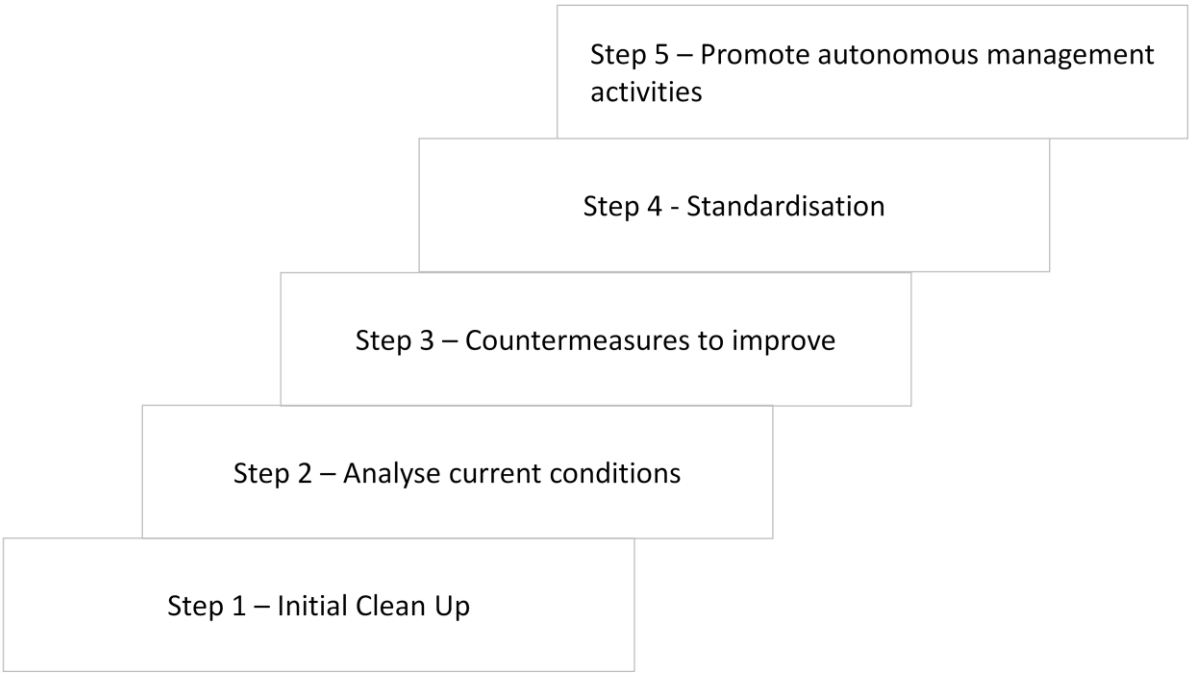
This pillar has 10 defined steps.

The methodology is focused on a structured approach to ensure processes that produce zero defect. To do this the early steps focus on understanding losses and the conditions that generate defects, and the later steps on establishing a system, with defined standards and process parameters, where defects cannot be produced.

Office TPM

The seventh pillar is Office TPM.

This is focused on Establishing an efficient office where office work loss is eliminated.



There are 5 steps to this pillar.

Some people understand this pillar as being a system for 5S in the office but in fact it is far more than this.

The purpose of the pillar is to eliminate losses in all the activities that are undertaken in the office environment, which may include sales processes, logistics processes and production planning. Step 1 is focused on an initial clean up, and then step 2 analysing current conditions and looking for opportunities to reduce the waste in processes.

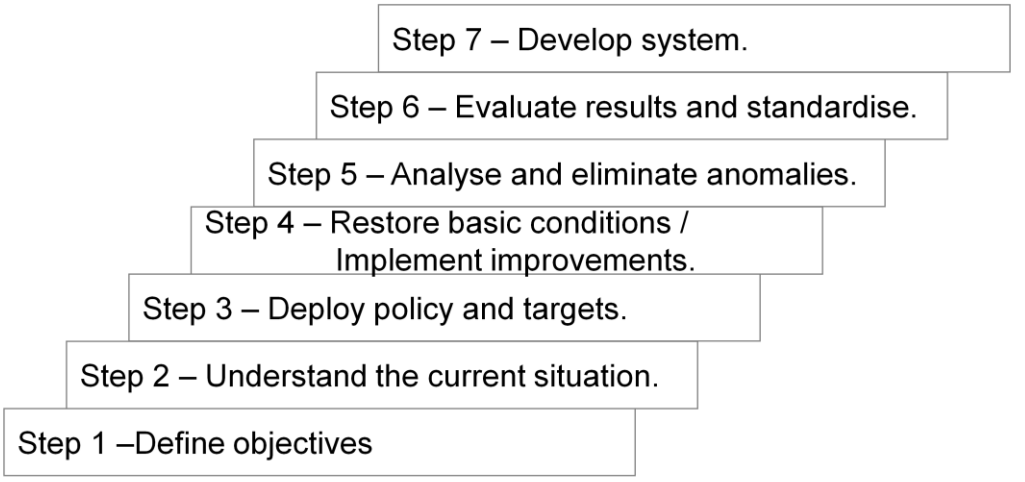
Step 3 is taking countermeasures to improve the situation and then step 4 promoting standardisation.

The purpose of step 5 is to promote total autonomous management of processes.

Safety, Health and the Environment

The final pillar is focused on Safety, Health and the Environment. This pillar focuses on establishing facilities which are safe and secure for workers.

The 7 Steps of Safety, Health and Environment

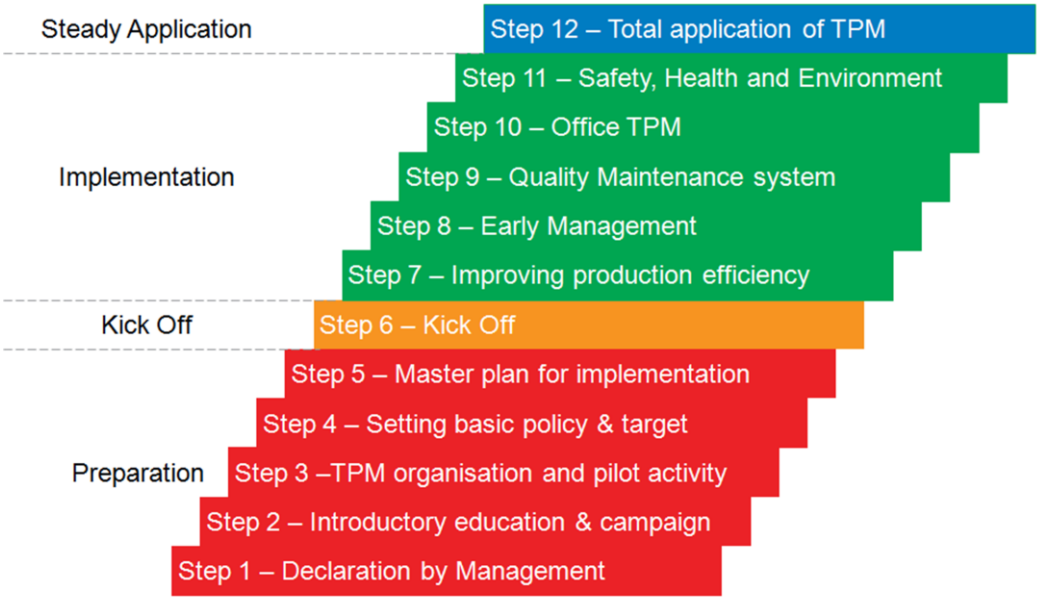


There are 7 Steps for implementing SHE, which run throughout the phases of TPM development – Preparation(Steps 1-5), Introduction (Step 6), Implementation (Steps 7-11) and Consolidation (Step 12 on the)

For example, SHE Step 4 happens when Autonomous Maintenance is implemented in Step 7 of the overall TPM Development program.

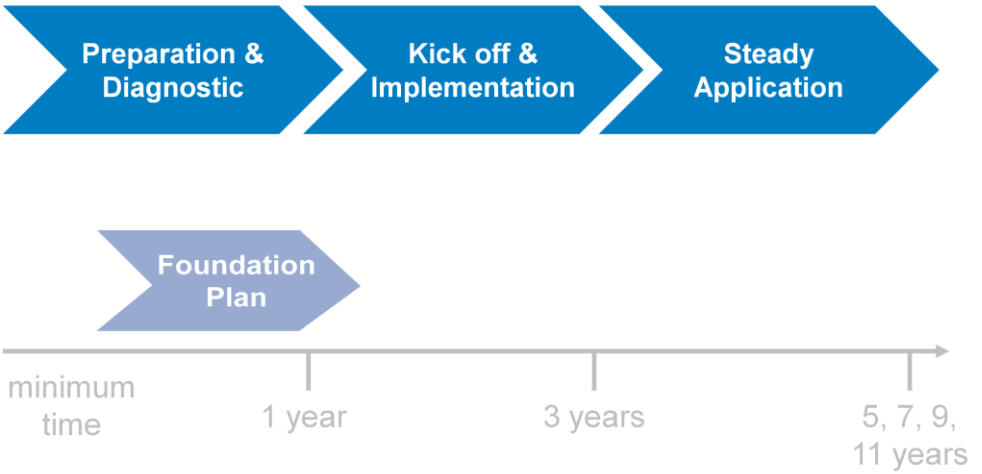
As the implementation of these pillars is described elsewhere, we will instead look into the principles of SHE.

The TPM deployment approach



For overall TPM implementation JIPM define a twelve step process, broken down into 4 phases.
The fist phase is preparation. This is critical to the success of the TPM implementation and success.
Management have to commit to TPM as part of their long term planning, communicate their commitment to the workforce and then identify a pilot area of the business to start the TPM implementation. Policies and targets need to be set and an overall TPM master implementation plan developed.
The TPM roll out activities can then begin to implement the plan. The implementation phase may include a phased roll out of activities to address each pillar, leading to the steady application phase focused on zero accident, zero breakdown and zero defects.

Implementing a TPM programme

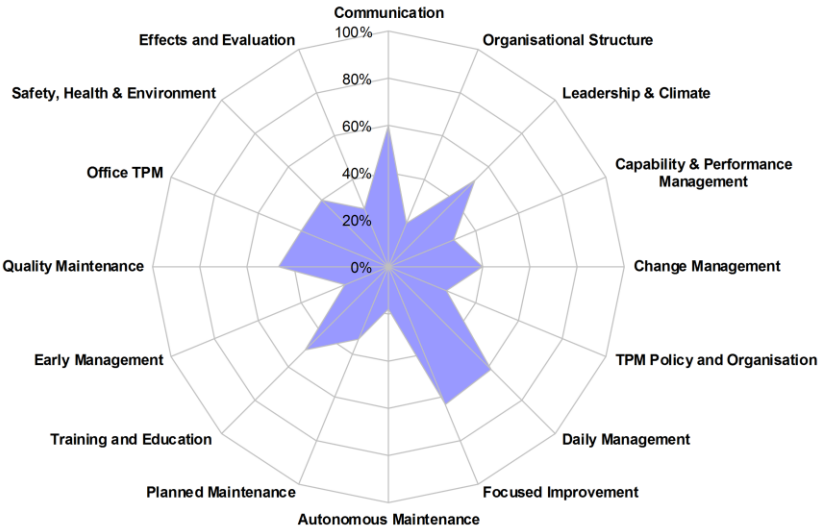


Implementing TPM is a long term commitment, and if the vision is to reach world class standards of TPM, this may take 11 years or more.

Preparation & Diagnostic

Before launching a TPM programme there is a significant amount of preparation required by management, including defining responsibilities and a TPM structure.
To know the status of current systems management meet to instigate a diagnostic check.

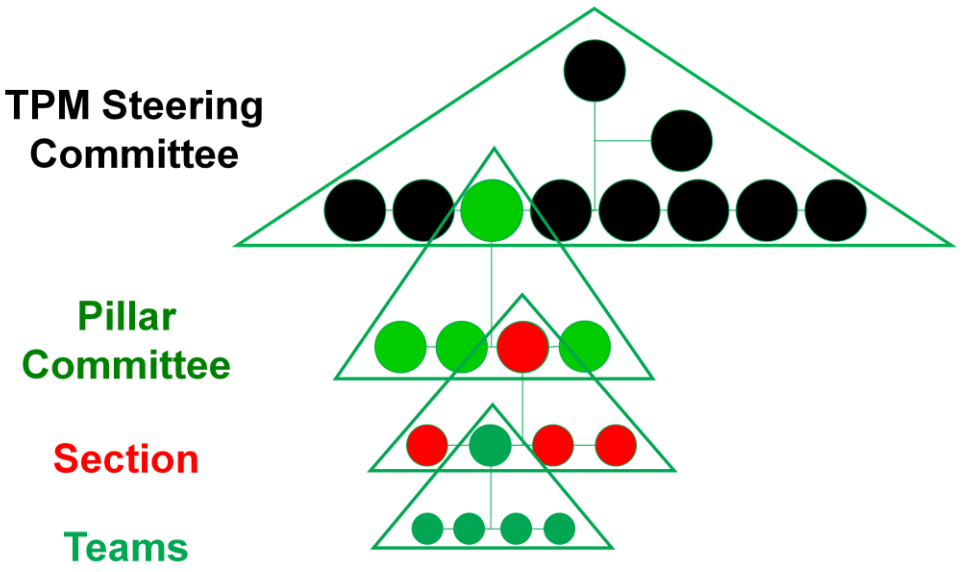
TPM Deployment Assessment (process) Radar Chart	Organisation	ACME
	Date	04/05/2011
	Assessors	C Brown



Overall Score	41%

Ask: What do the scores refer to?

This is an example of a diagnostic check, showing the degree of compliance against a defined set of questions for each pillar.



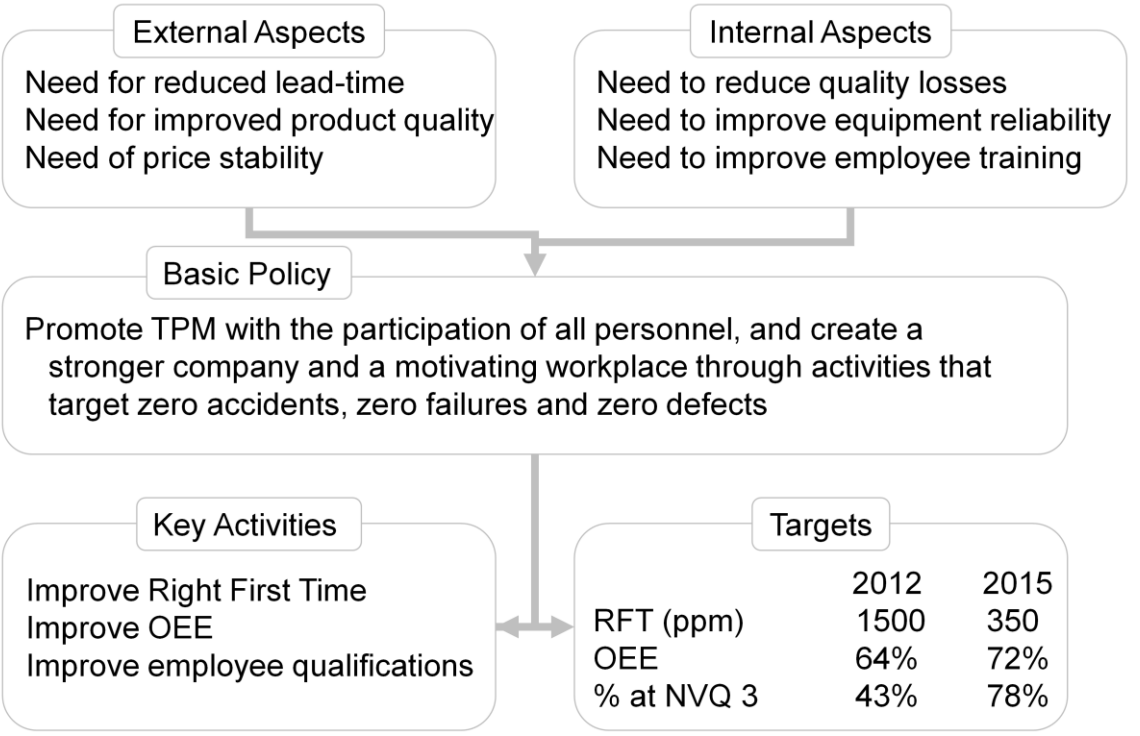
For successful TPM implementation it is essential that management define an organisation structure to deploy TPM. JIPM promote the use of overlapping shall groups. A pillar leader for each pillar is nominated, this forms the basis for the TPM steering committee.

Each pillar leader would then establish a pillar committee, and members of these committees would be responsible for deploying the pillar to sections/teams.

- Establish policy and objectives
- Define a master plan for implementation of TPM

A TPM policy and specific measurable objectives and targets need to be established by management. While an organisation may already have a set of objectives, these need to be reviewed and if required amended to align with the TPM policy and the goal of TPM.

Management would develop a master plan for TPM implementation, with specific plans for the implementation of each pillar.

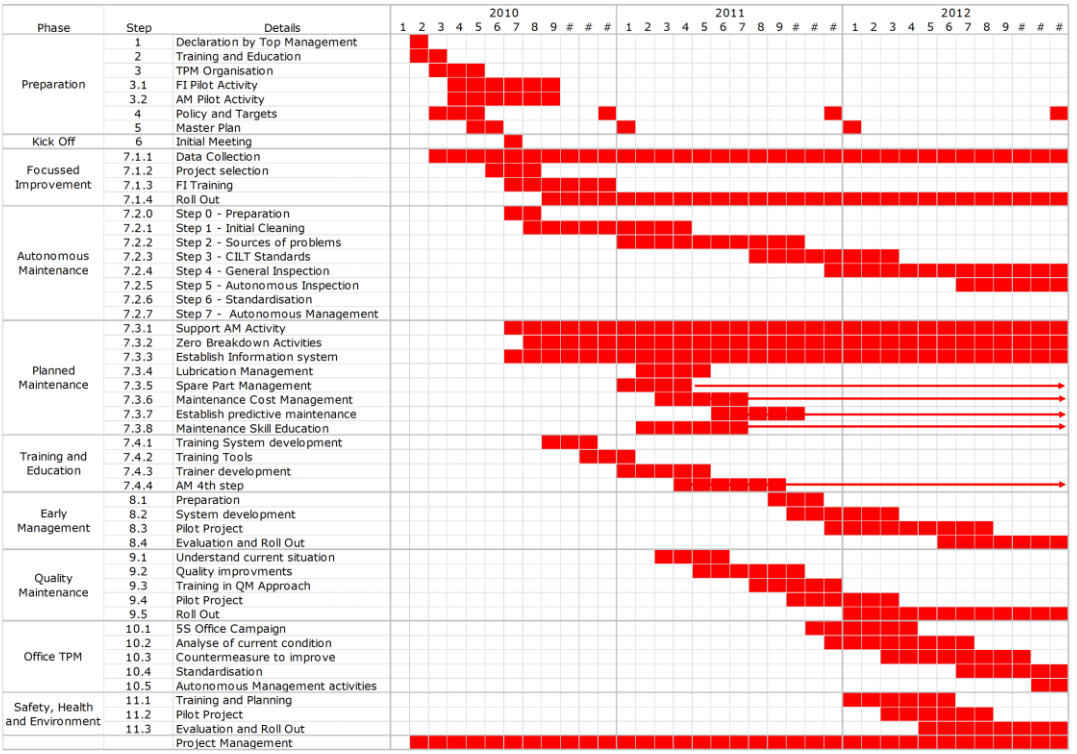


When considering setting the policy and objectives internal and external factors should be considered.

From that key activities and areas for specific focus are identified and improvement targets set.

An example is shown above.

Master Plan Example



Phase	Step	Details
Preparation	1	Declaration by Top Management
	2	Training and Education
	3	TPM Organisation
	3.1	FI Pilot Activity
	3.2	AM Pilot Activity
	4	Policy and Targets
	5	Master Plan
Kick Off	6	Initial Meeting
Focussed Improvement	7.1.1	Data Collection
	7.1.2	Project selection
	7.1.3	FI Training
	7.1.4	Roll Out
Autonomous Maintenance	7.2.0	Step 0 - Preparation
	7.2.1	Step 1 - Initial Cleaning
	7.2.2	Step 2 - Sources of problems
	7.2.3	Step 3 - CILT Standards
	7.2.4	Step 4 - General Inspection
	7.2.5	Step 5 - Autonomous Inspection
	7.2.6	Step 6 - Standardisation
	7.2.7	Step 7 - Autonomous Management
Planned Maintenance	7.3.1	Support AM Activity
	7.3.2	Zero Breakdown Activities
	7.3.3	Establish Information system
	7.3.4	Lubrication Management
	7.3.5	Spare Part Management
	7.3.6	Maintenance Cost Management
	7.3.7	Establish predictive maintenance
	7.3.8	Maintenance Skill Education
Training and Education	7.4.1	Training System development
	7.4.2	Training Tools
	7.4.3	Trainer development
	7.4.4	AM 4th step
Early Management	8.1	Preparation
	8.2	System development
	8.3	Pilot Project
	8.4	Evaluation and Roll Out
Quality Maintenance	9.1	Understand current situation
	9.2	Quality improvments
	9.3	Training in QM Approach
	9.4	Pilot Project
	9.5	Roll Out
Office TPM	10.1	5S Office Campaign
	10.2	Analyse of current condition
	10.3	Countermeasure to improve
	10.4	Standardisation
	10.5	Autonomous Management activities
Safety, Health and Environment	11.1	Training and Planning
	11.2	Pilot Project
	11.3	Evaluation and Roll Out
		Project Management

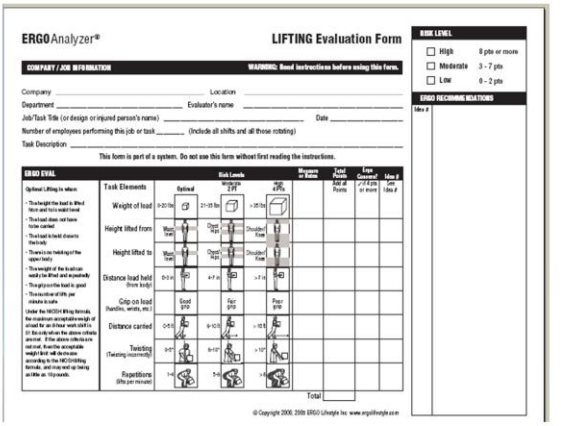
An example of a master plan is shown. You will notice that this projects forward 3 years and contains plans for each pillar and each step. The plan would be reviewed at regular intervals by the TPM steering committee and updated with the progress made.

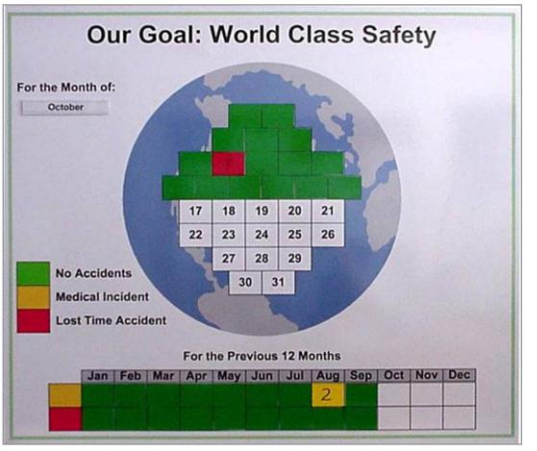
Kick off

The kick of is the official launch of TPM. It is critical all employees understand agree with Top Management TPM policy and implementation plan and how all employees will play a role in successful TPM implementation.

Implementation

Striving to achieve zero accidents

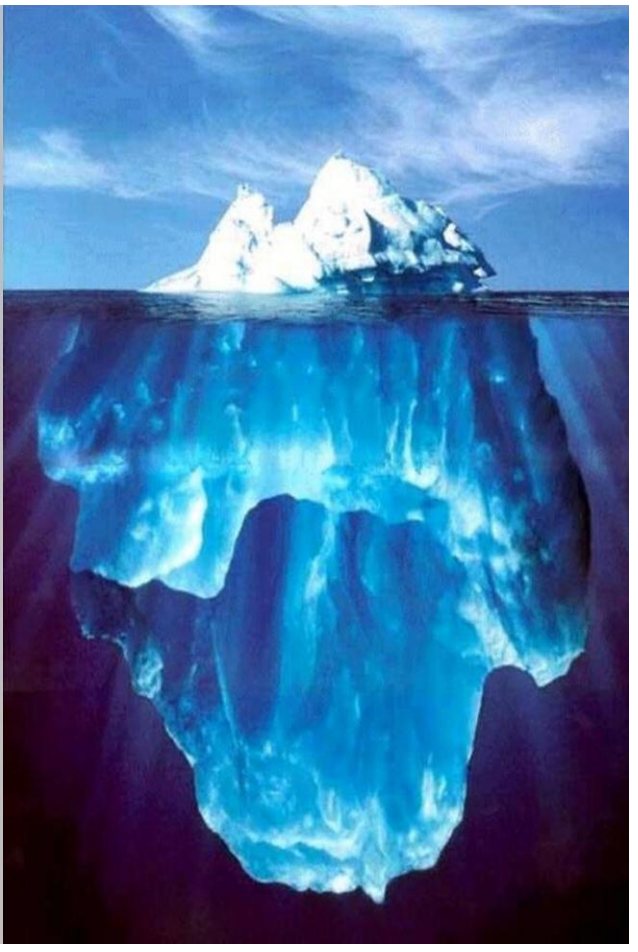




Once the TPM programme is launched the TPM implementation can begin. The TPM methodology is to strive towards the goal of zero accidents. Safely needs to be considered as a priority in all activities. For example in the initial cleaning phase of step 1 of AM, consideration should be given on how to assure employee safety.

Implementation

Striving to achieve zero defects



Management and all employees need to develop a culture that defects are not acceptable and have to be removed. And believe that achieving zero defects is possible.