

LEGAL ISSUES OF THE ALLOCATION OF RISK IN SHIPBUILDING CONTRACTS IN THE LIGHT OF TECHNOLOGICAL INNOVATION

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The maritime industry is currently experiencing enormous technological developments to achieve the intermediate target of reducing net greenhouse gas emissions. Dual fuel engines, alternative fuels, decarbonisation and mechanical sails are now part of modern shipping aimed at reducing fuel consumption and carbon emissions. Modern technology is still developing, which means that the allocation of design and construction risk in shipbuilding contracts is of paramount importance. Both shipowners and shipbuilders face unknown risks related to the new and still evolving technologies applied in the construction of modern vessels where international standards for such technologies are still in the process of being fully developed. The fundamental principle is to allocate the risk to the party that is in the best position and is able to manage or control the risk. Although the construction risks would normally fall upon the shipbuilder, the allocation of design risks, especially in the context of new innovative technologies, is a more complex issue. Modern technology might not be sufficiently well tested, which creates a risk that a vessel may not be constructed as intended or contracted. If the technology or its design is defective, failure to allocate the risk appropriately might lead to complex legal issues. These may include liquidated damages upon sea trials, rejecting the vessel and the termination of the contract, warranty claims for defects in applied innovative technology, or delays in the vessel's delivery. The shipbuilding contract is the best place for the shipyard and the buyer to allocate the risk of design defects.

Keywords: *gas emissions; EU and IMO rules and regulations; innovative technologies; shipbuilding contract; allocation of risk; liabilities.*

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1. INTRODUCTION

The burning of fossil fuels and the traditional production of oil and gas are major human activities that contribute to climate change.

The requirements of international laws and market competitiveness spur technological innovation in the shipbuilding industry. The maritime industry is currently experiencing enormous technological developments to achieve the intermediate target of reducing net greenhouse gas (GHG) emissions.

The emissions of GHG should be reduced by cutting the use of fossil fuels, such as oil and gas, methane and nitrous oxide emissions, and replacing the same with new innovative technologies.

Dual fuel engines, alternative fuels (such as methanol, hydrogen, etc.), decarbonisation, and mechanical sails are now part of modern shipping aimed at reducing fuel consumption and carbon emissions. Such new, innovative and clean energy technologies represent substantial challenges for the shipbuilding industry. Shipping companies and shipyards worldwide need to cooperate and find solutions in order to have their new ships designed, constructed, equipped and delivered in accordance with the decarbonisation rules and regulations of the EU regulatory bodies and the International Maritime Organization (IMO).

Efforts are being made at the EU and global level to support decarbonisation in the maritime sector and to promote the use of renewable energy, such as solar and wind energy, low-carbon fuels and clean energy technologies for ships.

2. EU AND IMO REGULATORY RESPONSES TO SHIPPING-RELATED GREENHOUSE GAS EMISSIONS

In order to reduce emissions of GHG from ships into the atmosphere, the EU and IMO have responded with a substantial volume of laws and regulations imposing new standards applicable to GHG emissions from ships or amending existing ones:

1) The Climate Delegated Act Amendment (EU 2024/3215) – includes amendments to the shipping technical screening criteria and sets out which shipping activities can be classified as environmentally sustainable and qualifies as contributing substantially to climate change mitigation or climate change adaptation. The shipping activities that have been included in the EU Taxonomy Regulation, are the construction, modernisation, operation and maintenance of infrastructure that is required for zero tailpipe CO₂ operation of vessels.

2) The FuelEU Maritime Regulation on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC (Regulation (EU) 2023/1805) (FuelEU Maritime) aims to achieve a reduction in the EU's net GHG emissions by at least 55% by 2030. FuelEU Maritime sets maximum limits for the yearly average of the GHG intensity of the energy used by ships above 5,000 gross tonnage calling at European ports, regardless of their flag. Further, under FuelEU Maritime, the rating of the vessels' GHG intensity is to be reduced in steps, with a 2% reduction in 2025 and up to, ultimately, an 80% reduction by 2050. The targets cover not only CO₂ but also methane and nitrous oxide emissions over the full lifecycle of the fuels used on board. FuelEU Maritime allows for innovation and for the development of new sustainable fuels and energy conversion technologies, offering operators the freedom to decide which fuels and technologies to use based on ship-specific or operation-specific profiles. It also aims to reduce air pollution in ports from passenger and container ships moored at berth or at the quayside.

3) From 1 January 2025, FuelEU Maritime will apply in full in respect of ships operating and trading within the EU or European Economic Area (EEA). FuelEU Maritime has the potential to affect the shipping industry significantly and may require stakeholders to take measures to align their contractual frameworks.

4) Even the Baltic and International Maritime Council, the largest shipowners' association (BIMCO) in the world, has introduced a FuelEU Maritime clause in its SHIPMAN (Ship Management Agreement) form of 2024. *Inter alia*, it states that: "The Parties acknowledge that the Vessel is required to comply with FuelEU Maritime and that the Managers (...) shall be the responsible compliance entity for the Vessel in accordance with FuelEU Maritime. Where Delivery occurs after 1 January 2025, the Owners shall, by no later than [X*] days prior to Delivery, provide the Managers with estimates of all relevant underlying information and data to be contained in a Partial FuelEU Report (where applicable) which shall be complete to the best of the Owners' knowledge together with any relevant information recorded in the FuelEU database."

5) The International Convention for the Prevention of Pollution from Ships 1973 (MARPOL) has been adopted by about 105 parties worldwide, representing about 97% of world merchant shipping by tonnage. MARPOL Annex VI – Carbon Intensity Regulations, from 1 January 2023, requires all ships to improve their energy efficiency in the short term and thereby reduce their GHG emissions. The aim is to reduce the carbon intensity of all ships by 40% by 2030 compared to the 2008 baseline.

6) IMO has created an index known as the Energy Efficiency Existing Ship Index (EEXI) in order to measure ships' energy efficiency to reduce their GHG emissions and to collect data for the reporting of ships' annual operational carbon intensity indicator (CII) and CII rating. EEXI is a measure related to the ship's technical design. The CII and EEXI regulations are also in Annex VI of MARPOL.

7) As required by Annex VI of MARPOL, from 1 January 2023 all ships are required to have an International Air Pollution Prevention (IAPP) certificate which must include the EEXI value. If ships do not have an EEXI value, then the IAPP certificate will not be issued. Without a valid IAPP certificate, vessels are unable to trade. If the EEXI value is below the target value, the shipowner will need to take action to improve the rating.

3. SHIPBUILDING

How is decarbonisation affecting shipbuilding? How is the demand for the use of renewable energy, such as solar and wind energy, low-carbon fuels and clean energy technologies for ships affecting the shipbuilding industry?

Significant numbers of ships under construction in the world's leading shipyards have dual fuel engines, and some shipowners are aiming to acquire vessels with alternative fuels that can significantly reduce fuel consumption and emissions. In the light of innovative technology, the allocation of risk between buyer and shipyard, in all its complexity, is of paramount importance. The best place for the allocation of risk to be agreed and defined is the shipbuilding contract.

As far as the construction of the vessel is concerned, the general principle is that the shipbuilding contract should allocate such risk to the builder as the party that is in the optimal position to manage and control the risk of the vessel's design, construction, and equipment.

Although in the construction industry, generally speaking, it is common for design risks to be allocated to the construction company that has appointed the engineer or architect to design the project, in the shipbuilding industry it is common for the shipyard to take responsibility for the design of the vessel. Some standard shipbuilding contract forms, such as SAJ (Shipbuilders' Association of Japan) and AWES (Association of Western European Shipbuilders) do not regulate this issue, presuming that by doing so they might avoid creating a liability for the shipbuilder. As referred to in the *Aktiebolaget Gotaverken v Westminster Corporation of Monrovia and another* below.¹

¹ See also Curtis, S., *The Law of Shipbuilding Contracts*, 3rd Edition, LLP, London/Hong Kong, 2002, p. 17, fn. 2.

However, currently both shipowners and shipbuilders face unknown risks from the new technologies applied in the construction of modern vessels. New technologies are still evolving, and international standards and the rules and regulations applicable to modern technology are still developing. Consequently, the parties to the shipbuilding contract should pay special attention to the allocation of both the vessel's design and the vessel's construction risks. This includes the use of indemnity clauses, limitation of liability clauses, and warranties that specify who is responsible for what and to what extent.

BIMCO's standard shipbuilding contract (NEWBUILDCON),² as amended from time to time (hereinafter: the Contract), has been used by the maritime community worldwide for decades.

Relevant clauses of the Contract include:

1) Shipyard's obligations

"The Builder shall **design**, construct, test and survey, launch, equip, complete, sell and deliver the Vessel to the Buyer **all in accordance with good international shipbuilding and marine engineering practice...**"

The Contract has been extremely helpful and useful for many years. It has been common for shipyards to be in charge of designing ships, either exclusively or in some form of collaboration with the buyer or buyer's architects/designers.

However, the terms of the Contract should not be taken for granted. Shipyards need to be careful as to whether they want to bind themselves by contractual obligation to design the vessel in light of the new innovative technologies and according to the regulatory requirements referred to in Section 2 above. Special attention should be paid when negotiating the terms of the shipbuilding contract where the parties intend to implement new technology that is still evolving. Shipyards should pay particular attention to the provisions in the shipbuilding contract pursuant to which they are required to design, construct, test, survey, equip and complete the ship in accordance with good international shipbuilding and marine engineering standards. In our opinion, it is difficult to presume that there are established international shipbuilding and marine engineering practices or standards that fully apply the laws, rules and regulations set out in Section 2. The parties to the shipbuilding contract should be aware of this when allocating risk.

² See <https://www.bimco.org/contractual-affairs/bimco-contracts/contracts/newbuildcon/> (accessed 25 February 2025).

2) Rules, regulations and requirements of the Regulatory Authorities

“The Vessel shall be **designed**, constructed, surveyed, tested and delivered in compliance with the applicable laws, rules and regulations ... of the ... Regulatory Authorities. All such laws, rules, regulations and requirements of ... the Regulatory Authorities shall be complied with without qualification. Regulatory Authorities mean the regulatory authorities whose rules and regulations must be complied with in the construction and delivery of the Vessel ...”

In our opinion, the Regulatory Authorities referred to in the Contract include relevant bodies of the EU and IMO. The applicable laws, rules, regulations or requirements referred to in the Contract include those referred to in Section 2.

It is worth mentioning that although disputes arising out of or in connection with shipbuilding contracts are usually referred to arbitration (in London), where the arbitrators are requested to provide their interpretation/construction of certain clauses/terms of a shipbuilding contract, this does not apply to the laws, rules and regulations of the Regulatory Authorities defined in the Contract. Clause 42 (a) of the Contract states: “Any dispute concerning the Vessel’s compliance or noncompliance with the rules, regulations and requirements of the ... Regulatory Authorities shall be referred to the ... Regulatory Authorities ..., the final decision of which shall be final and binding upon the Parties hereto.” Obviously, the final decisions of the international Regulatory Authorities, such as IMO and EU bodies, require their indirect enforcement by public authorities in every State through their respective port state control.

3) Modifications and change required by the Regulatory Authorities

In addition to the shipowner’s and shipyard’s rights to request certain modifications or changes in the ship’s specification during the ship’s construction, “if, after the date of Contract, there are any changes in the applicable laws, rules, regulations or requirements (or their application) of the ... Regulatory Authorities” and “if such changes will be compulsory for the Vessel upon her delivery the Builder will need to incorporate such modifications and/or changes into the construction of the Vessel”.

4) Shipyard’s guarantee (warranty)

Clause 35 (a) of the Contract provides that: “The Builder shall guarantee the Vessel against any Defects (see Definitions) provided such Defects are: (i) discovered within the number of months ... after delivery of the Vessel ...”

Definitions in the Contract include:

“‘Defects’ means any deficiencies or defects in **the design**, construction, material and/or workmanship on the part of the Builder or its Sub-contractors, excluding ... faulty design if technical knowledge did not exist as of the date of this Contract”.

Guarantee/warranty provisions in the Contract should be considered in the light of innovative technologies (such as dual-fuel engines, alternative fuels – solar panels and wind turbines, ammonia, hydrogen, methanol, etc.).

Traditionally, the warranty clauses in shipbuilding contracts either did not make any reference to the faulty design of the ship, which implies that the shipyards did not limit their liability for the design of the ship pursuant to the terms of the warranty clause as they did in respect of all defective workmanship and material in the hull of the ship, her machinery and equipment, or expressly excluded the application of the warranty regime to the faulty design if technical knowledge did not exist as of the time the contract was made.

Either way, shipyard’s liability for faulty design was vaguely defined in warranty clauses. In the case of *Aktiebolaget Gotaverken v Westminster Corporation of Monrovia and another*,³ the High Court held that the shipyard’s warranty obligations in respect of ‘material used and work performed’ included the shipyard’s faults in design.

In order to avoid any ambiguity, BIMCO’s guarantee clause in the Contract contains an express reference to deficiencies or defects in the design.

Traditionally, the warranty period has commonly been no more than 12 months from the date of the vessel’s delivery. For obvious reasons, the shipyard prefers the warranty period to be shorter and the shipowner prefers a period as long as possible.

However, in the light of new technology and designs in shipbuilding, especially in respect of ships’ engines, and given the rules and regulations referred to in Section 2 above, the use of modern technology, and the application of new international standards of acceptable levels of fuel emissions, the parties to shipbuilding contracts are required to allocate and manage the risk more equitably than ever before.

English courts generally follow the parties’ intentions clearly set out in the contract. Bearing this in mind, it is of extreme importance for the shipyard and the buyer to clearly allocate the risk in their shipbuilding contract regarding liability for the design and performance of the ship.

³ Macinnes, A.; Jeon, S., *Role of an Owners’ Superintendent or Naval Architect – Walking the Line*, *Tatham Macinnes*, 9 March 2020, <https://tatham-macinnes.com/knowledge/role-superintendent-naval-architect-walking-line/> (accessed 25 February 2025).

4. ALLOCATION OF RISK

BIMCO's Contract is (primarily) governed by English law.

Under English law, the shipbuilding contract is a contract for the construction and sale of a ship by description.⁴ More specifically, it is a contract for sale in the future rather than for the sale of existing goods, just like a building contract.

Unlike the continental European legal tradition, English courts seek to establish the objective meaning of the contract rather than the parties' subjective intentions. Therefore, the terms of the contract are relevant evidence. Allocation and management of risk is central to all commercial contracts.⁵ Effectiveness and value for money of contracted services will only be achieved where risk allocation is equitable and where the party managing the risk is the one most reasonably able to do so.⁶ The fundamental principle is to allocate the risk to the party that is in the best position to manage or control the risk.⁷

The parties should carefully consider the allocation and management of risk and the legal issues arising therefrom when negotiating a shipbuilding contract based on innovative technology.

When making their decision as to the contract party's right of indemnity, the English court and English arbitrators will take into consideration the allocation of risk agreed by the parties to the contract.

Bearing in mind that innovative technologies in the marine industry are still evolving, the design risk should be distributed appropriately between the parties, taking into consideration their respective knowledge and experience. The usual places in a shipbuilding contract where the parties can agree to allocate their respective risks are the provisions governing their respective representations and warranties, indemnities and the limitation/exclusion of liability clauses, contractual remedies, and guarantee/warranty.

⁴ Muttiah, N., Key Terms in a Shipbuilding Contract (Part 1), *Praktis*, 21 February 2023, <https://www.praktis.com.my/all-articles/key-terms-in-a-shipbuilding-contract> (accessed 25 February 2025).

⁵ Designing Buildings, Risk Allocation, https://www.designingbuildings.co.uk/wiki/Risk_allocation (accessed 25 February 2025).

⁶ Government Commercial Function, Risk Allocation and Pricing Approaches, Guidance Note, May 2021, https://assets.publishing.service.gov.uk/media/60a388a9e90e07357baa83da/Risk_allocation_and_pricing_approaches_guidance_note_May_2021.pdf (accessed 25 February 2025).

⁷ Simpson, M.; Wilkinson, T., Risk Allocation in the Construction Industry, *Systech*, 8 January 2025, <https://www.systech-int.com/insights/thoughts/risk-allocation-in-the-construction-industry> (accessed 25 February 2025).

If the design risk is not clearly allocated in a shipbuilding contract, it might be presumed that the design risk is the responsibility of the shipyard. However, the shipyard should be indemnified for the design risk if it did not assume it under the terms of the shipbuilding contract.

If any changes in the applicable laws, rules and regulations or requirements of the Regulatory Authorities are compulsory for the ship upon her delivery, it is commonly presumed that it is the shipyard's responsibility to incorporate such changes into the ship's construction (Clause 26 (b) of the Contract). It is our view that in each particular case the parties to the shipbuilding contract should appropriately allocate the risk of application of changes and modifications in the rules, regulations and requirements of the Regulatory Authorities to the ships's construction, especially where such changes and modifications affect the regulations referred to in Section 2 above.

In the contexts of new technology, it is difficult to predict what warranty period would be the most appropriate for both parties. Equally, it is hard to predict what remedies and repairs the shipyard would be required to fulfil in cases where the new technology is provided by third parties, including as part of the buyer's supply. The capacity of the shipyard and/or its subcontractors to repair faults in the vessel's modern technology fuel systems, the facilities existing in the place where the repairs should be made, the experience and capability of the crew to deal with such faults, and realistic warranty periods should be carefully considered.

Shipyards and shipowners should appropriately allocate the risk attached to their respective liabilities when drafting the guarantee/warranty clause in the shipbuilding contract, particularly bearing in mind the application of new, untested materials and technologies and the work performed on the new fuel alternatives related to which there is little significant experience. When allocating risk in respect of the shipyard's warranties, the parties should consider that innovative technology provided by third parties (including that supplied by the buyer's suppliers) is beyond the shipyard's control.

The proper and fair allocation of risk should minimise uncertainty regarding the scope of future potential liabilities.

If the parties do not allocate the risk in their shipbuilding contract properly, they might face substantial and expensive legal disputes arising from:

- faults in the design, construction and equipment of the vessel and in the vessel's propulsion caused by the installation and application of new, modern and untested technology;

- failure to produce a ship in accordance with good international shipbuilding and marine engineering practice which, in the field of modern technology, is still non-existent or untested;

- modifications of innovative technology during the vessel's construction as required by the rules and regulations of the Regulatory Authorities;

- rejection of the vessel on delivery if the vessel does not comply with the said rules and regulations, and/or fails to:

- correspond with the description agreed in the shipbuilding contract and technical specification;
- be of a satisfactory quality; and
- be reasonably fit for purpose;

- termination of the contract and claim for damages.

The allocation of risk in shipbuilding contracts represents a very important negotiating point. Both the shipyard and the buyer seek to minimise their respective risks; however, the shipbuilding contract can only be performed fully if the risk allocation is equitable and appropriate and where the party managing the risk is the one most suitable and able to do so.

The parties are aware that new technologies implemented in new vessels have not yet been tested properly and that there is not much history of interpretation of the new applicable rules and regulations listed in Section 2 above.

It remains to be seen whether and to what extent BIMCO's Contract description of the vessel's engine will take into consideration the fuel requirements referred to in Section 2. Equally, to what extent will a shipyard's failure to satisfy such requirements entitle the buyer to claim liquidated damages?

There is little point in allocating risk to only one party to the shipbuilding contract if the result thereof would create substantial errors and defects in the vessel's design and performance, consequently failing to meet the English law requirements listed above. The risk should always be allocated appropriately between the shipyard and the shipowner or buyer.

5. CONCLUSION

The maritime industry is currently experiencing enormous technological developments in order to achieve an intermediate target of a reduction of net GHG emissions by at least 55% compared to 1990 levels by 2030. Modern technology is still developing, which makes the allocation of design and construction risk in

shipbuilding contracts a very complex matter. Both the shipowners and shipbuilders face unknown risks of the new technologies applied in the construction of modern vessels the technology of which is still evolving, and international standards for it are still in the process of being fully developed. The shipbuilding contract is the best place for the shipyard and the buyer to allocate the risk of design defects. Allocation of design risks in the context of new innovative technologies is a complex issue requiring careful contractual arrangements to balance responsibilities and mitigate potential disputes between shipbuilders and shipowners.

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Sažetak:

PRAVNI ASPEKTI RASPODJELE RIZIKA U UGOVORIMA O GRADNJI BRODA U SVJETLU TEHNOLOŠKIH INOVACIJA

Pomorska industrija susreće se s važnim tehnološkim zahtjevima radi postizanja ciljanih smanjenja stakleničkih plinova. Dvojni motori na gorivo, alternativna goriva, dekarbonizacija i mehanički jarboli sada su sastavni dio modernog pomorstva usmjerenog prema smanjenju potrošnje goriva i izgaranja ugljika. Moderna se tehnologija još uvijek razvija, što čini podjelu rizika za projekt i izgradnju broda u ugovorima o gradnji broda od iznimne važnosti. Brodovlasnici i brodogradilišta suočeni su s nepoznatim rizicima koje donose nove tehnologije, a koje se primjenjuju u gradnji modernih brodova, pri čemu se tehnologija još uvijek razvija, kao i međunarodni standardi za takve tehnologije koji su još u fazi postupnog razvoja. Temeljno je načelo da se rizik dodijeli onoj ugovornoj strani koja je u najboljem položaju i najbolje osposobljena upravljati dodijeljenim rizikom, odnosno kontrolirati ga. Iako je uobičajeno da je rizik gradnje broda na strani brodogradilišta, pitanje dodjele rizika projekta, osobito u svjetlu tehnoloških inovacija, znatno je složenije. Moderna tehnologija još nije u dovoljnoj mjeri testirana, što upućuje na rizik da brod možda ne bude izgrađen kako je zamišljen i ugovoren. Ako se utvrdi da primijenjena tehnologija ili sam projekt imaju nedostatke, izostanak pravilne raspodjele rizika može prouzročiti složene pravne probleme. Spomenuti problemi mogu se odnositi na pitanje primjene ugovorne kazne tijekom probnih vožnji broda, naručiteljevo odbijanje broda i raskid brodograđevnog ugovora te garantne reklamacije zbog nedostataka u primijenjenoj novoj tehnologiji ili kašnjenju isporuke broda. Ugovor o gradnji broda najbolji je način na koji brodograditelj i naručitelj mogu dogovoriti raspodjelu rizika od nedostataka u projektu.

Ključne riječi: emisije plinova; pravila i regulative EU i IMO; inovativne tehnologije; ugovor o gradnji broda; raspodjela rizika; odgovornosti.