Igus: Introduction

BULK TERMINALS ANTWERP 2024
23-24 OCTOBER

igus

Country Manager

E-Chains®, Chainflex®, Drytech®

Inside Sales Engineer

E-Chains®, Chainflex®

Inside Sales Engineer

Drytech®

Inside Sales Engineer

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Marketing Manager

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Order Management

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igus belgium

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Igus facts & figures

€1.115 billion
Sales

4,600
Employees worldwide

31
Locations and 50 distributors

188,000
Customers

243,000
Products from stock

800
Injection moulding machines

igus Product Portfolio

- E-chain systems
- Flexible cables
- Plain bearings
- Linear guiding
- Plastic gears
- Low-Cost automation
- 3D Printing
- Custom parts
- .....

igus® facts at a glance

Improve what moves

Zero plastic waste

Easiest company to deal with

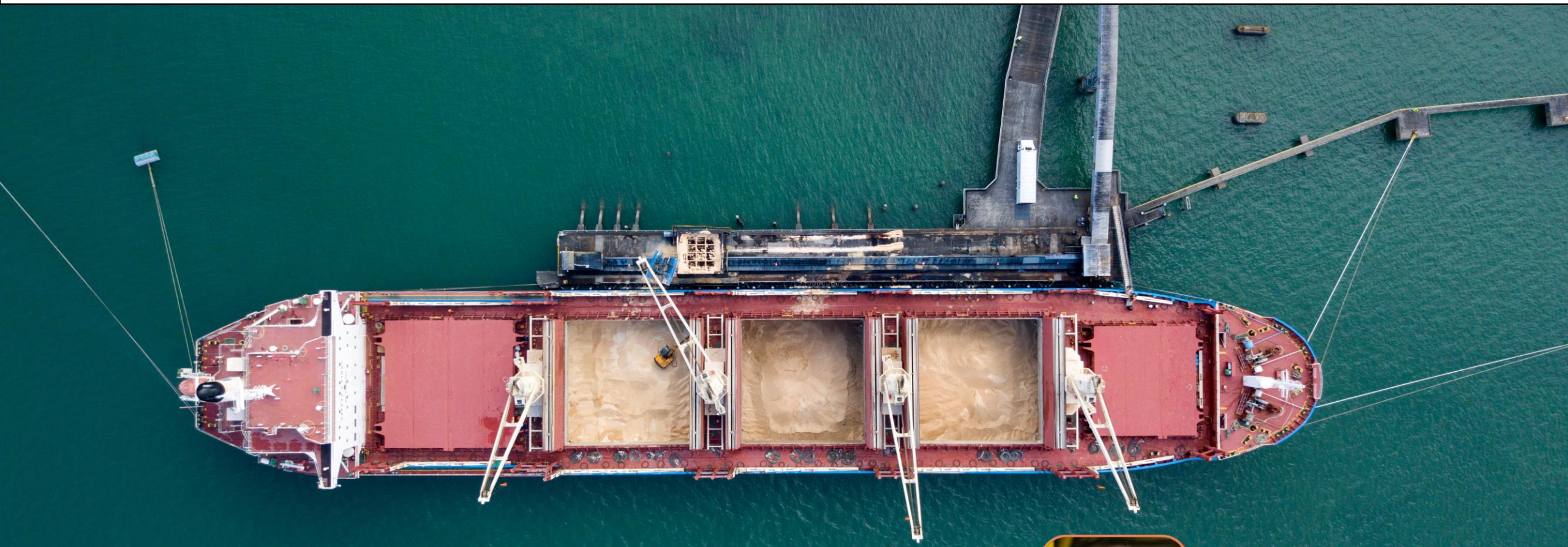
igus® in bulk handling applications

igutex® in Heavy Duty applications

iglidur® & igutex® heavy Duty applications

igus® for a sustainable future

Shore Power for Dry Bulk Terminals: Challenges and Solutions



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Tobias Batzdorf
Manager Shore Power
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Tel.: +49 2203 9649-7391

The Global Shore Power Tide is Rising – The Time to Prepare is Now

Health concerns

May 1, 2023

American Lung Association.

Support for California Ocean-Going Vessels At Berth Waiver
Re: Docket ID No. EPA-HQ-OAR-2023-0152
Comment from th
Via email: a-and-r

The American Lur
(EPA) to approve
Vessels At Berth (
updated policy to
California's ports.
neighborhood-lev

Californians face
Lung Association'
most ozone-pollut
progress in reduci
including asthma
communities and
impacts, including
ships and other o

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Internal company directives…

01/13/2022

APM Terminals commits to industry-leading reduction in greenhouse gas emissions

APM Terminals will bring forward its Net Zero greenhouse gas emission target to 2
reduction in absolute (total) emissions has been set as an interim milestone for th
by any terminal operator to date.

This commitment builds upon the company's existing strategic approach to decarbo
to reduce its carbon footprint. It will also contribute to a broader target set by paren
greenhouse gas emissions in 2040 across all business entities.

- Zero-Emission Shore Power

  We will support the decarbonisation of the broader shipping industry in collaboration with our partners and port authorities e.g., through providing shore power.

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Local and Global emissions reduction goals

EU AFIR: Ports must provide shore-side electricity by 2030

by The Editorial Team — July 25, 2023 in Fuels

The European Union Council today adopted the alternative fuels infrastructure regulation (AFIR) which establishes, among other things, that maritime ports must provide shore-side electricity for vessels by 2030.

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NEWS • News

Lowenthal calls for end to ocean shipping pollution during Long Beach town hall

The congressman said his proposed Clean Shipping Act

Battery powered Vessels

'World's first' 700 TEU pure battery-powered containerships are here

VESSELS

December 29, 2023, by Naida Hakirevic Prevljak

China's shipping company COSCO Shipping Development has taken delivery of two 700 TEU electric containerships built by COSCO Shipping Heavy Industry (Yangzhou), part of COSCO Shipping Group.

Samskip to Build Zero Emission Autonomous Feeder Ships at Cochin

Project envisions up to four hydrogen powered container feeder vessels designs for autonomous operations (Samskip)

PUBLISHED MAR 20, 2023 3:23 PM BY THE MARITIME EXECUTIVE

India's Cochin Shipyard received the contract to build what is being called the world's first zero-emission feeder container vessels for a project being led by Samskip, a logistics and shipping company based in the Netherlands. First announced last year, the SeaShuttle project envisions hydrogen-powered, remotely controlled, and autonomous-ready containerships that would operate between the Oslo Fjord and Rotterdam.

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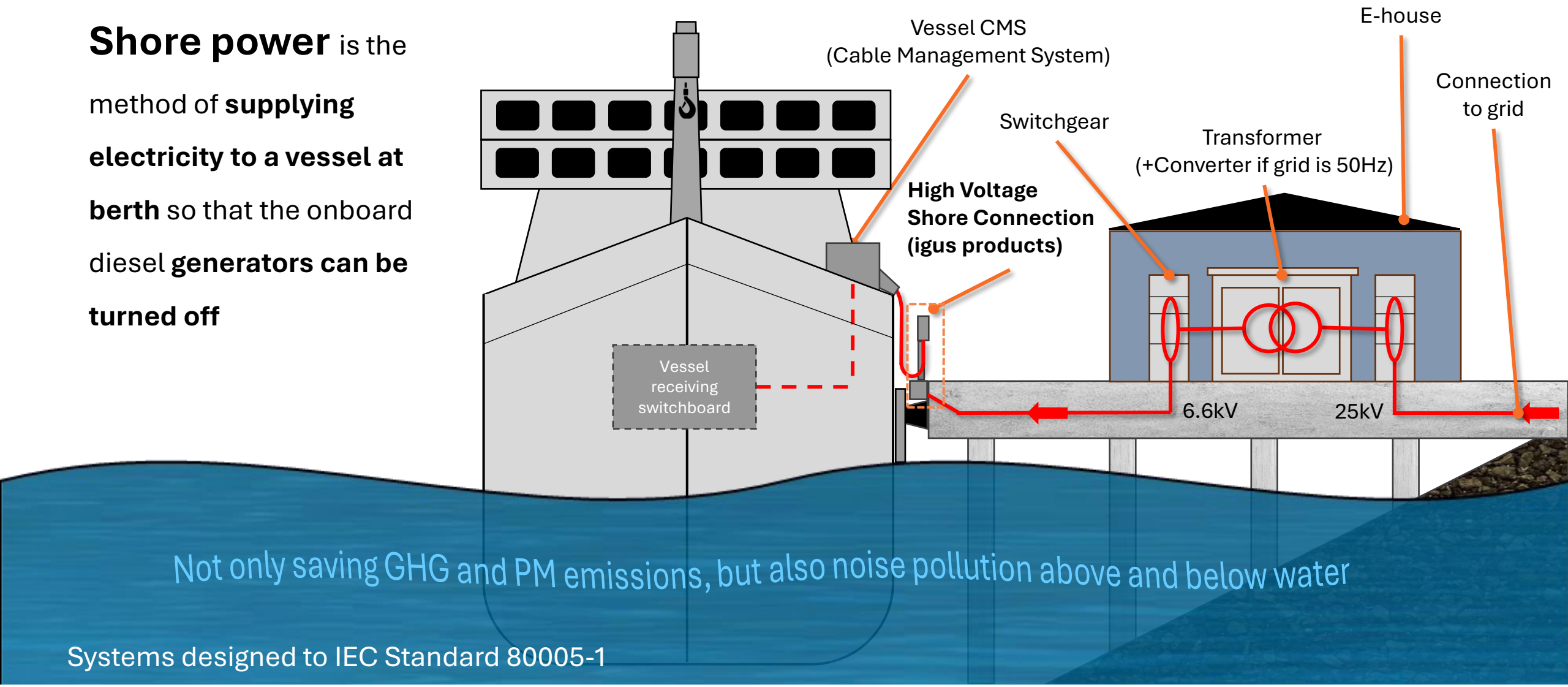
Overview and Definition of Shore Power for Ocean Going Vessels

Shore power is the method of **supplying electricity to a vessel at berth** so that the onboard diesel **generators can be turned off**



Not only saving GHG and PM emissions, but also noise pollution above and below water

Systems designed to IEC Standard 80005-1

Defining Goals for Designing a Shore Power System

The 3 Main Goals

1. **Fully comply with the IEC 80005-1** standards and machinery safety directives

2. **Provide 100% connection** capability today AND tomorrow with a single investment

3. **Integrate seamlessly into your core business** of moving containers – not connecting shore power!

Status IEC/IEEE 80005-1

- Actual no Annex for Bulk Vessels

- Installations in China:
  - CMS (cable reel on board), 1 Plug/Socket, 6.6 kV

- Working group is discussing requirements
  - Voltage 11kV, up to 6.5 MVA, 1 Plug/Socket
  - Vessel owners want the CMS on-shore side (less costs on-board)
    - Does this work?
    - Will one system fit all terminals?

PAUL GORIS
Executive director, Dry Bulk Terminals Group

Wake-up call

When discussing onshore power for vessels, the specific needs of dry bulk terminals must be taken into account

IAPH and Dry Bulk Terminals Group have been informed by a DNV-initiated industry expert group how dry bulk terminals should be managing their onshore power supply (OPS).

Mainly shipowners, plus a very small number of ports, participated in the group's discussions. However, Dry Bulk Terminals Group, as a platform for the industry, cannot share the conclusions of this group. As these conclusions would provide a set of general requirements for an OPS system for bulk carriers to the International Electrotechnical Commission (IEC), IAPH and Dry Bulk Terminals Group members need to be aligned to have the cable management system (CMS) onshore of the ship.

Arguments from this industry group to having the CMS onshore are one-sided, potentially leaving the terminals to solve the problem and to make the investments. The group is claiming that the CMS is located on the shore in every other shore power standard, apart from container ships and terminals. Tankers, Ro-Ro, cruise, PCTC and LNG are used as examples to make this claim for dry bulk vessels. And another claim is that there are much fewer berths equipped with shore power than ships making the total investment smaller and installation less complex.

What remains forgotten is that dry bulk terminals would have huge operational challenges for having the CMS onshore. Examples include mobile cranes that should be able to move freely, as each dry bulk commodity needs to be loaded or unloaded in a different way. Not to forget about rail-guided gantry cranes alongside many dry bulk terminals. The container industry has chosen to have the CMS on-board because of this reason – which is a lack of space with large gantry cranes at the quay.

Lowering cables from ship to shore is much easier than installing cranes with up to 20 metres reach and require less operational procedures land side.

When vessels would also like to maintain flexibility in mooring positions along the berth, the terminals would have to invest in multiple or movable cable cranes, which would again increase costs significantly.

Different than on liquid or LNG terminals, dry bulk terminals present more dusty environments that can easily deteriorate moving equipment. The challenge for each dry bulk terminal is to keep the dust or spillage on the terminal in order to mitigate it and not to have the vessel exposed to it. It is in the vessel owner's own interest this remains as a standard on dry bulk cargo handling.

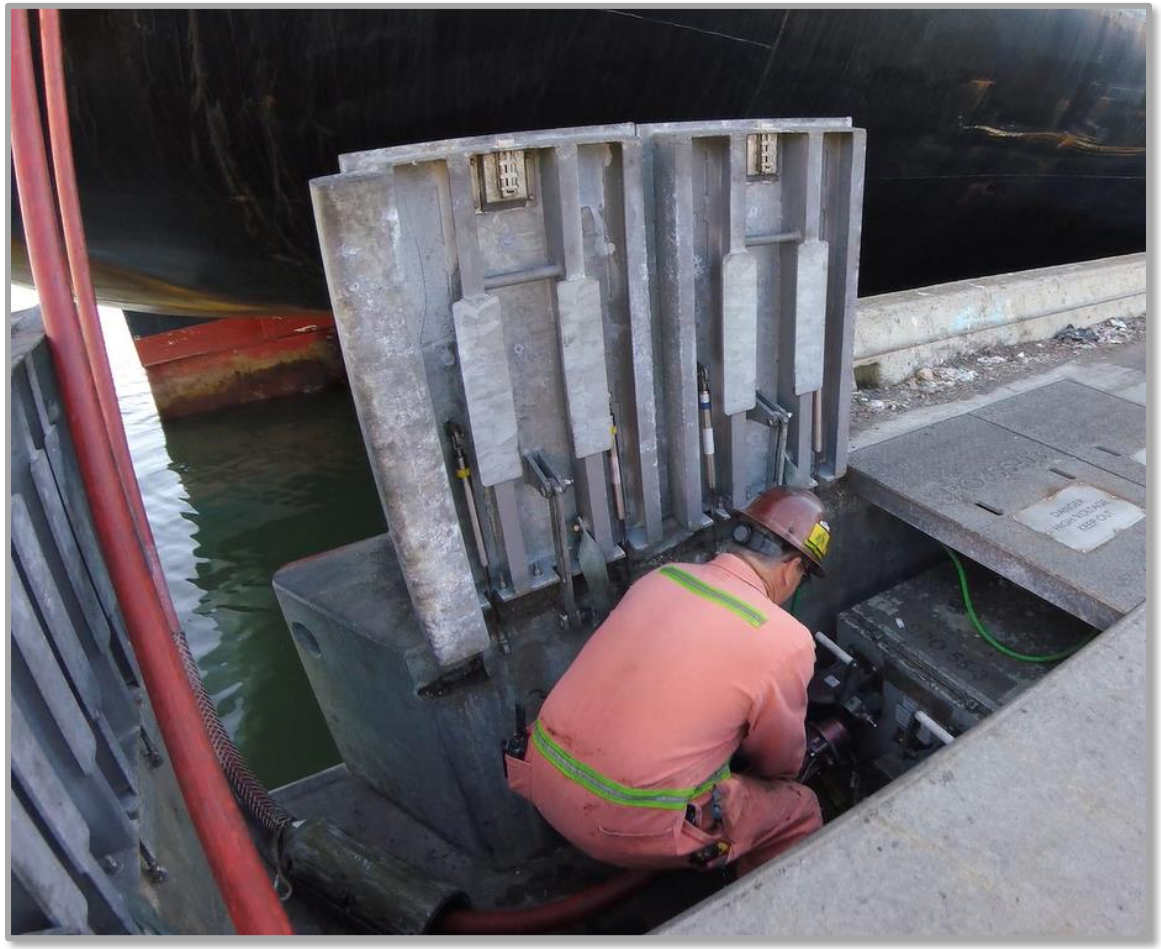
Simply concluding the investment should be made by terminals and ports is again one-sided. Compensation by governmental funding is an assumption made, yet this differs greatly per government and municipality. Besides this, leaving it up to government, and keeping the favours on board, is again one-sided.

We all confirm our commitment to the greening of our world and for our industry. As the DNV-initiated bulk carrier shore power group will make its requirements to the IEC shortly, both IAPH and the Dry Bulk Terminals Group will stay alert to have this arranged in our common interest. In other words: cables aboard! ■

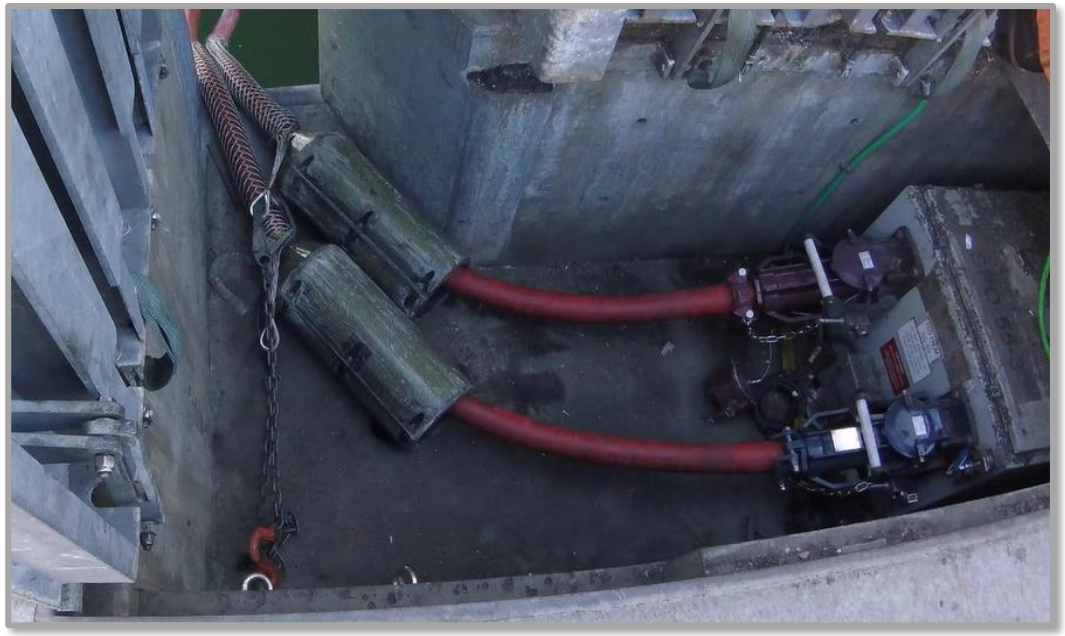
IAPH members are asked to send their technical arguments favouring CMS on-board to antonis.michail@iaphworldports.org

Lessons Learned: The Creation of The Connection Dilemma

There are **3 factors** identified through research that **create limitations with the pit/vault methodology**



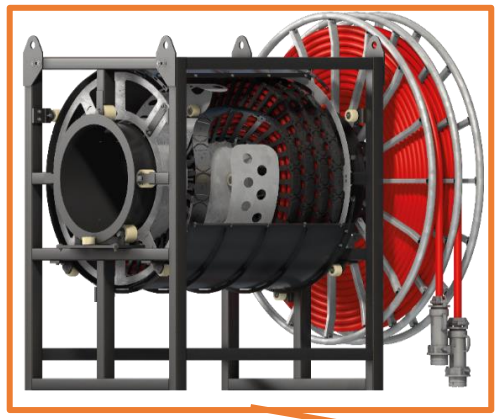
1. Limitations of the Usable Cable Length from Vessel
2. Variation of Possible Locations for Cable Deployment
3. Compromised Optimal Berthing Locations



Challenge #1: Limitations of the Usable Cable Length from Vessel

The IEC standard **only requires that 10m of extra cable** is available on the shore. This provides +/-10m of length from the drop point for a total of 20m of connection range.

Vertical motions for **tidal range** and **loading** can vary by 20m/66ft



Cable length is limited by the size of the reel in the container

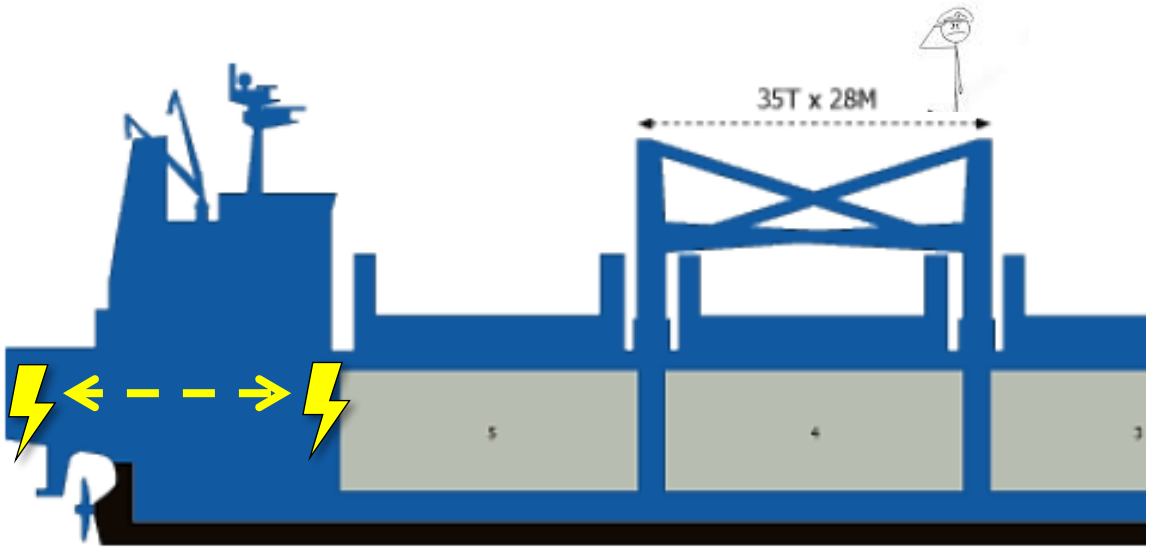
10m/33ft left

10m/33ft right

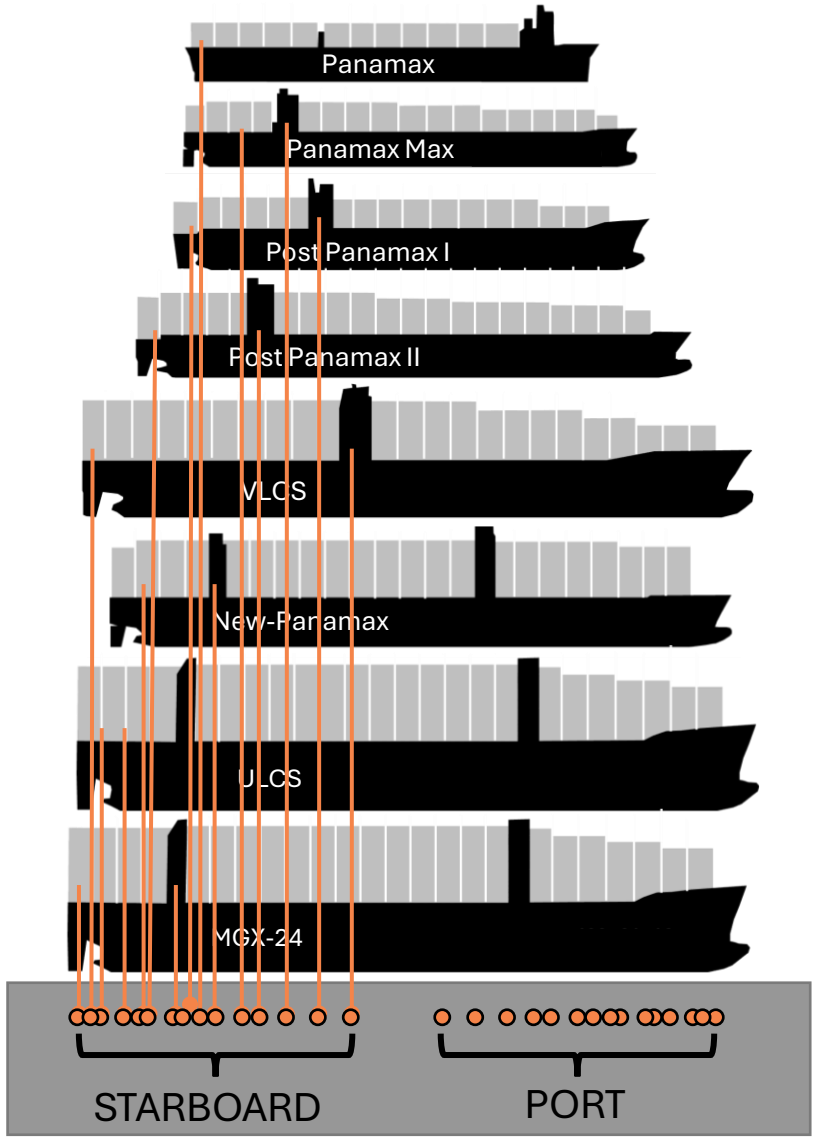
Note: (2) x 10m/33ft cable = 200kg/440lbs

Challenge #2: Variation of Possible Locations for Cable Deployment

- **Different vessel sizes and configurations** create many locations for the onboard cable reel
- The on-board cable reel can be installed in **a container or at the bridge**
- **Starboard vs port** berthing creates even more needed connection points

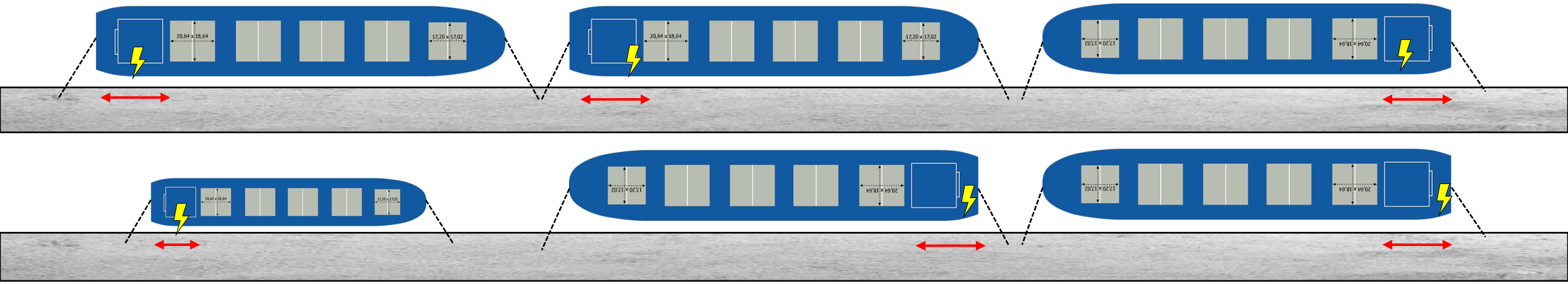


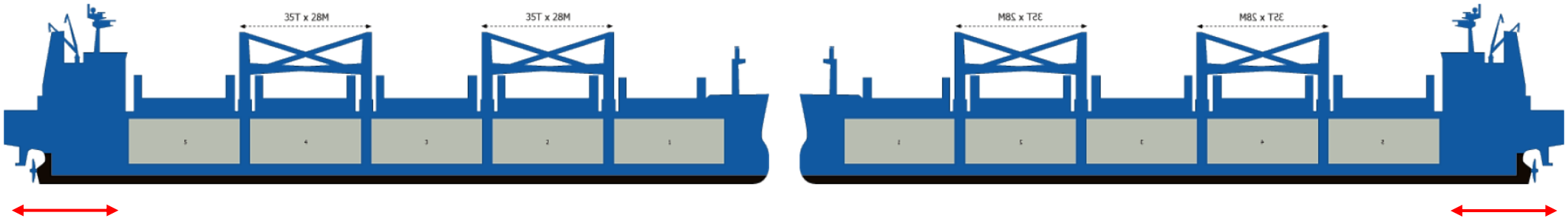
up to 30m/98.4ftft



Challenge #3: Compromised Optimal Berthing Locations

- **Maximizing vessel density** with various vessel LOA's on long quays creates many needed points





CMS Possible Positions
Starboard side 30m

CMS Possible Positions
Port side 30m

Changing positions of onboard cable management systems...

Designing a Terminal with Fixed SPOs: The Numbers Don't Add Up

Study: Cable reel deployment with 10m extra cable per IEC Standard Document = only **40% Coverage**

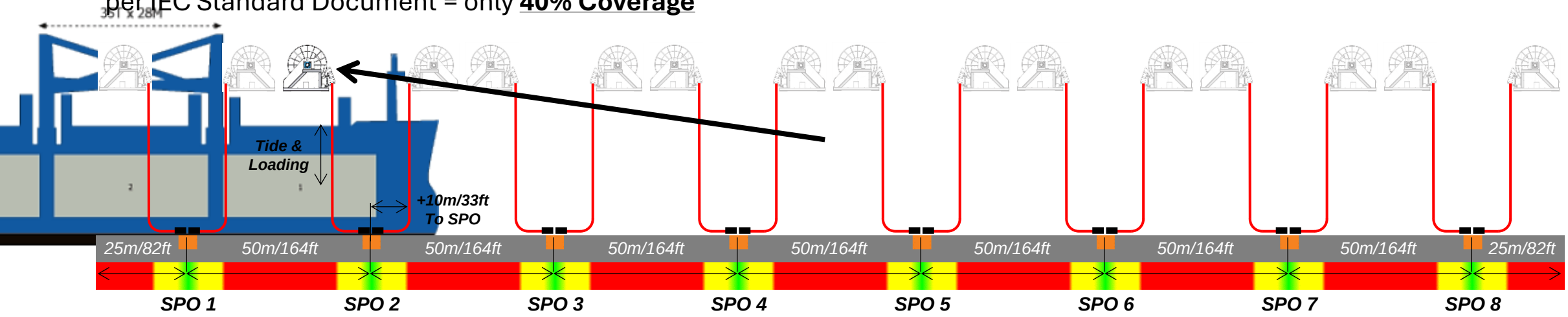
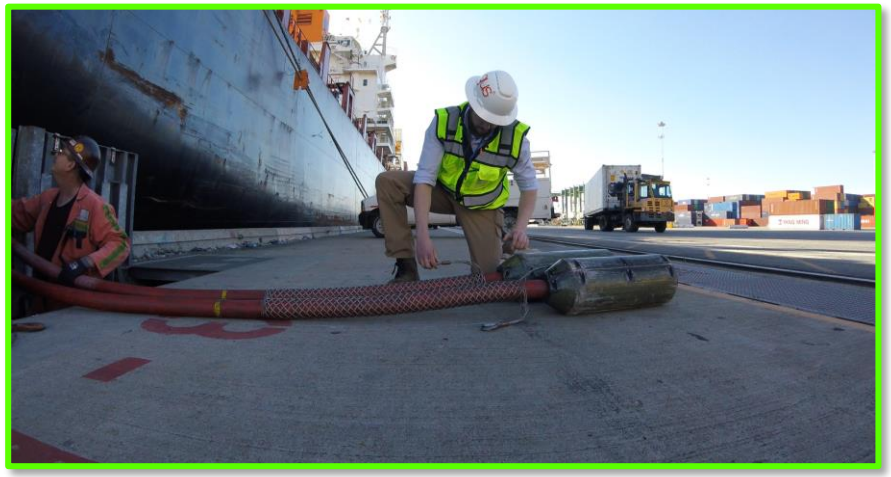
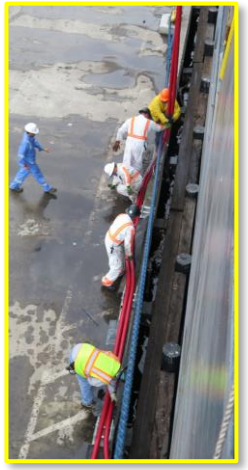


Illustration to scale: 400m/1312ft Quay Length with Typical Layout (8) SPO every 50m/164ft



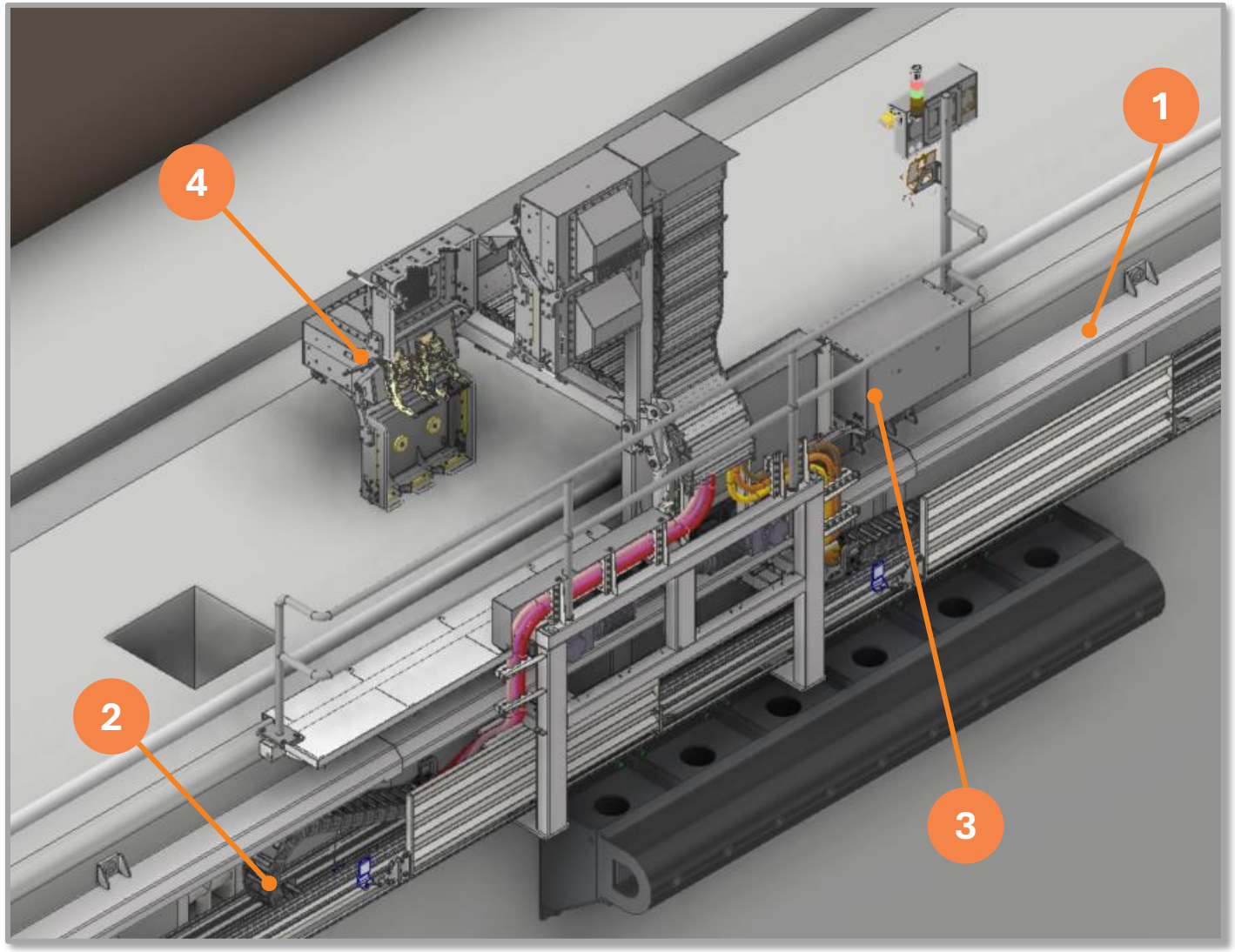
Green Zone:
good alignment and easier connections

Yellow Zone:
misalignment handling long cables and cables exposed on the deck



Red Zone:
dead zone connection is not possible due to cable length

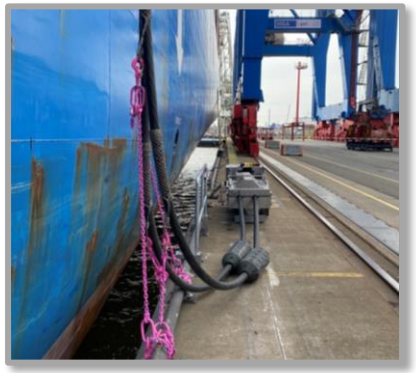
iMSPO General Description



Core components

1. Track Element guides carriage and protects e-chain system
2. E-Chain System guides and protects cables while in motion
3. Socket Carriage contains propulsion system and control with HMI
4. Socket Box protects people from plug failure, type approved

Shore Power e-chain® Reel



- Minimal construction and very little berth outage time required for installation
- Up to 125m of service flexibility from the e-chain reel position
- Narrow runway space needed (less than 1m) between bollards and cranes

Alternative Solution with onshore CMS + iMSPO

Special Considerations for Dry Bulk Terminals

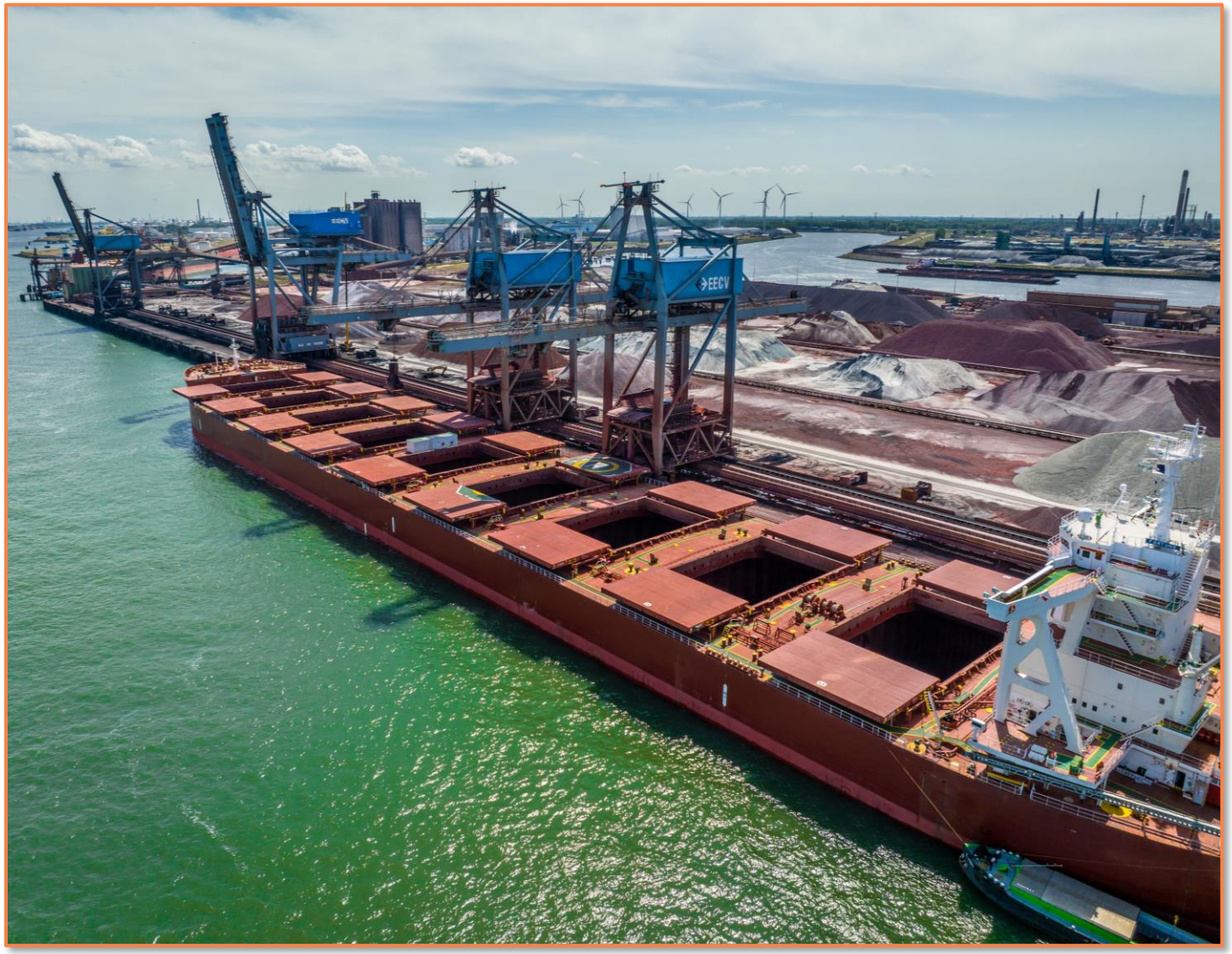
1. Aggressive environment for machinery
   - Products designed for this environment must be used

2. EX areas shore and vessel side
   - Shore power connections must be carefully considered

3. For smaller terminals and finger piers the vessel may need to be repositioned
   - It may be necessary to move the vessel to reach all hatches

4. Space needed to install a solution
   - Crane rails, loading equipment, bollards and bull rails must all be considered

Challenge 1: Aggressive Environments



Environmental conditions must be considered carefully when planning for a shore power system.

Components must be:

- Abrasion resistant
- Corrosion resistant
- Marine grade

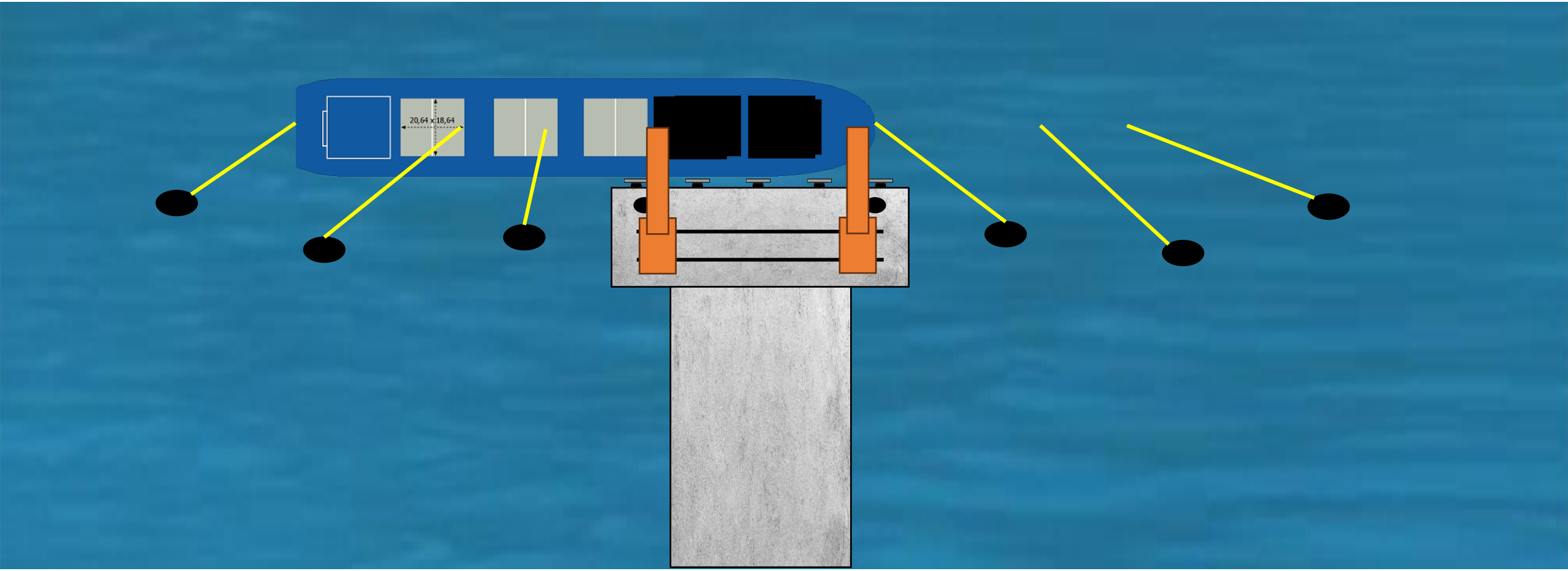
Designs should consider:

- Material buildup mitigation
- Washdown proof

Challenge 2: EX area considerations

- Connections should be made in areas away from classified areas.
- Because of the EX-environment, the use of products that contain slip rings should be limited.
- On the vessel, the best location to make a connection is between the bridge and the aft of the vessel.
- On the terminal, landside equipment should also be carefully planned.

Challenge 3: Movement of Vessel During Loading



How to Get Started

- Familiarize yourself with the standards IEC 80005-1 → get involved in the work groups

- Determine your power needs
  - how many vessels
  - load profiles for each vessel

- Study berthing arrangements and mooring line geometries

- Check your space requirements
  - Location of backland electrical equipment
  - Space available for ship-to-shore connection: Fenders, bollards, bull rails, crane rails
  - Cable installation and trenching

- Start planning early. These projects take time, and some equipment has long lead times.

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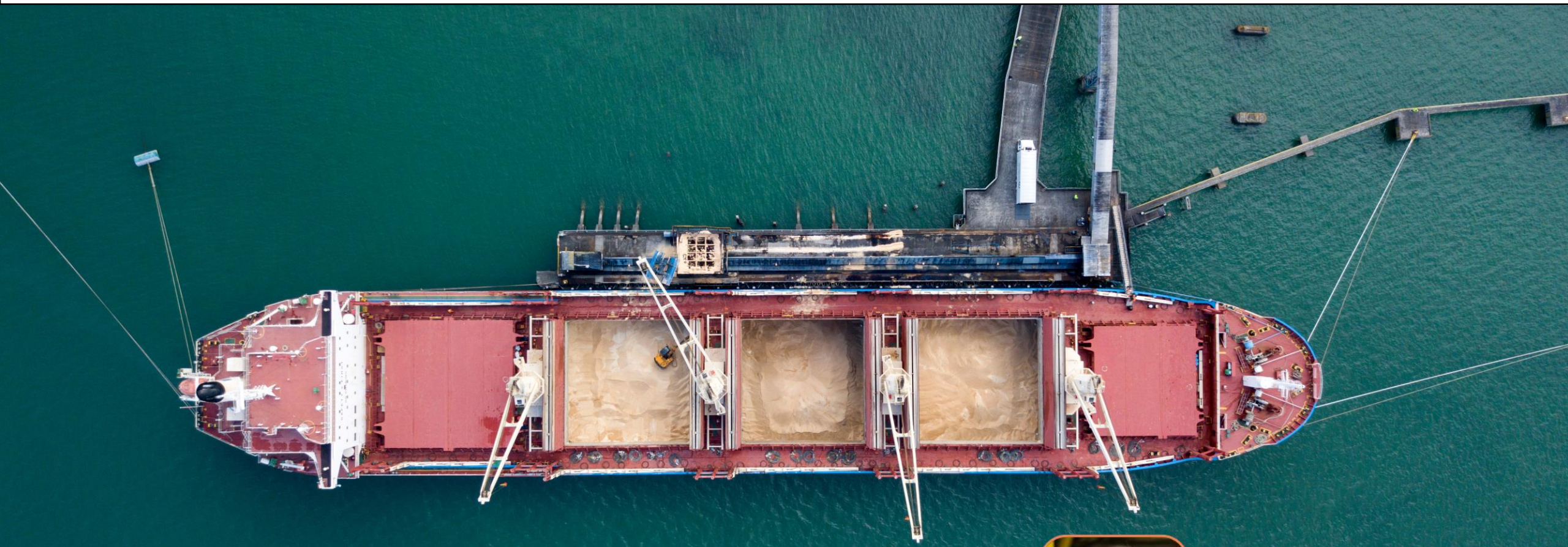
Shore Power for Dry Bulk Terminals: Challenges and Solutions



Thank you for your time and attention!

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