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Editorial

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Editorial

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Over the past years, *Maritime Engineering* has consistently been a journal of many remarkable scientific contributions in numerous topics of Offshore and Coastal Engineering, as well as in other related topics of advanced research and practical applications in Maritime Engineering.

Owing to its track-record of publishing high-quality contributions, the year 2020 was no exception in spite of the challenging times faced due to the world's pandemic crisis, whose impacts also reached the 'realm of scientific publications'. Nevertheless, the number of submissions was still considerably high, which enabled a noteworthy gathering of scientific and applied case-study contributions that represent a meaningful impact in the development of Maritime Engineering. For the year 2021, the same mission remains: to keep on providing high-quality papers on the aforementioned topics to the scientific and professional communities.

As part of this mission, the first issue of this year is presented. As in several other published issues, – for example Correia *et al.* (2019a, 2019b, 2020a, 2020b), Fazeres-Ferradosa *et al.* (2019a, 2020) – there is a good balance between research and applied engineering papers, from practical cases to fundamental research. This issue brings us three interesting papers on the topics of Marine and Petroleum Geology (Yan *et al.*, 2021), Statistics of Met-ocean Environment (Myrhaug and Lader, 2021) and Coastal and Maritime Structures (Melchers and Howlett, 2021).

On the first topic, Yan *et al.*, (2021) provide an experimental modelling study concerning the pockmarks caused by gas hydrate decomposition by aeration. Often the decomposition of gas hydrates releases gas at large volumes, which escape violently, from deep submarine sediments. Not rarely, this results in significant changes in the seabed morphodynamics. For example, in natural gas hydrates, the decomposition of 1 m³ is converted to 164 m³ of gas and 0.8 m³ of water (Wang *et al.*, 2018). Such volume expansion can lead to marine geological

disasters, with pockmarks being one of them. In fact, the decomposition of gas hydrates is often pointed out as a cause of failure for submerged slopes (Nian *et al.*, 2020). Failure of submarine slopes remains a marine/geological phenomenon which is, by far, less studied than other geotechnical related failures (Rhee, 2015). Through a physical model, Yan *et al.*, (2021) showed that inflation in an underwater slope causes shear damage on the slope surface, with a venting channel eventually developing into a crater-like pockmark. Additional insights are given on the relationship between the sedimentation velocity and the flow velocity, the pore pressure at the slope and the influence of these variables in the submarine slope failure. This contribution provides an interesting topic that has considerable practical implications for numerous maritime structures and engineering operations, with a particular focus for those inherent to the exploitation of natural resources as oil and gas, namely in the stability of bottom-fixed structures (*e.g.* Paiva *et al.* (2020), Pavlou *et al.* (2019) or Seth *et al.* (2021)).

On another appealing theme, the statistical description and prediction of met-ocean data stand as a key topic to design marine structures at the nearshore (Goulby *et al.*, 2017; Hames *et al.*, 2019) and offshore locations (Fazeres-Ferradosa *et al.*, 2018). A review of such statistical models is given, for example in Vanem *et al.* (2019), whereas practical applications are provided by Fazeres-Ferradosa *et al.*, (2019b) and Hames *et al.*, (2020). In the present issue, Myrhaug and Lafer (2021) provide us with a novel analytical method to estimate the random wave-induced drift in shallow waters within sea states, using deep-water wind statistics or deep-water wave statistics. In this new method, the wave-induced current in shallow waters is expressed in terms of the significant wave height and mean wave period. The method is then applied based on the met-ocean data from a deep-water location in the North Sea, but could be of added value to many other applications, namely, for nearshore drift-induced sediment transport, or even for matters related to the design of maritime structures under

wave-induced current loads and associated phenomena – as scour at breakwaters (Kim *et al.*, 1999) and other structures (Fazeres-Ferradosa *et al.*, 2021) – or safety matters at near-shore locations (Hoguane *et al.*, 2019). Myrhaug and Lafer (2021) method stands as a simple way to obtain preliminary estimations that might be used in practical cases, before diving into complex numerical models to propagate offshore conditions to nearshore locations.

Finally, a third contribution is given by Melchers and Howlett (2021), which present a remarkably interesting field case. This study concerns the corrosion phenomenon at the Phoenix caissons after 75 years of marine exposure. Near the coast of Arromanches (France), these reinforced concrete caissons endured a long period of marine immersion, tidal, splash and atmospheric conditions, from 1944 to nowadays. Therefore, this case study addresses a broad range of conditions over an unusually large period, which is not commonly reported in the literature. While giving a very interesting historical perspective on the caissons life cycle, Melchers and Howlett (2021) use observed data to derive important guidelines for the design of new reinforced concrete structures and the prediction of the remaining life of older marine exposed reinforced concrete structures. Additionally, this paper provides a clear photographic compendium that really shows the evident degradation of the caissons, along with several building pathologies. This article concludes that archival material from the Second World War revealed the caissons were designed to low safety margins and constructed at a very fast rate mostly with unskilled labour and minimal material usage. The concretes had a high cement content and were made with calcareous aggregates. Melchers and Howlett (2021) point out that these factors contributed to the high strength, low permeability, and high remaining alkalinity of the concretes and hence to the very low evidence of reinforcement corrosion. This paper stands as a worthwhile read for all practising coastal engineers.

As *Maritime Engineering* continues bringing to its readers meaningful contributions to a broad range of topics included in its scope of activity, the year 2021 is foreseen as another year full of interesting initiatives at our journal. Therefore, as a closure to this editorial, a chance is taken to advertise our next themed issue for 2021, ‘Good practices for Coastal Erosion and Sea Level Rise Management’. This themed issue counts with the valuable expertise of the Leading Guest Editors, Professor Francisco Taveira Pinto and Professor Paulo Rosa Santos, from the Faculty of Engineering of the University of Porto (Portugal). It is a themed issue on a topic of crucial importance for all engineers, scientists and remaining professionals, who somehow deal with the matters of coastal morphodynamics, coastal protection and monitoring activities, climate change and sea level rise on coastal and nearshore regions, among other important issues embraced by the scope

of coastal engineering towards sustainable management and responsible action to counteract the effects of sea-level rise.

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