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Modern Mobile Electrification Systems

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Conductix-Wampfler

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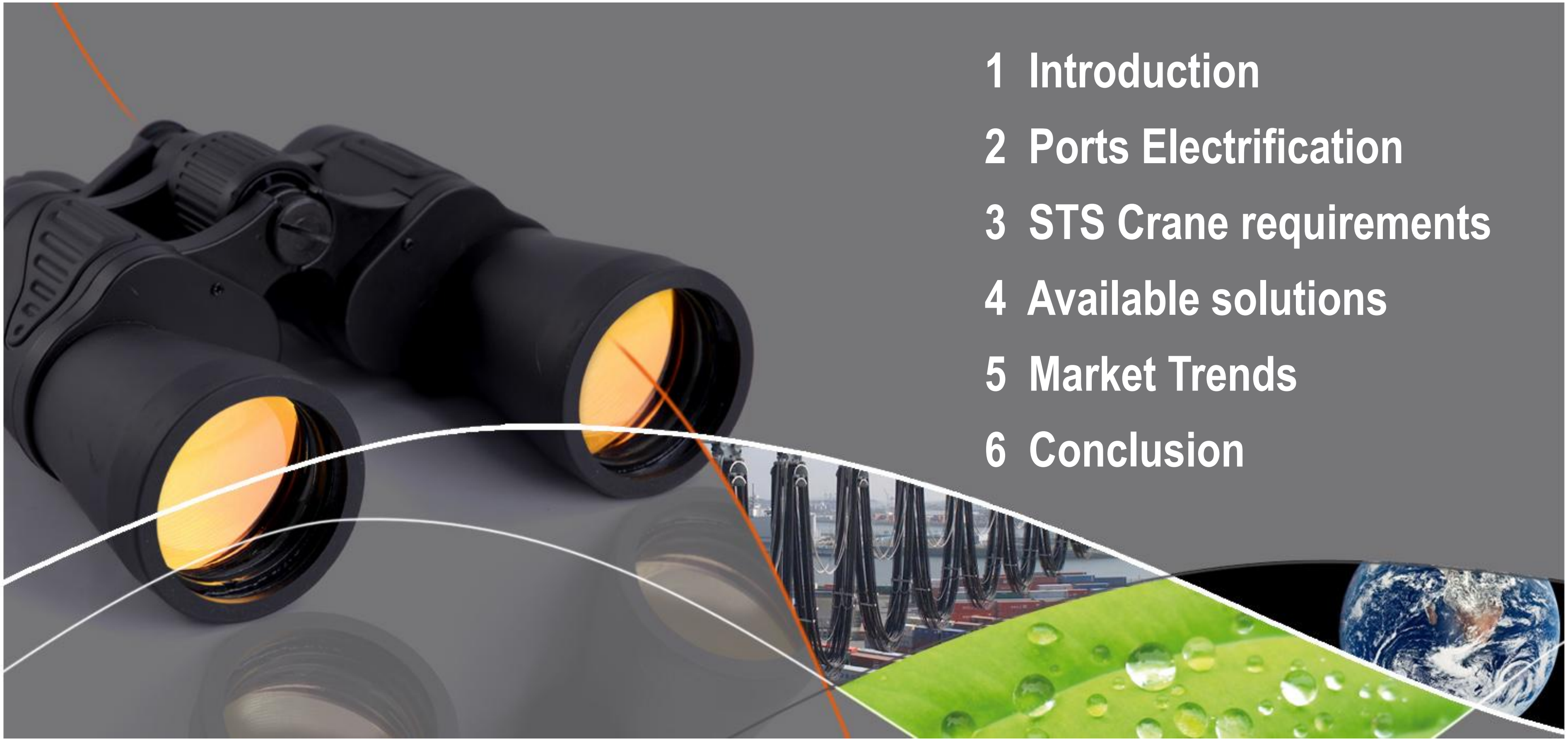
DELACHAUX GROUP

Overview



1 Introduction
2 Ports Electrification
3 STS Crane requirements
4 Available solutions
5 Market Trends
6 Conclusion

Conductix-Wampfler
Part of the Delachaux Group

- **Founded 1902**
- **Listed on Paris Stock Exchange**
- **Employees: 2600**
- **Total Group Sales 2009: around 650 Mio. €**

- **3 main operation fields:**
  - Railways & Urban Transit Systems
  - Conductix-Wampfler – Energy and Data Transmission
  - Aircraft & Automotive Industries



Full range
of Mobile Electrification Products

Mobile Electrification in terminals

1. *STS* | Ship to Shore Cranes
2. *RTG* | Rubber Tyred Gantry Crane
3. *RMG* | Rail Mounted Gantry Crane
4. Intermodal Cranes
5. Shore Power Supply (E-Shore)

Interfaces to and on Ship-to-Shore Cranes

Terminal
Energy supply
Terminal control
Service control

Telphone / video

Crane (E-house)
Transformer

Main control
Crane control systems:
- Gantry drive
- Hoist
- Kranfahrwerk

Telephone / video

Trolley
Cabine control
Crane control
Telephone / video

Spreader
Control spreader
Scanning systems

Need for Mobile Energy and Data Transmission

Interface:
Crane - Trolley

Introduction | Ports Electrification | **STS Crane requirements** | Available solutions | Market Trends | Conclusion

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Energy and Data transmission on STS Increasing demand

- **Change in Crane design**
  - increasing boom length due to bigger vessels
  - increasing trolley speed to reduce loading and unloading time (240m/min)
  - change from machine trolley to rope driven trolley

- **Increasing demand and usage of equipment**
  - increased load capacity (double spreader)
  - 24/7 operation in most major ports
  - Less maintanance of equipment – or in shorter period of time

- **Climate requirements**
  - Increasing extreme weather conditions
  - reliable functionality of equipment in all climate zones (snow, ice, rain, high humidity, dust, UV...)

Today's available solutions

1. Festoon System

- 1.1 Single Towing arm on trolley
- 1.2 additional rope driven trolley
- 1.3 rope driven trolley supported by motorized trolleys (2)
- 1.4 motorized festoon system (3)

2. Energy Guiding Chain

3. Conductor Rail System with Wireless Data communication

- 3.1 Radio data transmission
- 3.2 Microwave data transmission
- 3.3 Inductive data transmission

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Interface Crane-Maintrolley

Comparison of modern energy and data transmission

Lfd. No.	Solution	speed m/min	C°	Wind	Emergency capabilities	Capacity (Energy & Data)	Data sy	Service requirement	Life time Exp.	price in %
1.1	Festoon	< 180	robust	medium	good	high	high	medium	> 10	100
1.2	Festoon & Catenary	< 220	robust	medium	good	high	high	medium	> 10	105
1.3	Motorized Festoon	< 350	robust	medium	good	high	high	medium	12	140
2	Energy Guiding Chain	< 350	medium (snow, ice)	robust	sensible	high	high	medium	< 7	120
3.1	Conductor Rail & inductive data	< 350	robust	robust	good	< 1000A < 1000V < 100 Mbit	high	low	>12	65
3.2	Conductor Rail & wireless data	< 250	robust	robust	good	< 1000A < 1000V < 10 Mbit	medium	medium	< 12	70

Share of different solutions globally

	period 1995-2009	2010
1.1 Standard festoon systems	42 %	36 %
1.2 Festoon systems with catenary trolley	18 %	25 %
1.3 Motorized festoon system	26 %	17 %
total festoon	(85 %)	(78 %)
2. Energy guiding chain solutions	12 %	18%
3.1 Conductor rail & wireless data transmission solution	<1 %	2 %
3.2 Conductor rail & inductive data transmission solution	<1 %	2 %
total:	100 %	100 %

Energy and Data transmission on STS

What is the market demanding?

Introduction | Ports Electrification | STS Crane requirements | Available solutions | **Market Trends** | Conclusion

- **Efficient and cost effective solutions**
  - robust and easy to install
  - life time expectations > 15 years
  - easy to maintain
  - total cost of ownership

- **Increased demand for speed and data transmission**
  - possible higher speeds due to automation
  - higher data rates due to cameras and real-time requirements

- **Environmental and sustainable solutions**
  - minimal use of energy
  - use of sustainable products

Focus on Refurbishment in favor of new Cranes

- Upgrade of drive and control systems
- Increased boom length on STS Cranes
- Cost efficient solution to re-use older equipement
- Recycling of old systems

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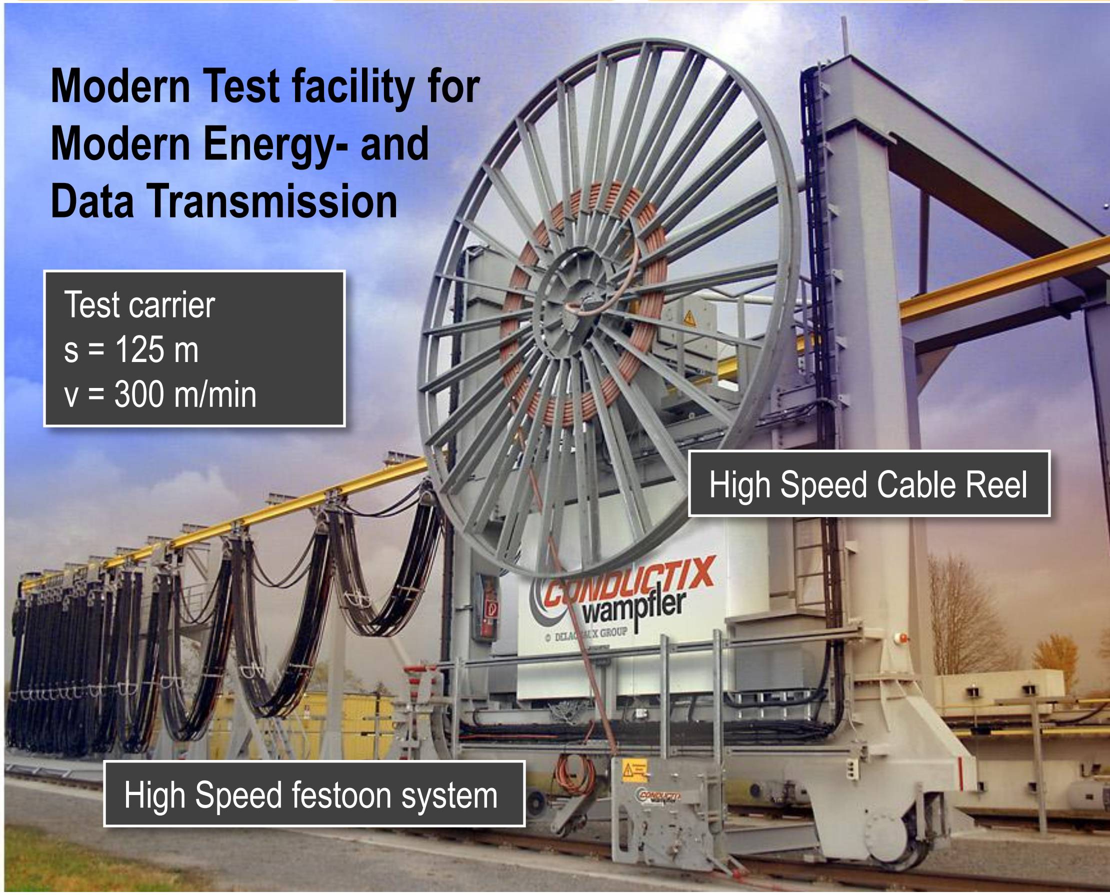
Testing of modern systems is cruical!



Environmental development is in the focus of the Ports industry

Example: Electrification of RTG‘s

- Conversion Diesel to Elelectric
- Focus on cost & energy efficient solution
- Use of new concepts and ideas in the terminals

(conductor rail and reels on RTG‘s)

Conclusion

- Traditional festoon solution still by far the most used and accepted solution for modern STS Cranes!
- Market is looking for new, energy efficient and reliable solutions
- Conductor rails are becoming an establish solution in terminals all around the world (e.g. E-RTG)
- Solutions for the Crane industry need to be energy efficient, environmental friendly and cost efficient!

Thank you for your attention!

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