Development of a framework for 5S implementation considering specific industry and country context

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Abstract

The 5S is an effective management tool which can improve housekeeping, environmental conditions and health and safety standards. Therefore it helps to increase overall performance of an organization in different parameters. Due to specific industry and country situation, implementation process of 5S may be little varied. In this paper, development of a framework for 5S implementation for a specific industry is described considering specific country context.

Keywords

5S, Lean Manufacturing, Total Quality Management

1. Introduction

5 s originated in Japan has following components: Sort, Set in Order, Shine, Standardize and Sustain. It has been found to be effective making the workplace tidy, safe and improving quality and productivity [Pheng et al]. 5-s Principles focuses on effective workplace organization, simplification of work environment and minimization of waste while improving quality and safety. Success of 5-s totally depends upon total employee involvement, its continuous monitoring and everyone should work in a team [Korkut et al]. During the implementation of 5S, different types of obstacles and situations arise depending on the industry type, culture of the locality, and other factors. Therefore it would be helpful for the management to implement if a framework provided considering the local situation and industry type. In this paper, a framework is developed for food and beverage industries in Bangladesh and the procedure may replicated in other locations and industries too.

2. Methodology

The methodology used for this work is as follows:

- Making a Standard 5s Questionnaire.

- Visiting some food and beverage industries in Bangladesh.

- Getting the Questionnaire's answers from the appointed persons regarding 5s Implementation.

- Analyzing the answers and finding out the overall conditions.

- Making a frame work by minimizing the lacking finding out from these visited industries.

- Discussion on the benefits of 5s implementations.

For this work, a total of seven industries were visited and information was collected through questionnaire.

3. Analysis

After collecting the relevant information in the form of questionnaire and interview, the data was analyzed and used for the formation of the framework. The findings from the data are presented below in the tables and chart.

Table 1. Sort segment of 5S related analysis

Sl	Criteria	PERFETTI	AST	AKCGD	TFI	NFI	RDW	SMART	Yes percentage	No percentage
1	Develop sorting and disposition rules	Yes	Yes	Yes	No	Yes	No	Yes	71.43	28.57
2	Use red tagging for unwanted items	Yes	No	Yes	No	No	No	No	28.57	71.43
3	Floor area free of unwanted items	Yes	Yes	Yes	No	Yes	No	Yes	71.43	28.57
4	Using of Quarantine zone	Yes	No	No	No	No	No	No	14.29	85.71
5	All Machines are in regular use	Yes	Yes	Yes	Yes	No	No	Yes	71.43	28.57

In the analysis of the questionnaire on sort of 5S as shown in Table 1, it is found that the majority do not use red tagging and quarantine zone. On the other hand, the majority have sorting rules, keep the floor area clear and use al machines regularly. Altogether 51.43% are found to be positive side in this sort segment of 5S.

In the analysis of the questionnaire on set in order of 5S as shown in Table 2, it is found that the majority do not use ergonomics and safety principles. Also the majority have not yet made a place for everything used in the industry so that everything could be fond easily. red tagging and quarantine zone. On the other hand, the majority with just above half have used time study to eliminate unnecessary motions and found best locations for items. Besides, the majority use identification labels for required items. Altogether 54.23% are found to be positive side in this segment of set in order of 5S.

Table 2. Set in Order segment of 5S related analysis

Sl	Criteria	PERFETTI	AST	AKCGD	TFI	NFI	RDW	SMART	Yes percentage	No percentage
1	Eliminate unnecessary motion and doing time study	Yes	Yes	Yes	No	No	No	Yes	57.14	42.86
2	Ergonomics and safety	Yes	yes	Yes	No	No	No	No	42.86	57.14
3	Identification labels for required items	Yes	Yes	Yes	No	Yes	No	Yes	71.43	28.57
4	Finding the best location for items	Yes	Yes	Yes	No	Yes	No	No	57.14	42.86
5	A place for everything and everything in place	Yes	Yes	Yes	No	No	No	No	42.86	57.14

Table 3. Shine segment of 5S related analysis

Sl	Criteria	PERFETTI	AST	AKCGD	TFI	NFI	RDW	SMART	Yes percentage	No percentage
1	Sources of contamination are identified and eliminated	Yes	Yes	Yes	No	Yes	No	Yes	85.71	14.29
2	Develop daily/weekly/monthly checklists	Yes	No	Yes	No	No	No	No	57.14	42.86
3	Create standard work instructions for all cleaners	Yes	Yes	Yes	No	Yes	No	Yes	28.57	71.43
4	Identifying opportunities to improve cleanliness	Yes	No	No	No	No	No	No	42.86	57.14
5	Cleaning schedules are available and displayed	Yes	Yes	Yes	Yes	No	No	Yes	14.29	85.71

In the analysis of the questionnaire on shine of 5S as shown in Table 3, it is found that the majority have identified sources of contamination and then eliminated together with development of time bound checklist. On the other hand, the majority do not have standard work instructions for all cleaners, cleanliness improvement opportunities are not identified . Furthermore, the majority do not have cleaning schedule and put in display. Altogether 45.71% are found to be positive side on shine segment of 5S.

Table 4. Standardize segment of 5S related analysis

Sl	Criteria	PERFETTI	AST	AKCGD	TFI	NFI	RDW	SMART	Yes percentage	No percentage
1	Develop a standard 5S chart	Yes	Yes	Yes	No	Yes	No	Yes	14.29	85.71
2	Created standard work instructions and train team on all workplace processes	Yes	No	Yes	No	No	No	No	57.14	42.86
3	Develop 5S audit procedures	Yes	Yes	Yes	No	Yes	No	Yes	28.57	71.43
4	Display board is used, organized and up to dated	Yes	No	No	No	No	No	No	0.00	100.00
5	Visual controls such as color coding, flow charts and labeling are used	Yes	Yes	Yes	Yes	No	No	Yes	28.57	71.43

In the analysis of the questionnaire on standardize of 5S as shown in Table 4, it is found that the majority do not have standardized 5S methods like standard 5S chart, development of 5S audit procedures, display board, visual control etc. Only a little more than half have provided training on workplace processes based on standard work instruction. Altogether 25.71% are found to be positive side on shine segment of 5S.

Table 5. Sustain segment of 5S related analysis

Sl	Criteria	PERFETTI	AST	AKCGD	TFI	NFI	RDW	SMART	Yes percentage	No percentage
1	Everyone's role is explained and 5S becomes a habit	Yes	Yes	Yes	No	Yes	No	Yes	14.29	85.71
2	Maintain a 5S audit calendar	Yes	No	Yes	No	No	No	No	42.86	57.14
3	Display all 5S communication, audits and feedback locally in each area	Yes	Yes	Yes	No	Yes	No	Yes	14.29	85.71
4	Reward and appreciation scheme on place	Yes	No	No	No	No	No	No	14.29	85.71
5	Improvement to the 5S system	Yes	Yes	Yes	Yes	No	No	Yes	14.29	85.71

In the analysis of the questionnaire on sustain of 5S as shown in Table 5, it is found that the majority do not have programs to sustain 5S system like explanation of everyone's role, display of relevant information, reward and appreciation scheme, endeavour to improve the 5S system, and maintaining a 5S audit calendar. Altogether 25.71% are found to be positive side on shine segment of 5S.

4. Framework Development

Based on the analysis of the collected information, a frame work is developed. The framework for 5S implementation is as follows:

1) Activities of Quality Assurance Department:

- Establishment of a strong Quality Assurance Department.

- At least one or two persons are expert in 5s and good house keeping.

- Expertise in 5s Implementation process will co ordinate the whole implementation process.

2) "Red Tagging" of unnecessary items:

- Reducing the sorting process time.
- More visual control over sorting process.
- To provide a systematic approach to Sort activities.
- If there are many employees or multiple shifts then to effectively communicate which items have been considered unnecessary.

3) Using of Quarantine zone and alternative locations:

- Unwanted items need to be placed in a quarantine area.

- Other items may be deemed necessary, but used infrequently and so an alternative location needs to be found.

4) Properly organized Store & Storage area:

- Items in stores and storage areas are kept in shelves, racks or bins and clearly marked.

- Shelf grid are marked with reference number/ names for easy retrieval of items.

- All stationeries in the cupboards are kept in places , identified with symbols and marks.

- Items are stored in alphabetical order and in a logical manner (left to right, top to bottom).

5) Maintaining Checklist: Importance of using Checklists are □Save time and brain power

- Make delegating easier.

- To measure and improve 5s workplace organization.

- instill 5s philosophy, and evaluate success of 5s implementation.

6) Cleaning schedules available and displayed:

- Keeping records that show what type of cleaning was completed, when it was completed, who did the cleaning and who checked and signed off the cleaning as acceptable.

- Clear instructions outlining the step-by-step process which staff responsible for cleaning.

- The frequency of cleaning e.g. daily, weekly, monthly or annually.

7) Gap Analysis:

- Gap analysis needs to be done on monthly basis.

- Finding the difference between desired 5s score and achieved score.

- Sort out the reasons of the gap and minimizing it.

8) 5s Internal Audit & Using of Audit Calendar: For Audit purpose following criteria's are required

- An internal audit sheet needs to be maintained.

- A team needs to be appointed to conduct the internal audit.

- The internal audit is conducted once in a monthly basis.

    Using of 5s Audit Calendar may help in these following regards:

- Making the total 5s process simplified.

- Degree of Standardization

- Making the first four S's a habit and part of the company's culture.

5. Conclusion

5S is a simple but effective method for overall management of an industry. It is expected that the framework proposed in this work would make it easier for the relevant industries to implement 5S. This framework is developed considering the industry type and locality factor though the majority should be the common features. Further, the methodology used here may be replicated for the development of framework relevant to other industries and locality.

References

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