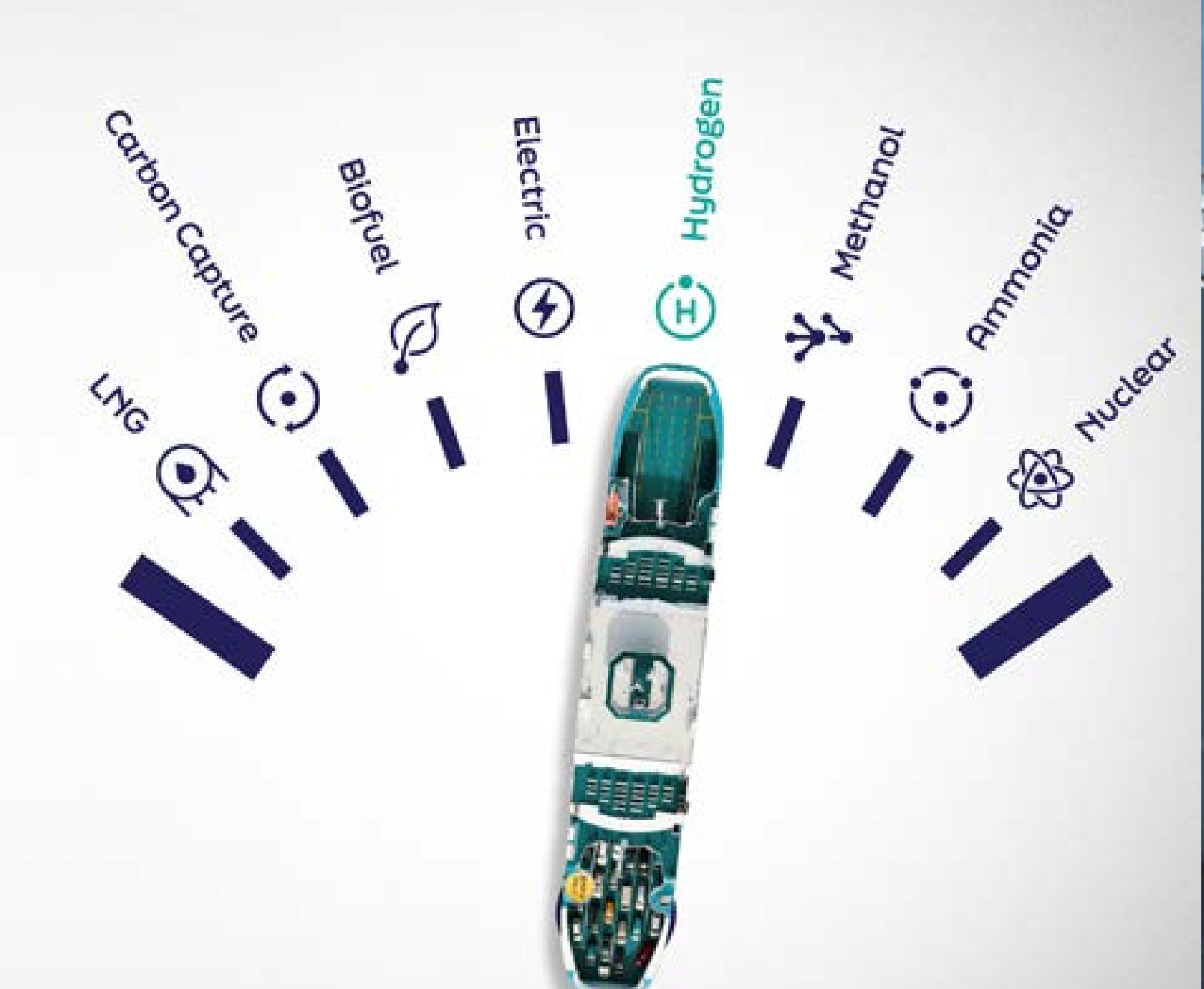


SAFETY SPOTLIGHT

Batteries and Alternative Fuels

INTERFERRY
October 2024

Regulatory Landscape

(Environmental measures to achieve IMO 2050 target and EU measures)

Adopted

Under discussion

2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2030 | 2040 | 2050

EEDI

Early implementation of **EEDI Phase 3** *(From 1 Apr. 2022)*

(Container ships, LNGCs, Gas carriers, General cargo ships, Cruise passenger ships having non-conventional propulsion)

EEDI Phase 3 *(From 1 Jan. 2025)*

(Bulk carriers, Tankers, Refrigerated cargo ships, Combination carriers, Ro-Ro ships)

Further EEDI Phase? *(subject to further discussion)*

EEXI

EEXI requirements (From 1 Jan. 2023)

EEXI review (Completed by 1 Jan. 2026)

Carbon Intensity Reductions via improved energy *efficiency*
***- New ships**: Strengthening EEDI*
- Existing ships
: 40% average CII ↓ by 2030

IMO DCS
(The first monitoring began in 2019)

CII requirements *(From 1 Jan. 2023)*

CII review (phase 1) (Completed by 1 Jan. 2026)

CII review (phase 2) (Extended after 1 Jan. 2026)

IMO GHG Strategy
(Initial Strategy adopted in Apr. 2018)

2023 IMO GHG Strategy

2028 IMO GHG Strategy

Zero or near-zero emission fuels or energy sources:
5% (striving for 10%) uptake by 2030

Net zero GHG emissions:
By or around 2050

2030 Indicative checkpoint:
Net-zero GHG emissions 20% ↓ (striving for 30%) (compared to 2008)

2040 Indicative checkpoint:
Net-zero GHG emissions 70% ↓ (striving for 80%) (compared to 2008)

Candidate measures

Development of lifecycle GHG/carbon intensity guidelines

To be further developed *(discussions in CG & ISWG-GHG & GESAMP-LCA WG)*

Discussions on mid-term GHG reduction measures

A basket of candidate mid-term measures *(Entering into force in 2027)*
- Technical element ***(GHG Fuel Standard)***
- Economic element ***(GHG emissions pricing)***

EU measures
(The first EU MRV monitoring began in 2018)

***EU ETS** – Including maritime transport from 2024*

Phase-in
2024 40%
2025 70%
2026 100%

***FuelEU** – Reducing GHG intensity from 2025*

Reduction relative to ref. year (2020)
2025 ↓2%
2030 ↓6%
2035 ↓14.5%
2040 ↓31%
2045 ↓62%
2050 ↓80%

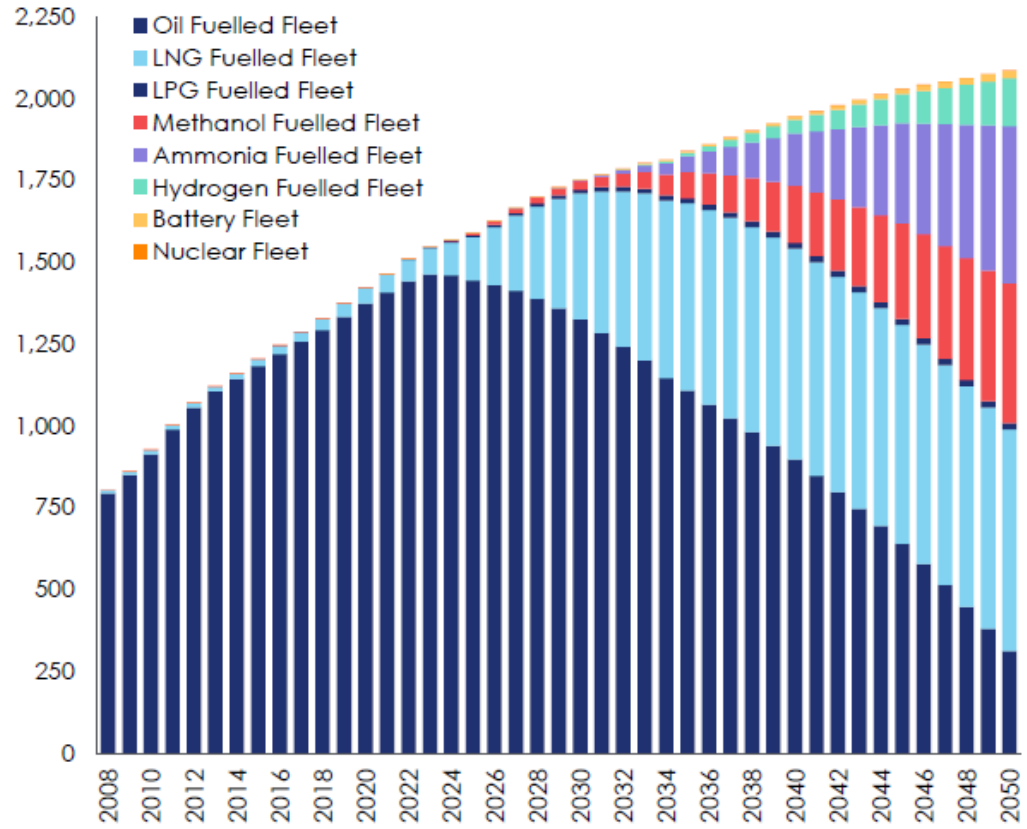
***OPS requirements** from **2030** (FuelEU)*
Containerships & Passenger ships (TEN-T maritime ports)

If by 2030 overall RFNBO usage < 1%

***2% RFNBO usage target** from **2034** (FuelEU)*

Alternative Fuels & Potential Fleet Development

- **Liquefied Natural Gas (LNG)**
- **Methanol**
- **Ammonia**
- **Hydrogen**
- **LPG, Biofuels, Electricity, Nuclear**



Source: Clarkson's Research

LR Risk Based Certification

Process

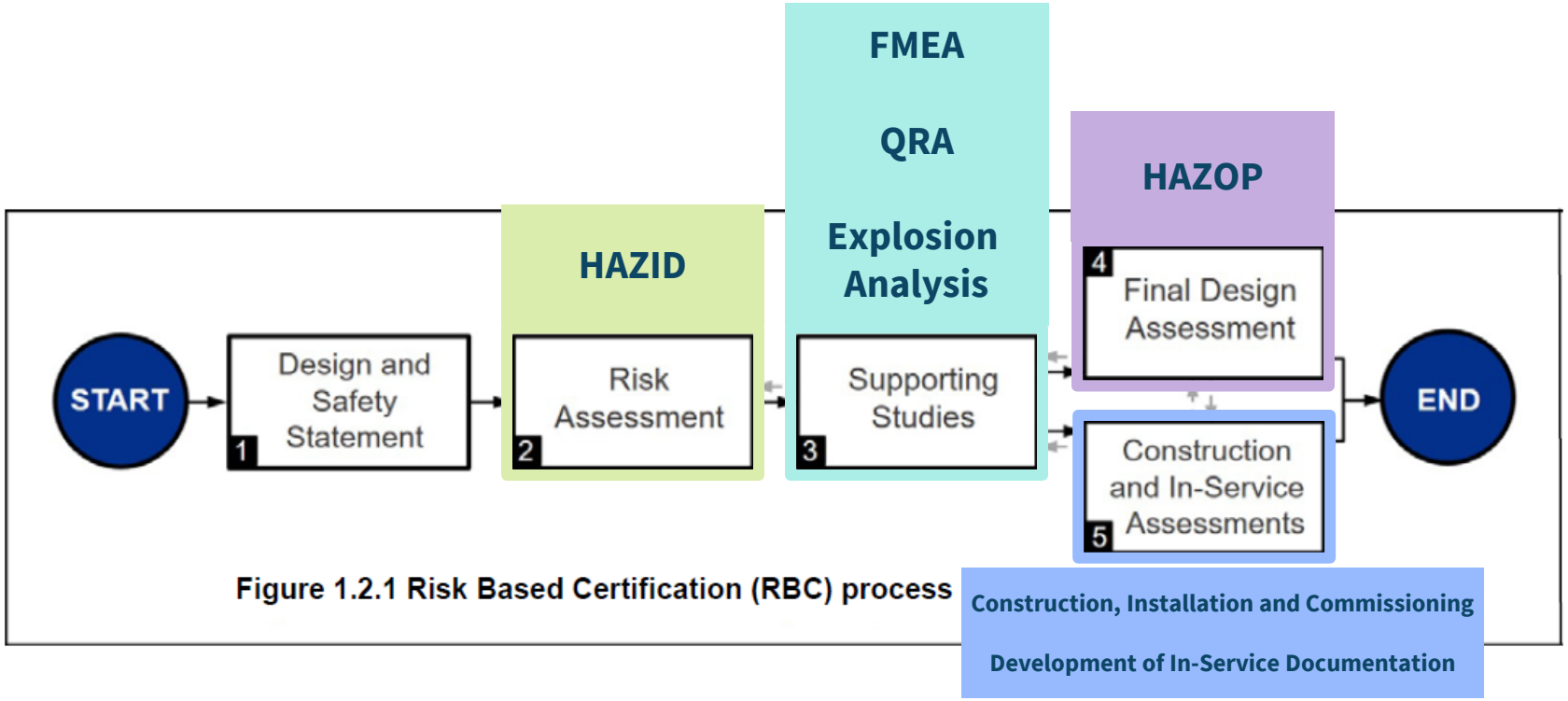


Figure 1.2.1 Risk Based Certification (RBC) process

ShipRight
Design and Construction

Risk Management

Risk Based Certification (RBC)

September 2021

Torghatten Nord Vestfjorden

Myklebust Verft, The Norwegian Ship Design Company

- In service 2026
- 2x Hydrogen and Biofuel Ferries
  - Full (bio)diesel back-up
  - NSD 120CFb design
- Vestfjorden
  - Bodø, Værøy, Røst, Moskenes
- Year round operation
- 120 cars, 600 passengers
- >85% energy used shall derive from H2
- Compressed H2
- LR AIP Granted August 2022

LR’s Decarbonisation Hub

Expertise Services Knowledge Client login and support Search Menu

Home / Maritime Energy Transition / Maritime Decarbonisation Hub

Accelerating the sustainable decarbonisation of the maritime industry

Maritime Decarbonisation Hub

Maritime energy transition | Maritime Decarbonisation Hub

LR's Maritime Decarbonisation Hub accelerates the sustainable decarbonisation of the maritime industry by enabling the delivery and operation of safe, technically feasible and commercially viable zero-emission vessels by 2030.

> The shipping industry needs leadership, collaboration and evidence-based direction to achieve its decarbonisation goals.

Readiness status of different fuel options

Electric
Biofuel
LNG
Ammonia
Methanol
Back to tab

Electrification

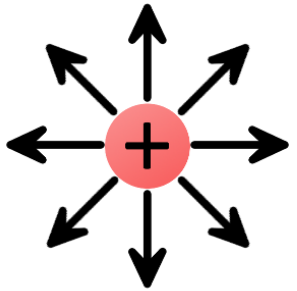
Advantages:

1. **Zero emission:** Fully battery-powered ships produce zero direct emissions of GHGs and harmful pollutants during operation.

2. **Noise reduction:** Electric propulsion systems powered by batteries are significantly quieter than traditional engines, reducing noise pollution in marine environments.

3. **Operational flexibility:** batteries can provide quick and precise power adjustments for better control and maneuverability and can provide power to smooth peak loads in the ship network.

4. **Energy efficiency:** Fewer energy conversions are required than when using fuel, and therefore fewer energy losses. Additionally, electric motors are more efficient than combustion engines.



Electrification

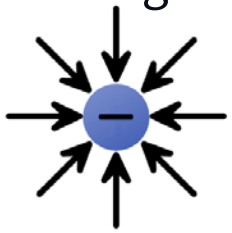
Disadvantages

1. **Limited range:** the relatively low energy density of current battery technologies compared to ships using liquid fuels limits the operational profiles of a fully battery powered ship. The use of batteries in hybrid power systems (i.e. in combination with other higher energy density technologies) increases potential applications.

2. **Recharge time and infrastructure requirements:** recharging batteries takes longer than conventional refueling of ships, impacting scheduling and operational efficiencies, and also requires significant port energy infrastructure to support this (particularly fast recharging).

3. **Environmental and social impacts:** the materials used in batteries must be sustainably sourced, and the supply chain of materials is under focus in respect of human rights violations in mining activities. At the end of their life, responsible recycling is required to limit environmental impacts and ensure effective recovery of scarce raw materials.

4. **Thermal runaway risk:** Lithium-ion batteries present a risk of uncontrolled exothermic chemical reactions which needs to be mitigated, and crew need to specialized training.



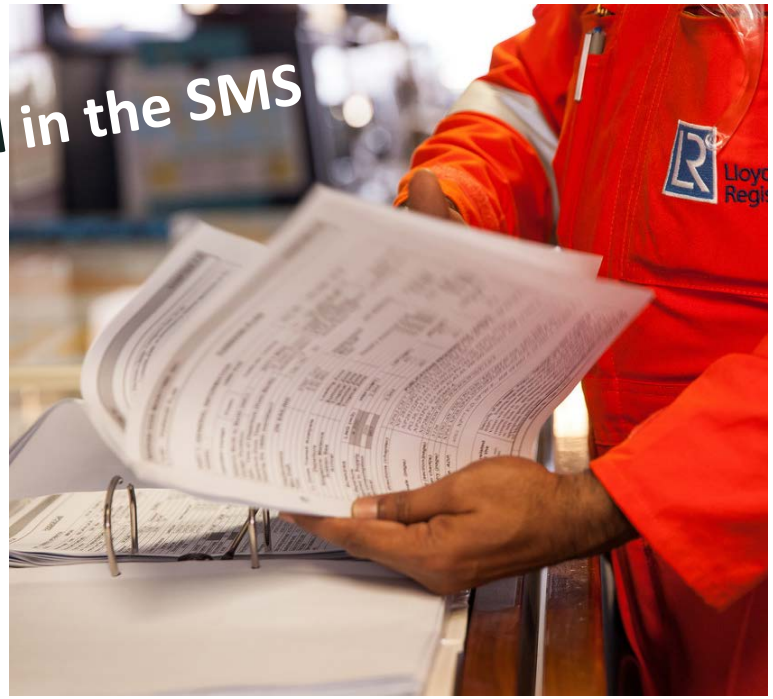
Examples of safety measures following Hazid and Hazop process for lithium batteries

- Prompt monitoring of increase temperature via thermo-cameras and infrared already entering at parking space (such as done for trucks' tunnel transit)
- Cooling down and fire-fighting independent systems layout study
- No storage of combustible materials within the parking space
- Extra ventilation to be activated from outside the space to prevent explosion
- Space segregation with boundary cooling for EV and fuel vehicles in order to minimize interaction risks
- Dedicated external areas for batteries charging stations
- Specific awareness of crew members on toxicity and explosive gases and risks associated to, immediate actions to be put in place to limit damages and chain effects

Safety Management System Implications

- Develop protocols based on HAZIDs and HAZOPs and Best Practices
  - Consistent
  - Communicated
  - Evaluated

RA Mitigating measures and best practices need to be included in the SMS



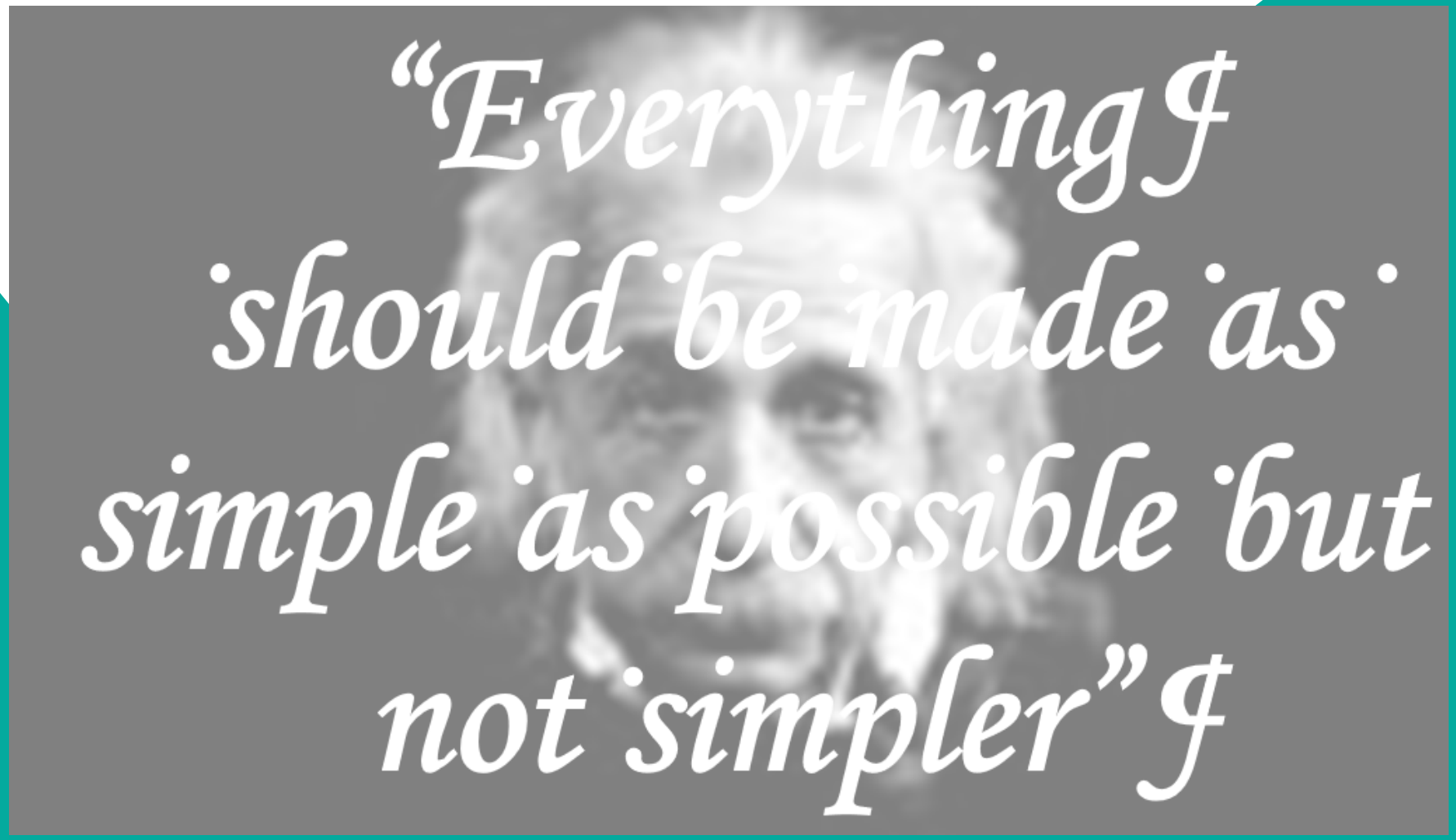
- Training and awareness of crew
  - Sufficiently trained onboard staff
  - Relevant technical detail available on board
  - Appropriate training and drills for specialized emergency response actions

Summary

This is not the time to cut corners, let’s do this right.

Realistic processes to be in place in the SMS.

Keep the operating crew and shoreside teams in mind



Thank you

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