Abstract

Assembly lines are traditional and still attractive means of mass and large-scale serial production. Due to high capital requirements when installing or redesigning a line, configuration planning is a great relevance for practitioners. The evidence from a number of US projects suggests that reengineering an existing system costs significantly less than new system development. Process reengineering is modifying the process for the process improvement. Here first to consider the frame assembly conveyor line and identified all the problems are affected the conveyor line, like stage wise problem, store wise problem, facility wise problem, DOM error and customer complaint. After finding the problem, identified the maximum priority problem by the three step problem classification, and find the root causes of the maximum priority problem, at last to give the valuable solution for the maximum affecting problems. Finally to implement the solution and monitor the improvement process of the frame assembly conveyor line.

Keywords: Process Reengineering, Conveyor line, Frame assembly

I. Introduction

Process reengineering is the fundamental redesign of the process of achieving improvements in critical measures of performance. The simple meaning of process reengineering is the analysis and redesign of work flow within and between enterprises.

Process reengineering is Documenting, analyzing, and comparing a process to benchmarks such as class practices, implementing the required changes, or installing a different process.

The basic steps of the process reengineering are given below;

a) Plan the process re engineering
b) Analyze the current process
c) Conduct process improvement analysis
d) Redesign / Re-Engineering process
e) Develop implementation
f) Implement re engineered process and change strategy
g) Process re engineering follow-up & assessment

II. Introduction about Frame Assembly

In automobile industries the frame was done the important role. The engine and chassis was mounted on the frame only. The frame was assembled by the conveyor line. The conveyor line was divided into many stages. In every stage the frame was assembled by step by step procedure.

III. Production Detail

The daily production details was updated to the software, it can easily observed by the software. From the production detail number of completed frame per day and number of passed frame to other shop per day can easily observed.
IV. Problem Description
Frame assembly conveyor line has work under some assembly problem, quality problem and material shortage problem. Due to this the efficiency of the conveyor line is affected and rework will be done. Finally the time loss also happens. The frame assembly conveyor line II losses the productivity due to the following concerns.

The list of the concern is given below:

a) Stage wise problem
b) Stores wise problem
c) BOM & DOM error (Bill of Material & Destination Off-take Master)
d) Customer complaints
e) Others

V. Problem Classification Details

<table>
<thead>
<tr>
<th>S.No., Step</th>
<th>Name of classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I</td>
<td>Prioritization</td>
</tr>
<tr>
<td></td>
<td>Degree of difficulty</td>
</tr>
<tr>
<td>2 II</td>
<td>Based on critical, impact and ease of completions</td>
</tr>
<tr>
<td>3 III</td>
<td>Based on critical, impact and time</td>
</tr>
</tbody>
</table>

Because of the more number of concerns observation we want to identified the maximum affecting concern, so only this above three steps will help to find the major affecting concern. If we solve the major concern will help to improve the conveyor line or improve the production.

Step-1
5.1. Prioritization

In the above figure (fig No 3) the total concern of the conveyor line was taken and analysis. Form the total 47 concerns the 25 major affecting concern was identified form the prioritization. Expect the critical low and urgent low, other meeting place are taken for the major affecting problem.

5.2. Degree of Difficultization

In the above figure (fig No 3) the total concern of the conveyor line was taken and analysis. Form the total 47 concerns the 31 major affecting concern was identified form the prioritization. Expect the impact for production low and ease of completion low, other meeting place are taken for the major affecting problem.

The above two problem classifications are called step-1 problem classification. From the step-1, 26 major concerns are identified.

Step-2
5.3. Prioritization with Ease of completion

In the given figure (fig No 4) again reduce the number of concern for the reason for find the maximum affecting problem.
Step-3
5.4. Prioritization with time for completion

VI. Problem Identification
From the problem classification the five major problems are identified. To solve the major affecting problems will help to improve the process. The major affecting problems are given below:

i. Wrong orientation in Engine Mounting Bracket rear LH & RH
ii. Wrong orientation in Cab Mounting Bracket rear LH & RH
iii. Wrong orientation in Shock absorber Bracket LH & RH
iv. Shock absorber top mount not mentioned in DOM for 3rd model
v. Rear spring Bracket torque not ok for 5th model

VII. Summary
Wrong orientation in Engine Mounting Bracket rear LH & RH:
The engine mounting bracket part No are given below:

<table>
<thead>
<tr>
<th>Part No</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2986814</td>
<td>RH</td>
</tr>
<tr>
<td>A2986914</td>
<td>LH</td>
</tr>
</tbody>
</table>

These brackets are used to fitment the rear side of the engine. This orientation problem is basically happened because of the part No identification not proper. The unskilled worker problem is easy to solve but the major cause is part No identification only.

Wrong orientation in Cab Mounting Bracket rear LH & RH:

<table>
<thead>
<tr>
<th>Part No</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1986814</td>
<td>RH</td>
</tr>
<tr>
<td>A2986914</td>
<td>LH</td>
</tr>
</tbody>
</table>

This cab mounting brackets are used for the rear cab placement. If the orientation changed the cab placement is not proper. This orientation problem is basically happened because of the part No identification not proper. The unskilled worker problem is easy to solve but the major cause is part No identification only.

Wrong orientation in Shock absorber Bracket rear LH & RH:

<table>
<thead>
<tr>
<th>Part No</th>
<th>Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>A6122222</td>
<td>RH</td>
</tr>
<tr>
<td>A6122322</td>
<td>LH</td>
</tr>
</tbody>
</table>

This orientation problem is basically happened because of the part No identification not proper. The unskilled worker problem is easy to solve but the major cause is part No identification only.

Shock absorber top mount not mentioned in DOM for 3rd model:
The part No of the Shock absorber top mount is A3B00200. The root cause of the problem is DOM error only.

Rear spring Bracket torque not ok for 5th model:
The torque of the rear spring bracket is 300N and it is used for the fitment of the rear spring of the chassis assembly. The root cause of this concern is time shortage of the stage 4 and very tough for the handling.
VIII. Problem Solution

Table 5 Recommended solutions

<table>
<thead>
<tr>
<th>SL No</th>
<th>Name of the concern</th>
<th>Recommended solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Engine mounting bracket orientation wrong</td>
<td>Recommended the supplier to print or sticker the LH &amp; RH</td>
</tr>
<tr>
<td>2</td>
<td>Cab mounting bracket orientation wrong</td>
<td>Recommended the supplier to print or sticker the LH &amp; RH</td>
</tr>
<tr>
<td>3</td>
<td>SH absorber bracket orientation wrong</td>
<td>Recommended the supplier to print or sticker the LH &amp; RH</td>
</tr>
</tbody>
</table>
| 4     | SH top mount not mentioned in DOM for 3rd model | • Recommended to add the spec  
• Recommended to add the part in the DOM |
| 5     | Spring bracket torque not ok for 5th model | • Fit the special tool in over head with horizontal position (like chassis)  
• Increase 2 man power for the special tool handling (2 for reaming and 2 for torque the bracket) |

IX. Results and Discussion

9.1. Result:
Cab mounding bracket rear LH, L was printed and RH, R was printed. Engine mounting bracket rear LH, L was printed and RH, R was printed. Shock absorber top mount for 3rd model was mentioned in DOM. Shock absorber Bracket green sticker for LH and Shock absorber Bracket red sticker for RH.

9.2. Discussion

From the above table and chart the different between plan, off-track and passed was clearly identified. From these details the complete and uncompleted percentage was easily identified.
X. Conclusion

The frame assembly conveyor line concerns are monitored from the stage wise, store wise, customer complaints, DOM error and others problems. From the total concern the major affecting concern of the frame assembly conveyor line was identified and solved. Thus the major affecting concerns are solved, the conveyor line is improved.

XI. Reference


