BALTIC AND BLACK SEA
PORTS & SHIPPING 2022

The Zero Emission Terminal – How to connect the green future

Electrification & data communication solutions for port equipment

VAHLE Group – Key Facts

845 employees worldwide

100 %

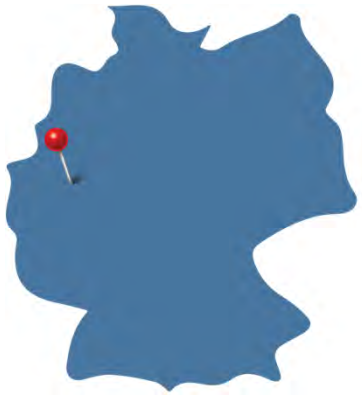
Family owned since 1912

12 VAHLE subsidiaries worldwide and representations in 52 countries

€ 150 mil. in sales

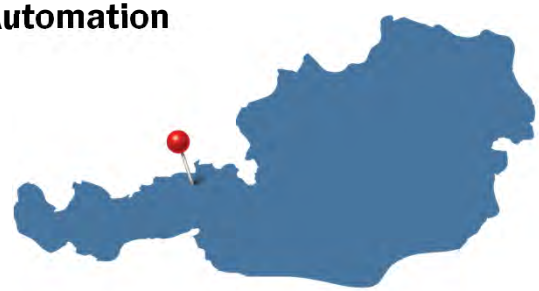
Headquarter Kamen, Germany

- Engineering
- Production
- Sales



Technology Center Automation Schwoich, Austria

- Engineering
- Trend Scouting
- Training



Container Terminal Automation

Step by step approach

Electrification

- Electrification by **conductor bars** (1000 V, 1000 A with aluminum / stainless steel)
- **Automated power** Connection for block changes
- Automated **seamless switching**

Positioning

- **Absolute, precise positioning system**
- Independent from external influences
- Contactless reading head
- Position **accuracy** up to **± 1 mm**
- **PN / PB / Ethernet** Interfaces for Plug and Play integration

Data communication

- **Highly shielded** data communication
- Up to **600 Mbit/s** net rate
- **Low latency** times
- Interfaces **ready for automation** – Ethernet, Profinet and Profinet Safe

Automation

- **Combination** of electrification, positioning and data communication for remote control
- **Autosteering**
- **Power measurement**
- **Energy optimization**
- **Remote maintenance**

Hong Kong, Modern Terminals Limited

Project success stories

2011 - 2013

104 RTGs (retrofit & new cranes)

Electrification of 66 container blocks

Hong Kong, Modern Terminals Limited

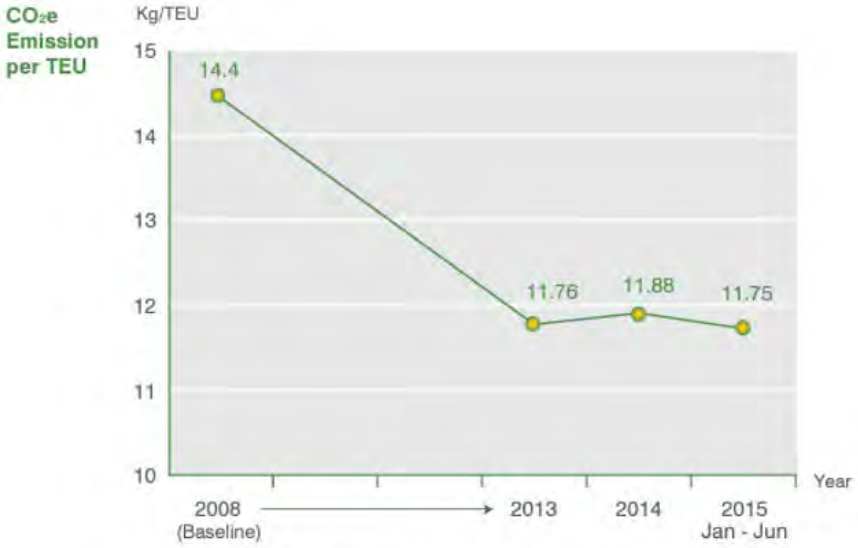
Customer Case study

Electricity-powered Rubber-tyred Gantry Cranes (E-RTGs) Conversion

By the end of June 2015, there were some 200 Rubber-tyred Gantry Cranes (RTGs) across our business units in Hong Kong and mainland China. To reduce associated emissions, the Group has been progressively replacing traditional diesel-fuel powered RTGs with hybrid RTGs and E-RTGs. All of our 94 RTGs in HKBU were converted to E-RTGs with engines compliant with EU Stage IIIA emission standards by the end of 2014; DCB has already been using a full fleet of E-RTGs since it commenced operations in 2007; in TIG P2, E-RTG conversion has taken place in 2008, covering 95% of all RTGs. In 2014, the replacement of eight E-RTGs in HKBU contributed to the reduction of over 850 tonnes of CO_2e emission.

New environmental targets for our operations

Operations	Unit	Baseline year	Reduction target
Container operations	CO_2e kg/ TEU	2008	10 kg/TEU in 2018, 30% reduction from base year
Break-bulk cargo operations	CO_2e kg/ ton	2013	1.7 kg/ton in 2018, 11% reduction from base year



*Only data of container terminal operations is included in the calculation.

Total savings since 2011:

298.130 tons CO^2

Source: MTL Sustainability Report 2018-2019

Great Britain, HPH UK – Port of Felixstowe

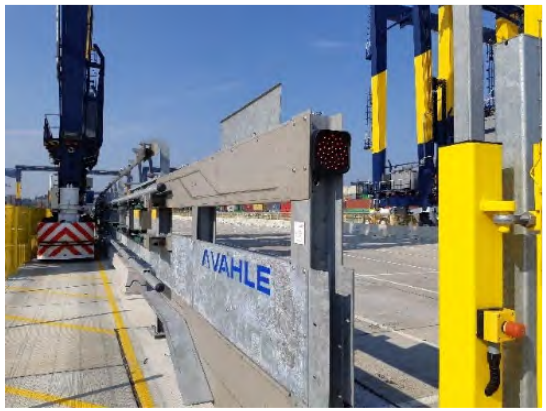
Project success stories

2015 – today

Retrofit
66 ZPMC RTGs
Greenfield
Berth 9: 8 new remote ZPMC eRTGCs
17 new Konecranes aeRTGCs

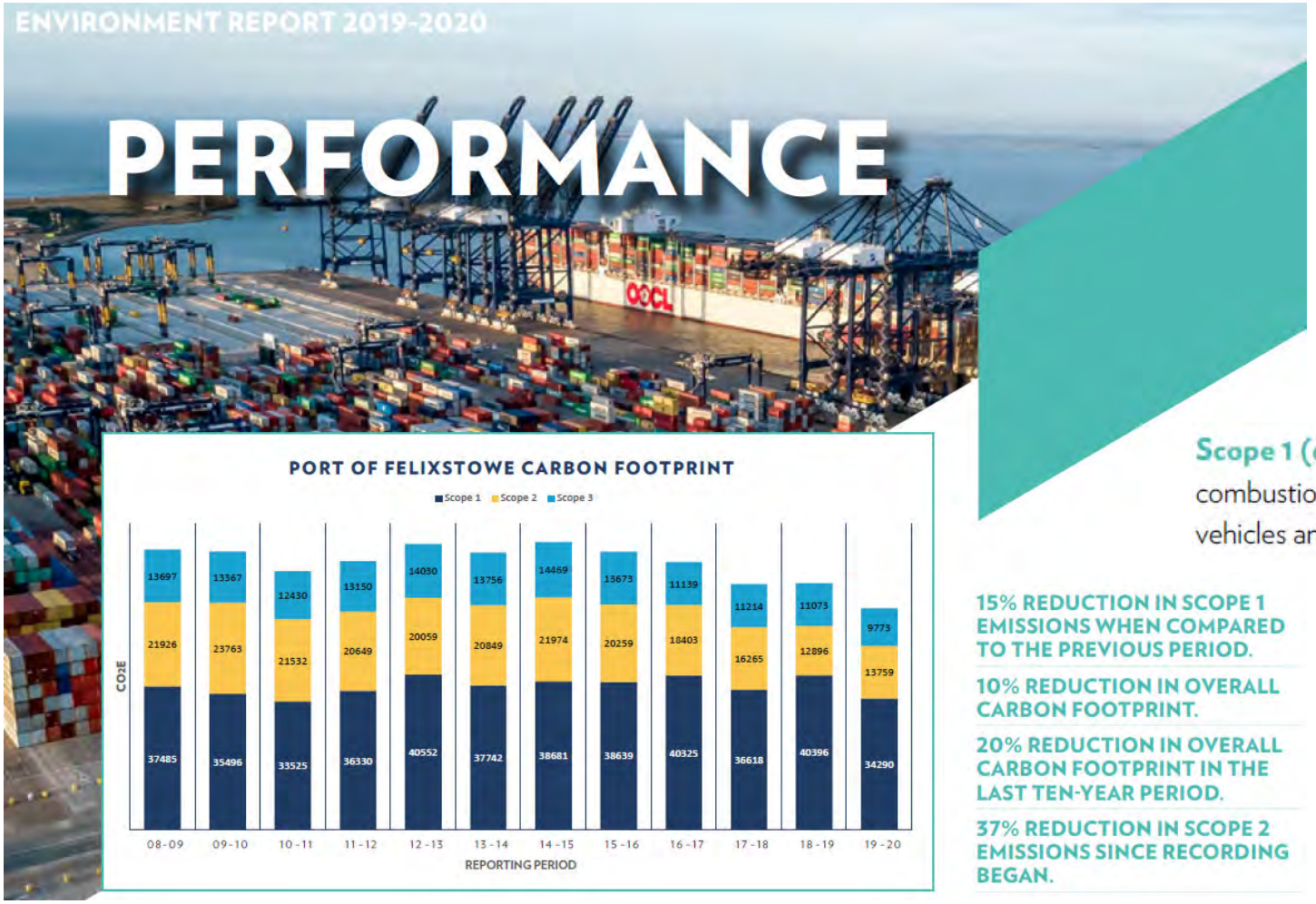
Retrofit
59 blocks (15,322 m)
Greenfield
Berth 9: 8 container blocks

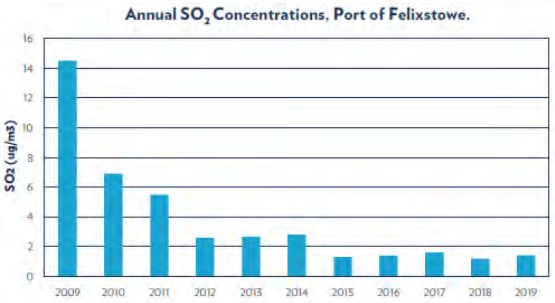
Automation with **SMGX data communication** and positioning



Great Britain, HPH UK – Port of Felixstowe

Customer case study





Scope 1 (direct) emissions produced on-site by fossil fuel combustion; mainly by RTG cranes, internal movement vehicles and port vehicles.

15% REDUCTION IN SCOPE 1 EMISSIONS WHEN COMPARED TO THE PREVIOUS PERIOD.

10% REDUCTION IN OVERALL CARBON FOOTPRINT.

20% REDUCTION IN OVERALL CARBON FOOTPRINT IN THE LAST TEN-YEAR PERIOD.

37% REDUCTION IN SCOPE 2 EMISSIONS SINCE RECORDING BEGAN.

Total savings since 2015:

89.620 tons CO^2

Source: PoF Environment Report 2020

Thailand, HPT Laem Chabang – Terminal D

Greenfield Project Success Stories

2017 - today

Remote operation with 20 new AERTGCs

Automation of 20 container blocks
in phase 1 – 5,040 m
Phase 2 to kick-off in 2022

Including **SMGX data communication system**

World's first fully automated terminal

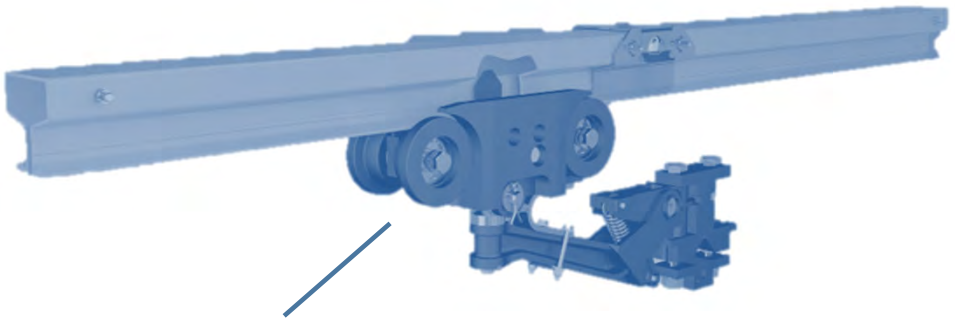
SMGX Data Communication

Facts & Figures

Characteristics

- EN55022 Class A certified: **no radio frequency device**
- Lowest emission for safe and reliable operation
- Simultaneously video and data transmission with one device
- Coexistent with other radio systems
  - Antenna driving in/out of the rail without influencing the remaining devices
- Frequency band 2,4 or 5 to 5.8 Ghz
- Up to **400m**

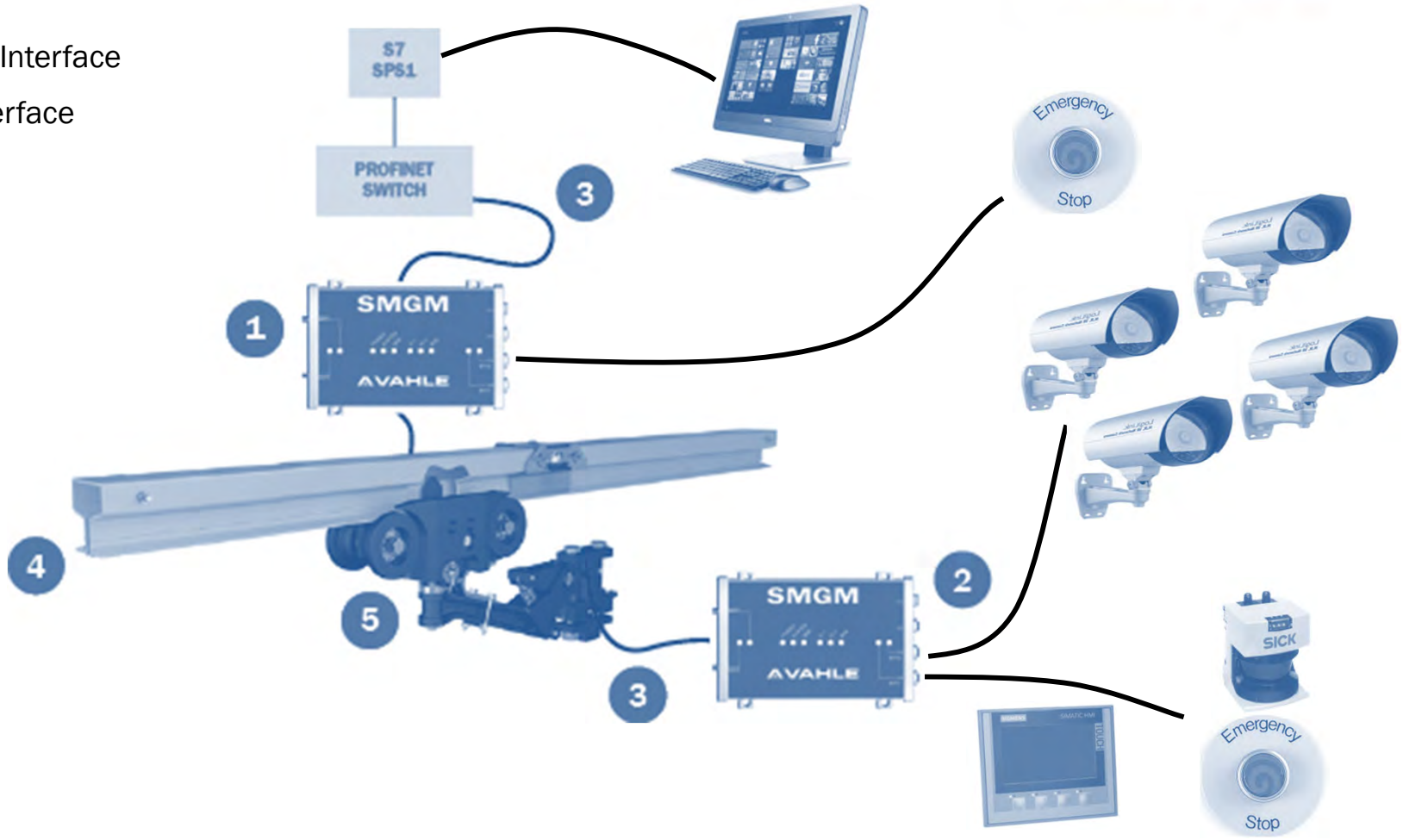
SMGX data communication waveguide
installed at the steel support structure



SMGX antenna
installed at the current collector trolley

SMGX Data Communication
Overview

1. SMGM Stationary Segment Interface
2. SMGM Mobile Segment Interface
3. SMGM HF Cable
4. SMGX Profile
5. SMGX Mobile Coupler



USA, Gulftainer Wilmington

Project Success Stories

2021 - today

9 new Konecranes AERTGCs

Automation of 6 container blocks
in phase 1 – 1,316 m

Including **SMGX data communication system**

USA, Ports America – Chesapeake, Baltimore

Project Success Stories

2021 - today

15 new Konecranes AERTGCs

Automation of 4 container blocks
in phase 1 – 1,176 m
Commissioning project ongoing

Including **SMGX data communication system**

Terminal Automation for Next-Gen Ports

Benefits of VAHLE Electrification & Automation Solutions

ECONOMIC

- Optimized OPEX by reduced fuel cost and idle time
- Reduced dependency on fossil fuel supplies
- Reduced GenSet maintenance cost
- Smart / remote maintenance
- Personnel costs are saved
- Productivity is increased
- Optimized Total Cost of Ownership

ECOLOGIC

- Reduction of CO_2 emissions and noise pollution
- Sustainable and green – at best with renewables

EFFICIENT

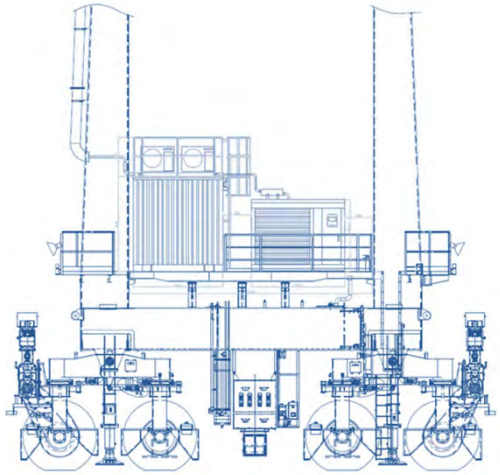
- Flexible yard operation
- Automatic connection system
- Autosteering
- Seamless synchronization
- Human Safety

Hybrid RTG Overview – Project case

VAHLE Hybrid RTG– Design

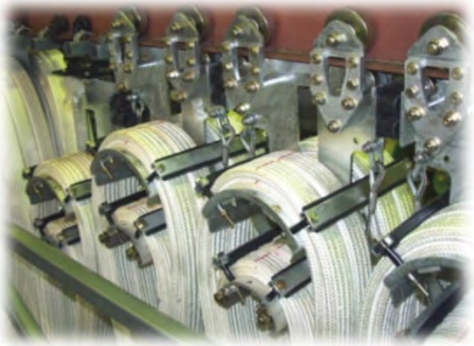
Diesel Generator Set / Powerhouse

The diesel generator could be e.g. Cummins engine and Stamford generator. Convenient maintenance is possible with the screen door and maintenance platform. The new powerhouse make full use of the original engine fuel tank, exhaust pipe and waste discharge pipes.



Pre-assembled festoon systems

We build your desired festoon system in our workshop with all cables and accessories. This pre-assembled systems are then easily installed on site.

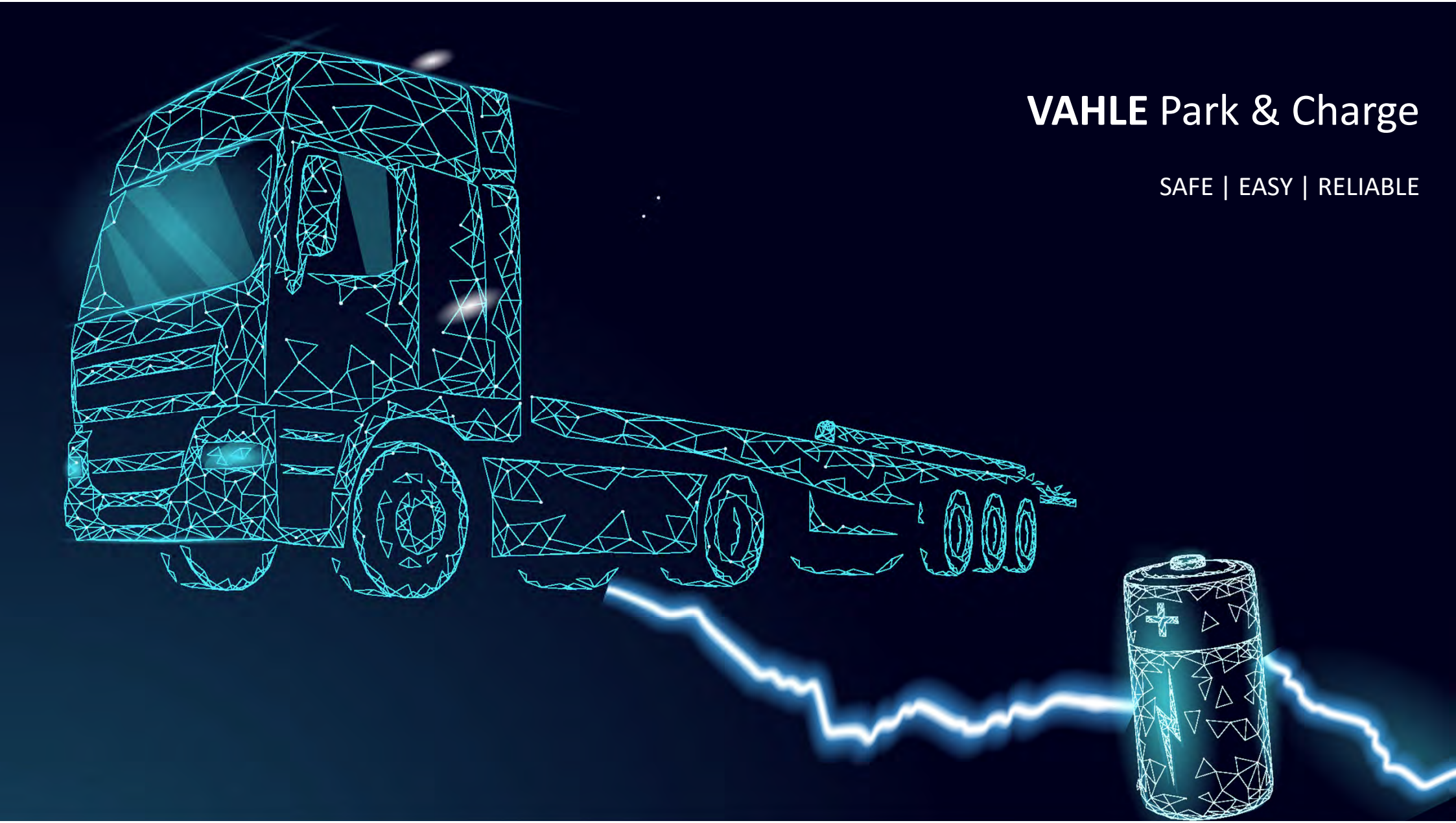


Konecranes STS cranes for Lithuania – Klaipeda Smelte Container Terminal (TIL Group)

Technical Specification – W 135 carriers – 1 storey

Length of system:108,7m
Travel distance: 98,7 m
Storage area: 10 m
Number of loops: 16
Cable loop depth: 4.02 m
Travel speed: 180 m/min.
Acceleration: 0,6 m/s²

Cable package:
16 cables of different size


VAHLE Park & Charge
SAFE | EASY | RELIABLE

VAHLE - Park & Charge

VAHLE Shore Power Extenders

Project Success Stories

Problem

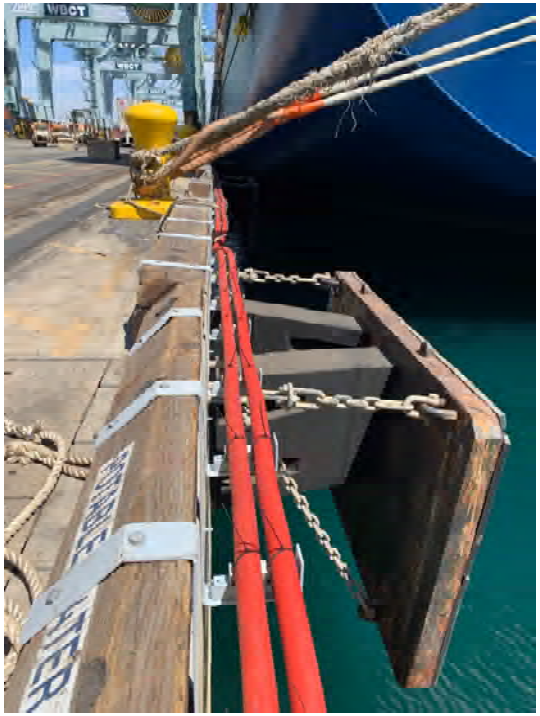
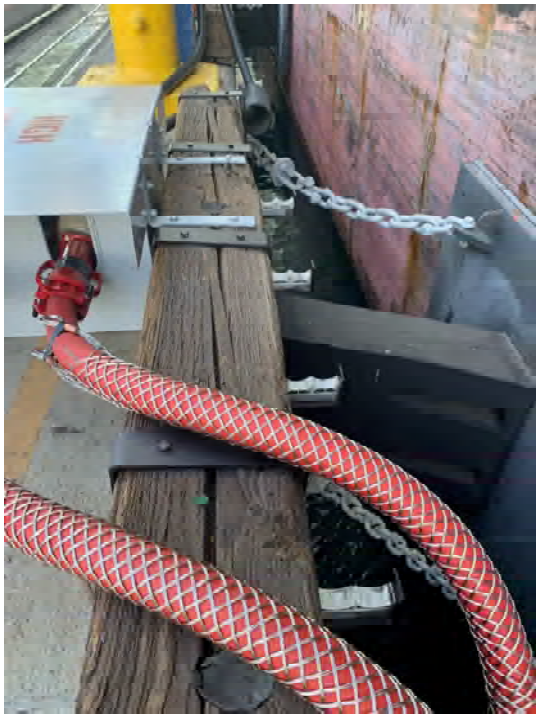
- Missalignment of vessels with the shore power vaults
- Ship Diesel must stay on during berthing, creating a lot of pollution

Reasons

- Lack of Shore Power Vaults (To expensive)
- Increased size of vessels
- Increased possible combinations of vessels moored
- Port – Starboard berthing
- Berthing congestion

VAHLEFLEX(SC) (N)TSCGEWOEU 6/10kV
Medium voltage cable for Shore-Connection systems

VAHLE Shore power extenders (UL Field Evaluated)


THANK YOU FOR YOUR ATTENTION