Process automation at Ports and Terminals

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Inte-Transit
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Outline

• Company
  – General Description
  – Technologies
  – Business Areas

• Ports&Terminals process automation
  – Why to automate?
  – Automation figures
  – How does an automation process really work?
  – Use Cases
  – Conclusions
Company

- Orbita is an Engineering Company
- Offering technical and technological services to the Industry
- Founded in 2006
- Direct employees 117 (oct ‘14)
Company

Main Figures

Center Zone Madrid
East Zone Valencia

8 years of continuous growth

78 Engineers
Projects

18 Personnel
Management and Administration

21 Technicians
Workshop and Assembly

1250 m²
Office Space

2800 m²
Fabrication and Assembly

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Company Technologies

Automation Engineering
- Control Engineering
- PLC Programming
- Numerical control
- SCADA Systems
- Industrial RFID Solutions
- Robot Programming
- Industrial Communications
- Process Automation Consulting
- Automated Gate Systems

Electric Engineering
- Electric Design
- Electrical Cabinets Design & Assembly
- Electrical Installations
- Certification of Electrical Facilities
- Drives and Power Control

Artificial Vision Engineering
- Poka Yoke Systems
- Quality Control
- Surface Inspection
- Robot Guidance – 2D and 3D
- Metrology
- OCR recognition systems

Software and IT Engineering
- Databases
- Warehouse Management Systems
- MES Solutions
- Bespoke Software
- Networking & Security
- Data Centers
- Traceability Solutions
- Gate and Crane OS

Mechanical Engineering
- Bespoke 3D designs
- Custom solutions
- Aerial Conveyors
- Ground Conveyors
- Robotic Cells
- Automatic Screw Machine
- Handling and palletizing
Ports & Terminals

Your access to advanced port container logistics

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Ports & Terminals

Why to automate?

- Predictability & Reliability
- Optimized processes, identification of bottlenecks, optimization of space within the Terminal
- 24 hour operation
- Shorter stays of the ships at the container Terminal
- Continuous monitoring and improvement
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Why to automate?
1. Operational costs reduction

Container terminals operational costs

Data by the Organization for Economic Co-operation and Development (OECD)

Workforce restructuring: from physical handling of goods to the organisation of work via automation and electronic information systems.

Human Skills should be transferred to automation and to the control of the automated systems.
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Why to automate?
2. Increased personnel safety

*Injuries by category and potential for reduction via automation, US West Coast Data.*

<table>
<thead>
<tr>
<th>Category</th>
<th>2009 Injuries</th>
<th>Estimated Injury Reduction (%) with:</th>
<th>Column (a) ASC+Shuttles</th>
<th>Column (b) ASC+AGV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor driver</td>
<td>298</td>
<td></td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Lasher</td>
<td>214</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mechanic</td>
<td>216</td>
<td></td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Holdman</td>
<td>124</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dockman</td>
<td>88</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Foreman</td>
<td>77</td>
<td></td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td>Clerk supervisor</td>
<td>53</td>
<td></td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td>Gantry crane driver</td>
<td>35</td>
<td></td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Conversion from existing manual operations to full automation (including AGVs) potentially reduce injuries by approximately 40%.

A 25% reduction in injuries is expected from conversion to an ASC/Shuttle-type terminal.

*Data by Port Technology International article: Mark Sisson, PE, Senior Port Planner, AECOM, Oakland, CA, USA*
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Why to automate?

3. Environmental conservancy

Emission reductions:
- Reducing vehicle congestions
- Increasing throughput velocity

Data by the Organization for Economic Co-operation and Development (OECD)

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What’s the perspective of the Terminal Operator?

VIDEO

New Automatic Gates in TCB (Barcelona)
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How does an Automated Access work?

Prerequisite: electronic exchange of information between the participants in the process: shippers, terminal, Customs…

Objectives:
- Unassisted operation of entry and exit lanes, except for exceptions management

Technology:
- Automated identification of ISO container codes, truck license plates and IMO labels
- Complete integration with the Terminal’s TOS
- Access granted or denied depending on the TOS response
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Gate Automation: GateSuite

Automation of the access and exit of trucks in container terminals.

VIDEO

Orbita Ports&Terminals - GateOS
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GateSuite

Traceability of containers in real time at the gate. Process control. TOS integration.

Lanes Inspection

GateOS
Use Cases
Damage inspection

Cost per loss cause.

Frequency per loss cause.

Common causes for cargo damage:
- Physical damage to the containers
- Wet damage, leaks

Possible solutions:
- Preventive detection
- Pro-active systems at terminal accesses

Data by Swedish Club P&I Claims Analysis, 2013

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Use Cases
Damage inspection

Average cargo claim cost since 2009 has fallen but the frequency has risen, as a result total claim costs have increased.

PEMA estimates US$1 billion annually in losses from insurance carriers or companies responsible for moving goods.

Data by Swedish Club P&I Claims Analysis, 2013
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GateSuite
Automatic Damage Inspection. Proof of evidence.

Video
Orbita Ports & Terminals GateDMG 3D
Ports & Terminals

Use Cases

CraneOCR

OCR in STS cranes helps automatically identify containers as they are being loaded or unloaded.

Allows the remote management of exceptions, with more than one crane assigned per Clerk.

Events and cargo list are confronted with TOS information on the fly.

Improves safety by removing personnel from the quay to a control room.

Data by Swedish Club P&I Claims Analysis, 2013

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Use Cases: Crane Process Automation: CraneSuite

VIDEO
Orbita Ports&Terminals - CraneCCR
Use Cases: Crane Process Automation: CraneSuite
Traceability and process status information.
Remote control center.
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Use Cases: Crane Process Automation: CraneSuite
Container code information, internal terminal truck identification, damage control.
Use Cases: CraneSuite TPS
Truck positioning system and Traffic control under the cranes

Video
Orbita Ports&Terminals - CraneSuite TPS
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Conclusions. Automating processes brings…

Operational Costs Reduction
  Increase throughput
  Identify bottlenecks
  Workforce training

Continuous monitoring

Safety and security
  Remove personnel from quay

Environmental sustainability
  Reduce congestion
  Reduce delays
Thank You