

# Improvement of Operational Efficiency by Eliminating Non Value Added Activities using Lean Techniques

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**Abstract**— Many enterprises in India have deployed lean production in consideration of its great success in other countries, but many of them failed to realize their original targets because they began to deploy lean production from tool level and haven't understood the actual value stream of their business, which is essential for an enterprise to implement lean production and keep improving. The purpose of this study is to follow the value stream, walk the flow and determine the value adding and non-value adding process. This will help eliminate roots of wastes, rearrange overall value stream better increase the competitive ability and organizational efficiency.

**Key words:** Efficiency, Lead Time, Lean, Value, Waste

## I. INTRODUCTION

Lean is all about doing more with less. Lean is not merely a philosophy but a methodology for eliminating non value adding activities thereby reducing lead time. The most commonly used lean tools are VSM and Kanban

A value stream is all the action (both value added and non-value added) currently required to bring a product from its raw material stage to the hands of customer, i.e. from design to launch. Value stream mapping is a tool that helps to see and understand the flow of material and information as a product makes its way through the value stream. It is nothing but a flow of information and materials between production (the company itself) customer and supplier. It also involves carefully drawing a visual representation of every process in material and information flow.

## II. PROBLEM DEFINITION

“To study the operational aspects of the plant in order to reduce non value adding activities across different areas by using various lean techniques thereby reducing overall lead time and improving productivity”

## III. METHODOLOGY

We use the DMAIC methodology to tackle our problem. It stands for Define, Measure, Analyze, Improve and Control.

- 1) Define - The purpose of this step is to clearly articulate the business problem, goal, potential resources, project scope and high-level project timeline.
- 2) Measure - The purpose of this step is to objectively establish current baselines as the basis for improvement.
- 3) Analyze - The purpose of this step is to identify, validate and select root cause for elimination.

- 4) Improve - The purpose of this step is to identify, test and implement a solution to the problem; in part or in whole.
- 5) Control - The purpose of this step is to sustain the new process.

In the measure phase we mainly focus on Value Stream Mapping. Value stream mapping is a lean management tool which assists in establishing the current state of a process while providing opportunities to improve the existing process by eliminating the 7 sources of waste. By applying this method a better diagnosis of the situation can be obtained, opportunities for eliminating wastes, reduction of cost and lead time can be done. The steps involved in VSM are as follows:

- Selecting the product (family) to map
- VSM Symbols
- Defining the process boundaries
- The Process Steps
- Information Flows
- Process Data
- Calculating the Time Line
- Multiple Suppliers and Customers
- Interpreting the Data
- Next Steps (Ideal and future state maps)

## IV. DATA ANALYSIS

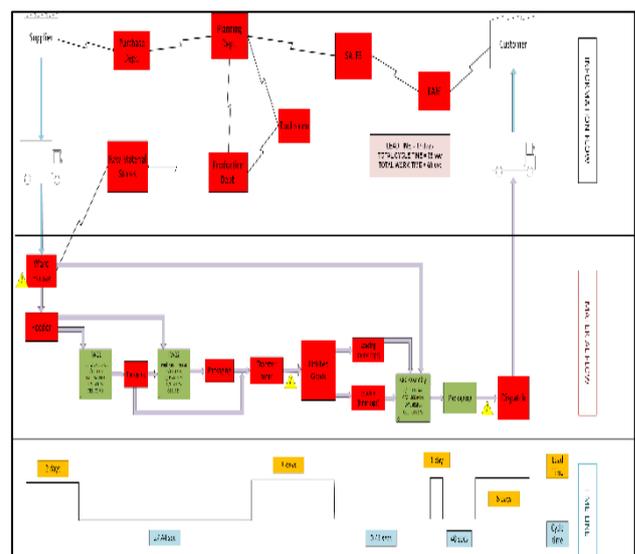


Fig. 1: VSM Current State

Lead time: 17 days  
CRC Cap Production cycle

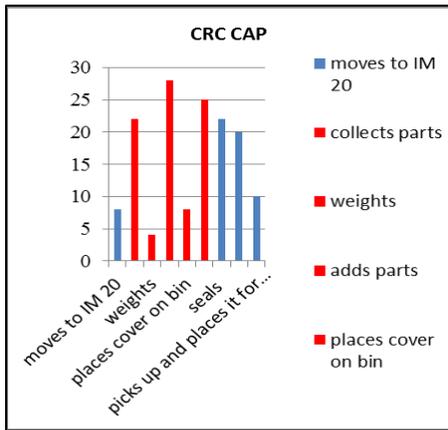


Fig. 2: CRC Cap Cycle Time (Present)

Total time: 147s

Non value adding: 87s; value adding= 147-87= 60

% efficient: 60/147 = 40.81%

We observed that during the production process, that worker waster time by weighing the parts at the weighing machine which was next to the machine. The worker also had to collect and add parts into a packet to maintain the correct weight. This is about 36% of the cycle time.

### V. INFERENCE

We observed that during the production process, that worker waster time by weighing the parts at the weighing machine which was next to the machine. The worker also had to collect and add parts into a packet to maintain the correct weight. This is about 36% of the cycle time. This can be eliminated by using a low height industrial weighing machine. Weighing machine

#### A. RUN-A-WEIGH:

The USA-made Run-a-Weigh portable floor scale features a spacious 24.5 x 30 inch (62 x 76 cm) platform with two-way, easy-access integral ramps, built-in handles and wheels, battery power option, plus a lightweight 95 lb (43 kg) frame for easy mobility and use in multiple locations. The Run-a-Weigh easily fits through standard doors and can

go wherever you need it for weighing drums, barrels, industrial containers, and small crates. The ultra-low, 2.2-inch-high profile allows easy loading of heavy items. It is available in a heavy-duty checkered mild steel deck with 500 lb x 0.2 lb / 225 kg x 0.1 kg or 1,000 lb x 0.5 lb / 450 kg x 0.2 kg capacity or washdown 304-grade stainless steel smooth deck with 1,000 lb x 0.5 lb / 450 kg x 0.2 kg capacity. All components are USA-made including the scale, stainless steel load cells, and indicator.



Fig. 3: Run a Weigh

### VI. RESULT

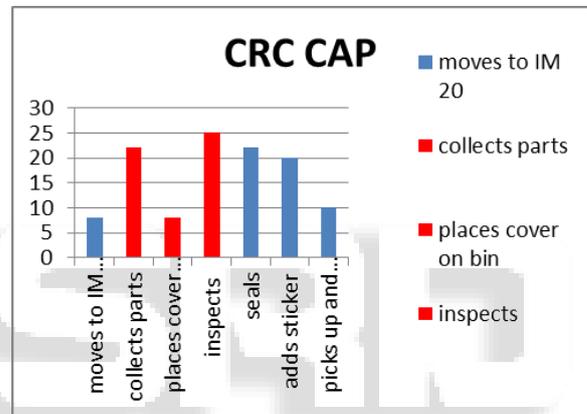


Fig. 4: CRC Cap Cycle Time (Proposed)

Total time: 115s

Non value adding: 55; value adding: 60

%efficiency: 52.17%

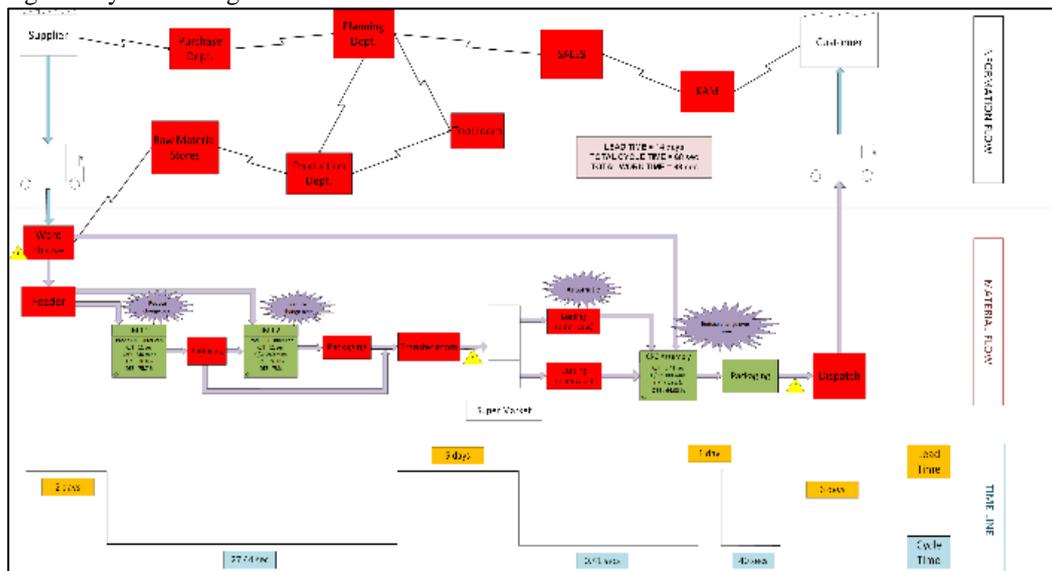


Fig. 5: Future State VSM

- 1) The initial cycle time was 147s which was reduced to 115s
- 2) The operational efficiency increased from 40.81% to 52.17%

## VII. CONCLUSION

Lean manufacturing is all about minimizing wastes. Mapping of the current state involves identification of value added and non-value added activities. The current state of the production process has been mapped. By implementing the Value Stream Map we were able to minimize the NV activities in terms of the 8 wastes (DOWNTIME) we were able to increase operational efficiency by about 15% we also suggested the use of the supermarket concept to reduce inventory before assembly.

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