BEEKEEPING   Level - II

Standardize and sustain 3S

NTQF Level II

Learning Guide #2

Unit of Competence: Standardize and sustain 3S
Module Title: Standardizing and sustaining 3S
LG Code: **AGR BKG1 MO4-LO2-LG2**

TTLM Code: **AGR BKG2 TTLM 0919v1**

LO 2: Standardize 3S

Instruction Sheet	**Learning Guide #1**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

➢ Prepare Plan used to standardize 3S activities.

➢ *Use relevant procedures* and *tools and techniques* to standardize 3S

➢ follow checklists for standardize activities and *reported* to *relevant personnel*

➢ keeping workplace to the specified standard

➢ Avoiding Problems by standardizing activities

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

➢ Prepare Plan used to standardize 3S activities.

➢ *Use relevant procedures* and *tools and techniques*to standardize 3S

➢ follow checklists for standardize activities and *reported* to *relevant personnel*

➢ keep workplace to the specified standard

➢ Avoiding Problems by standardizing activities

Learning Instructions:

1. Read the specific objectives of this Learning Guide.

2. Follow the instructions described in number 3 to 13.

3. Read the information written in the "Information Sheets 1". Try to understand what are being discussed. Ask you trainer for assistance if you have hard time understanding them.

4. Accomplish the "Self-check 1" in page 6.

5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).

6. If you earned a satisfactory evaluation proceed to "Information Sheet 2". However, if your rating is unsatisfactory, see your trainer for further instructions or go back to Learning Activity #1.

7. Submit your accomplished Self-check. This will form part of your training portfolio.

8. Read the information written in the "Information Sheet 2". Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

9. Accomplish the "Self-check 2" in page 24.

10. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).

11. If you earned a satisfactory evaluation proceed to "Operation Sheet 1" in page 27. However, if your rating is unsatisfactory, see your trainer for further instructions or go back to Learning Activity #1.

12. Read the "Operation Sheet 1" and try to understand the procedures discussed.

13. Do the "LAP test" in page 28 (if you are ready). Request your trainer to evaluate your performance and outputs.Your trainer will give you feedback and the evaluation will be either satisfactory or unsatisfactory. If unsatisfactory, your trainer shall advice you on additional work. But if satisfactory you can proceed to Learning Guide #3.

Information Sheet 1	Preparing Plan used to standardize 3S activities.

Definition of the Standardize

Standardize, the fourth pillar of our visual workplace, differs from Sort, Set in Order, and Shine. This is because it is the method- you use to maintain the first three pillars of 5S. Building on this definition, we may define Standardize the result that exists when the first three pillars-Sort, set in order and Shine-are properly maintained.

Benefits from Standardize

1. Lead to workplace standardization

- prevent setbacks in the first three pillars
- Make implementing them a daily habit
- Ensure that all the three pillars are maintained in their fully implemented state.

2. Lead to work standardization

- Muda elimination
- Quality improvements
- Cost improvements
- Delivery time improvements
- Process improvements

Here are some of the problems that result when we do not implement Standardization well:

- Conditions go back to their previous and undesirable levels even after a companywide 5S implementation campaign.
- At the end of the day, piles of unneeded items are left from the day's production and lie scattered around the production equipment.
- Tool storage sites become disorganized and must be put back in order at the end of the day.
- Cutting shavings constantly fall on the floor and must be swept up.

- Even after implementing Sort and Set in order, it does not take long for office workers to start accumulating more stationery supplies than they need.

These problems and others reveal backsliding in gains made from implementing Sort Set in Order, and Shine Activities. The basic purpose of the Standardize pillar is to prevent setbacks in the first three pillars, to make implementing them a daily habit, and to make sure that all three pillars are maintained in their fully implemented state.

How to Implement Standardize

The three steps to making Sort, Set in Order and Shine activities (the three pillars or 3S) a habit are:

Step 1: Decide who is responsible for which activities with regard to maintaining 3S conditions.

Step 2: To prevent backsliding, integrate 3S maintenance duties in to regular work activities.

Step 3: Check on how well 3S conditions are being maintained.

As you read this section, you will discuss some of the tools for implementing Standardize of the Sort, Set in Order, and Shine activities. This is because in order to standardize we must use these same tools in a more systematic way to make sure that the first three pillars are maintained.

Self-Check 1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define the fourth pillar of 5S? (2 point)

2. Describe the benefits from standardize. (5 points)

3. What by mean standardize leads to work standardization? (5 points)

4. List problems that avoided by implementing standardize activities (10 points)

5. What are the three steps to making the 3S a habit? (8 points)

***Note:* Satisfactory rating - 16 points   Unsatisfactory - below 16 points**
You can ask you trainer for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____   Date: _____

1. _____

   _____

   _____

   _____

2. _____

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3. _____

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4. _____

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5. _____

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Information Sheet 2	*Use relevant procedures* and *tools and techniques* to standardize 3S

Common Tools and Techniques to standardize 3S are:

- 5S Job Cycle Charts
- Visual 5S
- The Five Minute 5S
- Standardization level checklist
- 5S checklist
- The five Whys and one How approach(5W1H)
- Suspension
- Incorporation
- Use Elimination

The Three Steps to Make the 3S Activities a Habit/Standardize using the Tools and Techniques of 3S Standardization

1. Assign 3S Responsibilities

When it comes to maintaining three pillar conditions, everyone must know exactly what they are responsible for doing and exactly when, where and how to do it. If people are not given clear 3S job assignments based on their own workplaces, the Sort, Set in Order, and Shine activities will not have much meaning. Similarly, clear 3S instructions must be given to the people who deliver goods from outside suppliers. The delivery sites should be clearly marked and a 5S Map posted to show where each supplier's goods are to be unloaded. At each unloading site, signboards should make it clear whose things go where and in what amount. The suppliers should be made responsible for maintaining 3S conditions at their own unloading sites and encouraged to join in full 5S implementation.

Tools for assigning 3S responsibilities include:

- 5S Maps
- 5S schedules
- 5S job cycle charts, which list the 5S jobs to be done in each area, and set frequency cycle for each job (see the figure below). In the example shown in the figure below, 5S duties are sorted out according to the first three pillars and the scheduling cycle. In the figure, code letters are used for the various cycle periods:

  A is for 'continuously," B for "daily (mornings)," C for "daily (evenings), " D for "weekly," E for "monthly" and F for "occasionally." Each 5S job assignee can then use these charts as 5S Checklists. This particular example shows clearly who is responsible for each job, which area, what to do, and when to do it.

No.	5S Job	Sort	Set in Order	Shine	Standardize	Sustain	A	B	C	D	E	F
1.	Red-tag strategy (occasional, companywide)	O									O	
2.	Red-tag strategy (repeated)	O					O					
3.	Place indicators (check or make)		O						O			
4.	Item indicators (check or make)		O						O			
5.	Amount indicators (check or make)		O						O			
6.	Sweep around line			O			O					
7.	Sweep within line			O			O					
8.	Sweep around worktable			O			O					
9.	Sweep on and under worktable			O			O					
10.	Sweep work areas and walkways											

Div./Dept./Section: Production Div. 1, Assembly Dept. A
Entered by: Comarella   Date: 1 Feb 1994

Figure: A 5S Job Cycle Chart

2. Integrate 3S Duties into Regular Work Duties

If people carry out three pillar maintenance duties only when they see three pillar conditions slipping, then the five pillar implementation has not yet taken root. Maintenance must become a natural part of everyone's regular work duties. In other words, the five pillars -centered on maintaining 3S conditions-must be part of the

normal work flow. We sometimes refer to this as "5S line integration" or establishing a five pillars flow. Visual 5S and Five-Minute 5S are two approaches that help make maintenance work part of the everyday work routine. .

Visual 5S

The Visual 55 approach makes the level of five pillar conditions obvious at a glance. This is particularly helpful in factories that handle a great variety and number of materials.

The main point of Visual 5S is that anyone should be able to distinguish between abnormal and normal conditions at a glance.

As a factory example, consider a drill-press process where Set in order has been applied so that the position and amount of each finished work piece is clearly indicated. As an additional visual aid, the place where the last batch item goes can be marked with a thick red line to indicate that it is time to stop and send the batch to the next process.
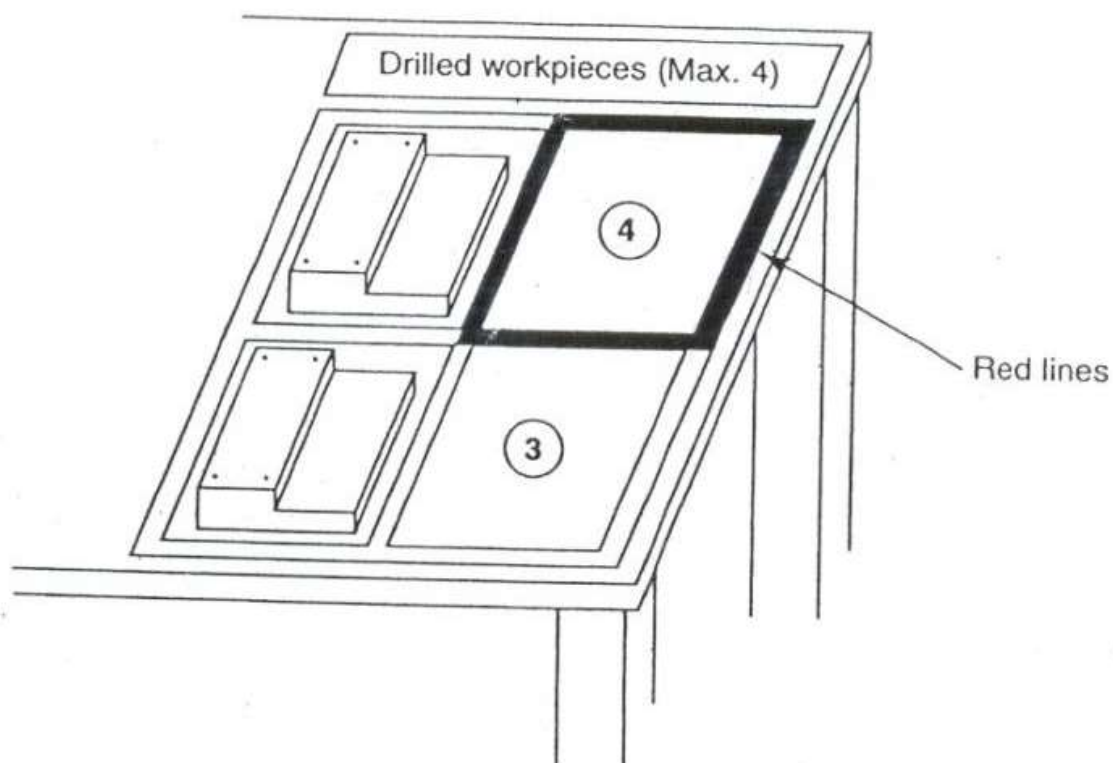

Figure: Visual 5s Method for Indicating Maximum Batch Size

Five-Minute 5S

When using the Visual 5S approach, instant visibility can act as a trigger for taking immediate three pillar action(Sort, Set in Order, and Shine activities) against the discovered abnormalities (i.e., overproduction, disorder, and contamination). We must also deal with the question of how skillfully and efficiently these actions are carried out. Instead of following two hours for removing all of the cutting shavings from the floor, we can set up a half-hour or a one-hour Shine procedure that accomplishes the same task. The term "Five-Minute 5S" is a loose one-the actual time can be three minutes, six minutes, or whatever is appropriate. The point is to make the five pillar work brief, efficient, and habitual. In figure below shows a signboard that was made as part of a Five-Minute 5 campaign.

Figure: Five-Minute 5s Signboard

3. Check on 3S Maintenance Level

After we have assigned the three pillar jobs and have incorporated the three pillar maintenance into the everyday work routine, we need to evaluate how well the three pillars are being maintained. For this, we can use a Standardization-level Checklist as shown in the figure below.

Standardization-Level Checklist		Dept.: Assembly Dept. 1	Feb. 15, 1994		
		Assigned area	Entered by: McCarthy		Page
No.	Process and checkpoint	Sort	Set in Order	Shine	Total
1.	Work at Line A, Process 1	1 2 3 (4) 5	1 (2) 3 4 5	1 (2) 3 4 5	8
2.	"	1 (2) 3 4 5	1 2 (3) 4 5	1 2 (3) 4 5	8
3.	"	1 (2) 3 4 5	1 (2) 3 4 5	1 (2) 3 4 5	6
4.	"	1 (2) 3 4 5	1 2 (3) 4 5	1 (2) 3 4 5	7
5.	"	1 2 (3) 4 5	1 2 (3) 4 5	1 2 3 (4) 5	10
6.	"	1 2 3 (4) 5	1 2 3 (4) 5	1 2 3 (4) 5	12
7.	Average and total for Line A	1 (2.6) 3 4 5	1 2 (2.8) 4 5	1 2 (2.8) 4 5	(50)

Figure: Standardization Level Checklist

To evaluate the effectiveness of the maintenance activities, the evaluator ranks the Sort, Set in order, and Shine levels on a scale of 1 to 5. Such checklists can be made for specific workshop and/or production processes. One example is shown in the Figure below. 5S Checklists like the one in the figure are used to check five pillar levels in the factory as a whole. When a company implements 5S Month of intensive activities, 5S Checklists should be used to make weekly evaluation of five pillar conditions.

5S Checklist (for factories)

Factory: Tokai plant
Checked by: NK

Scoring: 3 = Very good; 2 = Good; 1 = OK; 0 = Not good

Location	Check Item	Check Description	1	2	3	4	5	T
Outdoors (overall)	Are storage areas clearly determined?	Areas for paring, pallets, temporary materials storage, delivered goods reception, trash processing, and boxes	0	2	0	2	0	4
	Have paths been clearly defined?	Have white and yellow lines been laid down?	0	2	0	2	0	4
		Are traffic signs used?	0	3	0	3	0	6
		Are there any exposed wires or pipes?	1	3	1	3	1	9
	Are outdoor areas kept clean?	Are ashtrays, trash cans, gardens, entrance areas, windows, and paths kept clean?	1	3	1	3	1	9
	Are there any unneeded items?	Are signboards, copy machines, and pathways arranged properly?	1	1	1	1	1	5
Clerical (overall)	Have temp storage areas been clearly defined?	Have fire-extinguishing equipment and emergency exits been established?	2	3	2			
	Are office areas kept clean?	Are the walls dirty?						

Figure: checklists for an entire factory

The Concept of Prevention

When we find that tools have not been put back correctly, we immediately take care of them. When we find an oil puddle on the floor, we immediately mop it up. Making these actions habit is the foundation of Standardize. However, when the same problems keep on happening over and over again, it is time to take the concept of Standardize to the next level: prevention.

To take this pillar to a higher level, we must ask "why?" Why do unneeded items accumulate (despite Sort procedures)? Why do tools get put back incorrectly (despite Set in order procedure? Why do floors get dirty (despite Shine procedures)? When we ask "why" repeatedly, we eventually find the source of the problem and can address that source with a fundamental improvement. Such improvements can help us develop Unbreakable standardization, which means:

- Unbreakable sorting
- Unbreakable setting in order
- Unbreakable setting shining

Unbreakable Standardization	**=**	Unbreakable Sorting **+** Unbreakable Set in order **+** Unbreakable Shining

Prevent unneeded items from Accumulating (Preventive Sort Procedures)

The Red-Tag Strategy described sorting out unneeded items. This strategy is a visual control method that enables anyone to see at a glance which items are no longer needed. However, we should note that the Red-Tag Strategy is an after-the-fact approach that deals with unneeded items that have accumulated. No matter how often we implement this strategy, unneeded items will accumulate in the interim.

Nowadays, smart companies are shifting from this type of "alter the-fact" sorting to preventive sorting. Preventive sorting means that instead of waiting until unneeded items accumulate; we find ways to prevent their accumulation. We could also call this approach "unbreakable' sorting because once sort procedures have been implemented, having only needed items in the workplace becomes an "unbreakable" condition.

To achieve unbreakable sorting we must prevent unneeded items from even entering the workplace. These words- «only what is needed" -have a familiar ring to anyone acquainted with the just-in- time (JIT) philosophy and program. To prevent the accumulation of unneeded inventory, we must find a way to procure and produce only those materials that are needed, only when they are needed, and only in the amount needed.

For example, suppose your company is scheduled to produce a certain number of units of a product during a particular month. Ideally, at the beginning of this month, only the parts needed to produce the scheduled number of units would be delivered to you from your suppliers. For any given part, your company might even receive the part in several deliveries, depending on the type of part and the delivery considerations.

Receiving parts just-in-time for production rather than storing large quantities of parts in advance eliminates many of the potential costs associated with maintaining inventory. As well, receiving parts just-in- time is a preventive measure that avoids the accumulation of parts that needed to be sorted.

Prevent Things from Having to Be Put Back (Preventive Set in Order Procedures)

Preventive setting in order means keeping set in order procedure from breaking down. To achieve preventive setting in order, we must somehow prevent the inefficiency that results from the lack of orderly control of any specific item. There are two ways to do this: (1) make it difficult to put things in the wrong place and (2) make it impossible to put things in the wrong place.

 The first method relies heavily on discipline and visual controls. Clearly marked storage sites show at a glance what goes where and in what amount. When it is obvious what goes where and in what amount. When it is also obvious that things are not put back properly. As people practice returning things, such visual setting in order becomes habitual. This condition supports setting in order that is difficult to break. However, there is still a big difference between setting in order that is difficult to break and setting in order that is unbreakable. 'Why settle for the first when the second is possible? But how we achieve unbreakable setting in order?

The 5 Whys and 1How (5W1H) Approach

We begin by asking "why?" until we identify the underlying causes- for every answer we gel we must ask "why" again. Usually we ask "why" at least five times to get to the root of the problem. When we do find the underlying cause, we ask "how" we call fix it. Accordingly, this method is called the "5W1H' approach.

 When we ask "why" setting in order is breakable, we find that one answer is because people make mistakes putting things back. At this point, we need to identify what types of items are not being returned correctly. Once we identify this, the question is how to achieve unbreakable setting in order by making it impossible to return them to the wrong place. If we can somehow eliminate the need to return items at all, we can achieve unbreakable setting in order.

Three techniques for doing this are:

- Suspension

- Incorporation

- Use elimination.

Suspension

In the Suspension technique, tools are literally suspended from above, just within reach of the user. Figure above shows this method in practice. Here a weighted pulley device is used to suspend tools from an overhead rack. When the operator finishes using the tool, he merely releases it and it automatically returns to its proper storage place.

While this technique does not eliminate the need to return items to a specific place, it does effectively eliminate the need for people to return them. People may make mistakes in returning things, but suspension devices do not. This technique achieves unbreakable setting in Order.

Figure: Tools Suspended from an Overhead Rack

Incorporation

Incorporation means creating a flow of goods or operations in a factory process in which (1) jigs, tools, and measuring instruments are smoothly integrated into the process and (2) such devices are stored where they are used and therefore do not have to be returned after use. The figure below shows an example where a measuring gate has been incorporated into a cutting process for an automobile part. The measuring gate catches any pieces that have not been machined to the correct height. This measuring procedure is an example of "mistake-proofing" (or poka-yoke). The incorporation of the measuring gate into the cutting process means that its storage place is also its place of use. It is therefore used (for full-lot inspection) without having to be put back anywhere.
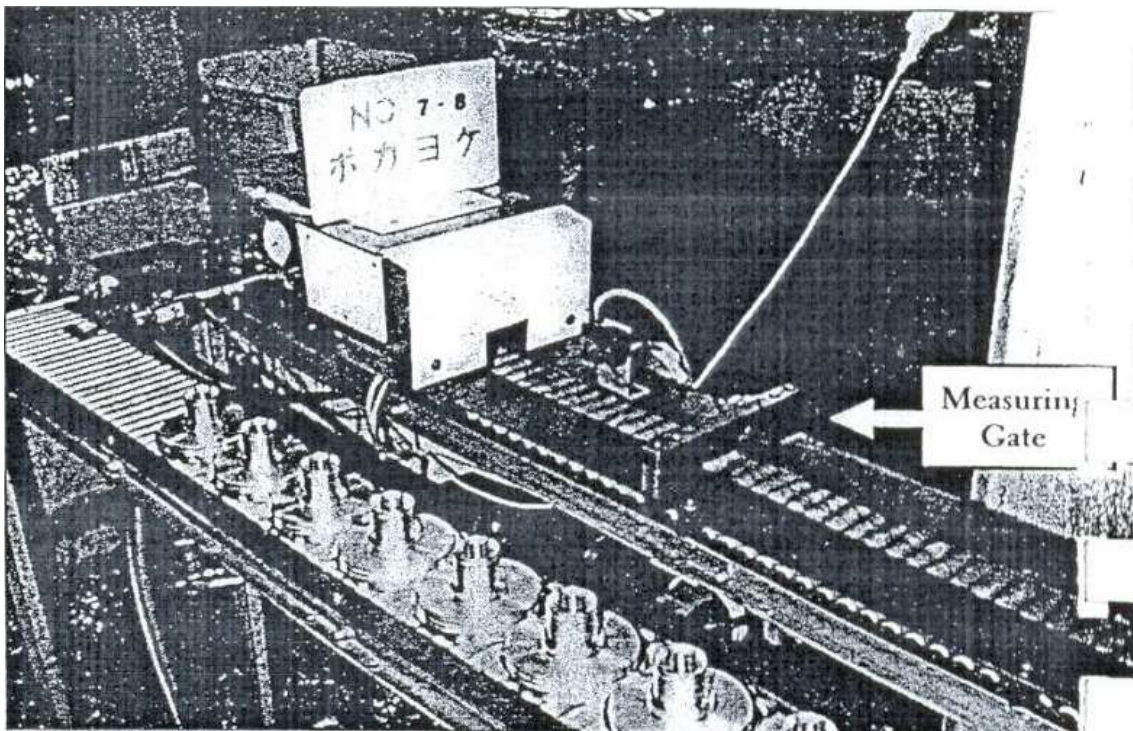

Figure: Incorporating a Measuring Gate into the Process Flow

Use Elimination

Suspending or incorporating jigs, tools, or measuring instruments effectively eliminates the need to return them after each use. However, these items are still being used. The question is whether there is some way to serve the function of the tool without using the jig, tool or measuring instrument. A set in order approach that eliminates the use of a particular jig, tool or measuring instrument is in fact unbreakable setting in order.

There are three techniques for eliminating the use of certain tools:

- Tool unification
- Tool substitution
- Method substitution

Tool unification

Tool unification means combining the functions of two or more tools into a single tool. It is an approach that usually reaches back to the design stage. For example, we can reduce the variety of die designs to unify dies or make all fasteners that require a screw-driver conform to the same kind of screw-driver, flat-tip or Phillips.

Tool substitution

Tool substitution means using something other than a tool to serve the tool's function, thereby eliminating the tool. For example, it is sometimes possible to replace wrench-turned bolt with hand-turned butterfly-grip bolts, thereby eliminating the need for a wrench.
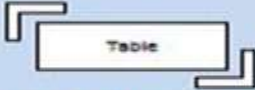
Method substitution

If we substitute ordinary wrench-turned bolts with hand-turned butterfly-grip bolts, we have eliminated the wrench, but we have not eliminated the method (bolt fastening). Bolt fastening is just one way to fasten things. Fastening pins, clamps and cylinders can also be used for this purpose. *We* may find we can improve efficiency even more by replacing one method with another. This is "method substitution."

Standards for Location Indicators

Standards for indication of fixed posation

● Standards for indication of fixed positions (examples)

|	Line color	Line width	Materials	Method	Objects
Indicating square outline Material storage	White Green	5cm	Tape Paint	Indicate on partition line.	Carts, lifts, empty boxes, pallets, inspection boxes, materials, parts, products, defectives, measuring tools
Indicating corners Table	White Green	5cm	Tape Paint	Indicate on partition line.	Tables, platforms
Indicating leg positions Table	White Green	5cm	Tape Paint	Indicate on partition line.	Tables, platforms

fixed position Indications

Indications on Shelves
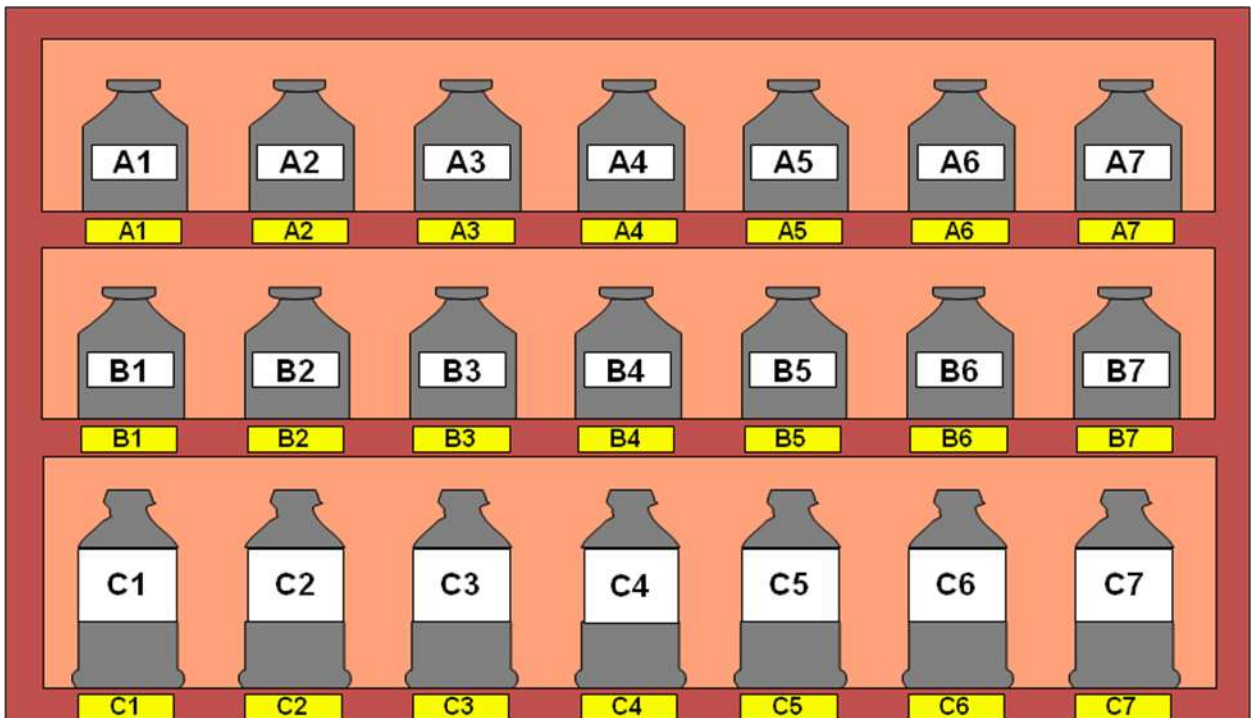
Indication of pathways

Standards of pathways on premise (examples)

	Standards
Width of walkway	80 cm or more
Width of main pathway	1.2 m or more
Color of partition line	Yellow or white
Material for partition	Tape or paint
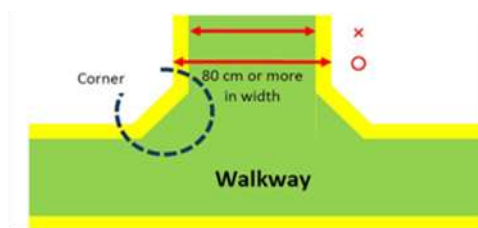
Prevent Things from Getting Dirty (Preventive Shine Procedures)

Preventives shine Procedures will prevent things from getting dirty to begin with. Anyone has participated in 5S implementation can tell you that the initial cleanup is very hard work. To minimize the drudgery of cleaning up, the key is to treat contamination problems at their source. The 5Why approach can be applied In figure out why dirt is being generated, and how this problem can be fixed. For example, instead of mopping up oil puddles, figure out where the oil is leaking from and repair the leak.

1. Question: Why mop the floor every day?

Answer: Because oil collects on the floor.

2. Question: does oil collect on the floor every day?

Answer: Because there's a leak from the drill press machine

3. Question: Why is there a leak from the drill press machine?

Answer: Because oil is leaking from a valve.

4. Question: Why is oil leaking from a valve?

Answer: Because it's broken.

5. Question: Why hasn't the valve been replaced?

Answer: because we didn't notice it was broken

6. Question: How can we coordinate getting the valve fixed?

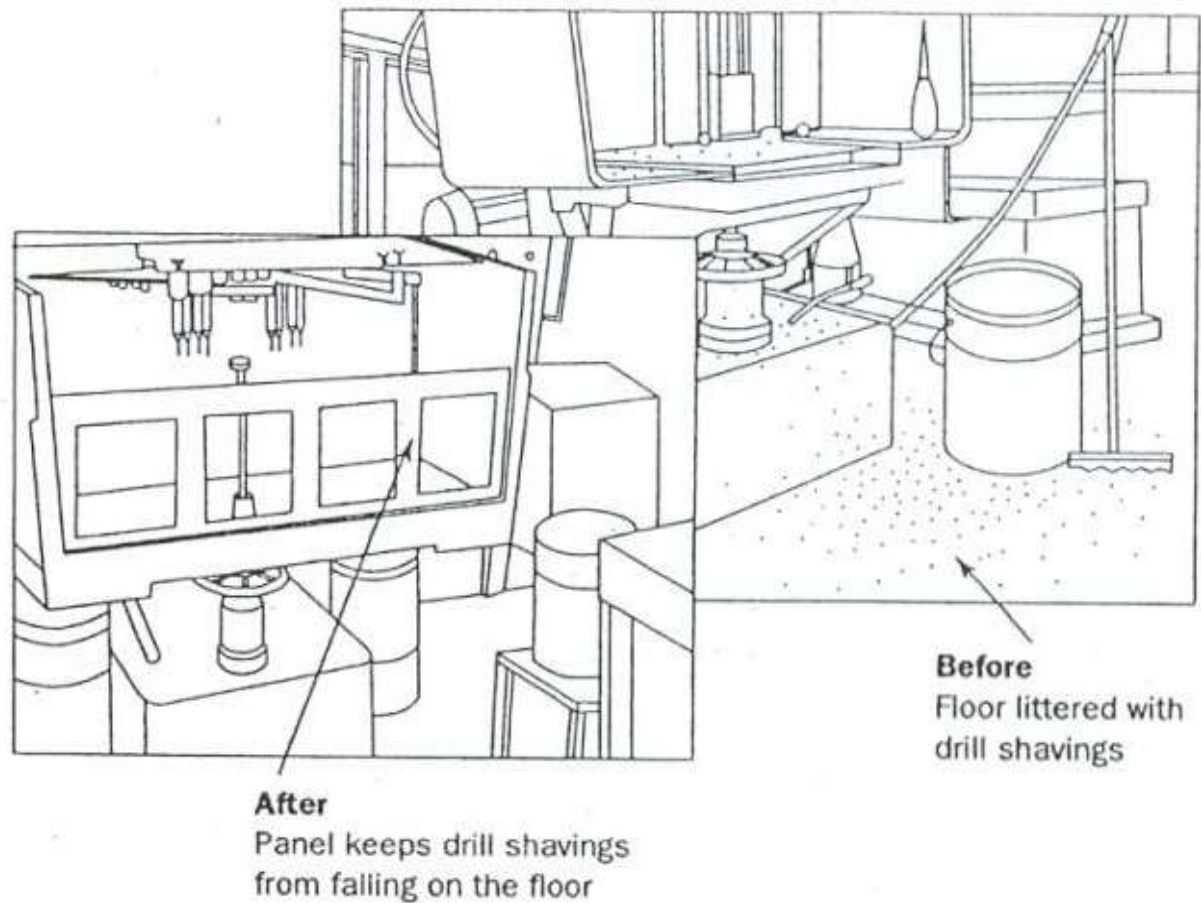Answer: The maintenance team will order the part and the operator will replace it.

Before
Floor littered with
drill shavings

After
Panel keeps drill shavings
from falling on the floor

Figure: A Preventive Cleanliness Device of a Drill Press

Summary

The fourth pillar is Standardize, which is the result of properly maintaining the first three pillars Sort, Set in Order, and Shine. The basic purpose of Standardize is to prevent setbacks in the first three pillars to make them a daily habit, and to make sure they are maintained in their fully implemented state.

The first part of implementing the fourth pillar involves making sort, Set in Order, and Shine a habit. The three steps in this process are:

(1) Assigning the three pillar job responsibilities;

(2) Integrating three pillar duties in to regular work duties; and

(3) Checking on the maintenance of the three pillars. When it comes to maintaining three pillar conditions, everyone must know exactly what they are responsible for doing and exactly when, where, and how to do it. The five pillars must become part of the normal work flow. And 5S work must be brief, efficient, and habitual. Some of the tools in making sort, set in order, shine procedure habit are: 5S Job Cycle Charts, Visual 5S, Five –Minute 5S, a Standardization Level Checklist, and 5S Checklist for factories.

The second part of implementing the fourth pillar involves taking standardize to the next level: prevention. Unbreakable standardization means making Sort, Set in Order, and Shine procedure unbreakable. The three aspects of unbreakable standardization are preventive sort procedures, preventive set in order procedures, and preventive shine procedures.

Preventive sorting means that instead of waiting until unneeded items accumulate we find ways to prevent their accumulation. To do this, we must prevent unneeded items from even entering the work place. Preventive setting in order means keeping the set in order procedure from breaking down. We do this by making it difficult or impossible to put things back in the wrong place. Several techniques for accomplishing this are: the 5W and 1H approach, suspension, incorporation, and use elimination. Finally, preventive shining means preventing things from getting dirty. The key to preventive shining is treating contamination problems at their source. The closer you can get to the source of contamination, the better you will be able to implement preventive shining.

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the result of implementing 3S without standardization? (4 points)

2. List at least five tools and techniques used to standardize the 3S.

3. What are the tools used to assign 3S responsibilities? (3 points)

4. How the 5 whys and 1 how (5W1H) approach are used to sustain the 3S? (6 points)

5. What is suspension in terms of sustaining of the 3S? (3 points)

6. Define incorporation. (3 points)

7. Describe Use Elimination in sustenance of the 3S. (3 points)

8. What will result implementing 3S without standardization? (4 points)

Note: **Satisfactory rating - 17 points   Unsatisfactory - below 17 points**
You can ask your trainer for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

1. _____

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Operation Sheet 1	**Procedures in Implementing Standardize**

Sequence of Standardize

1. Planning for Standardization

2. Assign 3S Responsibilities for everyone in the work place by using the tools by using the tools such as 5S Maps, 5S schedules, 5S job cycle charts

3. Integrate 3S Duties into Regular Work Duties by using the two approaches: visual 5S and five- minute 5S

4. Check on 3S Maintenance Level by using Standardization-level Checklist and 5S checklist and make maintenance/correction on back sliding the 3S.

5. Prevention of back sliding of the first three pillars by using 5W1H approach, suspension, incorporation and use elimination.

LAP Test	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, workshop, tools and materials you are required to perform the following tasks within -------- hours.

Task 1: Prepare standard to the sort activities in your workplace.

Task 2: Prepare standard to the set in order activities in your workplace.

Task 3: Prepare standard to the shine activities in your workplace.

- consider the:
  - ➢ OHS procedures

List of Reference Materials

- 5S for operators (1995)
- Journals/publications/magazines
- Reference Book
- Job specifications
- Safety Manual and Guide
- Learning Guide #2