

ICMIEE18-111

Implementation of 9S Approach in a Jute Industry: A Case Study

Md. Sumon Rahman^{1*}, Md. Ariful Islam², Md. Tahiduzzaman¹, Md. Shohanur Rahman¹

¹Department of Industrial and Production Engineering, Jessore University of Science & Technology, Jessore-7408, BANGLADESH

²Business Administration Discipline, Khulna University, Khulna - 9208, BANGLADESH

ABSTRACT

Productivity improvement is one of the foremost intentions of any manufacturing industry. This productivity may fall due to various non-value-added activities. In this study, implemented “9S” is actually an extension in basic and conventional “5S” (Sort, Set in order, Shine, Standardize and Sustain) system which is a Japanese system for overall organizational adjustment and good maintenance of places in a selected jute industry (Platinum Jubilee Jute Mill) which is situated in Khulna, Bangladesh. Authors have extended this basic 5S system by incorporating Safety, Spirit, Simplicity and finally Skill. It creates a dynamic environment where improvement efforts in safety, quality, cost, delivery and creativity are heartened with the participation of all employees. The purpose of the study is to improve productivity by implementing the 9S approach in a new manner of 5S. After proper implementation of 9S in selected jute industry the productivity improved from 1477.63 tons to 1837.04 tons of jute product.

Keywords: 9S, Productivity, Jute product, Case Study.

1. Introduction

To earn the profit is the main goal of a manufacturing industry through reducing or eliminating all kinds of non-value added activities. Non-value added activities are those the customers do not pay for. The concept 9S is the extension of 5S which help an organization to reduce waste and improve productivity. 5S was established in Japan and was identified as one of the methods that used as a principle of continuous improvement, also called kaizen [1]. 5S is a workplace organization method that uses a list of five Japanese words: *seiri*, *seiton*, *seiso*, *seiketsu*, and *shitsuke*. English equivalent words are “Sort”, “Set In order”, “Shine”, “Standardize” and “Sustain”. This helps to organize a work space for efficiency and effectiveness by detecting and eliminating the items used, retaining the area and items, and sustaining with a new manner. Normally 5S is viewed as a part of a broader concept known as visual control, visual workplace or visual factory [2], [3]. The objective of this study has developed the productivity of selected jute industry to respond to the improvement process implementation 9S and the need to eliminate existing non-value added activity and wastes. In here, 9S is the extended from basic conventional 5S to advanced 9S such as Safety, Spirit, Simplicity, and Skill.

2. Literature Review:

In 2017 researchers implemented the 5S methodology in a Food and Beverage industry to save money, space, increase productivity by decreasing rejection of components.[4] To promote the service quality in health care provision In the Sri Lankan health sector 5S used as the entry point [5].It is possible to improve the quality of the work by proper implementing of the 5S

approach.[6] Researchers applied the 6S kaizen method in a laboratory to facilitate the work process, reduce waste, improve worker safety, and also improve staff performance. [7] 5S method is very important and has a positive correlation to the overall performance of production results [8]. It has proved that 5S is an effective method for improving housekeeping, health and safety standards in the workplace as well as environmental performance. The study also concluded that effort and participation from top management is a must for proper implementation of 5S [9].

3. Meaning of 9S

Basically 9S is the advanced extension of conventional 5S [10] technique. The steps of 9S process are as follows:

3.1. Sort:

Sort means, removing all unnecessary items from the working area. It helps an employee to easy access to their equipment.

3.2. Set in Order

The practice of orderly setup so the right item can be picked efficiently (without waste) at the right time and easy to access for everyone. A place for everything and everything in its place .

3.3. Shine

Clean the work area and tools as they always are ready to be used for the workers.

3.4. Standardize

It means the best practice within the workplace. It ensures that all setup and tools are in right condition by promoting visible and modest directions.

3.5. Sustain

Implementing behaviors and ways to continue the recognized standards over the long term and making the workplace organization the key to managing the process for success.

3.6. Safety

It means creating the working environment safe and free from any kind of recognizable hazard.

3.7. Spirit

It means teamwork. None can't implement 5S individually. It is very essential "S" of 9S as without spirit or teamwork, 5S or 9S couldn't be sustained or even executed.

3.8. Simplicity

For an efficient and successful manufacturing system must be simple. The Simpler system is easy to understand, easy to execute, and easy to implement for workers and management.

3.9. Skill.

Skill means the ability to do something well. Skilled workers play an important role in their occupations that are economically productive. The Proper training program helps the workers to become more skillfulness.

4. Methodology:

The focus of this study is to analyze the working area of the selected jute industry. The industry was first visited in April 2017 before 5S implementation. The first step is to identify problems by using the method of observation and note the production data on the condition of different production lines. Assessment 9S concept is applied to the production floors. Then the industry was revisited in accordance with different stages of implementation of 9s during a six months period from April 2017 to September 2017. Data was collected from the previous condition of the industry (before the implementation of 9S) and existing condition of the industry (after the implementation of 9S). Then in the value analysis of the assessment results 9S, pictures are taken before and after implementation of 9S and data are recorded, so that can be given recommendations for continuous improvement (Kizen).

5. Result and Discussion:

The selected jute mill produces two types of jute products as hessian and sacking jute cloth and bag using about 1800 loom machine. Before implementation of 9S observed three months on the production process and collected production data from April 2017 to September 2017. The monthly status among (winding section,

weaving section, finishing section) is being showed by table-1.

Table- 1: Monthly production data (Before 9S implementation)

		April	May	June	
Windin g	Sacking (ton)	50.89	45.25	46.91	Total
product ion	Hessian(ton)	16.96	15.08	14.30	
Weavin g	Sacking (ton)	188.2	161.3	158.1	
product ion	Hessian(ton)	2	6	5	
Bag Product ion	Sacking (ton)	62.74	53.78	50.71	
	Hessian(ton)	169.7	141.6	147.7	
		8	5	9	
		56.59	47.21	50.26	
Total		545.1	464.3	468.1	1477.
		8	3	2	63

After successful implementation of 9S, the productivity increased from previous months which present as table-2.

Table-2: Production after implementation of 9S

		July	Augu st	Septe mber	
Windin g	Sacking (ton)	61.72	85.44	110.70	Total
Produc tion	Hessian (ton)	20.18	58.48	70.23	
Weavi ng	Sacking (ton)	165.6	192.3	200.96	
Produc tion	Hessian (ton)	9	0	66.98	
Bag Product ion	Sacking (ton)	57.89	64.10	66.98	
	Hessian (ton)	150.9	168.1	187.92	
		7	4		
		53.32	59.38	62.641	
Total		509.7	627.8	699.43	1837.
		7	4		04

<u>Term</u>		<u>Before</u>		<u>After</u>
1.Sort	Unnecessary parts are placed in floor		Removed unused part from workplace	
2.Set in order	Products pickup randomly		Products pickup in a systematic way	
3.Shine	Workplaces are not net & clean		Net & clean workplace	
4.Standaedized	No proper container used		Used standard container	
5. Sustain				For sustaining the '9S' technique effectively and to strictly adhere to it in the organization, operators, supervisors and floor managers audits are conducted periodically.
6. Safety	No mask used		Used mask	
7.Spirit(team-work)		Discussion between worker and management did not hold About 9S.	Group work to sustain 9S	

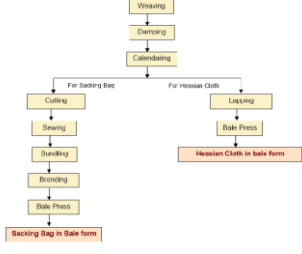

8. Simplicity		No working flow- chart are found	Provided a simple working flow - chart	
9. Skill	No training program was held		Training program hold periodically	

Fig.-1: 9S implementation report

After successful implementation of 9S, the results are presented showing the improvements in different parts of the selected jute industry for different S of the 9S system on different occasions are as shown in figure- 1.

The monthly improvement of productivity is as shown in figure- 2.

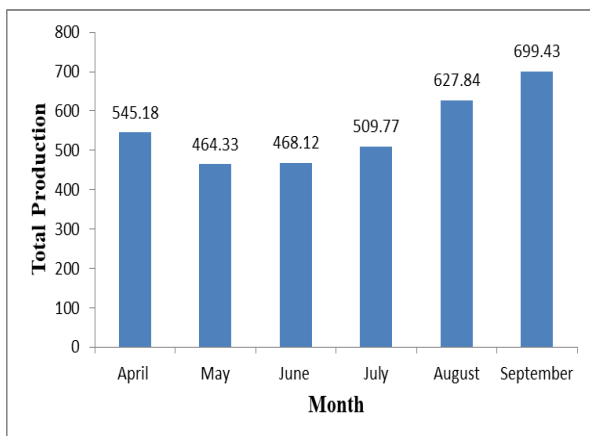


Fig. - 2: Monthly production rate.

From figure- 2, it shows that productivity is increasing from July to September. Before implementation of 9S, the total production was 1,477.63 tons which shown in table -1. On the other hand, after successfully implementation 9s concept the total production increased as 1,477.63 tons to 1,837.04 tons which shown in table -2. As a result due to the implementation of 9S concept productivity improved 359.41 tons. If this concept is sustained for day long then the productivity will be improved continuously.

6. Conclusion:

From this study, it can be seen that successful implementation of 9S plays a very important role in the

fastener or any manufacturing industries to find out and eliminate various types of non-value added activities. In this study, before implementation of the 9S method the total productivity of three months was 1,477.41 tons and after implementation of the 9S method the total productivity of three months calculated 1,837.04 tons indicating the improvement of production rate and reduces the unnecessary usages of properties. The results showed that the 9S methodology can be effectively used in this sector. From this study it can be concluded that by proper implementation of 9S concepts can help a jute industry to achieve high benefit without higher investment, it can be applied to any industry.

REFERENCE

- [1] Hirano, Hiroyuki. *JIT Factory Revolution: A Pictorial Guide to Factory Design of the Future*, 1988.
- [2] Ortiz, Chris A. and Park, Murry. *Visual Controls: Applying Visual Management to the Factory*. New York: Productivity Press, 2010.
- [3] Jump up^ Galsworth, Gwendolyn D. *Visual Workplace: Visual Thinking*. Portland, Ore: Visual-Lean Enterprise Press, 2005.
- [4] Sk. Riad Bin Ashraf et al, Implementation of 5S Methodology in a Food & Beverage Industry: A Case Study, *International Research Journal of Engineering and Technology (IRJET)* Volume: 04 Issue: 03 | Mar -2017
- [5] K.W.C.U. Kendangamuwa, S. Sridharan, D R K Herath, R.M.M.K. Ratnayake, "Factors Contributing to the Sustainability of 5S Programmes in Government Hospitals in Regional Director of Health Services Area Kurunegala,"

- [6] Y. Johana, N. M. Hardi, L. Abdullah, N. Jumadi, W.N.S.W. Mohammad, N. S. Taharuddin, "The Sustainability of QE/5S Implementation in an Administration Office of a Higher Education Institution," 2014, <https://www.researchgate.net/publication/278244980>
- [7] AD Sari¹, MR Suryoputro², and FI Rahmillah³ A study of 6S workplace improvement in Ergonomic Laboratory, Materials Science and Engineering 277 (2017) 012016
- [8] Cristina Veres (Harea)^{Pa}, POF, Liviu Marian^{PaP}, Sorina Moica^{PbP}, Karam Al-Akel^{Pa} Case study concerning 5S method impact in an automotive company, Procedia Manufacturing 22 (2018) 900–905
- [9] Rahman, M.N.A; Khamis ,N,K; Zain, R,M;, Deros, B,M; and Mahmood, W,H,W; "Implementation of 5S Practices in the Manufacturing Companies: A Case Study," American Journal of Applied Sciences 7 (8): 1182-1189, pp.1184-1186, 2010.
- [10] H. Hirano. 5S for Operators: 5 Pillars of the Visual Workplace, (SteinerBooks), 1996.