

Are Automatic Guided Vehicles Right For You? Customer Case Studies Of Successful AGV Applications

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Presented by:

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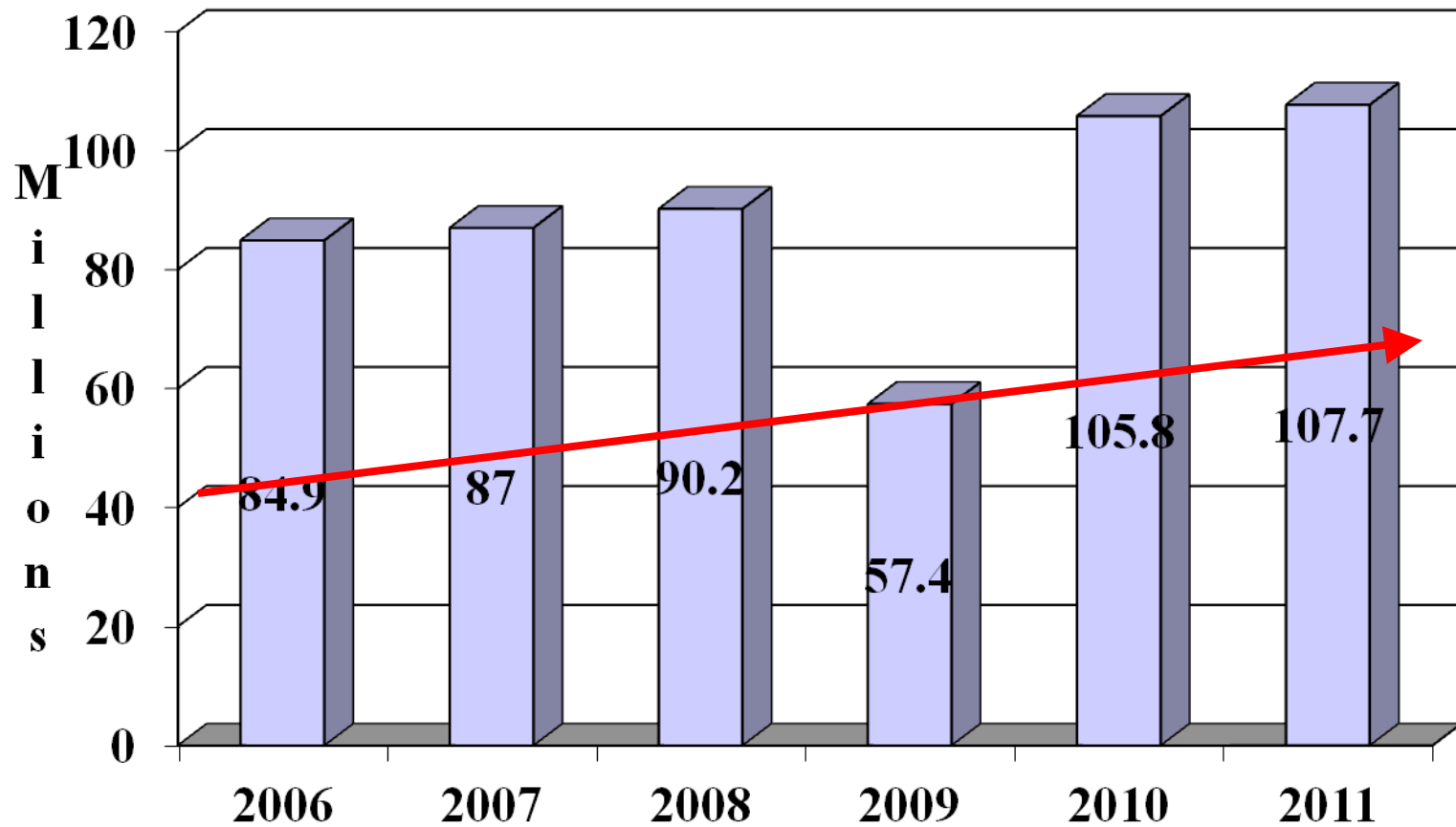


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Agenda

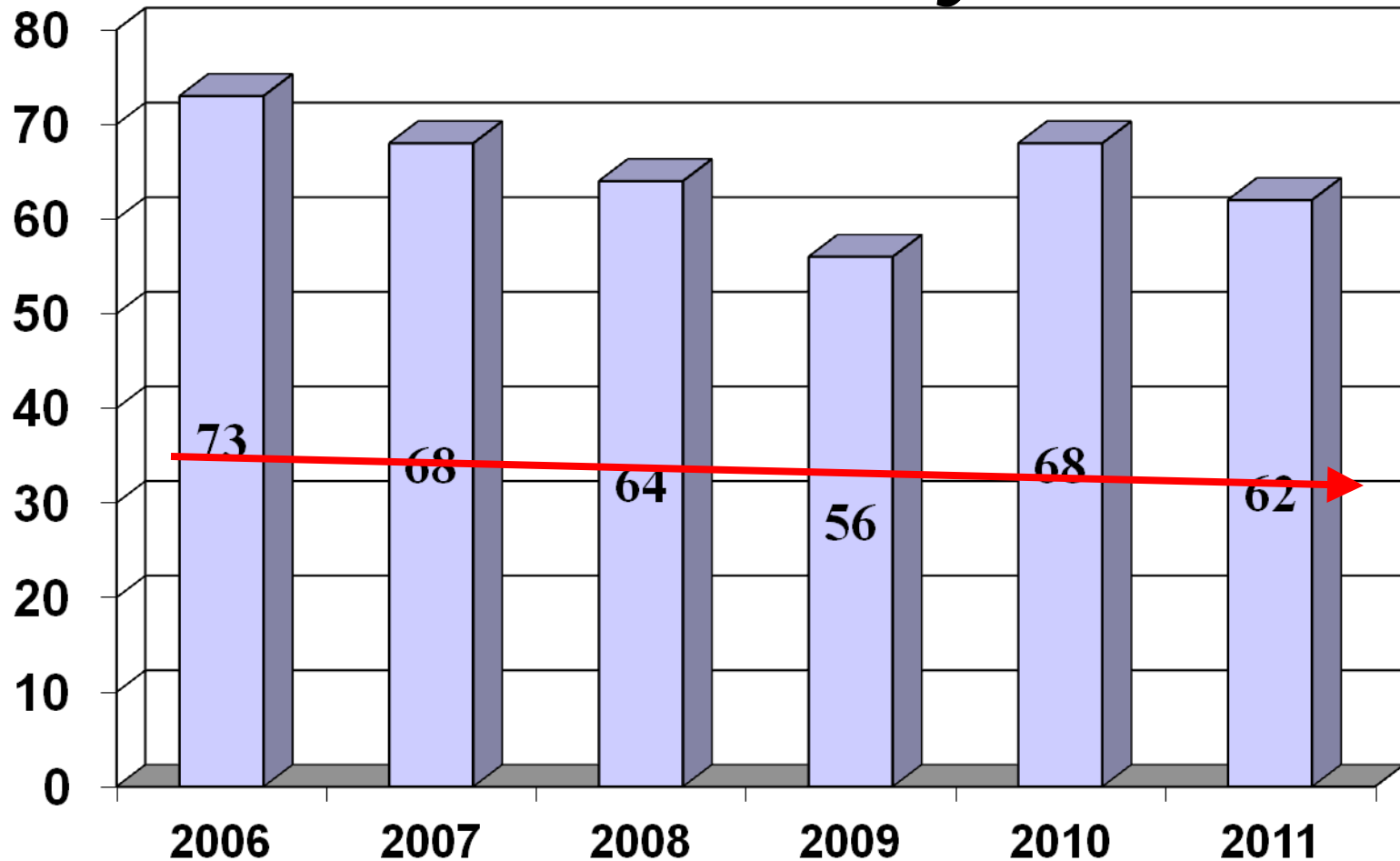
- Recent AGV Growth in North America
- Typical AGV Applications
- Justification Approach

North American AGV Market Total Dollars

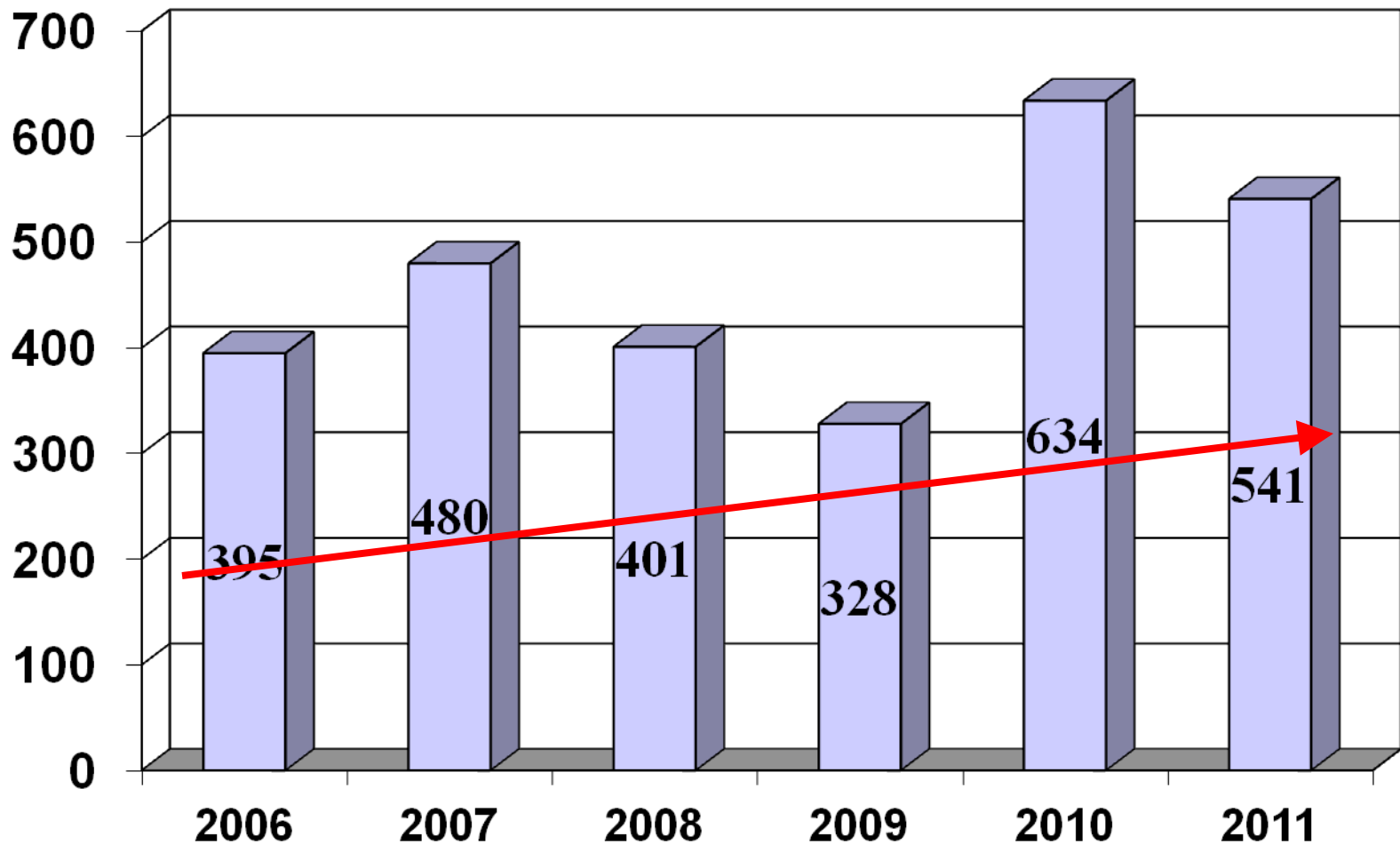


Total AGV Market

North American Market Total AGV *New Systems*



North American Market Total *New Vehicles*



APPLICATIONS

Automatic Guided Carts



John Deere

- Assembly of lawn mowers from start to finish
- 80 AGCs in use
- Magnetic tape guidance

Automatic Guided Carts



Features

- Magnetic tape for flexibility and reduced costs
- Previously used wire-guided AGVs
- Equipped with scissor lifts for improved ergonomics
- Uses opportunity charging

Custom Heavy Load Solution



Metal Manufacturing

- Roll Handling of Raw Materials Between Production Processes
- Carries Heavy Loads of up to 22 Metric Tons

Custom Heavy Load Solution

Features

- Carries Loads of up to 400° C
- Expansion due in 2013



Manufacturing Transport



Outdoor Power Equipment Manufacturer

- Automated Raw Materials Delivery to Production & Finished Goods Take-Away
- 15 Automatic Guided Vehicles
- 75+ Pickup / Drop-Off Locations
- Opportunity Charging
- Just-in-time production

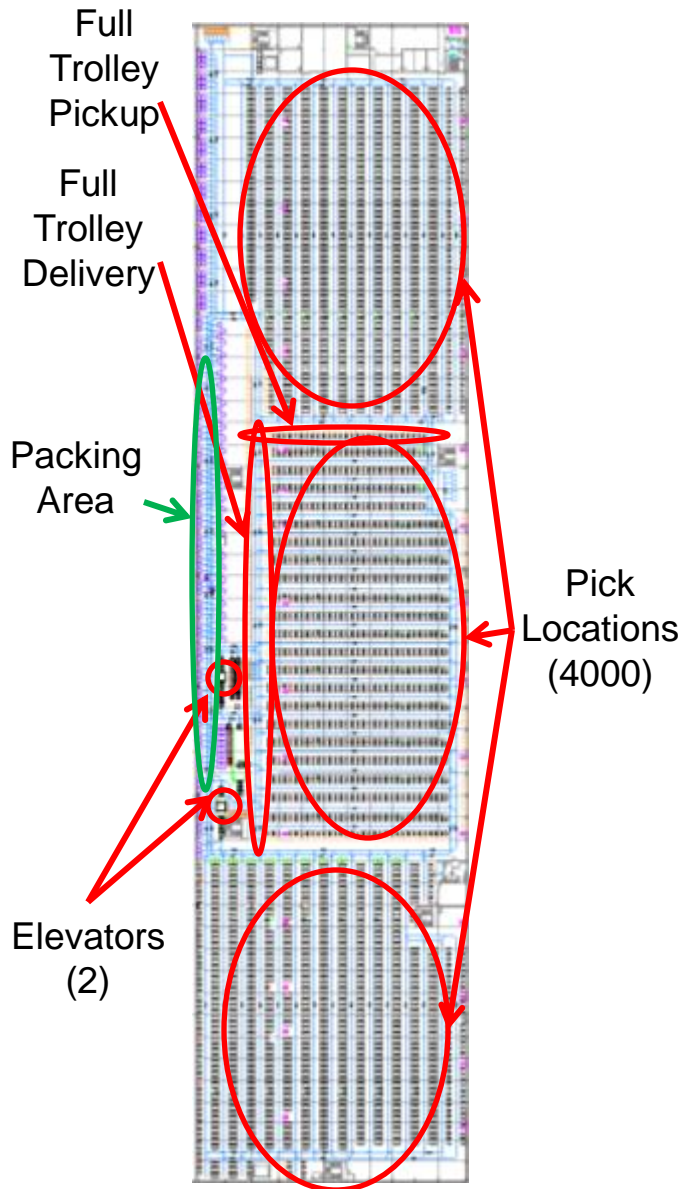
Manufacturing Transport



Features

- Laser Guided Vehicles
- Integrated Bar Code Scanning
- Leaves floor transportation available for manual vehicle traffic
- Flexible for Future Business / Production Requirements
- Elimination of Non Value Added Tasks: Long Product Hauling

Retail Distribution Center



- **Pick Pallets** are introduced to the picking mezzanine via 2 elevators from ASRS
- **Pick Pallets** are picked up by AGV at elevator and delivered to 4000 pick locations
- Pickers walk aisles (Person to Goods Picking) and pick items as appropriate to build an order on a trolley (wheeled cart). Pickers manually push filled trolleys to the full trolley pick up area
- **AGVs** remove empty pick pallets and trash bins from the picking area
- **AGVs** move trolleys from the full trolley pickup area to the full trolley delivery area.
- **AGVs** deliver empty pallets to packing area
- **AGVs** deliver “packed” pallets to elevator for movement to ground floor shipping area
- Move empty trollies to storage area

Retail Distribution Center



Objectives of Automation

- Increase Picker Productivity
- Reduce Labor Costs
- Reduce Product Damage
- Maximize plant safety
- Track Inventory
- Maximize flexibility for future changes

Finished Goods Handling



Lorillard Tobacco

Installation of
Robotic Palletizers
Laser Guided AGV System

Finished Goods Handling



- Reduce maintenance
- Phased Implementation

Warehouse Transportation



Ventura Foods

- AGVs transport pallets from production to temporary storage or to stretch wrapper
- 6 AGVs in use
 - 5 dual roller bed AGVs
 - 1 forked AGV

Warehouse Transportation

Features

- AGVs travel ¼ mile to temporary storage
- Dual roller bed AGVs move two 2,500 pound pallets
- Forked AGV moves a single pallet
- System streamlined processes, reduced costs and improved productivity



Retail Case Picking

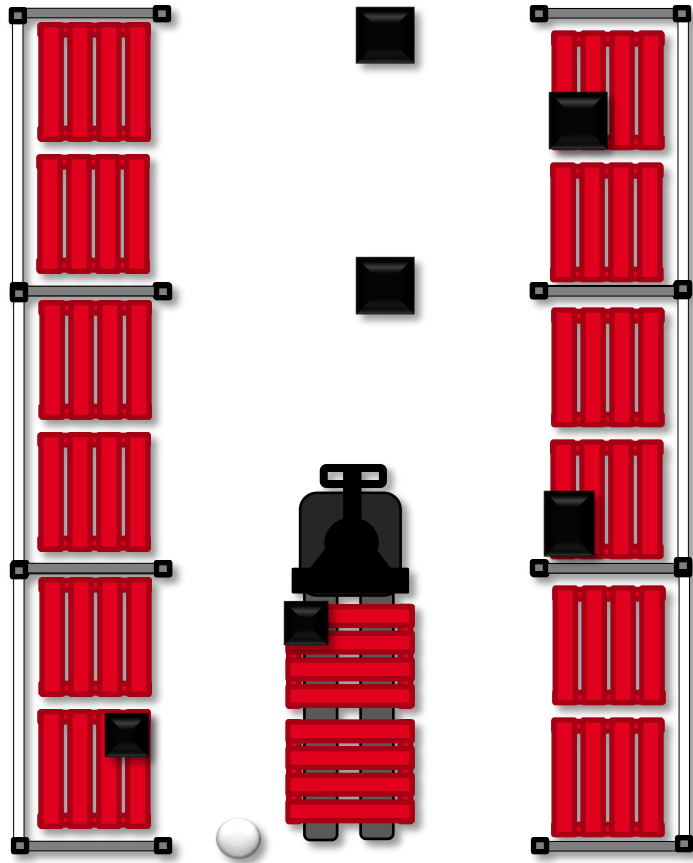


Case Picking w/ Voice

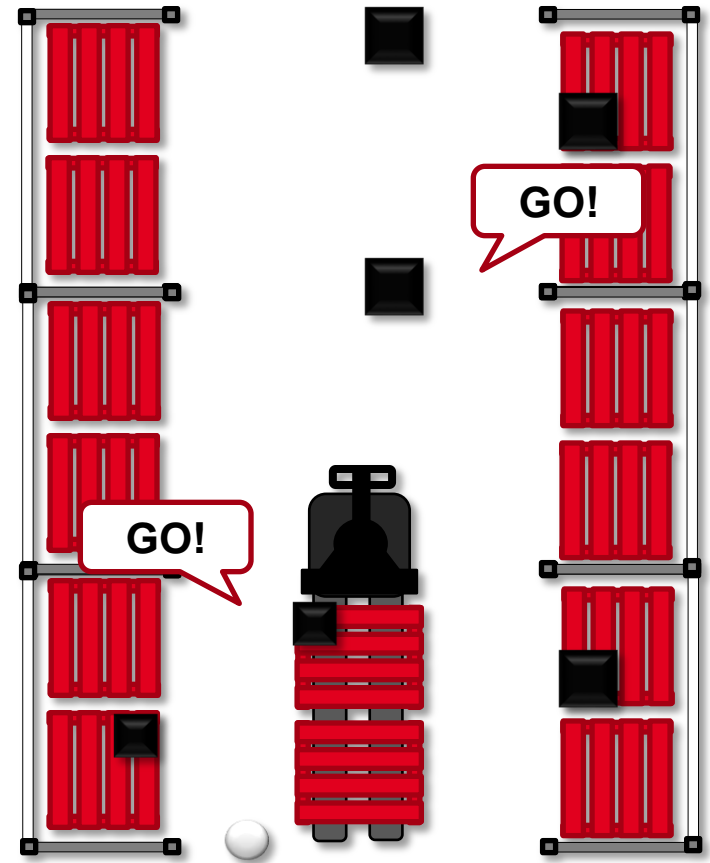
- Applying proven AGV & voice technology to manual order selection processes
- **Objectives**
 - Eliminate non-productive tasks
 - Increase productivity
 - Order Picking: > 20% increase
 - Order Putting: > 30% increase
 - Transport: > 50% increase
 - Improve safety
 - Improve working conditions

Retail Case Picking

Current pallet truck order selection



AGV hybrid pallet truck order selection



Outdoor Capable AGV



Beverage Industry

- Tugger Movement from Packaging to Shipping
- Automated Trailer Hitch
- Indoor/Outdoor Capabilities

Outdoor Capable AGV



Vehicle Features

- Custom Traffic Management with non-AGV Traffic
- IP-65 Rated for Protection Against Low-Pressure Water Jets
- Tows Loads of up to 65,000 lbs.

Narrow Aisle Storage



Canadian Tire

- Vertical Lift to 35 Feet
- 2200 Pound Loads
- 74 Inch Working Aisle
- 6700 Feet of Path
- 19 Aisles of Rack
- 12,472 Rack Locations

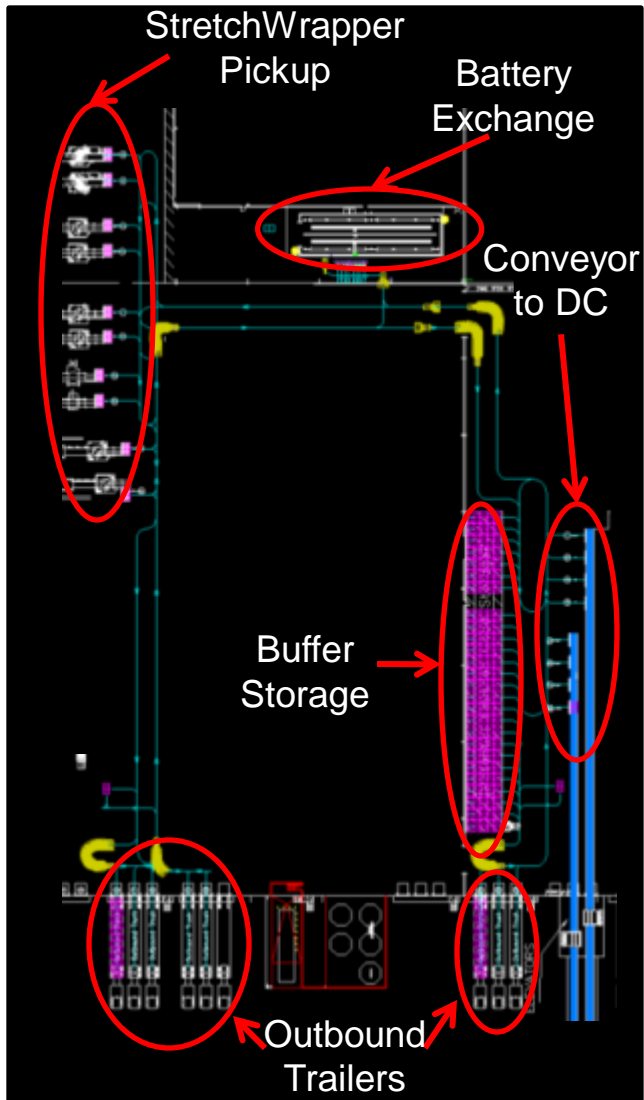
Narrow Aisle Storage

Objectives

- Replacement of manual VNA Trucks
- Phased Implementation
- Expansion on the horizon



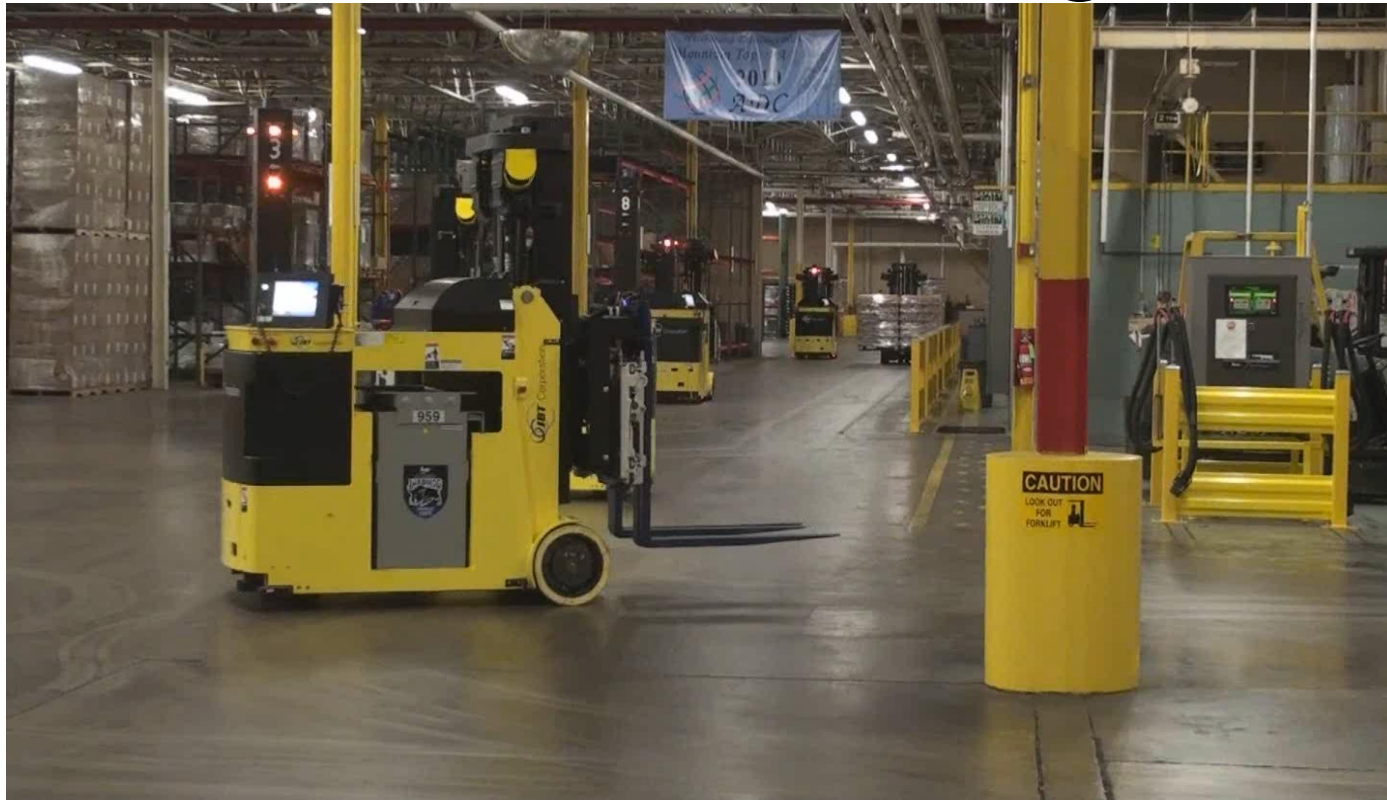
Truck Loading



PepsiCo Atlanta

- 11 Counterbalanced SGVs with single/double fork attachment
- Handling CHEP Pallets 40" (W) x 48" (L) x 67" (H); 2,500 lbs/pallet
- Pickup Loads at 10 Stretch Wrappers
- Deliver Product onto Outbound Shipping Trailers, or Transfer Conveyors to DC
- If Transfer Conveyors are Jammed or Down, Provide Temporary Block Stacking in Buffer Storage Area
- Fully Integrated with WMS

Truck Loading



- Automate pallet movement at end of line
- 160 pallets/hour
- Load standard, over-the-road trailers
- Support 8 trailer loading patterns
- Maximize plant safety
- Reduce plant/product damage
- Maximize flexibility for future changes
- Two year payback



JUSTIFICATION

Justification of AGVs

Key Items for Consideration

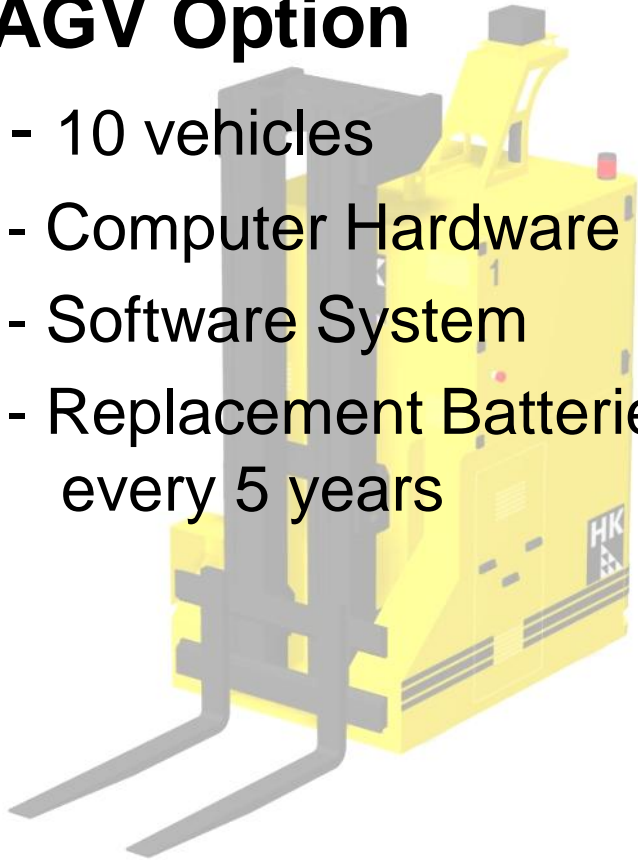
- Operational Shifts
- Personnel
- Product Damage
- Dependable Delivery Times
- Flexibility



Sample Project

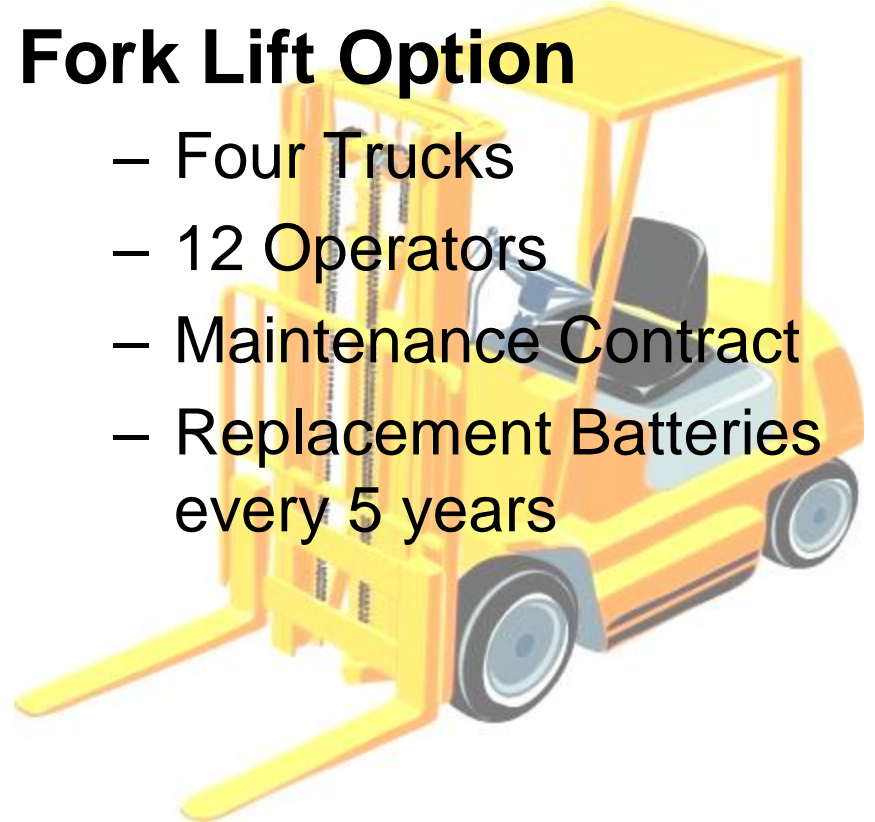
AGV Option

- 10 vehicles
- Computer Hardware
- Software System
- Replacement Batteries every 5 years



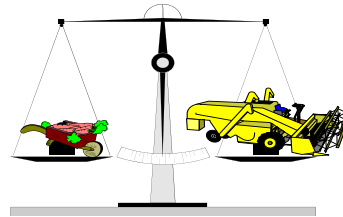
Fork Lift Option

- Four Trucks
- 12 Operators
- Maintenance Contract
- Replacement Batteries every 5 years



ROI Spreadsheet

Scenario-Based
10 Year
Return on Investment Analysis



*Automation Project Name
vs. Alternative Name*

Questions / Comments



Let's bridge the gap...



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Automatic Guided Vehicles Systems (AGVS)

<http://www.mhi.org/agvs>