Just in Time (JIT) Production System

Topics
- Business & productivity
- What is JIT?
- Inventory is the driving force
- Pull-through system & kanbans
- Other concepts
- Benefits
- Conclusions

Business Goals
- Reduce Cost
- Improve Quality
- Reduce Time
- Reduce Waste
Japanese View of Productivity

Reduce cost by eliminating waste
— any element of production that does not add value to the final product

Waste is found in:
- Overproduction
- Inventory
- Conveyance
- Defects & correction
- Waiting
- Processing

Reduce cost by eliminating waste — any element of production that does not add value to the final product

Just in Time

Produce only the necessary parts/products, in the necessary quantity, at the necessary time

JIT Objectives

- Reduce cost by eliminating waste
- Make it easier to achieve & assure quality
- Attempt to create work sites that respond quickly to change
- Organize work sites to emphasize human resource
JIT Approach

- Integrated (systems) approach to production
- Efficiently use resources (facilities; materials; labor)
- Eliminate waste (muda), unevenness (mura), and overburden (muri) — 3 m’s

Inventory

Inventory is Driving Force
Inventory is Driving Force

Setup Time

Down-time

Tooling

Training

Packaging

Purchasing

Pull-Through System
Kanban Types

- Withdrawal kanban—pass authorizes movement of parts from one work center to another; stays with parts until parts consumed, then returns for part replenishment
- Production kanban—release order to preceding process to build specified number of parts

Withdrawal Kanban

<table>
<thead>
<tr>
<th>Part number</th>
<th>Raw materials and other part types used in manufacturing at the work center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container capacity (number of parts)</td>
<td>Preceding work center number</td>
</tr>
<tr>
<td>Stock location number</td>
<td></td>
</tr>
</tbody>
</table>

Production Kanban

<table>
<thead>
<tr>
<th>Part number</th>
<th>Subsequent work center number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container capacity (number of parts)</td>
<td>Stock location number</td>
</tr>
<tr>
<td>Number of kanbans released</td>
<td>Preceding work center number</td>
</tr>
<tr>
<td>Stock location number</td>
<td></td>
</tr>
</tbody>
</table>
Rules for Kanban

- No withdrawal of parts without a kanban
- Subsequent process comes to withdraw only what is needed
- Do not send defective parts to subsequent process
- Preceding process should produce only exact quantity of parts withdrawn by subsequent process

Rules for Kanban (cont’d)

- Smoothing (minimize fluctuations) of production
- Fine tuning of production using kanban
  - Stop process if production requirements decrease
  - Use overtime & improvements in processes if production requirements increase

Other Important Concepts

- Jidoka — warning system to indicate production problems (minor to serious)
- Autonomation — manual or automatic stopping of production if defective part is produced
- Mixed production — make all models at same time on same line
- Work improvement — ideas of workers improve production
Concepts (cont’d)

- Multi-work assignment — workers shifted to other jobs as needed
- Fool-proof methods — various techniques that prevent mis-assembly or other defect causing actions
- Total quality control — no defective part is passed on to next process/operation

Benefits of JIT

- Increased productivity
- Better quality
- Reduced lead time
- Less scrap & rework (less resources)
- Less work in process (WIP)
- Higher worker motivation & more teamwork

Benefits of JIT (cont’d)

- Saved space
- Increased worker & equipment efficiency
- Benefits across functional boundaries (e.g., manufacturing; manufacturing engineering; purchasing; sales & marketing; accounting; quality control; assembly)
Conclusions

- Easy to talk about, difficult to implement
- Problems solved at root cause level
- Doesn’t allow for labor or equipment disruption
- Doesn’t consider market forecasting procedures
- Benefits outweigh challenges