

An Investigation of Strategies to increase Productivity and Operational Efficiency through Implementing 5S Productivity Technique in the Soap Manufacturing Industry

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ABSTRACT

The present research was carried out at one of the leading multinational organizations which manufacture goods that have been categorized under personal health care and food products. However the main focus of the study has been limited to the productivity related matters in the soap manufacturing process of this selected organization. Therefore, the main objective of this research was to investigate the reasons for low productivity and suggest solutions through implementing 5S technique to overcome that problem. In order to achieve this objective, both primary and secondary data were used and were analyzed using qualitative and quantitative measures. During the analysis, it was able identify lack of proactive maintenance procedures, improper utilization of preventive maintenance procedures, problems in handling tools, use of improper tools, poor worker attitudes & behavior, lack of technical knowhow of the workers, poor relationship between management & workers, getting high time for changeovers, increase in defect rates as reasons for low productivity in the selected manufacturing process. Then, as the solution for overcoming the low productivity, the researcher suggests that the management has to pay attention on the reasons for the problem and resolve them through effective implementation of 5S technique.

KEYWORDS: Operational Efficiency, Productivity, Standard Operation Procedure, Total Productive Maintenance, Value Stream Mapping

INTRODUCTION

The selected organization of study is a multinational organization and is a home for 26 popular soap brands which are currently very popular in Sri Lankan commodity market. When analyzing the soap manufacturing process, it involves not only several machines such as mixing machines, cutting machines, plodder machines, stamper machines, and carton feeding machines but also a considerable amount of human component as well. Hence, the productivity and the operational efficiency in production can be subjected to the performance of both machineries and human resource.

However, most of such manufacturing oriented organizations are suffering from low productivity and it is a major problem for them.

Research Objective

The present research was carried out to identify such major problems in the soap manufacturing process of the selected organization of study and provide some feasible solutions to overcome them. In order to achieve this main objective, the scope of the research has been limited to identify employee related problems that can create some impacts for the lower productivity of the organization. Therefore the research would specifically focus on morale enhancement of workers and thereby enhance their innovation capabilities and teamwork skills. In addition to that the findings of the research would also be helpful to manage wastages in minimum level.

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LITERATURE REVIEW

Following sub sections have been used to cover the theoretical background of this research.

Productivity

Basically productivity can be defined as affective use of the resources and time. It is simply defined by ratio between inputs and outputs. Actually it is an output of production process per unit input. Also productivity has various categories such as partial productivity, multifactor productivity and total productivity.

Productivity and Overall Equipment Efficiency (OEE)

OEE is a calculation which focuses on individual items of process or manufacturing equipment at a finite level and allows their 'effectiveness' to be measured individually or in groups.

Availability

Availability takes into account Down Time Loss, which includes any Events that stop planned production for an appreciable length of time. The remaining available time is called Operating Time. Therefore the availability is the ratio of loading time to the time actually consumed for the operation.

Performance Rate

Performance takes into account the speed Loss, which includes any factors that cause the process to operate at less than the maximum possible speed.

Quality products Rate

Quality product rate is the ratio of the quantity (material and energy) to be machined or loaded for machining to the actual quantity of quality products.

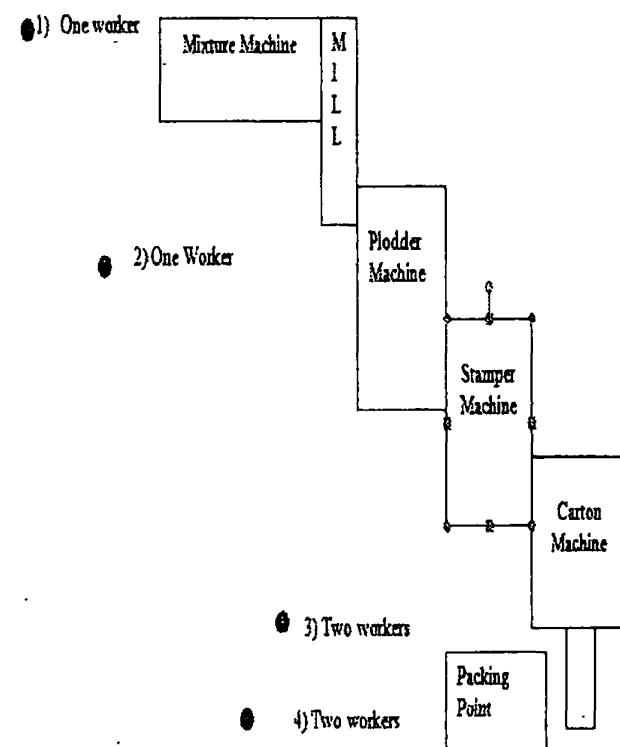
METHODOLOGY

This research can be categorized as a cross sectional study because the primary and the secondary data have been gathered during a specific period of time. During that time it was not modified any existing variables of

the study setting and hence the present research was non-contrived in its nature. Both primary data and secondary data were used. Observations, informal discussions and a questionnaire were used to gather primary data and all employees who work in production line were selected to obtain these primary data. The daily production sheets of the organization of study were the secondary data. The data analysis was performed using value stream mapping technique, graphical and tabular representations.

Figure 1 represents the current layout of the selected production line. Further, Figure 2 explains the value adding and non value adding activities of this production line.

Figure 1: Current Layout of the Production Line



DATA COLLECTION AND ANALYSIS

The primary data that were collected from the questionnaire were analysed graphically. This questionnaire measured the five core component and those were;

- Time period devoted to implement 5S Activities
- Recourse allocation for 5S activities

- Degree of importance of 5S for production floor.
- Employee commitment and perception about 5S activities.
- The degree of successful implementation of 5S activities

In addition to that age, gender, department and role were considered as significant features.

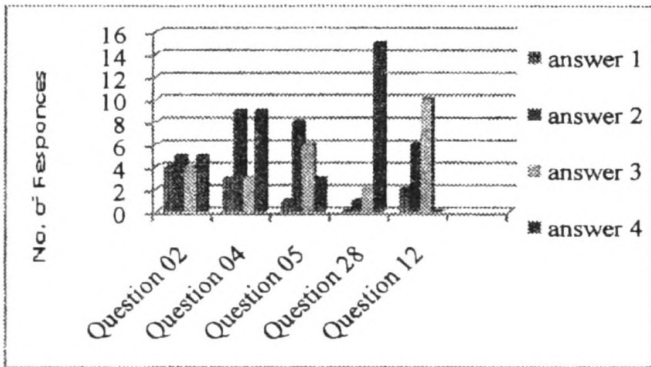


Figure 3: Responses for the Time Period Devoted to Implement 5S Activities

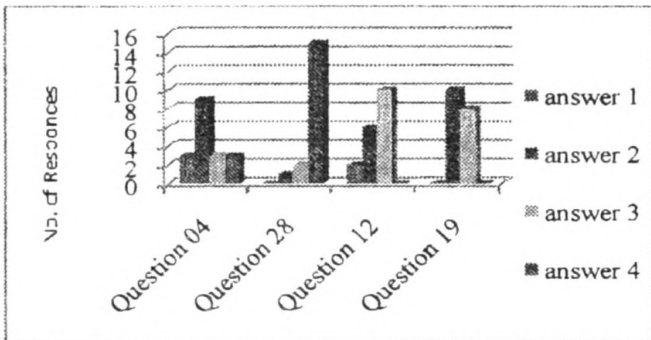


Figure 4: Responses for Resource Allocation for 5S Activities

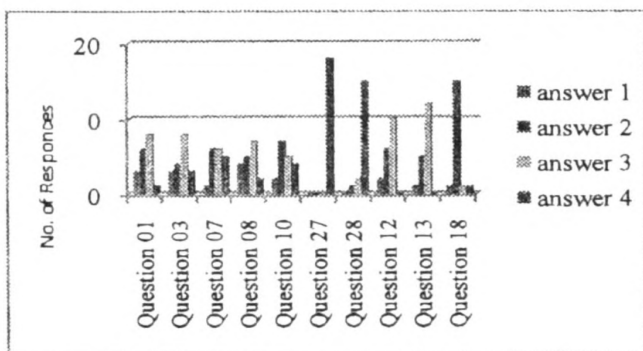


Figure 5: Responses for Degree of Importance of 5S for Production Floor

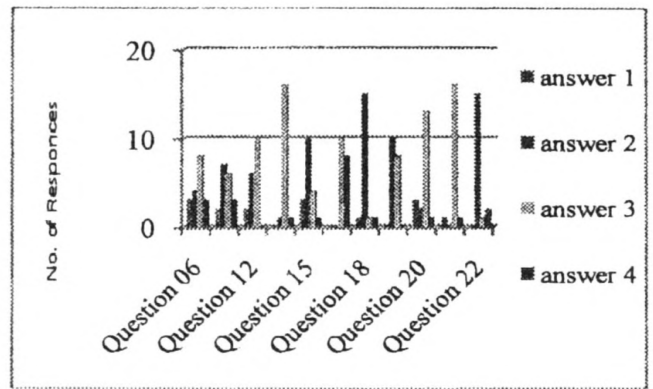


Figure 6: Responses for Employee Commitment and Perception about 5S

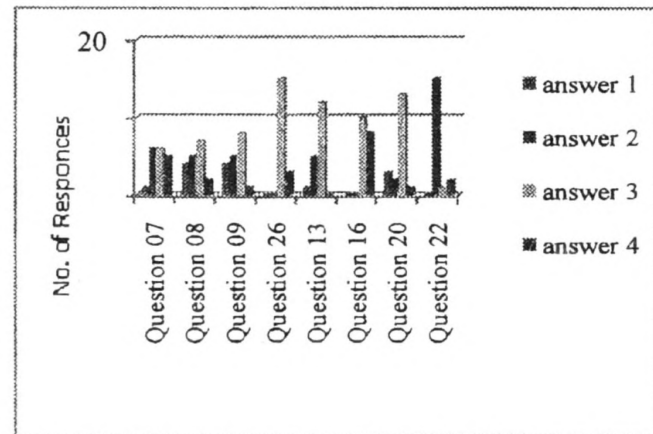


Figure 7: Responses the Degree of Successful Implementation of 5S Activities

Table 1 shows the production details, defects rate and break down times and when analysing them it was evident for lower productivity of the selected production process.

Table 1: Production Data - Normal Eight Hours Shift

Hour	Boxes per Hour	Defects	Break Down Time
07 A.M - 08 A.M	35	1821	20 Minutes
08 A.M - 09 A.M	70	655	
09 A.M - 10 A.M	35	244	30 Minutes for J.H
10 A.M - 11 A.M	70	452	
11 A.M - 12 NOON	40	401	18 Minutes
12 NOON - 01 P.M	70	196	
01 P.M - 02 P.M	55	820	7 Minutes
02 P.M - 03 P.M	60	992	4 Minutes

RESULTS AND DISCUSSION

The main objective of the present study was to identify barriers to improve productivity and improve the productivity by giving solution for those barriers. According to the current situation in the department, the breakdowns, changeovers and workers attitudes towards the productivity are the critical problems. Accordingly the factors affecting to the productivity were identified and following set of solutions can be suggested to improve the efficiencies.

Solution1: Organize Training and Development Programs

A skills training should be given to both operators and fitters especially to perform the processes accurately. Also there should need programs to change the attitudes and behaviors of the workers by securing their jobs and making good environment. Further, the management can arrange continuous meetings with workers in order to maintain good relationship with each other and to motivate them to participate in the decision making process.

Solution 2: Hired skilled work Force

Hiring skilled workers from outside is another strategy to reduce the training and development cost of the organization.

Solution 3: Improve the Management Commitment

The management commitment can be improved by assigning supervisors for each machine. Then, they can supervise all the processes of each machine assigned to them. Further, a supervisor can be assigned to changeover tasks and maintenances of the machine. Then, the efficiency of machine handling that can be enhanced. This is also a good solution to improve efficiencies of both machine and the supervisor.

Solution 4: Organize Interdepartmental Kaizan competitions

This is another solution to motivate people and improve their learning and skills. Through that new innovations would be emerged as solutions for overcoming problems.

Solution 5: Increase Incentive Payments

By increasing the incentive payments, the management can motivate the workers. Then, workers will work in better environment of work. By that the productivity of the department can be enhanced.

Solution 6: Using 5S Technique

Implementing 5S technique is a better solution to cope with all the areas of the problem because the 5S technique is based on eliminating non value adding activities in the production process. Also, it is more familiar to the workers and the implementation is very easy. This will motivate people and also sustain with it for the future. Table 2 represent the feasibility study for the solutions proposed above.

Table 2: Feasibility Study

Solutions	Criteria				
	Importance	Time	Sequence	Financial	Ease of implementation
S1	✓				
S2	✓				
S3	✓		✓	✓	
S4		✓	✓	✓	
S5		✓	✓		✓
S6	✓	✓		✓	✓

According to the feasibility study, the management should undertake most feasible solutions to reduce deficiencies in the productivity. According to the finding of the research, there are set of solutions that can be taken immediately. First the management has to pay the attention to the factors effecting to productivity and sustain with the

solutions at least until the solutions are implemented. Then conduct training programs for workers to gain experience and technical knowhow about the machines and the production processes. After assigning workers, the necessary tools should be arranged for them. Then as identified, the processes should be followed with SOP (Standard Operation Procedure) and worker motivation program should be done to improve the motivation and actions should be taken to change the attitudes of workers. And also, implement the Total Productive Maintenance (TPM) and Kaizen activities in correct manner in order to create a pleasant working environment. Finally implement all the 5S activities in the department as they have implemented only 3S activities in order to get effectiveness of implementing it.

CONCLUSION

The analysis has identified the following factors as the reasons for low productivity;

- Not performing proactive maintenance
- Problems in Tools
- Workers attitudes and behaviour
- Poor relationship between management and workers
- Frequent breakdowns in the machines
- Poor technical know-how of the workers
- Improper handling of raw materials
- High defect rates
- High time for changeovers

As the conclusion, there are controllable and uncontrollable factors that are directly affecting the productivity of any type of production floor. Though it is easy to find solutions and implement them for the controllable factors such as breakdowns, and other mechanical factors, it would be hard to give solutions for uncontrollable factors like workers attitudes and their behaviors and even if found solutions for them, it is again questionable to implement them successfully.

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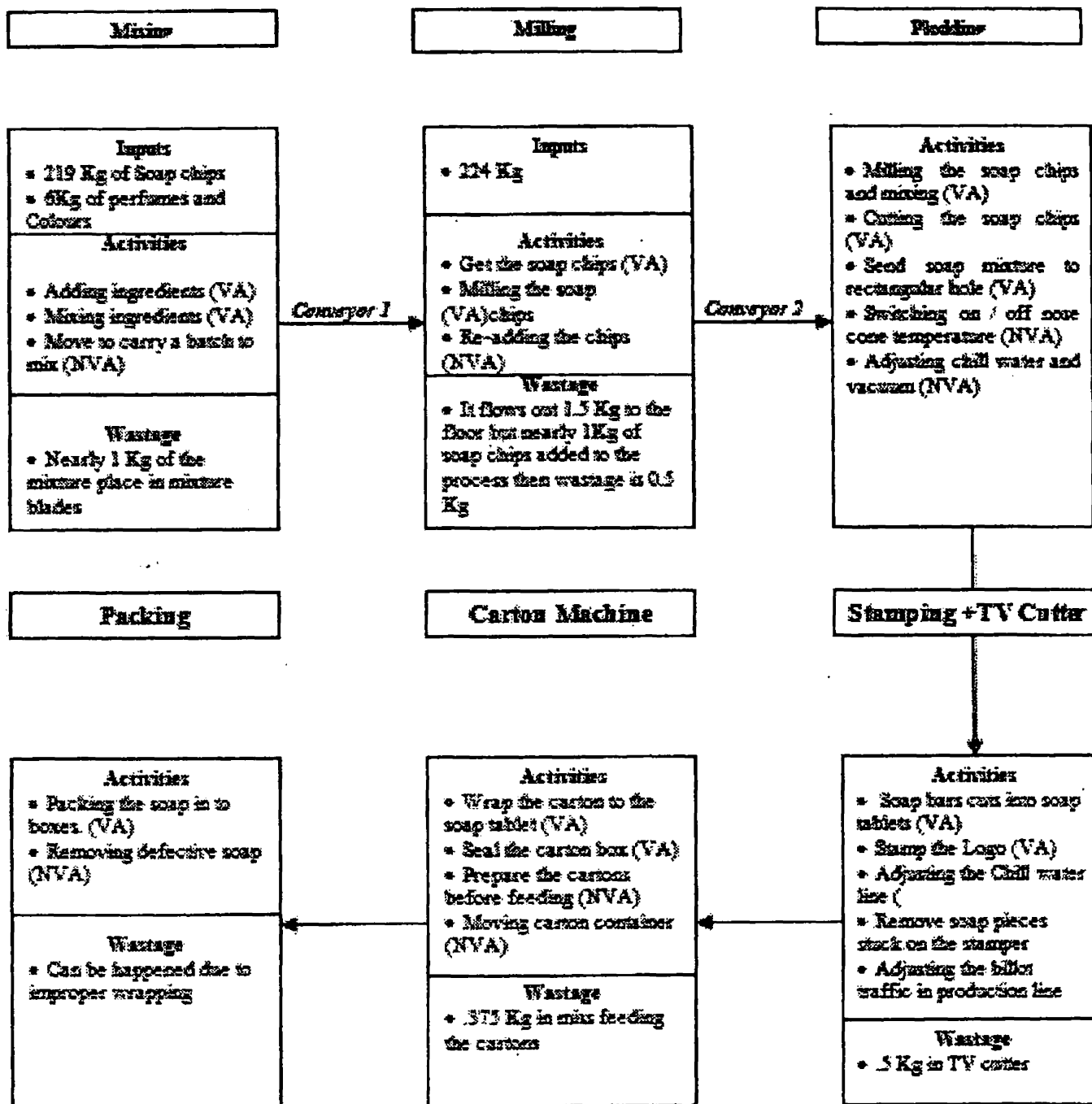


Figure 2: Value Adding and Non Value Adding Activities