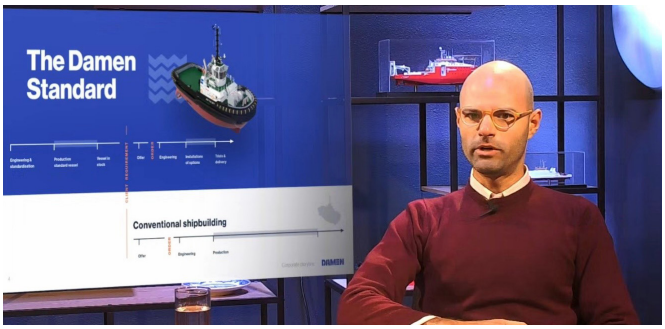
FOLLOWING NAVAIS FOOTSTEPS

Maritime Designer Award Contest

We've just completed NAVAIS and were surprised to know that each year in the Netherlands, a Maritime Designer Award is awarded to a designer who has made a contribution to improving the design and engineering process of ships. The work in NAVAIS became eligible as it met all the criteria (innovative, multidisciplinary, feasibility and market potential) and has been participant of the Contest. The point was only to choose which part of it will be presented.



The content was held in online while the jury was in the same room for the quick communications and discussions right during the stories of participants. The final discussion was arranged by jury without any access from participants and it took one day more to know the name of the winner.

This year, the achievements of NAVAIS did not receive the main prize, but were highly appreciated by a competent jury. Let us get you right into details of the innovative NAVAIS project.

Baldassare Messina (Damen Shipyards Gorinchem) teamleader of Workpackage 3, with contributions by Pawel Gierszewski and Stanislaw Polec (Damen engineering Gdansk), Stanislav Seleznov (Marine Design Engineering Mikolayiv), and Sergiu Matei (Marine Engineering Galati) managed a multidisciplinary team to investigate a strategy to come to an optimal modular design for workboats. Our team in the contest was leaded by Maarten Deul, program manager R&D, who put maximum efforts for NAVAIS objectives to come true.

The result is a strategy that, starting from the vessel requirements, ensures alignment between the Functional, Logical and Physical domains that define a modular ship. This distinction in domains is needed to ensure compliance to all defined requirements, as they will develop and detail during the design process.

To reach this result, main components of ship systems that are typically part of every ship (Structures, Propulsion system, Bilge system (including internal firefighting and deck-wash functions), Fuel oil system (including transfer and supply functions), Cooling system, Fresh and black water systems, Lubrication oil system (including clean and dirty oil functions), Hydraulic oil system, External fire-fighting system), have been analyzed for commonality.

The innovation is that this commonality analysis is done on all levels, not only on the physical level of main components (P), but also – and in parallel – on system architecture (L), system functionalities (F) and requirements (R). The collected system requirements, functionalities and logical execution have been captured in Design Philosophy Documents (DPD). The DPD is generic for a product platform. The physical execution of the systems (which are specific) have been captured in the System Principle Documents (SPD).

The information on the designs (on all four levels) are stored in a library which is part of the Dassault 3DExperience platform.

The applicability has been verified by showing for the bilge system (a good example of a system that is on board of each ship, but with many ways of configuration) that in the design process:

- systems connect with each other at all domain levels and with different interfaces;
- the multitude of system requirements connect with a high level vessel requirement;
- configuration in the vessel is much easier and of higher quality, using predefined system components stored in dedicated re-usable libraries;
- the modules can be approved by class prior to implementation in a specific vessel to enable the integration of new technologies at much reduced technical risks.

The Business potential is that the design and engineering leadtime can be drastically reduced, while the flexibility in the design outcome is maintained and a reduced technical and integration risk is realized.

The story told by Baldo raised a lot of questions from jury and explanations from the team took pretty much time. There was a short story from Stanislaw Polec regarding the RLFP structure and Logical domain itself. The idea looked clear at the beginning of NAVAIS but there was a hard way to create the final demonstrator of Utility Vessel with scaling effect and all the other parties has contributed greatly to make true this enthusiastic ideas.

The main question for MDEM was about creating logical and physical domains for the demonstrator of Utility Vessel (Workpackage 3). And in fact the logical structure of the mechanical system is already known and acknowledged while the hull structure from the very beginning was a black box. Stanislav Seleznov explained that it was the main challenge for MDEM to determine the Logical structure and create project tree for future modelling keeping in mind the modularization principles and scaling effect for the vessel. Questions for the Physical domain of mechanical discipline were covered by Sergiu Matei (MEGA) and is story has become a part of a long hard fight we've experienced during the years of NAVAIS.

The final results were estimated by Maarten Deul. He emphasized that it could the first practical experience of MBSE in shipbuilding. We have no doubts that achievements of NAVAIS will be appreciated in future by European shipbuilding. And as a confirmation from MDEM I can say that at a moment we are trying to implement our NAVAIS experience in DAMEN AMELS project of cruise yacht, but it will be another story.

Anyhow we congratulate the participants and winners of the competition, whose dedicated work deserves attention and recognition! As far as we are concerned, we will continue our work and will inform you about the results of innovative NAVAIS project.

The research has been carried out as part of the project NAVAIS. NAVAIS project has received funding from the European Union's Horizon 2020 research and innovation programme (contract no. 769419). ■