# Welcome to
# TPM & 3 “S” Awareness Programme


BEST CHOICE
Quality
Production
Cost
TPM
Total Productive Management
Morale
Lead Time
Safety


INTRODUCTION
Efficient work and quality require clean environment, safety and discipline
AIM TO IMPROVE THE CONDITION OF WORK PLACE

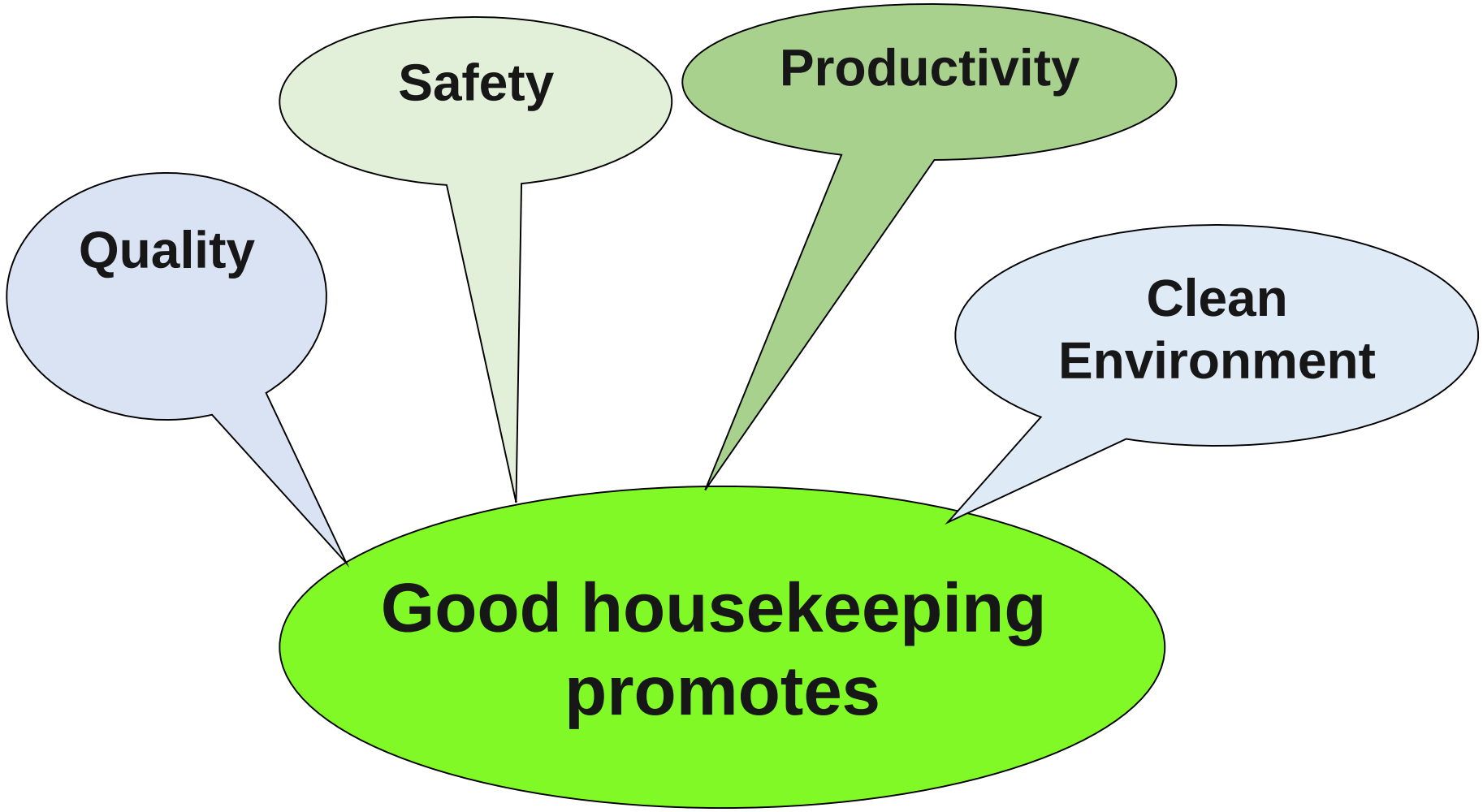
BMM
POTENTIAL IN TONNES

# 5S

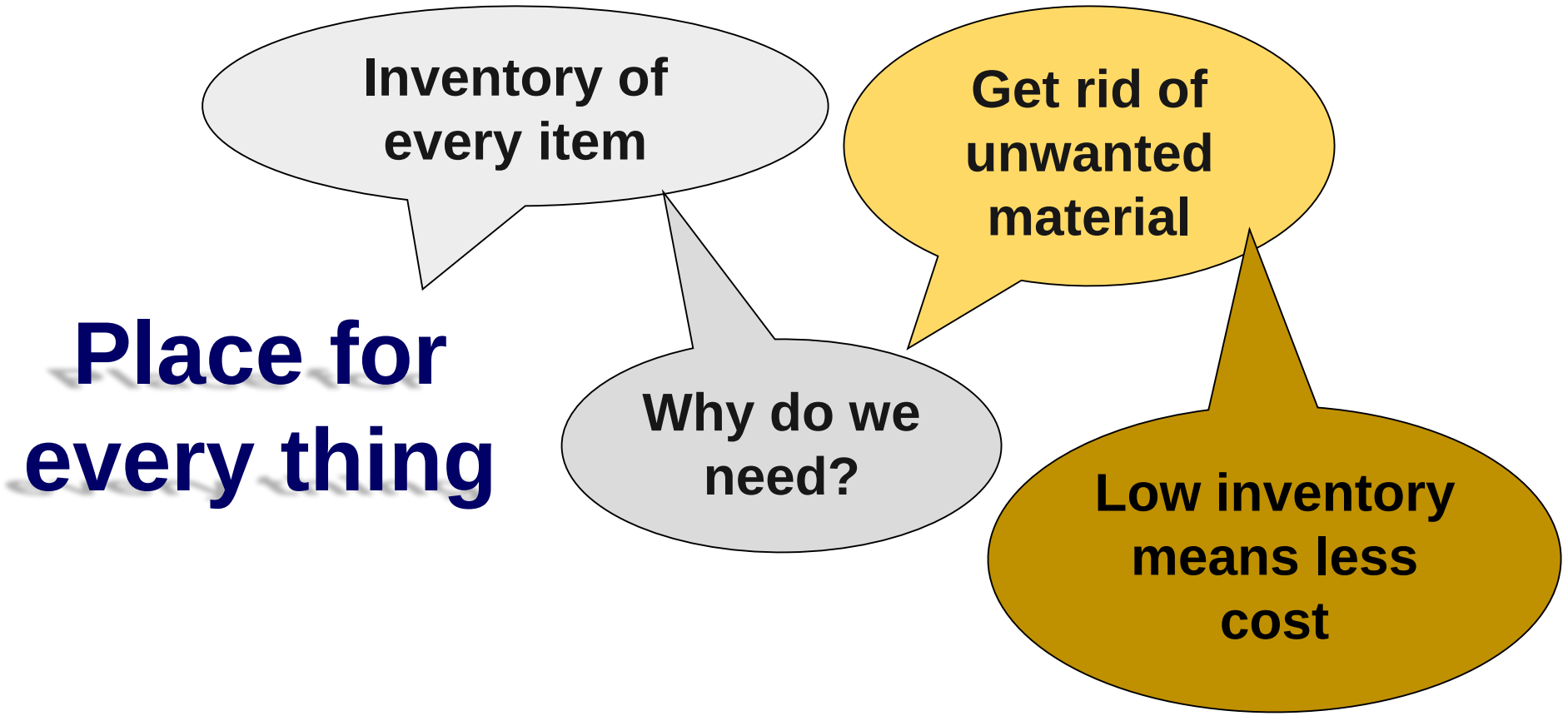
1. **5S is a workplace organization technique**
2. **It is a way to involve associates in the ownership of their workspace**
3. **It helps create and maintain the efficiency and effectiveness of a work area**

5S is a starting point for any Improvement activities in a company like TQM, TPM, Business Excellence, Kaizen etc

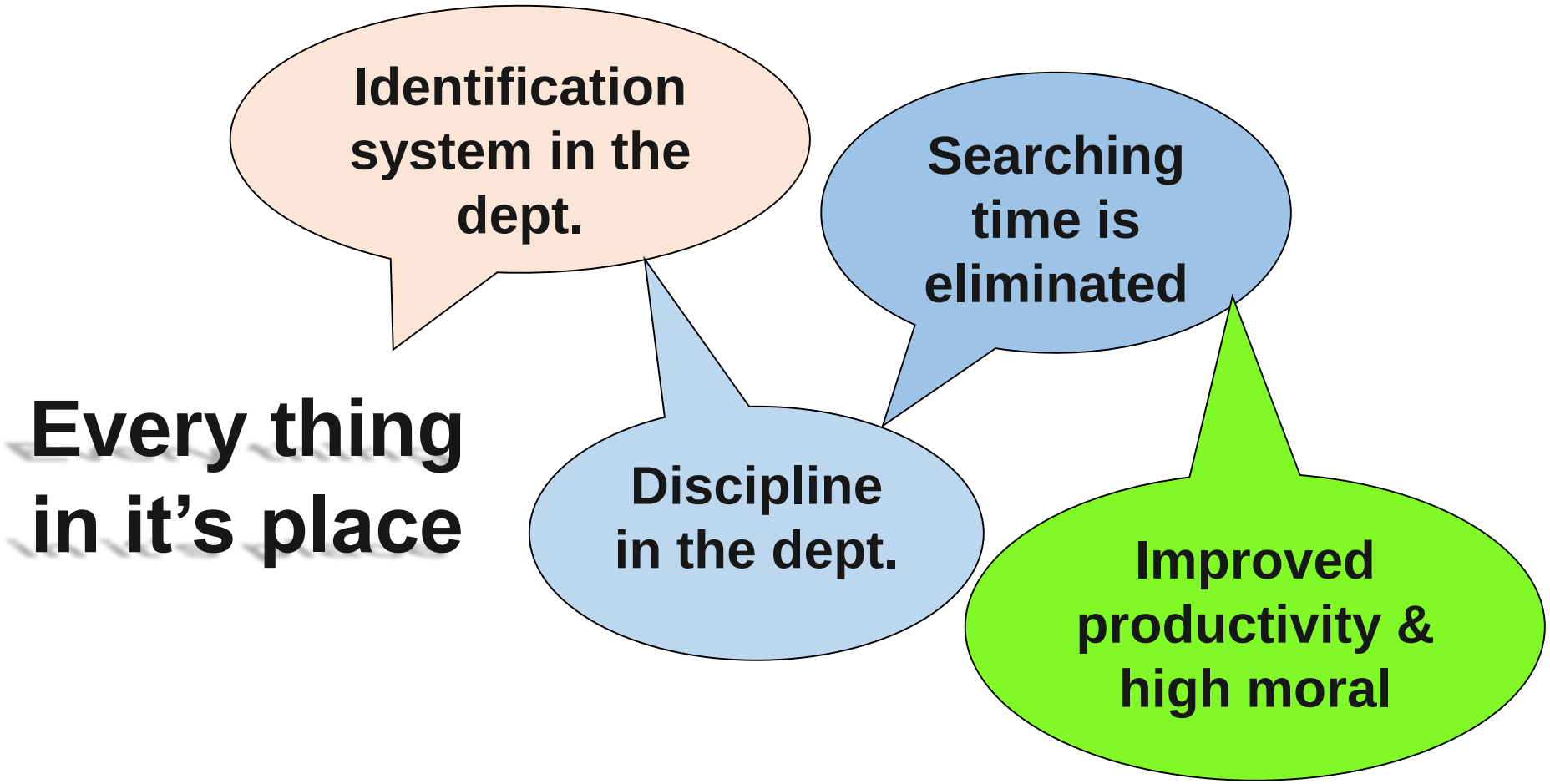
# Why 5S


Safety
Productivity
Quality
Clean Environment
Good housekeeping promotes

# Good Housekeeping



# Good Housekeeping



# 5S EXPLANATION


| SORT | SET IN ORDERT | SHINE | STANDARDIZE | SUSTAIN |
|---|---|---|---|---|
| When in doubt move it out- RED TAG technique | A place for everything & everything in its place | Clean & inspect/ inspect through cleaning | Make up the rules, follow and enforce them | Part of daily work it becomes a habit |


TPM
1S
SEIRI
2S
SEITON
3S
SEISO
4S
SEIKETSU
5S
SHITSUKE

# 5 S are 5 Japanese words starting with the Alphabet “S” .-

**These are concerned with Establishing & Maintaining**
**House Keeping, Safety & Quality Environment in an Organization**

| | | |
|---|---|---|
| **1. Seri** | **Sorting** | Differentiate between the wanted and unwanted items and discard the unwanted. |
| 2. **Seiton** | **Systematic** | Keep things in order and in the right place Arrangement |
| **3 Seiso** | **Spic & Span** | Keep your work place clean. |
| 4 **Seiketsu** | **Standardize / Sanitation** | Keep Adherence easy & clean. |
| 5. **Shitsuke** | **Self discipline** | Discipline yourself. |

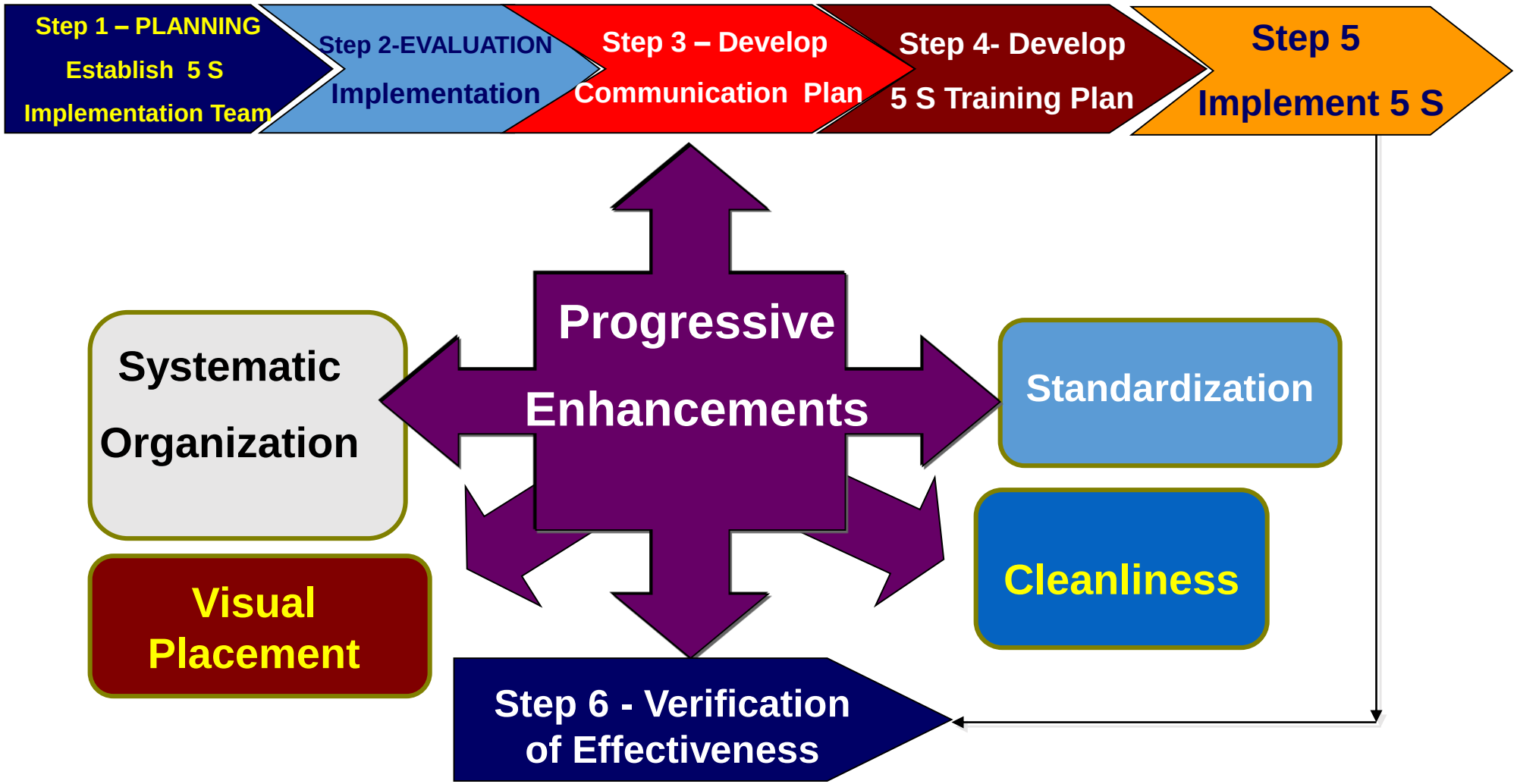
# 5S

- An essential step required for Waste Elimination with Good Housekeeping

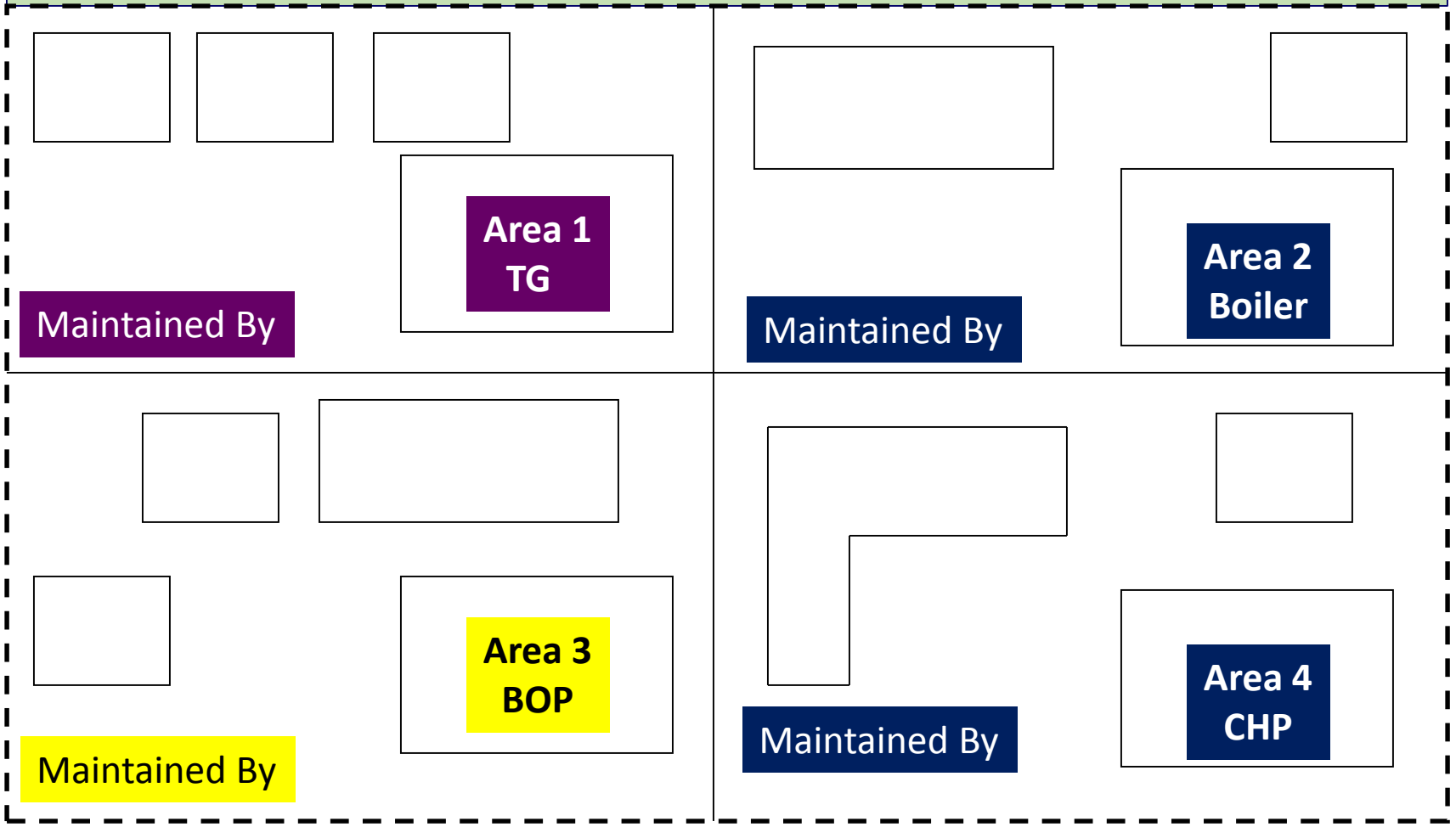

- An integral step in TPM, TQM, Kaizen
- A required element to achieve Lean Manufacturing.

# Steps of 5S – Planning & Starting

# 5 S Implementation Plan



# 5S Boundaries



| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 1S - Sorting | 1 | Needed & not needed items are mixed throughout work area |
| | 2 | Needed and not needed items have been sorted & not needed have been removed from work area |
| | 3 | A list of needed items for the work area has been documented |
| | 4 | Needed items are routinely assessed against business needs to assure functionality and fit |
| | 5 | Needed items are routinely reworked/ replaced as needed to improve work area performance |
| 2S - Simplifying | 1 | Items are placed randomly throughout the work place |
| | 2 | Needed items have been safely stored and organized according to frequency of use |
| | 3 | Needed items have dedicated locations and are properly labeled with required quantities |
| | 4 | Needed items have been minimized in number/ size and are properly arranged for retrieval and use |
| | 5 | Needed items can be retrieved within 30 seconds and require a minimum number of steps |

**Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention**

BMM
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| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 3S Systematic Cleaning | 1 | Key work area items to be checked during a sweep are not identified |
| | 2 | Key work area items to be checked are identified and documented |
| | 3 | Visual controls for equipment, files and supplies have been established for the work area |
| | 4 | Daily inspection occurs to assess area readiness, potential problems are identified and fixed |
| | 5 | Problem sources are documented with solutions defined and implemented |
| 4S - Standardizing | 1 | No work area agreements exist |
| | 2 | Work area SOP are identified and documented for needed item organization and work area controls |
| | 3 | Work area SOP for needed item labeling and visual controls are posted and followed by work team |
| | 4 | System for labeling, housekeeping, inspections, and work place design are consistently followed & demonstrate area performance improvement |
| | 5 | Methods for housekeeping, labeling, inspections, and work place design are continually improved and shared externally as applicable |

**Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention**

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| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 5S Sustaining | 1 | There is no measurement of 5S performance |
| | 2 | 5S level has been determined and posted on the communication board |
| | 3 | Work team is routinely checking area to maintain 5S standard and posting results |
| | 4 | Sources and frequency of problems are documented as part of routine work, root causes are identified, and corrective action plans are developed |
| | 5 | Root causes have been eliminated and improvement actions focus on developing preventive methods |

**Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention**

# The outcomes of 5S

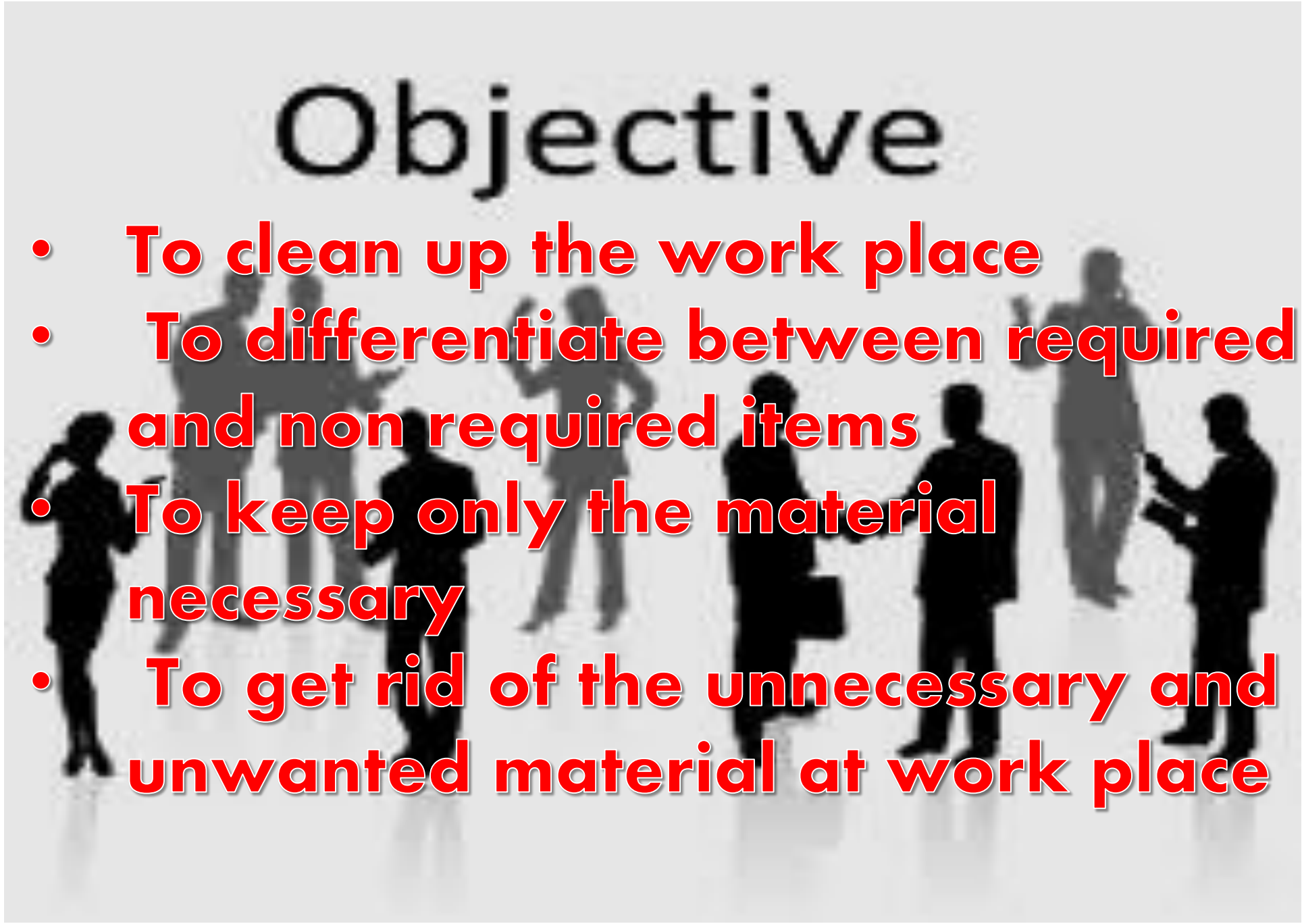
- A standard is set :
  - Only items that are required or essential to support the work are held in the area.
  - Essential items are organised and located in a set position to support effective and efficient work, with the view of minimising wasteful motion.
  - Tools, plant and equipment are maintained to support safe operations and ensure good working conditions.

# BENEFITS OF 5S

- Saves Floor & Storage Space
- Prevents  Duplication of Effort
- Better Utilisation of Existing Material
- Search Time Reduced
- A Clean and Pleasant Offices
- Elimination of Wastage of Time & Money
- Productivity Improvement & High Morale

# Objective

- To clean up the work place
- To differentiate between required and non required items
- To keep only the material necessary
- To get rid of the unnecessary and unwanted material at work place



# PROCEDURE

## The Conditions required for enforcing 1s is as follows:

- **MUST CONDITION: List of required items (for each of the required items, persons to be identified for carrying out the responsibility to maintain the said items in the circle).**
- **DESIRED CONDITION: For new items, system to be developed.**

**To implement 1S and achieving effective results in a circle, the following procedure shall be adopted:**

1. Take photographs of the area work place of the circle & materials available in the work place and its surroundings.

2. Prepare a comprehensive list of all items available in the circle

# LISTING OF ITEMS AVAILABLE IN THE CIRCLE

**Plant:** _____

**Circle no:** _____ **Circle Name:** _____

**Area** _____

| SI. NO | Item Description | Specification | Quantity |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

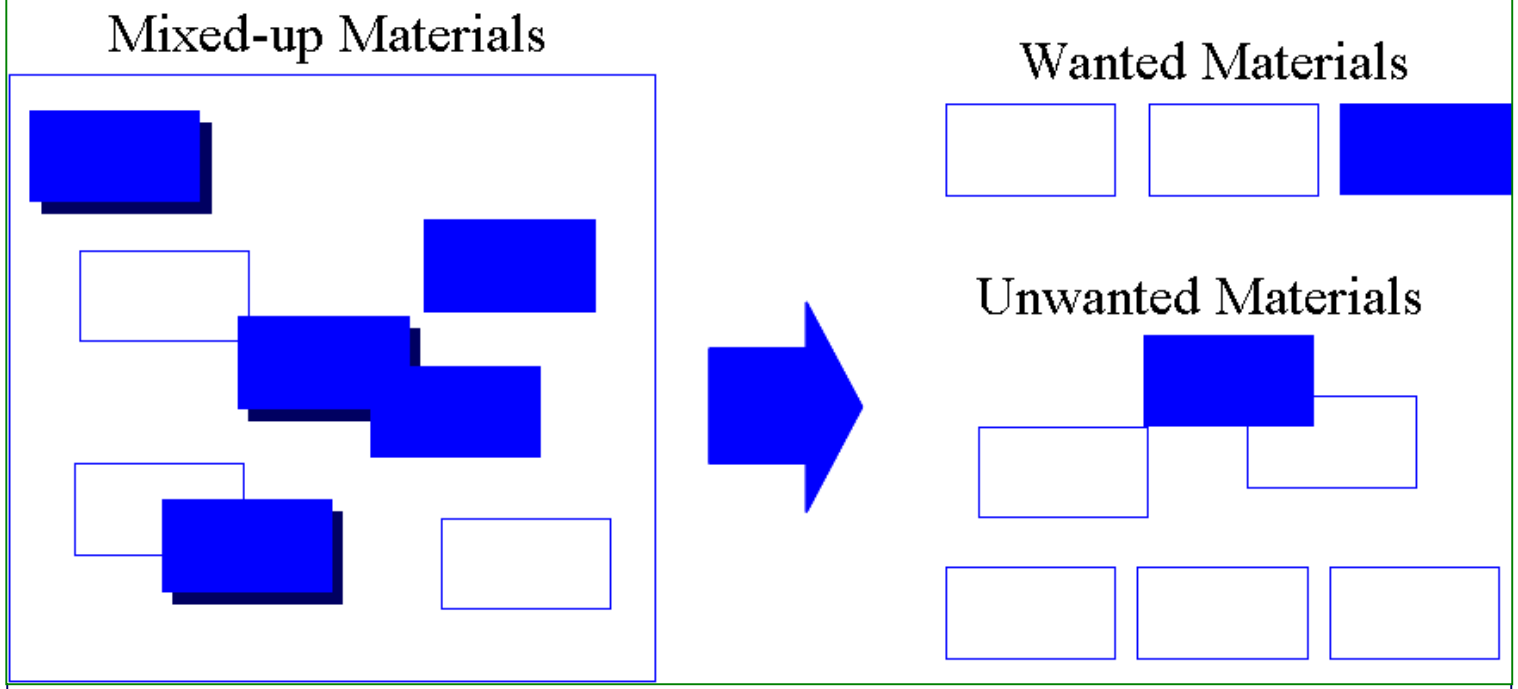
Name & sign of
Leader/Dy .Leader

Name & sign of
TPM Coordinator

Name & sign of
Plant Incharge

# Sorting

## 1S - Sorting



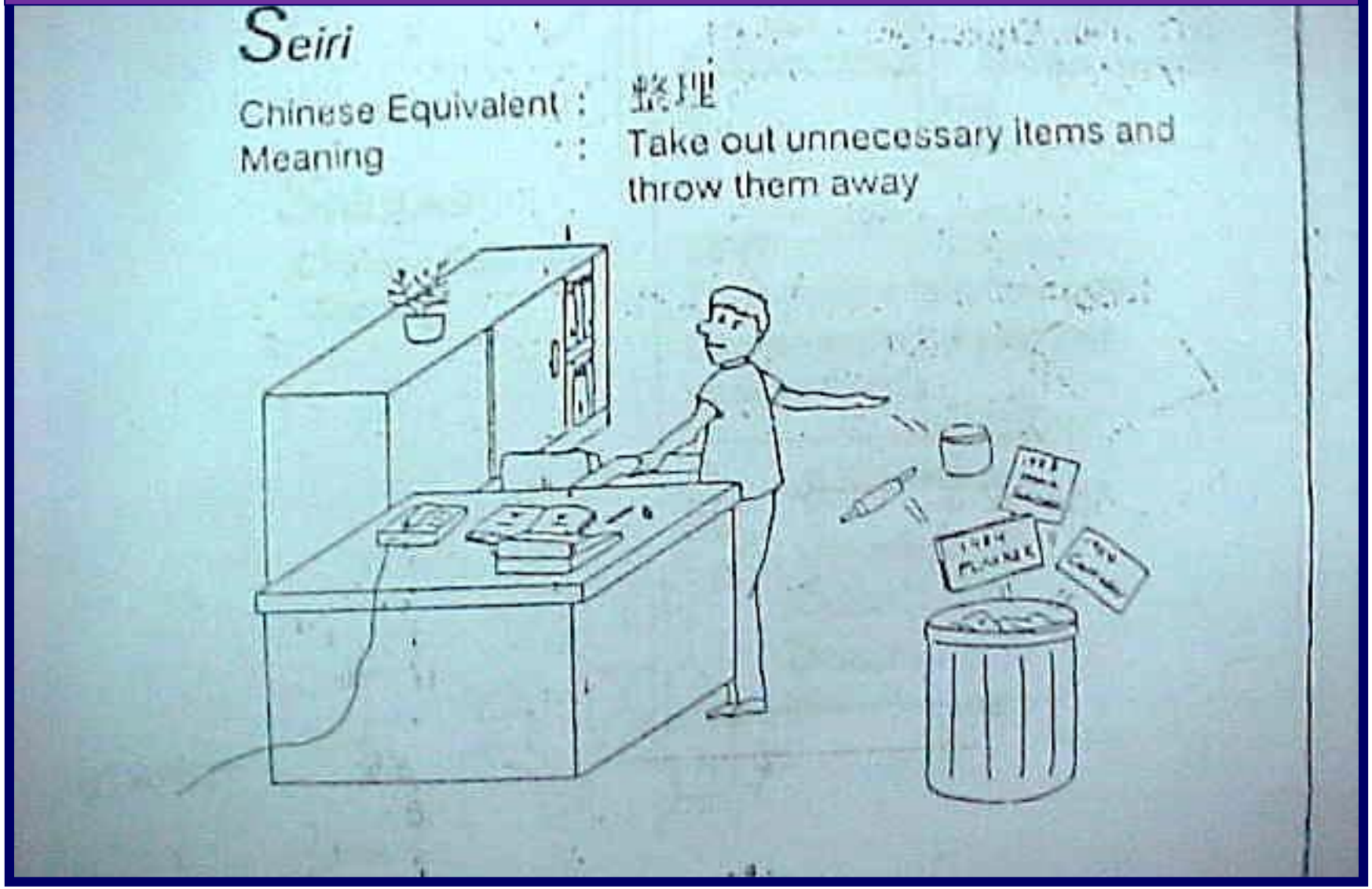

- **To do this you may need to develop a policy or fix some rules, i.e**
  - ***Low priority* items may be stored in a distant place.**
  - ***High priority* items may be kept in a designated area.**
- **The team should agree the rules and must stick to them.**

## Seiri :Sort out items and discard the unnecessary

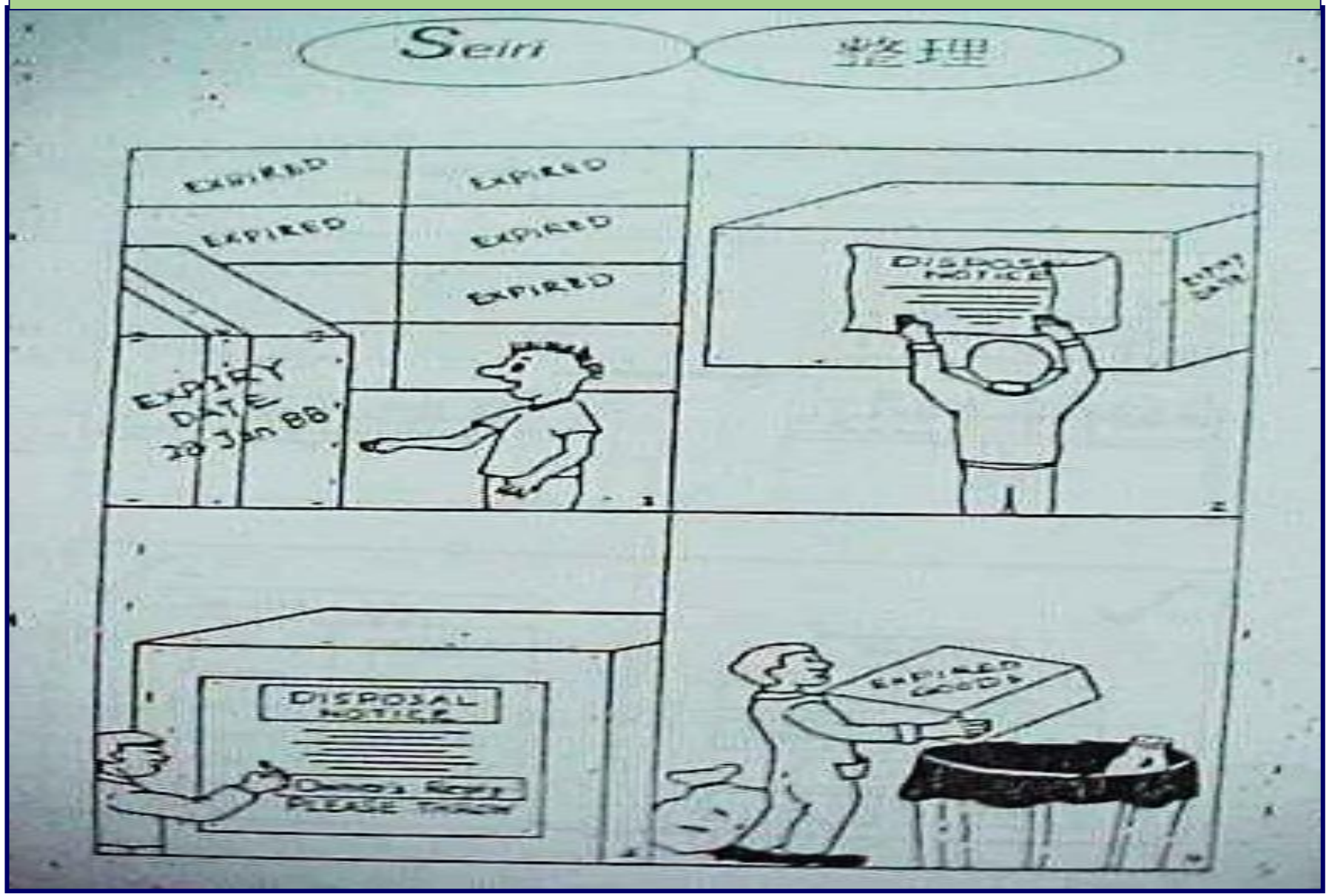
**Key Check :**

1. Do we find items scattered in our workplace
2. Are there boxes, papers and other items left in a disorganized manner.
3. Are there equipments and tools placed on the floor.
4. Are all items sorted out and placed in designated spots.
5. Are the tools properly sorted and stored

# 1S - SEIRI - SORTING



# 1S - SEIRI - SORTING



# 6 Steps of 1S

| Steps | Activity | Remarks |
|---|---|---|
| **Step 1** | **Make List of item existing at Present** | As per above format |
| **Step 2** | **Decide Usage Frequency of Each Item** | -Do - |
| **Step 3** | **Divide this into five Category :**<br>**A)Items to keep at Work Area**<br>**B)Items to be kept in another Area Managed by User**<br>C)Items to be kept at common place like Store<br>D)Items not required by this area but other areas<br>E)Items not usable by own / other Areas | **Items A) , B) – Required Items for your Area**<br>**Items C) , D), E) – Not Required Items for your Area** |
| **Step 4** | **Decide Persons who would be in charge of each item** | To be mentioned in the above format. |
| **Step 5** | **Make List of required items** | Cover only A, B & C category |
| **Step 6** | **1. Make Standard – Addition / Removal of required item**<br>**2. Decide the methods of Managing items outside** | Audit & review |

# 1S Listing Format

**Division :**

**Area / Location :**

| SN | Item Description / List | Quantity | Usage Frequency | 1 S Category (5 Types – A,B,C, D,E) | Identification Date | Disposal Plan | Target Date | Resp | Implementation Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |

**** 1S Five Types Category A, B, C, D, E :**

**A)Type - Items to keep at Work Area**
**B)Type - Items to be kept in another Area Managed by User**
**C)Type - Items to be kept at common place like Store**
**D)Type - Items not required by this area but other areas**
**E)Type - Items not usable by own / other Areas**

# 1S Activity

## 1S Listing Format (1/9/12 to 30/3/13)

| SN | Item Description / List | Quantity | Usage Frequency | 1 S Category (5 Types – A,B,C, D,E) | Identification Date | Disposal Plan | Target Date | Resp | Implementation Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Accretion measuring rod | 12 | Daily | A | 1/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 2 | Cooling drum | 4 | Daily | A | 1/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 3 | QRT Protection tube | 2 | Daily | A | 1/9/12 | N/A | N/A | Indrajit singh | Done |
| 4 | Accretion measuring scale | 1 | Daily | A | 1/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 5 | Water hose | 1 | Daily | A | 4/9/12 | N/A | N/A | Indrajit singh | Done |
| 6 | Air hose | 1 | Daily | A | 4/9/12 | N/A | N/A | Indrajit singh | Done |
| 7 | QRT wire | 1 | Daily | A | 6/9/12 | N/A | N/A | Indrajit singh | Done |
| 8 | Tool box | 1 | Daily | A | 12/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 9 | Main cooling fan | 1 | Daily | A | 20/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 10 | Cooling fan | 2 | Daily | A | 20/9/12 | N/A | N/A | Dilip Kumar | Done |
| 11 | Primary Air fan Duct assembly | 2 | Light up | B | 19/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 12 | Cooling duct assembly | 2 | Shut down | B | 20/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 13 | Ldo firing gun | 2 | Light up | B | 19/9/12 | N/A | N/A | Indrajit singh | Done |
| 14 | Ldo control valve stand | 1 | Light up | B | 19/9/12 | N/A | N/A | Indrajit singh | Done |
| 15 | Transfer cute Bridge | 1 | Shut down | B | 20/9/12 | N/A | N/A | Trilochan Gorai | Done |
| 16 | Barricading angle | 8 | Shut down | B | 20/9/12 | N/A | N/A | Trilochan Gorai | Done |

# 1S Listing Format (1/3/13 to 31/3/13)

| SN | Item Description / List | Quantity | Usage Frequency | 1 S Category (5 Types – A,B,C, D,E) | Identification Date | Resp |
|---|---|---|---|---|---|---|
| 1 | Hammer 5 kg | 1 | Daily | A | 1/11/12 | Makar tudu |
| 2 | Hexagonal bar | 1 | Daily | A | 1/11/12 | Manohar |
| 3 | Round bar long | 1 | Daily | A | 1/11/12 | Manohar |
| 4 | Round bar small | 1 | Daily | A | 1/11/12 | Manohar |
| 5 | Air hose | 1 | Daily | A | 3/11/12 | Makar tudu |
| 6 | Tool Box | 1 | Daily | A | 16/11/12 | Makar tudu |
| 7 | Scoop | 1 | Weekly | B | 3/11/12 | Manohar |
| 8 | Fire extinguisher | 1 | Emergency requirement | B | 17/12/12 | Manohar |
| 9 | Hand lamp | 1 | Daily | B | 17/12/12 | Makar tudu |
| | | | | | | |

# CATERGORIZATION

- After prepartion of list of all available items, a separate list to be made for the items which are useful within the circle and put them in catergory-1.
- List of balance items to be circulated to the Leader/Dy.Leader of other circles of the same plant by hard copy to notify and seek a reply within a time period of 7 days for the usefulness of the material in their circle. The responsibility is lying with the TPM Coordinator
- Enlist the items required in any other circle of the same plant and put them in Category-2
- If no replay is received from any circles or after selecting the materials for Category-2,rest items list to be circulated by e-mail to TPM Coordinators & Plant Head of all plants to find out whether the same materials are of useful in some other plant in the organization & seek confirmation within 10 days. The responsibility is lying with the TPM Coordinator.
- If any communication is received, accordingly prepare the list and group them in Category-3
- After preparation of item list for Category-1, Category-2 and Category-3, left out materials, if any, should be put in Catergory-4 and the same should be sent to stores for disposal. The responsibility is lying with the TPM Coordinator in consultation with departmental Head.

**Finally Categorization of items as per usefulness of the material is done considering the usefulness of the materials available in the circle.**

* **CATEGORY-1** — **Materials useful within the circle.**

* **CATEGORY-2** — **Materials not useful for the circle but useful in other circle of the same plant.**

* **CATEGORY-3** — **Materials not useful for the same plant but useful in some other plant.**

* **CATEGORY-4** — **Materials not useful in any plant( To be discarded)**

**Prepare a comprehensive list of items as per the format:**

## Comprehensive list of available items in the circle with its category

Plant: _____

Circle no: _____ Circle Name: _____

Area _____

| Sl. NO | Item Description | Specification | Quantity | Category |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

Name & sign of Leader/Dy .Leader

Name & sign of TPM Coordinator

Name & sign of Plant Incharge

- It is clear from above categorization that Category-1 denotes **list of required items within circle**
- Category-2,3 &4 if grouped together denotes **list of unwanted items for the circle**

## List of required items within the circle ( Category-1)

Plant: _____

Circle no: _____ Circle Name: _____

Area _____

| SI. NO | Item Description | Specification | Quantity | Category | Responsibility |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Name & sign of Leader/Dy .Leader

Name & sign of TPM Coordinator

Name & sign of Plant Incharge

**NB: This would be the signed controlled copy of list of required items for the circle.**

## List of unwanted items for the circle

Department: _____ Date:

Circle no: _____ Circle Name: _____

Area _____

| SI. NO | Item Description | Specification | Quantity | Category | Responsibility for counter |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Name & sign of Leader/Dy .Leader

Name & sign of TPM Coordinator

Name & sign of Plant Incharge

- **Transfer the material to other circles/departments.**
- **List of Discarded materials should be handed over to stores for disposal/selling**
- **In case of any new inclusion or deletion of material is required. Dy.Leader/Leader should fill a format as follows**

## Dy.Leader/Leader should fill a format as follows

**List of unwanted items for the circle**

Department: Date:

Circle no: _____ Circle Name: _____

Area _____

| Sl. NO | Item Description | Specification | Quantity | Category | Responsibility for counter |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

Name & sign of Leader/Dy .Leader

Name & sign of TPM Coordinator

Name & sign of Plant Incharge

## List of items to be deleted

Plant:

Circle no: Circle Name:

Area

| Sl. NO | Item Description | Specification | Quantity | Category | Responsibility | Date of deletion |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

Name & sign of Leader/Dy .Leader

Name & sign of TPM Coordinator

Name & sign of Plant Incharge

| | | | |
|---|---|---|---|
| PLANT: | | TYPE OF AUDIT: SELF/DEPT.HEAD/ TOP MGT | |
| TPM CIRCLE: | | | |
| AREA: | | AUDITOR | |
| DATE: | | | |

| Item | Criteria | Levels | | | | | Remarks |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | |
| **Photographs of the area work place of the circle & materials available in the work place & its surroundings** | **Whether photographs of the area of work place and materilas available in the work place and its surroundings taken before strating 1S?** | | | | | | |
| **Comprehensive list of all items available in the work place and its surroundings** | **Whether list of materials available in the work place prepared as per the prescribed format?** | | | | | | |
| **Categorization of items available in the work place** | **Whether categorization of all the items available in the work place done as per the procedure?** | | | | | | |
| **List out of required items with responsibilty** | **Whether list of unwanted items ( Category-2,3 & 4) for the circle made and circulated for its disposal?** | | | | | | |
| **List of unwanted items for the circle** | **Whether the valuation of category-4 items has been made and sent to stores for disposal?** | | | | | | |
| **valuation of category-4 items** | | | | | | | |

# The Second S – Simplifying
# Set in Order

**A place for everything and everything in its place, clean and ready to use**

- Arrange workplace for safety and efficiency
  - Identify key equipment and supplies
  - Determine location for each item
  - Outline locations and zones
  - Develop shadow boards, label items
  - Document layout, equipment, supplies

# Pillar 2: Set in Order (Organize)

- Focuses on creating efficient and effective storage methods
- Arranges items so that they are easy to use
- Labels items so that they are easy to find and put away
- Can only be implemented once the first pillar, Sort, has cleared the work area of unneeded items
- Strategies include:
  - Affixing labels and placards to designate proper storage locations
  - Outlining work areas and locations
  - Installing modular shelving and cabinets

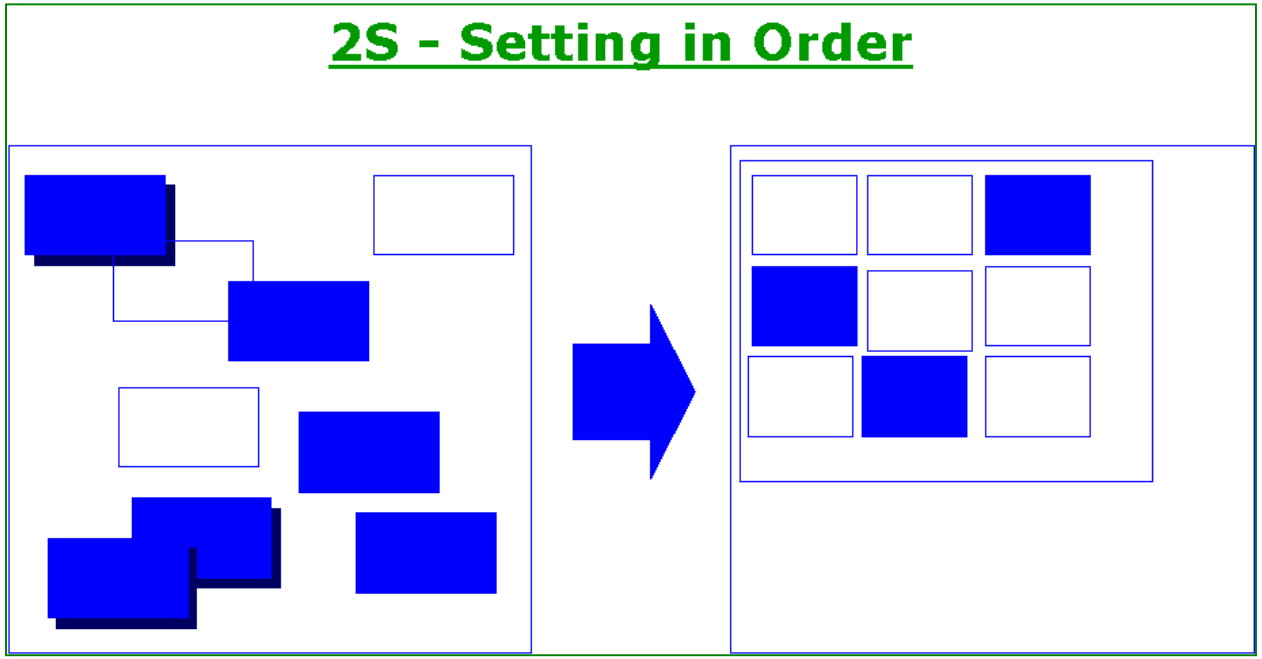
# Set In Order (Seiton)

- The second S and focuses on efficient and effective storage methods. Key Evaluation for 2S :
  - **What do I need to do my job?**
  - **Where should I locate this item?**
  - **How many of this item do I need?**

- Strategies for effective Set In Order are:
  - Painting floors - Outlining work areas and locations, shadow boards.
  - Modular shelving and cabinets for needed items

- "A place for everything and everything in its place.“

# 2S - Organizing




## Check points for a organised workplace:

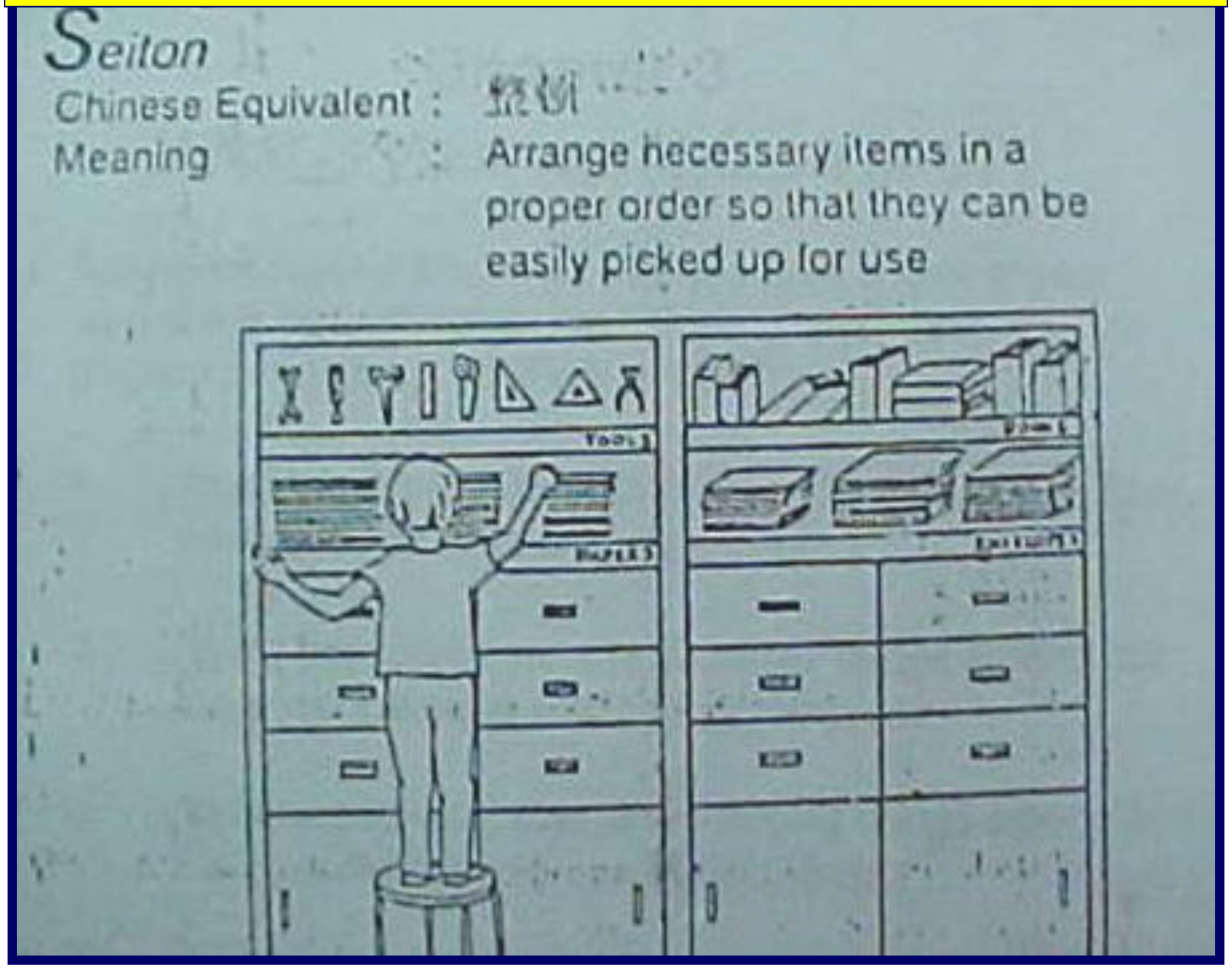
1. Are tools divided into “specialised use” and “regular use” items?
2. Is the number of tools required kept to a minimum?
3. Are pallets, waste bins, hoses always placed in the correct location?
4. Is anything stored around safety or fire fighting equipment?
5. Are positions of main corridors and aisles clearly marked?
6. Can we immediately and safely find the items we need?

**Seiton: Arrange a place for everything.Everything in its place.**

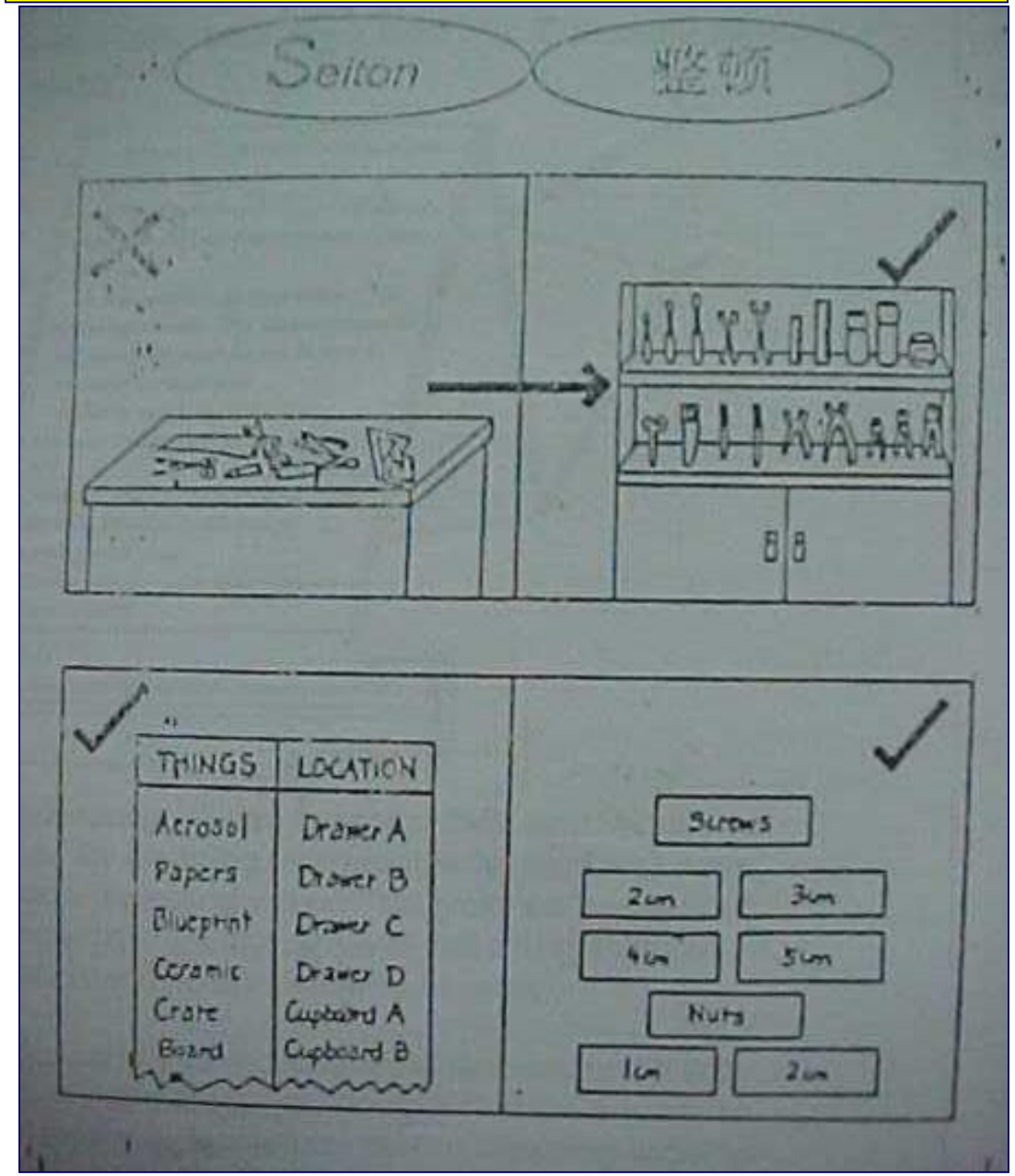
## Check :

1. Are passages and storage places clearly indicated.
2. Are commonly used tools separated from those seldom used.
3. Are containers and boxes stacked up properly.
4. Are fire extinguishers and hydrants readily accessible.
5. Are there grooves, cracks or bumps on the floor which hinder work or safety.

# 2 S - SEITON - KEEP THINGS IN ORDER



# 2 S - SEITON - KEEP THINGS IN ORDER



## 2S

Purpose: To get the required item at required time.

| | |
|---|---|
| Key words: | • Decided item (Step 5 of 1S)<br>• Decided quantity<br>• Decided place. |
| Step - 1 | Decide method of replenishment (for each decided item).<br>Pull system: user is drawing the material.<br>Push system: Supplier is sending at regular interval. |
| Step – 2 | Decide basic information of each decided item.<br>Specification, Manufacturer, Purchase source, Unit quantity, Lead time for procurement, mode of supply, cost etc. |
| Step – 3 | Decide tentative stock quantity.<br>Minimum – maximum quantity subject to supplier condition. |
| Step – 4 | Decide location (tentative)<br>Where to store the material. |
| Step – 5 | Decide ordering type (based on step 1 & 2)<br>Fixed period (ordering period)<br>Ordering point, order quantity (OPOQ)<br>Unfixed period (when required) |
| Step - 6 | Decide ordering quantity<br>Maximum – Minimum ordering quantity. |
| Step – 7 | Include / addition above information in required item list of 1S (Step – 5) |
| Step – 8 | Standardization for sustaining 2S condition. |
| Note: | • FIFO to be introduced from the beginning.<br>• Applicable for all the items available at Store.<br>• 2S is applicable for A, B & C category items. |

# 2S Format Steps for 2S Activities (Step 1 – Step 5)

| Item List as per Step 5 of 1S | | Step 1 – Method of Replenishment | | Step 2 – Items Basic Information | | | | | | | Step3 – Stock Quantity Subject to Supplier | | | Step 4 – Item Location | Step 5 - Ordering Type (Based on Step 1 & 2) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pull System (User is Drawing) | Push System (Supplier is Sending) | Unit Qty | Specification | Manufacturer | Purchase Source | Mode of Supply | Lead Time for Procurement | Cost | Max | Min | | | Fixed Period | OPOQ | Unfixed (As per requirement) |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | |

# 2S Format Steps for 2S Activities (Step 6 – Step 8)

| Item List as per Step 5 of 1S | Step 6 – Deciding Ordering Quantity | | Step 7 – Include This Additional Informations in required Item list of 1S (Step5) | | | Step 8 – Standardization for Sustaining | Remarks |
|---|---|---|---|---|---|---|---|
| | Max | Min | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 2S - Simplifying | 1 | Items are placed randomly throughout the work place |
| | 2 | Needed items have been safely stored and organized according to frequency of use |
| | 3 | Needed items have dedicated locations and are properly labeled with required quantities |
| | 4 | Needed items have been minimized in number/ size and are properly arranged for retrieval and use |
| | 5 | Needed items can be retrieved within 30 seconds and require a minimum number of steps |
| Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention | | |

# 1S, 2S KPI / KAI

| KPI (Key Performance Index) | KAI (Key Activity Index) |
|---|---|
| 1. Progress against Master Plan – 2S Status<br>2. No of Trainings<br>3. No of Items Identified in 1S<br>4. No of Meeting<br>5. No of Improvement done<br>6. Before / after Photograph<br>7. Audit Score<br>8. Saving due to 2S Activity | 1. 1S/2S Activity Categorization, Organization, Team formation, Planning<br>2. 1S Listing of all Available Items/ Usage Frequency / Wanted & Unwanted as per 06 Categorization<br>3. Tag Attach / Removal Activity for Unwanted Items/ Disposal Plan<br>4. Standard Making<br>5. Training on 1S/2S<br>6. Audit & Before Photographs |

# 1S & 2S

| 1S Activity | Outcome | Skill | | Support |
|---|---|---|---|---|
| | | Knowledge | Technique | |
| | 1. 1S Score / Audit<br>2. List of 1S / Action Plan<br>3. Before Photographs<br>4. Disposal Plan<br>5. Trainings | 1. Why / What is 1S Activity<br>2. 06 Steps of 1S Activity<br>3. Items usage Frequency | 1. What is 2S<br>2. Sorting wanted / unwanted<br>3. Tagging<br>4. Standard Making<br>5. List of Items<br>6. Audit | 1. HOD<br>2. Area Incharges |

# Sample Examples of 1S & 2S (Ref Annexure PPT A)

# The Third S – Systematic Cleaning
# Cleaning is Inspection

## Cleaning for Inspection

- Perform daily cleaning and inspection to understand work conditions
  - Identify points to check for performance
  - Determine acceptable performance
  - Determine visual indicators/controls
  - Mark equipment/controls
  - Conduct daily cleaning/inspections

# Pillar 3: Shine (Clean and solve)

- Focuses on thoroughly cleaning the work area
- Daily follow-up cleaning is necessary to sustain improvements
- Enables workers to notice malfunctions in equipment such as leaks, vibrations, breakages, and misalignments that could lead to loss of production
- It is a good idea to establish Shine targets, assignments, methods, and tools before beginning the Shine pillar

## Shine: (Seiso)

- Once We have eliminated the clutter and junk that has been clogging  our work areas and identified and located the necessary items, the next step is to thoroughly clean the work area.

- Daily follow-up cleaning is necessary in order to sustain this improvement.

# Shine: (Seiso)

- Pride in a clean and clutter-free work area and the Shine step will help create ownership in the equipment and facility.

- All  begin to notice changes in equipment and facility location such as air, oil and coolant leaks, repeat contamination and vibration, broken, fatigue, breakage, and misalignment.

.

# Shine: (Seiso)

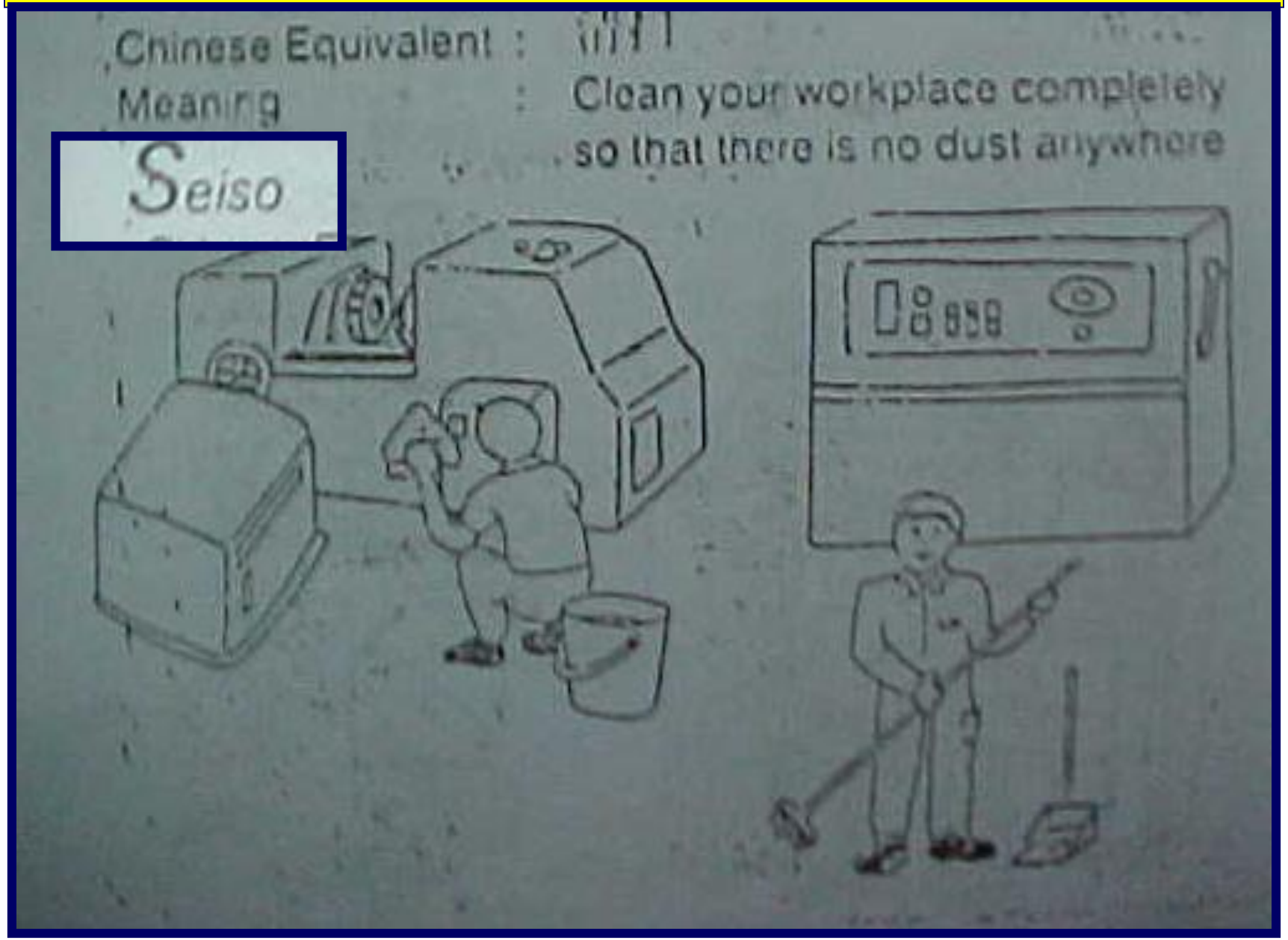
- To thoroughly clean the work area.
- Daily follow-up cleaning is necessary in order to sustain this improvement.
- Workers take pride in a clean and clutter-free work area and the Shine step will help create ownership in the equipment and facility.
- Workers will also begin to notice changes in equipment and facility location such as air, oil and coolant leaks, repeat contamination

# Seiso :Clean your workplace thoroughly.

**Checks :**

1. Are the floor surfaces dirty.
2. Are machines and equipment dirty.
3. Are wires and pipes dirty or stained.
4. Are machine nozzles dirty by lubricants and inks.
5. Are shades, light bulbs and light reflectors dirty.

# 3S - SEISO - SHINE (CLEANLINESS)



# Seven Steps 3S Implementation

1. Initial Cleaning
2. Counter measures against source of contamination and inaccessible area
3. Formulation of cleaning standards
4. Visual Management and visual controls (for files, floor areas and office, Plant equipment)
5. General Office area inspection (use check sheet)
6. Systematic System (orderliness and tidiness)
7. Practice Self - management

| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 3S Systematic Cleaning | 1 | Key work area items to be checked during a sweep are not identified |
| | 2 | Key work area items to be checked are identified and documented |
| | 3 | Visual controls for equipment, files and supplies have been established for the work area |
| | 4 | Daily inspection occurs to assess area readiness, potential problems are identified and fixed |
| | 5 | Problem sources are documented with solutions defined and implemented |

**Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention**

# The Fourth S - Standardizing

## Developing Common Methods for Consistency

- Make abnormal conditions noticeable and document checks
  - Document checks
  - Establish/document standard methods across similar work areas
  - Document new standard methods

# Pillar 4: Standardize (Make consistent)

- Used to maintain the first three pillars
- Focuses on creating a consistent approach with which tasks and procedures are performed
- The first step is to assign 5S job responsibilities and integrate 5S duties into regular work duties using tools such as:
  - job cycle charts
  - visual cues (e.g., signs, placards, display scoreboards)
  - checklists
- The next step is to prevent:
  - accumulation of unneeded items
  - procedures from breaking down
  - equipment and materials from getting dirty

## Standardize: (Seiketsu)

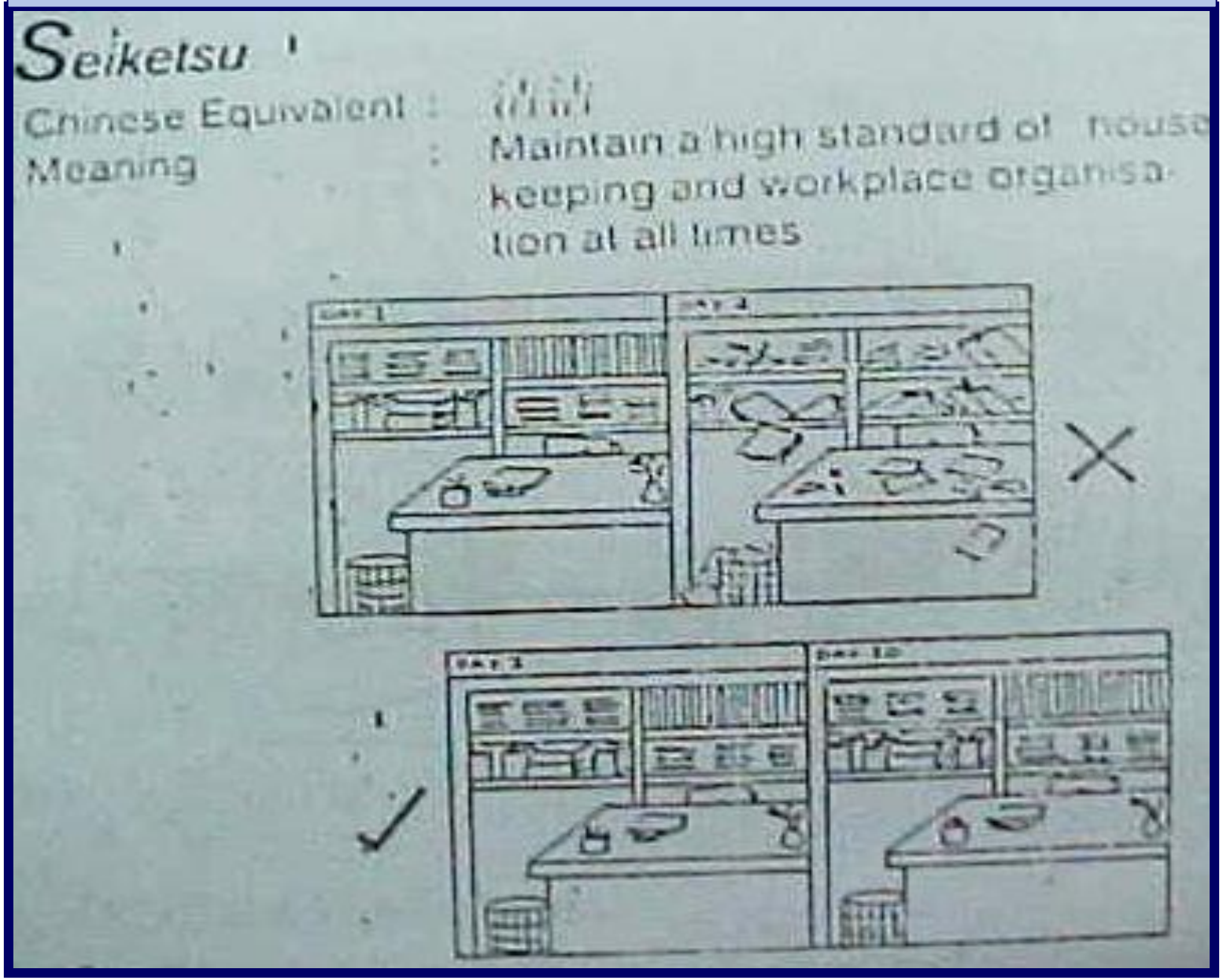
- **S**tandardizing best practice in work area.
- Allow all to participate in the development of such standards.
- They are a valuable but often overlooked source of information regarding their work.

## Standardize: (Seiketsu)

- After the first three 5S's have been implemented, you should concentrate on standardizing best practice in your work area.

- Allow your employees to participate in the development of such standards.

# 4 S - SEIKETSU - STANDARDISE



| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 4S - Standardizing | 1 | No work area agreements exist |
| | 2 | Work area SOP are identified and documented for needed item organization and work area controls |
| | 3 | Work area SOP for needed item labeling and visual controls are posted and followed by work team |
| | 4 | System for labeling, housekeeping, inspections, and work place design are consistently followed & demonstrate area performance improvement |
| | 5 | Methods for housekeeping, labeling, inspections, and work place design are continually improved and shared externally as applicable |
| **Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention** | | |

# Pillar 5: Sustain (Keep it up)

- Makes a habit of properly maintaining correct procedures
- Often the most difficult pillar to implement and achieve
- Sustain focuses on defining a new status quo and standard of workplace organization
- Without the Sustain pillar, the achievements of the other pillars will not last long
- Tools for sustaining 5S include:
  - Signs and posters
  - Newsletters
  - Pocket manuals
  - Team and management check-ins
  - Performance reviews
  - Department tours

# The Fifth S - Sustaining

## Holding the Gains and Improving

- Maintain the gains from other 5S activities and improve
  - Determine 5S Level of Achievement / Audit
  - Perform routine checks
  - Analyze results of routine checks
  - Measure progress and plan for continuous improvement

# Sustain: (Shitsuke)

- This is by far the most difficult S to implement and achieve.
- Sustain focuses on defining a new status quo and standard of work place
- Human nature is to resist change and found themselves with a dirty cluttered shop a few months following their attempt to implement 5S.
- The tendency is to return to the status quo and the comfort zone of the "old way" of doing things.

## Sustain: (Shitsuke)

- Sustain focuses on defining a new status quo and standard of work place
- This is by far the most difficult S to implement and achieve. Human nature is to resist change. The tendency is to return to the status quo and the comfort zone of the "old way" of doing things.

## Shitsuke :Train people to be disciplined

**Sample Checks :**

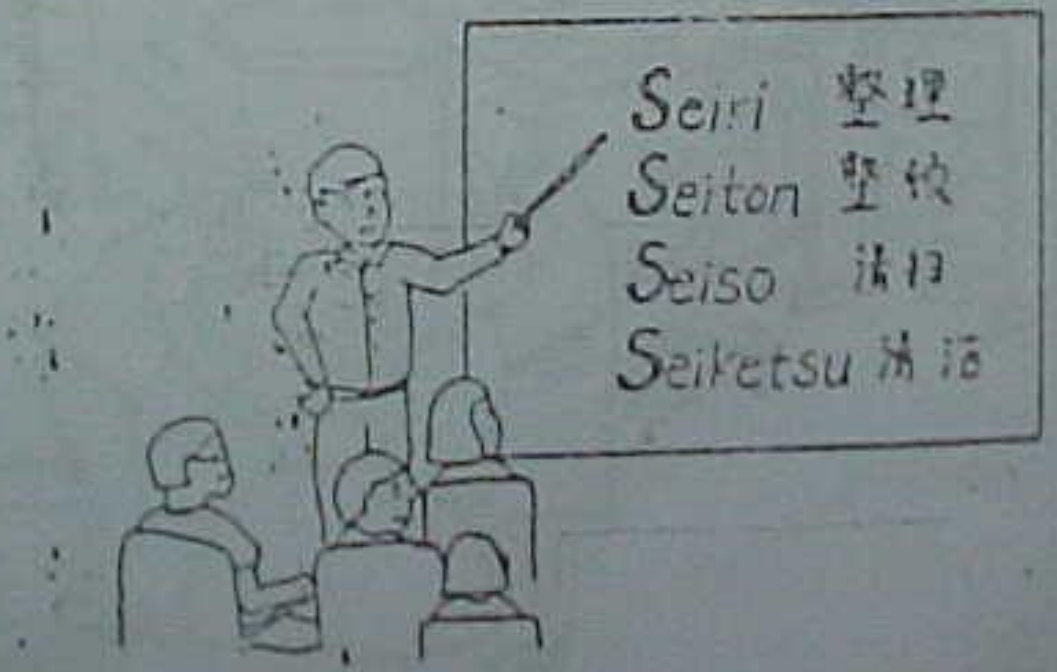
1. Are regular 5 - S checks conducted.
2. Do people clean up without reminders.
3. Do people follow rules and instructions.
4. Do people wear their uniforms and safety gears properly.
5. Do people assemble on time.

# 5 S - SHITSUKE - SELF DESCIPLINE& TRAINING

**Shitsuke**

Chinese Equivalent : 修养

Meaning : Train people to follow good housekeeping disciplines independently



| 5S Steps | Level | Work Place / Activity Status |
|---|---|---|
| 5S Sustaining | 1 | There is no measurement of 5S performance |
| | 2 | 5S level has been determined and posted on the communication board |
| | 3 | Work team is routinely checking area to maintain 5S standard and posting results |
| | 4 | Sources and frequency of problems are documented as part of routine work, root causes are identified, and corrective action plans are developed |
| | 5 | Root causes have been eliminated and improvement actions focus on developing preventive methods |

**Level 1 = Just Beginning, Level 2 = Focus on Basics, Level 3 = Make it Visible / Visual, Level 4 = Focus on Consistency, Level 5 = Focus on Prevention**

## 5S OBJECTIVES & KPI

1. Development of 5S System at Selected Model Areas as per Activity Master Plan & Key Performance Index at various Stages of 5S
2. KPI :
    1. **Progress against 5S Master Plan**
    2. **No of Trainings / No of Items / Area Identified for Improvement /No of Improvement done**
    3. **Before / after Photograph**
    4. **5S Audit Score**
    5. **Saving due to 5S Activity**

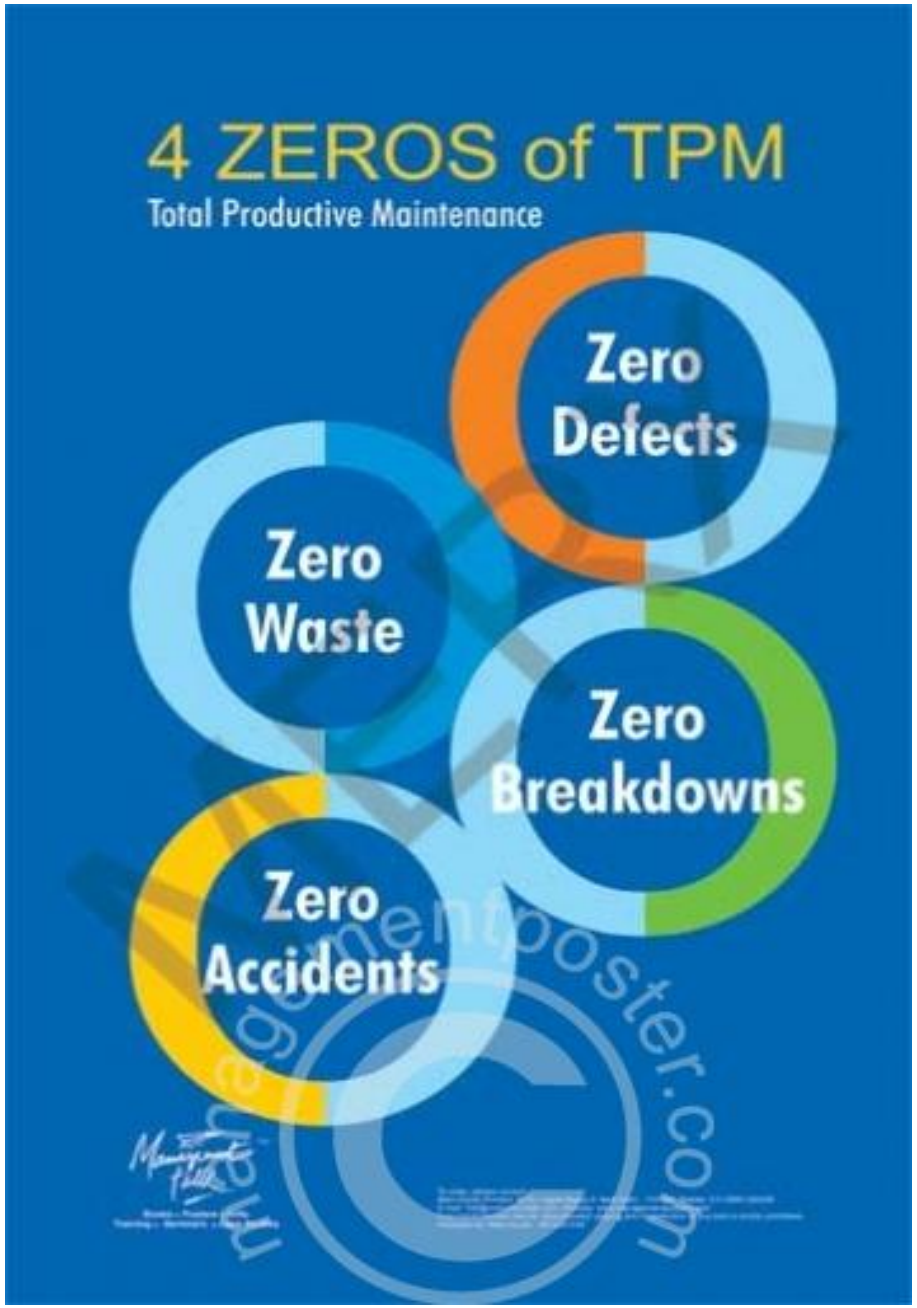
# Resources for 5S Implementation

# Resources for 5S Implementation

| SN | Items |
|---|---|
| 1 | Visual displays material / stickers / Board placard etc/ Colors / Painter / Containers / Dustbins / Stationary / Carpenter for making wooden rakes, Bins, templates |
| 2 | Material Handling Equipment (for shifting Scrap / Waste Material) |
| 3 | One time Manpower for shifting Sorting / Major items / and repeat every 06 Months at Area during shutdowns. |
| 4 | 5S Team formulation & 5S Monitoring / Audit |
| 5 | Training resources on 5S – Participant, 5S Co-ordinators & Area Incharges. SOP Preparation at respective areas on Safety, Standards, Checksheets for 5S Activity and Abnormality listing registers |
| 6 | 5S Posters, Manuals, Pocket diary, Red / Yellow Tags, Audit sheet & 1S/2S Activity Listing Booklets, Files, 5S Activity Board at areas |
| 7 | Cleaning Tools & Inspection tools, Digital Camera for Photographs |
| 8 | 5S Trophy, Recognization of Best Group / Areas |

# TPM aims at Culture change of an organization

In TPM it is all the way for Zero – Defects / Accidents/ Breakdowns.



# What is TPM?

Total Productive Maintenance (TPM) is a method to achieve maximum equipment effectiveness through employee involvement

Management + Operators + Maintenance

# MEANING OF *'TOTAL'* IN TPM

1. ***'Total' Effectiveness***
   - Zero failure
   - Zero rejection
   - Zero accident

2. ***'Total' maintenance system***
   - Maintenance prevention (MP)
   - Preventive maintenance (PM)
   - Maintainability improvement (MI)

3. ***'Total' participation***
   - Involvement of everyone
   - Involvement of every department
   - Conduct zero loss activity through
     * House keeping (5 's')
     * Skill development
     * Kaizen
     * Small Group Activities (SGA)

# TARGET AREAS

* Reduce breakdown and idle running.

* Improve cleanliness and environment.

* Conserve materials and energy.

* Improve safety and hygiene.

* Improve effectiveness of maintenance system.

* Develop early equipment management system for new equipment's.

* Develop and upgrade skills of the employees.

# TPM Policy

BMM Ispat is committed to practice TPM principles in our activities for achieving excellence in all areas of works, with the participation of all stakeholders by delighting our Customers.

**OBJECTIVES:**

1. We drive to achieve Zero Break-down, Zero Defects and Zero Accidents by developing employees through continuous learning & intensive use of statistical techniques.

2. Improving morale of our employees by providing clean and safe working environment.

Date : 15th September, 2015

Chairman

# BENEFITS OF TPM

## *Tangible*

**P** : Increase in value-added productivity of 150% to 200%.
Number of sporadic accident cases cut to 1/10 to 1/250.
Overall equipment efficiency improved 150% to 200%.

**Q** : Process defect ratio cut to 1/10, customer complaints cut to 1/4.

**C** : Manufacturing costs reduced by 30%.

**D** : Product and work-in-process inventories reduced by half.

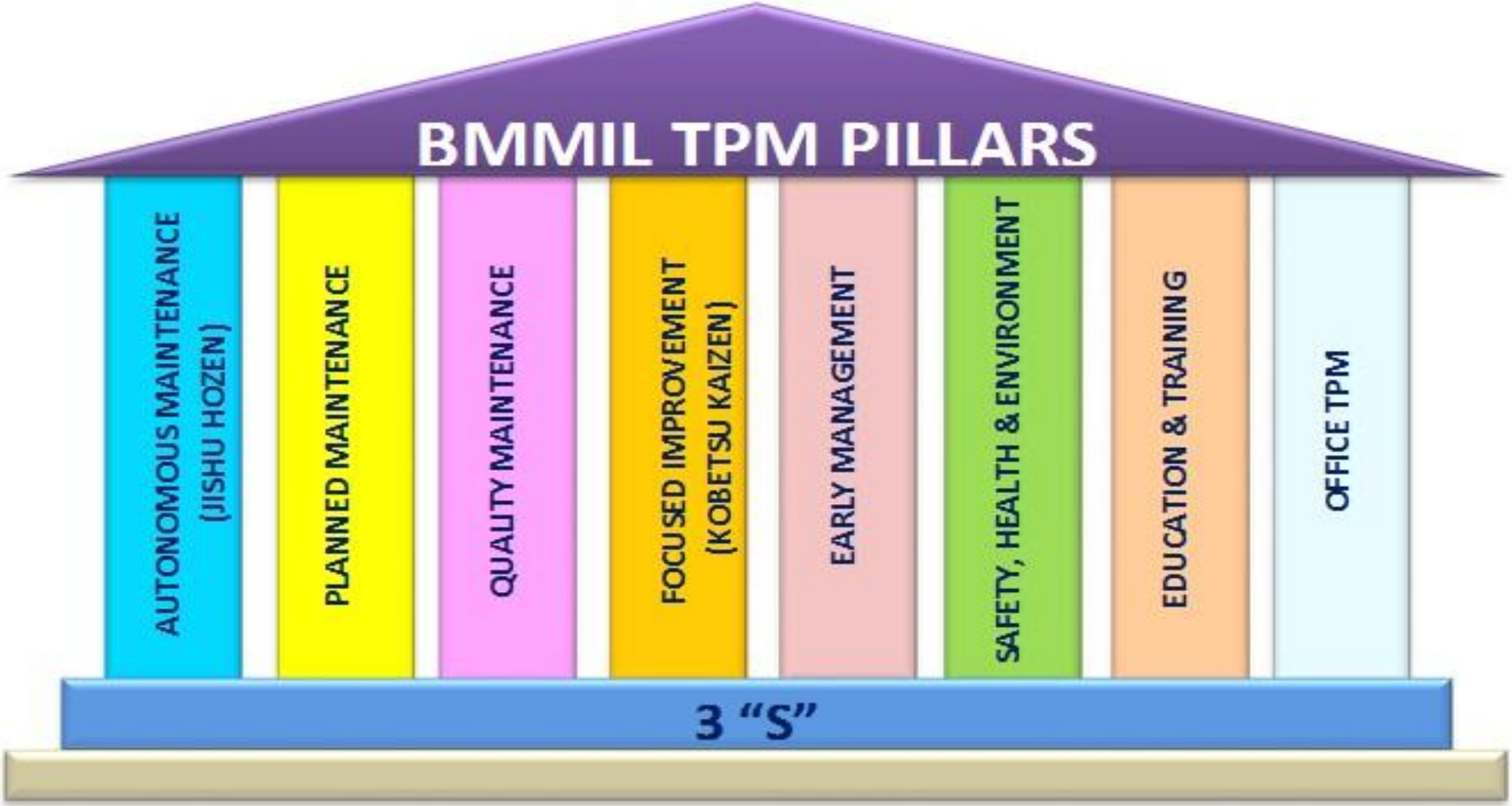
**S** : Cases of accidents with interruption of service zero, pollution cases zero.

**M** : Number of improvement proposals increased 5- to 10-fold.

## *Intangible*

1. : Thorough realization of Jishu-Hozen ; i.e. people come to preserve their own equipment without being pressed to do so by their superior.
2. : The target of zero accidents and zero defects is attained; this makes employees confident in their ability to complete even difficult work, if they resolve to do so.
3. : Work sites formerly rife with oil and cutting chips become remarkably clean, helping to create a pleasant work environment.
4. : Visitors to a plant have a positive impression, which leads to increased orders.

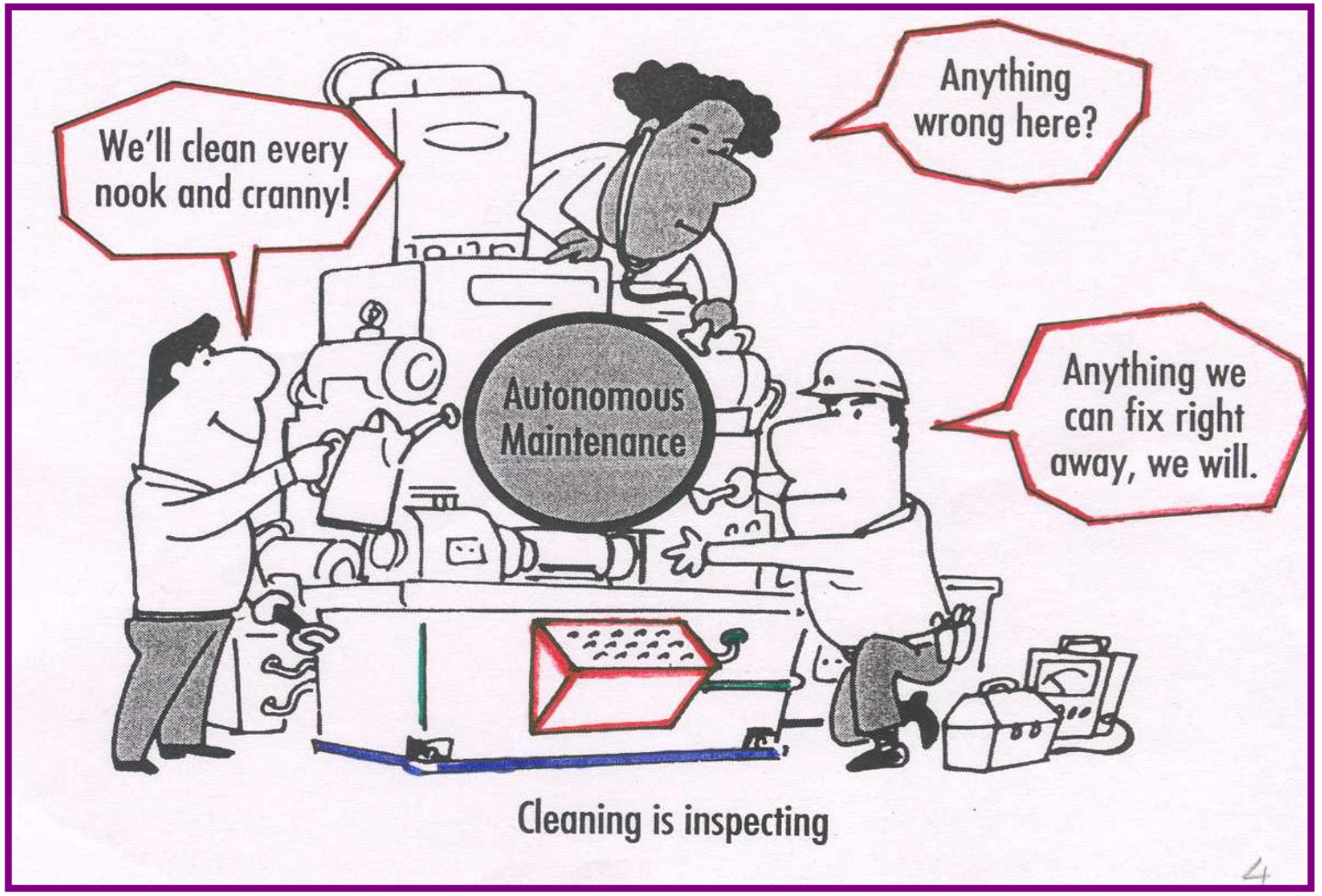
# TPM PILLARS


BMMIL TPM PILLARS
AUTONOMOUS MAINTENANCE (JISHU HOZEN)
PLANNED MAINTENANCE
QUALITY MAINTENANCE
FOCUSED IMPROVEMENT (KOBETSU KAIZEN)
EARLY MANAGEMENT
SAFETY, HEALTH & ENVIRONMENT
EDUCATION & TRAINING
OFFICE TPM
3 "S"

# TYPICAL ACTIVITIES OF AUTONOMOUS MAINTENANCE

## STEP 1: INITIAL CLEANING

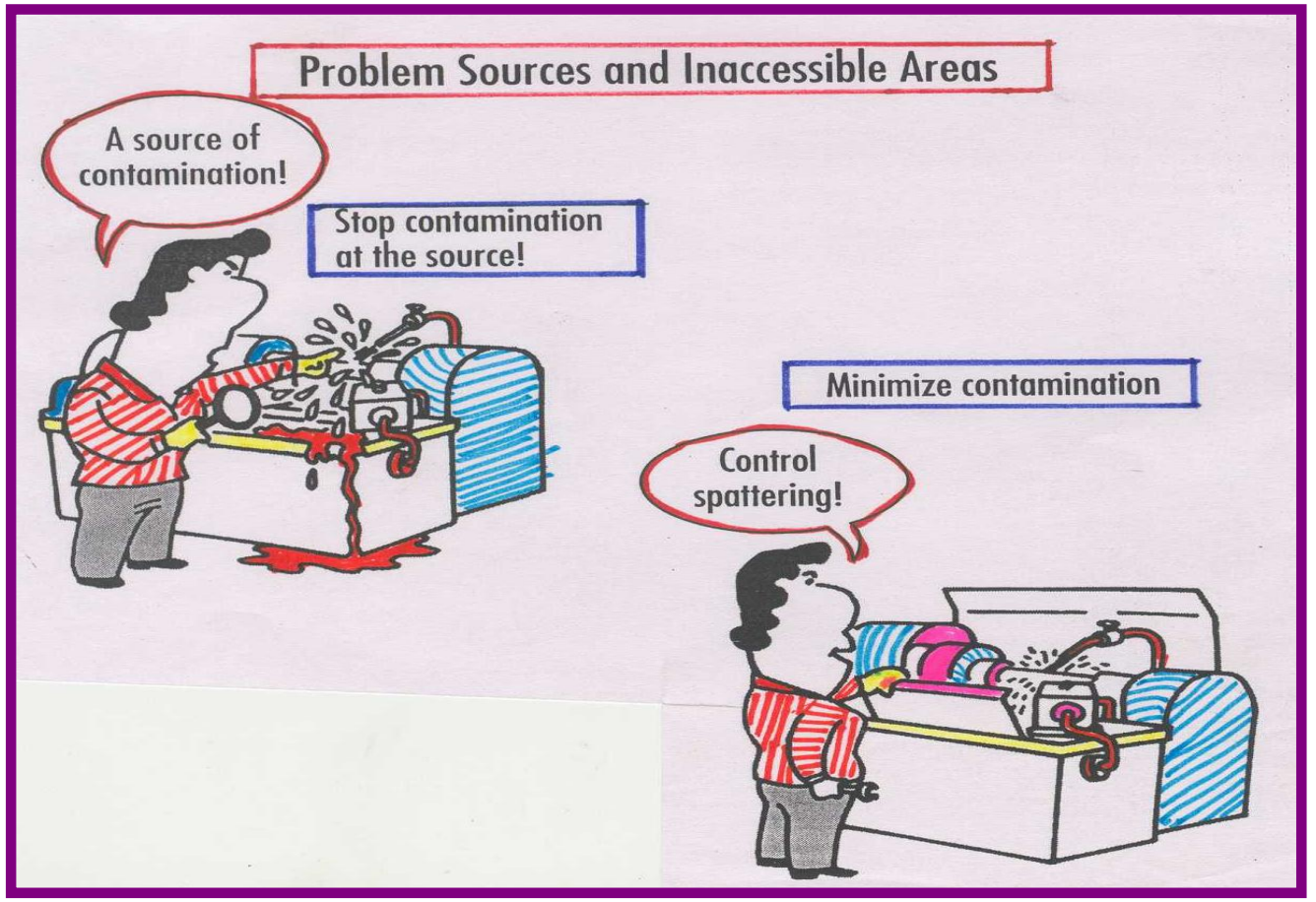
* Daily inspection
* Lubrication
* Parts replacement
* Simple repairs
* Abnormality detection
* Precision checks



# STEP-2 : ELIMINATE PROBLEM SOURCES AND INACCESSIBLE AREAS

***It includes :***

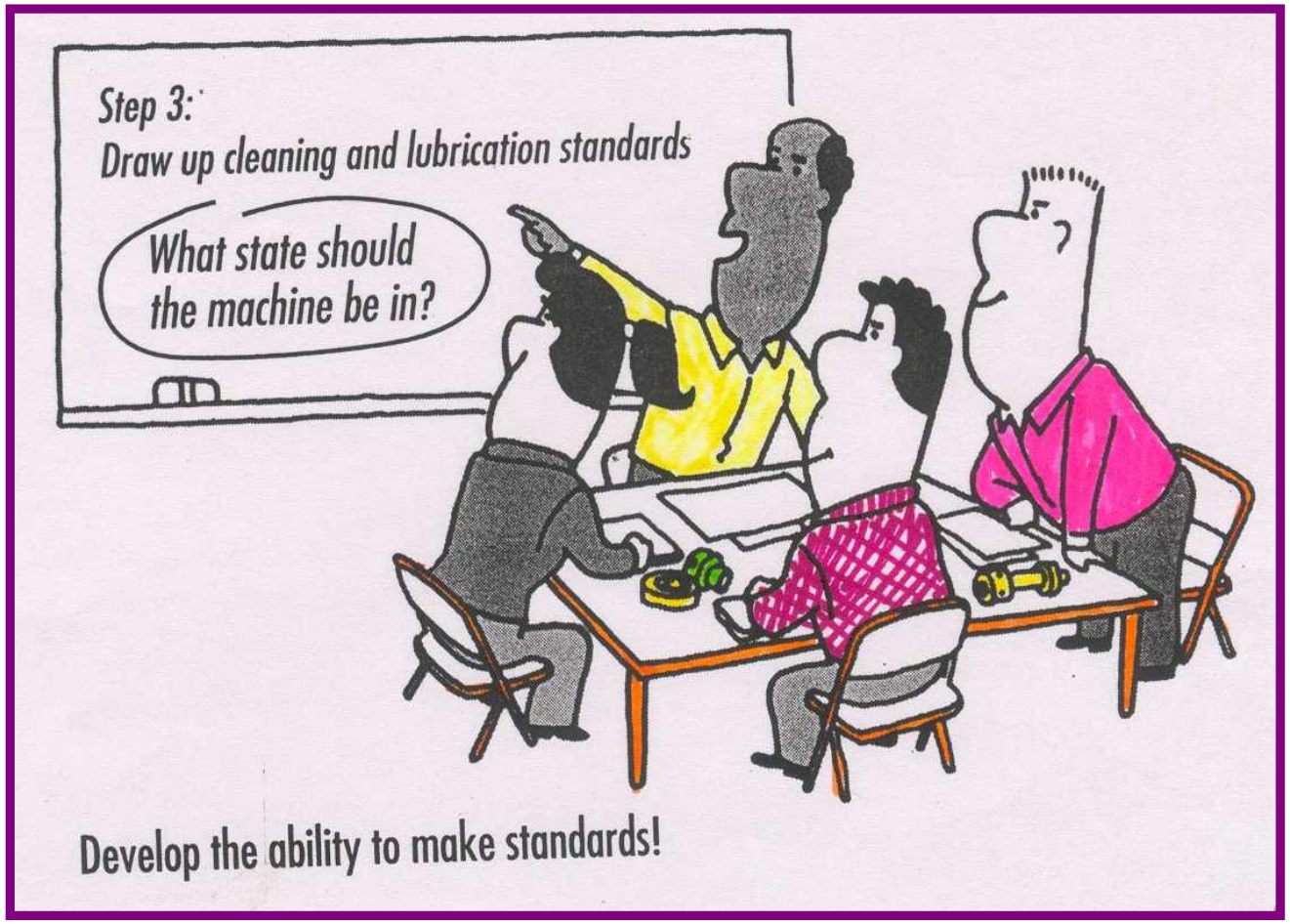
- **Stop contamination at the source**
- **Reduce cleaning and lubrication time**
- **Modify equipment to make cleaning and lubrication easier**
- **Install covers and inspection windows to make checking easier**



# Step-3 : Draw up Cleaning, Lubrication And Inspection Standards

***It includes :***

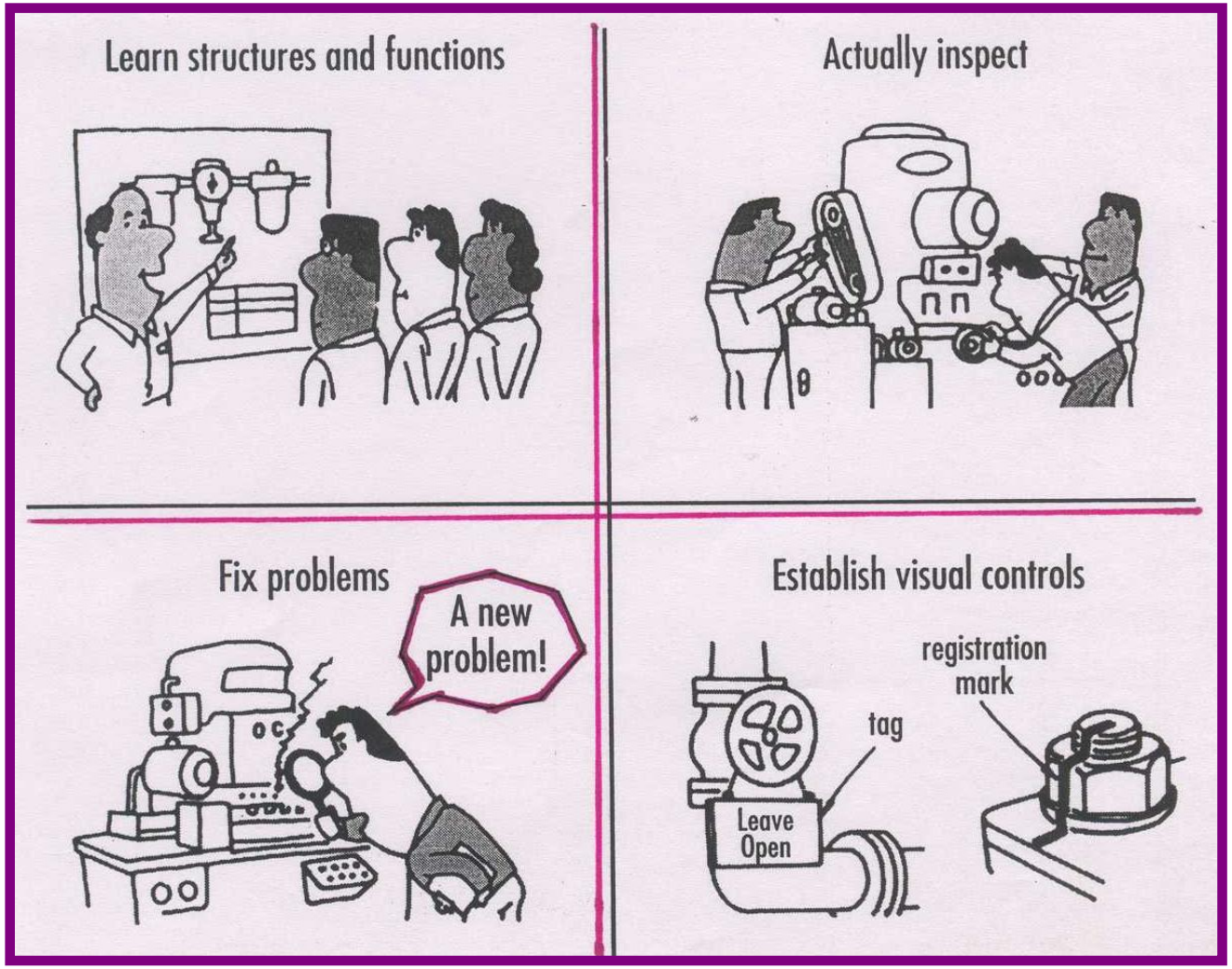
- Team members decide what standards they need to follow to prevent deterioration of their equipment.
- They set standards for cleaning, inspection and lubrication of their equipment.
- As these standards are set by the operators themselves, they understand them well and their implementation becomes easier and more effective.



# STEP-4 : CONDUCT GENERAL INSPECTION

***It includes :***

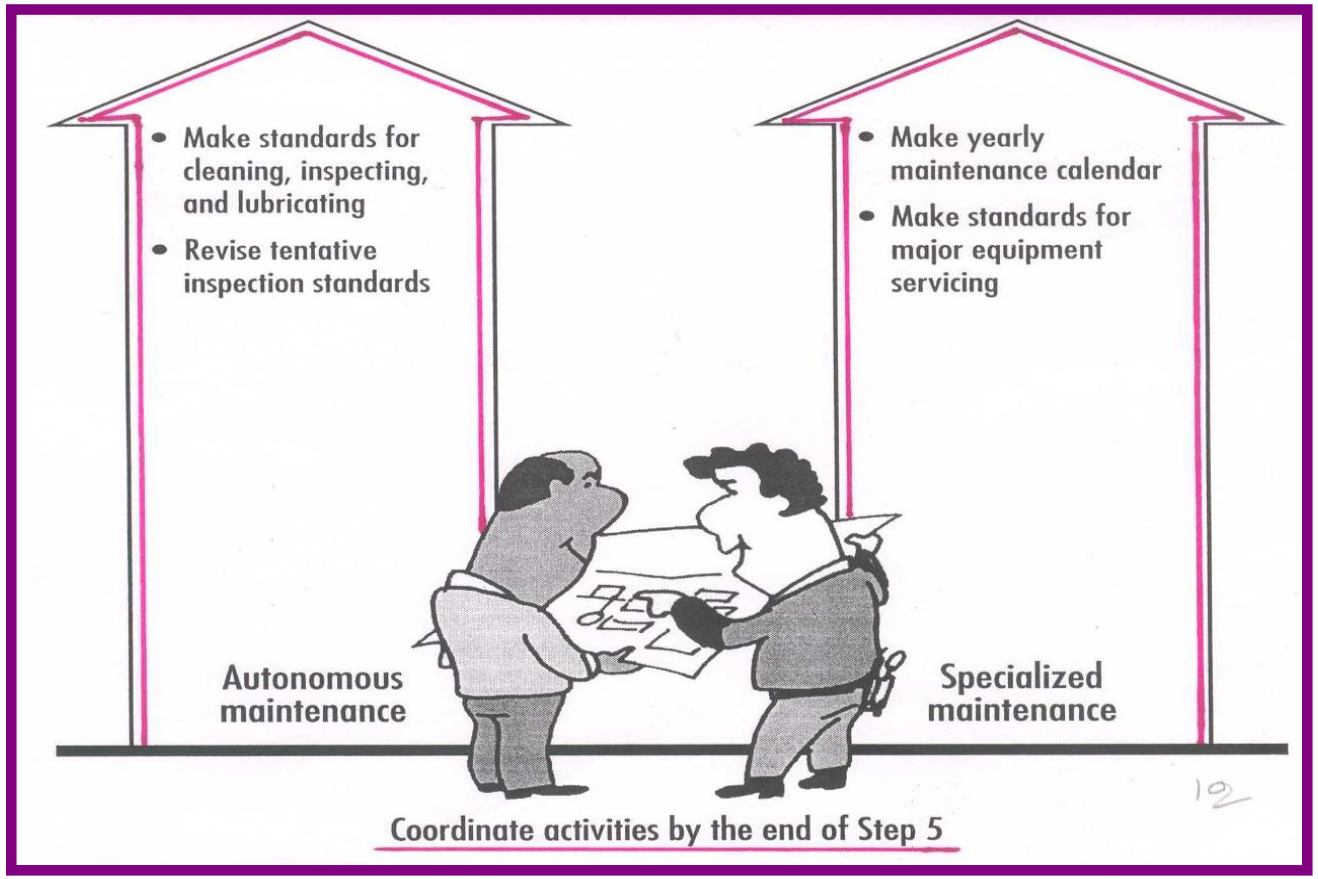
- Learn the structure and functions of your own equipment (training by maintenance ).
- Conduct OPLs and OJTs on operational and maintenance skills.
- Test your understanding and then actually inspect the equipment.
- Correct new problems you find.
- Establish thorough *visual controls* to help control equipment conditions.



# STEP-5 : CONDUCT AUTONOMOUS INSPECTION

***It includes :***

- Revise the cleaning, inspection and lubrication standards.
- Streamline those tasks to ensure that we can carry out maintenance reliably within the time allotted.
- Decide what combination of specialized maintenance tasks and autonomous maintenance activities will create the most efficient system overall.
- Integrate and consolidate autonomous maintenance tasks and standards within the maintenance department's annual maintenance calendar.

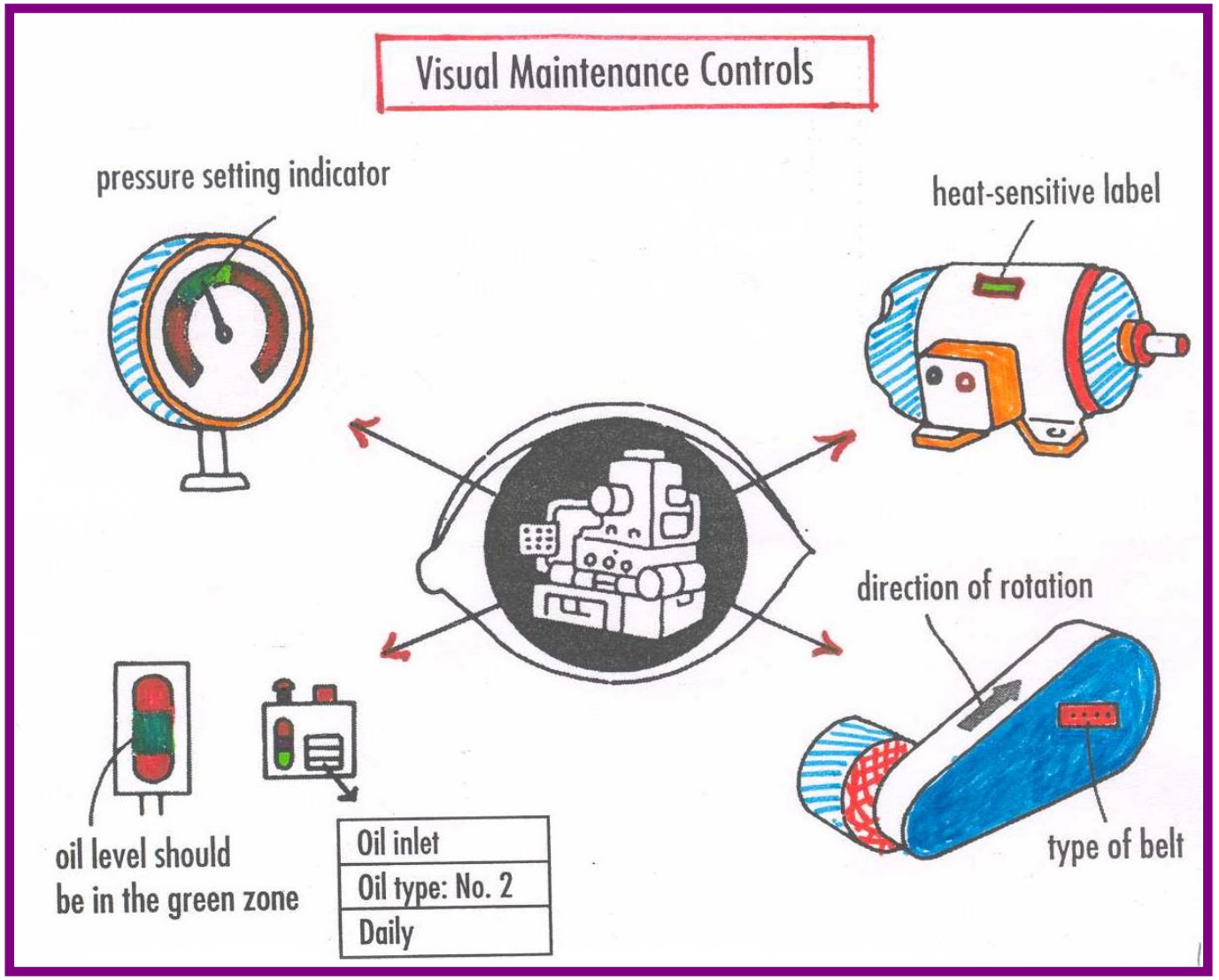


# STEPS-6&7 : SUSTAIN YOUR GAINS AND CONTINUE TO IMPROVE

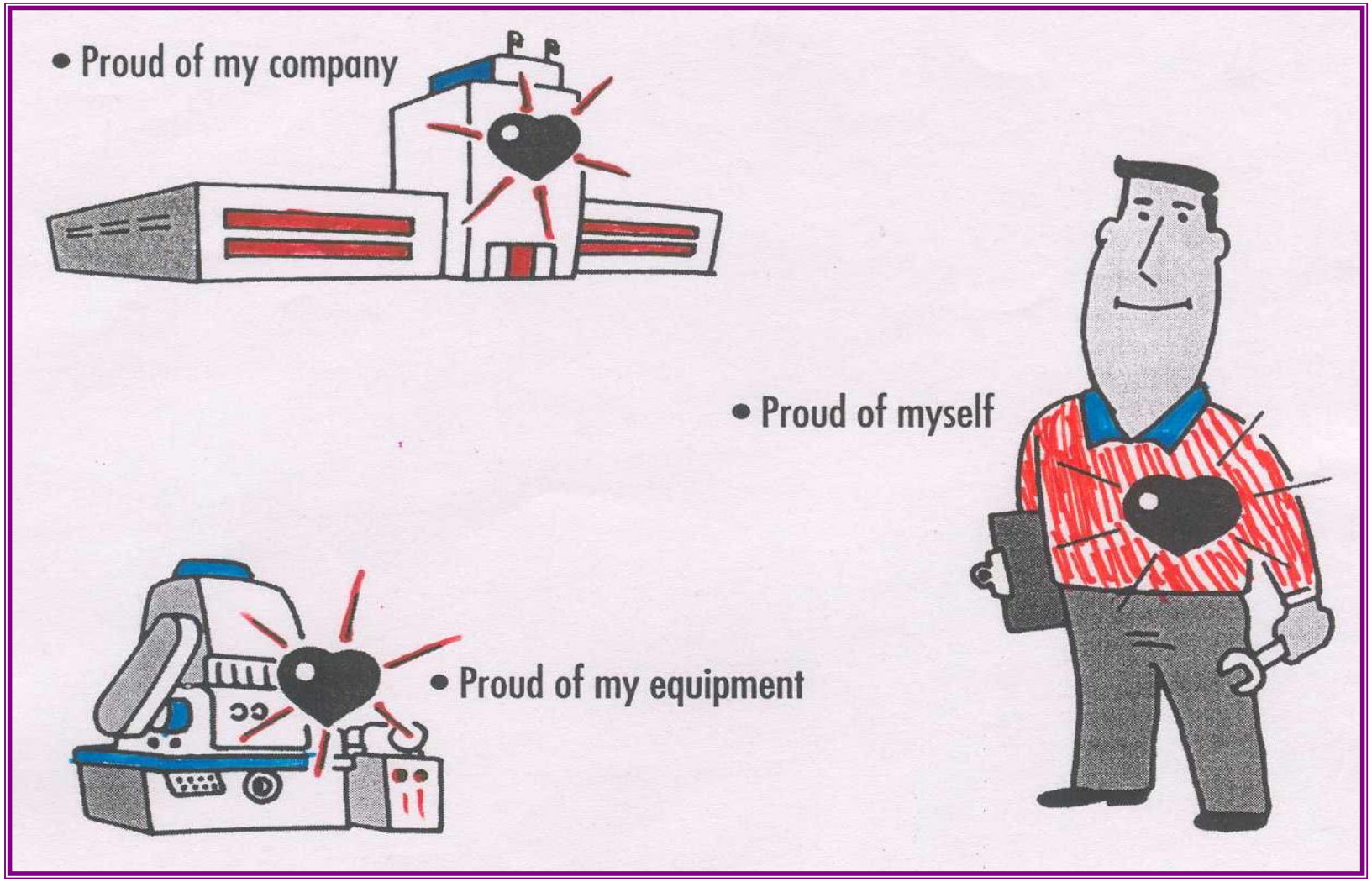
***It includes :***

**In this step special focus is given on visual control and activities related to seiri and seiton. In addition to maintaining basic conditions and inspecting equipment, operators may also be responsible for :**

- **Correct operation and setup .**
- **Detection and treatment of abnormal conditions.**
- **Recording data on operation, quality and processing conditions.**
- **Establishing of visual control signs.**



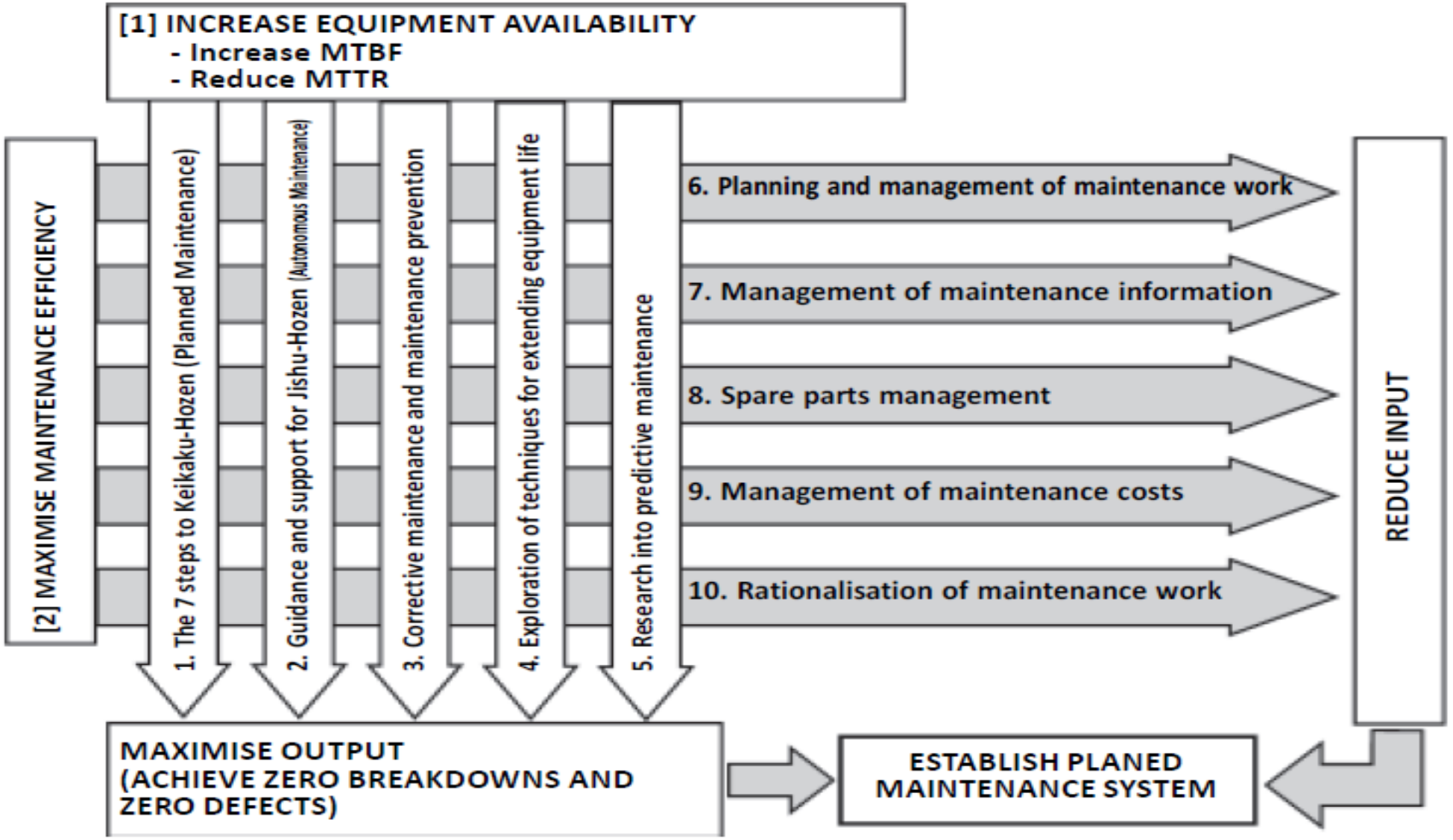
# Who Benefits From Autonomous Maintenance ?



# TPM PILLAR-2:
# PLANNED MAINTENANCE

BMM
ENTIAL IN TONNES

## Overview of a keikaku-Hozen programme



# ELIMINATING BREAKDOWNS

BMM
POTENTIAL IN TONNES

**CONTENT :**

- What is breakdown ?
- Who causes breakdown ?
- Why do machines fail ?
- When do breakdowns happen?
- Ways  to eliminate breakdowns.
- How not to break Equipment / Machine?

# Four Activities To Achieving Zero Breakdowns

- **Daily checking**

  (cleaning, lubrication and tightening of bolts.
- **Adhere to rules**

  (use and operate machine correctly).
- **Restore deterioration**

  (eliminate/control factors that cause deterioration).
- **Education & Training**

  (sharpen operation and maintenance skills)

## MTBF (Mean time between failures)

$$\text{MTBF} = \frac{\text{Total production time} - \text{Down time (break down time)}}{\text{Number of failures}}$$

## MTTR (Mean time to repair)

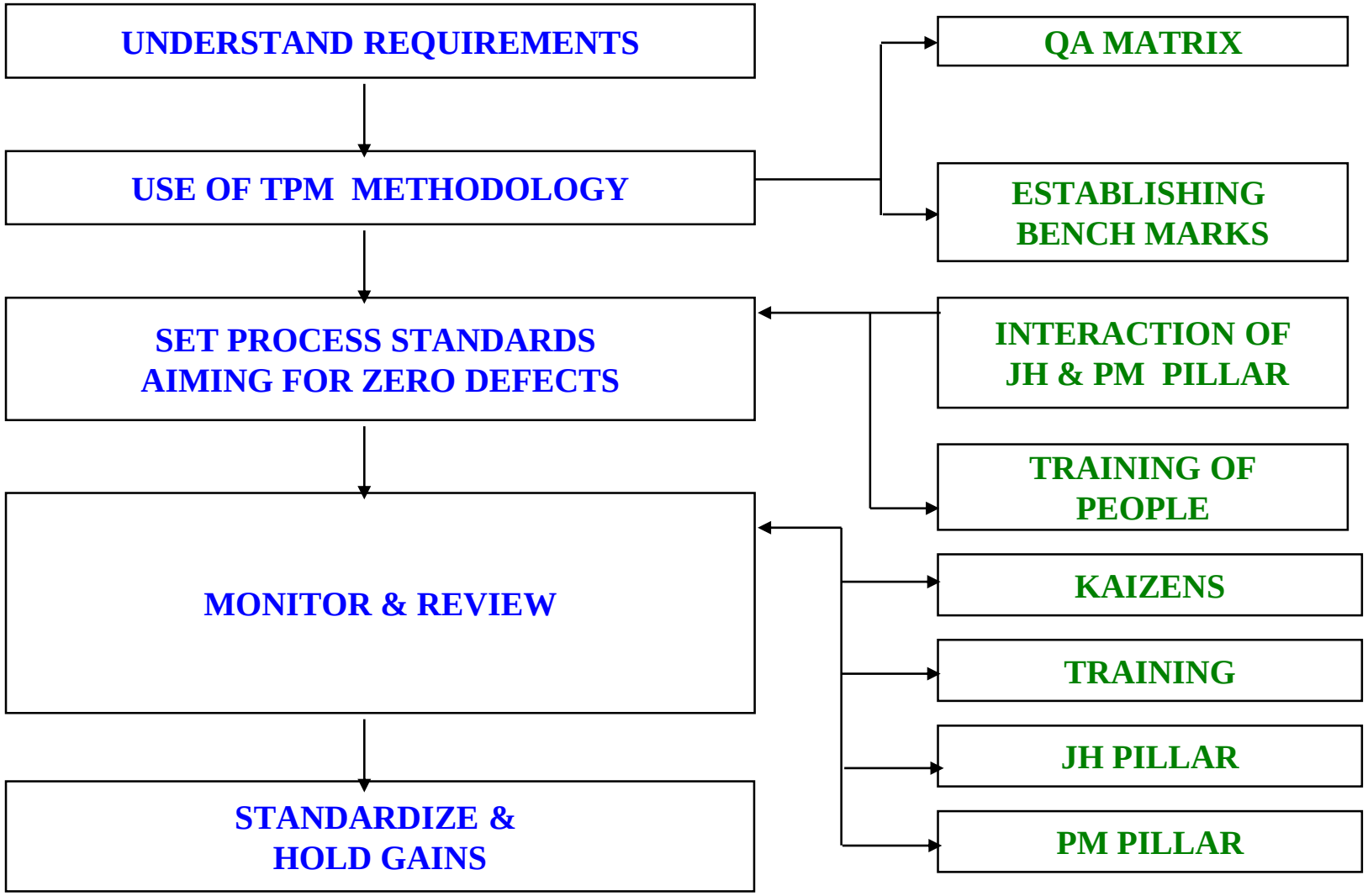
$$\text{MTTR} = \frac{\text{Total repair time}}{\text{Number of failures}}$$

# PILLAR 3: QUALITY MAINTENANCE

Quality maintenance consists of activities that establish equipment conditions, which do not produce quality defects. In other words, it aims at maintaining the equipment for producing perfect products.

**ENHANCING CUSTOMER SATISFACTION THROUGH SUPPLY OF DEFECT FREE PRODUCTS TO INTERNATIONAL QUALITY STANDARDS.**

# APPROACH


UNDERSTAND REQUIREMENTS
USE OF TPM METHODOLOGY
SET PROCESS STANDARDS AIMING FOR ZERO DEFECTS
MONITOR & REVIEW
STANDARDIZE & HOLD GAINS
QA MATRIX
ESTABLISHING BENCH MARKS
INTERACTION OF JH & PM PILLAR
TRAINING OF PEOPLE
KAIZENS
TRAINING
JH PILLAR
PM PILLAR

# PILLAR 4: FOCUSSED IMPROVEMENT (KOBETSU KAIZEN)

**It indicates specific and focused improvement and includes all activities that maximize the overall effectiveness of equipment, processes and plants through uncompromising elimination of losses.**

***We Shall Continuously Strive To Improve Overall Plant Efficiency Of Shops By Eliminating Losses & Maximizing Yield Through Participation of All Employees.**

# WHAT IS KIAZEN ?

**The Japanese word "KAIZEN" means Continuous Improvement**

- **KAI – Change**
  - **Number of times**
- **ZEN - Good or better**
  - **Self Realization**

Kaizen is basically small small improvements carried out by the person who is doing the job in his/her day to day work.

# SIX MAJOR LOSSES

## DOWN TIME LOSSES :

1. Equipment failure - from breakdowns

2. Setup and adjustment - from exchange of die in machine, etc.

## SPEED LOSSES :

3. Idling and minor stoppages - due to the abnormal operation of sensors, blockage of work on chutes, etc.

4. Reduced speed - due to discrepancies between designed and actual speed of equipment

## DEFECT LOSSES :

5. Process defects - due to scraps and quality defects to be repaired

6. Reduced yield - from machine startup to stable production

# PILLAR 5: EARLY DEVELOPMENT

**This applies to mainly new products and new equipment. The goal is to reduce dramatically the cycle-time from initial development to full scale production and to achieve a vertical startup (a startup - fast, free of bugs and right first time, every time at minimum cost and minimum time).**

**Development of Competitive Processes & Products to Meet the Market Demand & Enhance Customer Satisfaction.**

# TARGET

BMM
POTENTIAL IN TONNES

•Directs practical knowledge and understanding of manufacturing equipment gained through TPM towards improving the design of new equipment

•New equipment reaches planned performance levels much faster due to fewer startup issues.

•Maintenance is simpler and more robust due to practical review and employee involvement prior to installation

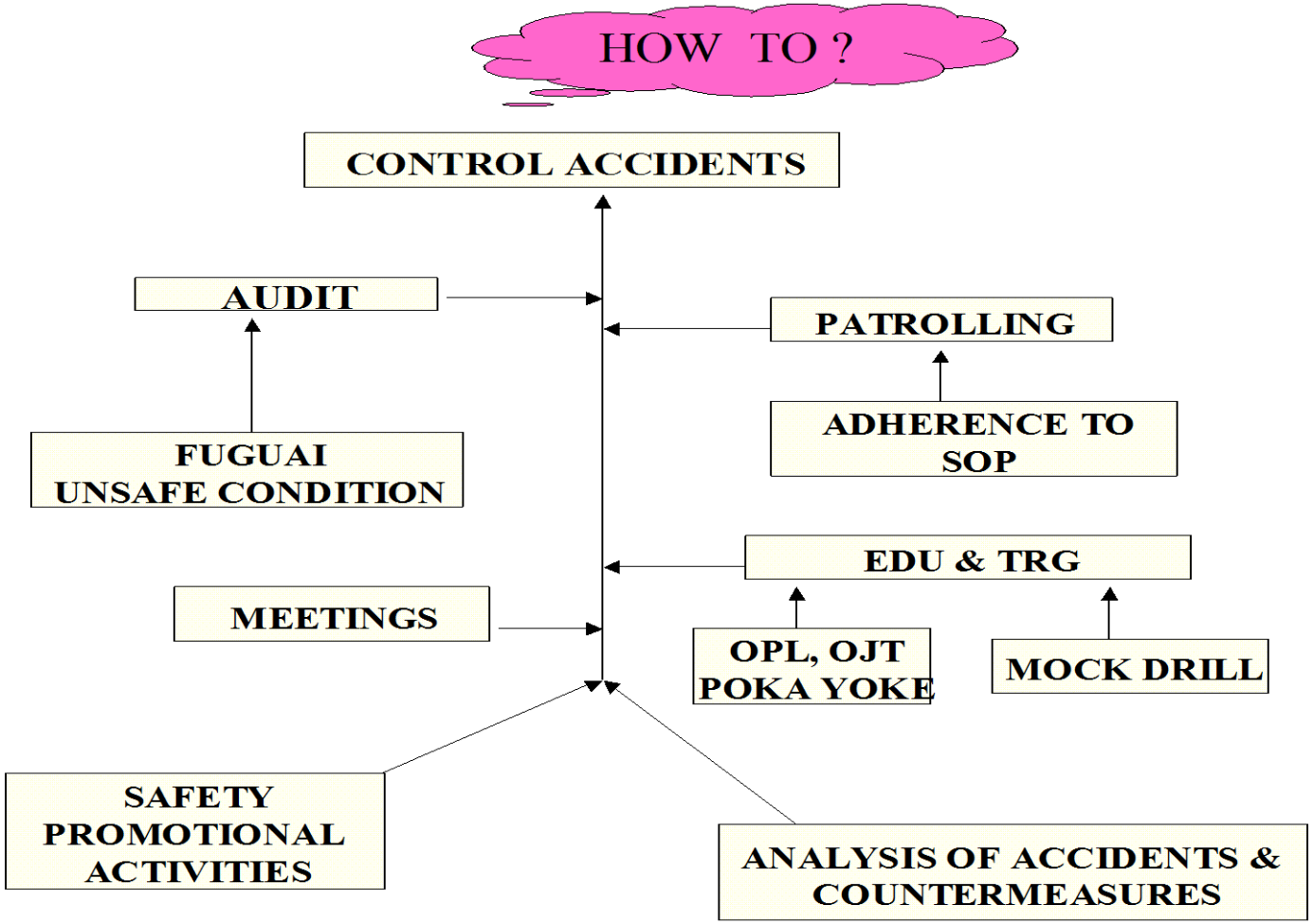
# PILLAR 6: SAFETY, HEALTH AND ENVIRONMENT

- Elimination of unsafe conditions
- Use of visual controls
- Making the work place conducive to work and pollution free
- Establishing fool proof system

**To Work Towards Continuously Improving the Environment and Maintaining Accident Free Workplace**

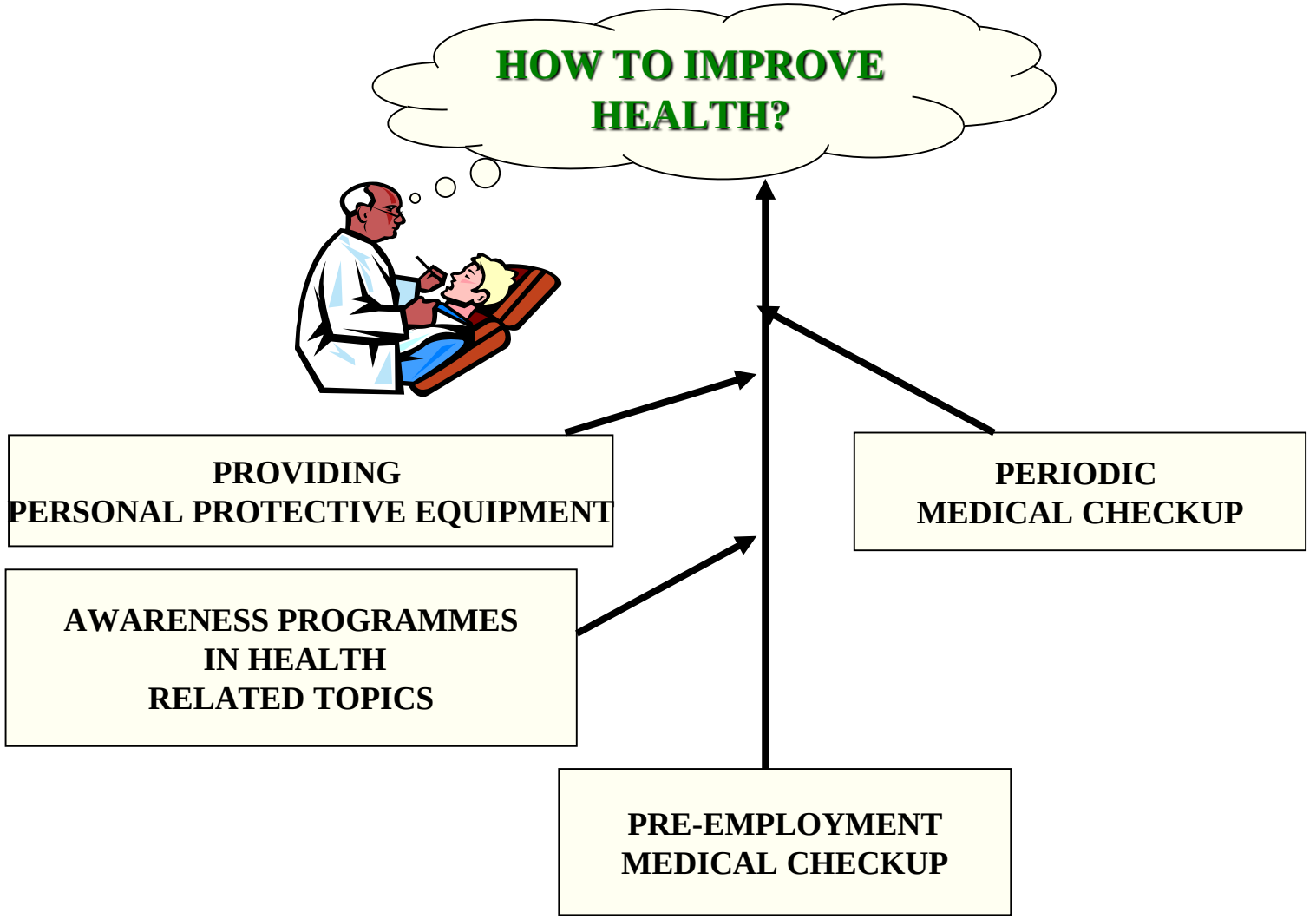
# TARGET

- ZERO ACCIDENT
- 100% COMPLIANCE TO POLLUTION NORMS
- HEALTHY & SAFE ENVIRONMENT



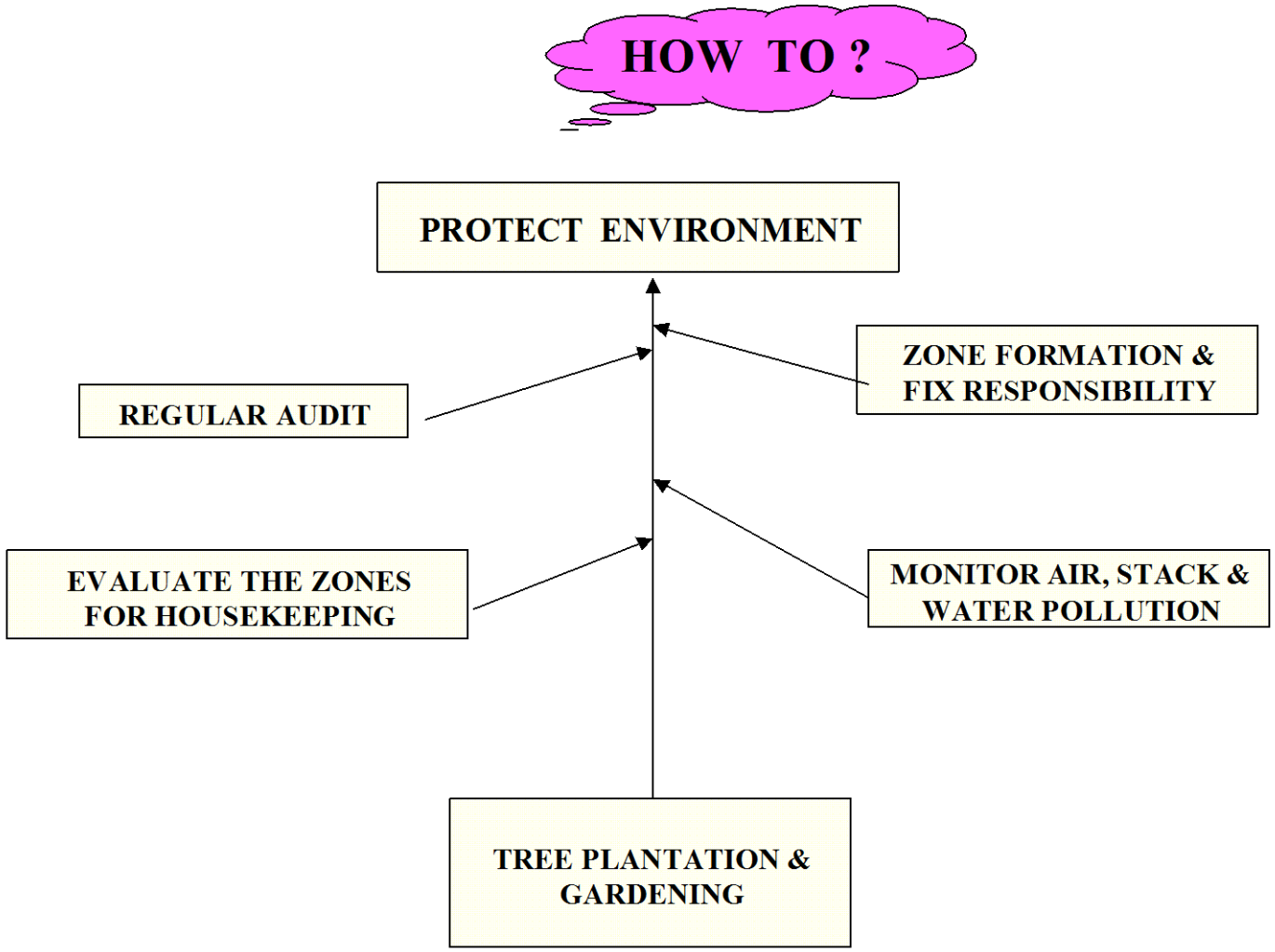
# APPROACH TO IMPROVE HEALTH

- ZERO ACCIDENT
- 100% COMPLIANCE TO POLLUTION NORMS
- HEALTHY & SAFE ENVIRONMENT



# APPROACH TO CONTROL ENVIRONMENT

- ZERO ACCIDENT
- 100% COMPLIANCE TO POLLUTION NORMS
- HEALTHY & SAFE ENVIRONMENT



# TPM PILLAR 7: EDUCATION & TRAINING

BMM
POTENTIAL IN TONNES

- It aims at improving the abilities of the individuals that not only helps the company's bottom line but also increases people's zest for life and pride in their work.

- Enhancement of operators' operating and maintenance skills.
- Development of system of measuring the skill of employees.
- Preparation of simple and user friendly training formats.

- To develop all necessary skills amongst the employees at all levels for satisfactory implementation of TPM principles.

# EDUCATION & TRAINING

- ✓ **Educational / Training materials developed based on :**

  **1) Books, Journals, Periodicals, CDs available in Library (In-House).**
  **2) Knowledge gained from various conferences , seminars & external programmes.**
  **3) External faculties are being invited for In-House Training Programme.**
  **4) Also developing the Internal Faculties to conduct the Training Programmes.**

- ✓ **Need based training programmes conducted & participants are nominated from relevant departments.**

- ✓ **Interactive sessions held in order to ensure the knowledge conveyed.**

- ✓ **To hold post-education tests in class room, wherever feasible. If needed re nominate people or re-conduct the programme till satisfactory levels.**

# 4 STEPS OF SKILLS DEVELOPMENT

**Level I (Basic) :** Can perform the task only under supervision

**Level II (Advanced) :** Can independently perform the task

**Level III (Expert) :** Can independently perform the task and also train others

**Level IV (Master) :** Can independently perform the task, train others and command & control the team

# TPM PILLAR 8: OFFICE TPM

BMM
POTENTIAL IN TONNES

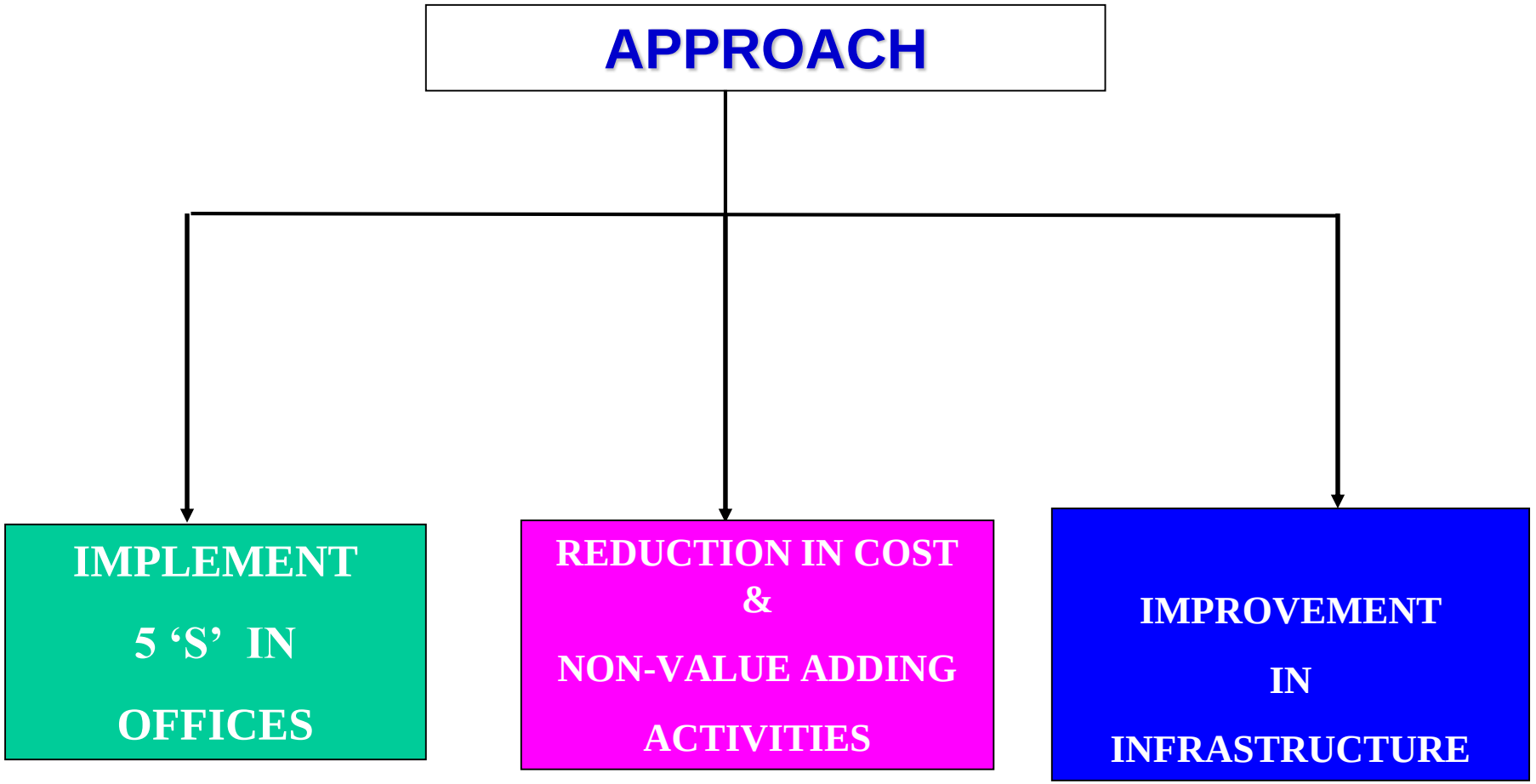
- TPM activities in other than production departments e.g., those departments, which are supporting to the production department.

-This includes :

- Administrative improvements
- Functional improvements (Out-put)

- To Contribute To The Profitability Of The Organization
- Through Efficient Services, Eliminating Non-Value
- Adding Activities And Total Participation In
- House Keeping Principles.

# WHY OFFICE TPM REQUIRED ?



# BEFORE IMPLIMENTATION OF TPM

BMM
POTENTIAL IN TONNES

First the Bad and the Ugly - Life Without 5S

# EFFECTIVENESS OF TPM

BMM
POTENTIAL IN TONNES

## The Good- Life after 5-S

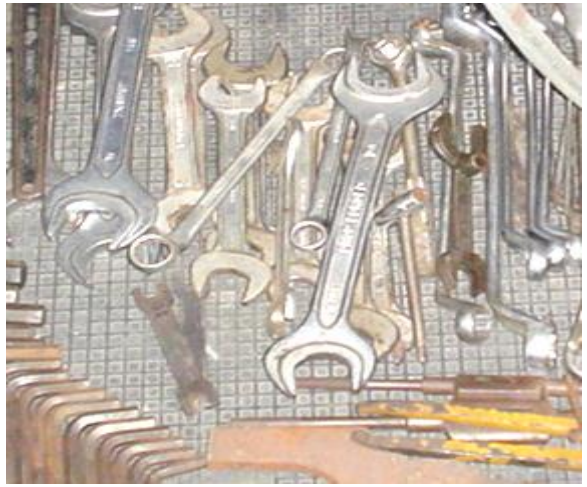





# EFFECTIVENESS OF TPM

BMM
POTENTIAL IN TONNES

## Before



* All hand tools are kept in one tray

## After

*Shadow board provided for hand tools

* Reduced searching time

# EFFECTIVENESS OF TPM

## 3 S": **Keep Machine Clean**

**Before**

**After**

Easy Inspection

# EFFECTIVENESS OF TPM

## 3 S": Environment Cleanliness

**Before**

Difficult to identify the soap oil level

**After**

Easy to identify the soap oil level

# TPM


**“A Change for Success”**

# On the Strength of TPM

# Practice TPM


*to achieve Excellence*

# Thankyou...