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Experimental investigation on a lightweight ship balcony overhang with bimetallic welded joints

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Integration of lightweight and sustainable solutions in marine structures design is essential to achieve weight reduction goals and improve structural response. A key step to assess the reliability of innovative structural solutions is represented by large-scale experimental investigation.

The current paper deals with the analysis of a lightweight ship balcony overhang, which includes an aluminium honeycomb sandwich structure and bimetallic welded joints. The design of the ship balcony overhang was previously performed, as an illustrative example, with the aim of suggesting the replacement of common marine structures with more green and lightweight alternatives.

In order to validate the design procedure and to assess the feasibility of the suggested solution, an experimental investigation on a large-scale structure was performed. The ship balcony overhang was tested under bending with a configuration representative of severe loading conditions for ships balconies. The experimental analysis allowed the evaluation of the structure's strength, stiffness and failure modes, which are useful data to improve the design methodology of such structures and to calibrate numerical models. Comparison with similar structures reported in literature were performed in order to assess the benefits and drawbacks of the suggested lightweight structure.

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