PROMAT 2015

McCormick Place South | Chicago
March 23-26, 2015
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6 Steps to Optimizing Order Fulfillment

Sponsored by:

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Presented by:
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Today's session

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

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1. Classify Inventory

- Classify Your Inventory Into Categories Based On Picking Size (Pallet, Case, Piece) And Velocity (Fast, Medium, Slow)

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Categorize Your Inventory

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

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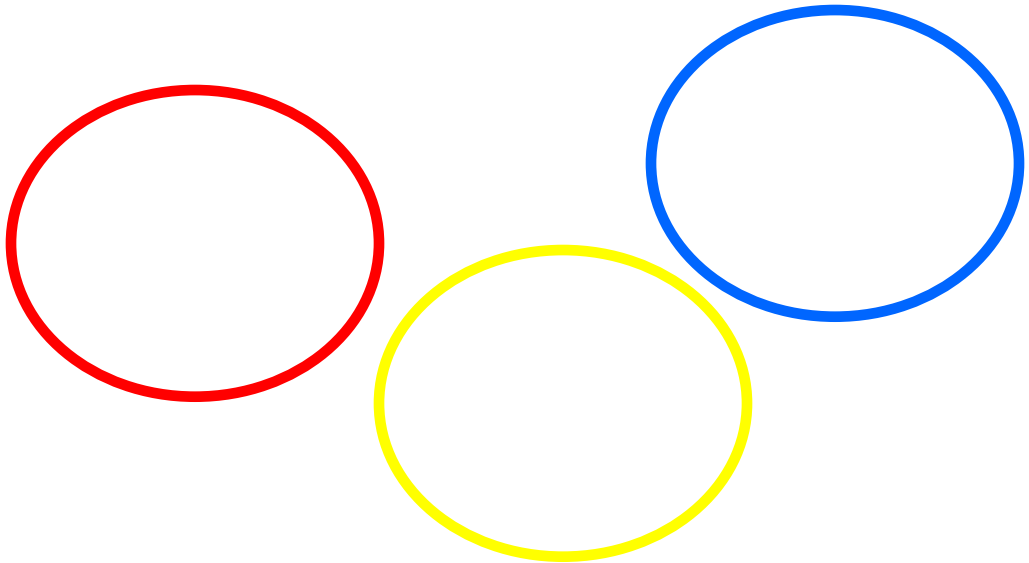
Whatever Makes Sense
For Your Operation!



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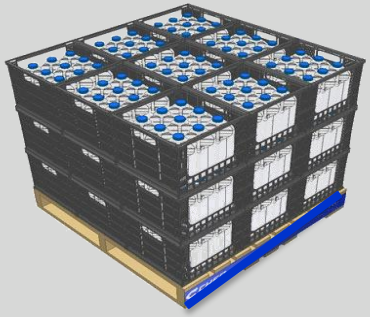
Determine Storage Method

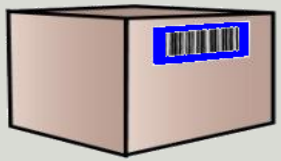
Pallet Picking

- 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

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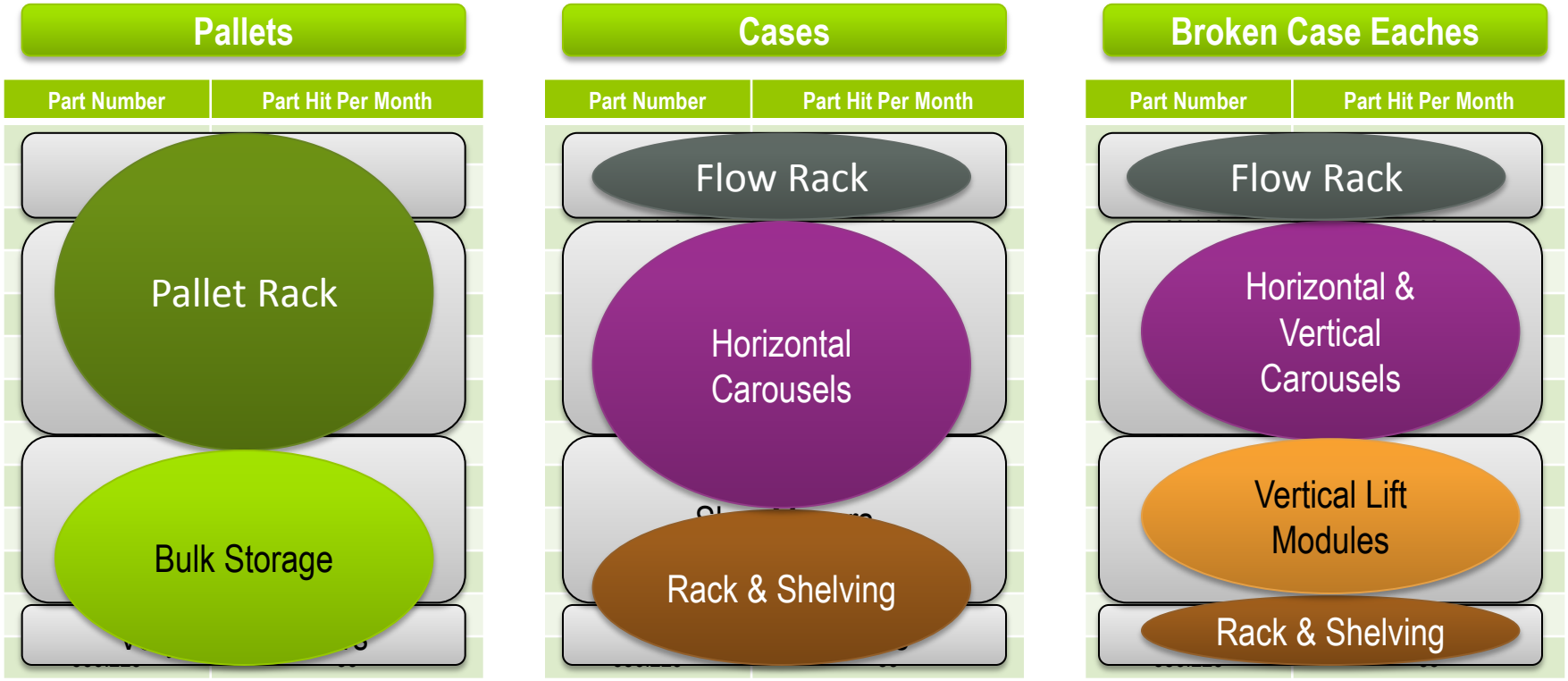
Analyze Your Inventory



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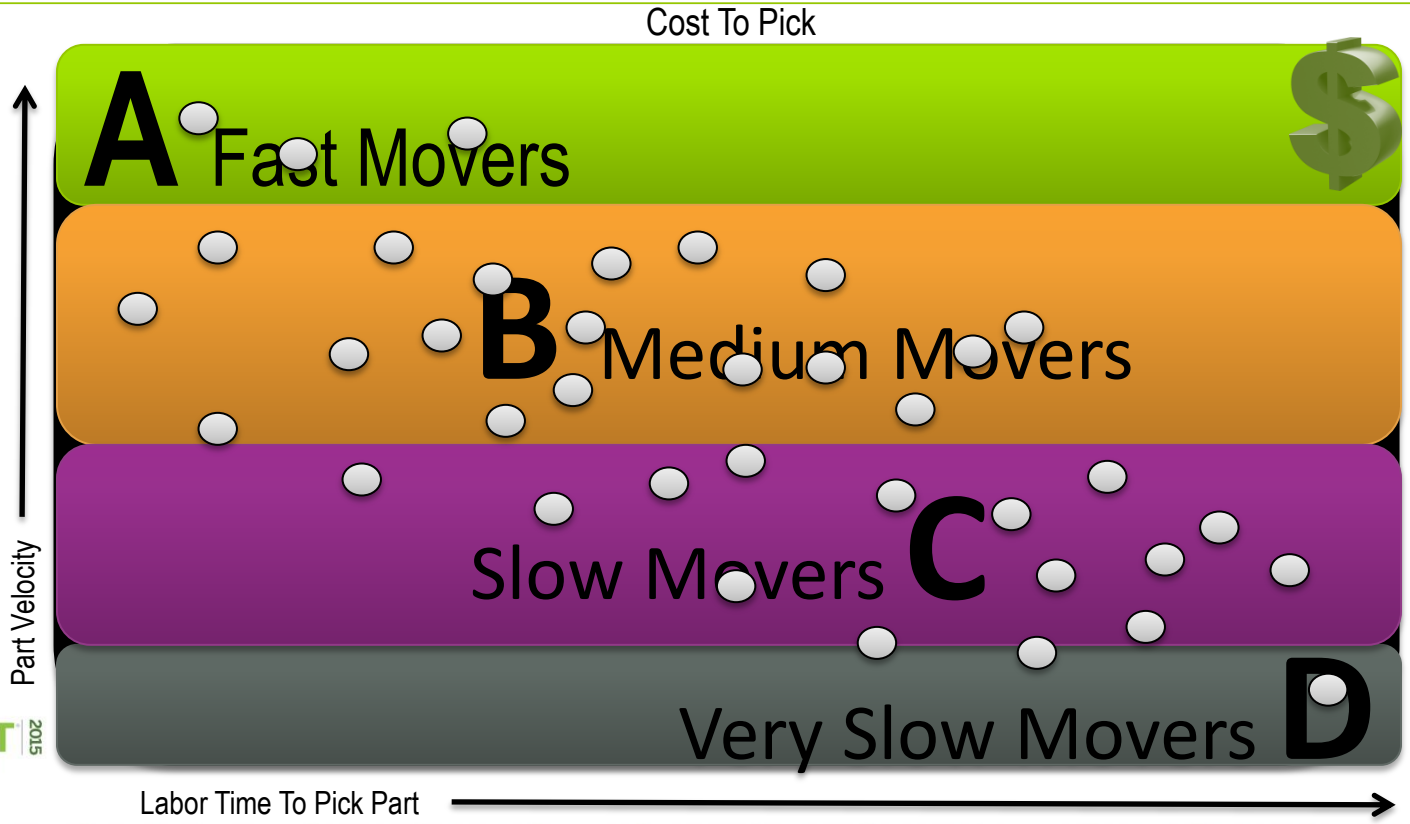
Plot Part Attributes



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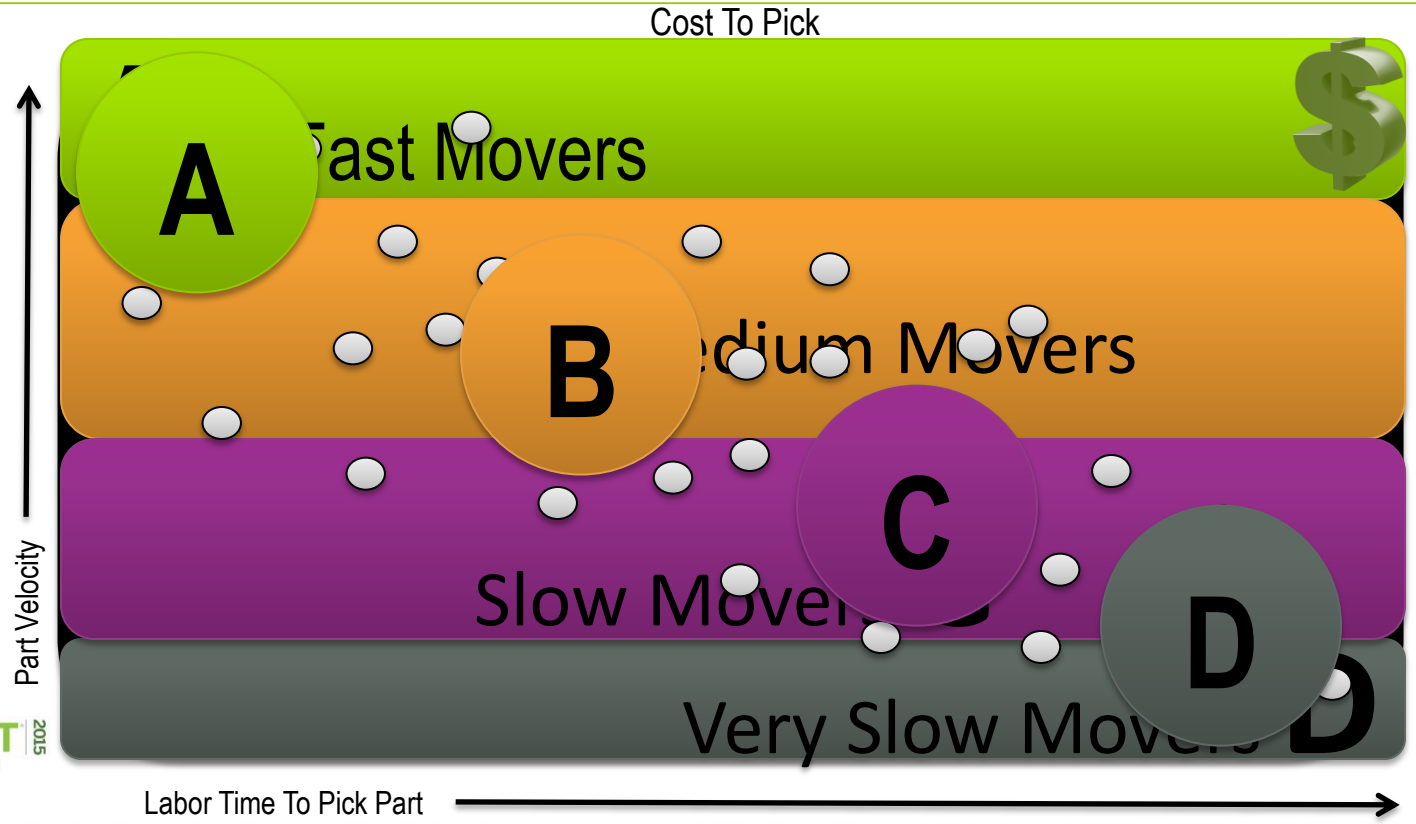
Group Parts Together



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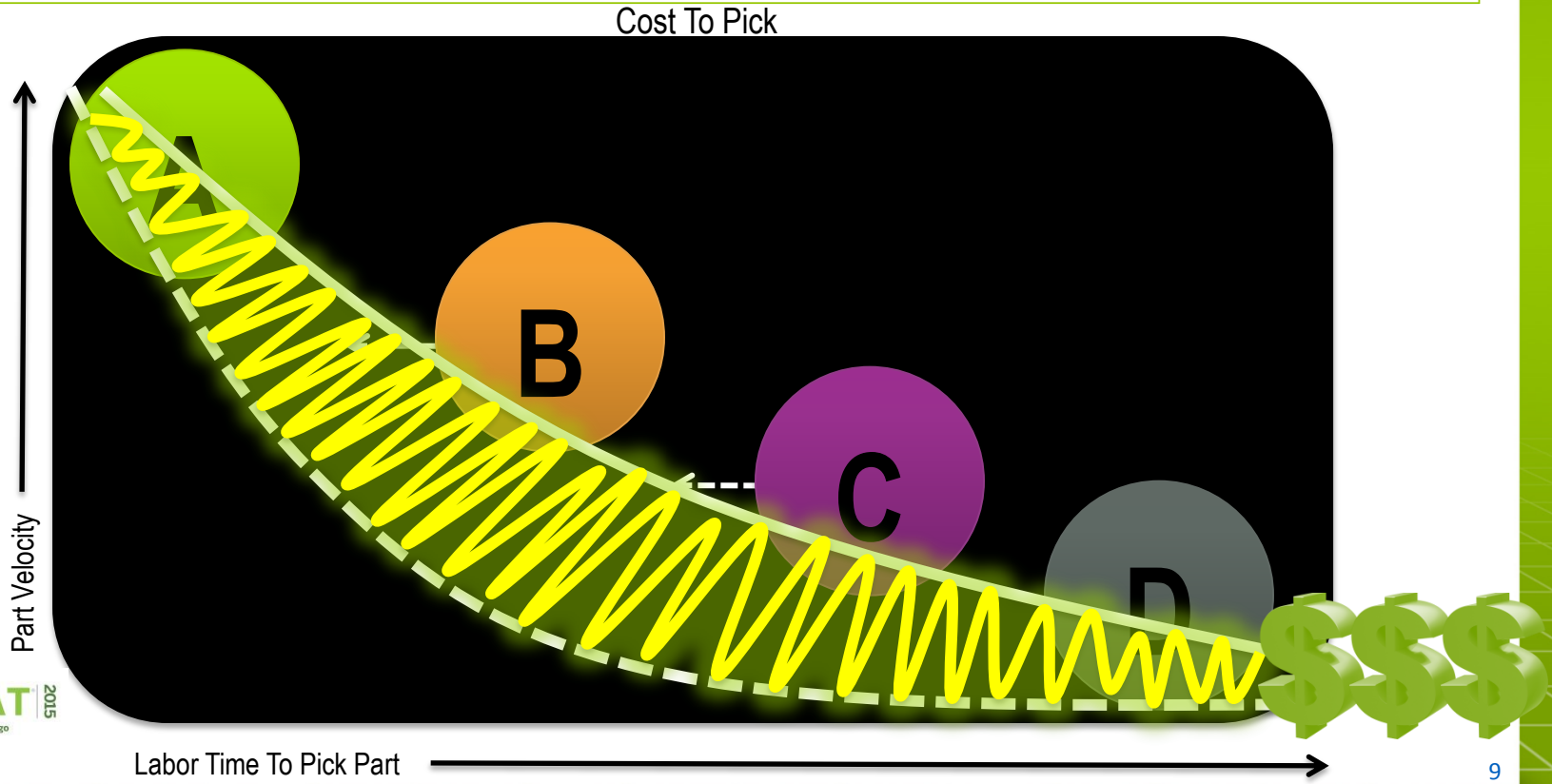
Move Towards Improvement



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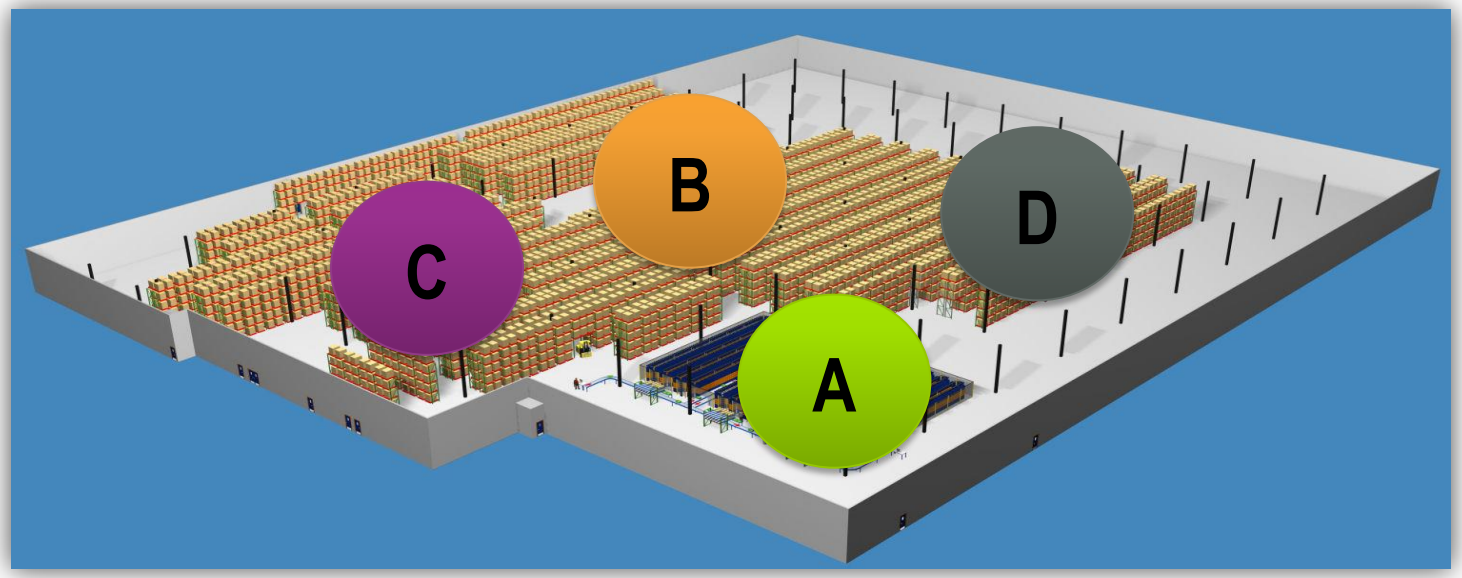
Pareto Principle (80/20 Rule)

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



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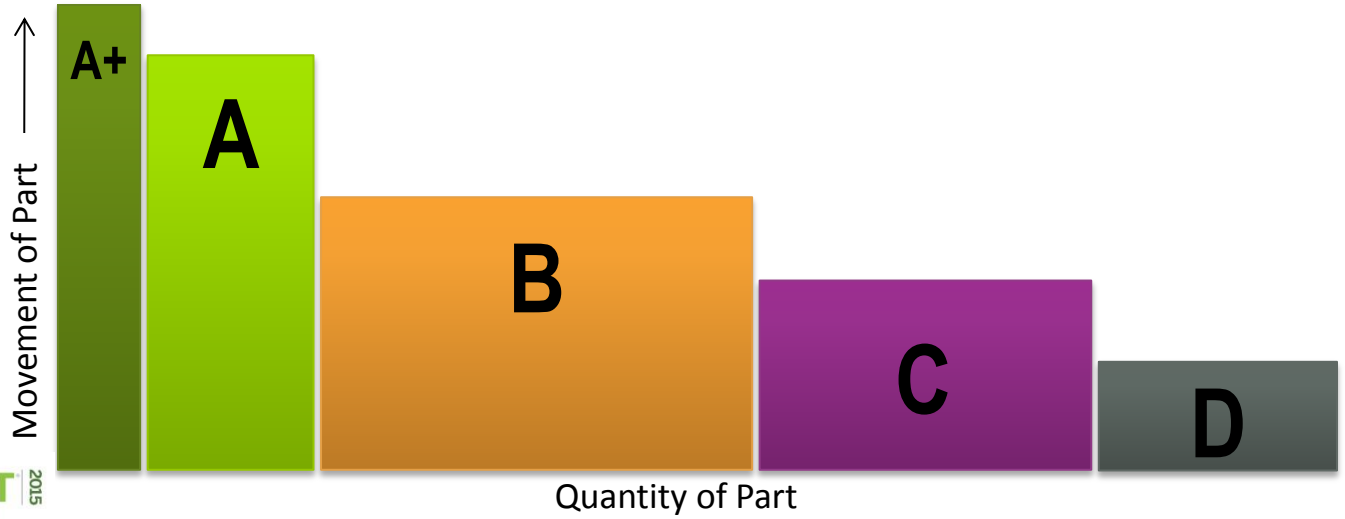
Analyze Your Part Categories

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



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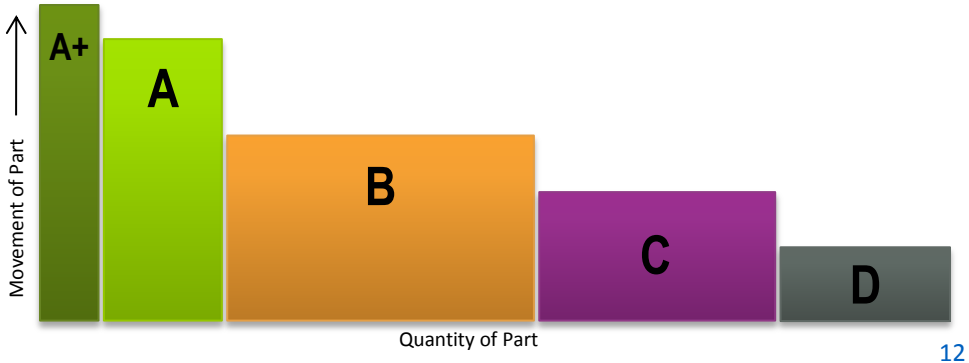
Medium & Slow Movers

- 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?



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2. Match Inventory Classifications to Storage Technologies

- Match Your Inventory Categories And Classifications To The Best Storage Technologies

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Types of Material Handling

Rack & Shelving

Drawer Systems

Pick Modules

Most Operations Require Multiple Storage Mediums To Effectively Store Parts

Horizontal Carousels

Vertical Carousels

Vertical Lift Modules

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Prioritize Your Benefits

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

Fast Movers	Medium & Slow Movers	Very Slow Movers
Throughput	**Space**	**Ergonomics**
Space	**Productivity/Labor**	**Accuracy**
Productivity/Labor	**Throughput**	**Productivity/Labor**
Accuracy	**Accuracy**	**Inventory Control**
Inventory Control	**Inventory Control**	**Space**
Ergonomics	**Ergonomics**	**Throughput**

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Select The Best Technology

Features	VLM	Vertical Carousel	Horizontal Carousel	Shelving
Space Footprint	5	5	4	1
Throughput	4	3	5	1
Productivity	4	3	5	1
Accuracy	5	4	5	2
Control	4	4	3	1
Ergonomics	5	5	4	1
Expandability	4	2	4	5

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

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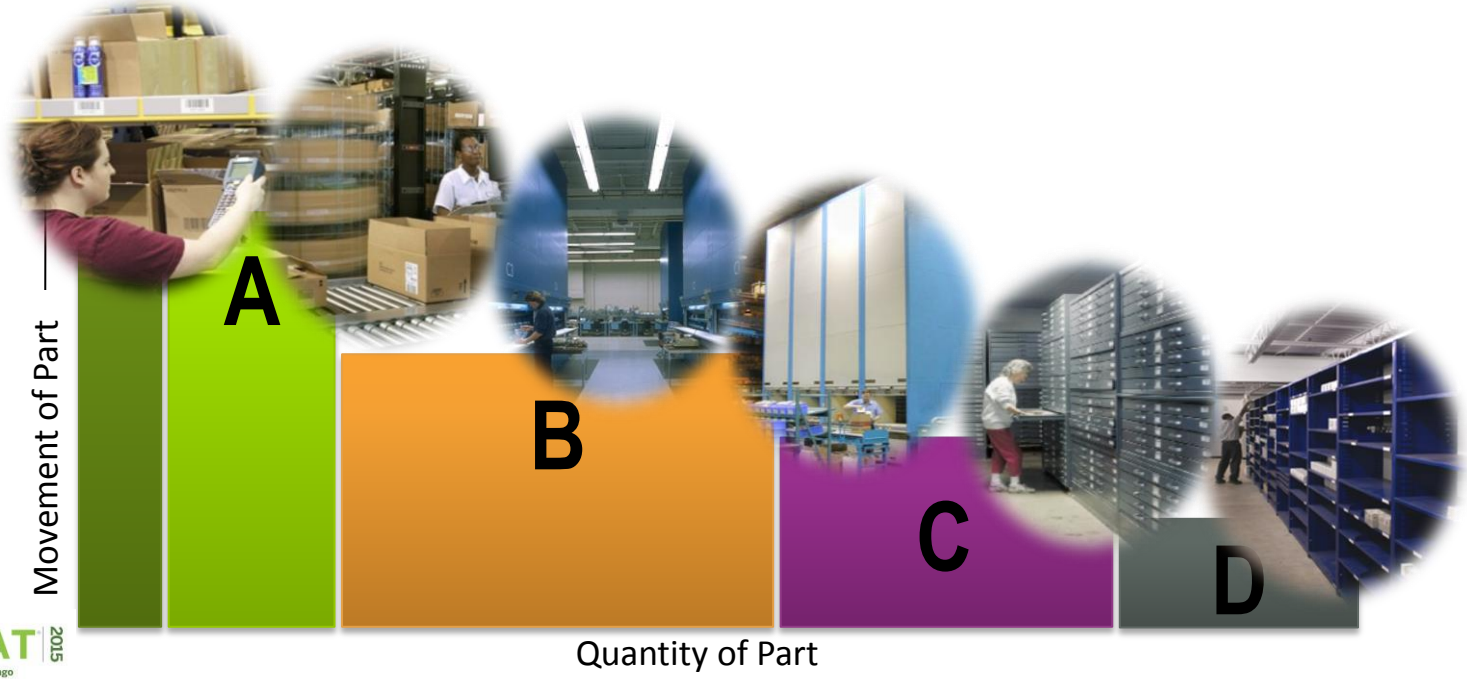
Parts Need Different Storage

- Inventory Categories Require Different Storage Methods



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3. Slot Inventory Within The Storage Technology

- Slot Your Warehouse For Maximum Efficiencies And Storage Capacity

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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

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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

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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

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Prioritize Your Slotting Goals

- Improve Space Utilization
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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)

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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

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Good Data = Good Results

- Collecting Good Data Is The Largest Challenge
- Ideally, Capture up to a Year of Data
  - Seasonality
  - Average Inventory Growth

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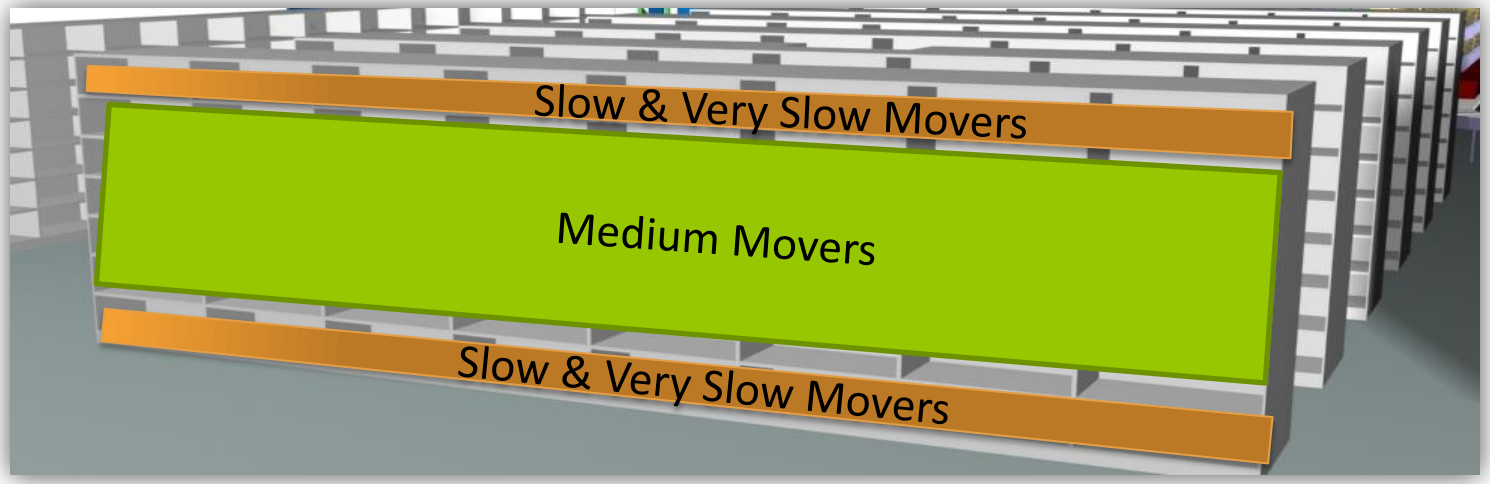
Create A Slotting Plan

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



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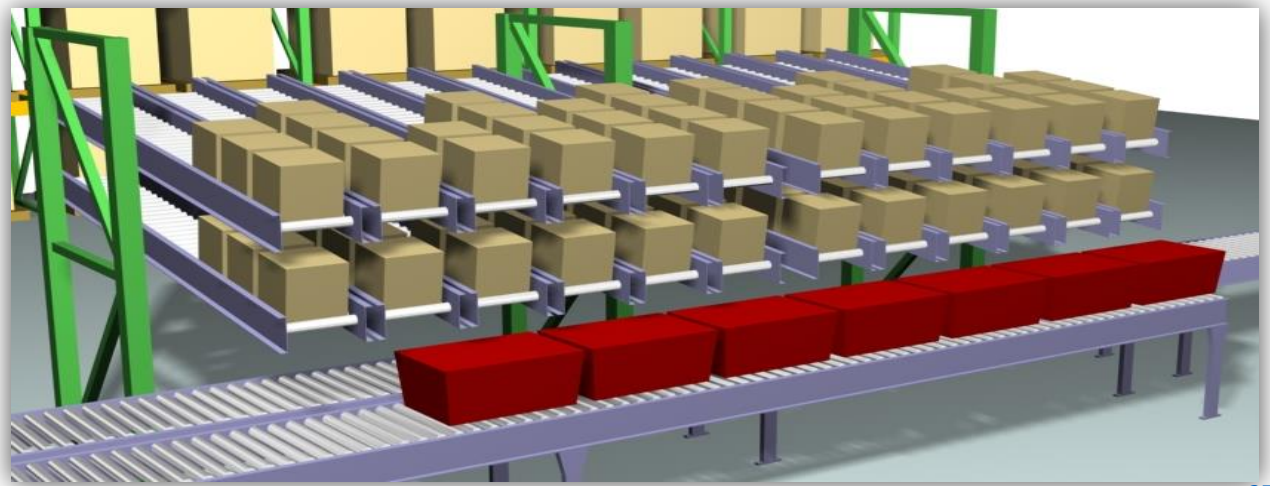
Consider Your Constraints

- Location Capacity
  - Will The Quantity Fit Into One Lane? Do You Need Two?
- Product Weight
  - Will The Equipment Hold The Weight Of The Product?



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Consider Your Constraints

- Product Size
  - Will The Product Physically Fit Into The Equipment?
- Product Groupings/Kitting
  - Slot Frequently Picked Products Close Together

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4. Map Workflow to Maximize Throughput & Reduce Labor

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

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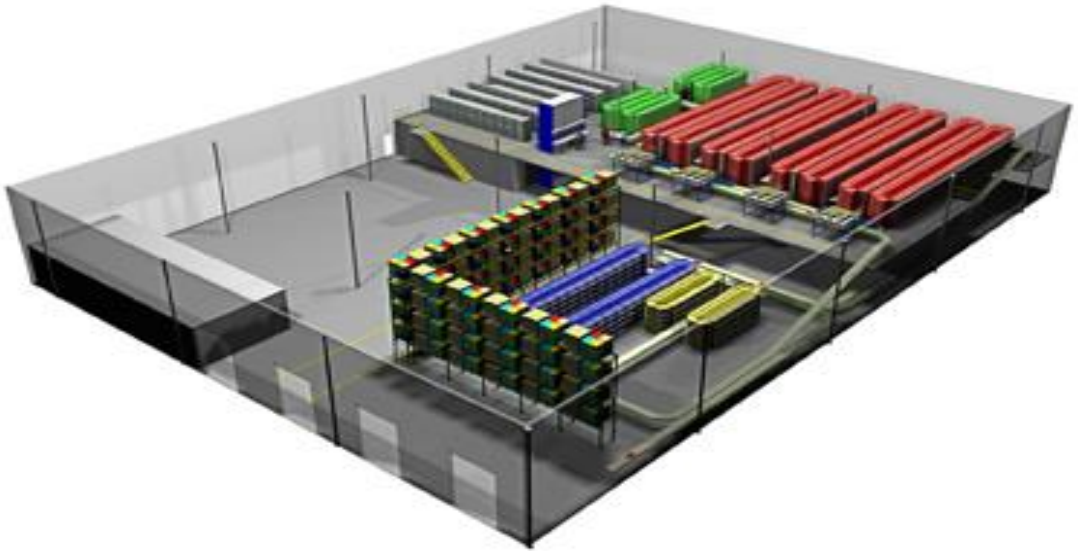
Balance Work Flow

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



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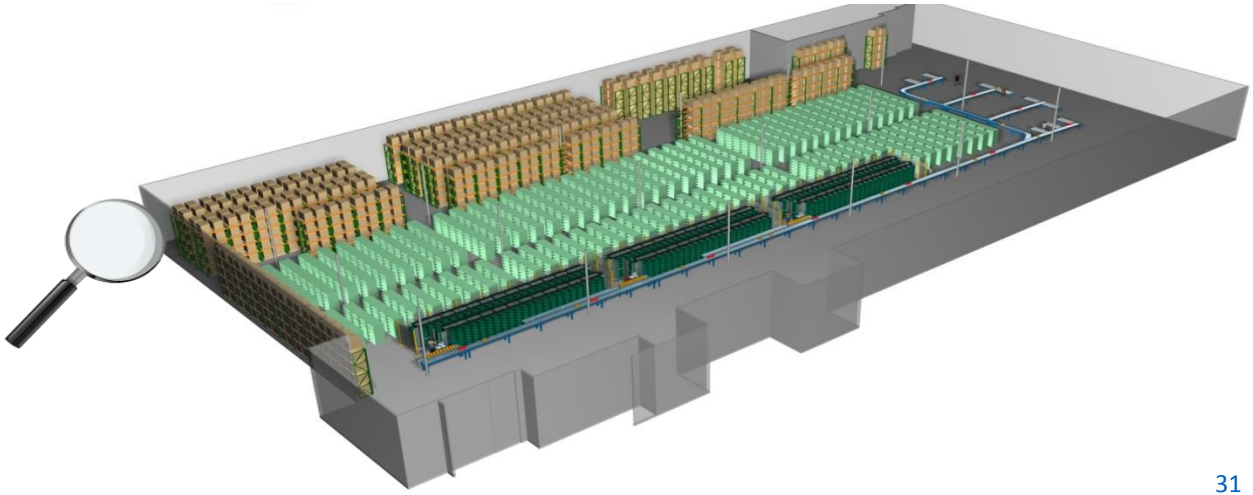
Bring Work to Worker

- 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



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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

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6. Add Automation to Reduce Costs

- Reduce Labor Costs By Adding Automation

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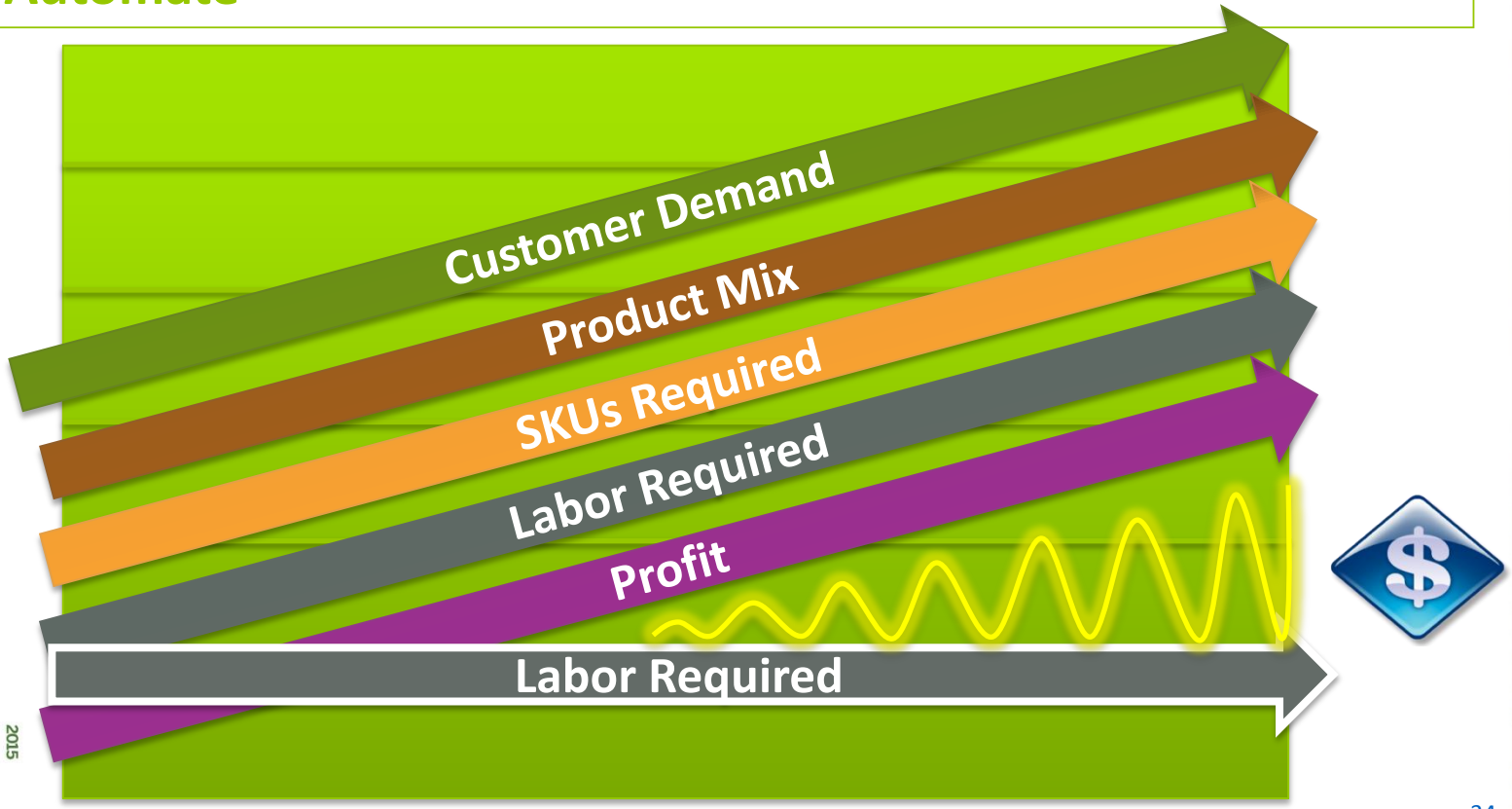
When To Automate



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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

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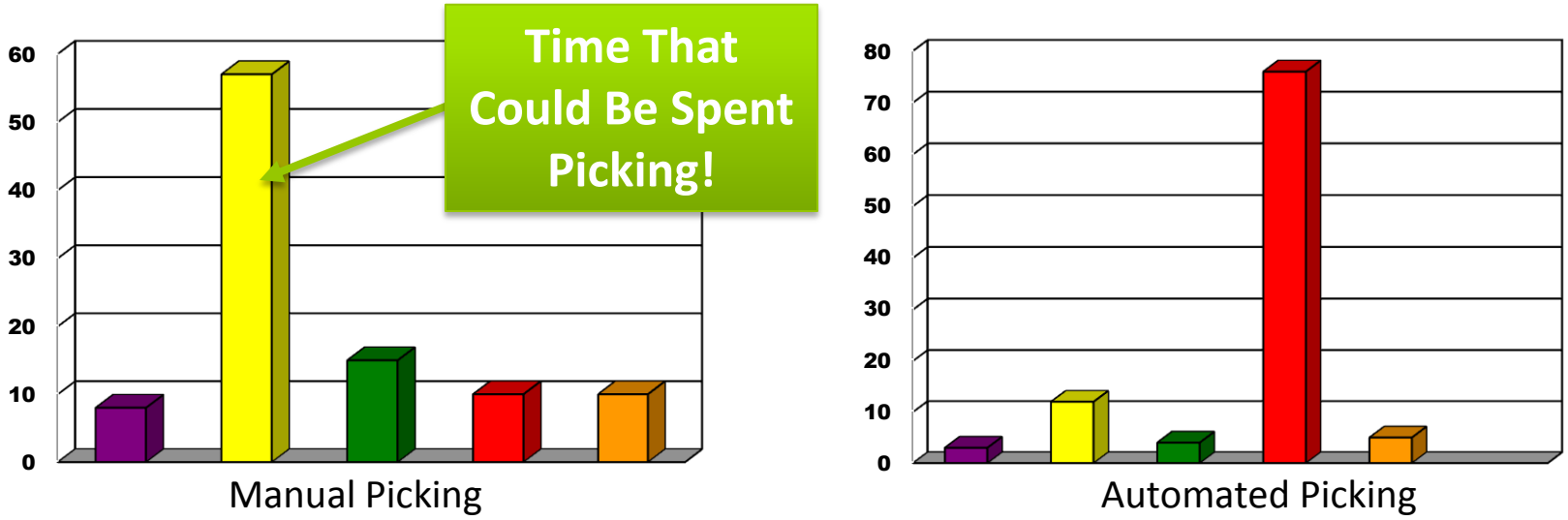
Increased Productivity



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Low Risk Productivity

Low Risk Technology	Bag & Tag (lines per hour)	Pick & Toss (lines per hour)
Shelving	10 – 35	30 – 75
Drawers	10 – 35	30 – 50
Flow Rack	25 – 45	75 – 150
Pick To Light Rack	35 – 60	95 – 200
Horizontal Carousels	75 – 200	225 – 750
Vertical Carousels	50 – 175	150 – 225
Vertical Lift Modules	50 – 150	125 – 175

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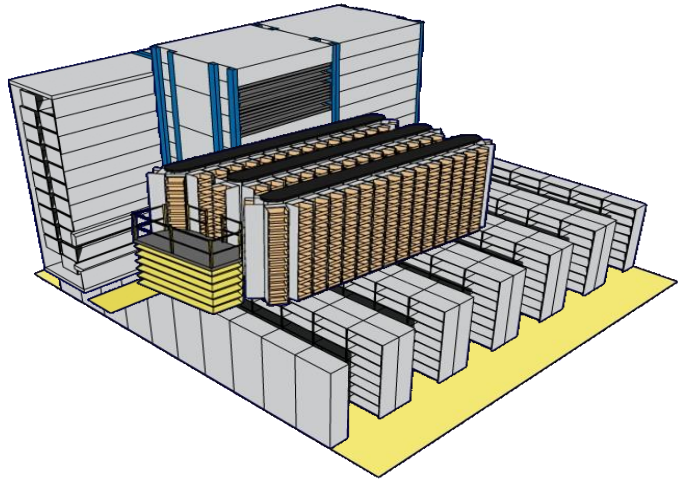
Improve Space Utilization

- 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
  - Interpaks
  - Combinations of Above



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Storage Types & "Net Cube"

Technology	Wasted Unit Space	Wasted Vertical Height (Based on 20' Ceiling)
Shelving	50 - 70%	70%
Drawers	40 - 60%	80%
Flow Rack	60%	70%
Pick To Light Rack	60%	70%
Horizontal Carousels	25%	30%
Vertical Carousels	20%	10%
Vertical Lift Modules	10%	10%

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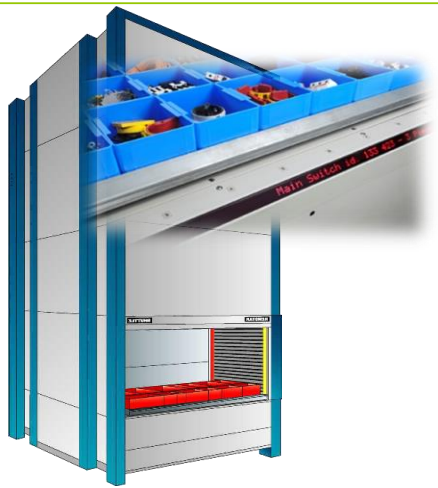
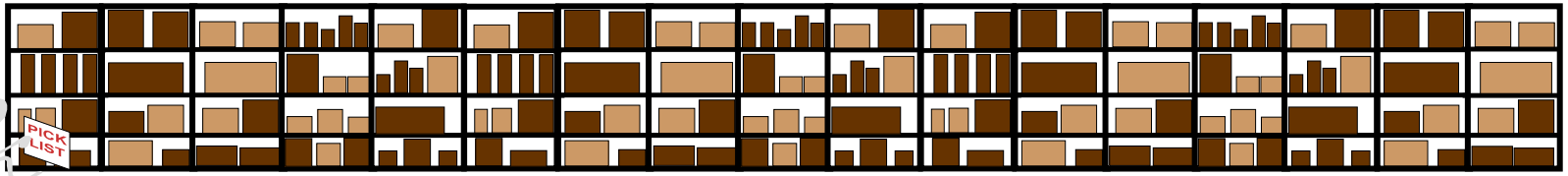
Increased Picking Accuracy



Use Light Directed Picking to Reduce Picking Errors



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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

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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!!!!!!!

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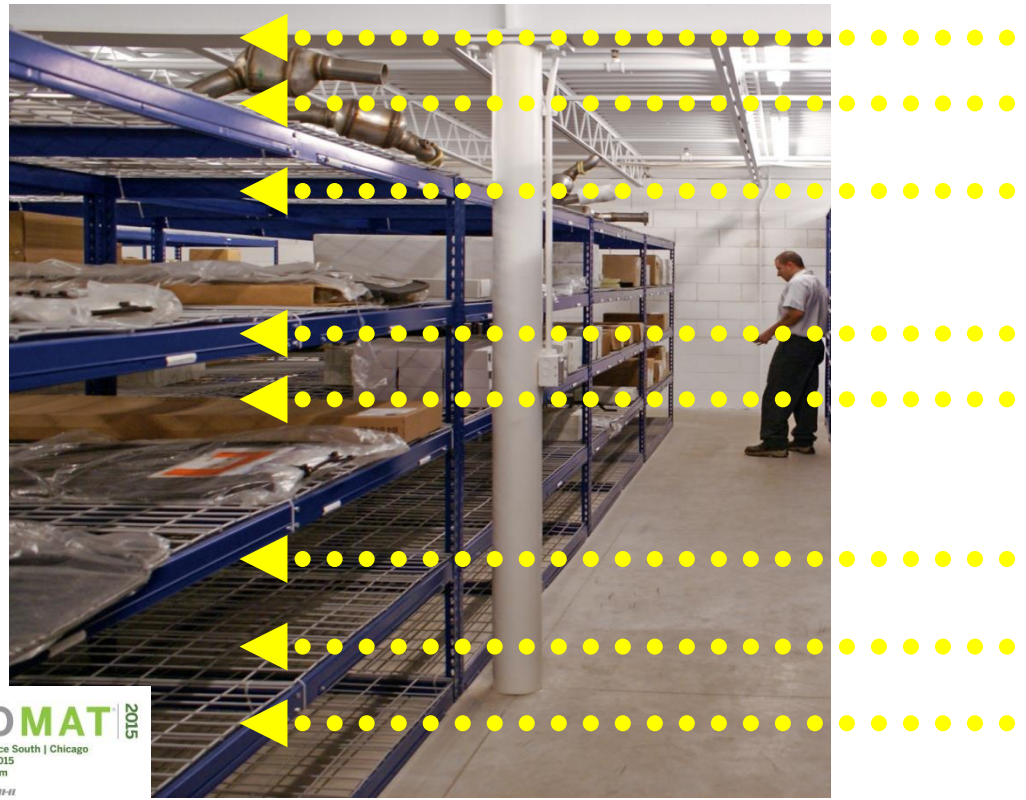
Manual Picking and Ergonomics



Reaching

Lifting

Bending

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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

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Real World Case Studies

Florence, KY

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%

Kansas City, KS

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

St. Louis, MO

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

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Thank You

For More Information:

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