

Implementing Lean Technique by using Value Stream Mapping (VSM) in a Labour-intensive Small and Medium Enterprise (SME): Case Study of Goods Manufacturing Company

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Abstract

Labour-intensive Small and Medium Enterprises (SMEs) need to apply the lean manufacturing for business improvement of their competitiveness. The objective is to redesign the production system by implementing lean techniques using Value stream mapping (VSM) in Labour-intensive SME. A case method is conducted to explore the implementation of lean techniques using VSM. This study shows that VSM is an effective tool for improvement of production system in Labour-intensive SME.

Keywords: Lean Manufacturing, Value stream mapping (VSM), Case Study, Labour-intensive SME.

1. Introduction

Labour-intensive Small and Medium Enterprises (SMEs) need to apply the lean manufacturing for business improvement of their competitiveness (Faisal, 2016). Hines and Rich (1997) considered that Value Stream included both value added (VA) and non-value added (NVA) for a given product from its inception through delivery to the customer.

Womack et. al. (1990) defined the Lean Manufacturing as a manufacturing philosophy that focuses on the elimination of waste to reduce the lead time in a value stream. Value stream mapping (VSM) is applied to improve and redesign the production system for implementation of lean manufacturing. Rother and Shook (1999) described VSM as a pencil and paper tool that helps to see and understand the flow of material and information through value stream. It helps to identify and eliminate wastes.

The term “lean manufacturing” was coined by Womack et al. (1990) in their book, “The Machine that Changed the World”. Researchers and practitioners started using the term, “lean manufacturing”. JIT became an integral part of the LM. Karlsson and Ahlstrom (1997) explored the applicability of the LM concept and its principles to small and medium-sized firms. They concluded that most of the principles contained in LM were applicable to SMEs. Anand and Kodali (2010) proposed a ten-step implementation framework for LM in SMEs, based on their review of literature on implementation of LM. Dombrowski et al. (2010) described the development of a framework that was configured in four levels: the goals, the sub-goals, the methods and tools to support an adaptive configuration of LM for SMEs. Singh et al. (2011) concluded that VSM was a very effective technique for identification and reduction of various types of wastes by a case study of a small manufacturing industry. Parthanadee and Buddhakulsomsiri (2014) studied the use of VSM and simulation to improve the efficiency of the batch production system in SMEs.

There are plenty of discourses on Lean Manufacturing implementation in SMEs. There is a scarcity of literature on implementing lean techniques using Value stream mapping (VSM) in Labour-Intensive SMEs. The objective of this paper is to redesign the production system by implementing lean techniques using Value stream mapping (VSM) in Labour-Intensive SMEs.

2. Case Study of Goods Manufacturing Company (GMC)

GMC is a Labour-intensive Small and Medium Enterprise (SME) that manufactures the leather goods with ISO certification. After the selections of product based on the customer demands, current state of VSM collects the data, such as process cycle time, work-in-progress (WIP), number of workers and utilization. Current state mapping is based on the existing condition of organization (Figure 1). It shows both VA and NVA process in the manufacturing process flow. After analysing and evaluating the current state process of the product, the seven wastes are identified. Based on the analysing of current state, the future states are mapped (Figure 2). The last stage is based on implementation of the future state map.

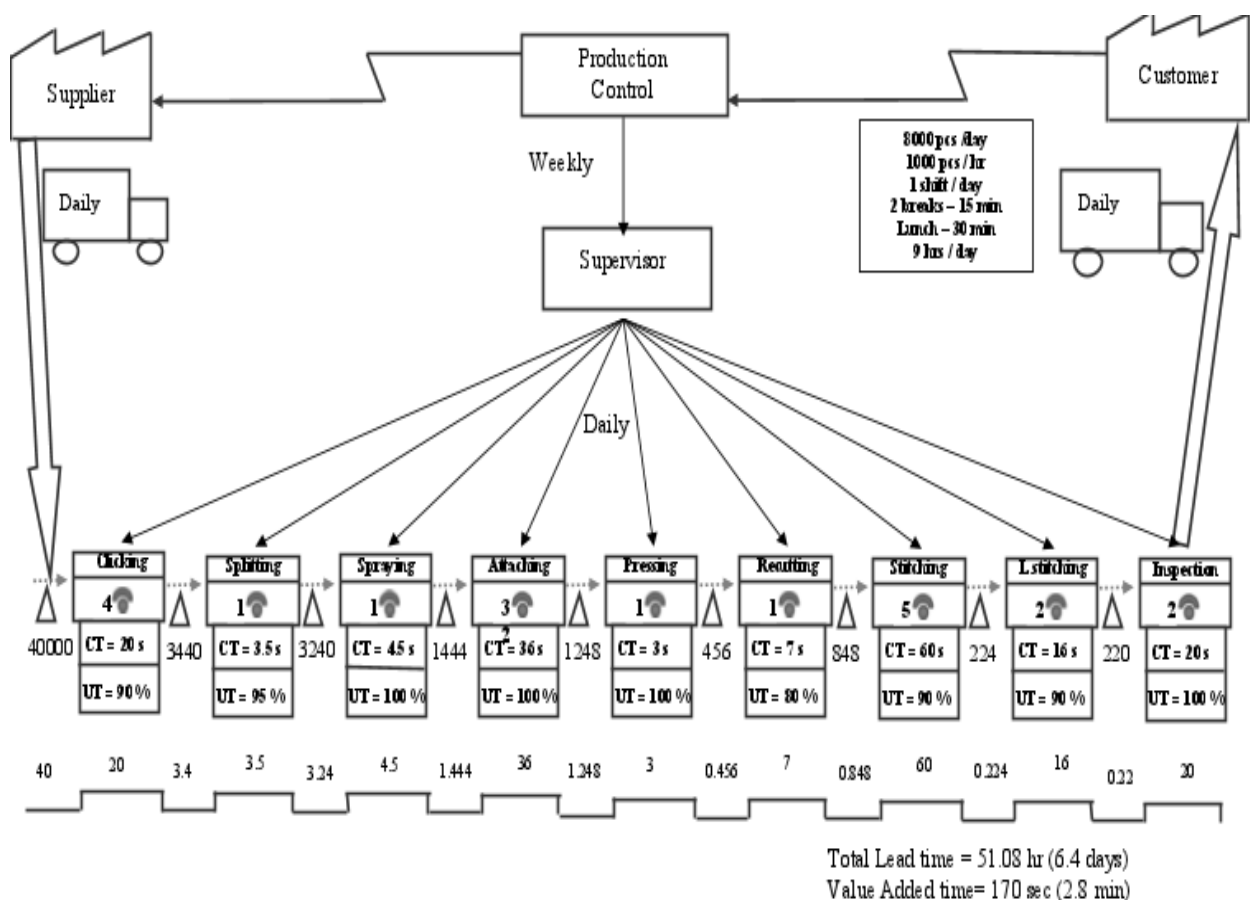


Figure 1 Current State Mapping

The future states are mapped based on the following lean principles:

- TAKT time (the rate at which customer buys a product) is 3.6 second per unit
- Pitch (Takt time converted into units) is 100 units in 6 minutes
- Two supermarkets are to maintain low levels of inventory at rate of 125 units
- Kaizen and 5S help to identify the small incremental improvements
- Three pull systems are used for inventory system
- U type cell for each department is designed to improve the layout

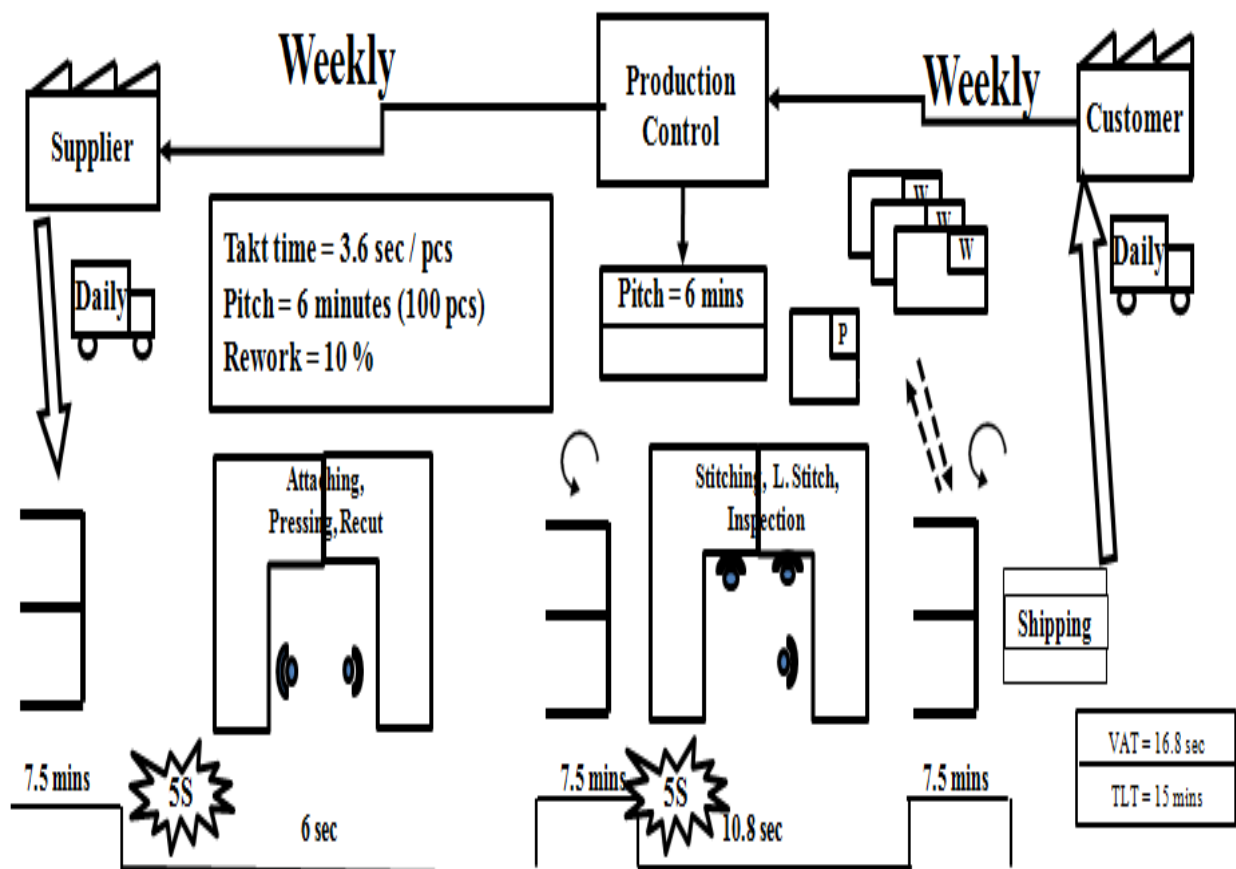


Figure 2 Future State Mapping

3. Conclusion

This study showed that VSM is the best redesigned tool for successful implementation of lean manufacturing because Small and Medium Enterprises (SMEs) are at the introduction stage of lean implementation. There is a possibility of reduction of lead time because of more work in process. So the customer demand is unable to satisfy because of more lead time. The simulation analysis needs to be done to find the improvement of throughput. VSM also found to be an effective tool (Serrano et. al., 2008) for redesigning the production system of Labour-intensive Small and Medium Enterprises (SMEs).

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