

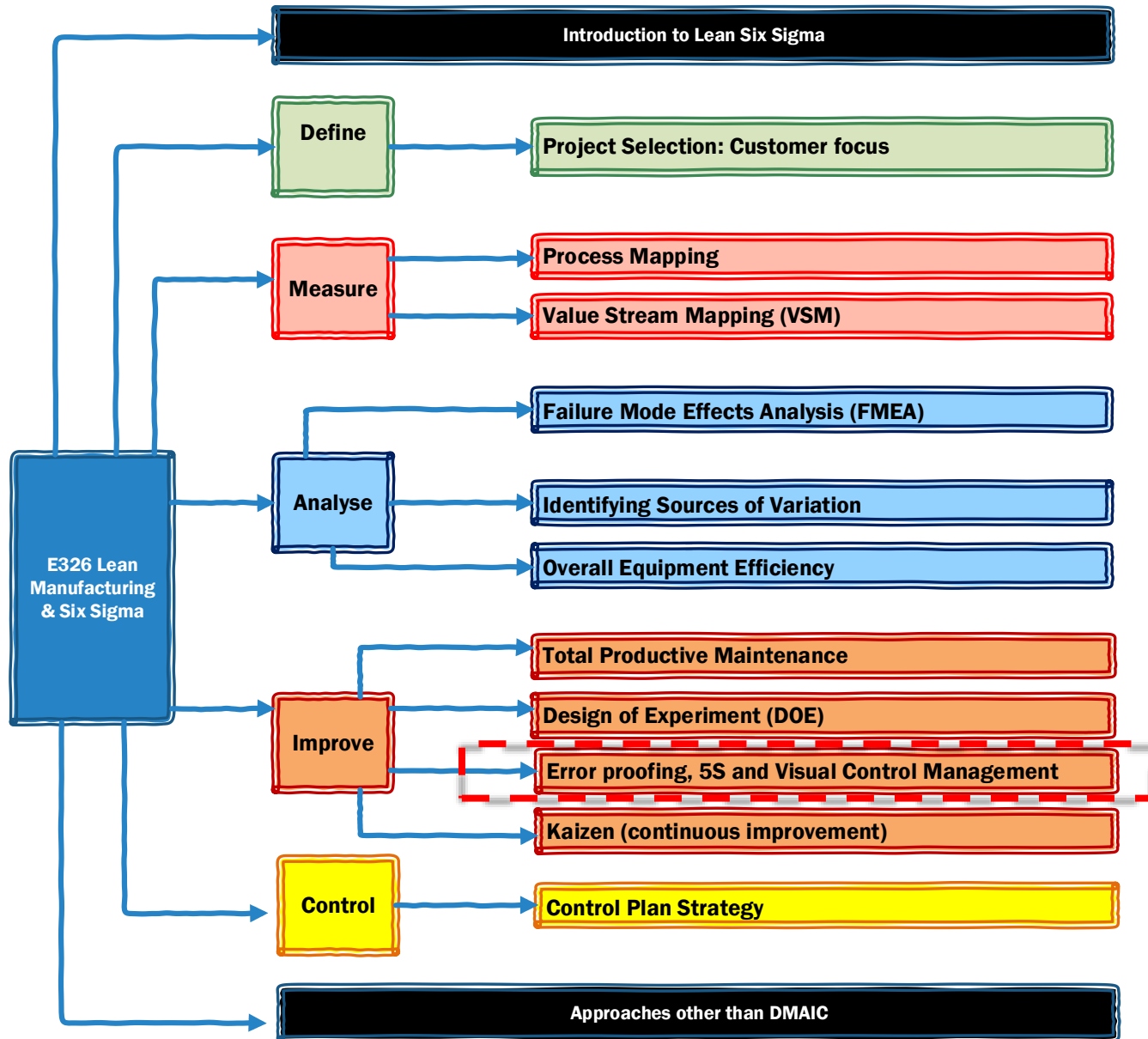
Problem 10

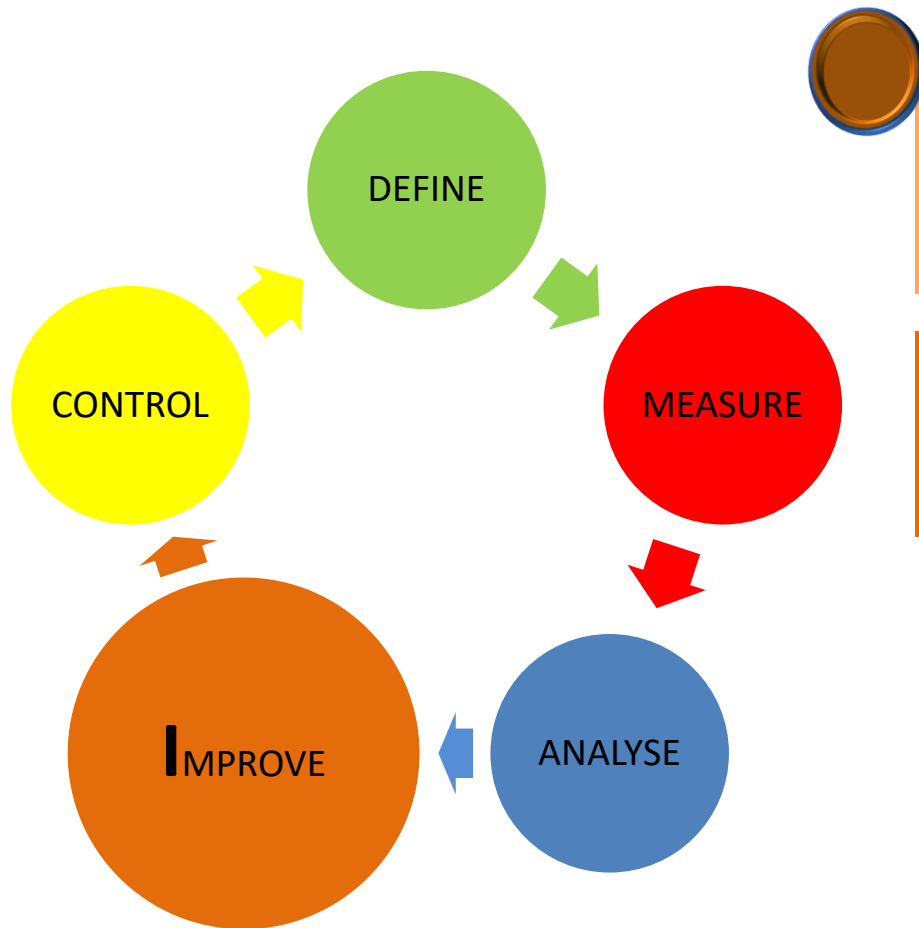
Keep it Simply Simple

E326 – Lean Manufacturing & Six Sigma

SCHOOL OF
ENGINEERING

E326 Lean Manufacturing and Six Sigma Topic Tree





- Zero Defect Quality (ZDQ)
 - Jidoka
 - Poka-Yoke
 - 5S

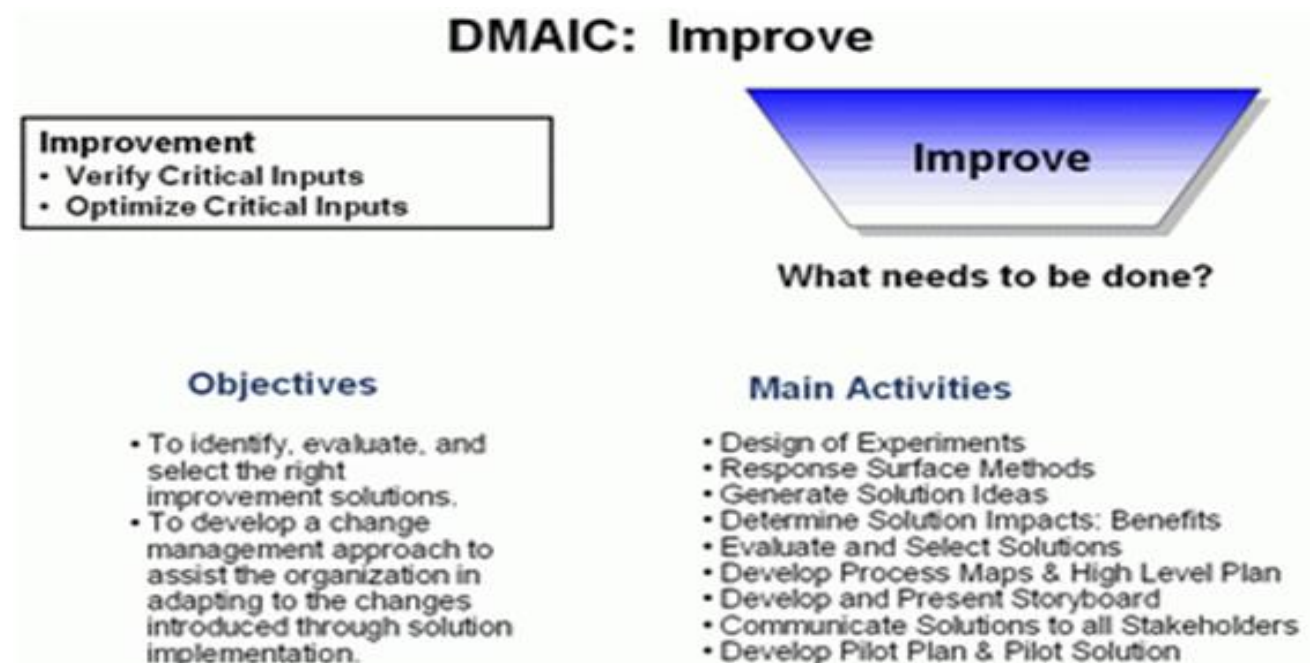
Objectives of Improve phase:

- Improve the process by attacking root causes.

Improve Phase of DMAIC



- This phase is most concerned with verification of the critical input parameters and optimization.
- Objectives are to:
 - (i) Identify, evaluate and select the right improvement solutions.
 - (ii) Develop a change in management approach to assist the organization in adapting to the changes introduced by the solution implementation.



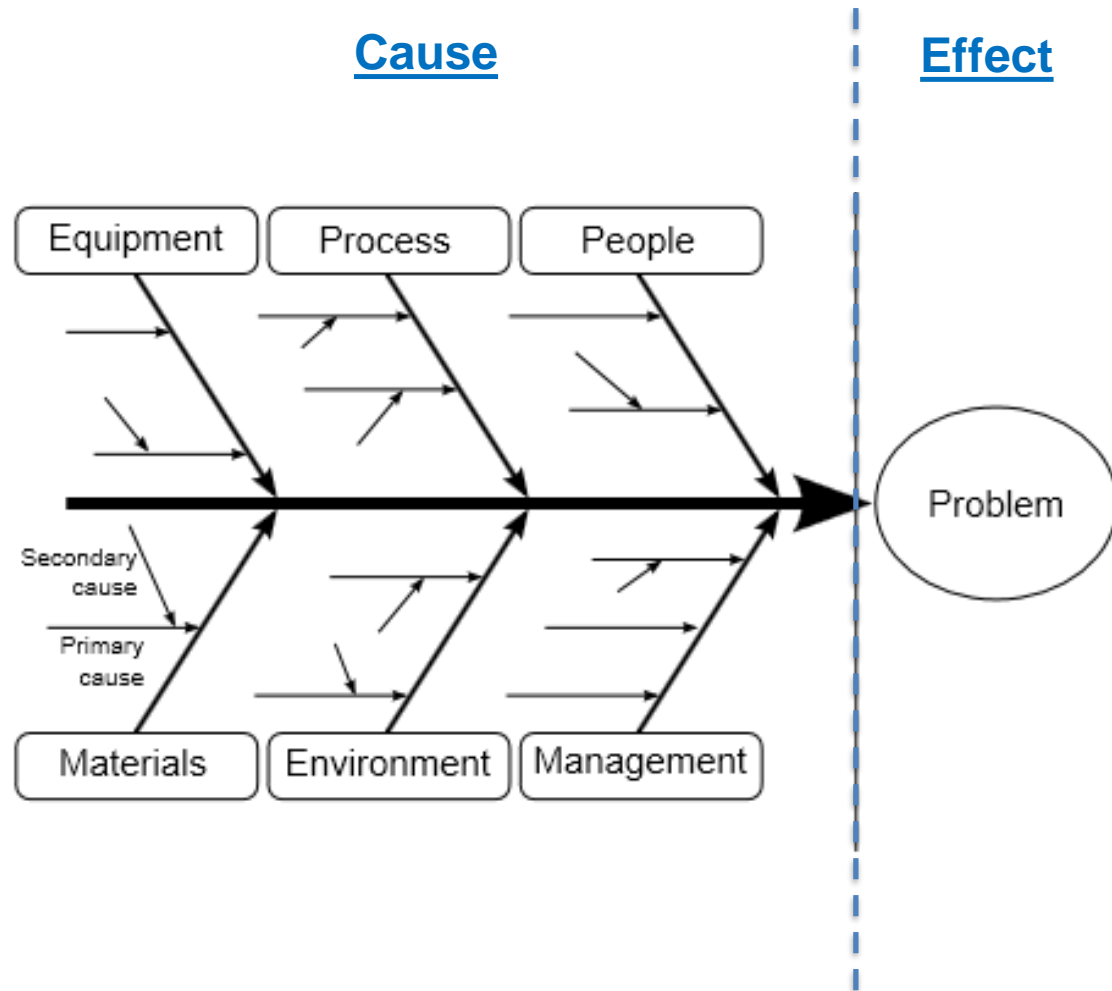
Errors vs. Defects



A Cause and Effect Diagram is an analysis tool to display possible causes of a specific problem or condition.

This technique is popular in problem solving and is one of the Six Sigma techniques.

In Zero Defect Quality, “Errors” are considered as the “Causes” that lead to “Defect”. When an error is eliminated, defect can be avoided.



What causes defects?



1. Poor procedures or standards
2. Machines
3. Non-conforming material
4. Worn tooling
5. Human Mistakes

The above defects causes can be predicted and corrective action can be implemented to eliminate, except for human mistakes (errors).

Types of Human Errors



1. Forgetfulness
 - Occurs when one is not concentrating
2. Errors due to misunderstanding
 - Jump to conclusions before being familiar with the situation
3. Errors in identification
 - Misjudgment of a situation due to unclear observation
4. Errors made by amateurs
 - A new worker does not know the operation
5. Willful errors
 - One ignores rules under certain circumstances

Types of Human Errors – cont..



6. Inadvertent errors

- One makes error because of absent-minded

7. Errors due to slowness

- Slow down actions due to delays in judgments

8. Errors due to lack of standards

- There are no suitable instructions or work standards

9. Surprise errors

- Equipment runs differently from expected

10. Intentional errors

- One makes mistake deliberately

Defects due to Human Errors



- Omitted processing
 - Start operation without cover in place
- Errors setting up work piece
 - Place item in the wrong orientation
- Missing parts
 - Forgot source item
- Wrong parts
 - Use wrong toner
- Processing wrong work piece
 - Photocopy the wrong pages
- Adjustment error
 - Wrong selection of printing quality option
- Equipment not set up properly
 - Photocopier is not switched on

Zero Defect Quality (ZDQ)



- A quality concept to manufacture at ZERO defects and prevent passing of defects to downstream processes (source inspection).
- Based on disciplines and controlled processes that prevent defects from happening.
- It recognizes that people sometimes do make mistakes (no finger pointing).
- Mistake-Proofing devices/designs (Poka-Yoke) are used to prevent errors from becoming defects.

“ZERO DEFECTS” is the goal!

Question: Will there be any side effect by pushing company to achieve “Zero Defects”?

How to Achieve Zero Defect Quality



ZDQ functions by combining four elementary components:

1. Point of Origin Inspection

- Check for factors that cause errors (**Cause**), not the resulting defect (**Effect**).

2. 100 % Audit Checks

- Use inexpensive devices to inspect automatically for errors or defective operating conditions.

3. Immediate Feedback/Action

- Operations are stopped instantly when a mistake is made and not resumed until it is corrected.

4. Jidoka

- Andon - Detect defects and immediately stop the production
- Poka Yoke - Prediction and Prevention, Detection

Purposes of Inspection



- Discovering Defects
 - To identify defects resulting from abnormal processing
- Reducing Defects
- Eliminating Defects
 - To detect errors during processing and take immediate corrective action

Inspection Techniques



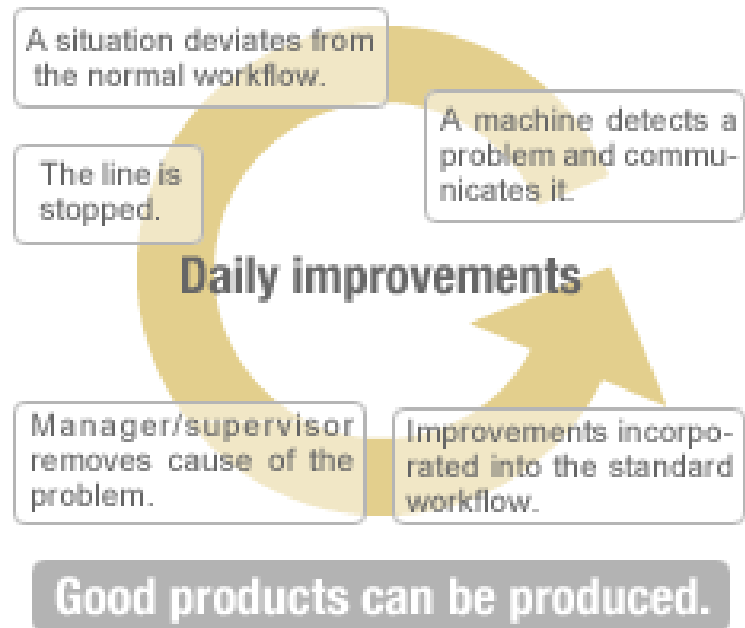
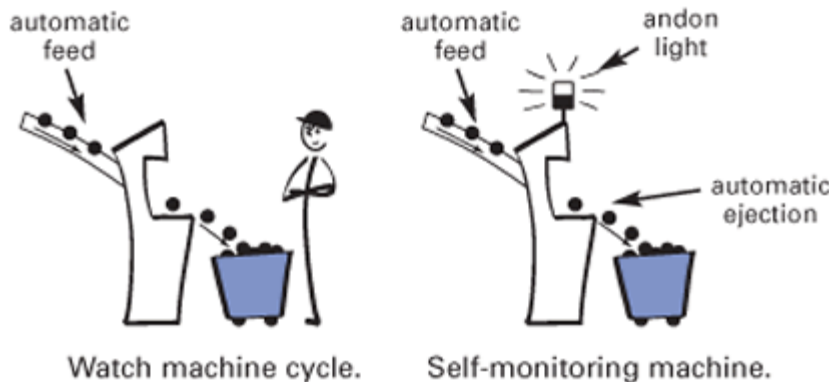
- Judgment Inspection (defects occurred)
 - Separates defective products from good ones after processing. *It prevents defects from being delivered to customers, but does not decrease a company's defects rate.*
- Informative Inspection (defects occurred)
 - Investigates the causes of defects and feedback this information to the appropriate processes so that action can be taken to reduce the defect rate:
 - Statistical Quality Control
 - Successive Inspection System
 - Self-Inspection System
- Point of Origin (defects about to occur)
 - A defect is a result usually caused by a simple mistake. Through 100% inspection at the source, *the mistake can be corrected before it becomes a defect.*

Jidoka (Automation)



- Quality at the source
- Detects defects and immediately stop the production or manufacturing process.
- Fixes the defect and finds solutions so that the defect or error does not occur again.

The Evolution toward Jidoka



Autonomation vs Automation



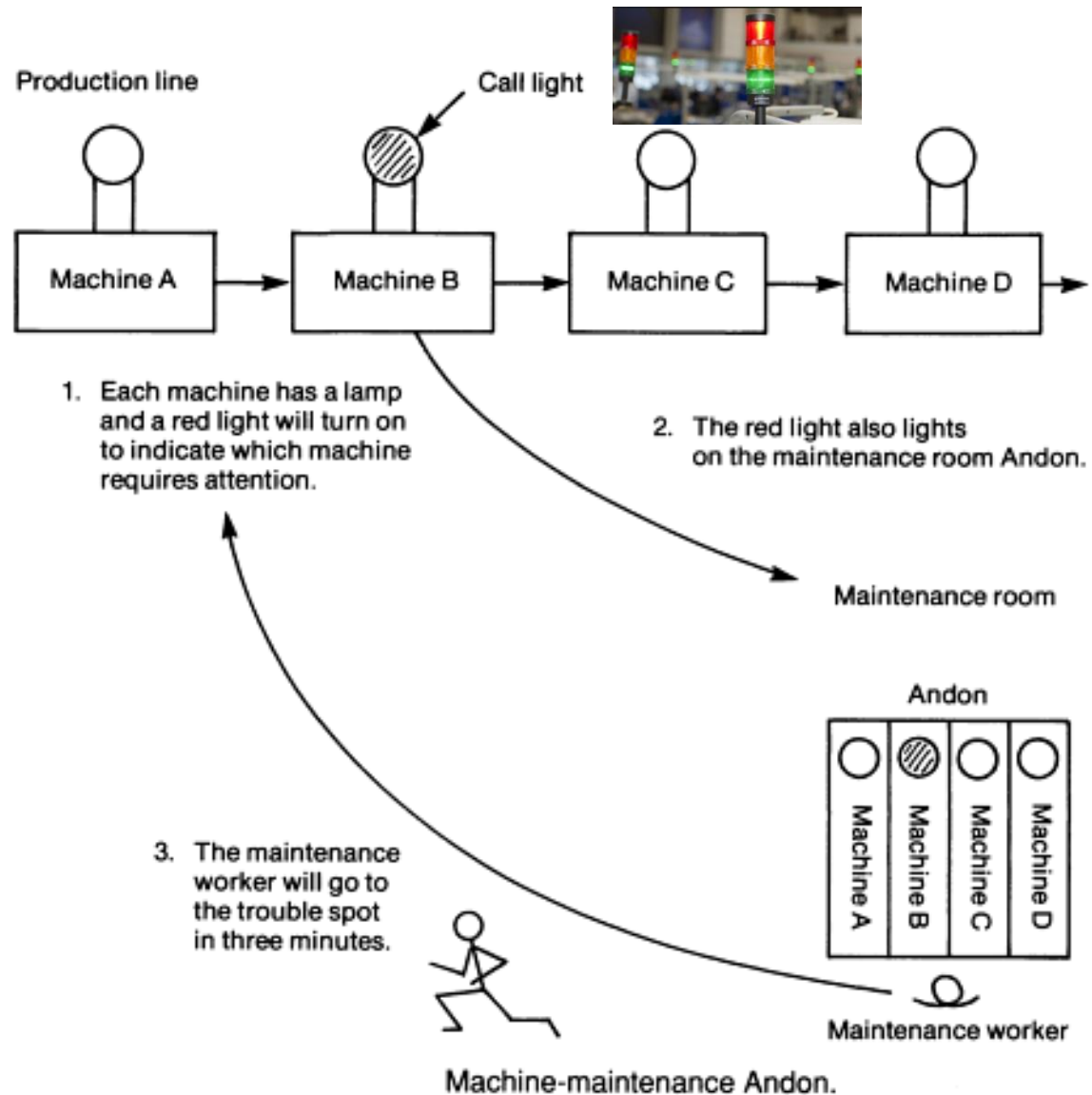
Category	Automation	Autonomation
People	Manual processes become easier but still needs human supervision	Supervisors can multi-task and productivity improves
Machines	Machines complete cycle until stop button is activated	Machine detection of errors and correction is autonomous
Quality	Defects can be produced in mass quantities due to machine malfunction	Machine crashes are prevented by auto-stop, hence defects are avoided
Error and Diagnosis	Errors are discovered later and root cause analysis is long term	Errors are discovered and corrected quicker



Andon



Andon is a manufacturing term referring to a system to notify management, maintenance, and other workers of a quality or process problem. The centrepiece is a signboard incorporating signal lights to indicate which workstation has the problem

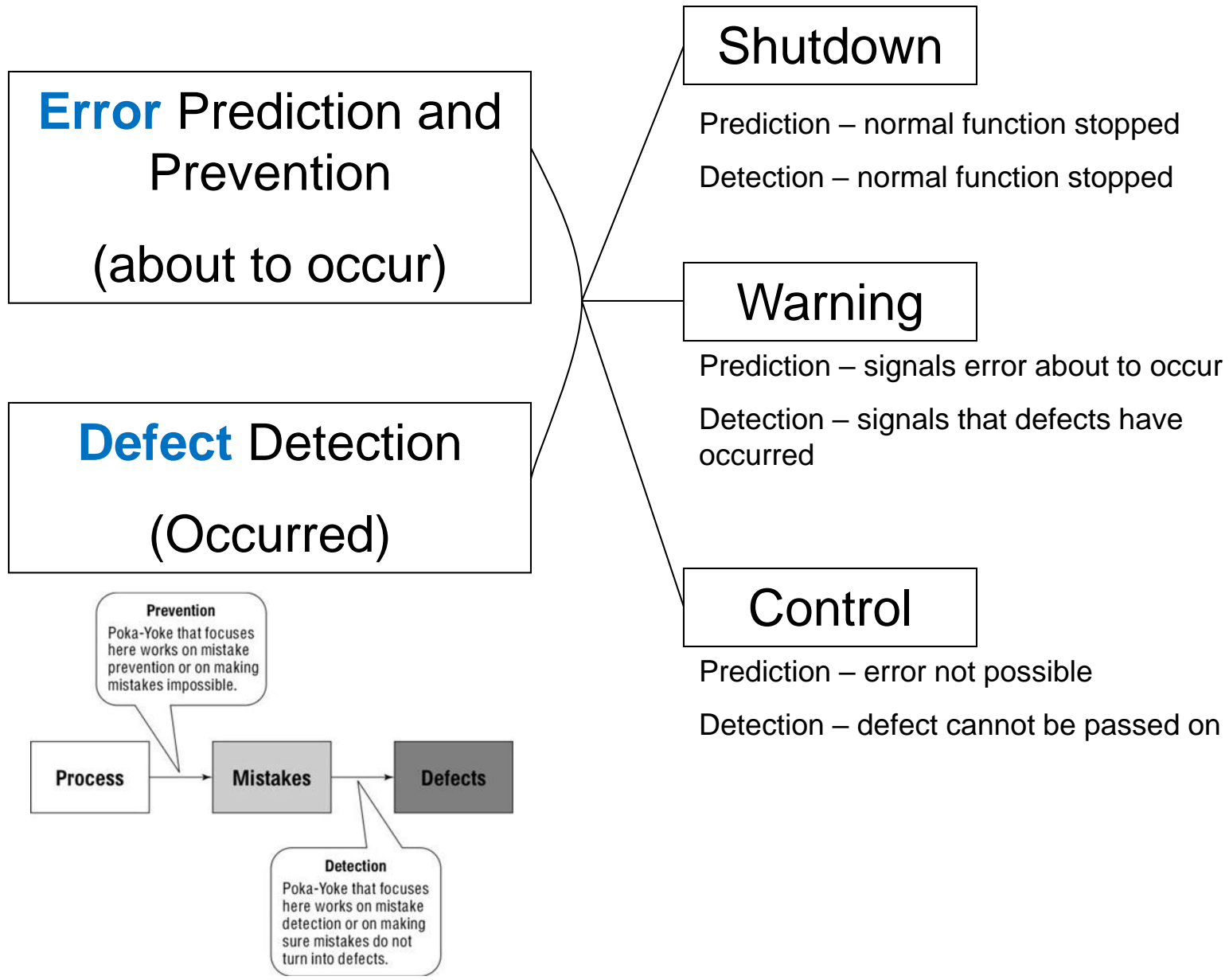


Poka-Yoke (Mistake/Fool-Proofing)



- Mistakes proofing systems
- Uses sensor or other devices (jigs) for catching errors that may pass by operators or assemblers.
- Poka-Yoke effects two key elements of ZDQ:
 - Identifying the defect immediately (Point of Origin Inspection)
 - Quick Feedback for Corrective Action
- Poka-Yoke detects an error, gives a warning, and can shut down the process.

Basic Functions of Poka-Yoke



Approaches of Poka-Yoke system



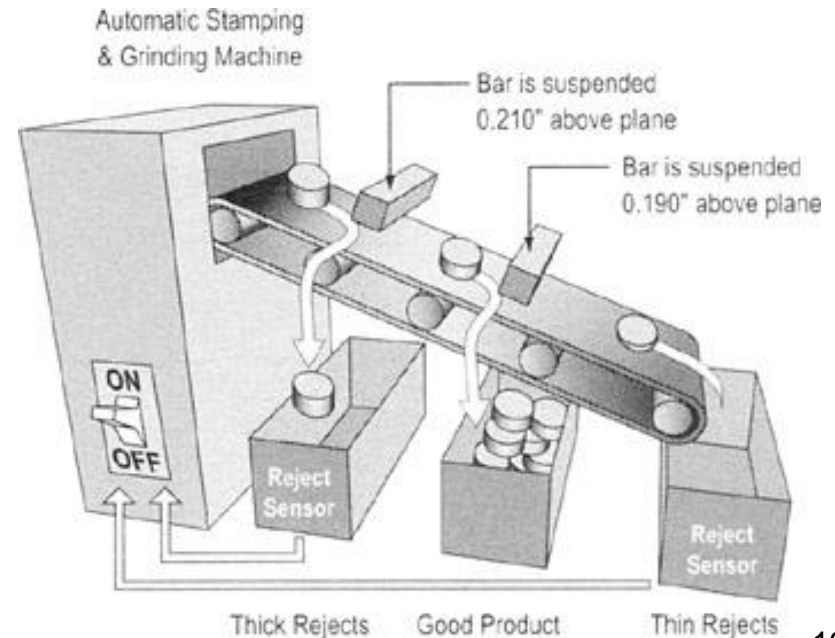
Two Poka-Yoke System approaches are utilized in manufacturing which lead to successful ZDQ:

1. Control Approach

- Shuts down the process when an error occurs.
- Keeps the “suspect” part in place when an operation is incomplete.

2. Warning Approach

- Signals the operator to stop the process and correct the problem.

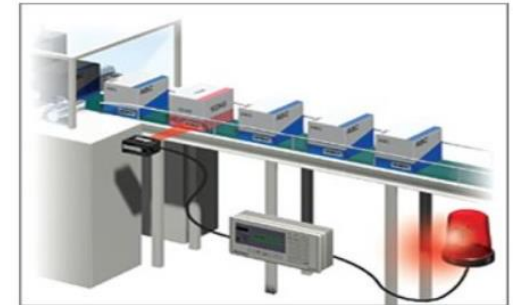


Poka-Yoke Setting Function



Poka-Yoke systems consist of three primary methods:

- Contact method
 - Functions by detecting whether a sensing device makes contact with a part or object in the process
 - Physical, Energy, Mechanical
- Counting method
 - Used when a fixed number of operations or a fixed number of parts are attached
 - Sensor counts processes or parts
- Motion-Sequence method
 - Sensors determine if a motion or a step has occurred.



Counting cookies

Ways of Detection



- Poka-Yoke devices example in manufacturing



Guide Pins



Limit Switches



Counters



Error Detection
and Alarms



“Temp declaration
form” “pop-up” as
Checklists

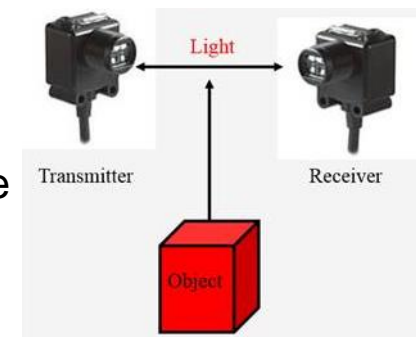
Ways of Detection



- Sensing devices
 - Physical contact devices
 - Switches, limit switches, touch switches



- Energy sensing devices
 - Vibration, pressure, photoelectric, fiber-optic, temperature
- Warning sensors
 - Color code, lights



Examples of Mistake-proofing



bathroom sinks have a mistake-proofing device. It is the little holes near the top of the sink that help prevent overflows.



There is only one way that you can plug it into the wall socket.



Laptop plug ins are designed such that only plugs with the right shape and right position is able to fit in.



Automobile controls have a mistake-proofing device to insure that the key is in the on position before allowing the driver to shift out of park. The keys cannot be removed until the car is in park.

Lean Six Sigma: 5S



- **5S** is a workplace organization technique composed for five primary phases:
 - **Seiri** : Sorting
 - **Seiton** : Straighten or Set in Order
 - **Seisō** : Sweeping or Shining
 - **Seiketsu** : Standardizing
 - **Shitsuke** : Sustaining



SORT

Keep only
necessary items
in the workplace.



SET IN ORDER

Arrange items
to promote
efficient workflow.



SHINE

Clean the work
area so it is
neat and tidy.



STANDARDIZE

Set standards
for a consistently
organized workplace.



SYSTEMATIZE

Maintain
and review
standards.

5S in Lean Six Sigma



- 5S is a fundamental pillar of a Lean deployment. The 5S exercise captures core principles of the Lean philosophy that facilitate the extension and development of a lasting lean implementation.
- For Six Sigma, 5S can be invaluable for reducing waste. High-performing processes and workplaces are always characterized by organization and cleanliness.
- Think of it as the foundation upon which a house is built upon, that is, “the foundation of improvement”.
- Rather than think of it as a onetime event or something that is done once a year, think of it as the beginning of a culture and process that enables the pursuit and elimination of waste from your organization.

Visual Management



- The 5S Visual Management system is designed to create a visual workplace – a work environment that is self-explaining, self-ordering and self-improving, and thus helps create and sustain competitive advantage for organizations.
- It translates critical organizational requirements into visual stimuli, and uses these visual stimuli to highlight, report, clarify, and integrate mission, vision, values and culture into an organization's operating systems and performance requirements.
- Based on a simple set of visual cues, 5S/Visual Management helps you quickly locate tools, materials, information and quantity limits, identify issues before they become problems and create ownership etc.



SORT (Seiri)



- Only use materials, equipment, tooling, and supplies that are needed, when they are needed, in the quantities needed.
- Eliminate excess/obsolete equipment
- Eliminate excess/obsolete inventory
- Improve inefficient space utilization
- Eliminate space taken up by unneeded items
- Remove outdated papers and files
- Reduce cabinets, shelving, lockers containing supplies
- Look into unlabeled containers, boxes, shelves, bottom of locations
- Eliminate outdated posters, wall boards, metrics, slogans, and banners.

SORT (Seiri)



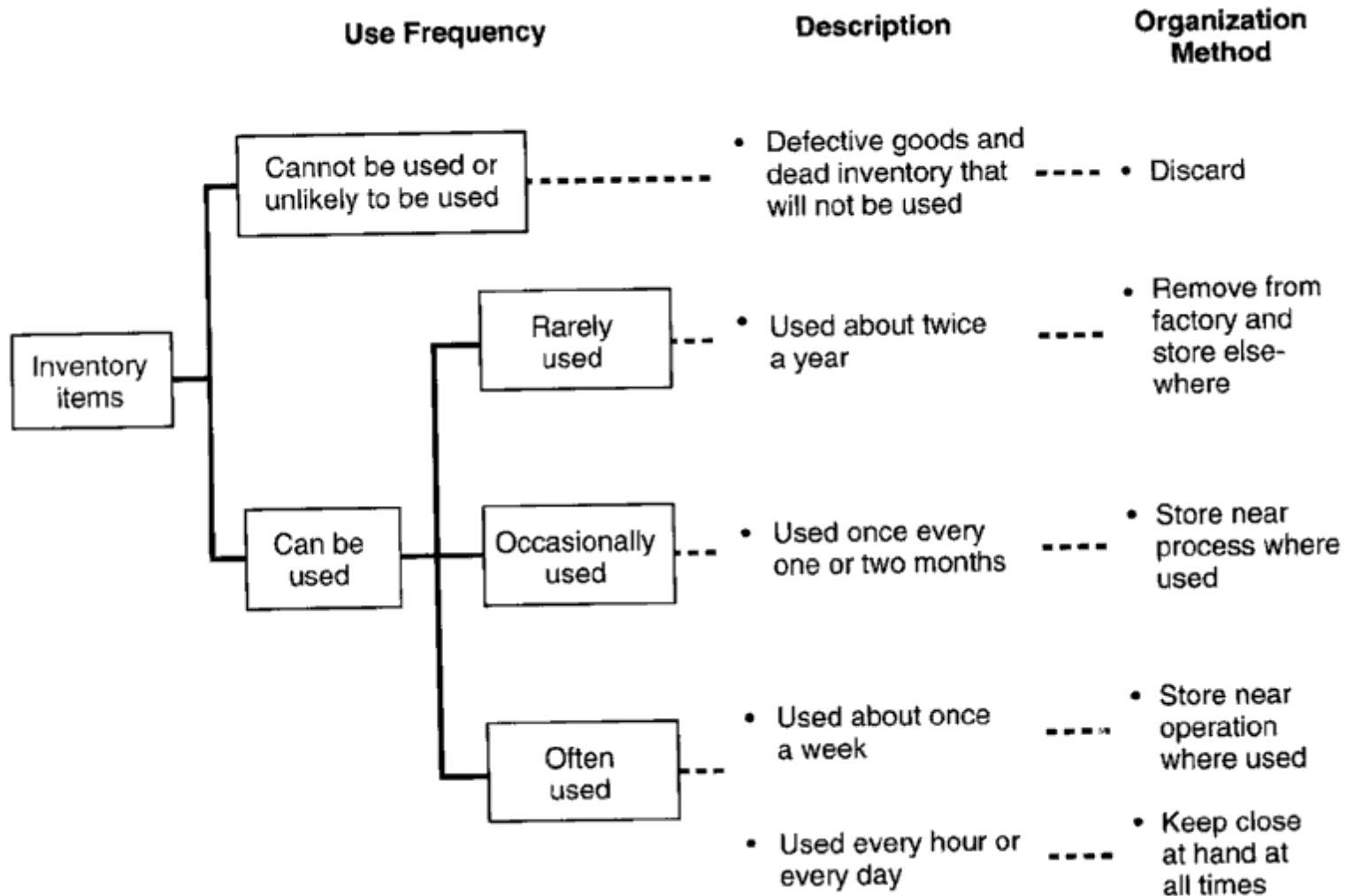
Red Tag Program

- Identify requirements for red tag items
 - Will not need within one week, one month, etc.
 - Define what is needed and not needed
 - Usefulness, Frequency, Quantity
- Identify items to be red tagged (items that may or may not be used)
 - Inventory
 - Machines & equipment
 - Shelves, cabinets, files, desks
 - Tools
- Design red tag
 - Visible & readable
- Attach tags
- Remove tagged items

SORT (Seiri)



Red Tag Criteria (Example)



SET IN ORDER (Seiton)



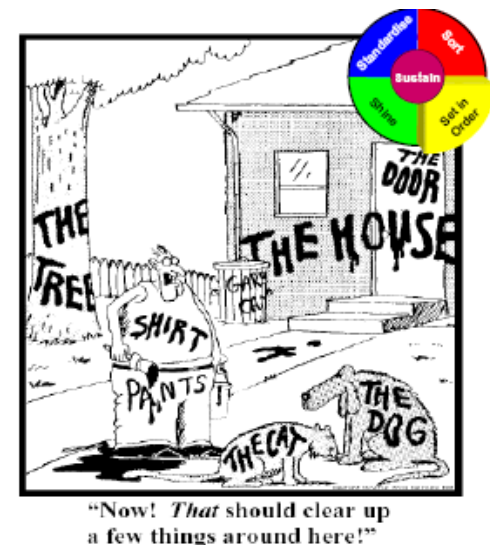
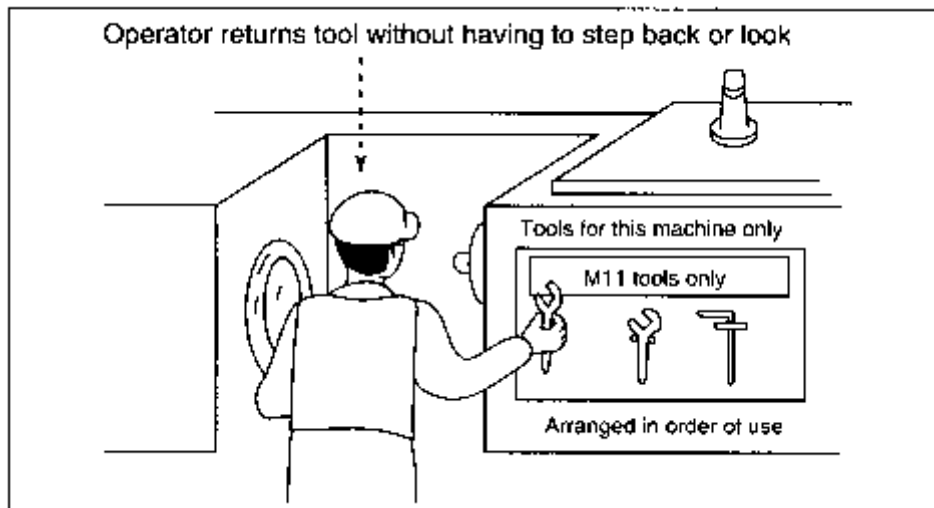
- Needed items are arranged so that it is easy for ANYONE to use
- Needed items are labeled so that it is easy for ANYONE to find them and put them away.
- To eliminate wastes such as searching waste, waste due to difficulty in using items, waste due to difficulty in returning items.
- Use Visual Controls to Communicate standards



SET IN ORDER (Seiton)



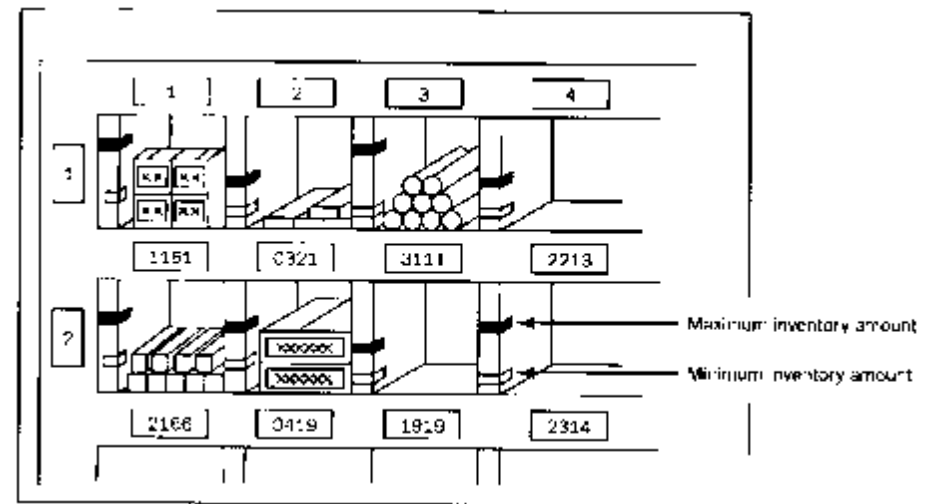
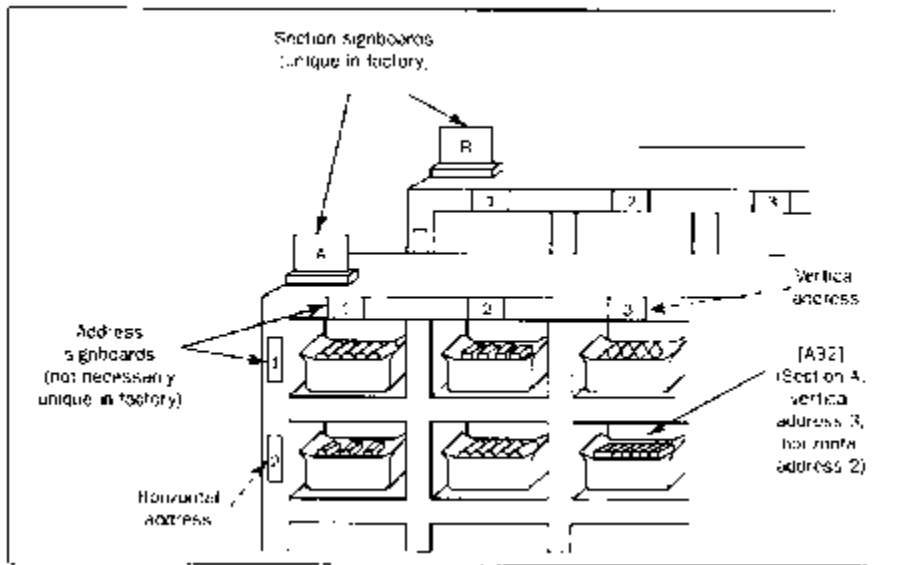
- Deciding Appropriate Locations
 - Locate items in the workplace according to their frequency of use
 - Place frequently used items near the place of use
 - Store infrequently used items away from the place of use
 - Devise a “just let go” arrangement for tools
 - Store tools according to function or product
 - Store items together if they are used together, and store them in the sequence in which they are used



SET IN ORDER (Seiton)



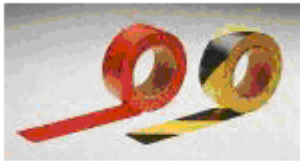
- Identifying Locations
 - Signboard Strategy – For identifying “what”, “where” and “how many”. E.g., names of work areas, inventory locations, equipment storage locations, standard procedures, and machine layout



SET IN ORDER (Seiton)



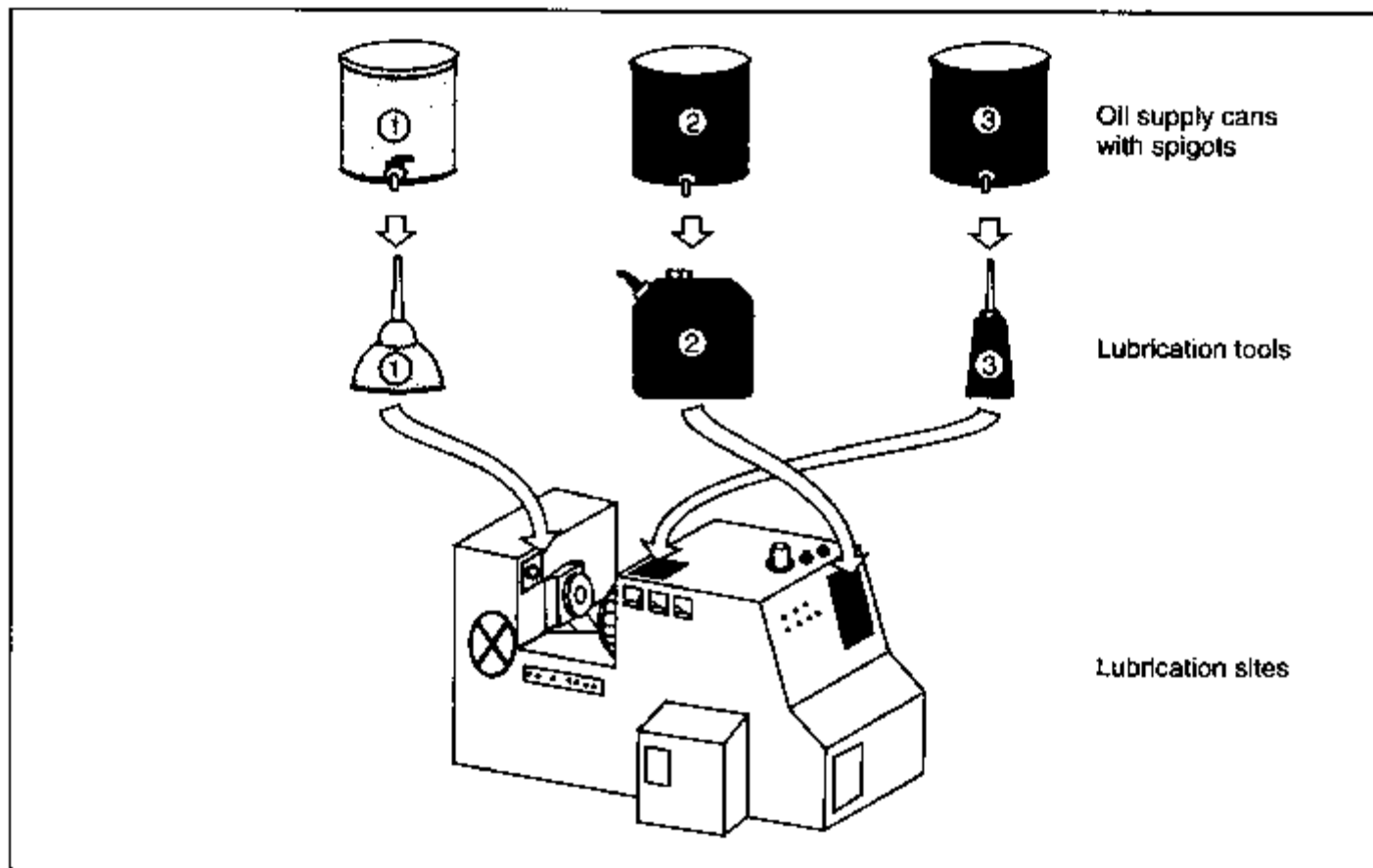
- Identifying Locations
 - Painting Strategy – For identifying locations on floors and walkways
 - Marking “walkways” and “operation areas”
 - Cart storage location, aisle direction, door range, hazardous areas



SET IN ORDER (Seiton)



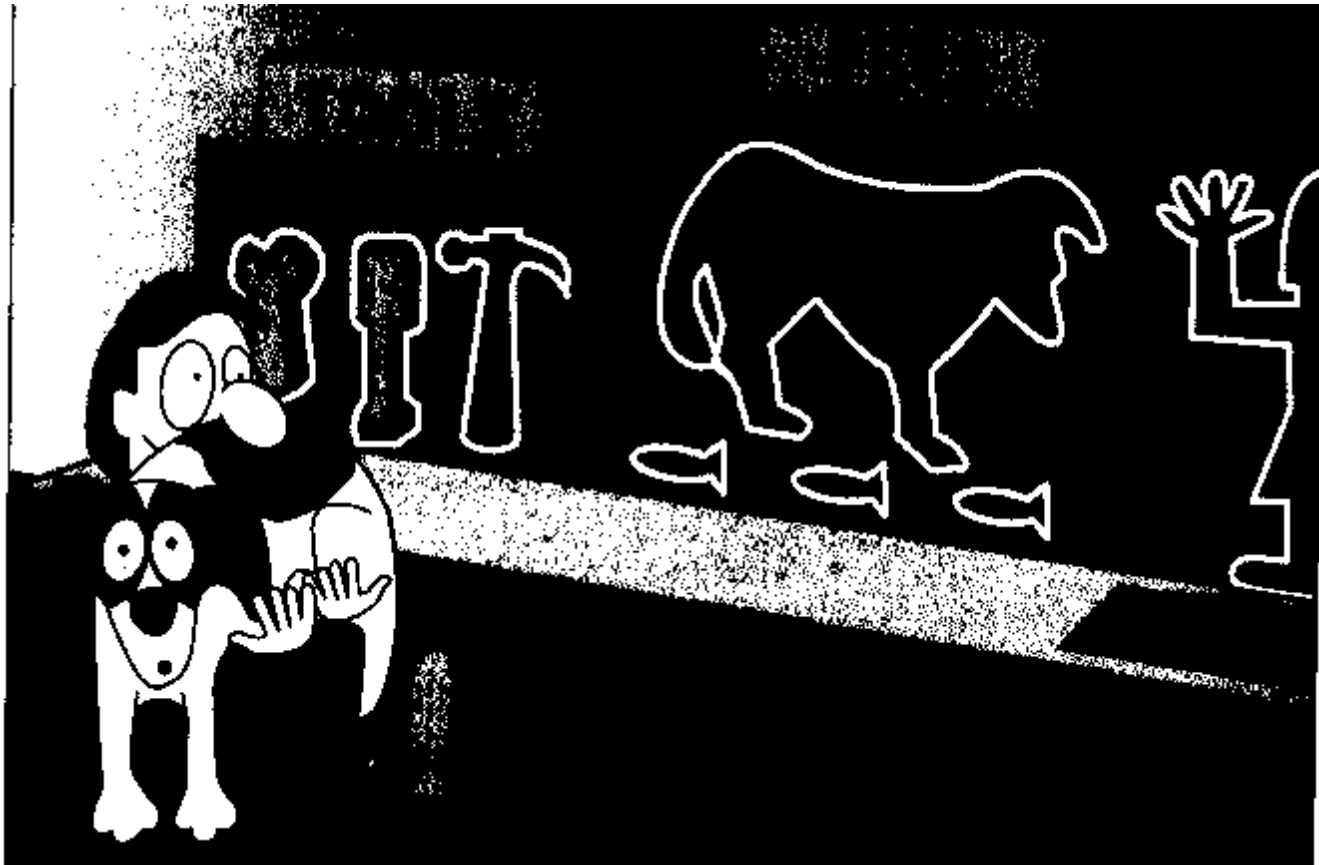
- Identifying Locations
 - Color-Coding Strategy – For identifying parts and tools are to be used for which purpose



SET IN ORDER (Seiton)



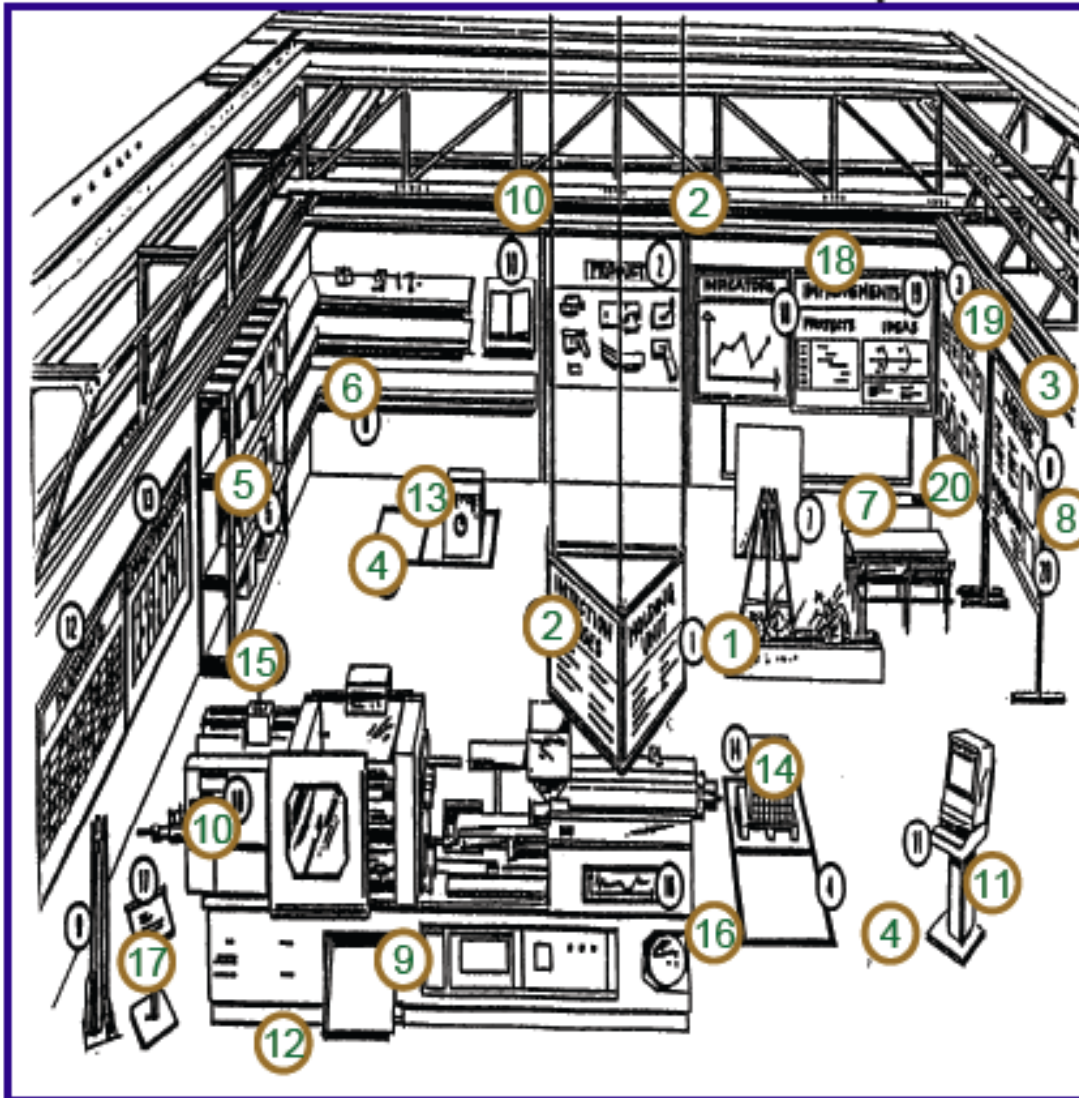
- Identifying Locations
 - Outlining strategy



SET IN ORDER (Seiton)



- Visual Management Examples



The Team's Work cell – Target State

1. Identification of area
2. Identification of process, resources, and products
3. Identification of the team
4. Footprints on the floor
5. Footprints of tools and racks
6. Technical area
7. Communication and break areas
8. Information and instructions
9. Tool Board

Visual Documentation

10. TWI - Std Work Documents

Visual Production Control

11. Computer terminal
12. Production schedule
13. Maintenance schedule
14. Identification of RM and WIP

Visual Quality Control

15. Monitoring signals for machines
16. Statistical process control (SPC)
17. Record of problems/defects

Metrics/Key Measures

18. Goals, Objectives and Results-Product/Process Control Boards

Visual Process

19. CI activities
20. Project List and mission statement

SHINE (Seiso)



- The cleaner, the better
- Clean areas where red tagged items were removed
- Remove dirt, oil, scraps, and garbage
- Clean on a daily basis
- Audit the cleaning process
- Improve equipment maintenance
- Clean aisles, walkways, floors, machines, desks
- Assign cleaning responsibilities
- Create target areas: equipment, floors, inventories
- Cleaning checklists
- Verification review procedure
- Correct deficiencies
- Cleaning is a team effort
- Correct root cause of un-cleaned items

SHINE (Seiso)



- Five steps in implementing Shine
 1. Determine Shine targets
 - Warehouse items
 - Equipment
 - Space
 2. Determine Shine assignments
 - Assign and schedule
 3. Determine Shine methods
 - Choosing targets and tools
 - Performing the Five-Minute Shine (practice daily and keep it short)
 - Creating standards for Shine procedure
 4. Prepare Shine tools
 - Apply “Set in Order” to cleaning tools
 5. Implement Shine

STANDARDISE (Seiketsu)

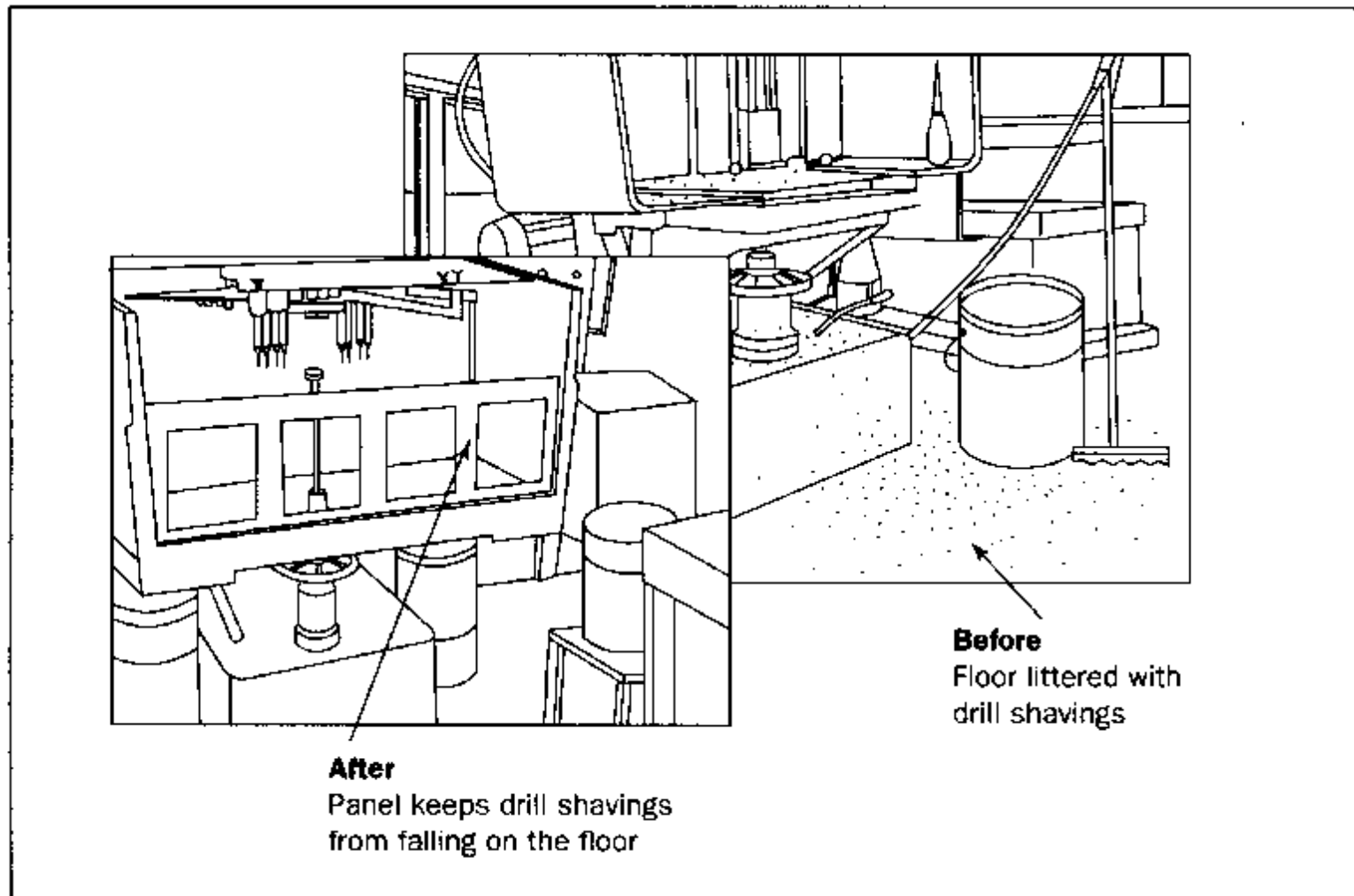


- Maintaining and controlling continual improvement achievements
- Ensuring that SORT, SET IN ORDER, and SHINE are synchronized
 - Assign 3S responsibilities
 - Integrate 3S duties into regular work duties
 - Check on 3S Maintenance level
- Plan, allocate, act, verify
 - Step 1: Planning
 - Who does what and when
 - Step 2: Allocation
 - Assign resources to tasks
 - Step 3: Act
 - Perform tasks and integrate into daily operations
 - Step 4: Verify
 - Ensure effectiveness
- Prevention
 - Preventive Sort Procedures
 - Preventive Set in Order Procedures
 - Preventive Shine Procedures

STANDARDISE (Seiketsu)



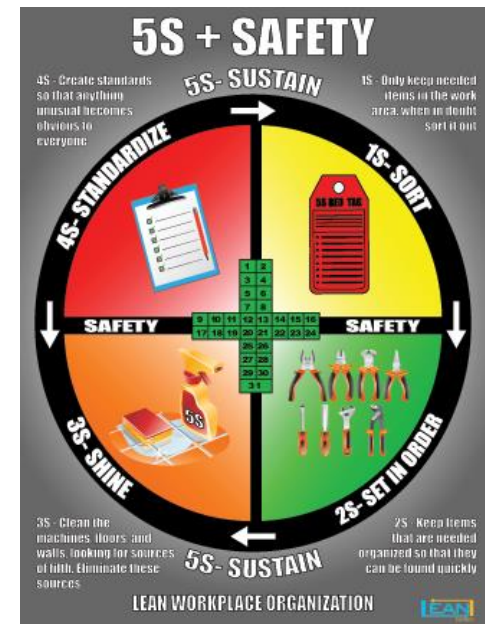
Example: Preventive Shine Procedures



SUSTAIN (Shitsuke)



- 5S Slogans
- 5S Posters
- 5S Photo Exhibits and Storyboards
- 5S Newsletters
- 5S Maps
- 5S Pocket Manuals
- 5S Department Tours
- 5S Months



SUSTAIN (Shitsuke)



Cell Tracking Centre – Production Control Board



5S Summary



- **SORT.** Separate needed items from unneeded items. Keep only what is immediately necessary item on the shop floor.
- **SET IN ORDER.** Organize the workplace so that needed items can be easily and quickly accessed. A place for everything and everything in its place.
- **SHINE.** Sweeping, washing, and cleaning everything around working area immediately.
- **STANDARDISE.** Set in place the rules and policies that support the first three steps, Sort, Straighten and Shine. Work practices should be consistent and standardized.
- **SUSTAIN.** Everyone understands, obeys, and practices the rules when in the plant.

The 6th S: 5S + Safety



- In some US companies, the 6th 'S' is introduced – Safety

- Make a safer workplace by:

- Look for unsafe conditions
- Look for potential for unsafe acts
- Look for difficult tasks
- Try the jobs yourself... where could you get hurt?
- List the opportunities and resolve them



Caution
Fork-Lift Trucks
operating

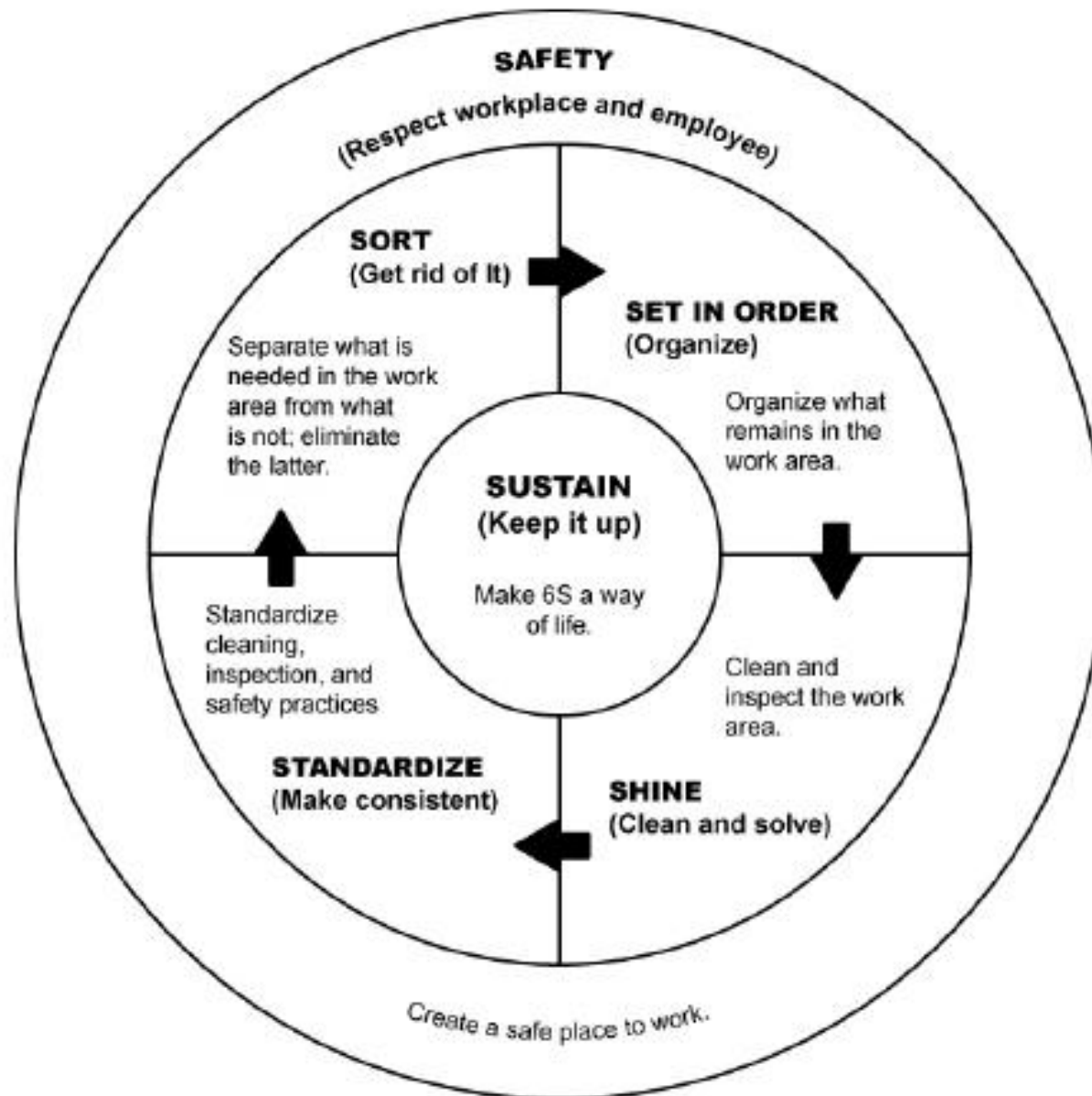


**Keep
clear**

- Includes the identification of danger areas, personal protective equipment (PPE) requirements and what needs to be cleaned and inspected.



Relationship of the 6S Pillars



Problem 10

Suggested Solution

6S Audit Form



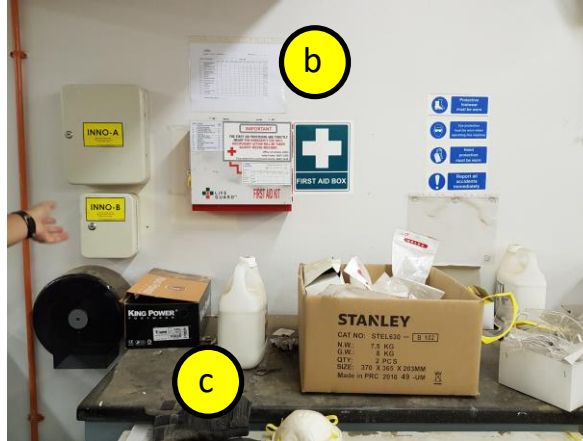
6S – Audit Criteria

6S Criteria						
Score	SORT	SET IN ORDER	SHINE	STANDARDIZE	SUSTAIN	SAFETY
1	The workplace is cluttered and disorganized; one can't distinguish between needed and unneeded items.	It is impossible to tell what goes where and in what amount.	The workplace is left dirty.	Schedules for area cleaning and organizing are not in place. Cleaning is done only when it really needs it.	Few employees understand the idea of 6S. Limited training has occurred but no action plans are in place.	Safety is not of prime importance. Routine safety practices are not being performed.
2	Anyone can easily distinguish needed from unneeded items.	There are location and item indicators for all instruments, supplies, and equipment.	The workplace is cleaned daily.	Cleaning schedules are sometimes followed, especially for visits from outside facility.	The first three components of 6S are in place throughout the facility. Benefits are starting to be captured.	Safety standards are followed most of the time, especially for visits from accrediting agencies.
3	All unneeded items are stored away from the workplace.	Various techniques (i.e. color coding, outlining, easy replacement methods) are used to facilitate replacing things properly.	Cleanliness has been combined with inspection.	Cleaning schedules are followed daily involving everyone in the area.	6S audits are performed regularly throughout the workplace. The audit results are posted in the area.	6S safety standards are followed by specific individuals.
4	All unneeded items have been disposed of.	Specific indicators show what supplies and materials go where and in what amount.	Cleanliness (dirt-prevention) techniques have been implemented.	Audits are regularly performed. Scoring and action plans are posted and used as a driver for change.	Audits drive improvements. Accountability is understood. Actions are completed quickly, with little planning required.	Safety standards and audits are regularly performed by everyone. Scoring and action plans are posted and used as a driver for change.
5	Only needed items are present and visually controlled.	There is a place for everything and everything is in its place.	The workplace stays clean based on visual controls and standard practices.	The actions between sort, set in order, and sweep are smooth and seamless. Little effort is required to "run" 6S.	The culture has changed, 6S is part of how we work.	A culture of safety exists. Audits occur continuously with immediate corrective actions. Everyone is prepared for unannounced audits by an agency on any given day.

Areas for improvement



6S – Examples of SORT (Seiri)



- a. Eliminate excess/obsolete inventory from material section
- b. Remove outdated papers and files
- c. Eliminate space taken up by unneeded items from work bench surface
- d. Eliminate excess/obsolete equipment from work bench drawers
- e. Improve inefficient space utilization in drawers

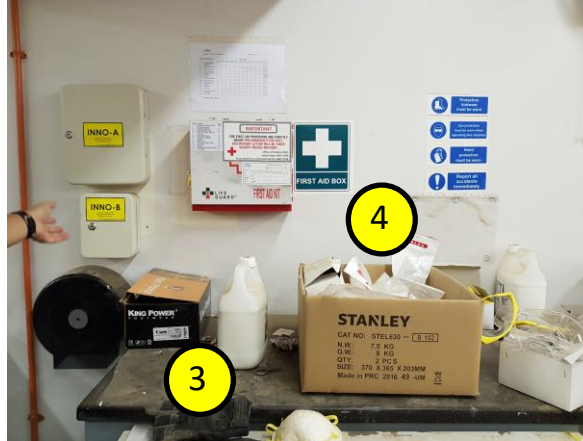
Not in pictures

- f. Reduce cabinets, shelving, lockers containing supplies
- g. Look into unlabelled containers, boxes, shelves, bottom of locations
- h. Eliminate outdated posters, wall boards, metrics, slogans, and banners.

Areas for improvement



6S – Examples of SORT (Seiri)



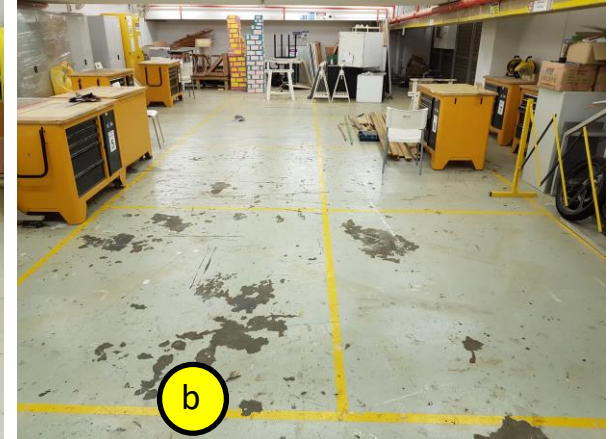
	6S		EVALUATION FORM	SCORE	COMMENTS
1.	Sort	Removing unnecessary items	All items not required for performing operations are removed from the area, only supplies and equipment are present at work stations.	1	
2.	Sort	Storage of cleaning equipment	All cleaning equipment is stored in a neat manner; handy and readily available when needed.	1	
3.	Sort	Instruments	Instruments are arranged neatly and stored; kept clean and free of any risk of damage.	1	
4.	Sort	Supplies	All supplies are arranged in a neat and orderly manner with the earliest expiration date in front.	1	
5.	Sort	Equipment	All equipment is properly labeled and stored in an orderly manner.	1	
6.	Sort	Emergency carts	All supplies are arranged neatly and readily available when needed.	1	
7.	Sort	Bulletin Board	All bulletins are arranged in a neat and orderly manner. No outdated, torn, or soiled announcements are displayed.	1	
8.	Sort	Emergency access	Fire and emergency equipment are unobstructed and stored in a prominent easy-to-locate area. Stop switches and breakers are marked or color-coded for visibility.	1	
			Sort Average:	1.0	

Observations: The workplace is cluttered and disorganized; one can't distinguish between needed and unneeded items.

Areas for improvement



6S – Examples of SET IN ORDER (Seiton)



a. Deciding Appropriate Locations.

- Store items according to function or product (in drawer)
- Store together if they are used together, in the sequence in which they are used
- Locate items in the workplace according to their frequency of use (higher drawers)

b. Identifying Locations

- Painting Strategy, marking “walkways” and “operation areas”, cart storage location, aisle direction, door range, hazardous areas

Not in pictures

- Colour-coding Strategy, to identify items according to function or product
- Outlining Strategy, for tools inside / outside drawers
- Signboard Strategy, names of work areas, inventory locations, equipment storage locations, standard procedures, and machine layout

Areas for improvement



6S – Examples of SET IN ORDER (Seiton)

9.	Set in Order	Items on floor	Work-in-process, supplies, and any other materials are not left to sit directly on the floor. Large items such as supply carts are positioned on the floor in clearly marked areas.	1	
10.	Set in Order	Hallway markings	Hallways are clearly marked and can be identified at a glance; there is no chipped or worn paint, or damaged bumpers.	3	
11.	Set in Order	Hallway maintenance	Hallways are always free of equipment and obstructions; nothing is stored in the hallways.	1	
12.	Set in Order	Storage and arrangement	Storage of boxes, containers, and materials are always stored in a neat and orderly manner. When items are stacked, they are never crooked or in danger of toppling over. All boxes are 18" from the ceiling.	1	
13.	Set in Order	Equipment labels	All machines and equipment are neatly labeled.	1	
14.	Set in Order	Equipment maintenance	Controls on machines and equipment are properly labeled and critical points for routine maintenance checks are clearly marked. Equipment checksheets are easily displayed.	1	
15.	Set in Order	Equipment storage	Nothing is placed on top of machines, cabinets, or equipment; nothing is leaning against walls.	1	
16.	Set in Order	Document storage	Only documents necessary to operations are stored at the work area and are stored in a neat and orderly manner.	1	
17.	Set in Order	Document control	All documents are labeled clearly as to content and responsibility for control and revision. Obsolete and unused documents are routinely removed.	1	
18.	Set in Order	Solutions storage	All solutions are properly labeled and stored in a neat and orderly manner.	1	
19.	Set in Order	Supplies storage	All supplies are properly labeled and neatly displayed for easy access.	1	
Set in Order Average:				1.2	

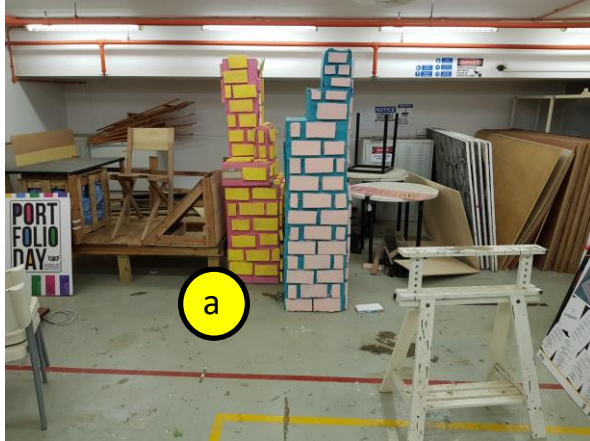
Observations:

- It is impossible to tell what goes where and in what amount.
- There are location and item indicators for all instruments, supplies, and equipment.
- Various techniques (i.e. color coding, outlining, easy replacement methods) are used to facilitate replacing things properly.

Areas for improvement



6S – Examples of SHINE (Seiso)



- a. Create target areas for work-in-process and completed projects.
- b. Clean areas where unneeded items were removed from aisles, walkways, floors, machines, desks
- c. Remove dirt, oil, scraps, and garbage, from floor and drawers

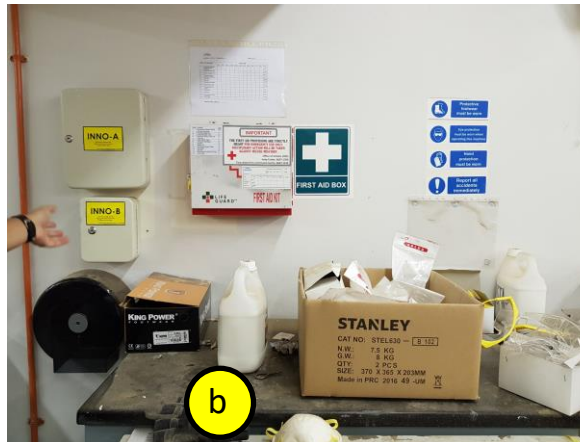
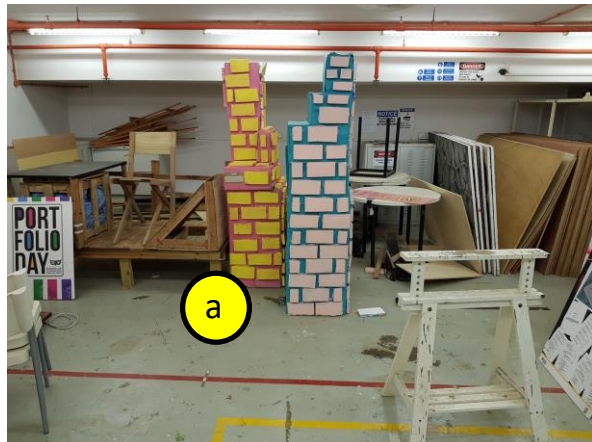
Not in pictures

- c. Clean on a daily basis
- d. Audit the cleaning process
- e. Improve equipment maintenance
- f. Clean Assign cleaning responsibilities
- g. Cleaning checklists

Areas for improvement



6S – Examples of SHINE (Seiso)



20.	Shine	Equipment cleaning	All machines and equipment are kept clean by routine daily care. There is a specific plan including accountability.	1	
21.	Shine	Floor cleaning	All floors are clean and free of debris, liquids, and dirt. Cleaning of all floors is done routinely -- daily at a minimum -- with a posted schedule.	1	
22.	Shine	Work areas - utility rooms, nurses station	All work areas are clean and free of clutter; needed equipment is stored properly and charged as required; no unnecessary equipment is stored in the work areas..	1	
23.	Shine	Medication Room	Medication room is clean and free of clutter. All medications are stored properly; nothing is left on counters or on med carts. Syringes are stored in locked areas. No unnecessary equipment is stored in the medication room.	1	
24.	Shine	Storage rooms	All rooms are cleaned on a regular posted schedule and free of unnecessary supplies.	1	
Sweep Average:				1.0	

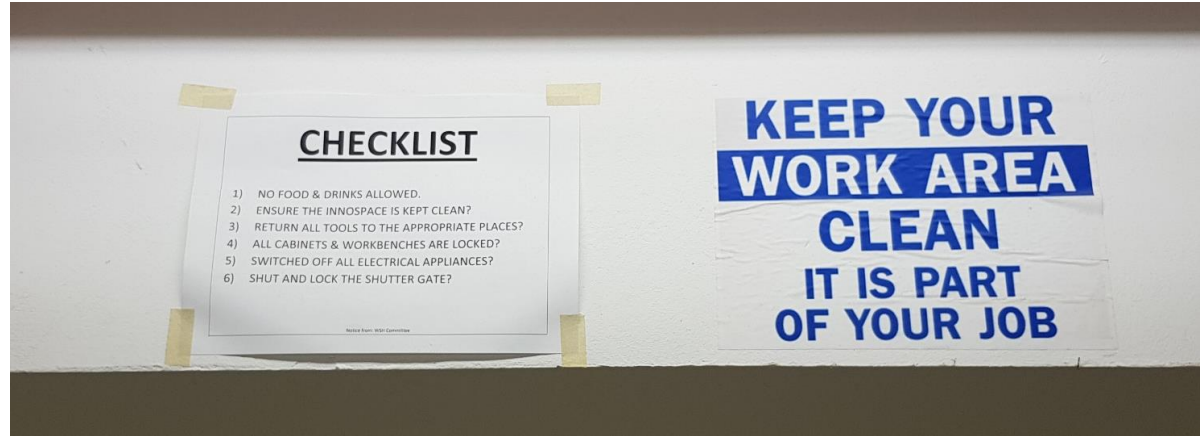
Observations: The workplace is left dirty.

Suggestions: To introduce five steps in implementing Shine, namely determine Shine targets, assignments, methods, prepare Shine tools, implement Shine.

Areas for improvement



6S – Examples of STANDARDISE (Seiketsu)



- a. Maintaining and controlling continual improvement achievements
- b. Ensuring that SORT, SET IN ORDER, and SHINE are synchronized

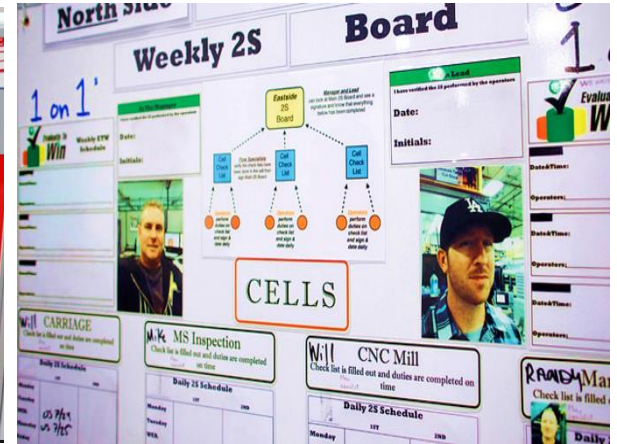
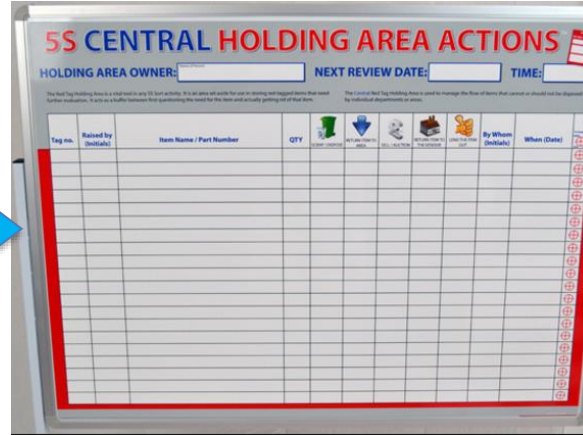
25.	Standardize	Shelves/carts/peg boards arrangement	All supply storage units are arranged, divided, and clearly labeled. It is obvious where things are stored; status and conditions are recorded.	1	
26.	Standardize	Work stations	Work stations are free of objects including records and documents. Equipment and supplies are clean and placed in their proper location.	1	
27.	Standardize	Standard work	Standard work practices exist for all operations. These practices are understood and followed.	3	
28.	Standardize	Action Boards	6S action boards are in place and actively being updated. The boards are the focus of change and improvement.	3	
Standardize Average:				2.0	

Observations: There are sign postings, checklist to remind user of their duty to keep place clean and tidy, though more can be done, e.g. bigger sign postings, more prominently placed.

Areas for improvement



6S – Examples of SUSTAIN (Shitsuke)



- Gets everyone to understand, obey, and practice the rules when in the space.
- Cell Tracking Centre – Production Control Board

29.	Sustain	6S control and maintenance	There is a disciplined system of control in place and followed by everyone.	1	
30.	Sustain	Auditing	Routine audits are conducted according to posted schedule. Improvements are launched from auditing process and results are posted for all employees to see.	1	
31.	Sustain	Employee involvement	Employees are engaged. Everyone knows their role. Audits are rotated among 6S team.	1	
32.	Sustain	Cultural change	The culture has changed. People look differently at their role in the organization and embrace 6S principles. Safety is stressed.	1	
Self-Discipline Average:				1.0	

Observations: There are no prominent board to feature good practices, achievements.

Suggestions: Consider to include 5S Slogans, 5S Posters, 5S Photo Exhibits / Storyboards, 5S Newsletters, 5S Maps, 5S Pocket Manuals, 5S Department Tours, 5S Months.

Areas for improvement



6S – Examples of SAFETY



a. Make a safer workplace by looking for unsafe conditions, potential for unsafe acts.

33.	Safety	Date checks	All supplies, medications, and equipment are checked according to an established schedule and documented. A schedule is posted to ensure accountability. Outdated items are removed and returned to appropriate department.	1	
34.	Safety	Personnel Protective Equipment (PPE)	Appropriate personal protective equipment is available for each specific indication. All staff are trained in it's use and is routinely followed and documented.	3	
35.	Safety	Emergency equipment	Emergency equipment is checked according to established schedule and documented.	1	
36.	Safety	Equipment charging	All equipment is charged and plugged into a grounded outlet. Equipment with torn or frayed cords are removed and sent to repair. Maintenance log exists.	1	
37.	Safety	Disposal of materials	All supplies, linen, trash, and fluids are disposed of according to established protocols.	1	
38.	Safety	Testing of equipment	All equipment is tested prior to use - bed, lights, machines, suction, etc. Malfunctioning equipment is tagged, removed, and sent for repair.	1	
39.	Safety	Error prevention	Behavioral based safety practices are part of daily work. Investigations occur immediately after a safety event with corrective actions.	3	
40.	Safety	Safety focused culture	Safety is an active part of business. It is discussed as a business objective measure. Safety education occurs without disruption to the operation; safety is part of the job.	3	
Safety Average:				1.8	

Observations: There are first aid box and safety instructions, but more can be done.

Learning Objectives



- Demonstrate understanding of Zero Defect Quality in Lean Manufacturing
 - Apply Jidoka in the processes by eliminating the root causes of defects
 - Apply Poka-Yoke improvement techniques to achieve Zero Defect Quality
- Describe 5S and apply some of the techniques used in 5S
 - Identify the benefits of doing 5S
 - Demonstrate the concepts and activities involved in each of the respective 'S's
 - Apply Visual Management in 5S implementation
 - Explain how 6S (5S+Safety) is developed
 - Discuss on Safety Indicators, Production Board /Takt Board / 5S Board

Overview of E326 Lean Manufacturing and Six Sigma

