

Productivity Enhancement in KV cylinder head line: A case study at Recon manufacturing industry

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Abstract: Value Stream mapping is the simple process of directly observing the flow of information and flow material as they occur and summarising them visually. A value stream map contains all type of activities whether they are value added or non- value added activities. Value stream mapping (VSM) is a visual tool used to help see the hidden wastes and the sources of waste in the value stream. This tool is used primarily to identify, demonstrate and decrease waste, as well as creates flow in the manufacturing process. VSMs can be created merely using paper and pencil. It helps to identify and eliminates non-value added activities. This paper discusses the utilization of lean manufacturing techniques in Manufacturing Industry. The VSM used to improve the flow of information and materials thereby improvement in the productivity eliminating wastes.

Key words: Current state map, Future state map, Cycle time,

Introduction

Value stream mapping is a lean-management method for analyzing 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.

The process is analyzed for opportunity to drastically reduce and simplify it to the fewest actions necessary. By reducing wastefulness the proportion of value adding time in the whole process rises and the process throughput speed is increased. VSM is a systematic methodology to identify wasted time and actions in a manufacturing process. Value stream mapping can be a communication tool, a business planning tool, and a tool to manage ones change process.

LITERATURE SURVEY

This section of the paper provides the brief background about VSM. A value stream map is an end-to-end collection of processes /activities that creates value for the customer [1]. Abbas et al. (2001) focused on some problems stated above by means of an innovative mapping technique named value network mapping (VNM) obtained through an integration of production flow analysis and simplification toolkit and VSM. The authors show that VNM supports lean manufacturing through the creation of U shaped cells and the improvements of material handling methodologies.

Braglia et al. (2006) also focused on stated problems by developing a step by step procedure named 'improved value stream mapping' that makes it possible to apply value stream mapping to product characterized by a complex bill of materials. The basic idea held by the method is to identify the critical production path using the temporized bill of material. The improvements are made in the critical path, considering all possible sharing with secondary path as possible constraints. [1]

António Pedro Lacerdaa, Ana Raquel Xambrea,b* and Helena Maria Alvelosa, Published online: 18 Jun 2015., This research paper are based on real case study an automotive industry 15 plastic product are produced for a specific client and work focused on luxury car. The materials are used for ABS high quality performance. Manufacturing technologies are used thermo plastic injection, assembly of component and fabric bonding. For this special case data was collected 15 observations each and estimates the value. After collected a valid observation the observed time, normal time and standard time were calculated. In this cases 26 critical points. After using SMED process decreases the inventory level and achieve a more flexible process also operator number reduce like four to three. For this case 14 lean waste solutions find out and 11 were implemented. One bottleneck operations eliminated by changing a 95s operation into 1s one. Ultimately by implementing the action plan the resulting production system become more effective. [2]

M. Braglia , G. Carmignani & F. Zammori, Published online: 06 Oct 2011, A new value stream mapping approach for complex production systems, International Journal of Production Research In this research paper we focused on value stream mapping. There is use of innovative frame work to apply value stream mapping to products with complex bil of material. Main objective is to solve this limitation so that lean production can be enhanced in complex system too. This method is not easy to use in the case of complex production processes characterized by multiple flow that merge. To address this problem a new framework improved value stream mapping has been developed. This was done by integrating the standard Value stream approach with a set of additional tools derived from the manufacturing engineering area. [3]

William M. Goriwondo, Samson Mhlanga, Alphonse Marecha,2011, Use of the value stream mapping tool for waste reduction in manufacturing : Case study of bread manufacturing in Zimbabwe , International Conference on industrial Engineering and Operations Management. Value steam mapping (VSM) is a world class manufacturing tool that can be used to minimise waste in manufacturing. Companies are experiencing intense competitive pressure due to globalization hence they cannot afford to operate with waste in their processes. This paper details the use of the VSM tool in reducing waste in bread manufacturing for a company in Zimbabwe. [4]

The addressed problem of lack of analyses required to prioritize different alternatives has been addressed by Mcdonald et al (2002) and Lian and Van Landeghem, (2002), both the papers combining VSM with discrete event simulation in order to define the basic parameters for the FSM (i.e. number of kanban, pitch increment, micro mix etc.) and to assess the effect of these parameters on the performance of the system. Finally the last problem is a addressed by Pavnaskar and Gershenson,(2004), in the article thus authors identify the main differences and similarities between a productive and engineering processes. [5]

Last problem stated here essentially because there seems to be a lack of technical works dealing with this critically and may be disregarding the real variability of a process is one of the root cause of waste and must be carefully analyzed and reduced before lean manufacturing can be set into place [Hopp and Spearman,2000].

Value Stream Mapping Principles Value Stream Mapping has increasingly been applied by leading manufacturing companies throughout the world. It has proven to have many positive outcomes which include such concepts as reduced cycle time, decreased cost, reduction of defects and waste. VSM aims to achieve the same output with less input; such as less time, less space, less human effort, less machinery, less material and less cost. VSM is one first needs to understand the basic principles that guide it. Some major principles includes recognizing wastes, having standard processes, having a continuous flow, pull-production, quality at the source and maintaining continuous improvement. Companies such as Toyota, Pratt & Whitney, Sikorsky, Delphi, Ford, and many others companies have achieved large savings by implementation of Lean principles in their manufacturing activities.

The Five S's are some rules for workplace organization which aim to organize each worker's work area for maximum efficiency.

Sort – Get rid of clutter. Separate out what is needed for the operations and remove the unneeded components.

Straighten (Set in order) – Set in order, or organize the work area. Make it easy to find what is needed. A place for everything, and everything in its place.

Scrub (Shine) – Clean the work area. Make it shine.

Standardize. Establish schedules and methods of performing the normal tasks of the operation in general, and the process of cleaning and sorting.

Sustain – Implement programs to sustain the gains through involvement of all employees from every level.

VSM TOOLS: Value stream mapping is a tool which helps Lean thinkers and to develop the lean manufacturing within the organization, and when it applies the results will be in the form of higher customer satisfaction and reduction in waste. Value stream maps enable the team to look into the flow of material from beginning to the end.

VSM METHODOLOGY: Value stream mapping initially follows some steps. A current state without a future state is not much use. The future-state map is most important.

The first step is drawing the current state, which is done by gathering

Elimination of Waste: VSM Eliminate different type of waste 1) Waste of Over- production: - The most serious of the wastes, overproduction can cause all other types of waste and results in excess inventory. 2) Motion: - Wasteful motion is all of the motion, whether by a person or a machine, that could be minimized. 3) Defects: - Defects refer to a product deviating from the standards of its design or from the customer's expectation. 4) Over-processing refers to any component of the process of manufacture that is unnecessary. 5) Transport: - Transport can also cause the waste of waiting, as one part of the production chain must wait for material to arrive.

REDUCTION OF CYCLE TIME Cycle time reduction is the strategy of lowering the time it takes to perform a process in order to improve productivity. The reduction of cycle time first step is developing a flow process chart for accuracy of data. Then second step is to determine what would be the desired lead times. The next step set to benchmarking in industry because measures of cycle time in competitor organization to determine if the total process cycle time is currently competitive.

CONCLUSION:

VSM is continuous improvement process; we must keep on changing future state into current state that will not end during our life. VSM have been proven to be a greatly useful tool to eliminate some waste in a cycle and find there are more waste for us to eliminate in next cycle, during which lean becomes a habit or culture. The technique of lean tool can be applied to every situation in a company by finding out what customer wants and eliminating waste. The idea is to create culture in which people at various levels of an organization are continuously improving their production every day & in every way.

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