

Automated Terminals on the Pacific Rim

PPCAC

Los Angeles Feb 22, 2012
Mark Sisson, PE

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 transshipment, either barge or mainline
- Low level of rail
- Relatively low labor cost
- Relatively low concern over environmental impact

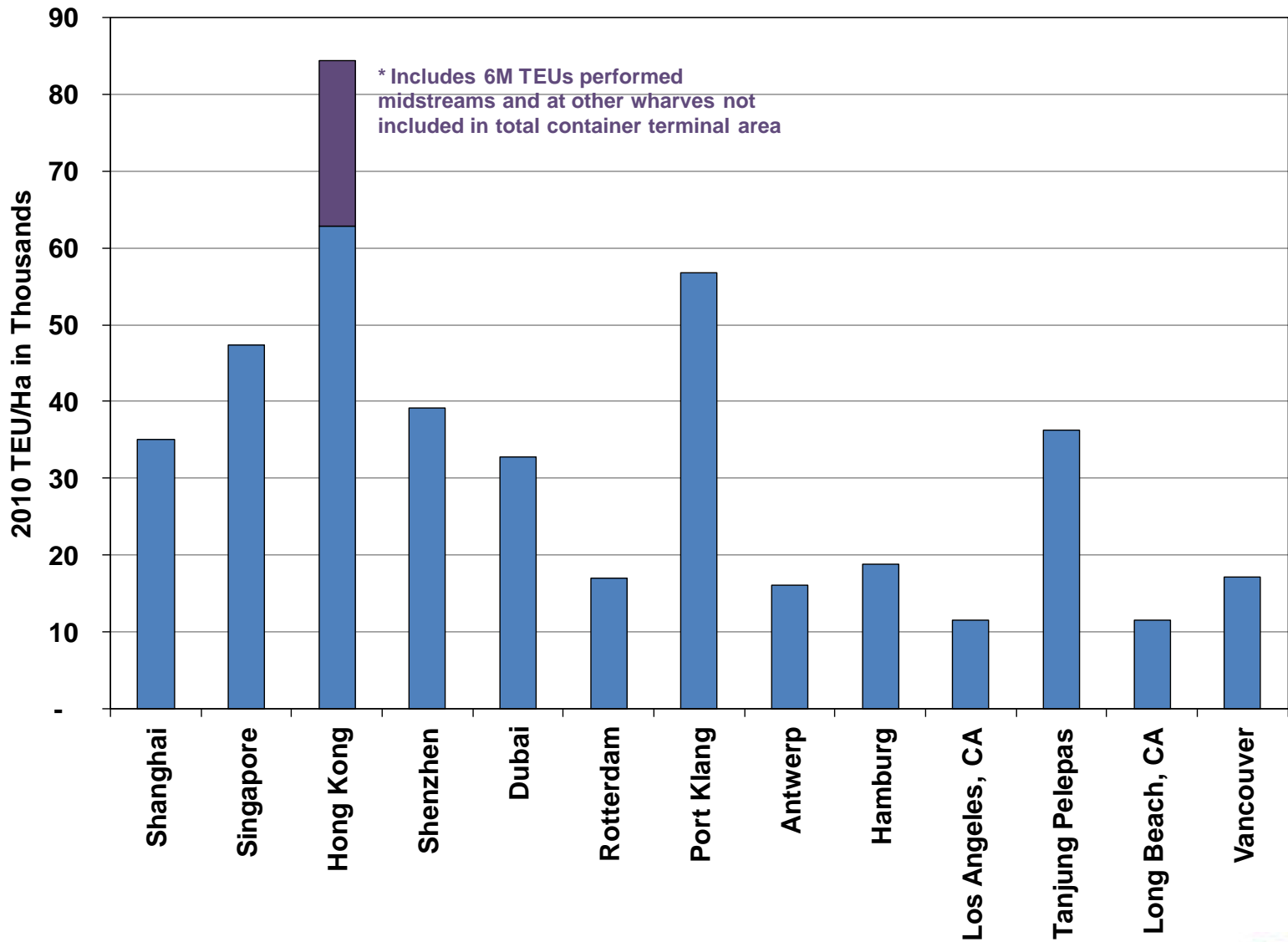
Asian Terminals Have Historically used Aggressive Conventional Means to Achieve Industry Leading Statistics

- 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

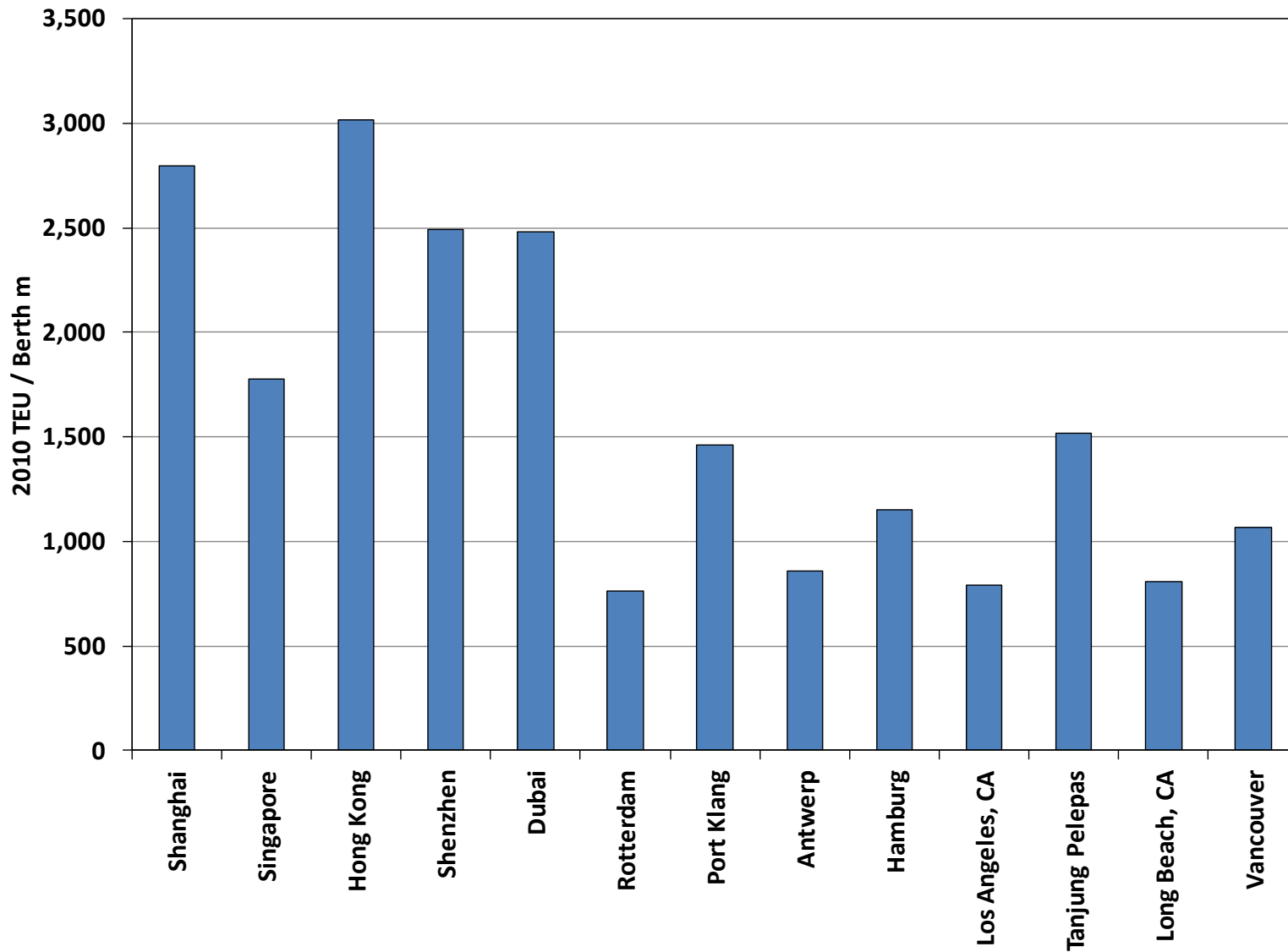
Port of Singapore



TEU per Hectare (1 Ha = 2.47 acres)



Lifts per Meter of Berth



Containers Being Handled without a Berth or Container Yard!



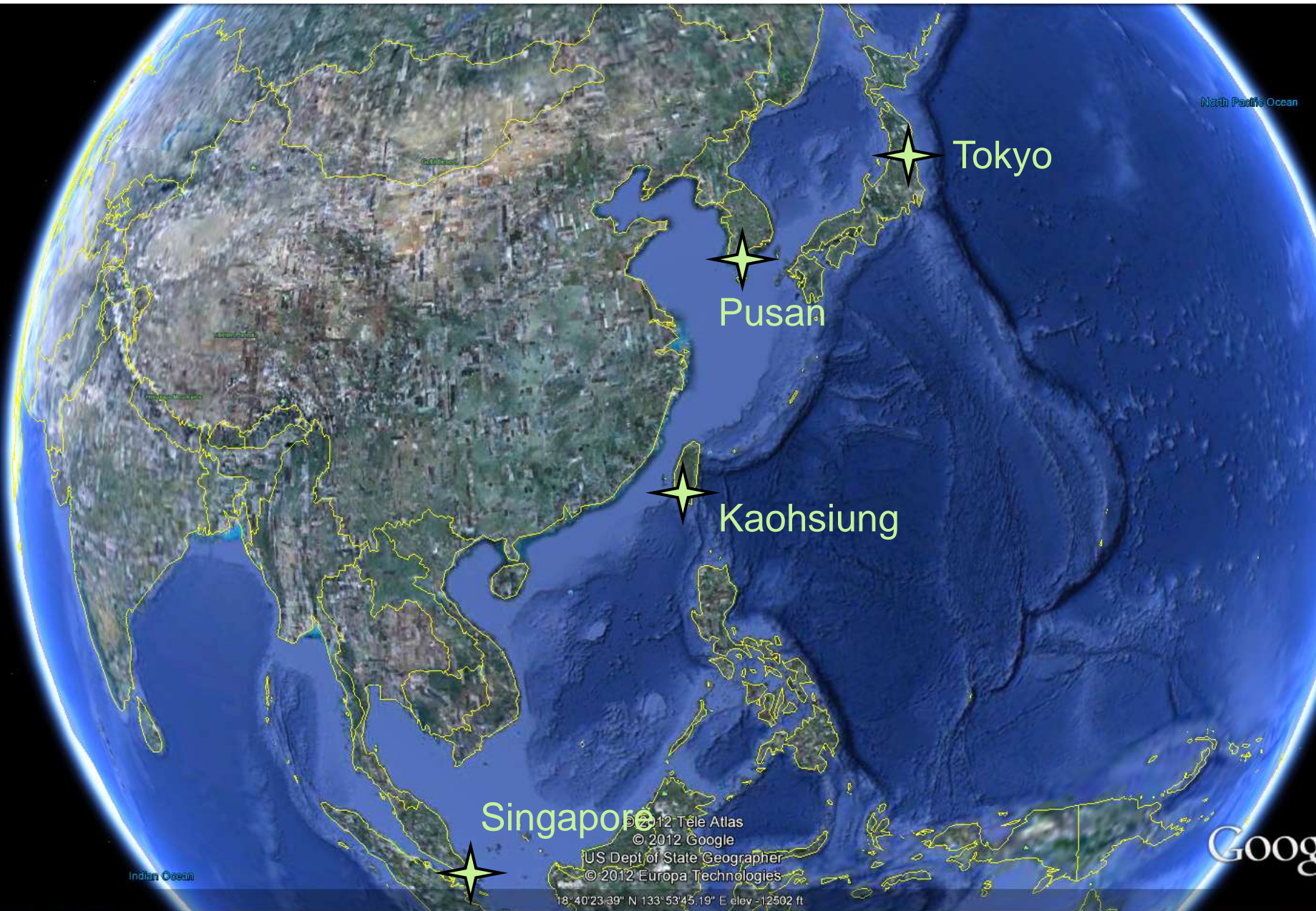
Ten Cranes on One Ship in China!



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



Pusan Newport, Korea



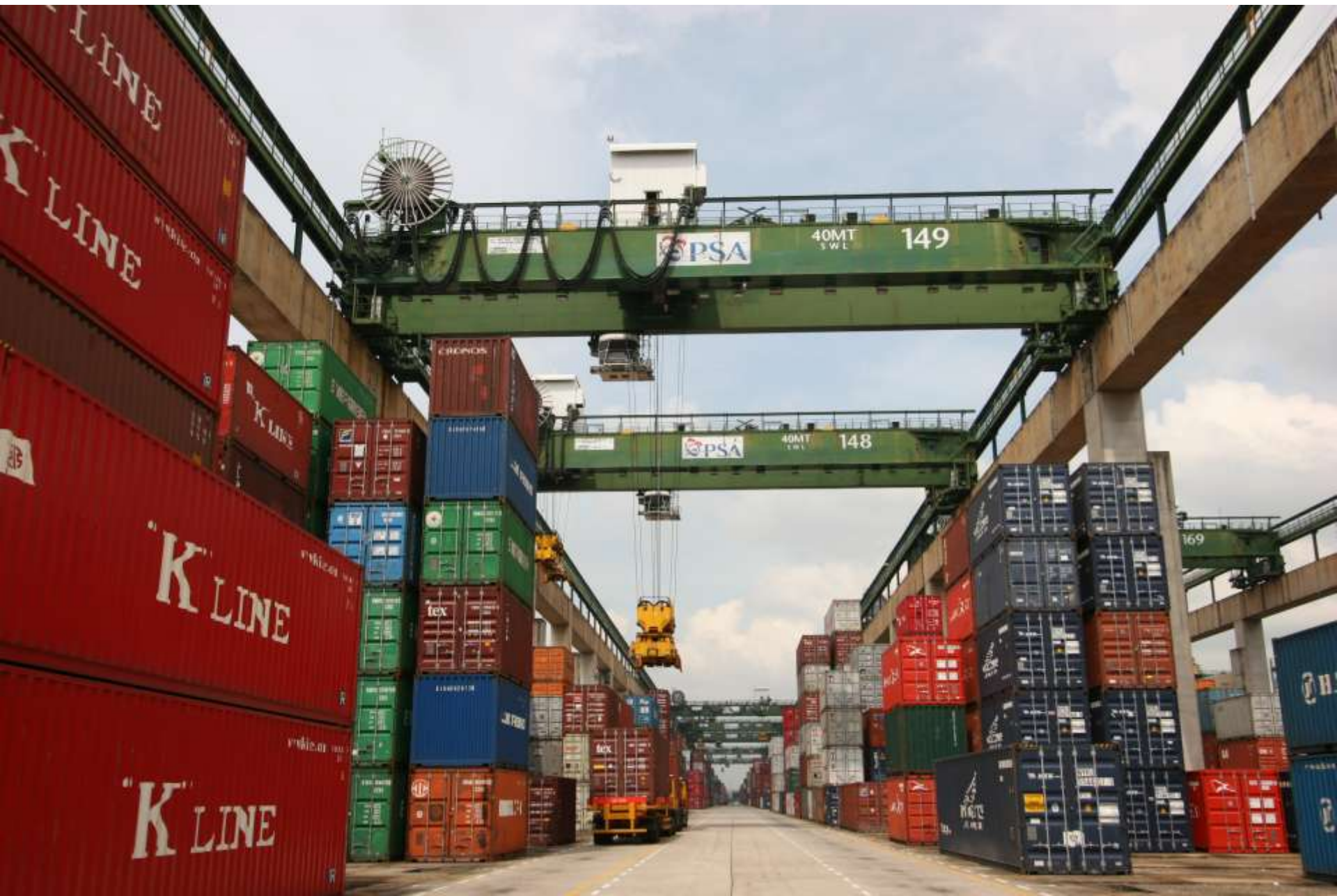
Evergreen Kaohsiung, Taiwan



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 transshipment
- 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



TraPac Los Angeles Layout



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



Contact Information

- Mark Sisson, PE
AECOM
2101 Webster Suite 1900
Oakland CA, 94612
Phone: 510-844-0549
Email: mark.sisson@aecom.com
Web www.aecom.com