Journal of
*Marine Science and Engineering*

MDPI

*Editorial*

# Design, Analysis and Maintenance of Green, Innovative Marine Structures

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This Special Issue includes eleven research studies on structural design, analysis and maintenance of green, innovative marine structures. The Editors discussed the integral framework for green marine structural design in the era of climate change perspective. The contributions are grouped into three topics, namely advanced methods for the design and analysis of marine structures [1–5], new materials and corresponding computational methods [6–8] and innovative marine structures [9,10].

The study presented in [1] developed a risk-based framework for performing multi-attribute decision-making ship structural design of a multi-purpose ship. The corrosion degradation progress for the longitudinal girder between the fuel oil tank and water ballast tank in the double bottom of a bulk carrier, based on 1918 corrosion depth values in 20 ships, is analyzed in [2]. The visualization of the collision avoidance system for the drill floor of an offshore drilling facility, using the digital twin concept, is presented in [3]. The experimental and numerical study of the compressive collapse of initially corroded steel-stiffened plates with multiple circular openings, which may be used as tank wash plates, is provided in [4]. A new method of failure mode identification of the ultimate strength of stiffened panels is developed in [5], where the boundary between different failure modes is determined, and a four-parameter ultimate strength formula is proposed.

A novel analytical approach for buckling of ring-stiffened porous graphene platelet-reinforced composite cylindrical shells under hydrostatic pressure is proposed in [6] under the framework of symplectic mechanics. The study presented in [7] established a procedure for assessing the impact of material composition and weave on the ultimate strength of GFRP stiffened panels. The hygroscopicity, mechanical properties, and biofouling resistance of biocomposites made of epoxy resin with 28 m% bio-based carbon content reinforced with flax and hemp fibers are addressed in [8].

Studies presented in [9–11] dealt with an innovative tourist submarine with a hull made of transparent acrylic cylinders, enabling passengers an almost unobstructed view from the hull's interior. A numerical study of the hydrodynamic resistance of the submarine is analysed in [9] using the RANS-based CFD method. The experimental study of the same submarine is described in [10], covering resistance, towing, seakeeping, and open-water propeller tests. Structural aspects of the submarine design are covered in [11], where a novel design-by-analysis approach is proposed for this purpose.

*The Journal of Marine Science and Engineering* hosted a webinar entitled "Design, Analysis and Maintenance of Green Innovative Marine Structures "on 9 November 2022 [12], providing the recent advances in the modelling of the environmental conditions, cruise ships and yacht structural design, risk-based hybrid light-weight structural design accounting for carbon footprint and digital twin of floating offshore wind turbine.



**Citation:** Parunov, J.; Garbatov, Y. Design, Analysis and Maintenance of Green, Innovative Marine Structures. *J. Mar. Sci. Eng.* **2023**, *11*, 1535. https://doi.org/10.3390/jmse11081535

Received: 14 July 2023
Accepted: 18 July 2023
Published: 1 August 2023

**Funding:** Joško Parunov is co-financed by the European Union from the European Regional Development Fund within the Operational Program "Competitiveness and Cohesion 2014-202", project KK.01.2.1.02.0339—Development of the multi-purpose luxury touristic and research submarine and supported in part by Croatian Science Foundation under the project IP-2019-04-2085. Yordan Garbatov has been supported by the Strategic Research Plan of the Centre for Marine Technology and Ocean Engineering, CENTEC, financed by the Portuguese Foundation for Science and Technology (Fundação para a Ciência e Tecnologia-FCT) under contract UIDB/UIDP/00134/2020.

**Acknowledgments:** The editors wish to express sincere gratitude to all authors and reviewers.

**Conflicts of Interest:** The authors declare no conflict of interest.

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