European Journal of Mechanical Engineering Research
Vol. 9, Issue 2, pp.22-26, 2022
Print ISSN: ISSN 2055-6551(Print)
Online ISSN: ISSN 2055-656X(Online)

# Waste Reduction by Lean Manufacturing Using Vsm Methodology for Wilo Range Pumps

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**Citation**: Gujar A.J., Vasudev R.S., Sawalwade S.R., Jankar A.B., Thamake R.B., Sonawane A.M., Kulkarni A.K. (2022) Waste Reduction by Lean Manufacturing Using Vsm Methodology for Wilo Range Pumps, *European Journal of Mechanical Engineering Research*, Vol. 9, Issue 2, pp.22-26

***ABSTRACT****: Cycle time is the time required to deliver a product or service to a customer. Long cycle-times not only prevent prompt delivery of products/service to your customer, but also increase costs. One of the best ways to cut down on your cycle-time is to conduct activities in parallel and eliminate unnecessary waste time as demonstrated on the next slide. Broadly speaking, and organization competes on the basis of quality, cost, flexibility and time. This factor is complementary, even symbiotic. Today's discriminating customer demands world class quality at a competitive price. When all the leading companies in an industry achieve a high-level quality, a focus on quality alone cannot keep a company competitive. Quality then becomes, expected factor, which must be complimented by a faster response time and flexibility. In increasingly, cost and quality are viewed as residuals or outcomes of competing on the basis of time end flexibility. In business, time is not infinite and limitless competing on the basis time is defined to include the following: using time as strategic weapon identify market opportunity responding to that opportunity before competitors do and eliminating non-value-added activities. Cycle time is the time required to deliver a product or service to a customer. Long cycle-times not only prevent prompt delivery of products/service to your customer, but also increase costs. One of the best ways to cut down on your cycle-time is to conduct activities in parallel and eliminate unnecessary waste time as demonstrated on the next slide. Broadly speaking, and organization competes on*

*the basis of quality, cost, flexibility and time. This factor is complementary, even symbiotic. Today's discriminating customer demands world class quality at a competitive price. When all the leading companies in an industry achieve a high-level quality, a focus on quality alone cannot keep a company competitive. Quality then becomes, expected factor, which must be complimented by a faster response time and flexibility. In increasingly, cost and quality are viewed as residuals or outcomes of competing on the basis of time end flexibility. In business, time is not infinite and limitless competing on the basis time is define to include the following: using time as strategic weapon identify market opportunity responding to those opportunity before competitors do and eliminating non-value-added activities.Wilo india Mather is one of the world leading manufacturer of pumps and pump system, when it comes to transfer, pressure boosting, firefighting, utility service, drainage and dewaterating with maximum than 140 years of expensive and well known world's leading pump manufacture this pumps are used for commercial, residential buildings like mall, airport and other properties. Wilo was required to improve its performance and production efficiency but there were a lot of problems in order to fulfil of process marked by both infective and effective work. In this research lean manufacture aim to identify and eliminate the waste so, that the company could improve its performance this concept of lean manufacturing concept could improve the responsiveness through waste reduction continues improvement and cost reduction in order to identify and eliminate waste value stream mapping, time study, questionnaire, kaizen method etc are used. This method will help to reduce the waste in production.*

**KEYWORDS**: Cycle-Time, Value added and non-value-added activities, Productivity, Lean manufacturing, VSM, Time Study, Questionnaire, Kaizen Method.

## INTRODUCTION

In today's fast-moving world, it is very much significant for the manufacturing industries to fulfil customer's demands on time to ensure customer satisfaction. Thus, manufacture needs to find ways to reduce the cost of the product and the processing time along with the improved performance and quality of the product. Cycle time is the time required for performing various machining operations on the product at workstation. It is the total time elapsed for converting raw material into the finished product. It not only includes service time for machining but also comprises of the idle time or setup time between two consecutive operations

Lean manufacturing is a systematic approach used to identify waste. These lean concepts could improve responsiveness through waste reduction, continuous improvement and cost reduction. In order to identify and eliminate waste the value stream mapping tools, value stream analysis tools and bottleneck diagram is used.

Cycle time is the total time from the beginning to the end of your process, as defined by the organization and their customer. In cycle time contents process time, during which a unit is acted upon to bring it closer to an output, and delay time, during which a unit of work is spent waiting to take the next action.

Global market is developing rapidly, hence every company is focusing on efficiency and competition of a company to survive in the industrial market. Many Companies are competing to Update/Upgrade then

Manufacturing Strategy Management. Today Problem Faced by every company are how to deliver a product or material with fast, cheap and with good quality. Some methods are used to minimize this waste such as replacement of old machines, high-tech computerized machine and hiring skilled workers and use of lean manufacturing to identify the waste or problem and try to solve it with best combination on the production line so that the production can be increased and the company can survive the win industry competition.

Wilo Mather plant is one of the world's leading pump manufacturing company. Which produce high pressure pump. Which are used for transfer, pressure boosting, firefighting, utility services and drainage and used in residential and commercial building, malls, airport etc. Hence waste is defined as all the activities that consume time, space and resources but does not contribute or fulfill the need of customer. In this case identifying the waste in the production process and to do improvements lean Manufacturing concept is applied. This concept is used widely by the manufacturing company and to meet the high demands of customer. To determine the waste various methods such as value stream mapping, time study, kaizen method is used. The aim of this study is to identify the problem and analyzing the line of production of product. Before production and after production and improve efficiency of production.

## LITERATURE REVIEW

Lean manufacturing can be defined as a systematic approach to identify the waste or problem faced by company and eliminate waste or value-added time through continuous improvement in production strategy. Lean manufacturing can focus on improving the throughput of a product. Reducing lead time, Inventory, defect, rework and process waste and ultimately improving financial saving and customer satisfaction.

Mashitah Mohamed *et al*. (2015) –assert that lean manufacturing system has identified as an approach of improving performance of the process and product setup time can be classified as waste of the company this study will focus on how much an Automotive manufacturing company is Malaysia is able to kindly Malaysia is able to improve their operations time by reducing setup time at the same time improve their productivity level the objectives of this Richa research are to identify the factors that influence high setup time and to highlight the action that can be minimised to reduce the setup time observations and interviews were conducted to understand the whole assembly process in conclusion reducing Hai set up time in assembly line can be materialized by the company after identifying three major factors which lead to the higher setup time in changeover process activities promotion activities done by the company able to reduce hi setup time in change your process from 45 minutes to 28 minutes after 5 months improvement

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Abdul Talib Bon *et al* - Cycle time reduction has appeared as an important improvement to produce a high productivity for the satisfaction of customer requests. Time study is applied to measure the standard time of process. Manufacturing industry is involved in this study to reduce cycle time in the assembly line. This study to improve productivity in the assembly line for reduced cycle time. By making simple changes to the process, it can reduce the time taken for each work sequence to improve the process flow and speed it up the process flow. However, it is important of use time study method because the importance and uses of stopwatch time study can

be stated as under all this, determining schedules and planning work.

Ana Julia Dal Forno note that value stream mapping (VSM) is an important tool of the lean approach and is used to identify value-adding activities and those considered wasteful of materials and the flow of information and people. However, when not applied correctly, VSM can complicate the identification of waste, lead to misinterpretations and assessment mistakes, and undermine the implementation of future improvements. Aper sought to identify problems concerning VSM implementation, investigate the possible causes and define guidelines to make its execution less complex, and have a greater chance of success. The paper identified future opportunities for VSM implementation, especially about increased productivity and reliability of this lean tool.

According to Gokulraju Lean manufacturing is a method adopted to shorten the time between the customer order and the customer order and the product shipment by eliminating sources of waste key Words: Lean Manufacturing, Value Stream Mapping,OEE, TAKT time, Line Balancing, Kaizen. The purpose of this study is to suggest ways to reduce lead time and increase throughput of a high-pressure gate valve production line through the use of value stream map the current state value stream value map shows that most of the waste in the process contributes to long lead-time in the form of non-value-added time while the product waits in the queue.

Vivek Deshpande *et. al.* (2014**)** note Manufacturing throughput time reduction is a major concern for all manufacturing industries today. It is defined as the amount of time each unit spends in the manufacturing process; this includes time spent actively being worked upon at each step of the process as well as any time spent waiting between steps.
The need of throughput time reduction arises because of competition in market and quick availability of products to customers from competitors. To reduce waiting time, Process time move time and set-up time should be reduced.

**ENDNOTE**

After studying and analyzing the problems present in the Wilo pump assembly line improvements were made. Lead time was reduced by identifying and eliminating work in process inventory. For improvement activity implementation it is necessary to collect the information about the value added and non-value-added activity time of the process. From current state value stream mapping, it is identified the value added, and the non- value-added activity time of each process.

- To reduce set-up time, SMED and method study should be used. Increasing material handling capacity will also reduce it.

- Process time can be reduced by Optimizing machining parameter (Speed, feed, depth of cut) and by increasing machine capability.

- Move time can be reduced by changing layout of the plant and by setting a cellular manufacturing in which group equipment performing sequential operations. Increase in Material handling capacity reduces move ti

## CONSLUSION

We need lean production so, lean production means continuous improvement, we must keep on changing future state current state that will not end during our life. The process time like the value and non-value-added actives are identified by using value stream mapping. A current state value stream map was created, and analysed, and Future state value stream map machines were assembled and arranged through layout which changed to allow the flow of product in the manufacturing process more smoothly through. Reducing high set up time in assembly line to focus and concentrate in activities in assembly line without less moment. The successful Lean Manufacturing System implementation requires simultaneous integration and implementation of Lean elements along with proper sequence. Lean Manufacturing process in competitive business environment can be sustained.

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End of this paper