

# Lean Kaizen Business Consulting

## Total Productive Maintenance?

*Become a least cost producer with  
world class Quality & Delivery*



*Key to the future Survival*

Ask 'why' five times about every matter - Taiichi Ohno

A Journey to World class organization.....



# Total Productive Maintenance (TPM)

Western companies practiced many preventive maintenance techniques, but they could not control downtime of the manufacturing machines due to breakdown and minor stoppages that wrecked productivity and quality. Preventive maintenance practices did not help to bring the operations under complete control.

But how did Nippon Denso achieve this?

Nippon Denso compared its current situation with that of a mother

Nippon Denso added autonomous maintenance by operators. Maintenance workers were responsible for maintaining

Maintenance workers were responsible for maintaining the natural wear and tear and focused on the scheduled monthly, quarterly or yearly maintenance. This is known as planned maintenance.

TPM was invented and perfected by Nippon Denso of the Toyota Group in Japan. They managed to bring control over the downtime of the machines (reduce it to zero), increase capacity utilization and reduce rejections on the machines.



Nippon Denso of the Toyota Group became the first company to get the TPM certification in 1971 by the Japan Institute of Plant Engineers.

# TPM

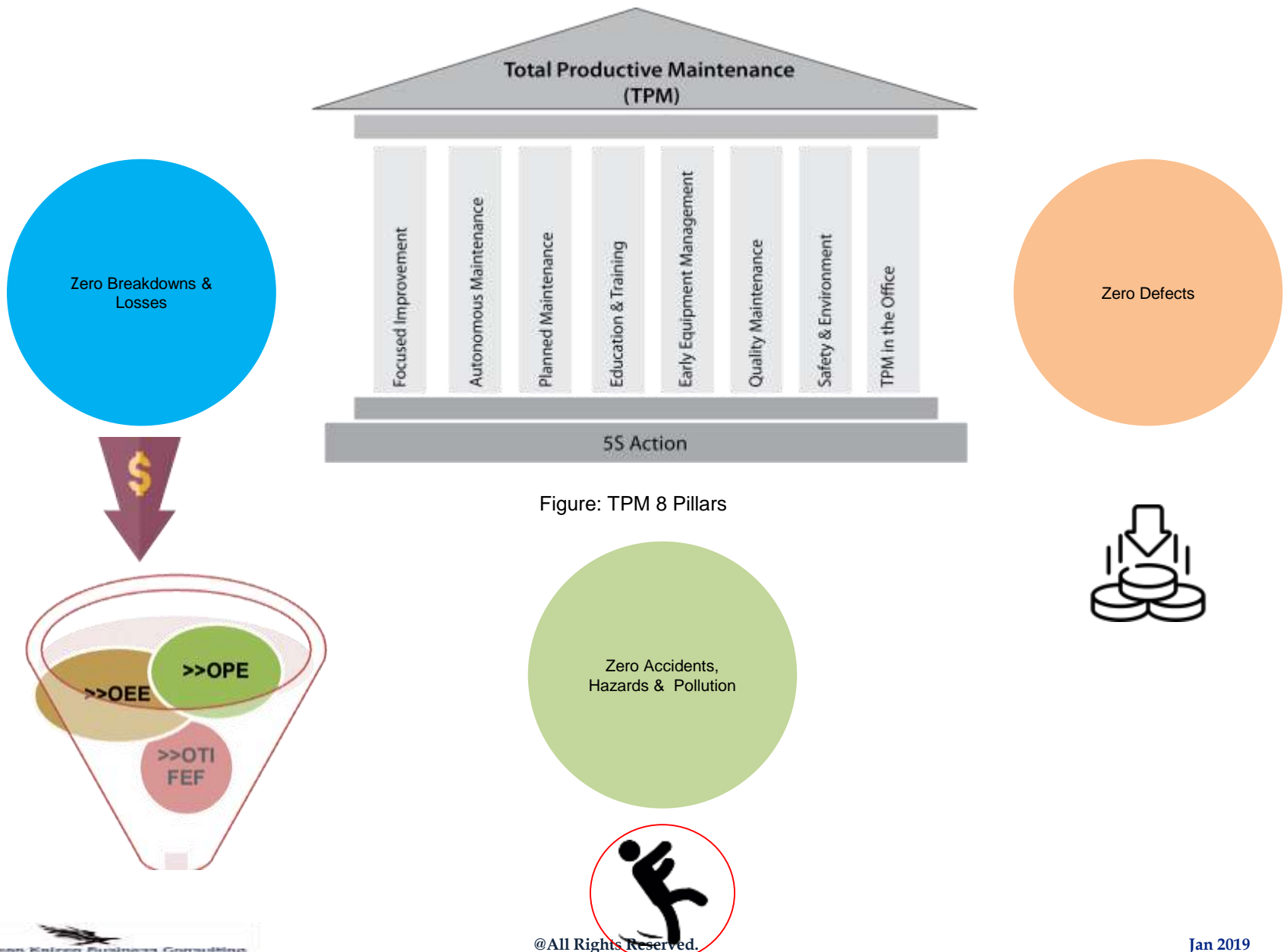


Figure: TPM 8 Pillars

# Benefits of TPM

## Productivity

+30%

## OPE

+30%

## OEE of critical equipment

Double. Increase in OEE will result in reduction or elimination of customer complaints and reduce the overall manufacturing cost by 30%.

## OTIFEF

The goal of achieving 100% OTIFEF, that is, delivering the right quantity at the right time, of the right quality comes within close range.

## Manufacturing Costs

Increase in OEE will result in reduction or elimination of customer complaints and reduce the overall manufacturing cost by 30%.

## Incidents and Accidents

Implementation of TPM also helps to reduce the incidents and accidents by 100%.



# Elimination of 16 losses in the company

## External Experts

The TPM sensei (external expert) works on the shop floor with the plant teams on the 'manager model machines' and implements the TPM.

## Managers Model Machine

These 'manager model machines' become the archetype for the changes to be brought throughout the plant on all the machines.

## AM and PM time

There should be a scheduled time for autonomous and planned maintenance activities.

## Maintenance part of VS

The maintenance team should be part of the value streams and report to the value stream manager so that practice of maintenance work order and waiting for the maintenance team are discontinued going forward.

Linkage of TPM pillars with the 16 losses.

S.N.	Losses	Autonomous Maintenance	Planned Maintenance	Quality Maintenance	Focussed improvement	Safety Health and environment	Education and Training	Office TPM	Early Equipment Management
Availability Losses									
1	Breakdown Loss	✓✓	✓✓				✓		✓
2	Planned Maintenance Time loss	✓	✓✓				✓		✓
3	Set up Loss	✓			✓✓				
4	Tool Change	✓			✓✓				
5	Start up		✓		✓✓				
Performance Losses									
6	Minor Stoppage Loss		✓✓		✓				
7	Reduced Speed Loss		✓✓		✓				
Defect & Rework Loss									
8	Defect and Rework Loss	✓		✓✓			✓		
Human Efficiency related Losses									
9	Management Loss				✓✓				
10	Operating Motion Loss	✓			✓✓				
11	Adjustment & Measurement Loss			✓	✓✓				
12	Line Organisation Loss	✓			✓✓				
13	Logistic Loss				✓			✓✓	
Cost Losses									
14	Yield Loss				✓				
15	Energy Loss		✓✓		✓				
16	Die, Tool & FOS Loss	✓			✓				
Pillar Man focus- H				H Secondary focus					

Figure: Linking eight pillars of TPM with the sixteen losses