Report

Arab Women in Maritime - Biofouling Management Workshop (AWIM-BMW)

10 & 11 May 2023
Jeddah, Kingdom of Saudi Arabia

GEF-IMO-UNDP Glo Fouling Partnerships project

Prepared in collaboration with Leila Ben Hassen, IMO Consultant
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Introduction

The Arab Women in Maritime - Biofouling Management Workshop (AWIM-BMW) hereunder referred to as the ‘Workshop’ took place on 10 and 11 May 2023 in Jeddah, Kingdom of Saudi Arabia. The Workshop was organized under the GEF-UNDP-IMO Partnerships project which is implemented by the International Maritime Organization (IMO). The GEF-UNDP-IMO Partnerships project is a joint initiative of the Global Environment Facility (GEF), the United Nations Development Program (UNDP) and IMO to tackle the issue of invasive aquatic species (IAS) introduced via ships’ biofouling. More information on the project and the issue can be found on the project’s website here: [https://www.glofouling.imo.org/](https://www.glofouling.imo.org/).

The Workshop was funded and hosted by the Transport General Authority (TGA) of Kingdom of Saudi Arabia, with the assistance of the London-based IMO Alternate Permanent Representative of the Kingdom of Saudi Arabia to IMO.

The main objectives of the Workshop were to:

- Increase awareness of ships’ biofouling management and best practices in the shipping industry, alongside the importance to protect marine biodiversity and tackle climate change; and
- Discuss opportunities for women in the sector, identify existing barriers and gaps related to gender equality, and recommend solutions.

A Concept Note and the Programme for the Workshop can be found in Annex 1 and Annex 2 of this report.

Two women representatives from eighteen countries from the Middle East and North Africa (MENA) region, namely Algeria, Bahrain, Djibouti, Egypt, Jordan, Kingdom of Saudi Arabia, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Somalia, South Sudan, Syria, Tunisia, United Arab Emirates, and Yemen were invited to participate. The Final List of Participants is provided in Annex 3 of this report.

Day 1: Wednesday 10th May 2023

Opening session

The session was opened by Prof. Omaimah Bamasag, Deputy of Transportation Enablement, Transport General Authority, Kingdom of Saudi Arabia.

In her opening address, Prof. Omaimah Bamasag emphasized how the Kingdom of Saudi Arabia was proud to host the Arab Women in Maritime – Biofouling Management Workshop, particularly in the city of Jeddah, which for centuries has been an important port and trading city in the area. The Jeddah Islamic Port is one of the busiest and most modern ports in the region. It is a gateway for trade, receiving 75% of the nation’s total inbound maritime trade and transhipments. Jeddah was therefore the ideal venue to discuss two important topics:

- The seafarer’s community and the contribution of women to this community; and
- Caring about the oceans, which are so critical to our lives and to enable international trade, specifically in the context of biofouling issues.

She ended her opening address by stating that biofouling on ships and the introduction of aquatic invasive species is a global issue that requires a global approach. H.E. Hessa Al Malek, President, Arab Women In Maritime Association (AWIMA) and Advisor to the Minister for Maritime Transport, Affairs, at the UAE Ministry of Energy and Infrastructure followed with a call for action.

H.E. Hessa Al Malek stated that the maritime sector has seen major progress in the last few years in terms of safety and environment, but acknowledged there are still challenges ahead that need to be addressed.

She added that the maritime industry is an integral part of the global economy and society, and it was therefore crucial to ensure this industry is inclusive and diverse. H.E. Hessa Al Malek reminded the participants that among seafarers in the maritime sector, less than 2% are women, which is a cause for concern. However, as President of Arab Women in Maritime Association (AWIMA), she is taking a stand to change the narratives. AWIMA is trying to increase awareness of the valuable roles of Arab women in the maritime industry, and to strengthen the network among Arab women. The association allows access to training and mentoring programmes, enabling women to enhance their development, knowledge and expertise.

Building the capacity of Arab women will enable them to take higher positions in management within the maritime industry. H.E. Hessa Al Malek stated that she believes Arab women have the skills, talents and passion to make the change. She also stated it is important to recognise that there is a gender issue and that women need supportive action to overcome the barriers they are facing. This includes implementing policies that support a work-life balance, mentoring, networking, and a safe and welcoming work environment.

In addition, by creating a more inclusive and diverse maritime industry, stakeholders will be better equipped to face the challenges of the future. And by investing in research and development, new, more efficient eco-friendly technologies can be developed.

H.E. Hessa Al Malek urged all the participants to act to come up with innovative solutions to address the issue of biofouling. She said, “By working together, we can create a more inclusive, sustainable and successful maritime industry.”

Ms. Gyorgyi Gurban, Head, Projects Implementation, Department of Partnerships and Projects, IMO, then took the floor to highlight that this Workshop was a first in the region, focusing on both gender and biofouling, and targeting Arab women from different backgrounds (scientists, environmentalists, engineers, etc.). It was important for the IMO to gather the participants’ views and suggestions for action on how to enable female empowerment in shipping in general, and in the biofouling sector specifically under the Glo Fouling Partnerships project.
She stressed that the issue is about gender equality, the impact and benefits that parity can have on societies and corporate companies. Historically shipping is a male dominated sector and today this needs to change.

The United Nations Sustainable Development Goal 5 (SDG5) on gender equality has been one of the IMO’s priorities and commitment at the high level, and policies, efforts and actions are undertaken by the IMO to address the gender gap. Hence the creation of the International Day for Women in Maritime, which provides an opportunity to reflect on the subject and discuss challenges and opportunities for women in maritime worldwide.

Finally, Ms. Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, Department of Partnerships and Projects, IMO, welcomed all the participants in the Workshop. She thanked the Transport General Authority of the Kingdom of Saudi Arabia for their technical, logistical and financial support that made this Workshop possible.

She highlighted that the theme of the Workshop addresses one of the most pressing environmental issues affecting the oceans today, namely the introduction of Invasive Aquatic Species (IAS) via ships’ biofouling in the marine environment. Further discussion would cover gender and how women can help address this issue.

**The IMO and gender equality**

Following the opening session, two introductory presentations were delivered for context, the first one on IMO and gender equality, and the second one on the GloFouling Partnerships project.

Regarding IMO and gender equality, an introduction to IMO’s work on gender equality, both within the Women in Maritime Programme and beyond, was delivered to explain what the organization is doing to address the gender gap and how IMO’s Department of Partnerships and Projects includes gender in its activities to engage and empower more women. Communication aspects were key to changing perceptions. This was delivered as a joint presentation by three IMO representatives, namely:

- Ms. Mariana Noceti, Principal Programme Assistant, Women in Maritime Programme, Sub-Division for Programme Management and Coordination, Technical Cooperation Division; *(Mariana Noceti presentation – found in Annex 4 of this report)*;
- Ms. Gyorgyi Gurban, Head, Projects Implementation, Department of Partnerships and Projects; and *(Gyorgyi Gurban presentation – found in Annex 5 of this report)*; and
- Ms. Karine Langlois, Social Media and Communications Officer, Public Information Services Legal Affairs and External Relations Division. *(Karine Langlois presentation – found in Annex 6 of this report)*.

**Ms. Noceti** recapped the establishment of the United Nations 2030 Agenda for Sustainable Development, and its 17 Sustainable Development Goals (SDGs), which cover a range of issues and objectives to end poverty, protect the planet and improve the livelihoods of everyone everywhere.
She noted women and girls represent half the world’s population and therefore half of its potential. Achieving the SDG 5 on gender equality will therefore help to achieve overall sustainable development.

Ms. Noceti highlighted that the IMO is focusing on achieving the following SDG 5 targets:

- **5.1**: Ending all forms of discrimination against all women and girls everywhere.
- **5.5**: Ensuring women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.
- **5.5.c**: Adopting and strengthening sound policies and enforceable legislation for the promotion of gender equality and the empowerment of women and girls at all levels.

Ms. Noceti added that women continue to be under-represented at all levels of political leadership, and that a lack of investment in education can translate into a lack of skills and limited opportunities in the labour market. She also underlined that ample evidence is available that investing in women lifts up communities, companies and countries. With more gender equality, companies can have better economic growth. Peace agreements that include women are more durable; parliaments with more women endorse more legislation on key social issues, such as health, education and child support.

Ms. Noceti then highlighted the work of IMO through its Women in Maritime programme, which, within the framework of maritime development and under the slogan of ‘**Training, visibility and recognition**’, has taken a strategic approach to enhance the contribution of women as key maritime stakeholders. The programme supports gender equality and the empowerment of women through gender specific fellowships; by facilitating access to high-level technical training for women in the maritime sector in developing countries; and by facilitating the establishment of professional women in maritime associations.

IMO has established eight such regional associations (WIMAs) under its auspices: AWIMA, WIMA Asia, WIMOWCA, WOMESA, MAMLa, PacWIMA, NPWMP-WCA, WIMAC. These associations create spaces of development, capacity-building, cooperation, and increase the visibility of women in the maritime sector, as well as make the maritime industry a barrier-free environment for women.

In order to address the pillar of "visibility", the below activities have been implemented through the Women in Maritime Programme:

- Organisation of the global conference of regional WIMAs and celebration of the second edition of International Day for Women in Maritime (#{WomenInMaritimeDay});
- Allocation of funds for WIMAs to enhance their website and increase their visibility;
- Creation of Maritime Speakers Bureau website, a database of female experts in different maritime topics ([https://maritimespeakers.com/](https://maritimespeakers.com/)). This will increase the diversity of maritime events and highlight the role of women as experts within the industry;
- The establishment of the Gender Equality Award, to accord an international recognition to those individuals, irrespective of their gender, who, either in their personal capacity or as representatives of their respective institutions, have made significant
contributions to advancing gender equality and the empowerment of women in the maritime sector;
- Data collection and assessment of the proportion of women working in the maritime sector; a new survey is planned for 2024; and
- Engagement with schools and universities to raise awareness among girls and young women about maritime careers.

Ms. Gurbán, who is also the gender focal point for the IMO’s Department for Partnerships and Projects, explained how gender equality was integrated into in the capacity building projects, taking into account the IMO Gender Strategy and its Action Plan.

She highlighted that when it comes to integrating gender into projects, specific targets and indicators are needed, plus an allocated budget, close collaboration with stakeholders, and data collection and analysis.

For example, equal participation in training and scholarships is requested in some projects as is the case for the GHG SMART project funded by the Republic of Korea.

Also, the SENSREC project in Bangladesh, sponsored by Norway, is a tangible example of collaboration between stakeholders and the government to amend the legislation and policies in the shipping recycling industry and sanitation to allow women to work in this sector.

Ms. Gurbán also mentioned the GloFouling Partnerships project where gender mainstreaming and gender equality have been integrated into all project’s activities and at the global, regional and national levels, with a gender marker, indicators and ratings to monitor implementation. The TEST BIOFOULING project has developed a specific Gender Action Plan for women in the biofouling sector that will be introduced during the Workshop.

Ms. Langlois gave a presentation about gender and communications at IMO. She focused on the new communication model, the tools they have been using and their impact.

When IMO created its gender programme in 1988, no communication strategy was developed to support it. Moreover, in those days, the communication landscape was mainly focused on traditional media, as social media did not exist, and therefore, the concept and strategy for gender equality was not being promoted.

Since the creation of the United Nations SDGs, the IMO has been changing the narratives and now includes the SDG5 (to achieve gender equality and empower women and girls) in all its communications material. Furthermore, IMO’s Women in Maritime programme has been rebranded to increase its visibility and today, the issue of gender equality has become an integral part of the communications outreach activities.

The Communication team has been working with the IMO’s Women in Maritime programme and has created new content to boost its impact and raise awareness of the programme itself. They achieved this through a series of outreach activities such as videos, and the creation of women in maritime profiles and success stories. A survey for women seafarers was prepared and the results were shared with IMO members of state.
In 2019, both the Day of the Seafarer and the World Maritime Day have dedicated their campaign themes to women empowerment. The campaigns emphasized the importance and value of women within the maritime industry. Many components were developed to support the campaigns, such as a photo library to depict women in maritime and help enhance women’s visibility in the maritime community.

**GEF-UNDP-IMO GloFouling Partnerships project**

The second context presentation was to provide an overview of the GloFouling Partnerships project under which the Workshop was organized, and of complementary project TEST Biofouling. Ms. Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd, facilitated the session and the presentation was delivered by three IMO representatives, namely:

- Ms. Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO; *(Lilia Khodjet El Khil presentation – found in Annex 7 of this report)*;
- Ms. Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO; and *(Jurga Šaulė presentation – found in Annex 7 of this report)*; and
- Ms. Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO. *(Yeongjoo Baek presentation – found in Annex 7 of this report).*

**Ms. Khodjet El Khil** started her presentation by sharing a video outlining the GloFouling Partnerships project, the impact of invasive aquatic species introduced via ships’ biofouling on the marine environment, and how the project is helping its beneficiary countries and stakeholders to address the issue.

A short video explaining the project: [https://youtu.be/oLtia5V-HsE](https://youtu.be/oLtia5V-HsE)

She specified that the main objective of this project is to help developing countries implement the IMO Guidelines for the control and management of ship’s biofouling to minimize the transfer of invasive aquatic species (IMO Biofouling Guidelines).

The project also aims to achieve some of the United Nations SDGs including SDG 5.

The project supports twelve beneficiary countries (so-called Lead Partnering Countries under the project) namely Brazil, Ecuador, Fiji, Indonesia, Jordan, Madagascar, Mauritius, Mexico, Peru, Philippines, Sri Lanka and Tonga across six different regions, Red Sea and Gulf of Aden, South America and Wider Caribbean, Pacific, East Africa, South Asia and Southeast Asia.

These Lead Partnering Countries are committed to:

- Creating a Task Force to increase awareness of biofouling and monitor action at the national level;
- Carrying national status assessments;
- Establishing rapid economic impact assessment;
- Drafting and implementing a national strategy and action plan; and
- Developing their capacity and expertise by participating in trainings and conferences delivered by the project.
Ms. Khodjet El Khil explained how the project is implementing gender mainstreaming through targeted initiatives focusing specifically on women; by collaborating with IMO’s Women in Maritime Programme; and by encouraging equality in participation and benefit sharing related to project’s activities and achievements. The target for women participation is 50% and the project is working towards achieving this target. Data shows that as of 2022, women participation rate achieved was as follows:

- Project activities: 38%;
- Project management: 48%; and
- Project expertise and consultancy: 50%.

Ms. Khodjet El Khil also mentioned the Global Industry Alliance (GIA) for Marine Biosafety as one of important component of the project and highlighted the key role this Alliance is playing in identifying the challenges stakeholders are facing to implement good management practices related to biofouling management, and the solutions to address these challenges.

In her presentation, Ms. Šaulė focused on one of the main objectives of the Glo Fouling Partnerships project, which is capacity building. She gave some examples of training; raising awareness and knowledge sharing activities delivered by the project, such as:

- Training package – “Introduction to marine biofouling: impacts and management of risks” for delivery in participating countries. This training course was adopted into eLearning course 1 - an online course developed in collaboration with the World Maritime University (WMU) accessible by all public;
- Publications, including guides for governments and technical reports on best management practices in various sectors 2 ;
- Global R&D Forum and Exhibition on Biofouling Prevention and Management for Maritime Industries is organised every two years; one was organized in 2019 in Australia; the second one was organized in 2022 in London, United Kingdom; and the third one is planned to be hosted by the Republic of Korea in fall of 2024;
- Pilot demonstration sites showcasing best practices of biofouling management, such as the International Workshop on biofouling prevention and management for ships in marine protected areas (MPAs) and Particularly Sensitive Sea Areas (PSSAs), held in Galapagos Islands, Ecuador from 6 to 9 June 2023 and another demonstration focusing on drydock operations planned in the Republic of Korea in fall 2024, as part of the project’s 3rd R&D Forum;
- Focused webinars 6 led by experts in the industry on specific topics related to biofouling management;
- News items 7 and posts on the different project’s online platforms (LinkedIn; Twitter; Instagram); and

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1 E-Learning tool: [https://lms.imo.org/moodle310/](https://lms.imo.org/moodle310/)
2 available online on the project’s website: [https://www.glofouling.imo.org/publications-menu](https://www.glofouling.imo.org/publications-menu)
3 The 1st R&D forum proceedings: [https://17616ec4-2b99-45ba-a5b5-7e2164091d97.filesusr.com/ugd/34a7be_ac5d3db26d443ac901581be935a36f0.pdf](https://17616ec4-2b99-45ba-a5b5-7e2164091d97.filesusr.com/ugd/34a7be_ac5d3db26d443ac901581be935a36f0.pdf)
4 The 2nd R&D forum proceedings: [https://17616ec4-2b99-45ba-a5b5-7e2164091d97.filesusr.com/ugd/34a7be_47b91ca88bc949c09f1a14cf94d3be8.pdf](https://17616ec4-2b99-45ba-a5b5-7e2164091d97.filesusr.com/ugd/34a7be_47b91ca88bc949c09f1a14cf94d3be8.pdf)
5 The 3rd R&D forum webpage: [https://www.glofouling.imo.org/events](https://www.glofouling.imo.org/events)
6 Recordings of past and schedule of upcoming webinars: [https://www.glofouling.imo.org/webinars](https://www.glofouling.imo.org/webinars)
7 News items available: [https://www.glofouling.imo.org/news](https://www.glofouling.imo.org/news)
- Awareness-raising through publishing various materials, animations, infographics and documentaries (available on the GloFouling website).

**Ms. Baek**, Technical Project Manager of the IMO project *Accelerating the Transfer of Environmentally Sound Technologies (TEST) to reduce biofouling and related emissions* presented the project. A sister project to GloFouling Partnerships, the TEST Biofouling project aims at facilitating the transfer of technologies related to biofouling management through demonstration pilots to reduce biofouling and greenhouse gas (GHG) emissions.

The TEST Biofouling project is funded by NORAD, the Norwegian Agency for Development Cooperation and has a budget of approximately USD$4 million. Various partners collaborate in this project, including three maritime technology co-operation centers (MTCC’s), to showcase novel technologies for biofouling management through projects at national and regional levels.

Ms. Baek mentioned the gender component of the project and the **TEST Biofouling project’s Gender Action Plan**, emphasizing this is the first time that IMO has developed a specific gender plan to contribute to achieve SDG5. The objective of the Plan is to showcase gender equality as a business case and establish baseline data to estimate the number of women working in the biofouling sector globally.

**Session 1: Impacts of ships’ biofouling**

**What is biofouling and how does it contribute to the loss of marine biodiversity and to climate change?**

Ships’ biofouling is one of the main vectors for the introduction of invasive aquatic species, which is considered to be one of the greatest threats to the world’s marine biodiversity. Biofouling on ships’ hull also increases the ships’ drag. To maintain speed, ships must burn more fuel, thus increasing greenhouse gas emissions. This session highlighted the impact of biofouling and environmental challenges.

Ms. Sanjam Gupta, Director, Sitara shipping Ltd, facilitated the session. The presentation was delivered jointly by:

- Ms. Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO; and *(Jurga Šaulė presentation – found in Annex 8 of this report)*; and
- Ms. Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO. *(Yeongjoo Baek presentation – found in Annex 9 of this report)*

**Ms. Šaulė** started her presentation by defining biofouling and Invasive Aquatic Species (IAS) and outlining the impact they have on the marine environment. She highlighted that it is always hard to detect the IAS in the initial stage, which is why it is very important to prevent them before they become established.

There are two major vectors for the transfer of IAS:

- Ships’ ballast water (ships only); and

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8 Awareness material available: [https://www.glofouling.imo.org/awareness-menu](https://www.glofouling.imo.org/awareness-menu)
Biofouling on immersed surfaces (ships and other moving marine surfaces).

Biofouling simply means the attachment of a species to any submerged surface in an aquatic environment. When fouled ships move from one location to another, they can introduce IAS through biofouling.

Ms. Šaulė also explained the different stages of the marine biofouling process over time, from organic matter to macrofouling growth, to biofilm and secondary and tertiary colonisers.

She mentioned different examples of biofouling apart the ones caused by ships, such as aquaculture, oil and gas and renewable energy structures.

IAS has been recognised as one of the five major drivers of biodiversity and can cause economic loss as well as have social and environmental impacts. For example, *Rugulopterix Okamurae*, which has spread in the Atlantic and the Mediterranean.

The expansion of this algae affects the tourism industry, causing a drop of the number of holidaymakers and national income, and an increase in the beach clean-up budget.

Biofouling also affects the fishing industry to the extent that some regional fishing fleets can’t get out to sea for several months.

Another example is the invasive mollusc *Crepidula Fornicate*, in northern Spain. This invasive species affects the livelihoods of women working to collect clams.

Ms. Šaulė shared a video took in commercial, military and touristic ports in the Gulf in northern Mediterranean. The documentary showed that 70% of the boats have at least one alien species in the fouling. There are 800 invasive species in the Mediterranean, which is at a world record high.

A short video explaining the role of recreational boating in the spread of invasive species: [https://youtu.be/HwyDmlkwmaY](https://youtu.be/HwyDmlkwmaY)

**Ms. Baek** focused on GHG emissions caused by biofouling on ships.

In 2018, shipping accounted for 2.9% of the global GHG emissions. In order to reduce emissions, ships need to be as efficient as possible.

Over time, biofouling makes the surfaces rougher and the ships slower. Additionally, the internal sea water system of the ship can affect the integrity and performance of the engine. Recent research shows that even light slime can trigger an increase of up to 25% per cent in emissions. When a hull is fully covered by barnacles, this can rise to 55% - a far higher percentage than the industry expected. However, thanks to innovative technologies, biofouling challenges can be addressed by using antifouling coating and prevention systems to reduce emissions and waste of money.

Ms. Baek covered the following points:

- IMO strategy to reduce GHG emissions from ships;
- Measuring biofouling and estimating the fuel consumption penalty;
- Reducing roughness and friction to save energy; and
- Reducing fuel consumption and emissions of CO2 and other air pollutants.

There is a new requirement under Annex VI of MARPOL Convention\(^9\), namely the Energy Efficiency Design Index (EEDI)\(^9\) that aims to improve the design of new ships and Energy Efficiency Existing Ship Index (EEXI)\(^9\) for existing ships. EEXI is used to measure ships energy efficiency and to initiate the collection of data for the reporting of their annual operational carbon intensity indicator (CII) and CII rating. The CII determines the annual reduction factor needed to ensure continuous improvement of a ship’s operational carbon intensity within a specific rating level\(^10\).

The fuel penalty means a higher economic cost for ships that increase their fuel consumption increase due to biofouling.

To be able to decide when to mitigate the problem most efficiently, there is a need to know the severeness of the biofouling problem. The amount of biofouling is described by two values:

- The percentage cover of slime on an engine surface; and
- The roughness measures. Without effective protection, the roughness can increase every year and accumulate between drydocking. The same cycle can be the same after every five years.

The penalty varies according to the roughness. Roughness on the propeller can also significantly energy demand and waste. Hence cleaning the propeller is also considered essential. When confronted by the biofouling on the hull, the ship operator has two options:

- Accept the speed loss; or
- Increase the power to maintain the speed of the ship, which causes more fuel consumption and therefore more GHG emissions.

There is therefore a strong link between biofouling on ships, fuel consumption and GHG emissions.

A short video explaining the impact of biofouling on GHG emissions: https://youtu.be/kEjPG7Sgal8

**Panel discussion:**

**Mr. Simon Doran,** Managing Director, HullWiper Ltd/Chair of Glo Fouling Partnerships’ Global Industry Alliance (GIA) for Marine Biosafety, explained that HullWiper Ltd is a service provider for biofouling cleaning and how this service has been evolving in the last decade. He stated his company offers safe, environmentally friendly hull cleaning solutions with capture to shipping companies.

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\(^9\) IMO Strategy on reduction of GHG emissions from ships: https://www.imo.org/en/OurWork/Environment/Pages/Improving%20the%20energy%20efficiency%20of%20ships.aspx

\(^10\) Frequently asked questions on the Energy Efficiency Existing Ship Index (EEXI) and the annual operational carbon intensity indicator (CII) and CII rating: https://www.imo.org/en/MediaCentre/HotTopics/Pages/EEXI-CII-FAQ.aspx
Mr. Doran stated that in the last decade there has been a big change in how ports operate. He gave the example of Jebel Ali port in Dubai and how the ship cleaning process has changed in the last 15 years. New rules and environmentally friendly processes were implemented. Thanks to an agreement reached with DP World, hull cleaning is made during the cargo operations.

**Ms. Zahra Alsaffar**, Environmental Stewardship Lead, Sustainable Development, at NEOM, Saudi Arabia, stressed the threats of ocean’s health caused by plastic pollution, acidification and climate change. She called for tight collaboration between all stakeholders, including scientists, researchers and academia, to find methodologies to detect IAS early, prevent, assess and monitor biofouling, in order to reduce the impacts on the marine environment. She mentioned different tools, such as molecular genetics, eDNA (environmental DNA) and meta barcoding, techniques for water sampling that can help biofouling management to monitor and mitigate the risk.

She called for increasing the awareness of the public, professionals and maritime community of the threats and impacts of marine biofouling, through communication and educational materials.

**Ms. Khodjet El Khil** commented on prevention of introductions and monitoring to mitigate risks. She noted that when it comes to monitoring IAS, there are several ways of doing so, mainly by conducting ports baseline surveys to provide inventories of marine life in a given marine area and then conducting surveys to detect a newly introduced species. There is also the environmental DNA analysis or eDNA technique which is increasingly being used. eDNA is a technique that allows detection of genetic material released in water, so analysis sampling allows scientists to detect invasive species even in a low number – therefore eDNA helps with early detection of aquatic invasive species.

Mr. Doran shared his views that the shipping industry was slow on the uptake of new technologies, making it hard to anticipate IAS in advance.

Fortunately, the Global Industry Alliance (GIA) for Marine Biosafety established under the GloFouling Partnerships project has been working to increase awareness of the biosafety risks related to biofouling on ships and the importance of investing in new environmentally friendly technologies to address this risk. Also, at HullWiper, a 20-year plan is in place with a substantial financial investment in innovative technologies.

Ms. Zahra Alsaffar explained how the culture impacts leadership sustainability and helps protect the ocean’s health. The implementation of a corporate culture requires a clear communication plan and strategy within the whole ecosystem. Furthermore, partnerships with stakeholders are equally important as it helps fostering the sustainability vision and implementation.

**Session 2: The global response**

How does the IMO global policy address biofouling related issues?
More countries are taking steps to tackle biofouling from ships, in line with the IMO’s 2011 Guidelines for the Control and Management of Ships’ Biofouling to Minimise the Transfer of Invasive Aquatic Species (IMO Biofouling Guidelines). The objective of this panel was to explain IMO’s policy and how it is being implemented by member States and other stakeholders.

Ms. Šaulė facilitated the session and the presentations were made by:

- Ms. Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO; (Lilia Khodjet El Khil presentation – found in Annex 10 of this report); and
- Ms. Reem Hassan Qutaish, Administrative and Financial Director, Jordan Maritime Commission; (Reem Hassan Qutaish presentation – found in Annex 11 of this report) each delivered a presentation, which was followed by a panel discussion.

The objective of Ms. Khodjet El Khil presentation was to showcase IMO’s initiatives in the policy sphere to help stakeholders tackling the risk of introducing invasive aquatic species in biofouling on ships.

The key topics covered by her presentation were the following:

- Contents of the IMO Biofouling Guidelines;
- The Biofouling Management Plan and Biofouling Record Book;
- IMO’s guidance and recreational craft; and
- Implementation of the Biofouling Guidelines.

Ms. Khodjet El Khil explained the role of IMO member States in developing global instruments such as conventions and guidelines to address environmental issues. IMO regulates shipping to ensure the industry operates in a safe and environmentally friendly manner and has adopted the Guidelines for the Control and Management of Ships’ Biofouling to Minimize the Transfer of Invasive Aquatic Species, referred to in short as ‘IMO Biofouling Guidelines’.

- The IMO Biofouling Guidelines were adopted on 15 July 2011. A Correspondence Group made of IMO member States and other organizations was tasked to review the Guidelines to make their implementation easier. A new version of the Guidelines was approved in April 2023 and is expected to be adopted in July 2023 at the 80th session of IMO’s Marine Environment Protection Committee (MEPC);
- The IMO Biofouling Guidelines provide practical guidance to a wide shipping audience on how best to avoid the transfer of IAS via ships’ biofouling, by implementing a series of biofouling management best practices (such as application of Anti-fouling paints, use of Marine Growth Prevention Systems; cleaning of hull and propeller; and other measures);
- The IMO Biofouling Guidelines define a ship as: a vessel of any type whatsoever operating in the aquatic environment. This includes hydrofoil boats, oil and gas platforms, offshore vessels – all types of ships, as identified in the format for a Biofouling Management Plan provided in the Guidelines;
- The Guidelines apply to the maritime community at large, such as: States, ship owners and operators, shipping agents; shipbuilders, ship designers, anti-fouling paint manufacturers; and
The Guidelines explain in detail all the management measures and provide recommendations regarding the below topics:

- Record keeping: all ships should be required to carry a Biofouling Management Plan containing the procedures for biofouling management; and a Biofouling Record Book where all operations related to biofouling management (maintenance and inspections for example) will be recorded;
- Anti-fouling coatings application and maintenance;
- In-water inspection, cleaning and maintenance;
- Management of waste resulting from cleaning;
- Ship design to minimize biofouling risks such as minimizing niche areas;
- Dissemination of information: States need to inform the IMO about their policies and regulations related to biofouling management;
- States and industry organizations should ensure appropriate training and education is provided to ships’ master and crew; and
- States should support research and development of technologies.

Ms. Khodjet El Khil advised that any State who would like to develop national measures, policies and regulations about biofouling management should take into consideration the IMO Biofouling Guidelines, disseminate very clear information on management to stakeholders and monitor their effectiveness.

She ended her presentation with four key messages and takeaways:

- IMO Biofouling Guidelines are the globally agreed standard to manage ships’ biofouling;
- National regulations should be in line with the IMO Biofouling Guidelines;
- The Guidelines are applicable widely in the shipping industry; and
- The Biofouling Management Plan and Record Book are key tools to document implementation.

Following the presentation, some questions were addressed by the participants to the presenters:

- **Ms. Nehla Hassan** from Alexandria Port Authority (Egypt) highlighted the need to support ports to manage biofouling appropriately and asked if it was possible for IMO to audit ports every three or five years in regard to the implementation of these guidelines, to ensure that ports fully apply the best practices to address biofouling;
- **Ms. Ilham Khabbaz** from the Ministry of Transport (Lebanon), suggested to combine all the efforts of the IMO to increase the uptake of the Biofouling Guidelines with Malta based REMPEC’s efforts in regard to ships ballast water management, for ships to address IAS and encourage more Arab countries to apply the Guidelines; and
- **Ms. Hanane Atmane** from the Ministry of Transport and Logistics (Morocco) shared how her country is committed to addressing the biofouling challenges by applying the IMO Biofouling Guidelines and establishing a national plan for the stakeholders. She also mentioned how the national regulations have included penalties in case of violation of the rules related to biofouling and ballast water management. This is to mitigate the impact of IAS and ensure a healthy marine environment.
Ms. Hasan Qutaish started her presentation by sharing general information about the Aqaba ports community and Aqaba new port.

She explained how Jordan, as a member State of the IMO, has been applying the IMO Biofouling Guidelines and shared the outcomes of the work undertaken by the Jordan’s national task force (established under the GloFouling Partnerships project), which includes:

- Draft of the Biofouling national policy;
- Draft of the Biofouling national regulations;
- Draft of national report on assessment of biofouling and impact on the marine environment of the gulf of Aqaba;
- Selection of a national academy for training programmes;
- Nomination of national experts to work on the national reports; and
- Analysis of national capabilities.

She also shared all the initiatives undertaken by Jordan Maritime Commission and the Aqaba Special Economic Zone Authority (ASEZA) to raise awareness of biofouling and the impact of AIS.

Panel discussion:

Ms. Nazli Selekk, Senior Partner, NSN Law (Turkey) and Member of the Executive Committee of WISTA International, was asked about the risks and the costs of not applying the IMO Biofouling Guidelines. She answered that the first impact is environmental, as the introduction of invasive aquatic species is a serious matter that have adverse effect on marine biodiversity and uncontrolled biofouling on ships can increase GHG emissions.

In addition, the issue of biofouling management can create issues between owners and charterers because fouled vessels will face speed and performance challenges.

The Biofouling Guidelines are very important as they provide a globally agreed framework for biofouling management and key aspects need to be included in national legislations.

Ms. Reham El Refaei, Director of the Environment Protection Department, Damietta Port Authority of Egypt spoke about the importance of ports’ digitalisation and the key role that technology can play in preventing IAS, helping ships’ time management, enhancing the coordination between ports and ship operators.

Session 3: Industry perspectives

Challenges and best practices: What role does the private sector play in promoting and developing innovative biofouling management solutions?

Ships’ biofouling is an issue that concerns different stakeholders. The objective of this session was to bring together different business stakeholders to discuss common challenges and best practices, opportunities and solutions to reduce the impact of biofouling and find ways to contribute to a sustainable blue economy.

Ms. Baek facilitated the session and the presentations were made by:
- Mr. Simon Doran, Managing Director, HullWiper Ltd/Chair of GloFouling Partnerships’ Global Industry Alliance (GIA) for Marine Biosafety. *(Simon Duran presentation – found in Annex 12 of this report)*;
- Ms. Reham El-Refaei, Director of the Environment Protection Department, Damietta Port Authority. *(Reham El-Refaei presentation – found in Annex 13 of this report)*; and
- Ms. Nahla Mohamed, Team Leader of Waste Management Group, Alexandra Port Authority, Egypt. *(Nahla Mohamed presentation – found in Annex 14 of this report)*.

**Mr. Doran** made a presentation about the **Global Industry Alliance (GIA) for Marine Biosafety**. The Alliance concept is a public-private partnership initiative of the IMO under several projects to enable private sector participation. The Global Industry Alliance (GIA) for Marine Biosafety, established under the GloFouling Partnerships project was launched online on the World Oceans Day on 8 June 2020. There are now 14 members from various industries involved in biofouling management, although M. Doran flagged the absence of some sectors such as ports or aquaculture.

The GIA objectives are to provide global solutions and improve biofouling management by identifying challenges and solutions.

GIA helps its members to ensure effective biofouling management through communication, regulatory, operational and environmental aspects. It also gives them a networking platform to access key stakeholders such as governments, regional organisations, trade associations etc. The GIA is represented in GloFouling global meetings, R&D conferences and events. Some key challenges highlighted by GloFouling global meetings, R&D conferences and events included:

- Lack of awareness of biodiversity risks and good management practises to mitigate risks;
- Barriers for the update and adoption of new technologies;
- Absence of standardised protocols: for in-water cleaning (IWC), waste management, etc;
- Knowledge gap about environmentally friendly and safe technologies or suitable methods for all industries; and
- Limited training or induction materials for industry staff such as seafarers, ports.

Regarding regulatory aspects, the GIA commissioned a report ‘Compilation and comparative analysis of existing and emerging regulations, standards and practices related to ships’ biofouling management’. The report, aside for presenting in a synthetic way the legal frameworks that are planned or in place worldwide, included some recommendations:

- Complete the review of the Biofouling Guidelines to improve specificity and in-water cleaning (IWC) guidance;
- Consider the development of a mandatory international regulations for biofouling based on the revised Biofouling Guidelines; and
- Develop an internationally agreed IWC performance standard, methods for IWC systems performance and identify independent expert approval bodies for testing IWC systems.
Moving to aspects of the work of the GIA related to environmental aspects, M. Doran mentioned the need to understand the biochemical and environmental risks of cleaning without capture of all levels of biofouling.

The aim of such initiative would be to study/ quantify biochemical waste generated in the process of IWC of all levels of fouling collected from diverse locations around the world.

After a short presentation on Damietta Port Authority, Ms. El-Refaei, shared some photos on settlement and growth of biofouling on hulls, propellers and other areas.

She also showcased how Damietta Port Authority is implementing its biofouling management plan in line with the IMO Biofouling Guidelines.

She highlighted some proactive actions to prevent and address biofouling, such as:

- Just In Time (JIT) operation system to reduce waiting time for ships; this is through coordination between the port authority and shipping agent;
- The digitalisation and the use of smart applications are helping the port to ensure efficiency and good performance to address biofouling;
- Using Cathodic Protection (CP);
- Implementation of alternate operational patterns for marine unit to reduce the chance of biofouling accumulation and growth;
- Regular under-water hull inspections to assess the anti-fouling coating and biofouling status;
- Regularly IWC; and
- Applying anti- fouling paints.

Ms. Mohamed started her presentation with an overview of Alexandria Port Authority (APA) and Dekheila port.

She then highlighted the economic and environmental impacts of biofouling in APA and the risks of IAS.

APA has a clear cleaning and biofouling plan, taking into consideration the different marine units they have, the hull materials and the allocated time for cleaning each unit.

Ms. Mohamed explained the different processes APA uses for ship cleaning, disposal of waste and anti-fouling paint they have been using.

Panel discussion:

Ms. Reem Abdullah Alkhowaiter, Bahri Ship Management, Kingdom of Saudi Arabia, was asked if when building a new ship, consideration was given to biofouling prevention into the design process.

She responded that Bahri has built 36 vessels so far. When designing a ship, the designers take into consideration all the different aspects to prevent and minimize biofouling. The choice of anti-fouling coating products depends on the type and size of the vessel, the function of the
vessel, the biofouling plan and strategy, timeline, dry docking, etc. She added that at Bahri, there is a performance group which analyses the fuel efficiency and the hull performance and can feed the designers with the relevant information to help them design an environmentally friendly ship.

**Session 4: Biofouling gender action plan**

**An introduction to the biofouling gender action plan**

To address gender disparity in the biofouling management sector, the IMO’s TEST Biofouling project has developed an action plan specifically for this sector. The presentation outlines the strategy on how to help increasing women’s working in the maritime industry from the current 14-29%\(^{11}\) compared to men, to the goal of a 50/50 balance in female to male employment.

Ms. Ben Hassen facilitated the session and the presentations were made by:

- Ms. Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO, *(Yeongjoo Baek presentation – found in Annex 15 of this report); and*
- Ms. Sanjam Gupta, who is the expert that assisted in developing this plan, *(Sanjam Gupta presentation – found in Annex 16 of this report).*

**Ms. Baek** provided background information on the IMO-NORAD Test Biofouling Gender Action Plan (GAP).

She mentioned that GAP is a three-year plan with three key objectives:

- Promotion of gender equality as a business case in maritime, specifically in biofouling, in all participating countries;
- Collection of qualitative and quantitative gender data of women’s participation in biofouling, analysis and communication of the outcomes; and
- Implementation and monitoring of specific gender activities.

Ms. Baek called all participants in the Workshop to complete a questionnaire developed by the TEST project team.

**Ms. Gupta** gave a presentation entitled “Charting the route towards inclusive biofouling management” and included the following key points and suggestions.

**Key points:**

- New human resources policies: all jobs should be gender neutral in the maritime industry;
- Communication and stakeholder commitment to driving gender equity, equality and inclusion are very important;
- There is a business case for gender diversity;
- There is a data gap and a need for baseline data of the number of women participating at different levels in biofouling related activities by industry in beneficiary countries; and

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\(^{11}\) Women comprise 29% of roles in the maritime industry (private sector), and around 20% of the workforce employed by IMO Member States in the sector are women, with only 14% of technical roles being held by women.
It is important to start tracking gender participation to compare, track improvement and set clear achievable targets.

Key suggestions:

- Promote role models and launch a “100 women in biofouling” campaign;
- Dedicate a special day for women in biofouling, or ensure they are present on International Day for Women In Maritime on May 18th;
- Prepare a social media campaign about women in biofouling;
- Conduct surveys to garner data;
- Create Women in Biofouling Network (create an app or make it part of WIMAs); and
- Run mentorship and leadership programmes.

Paving the way for Day 2 Workshops

The objective of this session was to highlight existing noteworthy initiatives which women from the Middle East and North Africa (MENA) countries could benefit from and which were expected to serve as reference information ahead of the group discussions during the Workshops scheduled on Day 2.

Ms. Ben Hassen facilitated the session and each of the following presenters delivered a presentation on specific relevant initiatives undertaken by their respective organizations:

- Ms. Lina Eyouni, Manager, Marine planning and monitoring. Environmental Sustainability, Red Sea Global. “Introduction to King Abdullah University of Science and Technology (KAUST) and Red Sea Global. How education leads to empowering women and young girls.” *(Lina Eyouni presentation – found in Annex 18 of this report)*;
- Ms. Nazli Selek, Senior Partner, NSN Law / Member of the Executive Committee, WISTA International. “Introduction to WISTA International and how networking is important for professional development and progression in the industry.” *(Nazli Selek presentation – found in Annex 19 of this report)*;
- Ms. Sanjam Gupta, Director, Sitara Shipping. “Introduction to maritime SheO program and women leadership” *(Sanjam Gupta presentation – found in Annex 20 of this report)*; and
- Ms. Miral Armanious, Marine & Offshore Engineering student Arab Academy for Science, Technology and Maritime Transport (AASTMT). “Introduction to AASTMT and women leadership.” *(Miral Armanious presentation – found in Annex 21 of this report)*

**Ms. Doumbia-Henry** introduced the new e-Learning course entitled “Introduction to Marine Biofouling: Impacts and Management of Risks” launched by the IMO on 1st February 2023. She highlighted the course has been developed under the framework of the GEF-UNDP-IMO Glo Fouling Partnerships project *(www.glofouling.imo.org)* in collaboration with the World Maritime University (WMU) to assist developing countries with the implementation of the IMO Biofouling Guidelines.
The course is primarily aimed at any individual involved in or having an interest in matters related to invasive aquatic species and biofouling management. However, it is also adequate for students and the general public. The course provides a detailed introduction to multiple aspects related to ships’ biofouling, its role as a vector for the introduction of invasive aquatic species, economic and environmental impacts, international and national policy on the subject and the management solutions and technologies currently available.

The course is free and currently available in English. Versions in other UN languages will be available at a later stage. Registration is open and there are no prerequisites for self-enrolment. Since this is a self-paced online course, it can be paused, saved, restarted and replayed at any time. Upon successful completion of the course and a short assessment, participants will be able to download and print a certificate of completion.

The course is hosted on the IMO Learning Management System (LMS) platform that can be accessed through the IMO website (scroll down to the bottom of the page) or through the following URL: https://lms.imo.org/moodle310/.

Ms. Doumbia-Henry indicated that so far, 480 participants had already registered for the course and 110 had completed it and received a Certificate of completion.

Note by GloFouling Partnerships: As of 03 July 2023, 591 participants have registered and 176 completed the course.

**Ms. Eyouni** delivered a presentation introducing the King Abdullah University of Science and Technology (KAUST) and Red Sea Global and highlighted how education leads to empowering women and young girls.

In the Kingdom of Saudi Arabia, many opportunities have been created in the maritime and environmental sector. Education is very important in the maritime sector, as part of developing society and its relevance and correlation to economic growth. Knowledge enhancement, training and upskilling are also important to fulfill the sector’s needs.

Ms. Eyouni shared examples of what KAUST and Red Sea Global can offer in terms of training sessions, marine summer camp, social and professional programmes and eLearning.

She suggested some solutions to fulfill the job market gap with more women, including:

- Engagement and communication between stakeholders and beneficiaries;
- Developing a successful internship programme for students;
- Training for emerging skills in traditional occupations (e.g. 3D modelling for ship engineers);
- Training for emerging occupations (e.g. cyber security, data analytics); and
- Training for traditional occupations (e.g. engineers, captains, riggers).

With respect to research and development she highlighted the benefits of:

- Building a wide platform of knowledge;
- Bringing together the best universities, ship owners, engineers, etc.; and
Ms. Selek introduced WISTA International and how networking is important for professional development and progression in the industry. She highlighted the following about WISTA International:

- **Vision**: to promote diversity and empower women;
- **Mission**: to attract and support women at management level in the maritime trading and logistics sectors;
- **Core value**: women to be professional, dynamic, open minded and committed; and
- **Today WISTA counts 4000 members in 56 countries.**

In 2021, IMO and WISTA International jointly conducted a woman in maritime survey and another one will be conducted in 2024. They also launched **Speakers’ Bureau**, a platform that gives women an opportunity to speak at events and gain more visibility.

They also put in place several educational programmes, such as:

- **Leadership Accelerator Programme**;
- **ICS Scholarship**;
- **Women in Maritime -Training: Presenting with confidence NRF-WISTA**; and
- **APEC SEN-WIMA-WISTA International Executive Certificate Course.**

WISTA also undertook some work in research:

- **Gender Diversity Handbook**;
- **Diversity and Inclusion pledge**; and
- **Impact of Covid-19 on women in maritime.**

There are six committees established under with WISTA covering different areas of expertise, as follows: Human Resources, diversity, technology, trade, environmental and yachting.

In addition, WISTA organised several ExCo Mid-Term meetings, regional conferences, annual global conferences, the Corporate Diversity Award and the WISTA personality of the year. WISTA International pledges for diversity and inclusion in the shipping industry.

Ms. Gupta delivered a presentation titled: “The importance of women in leadership and the need for visibility.”

Ms. Gupta highlighted that the global maritime logistics market is expected to grow at a robust rate of around 10% to 12% in the next couple of years. Women in leadership are still under-represented. Visibility and training are important to help women occupy leadership roles and inspire more women to be leaders.

Ms. Gupta reiterated the Women Leadership Accelerator Program which 90 women have already completed.
Women in leadership play a key role in driving change and progress in society, business and government. They bring innovative solutions, foster collaboration and teamwork and contribute to a positive work environment. They also promote practices that support diversity and inclusivity.

The Maritime SheEO’s Leadership Accelerator Program (LEAP), in association with WISTA International and empowered by IMO, was created to address the women in leadership gap in maritime. It covers a wide range of topics, including strategic planning, communication and conflict resolution.

Ms. Armanious, Marine & Offshore Engineering student at the Arab Academy for Science, Technology and Maritime Transport (AASTMT) introduced the AASTMT and the different programmes and trainings that colleges and institutes offer to students at the Academy.

She also mentioned that students can conduct internships with shipping companies and can be taken as cadets to finish their studies.

Ms. Armanious highlighted there are many female students at the AASTMT and she encourages girls to pursue their studies and careers in the maritime industry.
Day 2: Thursday 11th May 2023

Group 1, 2 & 3 parallel workshops

During Day 2, three working groups were held in parallel. Each group had designated facilitators with guiding questions to steer the discussion.

Group 1: Education, training, and capacity building

This group discussed educational needs for women to fulfil the marine biofouling job market gaps across the whole value chain of the industry. What are the reskilling and upskilling challenges and opportunities, and how can new generations of women be attracted to the sector? How can more women undertake research and development activities to help provide innovative solutions and address marine biofouling?

Ms. Lina Eyouni, Manager, Marine Planning and Monitoring, Environmental Sustainability, Red Sea Global and Ms. Zahra Alsaaffar, Environmental Stewardship Lead, Sustainable Development, NEOM, facilitated the discussion of the Group.

Ms. Fatoumata Ali Ahmed, Head of Marine Pilotage Department and Marine Pilot, Port of Djibouti, reported on the outcome of the discussion.

Group 1 Recommendations and needs:

- Prepare a new female generation in maritime starting from their education at an early age. Maritime education should be from primary school onwards;
- Help women to have the right skills (including technical ones), upskilling and reskilling to address the job market’s new requirements;
- Empower women and help them to work on their personal development;
- Ensure equal scholarship and training opportunities for women and men;
- Digitalisation and free e-learning courses: creating a biofouling learning platform where women can easily have access to information;
- Create or increase networking opportunities and mentorship from female role models and experts from different fields;
- Share positive and negative experiences and tips, such as how to overcome fear of the sea, so that women can work in maritime;
- Develop leadership skills, such as communication and self-confidence;
- Change male perceptions about women working in maritime and increasing awareness about the important role women can play in the industry; and
- Female recruitment should be based on qualifications and not gender quota.

Group 2: Business opportunities and financing

This group discussed women’s key role in promoting environmental sustainability and creating economic value in the biofouling industry. How can women have equal access to business opportunities? Without access to finance, women face difficulties in growing their businesses
and are excluded from the blue economy. How to bridge the gender gap in access to finance and ensure equal opportunities?

Mr. Simon Doran and Ms. Leila Ben Hassen facilitated the discussion of Group 2.

Ms. Abdullah Alkhowaiter reported on the outcome of the discussion.

Group 2 Recommendations and needs:

- Culture bias and mindset: narratives about women working in a male dominated sector need to be changed and accept that women can fit in any maritime role;
- Gender suitability and flexibility: possibilities for women to work both on the ground (e.g., ship, port) and in the office;
- Gender mainstreaming and human resources policies: when recruiting, the job description should be clear that both men and women can apply for the role;
- All businesses should assess and monitor the gender data to ensure women are working across all levels and types of job;
- Digitalisation and access to information about job opportunities: creation of a portal where women can have access to all the job opportunities in the maritime sector, with a clear job description of the required skills;
- Flexibility for both parents and facilities in the workplace, such as providing a nursery, gym, etc. This can help women to focus on work, perform better and not to worry about childcare. It will also save time in transport/commuting;
- Training and capacity building is needed for women at different levels and positions;
- Increase awareness about the different roles women can play in the marine biofouling sectors (e.g., researcher, engineer, auditor, scientist, lawyer, etc.);
- Financial and managerial education can help women start their own businesses in marine biofouling or scale up existing businesses; and
- Gender equality can only be reached if more women are involved in decision-making and in policies related to gender-balanced recruitment, career development and working conditions.

Group 3: Women visibility and leadership

This group discussed the challenges women face to make their contribution acknowledged in the professional sphere. What are the possible ways and means to identify skilled women in the biofouling community and unlock their potential? How to encourage more women to join and increase visibility of their contribution in the field?

Ms. Sanjam Gupta and Ms. Nazli Seleku facilitated the discussion of Group 3. Ms. Seleku also reported on the outcome of the discussion.

Group 3 Recommendations and needs:

- Increase visibility and recognition of women’s work:
  - Some women don’t feel comfortable being visible, this can be for various reasons including because of their local culture, but this doesn’t mean that they are not
good at their job. Hence their work should be recognised and made visible. This can be achieved by:

- Recognition by male peers of role models and female influencers in the industry;
- Increase male allies in the workplace;
- Raise awareness of men about women’s skills and capabilities, as well as women’s challenges, so they can help in addressing these; and
- Enable female empowerment by increasing self-confidence and reducing the pressure of being “perfect”;

**Promote education for women and girls:**

- Education, salary and independence are linked; therefore, education is key;
- There is a need to change parents’ awareness, culture and perception - some parents still consider education for women as a threat rather than an opportunity. They are concerned about “losing” their daughters when sending them to school; and
- Education of boys about gender equality is important to overcome gender bias;

**Women participation in the sector:**

- Encourage female participation in events, conference and workshops including opportunities for contribution and public speaking; and
- Create incentives for private and public sectors to recruit more females (e.g., financial incentives such as reducing taxes); this recommendation can be implemented in all the ministries of transport of the country members of the IMO, which play a key role in the maritime sector;

**Measure progress:**

- Use key performance indicators (KPIs) on gender equality - increase awareness and demonstrate how companies and governments can empower women; and
- IMO to include gender equality in its audit’s criteria.

**Session 5: Women on board**

**How to increase women’s contribution in the maritime sector?**

The objective of session 5 was to discuss potential solutions to increase opportunities for women in biofouling management, in line with initiatives led by the IMO, the GloFouling Partnerships project, the Test Biofouling project and the outcome of the discussion of the three groups.

**Ms. Ben Hassen** facilitated the session.

The same question was asked to each of the panellists:

“Increasing the number of women on board is essential for building inclusivity, diversity, and sustainability. However, there is still a long way to achieve that and address the gender gap. Based on the outcomes of the discussions in the three working groups, what are, in your opinion, the top three priority actions that the maritime community should implement to address the gender gap in the biofouling management sector?”

Based on the recommendations presented by the reporters of the working groups, each panellist highlighted the three fields where action should focus, namely: Education, training
and capacity building; Communication, awareness raising, promotion and networking; and Leadership, diversity and inclusivity. Panellists also identified some key actions that should be implemented by the biofouling stakeholders to address the gender gap under each of these three categories:

- **Education, training and capacity building:**
  - Call for all biofouling stakeholders to allocate budget for training and capacity building and identify sponsorships opportunities for women in universities including the World Maritime University leading to high level education; and
  - Organize another biofouling workshop for females either global or in other regions, to increase outreach;

- **Communication, awareness raising, promotion and networking:**
  - Create Women in Biofouling Management Network (WIB Network) and use #WomenInBiofouling to build up a network within the sector; and
  - Increase awareness of young professionals and students about the business opportunities for women in shipping and biofouling by using a trusted portal, such as the IMO website, official social media and collaboration with influencers;

- **Leadership, diversity and inclusivity:**
  - Implement gender mainstreaming in Human Resources strategies and policies in both private and public sectors; and
  - Implement gender equality index to assess and monitor the gender progress from 2% to 50% by 2030 in the maritime sector.

**Closing remarks:**

Ms. Hayat A. Al Yabis, Alternate Permanent Representative of the Kingdom of Saudi Arabia to the IMO and Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO, delivered the closing remarks.

In her remarks, Ms. Al Yabis highlighted that AWIM-BMW was the first workshop in the MENA region focusing on women in biofouling. Participants from eighteen countries were invited to formulate actions and priorities for ocean preservation, diversity and marine biofouling management.

She highlighted how informative this Workshop was, which covered different areas, including invasive species, aquatic environment, water cleaning, energy efficiency, and reduction of carbon emissions from shipping.

This Workshop focused on challenges but also opportunities in the Middle East region and brought to light how it is important for ports, regulators and other relevant stakeholders to come together to develop initiatives to deal with marine biofouling related issues.

Importantly, the Workshop also highlighted the role that women in various capacities can play to help promote healthy oceans.

This is why empowering women is critically important to address the biofouling challenges and each the participant in this Workshop can lead the change to protect our oceans’ biodiversity.
Ms. A. Yabis also announced that the Government of the Kingdom of Saudi Arabia commit to continue contributing to and helping to fund the GloFouling Partnerships project in the coming years.

Ms. Khodjet El Khil expressed her deep appreciation to the Transport General Authority and to the Kingdom’s representation at IMO in London for supporting the organization and hosting this Workshop and extended her appreciation to all the speakers, participants and the IMO team for their hard work and valuable contribution.

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ANNEX 1

CONCEPT NOTE

GEF-IMO-UNDP GloFouling Partnerships project:
Arab Women in Maritime - Biofouling Management Workshop (AWIM-BMW)
10-11 May 2023, Jeddah, Kingdom of Saudi Arabia

Biofouling, which the International Maritime Organization (IMO) defines as “the undesirable accumulation of microorganisms, plants, algae and animals on submerged structures (especially ships’ hulls)”¹², can be a cause of marine biodiversity loss, if invasive species are introduced to local marine environments. It is not a new problem¹³, but one that has intensified over the last few decades due to the expanded trade and traffic volume.

Biofouling on ships hull also plays a part in greenhouse gas (GHG) emissions from shipping. Based on findings¹⁴ released at the UN Climate Change Summit in Sharm-el-Sheikh (COP27)¹⁵, global carbon emissions reached record highs in 2022, with no sign of decline. The shipping sector in particular accounted for about 2.9% of GHG emissions in 2018¹⁶, a figure that will continue to grow if the causes remain unaddressed.

As time is running out to confront the climate change and biodiversity loss crisis, an all-hands-on-deck approach is needed to achieve both a greener shipping industry and a successful decarbonized future. In this respect, addressing the ships’ biofouling issue is a pressing priority, for two main reasons:

- **GHG emissions**: biofouling on hull and propeller increases the drag of ships, forcing them to burn more fuel to maintain speed and thus contributing to higher emissions.¹⁷ IMO research¹⁸ shows that light layer of slime can trigger up to 25% increase in GHG emissions, whilst biofouling from barnacles and micro-organisms can add up to 55% to a ship’s emissions as a result of reduced fuel efficiency.

- **Marine biodiversity**: biofouling is a significant vector for the transfer of Invasive Aquatic Species (IAS), which may pose threats to human, animal and plant life, economic and cultural activities, and the aquatic environment. Quantitative data, presented at the 15th meeting of the Conference of the Parties to the UN Convention on Biological Diversity (COP-15), shows that while the adoption of a new framework¹⁹ to halt biodiversity loss by 2030 and achieve recovery by 2050, is promising, the rate of bio-invasions is continuing

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¹³ Guidelines for the control and management of ships’ biofouling to minimize the transfer of invasive aquatic species were adopted by the Marine Environment Protection Committee (MEPC) in July 2011
¹⁴ https://www.globalcarbonproject.org/carbonbudget/
¹⁵ https://unfccc.int/event/cop-27
¹⁸ https://www.glofouling.imo.org/_files/ugd/34a7be_02bd986766d44728b5228c3ecb95ee.pdf
to increase at an alarming rate, disrupting entire habitats and causing biodiversity loss and species extinction.

The GEF–UNDP–IMO GloFouling Partnerships project is a collaboration between the IMO, the Global Environment Facility (GEF) and the United Nations Development Program (UNDP) to tackle the pressing issues caused by biofouling. The project drives actions to implement the IMO Biofouling Guidelines and best practices for biofouling prevention and management, through policy development, capacity building, awareness raising and knowledge sharing.

The GloFouling Partnerships project also supports developing countries to achieve a number of United Nations Sustainable Development Goals (SDGs) and specifically SDG 5 (Gender Equality "Achieve gender equality and empower all women and girls") to reduce existing disparities in maritime administrations, the scientific community, and the private sector.

### KEY FIGURES

- Around 90% of international trade in goods is carried out by sea.
- Shipping accounted for about 2.89% of the anthropogenic CO₂ emissions in 2018.
- IMO’s objective is to reduce the total annual GHG emissions from international shipping at least by 50% before 2050 compared to 2008.
- A layer of light slime can trigger an increase of up to 25% in emissions. When a hull is fully covered in barnacles, the increase can rise up to 55%.
- Economic costs associated with biofouling control in marine aquaculture are estimated between 5–10% of production costs.
- The Blue Economy will reach US$3 trillion/year by 2030 and represent 40 million full-time equivalent jobs.
- Women represent only 1.28% of the global seafarer workforce but with a percentage increase of 45.8% compared with 2015.
- IAS is one of the 5 drivers for biodiversity loss.
- IAS are the second most common threat associated with species that have gone completely extinct since 1500.
- In Canada, the economic damage to shellfish aquaculture due to leathery sea squirt, a species introduced via biofouling, is estimated as high as Canadian dollars 88 million per year. In New Zealand, the same species affects 22% of production areas, with a cost to green mussel producers which has been estimated to New Zealand as 23.9 million dollars.

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21 [https://www.glo fouling.imo.org/sdgs](https://www.glo fouling.imo.org/sdgs)
23 [https://youtu.be/pXImFx3XWA](https://youtu.be/pXImFx3XWA)
27 [https://jpbes.net/global-assessment](https://jpbes.net/global-assessment)
The value of gender equality is widely acknowledged. Nevertheless, the maritime sector, a historically male dominated sector, continues to struggle to ensure a fair representation of women in the workplace. The percentage of certified female seafarers is estimated to be 1.28%\textsuperscript{32}, meaning that more efforts are needed to attract women in this industry.

This is the reason why IMO supports gender equality and the empowerment of women through several initiatives, including scholarships and by facilitating the establishment of professional women in maritime associations, particularly in developing countries. Under IMO's auspices, eight Women in Maritime Associations (WIMAs) have been established in Africa, Arab States, Asia, the Caribbean, Latin America and the Pacific, covering some 152 countries and dependent territories.

IMO has also established, in 2021, the International Day for Women in Maritime, observed on 18 May every year. The Day celebrates women in the industry and is intended to promote the recruitment, retention and sustained employment of women in the maritime sector, raise the profile of women in maritime, strengthen IMO's commitment to SDG 5 and support work to address the current gender imbalance in maritime.

As part of these global efforts and within the context of the wider celebrations of the International Day for Women in Maritime on 18 May 2023, for which the theme is: "Mobilizing networks for gender equality", the IMO's GloFouling Partnerships project is organizing the Arab Women in Maritime – Biofouling Management Workshop. The Workshop is a two-day event taking place on 10 and 11 May 2023, and is hosted in Jeddah by the Kingdom of Saudi Arabia.

The objectives of this workshop are:

- To increase awareness on ships' biofouling management and best practices in the shipping industry and its importance to both protect marine biodiversity and tackle climate change; and
- To discuss opportunities for women in the sector, identify existing barriers and gaps related to gender equality and recommend solutions.

Women, nominated by their respective countries, are encouraged to participate in the event by contributing their experience to achieve these objectives and reach tangible solutions for all the generations.

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\textsuperscript{32} BIMCO/ICS 2021 Seafarer Workforce Report
ANNEX 2

PROGRAMME

Day 1: Wednesday 10th May 2023

8.00 - 9.00  Registration & Coffee
9.00 - 9.30  Opening session

Master of ceremony:
•  Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd

Welcome address - Keynote speaker:
•  Omaimah Bamasag, Deputy of Transportation Enablement, Transport General Authority, the Kingdom of Saudi Arabia

Opening remarks:
•  H.E. Hessa Al Malek, President, Arab Women In Maritime Association (AWIMA)
•  Gyorgyi Gurban, Head, Projects Implementation, Department of Partnerships and Projects, IMO
•  Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO

9.30 – 10.00  Presentation | The IMO and gender equality

An introduction to the International Maritime Organization (IMO) work on gender equality.
Women in the maritime industry are being historically underrepresented however the IMO has taken a strategic approach to help ocean’s stakeholders to achieve gender equality and empower all women and girls. The presentation will explain what IMO is doing to address the gender gap and how IMO’s Department for Partnerships and Projects includes gender in its activities to engage and empower more women.

Facilitator:
•  Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO

Presenters:
•  Mariana Noceti, Principal Programme Assistant for the Women in Maritime Programme, Technical Cooperation Division, IMO
•  Gyorgyi Gurban, Head, Projects Implementation, Department of Partnerships and Projects, IMO
•  Karine Langlois, Social Media and Communications Officer, Public Information Services, IMO

Q & A
10.00 – 10.30 Presentation | GEF-UNDP-IMO GloFouling Partnerships project

An overview of the project. Building partnerships to assist developing countries to minimize the impacts from aquatic biofouling (GloFouling Partnerships) is a collaboration between the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and the International Maritime Organization (IMO). The project aims to build capacity in developing countries to implement IMO’s Biofouling Guidelines and reduce the transfer of invasive aquatic species via ships’ biofouling. The presentation will outline the key achievements of the project.

Facilitator:
• Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd

Presenters:
• Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO
• Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO
• Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO

Q & A

10.30 -11.00 Coffee Break

11.00 – 12.00 Session 1 | Impacts of ships’ biofouling

What is biofouling and how does it contribute to the loss of marine biodiversity and to climate change?
Ships’ biofouling is one of the main vectors for the introduction of invasive aquatic species, which is considered to be one of the greatest threats to the world’s marine biodiversity. Biofouling on ships’ hull also increases the ships’ drag. To maintain speed, ships must burn more fuel, thus increasing greenhouse gas emissions. This session will highlight the impact of biofouling and environmental challenges.

Facilitator:
• Sanjam Gupta, Director, Sitara Shipping

Presenters:
• Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO
• Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO

Panelists:
• Simon Doran, Managing Director, HullWiper Ltd / Chair of Global Industry Alliance (GIA) for Marine Biosafety
• Zahra Alsaffar, Environmental Stewardship Lead, Sustainable Development at NEOM
• Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO

Q & A
12.00 – 13.30 Lunch

13.30 - 14.30 Session 2 | The global response

How does the IMO global policy address biofouling related issues?
More countries are taking steps to tackle biofouling from ships, in line with the IMO’s 2011 Guidelines for the Control and Management of Ships’ Biofouling to minimize the transfer of Invasive Aquatic Species (IMO Biofouling Guidelines). The objective of this panel is to explain the IMO’s policy and how it is being implemented by Member States and other stakeholders.

Facilitator:
• Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO

Presenters:
• Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO
• Reem Hasan Qutaish, Administrative and Financial Director, Jordan Maritime Commission

Panelists:
• Nazli Selek, Senior Partner, NSN Law / Member of the Executive Committee, WISTA International
• Reham El-Refaei, Director of the Environment Protection Department, Damietta Port Authority, Egypt

Q & A

14.30 -15.00 Coffee Break

15.00- 16.00 Session 3 | Industry perspectives

Challenges and best practices: What role does the private sector play in promoting and developing innovative biofouling management solutions?
Ships’ biofouling is an issue that concerns different stakeholders. The objective of this session is to bring together different business stakeholders to discuss common challenges and best practices, opportunities, and solutions to reduce the impact of biofouling and find ways to contribute to a sustainable blue economy.

Facilitator:
• Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO

Presenters:
• Simon Doran, Managing Director, HullWiper Ltd / Chair of Global Industry Alliance (GIA) for Marine Biosafety
• Reham El-Refaei, Director of the Environment Protection Department, Damietta Port Authority, Egypt
• Nahla Mohamed, Team Leader of Waste Management Group, Alexandria Port Authority, Egypt

Panelist:
• Reem Abdullah Alkhowaiter, Bahri Ship Management

Q & A
16.00-16.20  **Session 4 I Biofouling gender action plan**

**An introduction to the gender action plan.**
To address the gender disparity in biofouling management sector, the IMO’s TEST Biofouling project has developed an action plan specifically for this sector. The presentation will outline the strategy on how to help to increase women in maritime industry from 14-29% vs men to 50-50% employment.

*Facilitator:*  
Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd  

*Presenters:*  
Yeongjoo Baek, Project Technical Manager, TEST Biofouling, IMO  
Sanjam Gupta, Director, Sitara Shipping

**Q & A**

16.20 – 17.30  **Paving the way for Day 2 workshops**
The objective of this session is to highlight some existing noteworthy initiatives which women from the Middle East and North Africa (MENA) countries could benefit from and will serve as reference information ahead of the group discussion workshops of Day 2.

*Facilitator:*  
Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd  

*Presenters:*  
Lina Eyouni, Manager, Marine planning and monitoring, Environmental Sustainability, Red Sea Global. Introduction to King Abdullah University of Science and Technology (KAUST) and Red Sea Global. How education leads to empowering women and young girls.  
Nazli Selek, Senior Partner, NSN Law / Member of the Executive Committee, WISTA International. Introduction to WISTA International and how networking is important for professional development and progression in the industry.  
Sanjam Gupta, Director, Sitara Shipping. Introduction to maritime SheO programme and women leadership.  
Miral Michel Moneer Armanious, Marine & Offshore Engineering student Arab Academy for Science, Technology and Maritime Transport (AASTMT). Introduction to AASTMT and women leadership.

**Q & A**

*Registration of participants in workshop groups on Day 2.*

**Closing the day**

19.00 – 21.00  **Reception hosted by the Kingdom of Saudi Arabia**
Day 2: Thursday 11th May 2023

8:30 – 9.00  Welcome coffee

9.00 – 9.15  Day 2 welcome (main room)
Facilitator: • Lilia Khodjet El Khil, Project Technical Manager, Glo Fouling Partnerships project, IMO

9.15 – 11.00 Group 1, 2 & 3 parallel workshops (break out rooms)

Group 1: Education, training, and capacity building
This group will discuss educational needs for women to fulfil the marine biofouling job market gaps across all the value chain of the industry. What are the reskilling and upskilling challenges and opportunities and how can new generations of women be attracted to the sector? How can more women undertake research and development activities to help provide innovative solutions and address marine biofouling?

Facilitator: Lina Eyouni, Manager, Marine planning and monitoring, Environmental Sustainability, Red Sea Global.
Co-Facilitator: Zahra Alsaffar, Environmental Stewardship Lead, Sustainable Development at NEOM

Group 2: Business opportunities and financing
This group will discuss women key role in promoting environmental sustainability and creating economic value in the biofouling industry. How can women have equal access to business opportunities? Without access to finance, women face difficulties in growing their businesses and are excluded from the blue economy. How to bridge the gender gap in access to finance and ensure equal opportunities?

Facilitator: Simon Doran, Managing Director, HullWiper Ltd / Chair of Global Industry Alliance (GIA) for Marine Biosafety
Co-Facilitator: Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd

Group 3: Women visibility and leadership
This group will discuss the challenges women face to make their contribution acknowledged in the professional sphere. What are the possible ways and means to identify skilled women in the biofouling community and unlock their potential? How to encourage more women to join and increase visibility of their contribution in the field?

Facilitator: Sanjam Gupta, Director, Sitara Shipping
Co-Facilitator: Nazli Selek, Senior Partner, NSL Law / member of the Executive committee WISTA International
11.00 – 11.30  Coffee break

11.30 – 11.45  Reports of the three workshops
Each group will present the outcome of their workshop discussions.

11.45 – 12.40  Session 5 I Women on board

How to increase women’s contribution in the maritime sector?
The objective of this session is to discuss potential solutions to increase opportunities for women in biofouling management, in line with initiatives led by the IMO, the GloFouling Partnerships project, and the Test Biofouling project.

Facilitator:
•  Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd
Panelists:
•  Hayat A. Al Yabis, Alternate Permanent Representative of the Kingdom of Saudi Arabia to the International Maritime Organization
•  H.E. Hessa Al Malek, President, Arab Women In Maritime Association (AWIMA)
•  Cleopatra Doumbia-Henry, President, World Maritime University (WMU)
•  Simon Doran, Managing Director, HullWiper Ltd / Chair of Global Industry Alliance (GIA) for Marine Biosafety
•  Sanjam Gupta, Director, Sitara Shipping
•  Nazli Selek, Senior Partner, NSN Law / Member of the Executive Committee, WISTA International
•  Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO

Summary and conclusion

12.40 – 13.00  Closing of the Workshop

Closing remarks and group photo

•  Hayat A. Al Yabis, Alternate Permanent Representative of the Kingdom of Saudi Arabia to the IMO
•  Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships project, IMO

13.00 – 14:30  Lunch

14.30 – 18.00  Afternoon site visit to Jeddah Islamic Port, hosted by the Kingdom of Saudi Arabia

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ANNEX 3

LIST OF PARTICIPANTS

- Cleopatra Doumbia-Henry, President, World Maritime University (WMU);
- Farida Mhamdi, Administrator, Merchant Marine Directorate, The Ministry of Transport and Logistics;
- Fatouma Ali Ahmed, Head of Marine Pilotage Department and Marine Pilot, Capitainerie Port de Djibouti;
- Gyorgyi Gurban, Head, Projects Implementation Department of Partnerships and Projects, IMO;
- Hajar Aljabri, Head of Maritime Activities and License, Ministry of Transport, Communications and Information Technology;
- Hanan Al Khzaimy, Head of Competitiveness and Marine Quality Department, Ministry Of Energy and Infrastructure;
- Hanane Atmane, Head of navigation safety and prevention of pollution from ships, Merchant Marine Directorate, The Ministry of Transport and Logistics;
- Hayat A. Al Yabis, Alternate Permanent Representative of the Kingdom of Saudi Arabia to the International Maritime Organization, Transport General Authority, Kingdom of Saudi Arabia;
- H.E. Hessa Al Malek, President/ Advisor to the Minister for Maritime Affairs, AWIMA/ Ministry Of Energy and Infrastructure;
- Ilham Mansour Mansour El Khabbaz, Chief of Maritime Transport Division, Ministry of Public Works and Transport, Directorate General of Land and Maritime Transport;
- Karine Langlois, Social Media and Communications Officer, Public, Information Services, IMO;
- Khanssa Lagdami, Assistant Professor, World Maritime University (WMU);
- Kalli Morris, Advisor, The Kingdom of Saudi Arabia at the International Maritime Organization;
- Jurga Šaulė, Senior Project Assistant, GloFouling Partnerships project, IMO;
- Leila Ben Hassen, Founder & CEO, Blue Jay Communication Ltd;
- Lilia Khodjet El Khil, Project Technical Manager GloFouling Partnerships project, IMO;
- Lina Eyouni, Manager - Marine Planning and Monitoring, Environmental Sustainability, Red Sea Zone Authority (RSZA);
- Madjida Abi, Deputy director of port activities, Ministry of transport;
- Maya Zakaria El Tayara, Head of Maritime Training Division, Ministry of Public Works and Transport;
- Mariana Noceti, Principal Programme Assistant, Women in Maritime Programme Sub-Division for Programme Management and Coordination (TCD), IMO;
- Meriem Ernez Ep Cherif, Deputy Director, Ministry of Transport;
- Miral Michel Moneer Armanious, Marine & Offshore Engineering student, Arab Academy for Science, Technology and Maritime Transport (AASTMT);
- Nafissa Mohamed Dato, Lawyer, Maritime Affairs of Djibouti;
- Nahla Mohamed Hassan Mohamed, Team Leader of Waste Management Group, Protection Management Department, Alexandria Port Authority;
- Nazli Selek, Member of the Executive Committee, WISTA International;
- Omaimah Bamasag, Deputy of Transportation Enablement, Transport General Authority, Kingdom of Saudi Arabia;
- Reem Hasan Mahmoud Qutaish, Administrative and Financial Director, Jordan Maritime Commission;
- Reem Abdullah Alkhowaiter, Bahri Ship Management;
- Reham Abdelsamea Mohamed El-Refaei, Director of the Environment Protection Department, Damietta Port Authority;
- **Salma Mnif Ep Abdelkefi**, Head of Port Exploitation Division, Port and Maritime authority;
- **Samah Munib Mohammed Al Jamal**, Seafarer Officer, Jordan Maritime Commission;
- **Sanjam Gupta**, Director, Sitara Shipping;
- **Sheikha Alrajaibi**, Logistics Operations Specialist, Ministry of Transport, Communications and Information Technology;
- **Shireene Mohamed Galal Mounir Salaheldin**, Director and Board Executive Member, Arab Women in Maritime Association (AWIMA) General Secretariat;
- **Simon Doran**, Chair of Global Industry Alliance (GIA) for Marine Biosafety, Managing Director, HullWiper;
- **Yeongjoo Baek**, Project Technical Manager, TEST Biofouling project, IMO; and
- **Zahra Alsaffar**, Environmental Stewardship Lead, Sustainable Development, NEOM.

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ANNEX 4

MARIANA NOCETI PRESENTATION

The IMO and gender equality

(refer to the pages hereafter)
The IMO and gender equality

Women in maritime

Arab Women in Maritime - Biofouling Management Workshop (AWIM-BMW)
10-11 May 2023, Jeddah, the Kingdom of Saudi Arabia

Mariana Noceti, Focal Point for Women in Maritime Programme, TCD, IMO

Universal call to action.
Adopted by all UN Member States in 2015.
15-year plan to achieve the Goals

SDG 5 Targets and IMO’s work

Gender equality

- What’s the goal?
- Why do we need gender equality?

Gender architecture at IMO and beyond

5.1 End all forms of discrimination against all women and girls everywhere.
5.5 Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.
5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.

WiM programme
IMOGENDP
DDP projects
IODEO Gender Audit
UN Gender Focal Points
UN SWAP
**Partnerships**

- WISTA International
- SheEO LEAP
- AtoN managers course
- IPER Port mgmt
- GIMI Port

**Fellowships and trainings**

**Aimed at:**
- Providing increased employment opportunities for women at the higher management levels of the port and maritime sectors.
- Facilitation of the recruitment and retention of women in the maritime sector.
- Development of a cadre of women instructors and subject matter experts.

**Aims to:**
- Prepare the women in the maritime industry to take on leadership roles.
- Cover four themes: Personal Mastery, Strategic Thinking, Leadership, Personal Brand.
- Methodologies and tools to improve/standardize delivery of TC activities to support women in the maritime sector.
- Delivery in country by national trainers.
- Roll-out of such national training packages to port and maritime administrations.

**Visibility and outreach**

**18 May - ID4WiM**
- Global conference of regional WIMAs at IMO HQ (18-19 May 2023)
- Women in Maritime Survey
- New survey in 2024.
- Internationale Day for Women in Maritime
- Gender Equality Award
- Women in Maritime Survey
- International Day for Women in Maritime

**Visibility and outreach**

- Happy International Women’s Day
- Gender Equality Award
- Women in Maritime Survey
- International Day for Women in Maritime

- **Gender Equality Award**
  - Recognition to those individuals that have made significant contributions to advancing gender equality and the empowerment of women in the maritime sector.

- **Women in Maritime Survey**
  - Collects data to examine the proportion and distribution of women working in the maritime sector.
  - New survey in 2024.

- **Maritime Speakers Bureau**
  - Database of female experts on maritime subjects.
  - No more excuses for “manels”

- **WIMAs websites**
  - Fund allocation to all eight WIMAs for improvement of their websites and enhance visibility.

- **Visibility and outreach**
  - Spending more on the promotion of the maritime sector.
  - Social visits to inform female students about maritime careers.

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- **Visibility and outreach**
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ANNEX 5

GYORGYI GURBAN PRESENTATION

The IMO and gender equality

(refer to the pages hereafter)
The IMO and gender equality

Arab Women in Maritime - Biofouling Management Workshop
(AWIM BMW)
10-11 May 2023, Jeddah, the Kingdom of Saudi Arabia

IMO Gender Strategy and its implementation in IMO Projects/Biofouling projects

- Gyorgyi Gurban, Head, Projects Implementation, Department of Partnerships and Projects (DPP), IMO

IMO Gender Strategy Goals

Goal 1
Mainstreaming gender equality considerations into programming and planning

Goal 2
Culture of diversity, gender equality and inclusivity in IMO

Goal 3
Monitoring of gender equality work of IMO

Goal 4
Compile gender data and statistics

Goal 5
Showcase IMO leadership on gender equality through communication, outreach and partnerships


Action Plan
- Staff training
- More gender inclusion for projects
- Policies’ review
- Monitoring implementation of activities
- Studies, research, analysis

More gender inclusion for projects/Biofouling

- Gender mainstreaming in IMO projects
- Specific targets, indicators
- Budget key for gender activities + possible dedicate % place just for women in trainings
- Work with key stakeholders, listen to opinions from the ground
- Collect data, analyze, address

IMPACT (examples): change in legislation/strengthened participation/seed fund to women entrepreneurs

- TEST Biofouling Gender Action Plan
  - Through their Divisional Gender Focal Point
  - Individually by sharing comments/recommendations/concerns
  - Develop a survey to further understand IMO specific needs

WE ARE ON THIS JOURNEY TOGETHER

www.imo.org
ANNEX 6

KARINE LANGLOIS PRESENTATION

The IMO and gender equality

(refer to the pages hereafter)
The IMO and gender equality

Arab Women in Maritime - Biofouling Management Workshop (AWIM-BMW)
10-11 May 2023, Jeddah, the Kingdom of Saudi Arabia

Gender and Communication

Karine Langlois, Social Media and Communications Officer, Public Information Services, IMO

IMO Communication Strategy

• Background
• New communication model
• Tools we use
• Impact it has

Communication perspective

• “The Power of Imagery Is Key When Trying to Advocate for More Diversity in a Given Industry.”
• Programme created in 1988 but no visual representation of women on the job.

Before 2010

• We did not have social media
• We did not have videos
• We did not have news story
• Our messaging did not include gender equality

New approach

• New communication model fueled by digital media.
• “One of the most valuable and exciting features of modern communication and outreach techniques is the inherent ability to cross-promote the same material across various different platforms.”
Key messages updated to include gender equality

• Key messages are the lasting impressions that our target group should receive in order for us to achieve our communication goals. They must be short, easily understood, remembered and repeated; concise, precise and direct.
  • IMO is part of the UN family, actively engaged in issues related to global ocean governance
  • IMO cares for the environment and works to protect it
  • IMO works to protect seafarers in the workplace
  • IMO is strongly committed to helping its Member States achieve the UN 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals (SDGs), particularly Goal 5 “Achieve gender equality and empower all women and girls”.

Impact

• Rebranding exercise
• Gender Equality is now an integral part of our outreach efforts.

Our tools

• Modern communication technology means our ability to reach new audiences is increasing rapidly. Use multimedia and social media to engage, inform and inspire.
  • Social Media (Twitter, LinkedIn, Instagram, Facebook)
  • Video and audio (Films, podcasts, radio etc)
  • Websites
  • Infographics
  • Photography (photo stories)

How we achieved it.

How it translates today
ANNEX 7

LILIA KHODJET EL KHIL, JURGA ŠAULĖ AND YEONGJOO BAEK PRESENTATION

GEF-UNDP-IMO Glo Fouling Partnerships project

(refer to the pages hereafter)
Objective
Assist developing countries to implement the IMO Biofouling Guidelines to prevent the transfer of invasive aquatic species.

Watch short animation, explaining about the project:
https://youtu.be/oLtia5V-HsE

12 Lead Partnering Countries
- Argentina
- Brazil
- Chile
- Ecuador
- Indonesia
- Jordan
- Mexico
- Mauritius
- Peru
- Philippines
- Tonga
- Fiji
- Sri Lanka
2. National Status Assessment

3. Rapid Economic Impact Assessment


5. Training and conferences

1. National Task Force
   - Raise awareness

All 12 countries have established a National Task Force to lead and coordinate actions. All 12 countries have developed National Status Assessment reports.

6. Biofouling management journey in Lead Partnering Countries

12 workshops to raise awareness

6 Regions
- East Africa
- South America and Caribbean
- Pacific
- Red Sea and Gulf of Aden
- South Asia
- Southeast Asia

Regional Organizations
- Southeast Asia - PEMSEA
- Pacific - SPREP
- Red Sea & Gulf of Aden - PERSGA
- South Asia - SACEP
- Southeast Pacific - CPPS

Global Industry Alliance (GIA) for Marine Biosafety

Identify common issues and barriers for biofouling management and foster solutions.

11th Meeting, April 2023, IMO HQ

Capacity development
Training activities

Introductory training course
E-Learning course on biofouling management

https://lmsimo.org/moodle310/

Guides for Governments
Technical reports

Development of Publications

Biofouling regulations
Biofouling management

Pilot demonstrations / Technologies and Best practices for Biofouling Management

Biofouling management in marine protected areas
(Galapagos Islands, Ecuador June 2023)

Biofouling management and drydock operations
(Korea, October 2024)

Knowledge sharing

R&D Forums

Awareness raising

Animations and documentary

Gender

by Lilia Khodjet El Khil, Project Technical Manager, GloFouling Partnerships, IMO
Targeted initiatives focusing specifically on women and work with IMO’s Women in Maritime:

- WISTA International (Women’s International Shipping and Trading Association)
- AWIMA (Arab Women in Maritime Association)
- PacWIMA (The Pacific Women in Maritime Association)
- WOMESA (Association of Women Managers in the Maritime Sector in Eastern and Southern Africa)
- WIMA Asia
- WIMA Philippines

Equality in participation and benefit sharing related to project activities and achievements

Gender Marker ratings: from 0 to 3. Because this workshop is gender specific, it will be rated 3 (the maximum).

TARGETS: Equitable participation 50% Male/Female.

- Training activities; regulatory activities; experts and consultants; project management and focal points; participation in meetings at national and regional level

OTHER TARGETS:

- Incorporation of gender in national and regional reports: 50%
- Project expenditures include gender mainstreaming: 50%
- Reporting, monitoring and evaluation of project: 90%

ANNUAL REPORT (2022)

Participation in project activities share by gender and geographical scope:

- Global: 38%
- National: 50%
- Regional: 48%

Transfer of Environmentally Sound Technologies by Yeongjoo Baek, Project Technical Manager, TEST Biofouling project, IMO
New IMO project on biofouling management will further build on the achievements of GloFouling Partnerships

- Funded by the Norwegian Development Agency (Norad)
- 4 million USD
- Implementing partners: MTCC Africa, MTCC Caribbean and MTCC Pacific
- Duration: 2022-2025
- Focus on showcasing novel technologies and new sustainable methods of biofouling management through demonstration projects on national and regional level
- Contact: testbiofouling@imo.org

Pilot projects and demonstration of technologies and good practices

- Practical training
- In-water cleaning
- Ship inspection
- Regional level (TEST Biofouling)

TEST Biofouling Project Gender Action Plan

It is the first time that IMO (DPP) has developed a specific gender action plan to contribute to achieving SDG 5. Gender Equality.

[Main Purpose]

To support and attain the overall operationalization of the TEST Biofouling Gender Action Plan objectives, in particular showcasing gender equality as a business case and establishing baseline data for the number of women in biofouling globally and in the project’s participating countries.

Thank you

Questions?

For more information:
Web: www.glofouling.imo.org
Email: glofouling@imo.org
ANNEX 8

JURGA ŠAULĖ PRESENTATION

Impacts of ships’ biofouling

(refer to the pages hereafter)
Invasive aquatic species

Once introduced in a new host environment, non-indigenous marine species may establish in their new host environment, out-compete native species, and irremediably alter marine biodiversity.

Species characteristics

- In general, marine species may become invasive because:
  - They have the ability to survive or adapt to a wide range of changing environmental conditions (example: water salinity level, turbidity, temperature); and
  - They have the ability to rapidly reproduce, grow and disperse.

So….what can we do?

- Very few examples of special cases where IAS have been successfully eradicated.
- Once an IAS becomes established, it is almost impossible to eradicate.

Preventing invasions is critical!
Major vectors for the transfer of IAS

Ships’ ballast water

Biofouling on immersed surfaces

- Only ships
- Ships + other marine surfaces

Translocation via biofouling

A species that is attached to a wetted or immerged surface can be translocated when the surface moves in water:

- **Primary introduction**: first introduction of a non-indigenous species to a new region.
- **Secondary introduction**: spread of already introduced NIS within local areas.

Biofouling is a natural process in the sea

But when it grows on human-made structures:
- It can impair function, integrity and length of time
- It can be a vector for invasive aquatic species

The biofouling process

Biofouling starts with small organisms. This is microfouling by bacteria and microalgae called "slime".

Macrofouling

Larger organisms visible to the human eye: barnacles, tubeworms, mussels, seaweed.
Where do we find biofouling?

**Invasive algae**

*Rugulopterix okamurae*

- Invasive in Portugal, Spain and Morocco
- It has expanded in the Atlantic and Mediterranean

**Impacts**

- **TOURISM INDUSTRY**
  - Increased expenditure in beach clean-up
  - Loss of tourist visits

  When the algae dies off, it floats along the coast and covers nearby beaches. Just as an example, in one single beach the townhall picks up 2,800 tons in six weeks and have spent over 1 million euros in this operation. Imagine the total cost if we multiply this by all the beaches along the coast.

  This is also now affecting tourism. Imagine, if you know a beach is covered with algae you will probably not go. So the tourism industry and all the cafes and restaurants that depend on tourists can be severely affected.

- **FISHING INDUSTRY**
  - Fishing fleet in the region not able to get out to sea for several months.
  - The fishermen also complain about losses because fishing has collapsed to a depth of 40 metres in the Strait of Gibraltar, the trawl nets are full of algae. So in some ports, fishermen have stopped to go out to fish.

- **MARINE ENVIRONMENT**
  - Smothering of key natural areas affecting local species

  All this is happening because the algae has become a dominant organism and is now tipping over parts of the ecosystem. It has no natural enemies and grows everywhere, even on the bodies of sea cucumbers. When sea urchins die (they can live up to 8 years), their place is also colonized by the algae. The result is a completely changed seabed along the coast, which is the nursery for most marine organisms. All you can see in the video behind me is the invasive algae covering everything.
Impacting shellfish collections and livelihoods of women in northern Spain

In this second example, we can focus on how an invasive species can have direct impacts on the livelihoods of women.

In the northern part of Spain, there is an invasive mollusc, *Crepidula fornicata*, that is quite voracious and feeds on other molluscs that are living in the same area. The invasive mollusc can penetrate the shells of clams and kills them or makes them worthless.

Clam collecting is a very important activity for women in northern Spain. In this region, Women associations are traditionally in charge of clam collection along the coastlines during low tide. It is the main source of their livelihoods, which are now in danger because the invasive molluscs is eliminating clams from the region.

This case is not only about the economic cost but also the social aspect, by threatening the existence of these women associations, their source of income and their independence.

Watch this short video explaining the impact of recreational boating on the spread of Invasive Aquatic Species:
https://youtu.be/HwyDmkjwmax

Key points to remember

- Biofouling means the attachment of species to any submerged surface into an aquatic environment.
- When ships move from one location to another, they can introduce invasive aquatic species through biofouling.
- Invasive aquatic species has been recognised as one of five major drivers for biodiversity loss.
- Invasive species can cause not only economic loss, but also social and environmental impacts.

For more information

website: www.glofouling.imo.org
Email: glofouling@imo.org

Thank you! Questions?
ANNEX 9

YEONGJOO BAEK PRESENTATION

Impacts of ships’ biofouling

*(refer to the pages hereafter)*
GHG Emissions Caused by Biofouling on Ships

by Yeonjoo Baek, Project Technical Manager, TEST Biofouling project, IMO

Watch this short video explaining biofouling effects on GHG emissions:
https://youtu.be/kEjPG7Sgol8

Table of Contents

- IMO Strategy on Reduction of GHG Emissions from Ships
- Measuring Biofouling and Estimating the Fuel Consumption Penalty
- Reducing Roughness and Friction to save Energy
- Reducing Fuel Consumption and Emissions of CO2 and other Air Pollutants

IMO Strategy on Reduction of GHG emissions from Ships

EEDI ENERGY EFFICIENCY DESIGN INDEX
IMPROVING THE TECHNICAL PERFORMANCE OF NEW BUILD SHIPS

1. Energy efficiency design index
2. Improving the technical performance of new build ships
3. Different goals for different types of ships
4. The largest container ships

Examples of solutions for compliance

- Improved ballast water management systems
- Enhanced hull cleaning technologies
- Optimized vessel operating strategies
- Improved engine design and efficiency

IMO Regulation on Reduction of GHG Emissions from Ships
02 Measuring Biofouling and Estimating the Fuel Consumption Penalty

To decide when to mitigate biofouling, the following information is needed:

- Cover (%)
Accumulated roughness over years

Without effective protection, roughness (biofouling) will increase every year and accumulate between drydockings.

Different types of fouling and corresponding roughness

<table>
<thead>
<tr>
<th>Fouling condition</th>
<th>Roughness (μm in average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy calcareous fouling</td>
<td>10,000</td>
</tr>
<tr>
<td>Medium calcareous fouling</td>
<td>7,000</td>
</tr>
<tr>
<td>Small calcareous fouling or wax</td>
<td>1,000</td>
</tr>
<tr>
<td>Heavy slime</td>
<td>800</td>
</tr>
<tr>
<td>Deteriorated coating or light slime</td>
<td>300</td>
</tr>
<tr>
<td>Applied AF coating</td>
<td>150</td>
</tr>
<tr>
<td>Hydraulically smooth surface</td>
<td>0</td>
</tr>
</tbody>
</table>

Annual variation of hull roughness due to fouling

Relation between roughness and power penalty

<table>
<thead>
<tr>
<th>Fouling condition</th>
<th>Roughness (% in increase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy calcareous fouling</td>
<td>12.5%</td>
</tr>
<tr>
<td>Medium calcareous fouling</td>
<td>3.0%</td>
</tr>
<tr>
<td>Small calcareous fouling or wax</td>
<td>1.0%</td>
</tr>
<tr>
<td>Heavy slime</td>
<td>0.5%</td>
</tr>
<tr>
<td>Deteriorated coating or light slime</td>
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<tr>
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<td>1.5%</td>
</tr>
<tr>
<td>Hydraulically smooth surface</td>
<td>0</td>
</tr>
</tbody>
</table>

Increase in drag/friction on the hull

- A thin layer of algae or “silt” can increase friction with up to 15%
- Fouling of barnacles can increase friction with up to 50%

Roughness of propeller

Fouling on the propeller can also significantly increase energy demand, due to increased friction (energy waste) over propeller blades.

Reducing Roughness and Friction to save Energy
Increased power requirements

- To maintain a given speed a ship with biofouling will need to increase power.
- Engines in operation will need to burn more gallons of fuel to maintain the same speed.

The fuel penalty will vary with ship type

- Biofouling will be more severe for ships with low speed and long hull length.

Potential to reduce energy requirements

- **1-10%** By hull cleaning
- **3-8%** By propeller polishing
- **1-5%** By application of efficient hull coatings

Reducing Fuel Consumption and Emissions of CO₂ and other Air Pollutants

Fuel consumption and CO₂ emissions

- Clean hulls can lead to significant reductions in CO₂ emissions.
- From shipping these emissions currently stand at 2% of all global emissions.
- This emission value is expected to grow as global shipping increases.

Fuel consumption and other air emissions

- Carbon dioxide CO₂ is a greenhouse gas causing global warming and ocean acidification.
- Sulphur oxide SO₂ turns into sulphuric acid in water.
- Nitrogen oxide NOₓ cause health problems.
- Particulate Matter (PM) constituted of organic carbon and sulphate, impact air quality and human health.
Less acidification

- Shipping is responsible for ~13% of total sulphur emissions to the atmosphere (pre-IMO 2020 sulphur cap)
- Both sulphur and carbon dioxide makes the ocean more acidic
- Ocean acidification has an impact on many species, like corals, calcareous algae, mussels, oyster with calcified skeletons or shells

Thank you for your kind attention!

Questions? ybaek@imo.org
ANNEX 10

LILIA KHODJET EL KHIL PRESENTATION

The global response

(refer to the pages hereafter)
The Global Response:
The IMO Biofouling Guidelines

Contents of the IMO Biofouling Guidelines

01 RESOLUTION MEPC.207(62)
Guidelines for the Control and Management of Ships’ Biofouling to Minimize the Transfer of Invasive Aquatic Species, 2011
To provide practical guidance to a wide shipping audience on how best to avoid the transfer of invasive aquatic species via ships’ biofouling

- By implementing biofouling management best practices (AFS, MGPS, cleaning) for ships, including development of the Biofouling Management Plan & Record Book

The Guidelines were adopted on 15 July 2011 by IMO member States

02 Key topics
- Contents of the IMO Biofouling Guidelines
- The Biofouling Management Plan and the Biofouling Record Book
- IMO Guidance on Recreational Craft
- How to implement the Biofouling Guidelines

03 Ship definition
Guidelines’ ship definition: a vessel of any type whatsoever operating in the aquatic environment
This also includes:
- Hydrofoil boats
- Air cushion vehicles
- Submersibles
- Floating craft
- Fixed or floating platforms
- Floating storage units (FSUs)
- Floating production units
- Offloading units (FPSOs)

04 Guidelines for the Control and Management of Ships’ Biofouling to Minimize the Transfer of Invasive Aquatic Species, 2011

- AIM
- HOW
- WHEN

The practical guidance to ‘anyone in shipping’
The Guidelines: Management measures

- Record keeping: Maintaining a Biofouling Management Plan and a Record Book
- Anti-fouling coatings: Choosing a suitable AF coating for ship type/speed/operating profile; coating maintenance and reapplication
- In-water inspection, cleaning & maintenance: Monitoring AF coating condition & fouling status; removing fouling in an environmentally sound manner
- Waste management (cleaning in dry docks): Capture, treat and dispose of cleaning material

The Biofouling Management Plan and the Biofouling Record Book

Documenting the implementation of best practices

The Biofouling Management Plan

Appendix 1

Biofouling Management Plan and Record Book

Format and content of Biofouling Management Plan

The following information should be considered when developing a Biofouling Management Plan (the Plan). It is important that the Plan be specific to each ship.

The Plan may be a stand-alone document or integrated in part or full in the ship’s operational and procedures manuals and/or planned maintenance systems.

Introduction

This section should contain a brief introduction for the ship’s crew, explaining the need for biofouling management, and the importance of accurate record keeping.

Ship particulars
**Biofouling Management Plan**

Information to be recorded:

- After each dry-docking;
- When the hull area, fittings and voids below the waterline have been inspected or cleaned by divers;
- When the internal seawater cooling systems have been inspected and cleaned or treated;
- For ships with a MGPS fitted records of operation;
- Periods of time when the ship was laid up/inactive or operating outside its normal operating profile;
- Details of official inspection or review of ship biofouling risk.

**The Biofouling Record Book**

APPENDIX 2

<table>
<thead>
<tr>
<th>BIODETERIORATION MANAGEMENT PLAN AND RECORD BOOK</th>
</tr>
</thead>
</table>

Biofouling Record Book Form

- Period From: ___________________________ To: ___________________________
- Name of Ship: ___________________________
- Registration number: ____________________
- Gross tonnage: __________________________
- Flag: _____________________________

Registration number = IMO number and/or other registration numbers.

The ship is provided with a Biofouling Management Plan. 

Diagram of ship indicating underwater hull form revealing both side and bottom views of the ship, if necessary and recognised biofouling species.

**Guidelines for owners and operators of recreational craft less than 24 metres**

- Hull overgrown with fanworms
- Niche areas are particularly problematic
- Hull overgrown with Wakame

**Guidance for owners and operators of recreational craft less than 24 metres**

- Anti-fouling coating
- Minimizing biofouling in niche areas
- Inspection and cleaning
- Recording biofouling activities
- Trailered craft

**IMO Guidance for Recreational Craft**

Guidance for minimizing the transfer of invasive aquatic species as biofouling (hull fouling) for recreational craft (MEPC.3/Circ.762)

- Anti-fouling coating
- Minimizing biofouling in niche areas
- Inspection and cleaning
- Recording biofouling activities
- Trailered craft
Review of IMO Biofouling Guidelines

In 2018, IMO started the Guidelines review process. In 2020, IMO identified key elements and areas for revision, and established a Correspondence Group focused on the review of the Biofouling Guidelines.

When the IMO Biofouling Guidelines were adopted in 2011, it was agreed to review them based on experience gained from implementation.

The Correspondence Group reviewed the Guidelines and made a number of recommendations to restructure the Guidelines and make them more specific and user-friendly.

In 2021, the Correspondence Group was re-established by IMO to produce a new version of the Guidelines by 2023. The Group revised the Guidelines and submitted a revised text to IMO's Marine Environment Protection Committee (MEPC) for consideration.

In April 2023 at its 10th meeting, PPR agreed on REVISED GUIDELINES – to be adopted by IMO’s Marine Environment Protection Committee (MEPC) in July 2023.

Key implementation aspects to be considered by States

- Take the IMO Guidelines into consideration when adopting national measures on biofouling management
- Disseminate clear information on biofouling management to ships and stakeholders
- Monitor the effectiveness of the Guidelines
Key implementation aspects to be considered by States

- Include biofouling management in training and education syllabuses for ships’ masters and crew, and other stakeholders
- Support research and development of technologies for fouling prevention and cleaning
- Promote the co-benefits of effective biofouling management, i.e. saving fuel and CO₂ emissions

Use Guides for Governments produced by GloFouling Partnerships project!

Industry standards and initiatives on biofouling management

- **IPIECA (off shore)**: Alien invasive species and the oil and gas industry: Guidance for prevention and management, 2010.
- **BIMCO**: Industry Standard on in-water cleaning with capture, 2021.
- **IMarEST and WCC**: Developed jointly a template for a Biofouling Management Plan.
- **Green Marine**: Voluntary certification environmental program for the North American maritime industry which includes best management standards for biofouling.
- **Classification societies**: Offer guidance documents and templates to prepare the Biofouling Management Plan.

**KEY MESSAGES**

IMO Biofouling Guidelines are the global standard to manage ship’s biofouling

The Guidelines are applicable widely in the shipping industry

The Biofouling Management Plan and Record Book are key tools to document implementation

National regulations should be in line with the IMO Biofouling Guidelines

Questions and Answers
ANNEX 11

REEM HASAN QUTAISH PRESENTATION

The global response

(refer to the pages hereafter)
Reem H. Qutaish
Financial & administrative Director at Jordan Maritime commission
Member of the National Biofowling Committee
- Bachelor's degree in Economics and Finance from Yarmouk University in Jordan.
- I started my career in the banking sector in Jordan.
- In 2004, I started working for the Jordanian Maritime Authority in Aqaba.
- My leadership personality and the support of my family and friends helped me to face the challenges and progress in my work by supervising the management of a number of important positions, starting with internal audit and financial control, then I worked as head of the finance department, and now my current position is the director of financial and administrative affairs
- I have represented my country in many meetings and conferences in Arab and international organizations,
- I was elected Treasurer of the Arab Women in the Maritime Association (AWIMA) in October 2017. And I was re-elected in 2019 to the same position

The Hashemite Kingdom of Jordan
Jordan Maritime Commission
The Jordan Maritime Commission (JMC) Is the Maritime Administration in Jordan, since the establishment of (JMC) on 2002 with the following objectives / goals:
Regulating, supervising and developing the maritime sector in Jordan taking into account the protection of the marine environment and boosting maritime safety and security standards. Bearing in mind that Environmental protection can not be realized without controlling Safety & security.

Main functions
1. As a flag State
   Registration of vessels under the Jordanian flag and monitoring and inspection of Jordanian vessels.
   Issuance Official documents and maritime certificates for Seafarer's.
2. As a port state
   Inspecting foreign vessels that visiting the port of Aqaba.
3. As a coastal state
   Controlling territorial waters and ensuring the safety of navigation.

Our Mission
Achieving the highest international standards for organizing, control and developing of the maritime sector

The Legal Framework
Aqaba Ports Community consists of 12 terminals stretching over 32 specialized berths operated by world class operators utilizing technology and operating under international standards, building capacity within Jordan’s labor force and taking highest measures when it comes to safety and environment.
Aqaba’s main port located on the north shores of Aqaba moved to the South of industrial Zone.
Aqaba New Port
Consists of 9 berths with an average depth of 13-15 m. The Port’s annual handling capacity mounts to 36 million tons.
It handles grain, general cargo, ro-ro, coal and live cattle.
The New Port also contains grain terminal and 28 vertical silos with a total capacity of 100 thousand ton.
The grain terminal’s handling equipment includes 2 ship unloaders for a total capacity of 1600 ton/hour.

Jordan strategy to approve biofouling instructions
This strategy was designed under six main components and as follows:
- Legal and Institutional framework setup
- Biofouling Management
- Biofouling Research, Monitoring and Risks Management
- Enforcement and Control
- Awareness and Capacity Building
- National, Regional and International Cooperation

Procedures to protect Aqaba Gulf From IAS
- ASEZA issued a circular prohibiting the cleaning of submerged parts of the hull for foreign ships.
- As for the national ships which operating in the Gulf of Aqaba between Jordan and Egypt, cleaning of the submerged parts of the ship approved only with specific condition such as:
  1. To be cleaned with an area that has no coral reefs.
  2. Chemical and pesticides are forbidden from using in the cleaning process.
  3. To collect any solid wastes during the cleaning process.
  4. To take photos of the biofouling on the ship’s hull to identify and quantify the species on the ship’s hull.

National Task Force outputs
- National Task Force team were formed with all stakeholders, Two meetings were held and their outputs:
  - Draft Biofouling National Policy
  - Draft Biofouling management national regulations
  - National report on “Assessment of Biofouling and Impacts to the marine Environment in the Gulf of Aqaba”
- National Academic Institution was selected to carry on the training programs
- Nominated National Experts worked on the preparation of the National Reports
- National IT Capabilities were analyzed

Raising Awareness Initiatives
A working group established by Jordan Maritime Commission and Aqaba Special Economic Zone Authority to facilitate the national task force mission regarding nominating and picking up the expertise as well as the national entities to draft and finalize the following:
- National Status Assessment (NSA) report – Accomplished & reported to PERSGA & IMO
- National Strategy and Action Plan (NSAP) report - Accomplished & reported to PERSGA & IMO
- National Training Course module as per IMO module course - Accomplished & reported by JAMS.
- PERSGA and IMO were communicated regarding the list of nominated experts list along with their CV’s - Accomplished & reported
- Biofouling questioner and Mid Term Review Audit was conducted by Mr. David Vousden.
ANNEX 12

SIMON DORAN PRESENTATION

Industry perspectives

(refer to the pages hereafter)
Session 3
Industry perspectives

Arab Women in Maritime Biofouling Management Workshop (AWIM-BMW)
Jeddah, the Kingdom of Saudi Arabia 10-11 May 2023

The Global Industry Alliance (GIA)
A Platform for Industry Collaboration

The GIA
ESTABLISHED
• Formally established in June 2020.

ONLINE
• Launched online on World Oceans Day on 8 June 2022.

ALLIANCE
• A platform for industry collaboration.

Founding Members

HULL CLEANING SOLUTIONS
MARINE GROWTH PREVENTATIVE SYSTEMS
SONIHULL

Members 2023

HULL CLEANING SOLUTIONS
MARINE GROWTH PREVENTATIVE SYSTEMS
SONIHULL

COATINGS AND PAINTS
Acronobel, Hempel, Jotun, Marine Coatings

SHIP OWNERS AND OPERATORS
Hapag-Lloyd

OBSERVERS

Our Resources

GIA TASK FORCE
• Steering committee for the GIA
• Provides overall direction
• Selects activities and adopts work plan
• Approves financial disbursements
• Meets at least four times a year

In-kind contributions from members towards activities (USD15k per year)
Cash contributions from members towards activities
USD used cash contributions
Corporate Sustainability

SUSTAINABILITY REPORTING
- Opportunity for impactful actions
- Showcase contribution to global fight for marine biodiversity protection and GHG reduction
- Demonstrate credibility, transparency and accountability
- Attract customers, talent, etc.
- Contribute to the 'global good'

Visible Leadership

UNFCCC COP 26
- Official side event held in Glasgow in November 2021
- Launch of the GIA commissioned study on “Impact of biofouling on fuel consumption and GHG emissions”

Global Networks

ACCESS TO STAKEHOLDERS
- GIA members can interact through GloFouling networks: IMO, NGOs, governments, regional organisations, trade associations, industry, international experts, etc.
- GIA is represented in GloFouling global meetings, R&D conferences and other events such as the 2nd R&D Conference (2022) held in London and the GHG video launch held at the MEPC 79 Meeting in December 2023

Achievements

Regulatory Aspects
(completed in 2023)

Need to understand the regulatory context for biofouling management

Report:
'Compilation and comparative analysis of existing and emerging regulations, standards and practices related to ships’ biofouling management'
(surveys, direct engagement and literature review)
Industry Groups

Cross-sectoral

Synergies between sectors such as shipping, solution providers, ports and marinas, aquaculture sector

To identify common issues and barriers and foster solutions

Our Objectives

GLOBAL SOLUTIONS

• Improve biofouling management by identifying challenges and solutions

KEY CHALLENGES

• Lack of awareness on biosafety risks and good management practices to mitigate these risks
• Barriers for the uptake and adoption of new technologies
• Level playing field and standardisation process e.g., absence of standardised protocols for in-water cleaning, biofouling waste management, decommissioning rigs, etc.
• Knowledge gap about environmentally-friendy and safe technologies or methods suitable for all industries
• Limited training or induction materials for industry staff such as seafarers, ports and operators

GIA Study

Current Regulatory Environment for Biofouling Management

Compliance Barriers

KEY FINDINGS

• Comprehensive biofouling management policies are not widespread and those that do implement policies are not consistent
• There is a high degree of variation for In-water Cleaning (IWC) policies
• Uncertainty surrounding IWC policies can result in inconsistent conditions being applied by authorities
• The performance of anti-fouling systems can be variable
• Inconsistency in biofouling and IWC policies creates a major challenge for the shipping industry

Policy Needs

KEY FINDINGS

• The review of the Biofouling Guidelines is critical to minimise variations in implementation of biofouling management and IWC policies
• There are barriers to the implementation of consistent and effective biofouling management policies that cannot necessarily be solved by the review of the Biofouling Guidelines
• Without an overarching international regulation or convention on biofouling management, inconsistencies will continue to occur

Policies and Guidelines

Control and Management of Ships’ Biofouling
KEY RECOMMENDATIONS
• Complete the review of the ‘Biofouling Guidelines’ to improve specificity and IWC guidance
• Consider the development of a mandatory international instrument for biofouling based on the revised ‘Biofouling Guidelines’
• Develop an internationally agreed IWC performance standard, methods for IWC system performance and identify independent, expert approval bodies for testing IWC systems

Guideline Needs

Biofouling Conditions

Our Objectives

GIA Study
Analysis of the Impact of Biofouling on GHG Emissions

GIA Reports

Future Activities

SUBMISSIONS
• Marine Environment Protection Committee (MEPC)
• Sub-Committee on Pollution Prevention and Response (PPR)
Operational Aspects (2023 workplan)

Need to understand the ports perspectives

Report:
The aim would be to analyze port perspectives for biofouling management services

Environmental Aspects (2023 workplan)

Need to understand the biochemical and environmental risk of cleaning without capture of all levels of biofouling

Report:
The aim would be to study/quantify biochemical waste generated in the process of IWC of all levels of fouling collected from diverse locations around the world

Raising Awareness (2023 workplan)

Need to understand recent drastic climate changes, impact on marine biodiversity and the urgency of taking action now

Video:
The aim would be to raise awareness on this critical issue and call for immediate action

GIA Members

Thank you!

For more information visit our website www.glofouling.mio.org or email us at glofouling@imo.org

Follow us on LinkedIn and Twitter for the latest news and updates!
ANNEX 13

REHAM EL-REFAEI PRESENTATION

Industry perspectives

(refer to the pages hereafter)
Overview on Damietta Port

- Damietta port is one of the Egyptian key commercial seaports, located on the Med coast.
- It is only 4.5 kilometers west of Damietta branch of the River Nile, and about 70 kilometers west of Port Said Port.
- The Port is Connected to the River Nile with navigational channel, 4.5 km, and it ends with a river port with a quayside of 340 meters.
- The port's total area is 11.8 million square meters, while the current water surface area is 3.9 million square meters.

Overview on Damietta Port

- The port currently consists of 23 berths with a total length of 6,600 meters.
- Damietta port receives most types of cargo ships such as container ships, LNG tankers, general cargo ships, bulk cargo, and ro-ro ships.
- The total number of ships received by the port in 2022 is 3,343.
- Damietta Port owns 12 tugboats and other 16 marine boats for different functions like mooring, pilotage, firefighting... etc.

2- Risks of biofouling

- Contribute to climate change and greenhouse gas emissions
- Biofouling on the hull and propeller increases the drag of ships by increasing the surface roughness and friction resistance, so it increases power requirement and forces them to burn more fuel to maintain speed and thus contributing to higher GHG emissions
- This means an increase in fuel consumption and operating costs as well.
- Contribute to transferring of invasive aquatic species which pose a threat to human, animal, and plant life and a threat to the aquatic environment
- Cause corrosion of assets
1- Settlement of biofouling on marine units' hull and niche areas causes:
  increasing in power requirement and fuel consumption (increase operational cost)

2- Corrosion and Clogging of assets (in-water pipes of firefighting system and
  metal sheet bits)

3- Instability and sinking of buoys

3- Damietta Port Biofouling Management Plan takes into
consideration the IMO biofouling guidelines
  • Planning for Biofouling management
     The plan includes stages and dates of coating maintenance and reapplication of anti-
     fouling paints.
  • Choosing a suitable anti-fouling paints
     Provide long protection against marine organisms with long-lasting antifouling
     performance.
     Ensure Tributyltin free (TBT free) as it has been banned by IMO since 2008 because of its
     toxicity.
  • Monitoring antifouling condition and fouling status
     In-water inspection is done within a period of two to three years by the classification
     societies to renew the certificates of validity of the antifouling system.
  • Truly disposal of collected biological waste:
     The fouling –waste is collected (to minimize the risk of releasing biological organisms into
     the aquatic environment) then a specialized contractor transfers it to environmentally
     approved hazardous waste landfills.

4- Proactive measures
1. Applying Just in time (JIT) operation system
   - Damietta Port applies Just in time (JIT) operating system to reduce waiting time (idle time) for ships through:
     - Prior coordination between the shipping agent and the port authority in order to allow berthing of ships upon arrival without need to wait at the external anchor.
     - Digitization of all stages of the ship’s call and berthing process such as:
       - Using smart applications for administrating and speeding-up all stages of the ship’s call like berthing, loading and unloading.
       - Pilotage and towing permit are issued also electronically.
       - Ship departure permit are issued electronically as well.

2. Using Cathodic protection (CP) anodes to protect sheet bits that support berths through the application of a system like the Marine Growth Prevention System (MGPS)

3. Operators implement an operational pattern for marine units in which all units are operated alternately to reduce their idle time, which reduces the chance of biofouling accumulation and growth.

4. Divers do regularly in-water inspection for the hull of the marine units as a general means of routine surveillance to detect the status of anti-fouling coating or to detect biofouling growth.

5. Applying frequent in-water cleaning (preventive in-water cleaning) for soft and microfouling which is done gently and manually by divers to minimize the risk of biofouling and prolonging the life of anti-fouling paints and which can also reduce the risk of spreading invasive aquatic species by preventing macrofouling accumulation.

6. Preventing biofouling (anti-fouling paints) by coating the underwater sections of the ship’s hull and its niche areas to prevent and slow the growth of biofouling.

5- Reactive Practices
   - Some reactive practices are taken when we notice an increase in the amounts of biofouling on marine units or increasing in fuel consumption in marine units such as:

   1. Cleaning Tugs (hull and niche areas) at the dry-dock (shipyard in Alexandria) to have a proper surface preparation and applying new antifouling paints
Dry-docking schedule for tugs consists of (sandblasting/re-priming/re-coating with anti-fouling paints for the hull and the niche areas)

2- Boats are cleaned on the ship lift with some mechanical tools such as hydro jetting (high-pressure water jet) and Powered rotating brushes

3- Reactive-cleaning and applying anti-fouling paints for Navigational Signs (buoys)

Using approved antifouling paints

Tributyltin (TBT/antifouling biocide) has been banned by IMO since 2008 because of its toxicity

Boats after proper surface preparation
Polishing of (uncoated propellers/Uncoated propeller shafts) and applying new antifouling paints to maintain operational efficiency

6-Role of port state control under the AFS Convention

- Port State control has the right and authority to conduct inspections of anti-fouling systems on ships (Ships of 400 gross tonnage and above or Ships of 24 meters or more in length but less than 400 gross tonnage) engaged in international voyages
- Parties of AFS 2001 required to carry an IAFS Certificate and the attached Record of Anti-Fouling Systems
- Ships of Non-Parties to AFS 2001 (PSCO should ask for documentation that contains the same information as in an IAFS Certificate and take this into account in determining compliance with the requirements
- PSCO can do sampling and analysis of the ship’s anti-fouling system to establish whether or not the ship complies with the AFS Convention
Role of port state control under the AFS Convention

- Detention (meaning that the Member State could decide to detain the ship)
- Dismissal (meaning that the MS demands that the ship leaves port)
- Exclusion (The Member State could decide to exclude the ship to prevent it entering its Waters)
- Reporting to flag state

Thank you so much for your interest and attention
ANNEX 14

NAHLA MOHAMED PRESENTATION

Industry perspectives

(refer to the pages hereafter)
BIOFOULING MANAGEMENT IN APA

Presented by
Chemist/ Nahla Mohamed Hassan
Team leader of Waste management group in General administration for environmental protection
Alexandria Port Authority

1- APA overview
- Main location
- Strategic location
- APA is a global strategic hub
- Port activates and facilities
- Transformation to green port

2- Shipping traffic

3- Biofouling in APA
- Environmental and economical impact of biofouling
- Risk of invasive aquatic species
- Marine unit of APA exposed to biofouling accumulation
- Cleaning plane of biofouling from APA marine unite
- Facilities of biofouling cleaning

4- Biofouling treatment in APA
- Biofouling removal from marine unit
- Biofouling disposal
- Painting

5- Challenges of biofouling accumulation in APA

6- Anti fouling regulation at APA

Alexandria is the second most important city in Egypt located on the western edge of the Nile between the Mediterranean Sea and the Lake Mariout.

Characterized by its connection to international shipping routes through strategic location on the Mediterranean Sea in Africa.
**Strategic Location**

- Alexandria Port is considered one of the oldest ports in the world.
- Leading Location at the Arab republic of Egypt.
- Regarding its volume of imports and exports through more than 60% of Egypt foreign trade passes.

**A Global Strategic Hub For Trade Movement**

- Alexandria Port consists of two main ports, Alexandria and Dekheila Port, with 80 total no. of berths, depths from 6-20 m and specialized terminals as general cargo, containers, ro-ro and passengers terminal.
- Offers many services and facilities to customers. The port deals with major international routes.

**Port activities and facilities**

- Stevedoring
- Storage & warehouses
- Towage & pilotage
- Repair & maintaining ships
- Ships bunkering

**Alexandria Port initiative to transform to Green Port**

- Waste Disposal System (Solid-Liquid) safe disposal of waste resulting from ships through (Burial - Incineration - Recycling).
- On shore Power Supply (OPS) which has made an actual contribution to the commitment to the requirements of the environment.
- JIT (Just in time) which reduced the waiting rate of ships by up to 70% and thus reduced the percentage of emissions issued by ships thus accelerating the rate of handling.
- Applying sustainable environmental systems. Alexandria port has obtained the quality standard for the environmental management system I S O 1 4 0 0 1 - 2 0 1 5.
Total Handling Volume
62.3 million tons

Total number of vessels
2022 3941

Environmental impact
1. introducing of non-native IAS to marine environment
2. Increasing GHG EMISSION

Economical impact
1. much coast for cleaning and removal of biofouling from marine units hull
2. much cost due to fuel consumption
An invasive species can be any kind of living organism—an amphibian (like the cane toad), plant, insect, fish, fungus, bacteria, or even an organism’s seeds or eggs—that is not native to an ecosystem and causes harm.

Species that grow and reproduce quickly, and spread aggressively, with potential to cause harm, are given the label “invasive.”

There are indirect threats of invasive species that include:

- Changing the food web in an ecosystem by destroying or replacing native food sources.
- Providing little to no food value for wildlife.
- Altering the abundance or diversity of species that are important habitat for native wildlife.

Marine units of APA exposed to biofouling accumulation:

- Pilot boats
- Tugboats
- Skimmers boats, trash collector (anti pollution boat)
- Buoys
Cleaning plane of biofouling for Alexandria port marine units by year

<table>
<thead>
<tr>
<th>Marine unit</th>
<th>Hull material</th>
<th>Time of biofouling cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buoys</td>
<td>fiber glass/iron</td>
<td>every year</td>
</tr>
<tr>
<td>Tugboats</td>
<td>iron</td>
<td>every 2 years</td>
</tr>
<tr>
<td>Pilot boat</td>
<td>Aluminum/Fiber glass</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>Anti pollution boats (Trash collector/Skimmer)</td>
<td>iron</td>
<td>Every 2 year</td>
</tr>
<tr>
<td>Service small boat</td>
<td>iron</td>
<td>Every 6 months</td>
</tr>
</tbody>
</table>

Cleaning of biofouling from marine units depends on how quickly biofouling accumulates on the marine unit surface which depends on the following factors:
1. the hull material of marine unit
2. period of staying in water

Facilities for biofouling cleaning and painting at APA

1. APA marine units (small unite)
   - Mechanical slipway accommodates 16 unit with maximum load 600 ton
   - Dry dock accommodates only one marine unit with maximum load 1200 ton

2. Mega vessels
   - Alexandria ship yard company has 2 Dry Docks suitably equipped for all biofouling cleaning and painting steps
1. Manual Removal Of Biofouling Layers From All Parts Of Marine Unite Or Vessels As Hulls, Load Lines Area, And Propellers

2. Removal of remaining parts of biofouling by sandblasting process using compressor sand nozzle

3. Collection of biofouling wastes in a big canes specified for type of wastes that around work area

4. Final disposal of biofouling wastes by delivering it to the final disposal company that transfer this waste to sanitary landfills that outside the port
1. First layer is anti-corrosion - epoxy primer
2. Second layer is a tie coat between epoxy primers and antifouling systems
3. Third layer is antifouling paints - Sea Force this paint is with a certificate of "TBT free" this layer should be painted at 24hrs prior entry into water.

Accumulation of Biofouling on Keel Cooler Part of Anti-Pollution Boats. This part is responsible for cooling the engine of the boat, so due to its high temperature it is a good substrate for attracting the biofouling on its surface.
Egypt has been joined anti fouling system convention in 2016. The convention is applied to the following:

- **For vessels**
  - A. International antifouling system certificate (IAFS) that issued by one of the international maritime classification societies (LR)
  - B. record book for antifouling paints
  Both document are inspected by Egyptian port state control, if this document are not found, the ship will be detained.
  - C. If any ship request bio fouling cleaning in APA it enter the dry dock of Alexandria ship yard company

- **For marine unit of APA**
  - 1. service boat and anti pollution boat less than 400 GRT not required for IAFS, but they have "declaration of antifouling system" which is filled out and signed by the unit operator and left on board attached with paint receipt.
  - 2. tugs that have more than 400 GRT should have IAFS that must be endorsement by the international maritime classification societies (LR) after survey in accordance with regulation 1 of annex 4 to the international convention of control of anti-fouling system on the ship, survey include:
    - a. Initial survey before the vessel enter the service
    - b. Survey when antifouling system are changed or replaced
  biofouling cleaning and painting must be done in a dry dock of Alexandria company ship yard.
Thank You
ANNEX 15

YEONGJOO BAEK PRESENTATION

Biofouling gender action plan

(refer to the pages hereafter)
IMO-Norway TEST Biofouling Project Gender Action Plan

First Time Developed Specific Gender Action Plan (GAP)

First specific GAP

It is the first time that IMO/DPP has developed a specific Gender Action Plan, with the aim to have a more impactful, specific response to the needs of the subject area and regions addressed by an IMO major project.

IMO-Norway TEST Biofouling Project Gender Action Plan

Objective of GAP

Main Purpose

To support and attain the overall operationalization of the TEST Biofouling Gender Action Plan objectives, specifically showcasing gender equality as a business case and establishing baseline data for the number of women in biofouling globally and in the project’s participating countries.

3-Year Plan with 3 Key Objectives

- Objective 1: Gender equality as a business case in maritime/specifically in biofouling
- Objective 2: Qualitative gender data gathered and analyzed/baseline and targets
- Objective 3: Monitoring and delivery of IMO project-specific gender-related activities, targets, goals

IMO-Norway TEST Biofouling Project Gender Action Plan

3-Year TEST Biofouling Gender Action Plan, for year of 2023

<table>
<thead>
<tr>
<th>Objective</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender equality as business case in all participating countries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify women leaders in biofouling</td>
<td>Create women in biofouling network</td>
<td>Targeted women-only network based on lessons learned to address, showcasing business case</td>
<td></td>
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<tr>
<td>Identify industry leaders and women leaders as well as relevant associations</td>
<td>Organize on-the-spot networking events for women leaders (breakfast for example)</td>
<td>Strengthen and roll out network sustainability</td>
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<tr>
<td>Identify “He for She” champions in the biofouling</td>
<td>Write women leaders to all relevant TEST Biofouling meetings</td>
<td>Potential extra measure for women in biofouling globally</td>
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</table>

IMO-Norway TEST Biofouling Project Gender Action Plan

3-Year TEST Biofouling Gender Action Plan, for year of 2023

<table>
<thead>
<tr>
<th>Objective</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire and share with industry/national SMEs to fulfill in relation to:</td>
<td>Undertake analysis of baseline data gathered both in relation to:</td>
<td>Target commitments from stakeholders to undertake identified actions to support women empowerment in biofouling (both beneficiary countries and globally)</td>
<td></td>
</tr>
<tr>
<td>number of women and</td>
<td>number of women in biofouling:</td>
<td></td>
<td></td>
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<tr>
<td>constraints/relevant sectors</td>
<td>constraints/ issues related to gender equality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constraints: Identified to support women empowerment in biofouling globally</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender equality</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Test success outcomes of the analytical work and agree on specific actions to undertake</td>
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</table>
Thank you for your kind attention.
ANNEX 16

SANJAM GUPTA PRESENTATION

Biofouling gender action plan

(refer to the pages hereafter)
Presented by: Sanjam Gupta, Sitara Shipping

Charting The Route Towards Inclusive Biofouling Management.

"Leadership should be focused on extending the ladder of opportunity for everyone." 
– Justin Trudeau

The goal is not to change overnight. Instead starting with the commitment to driving gender equity, equality and inclusion.

How do you define roles?

Objective 1: Gender Equality as a business case in maritime and specifically in biofouling is showcased in all the participating countries.

Objective 2: Qualitative gender data gathered on women’s participation in biofouling-related activities by industry in the beneficiary countries.
Objective 1:

**Diversity has a Business Case**

Organisations need to showcase and consistently communicate that there is a business case for gender equality and inclusion of more women in biofouling practices in target countries.

Objective 2:

**Let's Set Goals!**

We need to start tracking gender participation so that we can compare, track improvements, and set clear and achievable targets.

We then use these results to create awareness.

Gender balance needs to become a growth imperative rather than a diversity goal.

Objective 2:

**Let's Walk The Talk**

- Organisations need to commit to achieving 50:50 gender ratio
- Encourage gender equality in project training amongst workshop participants
- Follow-up and monitor these gender-specific commitments and targets and report on them to the donor
- Dedicate specific resources to gender equality related work
- Ensure gender multilingualism in all communication, activities.

Objective 1:

**Forming New Agendas**

A new HR agenda needs to be created where gender and diversity form an important pillar, where women are explicitly mentioned and targeted as well.

Topics in which gender and/or women are included need to be for leadership development so women are really able to access leadership positions and focus on employees talent development and 'quality through diversity'.

Objective 3:

**Monitoring and delivery of IMO project-specific gender commitments.**
What can we do differently?

Social Media Campaigns
- Highlight gender-neutral roles and role models as well as a 100 women in Biofouling campaign.
- Dedicate a day to women in Biofouling or ensure they are included and present on May 18th.

Objective 3

Social Media Campaigns
- Create awareness around the participation of women
- Create aspiration for attracting women in biofouling and inspire existing women to excel
- Highlight the business and sustainability case for women in Biofouling
- Develop competencies to understand the different contributions that are made by both men and women and how they complement each other

Distribute Surveys
- Survey to be carried out to get data for women in maritime. Here we also ask women for their experiences, to better understand the leaky pipeline mechanism; that is, to focus on women who leave.

Creating Networks
- Women in Biofouling subnetwork to be created (could be part of the WIMA network)
- Build an APP connecting women in Biofouling

Create Support Systems
- Run a mentorship program to help young women get the mentoring needed to rise in their careers
- Women support each other and make connections
- Run capacity building workshops to improve participation of women
- Implementing mentoring activities at the local context, by collaborating with already existing networks.
Leadership Development Programs

In general, the programme will serve women professionals aiming to overcome gender barriers and grow within their organisations.

It aims to create a pipeline of women leaders.

It helps inculcate self-confidence and develop expertise.

January 2023 - December 2025

Objective 3

Thank you!
ANNEX 17

CLEOPATRA DOUMBIA-HENRY PRESENTATION

Paving the way for Day 2 workshops

(refer to the pages hereafter)
WMU President’s Remarks for Session: Paving the way for Day 2 workshops
Arab Women in Maritime - Biofouling Management Workshop
Dates: 16:20, 10 May 2023
Location: The Venue Jeddah Corniche Hotel, Jeddah, the Kingdom of Saudi Arabia

Excellencies, delegates, ladies and gentlemen,

As the President of the World Maritime University, it gives me great pleasure to introduce the WMU E-learning solutions.

WMU has established a capability of producing and delivering E-learning Solutions which include specialized academic expertise, state-of-the-art technical hard and software programmes and management capacity.

In 2020, WMU and the IMO agreed to cooperate in a pilot project relating to the design and development of three training courses to be delivered for the IMO in an e-learning format. The pilot project has been coordinated by the Technical Cooperation Division (TCD) of IMO.

The first E-learning programme on Oil Pollution Preparedness, Response and Cooperation (OPRC) was completed by WMU and successfully launched by IMO in April 2022. This E-learning programme has attracted more than a thousand participants from over 90 countries.

The second E-learning course entitled "Introduction to Marine Biofouling: Impacts and Management of Risks" was officially launched by the IMO on 1 February 2023. The WMU developed this course for the IMO under the GEF-UNDP-IMO GloFouling Partnerships project.

The course on Biofouling Management is one of the three E-learning courses that WMU has developed for the IMO. The Training Package includes international reference training material that will be used to increase expertise on biofouling management in the twelve beneficiary countries of the GEF-UNDP-IMO GloFouling Partnerships Project.

The goal of this course is to raise awareness and promote the implementation of the IMO biofouling guidelines across the world. This course is a significant milestone in the efforts to minimize the transfer of invasive aquatic species through ships' biofouling. It provides a comprehensive introduction to multiple aspects related to ships' biofouling, including its role as a vector for the introduction of invasive aquatic species, economic and environmental impacts, international and national policy, and the management solutions and technologies currently available. The course is a particularly useful tool for individuals interested in the management of biofouling and invasive aquatic species, and it is also suitable for students and the general public.
WMU contributed to the course design and development to effectively engage learners in understanding the main concepts of the related topics. In the innovative development phase, WMU transformed the classroom-based presentation materials into fully-animated, scenario-based, and role-play-type e-learning lessons and exercises so that they play the intended role in achieving the learning outcome at self-paced by an individual trainee. Since the official launch of the course in February this year, as of today, more than 480 participants registered for the course and 110 participants have successfully obtained a Certificate of Completion. I wish to take this opportunity to sincerely thank my IMO colleagues from the Technical Cooperation Division and Department of Partnerships and Projects, in particular Ms Lilia Khodjet El Khil and Mr. John Alonso who have made substantive contributions to the development of this course.

The success of the pilot E-learning courses has resulted in IMO commissioning WMU for more e-learning solutions. The third e-learning course aims to train personnel to perform audits under the IMO Member State Audit Scheme (IMSAS), which is based on the scheme developed by IMO. The course is designed to enhance the audit capacity of member states, thereby ensuring more consistent and effective implementation of IMO instruments worldwide. The e-lessons and role-play exercise packages developed for the course have been incorporated into blended learning modalities for IMSAS regional training programs in 2022. The distance learning modality of the IMSAS e-learning course is set to be launched in 2023.

Recently, two projects have been completed in Spanish (OPRC and ISM Code courses), and two new courses on Ballast Water Management and Maritime Single Window are under development with the support from IMO TCD and other technical teams.

At WMU, we are extremely pleased to be able to contribute to the IMO capacity-building efforts through E-learning. We also attribute the success of the pilot project and the follow-up programmes to the close relationship and excellent cooperation between the WMU E-learning Solutions Team and the IMO Teams.

WMU, as a centre of excellence in maritime and ocean education, research and capacity-building, stands committed to partnering with the IMO and other global partners to develop more future E-learning courses and increase women’s participation in access to these courses.

Thank you.
ANNEX 18

LINA EYOUNI PRESENTATION

Paving the way for Day 2 workshops

(refer to the pages hereafter)
**Workshop Overview**

This group will discuss educational needs for women to fill the marine biofouling job market gaps across the value chain of the industry.

**Facilitators:**
- Lina Eyouni, Ph.D.  
  Environmental Protection and Regeneration Red Sea Zone Authority  
  Red Sea Global
- Zahra Alsaffar, Ph.D.  
  Environmental Stewardship Lead  
  Sustainable Development  
  NEOM

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**Education Needs in Maritime Sector**

- Importance of maritime education and training as part of developing the sector and its relevance and contribution to economic growth.
- Knowledge enhancement and upskilling of the staff to support needs, especially that of marine sector is essential for transportation.

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**Training Examples**

- Investing in major projects and providing thematic focus and critical mass to address significant challenges
- Development tracks, programs, and initiatives
- Social and professional programs
  - Nursery
  - Localization
  - Career Days
- Environmental Stewardship Technicians Training Program
- Maritime Upskilling Training Program
- Elite Program
- Renewable energy Training
- Activities
  - Marine summer Camp
  - Elevate program
  - Internships
  - Courses
  - e-learning
- KAUST
- Red Sea Global
- IMO

---

**Educational Institution Examples**

**Locally**
- Faculty of Marine Studies  
  National Marine Academy
- National Maritime Academy

**Internationally**
- Massachusetts Maritime Academy
- Delft University of Technology
- World Maritime University
- University of Southampton
- Australian Maritime College
- Norwegian University of Science and Technology
- University of Strathclyde
- Korea Maritime and Ocean University
- Shanghai Maritime University
- University of Plymouth
- Korea Maritime and Ocean University

---

**Job Market Gaps**

**Needs**
- Higher middle-skill occupations
  - 3D printing, operating maintenance areas, building programs
  - Impact of environmental regulations, digital shift
  - Lack of women in marine sector

**Problem**
- Engagement between stakeholders and beneficiaries
- Developing successful programs for trainees
- Training for emerging skills in traditional occupations
- Training for traditional maritime occupations
- Data analysts
- Captains, riggers

**Solutions**
- Higher middle-skill occupations
  - 3D printing, operating maintenance areas, building programs
  - Impact of environmental regulations, digital shift
  - Lack of women in marine sector
- Engagement between stakeholders and beneficiaries
- Developing successful programs for trainees
- Training for emerging skills in traditional occupations
- Training for traditional maritime occupations
- Data analysts
- Captains, riggers
Research and Development

Research & development strategy:
1. Building a wide platform of knowledge
2. Bringing together the best universities, ship owners, engineering
   contractors, and manufacturing companies and research institutes.

1. To assess and develop unit designs to meet safety and cost-efficiency criteria.
2. To improve software and structural analysis tools.
3. To build on insights from academics, owners and suppliers.
4. To help experts gain a deeper knowledge of marine conditions.

Concluding Remarks

- The skills gap is a result of a mismatch between the education system and job market demands, which can be bridged by several strategies that job seekers and educational institutions can employ.

- The major role any education system has to ensure is employability.

Collaboration Between Employers and Educational Institutions

- Emphasize soft skills
- Focus on practical experience
- Lifelong learning

Thank You
ANNEX 19

NAZLI SELEK PRESENTATION

Paving the way for Day 2 workshops

(refer to the pages hereafter)
Our Vision

Promoting diversity  Empowering women

Our Mission

to attract and support women, at the management level, in the maritime, trading and logistics sectors.

Our Values

Professional  Dynamic  Open-Minded  Committed

WISTA works towards:
- diversifying the maritime trading logistics sector
- maximizing the business relationships among members
- creating opportunities for advancement
- improving professional experience and skill
- sharing best practices and knowledge

Our Mission

WISTA works towards:
- reducing the gender leadership gap
- building a community among female leaders
- promoting the creation of influential relationships
- facilitating the professional development of its members

Our Values

Professional  Dynamic  Open-Minded  Committed

WISTA works towards:
- diversifying the maritime trading logistics sector
- maximizing the business relationships among members
- creating opportunities for advancement
- improving professional experience and skill
- sharing best practices and knowledge

Growth of the Organization

- 1974: Established in the UK
- 1994: First non-European NWA was in Africa: Nigeria
- 1997: First American NWA was in the USA
- 1998: First Asian NWA was in Singapore
- 2010: First NWA in Oceania - Australia
- 2024: WISTA International will celebrate 50 years

3900+ Members

56 Countries

All Segments of the Industry

WISTA 1974

Established in the UK

1994

First non-European NWA was in Africa: Nigeria

1997

First American NWA was in the USA

1998

First Asian NWA was in Singapore

2010

First NWA in Oceania - Australia

2024: WISTA International will celebrate 50 years
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**IMO Consultative Status**

- WISTA International approved for IMO Consultative Status by Council in July 2018
- The IMO Assembly endorsed this decision during its 31st session in 2019

**Further Education**

- IMO & WISTA Leadership Accelerator Program
- ICS Scholarship
- Women in Maritime | Training: Presenting with confidence NRF-WISTA
- APEC SEM - WIMA - WISTA International Executive Certificate Course

**Our Work in Research**

- Impact of Covid-19 on women in maritime
- Diversity and Inclusion Pledge
- Gender Diversity Handbook

**Committees**

- HR COMMITTEE
- DIVERSITY COMMITTEE
- TECHNOLOGY COMMITTEE
- TRADE COMMITTEE
- ENVIRONMENTAL COMMITTEE
- YACHTING COMMITTEE
AWARDS

- Corporate Diversity Award
- WISTA Personality of the Year Award

Projects

WISTA International Pledge for diversity and inclusion in the shipping industry

"Embrace diversity of thought (including gender, race, ethnicity, and age), and contribute to a merit-based business environment within my organisation.

I will be a champion of equal opportunity and equal pay.

My behaviour will reflect how I wish our industry to behave in the future.

I will work – and encourage others to work – toward a diverse and inclusive maritime sector."

You can also sign the pledge at: https://wistainternational.com/pledge

Annual General Meetings and Conference

• 2018 Tromso Norway
• 2019 Cayman Islands
• 2020 Online AGM
• 2021 Hamburg
• 2022 Geneva
• 2023 Uruguay

Meetings

Annual ExCo Mid-Term Meetings:
• 2019 Geneva
• 2020 Online
• 2021 Online
• 2022 Accra
• 2023 London

Regional Conferences:
• WISTA MED
• WISTA Atlantic Forum
• WISTA Nordic
• WISTA Asia Pacific Region
• Local NA activities

WISTA International ExCo 2022 - 2023

- Elpi Petraki WISTA Hellas President
- Jemila Jawulaa Mahamah WISTA-Ghana Secretary
- Connie Rozen WISTA The Netherlands Treasurer
- Reem Chowdhury WISTA Bangladesh Member
- Dafne Angelidis WISTA Argentina Member
- Nazli Selek WISTA Turkey Member

PROFESSIONAL – DYNAMIC – COMMITTED – OPEN-MINDED

Women’s International Shipping and Trading Association - www.wistainternational.com
ANNEX 20

SANJAM GUPTA PRESENTATION

Paving the way for Day 2 workshops

(refer to the pages hereafter)
THE IMPORTANCE OF WOMEN IN LEADERSHIP
AND THE NEED FOR VISIBILITY

Sanjam Sahi Gupta

The global maritime logistics market is expected to grow at a robust rate of around 10% to 12% in the next couple of years.

How involved are women going to be?

EMPOWERING WOMEN

When women enter the workforce, their only representation of what leadership looks like is a boardroom full of men.

That needs to change.

- Have visible leaders who are women
- Have leaders who champion women at every role
- Offer training to women which will help them be better leaders
Why Leadership Training Is Critical To Helping Women Achieve Their Potential

Proven differences between the female and male brain.
- Leadership styles are based on thought processes, and hence look different for men and women.
- Their strengths are empathy, intuition, collaboration, and self-control.
- Recognizing these gender-specific traits and enabling them to leverage them for success.

Social and cultural conditioning has led to gender stereotyping.
- Women often need to combat the assumption that they are less competent than their male counterpart.
- Social realities look different for men and women, which need to change.
- Women are also told that other women are a threat to their success - there aren't enough seats for everyone.

Why Leadership Training Is Critical To Helping Women Achieve Their Potential

Women enter the workforce far less confident than their male counterparts.
- Women are more likely to have self-doubt about their job performance and careers.
- Women don’t recognise a gap in their skillsets. They are neither given training by their superiors, nor do they feel comfortable enough to ask to be trained.
- Confidence needs to be built right when they begin their careers.

“Investing in developing women's leadership skills will not only change the course of their future, but also that of their communities.”
How Women Can Take the LEAP!

Maritime SheEO’s Leadership Accelerator Program (LEAP) for Women in Maritime
In association with WISTA International and empowered by IMO.

Our Leadership Accelerator Programme

- **Build a Leadership Network**
  Designed to prepare future leaders who can shape the Maritime industry

- **Crafted, Curated, Certified**
  Program custom designed for Maritime women leaders

- **Mentoring from Experts & Leaders**
  Learn from diverse lived experiences, faculty, mentors, guest speakers

- **Multi-modal Blended Learning**
  Virtual, Digital & Assisted Learning that is practical and enriching

We’ve had 2 successful cohorts so far and 1 cohort is currently running.

Our Participants Learn:

- **Strategic Thinking**
  Critical thinking, problem solving, financial acumen

- **Be a SheEO**
  Building networks, personal brand, reputation

- **Leadership Perspectives**
  Managing and developing self, teams and systems

- **Personal Aspiration**
  Managing dreams, career, constraints

- **Digital Transformation**
  Disruptions in the way we work & live

- **Persuasive Communication**
  Influencing, negotiating, and managing conflicts

Women Who Win!

- **Anita Clark**
  Manager, Maritime Training Programs, The Maritime Group

- **Anna Keppeler**
  Co-founder, CEO, Startups4Good

- **Sarah Allwardt**
  Director of Sales & Marketing, The Maritime Group

- **Iqbalyn Banse**
  Director, Strategic Development, The Maritime Group

- **Vicke King**
  Founder, CEO, SheEO, San Francisco
“A woman with a voice is by definition a strong woman. But the search to find that voice can be remarkably difficult.”
– Melinda Gates
ANNEX 21

MIRAL ARMANIOUS PRESENTATION

Paving the way for Day 2 workshops

(refer to the pages hereafter)
Hello, I’m Miral

I'm a graduate of the Red Sea STEM School and a senior student at the College of Engineering & Technology, Marine & Offshore Engineering Department at AASTMT.

About

The Red Sea STEM School
2015 - 2018

AASTMT - CMTT - COE
2018 - 2023

Continuous Development

Institutes
- Sea Training
- Port Training
- Marine Upgrading Studies
- Maritime Postgraduate Studies
- Maritime Safety
- Regional Maritime Security

Undergraduate Studies:
- Maritime Transport Technology
- Marine Engineering Technology
- Marine & Offshore Engineering

Women at AASTMT

- Undergraduates
- Trainees
- Graduates
- Offshore Industry
- Maritime Industry

Thank You!
For more information contact:

GloFouling Partnerships Project Coordination Unit
Department of Partnerships and Projects
International Maritime Organization
4 Albert Embankment London SE1 7SR United Kingdom

www.glofouling.imo.org