

# Cable Management for Shore Power

**Georg Matzku**

*Head of Shore Power*

Webinar: Advanced Cable Solutions for Electrification and Sustainability  
*October 20<sup>th</sup> 2021*

# /// Facts & Figures Stemmann-Technik

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**Founded:** 1912 in Luxembourg  
since 1950 in Schüttorf · Germany

**Legal form:** Limited Liability Company [GmbH]  
**Owner:** part of **Wabtec Corporation** since 2014

Wabtec (**W**estinghouse **Air Brake Technology**) manufactures products for locomotives, freight cars and passenger transit vehicles, builds locomotives and is active in various other industry segments i.e. ports & maritime

NYSE: WAB, S&P 500

appr. 28k employees, 8 Bn US\$

**Employees:** about 640 [Schüttorf, Germany]  
about 110 [Poland]

**Areal:** 56.000 m<sup>2</sup>

**Workshop:** 15.000 m<sup>2</sup>

**Office:** 2.700 m<sup>2</sup>



# /// What's the Challenge? Zero emission latest in 2050 According to COP21 in Paris



"Climate change is the defining challenge of our age."  
 Ban Ki-Moon, CMP 3, Bali, Indonesia



Intergovernmental Panel on Climate Change



NEWS | 09 August 2021

## IPCC climate report: Earth is warmer than it's been in 125,000 years

Landmark assessment says that greenhouse gases are unequivocally driving extreme weather – but that nations can still prevent the worst impacts.



UNITED NATIONS NATIONS UNIES

POSTAL ADDRESS—ADDRESS POSTALE UNITED NATIONS, N.Y. 10017  
 CABLE ADDRESS—ADDRESS TELEGRAPHIQUE UNATIONS NEWYORK

Reference: C.N.735.2016.TREATIES-XXVII.7.d (Depositary Notification)

PARIS AGREEMENT  
 PARIS, 12 DECEMBER 2015  
 ENTRY INTO FORCE

The Secretary-General of the United Nations, acting in his capacity as depositary, communicates the following:

On 5 October 2016, the conditions for the entry into force of the above-mentioned Agreement were met. Accordingly, the Agreement shall enter into force on 4 November 2016, in accordance with its article 21, paragraph 1, which reads as follows:

"This Agreement shall enter into force on the thirtieth day after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 per cent of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession."

5 October 2016



28.10.2014 Official Journal of the European Union L 307/1

(Legislative act)

### DIRECTIVES

DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
 of 22 October 2014  
 on the deployment of alternative fuel infrastructure  
 (Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,  
 Having regard to the Treaty on the Functioning of the European Union, and in particular Article 91 thereof,  
 Having regard to the proposal from the European Commission,  
 After consultation of the draft legislative act by the national parliaments,  
 Having regard to the opinion of the European Economic and Social Committee (1),  
 Having regard to the opinion of the Committee of the Regions (2),  
 Acting in accordance with the ordinary legislative procedure (3),

ARX: SEPTEMBER 16, 2020 11:02 AM | UPDATED 4 DAYS AGO

### EU parliament votes to make ships pay for their pollution

By Kate Alonzo

6 MIN READ

BRUSSELS (Reuters) - The European Parliament on Tuesday voted in favour of including greenhouse gas emissions from the maritime sector in the European Union's carbon market from 2023, throwing its weight behind EU plans to make ships pay for their pollution.



FILE PHOTO: Shipping containers are being loaded onto the Yang Miao ship from Shanghai, China at Pier 1 at the Port of Long Beach in Long Beach, California, U.S., April 4, 2014. REUTERS/Bob Riba/2/Photo Funn

# /// What to Do for Going Green?

- Electronic Engine Control
- Scrubber (SOx and PM)
- SCR Catalysts (Nox)

**Emission**

**Fuel**

- Electric
- Ammonium
- Biofuel
- Fuel cell
- Hydrogen

**Engine Technology**

- Peak Shaving
- Fuel Cell
- Hybrid

**It's not easy  
being green**

- Shore Power or Cold Ironing
- Ship-side installations
- Land-side installations

**Shore Power**

**Design**

- Propeller
- Hull
- Drives
- Rudder

**Logistic**

- Industry 4.0
- Digitalisation
- Intermodal integration
- Integration into port operations

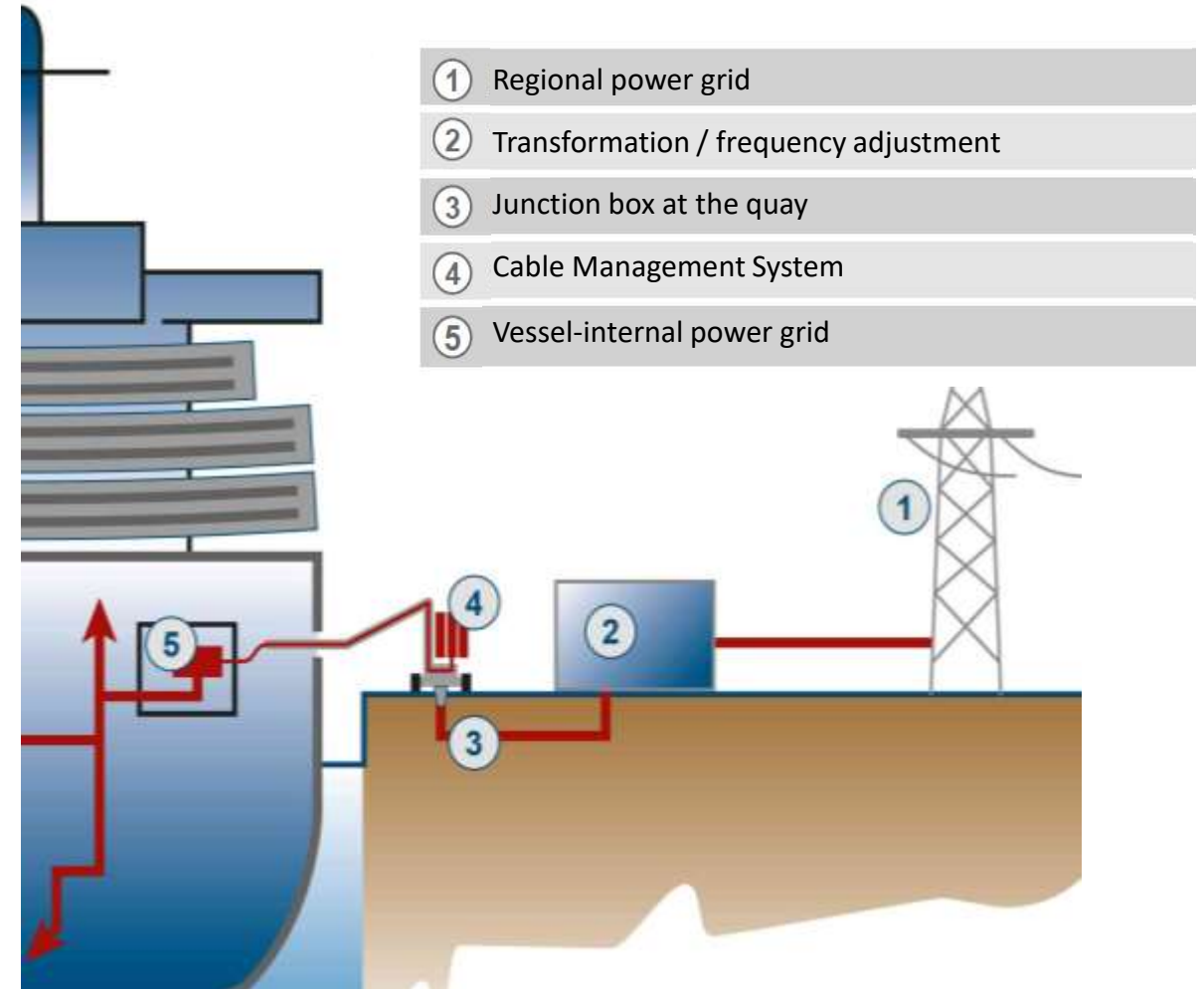
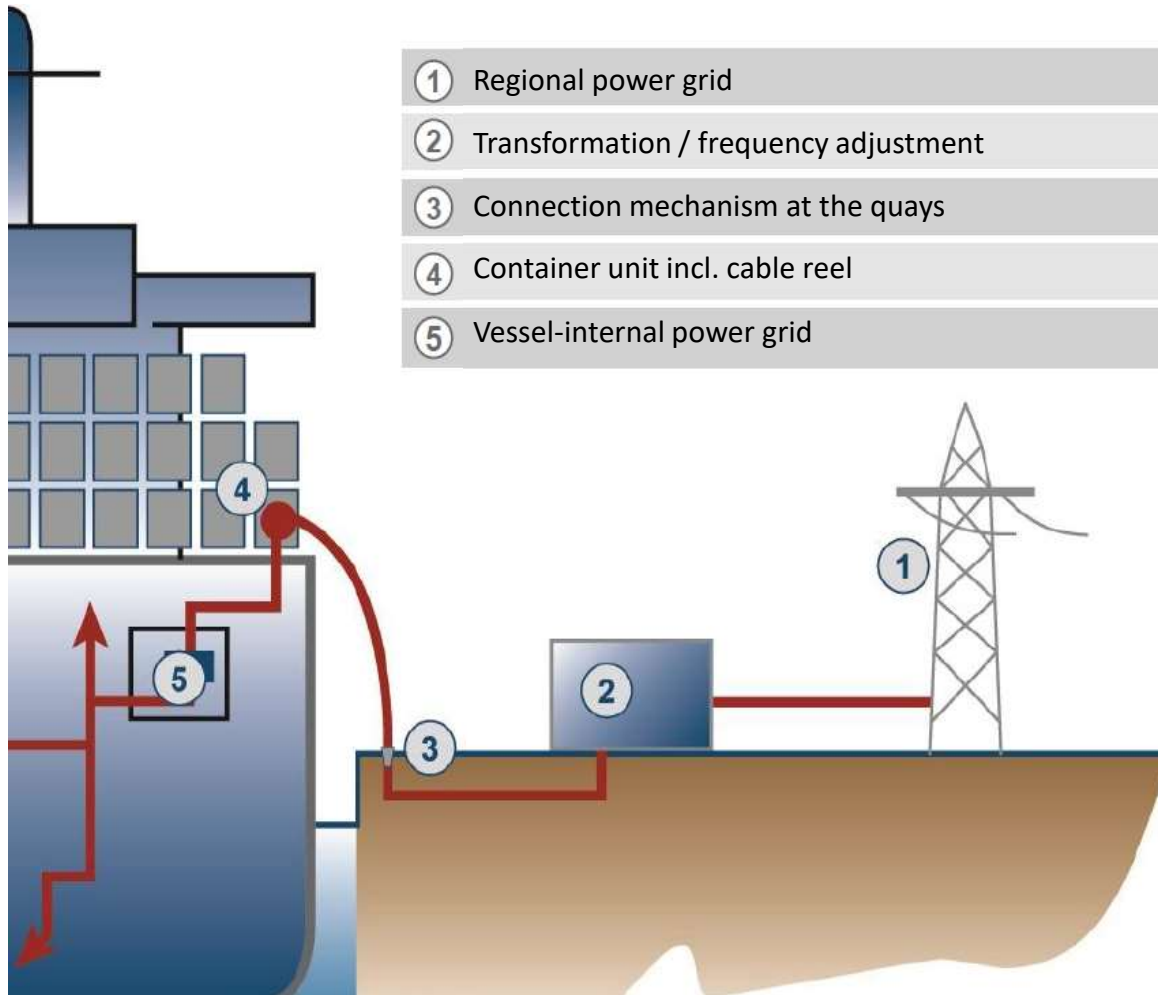
**Operations**

- Schedule planning
- Lower speed while driving
- Weather and current routing



# /// Shore Power: Container Vessels

**Shore power** or **shore supply** is the provision of shoreside electrical power to a ship at berth while its main and auxiliary engines are shut down.



# /// Reason for Going Green

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## I should

- Pressure from various stakeholders (local/national politics, NGO's, local residents)
- I get quite some money for funding

## I want

- It is cheaper (price kw/h, taxes, port fees)
- Corporate target: i.e. going on zero emissions until 2040
- Practical advantage (i.e. 24h work)

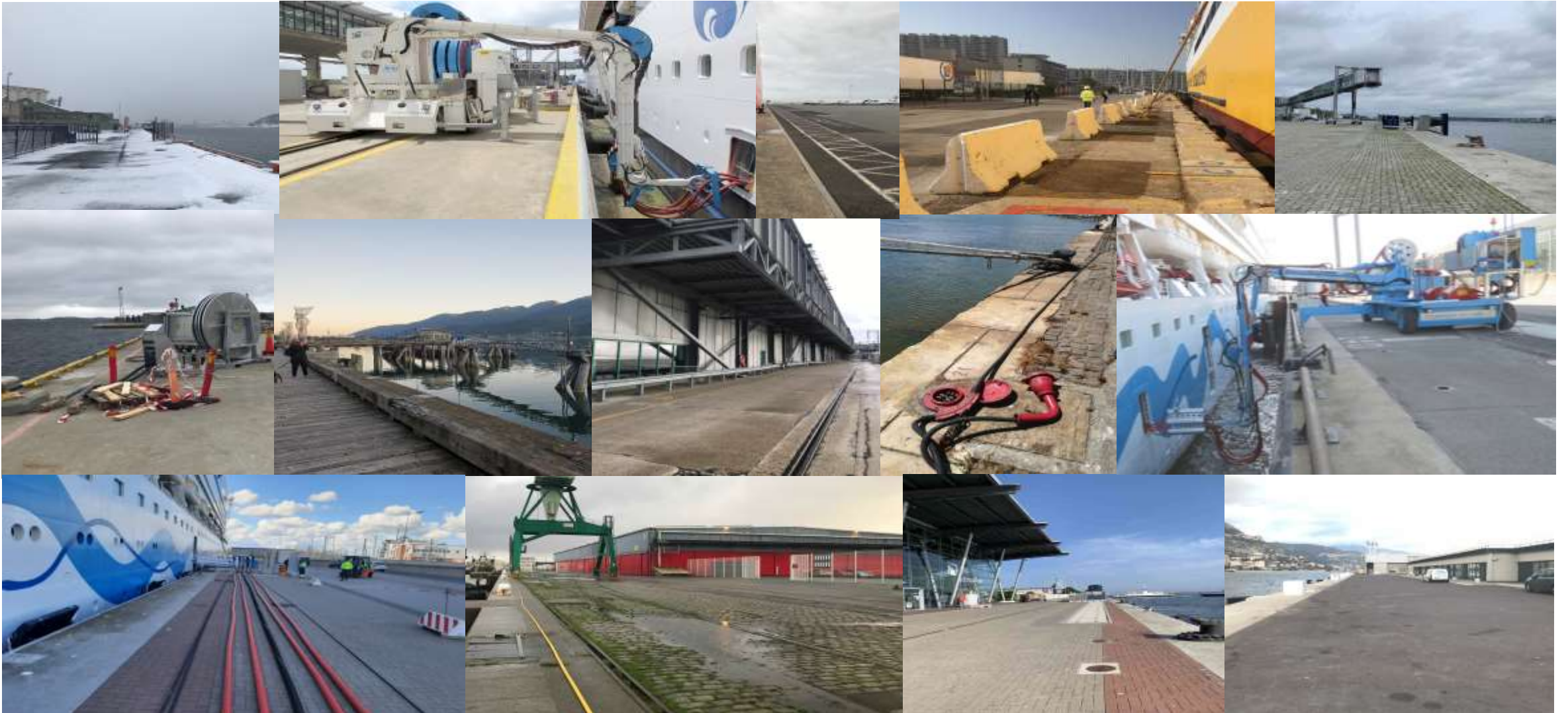
## I must

- Defined by law (i.e. California, Norway, EU)
- Defined by regulations/norm (i.e. IMO – IEC 80005-1 /-3)



# /// All Men are Created Equal – All Ports are Created Different: No Average, no Norm

Even within one port berths will be different



# /// ShoreCONNECT – Cable Dispensers

...for various vessels

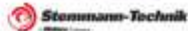
## /// ShoreCONNECT Variants – Cable Dispenser Low Voltage

...for various vessels types – low voltage

- Customer**  
Acciona, Spain
- Stemmann-Technik scope**
- 1 cable dispenser LV
  - 5 cables
- Technical Information**
- 50 Hz
  - Up to 1 MVA
  - 1750 A / 400 V
- Working range**
- Working range vertical plus hatch: +7 to +1m
  - Working range horizontal: 5m
  - Rotation range: +/- 107° out of the resting position
- Operations**
- 1 person needed to handle dispenser
  - No physical power needed to handle on shore



© Rodri94, La Comera



## /// ShoreCONNECT Variants – Cable Dispenser Low Voltage

...for various vessels types – low voltage

- Customer**  
Acciona, Spain
- Stemmann-Technik scope**
- 1 cable dispenser LV
  - 5 cables
- Technical Information**
- 50 Hz
  - Up to 1 MVA
  - 1750 A / 400 V
- Working range**
- Working range vertical plus hatch: +7 to +3m
  - Working range horizontal: 2m
  - Rotation range: +/- 95° out of the resting position
- Operations**
- 1 person needed to handle dispenser
  - No physical power needed to handle on shore



© Rodri94, La Comera



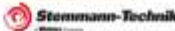
## /// ShoreCONNECT Variants – Low Voltage Cable Reel, Double Spiral LV Reels

...for various vessels types

- Customer**
- Diverse
- Stemmann-Technik scope**
- Double spiral HV reel on mounting plate
  - Plugs, plug covers and cable
  - Electrical control
  - Telescopic roller guide
- Technical Information**
- 60 Hz
  - 7.5MVA
  - 2x350 A / 6.6kV
- Working range**
- Up of 2x43m inside container
  - Cable output speed: 10m/min
- Operations**
- 40 ft. HC container in bottom storage
  - 2 person needed to handle application



© Rodri94, La Comera



## /// ShoreCONNECT Variants – Cable Dispenser High Voltage

...for various vessels types – high voltage

- Customer**  
Port of Kiel, Germany
- Stemmann-Technik scope**
- 1 cable dispenser 11 kV
- Technical Information**
- 50/60 Hz
  - Up to 5 MVA
  - Max 11 kV
- Working range**
- Working range vertical plus hatch: +4 to -1m
  - Working range horizontal: 2m
  - Rotation range: +/- 95° out of the resting position
- Operations**
- 1 person needed to handle dispenser
  - No physical power needed to handle on shore



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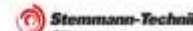


## /// Project Rotra Vente ShoreCONNECT Cuxhaven - RoRo

- Customer**  
Niedersachsen Ports, Siemens Gamesa
- Stemmann-Technik scope**
- 1 cable dispenser LV
  - 3 cables
- Technical Information**
- 50 Hz
  - Up to 750 kVA
  - 440 V
- Working range**
- Working range vertical plus hatch: +6,2m to -5m ???
  - Working range horizontal: 4m
- Operations**
- 1 person needed to handle dispenser
  - No physical power needed to handle on shore



© Rodri94, La Comera



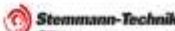
## /// ShoreCONNECT Variants – Low Voltage Cable Reel, Double Spiral LV Reels

...for various vessels types

- Customer**  
Technisk Bureau for NorSea Group in Hammerfest, Kristiansund, Tananger, Stavanger – Norway
- Stemmann-Technik scope**
- Double spiral LV reel with 2 cables
  - Mobile and stationary versions
- Technical Information**
- 60 Hz
  - 750kVA
  - 350 A / 690 V
- Working range**
- 14 x 30m and 2 x 40m versions
- Operations**
- 2 person needed to handle application



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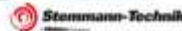
# /// ShoreCONNECT – Cable Management Vehicle

...for cruise vessels vessels

## /// ShoreCONNECT for Cruise Liners – reference „Hamburg-Altona“, Germany

...land side procedure can be handled by one person

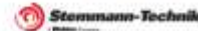
- Customer**
- Port of Hamburg, Germany for Siemens
- Stemmann-Technik scope**
- 1 vehicle
  - Energy chain in the ground – no junction box
- Technical Information**
- 50/60 Hz
  - 12 MVA
  - Max 11 kV
- Working range**
- Working range vertical plus hatch: +3,8 to -6m
  - Working range horizontal: 300m
  - Rotation range: +/- 95° out of the resting position
- Vehicle**
- Fully electric, zero-emission, self-propelled
  - 5.000mm x 2.500mm x 3.800mm (L x W x H)
  - Speed: 3 km/h
- Operations**
- 1 person needed to handle vehicle when connected with junction box
  - No physical power needed to handle vehicle



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## /// ShoreCONNECT for Cruise Liners – reference „Kiel“, Germany

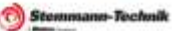
- Customer**
- Port of Kiel, Germany
- Stemmann-Technik scope**
- 1 vehicles / 1 cable dispenser 11 kV
  - 6 junction boxes (Ostsee Quai with 2 different berths) daisy chain with life-end caps
- Technical Information**
- 50/60 Hz
  - 16 MVA
  - Max 11 kV with 4 x 350 Amp
- Working range**
- Working range vertical plus hatch: +4 to -1m
  - Working range horizontal: 35m
  - Rotation range: +/- 95° out of the resting position
- Vehicle**
- Battery-driven, zero-emission, self-propelled
  - 10.000mm x 3.000mm x 4.200mm (L x W x H)
  - Speed: 4 km/h, 1 km/h when reeling/unreeling
- Operations**
- 1 person needed to handle vehicle when connected with junction box
  - No physical power needed to handle vehicle



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## /// ShoreCONNECT for Cruise Liners – reference „Rostock“, Germany

- Customer**
- Port of Rostock, Germany
- Stemmann-Technik scope**
- 2 vehicles
  - 4 junction boxes
- Technical Information**
- 50/60 Hz
  - 16 MVA @ 11 kV
  - 6.6 kV/11 kV with 4 x 350 Amp
- Working range**
- Working range vertical plus hatch: +4 to -1m
  - Working range horizontal: 35m
  - Rotation range: +/- 95° out of the resting position
- Vehicle**
- Battery-driven, zero-emission, self-propelled
  - 10.000mm x 3.000mm x 4.200mm (L x W x H)
  - Speed: 4 km/h, 1 km/h when reeling/unreeling
- Operations**
- 1 person needed to handle vehicle when connected with junction box
  - Only 2 people to connect vehicle with junction box with less than 20 kg/person
  - No physical power needed to handle vehicle



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## /// ShoreCONNECT for Cruise Liners – reference „Tianjin“, China

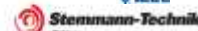
- Customer**
- Tianjin Cruise Port, China - R3PE
- Stemmann-Technik scope**
- 1 vehicle
  - 2 junction boxes
- Technical Information**
- 50/60 Hz
  - Up to 20 MVA @ 11 kV
  - 6.6 kV/11 kV with 4 x 350 Amp
- Working range**
- Working range vertical: 7,5 m
  - Working range horizontal: +/- 35m (70m)
  - Rotation range: +/- 95° out of the resting position
- Vehicle**
- Battery-driven (3 km range), zero-emission, self-propelled
  - 10.000mm x 3.000mm x 4.200mm (L x W x H)
  - Speed: 4 km/h, 1 km/h when reeling/unreeling
- Operations**
- 1 person needed to handle vehicle when connected with junction box
  - Only 2 people to connect vehicle with junction box
  - No physical power needed to handle vehicle



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## /// ShoreCONNECT for Cruise Liners – reference „Southampton“, UK – under construction

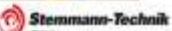
- Customer:**
- Port of Southampton, United Kingdom – PowerCon
- Stemmann-Technik scope:**
- 1 vehicle
  - 10 junction boxes, daisy-chain version
- Technical Information:**
- 50/60 Hz
  - 16 MVA
  - Max 11 kV
- Working range:**
- Working range vertical plus hatch: +4 to -3,5m
  - Working range horizontal: +/- 50m
  - Rotation range: +/- 95° out of the resting position
- Vehicle:**
- Fully electric, zero-emission, self-propelled
  - 10.000mm x 3.000mm x 4.200mm (L x W x H)
  - Speed: 4 km/h
- Operations:**
- 1 person needed to handle vehicle when connected with junction box
  - No physical power needed to handle vehicle



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## /// ShoreCONNECT for RoPax ferry – reference „Gdynia“, Poland, 2021

- Customer**
- Port of Gdynia, Poland
- Stemmann-Technik scope**
- 1 vehicle
  - 1 double ended junction box and 2 single ended junction boxes
- Technical Information**
- 50/60 Hz
  - 3,75 MVA @ 11 kV
  - 11 kV with 200 Amp
- Working range**
- Working range vertical plus hatch: +12,5m to +13,5m
  - Working range horizontal: +/- 50m (100m)
  - Rotation range: +/- 110° out of the resting position
- Vehicle**
- Battery-driven, zero-emission, self-propelled
  - 10.000mm x 3.000mm x 3.700mm (L x W x H)
  - Speed: 4 km/h, 1 km/h when reeling/unreeling
- Operations**
- 1 person needed to handle vehicle when connected with junction box
  - Only 2 people to connect vehicle with junction box with less than 20 kg/person
  - No physical power needed to handle vehicle



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## /// Conclusion

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- World is facing massiv ecological problems – it is **time to act now**: below +1.5° celsius
- **Governments** all around the globe **are acting** (money & law)
- **All men are created equal** – each port is created different.
- You **can not copy paste solutions** from one port to another
- You need to **create customized solutions for each berth**

It's not easy being green but it's worth it





**Stemmann-Technik**

A **Wabtec** Company

**Georg Franz Matzku**

Head of Shore Power

Stemmann-Technik, a Wabtec Company

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