

Review of 5S Technique

¹Prof. Saad Shaikh, ²Ansari Noor Alam, ³Khan Naseem Ahmed, ⁴Sawant Ishtiyak, ⁵Sayed Ziaul Hasan

Abstract— There are certain fields which are very demanding in today's trend. Small Scale Industry is one of the field. It plays an important role in Indian country. It has emerged as powerful source in providing relatively larger employment after agriculture. It contributes more than 50% of the industrial production in vast field of engineering .Global markets are continuously changing and demanding due to high quality and low cost. Such products can be produced using lean manufacturing , by this we aimed to reduce all types of wastes at product manufacturing so as to reduce product cost. 5S is a basic lean manufacturing technique for cleaning, sorting, organizing and providing necessary improvement in work place. This system helps to organize a workplace for efficiency and decrease waste and optimize quality and productivity via monitoring an organized environment[1]. 5S offers good results for required improvement. This method can be used in all companies , by this we can get good improvement in the production process of company. Consequently, 5S techniques would strongly support the objectives of organization to achieve continuous improvement and higher performance.[1]

Index terms— 5S, Effective Organization, Lean Manufacturing, Productivity.

I. INTRODUCTION

With the changing techno-economic scenario around the entire world, the market has turned from seller to buyer type[2]. The main object of every organization is to satisfy the stated and implied needs of the customers[2]. To provide quality product within stipulated time it is necessary to improve the working conditions[2]. In order to improve the performance of employee, organization has to create interesting working environment[2]. A pleasant condition can help improving performance and motivation on the workers [2]. 5S is a system in which to reduce work and optimize productivity and quality through maintaining and orderly work- place [3]. The benefit of good workplace include the prevention of defects; prevention of accidents; and the elimination of time wasted for searching tools, documentation and other ingredients of manufacture[5]. The 5S is the methodology of creation and maintaining well organized, clean, high effective and high quality

workplace. Its result is the effective organization of workplace, elimination of losses connected with failures and breakdowns in machines, improvement of the quality and safety of work[3-5]. The implementation of 5S is crucial as it serves as stepping stones to create a strong housekeeping culture in the organization[2].

The history and philosophy of the 5S has its roots in Japan. Name 5S is the acronym of five Japanese words of the following meanings:

1. Seiri (sort),
2. Seiton (set in order),
3. Seiso (shine),
4. Seiketsu (standardize),
5. Shitsuke (sustain).

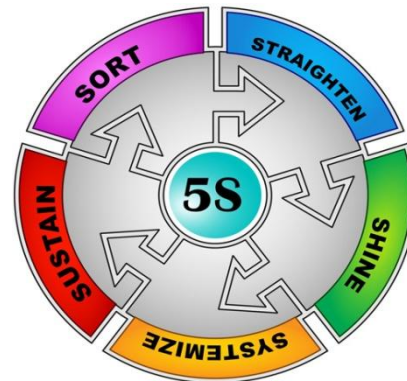


Figure 1. 5S processes[24]

This review paper consist of four chapters .The first chapter consist of introduction .The second chapter consists of literature review. It include the details related to the information and history which has been already done by other people that involved in implementing 5S, previously. The third chapter consist of methodology in which all five stages has been explained and the fourth chapter consist of conclusion.

II. LITERATURE REVIEW

5S initially based on the Japanese acronyms of seiri (organization), seiton (neatness), seiso (cleaning), seiketsu (standardization) and shitsuke (discipline), is used as a platform for developing an integrated management system by the parallel use of total productive maintenance (TPM) (Bamber et al., 2000). Osada (1991) refers to 5S as the

five keys to a total quality environment. 5S is a system to reduce waste and optimize productivity and quality through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. The practice of 5S aims to embed the values of organization, neatness, cleaning, standardization and discipline into the workplace basically in its existing configuration, and it is typically the first lean method implemented by firms. Kobayashi et al. (2008) make a distinction between 5S as a philosophy or way and 5S as a technique or tool by comparing the frameworks provided by Osada (1991) and Hirano (1995) respectively. From their study, they conclude that 5S tends to be recognized as a philosophy in Japan, but in the other hand it is likely to be considered as a technique or tool in the United Kingdom and United State of America. Osada (1991) views 5S as a strategy for organizational development, learning and change, whereas Hirano (1995) considers 5S to be an industrial formula that differentiates a company from its competitors.

A common definition of 5S in the West is housekeeping (Becker, 2001; Chin and Pun, 2002; Ahmed and Hassan, 2003; Eckhardt, 2001). In the West both 5S and TPM are sometimes disregarded or at least underutilized (Douglas, 2002). A framework of applying 5S within a business (as appose to a personal philosophy of way of life) was first formalized in the early 1980s by Takashi Osada (Ho et al., 1995).

The practice of 5S aims to embed the values of organization, neatness, cleaning, standardization and discipline into the workplace (Osada, 1991). In Japan the 5S practice was initiated in the manufacturing sector and then extended to other industries and services sector. The Toyota Production System provides a well-known example of 5S principles in practice, the early versions were based on 3-S this, became 4-S (Ohno, 1988).

Boeing in the USA pursues 5S as a world-class strategy (Ansari and Modarress, 1997). Even with these prestigious and complex examples it appears that many researchers and practitioners have difficulty going beyond the simplest 5S concept. This is suggested by Hyland and others where they believe that Australian manufacturing firms have only a basic perception of the importance and the potentiality of 5S (Hyland et al., 2000). These authors found of ten continuous improvement tools they investigated the usage and perceived importance of 5S was lowly ranked.

Therefore, we can say that there is no consensus about the scope of 5S. Much of Western literature still acknowledges 5S as housekeeping (Ahmed and Hassan, 2003; Becker, 2001; Chin and Pun, 2002; Eckhardt, 2001). However, 5S is more frequently framed in the "lean" philosophy (James-Moore and Gibbons, 1997; Hines et al., 2004; Kumar et al., 2006), since it encourages workers to improve their working conditions.

III. METHODOLOGY

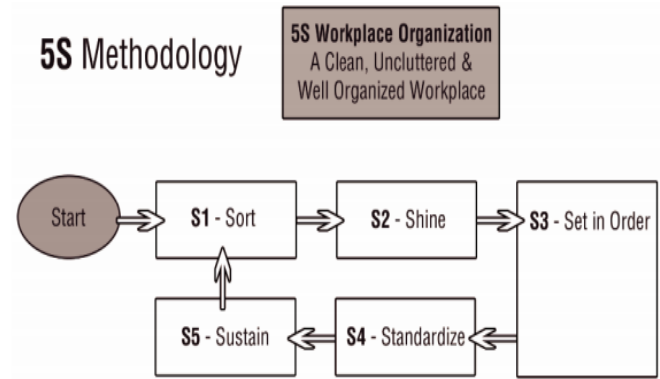


Figure 2. 5S Methodology[7]

5S is a manufacturing technique for work place organization and it is used to the implementation of lean conditions. 5S is a reference to five Japanese works which described standardized method to improve the work in the organization. Now we will see every method of 5S in detail.

A-SEIRI - Sorting Out

5S Seiri or Sort is the first step in 5S, it refers to the sorting of the clutter from the other items within the work area that are actually needed[23]. This stage requires the team to remove all items that clearly do not belong in the working area and only leave those that are required for the processes in question[23]. The necessary and unnecessary items available in the workplace should be sorted and classified .By sorting one can identify the materials, tools, equipment and necessary items for this. Frequently used items are placed near to reach while not frequently used items are placed after that. It helps to maintain the clean workplace and improves the efficiency of searching and receiving things, shortens the time of running the operation.

Following are the rules of performing Seiri:

- *If there is any unnecessary things which is causing mixing of things should be clear out.
- *Any unnecessary part of the item placed other side should be brought back to its original position.
- *Tools of material which lie on production floor should be in the tool floor.
- *Check weather all necessary things sorted to its own place.
- *All tools are classified properly with the rule.
- *After all these step, we will use Red Label or Red Tag technique, this technique is applied to all the unnecessary items for its recognition.

Benefits of Seiri:

- *Improve the processing in the work place.
- *Reduction in the cost.
- *Solves the problem of Stock of item.
- *Problem of losing tools eliminated.
- *Better Work area.



Figure 3. Sorting [23]

B-SEITON - Set in Order

5S Seiton or Straighten is the process of taking the required items that are remaining after the removal of clutter and arranging them in an efficient manner through the use of ergonomic principles and ensuring that every item “has a place and that everything is in its place”[23]. It means cleaning & organizing the necessary items neatly and systematically so that they can easily be taken and returned in the original place after use. By this we can increase the efficiency of production in the industry. The aim of this is to minimize the number of work that a worker has to perform during operation. Visualization of the workplace is also very important. Eg painting the floor helps to identify the places of storage of each material or transport ways, drawing out the shapes of tools makes possible the quick putting aside them on the constant places, colouring labels permit to identify the material, spare parts or documents. Tools, equipment, and materials must be systematically arranged for the easiest and the most efficient access. There must be a place for everything, and everything must be in its place.

Following are the rules of performing Seiton:

- *Position of every place should be decided earlier where items supposed to be placed.
- *All tools should be segregated on the basis of regular uses.
- *Put all the important items in a accessible position where it can be brought easily.
- *Small tools should be placed in a specific place or recognized place.
- *Safety equipments should be placed in the right position for emergency requirement.

Benefits of Seiton:

- *Increases the efficiency of the production.
- *Effectiveness increases.
- *Time required for seeking the items are reduced.
- *Improves the safety.

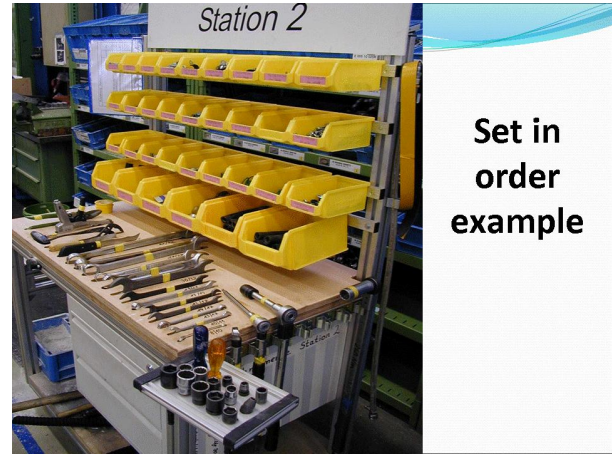


Figure 4. Tools Set In Order[23]

C-SEISO – Shine

5S Seiso or Sweep is the thorough cleaning of the area, tools, machines and other equipment to ensure that everything is returned to a “nearly new” status[23]. This will ensure that any non-conformity stands out; such as an oil leak from a machine onto a bright, newly painted clean floor[23]. For aesthetic view, it is essential to create a clean and regular working and living environment in the workplace. This is because dust, dirt and wastes can stop the efficiency of workplace. Cleaning should become a daily activity. Work place should be cleaned at regular intervals for better production. Regular cleaning permits to identify and to eliminate sources of disorder and to maintain the clean workplaces. During cleaning it is checked the cleanness of every item in the workplace on the regular basis. A sheet of cleaning can also be made by operator to check cleanness in the workplace. By providing this sheet, we can enhance the maintenance of the work place.

Following are the rules of performing Seiso:

- *Check roughly everything, and clear all major source of unnecessary things.
- *Clean all the machines present in the work shop on daily basis.
- *Check all the tools, equipments on weekly basis, and provide necessary cleaning.
- *Clean the shop floor & work floor.

Benefits of Seiso:

- *Cleans the workplace.
- *Increases the efficiency of machines.
- *Maintains the cleanness in the industry.
- *Finds the errors in the workplace.
- *Eliminates accidents due to cleanness.



Figure 5. Shine Floor[23]

D-SEIKETSU – Standardize

5S Seiketsu or standardize is the process of ensuring that what we have done within the first three stages of 5S become standardized; that is we ensure that we have common standards and ways of working[23]. Standard work is one of the most important principles of Lean manufacturing[23]. It maintains the habit or standard of cleanness all time in the industry. It maintains good practices at the workplace. Standards should be very clear and easy to understand. There is a need after some period to choose the best ways to practice sort, set in order and cleaning. It is assumed that standards should not be implemented only in the processes such as production, maintenance, storing, but also in the administrative processes, for example: book-keeping, customer service ,etc.

Following are the rules of performing Seiketsu:

- *Give strict instructions about cleanness to the whole staff.
- *Maintain habit to check the progress in the cleanness.
- *Make an audit sheet to ensure cleanness.

Benefits of Seiketsu:

- *Increases the safety of industry.
- *Reduction in the pollution created by industry.
- *Maintains the good habit among the staffs about cleanness.



Figure 6. Standardize[23]

E-SHITSUKE – Sustain

The final stage is **5S Shitsuke** or sustain, ensuring that the company continue to continually improve using the previous stages of 5S, maintain housekeeping, and conduct audits and so forth[23]. 5S should become part of the

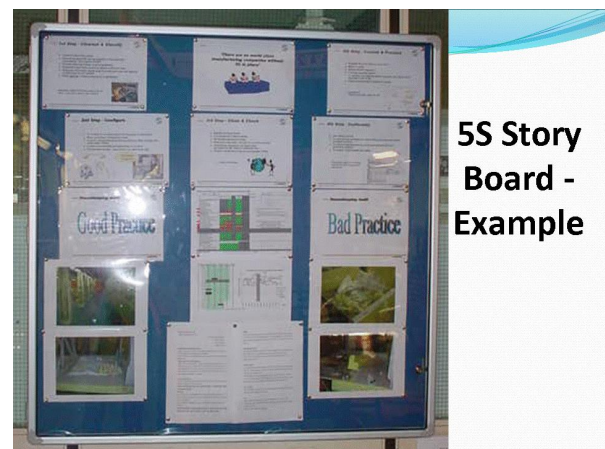
culture of the business and the responsibility of everyone in the organization[23]. It makes the habit for staffs of industry to learn all the above 4S. Trained skilled persons teaches the staff about the all 4S. The task here is undertaken by the leader directors. The directors should explain the importance of 5S to the personnel through various trainings. The knowledge of the personnel about 5S should be kept updated through the 5S boards to be formed at the workplace. To maintaining the standards and keeping the technique in safe and efficient order. It is also important to understand the need of executing the 5S rule on a fixed interval. The learning of the 5S rule is executed once a month by chosen team.

Following are the rules of Shitsuke:

- *Manager of the industry should take the responsibility to held a program for 5S rule.
- *Staffs should also be eager to learn the technique.

Benefits of Shitsuke:

- *Increases the awareness among the staffs.
- *Reduces mistake resulting by staffs.
- *Improves relations between the staffs.



5S Story Board - Example

Figure 7. Sustain[23]

IV CONCLUSION

By studying the 5S methodology we conclude that this technique is very useful and beneficial in Industrial organization[1]. We also concluded that by implementing 5S we could improve the quality, productivity and efficiency of industrial organization, it also has positive effect on overall performance.[1]

REFERENCES

- [1] Arash Ghodrati, Norzima Zulkifli , " The Impact of 5S Implementation on Industrial Organizations' Performance ", *International Journal of Business and Management Invention(ISSN)*, Volume 2 Issue 3, PP.43-49, March 2013.
- [2] Aziz Wan Asri Wan Abdul, Mat Azman Che, "The Effectiveness of Implementation of 5S on Employee Motivation" , *Business and Social Sciences Review (BSSR)*, Vol. 1, No. 1, pp. 41-51,2011.
- [3]Osada T. "The 5S: Five Keys to a Total Quality Environment", *Asian Productivity Organisation, Tokyo*.1991

- [4] Nilipour Akbar, Jamshidian Mehdi, "5S As an Environmental Organization Management Tool; Benefits and Barriers", *3rd International Management Conference*, pp.1-10,2005.
- [5] Wazed M.A., Ahmed Shamsuddin, "Theory Driven Real Time Empirical Investigation on Joint Implementation of PDCA and 5S for Performance Improvement in Plastic Moulding Industry", *Australian Journal of Basic and Applied Sciences*, 3(4): pp. 3825-3835, 2009.
- [6] R. A. Pasale, Prof. J. S. Bagi, "5S Strategy for Productivity Improvement: A Case Study", *Indian Journal Of Research*, Volume : 2, Issue : 3, Issn-2250-1991, 2013.
- [7] P. M. Rojarsra, M. N. Qureshi, "Performance Improvement through 5S in Small Scale Industry: A Case study", *International Journal of Modern Engineering Research (IJMER)*, Vol. 3, Issue 3, pp-1654-1660, 2013.
- [8] Chauhan et al., "Measuring the status of Lean manufacturing using AHP" *International journal of Emerging technology*, vol.1 no.2, pp.115-120, 2010.
- [9] Miller et al., "A case study of Lean, sustainable Manufactu-ring" *journal of Industrial Engineering and Management*, vol.3 no.1, pp.11-32, 2010.
- [10] Girish Sethi and Prosanto Pal, "Energy Efficiency in Small Scale Industries – An Indian Perspective" *Tata Energy research Institute*.
- [11] Chakraborty et al. "Internal obstacles to quality for small scale enterprises", *International Journal of Exclusive management research*, vol. 1, no. 1, pp. 1-9,2011.
- [12] Upadhye et al. "Lean manufacturing system for medium size manufacturing enterprise: An Indian case", *International journal of management science and engineering management*, Vol.5, no. 5, pp. 362-375,2010.
- [13] Hudli and Imandar, "Areas of Lean manufacturing for productivity improvement in a manufacturing unity", *world academy of science, engineering and technology*, vol. 69 ,2010.
- [14] Lukas et al. "Lean implementation in a low volume manufac turing environment: A case study" *Proceedings Industrial Engineering Research Conference*, 2010.
- [15] Kumar and Kumar. "Steps for Implementation of 5S", *International Journal of management. IT and Engineering*, vol. 2, no.6, pp. 402-416, 2012.
- [16] Gheorghe Dulhai. "The 5S strategy for continuous improvement of the manufacturing process in auto car exhausts", *Management and marketing*, vol. 3, no. 4, pp. 115-120, 2008.
- [17] Khedkar at el. "Study of implementing 5S techniques in Plastic Moulding" *International Journal of modern engineering research*, vol. 2, no 5, pp. 3653-3656, 2012.
- [18] Prashant Koli." General Implementation and Calculation of 5S Activity in any Organization" *International journal of Science and Research*, vol.1 no.3, pp.229-232, 2012.
- [19] WALKER, T. Creating total quality improvement that lasts, *National Productivity Review*, 114, 473-478 p, 2008 .
- [20] ANSARI, S. L., BELL, J., Target Costing: The Next Frontier in Strategic Cost Management, *Irwin Professional Publishing, Chicago, IL, USA.*, 1997
- [21] BOCA, G., 5S in practice, XXIV Micro CAD, *International Scientific Conference, University of Miskolc*, 29-34 p., ISBN: 978-963-661-916-3, 2010.
- [22] BLACK, S., PORTER, L., Identification of the critical factors of TQM, *Decision Sciences*, Vol.27, N0 1,1-21 p, 1996.
- [23] <http://leanmanufacturingtools.org/192/what-is-5s-seiri-seiton-seiso-seiketsu-shitsuke/>.
- [24]<http://www.scmep.org/5s-system-workplace-organization/>.

¹ Faculty of Mechanical Engineering, Anjuman-I-Islam Kalsekar Technical Campus School of Engineering, Panvel, Mumbai University, Maharashtra(India).

^{2, 3, 4, 5} B.E.Mech.(Students), Anjuman-I-Islam Kalsekar Technical Campus School of Engineering, Panvel, Mumbai University, Maharashtra(India).