Composition of the ISP Editorial Board

Dr. F. van Walree recently stepped down as member of the Editorial Board.

ISP Volume 66, Issue 1

ISP Volume 66, issue 1 of 2019, contains 6 articles on various topics. This is a special issue, containing extended versions of selected papers of the NAV2018 conference held in Trieste, Italy in June 2018. It contains various articles on ship strength, design and construction aspects as well as an article on numerical investigations of a cavitating propeller. More extensive summaries, as well as the full articles can be found on https://content.iospress.com/journals/international-shipbuilding-progress/66/1

Comparative study between analytical and FE analysis for the ultimate strength assessment of pitted platings

The ultimate strength assessment of platings affected by pitting corrosion wastage is a basic issue for the scantling and design of ship structures. In the past, several non-linear FE analyses were performed to investigate the incidence of pitting degree and corrosion depth on the ultimate strength of plate panels, with the main aim of providing some approximate formulations, useful at least in the preliminary project phase. Based on actual state of art, the main aim of current research is to provide an analytical formulation for the ultimate strength assessment of platings with random pitting corrosion wastage, by solving the Marguerre non-linear governing differential equations for large deflection analysis of platings in the post-buckling regime. In this respect, a comparative analysis between the analytical solution and a series of FE results is preliminarily performed for uncorroded platings, combining different levels of initial geometrical imperfections and welding residual stresses. Subsequently, the comparative analysis is extended to platings affected by pitting corrosion wastage. Hence, different levels of pitting and corrosion intensity degrees are properly combined in order to investigate the goodness of the proposed analytical formulation.
Mechanical buckling analysis of explosive welded joints used in shipbuilding

Aluminum superstructures and steel hull connections are of fundamental importance in ships. This study regards the buckling analysis of explosion welded joints, made of three layers (ASTM A516 low carbon steel, pure aluminium, A5086 aluminium alloy) and used in ship structures. Tensile and compressive tests were carried out on explosion welded specimens. The Infrared Thermography was used to detect the superficial temperature of the specimen during the tensile test and three phases of the temperature evolution were observed. The Digital Image Correlation technique was applied during the tests for the detection of displacement and strain fields. A theoretical analysis, considering the different materials was also performed for the analysis of buckling, which occurred during the compressive tests. Furthermore, a non-linear finite element analysis, considering the different mechanical properties of the explosive welded joint, was performed and was validated by means of the experimental results, obtained by the compressive tests.

Integrated design of an eco-friendly wooden passenger craft for inland navigation

The continuous increasing attention to environmental sustainability and air pollution reduction for transport systems, requires not only to adopt new technologies and innovative solutions to limit vehicles emissions, but also to study their life-cycle. In case of inland navigation, the operation close to urban areas or in natural protected environments requires the adoption of a green propulsion. Moreover, especially for small crafts, the problem of ship disposal at the end of life is of high importance, even once plastic materials should be disposed, due to high costs and process complexities. For such a reason the design of a new generation green passenger craft requires the analysis and knowledge of multiple engineering fields, that could lead to a fast and successful design only by means of an integrated approach. In the present work, this approach will be applied to the design of a passenger craft, adopting a hybrid electric powering system and build with strip planking process for wooden ships. The description of the construction process will be here described together with the on-board electric power system. The integrated approach allowed also to directly evaluate the vessel operative profile and asses whether the vessel could perform a Zero Emission Mode navigation.

Extreme loads determination on complex slender structures

For the dimensioning of particular structures like stingers or generic tubular elements for offshore industry, it is usual to predict the extreme values of wave induced loads. Both for model test and calculations, the traditionally adopted methods of analysis are based on Weibull distribution. The necessity to investigate severe sea state conditions together with the increased complexity of the structure is an evident source of non-linearities in the exciting force peaks distribution.
In the specific, the adoption of a standard Weibull approach is not indicated for accurately predict the extreme loads. The adoption of more accurate distributions suitable to capture peaks non-linearity will ensure to overcome or capture possible multi-modal behaviour of the considered population. These enhanced techniques can be used not only for model test results analysis, but also for results coming from preliminary hydrodynamic calculations (CFD). In the present work, two different methodologies based on Mixed Weibull and Generalised Pareto distributions will be applied to the results obtained for a stinger geometry, where Morison theory is adopted to evaluate wave loads considering shield effects between the single tubular elements.

**Numerical simulations of a cavitating propeller in uniform and oblique flow**

The numerical predictions of a cavitating model scale propeller working in uniform and oblique flow conditions are presented. The cavitating phenomena are numerically reproduced using a homogeneous (mixture) model where three previously calibrated mass transfer models are alternatively used to model the mass transfer rate. The turbulence effect is modelled using the Reynolds Averaged Navier Stokes (RANS) approach. The simulations are performed using an open source solver. The numerical results are compared with available experimental data. For a quantitative comparison the propeller thrust is considered, while for a qualitative comparison, snapshots of cavitation patterns are shown. The thrust values obtained with the three different mass transfer models are very close to each other, however differences in the predicted cavitation patterns are observed. Moreover, some discrepancies between the numerical results and experimental data are reported.

**Static and dynamic comparison of megayacht deck structure’s layouts**

The growing increase in length of super and megayachts has driven structural designers to adopt longitudinal layouts as a main point in the structural scantlings. By the way, the optimization of weights, strength, deformations and dynamic behaviour has to be evaluated separately for each new unit because of the particular and unique characteristics of each vessel. For this evaluation, especially for what the dynamic behaviour of ribbed plates is concerned, the use of numerical software based on the Finite Element Method is widely used since the early design stages in order to highlight benefits and weaknesses of a particular structural design. In this paper, two different structural layouts of megayacht decks have been studied and tested by using a FE software: the first one has been created with longitudinal and transversal stiffeners with the same cross section. In the second layout, transversal stiffeners are smaller in dimension but with lower span. The comparison has been carried out making reference to maximum strengths, deformations and dynamic behaviour. This work, starting from an initial layout obtained by a CS rule approach, made it possible to converge to an optimal structural configuration, at least for what the starting geometries are concerned.
ISP issues in 2019

For 2019 four issues of ISP have been scheduled. The first issue (March) is a special issue, containing extensions of selected papers of the NAV2018 conference, held in Trieste, Italy in June 2018. The second (June) and third (September) issues will be regular issues. The fourth issue (December) will be a special issue on the application of hydrogen in the marine field.

Next meeting of the Editorial Board

The next meeting of the Editorial Board has been scheduled for July 1st, at MARIN in Wageningen, The Netherlands.

Upcoming conferences, meetings and training courses

Overviews of relevant conferences, exhibitions, meetings and training courses can be found on:

http://www.marin.nl/web/Events
https://www.rina.org.uk/RINA_Events
http://www.sname.org/events/calendar
http://www.swzonline.nl/events-calendar.