



## EDITORIAL

# Marine Structures under Special Loads

Chandrasekaran Srinivasan\*

Madras Institute of Technology, India

---

### ARTICLE INFO

#### *Article history*

Received: 15 August 2022

Accepted: 25 August 2022

Published Online: 20 September 2022

---

Environmental loads that act on marine structures are highly non-deterministic in general. Estimating these loads is a basic requirement for their structural design, but their response is far beyond just counteracting the loads<sup>[1,2]</sup>. The marine environment poses more challenges starting from the choice of material, structural form, design methods, construction techniques, inspection methods, repair, and retrofitting. Furthermore, strength degradation and service life decrement are complex to estimate as they pose a non-proportional response to age and material use. Special loads such as fire, impact, blast, and loads that arise from marine growth need a special revisit. As the conventional design codes are silent about the recommendations for such special loads, design engineers satisfy the special requirements based on their domain expertise and experience. Corrosion is one of the major threats to the structural members of the marine environment. X52 steel, one of the most-preferred candidates for steel members,

also faces explicit challenges under this corrosive environment. Functionally Graded Materials (FGM), one of the recent advancements in material science, is seen as an effective alternative to counteract the challenges imposed by the marine environment. But, due to the limited knowledge of FGM and its manufacturing techniques, marine engineers cannot take the way out of using conventional marine steel. Apart from a very high-cost factor, relative disadvantages possessed by X52 steel in the marine environment are grossly ignored for want of no alternative.

Marine structures built for coastal protection should possess high reserve strength and long service life. Not because they are strategically important, but because they cannot often be structurally intervened for repair. Furthermore, repair of marine structures like jetties, dry docks, and breakwaters is generally carried out while they are in service. It is obvious that repairing structural members who face strength degradation is quite challenging

---

\*Corresponding Author:

Chandrasekaran Srinivasan,

Madras Institute of Technology, India;

Email: [drsekaran@iitm.ac.in](mailto:drsekaran@iitm.ac.in)

DOI: <http://dx.doi.org/10.36956/sms.v4i2.669>

Copyright © 2022 by the author(s). Published by Nan Yang Academy of Sciences Pte Ltd. This is an open access article under the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License. (<https://creativecommons.org/licenses/by-nc/4.0/>).

when they are in service [3]. Capacity reduction without any incremental decrease in the encountered loads places marine structures under a special category of repair and retrofiting. Invasive methods such as pressure grouting, crack filling with chemical admixtures, and waterproofing treatments are only cosmetic and shall not help restore the strength of structural members; but, even such methods of repair are directed by the chemical admixture manufacturers, which fall in the domain of non-engineering practices.

Inviting papers from academia, practicing engineers, and researchers addressing the above concerns aims to enlighten readers about robust design practices and repair techniques.

We believe that the papers, though few, shall help the readers understand the focussed complexities faced by marine structures. On behalf of the journal's Editorial Board, I sincerely thank the authors for contributing original papers to this journal. I shall expect a few more contri-

butions from academia in the future.

### **Conflict of Interest**

There is no conflict of interest.

### **References**

- [1] Chandrasekaran, S., Jain, A.K., Shafiq, N., et al., 2021. Design aids for offshore platforms under special loads, CRC press, Florida. pp. 280.
- [2] Chandrasekaran, S., 2020. Design of Marine Risers with Functionally Graded Materials, Woodhead Publishing, Elsevier. pp. 200.
- [3] Liu, H.J., Li, H.N., Fu, X., 2021. Wind-resistant performance and failure modes for a semi-submersible offshore platform during jacking closure. *Ocean Engineering*. DOI: <https://doi.org/10.1016/j.oceaneng.2021.110102>