

The sustainability aspects of antifouling coatings

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Agenda for today



1

WHO
Hempel and myself



2

WHY
Antifouling coatings are critical to energy efficiency



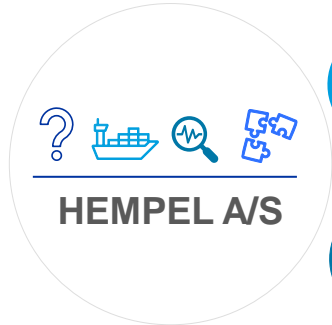
3

WHAT
The environmental aspects of antifouling coatings



4

HOW
Towards sustainable solutions and informed investments



Hempel & myself in brief

From being founded in 1915 delivering marine coatings to the Danish merchant fleet Hempel A/S is today a global company protecting our customers' assets across four different segments all over the world

8
Brands

26
Factories

7,500+
Employees*

17
R&D centres

359
Stores

250 000+
Customers



* Total number of employees as of December 2021

Decorative



Marine



Energy



Infrastructure



Viktor Avlonitis

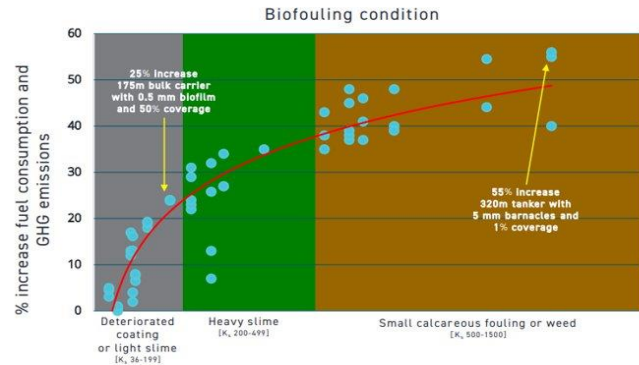


- IT and Business background
- PhD with the Danish Maritime Foundation
- Joined Hempel, working with service strategy and biofouling regulation
- Member of two ISO working groups on Biofouling management, working with BIMCO, and acting as IMO GloFouling GIA representative
- A part of the CESA at PPR10 WG on Biofouling Guidelines



The importance of preventing marine biofouling to ensure ship efficiency and protect marine ecosystems

Effect of biofouling



Biofouling management

Increase ship efficiency



Reduce GHG emissions by ensuring the hull remains smooth and clean between dry dockings



Prevent transfer of invasive species

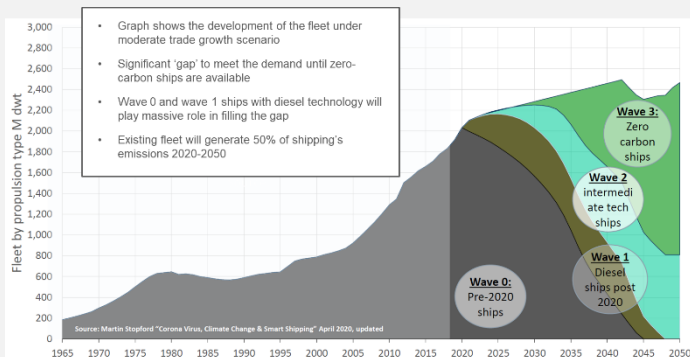


Prevent the spread of non-native aquatic species which can become invasive

Energy efficiency is key to achieve the net-zero target by 2050

WE NEED TO USE LESS ENERGY

Now and in the future



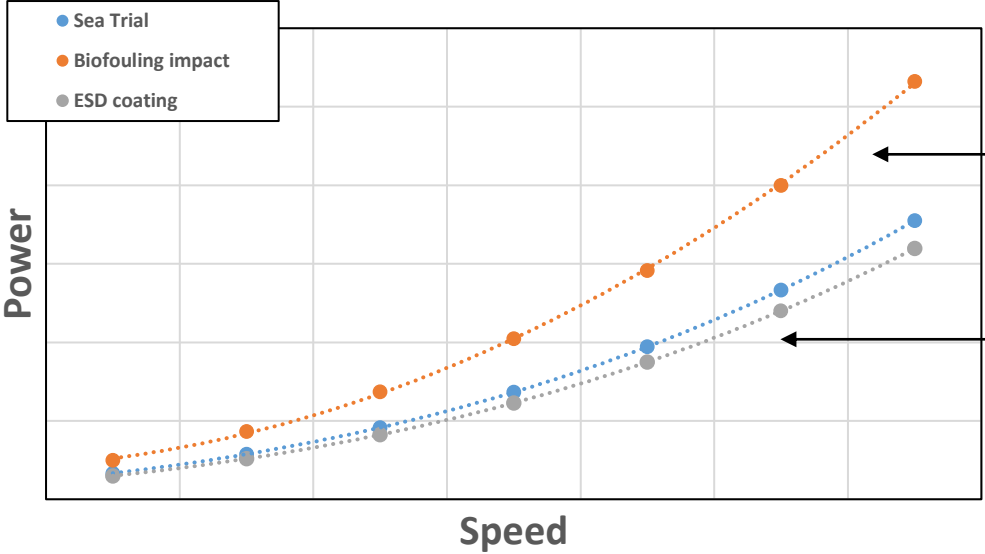
Strengthened IMO strategy

2030: Reduce carbon intensity with **40 %** compared to 2008

2040: An overall reduction of **70 %** compared to 2008

2050: Reaching net-zero GHG emissions

Moving beyond biofouling protection: Coatings as an energy saving device for performance improvement



Mitigating the power penalty of biofouling growth


- Coatings as a biofouling management tool



Improving the performance straight out of dock


- Coatings as an energy saving device + biofouling management tool

Environmental aspects of antifouling coatings itself



Emissions into air

VOC emissions from solvents used in paint during application at shipyards

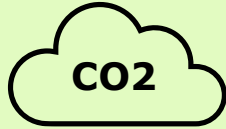


Emissions into water

- Biocide release
- Non-soluble polymer release

Industry dilemma: Balancing between antifouling coatings performance and environmental impact?

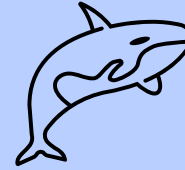
Antifouling coatings performance



- Antifouling coatings as an energy efficiency devise
- Preventing transfer of invasive species to local marine ecosystems

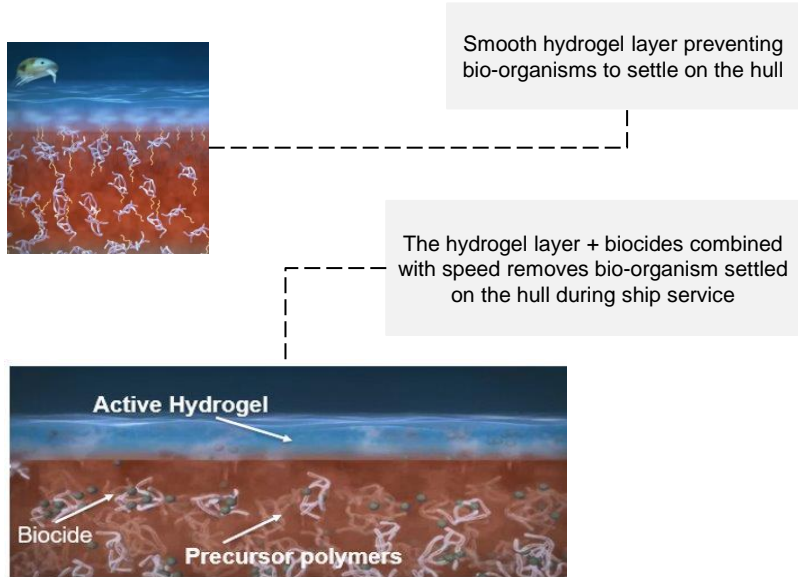


Environmental impact



- Protect marine ecosystems in trade ways and port ways from biocide and polymer release
- Reduce VOC emissions at shipyards during application

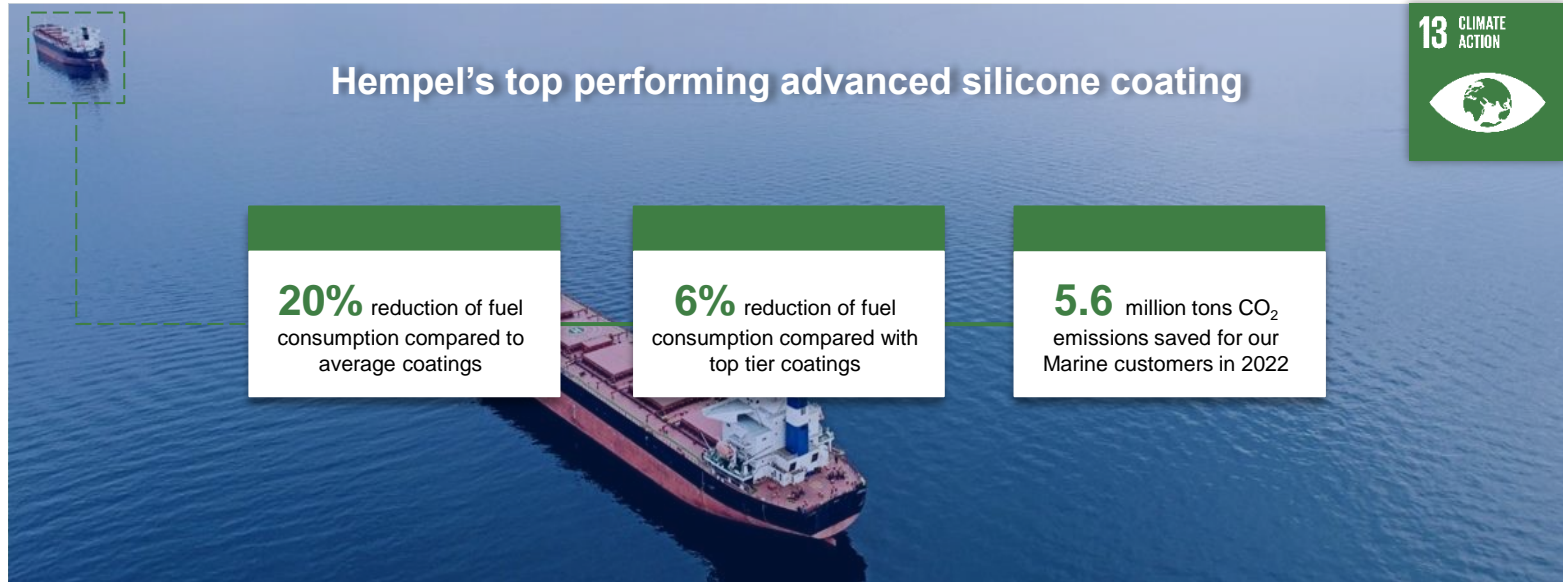
Advanced silicone coatings can significantly reduce this industry dilemma



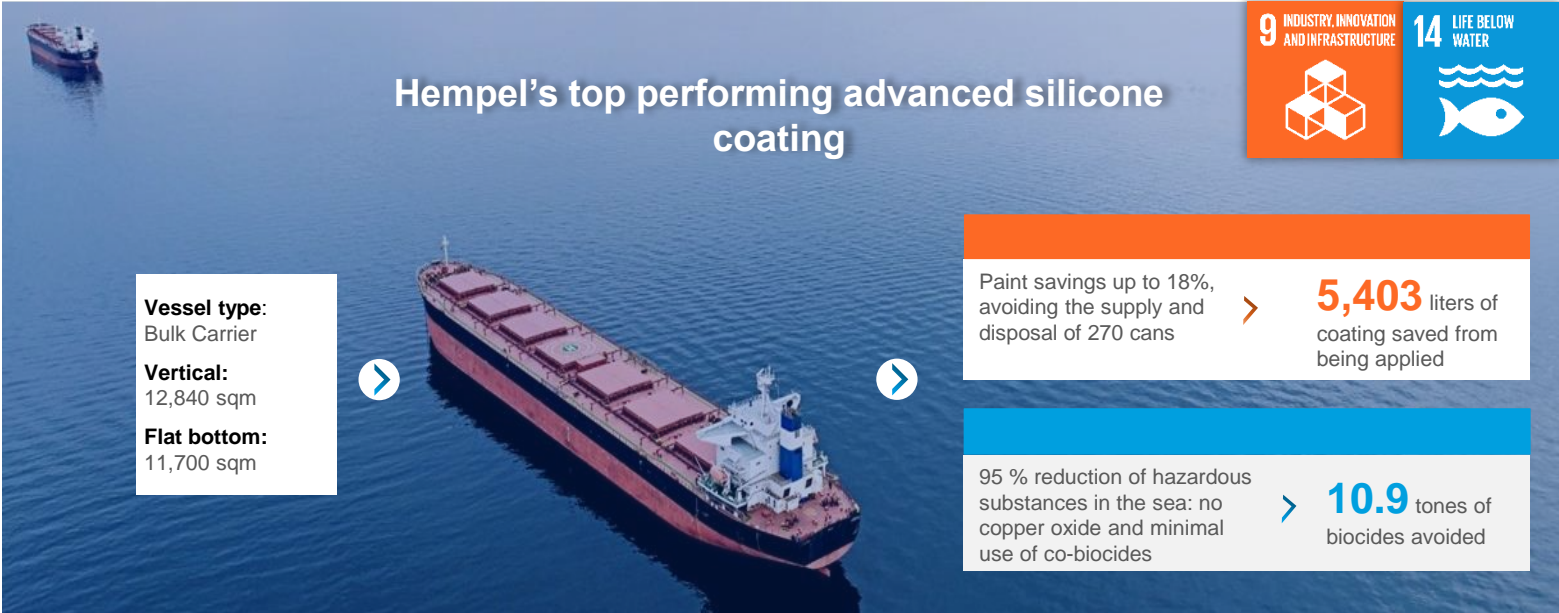
Hempel's advanced low friction silicone coating

- A **fouling release** coating technology
- Based on a **tailor-made surface energy**
- Uses **95% less biocide** pr. Square meter compared to a traditional antifouling
- Works by the formation of an **activated hydrogel** at the surface
- Characterized by a **smooth, stable surface**
- **Low frictional coefficient** – initial fuel savings
- **Unique performance** during idling – constant fuel consumption
- Biocide **release is independent** of ship speed

Advanced silicone coatings can significantly improve the hydrodynamics of a ship...



... and significantly reduce the industry dilemma between performance and environmental impact



Hempel's top performing advanced silicone coating

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

14 LIFE BELOW WATER

Vessel type:
Bulk Carrier

Vertical:
12,840 sqm

Flat bottom:
11,700 sqm

Paint savings up to 18%, avoiding the supply and disposal of 270 cans

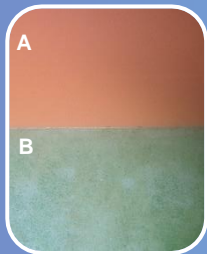
5,403 liters of coating saved from being applied

95 % reduction of hazardous substances in the sea: no copper oxide and minimal use of co-biocides

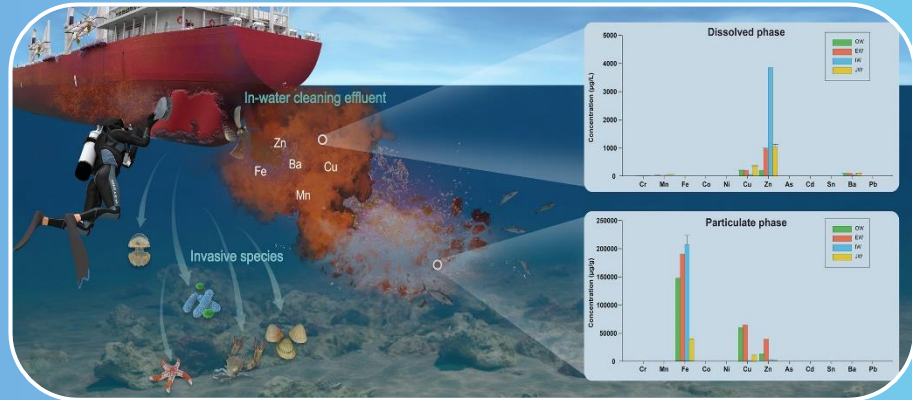
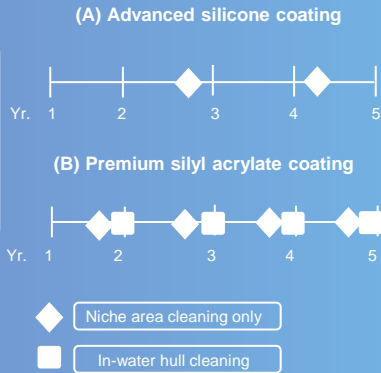
10.9 tones of biocides avoided

Ensures little to no cleaning, prevents the release of harmful waste to the water column

In-water cleaning leads to harmful waste into marine ecosystems and port water ways



31 months after dry docking
(In-water inspection report)



<https://www.sciencedirect.com/science/article/abs/pii/S0025326X21007281>

Steering towards more sustainable antifouling solutions for existing and new build vessels

Advanced silicone coatings signals a paradigm change in the coating industry enabling owners and yards to be first movers on sustainable hull management

Less fuel

With application of a silicone system a marine vessel can use less fuel to maintain same speed.

Less application

Paint savings up to 18 % significantly reducing paint supply and waste materials

Less release

95% less biocidal release in the water, less release of polymers and less need of hull cleaning



Industry must strive towards antifouling solutions that enable energy efficiency while protecting biodiversity



Energy efficiency is key to achieve net-zero by 2050

Efficiency upgrades are key and antifouling coatings are a low hanging fruit



Need to balance performance and environmental impact of antifouling coatings

Advanced low-friction silicone-based coatings offer a way forward to address the industry dilemma



Energy efficiency measures must be evaluated through a holistic approach

Ensuring educated decisions on how to upgrade ship efficiency

Building an industry framework to take educated decisions on energy efficiency measures





Accelerating the transition towards sustainable energy
efficiency upgrades

Thank you for
your time

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