Choosing the Right Pallet ASRS for Your Operation

Presented by:
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Vice President, Americas Technology Center

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swisslog
Agenda

1. Challenges and trends driving automation
2. Where does automation bring value?
3. Pallet Stacker Cranes
4. Pallet Shuttle Systems
5. How to assess the right solution?
6. Justifying the investment
7. Questions & Answers
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7. Questions & Answers
1. Operational Expenses

2. Working Environment

3. Market Requirements

Challenges & Trends
1. Operational Expenses
Challenges & trends

- Carbon footprint: Rising energy costs
- Urbanization: Increased real estate costs
- High labor costs: Labor availability & costs

- Sustainability
- Reduced space
- Reduced labor force
2. Working Environment
Challenges & trends

- Monotonous tasks
- Ergonomics
- Government regulations

REDUCED LABOR FORCE
HARSH WORK ENVIRONMENT
STRICT REGULATIONS

Working time
Fast operation
Fast operation
# 3. Market Requirements

**Challenges & trends**

<table>
<thead>
<tr>
<th>Segment</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local &amp; ethnic food</td>
<td>Fresh but convenient</td>
</tr>
<tr>
<td>Smaller order volumes</td>
<td>More frequent delivery</td>
</tr>
<tr>
<td>Packaging</td>
<td>Crossovers</td>
</tr>
</tbody>
</table>

**Increasing segments**
- Farm to fork
- Bio / gluten lactose free

**Faster delivery**
- Cost of poor quality
- E-Commerce

**Greater variety**
- No best before
- Food quality

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Huge Growth in Cold Storage

“Demand for public cold space from online grocery sales alone will grow by up to 100 million square feet, or about 50% of the current inventory, over the next five years, according to CBRE. That’s equivalent to about 200 regional malls’ worth of space.”

-Bloomberg Businessweek
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Basic Intralogistics Process
Processes within the four walls of a warehouse

TRANSPORT
- Unloading
- Receiving

STORAGE
- Put away
- Replenishment
- Picking
- Storage
- PALLET ASRS

ORDER FULFILLMENT
- Consolidation Staging
- Loading
## Automating Warehouse Processes

Where will automation deliver most value in labor reduction?

<table>
<thead>
<tr>
<th>Warehouse Process</th>
<th>Variable Labor Costs</th>
<th>Automated Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unloading/Receiving</td>
<td>8%</td>
<td>Roll on - Roll off (RORO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Automated Guided Vehicles (AGVs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RF ID express receipt</td>
</tr>
<tr>
<td>2. Transportation/Putaway</td>
<td>12%</td>
<td>Pallet conveyors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monorail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shuttle cars</td>
</tr>
<tr>
<td>3. Replenishment</td>
<td>14%</td>
<td>Pallet Stacker Cranes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pallet Shuttles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AGVs</td>
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<tr>
<td></td>
<td></td>
<td>Miniloads</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Case Shuttles</td>
</tr>
<tr>
<td>4. Picking</td>
<td>35 - 40%</td>
<td>Auto Case Pick</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sortation systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Goods-to-person pick</td>
</tr>
<tr>
<td>5. Staging/Loading</td>
<td>12%</td>
<td>Pallet conveyors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Auto Pallet wrap</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AGV loading</td>
</tr>
<tr>
<td>6. Auxiliary tasks</td>
<td>5 -10%</td>
<td>Layer picking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full Pallet Outfeed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Empty Pallet stackers</td>
</tr>
</tbody>
</table>
Pallet Conveyor
Miniload Crane
Pallet Stacker Crane
Case Shuttle
Pallet Shuttle
Robotic Cube Storage
Robotic Picking
Case Shuttle
Mixed Case Palletizing
Software
Pallet Conveyor
Miniload Crane
Case Conveyor
Robotic Picking
Mixed Case Palletizing
AGV Goods-to-Person
ASRS Technologies
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# Pallet Stacker Cranes

## Five key components

<table>
<thead>
<tr>
<th>Mast</th>
<th>Lift carriage with fork unit</th>
<th>RowCarrier</th>
<th>Rack</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapered single or double mast in modular design for less weight and easier shipping.</td>
<td>The strong fork unit allows single, double and triple deep reach.</td>
<td>For multi-deep storage solutions, we use a reliable 8 wheel driven satellite which is powered by supercaps.</td>
<td>Robust rack designed for storage of heavy pallets.</td>
<td>The brains of the system. A standard warehouse management software designed by Swisslog for Vectura.</td>
</tr>
</tbody>
</table>

**SynQ**

**POWERED BY POSSIBILITIES.**
Efficient Storage
Meeting the most challenging requirements

Pallet Stacker Cranes
Do you want to store pallets more efficiently and be more cost effective?

1. Flexibility
   - Multiple storage solutions

2. Efficiency
   - High no. of SKU & storage capacity

3. Reliability
   - Reduced error rate

4. Cost effective
   - Favorable return of investment
Pallet Stacker Cranes
Proven technology since 1969

Tapered mast in modular design for less weight and easier shipping.

20% lower energy consumption thanks to reduced weight of the crane.

Pre-testing before shipping reduces installation time.

Integrated into other sub-systems for efficient warehouse processes.
Pallet Stacker Cranes
Special features for deep freeze with 250+ cranes in operation

- Integrated cameras to reduce maintenance time in freezer
- Specific grease/oils for freezer environment
- Heated control cabinets with generated power
- Quick disconnects for components to reduce wiring/troubleshooting in the freezer
Pallet Stacker Cranes

Internal and external use of regenerative energy for optimal use of cycles

Internal use of regenerative energy

Diagram:
- Power module
- Brake resistor
- Power supply
- Power supply for external devices
- Inverter
- Drive X
- Inverter
- Hoist y
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Pallet Shuttle Systems

Five key components

**AisleCarrier**
Built low to maximize storage capabilities.

**RowCarrier**
All wheel drive and Supercaps/battery powered to ensure reliability.

**Rack**
System is independent of rack supplier. Racking can be designed without bracing in aisles to ease access.

**Vertical Conveyor**
Robust VC design for one, two or three loads using forks, conveyors or chains.

**Software**
The brains of the system. A standard warehouse management software designed by Swisslog for PowerStore.
High Density Storage
Meeting the most challenging requirements

Pallet Shuttle System
Do you want to maximize available space, remain flexible and increase throughput?

1. Flexibility
2. Efficiency
3. Reliability
4. Cost effective

- Multiple storage solutions
- High throughput & storage capacity
- Reduced error rate
- Favorable return of investment
Why are Pallet Shuttle Systems Gaining in the Market Place?

Advantages

Can be implemented into a building of any shape and size.

The modular technology allows for easy addition of extra modules.

Suitable for all common pallet types.

Integrated into other sub-systems for efficient warehouse processes.
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Factors to consider:
- Throughput requirements
- Inventory requirements
- SKU count
- Storage density
- Availability

How to Assess the Right Solution?

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How to Assess the Right Solution?
Brownfield Site Considerations

- Existing building
- Low or varying building ceiling
- Odd shaped building areas
- Building columns and other fixed equipment
- Flooring conditions
  - Joints
  - Concrete quality
  - Level
GREENFIELD SITE CONSIDERATIONS

Module A

Module B

Module C

Chassis with Wheels, Mast, Cab, El cabinet & Motors
Warehouse Management Software
Product tracking and tracing throughout your warehouse
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Justifying the Investment

- Smaller building footprint
- Direct & Indirect Labor Savings
- Reduced cubic space/Energy savings
- Tax advantages
- Optimized Worker Ergonomics
- Reduced damage
- Control of Downtime
- Increased Safety
- Improved Inventory Accuracy
- Eliminate Physical Inventory Counting
Justifying the investment

- Improved Order Accuracy
- Maximize Order Fulfillment Rate
- FIFO Inventory Rotation
- Control of “quarantined” product
- Improved Product Integrity
- Maximize Service Reputation
- Forces Operations Discipline
- Enhanced Organizational Performance Culture
- Cost of Capital << Higher Annual Operational Expenses

Dense storage via ASRS technology
Q & A
For more information:

Speaker email: grant.beringer@swisslog.com
Website: www.swisslog.com

Or visit MODEX Booth #7657