Make Supplier as Just in Time Supplier –

through a Case Study

K. Sivasakthi Balan

Department of Mechanical Engineering
Shirdi Sai Engineering College
Bangalore, Karnataka, India

Copyright © 2014 K. Sivasakthi Balan. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Most of the Small and mid size organizations are doing this Supplier Development Program in which suppliers receive an award for a certain level of quality and on-time delivery. This paper explains the importance and the effect of imparting and developing the suppliers in similar to the technology, tools/principle/methodology used or followed in OEM and make the supplier as Lean Supplier / Just-in-time Supplier through a case study in a supplier firm of a leading Automobile industry in India.

Keywords: Dandori Time Reduction, Kaizen, Lot size reduction, Pull System establishment

1. Introduction

In India Most of medium and small size organization are doing supplier development program [12], but many of these programs are programs in word only. Most of these programs are nothing more than "Supplier Quality Award" programs, in which suppliers receive an award for a certain level of quality and on-time delivery. While there is nothing wrong with doing this, it falls short of what is truly needed in a successful supplier development program.

The main purpose of this kind of supplier development program should be aimed at achieving the following:
• Lower supply chain total cost
• Increased profitability for all supply chain participants
• Increased product quality
• Near-perfect Just-in-time delivery each point in the supply chain

Most supplier development programs do not do enough to meet these goals. Auditing suppliers once per year to determine if they've met certain on-time-delivery and quality goals will not actually fulfill the purpose of a supplier development program. We could call this type of work "supplier checking and verification" rather than "supplier development." Supplier development requires much more work than auditing and checking does.

Supplier development [4] is actually developing suppliers in much the same way employees are developed in the Original Equipment Manufacturer (OEM).

2. Statement Of Problem

Today the Indian automobile industries are facing the following key challenges in managing their supply chains.

1. Managing inbound Logistics/ JIT supplies
2. Integrating the end-to-end supply chain
3. Managing supply chain costs
4. Managing product/part proliferations

In this “Managing Inbound logistics/ Just in Time Supplies from Supplier remains a key concern on the upstream side of the Supply Chain for most of the Automobile industry during this highly competitive era. In this paper we try to focus on Just-In-Time Supplies in their inbound logistics area through implementing the Toyota Production System’s principles, which is methodology followed at their OEM, in the suppliers’ firm in the Chain

3. Methodology And Tool Used

The research method would involve different methods of data collection, data analysis, styles of writing/documentation and result communication to accomplish the above said goals.

The principle/methodology used in Toyota Production System (TPS) for Just in time Supplies [13, 9] are,

• Parts and Information Flow (PIF)
• Pull system establishment
Make supplier as just in time supplier

- Lot size reduction
- Dandori time reduction
- Layout modification

**Parts and Information Flow (PIF)**

PIF is a value stream mapping of parts & Information. The Purpose of PIF is to grasp the present situation as well as to find the areas and location that need Kaizen (continuous Improvement) at workplace. And the Objective of Preparing the PIF[13] is to understand the present condition and problem points at work area aiming to carry a kaizen.

**Pull System Establishment**

Pull System is one of the principles of Just-In-Time which is nothing but “Produce and transport – What is required, when is required and in what quantity is required”. Pull system is nothing but the following process withdraw the information from preceding process, what parts they need, when they need and in what quantity they need. This can be achieved by implementing the Kanban Principle[13].

The benefits of Pull system are
- Low inventory
- Balanced workload
- Continuous communication

**Lot Size Reduction**

The ideal lot size as per JIT is 1[13,10]. But usually it is not technically and economically possible. The goal is to have small lots that are producing the product in Small batches at each run.

Minimum Lot is defined as the Lot size which is produced as per customer Pull or Requirement. This is a fixed quantity variable time production system which can also follow a pattern production system. For Example the Customer requirement per pick up is 10 vehicle sets, then the lot size will be 10.

**Dandori Time (Set-up Time) Reduction**

It is a Japanese word which means Set-Up Change over Time[13]. Now-a-Days the Customers want variety of products in just the quantities they need. They expect high quality, a good price, and speedy delivery. To satisfy the customer’s requirements we need to introduce batch processes to produce in small lots. Doing this usually creates a need to reduce setup times.
The goal of setup reduction and changeover improvement should need to develop a production system that produces as much as what the customer wants, when the customer wants it, throughout the production chain. The result of this is being a strong, flexible manufacturing operation that is adaptable to changes.

Many companies produce goods in large lots simply because frequent changeover times make it costly. But the large lot will cause for high inventory, delay in the production chain and more over the quality will also decline.

4. Implementation And Results

In this study, we had tried some of these principles to implement in an automobile part supplier near Bangalore, Karnataka, who is a supplier for one of the leading automobile manufacturers. The supplier manufactures injection molding parts for 2 different types of cars (Type A & Type B).

Firstly the existing conditions were analyzed by preparing the Parts and Information Flow Diagram (PIF). The current PIF helped us to identify the existing problem and its locations. The PIF with identified problem for the organization is given below.

![Diagram](image)

Fig. 1. Parts and Information Flow Diagram

The main problem identified (apart from other problems) from the current state PIF was, the lead time from the production to finished goods (FG) was more. It was around 6 days for 2500 T machine and 14 days for 500 T & 900 T machines.

The lead time can be reduced by the work in process (WIP) Inventory reduction which can be done through the lot size reduction. The lot size reduction
can be possible through the Dandori Time (Change over time) reduction. The following figure gives this approach in the form of a flow chart,

![Flow Diagram for the Approach](image)

**Fig. 2. Flow Diagram for the Approach**

The Dandori time of all the three machines were observed and listed out the kaizen points for certain points. Those identified points of implementation are,

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Implemented kaizens</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before</td>
</tr>
<tr>
<td>1</td>
<td>Water hose connection routing</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Bolt length reduction by 40 mm</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Walk path reduced by mold layout modification</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Chamfering of bolt for easy removing</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Preheating waiting time</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Spanner &amp; tool standardization</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>Mold marking</td>
<td>9</td>
</tr>
</tbody>
</table>

**Total time saved** 25
TABLE II
KAIZEN POINTS FOR IMPLEMENTATION AT 900 T MACHINE

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Implemented kaizens</th>
<th>Time</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before</td>
<td>After</td>
<td>Saved</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Water hose connection routing</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spanner &amp; Tool Standardization</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mold Marking for Positioning</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total time saved</strong></td>
<td><strong>11</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE III
KAIZEN POINTS FOR IMPLEMENTATION AT 2500 T MACHINE

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Implemented kaizens</th>
<th>Time</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before</td>
<td>After</td>
<td>Saved</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HRS Connection Parallely doing when mold loading</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cleaning of mold parallely doing</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total time saved</strong></td>
<td><strong>8</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because of this implementation, the Dandori time was reduced for all the three machines as,

Fig. 3. Dandori Time Reduction in 500 T M/c
The Outcome of the above said Kaizan Implementation leads to the Results of lot size reduction in turn it reduces the Finished Good Stock drastically from 2 days to $\frac{1}{2}$ Day for Type A and from 3 Days to 1 day for Type B Model. That is shown in the following figure,
The overall outcome of the above said implementation, that is, the reduction in the lead time is given in the following figure.

5. Conclusion

In this study it is observed that when some of the basic principle of TPS is adopted and implemented in the organization who is a supplier of the OEM, a drastic change in the lead time can be witnessed. This will be one of the reason to make them as a Just In Time Supplier. So, our suggestion through this to the every OEM to implement the principle of TPS or whatever methodology/principles they are following in their organization, wherever is possible in every suppliers’ firm throughout the supply chain. This could be only possible through appropriate and continuous training in their upstream.

References

Make supplier as just in time supplier


Received: October 1, 2013