Inventory Management Using Plan, Do, Check, Act

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Session Overview

- PDCA Explained
- Definition and Importance of Inventory Management
- The Plan, Do, Check, Act Cycle Applied to Inventory Management
- Inventory Management Using the Inventory Quality Ratio
- Case study results
- Summary
PDCA Explained

Plan
- Define the desired condition
- Measure the current condition
- Set improvement targets

Do
- Take corrective action

Check
- Track progress to target

Act
- Identify root cause & correct
Defining Inventory Management

- management: The organizational process that includes strategic **planning**, setting objectives, directing resources, deploying the human and financial assets needed to achieve objectives, and **measuring** results.

- inventory management: The branch of business management concerned with planning and controlling inventories.

- aggregate inventory management: Establishing the overall level (dollar value) of inventory desired and implementing controls to achieve this goal.
Why is Inventory Management Important?

- It takes cash – capital – to produce or acquire inventory
- That cash tied up in that inventory is not usable for other parts of the business
  - It is called “working capital”
- Many companies barrow to support their working capital needs
  - A very real “cost” to the business
- Every dollar in inventory reduction leads to a dollar reduction in working capital
  - Saves cost of capital
### Importance of Business Benefits of Supply Chain Management

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Inventory Turns</td>
<td>72%</td>
</tr>
<tr>
<td>Decreased Carrying Costs</td>
<td>67%</td>
</tr>
<tr>
<td>Reduction in Cycle Times</td>
<td>62%</td>
</tr>
<tr>
<td>Improved Fill Rate</td>
<td>59%</td>
</tr>
<tr>
<td>ATP to Customers</td>
<td>58%</td>
</tr>
<tr>
<td>Transportation Costs</td>
<td>49%</td>
</tr>
<tr>
<td>Warehouse Operating Costs</td>
<td>44%</td>
</tr>
<tr>
<td>Reducing Mfg. Overhead</td>
<td>40%</td>
</tr>
<tr>
<td>Plant Utilization</td>
<td>44%</td>
</tr>
<tr>
<td>Manufacturing Cycle Times</td>
<td>43%</td>
</tr>
<tr>
<td>Collaboration</td>
<td>33%</td>
</tr>
</tbody>
</table>

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Why is Getting the Right Level of Inventory Hard?

**Major Reasons**

- We have too much inventory to begin with
- We don’t react to changes in demand soon enough
- Our inventory systems and metrics are backward looking – turns not demand driven
- Our ABC classifications are out of date
- Our order quantities and safety stocks are based on past usage
- We are still planning part quantities, rather than managing inventory dollars
How do you use ABC classes?

2008 Conference Responses

- Not sure what an ABC analysis is: 3%
- Don’t do ABC inventory analysis: 15%
- Use ABC for cycle counting only: 29%
- Use ABC for managing inventory levels (days-on-hand, order quantities, etc.): 21%
- Use for both cycle counting and active inventory management: 33%

Over half use ABCs to manage inventory
### 2008 Conference Responses

- Unit cost: 14%
- Inventory quantities: 12%
- Current inventory dollars: 13%
- Past usage dollars (last 12 months): 36%
- Future demand dollars: 11%
- Other: 10%
- Not sure: 5%

**Only 11% are forward looking**
Inventory Management Using PDCA

**Plan**
- Define the desired amount of inventory
- Measure the current amount of inventory
- Set inventory improvement targets

**Do**
- Take steps to reduce inventory

**Check**
- Track progress to target

**Act**
- Identify root cause of high inventory levels & correct
aggregate inventory management: Establishing the overall level (dollar value) of inventory desired and implementing controls to achieve this goal

- IQR is a metric
  - A more useful method of measuring inventory quality
  - Measures overall inventory performance
  - Measures performance by segment

- IQR is a methodology
  - A comprehensive approach to improving inventory performance
  - Follows PDCA

- IQR is a tool
  - Software to automate the metric & methodology
Inventory Quality Ratio

Metric, Methodology & Tool

- Top-down focus on inventory dollars
- Works with your current systems
- Enhances any MRP/ERP/SCM system
- No additional data entry required
- Gives planners and buyers the information they need to free-up working capital
IQR Inventory Analysis

Value

- 400K
- 300K
- 200K
- 100K

Time

- Usage History
- Today
- Future Demand

GHI DEF A B C

Rule
IQR Inventory Analysis

Rule

E1
A1
A1

Value
400K
300K
200K
100K

Time
-12
-6
-3
Today
1
2
3

Usage History
Future Demand
Inventory Quality Ratio Metric

IQR = \frac{\text{Active Inventory Dollars}}{\text{Total Inventory Dollars}}

Active inventory = \text{Material you need now}

Total inventory = \text{Active inventory plus all the other stuff you have on hand}

Perfect IQR = 100%
IQR Calculation

\[ IQR = \frac{A1 + A2}{A1 + A2 + E1 + E2 + E3 + SM + NM} \]

\[ IQR = \frac{200k + 200k}{200k+200k+100k+300k+200k+100k+300k+200k+200k+100k} \]

\[ IQR = 31\% \]
Measuring Inventory Performance

- Inventory Turns is the traditional measure

Current Inventory

Cost of Goods Sold for the past 12 months
Problems with Traditional Measures

- Inventory turnover ratios produce information that is:
  - Too little, too late, and too distorted
- Turnover calculation is a trailing indicator
  - Based on past sales
- Inventory turns data is aggregate
  - Does little to help track problems to their root causes
- Inventory data is provided on a monthly basis
  - Planners are always reactive

Best practice for Inventory Management:
Data must be provided frequently & at the part number level
Examples of IQR Metric

- Quick Look
- Actionable Information
Example of IQR Metric

- Note that inventory is displayed in the IQR categories in terms of dollars, not pieces
- The IQR metric is 39.2%
Example of IQR Actionable Information

- You want to be able to see IQR in segments that allow you to take action
Actionable Info at the Part Level

- From any IQR category summary you can drill down to the list of parts in the category
IQR Methodology

Plan
- Set Rules
- Quick Look
- Target Setting

Do
- Action Codes

Check
- Performance

Act
- Action Items
- Root Cause Analyses
Examples of IQR Method

Plan
- Set Rules
- Quick Look
- Target Setting

Do
- Action Codes

Check
- Performance

Act
- Action Items
- Root Cause Analyses
Plan – Set the Rules & Targets

- Set a rule in weeks of inventory for each IQR class
  - Rule A: 40
  - Rule B: 12.0
  - Rule C: 24.0

- Plan how much inventory reduction you will make

- Calculate the impact on the bottom line
- Work the parts with the highest excess first
- Drill down to see all the detailed data you need about a part
Do Take Action to Reduce Inventory

- Determine the action you want to take and apply an action code
- Make appropriate comments
Check Progress

- Two types of progress reports, a snapshot and trend chart
Act to Make the Change Permanent

- Identify root cause through Action Items
Act to Make the Change Permanent

- Identify root cause through adjusting planning factors

<table>
<thead>
<tr>
<th>Part Number</th>
<th>F/M</th>
<th>BOH</th>
<th>BOH-V</th>
<th>Safety Stock</th>
<th>Use 1-3</th>
<th>Req 1-3</th>
<th>Safety Stock</th>
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</thead>
<tbody>
<tr>
<td>17080605</td>
<td>D</td>
<td>16</td>
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<td>0</td>
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<td>51</td>
<td>38</td>
<td>0</td>
<td>8.4</td>
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</table>

Safety Stock Greater than 3 months requirements

<table>
<thead>
<tr>
<th>Part Number</th>
<th>P/M</th>
<th>BOH</th>
<th>BOH-V</th>
<th>Min OrdQty</th>
<th>Use 1-3</th>
<th>Req 1-3</th>
<th>Lead Time</th>
<th>Vendor Code</th>
<th>Order Value</th>
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<tbody>
<tr>
<td>93020404</td>
<td>P</td>
<td>0</td>
<td>0</td>
<td>120,000</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>93020403</td>
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<td>93020402</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Minimum order quantity Greater than 3 months requirements

<table>
<thead>
<tr>
<th>Part Number</th>
<th>BOH</th>
<th>BOH-V</th>
<th>OPQ</th>
<th>Req 1-3</th>
<th>Use 1-3</th>
<th>Lead Time</th>
<th>Vendor Code</th>
<th>Order Value</th>
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</thead>
<tbody>
<tr>
<td>17010021</td>
<td>4,601</td>
<td>18.0</td>
<td>5,000</td>
<td>2,220</td>
<td>2,710</td>
<td>2,172</td>
<td>69.9</td>
<td>22.5</td>
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<tr>
<td>17010012</td>
<td>2,220</td>
<td>10.0</td>
<td>5,000</td>
<td>1,670</td>
<td>1,030</td>
<td>119.4</td>
<td>69.9</td>
<td>22.5</td>
</tr>
</tbody>
</table>

Lot size Greater than 3 months requirements
Inventory Quality Ratio

Provides A Dollar Focus
Inventory Quality Ratio

Measures Inventory Performance Based on Future Requirements

Inventory Value

-12 -6 -3 Today 1 2 3

Usage History Time Future Demand

SM SM E2 E2 E3 E3

NM A1 A1 A2 A2 NM

E1 E2 E3

100K 200K 300K 400K
Inventory Quality Ratio

Dynamically Calculates A B C Classes

Inventory Value

Usage History

Time

Future Demand

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First Year Results - Pharmaceutical Company

22% Overall Inventory Reduction & 46% Excess Reduction

Total Inventory by IQR Category

- Active 1
- Active 2
- Excess 1
- Excess 2
- Excess 3
- Slow Moving
- No Moving

First Year Results - Pharmaceutical Company

22% Overall Inventory Reduction & 46% Excess Reduction
Results - Inventory Dollars and IQR

Purchased Parts by Category and IQR Performance

- Inventory Dollars ($1000)
- Inventory Quality Ratio (%)

- Active
- Excess
- SM+NM
- IQR%

Months After Implementation:
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Lucent Technologies & GTE
Inventory Analysis at Any Level

Corporate

Division A

Plant 1 -- Oracle

Business Units

Planning Mgr
Make Parts

Planner A
Planner B
Planner C

Products
Contracts

Plant 2 -- SAP

Materials Director

Finance

Purchasing Mgr
Buy Parts

Buyer D
Buyer E
Buyer F

Suppliers
Commodity

VP Supply Chain

Division A

Inventory Analysis at Any Level

Corporate
Inventory Analysis at Any Level

- Product Team 1
- Product Team 2
- Product Team 3
First Year Results
Electronics Company

18% reduction in 5 months & 32% reduction in 12 months

All Teams Combined – 3/29/2009
Typical Results of Using IQR

- Improve cash flow & capital immediately
- Reduce inventory 20% to 40%
- Increase turns with fewer shortages
- Maximize planner & buyer productivity
- Continuously improve overall inventory performance
IQR Environments

- Manufacturing companies
  - material planners
  - buyers
  - production schedulers
  - operations management
  - financial management
- Distribution and logistics
- Utilities and MRO stores
- Management consultants
Use of IQR is Spreading

- Airtechnics
- Alcatel
- Allergan Medical
- American Capital
- Andrew Corporation
- Armstrong
- ArvinMeritor
- Avery Dennison
- Banner Pharmacaps
- Beckman Coulter
- Binney & Smith
- Black & Decker
- Bosch Corporation
- Boston Scientific
- Bunn-O-Matic Corp
- Carrier Corporation
- Cummins Inc.
- Dana Corporation
- Dialogic - Intel Corp.
- Dow Chemical
- Dr Pepper Snapple
- Eastman Chemical
- Engenio - LSI Logic
- ERICO Incorporated
- Esterline Corporation
- Hendrickson Int’l
- Hope Global
- HunterDouglas
- Hyundai
- Johnson & Johnson
- Kinetic Concepts
- Korry Electronics
- Kohler Companies
- Krebs Engineers
- LuK Automotive
- Motorola
- Nature’s Way
- Newell-Rubbermaid
- Oakley
- Ocean Cuisine
- Pfizer - Pharmacia
- Rheem Manufacturing
- Sanford Corporation
- Schering-Plough
- Schlumberger
- Sikorsky Aircraft
- SP Richards Company
- Telex Communications
- Tighe Industries
- Tyco Electronics
- Unilever Bestfoods
- Valmont Industries
- Vita-Tech International
- Wellman Products
- Wenger Corporation
- Woodward Governor
- Yamaha Corporation
Summary

- Inventory systems are backward looking
- Future demand is better than past usage
- IQR is a metric, a method and a tool
- IQR logic is demand-driven & dollar-focused
- Keys to improving inventory & working capital
  - Plan: Identify excess by segment
  - Plan: Focus on the dollars
  - Do: Prioritize reduction opportunities
  - Check: Monitor and track performance
  - Act: Update MRP inventory settings
- Makes the planner & buyer jobs easier
- Improves turns, cash flow and profits!
Thanks for attending!

Questions?

- Things to think about in any economy
  - Are we being proactive in managing inventory?
  - What are my specific reduction opportunities?
  - How can a dollar focus help me?

- For future questions or information
  - DHowardell@InventoryPerformance.com
  - 626-836-6935