

5 S at a large enterprise

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Abstract— The authors expound the 5S method which defines the success of any other productivity improvement technique at an enterprise. 5S is applicable in any area of the work-process. However it primarily used at the operational level to maintain order, cleanliness and supports continues improvements, even so the use of 5S can produce similarly significant results in office areas. This paper underlines the advantages of 5S mainly at the operational level through the example of a large enterprise. This paper gives an overview of 5S solutions in the practice showing its main features and benefits for the enterprise.

Keywords— Kaizen, 5S, quality management, productivity, improvement

I. INTRODUCTION

Other Kaizen activities based on 5S. It creates a culture (behavior) and configures a system in the operational level. Improves process transparency, helps maintain order and explores and solves process issues. People pay attention to their work-environment, maintain and develop it consciously. The 5S system improves employee proprietary, discipline and image of the company [4]. Productivity accession is also possible orderly because in a well-structured workstation can be eliminated a lot of unnecessary losses (searching, unnecessary movements, repackaging, product injury, machine failures, unnecessary transportation).

5S is not just about tidying up and cleaning, it is a process organizing tool that creates the operating framework and conditions of the process not on paper but in physical reality [9]. With the introduction of 5S, we are working with workers together to design for the efficient layout and safe work environment and workflow [10], [11]. The clue is to work with the employees to create a system that is accepted and adhered to in the future.

II. THE ESSENCE OF 5S METHOD

The 5S method is a simple, easy-to-understand technique that underlies the success of any other productivity improvement technique.



Fig.1. 5S Elements

Source: What are some examples of 5S strategies?
<https://www.creativesafetysupply.com/qa/5s/what-are-examples-of-5s-strategies> (10.09.2019.)

The 5S method follows Kaizen's 3 steps: Eliminate, Decrease, and Change.

Target: Creating and maintaining an effective work environment that is safe and of good quality. To create a state in which the company can continuously promote Kaizen (continuous improvement).

The kernel of method: Creating a quality work environment. 5S is an abbreviation for five Japanese words. The first three are practical steps and the last two supports system sustainability.

Sort (Seiri): Remove the unnecessary - Keeping only what is used and red tag the rest. You should enquire from the workers whether defective tools and equipment, outdated items, and other non-essential materials on site. Items must be stored that are difficult to classify.



Fig.2. "Sorting" [8]

Set in order (Seiton): A place for everything and everything its place – Fixed locations and clear visualisation. Allocate and store items in accessible spots. Tools and items should be grouped based on use and function. Heavy materials should be placed where the employee is able to pick them easily.



Fig.3. “Setting in order” .[8]

Shine (Seiso): Everyday clean – Regular cleaning and checking to set the standard. Activities and items that cause dirt, contamination are traced and actioned. After the shift ends the work area must be cleaned. Tools and other equipment should be ready for use all the time.



Fig.4. “Shining” [8]

Standardise (Seiketsu): Same standard, every time for everybody – Optimising the standard across all shifts. Expectations of workers’ responsibility to maintain the culture of cleanliness must be set.

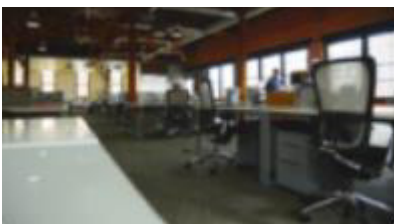


Fig.5. “Standardising” [8]

Sustain (Shitsuke): Maintain Discipline – Sustaining the habit of properly maintaining and improving the standards.[1] Sustaining helps workers contributing to maintaining a healthy and safe working environment.



Fig.6. “Sustaining good practising and improvements” [8]

Figure 7 and 8 shows the effects of introduction of 5S by an enterprise.

Fig. 7. shows:

- Inventory stacked far out of reach
- Unused older inventory
- Safety hazard; boxes stacked in aisles
- No discernable organization such as barcoding, inventory dating, color coding, or naming convention
- Trash and debris allowed to accumulate



Fig.7. Before 5S .[7]

After the introduction of 5S, the view of the work-area is very different. The materials and products are put in systematic order.

Fig. 8. shows:

- Uniform bins and racking
- Date tracking of inventory
- Bin contents are labeled
- Bins, racks, and floors are kept clean and in good repair
- Lighting in facility is sufficient
- Racks are low enough that ladders are not required to access inventory

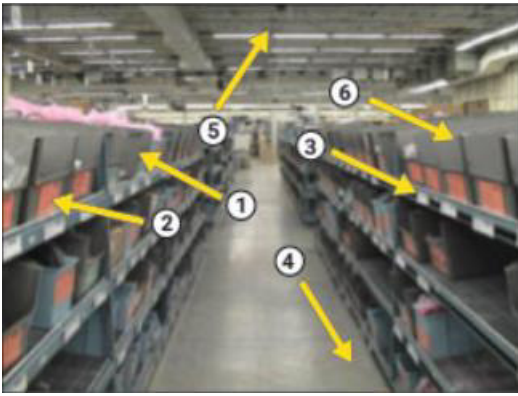


Fig. 8. After 5S .[7]

III. APPLICATION OF 5S IN THE PRACTICE

5S is applicable in any area where you work. We use it primarily at the operational level to maintain order, cleanliness and it supports continuous improvements, but the use of 5S can produce similarly significant results in office areas. [2]

Henceforward the authors submit the practical implementation of 5S. Managers are committed to configure call and inspiration, the engineer insure the tools the operator is responsible for their use and compliance. The process begins to create a list of items needed which describes exactly which tool should be at the station and which is unnecessary. Then the placement, naming and labeling of their place will follow. If something is out of place or disappears or it will be ruined, we already know what needs to be replaced. So the main point of 5S is to maintain order and cleanliness. To verify this, there is a 30-point series of questions that measure the status of the state in 5S. The certification system expects a result above 80%.

However in practice not only manual workers can use 5S, but also office workers in their own environment. We can't work without the tools we need is there or the space to do our work. Now the 80% requirement is not perform every month at the area, and the area's 5S policing needs to be reconsidered. The first thing we did to improve it was to ask the workers about the system. We were primarily concerned with the auditor about the recurring problems in each line and area. The first problem that could be eliminated was the lack of feedback. The area competent received the percentage, but they did not know what the difference was. To eliminate this, we turned to the IT team to report any discrepancies we found after each audit.

When this e-mail system was created, many things could be solved immediately, such as the lack of individual 5S cards, marking labels, required documents (including the list of items needed), or paintings. We solved the missing 5S cards and documents. Paintings and labels were the responsibility of the area. Replacing the list of items needed took the most time. This document contains a list of the equipment that is regularly used at a given station. It includes their quantity, and the identifier that the storage can use to replace the missing item.

These includes tools, additives, cleaning tools. This list may be drawn up with the operators and engineers help, and will be subject to periodic monitoring. But at that time, we noticed another opportunity for improvement: they can't just look back at e-mail. If it were collected in a database and could be queried at any time, Pareto analysis¹ could be made from it, which would lead to further increase in results. Before start this new development, we consulted with area assign to inquire about the effectiveness and shortcomings of the current system. At this point, questions that were too broad to be interpreted were revealed, ie the items in the question list do not necessarily indicate the cause of the problem. Therefore, we thought that not only would it be serve or not to select at the audit, but that the cause could be commented on. Even with the differences posted, the operating level 5S results increased 4%. The IT team has committed to improve the application. The result is spectacular, and this month there hasn't been a single line below the expected level. The efficiency analysis go on 60-90 days, which in this case is rather 3 months due to the rarity of the audit. So our next step will be to keep an eye out for further support, questions, or comments.

1Pareto: "80% of the problems are behind 20% of the root causes. It is essential to distinguish little and insignificant much." [3]



Fig.9. Percentage of rejects by week (self-edited)

Figure 9 shows the scraps rates for one of the line since January. This was calculated by looking at the total number of pieces produced and the number of scrap, and calculated the percentages from each week. The target is 0.4% (or lower) as shown in the chart, which is a company-defined index. It is a requirement of the Certification System that, wherever possible, the maximum should be at the target value. We suggest that if the line does not reach the result, it should be mandatory to start A3 for the problem. This gives us a much better chance of finding out the cause of the problem and eliminating it, so we can achieve better results in the future.

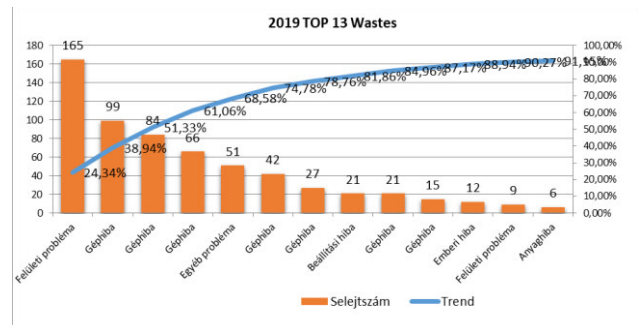


Fig.10. 2019 Top 13 wastes (scraps), (self-edited)

Fig. 10. shows a Pareto diagram of the main causes of scrap. Starting in January, these were the reasons that caused the most scraps. This also shows that the Pareto principle applies, ie that 20% of errors cause 80% of problems. Above the columns is the number of scraps, and for the trend, the percentages are calculated by dividing the number of the first scraps case by the total number of scraps, then dividing the second by the sum of the first two, and so on. We recommend that you open the A3 for the first 3 most scraps case and investigate the problem to prevent such a large number.

IV. CONCLUSION

The 5S system improves employee proprietary, discipline and image of the company. Improvements in productivity and quality have long-term effects on the success of business. Productivity accession is also possible orderly because in a well-structured workstation can be eliminated a lot of unnecessary losses. The introduction of the measurements of 5S method in the chosen enterprise saved lots of losses, also. There must be a sincere belief by employees from top management to operating employees that the enterprise is able to achieve higher productivity and quality with 5S method. The commitment to quality among the work force within the organization is essential. It can be obtained with motivational programs, job enrichments, goal setting, positive reinforcement, team development [5], [6]. Participative management which involves employees in important management decisions is a good method to improve productivity and to reach higher quality.

V. REFERENCES

- [1] <https://www.theleanwarehouse.co.uk/5s-poster---landscape-27182-p.asp> (10.09.2019)
- [2] Dr. Németh Balázs: 5S method and its application In: Kvalikon Kft. [online]: <http://www.kvalikon.hu/cikkek/5s-modszer-scm.php> (10.09.2019)
- [3] Pareto diagram (ABC analysis) (2015) [online]: <http://www.leanforum.hu/index.php/szocikkek/175-pareto-diagram-abc-elemzes-2> (page 26.), (10.09.2019)
- [4] Steven J. Skinner, John M. Ivancevich: Business for the 21st century, Irwin, 1992
- [5] David J. Rachman, Michael H. Mescon, Courtland L. Bovee, John V. Thill: Business Today Hoffmann Press, Inc.1990
- [6] David J. Rachman, Michael H. Mescon, Courtland L. Bovee, John V. Thill: Study Guide Business Today Sixth Edition Webcrafters Inc.1990
- [7] 5S Training and Research Page, Learn About 5S <https://www.creativesafety.com/content/education-research/5S/index.html> (06.09.2019)
- [8] <https://safetyculture.com/topics/5s-lean/> (08.09.2019)
- [9] <https://kanbanize.com/lean-management/value-waste/what-is-5s-lean/> (09.06.2019)
- [10] <https://www.epa.gov/sustainability/lean-thinking-and-methods-5s> (09.06.2019)
- [11] <https://www.factorysystems.eu/en/gme/5s-method-housekeeping/> (09.06.2019)