PRODUCTIVITY IMPROVEMENT WITH KAIZEN TOOL IN GARMENT INDUSTRY

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Abstract

Lean manufacturing is a totally process improvement technique that focuses on eliminating non-value added activities to improve productivity through as continuous improvement by minimizing cycle time, inventory level. which is the waste reduction approach in industrial segment. Most of the traditional garment industries are facing problems like longer lead time, poor line of balancing, rework and rejections, low flexibility of style changeover etc. in this research work these problems were addressed through the implementation of Lean manufacturing technique like VSM and kaizen principles. in this paper, brief review of concept of VSM and kaizen principles and its implementation in sewing section of garment industry to improve cycle time by modifying its layout through the help of kaizen technique to improve its productivity is highlighted. The combination of value stream mapping (VSM) and kaizen to improve the processes is discussed in detail.

Keywords – Lean Manufacturing, Value Stream Mapping, Kaizen, Line Balancing, Garment.

1. INTRODUCTION

Manufacturing becoming more competitive in market, there is a need of global efficiency in companies. for which increasing labor cost and decreasing operating costs are normal options. and even some companies are moving towards outsourcing their works. It requires constant effort at cost reduction to maintain continuous profits in manufacturing process, to sustain excessive manufacturing and to eliminate all waste in manufacturing methods are needed in current trends. Due to Today's global economic factors, and increased competition in the market, the customer demands are more with varied volumes. Without increasing the price of the product the competitions with the competitors are challenging task. For the company productivity, this can only achieved through only reducing non value added activities in manufacturing process by adopting new manufacturing techniques like lean manufacturing, Just in time, supply chain management and world class manufacturing, agile manufacturing etc. most of the time research focuses on large scale industries but in case of small scale especially in textile industries are scarce and also very few publications are addressing (1) . specify customer value, identify value stream, make easy value flow, pull value and move towards perfection principles to define lean concept (2). the frame work for textile industry through lean principle is explored and defined customer satisfaction in better manner (3). The effective lean tools like VSM and kaizen are the best solutions for the above said problems to increase the productivity. In order to clear visualisation where waste occurs in the process, a value stream map (VSM) is drawn .Value stream mapping are often used to assess current manufacturing processes as well as create ideal, future state processes. and in case of Kaizen technique a continuous improvement is possible due to small changes in process activities in any manufacturing sectors either small and medium and also even large scale enterprises. also without doubt. in this research work by using these two lean techniques the elimination of wastes in process is possible due to which, the lead time reduction and better productivity with higher customer satisfaction is shown with suitable case study in textile industry.

2. THEORETICAL FRAMEWORK

The need of essential tool to solve the waste exists in manufacturing process is Lean Manufacturing technique. The main goal of the lean concept is reduction in waste and to achieve minimum lead time this will make the company leaner and more flexible also (4). Initially, lean" was described in the book The Machine that Changed the World' and in the beginning of 1990s. The LM concept became the most attractive alternative manufacturing philosophy that can operate on daily basis and also motivation for the growth and survival of the company. The definition of waste within lean is fairly consistent, and a common view is that it builds on three main categories. Muda, Muri and Mura defined as waste, meaning an activity that does not add any value, overload systems and overload of systems and humans and there is variation in a system, e.g. uneven demand respectively. Lean can be defined in terms of two perspectives one is on components or elements and other is different approaches on concepts, methods in the process. The idea of Lean is to eliminate waste or non-value added activities as it came to be known later. Which is a philosophy developed by Toyota in 1950s to compete against the US automotive sectors. the success of companies depends of lean management concepts like employee commitment, new practices and their implementation. Many papers have proved the details of benefits with Lean adoption to a system such as reduction in lead time, Work in Process (WIP), Manufacturing time, cost reduction in inventory etc. (5). In this research work, the detailed demonstration is made through the lean manufacturing techniques to a garment industry. The suitable case study is detailed along with VSM and kaizen implementation to the process

3. LITERATURE REVIEW

In recent years, many literatures have extensively studied and documented the lean manufacturing implementation, since from 1990's lean manufacturing is a conceptual frame work and many authors have proved that, the lean concepts drastic amount of productivity increase with minimum amount of waste occurred in the company. Usually, Lean manufacturing concept aim is to eliminate seven forms of wastes, reduction of lead time, process inventory, and production cost in manufacturing process. This is a quality improvement programme. Companies such as Dell, Toyota, Ford, Pratt and Whitney, Sikorsky, Delphi, Ford and many other companies have achieved large savings and improved productivity by adopting lean principles in their manufacturing activities. The proper implementation of lean technique manufacturing flexibility (6). The all types of wastes are identified through the application of VSM (value Stream Mapping). (7) Presented a case study of VSM in an Indian garment export industry to evolve and test various strategies to eliminate waste and to improve the productivity. With the idea of VSM technique the author has reduced the lead time and improves company maintenance in press parts production (8). Then, Kaizen is used for continuous improvement of the minimization of sewing defects in Apparel Industry in Bangladesh and The results before and after implementation of kaizen is really fruitful in form of productivity (9). The mapping purposed to know all waste in value stream and took a step to lean application case study successfully (10). In this work, description of VSM and Kaizen principles are highlighted with the textile case study, here the work process across the Value stream is studied for finding value added and non value added activities and kaizen application is performed through the modification of process layout to achieve the productivity is the main intention of this work. i previous years, there were many illustrations on application of VSM and kaizen to other SME,s except textile industries but rarely addressed the application of VSM and Kaizen in textile industries to minimize the waste in their process.

4. RESEARCH APPROACH

The initial step in this research is to systematically study and define the history of the lean manufacturing concept and its different tools and techniques especially on VSM and Kaizen principles. This will be followed by the study of the existing production system, movements, layout, inventory movement systems, work balancing methods and other

different variables which needs to be improved for the betterment of the existing system. the main investigation is made on application of lean manufacturing concepts in textile industry, where empirical data were collected, according to the scope of the studies was defined on operational level basis and which is came to know that, the previously very little research has been conducted in this particular textile area. as per the scope of the study, applying lean manufacturing principles in the selected context through which the productivity improvement is highly possible by little changes in the work atmosphere is highlighted with proper case study approach. hence the better result in the process is going to achieve.

5. SELECTION OF CASE STUDY

This paper is mainly focused on implementing lean manufacturing techniques in a medium scale enterprise in the textile, Gokuldas export a textile industry, Unit-1, Hassan, south India, which is a pioneer in textiles mainly dealing with fabrication of cloths. The company has been dying, weaving and processing divisions. The company has approximately 23 manufacturing units. It has over 20 equipped manufacturing facilities with a capacity to produce and export approximately 2.5 million garments a month, The company engaged in the manufacturing of apparel and clothing in India and abroad also. Gokaldas exports Limited started in 1995, which is one the largest exporter of garments in India the company has received ISO 9001:200 certification for its quality management. The company mainly operates in two geographical segments. In India and outside India .The company is engaged in

the business of design, manufacture and sale of garments for men, women and children's. Brands. It is the largest manufacturer and exporter of apparels in India with an annual turnover of US$200 Million. It serves customers in the United States, Europe, Latin America, the Middle East and India. The important clients are Adidas, American Eagle, Benetton, Columbia, Nike, Puma, Reebok. The Gokaldas Exports, Unit-1, Hassan are having Currently 750 workers, including 450 machine operators and unit has monthly turnover Rs 1, 02, 33,665. The process background, with key activities of selected garment industry usually practiced on shop floor includes customer order design, material calculations and then from desired operations like cutting, fabric, and sewing, inspecting, and packing operations. And hence Thereafter, the various processes were carried out to complete the process finally, finishing and cleaning operations are performed. The finished component is then sent to the customer.

5.1. Data collection

In the current layout of sewing section is processing jackets for both men and women. Here loading, subassembly and checking operations are most important. And there are some non value added activities are occurred in this process while studying. These are treated as wastages that must be removed from the process are the main organization task. In this regard, application of VSM and Kaizen principles are considered in this work. The detail layout of fabric section is shown in below Fig. 3.1
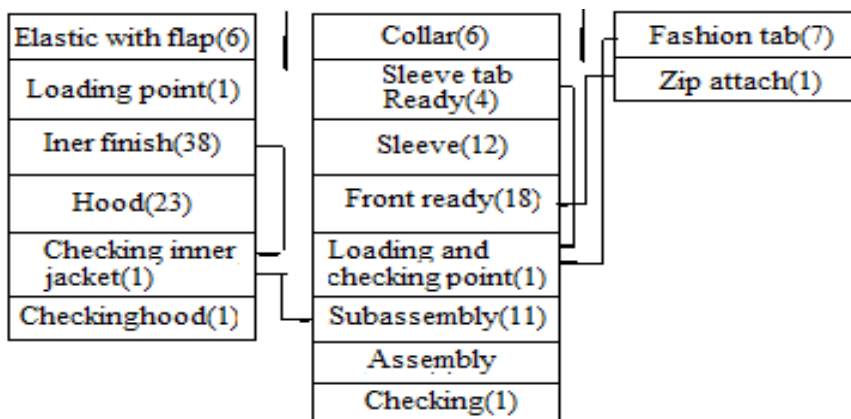

Fig.1: Current layout of sewing section

The above Figure shows the detailed layout of sewing section from starting point to loading and checking point. Here the Colombia 1058 jacket is preparing with 154 workstations in 130 minutes of operation cycle time, where, the waste occurred as 30 seconds for 1 jackets out of 200 jackets prepared per day and related 1 hr 40 minutes (110 minutes) is the wastage time. The most of the wastage time is due to improper arrangement of workstations between fashion tab and loading, unwanted movements made by checker for checking inner jacket.

5.2. Kaizen application

The continuous improvement is made through the application of kaizen principle the same is achieved by the modification of layout as fallows.

- Installing front ready before sleeves and collar adding that fashion tab and zip attach near front ready and collar.

- Installation of checking table in between the hood and inner finished can eliminate the wastage of time (30seconds) for an average of 10jackets.

- By reordering the work stations front ready, collar, sleeve tab, sleeve, fashion tab, zip attach, in the proposed line design we will save 1minutes for an average of 4jackets
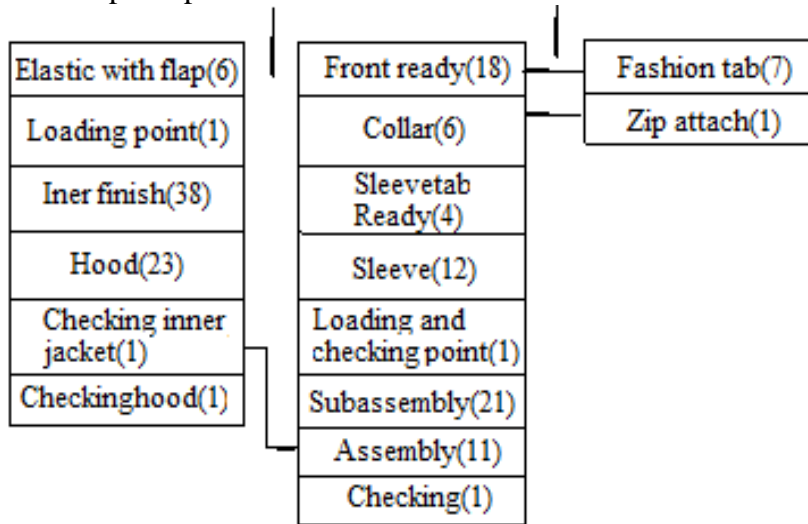

Fig.2: Proposed layout of sewing section

The modification of sewing operation layout the major changes is fashion tab to front ready instead of fashion tab to direct loading then checking then zip to collar instead of zip to loading and checking which saves two operation in the view of time saving and its sequence so the cycle time saves up to 50% compared to earlier sequence before modification is made. Which is towards the time saving and the productivity so that the both the changes are described in the above figures.

6. RESULTS AND DISCUSSIONS

After the application of kaizen principle through the modification of layout for the sewing section of columbia 1058 jacket the 15 seconds per jacket is saved and totally for 200 jackets 84 minutes have saved successfully. Due to which the cycle time for the sewing operation is reduced from 110 minutes to 84 minutes and the number of garments output is increased from 220 to 247 per day is the achievement of productivity and the same results are shown in the below graph figures 3 and 4 respectively.
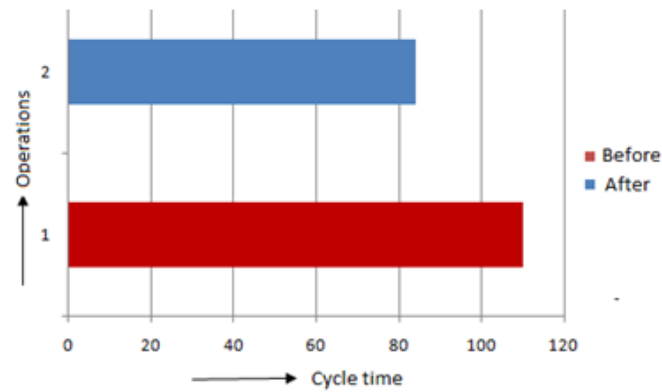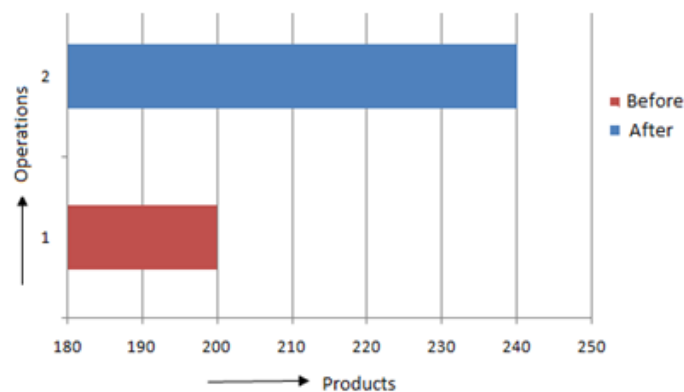
Fig.3: Cycle time reduction

Fig.4: Productivity improvement

7. CONCLUSION

In this research work the implementation of effective lean manufacturing technique like kaizen is implemented in garment industry. Before that the study of layout analysis is made in sewing process. finally wastes are occurred. To reduce these waste the implementation of lean concept like kaizen is preferred. Generally lean based production increases the profitability and reduces lead time. But the aim behind to induct lean in waste management is to reduce the waste existence of the textile industries. Eventually some paper proposes the lean based waste management for the textile industries. The lean principles are well suited for reducing and managing the industrial waste as a future work the additional lean concepts and principles are considered to manage the industrial wastages. finally, the wastes are identified and reduced by the modification of sewing machine layout. hence, in this work, the reduction of operating cycle time and improvement in productivity is obtained clearly. in this way, application of lean manufacturing technique like kaizen is one of the effective tool to small and medium scale organizations to achieve their productivity without changing the organizational infrastructure.

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