

Study of 6s Concept and its Effect on Small Scale Industry

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Abstract: The search for quality is never ending which involves continuous improvement process to find a way to restrict the reasons creating problems. These can be accomplished by going through stages instead of implementing a large improvement. The various concepts such as Kaizen, PDCA cycle, Quality circle, JIT, 5S, etc. Can be proven helpful in this type of improvement. Among all Kaizen have high level of difficulty as it requires huge potential steps. Due to this, as a foundation of "Kaizen" we study 6S concept. It is derived from concept of 5S. 6S concept have one more "S" which stands for safety with organization, surrounding and health. The merits of 6s concept are reduce in wastage, reduction in defects, soaring of productivity, morale of worker goes high, etc. This all combine resulted in gradual improvement of industry with reduction in environmental problems. Furthermore, it also reduced the cost of production and high product services.

Keywords: 6S, continuous improvement process, kaizen, 5S, productivity, EHS.

I. INTRODUCTION

The main purpose of 6S concept is to improve human capability and to improve the productivity of industries. It is a methodology for a systematic technique used by organizations comes from 5S of five Japanese words; Seiri (sort), Seiton (set in order), Seiso (shine), Seiketsu (standardize), and Shitsuke (sustain) and the sixth S refers to "Safety". Safety plays a vital role in any industry and it act as a key to the problems like wastage, poor quality and less productivity. The solution of all this problems is done via monitoring and organized environment and keeping the environment safe from accidents. It also provides useful visual evidences to obtain more firm results.

Six Pillars of 6S are-

1. Sort: Separate what is needed in work area and eliminate the unneeded items.
2. Set-in-order: Organize the remaining needed items.

3. Shine: keep neat and clean environment.
4. Standardize: Standardize the sorting, inspection, cleaning and safety practices.
5. Sustain: Make 6S a way of life.
6. Safety: Create a safe place to work.



A. Objective of the Study:

Ultimately main objective of studying 6S is to provide a better quality service and product and also to understand 6S in order to-

- Produce quality product in efficient time within improve workplace condition
- Reduce inventory
- Reduce searching time for parts/equipment's
- Reduced accidents
- Increase discipline relation with top management to employees to workers
- Lessen the failure and breakdowns of machines or material handling equipment (MHE)
- Make safe and motivate working environment for improving the organization/industry performance.

II. LITERATURE REVIEW

Title: The 5S methodology – a tool for improving the organization (2007)

Author: J. Michalska, D. Szewieczek

With regard to this article, Implementing 5S resulted in increasing the efficiency and safety alongwith reduction of pollution caused by industry. Further research clearly depicts the importance of training of workers about 5S rule is vital. To maintain the gradual improvement and to distribute activities on some main steps are its some of important task.

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Moreover, it is also important to have good understanding on the need of where to execute the routine inspection of usage of 5S rule. The method use for inspection is carried out by help of check-list on basis of which it creates radar graph of 5S, which in turn serves to estimation of workplace.

Title: The 5S strategy for continuous improvement of the manufacturing process in auto-car exhausts (2008).

Author: Gheorghe DULHAI

In this paper continuous improvement strategy and aim to improve manufacturing at auto-car exhaust was presented. The improvement of auto car exhausts quality, using the —5S rule, is accomplished at the initiative of the inferior levels of the organization coordinated and helped by the superior management. By efficiently using the strategy of 5S directly lead to a noticeable improvement in exhaust's quality.

Title: Step for implementation of 5S (2012)

Author: Kaushik Kumar, Sanjeev Kumar

In this paper, the steps are taken keeping in mind the ultimate benefit of an organization. For its implementation successfully, it was important for everybody to understand reason behind its application and what will be the possible outcome to this. This was important because the removal of useless items and the reorganization of processes can be extremely unsettling.

Title: Performance Improvement through 5S in Small Scale Industry: A case study (2013)

Author: P. M. Rojrasra, M. N. Qureshi

This paper explains the implementation of 5S methodology in the Krishna Plastic Company, Udhyognagar, Amreli, Gujarat. There are several available lean manufacturing techniques, out of which 5S offers good potential for required improvement. The study of 10 weeks was carried out in industry. The results showed the improvement in efficiency of production system from 67% to 88.8% in the following week.

III. METHODOLOGY

A. Explanation of 6S:

1S - SORT:

- Sort is the procedure of identifying all materials, tools, machines, etc. and differentiating the needed and useless items and at last keeping only essential items. The items which classify as useless are stored offsite. This helps in maintaining a clean environment at workplace and also improves the efficiency in searching for particular things. It also shortens the time of running the operation and provides easy access of needed items to workers.
- Sorting is often called —red-tagging as it applies for a simple red tag to be placed on items that are not needed for work. In this process first employees identify and mention what is useless and then managers are responsible for disposition of those items. That is why it is also called as two-part process.

Having red tag criteria have couple of merits - Firstly, there is no confusion among workers and another is that it reduces the wasted effort. It is duty of management to discuss about

what stays and what is disposed off. It involves process of differentiating between useful and useless items.



Fig1. (Short)

2S - SET IN ORDER:

- Set-in-Order, deals with organizing the items which are needed in a way that reduces the effort of workers. In simple words, it is about placement of things which are easily reached when necessary.
- The slogan- “A place for everything and everything in its place.”
- This is a progressive improvement where items already nearby are placed as close to the point of use as possible. In this step, there are two categories of regular needed items and irregular needed items. Regular needed things are kept as close as possible to worker, while frequently used items are kept less accessible compared to above one.
- 2S, Set-in-Order eliminates waste. For example, searching waste, waste due to difficulty in using items and returning items, motion waste, waste of excess inventory, waste of defective products and waste of unsafe conditions.



Fig2

3S – SHINE:

- This step consists of activities such as cleaning of workplace, maintaining elegant ambience and undertaking steps to keep area of work clean. Dirty working area results in defects in products, equipment and also safety hazards to employees. Shine identifies and solves these problems and also creates means for daily (or more frequent) removal. A checklist can be made for particular areas which are to be swept, scrubbed and sanitized on a regular basis.

- After the cleaning of work area, tools and equipment it is also needed to keep it that way. To keep workplace clean it is needed to prevent them from dirt and this can be achieved by preventing it from sources which result in making it unclean.
- The theme is —cleaning not for beatification alone but with a sense of purpose!
- TO show importance of Shine , below are given some issues which arise in absence of it :
 - Machine goes through breakdown if not given regular maintenance.
 - Oil and water spill on the floor causes slipping and injuries.
 - Lack of sunlight in working area leads to poor morale and inefficient work.



Fig3



Fig4

4S – STANDARDIZE:

- Standardization is the method to maintain the first 4S. The proper standards are essential to establish improve workplace during implementation phase. The main aim of the standardization is to create best practices and to get each team member to use the established best practices the same way. Without standardization monitoring on improvement is difficult. Thus it is imperative that standards should be clear and easy to understand and also be easily explainable.
- There are views that standards should not be just implemented in the typical operational processes such as movement maintenance, storing, production, but also in the administrative processes, like book-keeping, human resources management, customer service or secretariat service.

- The Action steps for implementing Standardization include:
 - Standard operating procedures for 6S should be made by updating workplace procedures, job aids, checklists, diagrams, charts etc.
 - Update documents which reflect the changes.

| ROTATION SCHEDULE | | | | |
|-------------------|-----------|-------------|-----------------|-------------|
| | SWEEPING | | GARBAGE REMOVAL | |
| | DAY SHIFT | NIGHT SHIFT | DAY SHIFT | NIGHT SHIFT |
| MONDAY | | | | |
| TUESDAY | | | | |
| WEDNESDAY | | | | |
| THURSDAY | | | | |
| FRIDAY | | | | |
| SATURDAY | | | | |

| STANDARDIZATION OF ACTIVITY | |
|---|----------------|
| Activity | Responsibility |
| 1 Sweep the entire area at the end of the shift | |
| 2 Put away material that was removed from its assigned storage location | |
| 3 Take empty pallets out of the area and store in an appropriate location | |
| 4 Empty garbage's as needed at the end of shift | |
| 5 Restock materials from overflow area when space permits | |
| 6 Move full pallets to designated areas away from shipping dock | |

Fig6 (Standardization Sheet)

5S – SUSTAIN:

- Sustain asks the executives to keep everything going every day. Along with worker also manager needs to follow the procedure in the work place so that sense of discipline and sincerity is maintained. There is a need of checklist to be made which helps manager to keep eye on everyone and whether everyone is following the rule to sustain or not. It leads to decreasing the number of non-conforming products and processes, consciousness of staff, improvements in the internal communication, and improvement in the human relations. The most common threat is sustaining the above 4S.
- The two major grounds for failure are-
 - Inability to understand by the workers/employee that 6S is nothing but a mutual understanding. Hence, they did not actively take part in every step of process.
 - For management to jump to assumption that employees will understand value of 6S immediately and will practice it is little bit difficult.



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- Action steps for implementing S5 – Sustain:
 - Audit should be done to ensure that processes established during standardization are maintained.
 - Use displays, newsletters and other communication tools to publicize successes and reward strong efforts with recognition.
 - Evaluate 6S effectiveness and continue to improve the process. Conduct regular review meetings to identify additional 6S opportunities.
- Sustain has a major role in process and without it it is not possible to maintain the whole 5S concept.

6S – SAFETY

- Safety in 6S is define as to keep the workers and workplace safe. The aim of safety is mainly to avoid hazards and create a safe working surrounding. Also when workplace is well organized then it is not a difficult task to notice the potential dangers.
- In order to deal with hazards, separate safety sweep need to be undertaken.
- Personal Protective Equipment (PPE) should be acquired by the worker during the working conditions in order to be safe in the industry. The Personal Protective Equipment (PPE) kit contains Helmet, goggles, safety shoes, hand gloves for protecting head, eyes, feets and hands respectively.
- First-Aid box is very important and should be provided atleast one kit between 150 workers and checked every month for sufficient medicines and its expiry dates. Also, Fire extinguisher should be provided in every department of company/industry and it expiry dates should also be checked and should be replaced if expired as soon as possible.
- Action steps for implementing Safety include:
 - In hazardous prone industries,EHS committee should be formed.
 - PPE to every employee should be mandatorily provided by the industry.
 - Fencing of machinery and proper maintenance of machine and equipment should be done.
 - Lockout and emergency procedures needs to be easily accessible.
- With the help of safety slogans banners and posters awareness must be developed among employees mind.



Fig7



Fig 8

IV. MERITS OF 6S

1S - SORT:

- Saves floor space
- Helps to get rid of obsolete items.
- Existing materials are utilized effectively.
- Unnecessary buying is avoided.
- Better house-keeping.

2S – SET IN ORDER:

- Wastage of time is eliminated.
- Easy access to materials.
- Material easily recoverable.
- Lesser production down time.

3S – SHINE:

- Work place is conducive to high productivity.
- Visual inventory level.
- Lesser production down time.
- Flow of material is smooth.
- Declination in accidents rates.

4S – STANDARDIZE:

- Effective control over process.
- Wastage of men, money and machines shows reduction.

5S - SUSTAIN

- Organization is well disciplined.
- Inclination in the morale of workers and also awareness is spread among them.
- The mistakes happened due to in-attentiveness of worker is deduced to large extent.
- Proceedings according to decisions,
- Internal communication processes is improved.
- Human relations is also improved.

6S – SAFETY:

- Safe working environment.
- Safe working conditions.
- Better machine conditions.
- Prepared for facing any industrial accident

V. CONCLUSION

6S concept strongly stands in supports with the objective of organization to achieve gradual improvement and effective performance. It help to give dirtless, properly organized and safe working environment. Also it reduces the floor space area. Our own research clearly depicted that training of workers regarding 6S rules is imperative. Essential thing is to divide activities on some main steps and to maintain the continuous improvement. The first half of battle is implementation of 6S and other half is to sustain it effectively.

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