Biographical Summary

Michael C. Moody is currently working for Maximus Arms in Franklin, TN. He has worked for several manufacturing companies, including BAE Systems, Maytag, and Danaher in various supply chain assignments. He is a graduate of East Tennessee State University, certified by APICS and ISM, and a Six Sigma Greenbelt. He served on the APICS board of directors for three years, and is past president of the Nashville APICS chapter.
Key Take-A-Ways

- How to implement a non-traditional cycle counting process
- How to implement improved process flows & inventory check points
- How to out-source receiving & warehousing, and implement milk runs for accuracy

BAE SYSTEMS....A NEW ADVENTURE
Background

- July 2008 - Jan 2010: Director of Inventory, BAE
- BAE Systems, Sealy TX: US Army contract for design/production of trucks, trailers and MRAP’s
- Assembly lines: 4 (chassis, 2 cab, trailer)
- Production rate 18 trucks/day w/ 1-1/2 shifts
- Planned ramp-up to 42/day w/ 2 shifts with new 2-1/2 ton LMTV (Light-Medium Tactical Vehicle) & 5 ton MTV with existing facilities

FMTV - Family of Military Tactical Vehicles

“Soft-skin 2-1/2 ton Cargo Heavy Metal Cab w/ & w/o Ballistic Alum. Plate
Caiman MRAP & FMTV Trailer

MRAP w/ Common MTV (5 ton) Chassis

5 and 10 ton trailers

Truck Variants

- M1078 standard cargo truck
- M1079 shop van configuration
- M1081 standard cargo LVAD, 2.5 ton capacity, air-droppable
- M1083 standard cargo truck, 5 ton payload
- M1084 standard cargo truck, 5 ton payload, with materiel handling equipment (MHE)
- M1085 Long Wheel Base (LWB) truck extended cargo bed
Truck Variants (cont.)

- M1086 Long Wheel Base (LWB) truck w/MHE
- M1087 Expandable Van
- M1088 tractor truck
- M1089 wrecker
- M1090 dump truck
- M1093 Standard Cargo Truck, LVAD, 5 ton capacity, air-droppable (and dump)
- XM140 High Mobility Artillery Rocket System

BAE Inventory Department

- Operations: Director, manager, 5 cycle counters, 2 planners, 2 clerical
- Warehousing/receiving: 6 supervisors, 140 associates
- Receiving hours: 24/7 at 7 docks with 6 shifts
- Inventory value: $100 million+
- SKU’s: 16,000+
Initial Challenge

- Gain/maintain accurate inventory considering:
  - Nearly infinite outside storage locations
  - Minimal control of inventory & transactions
  - Lack of/inconsistent reporting of scrap
  - Off-line operations pilferage for parts
  - In-effective cycle counting process
  - Last physical inventory was 7 years ago
  - Line rates are doubling over next year

Initial Actions

- Hired a warehouse manager + 2 more supervisors
- Process mapped of all inventory movement from receipt (7 docks) to line-side storage
- Reviewed cycle counting process/logic
- Opportunities for inventory toll gates/kanban
- Root cause analysis on stock-outs
- Research Houston market for warehousing
Cycle Counting

• Process/logic flawed so not all parts counted
• Receiving docks not included
• Off-site warehouses not included
• Minimal root cause analysis for shortages
• Line-side counts inconsistent
• 98% accuracy reported was really 85%

A-B-C Count Parameters

• A parts – 90 days  528 parts
  – 65% usage value
• B parts – 120 days  1,434 parts
  – 25% usage value
• C parts – 180 days  14,088 parts
  – 10% usage value
• Total parts counted = 16,050 (218/day)
Improving Inventory Accuracy

- Corrected cycle count table/formulas to pick up all parts to count
- Increased staffing to count by locations, while continuing with cycle counts
- Established performance metrics
- Established inventory check-points to verify inventory prior to line-set & for transactions
- Implemented daily dock “sweeps”

Production Start-Up: New LMTV

- Start-of-production mid-2009
- Phase out of “soft skin” 2-1/2 – 5 ton trucks
- LMTV design issues result in:
  - Re-design on new parts as production continues
  - Assembly problems: parts not fit, or new re-design parts not here
  - Incomplete trucks rolling off assembly line
  - Hiring of contract employees for off-line operation
Impact on Inventory Department

- Excess inventory
- Lack of storage space: racks full, ground full, trailer lot full, outside leased space full
- Blocked several docks to use ramps for parts
- No security on parts stored on ground
- Frequent changes in part # resulting in confusion to material handlers
- Delays in unloading trucks due to no delivery scheduling process/appointments

Out-sourcing of Warehousing

- Off-site inventory sites had grown to 4 due to ramp-up so search made for one single site
- Located site 20 miles away and executed contract with 3PL
- 2 shift operation with our employees initially providing IT/transaction support
- Established pull process with milk runs
- Inventory accuracy improved with consolidation
Physical Inventory

- Planned and conducted inventory during 2 week holiday and maintenance shut-down December 2009
- Hi-Rise storage area with 1,200 locations was largest challenge
  - 24/7 inventory teams to pull, count, replace
  - Rented additional narrow-aisle FL and scissor-lifts
  - Completed on schedule and found long lost parts
- Re-claimed $4 million in lost inventory
- Passed external audit from KPMG

Final Actions

- Develop process maps & work instructions for:
  - Cycle counting
  - Warehouse stocking and picking
  - Shipping
  - Preservation of parts
- Train warehouse personnel on new processes
- Preservation of parts execution using work instructions provided by engineering
Performance Metrics
YTD Cycle Counts

<table>
<thead>
<tr>
<th>Month</th>
<th>Planned</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>3,852</td>
<td>2,847</td>
</tr>
<tr>
<td>April</td>
<td>4,708</td>
<td>4,641</td>
</tr>
<tr>
<td>May</td>
<td>4,503</td>
<td>4,430</td>
</tr>
<tr>
<td>June</td>
<td>4,708</td>
<td>5,403</td>
</tr>
<tr>
<td>July</td>
<td>4,708</td>
<td>3,595</td>
</tr>
</tbody>
</table>

Cycle Count & Inventory Adjustments YTD

<table>
<thead>
<tr>
<th>Month</th>
<th>BY INV</th>
<th>BY Cyc Cnt</th>
<th>NET INV</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$4,133,576.82</td>
<td>($4,302,069.14)</td>
<td>($10.00)</td>
</tr>
<tr>
<td>February</td>
<td>$0.00</td>
<td>($14,246.71)</td>
<td>($8.00)</td>
</tr>
<tr>
<td>March</td>
<td>$911,191.14</td>
<td>($3,216,329.30)</td>
<td>($6.00)</td>
</tr>
<tr>
<td>April</td>
<td>$1,385,003.29</td>
<td>($1,475,416.77)</td>
<td>($4.00)</td>
</tr>
<tr>
<td>May</td>
<td>$1,114,220.02</td>
<td>($5,495,427.75)</td>
<td>($2.00)</td>
</tr>
<tr>
<td>June</td>
<td>$3,452,929.48</td>
<td>($3,609,230.52)</td>
<td>$0.00</td>
</tr>
<tr>
<td>July</td>
<td>$2,939,304.97</td>
<td>($1,413,741.00)</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

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YTD Parts & Dollars Counted

Cumulative Total Dollars and Items

- Dollars Counted: $27,488,976 in January, $47,339,803 in February, $142,574,306 in March, $256,553,265 in April, $403,747,878 in May, $540,815,453 in June, $540,815,453 in July
- Item Counted: 104 in January, 0 in February, 2,847 in March, 7,488 in April, 11,918 in May, 17,321 in June, 21,438 in July

YTD Parts Accuracy

YTD Cycle Count Results - Parts Accuracy

- Expected Accuracy vs. Actual Accuracy over time
YTD Dollars Accuracy

YTD Cycle Count Results - Dollars Accuracy

Expected Accuracy

Actual Accuracy

PCG - All Locations
Daily Cycle Count Results for the Week

Week Ending 4/23/2010
ABC Accuracy

<table>
<thead>
<tr>
<th></th>
<th>MAY</th>
<th>JUNE</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>89.33%</td>
<td>94.37%</td>
<td>94.37%</td>
</tr>
<tr>
<td>B</td>
<td>91.89%</td>
<td>99.53%</td>
<td>95.37%</td>
</tr>
<tr>
<td>C</td>
<td>89.88%</td>
<td>92.17%</td>
<td>92.37%</td>
</tr>
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</table>

Cycle Count Adjustment Codes

<table>
<thead>
<tr>
<th>Cat</th>
<th>Root Cause Type</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Process</td>
<td>Part adjusted out, not in location, found in other bin location</td>
</tr>
<tr>
<td>2</td>
<td>Training</td>
<td>Incorrect part number counted and adjusted in. Need to adjust out</td>
</tr>
<tr>
<td>3</td>
<td>Process</td>
<td>Part pulled for w/o not issued and adjusted out.</td>
</tr>
<tr>
<td>4</td>
<td>Process</td>
<td>Serial number issued to another work order. Adjust back i, issue to work order.</td>
</tr>
<tr>
<td>5</td>
<td>Glover</td>
<td>Customer Return part need to be adjusted back in.</td>
</tr>
<tr>
<td>6</td>
<td>Training</td>
<td>Unit of measure misidentification.</td>
</tr>
<tr>
<td>7</td>
<td>Process</td>
<td>Lot number conversion (wash).</td>
</tr>
<tr>
<td>8</td>
<td>Process</td>
<td>Parts not found. Not in location.</td>
</tr>
</tbody>
</table>
Pareto Root Causes

Inventory Adjustment Reasons

Final Comments

• Ensure your cycle counting process is logical and all parts are being counted
• Implement location (bin) audits if necessary
• Process map your inventory processes to opportunities for improvement
• Consider 3PL’s and off-site when necessary
• Performance metrics for success
Questions?

Thank you,
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Survey

www.tinyurl.com/kmd5irs