

#### PORT&TERMINAL Technology

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# Automation in traditional RTG operated Terminals

Present situation and challenges in regard of automation

Operational requirement's

Total Cot of Ownership

**RTG equipment requirement's** 



### **RTG Situation Today**

2 Main Girders
Weak Gantry Structure
Weak Rope Tower
Micromotion/Anti-Sway needed
Not ready for Fully Automation







## **Brownfield RTG Automation**

**HPC Study** 





# **Reference Terminal**

#### **Initial situation conventional RTG Terminal Setup**







# **ASC Concept**

#### **Default Design for Automated Terminals**



- Established end loaded ASC concept based on rail-mounted gantry cranes.
- Yard blocks arranged perpendicular to the quay to separate waterside and landside traffic.
- 16 modules with 2 cranes each are required to cope with waterside and landside handling volumes, providing 30 quay crane moves per hour.
- Requiring conversion of the yard operations.
- Horizontal transport methods as available today in the market (SC's, AGV's, etc.).



HPC Block End RTG Concept

#### Terminal Layout for automating with existing RTG Infrastructure



- The automated concept works like an end loaded ASC terminal with yard blocks parallel to the quay.
- Based on existing RTG infrastructure, without turning yard blocks.
- Enabling continued operations.
- Additional space is required for handover lanes at block ends.
- Parallel truck lane is used for wider container stacks.
- Container stacks are fenced for clear separation of manned and automated work areas.
- Requiring 28 Kuenz RTGs to provide 30 quay crane moves per hour.





# **Cost Comparison**

#### **Total Cost for Ownership**



- The Kuenz Block-End concept has a cost advantage of 50 Million EURO over the ASC concept.
- Saving 30% of total cost
- Hence, brownfield automation with the Kuenz Block-End concept pays off much faster than for ASCs.
- Considering CAPEX and OPEX the payback time is less than 5 years compared to ordering new conventional RTGs.

## **FREERIDER – Wheeled Automation**





### **RTG Situation Today**

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## **Kuenz FREERIDER**

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**Gantry Structure** 



#### **Wind Coefficient**



Cf = approx. 2 by using a rectangular main girderCf = 0,7 when using the curved main girder

# Kuenz SPIDER Easy Handling in Perfection



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# Kuenz SPIDER Easy handling in penetion



## **Kuenz FREERIDER**

# **Gantry Drives**







# Kuenz FREERIDER



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Speed





## Speed withou Speed









## **Speed with Container**





#### Wheeled Automation - Available Modes

→ by a **Remote Operation** 

Semi-Automated Operation
→ loading / unloading of trucks by a Remote Operator
→ Stack operation fully automated

→ loading / unloading of trucks and stack operation fully automated

Because of end-loaded design, it is even possible to load / unload street trucks fully automatic.



#### Wheeled Automation - Concept

■ Transfer Zones
→ at each block end

■ 1 or 2 FREERIDER RTG´s per block
→ powered by a mono spiral cable drum or bus bar system

FREERIDER RTG's equipped with small generator set or battery system to switch blocks

Standard Laser and Camera System combined with remote operating stations known from typical ASC terminals

> ■ Standard Infrastructure as used for manual RTG operation



## **How to get Wheeled Automation?**

#### **Implement Full Automation Concept**

#### Or automatize Step by Step







Minimum risk influenceing the daily terminal operation. No risk to work with an instable and not well proven system.



## **Kuenz FREERIDER**

May I can answer some questions

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