

Feasibility of Application of 5'S Methodology in Construction Industry

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ABSTRACT

This study presents a feasibility of 5'S methodology in construction management. 5'S is a systematic technique used by organizations comes from five Japanese words, Seiri (sort), Seiton (set in order), Seiso (shine), Seiketsu (standardize), and Shitsuke(sustain). This system helps to organize a workplace for efficiency, decrease wasting, and optimize quality and productivity via monitoring an organized environment. It also provides useful visual evidences to obtain result that is more firm. There is a real need for empirical studies in field of new management systems and their impact on construction management performance. As importance role of continuous improvement in today's organization, and lack of sufficient evidence to show the positive impact of 5'S on organizational performance, this study aims to determine performance factors and characteristics in industrial organization and identifying the effectiveness of 5'S implementation on organizational performance as well. The results show that 5'S is an effective tool for improvement of management, inventory control, quality of work, decrease in time as well as cost of construction. In this study the feasibility of 5'S methodology is checked by analytically, also advantages and disadvantages in construction management and implementation of each 'S' in construction management.

Keywords : Lean construction, Continuous improvement, Safety, Kaizen, 5S.

I. INTRODUCTION

5S is an approach originally developed in japan for better housekeeping. Now, it is been utilized for keeping better work place. It includes 5 steps which are to be followed sequence. 5s is a Japanese methodology to organize an improve the efficiency of shared workspace by incorporating regular task such as cleaning, sortening, and rearranging the surroundings and method of operation within the workplace.

5s consists of 5 phases are activities with names starting name the letter 'S' and provides a basic foundation for any organization's lean imitative for continuous improvement.

Following Japanese terms collectively are called 5S.

- 1S – Seiri or Sort
- 2S – Seiton or Set In Order
- 3S – Seiso or Shiny Clean Up
- 4S – Seiketsu or Standardize
- 5S – Shitsukae or Sustain

5S is not about housekeeping. It is not just keeping the workplace organized; it is about instilling the discipline in the work area to keep only what is needed there and having a home for everything.

5S is a workplace organization and continuous improvement system that lays the foundation for the all other lean improvement activities. By starting your lean journey with 5S we will discover the tools and techniques required to be successful in eliminating waste from our process. 5S is not a system or program that can be started and completed. It is continuous improvement process that provides a never ending methodology to continuously improve your operation. It has proven to work in any business, every sector, all industries, in any country and has been instrumental in changing the culture of organization worldwide. Many companies prefers to have “done 5S” many times before. These comments and mindset “it won't work here – we're different” are common in facilities that have not fully understood, embraced or maximized the benefits that can achieved through the concept of lean thinking.

II. METHODS AND MATERIAL

History of 5'S Methodology

5S was developed in JAPAN. Japanese companies were getting more success using 5S concept, thirty years ago researchers started studying the secret of successes of Japanese manufacturing companies 5S turned out to be the most impressive secret. The factories were so well organized. Two major formworks for understanding and applying 5S to business environments have arisen, one proposed by Osada, the other by Hirano. Hirano provided a structure for improvement programs with a series of identifiable steps, each building on its predecessor. As noted by John Bicheno, Toyota's adoption of the Hirano approach was '4S' with seiton and seiso combined.

5S is typically associated with other key industry tools such as, kaizen, lean manufacturing and continuous improvement programs. However, it can stand alone and will work in any environment, e.g. the workplace, your home, your PC and even in your own head 5S is a philosophy and a way of organizing and managing the workplace, especially a shared workplace (like a shop floor or an office space) and keeping it organized. 5S is a system to improve efficiency by eliminating waste, improving flow, reducing process unreasonableness and optimizing productivity through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. 5S is a method of cleaning up and organizing the workplace using its existing configuration. The key targets of 5S are workplace morale and efficiency.

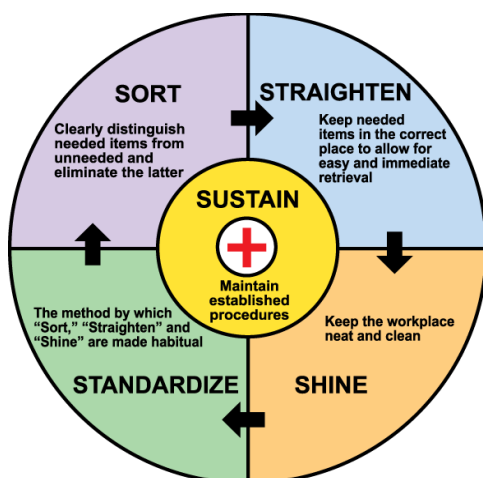


Figure 2. Cyclical 5'S Methodology

Additionally, it is quickly obvious when something is missing from its designated location. The benefits of this methodology come from deciding what should be kept, where it should be kept, and how it should be stored. 5S is a cyclical methodology designed for continuous improvement.

Although the process of applying the 5S principles is best illustrated with a circular diagram because it is a continuous process, there is a logical sequence for implementing the 5S methodology.

III. IMPLEMENTATION

1. SEIRI (SORT OUT)

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. This stage requires the team to remove all items that clearly do not belong in the working area and only leave those that required for the processes in question.

- Remove unnecessary items and dispose of them properly.
- Make work easier by eliminating obstacles.
- Reduce chances of being disturbed with unnecessary items.
- Prevent accumulation of unnecessary items.
- Evaluate necessary items with regard to cost or other factors.
- Remove all parts or tools that are not in use.
- Segregate unwanted material from the workplace.
- Need fully skilled supervisor for checking on regular basis.

2. SEITON (SYSTEMIZE)

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."

- Arrange all necessary items so that, they can be easily selected for use
- Prevent loss and waste of time by arranging work station in such a way that all tooling / equipment is in close proximity
- Make it easy to find and pick up necessary items

- Ensure first-come-first-served basis
- Make workflow smooth and easy
- All above work should be done on regular basis
- Seiton or orderliness is all about efficiency
- This step consists of putting everything in a assign place so that it can be accessed quickly on construction site.

3. SEISO (SHINE)

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. This will ensure that any non-conformity stands out; such as and oil leak from a machine onto a bright, newly painted clean floor.

- Clean your workplace completely
- Use cleaning as inspection
- Prevent machinery and equipment deterioration
- Keep workplace safe and easy to work
- Keep work place clean and pleasing to work in
- When in place anyone not familiar to the environment must be able to detect problems in 5 seconds within 50 feet.
- After work done workplace should be clean.
- Cleaning must be done by on field workers and managers should have watch on it
- Assign every person or group of person for cleaning
- There should be schedule for cleaning and sweeping which does not caused any
- It can be on daily or weekly basis

4. SEIKETSU (STANDARDIZE)

Seiketsu or standardize is the process of ensuring that what we have done withing the first three stages of 5S become standardize; that is we ensure that we have common standards and ways of working. Standard work is one of the most important principles of lean manufacturing.

- Standardize the best practices in the work area.
- Maintain high standards and workplace organization at all times.
- Maintain orderliness. Maintain everything in order and according to its standards.
- Everything in its right place.
- Every process has a standard.

- Generate a maintenance system for above phases, make a team for these work, the head of this team should be manager of that construction site
- Define the standards by which person must measure and maintain cleanliness
- Develop procedures, schedules, practices
- Personnel are trained to detect abnormalities and to correct them immediately

5. 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. 5S should become part of the culture of the business and the responsibility of everyone in the organization.

- To keep in proper working order
- Also translate as “do without being told”
- Perform regular audits
- Training and discipline
- Training is goal oriented process. Its resulting feedback is necessary monthly
- The last step of 5S shitsuke means discipline
- Maintain and practices the first 4 s seiri, seito, seiso, and seiketsu
- Make it a easy way of on field construction management
- The purpose of shisuke is elimination of bad habits and constant practice of good once.

Advantages of 5’S in Construction industry

- Time saving
- Health and safety is ensured
- Reduce time and cost
- Quality and productivity are increased
- Workplace is result in a place which is become easier to manage
- Smooth working
- Accidents and mistakes are minimized
- Maintenance of machine is done regularly

IV. CONCLUSION

The lean construction theory be applicable for construction processes also. Use lean construction theory in construction management will give a easy way of manage all things such as material, construction equipment, manpower and money which will reduce the cost of construction and improve the quality of work. The 5s methodology is simple and easy to understand to all worker as well as manager. For successful implementation of 5s methodology it requires practice of it.

V. REFERENCES

- [1]. Mohammad Hossein Zaeimbashi Isaabadi, EhsanHarirchian,"Comparison of Different Project Management Systems in Terms of Project Life Cycle Assessment in the Construction Industry", International Journal of Recent Technology and Engineering (IJRTE),Volume-4 Issue-2, May 2015.
- [2]. Mariano Jiménez and Luis Romero,"5S methodology implementation in the laboratories of an industrialengineering university school".Safety ScienceVolume 78, Pages 163–172 May 2015.
- [3]. R.T. Salunkhe, G.S. Kamble, Prasad Malage, "Inventory Control and Spare Part Management through 5S, KANBAN and Kaizen at ABC, Industry", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) volume 7 pp: 43-47, March 2009.
- [4]. Vipulkumar C. Patel and HemantThakkar "A Case Study: 5s Implementation in Ceramics Manufacturing Company",Bonfring International Journal of Industrial Engineering and Management Science, Vol. 4, No. 3, August 2014.
- [5]. J. Michalska, D. Szewieczek , "The 5S methodology as a tool for improving the organisation", Journal of Achievements in Materials and Manufacturing Engineering, Volume 24 Issue 2 October 2007.
- [6]. R. S. Agrahari and P.A. Dangle, "Implementation Of 5S Methodology In The Small Scale Industry: A Case Study"International Journal Of Scientific & Technology Research Volume 4, Issue 04, April 2015.
- [7]. PalomaMartínez Sánchez and Carolina Montoya Rodriguez," Impact of 5S on quality, productivity and organizational climate - Two Analysis Cases" Proceedings of the 2015 International Conference on Operations Excellence and Service EngineeringOrlando, Florida, USA, September 10-11, 2015.
- [8]. Arash Ghodrati and NorzimaZulkifli,"The Impact of 5S Implementation on Industrial Organizations' Performance" International Journal of Business and Management Invention Volume 2 Issue 3 PP.43-49 March. 2013.
- [9]. Sunil V. Desale and Sharad V. Deodhar, " Identification And EliminatingWaste In Construction By Using LeanAnd Six Sigma Principles" International Journal Of Innovative Research In Science, Engineering And TechnologyVolume 3, Special Issue 4, March 2014.
- [10]. MihailAurelTitu and ConstantinOprean,"Applying the Kaizen Method and the 5S Technique in the Activity of Post-Sale Servicesin the Knowledge-Based Organization" International MultiConference of Engineers and scientists Volume 3 March 17-19 2010 Hong Kong.
- [11]. S. A. AbbasianHosseini and A. Nikakhtar," Implementing Lean Construction Theory to Construction Processes' Waste Management" Journal Of Management in Engineering ASCE 2011.
- [12]. Salem and J. Solomon," Lean Construction: From Theory to Implementation" Journal Of Management in Engineering ASCE October 2006 .
- [13]. 5S Facilitator's Guide by www.visualworkplaceinc.com
- [14]. 5S/Visual Workplace Handbook by www.bradyid.com/visualworkplace.