

MARITIME SAFETY COMMITTEE
110th session
Agenda item 6

MSC 110/6/1
29 April 2025
Original: ENGLISH
Pre-session public release:

**DEVELOPMENT OF A SAFETY REGULATORY FRAMEWORK TO SUPPORT THE
REDUCTION OF GHG EMISSIONS FROM SHIPS USING NEW TECHNOLOGIES AND
ALTERNATIVE FUELS**

Ammonia as a Marine Fuel: Safety and Risk Mitigation

Submitted by the International Fertilizer Association

SUMMARY

Executive summary: The International Fertilizer Association (IFA) welcomes the development of robust safety measures for the use of low-carbon ammonia as a maritime fuel. As the primary producer, handler, and user of ammonia worldwide, the fertilizer industry possesses extensive safety expertise and operational knowledge that can contribute significantly to the safe adoption of ammonia as a marine fuel. While IFA broadly supports the Interim Guidelines for the Safety of Ships Using Ammonia as Fuel (MSC.1/Circ.1687), it proposes several enhancements based on its decades of experience with ammonia handling, transportation, and safety management.

Strategic direction, if applicable:

2 and 3

Output:

2.3, 3.2, 3.8

Action to be taken:

Paragraph

Related documents:

MSC.1/Circ. 1687

Introduction

1. The fertilizer industry acknowledges the finalization of the Interim Guidelines for the Safety of Ships Using Ammonia as Fuel by the CCC Sub-Committee and their approved at MSC 109. As the sector currently responsible for most of global ammonia production, it recognizes its position as a key stakeholder in the expansion of ammonia into new applications. The industry welcomes the opportunity to share its technical expertise gained through decades of safely handling ammonia at industrial scale.

2. The industry is striving for Zero Accidents. With this vision in mind, continuous, updated safety protocols and communications tools are being developed.
3. Land-based operations provide valuable insights that can support the maritime sector as it integrates ammonia into fuel systems. The fertilizer industry strongly encourages the shipping sector to adopt and maintain safety standards at sea that are equivalent to those long established onshore.
4. IFA Members are pleased to note the depth and thoroughness of the work currently being undertaken by the IMO Safety Committee in developing safety frameworks and technologies for ammonia. In particular, they wish to emphasize the critical importance of establishing and maintaining rigorous safety procedures, as well as implementing continuous and structured training programs for seafarers and operational personnel.
5. This submission is destined to provide a high-level, comprehensive overview of safety procedures and risk management practices, grounded in international best practices, including guidance from the [IFA Safety Handbook](#). The fertilizer industry stands ready to provide more detailed information as needed.

Ammonia as a Marine Fuel: Safety and Risk Mitigation

6. Bunkering ammonia as maritime fuel is not much different compared to ammonia transfer operations that are conducted with the 20MT shipped around the world on a yearly basis. The challenge comes from the fact that these bunkering operations will be performed in a different environment and context, e.g., between 2 ships. Today, ammonia transfer operations occur in dedicated industrial terminals, thus reducing exposure to a potential risk recipient.
7. Existing safety measures applied today for ammonia transfer operations will have to be translated and adjusted to the bunkering location and environment. Measures to prevent potential Ammonia LOPC (loss of primary containment) during bunkering are listed below.

Establishing a Systematic and Well-Structured Operational Safety Process

8. **Risk assessment protocol for each type of ship :** Prior to any operation involving ammonia, whether it pertains to bunkering, maintenance, or fuel system activation, a thorough risk assessment must be carried out for each individual ship. This assessment should not only evaluate standard operational hazards but must also encompass a broad spectrum of plausible scenarios on each ship. The scenarios should be accompanied by clearly defined response and mitigation strategies, preventive control measures, and an emergency response protocol to reduce risks to personnel, equipment, and the environment, including credible worst-case events, and detailed corresponding mitigation measures.
9. **Permit-To-Work for operational personnel:** For all personnel engaged in high-risk activities, a formal Permit-To-Work system must be enforced. This includes protective equipment as well as regular training.
10. **Incident Reporting and Management Procedures:** Incident Management and Reporting Procedures, including minor leaks or malfunctions, must be promptly reported through established channels. Each incident should trigger a rigorous

investigation process, including a root cause analysis to identify possible failures in the system, the monitoring procedures, or human behaviors. The findings should be translated into concrete corrective and preventive actions, shared across relevant teams, and integrated into ongoing safety training and operational procedures to ensure continuous improvement.

Crew Competence and Training across Jurisdictions

11. While the IMO draft safety guidelines address the installation of appropriate technologies and materials to ensure safe operations, it is essential to underscore that regular crew training is a cornerstone of safe ammonia handling. A combination of both training and operational experience is key to developing the required competencies for ammonia operations. The level of competency needed for each task depends on the role and responsibilities of the individual.
12. **Training Programs:** Seafarers on board ships using ammonia fuel should complete training to attain the abilities appropriate to the capacity to be filled and the duties and responsibilities to be undertaken. The master, officers, ratings, and other personnel on ships using ammonia fuel should be trained and qualified in accordance with in-depth standards and regulations, taking into account the specific hazards of ammonia used as fuel. Crew members must therefore receive comprehensive instruction in ammonia hazard awareness, the proper use of personal protective equipment and emergency response tools, as well as first aid procedures for chemical exposure.
13. To ensure that personnel can respond swiftly and effectively under pressure, training programs should incorporate scenario-based exercises simulating system malfunctions, accidental releases, and other emergency situations.
14. Moreover, ship-specific training should be reviewed and approved by governing regulatory authorities. The IGF Code provides detailed training requirements for ships that use gases or other low-flashpoint fuels. Ships under the jurisdiction of flag Administrations signatory to SOLAS should ensure that seafarers have the specified certificates of proficiency.
15. **Safety Documentation:** It is essential that ships carry up-to-date Material Safety Data Sheets (MSDS) for ammonia, accessible to all crew members. These documents provide critical guidance for safe handling and emergency response.
16. **International Safety Standards and Procedures:** Considerations should be given to harmonizing training standards internationally. As the use of ammonia grows within the global fleet, consistent minimum training requirements across jurisdictions will be vital to ensuring that safety is upheld regardless of flag or port state.

Emergency Preparedness and Response

17. Every vessel using ammonia as fuel should develop and incorporate ammonia-specific properties in its existing Emergency Response Plan. This section should clearly define crew roles and responsibilities, establish communication protocols, and outline evacuation and containment procedures.
18. Regular emergency drills simulating ammonia leaks or exposures should be conducted to ensure crew readiness and verify the effectiveness of procedures. Lessons learned from drills should inform continuous improvements in emergency preparedness.

Supply Chain Considerations

19. The fertilizer industry also wishes to highlight several supply chain considerations as ammonia fuel adoption increases:

- Production capacity forecasting: Current production is optimized for fertilizer applications, and significant capacity expansion will be needed to meet marine fuel demand without disrupting food security.
- Infrastructure development: New dedicated infrastructure may be needed to separate marine fuel supply chains from fertilizer supply chains.
- Quality specifications : The fertilizer industry recommends developing specific quality standards for marine-grade ammonia that may differ from fertilizer-grade requirements.
- Carbon intensity labeling: A standardized system to verify and communicate the carbon intensity of ammonia from different production pathways would benefit both industries.

Action requested of the Committee

20. The Committee is invited to note the information contained in paragraphs 1 to 19, and , consider in particular to the proposals in paragraphs 6 to 19.
