Applied Procedures for Lead Time Reduction: A Review

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Abstract *- A Lead time is the latency between the initiation and execution of a process. In terms of Supply Chain Management lead time can also be defined as the time from the moment the customer places an order to moment it is ready for delivery. In manufacturing sector lead time includes the time required to ship the parts to the supplier. In project management lead time is the time it takes to complete a task or a set of interdependent tasks. In this paper, we interpret the causes for excess lead time and suggest practical, inexpensive strategies and procedures for reducing it. Our recommendations are based on detailed study of many manufacturing industries. Interpreting the differences between work in process, flow time variance and lead time, we systematically review potential methods for lead time reduction by reducing lead time or flow time variance.*

Keywords: *Lead Time, Value Stream Method, TAKT Timing, First In First Out*

I. INTRODUCTION

In a recent tour of a plant, we learned that the "raw process time" (the total labour and machine time) for the product added up to about 4h whereas the average flow time (the time from job start until ready to ship) was around 4 weeks. This kind of disparity is not uncommon; in fact, it is all too often the rule. However, a few companies have reduced lead times (the time from when a customer order is taken until it is shipped) from weeks and months to hours and days. In recognition of its strategic importance, lead time reduction has become an important element of a campaign to increase the competitiveness of manufacturing industries.

II. IMPACTS AND BENEFITS OF LEAD TIME REDUCTION

The importance of lead and flow time reduction is highlighted by the fact that it is one of the few strategies that sales and production departments can agree on. From the perspective of sales, shorter lead times:

A. Benefits of Lead Time Reduction

- Offer the ability to quote faster delivery to customers.
- Lessen the impact of cancelled orders.
- Reduce the need to make forecasts about future demand.
- Improve quality management by reducing the opportunity for work to be damaged and shortening the time between manufacturer and defect detection.
- Reduce in-process inventories
- Decrease disruption of the production process due to engineering change orders
- Enable shorter frozen zones in the Master Production Schedule, thereby reducing the dependence on distant forecasting
- Allow easier overall management of the facility because there will be fewer jobs to keep track of and fewer special case (e.g., expedited jobs) to oversee.

III. METHODS OF LEAD TIME REDUCTION

The effects of shorter lead times call only be considered beneficial if they can be achieved without undue sacrifices in other areas such as quality and throughput. Because the benefits are so attractive, many specific suggestions for reducing lead times have been made. This previous work has done a great deal to help decrease lead time in specific in- stances. Additionally, many of the techniques found in the just-in- time (JIT) philosophy also result in reduced lead times were discussed in the many good books written on JIT. This paper, however, focuses directly on lead times and on ‹he causes of lead time inflation. In this light, we review read not reduction techniques found in the JIT literature with an eye toward efficacy and underlying concepts. Most of the techniques we discuss are inexpensive and fairly simple.

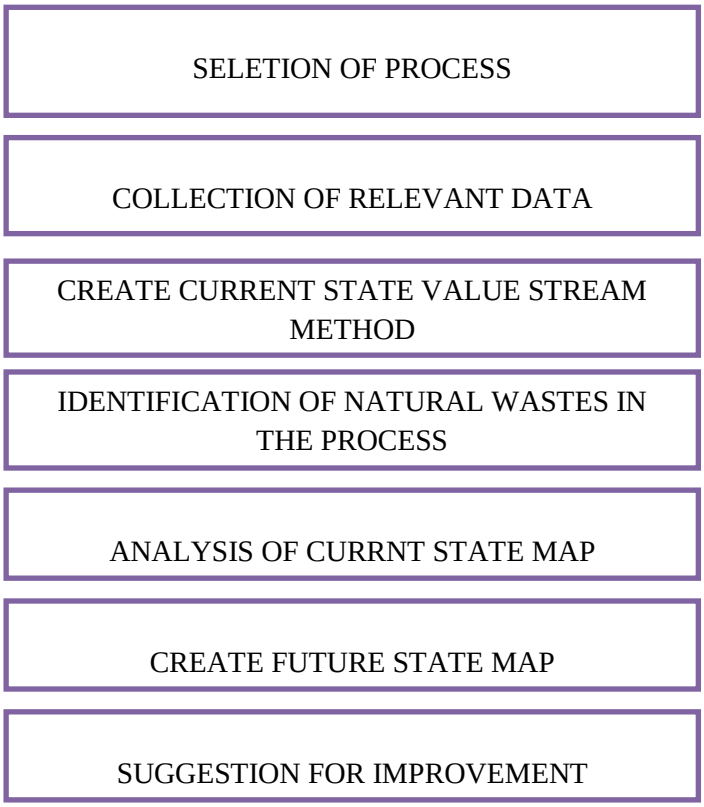

Figure1: Process of Lead Time reduction

IV. TECHNIQUES USED IN LEAD TIME REDUCTION

- VALUE STREAM MAPPING
- TAKT TIMING
- FIFI (First in First Out)

A. Value Stream Method

Value stream mapping is a lean-management method for analysing the current state and designing a future state for the series of events that take a product or service from its beginning through to the customer. At Toyota, it is known as "material and information flow mapping". The ultimate goal of VSM is to identify all types of wastes in the value stream and to take step to try and eliminate these. Waste can be a part of a process that takes time and resources but adds no value to the product. Value stream mapping has supporting methods that are often used in Lean environments to analyse and design flows at the system level (across multiple processes). Although value stream mapping is often associated with manufacturing, it is also used in logistics, supply chain, service related industries, healthcare, software development, product development, and administrative and office processes.

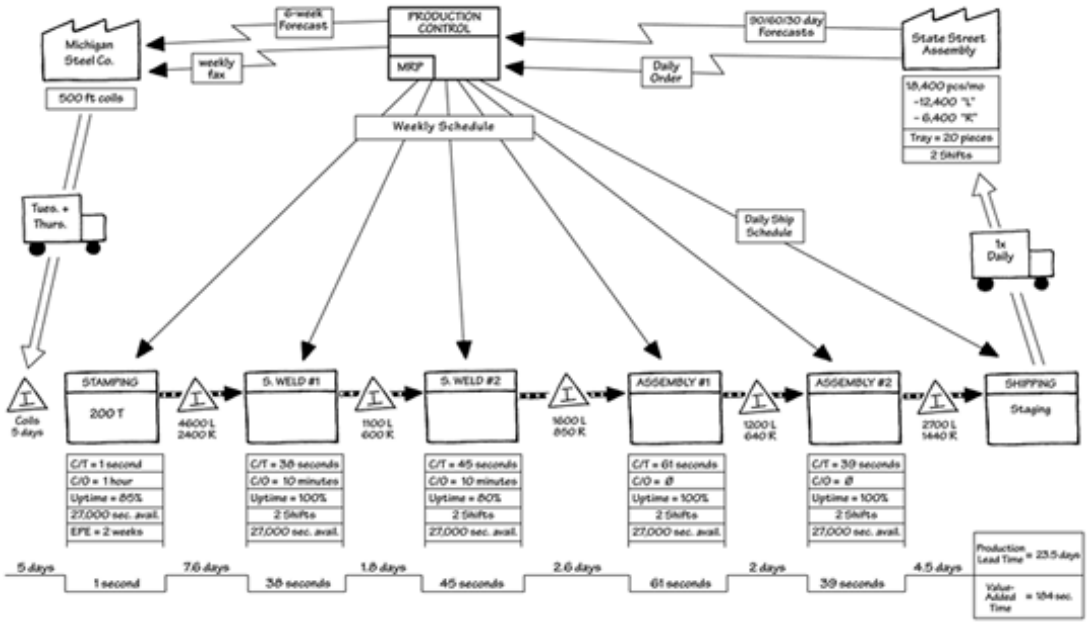

Figure 2: VALUE STREAM MAPPING

B. Steps in Value Stream Mapping

- Primary data was collected about the inventory, process time at each process for thedelivery valve production and mapping was done for the entire value stream.
- Value added time = process time / available time
- Non-value added time = inventory / requirements
- Identify product group.
- Map the flow or stream.
- Create the Implementation Plan

C. Takt Timing

Takt time is the maximum amount of time in which a product needs to be produced in order to satisfy customer demand. The term comes from the German word "takt," which means "pulse." In Lean, takt time is the rate at which a finished product needs to be completed in order to meet customer demand. Described mathematically, takt time is: Available time for production / required units of production.
In Lean, takt time is the rate at which a finished product needs to be completed in order to meet customer demand.

TAKT TIME
=AVAILABLE TIME /CUSTOMER DEMAND

D. Steps in TAKT Timing

- Properly set the Takt time for each and every operations in the industries
- Work force should be controlled and monitored
- Once the workforce Takt time is set it is difficult to change or alter
- Customer demand fluctuations can be predicted

E. FIFO (First in First Out)

FIFO is an acronym which most commonly stands for "first in, first out"**.** FIFO and LIFO accounting are methods used in managing inventory and financial matters involving the amount of money a company has tied up within inventory of produced goods, raw materials, parts, components, or feed stocks. They are used to manage assumptions of cost sheet related to inventory, stock repurchases (if purchased at different prices), and various other accounting purposes.

"FIFO" stands for first-in, first-out, meaning that the oldest inventory items are recorded as sold first but do not necessarily mean that the exact oldest physical object has been tracked and sold. In other words, the cost associated with the inventory that was purchased first is the cost expensed first. With FIFO, the cost of inventory reported on the balance sheet represents the cost of the inventory most recently purchased.

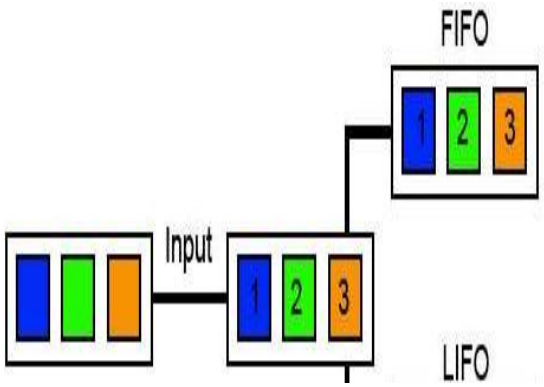

Figure 3: FIRST IN FIRST OUT

F. Steps Followed in First in First Out

- First-In, First-Out (FIFO) is one of the methods commonly used to calculate the value of inventory on hand at the end of an accounting period and the cost of goods sold during the period.
- This method assumes that inventory purchased or manufactured first is sold first and newer inventory remains unsold.
- Thus, cost of older inventory is assigned to cost of goods sold and that of newer inventory is assigned to ending inventory.
- His actual flow of inventory may not exactly match the first-in, first-out pattern.
- First-In, First-Out method can be applied in both the periodic inventory system and the perpetual inventory system.

V. CONCLUSION

In this paper, we have represented the structured and theoretical procedures and steps for the lead time reduction. The measure of the impact of these steps is under various considerations and irrespective of the conditions of the workstations and the criteria of the work nature.

VI. REFERENCES

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