



Ammonia-fuelled vessels, from concept to operational reality





Three responsibilities – One pathway



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Adoption and Integration

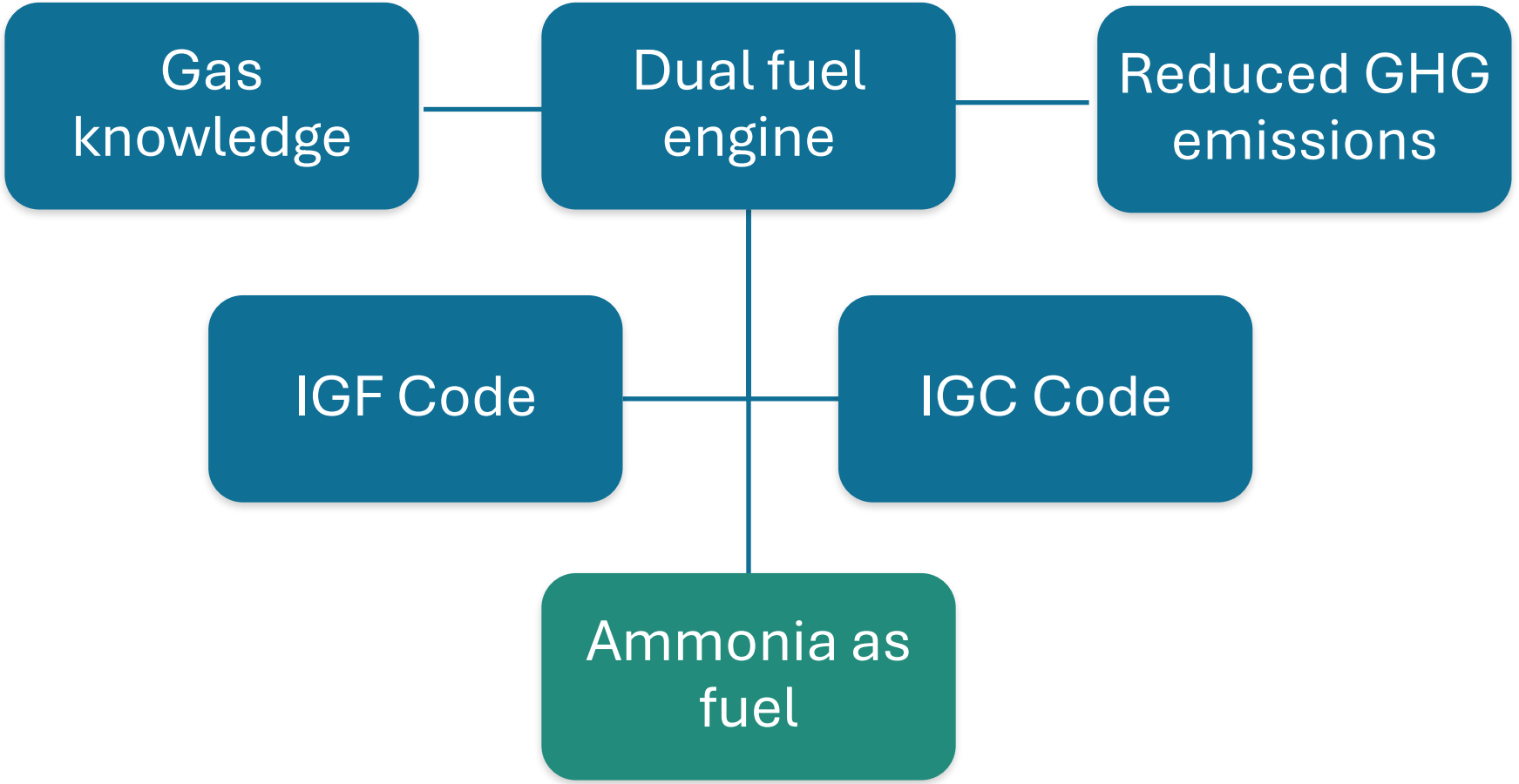


Andriy Nedenko

Technical Superintendent



Pathway





Bulk carriers

BELGIUM
FPS MOBILITY AND TRANSPORT
DG SHIPPING



- 210,000 DWT bulk carriers
- CMB.TECH – Anglo-Eastern Technical
- Flag: Belgium
- Class: Lloyd's Register
- Shipyard: CSSC Beihai (China)
- Engine: WinGD 6X72-DF-A



Source: CMB.TECH





Ammonia carriers

BELGIUM
FPS MOBILITY AND TRANSPORT
DG SHIPPING



- 46,000 m³
- Exmar
- Flag: Belgium
- Class: Lloyd's Register
- Shipyard: HD Hyundai Heavy Industries (Republic of Korea)
- Engine: WinGD 6X52-DF-A

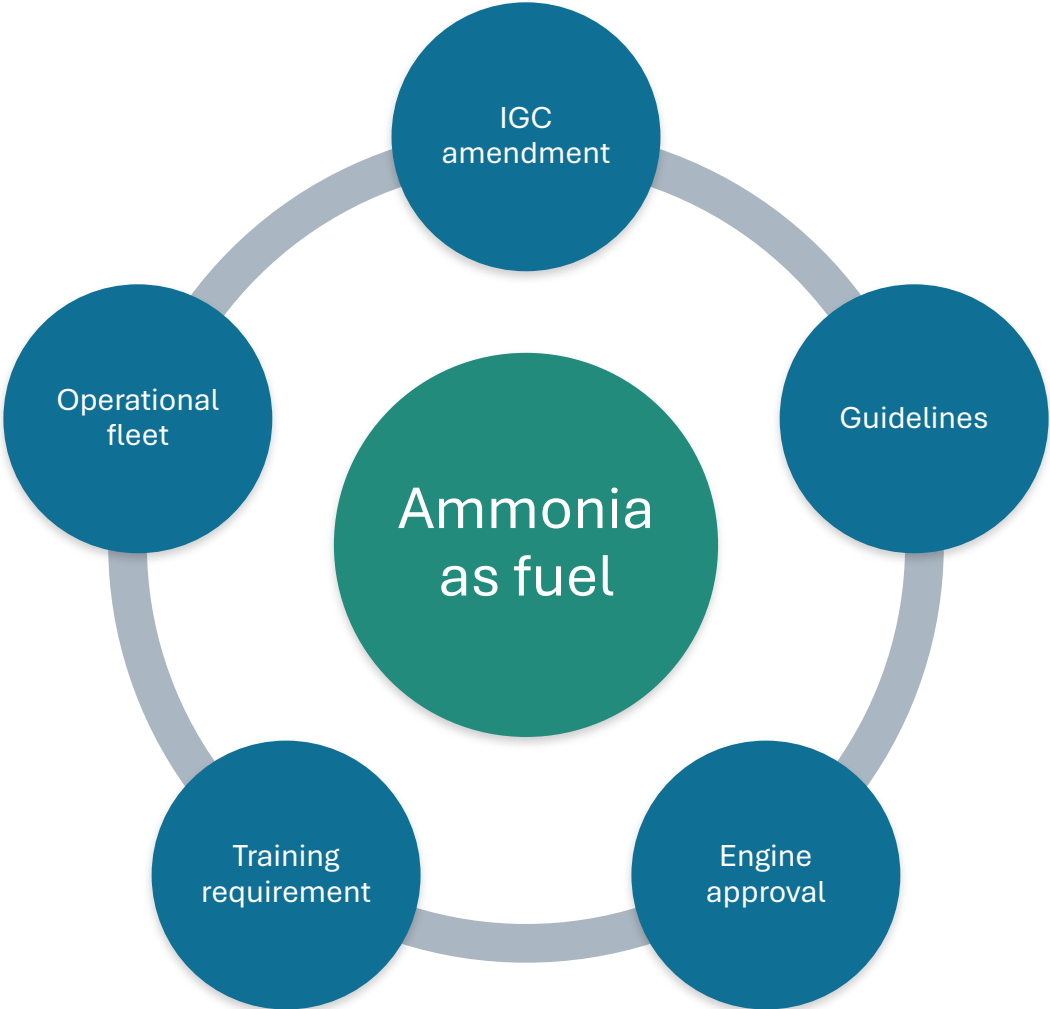


Source: Exmar

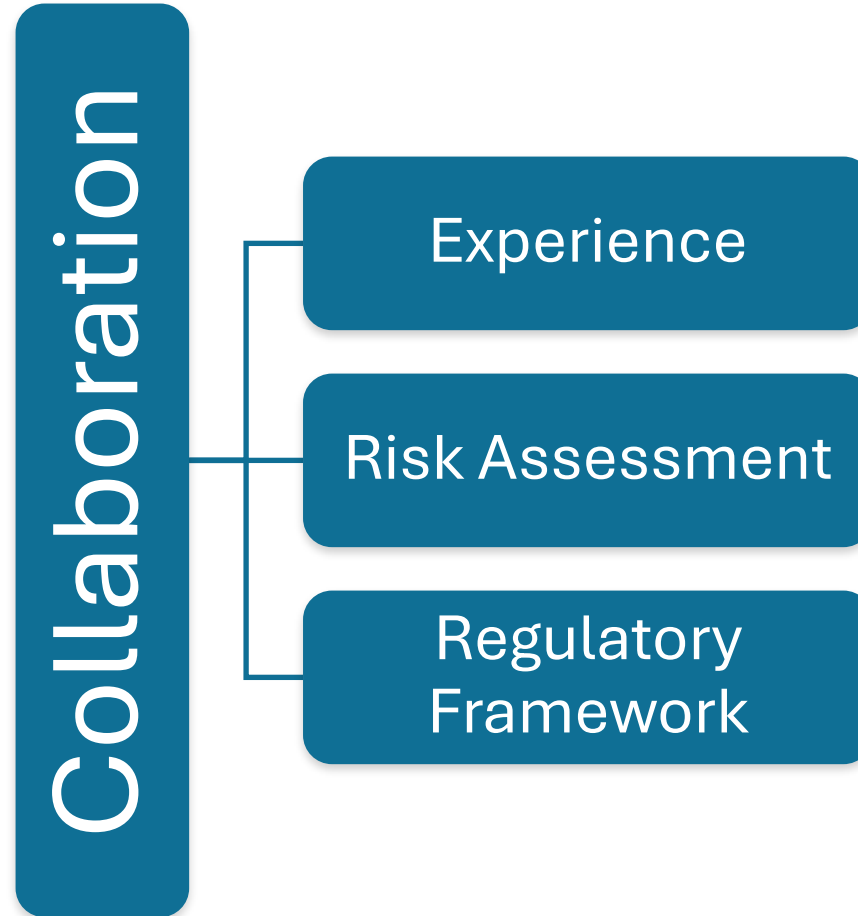




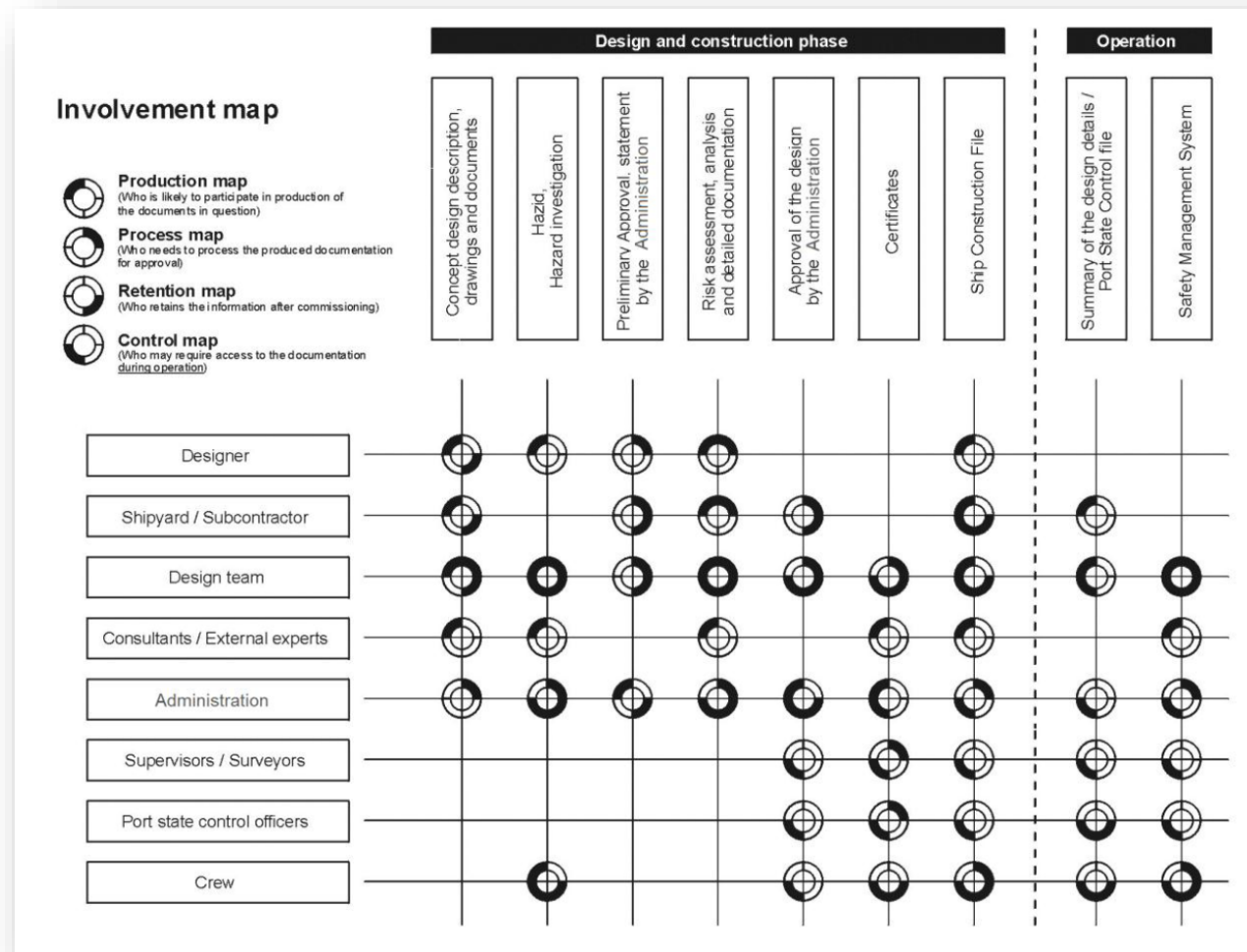
Regulatory pathway



Approach



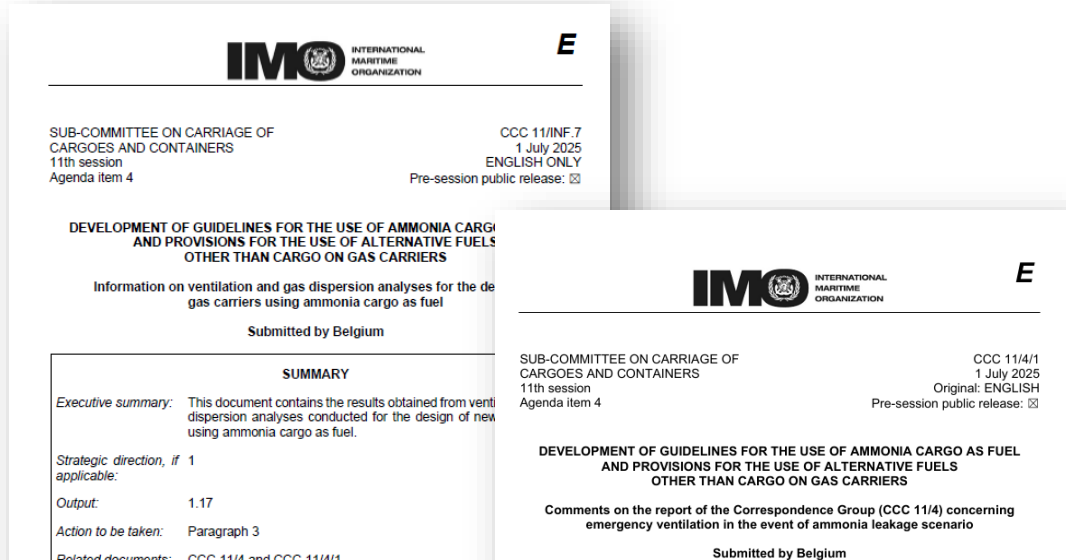
Alternative Design and Arrangement (AD&A)



Inherently Safer Design: through life management of risk

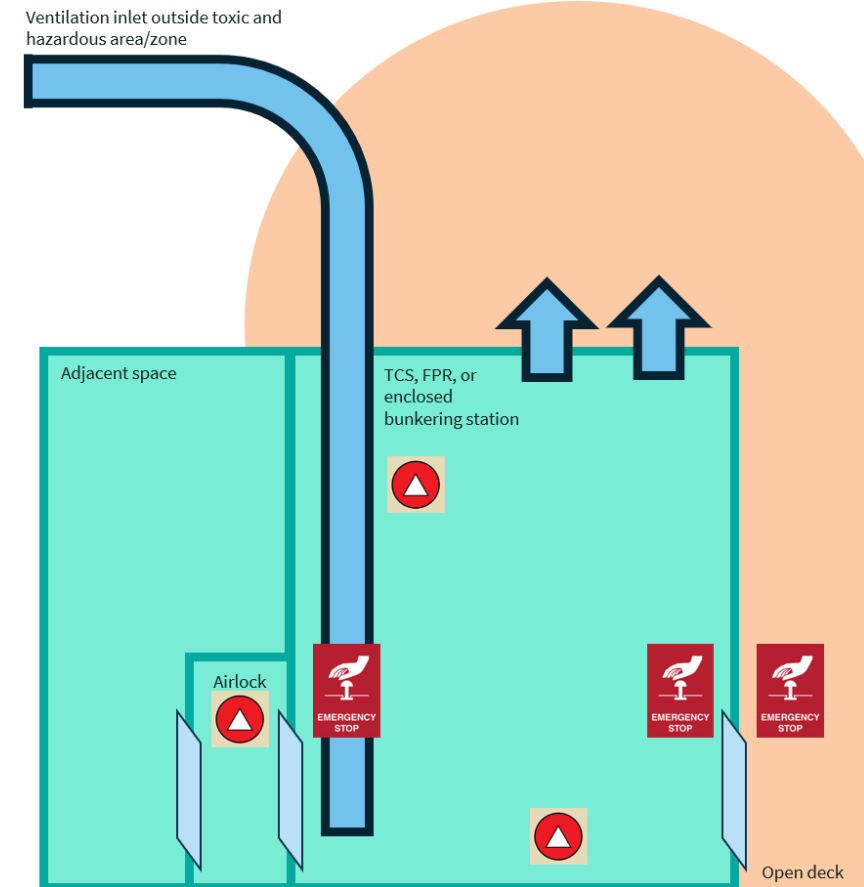


Inherently Safer Design: detection, ventilation, isolation



12 The simulations, resulting from the analysis of ventilation and gas dispersion, conducted with 30 air changes per hour (ACH) and 45 ACH, indicate that the gas cloud could reach critical receptors such as air intakes, escape routes, and lifeboats. In the case of ventilation shutdown or the use of water spray around a ventilation outlet opening, the risk appeared to be more effectively mitigated. In the simulation, the effectiveness of water spray around the heating, ventilation and air conditioning (HVAC) exhaust was reviewed.

13 The review of the mitigation measures showed that reduced ventilation rates could result in a reduction of the hazardous gas cloud size. Ventilation shutdown or the use of water spray around a ventilation outlet opening or a combination of both were found to mitigate the risk even more effectively.





Training

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Operational feedback

- Mindset
- Work Discipline
- Control and awareness
- Safety comes first
- Ergonomics and PPE
- Trust in the system design
- Reliable Fuel



Key points



- Innovation is not only a concept
- Understanding hazards and safety barriers
- Share experience from the gas industry
- Revision of guidelines