Guidebook for National Productivity Organization

Step-by-Step Implementation

5S

Textbook & Instructors’ manual

August, 2006

Japan Productivity Center for Socio-Economic Development

(JPC-SED)
Purpose of Instructors’ Manual

The global economic challenge have changed the perspectives of working culture towards excellent working performance with the adoption of best practices. One of the tools to achieve organizational excellence is the 5S management techniques.

5S management techniques have contributed significantly to improve internal efficiencies, operational effectiveness and foster on time delivery system to the delight of customers. To achieve this, organizations should integrate 5S activities into their business functions as their organizational culture.

National Productivity Corporation (NPC) has been the leading organization and disseminator of 5S best practices. It has continuously been improving 5S activities as a more effective approach in business operations.

We believe this guidebook would serve as a quick reference for 5S implementation and will be of benefit to all industries that strive to enhance continuous improvement for competitiveness.
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I  Accumulation of Wastes
I Accumulation of Wastes

Accumulation of unnecessary things

During the long time of business operation, many unnecessary things are accumulated in the workplace such as:

- Excessive work-in-process
- Defective products
- Useless machines, equipment, tools
- Useless documents and papers
Example - Unidentified work-in-process
Example - Defective products
Example - Wastes in the workplace
Example - Unclean machine
Example - Cutting cloths on the floor
Example - Materials placed on the ground
Example - Office in confusion
II Implementation of 5S
II Implementation of 5S

1. What is 5S?

5S is a discipline approach to keep the workplace clean and organized to improve productivity and quality.

The name of 5S comes from five Japanese words that start with “S”, Seiri, Seiton, Seiso, Seiketsu and Shitsuke.
## 2. Understanding 5S

<table>
<thead>
<tr>
<th>Japanese</th>
<th>English</th>
<th>Your language</th>
<th>Meaning</th>
<th>Example</th>
</tr>
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<tbody>
<tr>
<td>Seiri</td>
<td>Sort</td>
<td>Organization</td>
<td>Throw away unnecessary items</td>
<td></td>
</tr>
<tr>
<td>Seiton</td>
<td>Set in order</td>
<td>Neatness</td>
<td>30 second retrieval of documents / tools</td>
<td></td>
</tr>
<tr>
<td>Seiso</td>
<td>Shine</td>
<td>Cleaning</td>
<td>Individual cleaning responsibility</td>
<td></td>
</tr>
<tr>
<td>Seiketsu</td>
<td>Standardize</td>
<td>Standardization or Hygiene</td>
<td>Transparency of storage</td>
<td></td>
</tr>
<tr>
<td>Shitsuke</td>
<td>Sustain / Discipline</td>
<td>discipline</td>
<td>Do 5S daily</td>
<td></td>
</tr>
</tbody>
</table>

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3. Definition of 5S

1. Sort (Seiri or straighten up)

Clearly separate necessary things from unnecessary ones and discard the latter.

2. Set in Order (Seiton or Put things in order)

Arrange necessary items in good order so that they may be easily picked up for use.
3. Definition of 5S (Contd.)

3. Shine (Seiso or clean up)
   To clean and inspect the workplace thoroughly so that there is no dirt on the floor, machines and equipments.

4. Standardize (Seiketsu or Cleanliness)
   To maintain a high standards of workplace organization by keeping everything clean and orderly at all times.
3. Definition of 5S (Contd.)

5. Sustain (Shitsuke)

To train people to practice the 5S system continuously so that it becomes habitual and ingrained in the culture of the organization.
4. Why 5S?

The 5S concept is easy to everyone to understand because:

- It does not require the understanding of difficult terminologies.
- It is simple, driven by logic and natural to human behavior.
- It is within the reach of all type and size of industry or organization.
5. Objectives and Benefits of 5S

- **P,Q,C,D**
  - Improvement of operation efficiency

- **S**
  - Improvement in safety

- **M**
  - Improvement in morale

5S
- Sort (Seiri)
- Set in Order (Seiton)
- Shine (Seiso)
- Standardize (Seiketsu)
- Sustain (Shitsuke)
5-1 Reduce time of looking for something

If it is necessary to look for materials and tools after starting the work, there is a big loss of time.

This type of loss can be reduced by good disposition of necessary items beforehand.
5-2 Reduce defective products

If the shop floor is dirty and disorganized, workers do not mind if they produce defective products.

On the contrary, if the shop floor is clean, well organized and defective products are visible, they pay more attention so as not to produce defective products.
5-3 Reduce cost

If the workplace is clean and well organized, work efficiency is raised and quantity of defective products is reduced. Accordingly production costs are lowered.
5-4 Shorten the delivery time

To deliver the products on time, it is necessary to supply necessary materials when needed.

If the shop floor is dirty and in disorder, shortage of raw materials will often take place, which leads to delay of delivery.
5-5 Secure safe working condition

Raw materials or products that are not put properly, oil spilt on the floor, etc. may cause worker’s industrial accidents.
5-6 Worker’s morale

Clean and tidy workplace heighten worker’s morale and raise work attendance ratio.
5-7 5S is the basis of production management

JIT TQM TPM

Work management
Production control
Quality management
Productivity improvement

5S

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6. Overview of 5S implementation

The 5S approach outlined in this guidebook is a simple and systematic methodology which can be introduced and implemented in any size and type of organization.

To start the 5S: Step by Step Implementation, each phase must be thoroughly analyzed and addressed using the P-D-C-A Cycle approach as follows:
6-1 Plan

Preparation

- Provide training and education for everyone
- Form 5S team
- Set up 5S zone
- Determine 5S objectives, goals and implementation phases
- Make 5S action plan and launch 5S.
6-2 Do

• Sort:
  - Identify what is necessary

• Set in order:
  - Define what and how to arrange

• Shine:
  - Identify dirt sources
  - Identify root causes
  - Take an action to eliminate dirt sources and root causes
6-2 Do (Contd.)

• Standardize:
  - Who is responsible?
  - What actions to take to maintain the desired condition?
  - When must those action be taken?
  - Where must they apply?
  - What procedures need to be followed?

• Sustain
  - Everyone understands, obeys and practices the rules and procedures
6-3 Check

- Assessment
  - Conduct internal 5S audit.
  - Benchmark within the department and with other organization.
  - Ensure the established 5S procedures and follow them thoroughly.
6-4 Act

- Continuous improvement
  - Develop 5S practices into a HABIT.
  - Compare actual goals with set goals.
  - Reward and recognize efforts of staff.
  - Register 5S Certification.
  - Review Plan-Do-Check-Act Cycle.
6-5 Roadmap to 5S implementation

CONTINUOUS CREATIVITY AND INNOVATION

PLAN → DO → CHECK → ACT

PHASE 1
- Prepare
- Sort
- Set in order
- Shine
- Standardize

PHASE 2
- Plan
- Do
- Check
- Act

PHASE 3
- Audit

PHASE 4
- Continual improvement

ENABLERS

RESULTS
7. Plan

The objectives of the 5S training is to disseminate 5S methodology and prepare the workforce for meaningful participation in 5S activities.

This training program, which is the starting point of Step-by-Step Implementation of 5S, encourages workers to become actively involved in the application exercises.
7-1 5S Training

Training should proceed as follows:

- 5S Awareness for Top Management
- 5S awareness for Operators
- Step-by-Step 5S Implementation for everyone
- Step-by-Step Internal 5S Audit
Once the preliminary training is completed, everyone will have the required basic knowledge, and be responsible for action in progress. Plans describing implementation of the 5S phases must be prepared and released during the 5S declaration.
7-2 Official announcement of 5S

It is essential that the top management make official announcement of 5S to all employees.
7-3 Promotion poster of 5S

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7-4 Big cleaning
7-4 Big cleaning (Contd.)
7-4 Big cleaning (Contd.)
7-4 Big cleaning (Contd.)

Clean not only the workplace but machines, too.
7-5 Formation of the organization for 5S

Objectives:

To enhance total participation at all levels of employees and to develop a continuous improvement culture and best performance spirit in the teams.
Typical organization for 5S implementation

- President
  - 5S Committee
    - Manager
      - 5S group
  - 5S Facilitator
    - Manager.
The 5S committee consists of the top management and the managers of each department.

The role of the 5S committee is:

- Decision-making of 5S activity
- Leveling of 5S activity of each group
- Assisting the facilitator
- Diagnosis by the top management
5S facilitator

5S committee will assign the 5S facilitator, who is the key person. His/her role is:

- Instructor of the 5S training for all workers
- Preparation of 5S promotion pamphlet, poster, etc.
- Secretariat of the 5S committee
- Advisor to all 5S group
- Promoter and reporter of 5S activity
- Record-making of 5S activity
The 5S group leader is responsible for developing the implementation plan and 5S implementation at his workplace.

Every member must know their own 5S responsibilities and perform accordingly.
An example of 5S policy and goal

**5S POLICY**
We shall continuously maintain a high standard of 5S practices at our workplace through teamwork and self discipline. In doing so, we shall achieve:

- Improved productivity
- Consistent high quality products and services
- Timely delivery
- Reduces cost
- Safe working environment

**5S GOAL**
To be recognized as a National 5S Model Company
8. **Do**

Here are shown:

- Guidelines for practicing **SORT** (Seiri)
- Guidelines for practicing **SET IN ORDER** (Seiton)
- Guidelines for practicing **SHINE** (Seiso)
- Guidelines for practicing **STANDARDIZE** (Seiketsu)
- Guidelines for practicing **SUSTAIN** (Shitsuke)
8-1 Guidelines for practicing SORT

Description:

“Sort” focuses on eliminating unnecessary items in the workplace.

Guidelines:

It is the series of steps which keep only

- that is needed
- the amount needed and
- when it is needed
**8-1 Guidelines for practicing SORT (Contd.)**

**UNNECESSARY ITEMS**
- Items having no value and easy to dispose
  - Throw away immediately

**REQUIRED ACTION**
- Items having some sales value
  - Look for buyer who offers the best price
- Items having no value and their disposal is costly
  - Work out the least costly and safest way for disposal
### 8-1 Guidelines for practicing SORT (Contd.)

#### Disposal standard

<table>
<thead>
<tr>
<th>Necessity</th>
<th>Example</th>
<th>Method of arrangement</th>
</tr>
</thead>
</table>
| Low       | • No use in the past year  
           | • Use only one time in the last 6-12 months  | • Discard all of them.  
           |                     | • Store in a remote place |
| Medium    | • Once in the last 2-6 months  
           | • More than once in a month | • Store in the central storage in the workplace |
| High      | • Once a week  
           | • Everyday  
           | • Every hour | • Store close to the workplace |
8-1 Guidelines for practicing SORT (Contd.)

Potential impacts:

- Unwanted items are eliminated.
- Searching time is reduced.
- Working environment is improved.
- Space utilization is maximized.
8-2 Guidelines for practicing SET IN ORDER

Description:

“SET IN ORDER” reflects a very popular saying: “A place for everything and everything in it’s place”. It emphasizes safety, efficiency and effective storage and consequently improves the appearance of the workplace.
**Guidelines for practicing SET IN ORDER (Contd.)**

**NECESSARY ITEMS**
- Items frequently used
  - Must be placed near the point of use
- Items sometimes used
  - Can be placed further away
- Items not used at all but must be kept
  - Must be stored separately with clear identification

**REQUIRED ACTION**
8-2 Guidelines for practicing SET IN ORDER (Contd.)

SORT includes activities such as:

1. Mark reference materials with an oblique line to detect disorder from a distance.

2. Put names and numbers on all jigs tools.

3. Store tools beside the machine with which they will be used according to sequence of work operations.

4. Organize files and store using color cord to make it easy to identify materials at a glance.

5. Store similar items together, use rack or shelf.
8-2 Guidelines for practicing SET IN ORDER (Contd.)

6. Store different items in separate rows.

7. Do not stack items together, use rack or shelf.

8. Use small bins to organize small items.

9. Use color for quick identification of items.

10. Label clearly each item and its storage area (Visual control)

11. Use see-through cover for better visibility.

12. Use specially designed carts to organize tools, jigs and measuring devices that are for each particular machine.

13. Create too boards.
Potential impacts:

• Necessary items are identified and positioned in the right workplace and location.

• Unwanted items are eliminated.

• Searching time is reduced.
8-3 Guidelines for practicing SHINE (Seiso)

Description:

“SHINE” is to clean the workplace thoroughly. It ensures a more comfortable and safer workplace, as well as better visibility, which reduces retrieval time and ensures higher quality work, product or service. Everyone enjoys working in a clean environment which morale and increases productivity.
To successfully implement the third S as a daily value-adding activity, the following steps must be practiced.

Step 1: Delegate cleaning assignments.

Cleanliness is the responsibility of EVERY employees and the workplace must be divided into cleanliness areas.
8-3 Guidelines for practicing SHINE (Contd.)

Step 2: Determine what is to be cleaned.

Develop targets and categorize them for ease of use.

Step 3: Determine the method to be used.

Decide on the tools and materials required and what is to be cleaned in each area. Cleanliness must be practiced daily and must take only a short time to execute. Standards must be adopted to ensure people do the cleaning efficiently.
8-3 Guidelines for practicing SHINE (Contd.)

Step 4: Prepare cleaning tools and materials.

Set up cleaning tools and the required materials in such a manner do the cleaning efficiently.

Step 5: Implement cleanliness.

All equipment malfunction or defects must be fixed or reconditioned.
8-3 Guidelines for practicing SHINE (Contd.)

Potential impacts:

• Higher quality work and products.
• More comfortable and safer work environment
• Greater visibility and reduced retrieval time
• Lower maintenance cost
• Creates positive impression on visitors and during customers inspections
8-4 Guidelines for practicing STANDARDIZE

Description:

“Standardize” is to ensure a high standard of workplace organization by continued employment of SORT, SET IN ORDER and SHINE.

The key word is to consolidate the 3S by establishing standard procedures. This activity is carried out to determine the best work practices and find ways of ensure that everyone carries out their individual activity in their workplace.
Guidelines:

Once the 3S are in place, the next step is to concentrate on standardizing best practices. The plan must include the creation of procedures and simple daily checklists which are to be visibly displayed at every workplace.

The checklist must serve as visual signpost to ensure that the daily 3S requirements are carried out habitually as best practices in the work area.
8-4 Guidelines for practicing STANDARDIZE (Contd.)

Items to be included in the check list:

• Job responsibilities that includes:
  - Who is responsible? (ownership)
  - What actions must be taken to keep the desired condition?
  - When must those actions be taken?
  - Where must they apply?
  - What procedures will be followed to ensure compliance?

• Work-in-progress / inventory rules.
• Cleaning procedures.
• Maintenance schedules.
• Regular work activities integrated with 3S duties.
8-4 Guidelines for practicing STANDARDIZE (Contd.)

Potential impacts:

• Better workplace standards.

• Better Visual Control Systems.

• Establishment of Rules and Standard Operation Procedures (SOP)

• Information sharing on standards.

• Improvement in operation and workflow.
8-5 Guidelines for practicing SUSTAIN

Description:

“Sustain” is to make it a habit of maintaining the momentum of the previous four S to ensure sustainability of the system and to make further improvement by encouraging effective use of P-D-C-A Cycle.
Guidelines:
• Build awareness of the importance of 5S through retraining.
• Reward and recognize efforts of staff.
• Use techniques / approaches / strategies to sustain activities.

Review
☐ 5S Slogans and posters
☐ 5S Newsletters to share the progress of 5S activities
☐ 5S Achievements indicators
8-5 Guidelines for practicing SUSTAIN (Contd.)

Potential impacts:

• Compliance to workplace rules.
• Team spirit and discipline are developed.
• The KAIZEN mentality is inculcated in the employees.
• Adoption of best practices.
• Enhance operation effectiveness in a better working environment.
9. Check – 5S Audit

• Objectives:
To ensure that the organization can assess its strength as well as the areas for improvement and where the organization stands in the 5S movement.

• Guidelines for 5S Self-Assessment
Activities would have provided direct progressive 5S momentum. The 5S self-assessment is to be monitored and documented through 5S internal Audit methodology.
9. Check – 5S Audit (Contd.)

Organizations that have successful 5S activities measure their performance through periodical audits using 5S checklists. Results of the audits must be displayed at the 5S corner of every department. This creates an atmosphere of friendly competition and will help instill pride in the teams.

This evaluation and competition must be linked with a reward system; most successful organizations offer monthly rewards for the winning teams in the various 5S categories.
10. Act

Importance of KPIs

The self-assessment and 5S certification naturally drives the organization goal to continually improve on the quality and the cost effectiveness of providing the product or service through systematic guide using Key Performance Indicators (KPIs).
10. Act (Contd.)

Each work group needs its own set of KPIs to enable it to monitor its own progress by employing the 5S.

The KPIs most commonly used are:

- Productivity
- Inventory levels
- Lead time
- Number of accidents
- Machine breakdown
- Searching time
- Rework ratio
- Customer complaints
Conclusion

In summary, the 5S management is one of the preliminary steps for an organization to practice high level tools such as, Total Productive Maintenance (TPM) to meet the high standards of customer expectations.

The secret is to adopt the Roadmap To 5S Implementation and adhere strictly to the methodology of the four phases as explained using the P-D-C-A Cycle.
III 5S & KAI ZEN
III 5S & KAIZEN

Seiri is the first step of KAIZEN

KAI ZEN
(Continuous improvement)

Clarification of waste, abnormality and other problems

Placement standardization

Seiton

Seiri
**Seiton is clarification of things, location and q’ty**

Seiton is to clarify where (location), what (item) and how many (quantity) materials exist so that they can be easily recognized.
Visual Seiton

Visual Seiton allows workers to identify materials and tools necessary to work and return them to the original position easily.

1. Decide item placement
2. Prepare containers
3. Indicate the position for each item
4. Indicate the item code and its quantity
5. Make Seiton a habit
**Decide item placement**

Define items that are used frequently and then place them near the workers who use them. Other less frequently used items are placed farther away.

Items should be located at a height between a worker’s shoulder and waste.
Prepare containers

Containers such as boxes, cabinets, shelves, pallets must be prepared. It is a good practice to prepare containers with different colors.
Indicate the position of each item

Specific spot plates are placed on each shelf.
Indicate the position of each item

Necessary parts are identified with name plates on the container.
Indicate the position of each item

This is convenient for temporary indication which is changed frequently.

It is important to make a precise control.
Indicate the position of each item

Standing signboard

This is more flexible than the hanging signboard and less flexible than the hooked signboard.

There is a possibility of obstructing the passage.
Indicate the item code and its quantity

Example of quantity indication

Source: Y. Monden, "Toyota Production System", Engineering and Management Press

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Separation of WIP and defective products
Position mark
Make Seiton a habit

To continuously maintain the workplace in good order, Seiri and Seiso must be performed adequately.

- Thorough implementation of visual Seiton

- Practice Seiri and Seiso regularly, for example at the end of the day’s work.
First-In, First-Out

Various goods are piled up on pallets

Source: Y. Monden, "Toyota Production System", Engineering and Management Press
Setup for easy handling

<table>
<thead>
<tr>
<th>Classification</th>
<th>Index of activity</th>
<th>Example</th>
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<tbody>
<tr>
<td>Moving</td>
<td>4</td>
<td>Moving on the belt conveyer, lift, cart, etc.</td>
</tr>
<tr>
<td>In a cart</td>
<td>3</td>
<td>In the cart or other equipment with wheels</td>
</tr>
<tr>
<td>Put in a elevated box</td>
<td>2</td>
<td>In the box which is in an elevated position</td>
</tr>
<tr>
<td>Put in a box</td>
<td>1</td>
<td>In the container</td>
</tr>
<tr>
<td>Bulk</td>
<td>0</td>
<td>On the ground or pallet in bulk</td>
</tr>
</tbody>
</table>
Seiton of tools and jigs

Well arranged  Bad arranged
Tracing control

Source: Y. Monden, "Toyota Production System", Engineering and Management Press
Blind return and drawing cabinet

Source: Y. Monden, "Toyota Production System", Engineering and Management Press
Seiso

Seiso is not only to clean the workplace but to detect every kind of wastes and problems through complete cleaning.

Machine and equipment can be maintained in good condition, by thorough cleaning, which assures good quality of products and safety of the workplace.
• Assign a person who is in charge of cleaning of each workplace and machine.

• Establish the cleaning standard

  Where : Place

  Who    : Person in charge

  When   : Frequency

  How    : Cleaning method
Seiketsu

In order to keep Seiketsu:

• Eliminate powder, dirty, oil, etc.

• Minimize and localize the dirty place.

• Improve the place for easy cleaning.

• Modify the machine cover for easy inspection.
Eliminate the cause of powder

Source: Y. Monden, "Toyota Production System", Engineering and Management Press
Minimize and localize the dirty space

Source: Y. Monden, "Toyota Production System", Engineering and Management Press
Shitsuke

Shitsuke is to get workers into the habit of practicing Seiri, Seiso and Seiton.

• The important point of Shitsuke is forming the habit of practicing 3S.

• It is important to understand the objectives to form the habit.
IV  5S & Visual Control
What is visual control?

Visual control is a method by which the condition of production can be judged instantly just by looking at.
Importance of visual control

By visual control, everyone can recognize abnormality promptly and take necessary countermeasures. Furthermore, visual information is easy to understand and promotes cooperation at the workplace.
Visual work control

- Indication of the place for raw materials, work-in-process and final products
- Clarification of the passage and working area
- Warning signboard
- Operating procedure with pictures and illustrations
Indication of the workplace
Clarification of the passage
Work instruction

Hand Cleaning First
Before Working
Indication of a machine condition

Lub. oil level
Thermo label
Flow direction
Rotating direction
Marking
Warning signboard

Caterpillar

Danger!

Tube

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Visual production control

• Monthly, weekly and daily production plan

• Production achievement ratio

• Monthly and daily production progress
## Monthly production plan

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Visual quality control

• Indication of the place for defective products

• Limit samples

• Control chart

• Pareto diagram of defective products

• Result of fraction defective
Indication of the place for defective products
Limit sample