

# Lead Time Reduction of Structure Assembly

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**Abstract**— Lean manufacturing is a collection of tools that are used to reduce the waste and improve the efficiency in manufacturing. The manufacturing industry has enormous challenges in the current regulatory and political local weather with setting up an economically and environmentally sustainable industry model. This project reviews the literature and some of the lean principles such as the Value Stream Mapping. Aim is to reduce lead time by eliminating wastes and non-value added activities in the assembly line. The project is conducted with systematic approach of DMAIC. First the project charter is prepared with the help of guides and the supervisors in the company. Data collection was made by using time study procedure. Using this procedure standard time was calculated. By analyzing this data the current value stream map was developed and value added and non-value added activities were identified. By cause and effect diagram and pareto chart six sub-assemblies were selected for the improvement. By brainstorming with the guides and supervisors corrective actions and preventive actions were created. The project management technique of Critical Path Method was used to draw results. Using this technique optimal duration for the structure assembly was obtained. This project has enabled the company to reduce the structure assembly lead time by 70%.

**Key words:** Lean Manufacturing, DMAIC, Time Study, Standard Time, Value Stream Mapping, Project Management

## I. INTRODUCTION

Just-in-time (JIT) is an inventory procedure which companies hire to develop efficiency and reduce waste. This process requires producers to forecast demand adequately. A right illustration could be a car company that operates with very low stock phases, relying on its supply chain to provide the components it desires to build cars. The materials needed to manufacture the automobiles don't arrive earlier than or after they're needed; as a substitute, they arrive simply as they're wanted. It is important to optimize the manufacturing lead time so that JIT can be accomplished.

In the manufacturing lead time has the same definition as that of supply Chain management, but it involves the time required to ship the elements from the provider.

Lead time is made of

- Pre-processing Lead Time: It represents the time required to free up a purchase order or create a job from the time you be trained of the requirement.
- Processing Lead Time: it's the time required to acquire or manufacture an object.
- Post-processing Lead Time: It represents the time to make a bought item available in stock from the time you acquire it.

## II. LITERATURE REVIEW

In this paper titled “Lean Manufacturing Implementation Using Value Stream Mapping: A Case study of Pumps Manufacturing Company”, authors Santosh B. Dighe<sup>1</sup> and Abhay Kakirde explains about incline fabricating alludes to an assembling change process in light of the major objective of Toyota production system (TPS). In this paper titled “Application of Value Stream Mapping to Eliminate Waste in an Emergency Room” author Preetinder Singh Gill explains about VSM is an incline/quality administration instrument which helps with building up the present condition of a procedure while supporting to reveal open doors for development versus the seven wellsprings of waste. In this paper titled “An Effort To Apply Work And time Study Techniques In A manufacturing Unit For Enhancing Productivity” author Patange Vidyut Chandra explains about the significant territory of profitability change with the adroit utilization of work study strategy blended with present day delicate aptitudes.

## III. METHODOLOGY

The methodology followed is DMAIC. It gives systematic approach to solve the problem. There are 5 phases. They are listed below as per the requirement of the project.

### A. Define Phase

Activities carried out are

- Creating Project Charter
- Verifying Problem Statement and Goals
- Calculating benefits in financial terms
- Forming team
- Making schedule for project

### B. Measure Phase

Activities carried out are

- Value Stream Mapping
- Collecting information about the process
- Dividing them into elements
- Time study

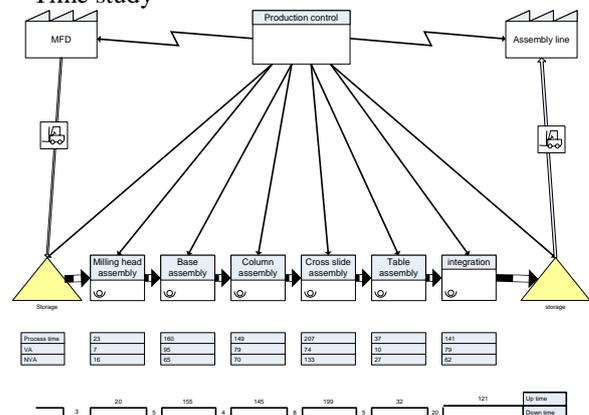


Fig. 1: Measure Phase

### C. Analyze Phase

Activities carried out are

- Identifying the value added and non-value added activities
- Identifying the causes for the non-value added activities
- Identifying the process with more non value added activities

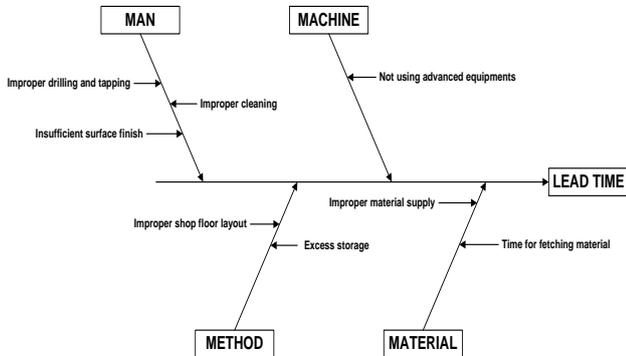


Fig. 2: Analysis Phase

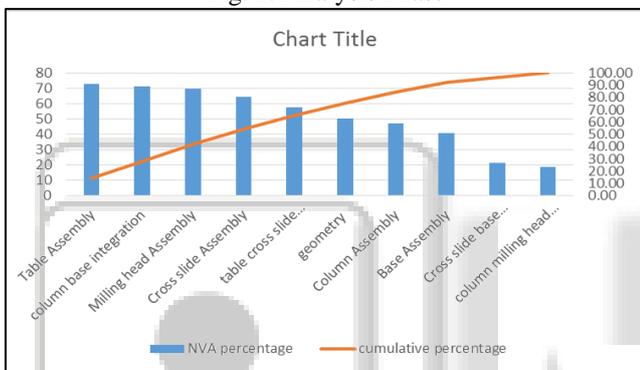


Fig. 3: Graph Measure Phase

### D. Improve Phase

Activities carried out are

- Developing the corrective action and preventive action
- Develop standard operating procedure
- Developing proposed Value Stream Map(s)
- Implementing the solution
- Checking whether goals are achieved

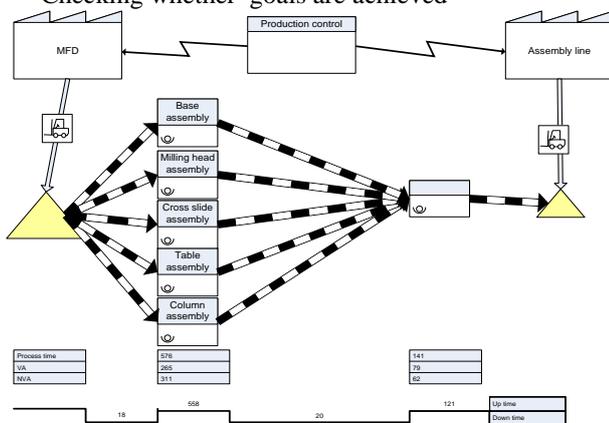


Fig. 4: Improve Phase

### E. Control Phase

Activities carried out

- Monitor the implementation on the process
- Identify the future improvement opportunities.

## IV. RESULTS & CONCLUSION

Previously the production layout was designed to work in series. New layout was developed so that similar activities could be done parallel. Kanban's were introduced to reduce inventory. Reworks were reduced by informing MFD division. Better tools were used to reduce time and effort. Readymade sub-assemblies were used. The project has reduced the NVA and wastes total duration of the structure assembly. The initial lead time was 717 minutes which was reduced to 212 minutes. Lead time has been reduced by 70%. Which enables company to increase its productivity by 3 times.

### REFERENCE

- [1] "Lean Manufacturing Implementation Using Value Stream Mapping: A Case study of Pumps Manufacturing Company", authors Santosh B. Dighe and Abhay Kakirde
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