

WEBINAR Q&A SUMMARY

Questions and Answers

Webinar: Coatings' key role in shipping decarbonisation

Date: 26th November 2024

Time: 09:00 – 10:00am GMT

Panellists:

Nikolaj Malmberg (NM)

Carl Barnes (CB)

Markus Hoffmann (MH)

1. Are (low friction) hull coatings affected by air lubrication systems? How?

NM:

CB:

MH: Air lubrication systems are not running constantly. When the airflow stops the fouling control systems should work normally. There is no indication that the air lubrication systems affect the efficacy of hull coatings as long as the air used is clean and not contaminated.

2. Nikolaj: How do you validate the claimed 6% fuel savings versus top-tier solutions?

NM:

3. N: What patterns suggest current laboratory testing protocols might need fundamental revision?

NM:

4. M: What evidence indicates current VOC measurement protocols might miss critical emissions?

MH: For fouling control systems, the VOC very often is not measured like in other areas like plastics but calculated on the amount of VOC being part of the paint formulation from the very beginning. These values of the initial VOC concentrations is then confirmed by standardized test methods.

The risk of missing critical amounts is relatively small but still there are significant VOC emissions during the application of coating systems.

5. Nikolaj: What data suggests current adhesion testing methods might be poor predictors of real-world performance?

NM:

6. Nikolaj: How do you measure silicone coating durability over time?

NM:

7. Nikolaj: What methodology supports your DNV verification process?

NM:

8. What about catalysts in the paint formulation?

NM:

9. What do you think about the new IACS update to determine V_{ref} in case low friction coating is used on the vessel?

NM:

CB:

MH:

10. Nikolaj: What metrics determine optimal hydrogel reservoir capacity?

NM:

11. Nikolaj: What methodology measures coating wear rates?

NM:

12. Nikolaj: How do you quantify smoothness maintenance over time?

NM:

13. Carl: How do you quantify the economic impact of that 0.5mm slime layer across different vessel types and operating profiles?

CB:

MH: The economic effect always depends on vessel type, speed, activity and roughness including slime. The studies from the US Navy for one of their frigates at 15 knots states an increased shaft power of 9 % for light slime.

The latest IMO study Impact of Ships' Biofouling on Greenhouse Gas Emissions states an impact of light slime from 3 to 20 %.

14. Niklai, what is the end-of-life fate for silicone coatings?

NM:

15. Do you trust noon report data for long-term performance monitoring of coatings, or is high-frequency data analysis based on ISO19030 the only option?

NM:

CB:

MH:

16. Carl: How do your findings on coating degradation rates question current dry-docking interval standards?

CB: Our data on coating degradation typically shows that extensive pre-planning prior to dry docking is not being carried out. For example, incomplete / inaccurate vessel data, changes to the operating profile not considered, fleet-wide specifications, no diversification and a lack of structured test patching etc.

17. Carl: What patterns in your dataset suggest current biofouling risk assessments might be fundamentally flawed?

CB: Our data suggests that it is a lack of extensive pre-planning and a ship-specific approach to specification and selection that is often the cause of fouling issues.

18. What about the difference in prices between the conventional and silicone coatings (the reason for not applying silicone coating)? Are coating makers willing to reduce the cost by giving an extra incentive to owners/operators and assisting with energy efficiency concept?

NM:

CB:

MH:

19. Carl: What methodology did you use to collect and validate data from 800+ drydock projects?

CB: On attendance at the dry dock (as owners' representative) we assess the level and type of biofouling coverage prior to washing. After washing we then assess the level of polish through, corrosion, mechanical damages, blistering etc. We also obtain the fouling control scheme i.e. the antifouling type, DFT's and the parameters (speed, activity and seawater temperature) that the scheme was designed for. Added to this we then obtain historical AIS data to assess the actual speed, activity, seawater temperature and static periods/locations that the vessel underwent. We can therefore compare scheme parameters to actual parameters to validate the performance of the fouling control product. Added to this we also obtain any information on cleaning events.

20. Carl: Why do vessels often select the same manufacturer despite poor performance?

CB: Difficult to answer this, it may be a historical (it's what we have always used), relationship with a particular paint supplier, budget considerations or confusion due to a complex product range (150+ products). At Safinah we can help Owners determine the parameters that are applicable to their specific vessel and help in selection of an appropriate fouling control product that based on our data is best suited to the expected vessel trade.

21. Carl: What evidence suggests current cleaning interval recommendations might be based on flawed assumptions?

CB: Whenever a clean is being considered, an inspection should be carried out first to determine the level of fouling. Any underwater clean will (no matter how carefully managed) cause some level of damage to the fouling control coatings (scratched, DFT loss etc).

22. Do you have a specific coating for the icebreaking vessels?

CB:

23. Carl: which part of the ship hull did your photo show with barnacles?

CB: I am unsure. The photograph was used just to show extensive fouling.

24. Carl: How do you track polish-through rates across different coating technologies?

CB: We can track these by observing polish through at the dry dock and then comparing scheme parameters vs actual parameters so that we understand if the vessel traded differently compared to the scheme design parameters. i.e. if we observe extensive polish through, is it because the vessel traded in warmer waters compared to the scheme design etc. We also look at cleaning events as these will also have an effect on polish through rates.

25. Carl: What specific data points determine your calculation of 1,300m² average macrofouling coverage?

CB: This is the total macrofouling coverage as an average across all vessels in our data set.

26. When we check the coating manufacturers' website, all we can find is a product sheet about coatings. We see a very limited amount of experimental (hydrodynamic or immersion test data) for only a very limited number of coatings. In this case, how client can make the decision on the performance of the coating on CII and EEXI?

NM:

CB:

MH:

27. Do you have any specific coating for the icebreaking vessels?

NM:

CB:

MH:

28. Carl, have your company provide guarantee for the paint completing with less than 100% sand/water cleaning preparation of the hull?

CB: At Safinah we don't provide paint guarantee's as we are not paint suppliers. Guarantees are provided by the paint supplier. However, at Safinah we can review these guarantees and provide our feedback on the guaranteed coverage and specifically exclusion clauses relating to static periods etc.

29. Carl: How do you define "high technology level" products and measure their actual performance advantages?

CB: We have our definitions for high, medium and low technology levels, typically high-performance technology products are Self Polishing Copolymers with a high-performance biocide package it can also cover FR products as well. However, these are just broad headings, and we further break this down based on the actual performance we see in dry dock returns. Also, just because a product may be perceived as high performance, it may not perform on all trades.

30. Nikolaj: Can Spot repair be carried out on Silicone coatings alongside or at anchorage in the above-water areas that are exposed temporarily? (Local laws permitting of course)?

NM:

31. I wonder if you could tell me the relationship between the hull coating and the EEXI and CII?

NM:

CB:

MH:

32. Markus: What evidence indicates current coating performance metrics might need fundamental revision?

MH: It is difficult to quantify the performance of fouling control coatings under controlled laboratory or immersion testing. As a consequence, there is no general accepted standard like ISO to measure directly the performance of an Antifouling. The best ways to analyse the

performance is either via indocking data and or performance measurement methods like ISO 19030.

One challenge is that the fouling depends also on activity, speed, fouling pressure and generally on biological processes and to get reliable data one needs larger numbers. Methods like ISO 19030 have some challenges like the separation of the propeller from the hull and the larger the fleet the more reliable is the outcome. At the same time these data are not publicly available, and not all coating systems are being tested.

33. Markus: What patterns in your data challenge current assumptions about docking interval optimisation?

MH: There seems to be a general trend that the coatings work well for 36 months and then the performance drops. This is partially due to a drop of the efficacy of antifouling systems, but also most coating systems have some deterioration, and the inherent roughness increases over time.

Some companies measure vessel performance with high accuracy and have made their business case to shorten the docking interval as the savings of the total cost is lower. But this depends again very much on each individual case and cannot be generalized.

34. Markus: How does your research on biofouling-resistant materials question current surface engineering approaches?

MH: Surface engineering does work for specific species. In most cases the surface approach fails as some other species of the 4000 to 6000 settling space is not deterred.

35. Markus: How do your findings on in-situ biocide generation challenge conventional antifouling approaches?

MH: I-Tech is not active in the field of in-situ generation of biocides. The most advanced systems which are tested currently are the UV systems.

36. Markus: How did you validate the 36% extra shaft power requirement for 10% barnacle coverage?

MH: We took the data from a study of the US navy; the value depends a lot on the vessel type and speed. The latest IMO publication shows similar numbers.

37. Do you have any coating that could be used on the propellers during HATs to protect sea grown on the propeller before SAT?

NM:

CB:

MH: I-Tech does not produce coatings ourselves but we supply to coating manufacturer. To the best of our knowledge there are no biocidal coatings used on propellers. Several coating companies offer coatings for propellers relying on a release effect. Fouling is then released from

the propeller when running. There is the possibility that on the tips these coatings might show erosion.

38. Markus: What data suggests current microplastic regulations might miss critical environmental impacts?

MH: Generally, all regulatory bodies regulate their specific field not taking into account a holistic picture. Many stakeholders of the coating industry work to further reduce the emissions of microplastic into the sea. Generally, microplastic particles are not added into paints and the emissions coming from hull coatings is very small compared to other sources. As the positive impacts of hull coatings like fuel savings are not fully taken into account there is a significant risk that this can lead to higher emissions of particles into air which can end up in the sea.

39. Markus: What evidence suggests current air lubrication effectiveness metrics might be misleading?

MH: Our expertise lies on the fouling control interaction with air lubrication. So we cannot give a qualified answer on this question

40. Do we need to use active or passive anodes together with the silicon coatings? What do your companies recommend to reach best surface?

NM:

CB:

MH: Visual inspections at indocking by coating advisors in dock. The study relies on data from Safinah.

41. Markus: What methodology determined the 44% vessel survey result with >10% barnacle coverage?

MH:

42. Markus: How do you measure fouling rates in sea chests versus hull surfaces?

MH: On hull surfaces it is done by visual inspection similar to the estimation of spot repairs. For the niche area it is done a similar way, but the range of error is significant higher.

43. Markus: What specific criteria define your high-range versus medium-range coating classifications?

MH: It is a mixture of technology, price, positioning of the coating company. There is no hard criteria for doing this.

44. Any specific coating for the azimuthing thrusters, CCP hubs, etc?

NM:

CB:

MH: I-Tech does not supply coatings. Some companies offer propeller coating relying on a fouling release effect. To the best of our knowledge so far no biocide containing systems have been launched to the market.

45. Markus: How do you measure the effectiveness of ultrasound against different fouling types?

MH: We do not work on ultrasound systems. The information shown relies on public available information. The ultrasound should work on all fouling types in the same way. It stops the growth of fouling at the initial settling phase

46. Any idea on interaction with low friction coatings and air lubrication systems? In case both are equipped what would be the final benefits? would it be less than the sum of individual benefits?

NM:

CB:

MH:

47. Markus: Any ecotoxicology assessment done for Selektope ?

MH: All biocides have to go through an intense approval process including ecotoxicology assessment. Biocides are the best assessed ingredients in a coating system.

48. Markus: What metrics determine optimal cleaning intervals for proactive maintenance?

MH: Proactive cleaning should happen constantly to take away the biofilm. It depends also on the fouling pressure and water temperature, but constantly cleaning eg once per week would be ideal from a conceptual way.

49. How long antifouling paint can exist in the dry dock condition.

NM:

CB:

MH: Depends of course on each paint and supplier, but generally speaking, polishing antifouling can withstand months in a dry dock also with exposure to sunlight. It has to be assured that at immersion the surface is clean and not contaminated. Silicone FRCs might have shorter time between application and immersion.

50. What would be your solution against biofouling for a stationary vessel in tropical waters?

NM:

CB:

MH: If the vessel will be stationary for very long period it will be difficult to protect it from fouling. For longer periods generally high performing antifouling coatings with a higher polishing rate and if it is barnacle fouling the presence of Selektope.

51. Nikolaj: How can you compare different biocides by just looking at the weight %? The X7 biocide is 1000 times more toxic than copper.

NM:

52. Has Safinah any feedback on graphite coatings? Where does this rank in price and performance compared to mainstream high-performance coatings?

CB: We have observed and supervised the application of Graphite coatings in dock on the underwater hull and the propeller on a number of occasions. We have also seen some in service data, however at the moment this is limited data

53. How does your research consider underwater noise?

NM:

CB:

MH:

54. How will this new Rightship rule/guidance update that includes low friction coatings change the position of coatings? What kind of effect is expected from this

NM:

CB:

MH:

55. Is there a coating/paint system in the market that makes anti-fouling completely unnecessary?

NM:

CB:

MH:

56. What do you think about the new IACS update and hull surface roughness measurements? Do you think this method is sufficient to determine the hydrodynamic performance of low friction coatings?

NM:

CB:

MH:

57. Nikolaj: Does Hull cleaning affect the Hull Roughness?

NM:

MH: How would the industry react if a previously unknown supplier arrived with a dramatically superior alternative? In the last 70 years it was the competition which helped to bring better and more sustainable solutions to the market. So if a new and superior solution will come up it is a good news for the shipowners and also for the industry. It is the shipowner who will decide. Each stakeholder will then have to work even harder for better solutions.

58. How would the industry react if a previously unknown supplier arrived with a dramatically superior alternative?

NM:

CB:

MH:

Disclaimer: Responses are presented verbatim.