

Importance Of Value Stream Mapping For Improvement In Inner Wheel Housing Manufacturing Line

(Case study in Caparo Ltd)

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Abstract - It is rightly argued that whenever there is a product for a customer, there is a value stream. This powerful tool not only highlights process inefficiencies, transactional and communication mismatches but also guides about the improvement areas. The variables chosen are process inventory, station cycle time and lead time.

Keywords- VSM, Lean manufacturing, .

I. INTRODUCTION

The Value Stream Mapping method (VSM) is a visualization tool oriented to the Toyota version of Lean Manufacturing (Toyota Production System). It helps to understand and streamline work processes using the tools and techniques of Lean Manufacturing. The goal of VSM is to identify, demonstrate and decrease waste in the process. Waste being any activity that does not add value to the final product, often used to demonstrate and decrease the amount of 'waste' in a manufacturing system. VSM can thus serve as a starting point to help management, engineers, production associates, schedulers, suppliers, and customers recognize waste and identify its causes. The beauty of value-stream mapping is found in its usefulness and

simplicity. VSM is a map that outlines the current and future state of a production system, allowing users to understand where they are and what wasteful acts need to be eliminated. The user then applies lean manufacturing principals to transition into the future state.

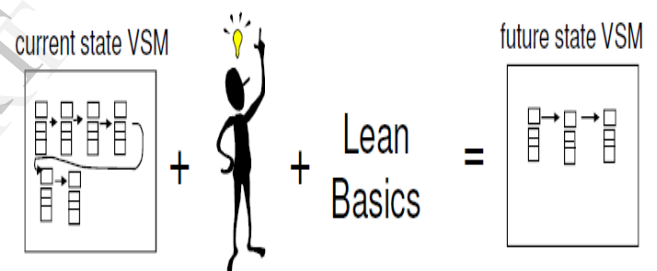


Figure 1. VSM concept

II. METHODOLOGY

It consists of following steps:

1. Selection of industry
2. Selection of production lines in the industry for study.
3. Preparation of current state map.
4. Proposed changes for future state map.

Preparation of future state map.

Current state map of inner Wheel Housing

Maximum forecast demand per month is 50,000 by the help of past records and increasing demand for new model of vehicle. Effective number of working days is 27 for the forecasted month; number of shifts per day is 3.

Available working time per day = 1320 minutes

So as we know,

Takt time = Actual working time per month

Demand of product

Proposed Changes For Future State Of Inner Wheel Housing

Acting upon the gap area identified by the value stream mapping of the existing state, some changes were proposed (Future state map). Store persons were asked to fulfill hourly demand instead of supplying shift wise. It requires a high degree of information flow and coordination to fulfill hourly demand. To track hourly demand a planning software SAP (software for planning) is proposed, as it helped to foster proper information flow regarding demand and consumption. SAP Software must be installed to connect all departments electronically. Mainly planning department controlled SAP and information delivered electronically from planning to further (another department or shop). All departments are connected with SAP to deliver the information in between. The SAP System brought the necessary schedule and delivery discipline. This is necessary to ensure

the functioning of raw material store and dispatch like a supermarket. It is also observed that inventory was high in production line. Caparo Ltd. is holding 15 days inventory in the store because of poor communication and a play safe tendency. Electronic information flow is proposed for the suppliers of Caparo Ltd. It will help in reducing order quantity and inventory at raw material stores. Implementation of milk run discipline introduced between Caparo and its suppliers reduced transportation costs, time and also reduces congestion at plant. These changes reduced inventory levels in raw material store. This also helped in making whole supply chain lean and flexible. To synchronize station cycle time with takt time at welding shop, a change is proposed in lay out (a new fixture is proposed to first robot so it will work on two fixtures simultaneously, this change of fixture on first robot will leave the third robot free) and a new robot is to be introduced in shop to make another line (third and fourth robot) for production and finally processing time is reduced (now two lines are there for production two robot in each line). Future state map captures all the information and data as per requirement of takt time.

III. RESULT AND DISCUSSION

The production lead time can be reduced from (18 days 1 hour 2 minutes and 52 sec.) to (11 days 1 hour 1 minute and 39 sec.) and processing time can be reduced from 124.7 sec. to 107.2. High demand at Caparo is easily

achievable with reduction in both WIP and finished goods inventory in supply chain. All these proposed changes will lead to a significant cost reduction at Caparo, and hence it will also help in reducing overall costs in the supply chain. Now Caparo will be in a position to deliver at an hourly rate, and high quality inner wheel housing at lower cost, which was also the requirement of lean and responsive environment. After applying proposed changes station cycle time will be less than takt time.

IV. CONCLUSION

At Inner wheel housing manufacturing line, it is concluded that

- Work in process inventory is reduced from 3 days to 1 day.
- Production lead time is also reduced from (18 days 1 hour 2 minutes and 52 sec.) to (11 days 1 hour 1 minute and 39 sec.)
- Finally processing time is reduced from 124.7 sec. to 107.2.

While applying VSM concepts some precautions should be observed. Since it gives a pictorial view of the process at any particular instant of time, it may capture the wrong picture at that particular instance, which may mislead decision makers. Secondly, VSM only hints about the areas of improvement. In present study the variables chosen are in process inventory, station cycle time and lead time

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