5th Co-operative Forum

SESSION 5

Marine Environmental Protection

Maersk Maritime Technology

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MARITIME TECHNOLOGY

A.P. Moller – Maersk

A diversified conglomerate founded in 1904

110,000 employees and operations in over 130 countries

Headquarters in Copenhagen.

Business segments:

- Container shipping (240/530 ships)
- Tankers (125/250 ships)
- Offshore supply services (65 ships)
- Tugs (approx. 500)
- Oil and gas activities
- Retail activities

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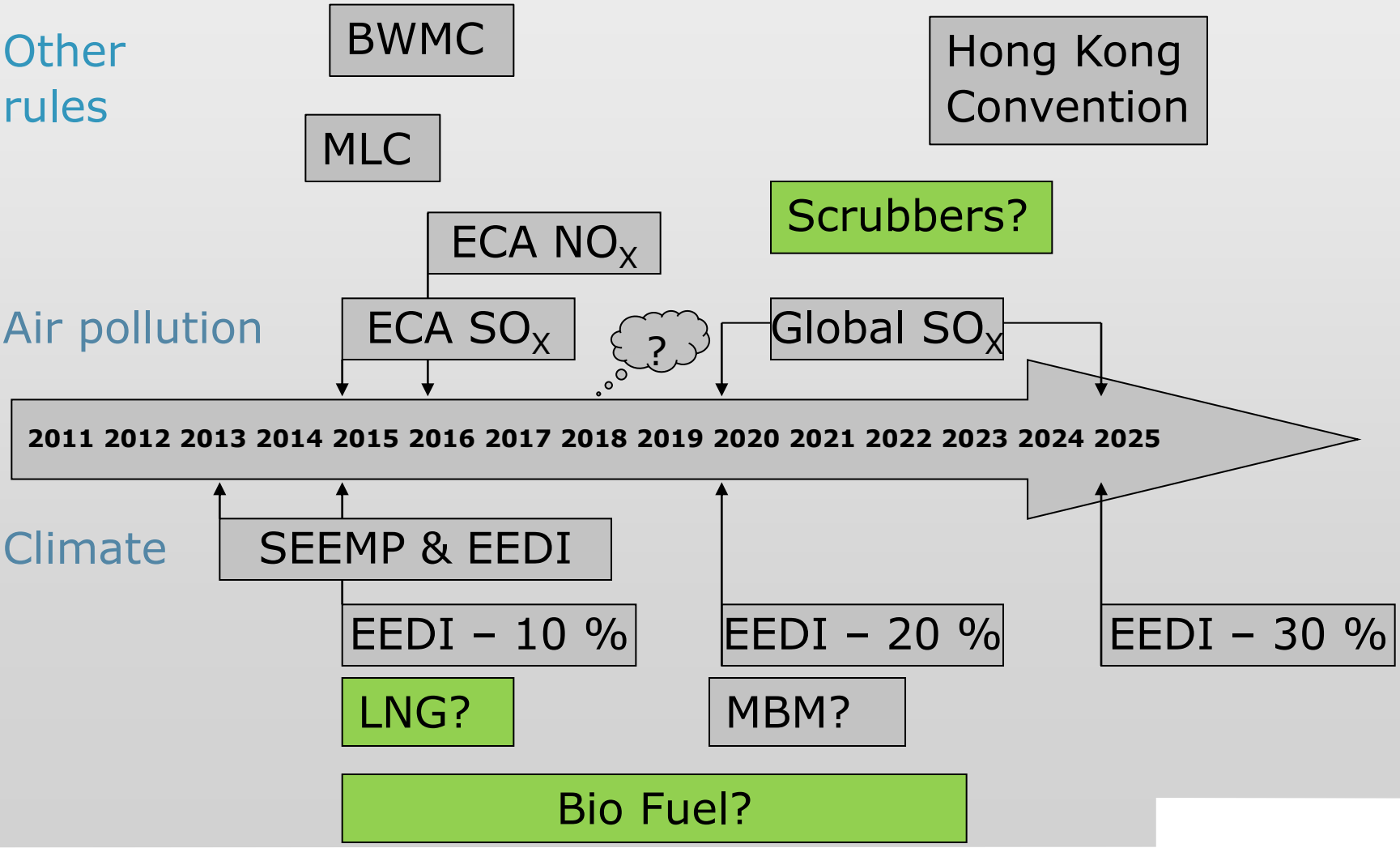
13 years of environmental regulation



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Strategic Level of Environmental Compliance

1 Eco-Resistant ✗

- Lobbying activities to slow or tone down regulatory changes

2 Eco-Compliance ✗

- Strives to **comply** with all **evolving** regulatory and key customers

3 Eco-Efficiency ✓

- Aspires to go beyond compliance in order to get competitive advantage

4 Eco-Advantage ✓

- Aspires to go beyond Eco-Efficiency in order to **create value** through cutting-edge environmental initiatives and leadership

Voluntary fuel switches to low sulphur fuel

- Maersk Line has undertaken voluntary fuel switches in:

- California from 2006 – mandatory from 2010
- Seattle-Tacoma from 2007
- Vancouver from 2007
- Hong Kong from from 2010
- Singapore from 2011
- New Zealand from 2011 to 2012

CO_2 Targets

- Maersk **Line**
  25% reduction per TEU-km from 2007 to 2020
- Maersk **Tankers**
  15% reduction per tonne-km from 2007 to 2015
- Maersk **Supply Service**
  10% reduction per ship from 2010 to 2020

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Innovation projects on the Maersk fleet

Maersk Attender
Crane pendulation

Thurø Maersk
BWTS testing

Maersk Kendal
Ventilation optimization

Jeppesen Maersk
Auto-tuning of main engine

Emma Maersk
Aux. engine waste heat

Roy Maersk
CLT Propeller

Maersk Kalmar
Biofuel

Olivia Maersk
Air lubrication

Alexander Maersk
Exhaust gas recirculation

Gudrun Maersk
Main eng. cooling systems

Laura Maersk
HT Pump optimization

Maersk Kate
Propeller boss cap fin

Maersk Belfast
Water based hydraulics

Arthur Maersk
Cylinder lube oil reduction

Clementine Maersk
CRS autologging and performance prediction

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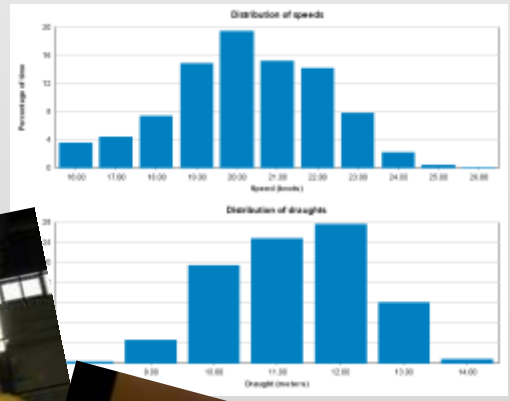
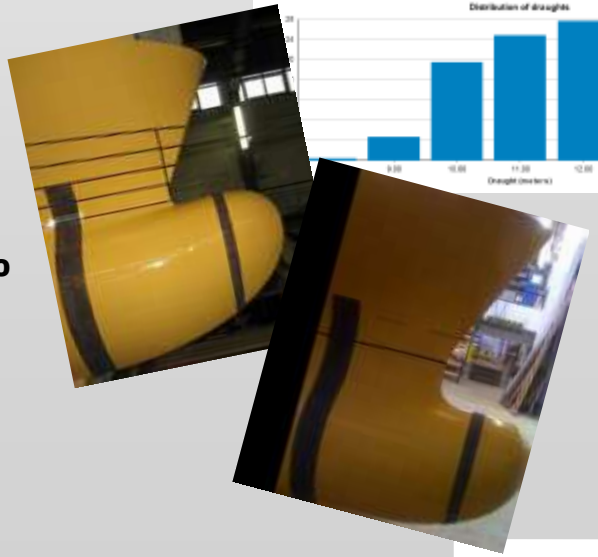
Optimized Containership

Based on detailed design and optimization of a new containership design Maersk Line and Maersk Maritime Technology together made significant improvements to a standard design

- Super long stroke engine: 3%
- Increased propeller diameter: 5%
- WHR and direct intake for TC: 9%
- Hull form optimization: 8%
- **Total reduction:** **app. 22%**





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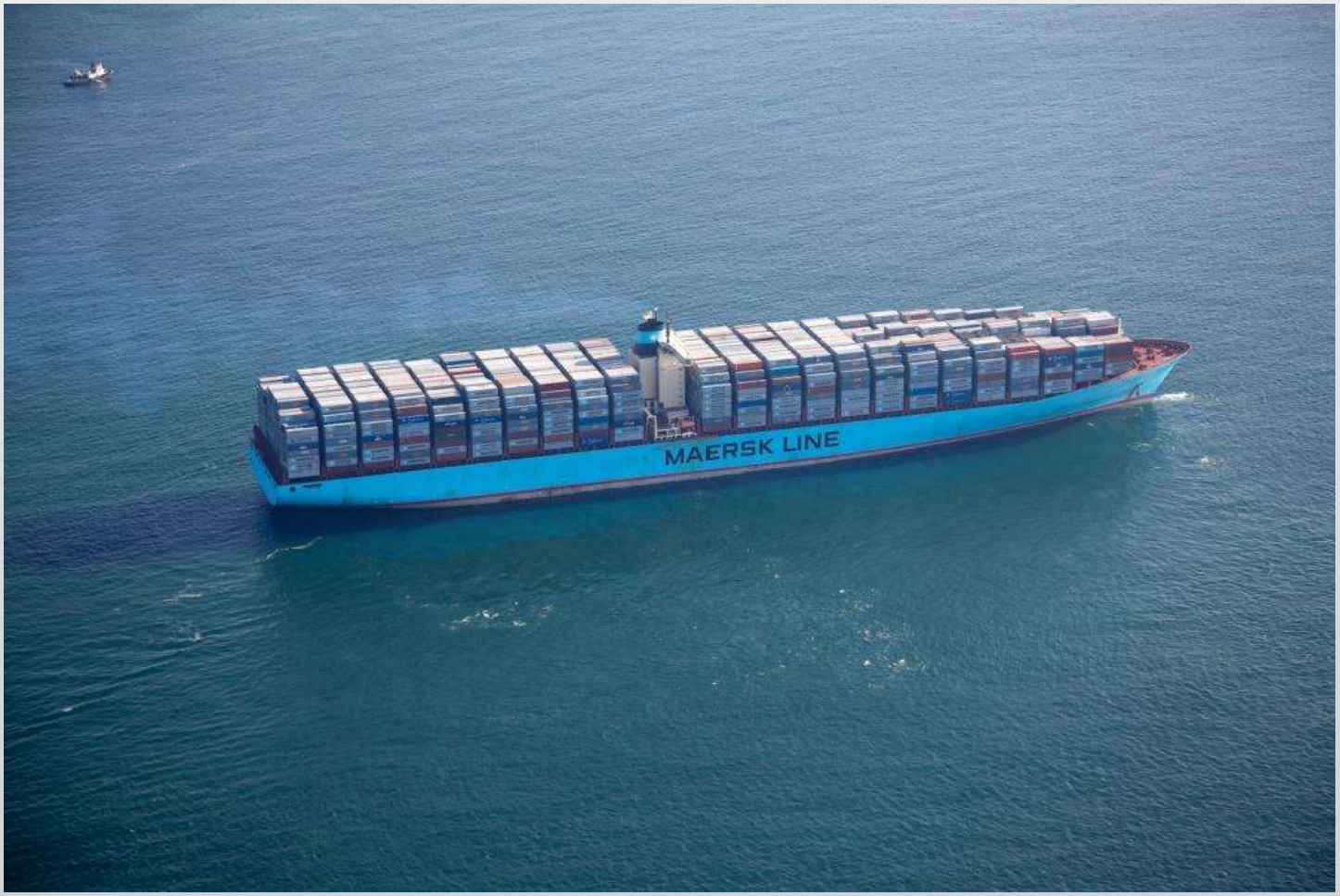
”Emma Maersk” – world’s largest containership arriving from East Asia to Algeciras with 15510 TEUs



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Triple-E:

Economy of scale

Energy efficient and

Environmentally improved

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Triple-E Class – 18,300 TEUs

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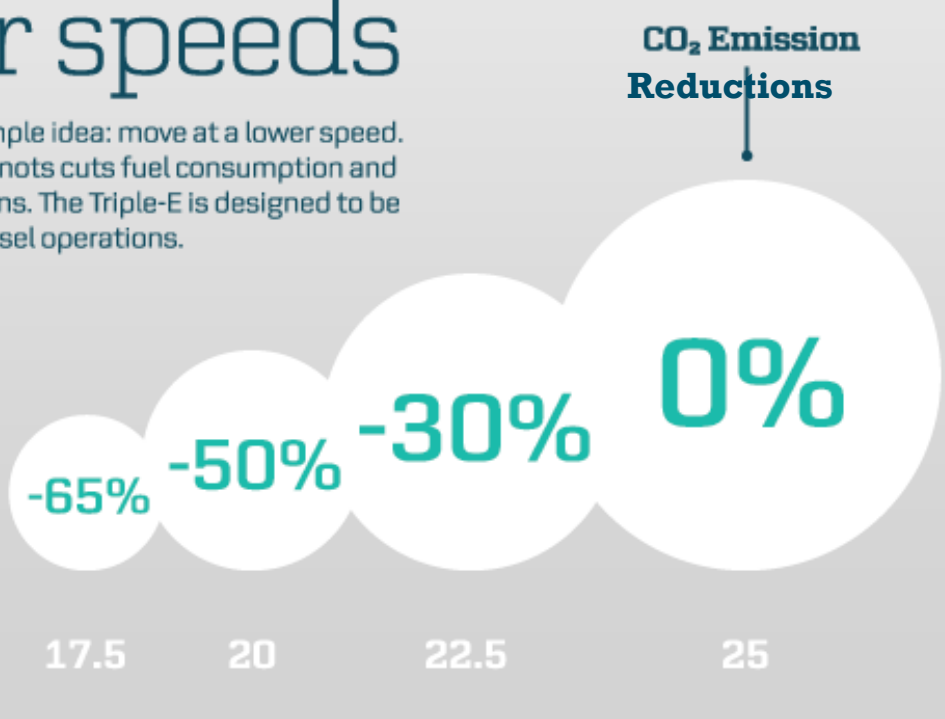
Slow Steaming

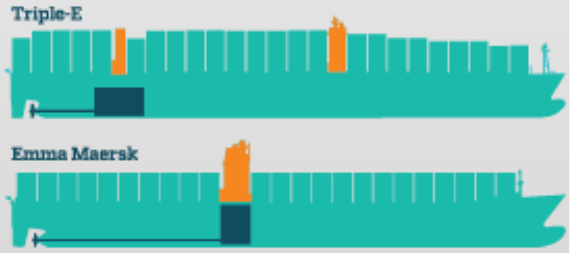
Designed for lower speeds

It started with a simple idea: move at a lower speed. A small change in knots cuts fuel consumption and lowers CO_2 emissions. The Triple-E is designed to be efficient across vessel operations.



Size and speed matter

An energy-efficient engine propels the Triple-E class. The engine operates at low propeller revolutions and uses larger propellers than traditional container vessels. This combination makes the engine more efficient, since less propulsive energy is required.



The above-mentioned reductions includes propulsion power only and assumes a fixed relation between fuel consumption and carbon emissions. Figures are indicative based on data from Emma Mærsk class vessels.

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Energy Efficient

… The Triple-E will produce 20 percent less CO2 per container moved compared to Emma Mærsk and 50 percent less than the industry average on the Asia-Europe trade lane.

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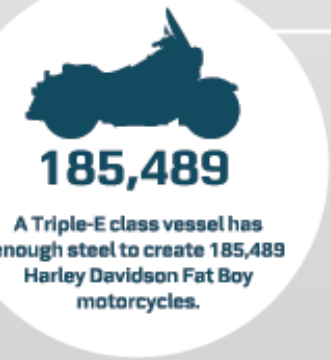
A recyclable ship

The Triple-E class will be designed for future safe and sound recycling. We will develop a new 'Cradle-to-Cradle Passport', which will list and describe the materials used to build the vessel, where they are located, and how they can be correctly disassembled and recycled.

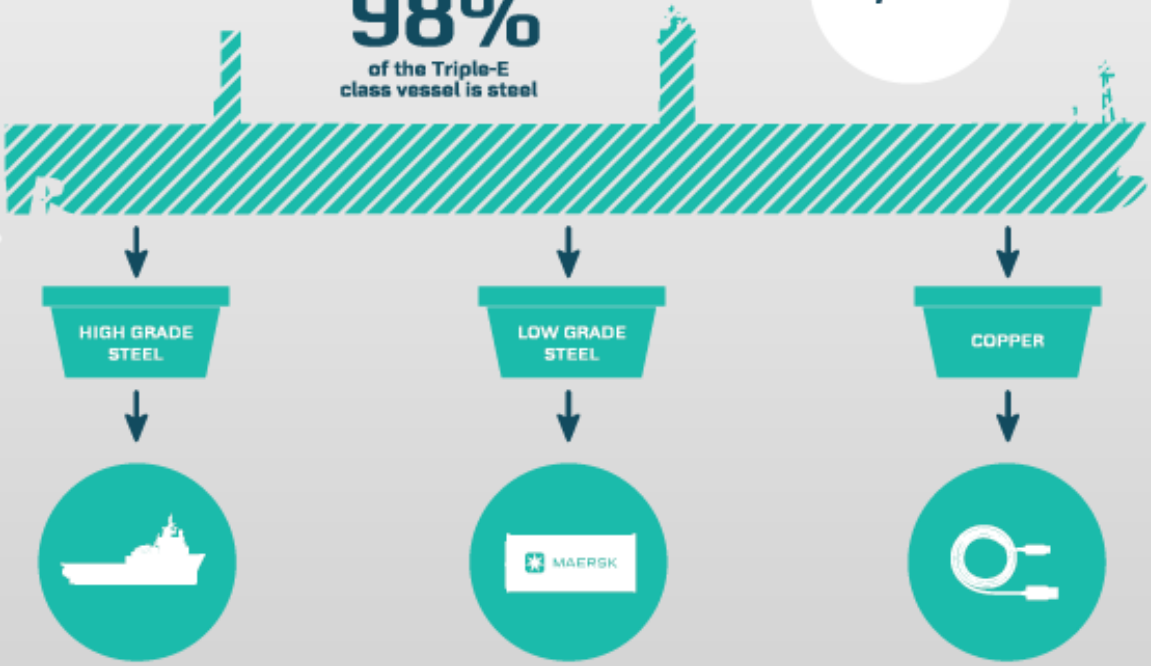


185,489

A Triple-E class vessel has enough steel to create 185,489 Harley Davidson Fat Boy motorcycles.

98%
of the Triple-E class vessel is steel

total weight
60,000ton



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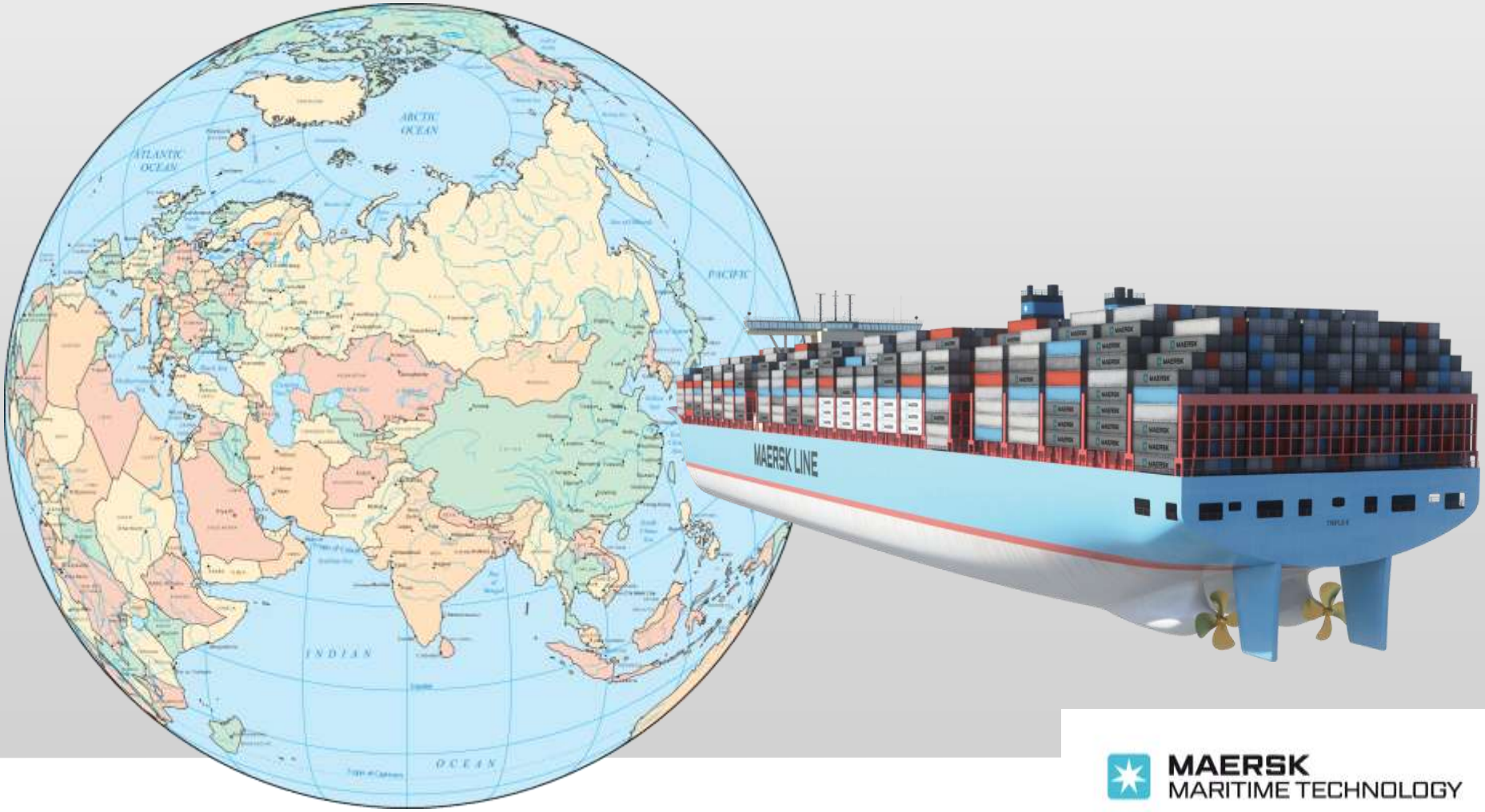
Designed for sailing between East Asia and Europe, which is one of the world's largest trades



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Will they be the largest ships to transit the Straits?

Navigating the Straits is always challenging, but even more so with a ship of this size.

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Triple-E Class vs. a VLCC

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Triple-E Class vs. a VLCC

	VLCC	Triple-E
Length	332m	400m
Beam	60m	59m
Height	66m	73m
Depth	30.5m	30.3m
Draught	22.6m	14.5/16M
DWT	323,000t	180,000 t
kW	29,000	60,000
Speed	16kn	23kn

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Largest ship to pass the Straits?

Jahre Viking
L = 458.5m
B = 68.9m
D = 29.8m
T = 24.6m

Max. T in Straits = 21.0m *

* **NAVIGATIONAL SAFETY IN THE STRAIT OF MALACCA**
Singapore Journal of International & Comparative Law
(1998) 2 pp 468 – 485

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Emma Mærsk
- WHR
- Electronic Engine
- Economy of Scale

SAMMAX & WAFMAX
- WHR, first in Korea
- Electronic engine
- Super Long Stroke Engine
- Large diameter propeller
- Hull optimized for operational Profile

[illegible]
- HR
- ctronic Engine
- Economy of scale
- Super Long Stroke Engine
- Hul optimized for operational Profile
- Twin Skeg
- All systems and consumers energy optimised
- Cradle to Cradle

Next generation
- ????

Evolution of Maersk Line container vessels

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Thank you

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