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FOLLOW-UP WORK EMANATING FROM THE ACTION PLAN TO ADDRESS MARINE PLASTIC LITTER FROM SHIPS

Microplastics from anti-fouling paints – an overlooked source of marine plastic litter

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SUMMARY

Executive summary:	Marine plastic pollution remains a grave threat to all marine environments. This paper highlights the need for further investigation into the prevalence and impact of microplastics from paints and anti-fouling coatings used on ships. It urges the Committee to prioritize within the *Action Plan to address marine plastic litter from ships* (resolution MEPC.310(73)) the need for further investigation and for action.
Strategic direction, if applicable:	4
Output:	4.3
Action to be taken:	Paragraph 12
Related documents:	MEPC 73/8/10; MEPC 75/INF.23 and MEPC 76/8

Introduction

1 In this document, the co-sponsors highlight the need for further investigation into the prevalence and impact of microplastics from paints and anti-fouling coatings used on ships, citing the recent interim report published by GESAMP (MEPC 76/8, MEPC 75/INF.23) and new research.

2 In 2018, IMO Members adopted resolution MEPC.310(73) on *Action Plan to address marine plastic litter from ships*, which recognizes the negative impacts of plastics, including microplastics, on marine life, biodiversity and human health. The resolution further acknowledges the importance of preventing marine plastic pollution from ships and the contribution IMO can make to delivering on the 2030 Agenda for Sustainable Development, particularly SDG 14.1. Marine plastic pollution remains a grave threat to all marine environments on Earth and the timeline for action, as agreed by the Committee, is 2025.

* Antarctic and Southern Ocean Coalition has supported the development of the document.

Sea-based sources of marine litter

3 In the interim report *Sea-based sources of marine litter – a review of current knowledge and assessment of data gaps* prepared by GESAMP (MEPC 75/INF.23), ships are acknowledged as a source of microplastic pollution into the marine environment. Microplastics are discharged through various sources, including sewage, grey water, hazardous wastes, oily bilge water and ballast water, in addition to microplastic pollution from lost containers, particularly those containing plastic pellets. While there is a significant repository of knowledge on microplastic pollution and its impacts more generally, including emerging knowledge of the impact of plastic pollution from ropes (Napper, 2022), the information regarding the contribution of marine paints and marine coatings as a source of microplastic pollution is still relatively sparse. The GESAMP report highlights that paints used on ships consist of a complex mix of polymers, anti-corrosive and anti-fouling compounds, with a growing body of evidence to suggest this is a potentially significant source of sea-based microplastic pollution with unknown environmental impact.

Microplastics from anti-fouling paints – an overlooked source of marine plastic litter

4 The latest available data relating to paints and anti-foulants as a source of microplastic pollution compiled in the GESAMP report (MEPC 75/INF.23) indicates that 6-7% of marine coatings are lost directly to the sea during the lifetime of a vessel. Another study provided a more detailed breakdown, with 6% of solid anti-fouling coating lost directly to the sea during its lifetime, 1.8% lost during painting, 3.2% during cleaning maintenance and 1% from weathering. Other work estimated that 40% of marine coatings use microplastics as binding agents, with annual input of marine paints to European waters estimated at 400-1194 tonnes per year. A further study found that marine coatings account for 3.7% of releases of primary microplastics in the World's oceans. Finally, one study found that, per capita, the input could be at the level of 2.3 g per year, resulting in approximately 11,270 tonnes per year of marine paint-sourced microplastics introduced to the World's ocean, based on a global population of 7.55 billion inhabitants.

5 The long-term impacts on marine ecosystem health of microplastic pollution from anti-fouling systems are unknown and require further investigation. The GESAMP report however, highlights a study that found that the particle size of material was generally in the size range of 50-300 µm, which is considered equivalent to the general size range of living microplankton, resulting in significant potential for uptake by planktivorous species.

Microplastics from anti-fouling paints – further information

6 In recent years, there have been a number of studies that have started to look in more detail at anti-fouling systems as a source of marine plastic pollution. The co-sponsors summarize some of the findings from recent research in this submission and argue that there is sufficient justification for increased focus on this source of marine plastic litter at IMO. A new summary of a study of samples from the North Sea and the German Bight, published by Dibke et. al. (2021), shows that the anti-fouling coatings applied to ships – known to be a source of heavy metals such as copper and zinc – are also a prominent and overlooked source of microplastics. The study found that most paint microplastics in the coastal waters of the German Bight are from ships and boats, with road markings and buildings acting as other sources. Paint microplastics may be up to 30 times more abundant than other microplastics in some regions.

7 A further study by Turner (2021) also shows that paint particles in the marine environment are an overlooked component of microplastics and that paint particle emissions may be as high as 35% of the synthetic micro-debris input. Hazardous additives in micro-paint particles may render them more harmful than other microplastics. This study identified that marine paints are comprised of more additives including copper, lead and chromium, than plastic, suggesting this as one reason for their absence in the extensive body of literature on microplastics in the marine environment. Recommendations arising from the study include the use of particulate capturing devices, waste collection systems and recycling facilities during paint disturbance, raising awareness of the potential impacts of discarded paint, and alerting the microplastics community to the significance of paint particles. These conclusions reinforce the importance of including paints and anti-foulants within the scope of work looking to address microplastic pollution.

8 Verschoor et al. (2016) estimated that 200 tonnes of secondary microplastics from paints are released annually from shipping activities in the Netherlands and identified maintenance and wear of paint layers as sources of microplastic emissions, in line with OSPAR (OSPAR Commission, 2017). Lusher et al. (2021) found shipping activities and paints to be significant sources of sea-based sources of microplastics to the Norwegian marine environment. This report notes that mapping the release and distribution of microplastics related to shipping is challenging as vessels are in motion and crossing between national and international waters; however, they concluded that maritime paints have been identified as a source and estimates built on production values are available, although more information should be gathered to support these estimates.

9 A study of sources and sinks of microplastics in the Caribbean Sea by Courtene-Jones et al. (2021) found paint fragments in surface water which may arise from regional maritime industry/tourism and that marine plastics are a major threat to sustainable use of marine and coastal resources of the Caribbean. In a review by Gaylard et al. (2021), large quantities of durable synthetic paint fragments have been correlated with intense shipping traffic and related activities in Korean waters (Song et al., 2014), as well as in the Adriatic Sea, where the types of paint (durable or anti-fouling) were not identified (Suaria et al., 2016). The paper concluded that paint fragments are an understudied portion of the microplastics in the ocean.

10 It is also important to note that approximately 53,000 merchant ships were registered by IMO in 2020. International maritime trade reached a total volume of cargo of 11 billion tonnes in 2018, and in the last 30 years the global ocean cruise industry has grown from 4 million passengers per year to an estimated 27 million. In this context, and given the growing body of research summarized above, it is clear that the growth in maritime traffic is an increasing contribution of microplastic input into the ocean from marine paints, coatings and anti-foulant. This source is exacerbated by the contribution of in-water cleaning and other pollution events such as pellet spills which can contribute to more localized microplastic pollution.

Proposal

11 The co-sponsors request the Committee to note the information provided in paragraphs 3 to 10, and urge the Committee to prioritize within the *Action Plan to address marine plastic litter from ships* (resolution MEPC.310(73)) the need for further investigation into the prevalence and impact of microplastics from paints and anti-fouling coatings on ships, and the need to take action to reduce the inputs of microplastics from paints and anti-fouling coatings into the marine environment. This could involve, for example, developing best practices to mitigate the leakage of microplastic pollution from paints and anti-foulants into the ocean, the development of improved anti-fouling systems with longer life spans and raising awareness of the potential impacts of discarded paint and alerting the microplastics community to the significance of paint particles.

Action requested of the Committee

12 The Committee is invited to consider the proposal in paragraph 11 and take action as appropriate.

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ANNEX

REFERENCES

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