5 Steps to Optimized Order Fulfillment

Presented by:
Brian Baker
Regional Business Director
Today’s Session

• Classify Inventory
• Match Inventory to Storage Technology
• Slot Inventory within Storage Technology
• Map Processes and Workflow to Maximize Throughput and Reduce Labor
• Integrate Business Systems to Maximize Visibility
• BONUS - Add Automation to Reduce Cost
1. Classify Inventory

- Classify Your Inventory Into Categories Based on Picking Size (Pallet, Case, Piece) and Velocity (Fast, Medium, Slow)
Categorize Your Inventory

- Categorize Your Inventory By:
  - Size
  - Pick Velocity
  - Pick Count
  - Weight

Whatever Makes Sense For Your Operation!
Determine Storage Method

Pallet Picking
- Pallet Rack
- Bulk Storage

Case Picking
- Flow Rack
- Conveyor
- Horizontal & Vertical Carousels
- Rack & Shelving

Broken Case Picking
- Flow Rack
- Horizontal & Vertical Carousels
- Vertical Lift Modules
- Rack & Shelving
Analyze Your Inventory

Pallets

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Hit Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

- Pallet Rack
- Bulk Storage

Cases

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Hit Per Month</th>
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<td></td>
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</table>

- Flow Rack
- Horizontal Carousels
- Rack & Shelving

Broken Case Eaches

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Hit Per Month</th>
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</thead>
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<tr>
<td></td>
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</tbody>
</table>

- Flow Rack
- Horizontal & Vertical Carousels
- Vertical Lift Modules
- Rack & Shelving
Plot Part Attributes

- **A** Fast Movers
- **B** Medium Movers
- **C** Slow Movers
- **D** Very Slow Movers

Cost To Pick

Part Velocity

Labor Time To Pick Part
Group Parts Together

- **A**: Fast Movers
- **B**: Medium Movers
- **C**: Slow Movers
- **D**: Very Slow Movers

**Cost To Pick**

**Part Velocity**

**Labor Time To Pick Part**
Move Towards Improvement

Cost To Pick

Part Velocity

Labor Time To Pick Part
Pareto Principle (80/20 Rule)

- 80% Of Business Comes From 20% Of Inventory
- What About The Other 80% Of Your Inventory?
Analyze Your Part Categories

- Companies Focus Their Attention On Fast Movers (A)
- Ignoring Slow (C) & Medium (B) Movers- The Largest Part
Medium & Slow Movers

• Look Closer At Slow & Medium Movers
  – How Much Floor Space Do They Require?
  – How Much Labor Do They Require?

• How Can You Make Your Largest Quantity of Inventory More Efficient?
2. Match Inventory Classifications to Storage Technologies

• Match Your Inventory Categories And Classifications To The Best Storage Technologies
Types of Material Handling

- Rack & Shelving
- Drawer Systems
- Pick Modules
- Horizontal Carousels
- Vertical Carousels
- Vertical Lift Modules

Most Operations Require Multiple Storage Mediums To Effectively Store Parts
Prioritize Your Benefits

Accuracy • Inventory Control • Space • Throughput • Productivity/Labor • Ergonomics

Fast Movers
- Throughput
- Space
- Productivity/Labor
- Accuracy
- Inventory Control
- Ergonomics

Medium & Slow Movers
- Space
- Productivity/Labor
- Throughput
- Accuracy
- Inventory Control
- Ergonomics

Very Slow Movers
- Ergonomics
- Accuracy
- Productivity/Labor
- Inventory Control
- Space
- Throughput
**Select The Best Technology**

*Rankings: 5=Best, 3=Better, 1=Good*

<table>
<thead>
<tr>
<th>Features</th>
<th>VLM</th>
<th>Vertical Carousel</th>
<th>Horizontal Carousel</th>
<th>Shelving</th>
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<tbody>
<tr>
<td>Space Footprint</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Throughput</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Productivity</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>1</td>
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<tr>
<td>Accuracy</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Ergonomics</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Expandability</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Parts Need Different Storage

- Inventory Categories Require Different Storage Methods
3. Slot Inventory Within The Storage Technology

• Slot Your Warehouse For Maximum Efficiencies And Storage Capacity
How To Use Slotting

• Slotting Is a Lot Of Work
  – Set Slotting Goals
  – Collect Data
  – Analyze Your Inventory Data
  – Categorize Your Inventory
  – Create a Slotting Plan
Slotting Goals

• Most Common Slotting Goal Is To Reduce Travel Time To Increase Productivity

• Slotting That Is Based On Only One Criteria May Improve That Specific Criteria, But At A Cost
  – Increased Congestion
  – Location Size
  – Longer Replenishment Time
  – Worker Injury
Set Slotting Goals

- Improve Space Utilization
- Minimize Handling of Parts
- Increase Productivity
- Balance Work Flow
- Improve Inventory & Accuracy
- Better Worker Ergonomics
- Minimize Travel Time To Product
- Reduce Search Time
Prioritize Your Slotting Goals

- Improve Space Utilization
- Minimize Handling of Parts
- Increase Productivity
- Balance Work Flow
- Improve Inventory & Accuracy
- Better Worker Ergonomics
- Minimize Travel Time To Product
- Reduce Search Time
Slotting Goals

• Be Sure To Consider Your Constraints
  – Location Capacity
  – Product Size
  – Product Weight
  – Product Groupings/Kitting
  – How The Product Is Accessed (Forktruck, Scissor Lift, Etc)
Collect Inventory Data

- Part Numbers & Descriptions
- Sizes & Weights
- Stock Quantity, Reorder Point & Reorder Quantity
- Part Quantity (Number Of Parts Picked Per Pick)
- Part Hit (Number Of Times A Product Is Picked)
- Parts That Are Used Together Frequently
- How Is The Part Picked
  - Pallets, Cases, Broken Case Eaches
Good Data = Good Results

• Collecting Good Data Is The Largest Challenge
• Ideally, Capture up to a Year of Data
  – Seasonality
  – Average Inventory Growth
Create A Slotting Plan

- Make a Plan to Slot Each SKU In The Proper Equipment Based on Movement
  - Faster Movers Most Accessible Location
  - Slower Movers Least Accessible Locations
Consider Your Constraints

- Location Capacity
  - Will The Quantity Fit Into One Lane? Do You Need Two?

- Product Weight
  - Will The Equipment Hold The Weight Of The Product?
Consider Your Constraints

• Product Size
  – Will The Product Physically Fit Into The Equipment?

• Product Groupings/Kitting
  – Slot Frequently Picked Products Close Together
4. Map Workflow to Maximize Throughput & Reduce Labor

- Map Your Business Processes And Order Workflows To Maximize Throughput And Reduce Labor Costs
Balance Work Flow

- Slot Parts To Ensure Optimum Work Flow
- Eliminate Bottle Necks
- Maximize Dead Zones
Bring Work to Worker

• Look For Places in The Warehouse Where The Worker Must Travel To The Work
• These Are Areas That Can Be Improved With Slotting
• Proper Slotting Brings The Work To The Worker
5. Integrate Business Systems to Maximize Visibility

- Integrate Business Systems To Reduce Paper, Extend Order Cut-off Times And Maximize Visibility To Key Business Owners
BONUS - 6. Add Automation to Reduce Costs

• Reduce Labor Costs By Adding Automation
When To Automate

Customer Demand
Product Mix
SKUs Required
Labor Required
Profit
Labor Required
Why Automate?

**PRODUCTIVITY**
Increase Productivity up to 600% & Save Labor Cost

**SPACE**
Save up to 30% to 65% Square Feet of Floor Space

**THROUGHPUT**
Improve Order Turnover & Lengthen Order Cut Off Times

**ACCURACY**
Reduce Errors with up to 99% Picking Accuracy

**CONTROL**
Improve Inventory & Location Control

**ERGONOMICS**
Significantly Reduce Bending & Reaching
Increased Productivity

Time That Could Be Spent Picking!

Manual Picking
- Receive Instructions
- Travel
- Locate & Recognize

Automated Picking
- Pick
- Wait, Mark & Dispose
## Low Risk Productivity

<table>
<thead>
<tr>
<th>Low Risk Technology</th>
<th>Bag &amp; Tag (lines per hour)</th>
<th>Pick &amp; Toss (lines per hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelving</td>
<td>10 – 35</td>
<td>30 – 75</td>
</tr>
<tr>
<td>Drawers</td>
<td>10 – 35</td>
<td>30 – 50</td>
</tr>
<tr>
<td>Flow Rack</td>
<td>25 – 45</td>
<td>75 – 150</td>
</tr>
<tr>
<td>Pick To Light Rack</td>
<td>35 – 60</td>
<td>95 – 200</td>
</tr>
<tr>
<td>Horizontal Carousels</td>
<td>75 – 200</td>
<td>225 – 750</td>
</tr>
<tr>
<td>Vertical Carousels</td>
<td>50 – 175</td>
<td>150 – 225</td>
</tr>
<tr>
<td>Vertical Lift Modules</td>
<td>50 – 150</td>
<td>125 – 175</td>
</tr>
</tbody>
</table>
Improve Space Utilization

• Match the Part Size to the Location Size
• Use the Right Storage Medium
• Store Parts in Pick Quantities That Make Sense
  – Eaches
  – Cases
  – Pallets
  – Kits
  – Combinations of Above
## Storage Types & “Net Cube”

<table>
<thead>
<tr>
<th>Technology</th>
<th>Wasted Unit Space</th>
<th>Wasted Vertical Height (Based on 20' Ceiling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelving</td>
<td>50 - 70%</td>
<td>70%</td>
</tr>
<tr>
<td>Drawers</td>
<td>40 - 60%</td>
<td>80%</td>
</tr>
<tr>
<td>Flow Rack</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Pick To Light Rack</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Horizontal Carousels</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Vertical Carousels</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Vertical Lift Modules</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Increased Picking Accuracy

Use Light Directed Picking to Reduce Picking Errors
Increased Picking Accuracy

• Increase Picking Accuracy Up To 99.9%
  – Eliminate Costly Wrong Picks
  – Increase Customer Satisfaction
• Reduce Product Shrinkage
• Reduce On Hand Inventory
• Reduced Cycle Counting / Auditing Costs
Picking Accuracy Costs Money

- A 1% Error Rate Can Eat Your Profits:
  - Figure 250 Lines Per Hour
  - 3 SKUs Per Order
  - Eight Hours Per Shift
    - One Shift Per Day
  - Equals 6,000 Picked Items
  - 1% Equals 60 Wrong Picks
  - @ $100 Cost Per Wrong Shipment

$6,000 Per Day!!!!!!!
Manual Picking and Ergonomics

- Reaching
- Lifting
- Bending
Automated Picking and Ergonomics
Reduce or Eliminate Ergonomic Issues

- Reduce Lifting Requirements
- Reduce Back Injuries
- Eliminate the Need for Ladders
- Help Avoid the Average $100,000 Claim
- Reduce Fatigue from Walking

Create Ergonomic Pick Zones Using Software Control
REAL WORLD CASE STUDIES
Mazak

- **Application**
  - Spare Parts Distribution To End Users

- **Equipment**
  - 17 VLMs Grouped In 4 Pick & Pass Workstations Integrated With Picking Software

- **Benefits**
  - Increased Productivity by 80%
  - Reduced Labor Requirements By 44%
  - Increased On Hand Part Inventory By 95%
American Crane & Tractor Company

- **Application**
  - Distribution of Aftermarket Crane & Tractor Parts

- **Equipment**
  - Two Pods Of Three Horizontal Carousels, Stacked with Picking Software & Pick-to-Light

- **Benefits**
  - Doubled Efficiencies
  - Increased Picking Accuracy
  - Improved Customer Order Turn Around Time
Mark Andy

• Application
  – Point of Use Storage for Manufacturing Parts

• Equipment
  – Two Horizontal Carousels and Three VLMs Integrated with picking software

• Benefits
  – Reclaimed 1,600 sq ft to Expand Production
  – Increased Parts Inventory by 40%
  – Maintained Productivity & Accuracy Rates
THANK YOU
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