



**EEPC INDIA**

**G**LOBALISATION and innovations in technology have immensely increased the level of competition. Improvements and innovation breakthroughs have become a necessity to stay in business rather than just mere tools to improve profitability of a company. Hence, concepts such as Six Sigma, Lean Manufacturing, Continuous Improvements, Quality Circles (QCs), Just-in-Time (JIT) are gaining popularity.

Lean manufacturing is the hymn of survival and success of any organisation through minimising waste. The 5S methodology is one of the basic and the most important tools to implement Lean manufacturing. It is a system to regulate the work flow by systemising the workplace, thus supporting the culture of continuous improvement.

One of the major features of engineering sector in India is that the heavy engineering segment dominates the manufacturing landscape. Heavy engineering is, in turn, supported by vast number of micro-, small-, and medium-scale entities in supplying crucial equipment, components, and spares for the smooth running of heavier units. As the global markets are increasingly adopting customised production systems, large units as well as MSMEs are transitioning their workspace with more lean manufacturing setups.

As the heavy engineering and capital goods manufacturing sectors are the large employers of labour in a highly diverse environment, the 5S for factory safety and security for increasing efficiency is the need of the hour.

The vision of the National Capital Goods Policy 2016 is to increase the share of capital goods contribution from the present 12 percent to 20 percent of total manufacturing activity by 2025, to increase the export contribution of the capital goods sector at least to 40 percent

**TECH FRONTIERS**

# 5S – Increasing efficiency in manufacturing

Among the first steps to improve production and productivity in an organisation is to implement the 5S methodology that cleans up the workplace and makes it secure and safe

of total production, and to improve the technology depth of the sector. The policy actions stated are:

- devising rationalised tax and duty structure to ensure cost competitiveness of the industry;
- adopting public procurement policy with specific provision in the contracts regarding domestic value addition, provision of technology, development of manufacturing clusters with shared facilities for SMEs;
- enabling skill development and ensuring availability of long-term financing at competitive rates for capital goods producers.

The 5S philosophy is one of the stepping stones for the MSME sector to move forward in the fast pace environment towards lean solutions in order to minimise the waste in the entire supply chain process.

The popular belief is that the Japanese invented the 5S methodology because the letter ‘S’ stands for five Japanese words that when translated to roman script, start with the letter ‘S’. In actuality, the principles within 5S were being utilised decades before by Henry Ford. It has been reported that prior to 1920, Ford was using CAN-

DO in his manufacturing processes. The acronym CANDO stands for Cleaning up, Arranging, Neatness, Discipline and Ongoing improvement. In the 1950s, representatives from Toyota visited the Ford facilities to be trained in automotive mass production methods. The Japanese later adapted the CANDO methods and applied them in their production facilities. Some commonly used words describing the steps in 5S are Sort, Set, Shine, Standardise, and Sustain. Throughout different companies, various words are used that have similar meanings. No matter what specific words are used to identify the steps in 5S, the purpose remains the same: create a clean, organised and efficient work environment.

**EEPC India’s initiatives in 5S**

EEPC India is working dedicatedly to promote concepts such as technology upgradation, automation, design intervention ,and skilling to help the Indian engineering sector to move up the value chain. The concept of 5S and Lean Manufacturing is another powerful tool which can help Indian industry, particularly the MSME sector, to excel. Keeping the above objective in mind, EEPC India has already

undertaken several initiatives in this area:  
**1.** EEPC India joined the Department of Commerce of the Union Ministry of Commerce and Industry in their celebration of Swachhata Pakhawada for a fortnight over 1-15 November 2018 across India. This was an initiative of the Government of India to drive the government’s five-year-long Swachh Bharat Mission.

**2.** In IESS VII, EEPC India with the support of Department of Heavy Industry, Government of India, set up a Swachh Bharat Pavilion which showcased the practical solutions for industrial cleanliness and hygiene.

**3.** In IESS VIII, EEPC India, with the support of Department of Heavy Industry, organised a half-day session on ‘5S for Factory Cleaning and Increasing Efficiency’. The idea was to propagate the concept of 5S in the Indian capital goods sector.

**4.** In 2019-20, EEPC India along with the support from National Productivity Council plans to organise a series of sessions on 5S and Lean Manufacturing for the benefit of the industry.

**ABOUT 5S**

*A standard place of each and every object and each and every object on its standard specified place – this can be observed as the basic formula of overall 5S system.*

As India’s engineering manufacturing is progressing towards more lean and customised-centric product solutions, the 5S + 2S has gained even more importance at the workplace. The term 5S relates to the five supports of the workplace as mentioned. These are:

- 1. Sort (seiri)** – Distinguishing between necessary and unnecessary things, and getting rid of what you do not need
- 2. Straighten/Set in order (seiton)** – The practice of orderly storage so the right

item can be picked efficiently (without waste) at the right time, easy to access for everyone. A place for everything and everything in its place

**3. Shine (seiso)** – Create a clean worksite without garbage, dirt and dust, so problems can be more easily identified (leaks, spills, excess, damage, etc)

**4. Standardise (seiketsu)** – Setting up standards for a neat, clean, workplace

**5. Sustain (shitsuke)** – Implementing behaviours and habits to maintain the established standards over the long term, and making the workplace organ-

<b>1</b>	<b>Sieri</b>	<b>Sort</b>
<b>2</b>	<b>Seiton</b>	<b>Set in Order or Store</b>
<b>3</b>	<b>Seiso</b>	<b>Shine</b>
<b>4</b>	<b>Seiketsu</b>	<b>Standardise</b>
<b>5</b>	<b>Shitsuke</b>	<b>Sustain</b>

isation the key to managing the process for success.

**The 2S**

**+1 Safety** – Safety in the workplace includes adherence to regulatory compli-

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ance standards, as well as purposeful minimising of potentially hazardous situations for workers. By creating a safe place to work, organisations curb potential financial loss, and value respect for

employees

**+2 Security** – Security measures if included in daily practices ensure safe, productive, profitable work environments. Organisations take steps to eliminate

risks associated with thefts and unsolicited visits of strangers etc. By implementing such plans for safety, organisations are able to reach their full potential for productivity.

## EACH STEP OF 5S DEFINED

### Sort/Seiri

Sort is the first step in any 5S process. The term sort is originally derived from the Japanese word Seiri. Each step in the 5S process has an associated goal that can be specifically outlined to help guide efforts. For the step of Sort, the goal is to remove unnecessary items from the room, station, or space being organised. Furthermore, the sorting phase also aims to provide a clean slate on which to build and carry out the other four steps.

#### How it works

Industrial bins are needed for an accurate sort. Based on the standard approach, there are three to four 'bins' or sorting categories used when conducting a 5S sort. These bins are:

- **Keep:** These are items used frequently and essential to the operation of the workplace being sorted. If the target area is a supply room, tool shed, or another area that feeds into greater business operations, employees should be evaluated on how often they draw tools from the Sort area to utilise those items. These tools should be returned to the 5S area after sorting is complete.
- **Remove:** Items that are not needed and are simply taking up space should be placed in a bin or pile to be removed. Examples might include the following items: broken or outdated tools, chemicals or components that have degraded or passed their expiration date.
- **Probation:** Items in this pile or bin are being evaluated for use. A specific amount of time should be set (that is appropriate to the business cycle) during which items

will be evaluated to see whether they are used often enough to keep. After the probationary period, these items are either discarded or organised back into the original workspace.

- **Move:** This option is talked about less, but is still an important consideration for items that may be helpful in a business. Items that are not needed often but must be on hand for times when they are required will need to be relocated. These items will eventually find new homes in other stations or rooms that make the most sense for them.

### Set in order/Seiton

#### How it works

A good way to begin this step is to map out the area where the tools and equipment will be returned to. During this stage, it is critical to really think about the jobs being performed in or around each station. This knowledge should be used to map out the most convenient and comfortable areas for workers to go to or reach towards. Employees' most-frequently-used tools should reside in easy-to-access areas with the least restrictions possible. The goal is to minimise the need for employees to repeatedly reach over and between items by placing the most-frequently-used tools and supplies closest to the station operator, while opting to place less utilised items in other areas.

### Shine/Seiso

#### How it works

1. In almost every case, a clean workplace is a safer workplace. For instance, keeping floors clear of dust and debris

helps reduce the risk of trips, slips, and falls – an extremely common cause of workplace injury. A clean workplace also helps counteract any potential infections or other health hazards employees might otherwise encounter. Simply put, workplace accidents have the potential to destroy efficiency, and a good shining can help workers avoid them.

2. Cleaning can be used as an inspection tool. Clear expectations are necessary for positive employee interactions and, ultimately, results. When employees know what is expected of their workspace, they are more likely to keep things in that state. Posting imagery nearby that shows the fully cleaned or 'shined' state of a workspace can be a helpful way to keep this communication alive even when no one is physically present to deliver it. Furthermore, an information board can even show step-by-step instructions for how certain areas or tools are meant to be cleaned at the beginning and/or the end of a shift.

3. A regular and thorough cleaning helps prevent tool and machinery degradation. Not only does this help with safety as described above, it can also ensure these items last longer. A longer natural lifespan means less costly replacement and maintenance in the future.

### Standardise/Seiketsu

#### How it works

Begin to standardise 5S operations by making the process more than a word-of-mouth agreement. This is the time to implement a clear, universally understood system so that employees are certain about

what they are expected to do. One excellent way to do this is to design and print out 5S audit sheets that can be used by whoever is checking an area on a given day. A checklist that asks specific questions about the work area can help ensure that processes are carried out as intended.

Some questions on the checklist may include:

- Are all tools in their correct place on the shadow boards?
- Have power tools been unplugged with their cords properly stored?
- Are the necessary supplies in place for the next worker who will begin a shift at that station?

## Sustain/Shitsuke

### How it works

1. **Demonstrate.** Anything expected of

workers should be demonstrated correctly by a trained and knowledgeable professional. This is the portion where workers gain an understanding of what actually needs to be done.

2. **Supervised undertakings.** Employees need to be worked with closely so they know what is expected. In addition, employees should be monitored through their first few attempts to make sure the daily 5S habits that are being formed are the exact habits needed and desired. Workers should not be coddled through this. Mistakes should be corrected.

3. **Periodic check-ins.** After the initial training, it is important to stay vigilant by utilising the auditing techniques established in the standardising step to regular-

ly ensure that things are running smoothly. Having employees learn to properly do these checks can be helpful for positive habit forming as well.

4. **Make changes as necessary.** Sometimes continued undesired behaviour or undesired results come about as a consequence of a faulty system. If this is the case, find the fault in the original setup and correct it as necessary.

## New employee training

When existing employees help train new employees, it helps refresh the tactics and practices of 5S.

- When a new employee joins a team that uses 5S, one of the best things to do is let current employees carry out the new employee's training. Teaching someone else



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how to accomplish a task requires one to evaluate his or her own knowledge, and workers can easily spot gaps that they may have questions about. Doing this also helps reinforce the ideas they are teaching, especially if workers have grown sloppy over time or deviated from the original expectations.

- Measure, don't just guess. Sustaining is about making adequate progress. The ultimate goal of 5S is to increase efficiency. The actual organisational steps taken on the way are components of this goal and should not overshadow the larger endeavour. It is imperative to keep accurate tabs on whether or not the 5S effort has helped workers cut down on production times, accident rates, missing equipment costs, etc over time. Use actual numbers and do not overlook the facts, even if they are not as impressive as hoped for.
- Properly sustaining 5S is about carrying out the task or concept time and time again until it becomes second nature. This can be a frustrating phase for both managers and employees, so it is important to ensure communication is open, factual, and constructive, while being free of accusations.

## 5S manufacturing

5S originated in manufacturing environments. While this visual organisation system has been adapted for use in many workplaces including warehouses, offices, and healthcare facilities, many manufacturing facilities continue to benefit from 5S. When combined with other Lean practices, 5S often proves especially useful.

In a manufacturing facility where employees routinely need to use tools and obtain materials, 5S plays a significant role. Visual markings make it easier to obtain those tools/materials and return them to their storage locations after use. Visual cues such as floor markings (floor tape, floor shapes, signs, etc) can also create boundaries around different areas such as those used for storing cleaning supplies, finished products, machinery, etc. In a fast-paced

work environment, these markings can mean the difference between a messy workplace and an efficient one.

Each employee in the manufacturing facility is taught which 5S tasks to perform as part of his or her daily work, and this makes the system sustainable over the long term.

## Common misconceptions

As with many other Lean strategies, the practice and implementation of 5S also features some common misconceptions.

- **Misconception:** Areas involved in 5S should be set up in ways those involved in the 5S process believe most suitable.

**Truth:** Work areas should ALWAYS be set up and organised for those who will be actually using the areas.

- **Misconception:** 5S just means 'throwing out expensive stuff' without rhyme or reason.

**Truth:** When it comes to 5S, there is often a big understanding gap of what is actually worth keeping. Items and equipment should not be kept simply because they have value to the outside world. Things should only be kept if they are of value to the organisation.

- **Misconception:** 5S is 'just a tool.'

**Truth:** 5S is a tool, but it is not 'just a tool.' It is a comprehensive framework that emphasises the use of a specific mindset and tools to create efficiency and value.

- **Misconception:** 5S is 'easy.'

**Truth:** There are many steps that need to be taken before 5S is even considered. In addition, employee involvement is the key. Employees need to 'buy-in' and be willing to learn and participate as well

- **Misconception:** Put up some safety signs and floor tape and you have implemented 5S.

**Truth:** 5S is so much more than applying some floor tape or adding some labelling to shelving units. At its most fundamental definition, we care about 5S because it allows for the abnormal to be detected. An area that has been 5S'd and is utilising additional visual control techniques, 'speaks' to the individual/manager/ob-

server of the workspace.

- **Misconception:** 5S is just a Japanese way of beautifying things.

**Truth:** It is more of a problem-solving approach, which utilises the help of various techniques and is a practical way to assist in increasing value.

- **Misconception:** 5S is all about cleaning; it is basically housekeeping on steroids.

**Truth:** The practice of 5S is multifaceted and interweaves a mindset with a practical process to assist in creating both culture and discipline.

## Solution – way forward

Through the 5S methodology, the management can create an environment where quality work is comfortable, clean and safe in the organisation and it can ensure the compliance to standards and will further foster continuous improvement. 5S is a system that is used to reduce unwanted waste and optimise productivity through continuously maintaining the system in the workplace in order to deliver the consistent operational results. The 5S method is a tool for continuous improving lean management processes, where the task is to create a highly efficient, clean, and ergonomic working environment.

However, effort and participation from top management is a key factor that determines the success of the 5S practice. Moreover, the most important barrier for implementation of 5S effectively is poor communication and existing barriers between managerial level and shop-floor employees and the poor training and awareness of 5S. Before the industry starts to implement a new manufacturing process, the top management should identify the true meaning of 5S, why and how to implement 5S system so that it will be beneficial for the industry. All members within the industry, from the top management to the operator, should work together to have a better performance in implementing the 5S system and create the situation as one of the competitive advantages for the industry.