

#### Planning and Design Considerations for a Container Terminal With Electric RTG Cranes

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The presentation provides an overview of different types of Electric RTG (ERTG) crane systems currently available with a comparison of key features along with examples. It also gives information on the proposed Hugh Leatherman Container Terminal located in Charleston with possible use of ERTGs.

The talk will conclude with key notes on how to implement ERTG systems into existing or new container terminals.



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# **Status of Container Terminals in Americas**

**Diesel RTG cranes dominate the container yard market** 

- Market pressure to operate with
  - Fewer air emissions
  - Higher density
  - Lower cost
- Automation has been slow but growing
- More than 75% of terminals use Diesel RTGs in the yard
- Remaining terminals use Top Pick, Side Pick and Strads
- Growing interest in ERTG / Hybrid cranes





## Why ERTG / Hybrid Cranes?

High ROI?

#### WHAT WE KNOW:

WHAT WE ARE NOT SURE:

- Reduces OPEX
- Reduces air emissions & noise
- Flexibility for remote operation
- Flexibility to retrofit existing diesel RTGs or purchase new

- How to electrify?
- How much extra CAPEX cost?
- What will be the reliability?
- How to phase out existing operations?
- Level of acceptance by labor?

#### **Remotely Operated RTG Considerations**

- Avoid RTG runway beam settlement
- Auto-steering and positioning
- Twist lock handling for gate trucks
- Gate truck driver safety protocols
- Operations during changing rows



## **RTG / ERTG / HYBRID CRANE SYSTEMS**



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## Hugh K. Leatherman, Sr. Terminal (HLT) Detailed Design



#### **AECOM Team Local Partners and Proximity to HLT Terminal**



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#### **Integrated Project Delivery Team of HLT**



## **HLT Project Execution Approach**



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## **Value Engineering**

Pre-Workshop • Project coordination • Base case material

- preparation
- Workshop logistics
- Team selection
- Workshop •Information Phase •Function Analysis Phase •Creative Phase •Evaluation Phase
- Development Phase
- Post-Workshop •Draft VE Report Preparation •Final VE Report

_	No. of Ideas	CFs	DC	NCF	PC	Developed With Another Idea	ABD
Overall Project	4	0	1	2	1	0	0
Berth Dredging	12	0	1	6	5	0	0
Buildings/Ancillary Structures	45	12	11	7	0	15	0
Electrical	34	8	12	9	0	4	1
General Design/Container Yard	34	10	8	2	0	14	0
Marginal Wharf	30	10	11	6	1	2	0
Total	159	40	44	32	7	35	1

#### Legend:

CF = Carried Forward DC = Design Comment NCF = Not Carried Forward PC = Procurement Comment ABD = Already Being Done













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#### Development of HLT Concept Design to 100% Design



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#### HLT Container Yard General Arrangement





- Terminal throughput goals
- Stacking density
- Truck traffic flows
- Maintenance access
- Terminal lighting requirement
- Refrigerated containers

#### **DESIGN (ENGINEERING)**

- Geotechnical conditions
- Pavement design
- Stormwater drainage
- Fire Hydrants
- High mast lighting
- Fence, Barrier, Striping



# **Concluding Remarks**

- North American market has a huge potential to phase out from Diesel RTGs
- Selection of type of ERTG/Hybrid system is site specific
- Market response to Zero emission vs. full operational flexibility will continue to drive toward full electric
- Multi-disciplinary engineering resources are required
- Look for Value Engineering opportunities before finalizing design
- Look to implement sustainable / resiliency concepts early on in terminal planning / design

Thank you for your attention!

**Questions?** 



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