


Editorial

Special Issue on Improving the Environmental Performances of Maritime Transport and Ports

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In recent years, we have witnessed an increase in maritime freight transport, leading to great economic performance for the ports and regions in which they are located; this has also led to an increase in related externalities, with environmental issues occurring during all the phases of navigation, and especially at terminals. In the aftermath of the COVID-19 pandemic, global society fostered a deep change in the maritime transport sector, including energy transition, shipping decarbonization, and the digitalization of global supply chains. In this era of change in the shipping sector, mitigation measures must be pursued and oriented toward the environmental sustainability of maritime transport, guaranteeing the resilience of the practices envisaged, especially in light of the disruptive challenges our world is still facing.

In this respect, this Special Issue aimed to collect and present high-quality research addressing the contemporary challenges and innovations aimed at the operations and management of ports and maritime transport to improve environmental performance.

A total of five papers (three research papers and two review papers) in the field of environmental mitigation of maritime transport impacts are presented in this Special Issue. Topics include alternative marine fuels, planning of container terminals, combined transport, and emissions mitigation. More specifically, Ref. [1] applied multicriteria analysis as a decision-support tool for the alternative marine fuel selection problem in coastal marine traffic. They used a combination of the Analytic Hierarchy Process and Simple Additive Weighting to involve relevant stakeholders in the case study of Croatia; results from the application showed that the best alternative for all stakeholders was electric propulsion, even though there were significant differences in opinions and perceptions with respect to the objectives and criteria. In [2], the authors presented a Terminal Decision Support Tool (TDST) to support the decision-making processes of port managers and applied it to the case study of the Port of Augusta in Italy. The TDST helps to consider both operation efficiency and environmental impacts at the planning stage and provides environmental impact mitigation measures based on different levels of evolution of container traffic. Scholars investigated the contribution of container stability to the impacts of maritime transport in [3], analyzing the case of transporting combined trains by sea. They suggested an improvement in the load-bearing structure of a flat wagon with the use of a viscous linkage between containers with the aim of reducing their dynamic load and modeled the solution using MathCad. Results from the modeling of the developed solution contribute to increasing the efficiency of combined transport and improving the safety of freight shipping. The two review papers deal with the analysis of emissions occurring during maritime transport operations and, in particular, at port terminals. The first [4] investigates the consequences of ships' emissions on human health and agricultural production in Italian ports and coastal areas and how such emissions can be reduced. The research indicates that black carbon emissions are threats to human health and agricultural production in Italy, as well as the global climate; thus, it is important to pay more serious attention to this issue



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when policymaking. Some cost-effective, emission-reducing measures are readily available, but there is a need for multi-level governance systems to institute new short-term and long-term policies. A systematic review [5] used PRISMA guidelines to develop a multi-layered review of the literature to find the most applicable methodology for the estimation of emissions in port areas. Results from the analysis detailed the five most commonly applied methodologies and datasets worldwide, with details on their formulas. The study assumed that the general methods used to assess ship emissions in ports are based on a combination of data about ship engines and their performances, fuels, movements, and energy consumption. In conclusion, all the papers published in this Special Issue are of great interest for mitigating environmental emissions in maritime transport and port areas, making significant and innovative contributions to the current state of research.

Although submissions for this Special Issue have been closed, more in-depth research in the field of mitigating the environmental impact of maritime transport is needed to address the challenges we are still facing today in this sector and frame the management of ports and maritime transport with a focus on environmental protection.

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