The impact of the antifouling systems on improving fuel efficiency and reducing exhaust gas emissions the case of Hempaguard X7

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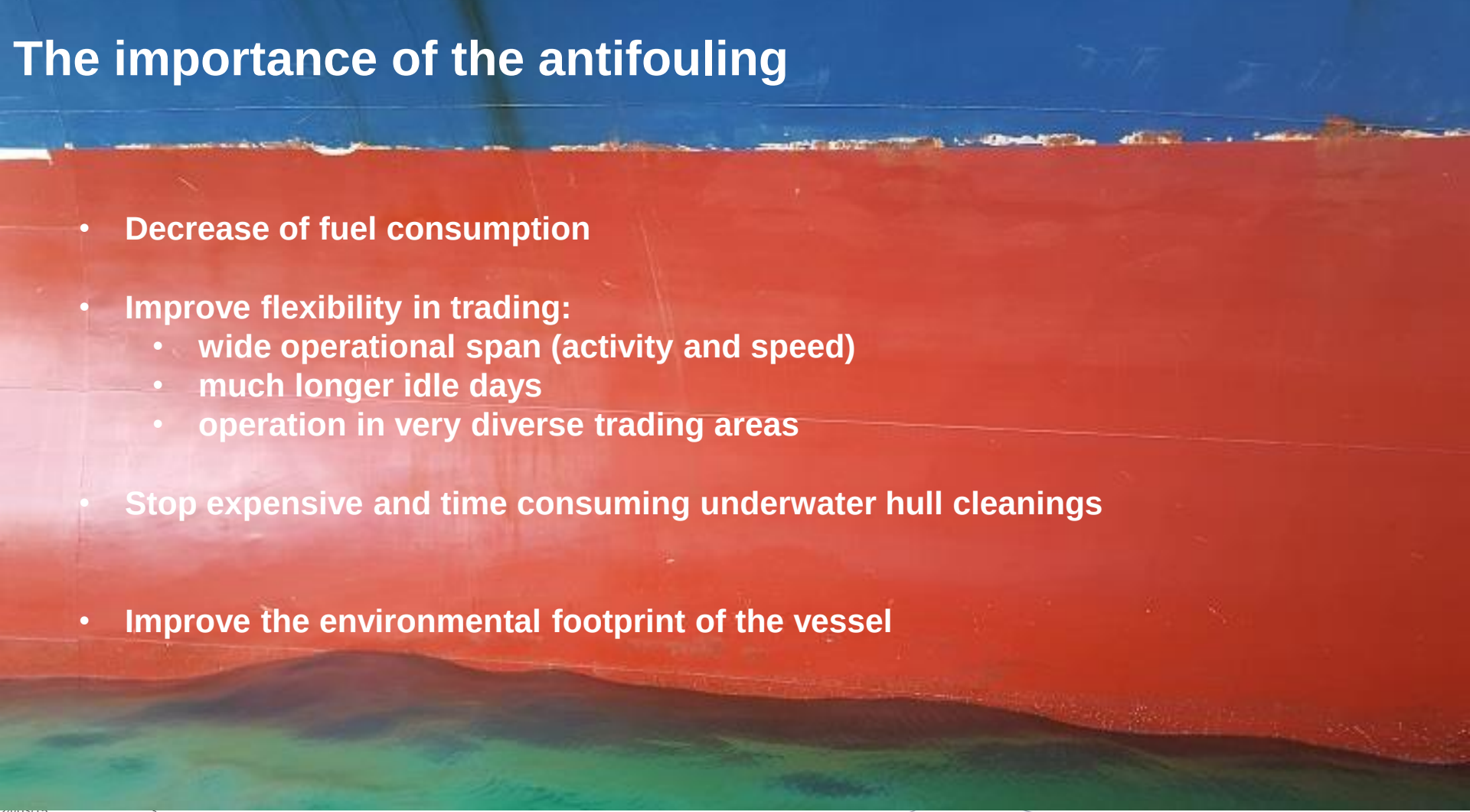
Davide Ippolito Ph.D.
Group Product Manager, Marine

The challenges

- Strict environmental regulations with strong business impact
  - Reduction of SOx emissions – 2020 sulphur cap
  - Reduction of NOx and particular matter (PM) emissions
  - Reduction of CO_2 emissions
  - Reduction of release of material into the sea (for example like microplastic)
- Challenging market conditions
  - Low freight rates for some segments
  - Increasing in market consolidation
- Increasing of CAPEX and OPEX
  - Retrofit costs of SOx scrubber - $3.0 – 8.0 MUSD
  - Retrofits costs for using alternative fuels (e.g. LNG) are high
  - Use of expensive MGO with uncertain availability
  - Operation cost of scrubber in the order of $45USD/ton of bunker scrubbed

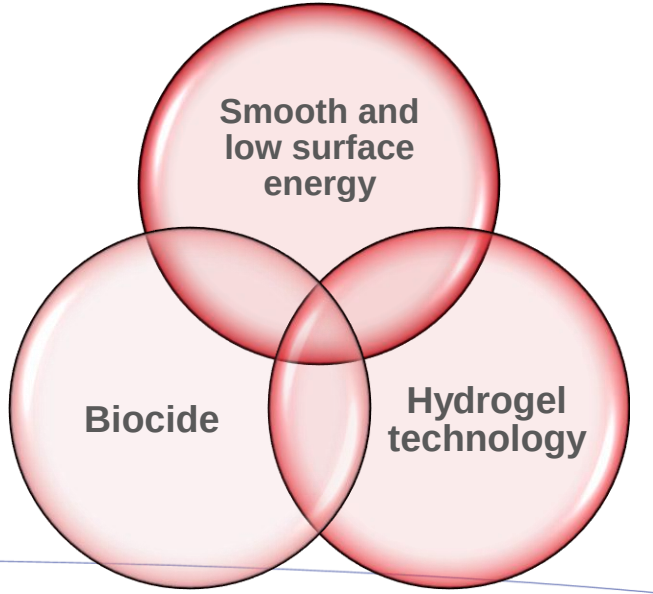
The importance of the antifouling



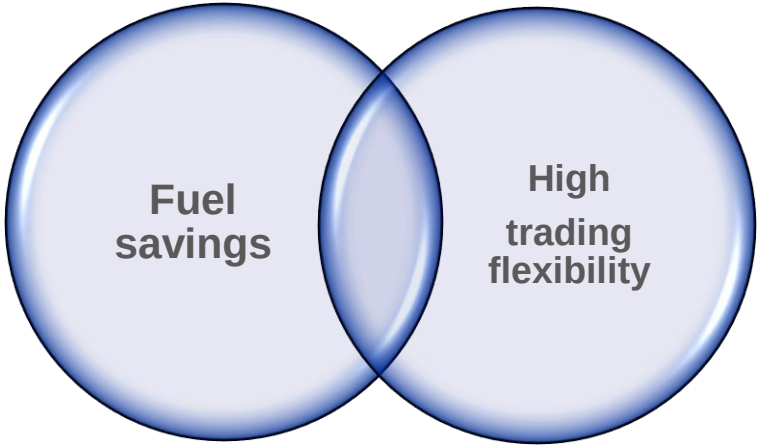
- Decrease of fuel consumption
- Improve flexibility in trading:
  - wide operational span (activity and speed)
  - much longer idle days
  - operation in very diverse trading areas
- Stop expensive and time consuming underwater hull cleanings
- Improve the environmental footprint of the vessel

HEMPAGUARD family
Redefining hull performance expectations

From a technical point of view



Value for you



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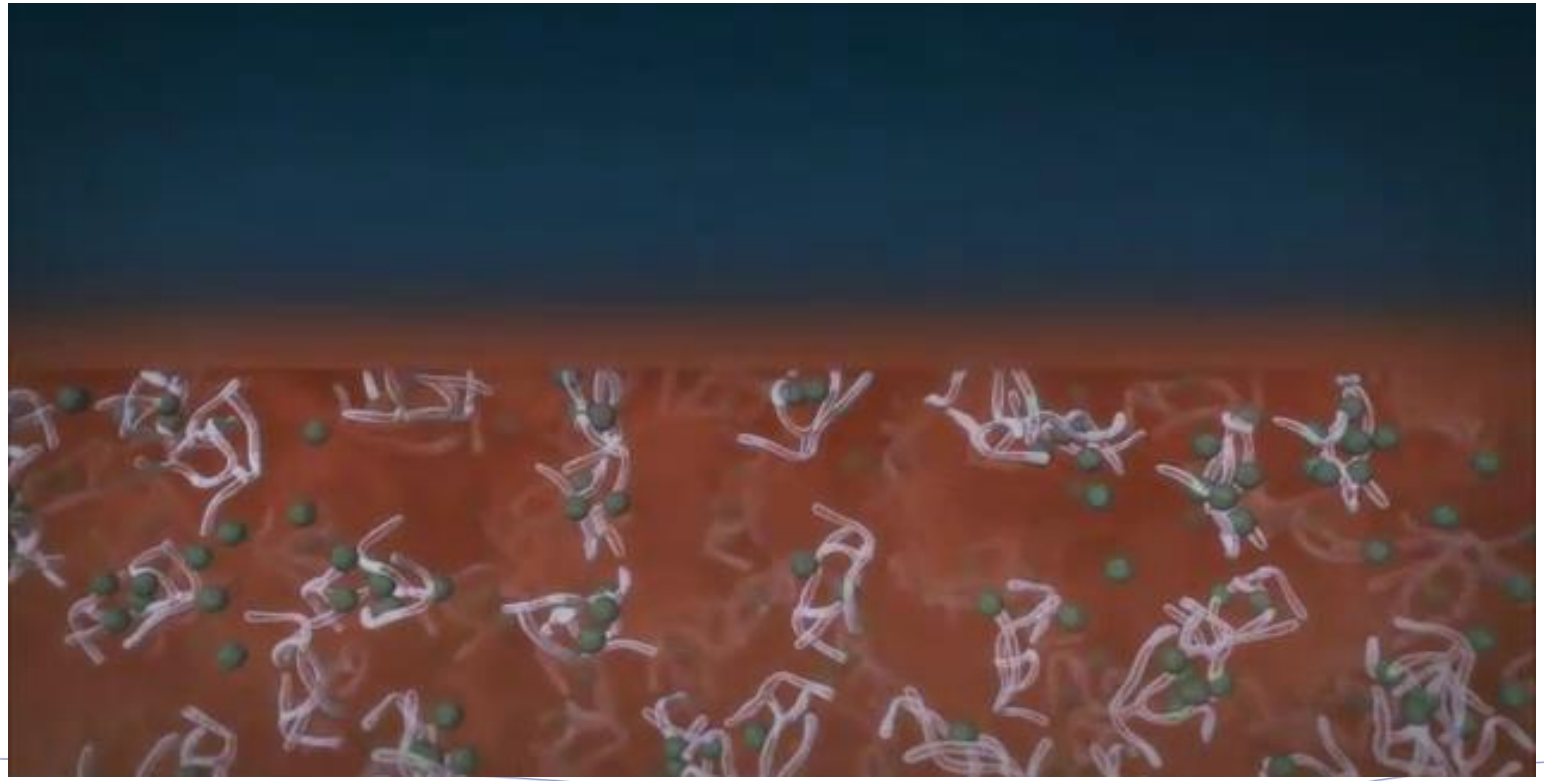
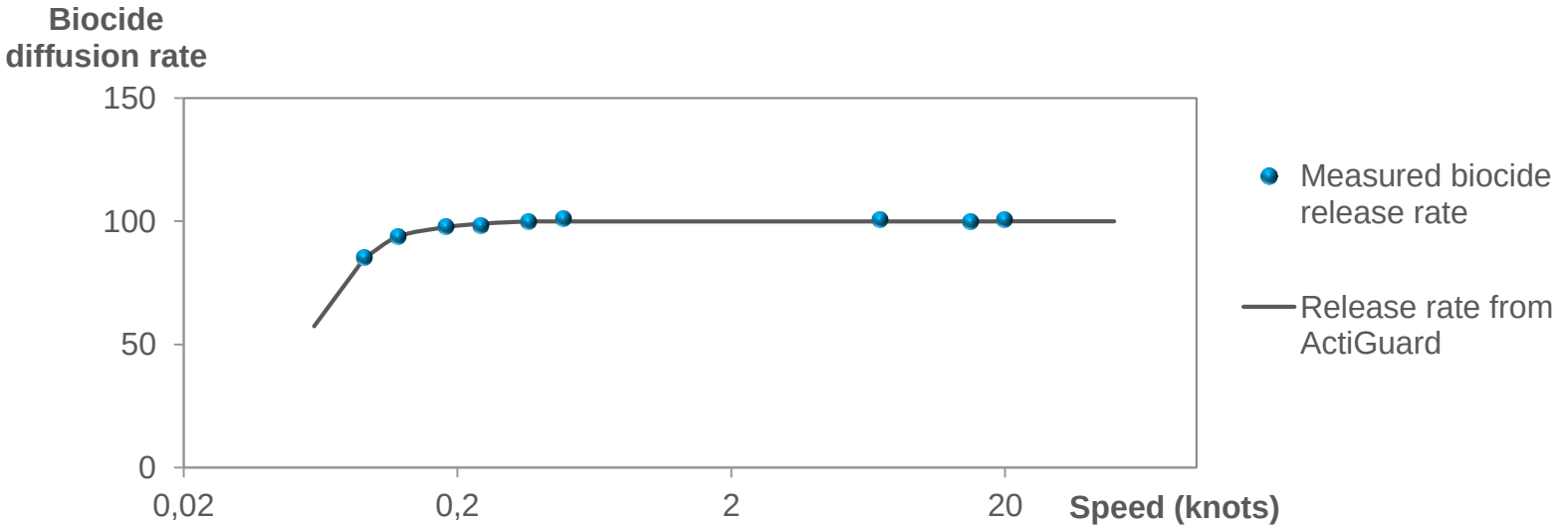
How the trading flexibility is achieved

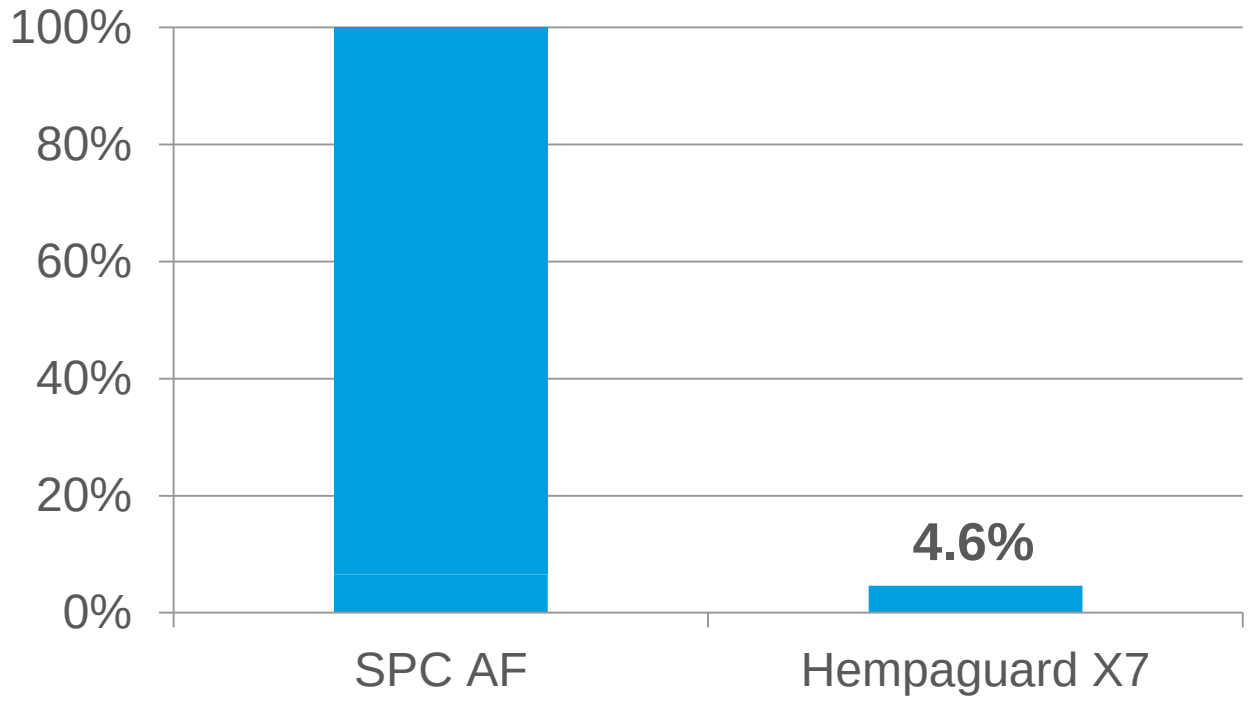


Complete **Flexibility** in Operation

- Vessel speed does not affect the diffusion rate of biocide
- Efficient biocide utilisation
- Highly effective during long idle period



Extremely low biocide content compared to a SPC antifouling – per m^2

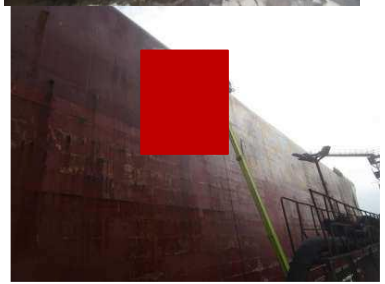


By weight of total biocide content for 1 m^2

Bulk carrier over 2 dry dockings intervals

Silyl methacrylate antifouling indocking after 3 years

Hempaguard X7 indocking, 3 years later



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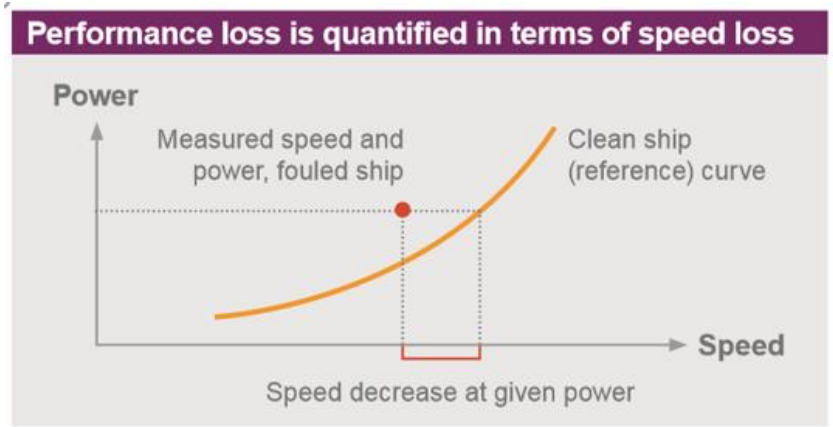
ISO 19030

Measurement of changes in hull and propeller performance

- Several methods exist to measure fuel performance
- ISO 19030 was introduced late 2016
- It is transparent method to compare ship´s speed-power relationship over time
- It allows to take fact based decisions on the need of any corrective actions

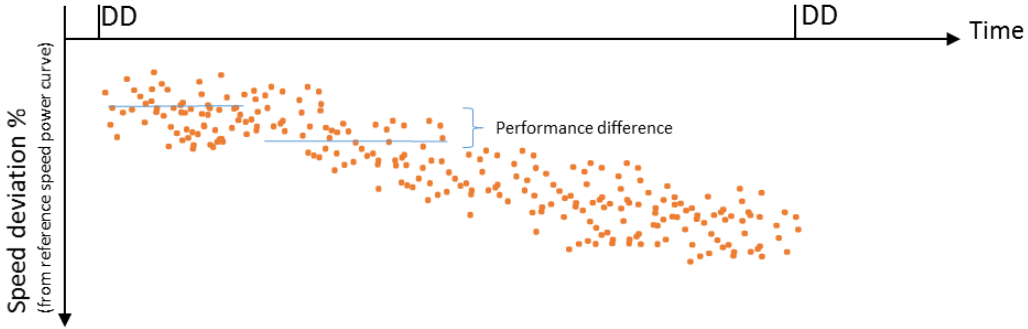
Speed loss and in-service performance



$$\text{Speed loss} = \frac{actual\ speed - expected\ speed}{expected\ speed}$$

- A relative measure [%]
- Related to power increase (roughly 1:3)

Speed loss and in-service performance



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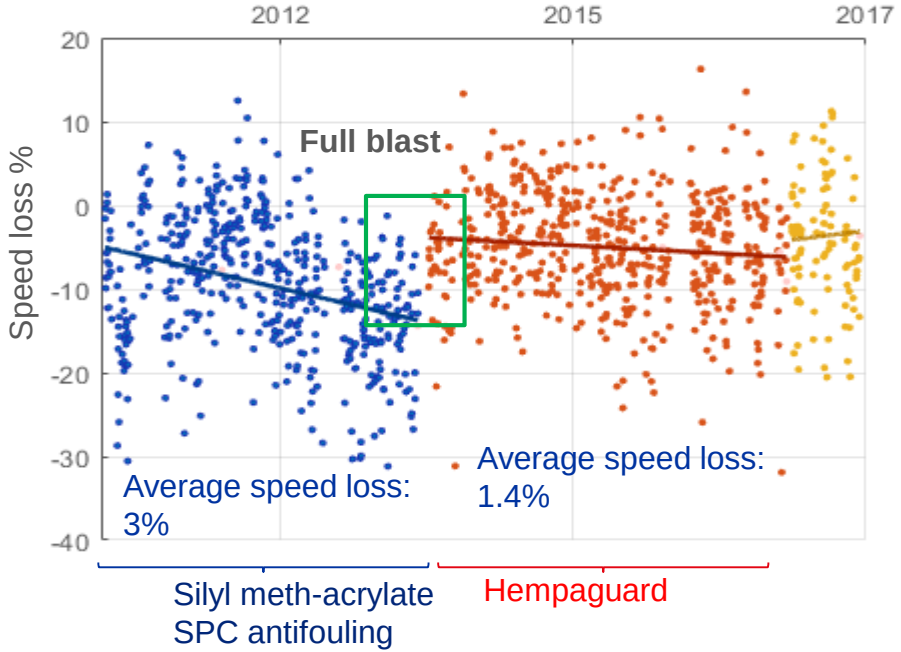
Performance example 1
Bulker – Hempaguard

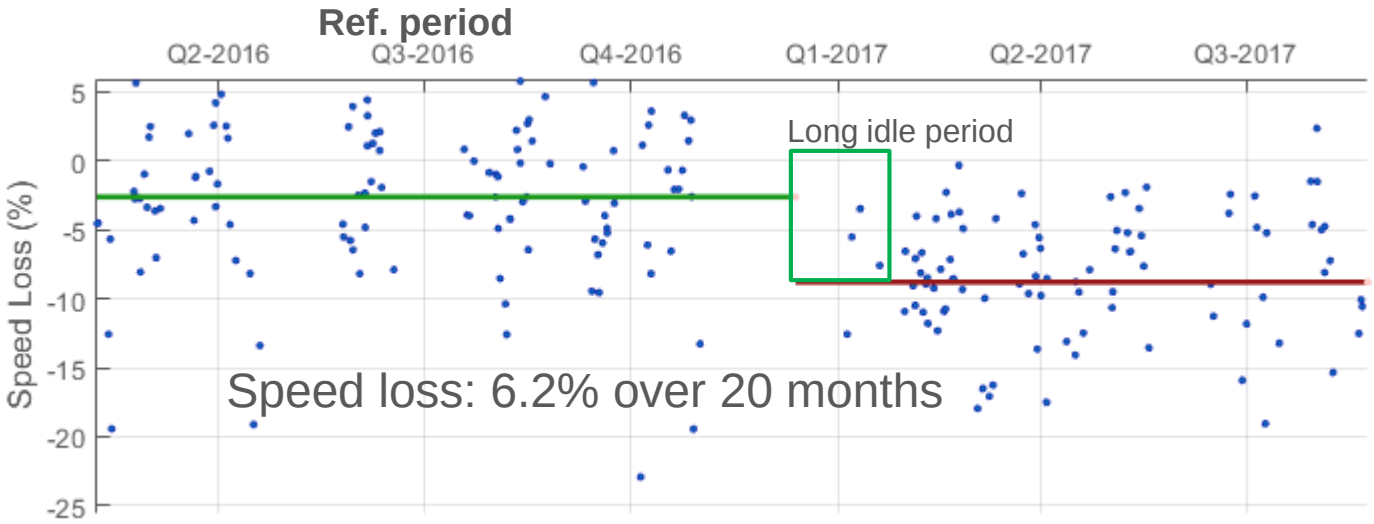


- **Data**:
  - Noon reports
- **Evaluation**:
  - Performance of Hempaguard good compared to SPC antifoluing
  - Fuel penalty from speed loss alone*:
    Hempaguard: 920,000 USD
    SPC antifouling: 2,000,000 USD
    Savings: 1,080,000 USD

CO_2 emissions saved: 7200 t

*90 t/day, 85% activity, 400 USD/t

Performance example 2
VLCC, top tier silyl acrylate SPC antifouling



Fuel penalty since DD*: 950,000 USD

*Given a fuel cost of 400 USD/ ton, 65% activity, 80 mt fuel/ day

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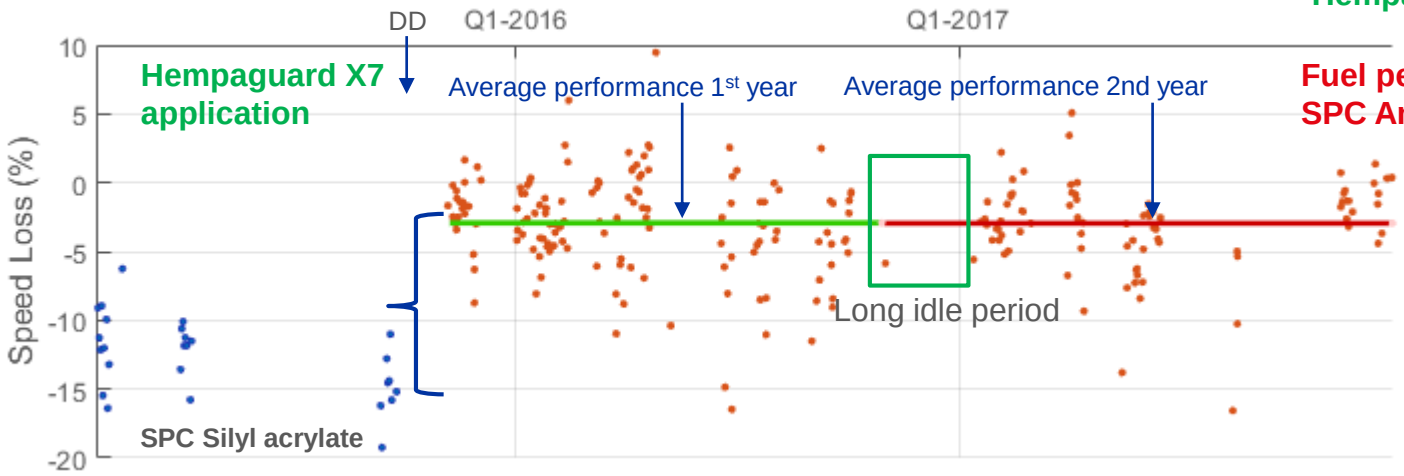
Performance example 3
VLCC – Hempaguard X7

Fuel penalty since DD*:
Hempaguard X7: 80,000 USD



Fuel penalty of the sister vessel:
SPC Antifouling: 950,000 USD

Average speed loss: 0.5 % over 20 months

*Given a fuel cost of 400 USD/ ton, 65% activity, 80 mt fuel/ day

Conclusions

Moving to the next generation antifouling like Hempaguard X7 is the pathway for improving fuel performance, reduce emissions and face the current market challenges

For any further clarification...
To go deeper into this topic...
To know something else about fouling defence...

Please contact:
Davide Ippolito
daip@hempel.com

Hempel SHAPE

Systems for Hull and Propeller Efficiency

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