

**5 S STRATEGIES FOR SHOP FLOOR IMPROVEMENT****Dr. Raju N. Panchal***, Anant D. Awasare, Dr. Jagruti R. Panchal

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DOI: 10.5281/zenodo.897770**KEYWORDS:** 5s, schedule, set-in-order, organizing.**ABSTRACT**

Various housekeeping activities are often used first in adopting the continuous improvement way of life. Here adopted some practice at plant are: Sort out what is unneeded; Set-In-Order what must be kept; Shine everything that remains and establish a cleaning schedule; Standardize the system throughout the facility and provide employees with training Sustain the effort with self-discipline and resources and time to improve their workplace. TPM starts with 5S. It is a systematic process of housekeeping to achieve a serene environment in the work place involving the employees with a commitment to sincerely implement and practice housekeeping. Problems cannot be clearly seen when the work place is unorganized. Cleaning and organizing the workplace helps the team to uncover problems.

INTRODUCTION**SEIRI - Sort out:**

This means sorting and organizing the items as critical, important, frequently used items, useless, or items that are not need as of now. Unwanted items can be salvaged. Critical items should be kept for use nearby and items that are not be used in near future, should be stored in some place. For this step, the worth of the item should be decided based on utility and not cost. As a result of this step, the search time is reduced.

SEITON - Organise:

The concept here is that "Each item has a place and only one place". The items should be placed back after usage at the same place. To identify items easily, name plates and coloured tags has to be used.

Vertical racks can be used for this purpose, and heavy items occupy the bottom position in the racks.

SEISO - Shine the workplace:

This involves cleaning the work place free of burrs, grease, oil, waste, scrap etc. No loosely hanging wires or oil leakage from machines.

SEIKETSU - Standardization: Employees have to discuss together and decide on standards for keeping the work place / Machines / pathways neat and clean. These standards are implemented for whole organization and are tested / inspected randomly.

SHITSUKE - Self-discipline:

Considering 5S as a way of life and bring about self-discipline among the employees of the organization. This includes wearing badges, following work procedures, punctuality, dedication to the organization etc.

This 5S implementation has to be carried out in phased manner. First the current situation of the workplace has to be studied by conducting a 5S audit. This audit uses check sheets to evaluate the current situation. This check sheet consists of various parameters to be rated say on a 5-point basis for each 'S'. The ratings give the current situation. The each of the above-mentioned 5S is implemented and audit is conducted at regular intervals to monitor the progress and evaluate the success of implementation. After the completion of implementation of 5S random audits could be conducted using these checks sheets to ensure that it is observed in true spirits by everyone in the work place.

**GUIDELINES TO IMPLEMENT '5S' AT WORKPLACE**

1. Obsolete: - Parts not required as the design has become obsolete.
2. Defective: - Parts can't be used as it is.
3. Scrap: - Scrap Items not thrown out.
4. Not in place: - Kept at wrong place.
5. Unnecessary: - Extra / not useful.
6. Mix-up:- Mixed parts.
7. Un-identified:- Nobody's materials.
8. Items not used for last 6 months.
9. Obsolete documents, not used but still stored for a long time.
10. Others: - Even what is this part?

METHODOLOGY TO IMPLEMENT

- Form a Team Leader (Preferably Senior person of respective area / Zone) and Team Members (Group of 4~ 5 people) for every Zone. Ensure the involvement of all associates.
- Form a committee of senior people (Preferably Department Heads) who should take a decision for the disposal of unwanted things / Scrap, out from the factory. Fix a date and time for Red Tag Campaign & carry out the audit across all Zones.
- Search & Identify unwanted things and tie them with a RED TAG.
- Other than product scrap, Red Tagged items should be moved to respective RED TAG AREA.
- All those items which are finally identified unwanted ones should be reviewed by the review committee and decision for disposing off should be taken within a fixed time (Maximum Time Limit is 15 days).
- Prevent generation and accumulation of unwanted things inside the factory premises.
- Repeat the same exercise at the fixed intervals (Once in a month).
- Monitor the performance zone wise for Space Savings, Reduction in Inventory, Search Time Reduction, and '5S' Audit Score.

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JISHU HOZEN (Autonomous maintenance):

This pillar is geared towards developing operators to be able to take care of small maintenance tasks, thus freeing up the skilled maintenance people to spend time on more value added activity and technical repairs. The operators are responsible for upkeep of their equipment to prevent it from deteriorating. By use of this pillar, the aim is to maintain the machine in new condition. The activities involved are very simple nature. This includes cleaning, lubricating, visual inspection, tightening of loosened bolts etc.

Policy:

1. Uninterrupted operation of equipment's
2. Flexible operators to operate and maintain other equipment's.
3. Eliminating the defects at source through active employee participation.

Steps in JISHU HOZEN:

1. Preparation of employees.
2. Initial cleanup of machines.
3. Take counter measures
4. Fix tentative JH standards
5. General inspection



6. Autonomous inspection
7. Standardization and Each of the above-mentioned steps is discussed in detail below.

1. Train the Employees:

Educate the employees about TPM, Its advantages, JH advantages and Steps in JH. Educate the employees about the equipment they use, the frequency of oiling, day-to-day maintenance activities required and the abnormalities that could occur in the machine and way to find out the abnormalities.

2. Initial cleanup of machines:

1. Arrange all items needed for cleaning.
2. On the arranged date, employees clean the equipment with the help of maintenance department.
3. Dust, stains, oils and grease has to be removed.
4. When cleaning oil leakage, loose wires, unfastened nuts and bolts and worn out parts must be taken care.
5. After clean up, problems are categorized and suitably tagged. White tags are place where operators can solve problems. Pink tag is placed where the aid of maintenance department is needed.
6. Contents of tag are transferred to a register.
7. Make note of area, which were inaccessible.
8. Open parts of the machine are closed, and the machine is run.

3. Counter Measures:

1. Inaccessible regions had to be reached easily. E.g. If there are many screw to open a flywheel door, hinge door can be used. Instead of opening a door for inspecting the machine, acrylic sheets can be used.
2. To prevent work out of machine parts necessary action must be taken.
3. Machine parts should be modified to prevent accumulation of dirt and dust.

4. Tentative Standard:

1. JH schedule has to be made and followed strictly.
2. Schedule should be made regarding cleaning, inspection and lubrication and it also should include details like when, what and how.

5. General Inspection:

1. The employees are trained in disciplines like Pneumatics, electrical, hydraulics, lubricant and coolant, drives, bolts, nuts and Safety.
2. This is necessary to improve the technical skills of employees and to use inspection manuals correctly.
3. After acquiring this new knowledge the employees should share this with others.
4. By acquiring this new technical knowledge, the operators are now well aware of machine parts.

6. Autonomous Inspection:

1. New methods of cleaning and lubricating are used.
2. Each employee prepares his own autonomous chart / schedule in consultation with supervisor.
3. Parts, which have never given any problem, or part, which don't need any inspection, are removed from list permanently based on experience.
4. Including good quality machine parts. This avoids defects due to poor JH.
5. Inspection that is made in preventive maintenance is included in JH.
6. The frequency of cleanup and inspection is reduced based on experience.

7. Standardization:

1. Up to the previous step only the machinery / equipment was the concentration. However in this step the surroundings of machinery are organized. Necessary items should be organized, such that there is no searching and searching time is reduced.
2. Work environment is modified such that there is no difficulty in getting any item.
3. Everybody should follow the work instructions strictly.
4. Necessary spares for equipment's is planned and procured.

**CONCLUSION**

Managers and researchers are interested in knowing how various 5S affect manufacturing performance. This study identified three 5S practices as a major driving forces to improve a set of three 5S related manufacturing performance variables (lead time, cycle time and inventory turns). In addition, setup time reduction is identified as less influential but important factor related to performance. These results provide information about the importance the physical flow aspects of manufacturing.

REFERENCE

1. M.V.Kavade, Anant Awasare "A Review of Assembly Line Changes for Lean Manufacturing" *IOSR Journal of Mechanical and Civil Engineering*, (IOSR-JMCE) ISSN: 2278-1684, PP: 01-05
2. M.V.Kavade, Anant Awasare "Compressor Assembly Line Changes for Integration with Application of Lean Manufacturing Tool", *International Journal of Advanced Engineering Research and Studies*, Vol. IV/ Issue II/April-June, 2013/E-ISSN 0976-3945
3. Anant Awasare "Reduction of Waste by Applying Lean Manufacturing Tool for Assembly Line", *International Journal of Engineering Technology, Management and Applied Sciences*, February 2016, Volume 4, Issue 2, ISSN 2349-4476, PP: 84-89.
4. Anant Awasare, P.S.Jadhav, D.S.Chinchkar "Lean Design of Assembly Line for Promote Continuous Improvement", *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4, Special Issue 1, January 2017, ISSN (Online) 2393-8021, DOI 10.17148/IARJSET, PP: 12-15.
5. Anant Awasare, D.S.Chinchkar, R.N.Panchal, P.R.Pawar "Waste Reduction for Assembly Line Layout with Integration of Lean Tool: Kanban", *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4, Special Issue 1, January 2017, ISSN (Online) 2393-8021, DOI 10.17148/IARJSET/NCDMETE.2017.22, PP: 89-92.
6. Anant Awasare, R.N.Panchal, A.M.Zende, H.M.Kumbhar "Development of Assembly Line Layout for Measurement of Work", *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4, Special Issue 1, January 2017, ISSN (Online) 2393-8021, DOI 10.17148/IARJSET/NCDMETE.2017.40, PP: 180-183.
7. Anant Awasare, J.R.Panchl, R.N.Panchal, A.M.Zende, H.M.Kumbhar "Application of operation research techniques for solving assembly line balancing problem" *International Advanced Research Journal in Science, Engineering and Technology*, Vol. 4, Special Issue 1, January 2017, ISSN (Online) 2393-8021.