Safinah Drydocking Data:

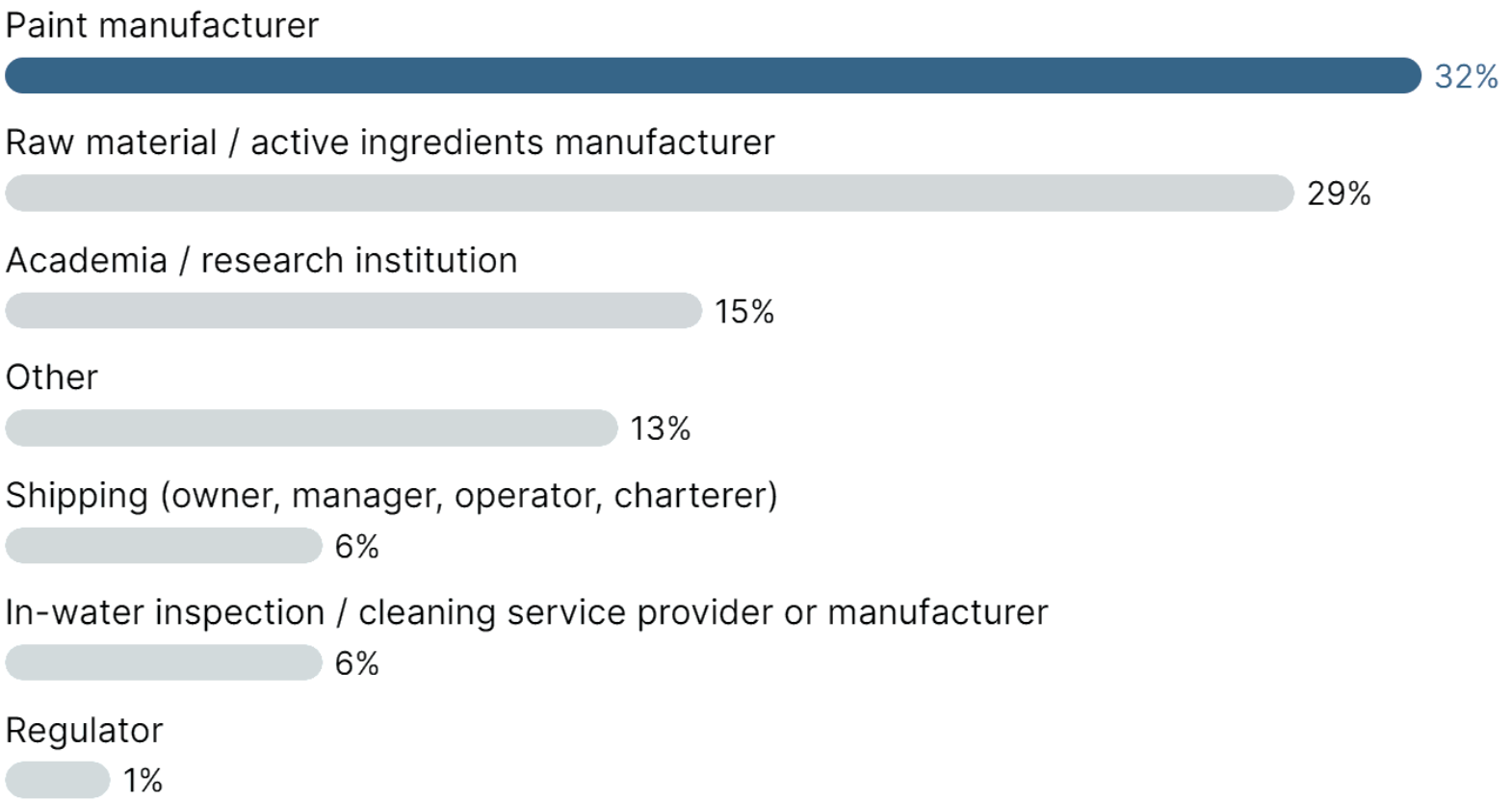
Coating selection and performance insights based on 800+ drydock projects

Dr Ral Mihaylova

International Antifouling Conference
10 - 11 September 2025, Gothenburg

Poll: What type of an organisation do you represent?

I represent:



*Number of poll participants: 126

Safinah

Marine

An **independent** coating consultancy providing authoritative, expert advice and support for the chain of activities that links vessels, structure design and construction, coatings, and the environment.

AFC Market

- **Anti-fouling coating (AFC)**
  - means a surface coating or paint designed to **prevent, repel** or **facilitate the detachment** of biofouling from hull and niche areas that are typically or occasionally submerged [MEPC.378(80)]

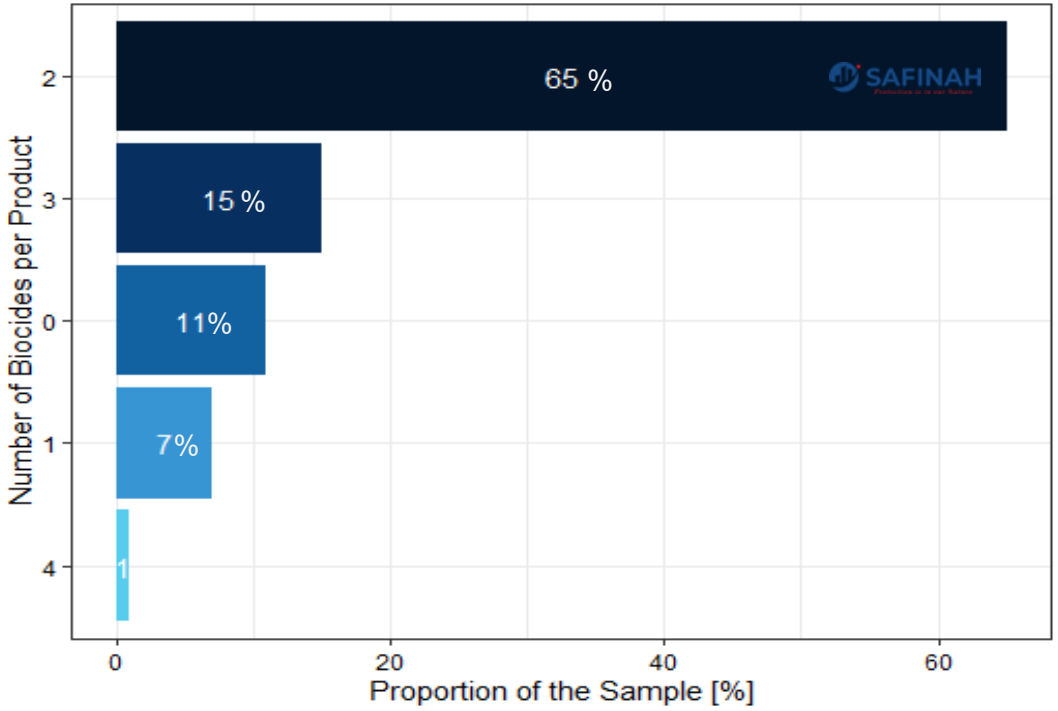
- **Biocides**
  - Number of biocides (sample): **11**
  - Combinations (sample): **32**
    - The top 10 combinations account for ~80% of all commercially available products

Commercially available AFCs

Segment	Products	Total Products
Marine	378	917
Yacht	539	

Different formulations under the same commercial name are included as different products. The list is not exhaustive. Source: Safinah Group, 2023

Number of Biocides in Commercially Available Marine AFC



Safinah Data

- **Data Definition:**
  - Data from coating supervision projects at drydock
  - 800+ projects
  - 200+ projects annually

How do ships arrive in drydock?

- Biofouling Presence
  - Technology / product
  - Operational parameters
  - Environmental parameters / seasonality
  - Biofouling management strategy
  - Coating / hull condition
  - Age effect on properties

Photo Credits: R Mihaylova, V Leksic, Safinah Group

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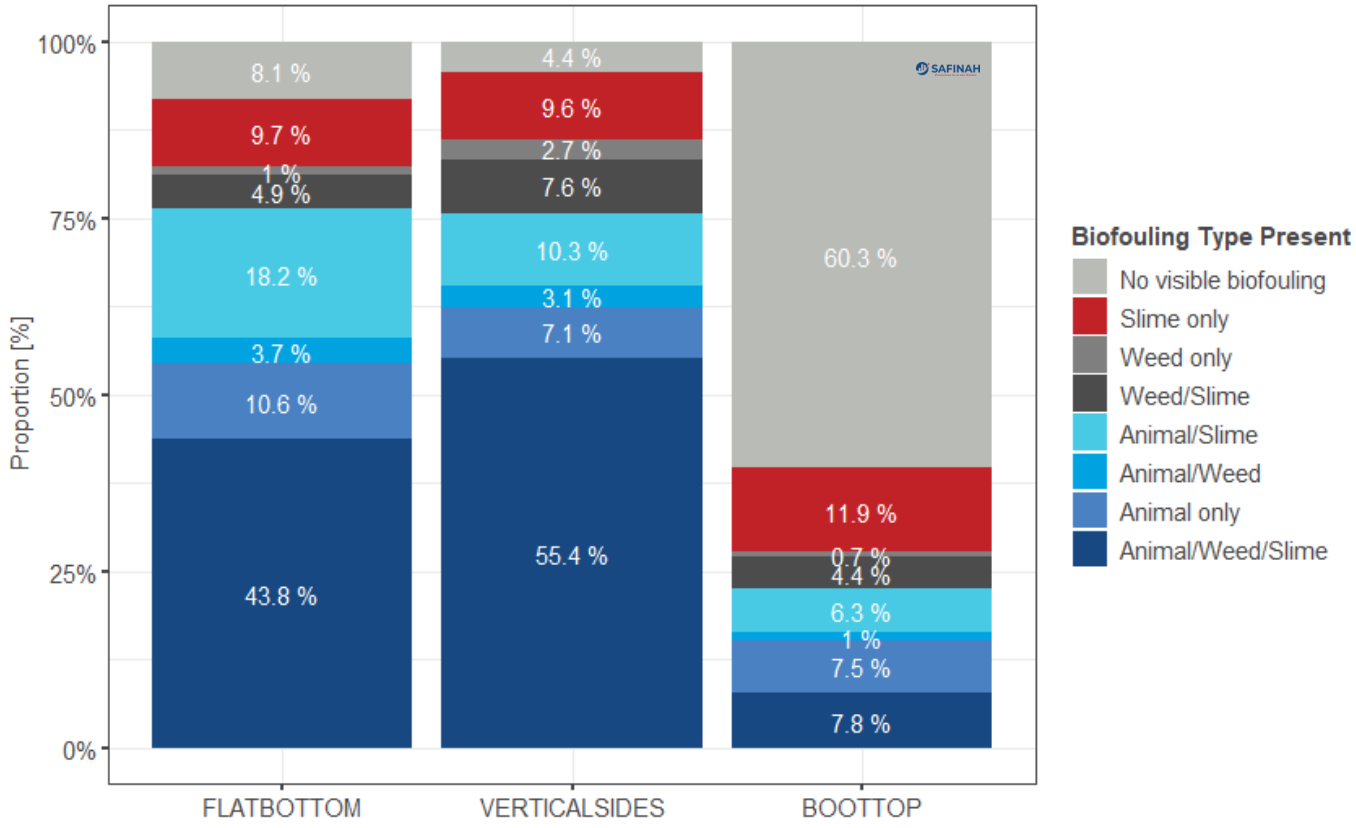
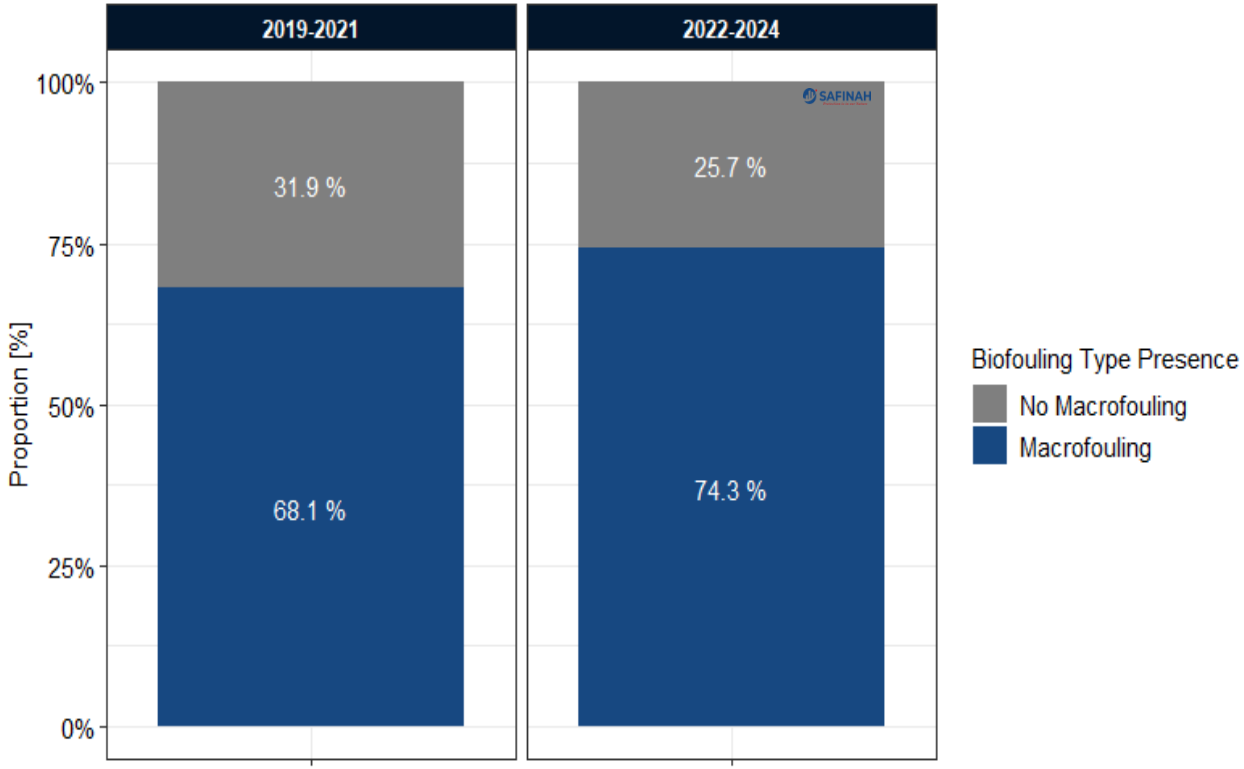


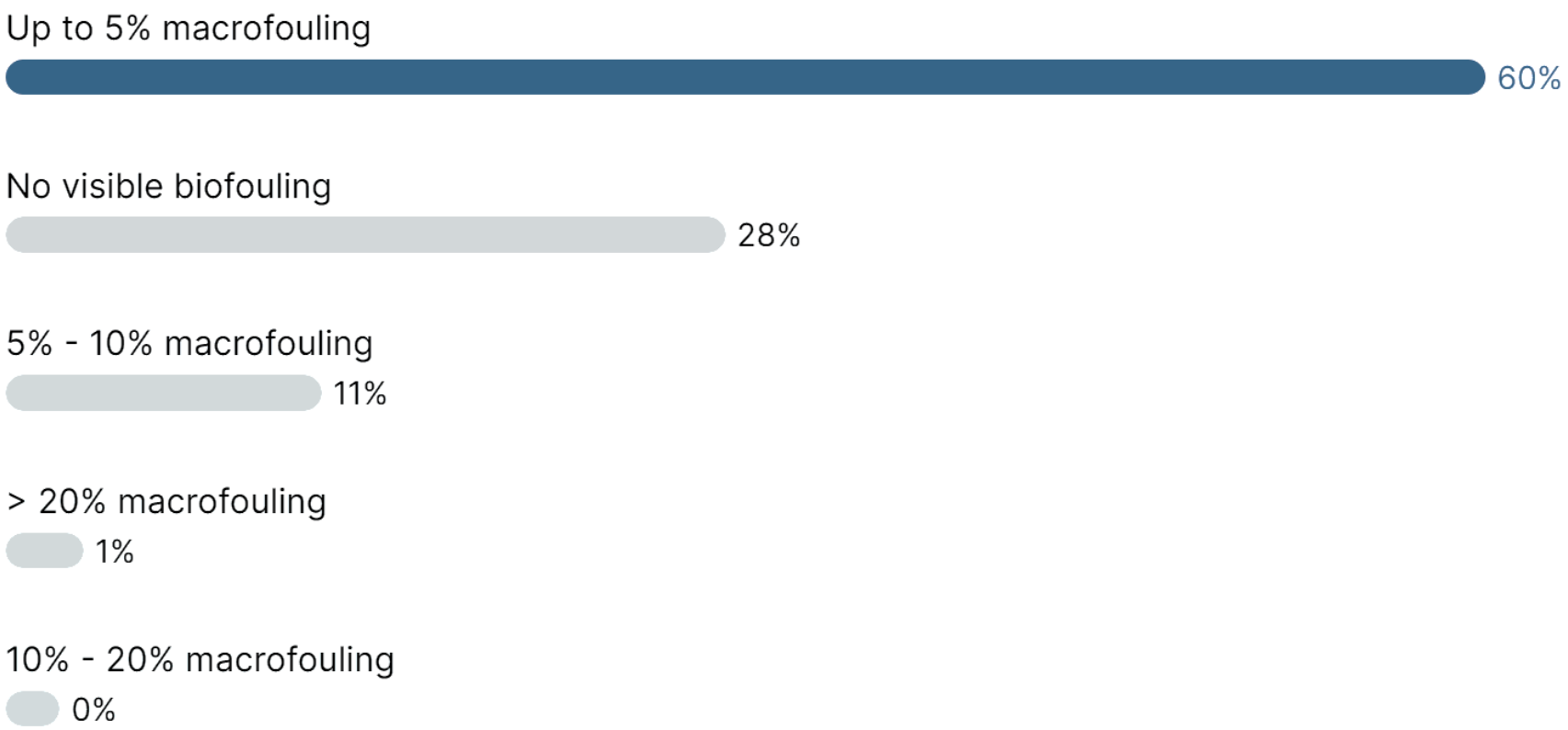
How common is the presence of macrofouling?

- Effects of macrofouling
  - Hydrodynamics / fuel / GHG emissions
  - Biosecurity
- Contributing factors
  - Coating selection?
  - Disruptions to trade?
  - Climate change?
  - Natural variation in data?



*Macrofouling: biofouling caused by the attachment and subsequent growth of visible plants and animals on structures and ships exposed to water. Macrofouling is large, distinct multicellular individual or colonial organisms visible to the human eye such as barnacles, tubeworms, mussels, fronds/filaments of algae, bryozoans, sea squirts and other large attached, encrusting or mobile organisms.
**Note that ships with no observed macrofouling may have arrived with significant coverage of microfouling (slime).

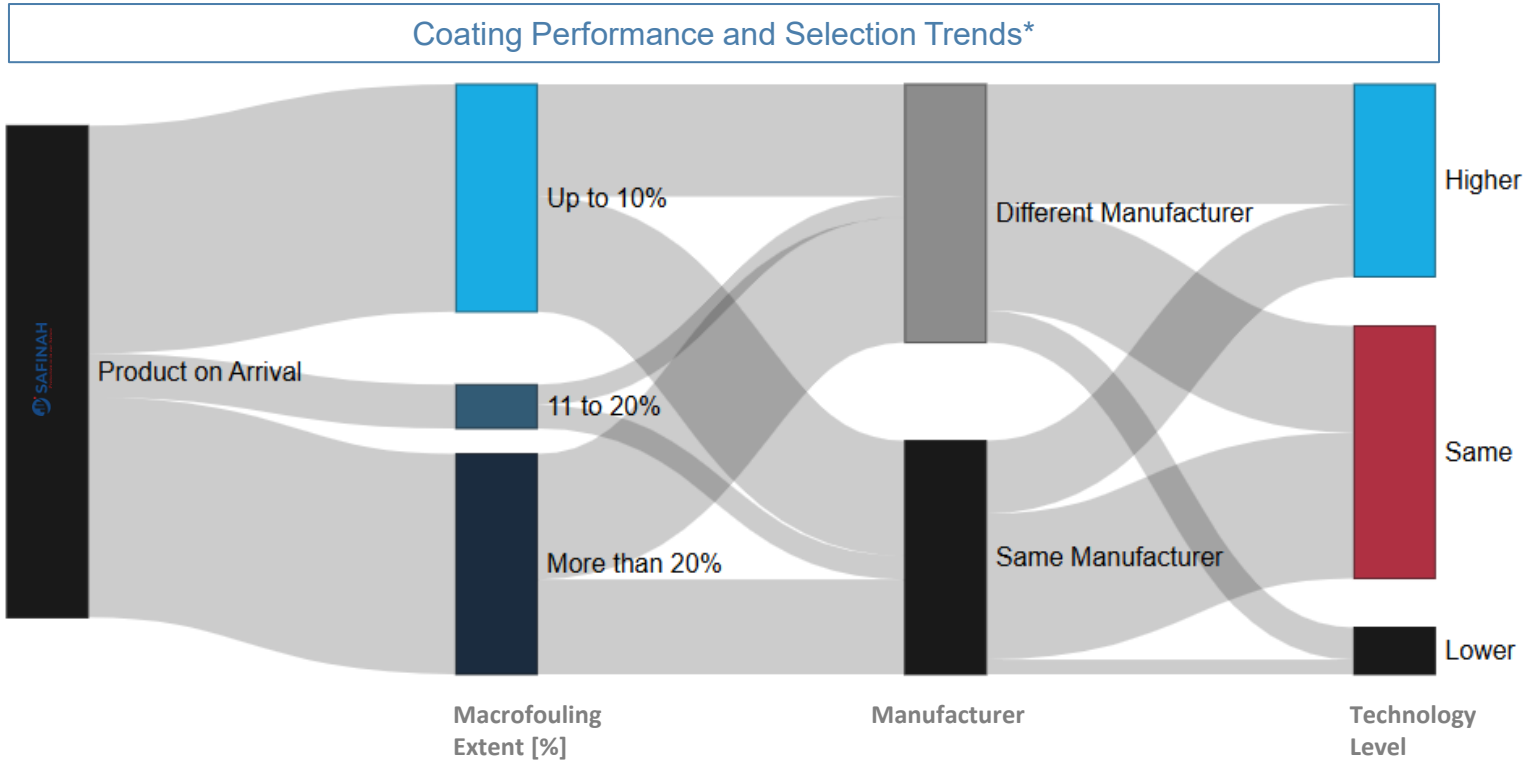
Poll: Overall, what would you consider to be a ‘good’ performance when the ship arrives in dry dock?



*Number of poll participants: 110

Is there a link between coating performance and product selection?

- Highlights
  - Across the sample, on average ~1,500m^2 per vessel covered in hard macrofouling
  - 20% of vessels observed with up to 1% of hard macrofouling on arrival in drydock (total area)**



More than half of the ships with >20% macrofouling on arrival in drydock opted for the same manufacturer and often the same product.

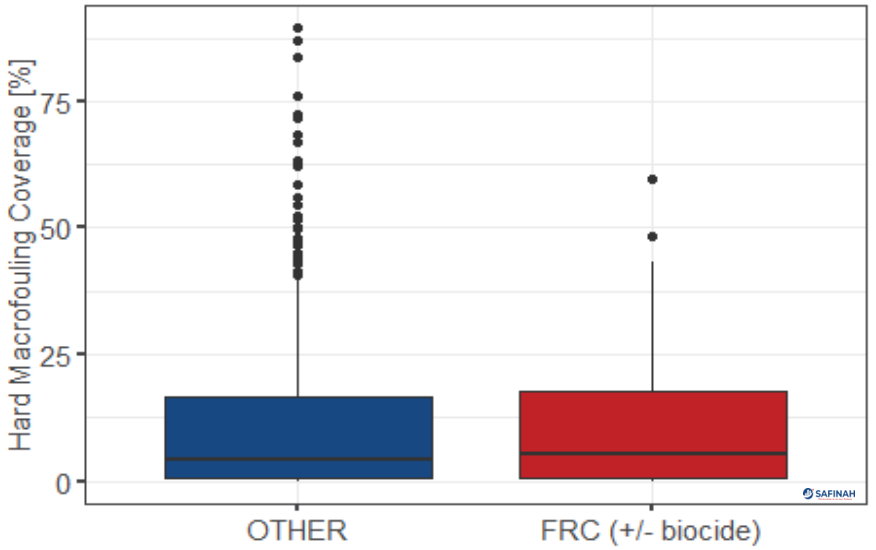
>> Lack of systematic review of fleet coating performance and effective pre-planning.

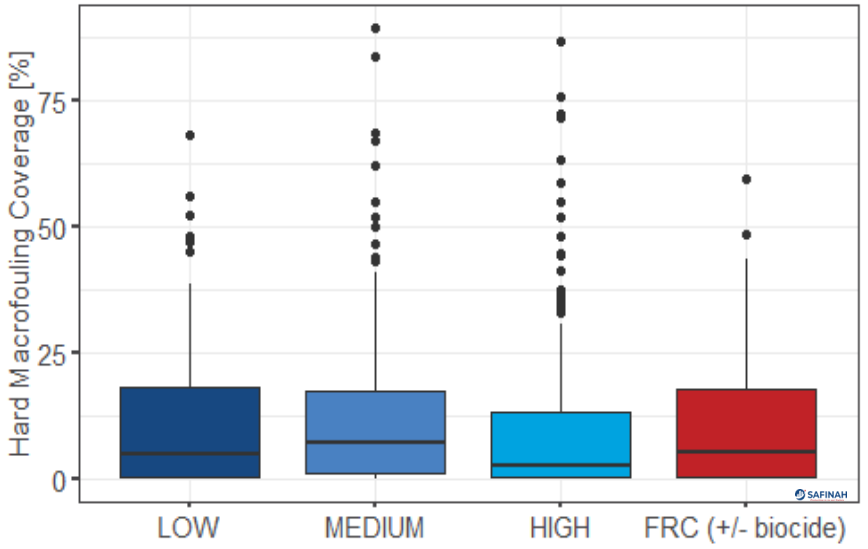
*Visualisation based on data for vertical sides of ~450 ships

**Average hull surface area in the sample >12,000sqm

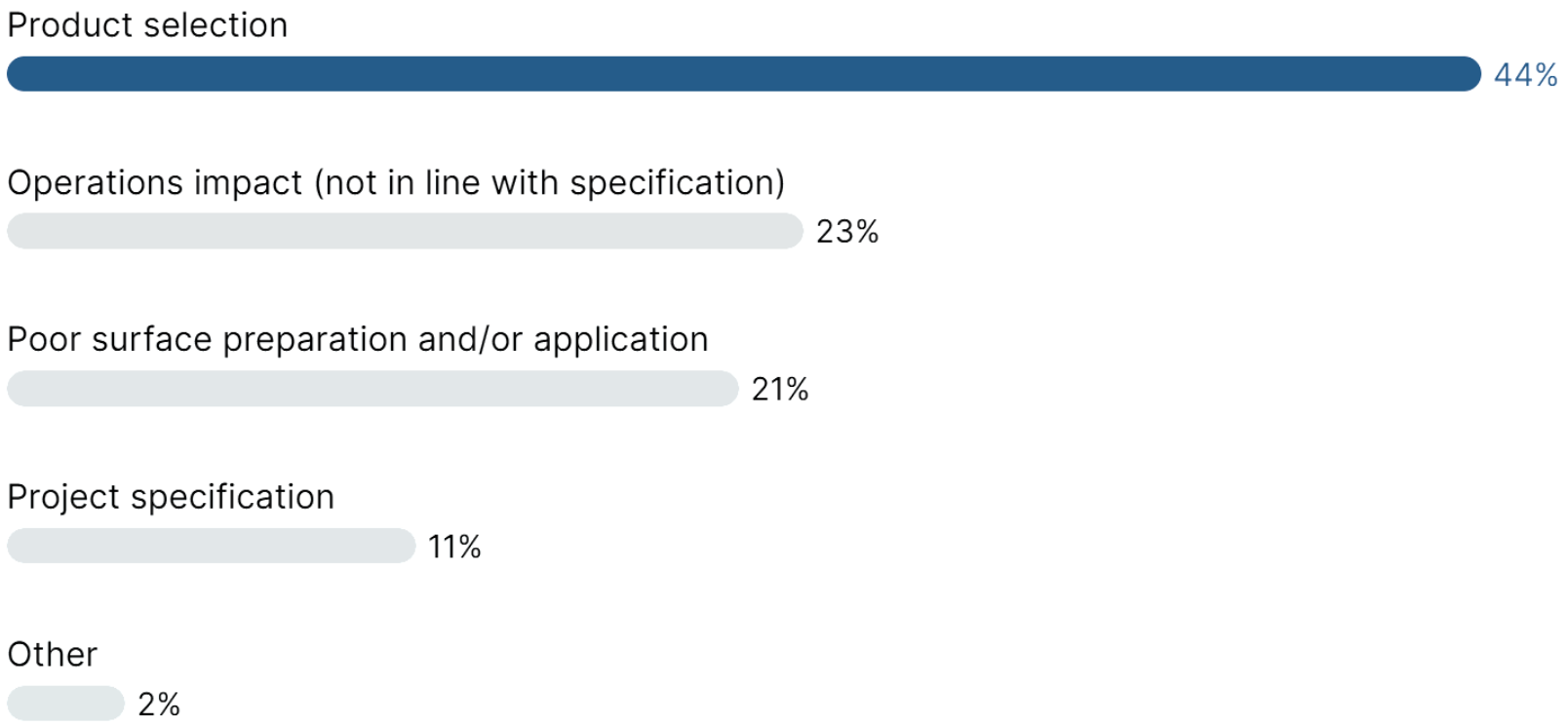
Do different technologies offer different performance?

- Hard macrofouling
  - Ship type / activity / trade
  - Coating technology
    - FRCs – ships (marginally) more likely to arrive in drydock with no visible biofouling on vertical sides compared to other systems
    - Other – ships (marginally) more likely to arrive in drydock with no visible biofouling on the flat bottom compared to FRCs
- Considerations:
  - Environmental conditions?
  - Operational conditions?
  - IWC regimes?
  - Technology classification?
  - Sample size?





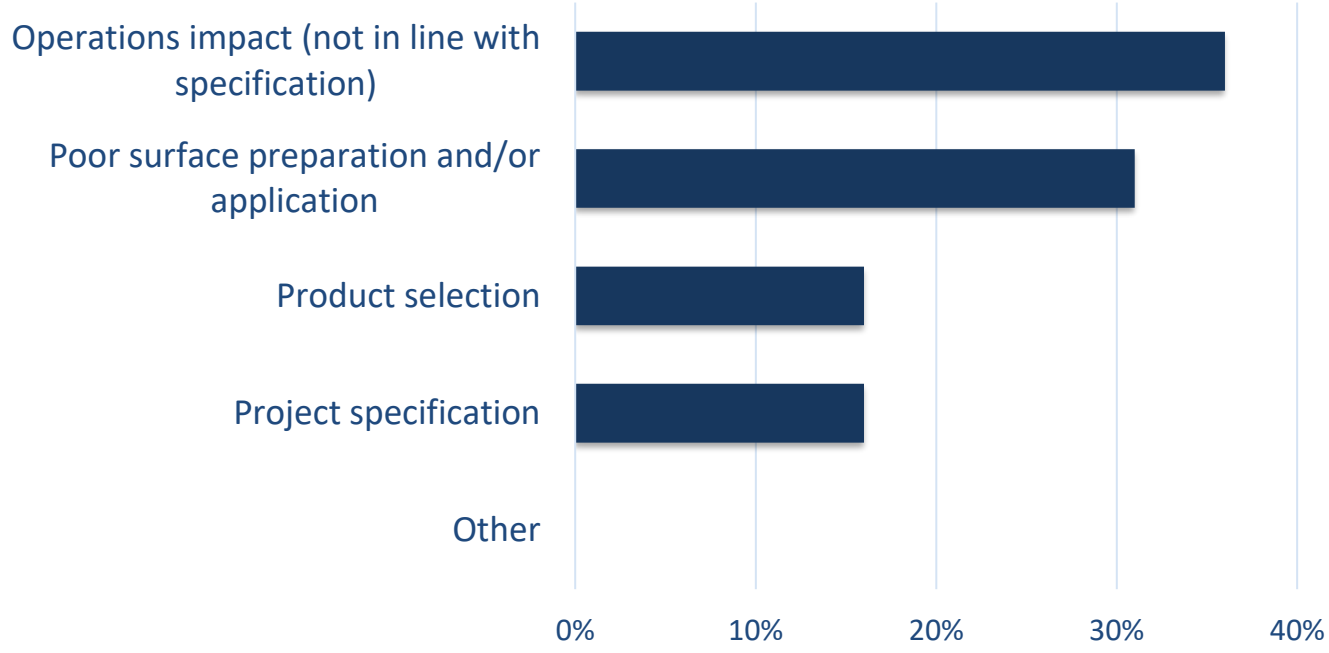
Poll: What do you believe is the main (most common) cause for poor hull coating condition?



*Number of poll participants: 110
** Note that the poll during the Safinah webinar in June 2025, which was well attended by the shipping industry, indicated Operations impact as the main cause.

What do you believe is the main (most common) cause for poor hull coating condition?

- Safinah webinar (June 2025)
  - 265 registered
  - 97 took part in the survey
  - Results: safinah.com (Blog)



Operations Impact

- Operational parameters
  - Speed
  - Activity
  - Extended stationary (idle) periods
  - In-water cleaning regime
  - Other
- Environmental parameters
  - Sea Surface Temperature (SST)
  - Salinity
  - Climate zones and trading routes
  - Other

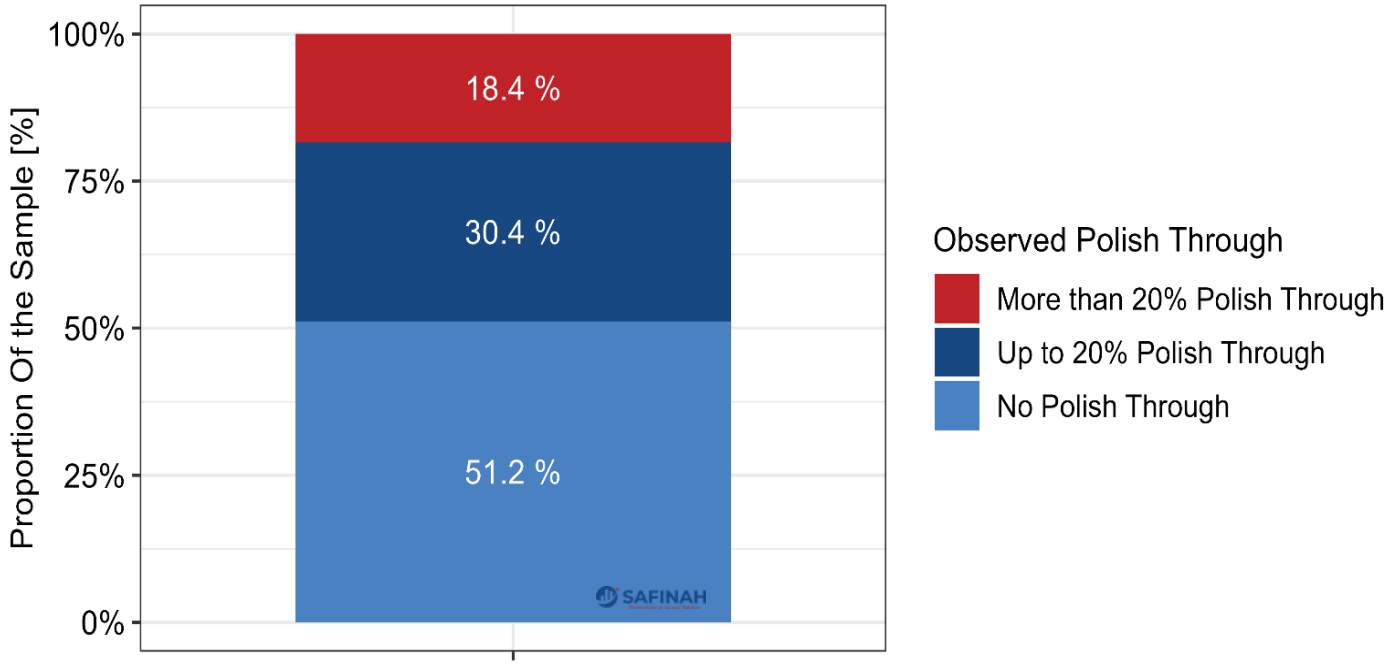
How do operational parameters affect performance (and specifications)?

- Parameters:
  - Activity: 46% to 61%
  - SST: 30% increase in time spent in warm waters

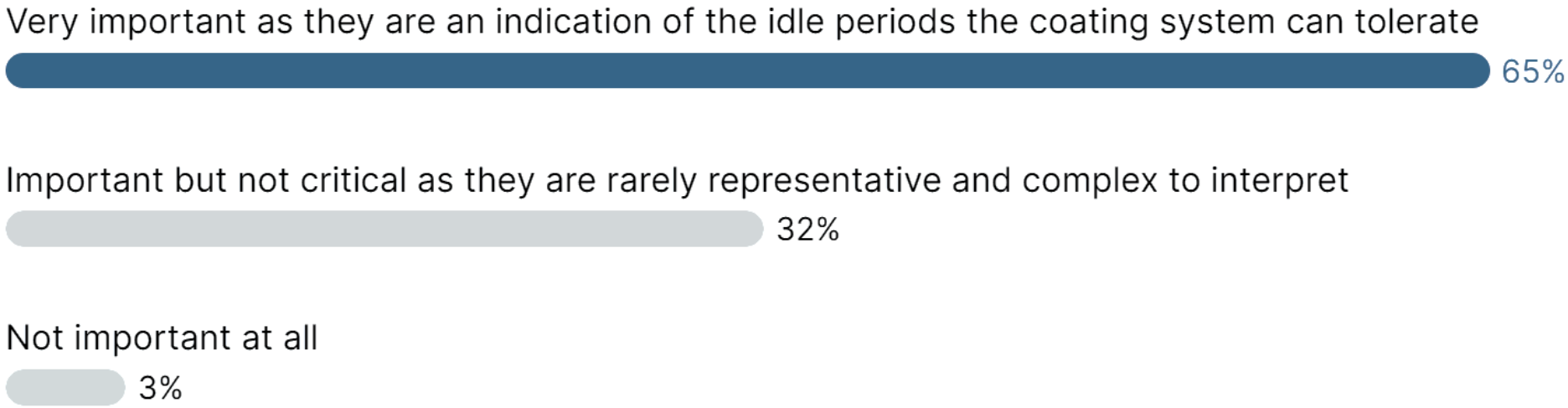
- Arrival condition:
  - 40% polish though on vertical sides
  - ~42% weed fouling on vertical sides

How often are ships affected by (premature) polish through?

- Sample
  - All non-polishing products excluded
- Potential scheme issues
  - Polish through
  - Other
- Recommendation:
  - Build flexibility into specifications based on product-specific characteristics



Poll: How important is it to consider static guarantees during project planning?



*Number of poll participants: 103

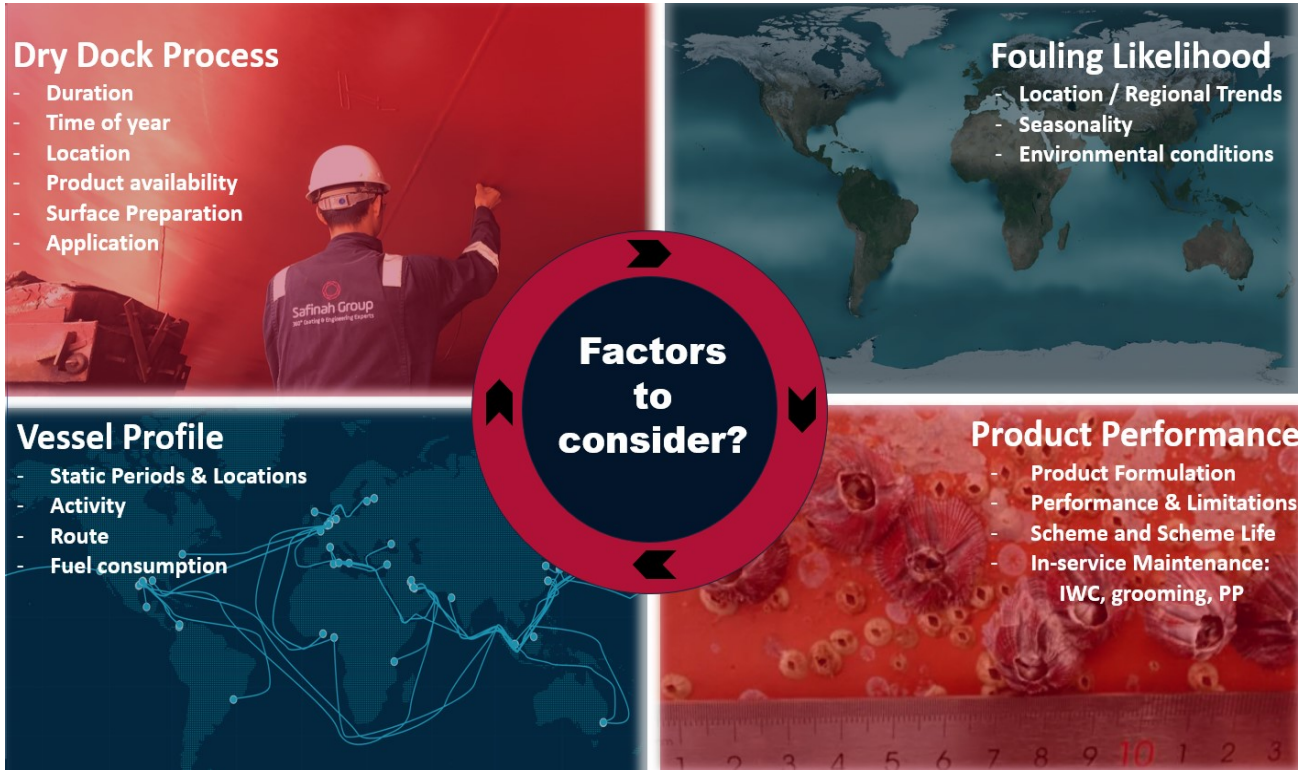
Idle Time Guarantees: What is the right question?

- Multiple examples of ships trading outside of static guarantees for >40% of the time with no performance implications (based on frequent in-water inspections and high frequency hull performance data)
  - Different systems?
  - Different conditions?
  - Different ages?

- What is (are) the right question(s)?
  - Are idle time guarantees an indication of coating performance?
    - When are idle time guarantees an indication of coating performance?
  - Can we use idle time guarantees as a base for biofouling management actions?

Summary

- **Tools:**
  - **Data** on coating performance across ship types, operational profiles, coating technologies, and specific products is critical for optimal product selection.
  - A **systematic approach to coating specification and selection** (functional specifications) and periodic reviews are key to robust evidence-based biofouling management strategies.



Work with Us

Joint Industry Projects

In-water Cleaning: Capacity Needs and Risks Under Different Policy Scenarios (JIP)

- **Aim:** The study aims to connect global fleet movements, IWC infrastructure availability, and policy scenarios to measurable outcomes available to industry and policy makers in order to inform policy development that promotes sustainable operations, reduces environmental risk, and ensures that new regulations align with existing targets, such as the reduction of GHG emissions, and not pose additional operational barriers to trade.

- **Immediate next steps:**
  - Project proposal finalisation: beginning of October 2025
  - Call for action (gaining industry support): October-November 2025
  - Consortium kick off meeting: end of November 2025 (target)

- **Project updates distribution list and collaboration:**
  - The project Consortium invites interested parties representing shipping companies, service providers and manufacturers, ports, regulators, NGOs or other industry bodies to express interest in joining the project updates distribution list.

Work with Us

Dr Ral Mihaylova
Head of Special Projects
E: ralitsa.mihaylova@safinah.com

Safinah Projects

Inspection and In-water Cleaning Benchmarking

Biofouling Management Plans and Record Books – free gap analysis

Niche Areas: Marine Growth Prevention Systems (MGPS) In-Service Performance