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# Implementation of 5s System in Small Scale Industries

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**ABSTRACT:** Small scale industries play an important role in Indian economic. It has emerged as powerful tool in providing relatively larger employment next to agriculture. It contributes more than 50% of the industrial production in value addition terms and generate one third of the export revenue. Global markets are continuously changing and demanding product of high quality and low cost. Such products can be produced using lean manufacturing, a management philosophy that aimed to reduce all types of wastes at all levels of product manufacturing so as to reduce product cost. 5S is a basic lean manufacturing tool for cleaning, sorting, organizing and providing necessary groundwork for work place improvement. This report deals with the implementation of 5S methodology in the small scale industry. The study was conducted using a qualitative research approach, and data was collected through interviews with managers and employees of small-scale industries. The results of the study indicate that the implementation of 5S has numerous benefits for small scale industries, including improved productivity, better quality, reduced waste, and enhanced safety. However, the implementation process is not without challenges, including resistance from employees, lack of training, and inadequate resources.

**KEYWORDS:** 5s, small scale, quality, lean manufacturing, quantitative approach

## I. INTRODUCTION

In the business world, customer needs are always changing, new technologies are continually being developed and generations after generation of new products appear in the market sales competition increase each year as companies strive to manufacture more sophisticated products at lower cost. 5S is a technique originated from Japan and it was first developed by Hiroyuki Hirano. The 5S approach is simple and universal. It works in companies all over the world. 5S activities provide essential support to successful improvements of a company such as shorter equipment changeovers, Just-In-Time inventory systems, Total Quality Management and Total Productive Maintenance. The 5S are defined as Sort, Set in Order, Shine, standardized and sustain. The two most important elements are Sort and set in order. The success of improvement activities depends upon them. Hiroyuki Hirano from Japan initially developed the concept of 5S approach to a production system. 5S is considered as a Lean management tool and it is useful in eliminating non-value added process available in the manufacturing industries. This is achieved by standardization of the methods and processes in properly organizing them in a standard manner. The 5S quality improvement tool and represents the several elements and its function. 5S is a lean tool that is used to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order. 5S was developed in Japan and was identified as one of the techniques that enabled Just-In-Time manufacturing. 5S is now being applied to a wide variety of industries. It has expanded from manufacturing to health care, education, government, and many other industries. Although the origins of the 5S methodology are in manufacturing, it can also be applied to knowledge-economy work, with information, software, or media in the place of physical product.

### Objectives of 5S

- Reduce Overall Cost, Waste, Time Inventory or Stock, Industry Pollution.
- Improve customer satisfaction, quality, standardized work awareness & morale of employees, efficiency, self – discipline, work environment, inter human relation or team Work, productivity, safety.
- Proper workplace management for better use of working area.
- Time saving in searching for tools and materials due to proper location and identification.
- Store tools beside the machine which they will be used according to sequence of work operations.
- Develop systematic storage as per 5S.

- Use small's bins to organize small items whole area of production is required to be cleaned & organized as per 5s.

## II. LITERATURE REVIEW

Literature study is required to understand the correct objective of the project work. The past research work gives the better idea and clear contain of cognition. It helps us to reach to a particular destination. The goal is “optimization implementation of 5s system in small scale industries. Ajay Anantrao Joshi et.al (2015) emphasized about the 7th as in the methodology in the paper. The 7th exhibits “spirit” (team spirit). The spirit stands for the formation of the team which has motivational leader and cooperative members. Targeted outcomes after the implementation of spirit are better communication among the employees of the organizations [1]. Workers feel the self-motivated at every time and they work with full of energy and with extreme high confidence. Spirit reduced the boredom approach of the employees toward their jobs. After all, the employees got better understanding of the problems and solve the issues with some appropriate approaches; hence, the healthy environment can be created. “Sphoorti Machine Tools” has improved productivity by successful implementation of 5S methodology. This study's main aim is to improve the bottom-line production without the need for capital investment which was conducted by Soumya R. Purohit et al (2015). Also, they have found increase in productivity and hence profit levels too. The other merit behind this methodology implementation was higher enthusiasm and punctuality among the workers and safer working situations [1].

Shreya Chavan et al. (2017) studied the implementation of 5S in Prabha Engineering manufacturing industry in Rabale (Navi Mumbai). 5S system implemented in the manufacturing unit which is found to be appropriate due to the many merits such as the wastes, scraps and losses were minimized, and production were controlled with flexible workstations. The main problems were ineffective inventory management, lack of quality improvements, quality control and lack of employee participation. After sorting the raw materials, labelling the tools and areas, removing dust and oils from the floor, creating the guidelines for above three and by keeping the discipline the desired results were gained. [2]

Nita Sukdeo et.al (2017) did the study of an ink manufacturing organization has been selected for the implementation of the 6S methodology. The organization was facing the issued regarding the products being returned because of incorrect labelling and packaging. Another concern was that employees were wasting their time searching for tools which resulted in downtime. The main purpose of the study was to enhance the overall rate of productivity and efficiency by solving such obstacles of the organization. A method called Organizational photography was applied to represent the situations of before and after effects of the 6S implementation. In this method of direct photo analysis, the researcher captures the photo and does the analysis of it. [3]

P. M. Rojasra et al (2013) described the development of key areas, which could be used to adopt and implement the lean manufacturing practice and also presented some of the techniques to evaluate and reduce the resources needed on projects resulting in enhanced production efficiency [4]. The prime aim of this study was to implement 5S methodology and measure the performance improvement in Krishna Plastic Company, which is a small-scale industry situated at Amreli, Gujarat. It shows that a small manufacture can rapidly increase output and reduce quality threats by 80%. Also, it presents methodology for determining the real problem connected with industries in implementation of lean. Author also presented selection of required lean tools in the light of company's long-term vision. [4]

Authors Oleghe Omogbaia et.al (2017) used Dynamic approach to implement the lean tool 5S methodology. They observed problems like out of order manufacturing, demand fluctuations, plant is small and tidy, and product manufactured is seasonal product. The SD model was built on various variables such as order entry rate, lead time, short time, manufacturing cycling time etc. This dynamic model is able to access the advance improvement in lean manufacturing. The analysis result shows that total time spent on searching the items is reduced from 0.6 to 0.2 work hours per day which exhibits 67% improvement. The company's managers need to adopt the methodology to improve the aspects of lean using an SD modeling technique. [5]

Sagar D Ghagare et.al (2017) analysed and implemented the 5S methodology in Harsh Polymers. The main problem faced by them was the utilization of raw materials and time wasting for finding the tools. [6] Also the place management was improper and the labours were unaware of modern innovative techniques. The research suggested that the most essential thing is to implement the rules. In order to solve the issues, they provided the bins for raw materials and tools. They created the racks in which they managed the tools according to the series of operation. Consequently, 25% to 30% of time was saved of worker by implementing this. Also the audit sheet was provided to maintain the



above 3S and that is the main aim of 4th S. By the cooperation among the staff and workers, all the aspects of 5S were achieved. [6]

### III. DATA COLLECTION FOR IMPLEMENTATION OF 5S

#### Data Collection in Industry

##### The following steps can be taken to collect data:

1. Conduct a workplace assessment: Observe the workplace and assess the current state of organization, cleanliness, safety, and efficiency.
2. Identify problem areas: Identify areas that need improvement and prioritize them based on their impact on productivity and safety.
3. Conduct a waste analysis: Analyse the waste generated in the workplace and identify opportunities for waste reduction.
4. Collect feedback from employees: Ask employees about their experiences working in the current environment and gather suggestions for improvement.
5. Measure productivity: Measure the productivity of the workplace before and after implementing 5S to quantify the impact of the changes.
6. Analyse inventory levels: Analyse the inventory levels and identify opportunities for reducing inventory waste.
7. Collect safety data: Collect safety data such as accident reports and near-miss incidents to identify potential hazards that need to be addressed.



Figure no 1. Before 5s implementing data collection

### IV. IMPLEMENTATION OF 5S AND ITS BENEFITS

#### Implementation of 5S

##### Step 1:

Start with the leadership team as with any improvement effort, implementation of the 5S's must be driven from the top of the organisation. Only the top management can create the environment needed and give the effort the visibility and importance it needs for long term viability. Hence, it is vital to get commitment from the top management to allocate resources for training and process improvements.

##### Step 2:

Build the infrastructure the 5S effort should fit within an organisation's existing improvement structure. Divide and conquer by establishing 5S sub-committees for communications, training, project support and best practices. The organisation should also appoint a person or a team to be the ambassadors or champions of the company's 5S.

##### Step 3:

Launch communications Conduct short, focussed and frequent communication sessions with all employees on what, why, how, when and who of the 5S initiative. Deliver the message in several formats including group meetings, using the organisation's Intranet

##### Step 4:

Train teams in 5S techniques Develop a plan to train everyone in basic 5S concepts and then supplement the generic training with just-in-time training in work-area-specific practices. Note that the initial teams may need to be trained in problem-solving techniques and root cause analysis. Additionally, there may be a need to provide training for the leadership team in communication skills, recognition strategies and facilitation skills.

##### Step 5:

Begin the 5S pilots select areas that need the 5S's as pilot areas. What is learned and gained in the pilot areas will be used to help in the development of a full roll-out plan. The first pilot work areas to receive 5S treatment should be ones with high visibility. For example, select work areas in which nobody wants to work because they are congested or dirty.

**Step 6:**

Establish Best Practices Creation and use of a best practice database can help multiply the impact of 5S successes by providing the means to share successes throughout the organisation.

**Step 7:**

Develop a full roll-out plan after completing the initial pilots and before involving the rest of the organisation in the 5S effort, step back and evaluate how the pilots performed. Get ideas from members of the pilots about how to strengthen the 5S process and use those ideas to develop a roll-out plan. A comprehensive roll-out plan defines the sequence of events, establishes roles, responsibilities and performance measures.

**Step 8:**

Continually evaluate and adjust as with any process, use the lessons learned to make improvements to the 5S effort. Modify and strengthen the infrastructure, select new tools to add to the “arsenal”, develop improved methods to measure and communicate progress, and challenge work areas to constantly improve.

**Benefits of 5s Implementation**

● **Benefits of Sort (Seiri):**

1. Improves work place
2. Cost saving
3. Problem solving
4. Proper organization of work space
5. Elimination of waste

● **Benefits of Set in order (Seiton):**

1. Save time of searching material
2. Easily identified of material
3. Increase efficiency of work
4. Controls inventory

● **Benefits of Shine (Seiso):**

1. Work place will remain clean
2. Efficiency of machine increases
3. Elimination of errors and defects
4. Elimination of accidents and incidents
5. Motivations to the employees as area is clean
6. Increase life of machine
7. Environment become safe
8. Reduction of waste

● **Benefits of Standardize (Seiketsu):**

1. Standard process aligned to the entire department
2. Proper and classified work environment
3. Reduced breakdown
4. Improve work area visually

● **Benefits Sustain (Shitsuke):**

1. Involvement of employees helps to boost the moral value of employee.
2. Positive work environment
3. Proper organized work culture

**V. RESULT AND DISCUSSION**

Time Analysis of Implementation Of 5S Time analysis or Time comparison is play an important role in a company or industry to improve working and productivity efficiency. Time analysis nothing but comparison of operation time means how much time take by the process, manufacturing of product, searching of tools and materials, etc., In our filter Company we have implement 5S, we have work on each stages of 5S and we recorded all data and compare it with before implementation of 5S data we have improve it after implementation of 5S, that comparison shown in below table

- Segregation of Needed/Un-Needed items from the workplace.
- Needed items are stored in an organized manner.
- Creation of Red Tag Area. Creation of shadow tool boards and systematic



- Die Rack arrangement for storing of Dies to reduce to reduce search time.
- Regular cleaning of machines and work area.
- Regular 5S Audit of Zones.

**Cleaning schedule**

Table no 1: Cleaning schedule

Company Places	Frequency of cleaning in days
Maintenance Table	Once/week
Shop Floor	Twice/week
Dispatch	Once/week
Storage	Once/week
Washroom	Once / day
Office	Once/week

**Material Searching Time**

Before and after conducting this activity searching time for tools was calculated which was the most frequently thing which every employee needs.

Table no 2: Material Searching Time

Activity searching time for tools	Time in Minutes	Days
Before(sept.to jan.22)	24 Min.	Employee per week
After(jan.to may.23)	6 Min.	Employee per week

**The following calculations show the cost saving in labour cost:**

Saving in time / week = 24 - 6 = 18 min.

Saving in time/ month = 18×4 = 72 min.

Salary of employee /day Minimum in Rs.280/8hrs = Rs.0.58/min

Cost saving per month / employee = Rs.42

Total labour cost saving /month = Rs. 42×8 = Rs.336 (since 8 employees work there.) Total labour cost saving/year =Rs.336×12 =Rs. 4023.

**Productivity (turnover)**

Table no 3: Productivity (turnover)

Production Cost.	Monthly	Yearly
Before (2022)	18 Lakhs	2 CR.
After(2023)	19 Lakhs	Approx. 2.28

**Accident Percentages**

Table no 4: Accident Percentages

Accident Percentages	Monthly	Yearly
Before (2022)	(0-1)	2
After(2023)	(0-0)	1

**Manufacturing lead time**

Table no 5: Manufacturing lead time

Cycle time	Type	Time	Dimensions
Before (2022)	Small shafts	8 to10 hr.	Dia.(50 to 100)mm.& Length (1000 to 1500)mm
	Big shafts	10 hr.	Dia.(100 to 250)mm.& Length (2000 to 3500)mm
After(2023)	Small shafts	6 to 8 hr.	Dia.(50 to 100)mm.& Length (1000 to 1500)mm
	Big shafts	9 hr.	Dia.(100 to 250)mm.& Length (2000 to 3500)mm

5s implementation in industry before and after



Figure no 2: Before 5s implementing tool table



Figure no 3: After 5s implementing tool table



Figure no 4: Before 5s implementing rack



Figure no 5: After 5s implementing rack



Figure no 6: Before 5s implementing scrap area



Figure no 7: After 5s implementing scrap area



Figure no 8: Before 5s implementing rejection area



Figure no 9: After 5s implementing rejection area



## VI. CONCLUSION AND FUTURE SCOPE

### Conclusion

The implementation of the 5S methodology in the small-scale industry resulted in significant improvements in productivity, efficiency, and safety. The methodology can be easily adopted by other small-scale industries to improve their operations and reduce waste. 5S implementation can have a positive impact on small scale industries. By implementing 5S principles, small scale industries can improve their productivity, efficiency, quality, employee engagement, and safety. This can lead to increased profitability and customer satisfaction. Therefore, it is recommended for small scale industries to consider implementing 5S principles to enhance their operations.

### Future Scope

5S implementation in small scale industry has a significant impact on the overall productivity and efficiency of the organization. The future scope of 5S implementation is vast, as it helps in reducing waste, improving quality, and increasing employee engagement. It also helps in creating a safe and organized workplace, which leads to better customer satisfaction and increased profitability.

## REFERENCES

- [1] Ajay Anantrao Joshi (2015): "A Review on Seven S (7S) as a tool of Workplace Organization" IJIET Volume 6, Issue 2, and ISSN: 2319 – 1058 pp.19-26.
- [2] Shreya Chavan, Reena Pant (2017): "Process improvement by using '5S' in manufacturing unit: A case study"
- [3] Nita Sukdeo (2017): "The Application of 6S Methodology as a Lean Improvement Tool in an Ink Manufacturing Company" Research Gate DOI: 10.1109/IEEM.2017.8290176.
- [4] P. M. Rojasra1, M. N. Qureshi (2013): "Performance Improvement through 5S in Small Scale Industry" IJMERE Vol. 3, Issue. 3, ISSN: 2249-6645, pp.1654-1660.
- [5] Oleghe Omogbaia, Konstantinos Salonitis (2017): "The implementation of 5S lean tool using system dynamics approach" Procedia CIRP 60 (2017), pp.380 – 385.
- [6] Sagar D Ghagare, Abhay A Desai, Rohit B Patil, Uttam Y Siddh (2017) "5S implementation in small scale industry" VOLUME-4, ISSUE-8, ISSN (PRINT): 2393-8374, (ONLINE): 2394- 0697 ,pp.23-29. [6]
- [7] Kaushik Kumar, Sanjeev Kumar (2012): "Steps for Implementation Of 5S" IJMRA Volume 2, Issue 6 ISSN: 2249-0558 pp.402-416.
- [8] Priyanka Rai (2016): "Effectiveness of 5S implementation on organizations performance" Abhinav Publication Volume 5, Issue 1, Online ISSN-2320-0073, pp.01-10.





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