2016 Compete Smart Conference

Michael Stuyvesant
Director of Sales
Our Company

Headquartered in Vancouver, WA

Established 1996

Joint Venture between Columbia Machine and Okura Yusoki

51 Employees

Robotic Palletizing Experts
Our Business

We build reliable, robust robotic palletizing solutions for a wide range of industries:

- Chemical Products
- Food and Beverage
- Consumer Products
- Building Products
- Agricultural Products
- Milling
- Pharmaceutical
- Many others
Associations

- Robotic Industries Association
- PMMI USA
- MHI Member Company
- Texas Grain & Feed
- IDFA International Dairy Foods Association
- PSSMA Paper Shipping Sack Manufacturers' Association, Inc.
- IAOM International Association of Operative Millers
- ASTA American Seed Trade Association
Canada and USA Rep Map

**United States**
- Garrett Packaging – Washington
- West Coast Seed – Oregon (Specialty Rep)
- Columbia Machine – California and Illinois
- Siggins – Missouri
- Storage Systems – Wisconsin
- Selectpack – Michigan
- Pack First – Ohio
- Packaging Machinery Systems – Mississippi
- Advanced Packaging Solutions – Georgia
- Jaffco Packaging – Pennsylvania and Rhode Island

**Canada**
- Chisholm Machinery - Ontario
Mexico, Central and South America Rep Map

**Mexico**
- Ancapack – Mexico City
- C&A Systems – Queretaro
- Grupo Victor – Guadalajara
- Schroeder Equipment – Monterrey

**Central America**
- Solem Pack – Guatemala
- QM Ingeneria – Costa Rica

**South America**
- Avante – Colombia
- Roditec – Colombia
- Midugar – Chile
- SOWing – Chile
- Integra – Brazil
- PTM - Brazil
Our People
Trends in Packaging Equipment

COMPLETE SOLUTIONS
A continued demand from end users is for the ability to purchase a more complete packaging line, incorporating numerous functions such as filling, closing, labelling and wrapping, from a single source. Only few suppliers are capable of offering a complete solution so often one company will lead a project and integrate machines from other OEMs.

MODULAR MACHINES
Although there is a requirement for complete lines, there is a growing demand for more modular machines to increase flexibility; driven by the increased variety of materials and packaging styles, and increasing use of SKUs.
Trends in Packaging Equipment

GROWTH IN DEMAND FOR AUTOMATION

OEMs are increasingly relying on integrating automation in machines to help meet customer requirements. Benefits of this include increased productivity, safety, functionality, flexibility and ease of operation, and reduced labor costs.

SMART MANUFACTURING (INDUSTRIE 4.0)

With machines incorporating greater degrees of communications and sensor technology, manufacturing is entering what some are calling the fourth industrial revolution, or Industrie 4.0 — a new era of highly efficient, flexible and customizable mass production. Other terms, such as smart manufacturing, Industrial Internet, and Advanced Manufacturing (to name a few), describe variations of a similar theme.

Elements include concepts such as big data, remote monitoring, pervasive sensing, wireless communication, distributed intelligence, M2M communication and integration of communication. Benefits include greater plant flexibility and safety, reduced downtime, asset management, machine health monitoring, rapid throughput of more customized products and improved quality.
2015: $7.51b in Packaging Equipment Shipments
NA Palletizer Market

The Value of US Shipments of Palletizing Machinery

$294 Million in 2015 > 3% of Total Revenues > $335 Million in 2020 (Estimated Growth)

Table 1.77 (Millions of Dollars)

<table>
<thead>
<tr>
<th>End-User Sector</th>
<th>2015</th>
<th>Share in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>$32.0</td>
<td>14.3%</td>
</tr>
<tr>
<td>Food</td>
<td>$42.2</td>
<td>18.8%</td>
</tr>
<tr>
<td>Household, Industrial &amp; Agricultural Chemicals</td>
<td>$44.8</td>
<td>20.0%</td>
</tr>
<tr>
<td>Personal Care, Toiletries &amp; Cosmetics</td>
<td>$20.8</td>
<td>9.3%</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>$27.1</td>
<td>12.1%</td>
</tr>
<tr>
<td>Other End-User Sectors</td>
<td>$57.0</td>
<td>25.5%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>$224.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1.77

Total Market ($M) = $224.0

- **25.5%**
- **20.0%**
- **18.8%**
- **14.3%**
- **9.3%**
- **12.1%**
Robotic Trends in Manufacturing

Robotic Growth in Palletizing

Source: PMMI – 2014 Trends in Robotics
Conventional Palletizers

Key Components

- Infeed conveyor
- Case turner
- Row forming conveyor with integrated pusher
- Layer forming table with stripper plate and layer-squaring device
- Elevator
- Pallet dispensers
- Slip and tier sheet dispensers
- Full load discharge conveyor
Conventional Palletizers

High Level

Advantages

• Better suited where the palletizer is located a distance from the case packers/sealers
• Higher throughput
• Utilizes space footprint more efficiently
• Choice for high speed applications (above 40-50/min)
Conventional Palletizers

Floor Level

Advantages

• Lower in cost
• Easier maintenance
• Better production visibility
• Ideal for coupling with case sealers
Types of Robots

**Cartesian**
Cartesian robots are typically used in slow production facilities where there is product with consistent weight and sizes needing to be palletized. It is ideally suited as a lower cost solution for single line production at speeds up to 10 cases per minute.

**SCARA**
SCARA (Selective Compliant Articulated Robot Arm) robots are generally used in faster production facilities than the cartesian robot. The SCARA can typically handle up to 40 lbs. and is ideally suited for palletizing from one to three production lines at a total case rate of 20 cases per minute.
**Gantry**
Gantry robots are generally the slowest, but have the advantage of being able to palletize a large number of SKUs simultaneously. They can also be used to handle extremely heavy product. The gantry robot has a larger footprint, and generally a much higher price tag.

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**Articulated**
Articulated robots are the most versatile robots in the production environment. They are faster and have a variety of end effectors to pick up various product types. The articulated robot can handle a wide range of payloads up to 2,200 lbs. (including the end effector), though heavier weights are getting more common when picking complete layers. Articulated robots are capable of palletizing up to four lines at a time. On a single production line, the articulating robot can handle cases that are 50 to 60 lbs. at 25 cases per minute (single picked).
Robotic Palletizer Cell

- Safety Guarding
- Control Panel
- Sheet Table
- Robot
- Infeed Conveyor
- Pallet Dispenser
- Discharge Conveyor
- Empty Pallet Conveyor
- Load Stacking Station
Benefits of Robotic Palletizing

- Increased productivity
- Higher reliability
- Small footprint
- Increased load quality
- Lower maintenance cost
- Reduction in labor
- Enhanced safety and ergonomics
- Flexibility for future needs
Product Handling

End of Arm Tools
- Clamp Style
- Fork Style
- Finger Style
- Vacuum Style
- Custom Design
Product Handling

Common Types of Packaging

Cases
- RSC
- Display
- Telescoping

Bags
- Form Fill & Seal
- Open Mouth
- Valve

Trays
- Corrugated or Plastic

Pails & Tubs
- Plastic, Metal, or Other

Shrink and Bundle Wrapping
# Profitability - ROI

## VARIABLE FOR TOTAL SYSTEM COST

<table>
<thead>
<tr>
<th>Total System Cost: $</th>
</tr>
</thead>
<tbody>
<tr>
<td>300,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quantity of Robots:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

## VARIABLES FOR CURRENT OPERATIONAL COSTS

<table>
<thead>
<tr>
<th>Robot System Usage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disclaimer: Average Robot Electrical costs are roughly $0.50 per hour</td>
</tr>
</tbody>
</table>

| 2 Shifts/Day |
| 5 Days/Week |
| 50 Weeks/Year |

<table>
<thead>
<tr>
<th>Annual Labor Costs per Operator, Including Fringe Benefits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disclaimer: Average Robot Electrical costs are roughly $0.50 per hour</td>
</tr>
</tbody>
</table>

| $ 45,000 |

<table>
<thead>
<tr>
<th>Number of Operators per Shift Removed:</th>
</tr>
</thead>
</table>

| 2 |

| Percentage of Labor Retained to Operate System per Shift: |

| 33% |

| Expected Productivity Gain: |

| 30% |

<table>
<thead>
<tr>
<th>Other Estimated Savings:</th>
</tr>
</thead>
</table>

| $ 10,000 |

*Source: RIA – www.robotics.org*
Profitability - ROI

Total Robotic System Cost Vs. Current Operational Costs

1 YEAR $2,085,586 Break Even Point
10 MONTHS $625,676 Labor Savings

$2,085,586 US DOLLARS

Source: RIA – www.robotics.org
## Profitability - ROI

<table>
<thead>
<tr>
<th>Year</th>
<th>System Costs</th>
<th>Maintenance Costs</th>
<th>Operating Costs</th>
<th>Labor Savings</th>
<th>Productivity Savings</th>
<th>Other Savings</th>
<th>Yearly Cash Flow</th>
<th>Cumulative Cash Flow</th>
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<tr>
<td><strong>TOTALS</strong></td>
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<td>$2,085,586</td>
<td>$625,676</td>
<td>$150,000</td>
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</tbody>
</table>

Source: RIA – www.robotics.org
Factors to Consider

• Production throughput
• Space and location in respect to packaging area
• Packaging type/speed (current and future)
• Frequency of SKU changeover
• Pattern complexity
• Load build on pallet, sheet, or unitized
• Number of products/patterns
• Maintenance requirements
• Accessories required
• Interface requirements with upstream and downstream equipment
• Total Cost of Ownership (TCO)
Why Purchase a Palletizer?

• Cost of the palletizer offsets the cost of manual labor for palletizing
• Increase of forklift traffic makes the environment unsafe for people manually palletizing
• OHSA standards regarding weight and repetitive motion limitations
• Increasing insurance premiums
• Increase in throughput makes manually palletizing impracticable
Questions?

Thank You