Applications of Value Stream Mapping in HEESCO

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Abstract: Value stream mapping (VSM) refers to all activities involved in designing, producing and delivering goods and services to customers. Objective of this research is to draw the current state map for the products in Heavy Engineering Equipment State Company (HEESCO) as a case study, that deals with job-shop production to identify and reduce the non-valued added activities and propose a future state to reduce the production lead time and improve the value added time.

Key word: Value Stream Mapping (VSM), HEESCO, value & non-value added.

1-Introduction:

The value stream refers to all activities involved in designing, producing and delivering goods and services to customers. Value stream maps are special type of process maps which represent all the actions, both value added and non-value added currently required to bring a product through the main flows essential to every product [1]. Value Stream Mapping (VSM) is a visual way of representing the flow of the information and material in the production of the product. Besides that, VSM can identify the seven wastes that occur in the production line [2].
We can describe the VSM methodology as a sequence of five steps, in which the initial four are all leading up to the actual improvement of the process[3].

Figure (1) The main steps of the value stream mapping methodology[3].

Value stream mapping is mainly divided into three sections:

- **Material flow**
- **Information or communication flow**
- **Time line** [4].

**Literature review :-**

**Bhim Singh etal:** have researched in the research paper that the original concepts and definitions about (VSM) demonstrated that it is necessary to map both inter-company and intra-company value-adding streams. VSM refers to specifics of firm that added value to the products or services under consideration. It usually starts with customer delivery and work its way back through the entire process.
documenting the process graphically and collecting data along the way. Finally it results in a single page map called “Value stream”, these maps contains data such as cycle time, work-in-process (WIP) levels, equipment performance data, and quality levels.[5]  

**M. Rother et al.:** They were pioneers in introducing material and information flow diagramming and how to develop lean thinking using practice. They have given the name as Value stream mapping, and is a flexible tool that let us put all of the information in one place in a way that is not possible with process mapping or other tools.[6]  

**Madhubala Rauniyar et al.:** find that every organization is striving hard on getting more work done in less time and greater ease. The fundamental aim of any organization has been to continuously minimize waste and maximize flow which would ultimately lead to customer satisfaction by providing right product at the right time. [7]

<table>
<thead>
<tr>
<th>processes</th>
<th>Scheduling Of Coils No. 1 And No 2 (Day)S</th>
<th>Real Of Coils No1 And No.2(Day)S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-wait for material coming</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>2-sand plast or shoot plast</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3-*define dimension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-*clean the end cutting to equipped for welding</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>5-welding(Full weld)</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>6-inspection</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7-make the stand of coil</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8-inspection</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9-bending</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>10-inspection</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>11-assembly straight tube with beding tube</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>12-assembly the Falnge and cover</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>13-final inspection</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total time</td>
<td>19 days</td>
<td>53 days</td>
</tr>
</tbody>
</table>

**Table (1) Coils Production Activities**
3-Experimental work :-

3-1 Analysis of Current State Map:

From table No.1 we noticed delay time between real time and schedule time of processing for production a single coils processing in (H.E.E.S.Co.), schedual time is (19) days, but real time to execute are (53) days. So to solve this problem we suggest the value stream mapping solution to find the waste of time. When you see the Production Activities for Coils, The detailed processing steps for the coil with the related schedule time and actual processing time as shown in Table (1) where inspection activities are also marked in bold row. 2D information/material flow for coils production is shown in Fig (2). These coils should be produced (as scheduled) in 19 day, Auto CAD software is also used to depict coil shape parts and its dimensions in (mm) as shown in Figs (3) respectively [8].
Fig (2) : Current information flow for single coils processing in (H.E.E.S.Co.)
Fig (3): Coils
3-2 Creation of Future State Map using VSM:
From the previous information and analysing of coil production activities we proposed applying value stream mapping, by using the Microsoft Office Visio draw the figure below.

![Future Value Stream Mapping Diagram]

**Fig (4) : future value stream mapping for single coils processing in (H.E.E.S.Co.)**
When we see fig(4) we find that VSM is much more useful than quantitative tools and layout diagrams that produce a non-value-added steps, lead time, distance traveled. Value-stream mapping is a qualitative tool by which you describe in detail how your Facility should operate in order to create flow. VSM is good for describing what You are actually going to do to avoid the waste time. the final map is more smooth and easy to understand directly and could explain the lead time in production system through the material and information flow then to find rapped action to solve this bottleneck.

5- Conclusion :

1- Value stream mapping is good solution for waste time

2- Applying VSM in (HEESCO) give us atop view for information flow and material flow.

3- VSM is much more useful than quantitative tools and layout diagrams that produce a non-value-added steps.

6- Future work:-

1- Applying VSM on all products in HEESCO.

2- Develop the ways of manipulated by using information matrix.

3- Using Value Network Mapping (VNM) in shop floor of job-shop system.
References:


