



Terminal Electrification & Automation

Electrification & data communication solutions for port equipment



850 employees worldwide

100 %

Family owned since 1912



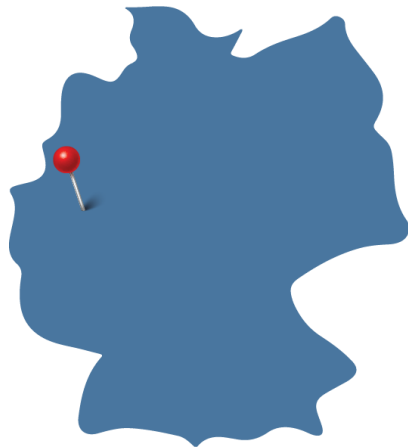
12 VAHLE subsidiaries worldwide and representations in 52 countries



€ 150 mil. in sales

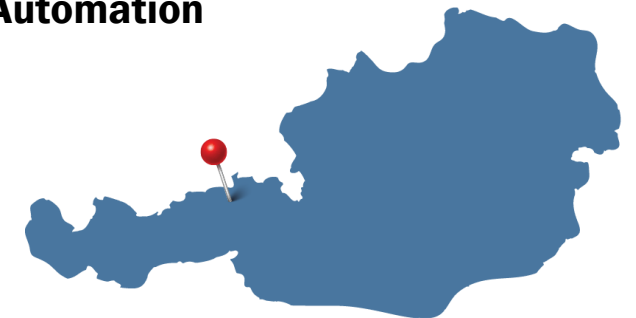
Headquarter Kamen, Germany

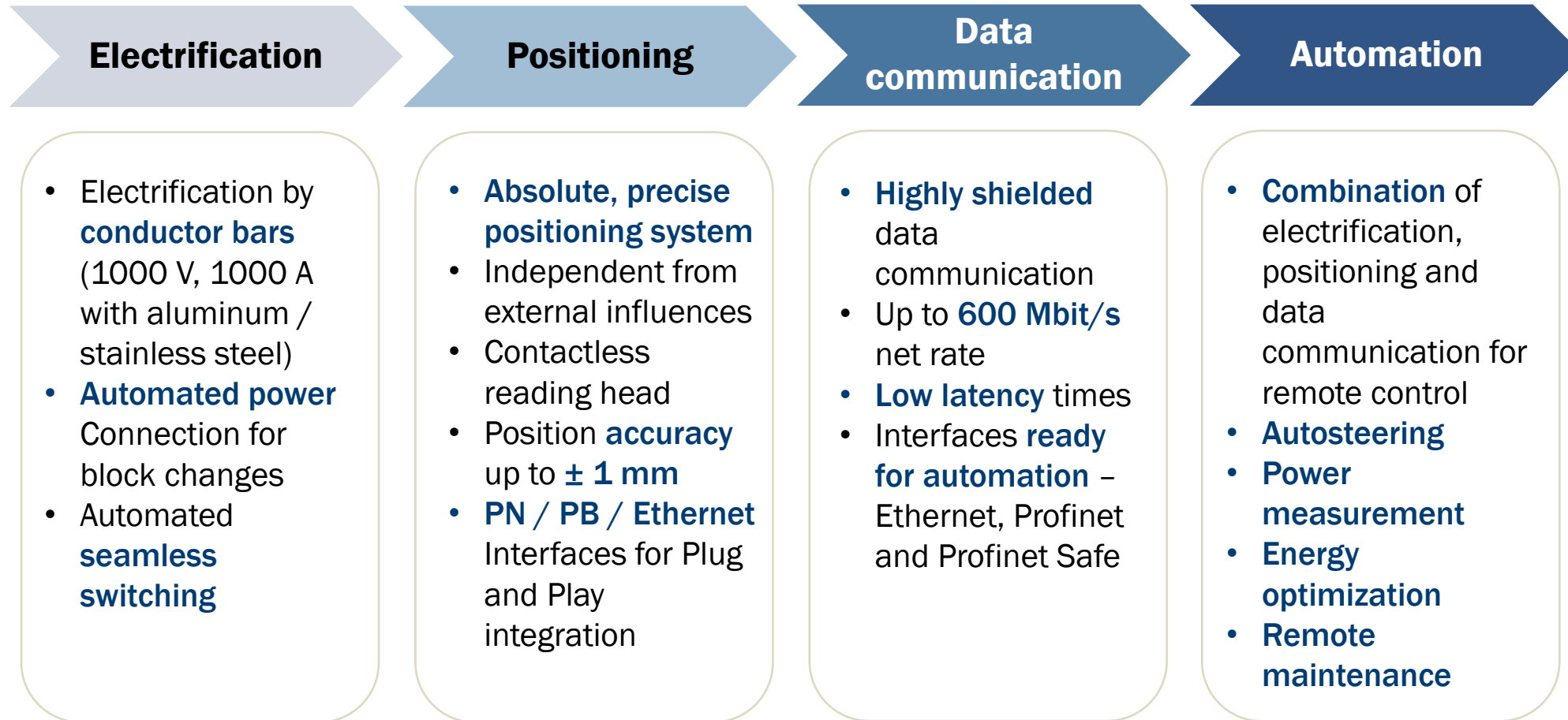
- Engineering
- Production
- Sales



Technology Center Automation Schwoich, Austria

- Engineering
- Trend Scouting
- Training



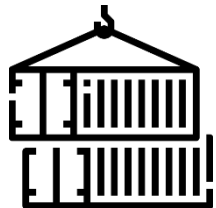




2011 - 2013



104 RTGs (retrofit & new cranes)



Electrification of 66 container blocks



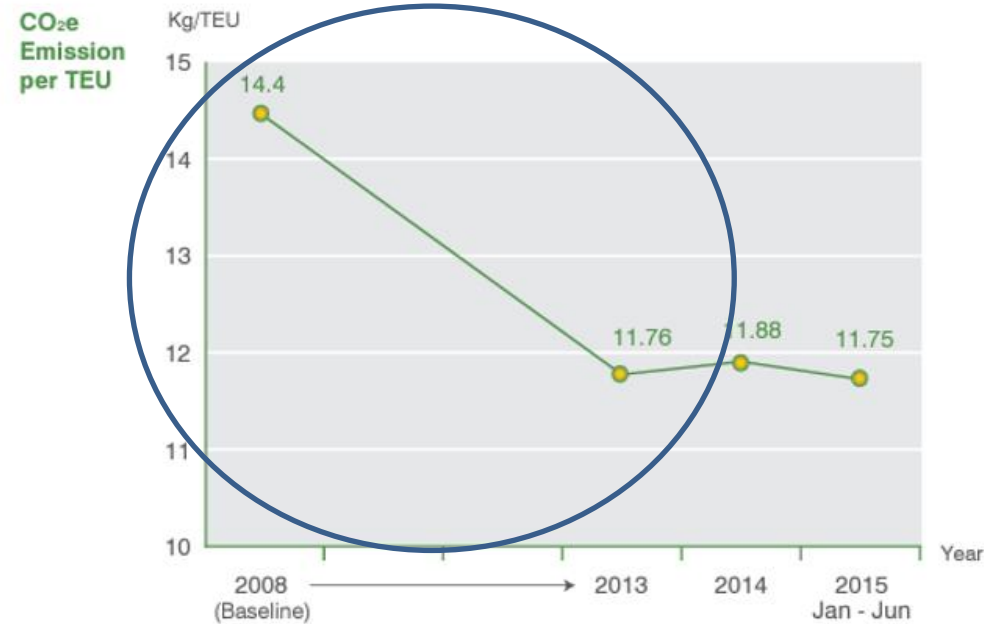
Electricity-powered Rubber-tyred Gantry Cranes (E-RTGs) Conversion

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 CO₂e emission.



New environmental targets for our operations

| Operations | Unit | Baseline year | Reduction target |
|-----------------------------|---------------------------|---------------|--|
| Container operations | CO ₂ e kg/ TEU | 2008 | 10 kg/TEU in 2018, 30% reduction from base year |
| Break-bulk cargo operations | CO ₂ e kg/ ton | 2013 | 1.7 kg/ton in 2018, 11% reduction from base year |

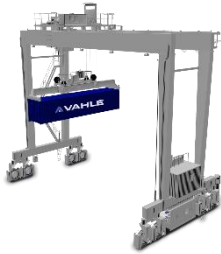


*Only data of container terminal operations is included in the calculation.

Source: MTL Sustainability Report 2018-2019



2015 – today



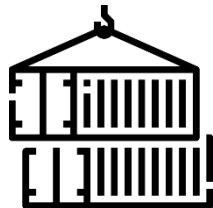
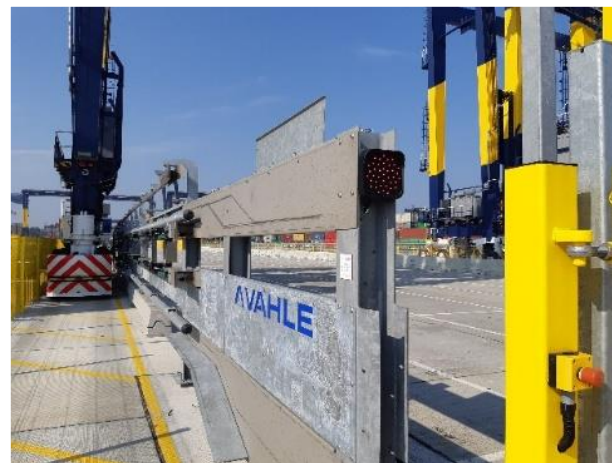
Retrofit

66 ZPMC RTGs

Greenfield

Berth 9: 8 new remote ZPMC eRTGCs

17 new Konecranes aeRTGCs



Retrofit

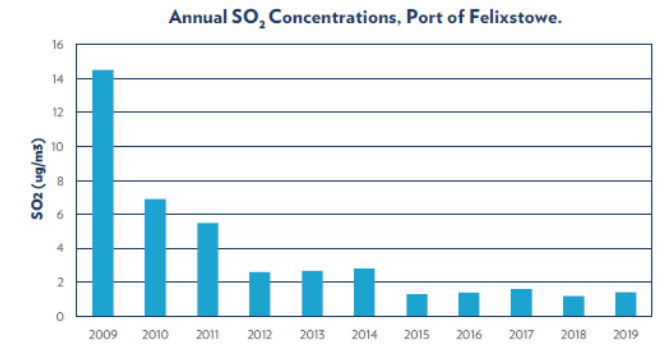
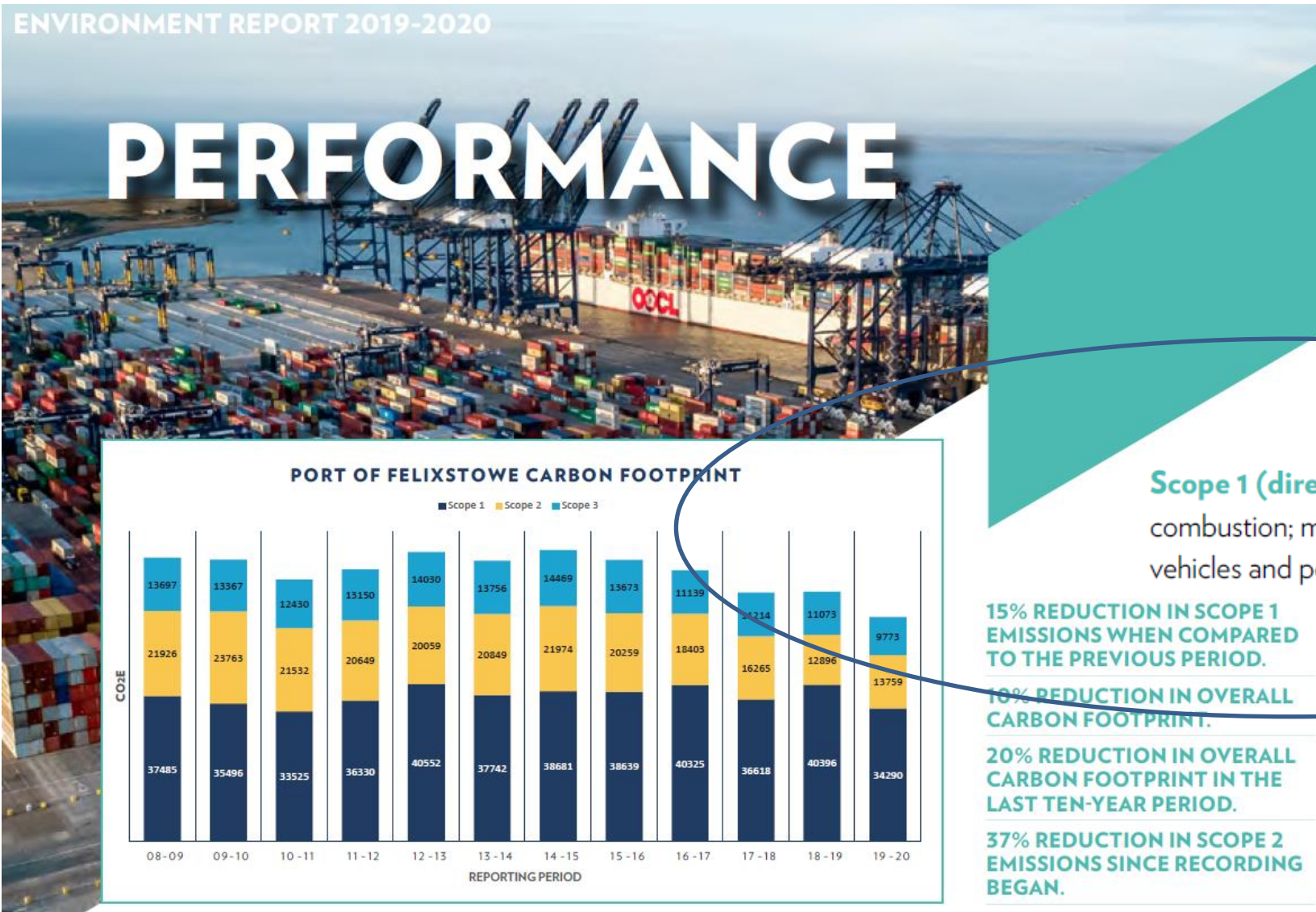
59 blocks (15,322 m)

Greenfield

Berth 9: 8 container blocks



Automation with **SMGX data communication** and positioning



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.

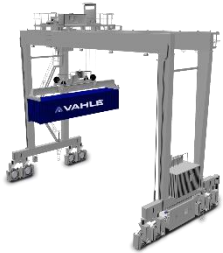
20% REDUCTION IN OVERALL CARBON FOOTPRINT IN THE LAST TEN-YEAR PERIOD.

37% REDUCTION IN SCOPE 2 EMISSIONS SINCE RECORDING BEGAN.

Source: PoF Environment Report 2020



Delivered May 2022 – Installation /
Commissioning pending



Retrofit of 4 Konecranes Diesel RTGCs
to full eRTGCs with Motor cable reels



Active reeling length of 230 m
Travel speed: 135 m/min
Tratosflex cable 6/10kV with 24 Fiber
Optics to enable further upgrades to the
crane, such as remote operations,



Frans Calje, PD Ports CEO, said: “The implementation of alternative, cleaner energy supplies is one of the key components to our long-term vision for Teesport and is another step in achieving our 30 year plan in which we aim to work with customers and stakeholders to elevate the River Tees to the UK’s most successful port region by 2050.

“PD Ports is a key piece of national infrastructure and as the Statutory Harbour Authority for the River Tees, we have a duty to ensure that we continuously work to reduce our impact on the environment throughout our operations.”

Source: pdports.co.uk

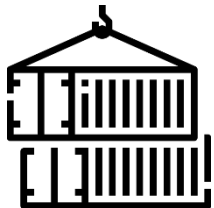


2017 - today

World's first fully automated terminal

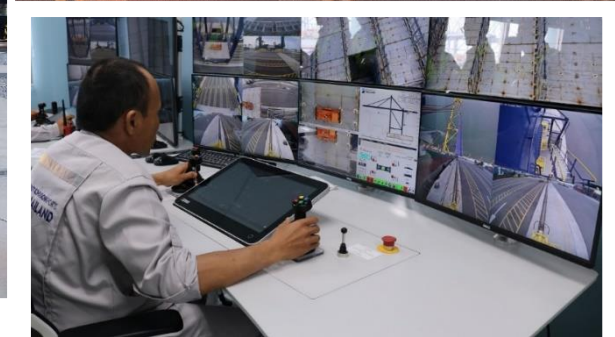


Remote operation with 20 new AERTGCs



Automation of 20 container blocks in phase 1 – 5,040 m

Phase 2 to kick-off in 2022

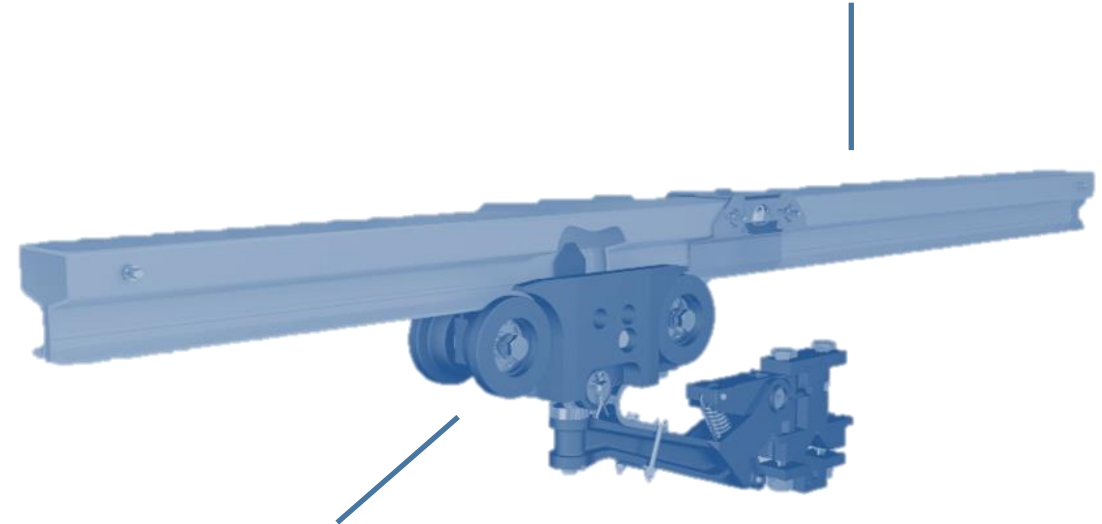


Including **SMGX data communication system**

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 **440m**

SMGX data communication waveguide
installed at the steel support structure



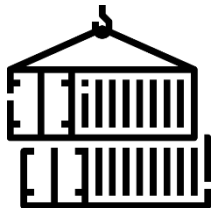
SMGX antenna
installed at the current collector trolley



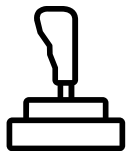
2021 - today



9 new Konecranes AERTGCs



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



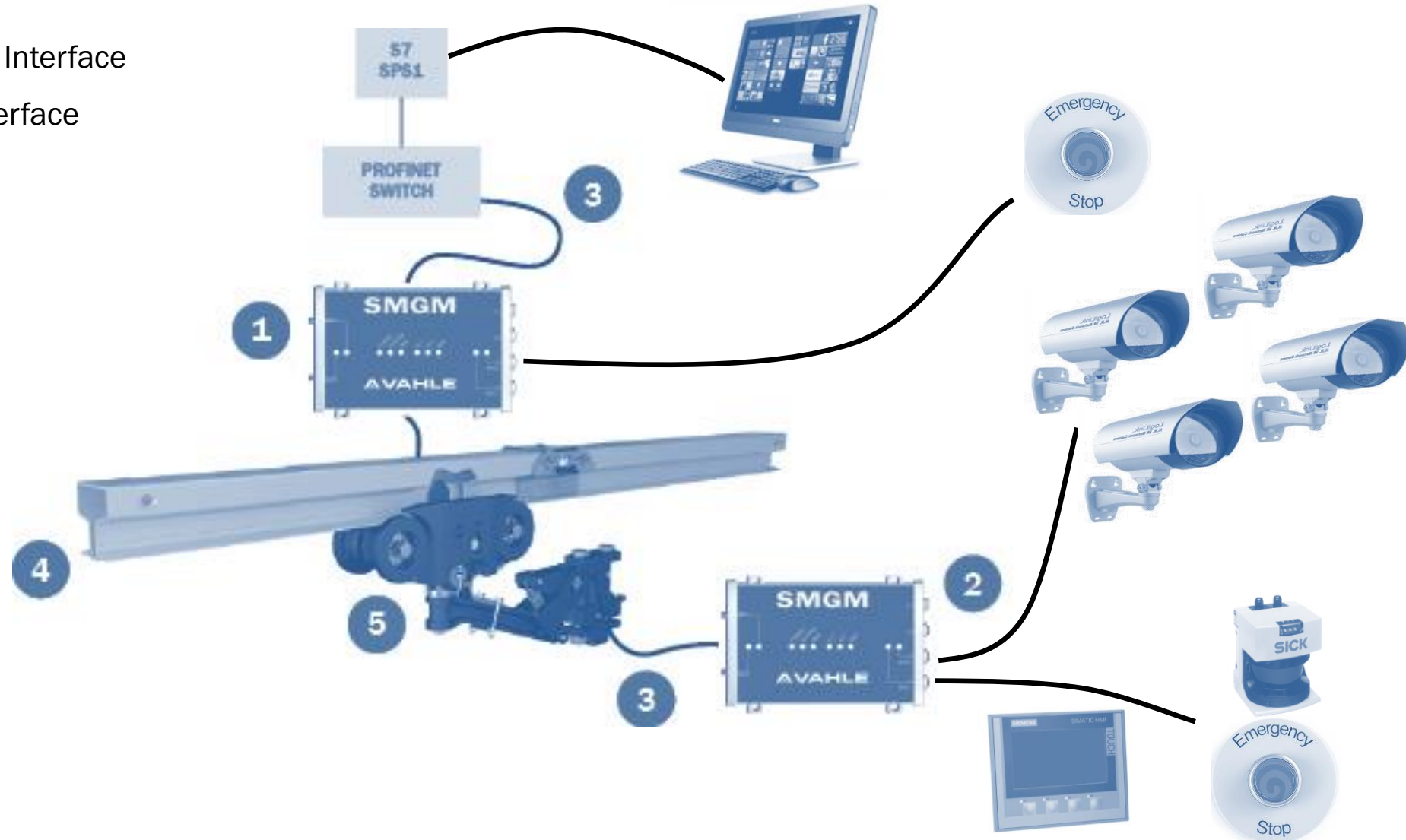
Including **SMGX data communication system**



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





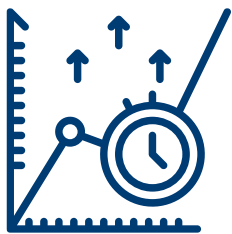
ECONOMIC

- 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 CO₂ emissions and noise pollution
- Sustainable and green – at best with renewables



EFFICIENT

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

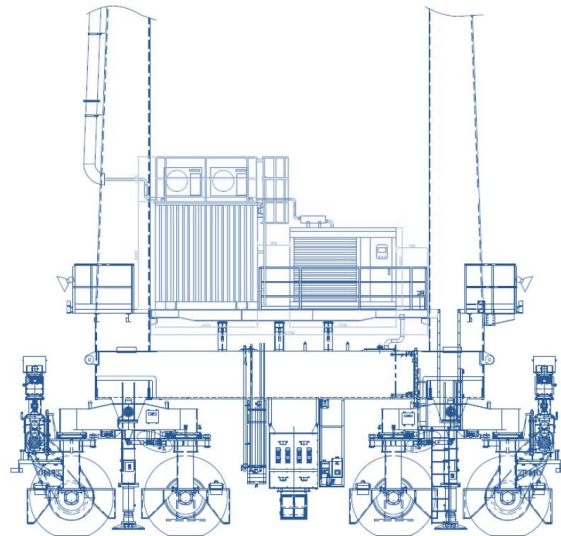


It is VAHLE's dedication to help ports and terminal operators grow through sustainable, digital and adaptable service solutions. For us as electrification and automation experts it is really exciting to help increasing customers efficiency, safety and equipment sustainability.

VAHLE Hybrid RTG– Design

Diesel Generator Set / Powerhouse

The new powerhouse make full use of the original engine fuel tank, exhaust pipe and waste discharge pipes.



Old Diesel Engine



New Hybrid sys



before



after



Upgrade your STS/QC with conductor bars | Increase of flexibility

Retrofitting ready for remote control



Operators benefits

- Faster container handling through speed increase of the main hoist (trolley & lift)
- Higher container stacking level
- High availability and absolute reliable
- Optimized Total Cost of Ownership

Technical benefits

- Minimize weight movement
- High trolley speed, up to 600 m/min
- No influences by wind / heavy rain / ice
- No cable loops and no storage area
- Extremely low maintenance

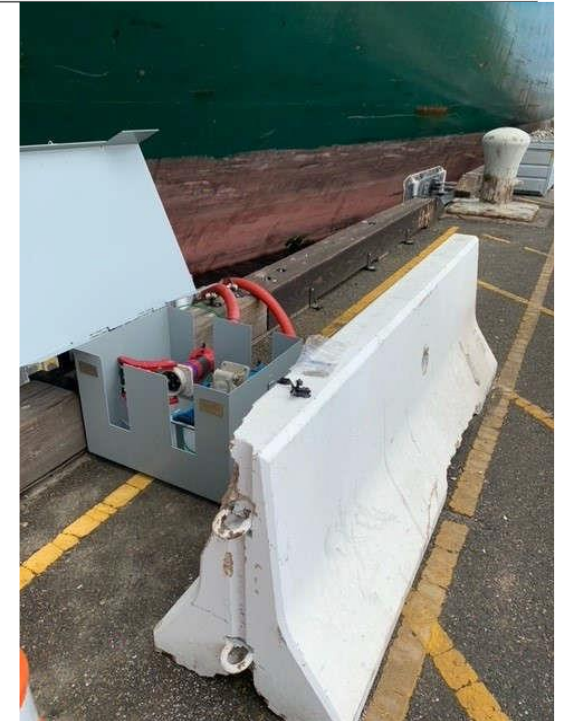


Problem

- 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 (Too expensive)
- Increased size of vessels
- Increased possible combinations of vessels moored
- Port – Starboard berthing
- Berthing congestion



VAHLEFLEX(SC) (N)TSCGEW0EU 6/10kV
Medium voltage cable for Shore-Connection systems



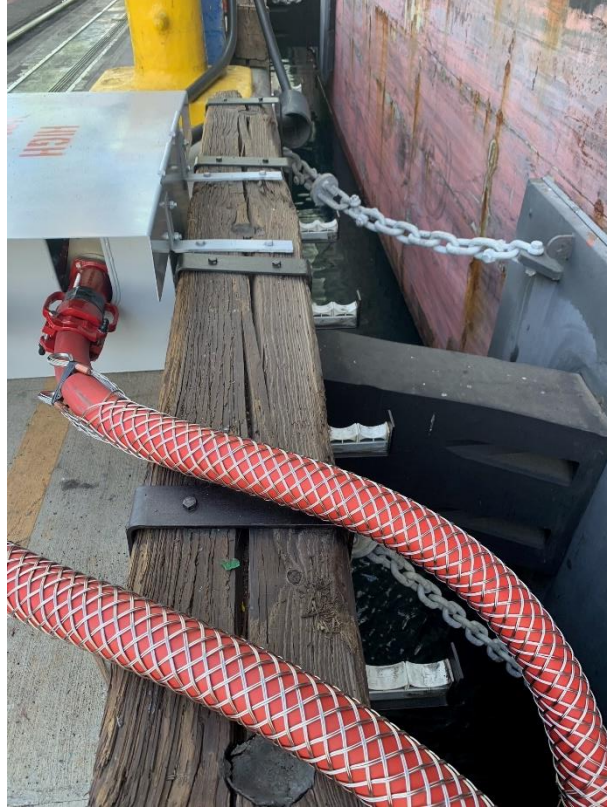
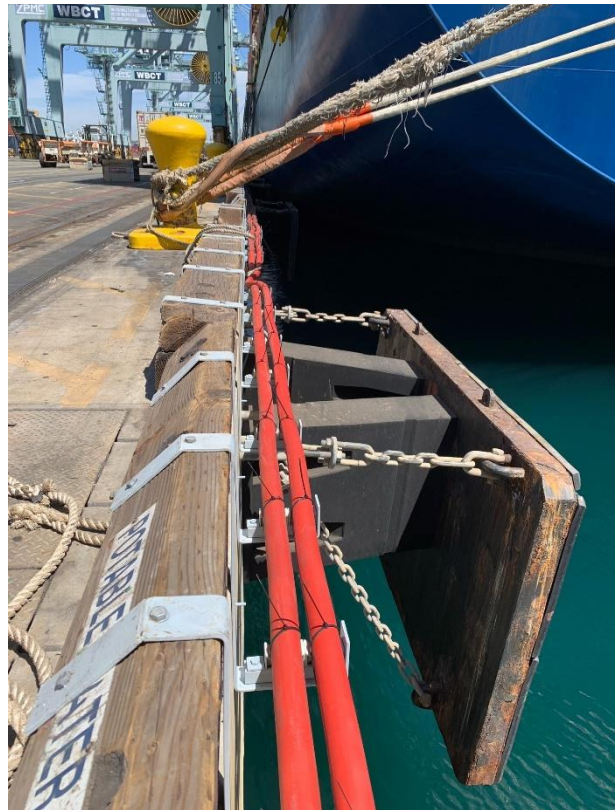
VAHLE Shore Power Extenders – Pier 400 Los Angeles – APM Terminals

Customer case study



The solution:

VAHLE Shore power extenders (UL Field Evaluated)





**THANK YOU FOR
YOUR ATTENTION**