Automated Container Terminals

Automation of TraPac Terminal, Los Angeles

Port Executive Management Seminar
Merida, Mexico

CH2MHILL®

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

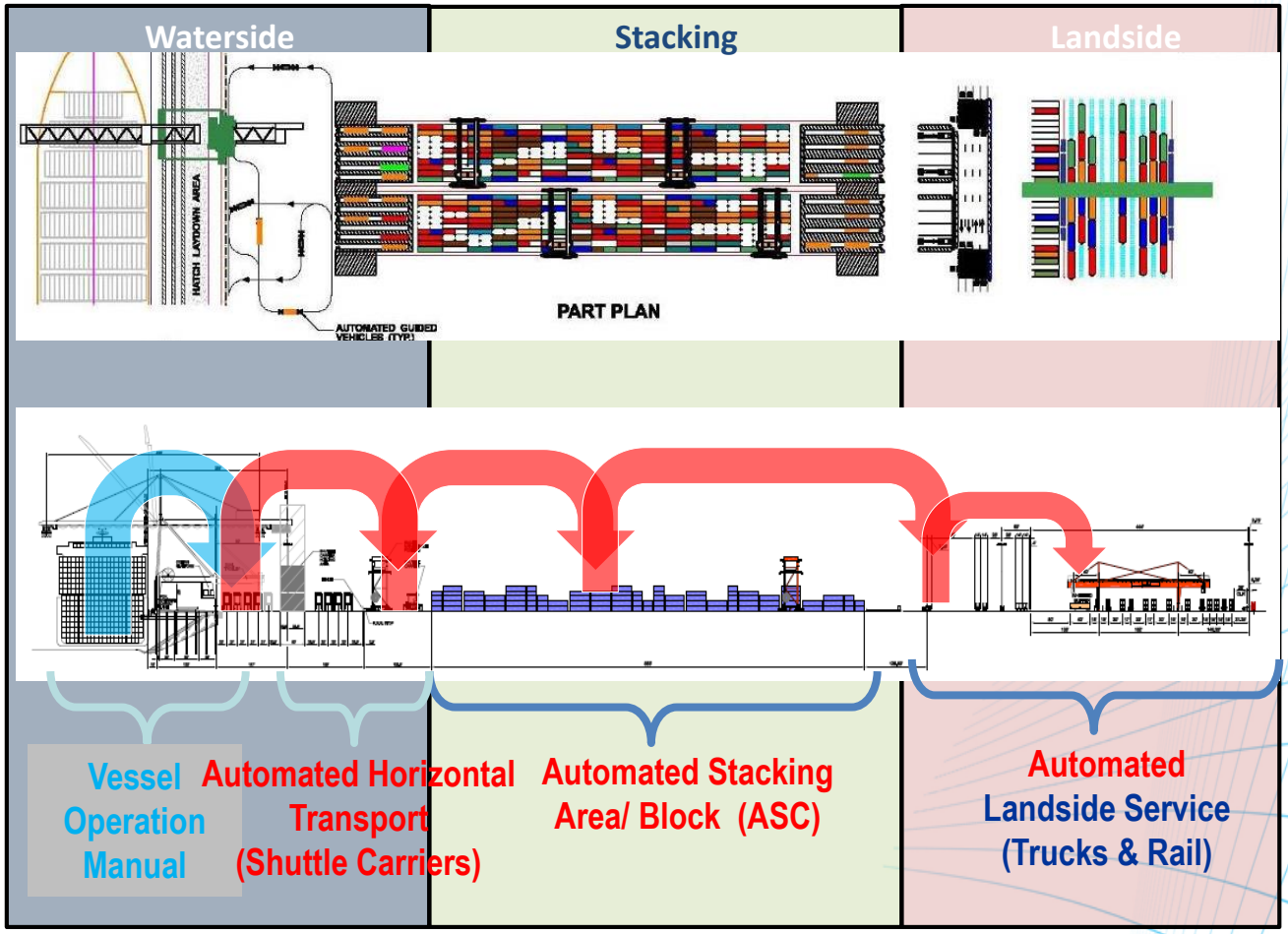
Vessel

UTR
(Yard Chassis)

RTG

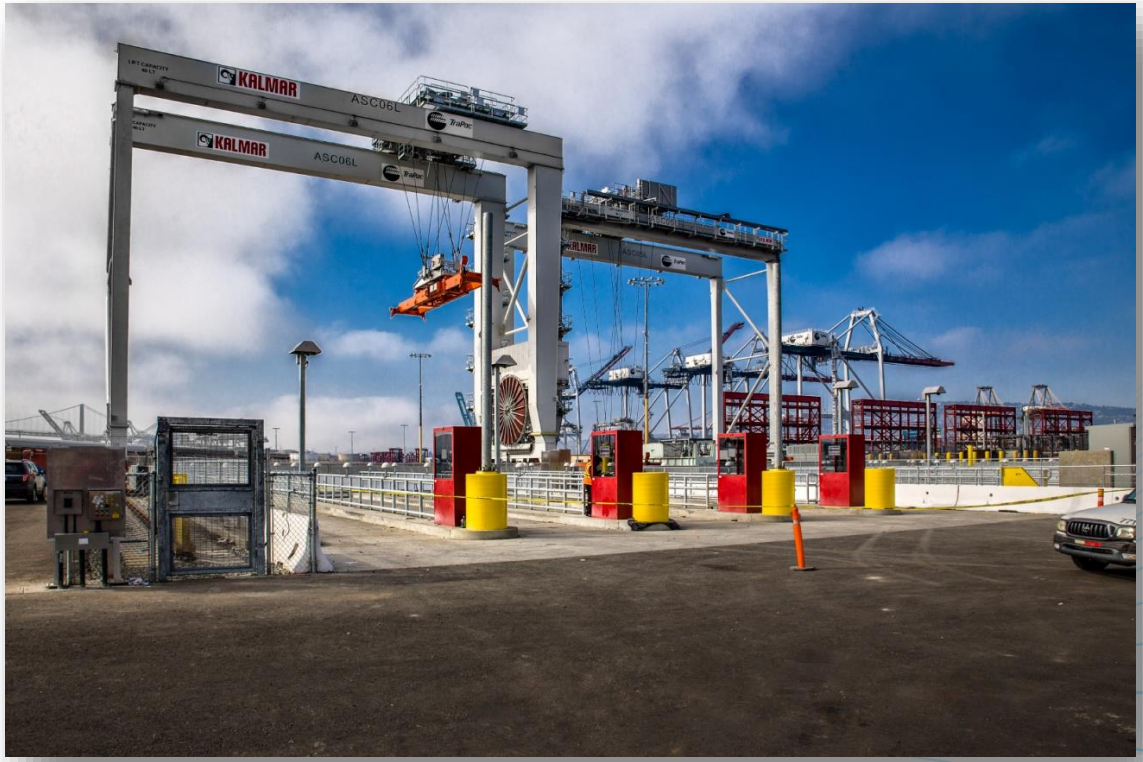
Truck

Automated Operations



Automated 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

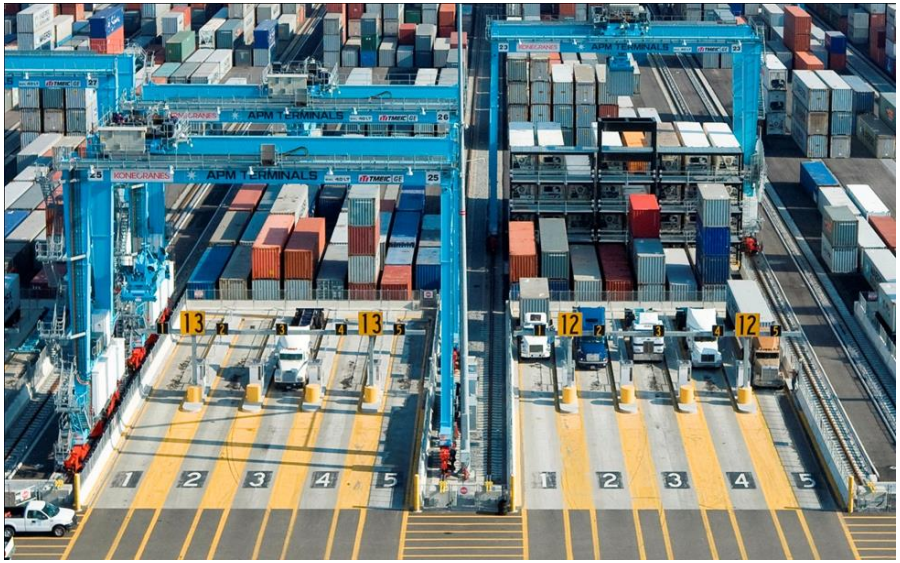


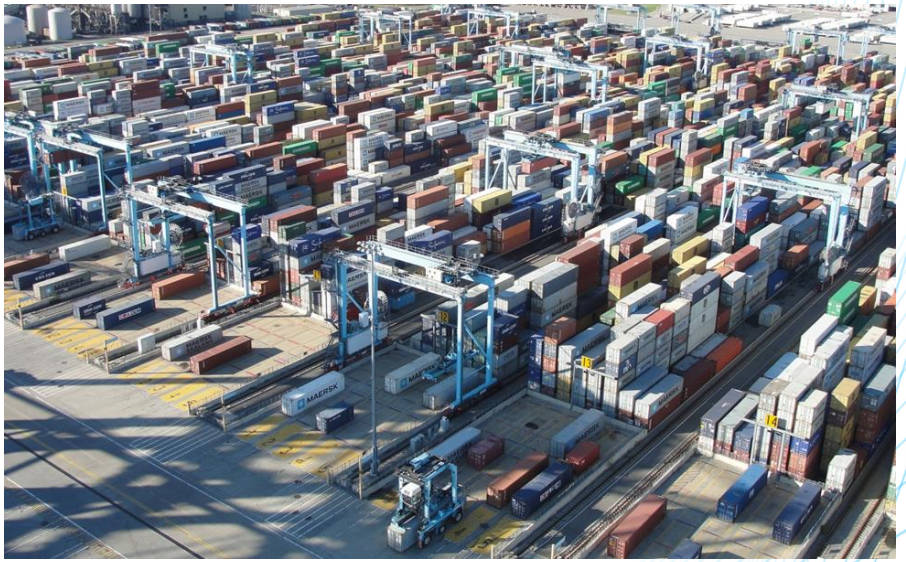
Horizontal Transport

Automated Shuttle Carriers (SC)s

Stacking Ability:
1 over 2 High

Key Terminal Features

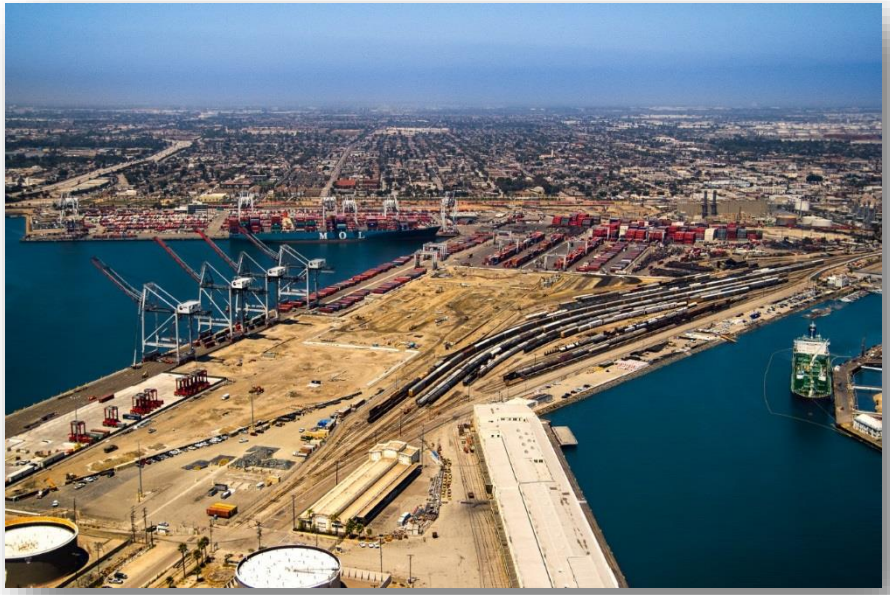




Port of Los Angeles

- **TraPac**
  Berths 142 – 147

Scope



Project Site In Construction

- 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

Civil Construction and Crane Equipment Integration

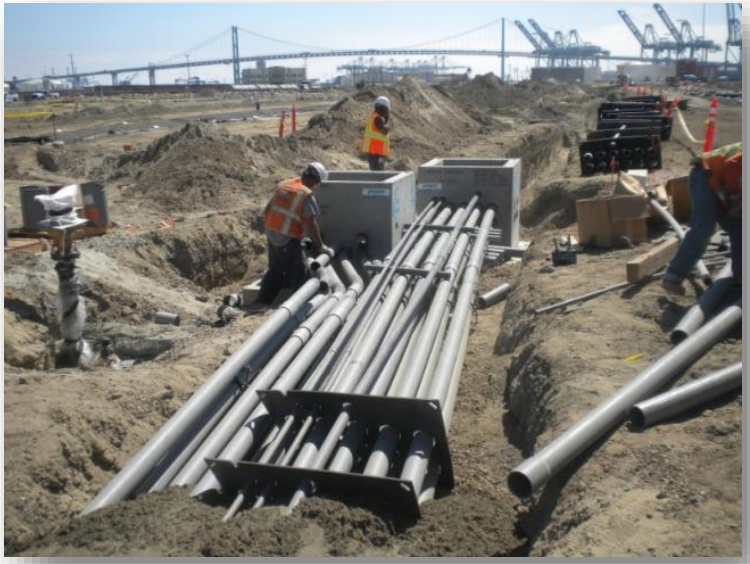
Workshops and Weekly Meetings

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!