Implementation Of Value Stream Mapping In A Small Scale Ph Paper Manufacturing Industry

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Abstract

In this era, the lean manufacturing tools are used in different organizations to eliminate the wastes in the various different stages of the production. One of the lean manufacturing tools is value stream mapping (VSM) which can be used in the small scale manufacturing industries to identify and to visualize the value add & non-value added activities. The value stream mapping helps to reduce the lead time and cycle time which results improment in the production rate and the overall productivity. In this research paper the researchers have mentioned the application of value stream mapping in a small scale pH paper manufacturing industry. The reseachers applied the four step value sream mapping methodology which helped to imrpove the utilization of the raw material and to reduce the scrap and the waste percentage.

Keywords: Lean manufacturing, value stream mapping, pH paper.

1. Introduction

The case study of value stream mapping which is one the lean manufacturing tools which has been applied successfully in the various organizations throughout the globe. This tool of lean manufacturing is used to visualize the overall manufacturing process in the industry. In the implementation of the lean philosophy, the value stream mapping is used for the improvement in the desired possible areas. The case study of pH paper manufacturing industry portrays the value stream mapping can be in the small scale industries with success. The organization where which is research is conducted has motived the research but has restricted of disclosure of its name for the confidentiality purpose. However the required supported data for the research is fully presented in this research paper.

2. Litreature Review

Value stream mapping seperates and eliminates the non-vale added activities from the process which results in the removal of wastes from the manucttuing and production processes. In the value stream mapping current states and the future states of the manufacturing processed are framed. To Make the process better than the previous process the non value added activities and the wastes are eliminated[3]. A tool of lean manufacturing called as value stream mapping is used to visualize the entire manufacturing process which also includes the material flow as well as the information flow containing value added activities as well as non-value added activities.[4] The Value stream maps are able to show the entire original manufacturing process which can be stated as the current states of the process. Limitations like bottlenecks, idle time, wasted time can be identified, ecvaluated and analized to create the future states of the process which are the ideal processes. Then the process are re-engineered and redesigned to fill the gaps. [5] Value stream mapping is a considered as the tool used for the continious improvement in which the process maps are altered for the improment of quality which leads to minimization of lead time. [7]

3. Process flow chart

In this reserach paper, four steps methodology of value stream mapping has been implemented. The first step is to identify and collect the information about the existing processes in the organiztion. In this step the data has been collected by observation method and by conducting the interviews. In the second step, the current states of value streams has been developed by using the current flow of the processes. One the current sates of value stream mapping gets developed, the researchers can analized the process for the future improvements. Hence the third step of value stream mapping is the development of future states of value stream for the establishment of improvement goals. The last and the fourth step of value stream mappping is to develop the plan or the roadmap to acheve the desirable future state. In this step the various wastes of prodection are eleminated by using the various lean manufacturing techniques.

3.1 Manufacturing process flow chart

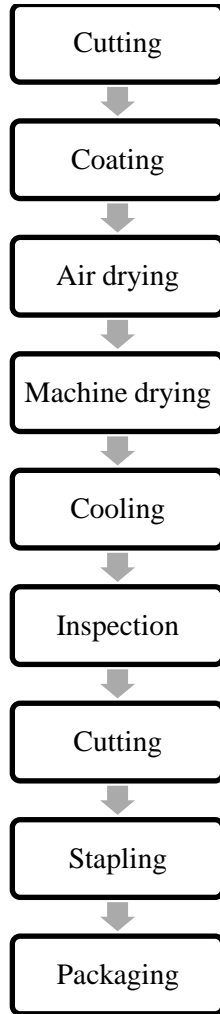The following process shows the steps involved in the manufacturing of pH papers.

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┌──────────────┐
│   Cutting    │
└──────────────┘
        ↓
┌──────────────┐
│   Coating    │
└──────────────┘
        ↓
┌──────────────┐
│  Air drying  │
└──────────────┘
        ↓
┌──────────────┐
│Machine drying│
└──────────────┘
        ↓
┌──────────────┐
│   Cooling    │
└──────────────┘
        ↓
┌──────────────┐
│  Inspection  │
└──────────────┘
        ↓
┌──────────────┐
│   Cutting    │
└──────────────┘
        ↓
┌──────────────┐
│   Stapling   │
└──────────────┘
        ↓
┌──────────────┐
│  Packaging   │
└──────────────┘
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Fig. 3.1: Manufacturing Process of pH papers

4. Development of value stream maps

4.1 Value stream mapping: Current states

The flow of materials as well as the flow of information has been identified while developing the current states of the value stream mapping. The cycle time, change overtime, number of products manufactured in the batch respected to the manufacturing processes including cutting, coating, air drying, machine drying, cooling, inspection, cutting, stapling, packaging are mapped.
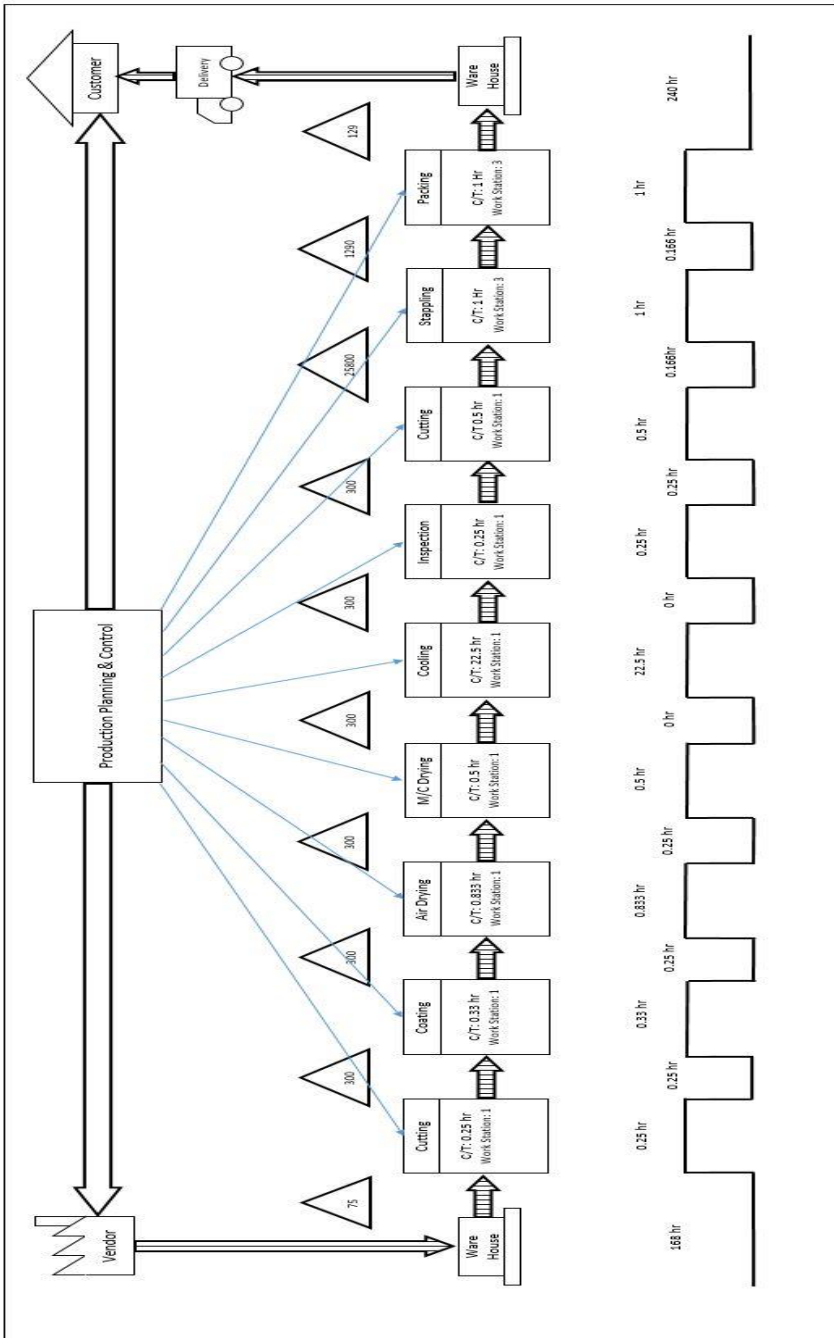
Fig. 4.1: Value stream mapping- Current states

4.2 Value stream mapping: future states

Future states of the value stream mapping are simillar to the current states of the value strean mapping but the major difference is that the future states always shows the future improvement achieved or to be achieved. After analysing the current states of the value stream maps varous contraints of the manufaturing process, value added and non-value added process are analysed.
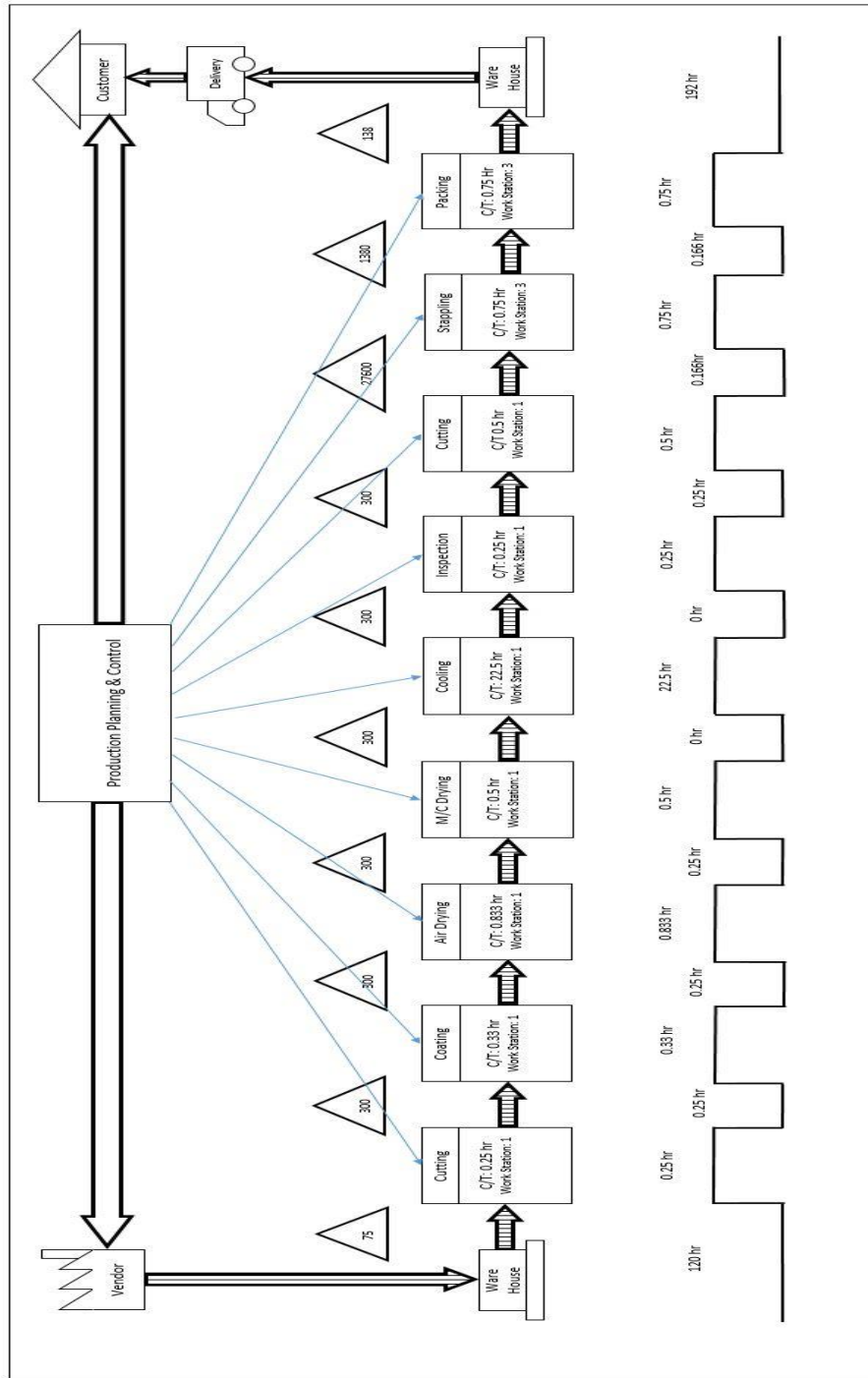
Fig. 4.2: Value stream mapping- Future states

5. Results and Discussions

It is analysied that changing the size of the paper resulted in the reduction in the the scrap and waste percentage. The non value added actvities are minimized which helps to dectction in the manufacturing lead time and the procurement and distribution lead time. Perviously 97.21% of the

area of a paper sheet was utilized. Now 99.13% of the area of the paper sheet is utilized. Hennce previously the scrap percentage was 2.79% and now after implementation of value stream mapping it has been reduced to 0.97%.

6. Conclusion

This research was aimed at the development of value stream mapping suited for the manufacturing of pH paper by minimizing the production wastes. The productivity has been improved by changing the size of the paper which allowed to utilize the higher percentage of area of the paper in the product. Hence the scrap percentage regarding the product has been decreased. After developing the current states of value maps and implementing the lean manufacturing tools, the non-value added time and lead time has been reduced. The value stream maps are used to visualize the process from the bird eyed view which helped in the improvement of the process continuously.

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