

**2007 Northeast Supply Chain Conference and Educational Exhibition**  
presents  
**Turn your Distribution Center into a Supply Chain Asset**  
Sam Flanders, President  
2wmc.com Consulting Group, Inc.  
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**How the Supply Chain Affects Your Distribution Center**

- **Customers**
- **Suppliers**
- **Managing Space for Materials**
- **Creating Sound Material Flow**
- **Information Management**
- **Systems and Technology**
- **Inbound Deliveries**
- **Outbound Shipments**

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**Are You Best Serving Your Customer?**

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Are You Meeting Your Customer's Expectations?

• **How do you compare to the competition?**

- Customer Service
- Order to Delivery Time
- Shipping Fees
- In stock order performance
- Shipment Accuracy
- Order Delivered in Perfect Condition
- Order Billed as Expected

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Turn Suppliers Into Motivated Partners

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Supply Chain Partner's

**A good supplier will work with you, to understand and help improve the efficiency of your distribution operation.**

**Partners should work hard to earn and then keep your business every day.**

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### How Good are your Key Suppliers?

- **Is Your Current Supplier**
  - Competitively Priced?
  - Able to Deliver on Time and Reliably?
  - Deliver with a Reasonable Lead Time?
  - Provide Material in the Format Expected?
  - Deliver Items Free of Damage / Right Quantity?
  - Able to Respond Promptly to Unusual Demand?
- **Will they work hard to improve in areas where they are less than perfect?**

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### Is an Alternate Supplier Available?

- **Suggestion: Create a supplier bench**
- **By Having more than One Supplier you can:**
  - Maintain competitive atmosphere
  - Ask for improvements in delivery or lead times
  - Optimize delivery frequency or quantities
  - Have an alternate supplier during unexpected supply disruptions
  - Ask for and get specific service enhancements, because you have someone else to turn to

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
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### Supplier Service Enhancement Examples

- **Internet Based Data Exchange** 
- **Require Standardized Pallet and Box Labeling** 
- **Changes to Packaging or Delivery Format**
- **Work to Schedule your Receipts** 

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## Keep a Vendor Scorecard

- **Evaluate all Suppliers:**
  - On-Time Delivery
  - Delivery within Appointment Window
  - Delivered with Expected Labeling and Paperwork
  - No Quality Problems
  - Quantities as Expected
- **Have receiver fill out a “Score Card”**
- **Track and Follow up on Problems**
- **Use History of Performance when Negotiating future relationship**



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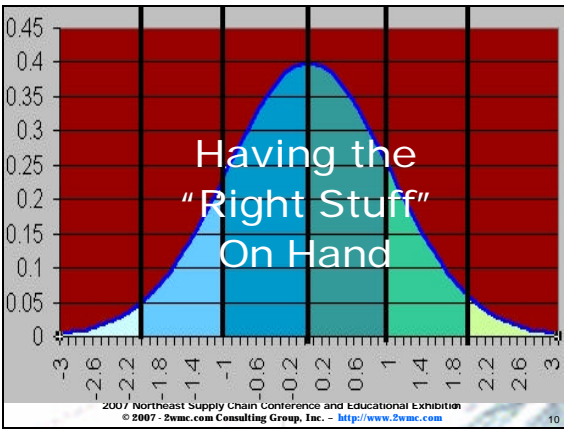
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## Do You Have the Right Products?

DC = Supply Chain Profit Center

- **Are You Keeping your Fastest Movers in Stock at all Times?**
- **Have you analyzed your current product movement characteristics?**
- **Do some items cost more to warehouse than they are worth?**
- **Would that same space be better used for**
  - Higher Profit Margin Items?
  - More Popular Items?

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**Having the "Right Stuff"  
What's Important  
From a Supply Chain Perspective**

- **Have reliable suppliers**
- **Have the right amount on hand**
- **Have accurate counts**
- **Plan for Storage for Peaks**
- **Calculate On-Hand Requirements based on Individual Product Demand Variability**

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**Having the "Right Stuff"  
Costs Associated with Inventory**

- **Storing Inventory is not "Free":**
  - Carrying Cost (interest)
  - Labor to receive / store / count / move
  - Rent for place to store
  - Insurance and Taxes
  - Shrinkage (Loss and/or Damage)
  - Obsolescence
- **More Materials / Longer Storage Times -> Greater Risk and Higher Expenses**

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**Inventory Strategies  
ABCD Categorization**

**Profile your SKUs (ABCD) fast, med, slow, dead**

- **A movers – top 5%**
- **B movers – top 5-20%**
- **C movers – the rest minus D**
- **D movers – "Dogs/Dead" - the things that are requested only a couple times a year**

**Do you know your "A" Movers?**

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**Inventory Strategies**  
**Optimal On Hand Levels**

**How much do you keep on hand?**

- **A Movers** – 1 day – 2 weeks
- **B Movers** – 1 week – 1 month
- **C Movers** – 3 weeks – 3 months
- **D Movers** – 3 months - ?? (or delete)

**Particularly for your “A” Movers:**

- a) Consider Supplier Reliability
- b) Consider Order to Delivery Time
- c) Want an economical shipping quantity

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**More Accurate Forecasting**

**“Best Practice In Inventory Management”**  
**- Tony Wild**

- Mean Average Deviation (10x better)
- Standard Deviation (13x better)
- Smoothed Forecast Models (15+x better)
- Adjustments for Seasonality

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**Just in Time**  
**Risks and Rewards**

- **Delay Receipt of Stock Until You Have Orders**
- **Receive Raw Materials and Ship Finished Goods on the Same Day**
- **Potential Pitfalls**
  - Flight Delay → Unhappy Customer
  - Supply Chain Interruption → You are Out of Business *(unless you have a back up supplier)*

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## Equipment Flow Suggestions

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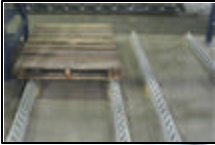
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### Improve Picking Efficiency and Sequencing of Product Flow

- **Flow rack can help with medium to fast each pick items**
- **Pallet flow can help with your fastest each pick items**

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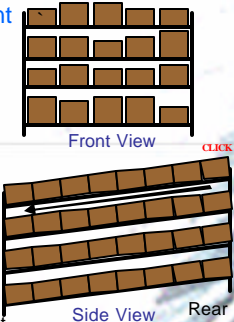
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### Pick Face Improvements Flow Rack

- Load the back – pick the front
- One Box per SKU at front
- All Product Delivered **Automatically** to Front
- Always Ergonomic Presentation
- Very dense presentation
- Good on-hand capacities
- Automatic replenishment
- Insured FIFO



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## Flow Rack and Pallet Flow

- **Both Systems**
  - Let you Pick in FIFO Sequence
  - Automatically Replenish Empty Case/Pallet
  - Provide Visual Cue for Replenishment
  - Provide a “buffer”, to give time to replenish location
  - Create an efficient and dense picking area

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## Pick Face Improvements Flow Rack Video Example



**Gravity Flow  
Rack Applications**  
Video Courtesy of:  
**Kingway  
and  
DCS**

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## Pallet Flow Use for High Cube Movers

- **Easy to Replenish** – drop new pallet in back
- **Gravity Feed** – Next pallet flows automatically
- **Two Aisles** – Just like flowrack – fill and pick aisles

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# Facility Flow Concepts

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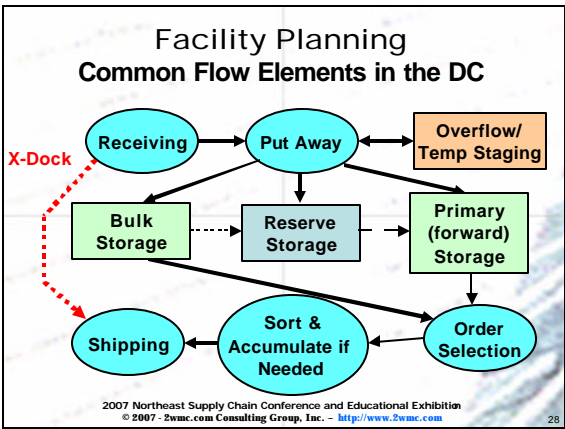
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## Material Flow Mapping/Changing your Flow

- **Create a Flow Diagram**
  - Use block areas and arrows
  - "Big" arrows represent heavy movement
- **Identify inefficient flow patterns**
- **Consider alternate flow patterns**
  - When considering alternatives – think about practicality of changes
  - Heavy Movement should be near dock
  - Slow movement can be away or up
  - Can you use areas above the floor?
- **Always strive to move materials in a linear and sequential manner**

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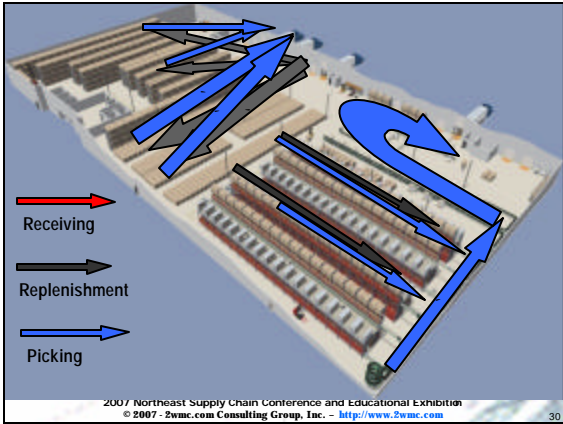
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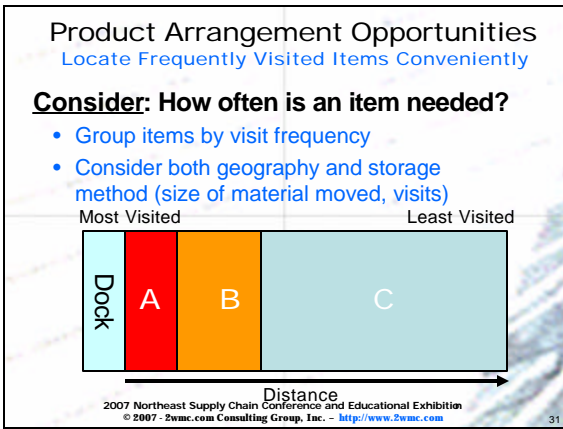
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## Supply Chain Alternatives to Traditional Distribution Strategies

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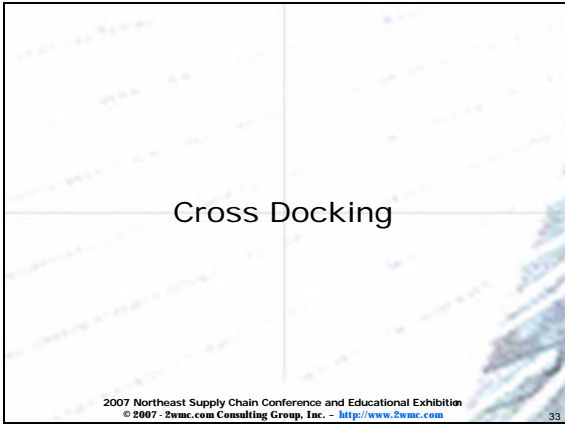
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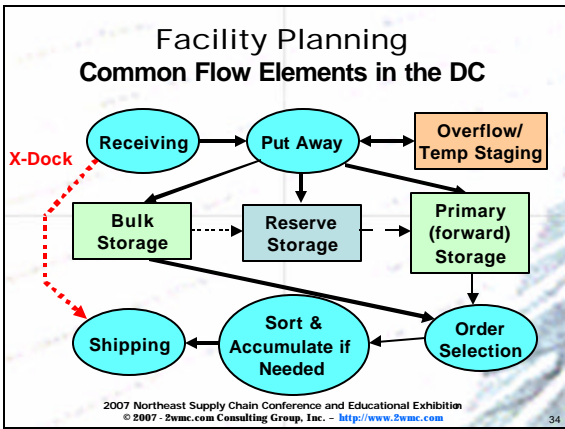
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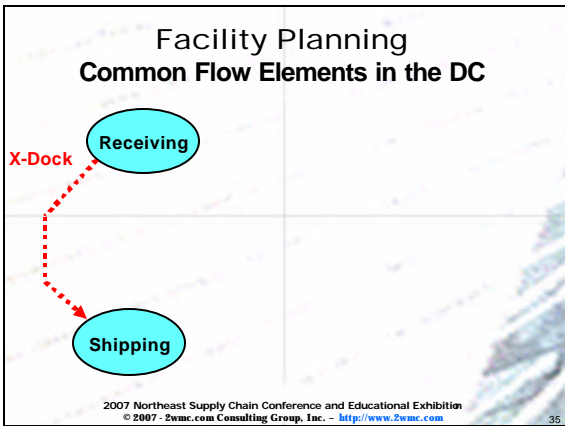
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## Cross Docking

- Consider cross docking fast moving items daily
- Also consider cross-docking or drop shipping (from another facility) items that are seldom requested
- **Avoid having to:**
  - Put Away Receipts
  - Count Items / Manage Damage
  - Manage Obsolescence
  - Replenish Items or Pick Items



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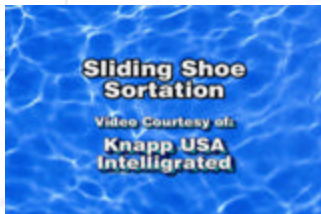
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## Cross Docking Cases Using a Sorter

- Load to conveyor/ sorter from inbound trucks
- Scan cases and sort to outbound truck lanes
- Two touches: one to unload and one to load
- No put away, counting, or replenishment



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## Other Cross Docking Examples

### Fast Moving Items

- Internet Grocer – Daily Baked Goods
- Backordered Items
- Seasonal Items (ex show shovels)

### Slow Moving Items

- Receive and Ship Non-Stock Slower Moving Items (from another supplier)
- Items that required special assembly or manufacturing

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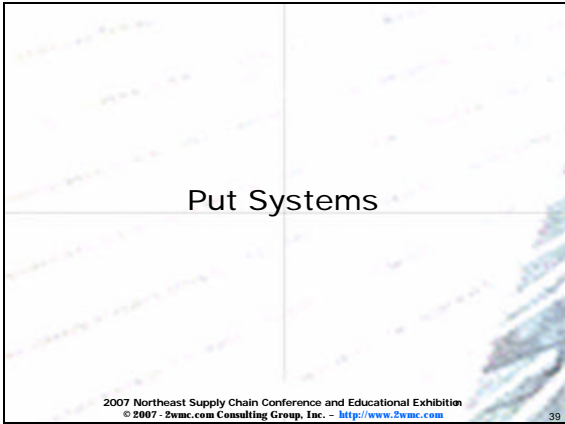
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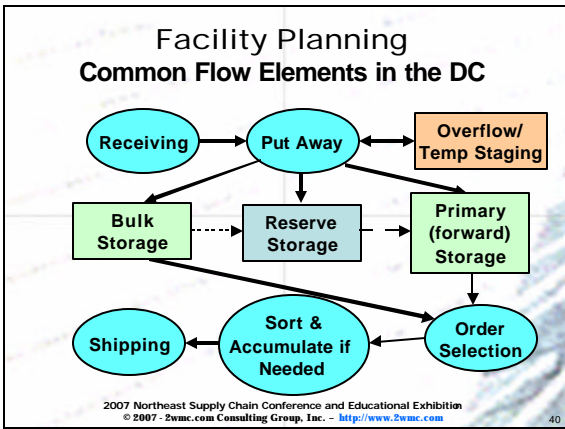
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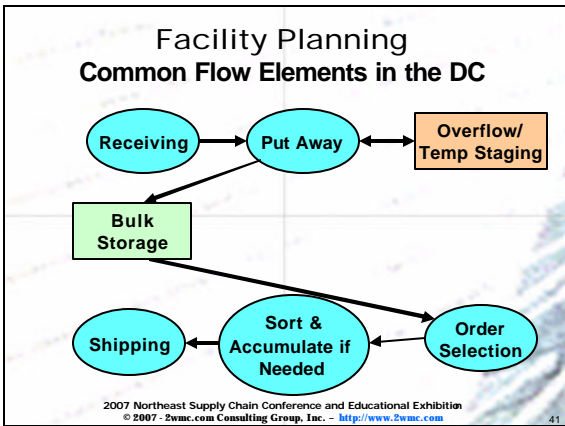
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## Speed Up Distribution Receive and "Put" Items

- **One Step Removed from Cross Docking**
  - Eliminate Reserve/Replenishment
  - Just Pick Cases and Distribute
- **For businesses that constantly change over their SKU sets**
  - Apparel
  - Magazines or Best Seller Books
  - Other Constantly Changing SKUs

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## Horizontal Carousel Put System for Store Distribution

Image Below: Courtesy White Systems



- Put to an order in the carousel, rather than picking product
- Can also be done with manual system, RF, Voice, or PTL

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## Order Consolidation Equipment Individual Item Sorter

- **Alternate "Put" System:**
  - Fast Moving Items Get Delivered to Induction Points in Cases
  - After identifying item, operators can induct unlimited number of items
  - Sorter "drops" the items to chutes or right to individual order boxes
  - Boxes may be customers or stores



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**Order Selection Systems**  
Automated Storage and Retrieval Systems

**General Advantages:**

- Eliminate Walking
- Dramatic Space Savings
- Good Ergonomics
- Significant Labor Reduction




**Limitations:**

- Must design carefully
- Limited Flexibility – dramatic business changes

**Warning: Careful Analyses Required**

- Peak Demands (Capacity/Throughput)

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Photos: Courtesy Remstar Knapp USA, White Systems

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**Space Saver AS/RS Eq**

- Store more compactly
- Store vertically
- Save 50-70% space per square foot
- Good option for space constrained facilities

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### Horizontal Carousel

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### Pick to Light (PTL)

**Theory of Operation:**

- **Start Order in Zone:**
  - Orders flow zone to zone
  - Or are inducted into zone
- **Locate Item & Qty:**
  - Light illuminates under product
  - Quantity shown under product on central bay display
- **Grab Item:**
  - Picker grabs item(s) and presses button to confirm
- **Exceptions:**
  - Picker can also communicate shorts and exceptions via buttons

Photos: Courtesy Siemens Dematic

Photo Below: Courtesy Diamon Phoenix

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### Pick to Light (PTL)

**Where to Use:**

- Dense Picking
- Larger Orders (10+ lines)
- Physically big or heavy orders
- Great paired with conveyor

Photos: Courtesy PCC, ASAP Automation

**Advantages:**

- Very Accurate
- Extremely Fast
- Hands Free

\$25-100 / light module  
 \$50k base software

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### Pick to Light (PTL) Disadvantages

- Can't batch easily
- Not as efficient with very small orders (1-3 lines)
- Limited Flexibility
- High cost \$50-\$200/SKU




Photos: Courtesy Working Machines, Lightning Pick

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### PTL Driven Batch Pick Cart

**RF PTL Pick Carts:**

- Make batching possible
- Picks and puts directed by cart display
- Can pick once, put to many orders
- Great for small / high commonality items

**Limitations:**

- Big Battery
- High Energy Needs

**\$8-15k / cart**





Photos: Courtesy Kingway / Siemens Dematic, Daifuku

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### Voice Directed Picking


**Theory or Operation**



- Pick instructions sent to a hip mounted receiver

**Computer:**  
"Bay 28, F-2 - Pick 3"

- Picker confirms picks via a microphone
- Picker reads a "check digit" to verify pick

**Picker:**  
"94 Pick 3 confirm"



Photos: Courtesy Voxware / Motorola

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### Voice Directed Picking

Photos: Courtesy Vocollect

**\$2-5k / terminal**  
**\$25-200k software**

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### Voice Directed Picking

#### Where To Use

- Cart or conveyor picking
- Heavy or Bulky items
- Freezers / Refrigerators
- Pallets, Flow Rack, Shelving
- Case and Each Picking
- Fork Truck, Pallet Jack, Man-Up, Pick Module, Cart Pick
- Large SKU populations (up to 100,000's of SKUs)
- All but fastest movers

Photos: Courtesy Vovware

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### Voice Directed Picking

#### Advantages

- **Very accurate** (every pick confirmed)
- **Very Fast** (dialogue is quick)
- **Excels at Batching** (one to many)
- **Cost is per picker - not per SKU**
- **Multi-Lingual** (accents OK)
- **Hands / eyes free** (low fatigue / speed / safety)
- **Focus / Pacing** (hard wired to respond)
- **User Friendly** (what do I say?)
- **Rapid Training** (faster than RF / PTL)
- **Very Flexible** (no wiring / bolted down items)

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## Voice Directed Picking

### Disadvantages

- Not cost effective in operations with less than 10 concurrent users
- Speed Limitation
- Scanning Negates Speed Improvement
- Problems Listening and Remembering
- Memorizing Check Digits
- Deaf / Can't Speak

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## AS/RS Equipment

### Mini AGV System




- Mini-AGV Robots bring shelving unit to picker
- Units are randomly retrieved and delivered sequentially
- Laser device points to proper location
- Picker can scan item bar code as it is picked
- Picks can be made rapidly due to quick delivery of next robot

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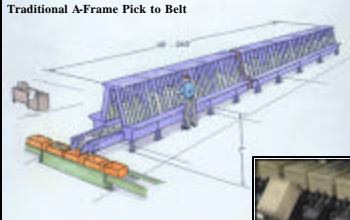



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## "A-Frame" Automated Dispenser

Photos: Courtesy Knapp USA

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In Closing...

Remember - Think Outside of the "WAREHOUSE BOX"

Remember - Your distribution center in the *MIDDLE* of the SUPPLY CHAIN!

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10 Second Summary

- Make Sure You are Paying Attention to What Your Customer Wants
- Work with Suppliers to Minimize Handling of Materials in the DC
- Have the Right Products in your DC and Pay Attention to Profitability
- Remember to Pay Attention Flow and Handling within the DC
- Consider Technology and Software Where it is Justified

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**THANK YOU!**

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