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## ANALYZING RELEVANCE AND PERFORMANCE OF 5S METHODOLOGY: A REVIEW

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**Abstract:** *This paper explains the 5S (Seiri, Seiton, Seiso, Seiktesu, Shitsuke) method and its techniques which is use to increase the productivity and efficiency of an organization. 5S is the arrangement of five Japanese words; Seiri (Sort), Seiton (Set in Order), Seiso (Shine), Seiktesu (Standardize), Shitsuke (Sustain). This scheme helps to eliminate the waste, provide safe environment via monitoring the organize environment and use visual data for obtain the best results with effectiveness. It also works on the principal of cubic space within the organization. Consequently, 5S is a set of straight forward steps towards continuous improvement. With this in mind, the present work has attempted to travel around various facets of 5S by analyzing the previous studies about its implementation and see how it can be fitted with in the industries to get the optimal results.*

**Key Words:** *5S, TPM, Quality, Implementation, Methodology, Organization*

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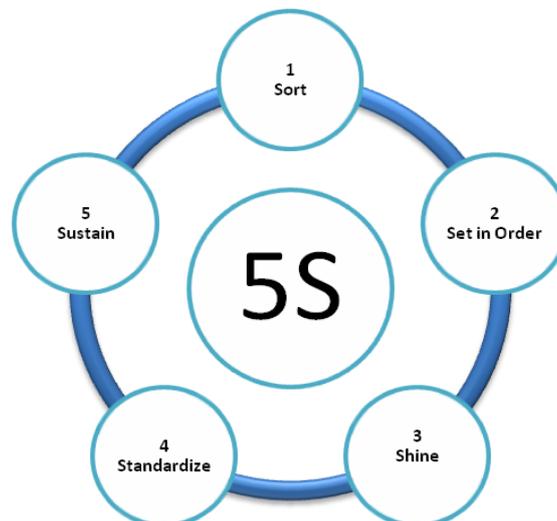
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## INTRODUCTION

Total productive Maintenance (TPM) is a productive maintenance process requiring participation of all staff in order to get maximum equipment efficiency in an organization, which involves all human resources [1]. It is described as the integrity of the active maintenance and autonomous maintenance activities run by all personnel in a small group activities. For implementation of TPM on operating level there is an idea which so called 5S [2]. 5S is a method that originated in Japan for improvement of worksite and management including five steps as shown in figure 1.

- Sort (Seiri) involve organization of workplace removes the unwanted parts
- Set in order (Seiton) involves putting the items to their place after use and provide easy access
- Shine (Seiso) involves clean the workplace after every shift, its helps in inspect and find the defect on worksite
- Standardize (Seiketsu) involves creating the guidelines and control for keeping the organization in order and clean
- Sustain (Shitsuke) involves training for each individual to maintain the 5S standards and to ensure that everyone follow them.



**Figure 1: 5S Closed cycle**

5S method creates an environment for standardize work and providing better working condition, improve quality, focuses on eliminating the waste, provide safety for workers,



keep the workplace clean, maintain the standards, ensure that everyone should follow them and make 5S as a culture for the organization.

### **5S- MEANS**

- Seiri (sorting, get rid of worthless materials, governing the institute) Deals with assort all the tools and materials and other apparatus in the workplace. Crucial equipment is gathered appropriately, which diminish peril.
- Seiton (set in order, provide place for everything) Find out the requisite of the employee. Tools, materials and other apparatus should be aligning for quick approach in the efficient way.
- Seiso (shine, cleanliness, get rid of waste and dust etc.) Focuses on keep the workplace neat and clean. Cleaning should be a daily activity. Every tool and apparatus should be restored to its place after its use.
- Seiketsu (standardize work environment, cleanliness and storage, rules and regulation for the firm) every person should know his responsibility. Cleanliness should a routine activity after every shift.
- Shitsuke (sustain, discipline and cognizance of the above set of rules) Retain these standards continuously for years.

The implementation of the 5S should begin from the prior training of the workers and inform about the 5S and its benefits. It is compulsory that every person in the firm should have known the rules of 5S and adopts its change. During training it is necessary that workers should be trained with a clear example so that they understand the methodology of realization of 5S's components. It is important to understand the fact that the 5S does not refer only for the production, but also to the stores, office position and others [3].

### **5S METHODOLOGY**

The complete description of 5S methodology as follows:

- **1S – Sorting**

Through the proper sorting it can be classified the equipment, tools, materials and other information for attainment of the work. Sorting get rid of waste material, non-conforming products, and damaged tools. It helps to maintain the workplace clean and augment the efficiency of searching and receiving stuff cut down the time of running the operation [4].



The 1S rule proceeding:

A) The following control questions should be answered at first stage:

- Are unnecessary elements creating mess in the work zone?
- Are unnecessary residue of the materials thrown anywhere in the work zone?
- Do tools and other material to production lie on the floor?
- Are the necessary objects sorted, classified and hold its own place?
- Are all measuring tools rightly kept?

On the basis of the above question it is possible for the computation of the workshop in terms of the 1S rule. If any of the above question is yes than it should arrange the things, which are on the shop floor.

B) One should bring the review of all the items which are on the shop floor and arrange them. Accordingly to carry out the sorting it should deal with the material which found on the workplace unnecessary.

C) To constant usage of 1S rule is called Red Tag which means giving red color tag to the stuff which operator will identified within his workplace. At the initiation of month put a tag on every object. During the month get rid of tag when object is used and at the end, decide whether the object is useful or not.

- **2S – Set in Order**

The main thing is visualization of area of workshop and the painted floor helps to select the place for storage or transport ways. Put label on every item for identifying easily.

Implementing the 2S rule:

Make sure items can be recognized by tagging them properly. Every working method has its own type of order. Identify and refine it. For make things faster use lean thinking [5].

The 2S rule proceeding:

- Cut down the preparation time for tool setting.
- Cut down the waiting time for materials, parts, files, and papers.
- By improving the plant design and workshop reduce the cycle and preparing time.
- Check out the parts in stores.
- Time and power spent on looking for fixture tools, jigs etc.
- Seeking for files and data in computers.
- Tags are attached so that items can be identified.



- Allegedly and clear.
- **3S – Shine**

Routine cleaning allow to identify and to get rid of source of jumble and to control the work area neat and clean. During cleaning machine, workshop and shop area, light source, ongoing information, route of cleanliness is monitored. Operator should take care about own maintenance and neatness.

Implementing 3S rule:

Renovation of workshop is the first step of 3S rule, routine cleaning is mandatory for maintain this improvement. Cleanliness is beneficial to note the damage on parts of machine, cracks and misalignment [6].

- **4S – Standardize**

Worked out and implemented standards in the workshop. Management should give direction to the workers, which are clear and easily understandable so that workplace clean and would be in order. All the workers of the workshop should be participated in this activity; the workers group knows particularly their own exercise and process of elaboration, usage gives them possibility of understanding the quality and each prospect of the operation. The objective is to easy access of the required standards for constant and ocular places should be assured.

It is conclude that standards not only being implemented in usual operational process e.g. maintenance, movement, production, sorting but also in organizational process like customer service, book keeping, HRM etc [7].

## **5S – SUSTAIN**

The basis is to set up a clean environment and to maintain it as an ongoing process forever. This increases the awareness in the workers and diminishes the non-conforming and faulty products. It also increases the human relation and communication between the workers.

It is also necessary to understand the need of implement and inspection of 5S. The inspection is done with the help of a check list, which provide estimation of work place. The inspection of realization of 5S principle is executed by a team once in a month [8].

## **RESEARCH BACKGROUND**

Lixia and Meng (2008) have defined how to make 5S as a culture in Chinese Enterprises accordingly in China many enterprises that carry out 5S management haven't benefited



from it due to misunderstanding and errors in 5S management like lack of leader's emphasis, lack of all employees' involvement, 5S is merely cleanup, too busy to implement etc. It concluded that 5S program can benefit an enterprise greatly if it is implemented correctly [9].

Shumin and Lixiaoling (2009) have worked on Analysis of Enterprise Downsizing Management mode based on 5S Management. Due to global financial crisis along with low sale and serious competition, downsizing is sweeping the world. Even top brand enterprises cutting off employees all over the world. Authors analyze why downsizing is happening and gave some functions for avoiding the downsizing the risk. In last it concluded that the downsizing management mode based on 5S management useful to avoid downsizing risk, to achieve goal of downsizing and to enhance competing capabilities [10].

Uma and Kannan (2010) implemented 5S in HRM. To stay competitive, a company has to respond. Since an organization is an integrated and interconnected system, an action taken in one place affects things elsewhere. A proper 5S training course sensitizes people so they can become more productive. It concludes that 5s is required to be followed in HRM for the organization to reach the pinnacle of glory at the same time care should be taken so as not to impose it very rigidly on the employees [11].

Rahman *et al* (2010) have described implementation of 5S method in the manufacturing companies. Authors take two company named A and B and compared them according to the 5S basis. The results show that the company A after implementing 5S only two areas was found out of excellent conditions, and company B was at modest level as compared to company A. It can be concluded that company A was standing towards the perfection level as compared to company B, and 5S practice seen as an effective method that can improve environmental performance, housekeeping, health and safety standards [12].

HungLi (2011) implemented 5S in Wan Cheng Manufacturing Factory in Taiwan. The company has difficulty in meeting customers' demand because of time consuming and non-efficient process flow so the authors had implement the 5S principles to assist the company to become more efficient and more productive by streamlining the process. The result was implementing 5S that company reduces its time consuming process which allows the additional productive for employees to work meeting customer demands and concluded



that 5S promote the organization to improve the process flow and have a better working environment [13].

Shyam (2011) implemented the 5S Methodology for a Graphic Communications Management Laboratory of University of Wisconsin-Stout. The lab used by GCM was unorganized and crowded which hinders the movement of people and material for that 5S has to be implemented to organize and manage GCM lab. After implementing 5S and reviewing the results that the lab was much cleaner and better organized. It concluded that 5S plays a major role in organize and more efficient lab use [14].

Moradi *et al* (2011) studied Effects on implementing 5S on TPM - Total Productive Maintenance. In this authors focused on relations between 5S and pillars of TPM are amplified. In this a well-known foodstuff producing factory had been investigated as a case. 5S has been implemented in all administrative and production departments of the company. In last it concluded that all the 5S principles affect TPM directly or indirectly. 5S, in particular, can six big losses. Its most challenging side is to provide the permanency of the approach. Successful 5S utilization is dependent on the trainings to be given by the directors to the personnel [15].

Jamian *et al* (2012) have worked on a conceptual model towards sustainable management system based upon 5S practice for manufacturing SMEs. Authors' main focus was on implementing 5S for sustainable development because the problem of sustainability is becoming a global concern by many organizations and showed that the practice of 5S is initially concentrates on the improvement of industrial workplace environment in the pursuit for high quality, low cost and rapid delivery of products. It was concluded that 5S have big influence on sustainable development [16].

Ghodrati and Zulkifli (2012) gave a review on 5S implementation in Industrial and Business Organizations and described 5S is a useful method for founding an organization and spread out a design and can improve communication and help employees to develop their characteristics to decrease downtime, lead time, inventory, defect, injury, and associated costs. Authors' concluded that there are difficulties in the effective 5S implementation, so there must be an applicable way to using 5S as improvement tool for communication system. 5S key of success is training and its implementation is not possible without proper training and employees are not capable to actively standardize the 5S [17].



Falkowski and Kitowski (2012) have defined the 5S methodology of as a tool for improving the organization production. Authors' implements 5S in a company that produce aluminum foils and defined how the 5S implement on a firm that requires the whole team commitment- both the employees and the company. In his work shows that 5S reduce the scrap, improve quality of product. In last it concluded that 5S is a cheap and versatile method for implement in any firm to increase the quality of product, reduce space but with adequate training and motivation the employees which lead to directly company's success in the market [18].

Panchal (2012) has described improving the organization through 5S methodology. Author focused on the methodology adopted in 5S and implementation of the same in a company. It can be observed that introducing the 5S guidelines bring the strong changes in the company like improvement in process by costs' reduction, enhancement of effectiveness and efficiency, maintenance and advancement of the machines' efficiency, increase safety and decrease the industry pollution, proceedings according to decisions and concluded that after implementation of 5S process improvement by cost reduction, improvement of the inter human relations etc [19].

Sorooshian *et al* (2012) studied on experience of 5s implementation: a case report. One of the main challenges of the corporate in this era is to manage the excellence of the work environment. 5S is known as a very effective technique to manage the quality environment of an organization. The implementation of 5S shows an enormous effect on organization. It is concluded that 5S practices can help companies to plan and implement efforts in order to create a workplace environment that is conducive to improving the quality of services [20].

Gurel (2013) have described a conceptual evaluation of 5S model in hotels. As the hotel sector is growing and the survival of hotels depends on increasing service quality and value. However traditional management approaches not sufficient to achieve this. Increasing quality and value depends on improving service production. Author focused on based on continuous improvement philosophy, 5S is an appropriate business model for hotels. It concluded that 5S model is analyzed as one of the methods which will satisfy the quality and value oriented management requirement of the hotels in place of the traditional applied practices [21].



Rojasra and Qureshi (2013) have worked on performance improvement through 5S in small scale industry: A case study. The small scale industries occupy a prominent position of unique importance in economy of India. In India, the survival and growth of small scale industry largely depends on its ability to innovate, improve operational efficiency and increase productivity. The 5S tool selected through AHP considering different criteria is to be applying for performance improvement of case company. Authors' studied the 5S implementation on a small scale industry name Krishna Plastic which manufactures a plastic component through injection molding. The study concluded that the efficient implementation 5S techniques lead to subsequent improvement productivity of the manufacturing plant [22].

Pasale and Bagi (2013) have worked on 5S strategy for productivity improvement: A case study. Authors' studied on a small scale industry named Sunmill Industries where much time was wasted in set up than the machining time. Due to all the material was misplaced and most of the materials get lost. So to increase the productivity it was necessary to reduce the non-productive time. In last it concludes that the 5S is an effective management tool which can improve housekeeping, environmental conditions and health and safety standards. Results of 5S are visible within short period of time. Employees in the organization become self-discipline [23].

Xu Chuanjie (2013) implemented 5S in university library. The purpose was to improve the service quality of university library, using 5S management experience, the definite implementation plan of 5S management was established. As the thoughts of 5S management fit the requirement of daily work in university library very well. In last it concluded that university library has become the symbol of university development and its academic level and service quality and the satisfaction degree of our library are improved, which indicate the proposed implementation plan is effective and efficient [24].

Rahimi *et al* (2013) have studied the application of symmetry components in the branch of youth and sports of Isfahan Province. Authors' implements the 5S process in the youth and sports and show the benefits of 5S after implementation then defined the method of implementing and how to analyze it and then research findings and concluded that the most important goal of the 5S is to make better the work of the employer. The 5S as one of the



powerful parts in improving the usage of the employer in the office of the sport and youthfulness for increasing the learning in organization [25].

Yusof *et al* (2014) have worked on the Sustainability of 5S implementation in an Administration office of a Higher Education Institution. The objective was to identify the appropriate measure to be applied to ensure the sustainability of 5S implementation and also investigate the difference of attitude of admin staff after implementation. After data analysis and finding concluded that 5S is the effective way in providing a better workplace for administration staff as they feel more comfortable, safe and well organized [26].

Malik (2014) has worked on implementation of 5S methodology in the surgical instruments industry of Sialkot. Author focused mainly on the basic tool of workplace organization of lean manufacturing. The surgical instruments industry is an ever growing trade. The environment of the workplace is a very important factor in the manufacturing process, since the health and physical stresses on the human body greatly influence the quality of the product then gave the guide line for the improvement of the environment of the manufacturing as well as the office space and concluded that implementation of 5s will be an advantage over others in the way that the efficiency of the company will improve due to better working conditions of employees [28].

## **CONCLUSION**

The study of these papers shows that efficient use of 5S in an organization leads to improve quality, optimal utilization of space and provide safe environment. 5S helps in minimize waste and increase productivity also. It promotes cleanliness in raw material, in storage and in finished products. It helps in increase in coordination between workers. From the literature, it is finding that some organization have the view that the implementation of 5S is somewhat difficult in nature so it is always be required to implement 5S in suitable and in effective manner to get the desired goal. Lack of communication between management and worker, poor training cum awareness programmes for worker about 5S comes into picture by studied different case studies and research background. Companies that wish to accelerate development of their own healthy program should make a good communication way between management and workers and should arrange scheduled training programmes for the workers.



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