Automated Container Terminals

Automation of TraPac Terminal, Los Angeles

Port Executive Management Seminar
Merida, Mexico
Virginia International Gateway (2007)
Global Terminal, NJ (2014)
TraPac, Los Angeles
Phase 1 – 2014
Phase 2/3 - 2015
Build-out - 2018
Why Automate?

• Increased efficiency, reliability and safety
• Maximizes the utilization of yard capacity
• Capacity to handle large ships
• Environmentally friendly
• Helps Cargo Terminals stay competitive
Acronyms

STS = Ship-To-Shore Crane

RTG = Rubber Tired Gantry Crane

ASC = Automated Stacking Crane

SC = Automated Shuttle Carrier
Non-automated container terminal operations

Vessel → UTR (Yard Chassis) → RTG → Truck
Automated Operations

- Automated Horizontal Transport (Shuttle Carriers)
- Automated Stacking Area/ Block (ASC)
- Automated Landside Service (Trucks & Rail)
Automated Stacking Cranes (ASC)s

• **Stacking Ability:**
  – 1 over 5 containers (Stack 5 High)

• **Specifications:**
  – Dimensions – 23.77 m H x 25.60 m W
  – Weight – 230 Tons

• **Operated by:**
  – TOS/TLS
Horizontal Transport
Automated Shuttle Carriers (SC)s

Stacking Ability:
1 over 2 High
Key Terminal Features
Port of Los Angeles

🌟 TraPac
Berths 142 – 147
Scope

- 200 Acres (81 Hectares)
- Throughput 1.6 M TEU
- 19 Automated Stacking Blocks
- 2 Mini Automated Stacking Block
- On dock rail yard

Re-Developed Terminal

- Total Equipment:
  - 39 – 8 wide ASCs
  - 1 – 10 Wide ASC
  - 17 – Automated Shuttle Carriers
  - 2 – ARMGs for rail yard
Automated Operations at TraPac
Unique Features at TraPac

- Fully automated both waterside & landside ASC block operations
- SCs deployed in conjunction with ASCs Blocks
- Containers transferred directly from waterside area to on-dock rail yard
- Two mini ASC blocks for hot cargo
- SCs uses magnets in pavement for navigation
Challenges

• Irregular Shaped Terminal
• Integrate Crane Equipment, Serving Utilities, Operations & Infrastructure Design
• Maintain Terminal Operation During Construction
• Existing Underground Utilities & Chemically Impacted Soil
• Meet Precise Crane Manufacturer Parameters
• Power System Load Estimation & Infrastructure
Collaborative approach between POLA, CH2M HILL, TraPac, and Cargotec led to operations, equipment, & infrastructure design that is fully integrated.
Phasing and coordination with TraPac helps maintain terminal operations during construction.

Phasing of Construction Activity

Berth 142-147 Active During Construction
TraPac Los Angeles Construction
Lessons Learned

• Automation is a paradigm shift in container terminal design
• Crane equipment, operations & infrastructure design should be integrated for smooth operation
• Success is dependent on collaboration between all parties
• Precise layout of rail, fences, utilities, duct banks, manholes, & equipment pads are needed in the field.
• Demarcation of work for all entities
• Adapting foreign equipment to U.S. codes and standards
• Continuous communication is key!