

Implementation of 5S Methodology at Spectrum Electrical Industries Limited

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Abstract: 5S is a fundamental establishment of Lean manufacturing framework. 5S is a precise strategy utilized by industries, and this originates from five Japanese words: seiri (sort), seiton (set in order), seiso (shine), seiketsu (standardize), and shitsuke (sustain). It is a tool that is use for cleaning, arranging, sorting out and giving the fundamental preparation to workplace improvement. This research work deals with practical implementation of one of the important lean manufacturing tool that is 5S methodology in the Spectrum Electrical Industries Limited MIDC, Jalgaon. An itemized use of the 5S framework is given. It will affect each and every one like Engineers, Supervisors, operators, worker from Top level to lower level management team of Industry. By following the 5S technique, this research work may demonstrate huge upgrades to productivity, profitability, efficiency, and housekeeping. The research work shows the significant improvements by using before and after pictures. It additionally plans to build a more grounded hard working attitude inside the workers and engineers who might be relied upon to proceed with the great practices.

Keywords: Lean Manufacturing, 5S, Continuous Improvement, Workplace Management, Productivity Improvement

I. INTRODUCTION

Plastic molding is all around generally utilized procedure in today's world. Because of the surprising expense of metallic materials and their absence of availability the plastic materials are in all respects broadly utilized in numerous applications. The plastic material has great characteristics and their characteristics can likewise be improved effectively by the utilization of catalyzers. Therefore plastic molding is getting extremely high consideration. Plastic trim has exceptionally wide order. Plastic items with complicated shapes are manufactured with the help of Injection molding machines. Injection molding machines are used for their high productivity and high quality. The plastic molding industries are replacing their conventional machines by the injection molding machines due to their high productivity, high efficiency and easy to use control.

Spectrum Electrical Industries Limited is one of the industry that use the Injection molding machine for manufacturing of plastic components of electrical application for the customers like Schneider Electric, Legrand, Anchor, Araymond, Nirmiti, Goldmedal etc... In the industry by directing investigation that helped us to recognize the issues with the machines, overall shop floor conditions, safety, low productivity, Long setup time, and cleanness of the industry.

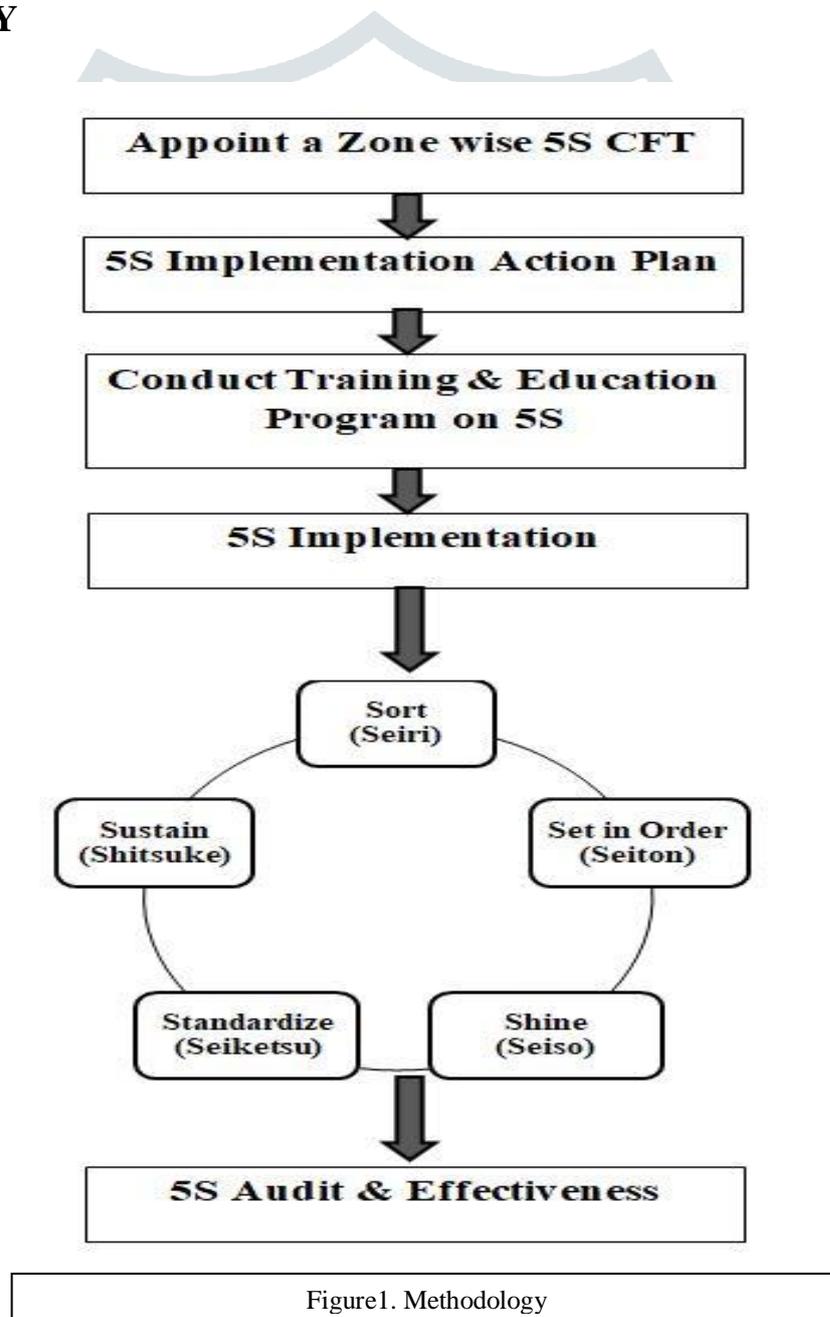
5S is a framework to reduce 7 deadly wastes like Transportation, Inventory, Motion, Waiting Time, overproduction, Over-processing, Defects and rework and enhance productivity through keeping up orderly working environment and utilizing visual signs to accomplish progressively reliable operational outcomes. The term 5S refers to five stages 1S-sort, 2S-set in order, 3S-shine, 4S-standardize, and 5S-Sustain that are additionally here and there known as the 5 pillars of a visual working environment. The 5S workplace organization is essential for company irrespective of its size. It was initiated from japan, keeping in mind all employee participation in lean manufacturing. The 5S principle is not only for shop floor, but also for the entire organization. Many managers believe that it is enough if the shop floor is kept clean. In reality every department in organization or industry should be kept organized. "A place for everything and everything in its place" is the mantra of the 5S strategy. The result is an improved plant manufacturing process and the lowest overall cost for finished goods produced.

OBJECTIVE

To Improve Productivity by implementation of “5S” Methodology on work place.

II. PROBLEM STATEMENT

1. Improper utilization of space in row material storage area and items and row material is not identified properly.
2. Wastage of time in searching of molds in mold-maintenance area.
3. Less Productivity due to operators and workers, they are taking more time in search of tools, materials etc. because of poor workplace management.
4. Unwanted material available in each department, which occupy the useful space.
5. The assembly area is not properly managed and unwanted material is also present near the assembly area.
6. No such specific area is defined for unwanted and rejected material.
7. No participation of supervisors and workers in improvement of work place management.
8. Production area is not properly managed, will reduce the worker efficiency and also reduce the productivity.

III. METHODOLOGY

1. Appoint Zone wise 5S Cross Functional Team i.e. CFT:

Cross functional teams are groups consisting of people from different functional areas of the company and focus on common goal, for example, Store, Mold Maintenance, Quality, Production, Assembly, Dispatch, Human Resource etc.. These can be working groups, where each member belongs the cross functional team, or they can be the primary structure of the organization. 5S CFT is mainly focus on improvement actions of workplace management.

This CFT consists of Zone Leader and Team Leader they are responsible for 5S activity of their respective zone or department.

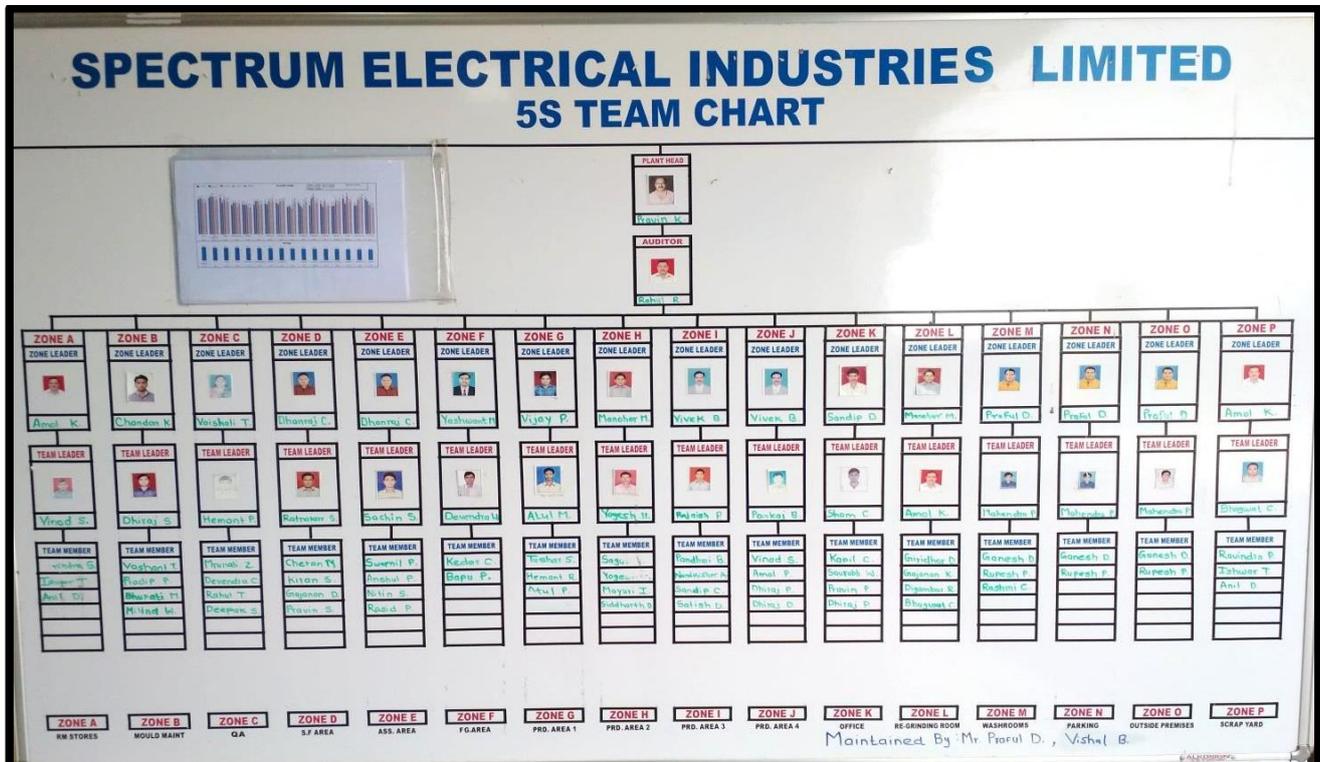


Figure2. 5S CFT

2. 5S Action Plan:

5S Action plan is a structure which will followed by CFT for the successful implementation of 5S methodology, it consist of steps that can strictly follow for the implementation activity. The Following points are considered for action plan:

- Zone and team formation.
- Training to the team members.
- Training on 1S and 2S.
- Importance of Red Tag Area and its Benefits.
- Training on how to make decision on Red Tag Area Material.
- Training on 3S.
- Training on how to maintain 1S, 2S, and 3S daily.
- Training on 4S.
- Training on how to maintain 4S.
- Training on 5S.
- Training on Safety.
- Training on how to maintain 5S daily and its importance.

5S Action Plan																	
Sr. No	Activity	Nov-18				Dec-18				Jan-19				Feb-19			
		WEEK I	WEEK II	WEEK III	WEEK IV	WEEK I	WEEK II	WEEK III	WEEK IV	WEEK I	WEEK II	WEEK III	WEEK IV	WEEK I	WEEK II	WEEK III	WEEK IV
1	Zone & Team Formation	P															
2	Training to the team members	A															
3	TRAINING ON 1S AND 2S			P													
4	IMPORTANCE OF RED TAG AREA AND ITS BENEFITS			P	P												
5	TRAINING ON HOW TO MAKE DECISION ON RED TAG AREA			A	A												
6	TRAINING ON 3S					P	P	P									
7	TRAINING ON HOW TO MAINTAIN 1S , 2S , 3S DAILY					P	P	P	P	P							
8	TRAINING ON 4S										P	P					
9	TRAINING ON HOW TO MAINTAIN 4S										A	A	A				
10	TRAINING ON 5S												P	P			
11	TRAINING ON SAFETY													A	A		
12	TRAINING ON HOW TO MAINTAIN 5S DAILY AND ITS IMPORTANCE														P	P	P
PREPARED BY : VISHAL BORSE										APPROVED BY : PLANT HEAD							

Figure3. 5S Action Plan

3. Training and Education Program on 5S:

5S Training is given to all employees from top level to lower level management. The main agenda for training is to give awareness to each and every employee of 5S for the successful implementation of 5S methodology. This training consist of basic information 5S, Information about Muda-Mura-Muri, Some examples of 5S etc... After the training the exam has been conducted for the effectiveness of employee.

SPECTRUM ELECTRICAL INDUSTRIES LTD.				
Zone:		Name:		Total Marks:
Subject : 5S				
Que No.	Question	Choose any one Option		
				Mark Option Here
1	What is 1S?	1 Sort	2 Shine	1
		3 Set in Order	4 Standerdize	
2	What is 3S?	1 Shine	2 Set in Order	1
		3 Standerdize	4 Stable	
3	What is 2S?	1 Sort	2 Set in Order	1
		3 Standerdize	4 Stable	
4	What is The Benefit of 1S?	1 Minimize unnecessary items	2 Easy to Identify	2
		3 Clean Environment		
5	What is The Benefit of 2S?	1 Easy to Identify	2 Clean Environment	2
		3 Minimize unnecessary items		
6	What is The Benefit of 3S?	1 Clean Environment	2 Easy to Identify	2
		3 Minimize unnecessary items		
7	What is 2S?	1 Set in Order	2 Standerdize	2
		3 Sort	4 Set in Order	
8	What is meant by Red Tag Are	Ans :		
9	What is The Benefit of 5S?	Ans :		
Prepared By: Vishal B	Approved By : Mayur Barhate	Effectiveness Verified By :		
Sign :	Sign :	Remark (if Any):		

Figure4. 5S Question Paper

4. Implementation of 5S:

4.1.1: 1S Sort:

Sort is the process by which one can identifies what is value adding and non- value adding to the customer. The non-value adding materials are waste and that material should be sort and disposed off. The organization must be separated into a few little zones with the end goal that every last space in the organization is incorporated when all zones are joined. Assign Zone leader for each zone.

Identify the red tag area and paste the tag on unnecessary items. The red tag is identification for the items to be disposed. Red tagging is very important for all machineries, equipment, drawings, and documents etc. that are not in use.

Review the red tag items on monthly basis and the review team consist of senior level manager or member who can able to take decision on disposal.

Example:

Sort Implementation at SEIL

- Zone Formation and Identification: Fig shows different zones in SEIL.

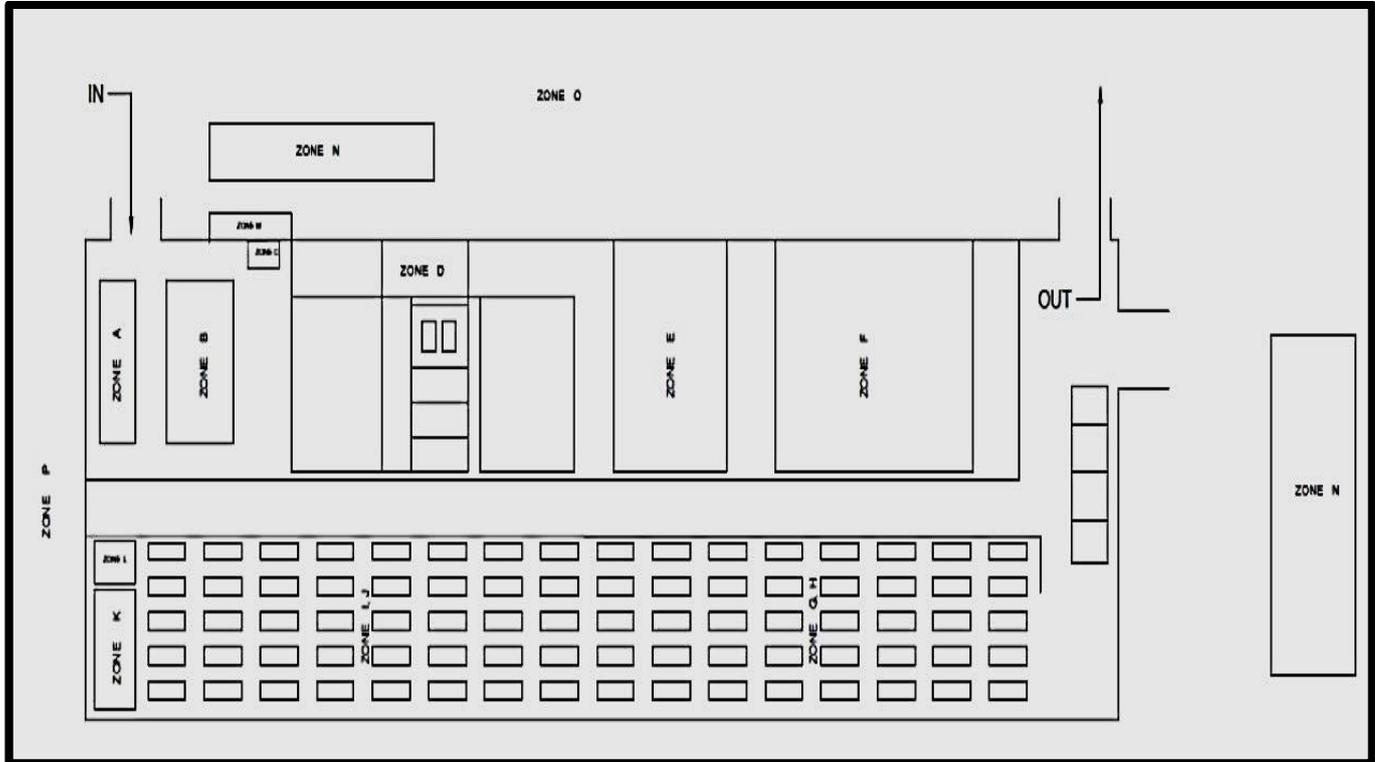


Figure5. 5S Zone Layout

- Red Tagging at SEIL: Figure Shows Red Tag Area.

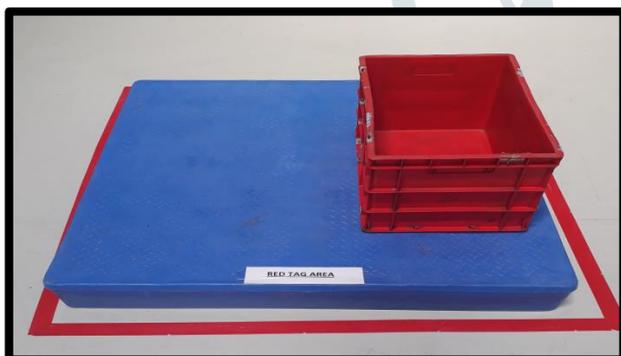


Figure 6. Red Tag area.

RED TAG			
Date:		Tagged by:	
Item Name:		Disc No:	
Location:		Rev No.: 00	
Duration of Last use:		Effective Date: 01.01.19	
		Page 1 of 1	
Item Information		Category	
Equipment	Value	Raw Material	
Tools & Jigs	Consumable	Work in Progress	
Finished Goods	Machine Parts	Others	
Gauge & Instruments			
Reason for Red Tag			
Not Required	Obsolete		
Defect	Unknown Object		
Scrap			
Suggested Action Required			
Return to	Scrap	COST	
Relocate	sell		
Comments			

Figure 7. Red Tag.

4.1.2: 2S Set in Order:

Set in Order is the second step in the 5S program. In this stage in 5S training, workers and supervisors organize the items in their work areas. A crucial principal of Set in Order is that items receive a designated place, which is marked by using tape, and clearly identified and labeled.

Ensure that all things are composed and every item has an assigned spot. Sort out every one of the things left in the work environment in a logical manner so they make task simpler for workers and operators to complete. This regularly includes setting things in ergonomic areas where individuals won't have to bend or make additional movements to reach them.

Figure 6. Red Tag Area.

Set in order is implemented by using different color coding & markings. All the items are identified and organize by the team leaders and the properly labeled with designated place and markings.

Example:

Set in Order Implementation at SEIL:

- What is wrong: No proper marking for sorting area.

Action taken: Properly marked by tape with identification

Before



After



Figure 8. Before and After for Set in Order.

4.1.3: 3S Shine:

Shine means to keep everything cleared and clean. This is done with the target of inspecting for issues and taking faster corrective actions on issues. Regular cleaning activity permits to identify and to eliminate sources of disorder, improper cleaning, and dirtiness to maintain the clean workplaces. During cleaning activity it is checked and confirms the cleanness of machine, workplace, shop-floor, equipment, molds, pipes, sources of light etc. It is beneficial to maintain the area clean and which helps to every individual to work in healthy environment. The 3S discipline activity helps to take care of machines and personal tidiness of every individual. This activity is carried out in three phases with the time limit of 15 minute, this 15 minute cleaning activity consist of machine cleaning, mold cleaning, equipment cleaning etc. in each zones.

Example:

Shine Implementation at SEIL:

- What is wrong: No proper place defined for rejection & collect in bags.

Action taken: Proper place defined for rejection & collect the material in only orange bin.

Before



After



Figure 9. Before and After for Shine.

Shop-floor area cleaning activity.



Figure10. Shop Floor Cleaned Area .

4.1.4: 4S Standardization:

Standardize aims for preparation of standard methods to continue to follow the 1S, 2S, & 3S activities effectively in the organization, thus to implement standardize, following activities were taken into consideration for the successful implementation of 4S:

- We have maintained a red tag register in each zone which we kept record of all the red tag items for our reference.
- In daily routine activity, if team leaders, supervisors and zone leaders notice unwanted material at the workplace then a red tag is paste on it and decisions is taken either to scrap or else.
- We used to review the red tag area every fort night to maintain the record of it. Thus from the record or data we found that the number of red tags decreased day by day.
- We use to review the improvement in each month with the top management.
- We have made standard work instructions of each product which will shows the standard procedure how to work, that helps to new operator or worker to understand the work procedure easily.

Example:

- What is wrong: No standard color coding for Break down mold, PM mold, and Ready mold.

Action Taken: Proper Status Label is pasted on mold.

Before



After



Figure11. Before and After for Standardize (1).

- What is wrong: No numbering and proper labeling available on files.

Action Taken: Proper numbering and labeling is now available on files.

Before



After



Figure12. Before and After for Standardize (2).

4.1.5: 5S Sustain:

Sustain means to make it a habit of properly maintaining correct procedures daily. Sustain is done with the goal of achieving higher productivity and better quality through higher employee morale. 5S performance goals should always be specific and measurable. Monthly Surprise Audits should be conducted on a regular basis, to measure how well each work area or zone is meeting their 5S goals. The audit results should be displayed so that everyone can see them and see how well their work area or zone is doing compared with others in the industry. In addition having a system that gives quarterly rewards to employees who are employed in zone that met and 5S objectives fills in as a motivator to meet 5S targets.

Zone A
Jan-19

5S Surprise Audit				
Unit Name:- store		Date:-		
1s and 2s Office Area		Responsibility: Anil Kulkarni		
S.No	Activity	Marks	Actual	Remarks
1 Tables and Chairs				
a	All Tables and Chairs are arranged properly	20	20	Yes
b	No broken or unused Table/Chair in the office	10	10	No
c	No shop/floor activities are done in office	15	15	No Activity
d	No person sitting on Table	10	10	No
e	Tables are arranged with proper identification	10	10	Yes with Identification
2 Files				
a	All Files are kept in Rack	10	10	Yes
b	All Files are having Identification	10	10	Yes
c	File Master list is available	10	0	No master list Available
d	All files are kept in neat and clean condition	10	10	Yes
e	No unwanted files kept in Rack/Table	10	10	No
f	Proper Numbering systems available on files	5	0.5	Yes
g	Racks or Cupboard should be Transparent	10	10	Yes
h	Cupboards are arranged with proper identification	10	10	Yes
3 Dustbins				
a	Location clearly marked	15	15	Yes clearly marked
b	Dust bin available	10	10	Yes Available
c	Dust bin in good condition	10	10	Yes
d	System to clear dustbin in place	10	10	Yes
e	Dust bins are marked with nos	10		
f	Dust bin easily accessible/easy to use & easy to clear/clean	10	10	Yes
4 Raw material stacking				
a	Raw materials are strack properly	10	10	Yes
b	Raw materials are placed with identification	10	10	Yes
c	is there proper storing stracker ?	10	10	Yes
d	Proper material handling equipments are available	10	10	Yes Available
e	Fix place for material handling equipments	15	15	Yes
f	Safety Work instruction is displayed	10	10	Yes displayed
g	is helmet compulsory in store	10	10	Yes
h	is there is FIFO system	20	20	Yes
i	Safety poster is displayed	10	0	No Not Displayed
Total Marks		300	280	93.3%
Percentage				
Auditor: Vishal Borse		Auditor: Bhagwat Chaudhari		

Zone C
Jan-19

5S Surprise Audit				
Unit Name:- Quality		Date:-		
1s and 2s Office Area		Responsibility: Vaishali T		
S.No	Activity	Marks	Actual	Remarks
1 Tables and Chairs				
a	All Tables and Chairs are arranged properly	20	20	Yes
b	No broken or unused Table/Chair in the office	10	10	No
c	No shop/floor activities are done in office	15	15	No Activity
d	No person sitting on Table	5	5	No
2 Files				
a	All Files are kept in Rack	10	10	Yes but insufficient Identification missing
b	All Files are having Identification	10	5	Not Available
c	File Master list is available	10	0	Not Available
d	All files are kept in neat and clean condition	10	10	Yes
e	No unwanted files kept in Rack/Table	10	10	No
f	Proper Numbering systems available on files	5	0	No Numbering
g	Required file document retrieval time -30 Sec--	20		
h	Racks or Cupboard should be Transparent	10		
3 Dustbins				
a	Location clearly marked	15	15	Yes marked
b	Dust bin available	10	10	Yes
c	Dust bin in good condition	10	10	Yes
d	System to clear dustbin in place	10	10	Yes
e	Dust bins are marked with nos	10		
f	Dust bin easily accessible/easy to use & easy to clear/clean	10	10	Yes
4 Inspection area				
a	Materials are kept with identification	15	15	Yes
b	Material in out marking available	10	10	Yes
c	Proper work instruction is displayed	20	20	Yes Displayed
d	No unwanted material lying in inspection area	10	10	No material lying
e	Inspection area properly clean	10	10	Yes
f	Separate section of offer material and checked material	10	10	Yes
Total Marks		230	215	91.4%
Percentage				
Auditor: Vishal Borse		Auditor: Hemant P.		

Figure13. Audit Reports for different zones.

IV. RESULT AND DISCUSSION

Month wise Audit result is displayed on 5S board. The efficient implementation of 5S technique in SEIL leads to subsequent improvement in productivity and quality of the manufacturing plant. The 5S improves overall performance and thus relate primarily in huge reduction of seven deadly wastes in manufacturing. It promotes neatness in storage of raw material and finished products and mold storage area. By implementing 1S rule process is improved because of cost reduction, better utilization of work place, prevention from lost tools. By implementing 2S rule it is easy to find any kind of necessary items or material very fast, safety is improved. By implementing 3S rule increase in machine efficiency, cleanliness is maintained properly. By implementing 4S rule because of standardization all the system runs smoothly without any kind of issue, above 3S rule is followed properly to maintain things properly. By implementing 5S rule it is easy to monitor the effectiveness of all zones, by monthly audit it is clearly shows the result of 5S and zone leaders can take proper decision on that audit result. Overall implementation of 5S rule the Productivity, Quality, Performance is improved in SEIL.

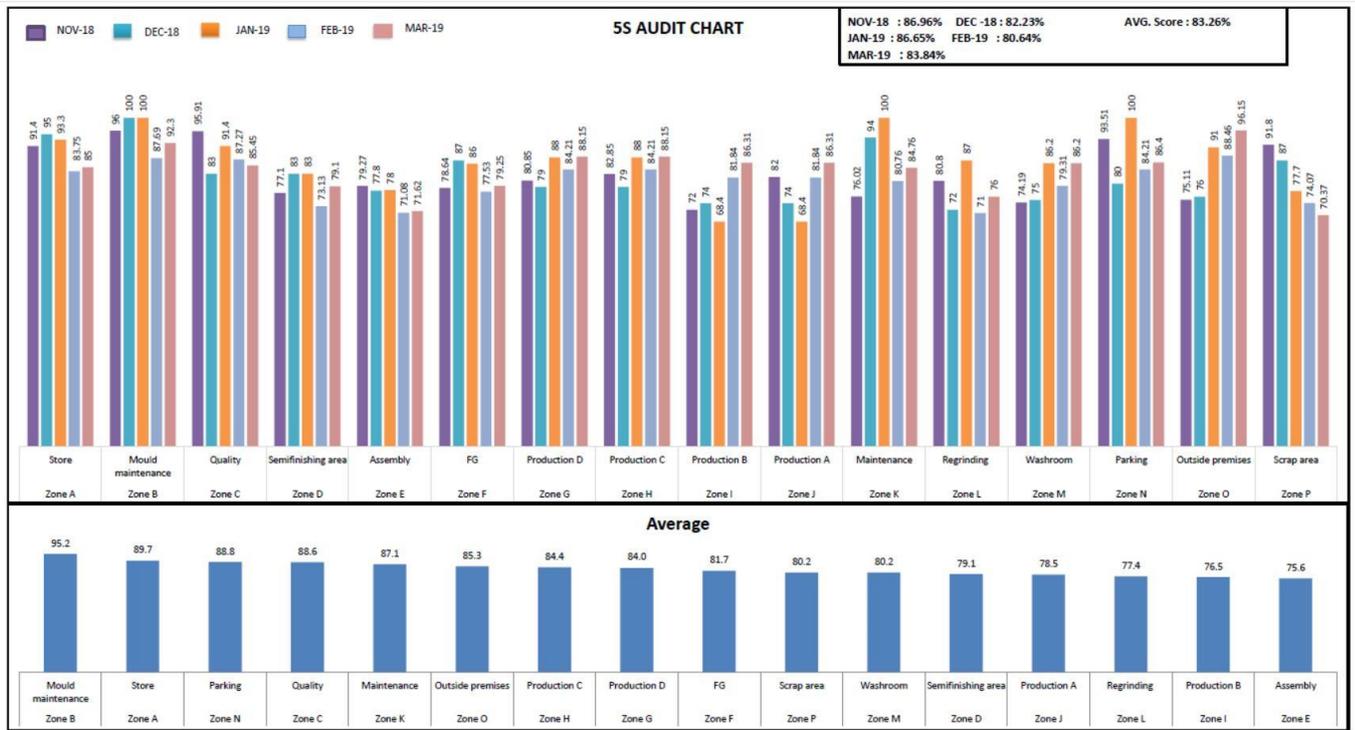


Chart1. Audit Result Chart.

V. CONCLUSION

Spectrum Electrical Industries Limited is one such industry which looked for improvement in productivity and by effective and successful implementation of 5S methodology has found increase in productivity and hence profit level increases. The secondary benefits of implementing 5S methodology included higher excitement and promptness among the workers, all employees of SEIL, safer and secure working conditions. Now, the 5S methodology is a habit in SEIL and they are improving day by day.

VI. ACKNOWLEDGE

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