

# Improve Productivity By Reducing Non-Value Added Activities By Using VSM In Manufacturing Industry

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**Abstract-** This Project seeks to analyse the internal product body size window in manufacturing company, located in Vadodara. An objective of the study is to carry out VSM for the product body size window which is manufactured in one of leading companies in India, to identify the non-valued added activities and reduce the same and propose a future state map to reduce the production lead time. The main objective of this study is to increase the productivity against the demand. The Quality related issue regarding material & material shortage online is not in the scope of this study. Taking a value stream perspective means working on the big picture, not a just individual process; and not a just optimization but an actual improvement. It covers value adding as well as non-value adding activities. This study also includes layout improvement and time study report. This research shows marking benefit associated with the implementation of lean program because this project shows an industrial case study of body size window

**Keywords-** Value stream mapping; kaizen; Cycle time; Productivity

## I. INTRODUCTION

Hindustan Fiber accompanies Indian Railway's phenomenal development and progress right from the start, through the ability to transform experience into improved products. Hindustan Fiber with long standing experience in the manufacture of compression molded SMC/DMC products for the Indian Railways has helped the railways induct the composite components. Hindustan Fiber have already diversified into manufacturing FRP Windows, Composite Modular Toilets, Traction Components, Aerodynamic Profile etc. The company has already geared up with the requisite manufacturing, capabilities tooling expertise and facilities for the futuristic railway coaches.

Windows of Non AC Coaches The non AC coaches are provided with glass and louver shutters made out of FRP. The Glass panel of the shutter is made of safety toughened glass. The shutters work in the grooved frame work of the window assembly. To prevent the glass shutters from dropping a balancing mechanism comprising of spring, lever etc. is

provided. To close the window positive force is required to be applied against the spring force. In the case of louvre shutters instead of the balancing mechanism a spring loaded safety latch is provided to prevent the louvre shutter from dropping.

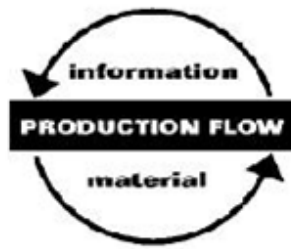
- To study the Current State map by collecting the data from the shop floor
- To identify the problems faced by the company in terms of Non Value Added time and minimize the waste.
- To propose Future State Value Map which can reduce Production lead time, increase the Value added time and reduce non value added time.



**Body size window**

## II. VSM METHODOLOGY

Value stream mapping can be a communication tool, a business planning tool and a tool to manage change in process. Value stream mapping initially follows the step shown at below. Notice that future state drawing is highlighted because our goal is to design and introduce a lean value stream. The future state map is most important. Material & information flow are two sides of coin, which included in VSM methodology.



This approach works the best in guidance of fellow researchers. In this the authors continuously receives or asks inputs from their fellows. It enriches the information pool of your paper with expert comments or up gradations. And the researcher feels confident about their work and takes a jump to start the paper writing.

### III. GENERAL OVERVIEW OF LITERATURE REVIEW

Rahani et al AR [1] focus on a case study of batch manufacturing product and to draw VSM. They suggest that we should walk and interact with workflow rather than doing office to collect data & to improve current stage. They make a series of Que. During their walk prod. Area 1: What is the Takt time? 2: What are the bottleneck and constraints found? 3: Where can inventory can be reduced? 4: How can you improve process? 5: Potential process improvement for future state design? This basic ques. gives huge ideas for improvement. They reduce Bottleneck, WIP & thus cycle time. In this paper Peter Hines [2] focuses on reduction of waste by adopting lean tools, if we reduce lead time the saved time can be used to improve quality & management issues. Thus this paper more focuses more productivity improvement rather than quality. He defines 7 stream mapping tools: (1) Process activity mapping (2) Supply chain response (3) Production variety (4) Quality mapping (5) Decision point analysis (6) Demand amplification (7) Physical structure (volume & value). It helps the researcher to choose the most appropriate methods for the particular industry, people and types of problem that exist. The typology is based on the identification of wastes.

In this journal Colin Herrona [3] et al identified that if we want to apply VSM the first step of implementation is to implement 5-S.

Takt time = Available production time/ Total daily quantity and

Uptime % = (Actual production time of a machine– Value added time/Availability time) \* 100 required. The aim of paper to use the Value Stream Mapping tool is to identify, quantify and minimize major wastes in a manufacturing set-up.

By this approach A Marecha [4] et al make matrices of waste to mapping tool. And give ranking to waste as per their complexity. They try to minimize their defects as per their priority: like the implementation of First-In-First-Out (FIFO), semi-automated process, development of an economic batch quantity, etc. and improve throughput by 16%.

Here, R Domingo [5] et al gives an example of GM's VSM documents the performance of the process with themetrics of process time, wait time, and first time quality. Here researcher introduces us to Value Stream Mapping.

VSM has its roots in the Toyota Production System (TPS) with a technique known as “Material & Information Flow Mapping”

Roberto Alvarez [6] et al has studied the real industrial case of assembly line improvement through rudemanagement. Empirical results drawn from case studies show that an operating decision has helped improve leanmatrix, especially reducing the the doc-to-dock time and increasing lean rate, and a pre-line manufacturing Thechange of organization is a better lean organization which has achieved the lowest cycle time. The movement of milk is wasted in the context of unnecessary inventions, excessive transportation and waste time, without changing production philosophy or layout. Combining milk and VSM combinations are an important tool for increasing the flexibility and way of improving the process for any industry.

Leonardo Rivera [7] et al briefly explained the procedure followed for the construction of CTP, its uses and its application. CTP & CTI both have been useful in the evaluation of a production process and its performances. The evaluation of these improvements through the use of the CTP and the CTI highlights the economic impact of time improvements.

P. Kuhlang[8] et al carried out research on the MTM that is also known as Hybrid Optimization of Added Value and VSM (value stream mapping) how interconnected to each other at different segments & different levels. If we consider the mutual benefits of both Application then it should increase in productivity, standardize the process and also reduce inventory/lead time. They have also examined ergonomics & some logistics aspects in their case study.

In this paper Sanjay Sharma [9] examined the relationship between cycle time & cost in the manufacturing company. Generally it is in reversely proportional to each other. However, as the focus is presently on the cost of the supply chain, a suitable framework is developed to analyze the

overall CT compression. The paper also approaches the DOF in the present context. Through an example of ACB & MCCB packaging he will try to explain the Make order situation with relative to the cycle time reduction in the case study.

Ravindrakumar [10] et al provide a case study of a hub manufacturing process by applying VSM technique. By application of VSM they succeeded to achieve 7 % cost saving & also reduction in the cycle time. It can be concluded that VSM is an effective tool for identifying the process.

Dushyanth Kumar KR[11] et al present a case study of a pump Assembly of a manufacturing company of the pump. In this case study he finds out the waste by developing CSM and try to eliminate them. He also developed FSM for that. He succeeded to reduce process time from 240 hours to 150 hours. He just made a small change in the shaft sleeve manufacturing process by using fishbone diagram & kaizen. He also used 5 S principle & some mechatronics principle for Accurate process & also helped in lead time reduction.

James T. Luxhoj [12] et al suggests that predetermined time systems could be employed for the remaining operations in the crop schedule for the single truss tomato production system, as well as for other crops that involve highly repetitive, short cycle work elements. With predetermined time systems, the focus is on the operation or method, and not on the operator. There is no need for a subjective "performance rating" factor. Therefore, the very use of predetermined time systems can potentially motivate substantial method and ergonomic changes. In addition, a macro predetermined time system, such as MOST, can provide labour data for the design phase of new greenhouse materials-handling systems