Automated Terminals on the Pacific Rim
PPCAC

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Overview

- Review of characteristics of terminals in Asia vs. US West Coast
- Asian Automation Examples
- US automation plans
- How to decide the best plan for a particular terminal
Characteristics of Asian Terminals

• Expensive land encourages high density operations
• Moderate/high levels of transhipment, either barge or mainline
• Low level of rail
• Relatively low labor cost
• Relatively low concern over environmental impact
Asian Terminals Have Historically used Aggressive Conventional Means to Achieve Industry Leading Statistics

• Tall RTGs and empty handlers
• 24/7 operations
• Mid-harbor barge/ship work
• Multi-pick spreaders
• Off-terminal container depots
• High number of cranes per vessel
Port of Singapore
TEU per Hectare (1 Ha = 2.47 acres)

* Includes 6M TEUs performed midstreams and at other wharves not included in total container terminal area.
Containers Being Handled without a Berth or Container Yard!
Ten Cranes on One Ship in China!

The Emma Maersk at Yantian International Container Terminals
Asian Innovation and Automation

- Historically density driven: very tall RMGs or Bridge cranes
- Recently aided by advanced in crane control and sensors
- High fuel cost is driving switch to electric yard cranes
- Medium/low labor cost has kept horizontal transport manual
Example Automated Terminals in Asia

Tokyo
Pusan
Kaohsiung
Singapore
Pusan Newport, Korea
Evergreen Kaohsiung, Taiwan
Truck Positioning Guide on RMG in Pusan
1-over-8 Bridge Cranes in Singapore
Bridge Crane Operating Room
Stacking frame for Reefers in Japan w Solar Panels on Roof
Oct 2011 World Cargo News

Interior and exterior views of the high density container racks developed by JFE Engineering for NYK Line at Ohi Pier, Tokyo
Characteristics of US West Coast Terminals

• Expensive labor encourages low density operations
• Historic abundance of land
  – Ocean fill
  – Conversion of breakbulk or military terminals
• Very little transhipment
• High level of rail
• Relatively low concern over environmental impact prior to early 2000s
• High current level of environmental concern
• Powerful unions have delayed implementation of automation
APMT Pier 400 Los Angeles
USWC Automation Issues

• Mix of greenfield and retrofit projects
• Phasing is important
• Ultra high density is not necessarily critical
• High labor costs make end-loaded systems appealing because horizontal transport can be automated
AMPT Norfolk Landside Operation
APMT Norfolk Wharf
Manned shuttles are used for transport
Euromax Rotterdam
AGVs
ASCs either parallel or perpendicular to wharf
2 ASCs per row
Terminal Planning and Analysis Goals

• Match berth and backland capacity and landside transfer capacity
• Understand equipment cost vs. productivity
• Compare overall costs of options considered
• Compare emissions and other environmental impacts of options considered
• Communicate planning process to decision makers via drawings and simulation animations
Thank You
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