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A Review Report On Productivity Improvement in Pumping Unit Manufacturing Line by Using Value Stream Mapping

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Abstract: Value Stream Mapping is a lean tool that employs a flow diagram documenting in high detail every step of a process. Value stream mapping is used as the fundamental tool to identify waste, reduce process cycle times and implement process improvement. This paper implies the implementation of VSM in Global Pumping Unit Manufacturing line in order to identify the bottleneck operation in the GPU line and also to reduce the waste, thereby increasing the productivity in the GPU manufacturing line.
Keywords: Value stream mapping, Changeover time reduction, Non Value added action

I. INTRODUCTION

GILBARCO VEEDER ROOT PVT LTD is a manufacturer of Fuel Dispensers .It has two main production units DBS (Dankar Business System) & EOU (Export Oriented Unit).In Export Oriented Unit (EOU) they are manufacturing Meter line and Global Pumping Unit (GPU) manufacturing line. Pumps for fuel dispensers are manufactured in GPU. Here stator, rotor and pump body are imported from an industry in UK and are machined & assembled in GPU. Lean Manufacturing principles can help you reduce your manufacturing lead time, improve the quality of your products and reduce your new product development time. Value Stream Mapping is a visual method of mapping the flow of materials and information from the time products come in from goods inwards, through all the manufacturing processes and finally ready for dispatch. Value stream mapping is a key tool in Lean Manufacturing Principles. This tool can be extended out of the confines of the organization to look at the effect your suppliers have on the complete supply chain. Value stream mapping is to be implemented in GPU manufacturing line.

II. HISTORY OF SURVEY

Some literature survey about Value Stream Mapping has been made recently from that study the following observations are made.

A. An Application of Value Stream Mapping In Automobile Industry: A Case Study

*R.M. Belokar, Sande*ep Singh Kharb et al ., (July 2012) They used Value Stream Mapping to identify Non Value added actions in each step. The process is analysed 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. This makes the redesigned process more effective (the right things are being done) and more efficient (needing fewer resources). After implementation of Value Stream Mapping there is near about 44% improvement by improvement in value adding activities. Lean production means continuous improvement, 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 you to eliminate in next cycle, during which lean becomes a habit or culture.

B. Use of the Value Stream Mapping tool for waste reduction in manufacturing : Case study for bread manufacturing in Zimbabwe

William M. Goriwondo*, Samson Mhlanga, et al.,(January 2011) This paper details the use of the VSM tool in reducing waste in bread manufacturing for a company in Zimbabwe. The case study shows how the VSM tool was used to identify and reduce defects by 20%, unnecessary inventory by 18% and motion by 37%. It incorporates waste relationship ranking and the importance of management commitment in waste reduction.
The study set to use the Value Stream Mapping tool in troubleshooting waste generated in Bread Manufacturing and identify ways of reducing this waste while at the same time increasing the proportion of the processes that add value to the product. This

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was achieved through the development of the Future State Map which has an increased throughput of 16%. This paper contributes to the advancement of World Class Manufacturing practices in developing countries with emphasis to Zimbabwe. Coming from a difficult period of low capacity utilization and hyper-inflation, waste reduction is of paramount importance in economic growth.

C. The Application of Value Stream Mapping Based Lean Production System

Lixia Chen (June 2010) This paper proposes a value stream mapping based lean production system for Chinese enterprises to help them deploy lean production systematically, which can make them have a overall look at total efficiency, tell them where they are, where they want to go and map a route to get there. This paper will help them eliminate roots of wastes, rearrange overall value stream better and increase the competitive ability of Chinese enterprises.VSM have been proven to be a greatly useful tool to eliminate some waste in a cycle and find there are more waste for you to eliminate in next cycle, during which lean becomes a habit or culture.

D. Value Stream Mapping : Case study in a Water Heater Manufacturer

Ali Turkyilmaz et all., (June 2013) The value stream mapping is a lean production technique used by Toyota Production System (TPS) to visualize and design flow of information, material and production to analyze non value added and value added operations. In this paper, the method of value stream mapping (VSM) was revealed by literature investigation and an application in a lean manufacturer firm. By drawing the value stream maps of an electric water heater assembly line non-value added (NVA) operations were determined and then they were eliminated in the improved case. It is shown that efforts on effective use of resources with prevention of waste in their source increase value added (VA) operations and also productivity. This study also emphasizes the VSM's important role in the supply chain while describing and recognizing extravagances for manufacturing facilities.

This application in water heater manufacturer shows that VSM is a very useful tool to realize potential improvement opportunities and constitute lean systems. In the workshop, there is a significant amount of the time spent on the manufacturing from waiting and non-value added operations. The method of mapping the value stream helps us to easily recognize the extravagancies. To achieve a continuous development in the system and to gain efficient results, the participation of the operators to the system is necessary. This is because, they are the ones who do this job the best.

E. Value Stream Management for Lean Office—A Case Study

Joseph C. Chen, Ronald A. Cox (April 2012) This paper presents a look at the concept of Lean Manufacturing as applied to the office environment. Lean Manufacturing, which is often referred to as Lean, is a philosophy of manufacturing process improvement through the elimination of waste. This paper addresses these issues by proposing, a systematic procedure for conducting Lean Office techniques, along with a case study at a local company. The case study demonstrates a step by step procedure to help more participants in Lean Office understand its benefits and how to get started.

This paper presents a systematic procedure which could be used by Lean practitioners to conduct Lean events in their office environment. The proposed procedure incorporates the knowledge of several articles, books and successful Lean events. It also includes a case study which follows the proposed procedures and is provided as a reference for creating a Lean office. The application of Lean principles in a manufacturing area means identifying the value added and non-value added activities in manufacturing processes and then eliminating the non- value added activities while improving the value added activities. The systematic procedure proposed here ex- tends this concept to transform an office environment into a Lean office that has customer-triggered working processes, faster and systematic task tracking, and reduced costs due to a reduction of non-value added active- ties.

F. Application of Value Stream Mapping to Eliminate Waste in an Emergency Room

Preetinder Singh Gill (2012) The paper will present the potential benefits emanating from application of VSM along with assessing its effectiveness in scenarios where it has been implemented already. Furthermore, challenges faced in implementation of the VSM tools are collated. Various solutions to address these challenges have been presented in the light of tribulations faced by today's healthcare industry.

VSM could prove to be an invaluable tool in eliminating waste from an emergency
room. However, the practitioners and their sponsors must ensure that the VSM should be used to: identify waste, plan waste reduction, revaluate the level of waste in the improved process, in an organization wide, perpetual cycle.

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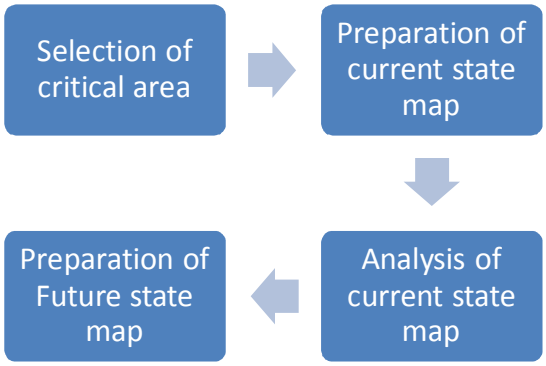
III. METHODOLOGY USED

Value stream mapping is the process of visually mapping the flow of information and material as they are repairing a future state map with better methods and performance. It helps to visualize the station cycle times, inventory at each stage, manpower and information flow across the supply chain. VSM enables a company to 'see' the entire process in both its current and desired future state, which develop the road map that prioritizes the projects or tasks to bridge the gap between the current state and the future state.

To start improving productivity by identifying waste and then removing it by implementing lean principle in the industry there is no other tool better then VSM. 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. A manufacturing system operates with timing of step-by step activities. The process analysis is carried out by collecting the data from various enquiries with expertise in shop floor, workers and
directly participating in measuring the time of various processes.



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 blue print for Lean Manufacturing. This section presents a methodology to develop a value stream mapping to identify material and information of current state.

IV. CONCLUSION

Hence, it is concluded from literature survey that the implementation of Value Stream Mapping has becoming interesting preference for the researcher. Therefore, in the existing work, it is observed that researcher are merely applied Value Stream Mapping with the other lean tools. VSM have been proven to be a greatly useful tool to eliminate some waste in a cycle and find there are more waste for you to eliminate in next cycle, during which lean becomes a habit or culture. Lean production means continuous improvement, we must keep on changing future state into current state that will not end during our life.

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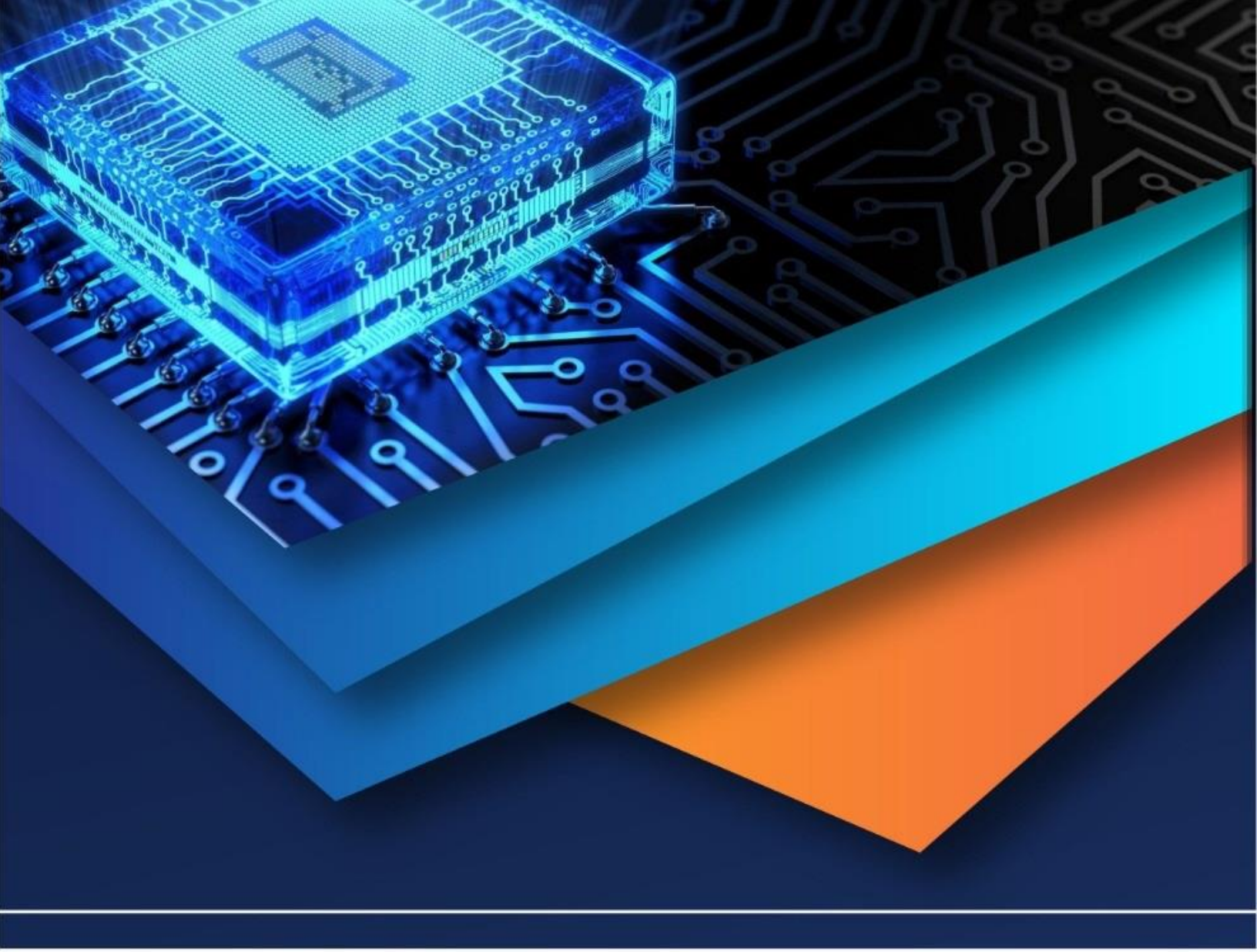

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