

## '5S' implementation in a Fasteners manufacturing company

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**Abstract** - The purpose of this paper is to use 5S tool so as to assist tiny scale producing organization to become additional productive and additional economical. a straightforward approach has been adopted for implementing 5S. throughout results, it has been analyzed that implementation of '5S' resulted in overall improvement of the organization. With the implementation of '5S', Tool looking time from workplace has been reduced from twenty five minutes to six minutes alongside different important advantages.

'5S' audit has been conducted within the organization. '5S' audit score has been exaggerated at the top of the project. 5S is powerful tool and might be enforced in numerous industries whether or not it's small, small, medium or giant. The publications and work bestowed in this paper can be helpful to researchers, consultants and others considerations with this subject to appreciate the importance of 5S.

**Key Words:** Lean manufacturing, 5S Audit, Red tag, log book.

### 1. INTRODUCTION

In Indian economy small-scale producing industries occupy a key place, thanks to their employment potential and their aid to total industrial output and exports. Now-a-days this sector facing challenges to retain its prosperous position as a result of conflict of recent competitors each within the national and international market. So, continuous improvement is needed to beat these challenges. within the competitive business the producing firms have to pay attention for the sweetening in productivity, quality, efficacy, safety and its service.

Lean producing (LM) is that the solely technique with that of these issues is resolved. luminous flux unit is enforced by its numerous tools like '5S', 'KAIZEN', 'Total Productive Maintenance', 'Value Stream Mapping, simply In Time, POKA-YOKE, 'Overall instrumentality Effectiveness', 'Plan Do Check Act'. Out of of these '5S' being economical and effective tool was chosen for finding involved business.

### 1.1 Summary of 5S methodology

5S Methodology is one in every of the essential and therefore the most vital tool to implement Lean producing. it's a system to manage the work flow by systemizing the geographic point, so supporting the culture of continuous improvement. 5S has been introduced in Japan in the main within the producing and service industries. 5S is the signifier for 5 Japanese words Seiri, Seiton, Seiso, Seiketsu and Shitsuke severally. the subsequent table explains these 5 words in best method.

### 2. METHODOLOGY

The whole methodology for implementation of 5S was framed by exploitation one in every of the lean tools i.e. set up Do Check Act (PDCA). In this, set up was created for 5S associate activity that was then enforced and checked i.e. assessment was administered to search out the results of implementation. Act refers to steps taken to fill the gap found under control stage nothing however the advance is completed and PDCA cycle is perennial for higher results.

#### 2.1 Plan

Before about to the implementation part, higher officers and engineers are going implement 5S ought to visit industries who have with success enforced 5S to line the benchmark. Consequently coaching on 5S should be provided for all. Then the 5S Council is necessary to be shaped.

#### 2.2 Do

**2.2.1 Sort:** Identification of necessary things and separating unwanted things with facilitate of red tag. Keep them away in storage or discard them. This can produce additional free house and hidden issues is known and this indirectly avoids accidents thereby increasing safety.

**2.2.2 Set in Order:** once distinguishing the mandatory things, decide the place for each item. make certain everything is unbroken on its present place solely. Yellow tape ought to be place to limit machine space and human

interference. This activity helps in reducing accidents, looking time for tools and different necessary things required oftentimes.

**2.2.3 Shine:** This refers to improvement of one's close and of him. Periodic improvement ought to be done. Improvement makes work atmosphere higher for work. This indirectly improves bioengineering and thereby productivity.

**2.2.4 Standardise:** each method in company ought to be standardise i.e. commonplace procedure (SOP) is formed. This includes commonplace for 5S activities too. Awareness is made with facilitate of posters pasting on the wall. Conjointly Vision and Mission of company similarly as 5S ought to be displayed on walls of workplace.

**2.2.5 Sustain:** This activity focuses on maintaining these four S activities. It tries to forestall fall back thanks to tolerance of workers.

**2.3 Check**

In this step 5S Audit is conducted on weekly or monthly basis for assessment of 5S work standing. Audit is administered by third party to avoid biasing. Audit contains five queries for every 'S' and every question has rating zero to four. So most marks is given to any question is four. So for every S most marks is twenty and for complete audit is for a hundred marks. once Audit is administered results area unit displayed on 5S board.

**2.4 Act**

For continuous improvement, the involved authority ought to make sure that gap found in this Audit ought to get fill until second Audit. Meeting is to be conducted to coach workers for higher results by comparison with benchmark. Results area unit displayed on 5S board and worker is rewarded WHO has greatest score among all different zones' worker in order that workers get impelled and that they work more durable.

**3. IMPLEMENTATION AND RESULT**

**3.1 Sort:** the entire house offered was divided into four zones X1, X2, X3, X4 viz. 'Maintenance', 'Production', 'Raw material and storage' and last is 'Quality and dispatch' severally. Currently unwanted materials in those zones were known and red labelled. Entry is formed into red tag log book. Red tag contains action to love that specific item and consequently it's sent to storage or discarded. Log book helps America once we wish to retrieve bound item that was unbroken in storage ways back. Once removing those unwanted things from the zones the house was saved in X3, X4.

1S-SEIRI/SORT	
Before	After
	
Items not needed lying near workplace	Items moved to red tag area
Red Tagging done	Space around workplace made clear

Fig. 1 Storage area before 1S implementation after and 1S implementation

Table a pair of shows the advance in saving area on the industrial plant floor. Same may be seen through figure one.

Table 2: Cost saving due to space clearance at company

Zones	Space Saving (sq. ft)	Saving in cost
X3	50.55	Rs.93517
X4	10	Rs.18500

Note: Cost is calculated in above table considering rate of Rs. 1850/sq.ft

**3.2 Set in order:** Before and once conducting this activity looking out time for tools was calculated that was the foremost of times factor which each and every worker desires, before it absolutely was noted as 25min/employee per week however later it absolutely was 6 min/employee per week.

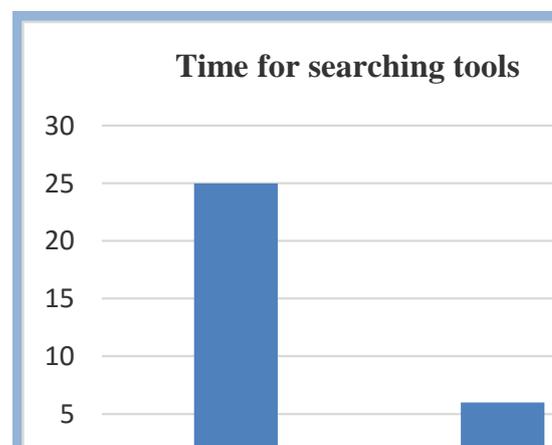


Fig 3: Saved Time in searching of tools

The following calculations show the cost saving in labour cost:

Saving in time / week = 25 - 5 = 20 min.  
 Saving in time/ month = 20×4 = 80 min.  
 Salary of employee /day Rs.290/8hrs = Rs.0.60/min  
 Cost saving per month / employee = Rs.44  
 Total labour cost saving /month = Rs. 44×8 = Rs.352 (since 8 employees work there.)  
 Total labour cost saving/year =Rs.352×12=Rs. 4224

**3.3 Shine:** Before 5S implementation there was no specific improvement schedule. Improvement was exhausted associate irregular manner. Throughout 5S implementation a improvement schedule was ready. the things that needed improvement were known. a selected amount was allotted once that these things should be cleansed. The improvement schedule for all things is given in table 3.

Table 3: Cleaning schedule

Locations	Rate of cleaning
Maintenance Table	Once/week
Shop Floor	Twice/week
Dispatch	Once/week
Storage	Once/week
Washroom	Once / day
Office	Once/week

Due to this schedule mechanically work surroundings started rising and currently it improved workers operating capability.

**3.4 Standardize:** each necessary method was standardized with the assistance of seniors and management and it's diagrammatic within the kind of flow charts and visual diagrams. Labels were connected to any or all files furthermore on all dies rack so simply it may be taken while not mensuration it .The problem of beginning the machine in reverse direction of motor was eliminated as a result of labels were placed on starters to begin the machine in right direction. This decreased abundant wastage of screws attributable to reverse threads. It conjointly helped new employees who be a part of associated don't work per steps that are to be followed and find yourself with waste or an accident. As we will see from fig. 4, Coils ar tagged that normal employee will browse and feed acceptable wire to machine. This decreased the wastage. Fig 5 explains simple understanding of knobs.



Fig. 4 labels are attached for easy access



Fig. 5 Arrow marked on starters

**3.5 Sustain:** Results are going to be seen provided that this 4S is followed systematically. Attributable to this activity 5S was created a habit of each worker. each employee who scored well in Audit (Refer fig.6) was rewarded and this helped lots in motivating workers who was least interested in implementing 5S.

Concerned Person: \_\_\_\_\_

\*0: Very bad, 1: Bad, 2: Average, 3: Good, 4: Very good

5S	NO.	Checkpoint	General Assessment Criteria	Score				
				0	1	2	3	4
1S	1	Materials	There is no unneeded material or parts.					
	2	Equipment	All machines should have identification labels					
	3	Connection apparatus	No unused tools, dies or jigs are present.					
	4	Visual control	Unnecessary materials can be easily recognized.					
	5	Written standards	Clear standards to dispose unused things.					
2S	1	Quantity indicators	Maximum and minimum inventory levels should be indicated					
	2	Item indicators	Each shelf at the storage areas and each part on it are marked					
	3	Location indicators	Regions and places have clearly designated name and place					
	4	Separation lines	Separation lines are certain and clear					
	5	Connection apparatus	30 seconds retrieval of tools and equipment					
3S	1	Machines	Machines kept away from chips and oil					
	2	Floors	Floor should be free of waste water and oil					
	3	Cleaning and control	Cleaning inspections and correct minor problems					
	4	Cleaning responsibility	Individual cleaning responsibility assigned					
	5	Cleaning habit	Operator habitual of cleaning his place					
4S	1	Ventilation	Air is odourless and fresh					
	2	Lighting	Adequate lightening should be there					
	3	Working clothes	Operators clothes are clean & free of lubricant					
	4	Protection from dirt	Avoiding dirtiness is must					
	5	First 3S	System for protecting first 3S					
5S	1	Training	Regular training programs for workers					
	2	Safety gadgets	Regular wearing of helmets/gloves/shoes					
	3	Interaction between people	5s applied properly & good environment					
	4	Rules and procedure	Up to date & regularly reviewed					
	5	S seeing in believing	Check for 5S environment					

Signature: \_\_\_\_\_ Total score out of 100 : \_\_\_\_\_

Fig. 6 5S Audit sheet

### 3. CONCLUSIONS

Typical manufacturing was obtaining born-again into Lean producing attributable to implementation of 5S. Plant layout was modified bit for implementation of 5S, operative procedures, tool organization, and material handling and improvement schedules were conjointly altered. The initial part, sort, resulted in removing unwanted things, broken tools, unused components and scrap materials. Unused inventory was came back to buying, seldom used tools were situated in storage and regularly required things were situated close to machine within the reach of operator and scrap things were discarded.

The second part, set so as, resulted in many changes within the organization of the workplace. Every of the workstations received their own set of tools. All the tools were color coded to their various digital computers. All equipment had specific locations. Trashcans and different things on the ground had floor markers to point their locations. All tools were far away from the ground and were placed on clamps.

Ordinarily used components were placed in bins on each digital computer. The third part, shine, resulted in removing scrap, dirt and different unwanted things from every digital computer. this primary clean-up helped to envision different problems clearly. The fourth part, standardize, resulted in developing commonplace operating procedures for the workers within the assembly space. Overall these activities as an entire contributed in minimizing waste, optimizing performance, increasing profit attributable to reduction in losses, rising safety and therefore the last however not the smallest amount capability of employees.

### REFERENCES

[1] Kaushik Kumar, Sanjeev Kumar, "Steps For Implementation Of 5S", IJMIE, Volume 2, Issue 6 ISSN: 2249-0558, 2012, pp.402-416.

[2] Mohd Nizam Ab Rahman, N.K. Khamis, Wan Hasrulnizam Wan Mahmood, Baba MdDeros, "Implementation of 5S Practices in the Manufacturing Companies: A Case Study", American Journal of Applied Sciences, Vol. 7, ISSN 1546-9239, 2010, pp.1182-1189.

[3] Ilija Đeki, "Lean Manufacturing In Two Serbian Food companies - Case Studies", International Journal for Quality research, Vol. 6, Issue 6 ISSN: 664-670, 2012, pp. 131-136.

[4] Ravikant V. Paropate, Dr. Rajeshkumar U. Sambhe, The Implementation and Evaluation of Total Productive Maintenance - A Case Study of mid-sized Indian Enterprise, International Journal of Application or Innovation in Engineering & Management (IJAEM), Vol. 2, Issue 10, 2013, pp. 435-442.

[5] A.N. M. Rose, B. Md. Deros, M. N. Ab. Rahman, "A Study On Lean Manufacturing Implementation In Malaysian Automotive Component Industry", International Journal of Automotive and Mechanical Engineering (IJAME) ISSN: 2229-8649 (Print); ISSN: 2180-1606 (Online); Vol. 8, 2013, pp. 1467-1476.

[6] Juthamas Choomlucksana, Monsiri Ongsaranakorn, Phrompong Suksabaia, "Improving the productivity of sheet metal stamping subassembly area using the application of lean manufacturing principles", Application or Innovation in Engineering & Management (IJAEM), Vol. 3, Issue 8, 2015, pp. 235-241.

[7] Shekhar Shahu, Lakhon Patidar, "5S transfusion to overall equipment effectiveness (OEE) For enhancing Manufacturing", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 - 0056 Vol.2 Issue: 07, 2015, pp.1300-1305.

[8] Mariano Jiménez, Luis Romerob, Manuel Domínguez, María del Mar Espinosa, "5S methodology implementation in the laboratories of an industrial engineering university school", International Journal for Quality research, Vol. 6, Issue 6 ISSN: 664-670, 2015, pp. 430-436.

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