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Application of Value Stream Mapping in a small scale paper diary manufacturing industry

Dr. Chinmay Pingulkar[1]
Assistant Professor[1], VIVA Institute of Technology
Email: chinmay.pingulkarviva@gmail.com[1]

Lean manufacturing techniques are employed nowadays in a variety of organisations to cut waste at all stages of the production process. Value stream mapping (VSM), one of the methods used in lean manufacturing, can be used in small-scale manufacturing sectors to identify and visualise value-added and non-value-added operations. Reduced lead and cycle times contribute to increased production rates and higher levels of productivity as a result of value stream mapping. The researchers have discussed the use of value stream mapping in a small-scale paper diary production industry in this research article. The researchers used a four-step value stream mapping methodology, which assisted in increasing the efficiency with which raw materials were utilised.
Keywords: Lean manufacturing, value stream mapping, paper diary.

1. Introduction

The value stream mapping case study is one of the lean manufacturing technologies that has been effectively used in numerous organisations around the world. The complete manufacturing process in the sector is visualised using this lean manufacturing tool. Value stream mapping is utilised in the lean philosophy's implementation to enhance in the desired and feasible areas. The value stream mapping can be successfully implemented in small size companies, as shown in the case study of the paper diary manufacturing sector. The research was inspired by the organisation conducting it, but for reasons of secrecy, its name cannot be publicly disclosed. However, this research report thoroughly presents the necessary supporting evidence for the study.

2. Literature Review

Waste is removed from the manufacturing and production processes as a result of value stream mapping, which identifies and eliminates non-value-added activities from the process. The value stream mapping frames the industrial processes' present and future stages. Non-value-added operations and waste are eliminated to improve the process over the previous method [3]. The complete manufacturing process, including the flow of materials and information comprising value-added and non-value-added operations, is visualised using a lean manufacturing technique called value stream mapping. [4] The complete original manufacturing process, or the process's current states, can be seen on the value stream maps. The future states of the process, which are the ideal processes, can be created by identifying, evaluating, and analysing constraints such bottlenecks, idle time, and lost time. The processes are then revised and reengineered to close the gaps. [5] Value stream mapping is seen as a tool for continuous improvement in which the process maps are changed to increase quality, which reduces lead time. [7]

3. Process flow chart

A four-step value stream mapping methodology has been used in this research report. The first stage is to locate and compile data regarding the organization's current processes. In this step, data was gathered through interviews and the observational approach. The second phase involved

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exploiting the processes' current flow to develop the value streams' present state. Once the value stream mapping method has reached its current stage of development, researchers can evaluate it for potential future advancements. The creation of future value stream states for the purpose of establishing improvement goals is, thus, the third phase in the value stream mapping process. The fourth and last step of value stream mapping is to create a plan or roadmap to achieve the desired future state. Various wastes of production are removed in this step by employing various lean manufacturing approaches.

3.1 Manufacturing process flow chart

The following process shows the steps involved in the manufacturing of paper diary.

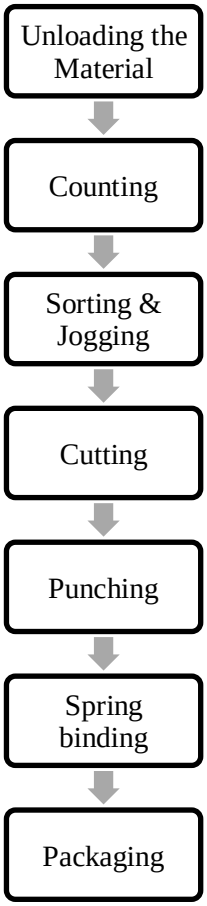

Fig. 3.1: Manufacturing Process of paper diary

4. Development of value stream maps

4.1 Value stream mapping: Current states

While developing the current states of the value stream mapping, the flow of materials as well as the flow of information was detected. The cycle time, change over time, and number of items

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created in a batch are mapped in relation to production processes such as unloading the material, counting, sorting & jogging, cutting, punching, spring binding, and packaging.

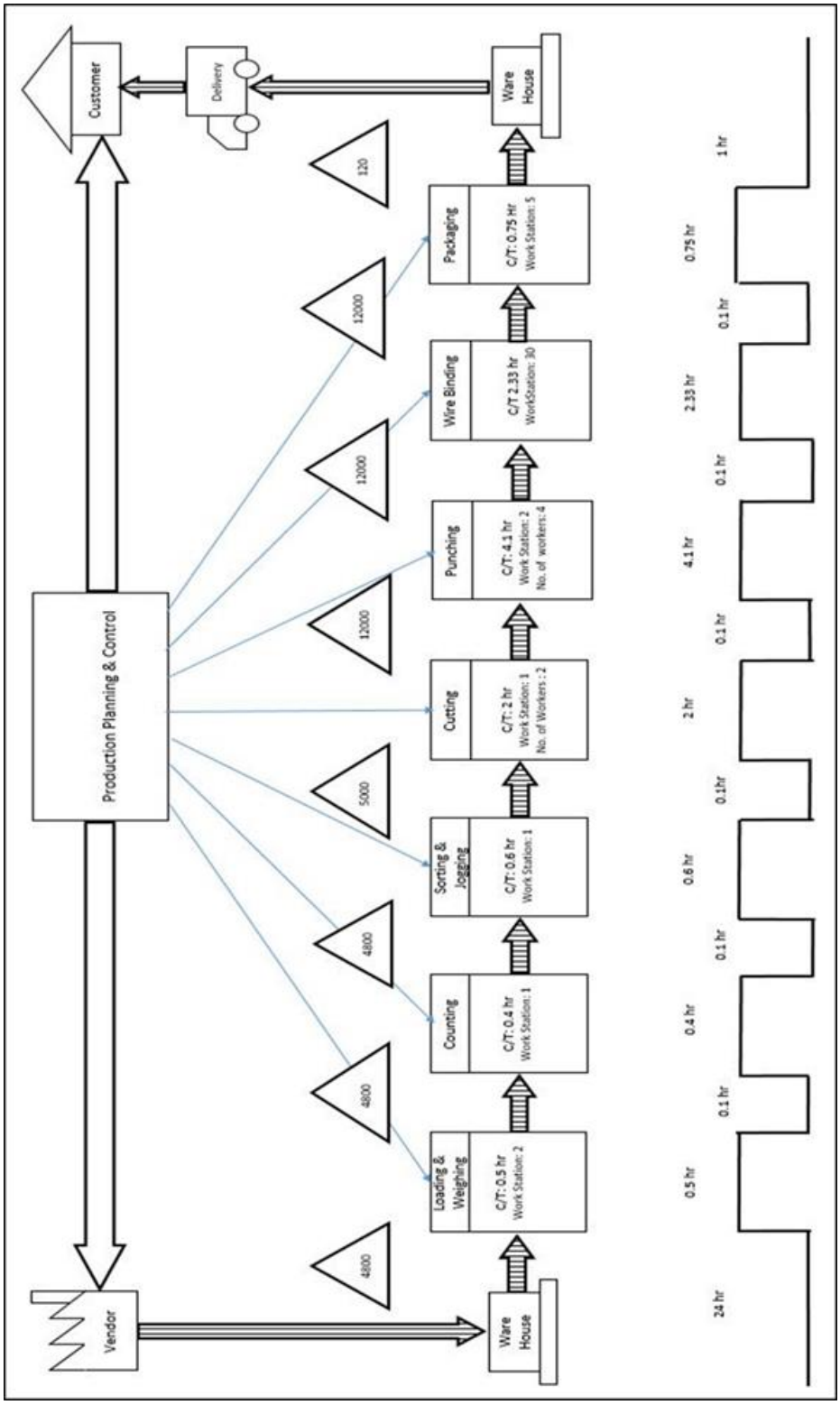

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Fig. 4.1: Value stream mapping- Current states

4.2 Value stream mapping: future states

Future value stream mapping states are similar to current value stream mapping stages, but the main distinction is that future states always represent the future improvement done or to be accomplished. Following an examination of the existing states of the value stream maps, various restrictions of the manufacturing process, both value added and non-value added, are examined.

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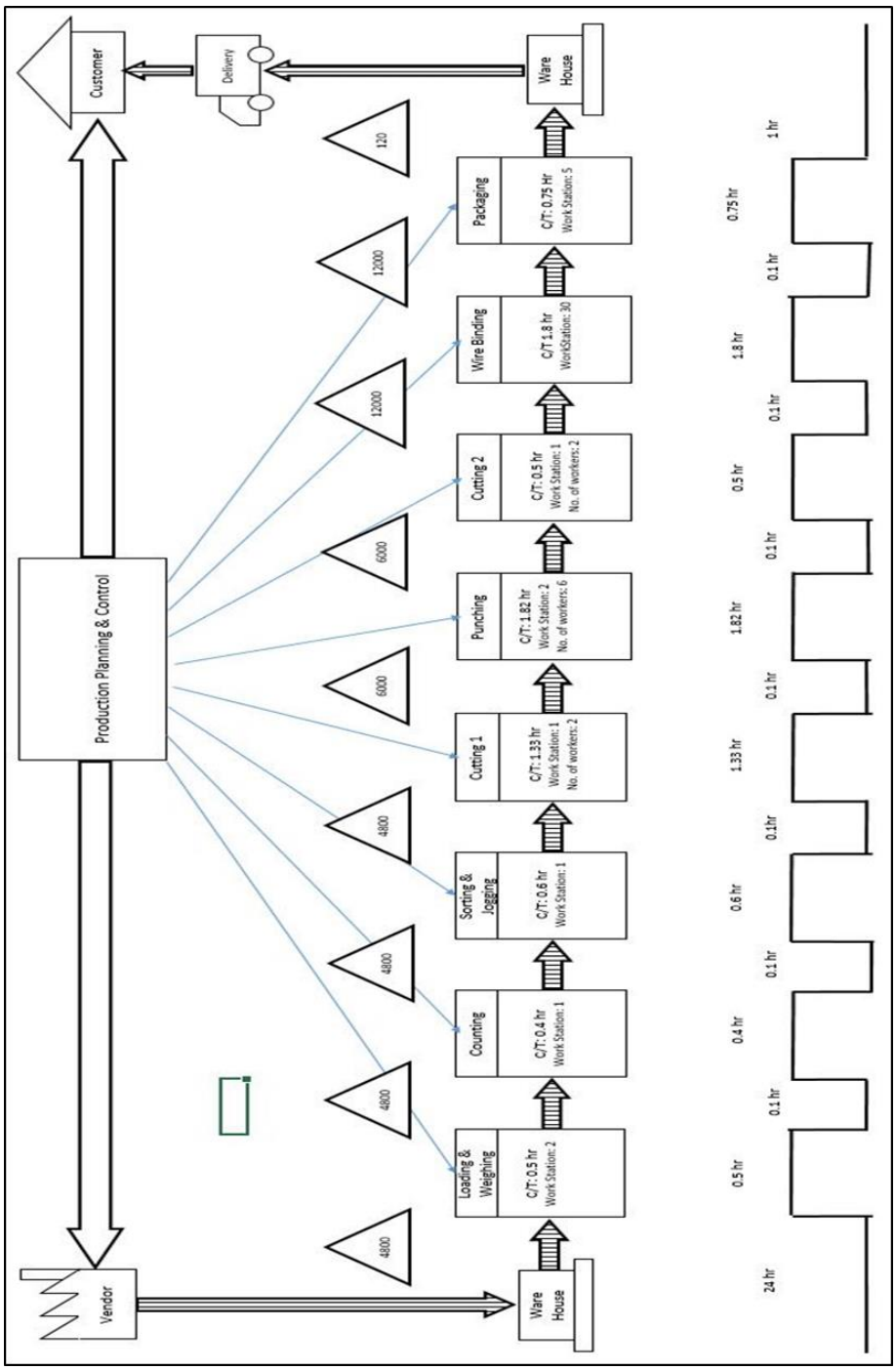

Fig. 4.2: Value stream mapping- Future states

5. Results and Discussions

According to the Value stream maps, the back cover was received from the vendor in the required size. The main important improvement made based on the data collected was that there was more waste generation of the separation paper; therefore, after discussing with the vendor, it was

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requested that instead of procuring beck cover page for individual diary, the sheet back cover of which is of the same size as the ruled paper size is procured and used as the separator of the bunch of ruled papers. Second, it was determined that the punching operation is the bottleneck operation, thus an additional worker is assigned to the appropriate punching operation's workstation in order to reduce the punching operation's cycle time. Also, in the previous stage, paper sheets were cut into 60 pieces, but in the following stage, the sheets are cut into 30 pieces first, then carried to the punching operation, and finally the punching operation is completed. The punched pieces are then sent to the cutting machine, where each piece is sliced into two pieces.

6. Conclusion

The goal of this study was to develop a value stream mapping strategy that would reduce production waste while still enabling the production of paper diaries. By altering the order of the operations, productivity has increased because of which the product's scrap percentage was decreased. The lead time and non-value added time have decreased as a result of the development of current state value maps and the application of lean manufacturing tools. Value stream maps are used to visualise the process from a high perspective, which aids in the process' ongoing improvement.

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