



## Growing Green at the UP's ICTF

Faster Freight Cleaner Air  
Feb 26, 2008

1

### Overview

- UP Railroad operates the Intermodal Container Transfer Facility (ICTF) in LA
- ICTF is the main off-dock railyard serving POLA/POLB
- At current volume of 715,000 lifts per year, the facility is approaching capacity
- UP is examining a number of innovative future options to increase capacity and reduce environmental impact

2



ICTF Location

### Current Operation at ICTF

- Small gage RTGs serving one track each
- Wheeled buffer storage
- Fleet of terminal tractors required to service RTGs
- All equipment manually operated and diesel powered



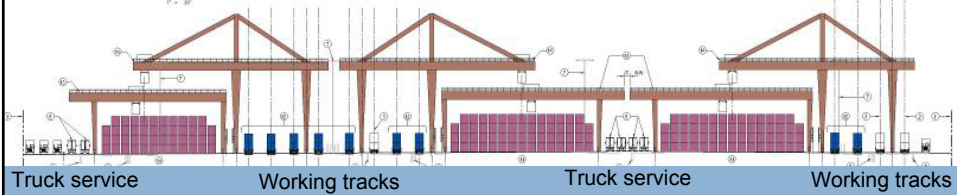
# Future Options with Rail Mounted Gantry (RMG) Cranes

neither option requires terminal tractors

## Unified RMGs



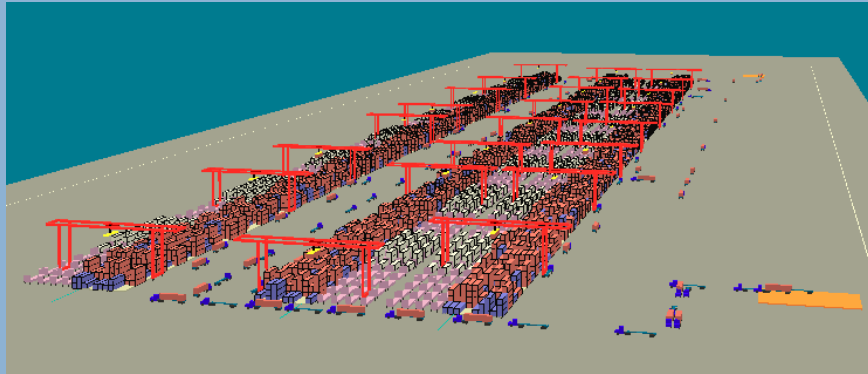
## Nested RMGs



## Example RMG Photo

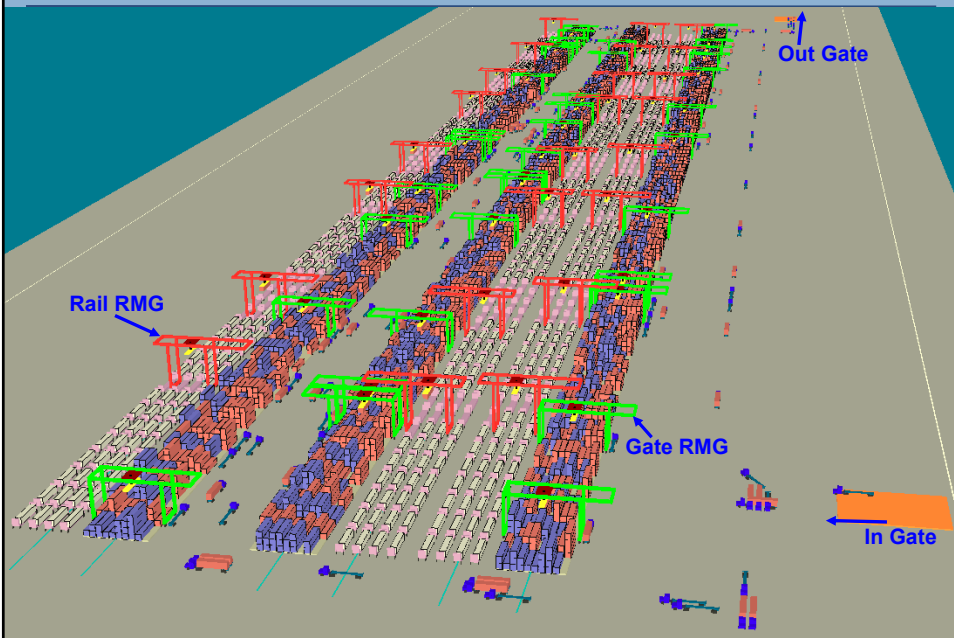


## Unified Crane Layout



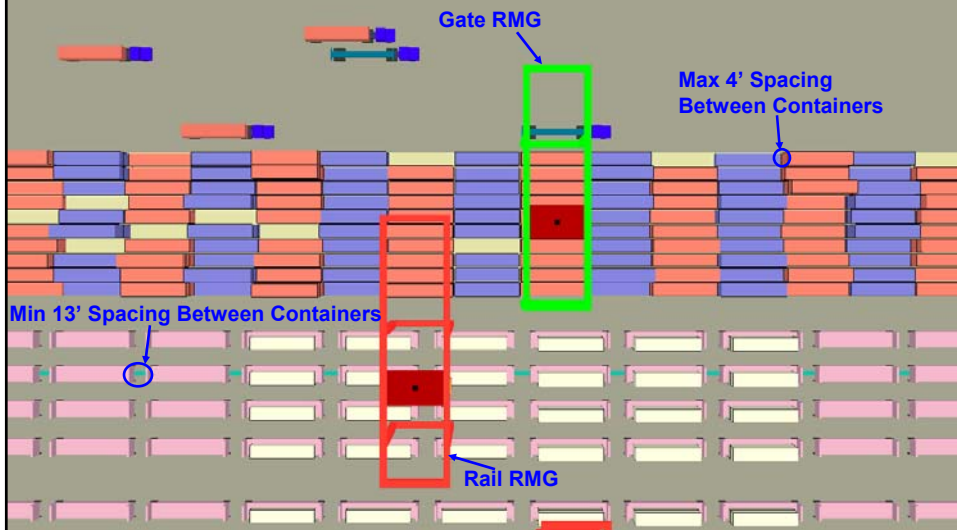
7

## Nested Crane Layout



## Train RMGs will Gantry with Every Move

DMJM HARRIS | AECOM



9 RMGs must gantry after picking from/setting to a railcar because buffer stack and railcar containers have different spacing

DMJM HARRIS | AECOM

### Key Analysis Issues

- RMG productivity to/from trains in each case
- Overall facility capacity
- Cost per move
- Emissions per move vs current operation
- Sensitivity to:
  - Truck arrival pattern
  - Time to work IBCs “coning delay”

## Gate Arrival Pattern vs Terminal Performance

### – Unified Case

- RMGs must give preference to truck service
- If daily pattern has a high peak, RMG productivity to/from train will be low during peak hours
- UP set minimum acceptable levels of RMG productivity

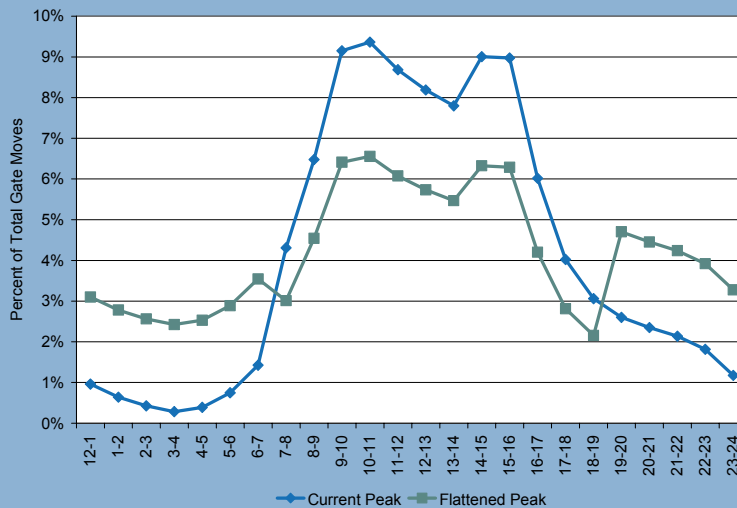
### – Nested case

- RMG productivity to/from train is unaffected because train RMGs do not serve gate trucks
- Sufficient gate RMGs must be purchased to serve peak gate hours
- If the ratio of peak hour gate arrivals to mean hour arrivals is very high, gate RMGs will be lightly utilized and capital cost will be high

11

## Fraction of Daily Arrivals per Hour

Current and Future Best Case Patterns



12

## DH's GMTS Simulation Model was Used to Analyze Each Option

### Input:

- Terminal Geometry
- Rail Loading and Discharge Sequence
- Operating Assumptions
- Equipment Cycle Time
- Peak Rail Load
- Peak Gate Load

### Output:

- Equipment Utilization
- Equipment Productivity
- Container Stack Population
- Street Truck Turn Time
- Other Terminal Performance Measures

## RMG Productivity to/from Trains

- Unified case:
  - 13-17 moves per RMG per hour during peak gate hours
  - 25-30 moves per RMG per hour during off-peak hours
- Nested case – 34 container moves per RMG per hr regardless of gate arrivals



## Deriving Annual Capacity from Hourly Productivity

- Maximum practical RMGs in use (minimum spacing between RMGs)
- Delay for switching railcars between working and storage tracks
- Delay for rehandling (if applicable)
- Downtime for maintenance and repair
- Seasonal peaking factors
- 1.5 million rail moves/year are achievable with either RMG system

## Costs Considered for Comparison

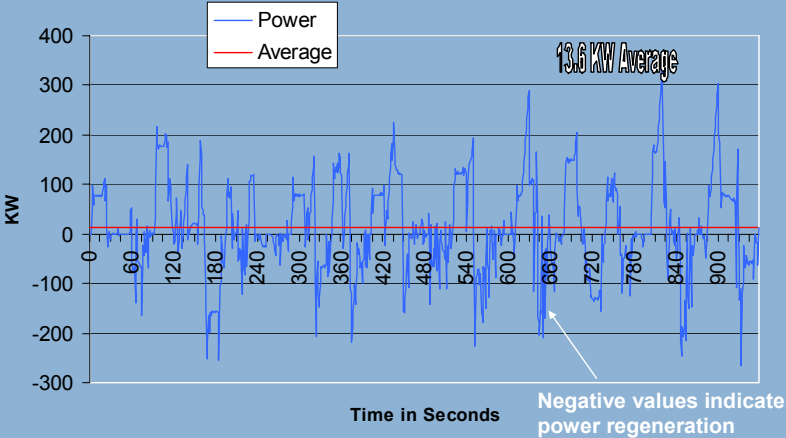
(6% Annual Interest Rate Used Where Applicable)

- Common Costs
  - Includes grading, paving, lighting, rail tracks, striping, electrical infrastructure
- Infrastructure
- Equipment Capital
- Energy
- Maintenance
- Labor
- Automation IT

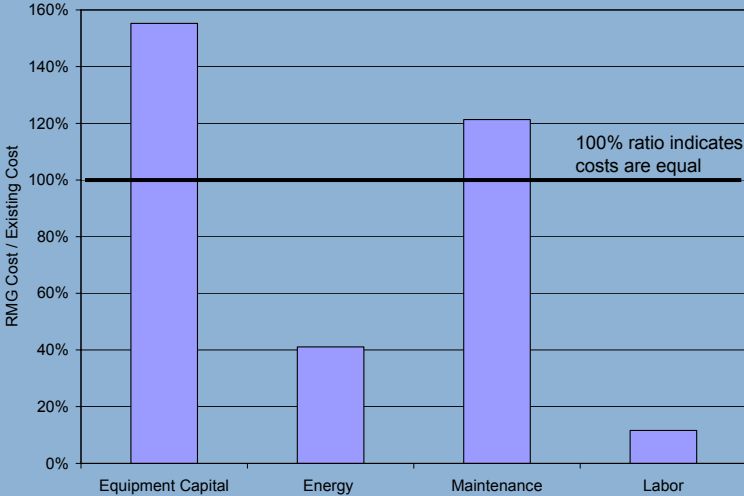


### Example RMG Power Usage

- Regeneration Allows for very low mean power requirements in RMGs
- 13.6 KW mean usage in this example



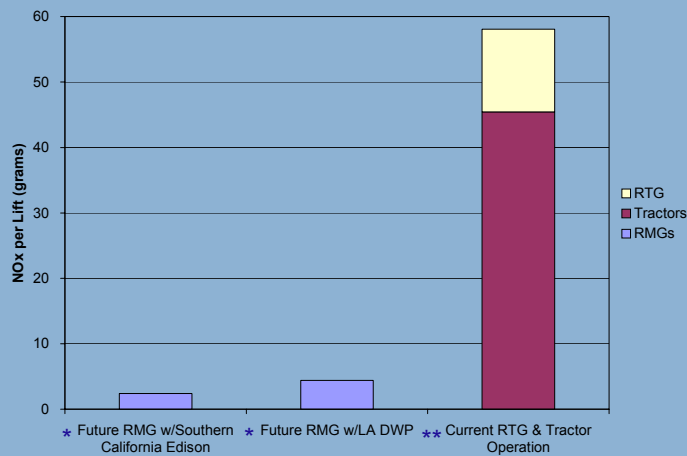
### Operating Cost per Move Nested RMG Option / Existing RTG+Tractor Cost



## Typical NOx per Move for RMGs vs RTGs+Tractors

DMJM HARRIS | AECOM

Note: data is not specific to ICTF



\* Data calculated from the EPA's Emissions & Generation Resource Integrated Database (EGGrids) – 2006

\*\* Based on simulation studies of similar facilities using Tier 3 Diesels  
19 [3 g/(bhp-hr) NOx]

DMJM HARRIS | AECOM

### Summary: Advantages of RMGs vs Current Operation

- Electrically powered: no local emissions
- Wide-span design allows more tracks on same sized facility
- Highly automatable: lower operating cost
- Safer: truck/crane collisions can be prevented through physical barriers
- Less noise
- Less light required



*Thank You*

DMJM HARRIS | AECOM

### **Speaker Contact Information**

- Mark Sisson, PE  
**DMJM+Harris**  
300 Lakeside Dr.  
Oakland CA, 94612  
Phone: 510-844-0549  
Fax: 510-835-3464  
Email: [mark.sisson@dmjmharris.com](mailto:mark.sisson@dmjmharris.com)  
Web [www.dmjmharris.com](http://www.dmjmharris.com)