10 PLUS Applications Using Autonomous Mobile Robots & Robotics to Solve Labor Issues

Presented by:
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We are NOT From a Manufacturer!
Todays Objectives

- HUGE Breadth of AMR & Robotics are Available
- Specialized Application AMRs Likely Exist
- Combining Several Models Yield Higher Benefits
- Leave Knowing More Today than You Knew Yesterday!
What & Why AMRs & Robotics

• Flexibility!!
  • Application
  • Material
  • Location
  • Processes…

• Saves Labor

• Increases Accuracy

• Improves Throughput

• Eliminates Single Point of Failure

• Provides a Fast ROI

• Allows for Rapid Growth

• Efficiently Handles Peaks & Valley
Easy Proof of Concept – POC

AMRs Unique Qualities:
• Flexibility
• Scalability
• Easy to Move/Locate
• Minimum Infrastructure

Just Some Applications:
• Order Picking
• Sortation
• Consolidation
• Kitting
• Many More
It's About the $$$

- ROI
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Better Robot, Better Price
North America industrial robot cost* per unit shipped

$90K

Source: Robotic Industries Association
*In nominal dollars
Major issues as it pertains to warehouse/DC operations

<table>
<thead>
<tr>
<th>Issue</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inability to attract and retain a qualified hourly workforce</td>
<td>41%</td>
<td>49%</td>
<td>55%</td>
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<tr>
<td>Insufficient space for inventory and/or operations</td>
<td>43%</td>
<td>40%</td>
<td>44%</td>
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<tr>
<td>Outdated storage, picking or material handling equipment</td>
<td>34%</td>
<td>33%</td>
<td>38%</td>
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<tr>
<td>Inadequate information systems support</td>
<td>31%</td>
<td>36%</td>
<td>32%</td>
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<tr>
<td>Inability to attract and retain qualified supervision</td>
<td>11%</td>
<td>25%</td>
<td>26%</td>
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<tr>
<td>Obsolete layout</td>
<td>24%</td>
<td>23%</td>
<td>23%</td>
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<tr>
<td>Lack of SKU weight and dim information in system</td>
<td>12%</td>
<td>12%</td>
<td>16%</td>
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<tr>
<td>Lack of higher management support</td>
<td>21%</td>
<td>19%</td>
<td>15%</td>
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Source: Peerless Research Group (PRG)

Answers DC Issues

- Labor
- Space
- Automation
AGV vs AMR

- Fixed Path vs. Autonomous
- Sensing Items, People & Things and Avoiding Them
  OR
  NOT
High Speed Sortation – Manual Induction
High Speed Sortation – Take Away

Parcels Come Down Chute
High Speed Sortation – Robotic Induction
Order Picking (Goods to Person)
Robotic Picking (Goods to Person)
Order Picking & Storage (AS/RS)
Replenishment – Shelving – Flow Rack
Retail Store Replenishment
Order Picking (Zone to Zone)
Order Picking (Person to Goods)

TOTE INDUCTION
Low/Medium Sortation – Kitting – Returns
Low/Medium Sortation – Kitting – Returns
Low/Medium Sortation – Kitting – Returns
Low/Medium Sortation – Kitting – Returns
Kitting (Person to Goods)
Deliver to Work Zones
Feeding Buffer & Automated Systems
AS/RS to Storage
De-Palletizing (Full Case Handling)
Criteria: You Pick 2… I Pick the Third

- Elements That Make Up Costs & Throughput:
  - Robots
  - Induction Stations
  - Destinations/Locations
  - Value Added Processes
Living The Dream ;-)
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