

# REVOLUTIONARY PROCESS IN SHIPBUILDING

## Model-based simulation with Bachmann hardware

Propulsion control systems for ships normally undergo factory testing or are tested with prototypes during commissioning. As these systems are becoming increasingly more complex, complete testing within a limited period of time is difficult. Bakker Sliedrecht has joined up with Bachmann electronic and Controllab to create a new model-based simulation process. The first ships, including the cable laying ship Ndurance, were tested with the new process – with great success.



Bakker Sliedrecht Electro Industrie B.V. was founded in the Netherlands in 1919. The company plans, develops and implements electrical engineering solutions in the maritime and industrial sector. Maintenance, technical acceptance and repair work complete the portfolio of the company.

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Typical testing procedures in shipbuilding are mostly very complex. New approaches are therefore in great demand. »We were on the lookout for new options because the demanding requirements of the ship's operators are particularly increasing the complexity of the control and monitoring systems. A reduction in diesel and energy consumption is required whilst maintaining maximum availability at the same time,« Anthon Knoops, manager of engineering automation at Bakker Sliedrecht summarizes. »Normal test procedures were no longer satisfactory here.« Together with Bachmann electronic and Controllab, we created an environment that linked a virtual model with the actual propulsion control system. All signals are exchanged between the systems. The benefits are obvious: The test engineer sits at his desk and can perform all the tests via the Bakker Integrated Modular Alarm Monitoring and Control System (BIMAC). »Far more scenarios can be run through on the virtual model than with onsite testing,« Anthon Knoops emphasizes the benefits of simulations.

### Dynamic design process

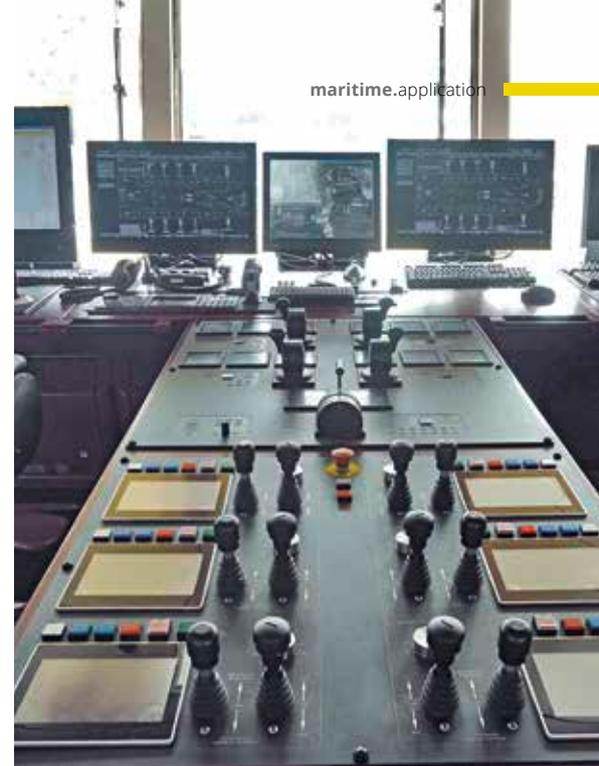
The new implementation of BIMAC also makes a new kind of design possible. »What has for a long time been standard practice in mechatronics we are now introducing in the shipbuilding sector. Instead of using fixed CAD models, we develop a dynamic model that is adapted to requirements during the design process,« explains Paul Weustink, manager of industrial projects at Controllab. Continuous testing enables faults to be identified already during the design phase and the architecture of the controller adapted accordingly. The powerful, modular M1 controller system from Bachmann electronic provides here the ideal basis: This uses standard interfaces and the system is intentionally designed as an open system. This ensures the effortless transfer of customized programs.

### Revolutionary Procedure in Shipbuilding

BIMAC has already proved to be an ideal solution in practical applications: Bakker Sliedrecht received the order from Shanghai Zhenhua



▲ The giant cable drum on the Ndurance.



▲ The installed M1 controllers provide a constant stream of information on the bridge about the onboard systems via the BIMAC system.

Heavy Industries Co. Ltd (ZPMC) for equipping the new N class ships of excavator specialists Boskalis with the most important electronic systems. The order comprised the planning and supply of the control cabinets, the multi-drive systems for the motors and winches, as well as the controller system based on BIMAC – implemented with the Bachmann M1 controller. Even before the cable laying ship was launched, all relevant tests could be carried out in accordance with the stringent requirements of the certification and classification bodies. From their headquarters in the Netherlands, the engineers at Bakker Sliedrecht could test the azimuth drives of the ship, couplings, gears and diesel generators. The availability of the onboard grid and the adherence to the strict redundancy requirements, particularly with regard to the automatic control of the ship using dynamic positioning, were also successfully tested. »A large number of certification and approval bodies were interested in the results, so that they could use the test procedure for their own purposes in the future,« Ronald Epskamp, marine sector manager at Bachmann, explained the significance of the project. BIMAC enables the companies to do far more than functional testing. »In future we will be able to show clearly what happens in the entire grid in the event of a fault and how such faults can

be prevented. This not only applies to electronic components but even mechanical components,« Ronald Epskamp stresses.

### Efficient solution

» Far more scenarios can be run through on the virtual model than is possible with testing on site. «

Anthon Knoops,  
Manager Engineering Automation  
at Bakker Sliedrecht



Model-based simulation makes it possible to save time and money for development projects: The construction of expensive prototypes for test purposes is no longer necessary. Tried and tested controller and drive models are then available for later use with new design tasks. The early testing enables electronic and mechanical components to be selected precisely to requirements. All this saves costs and thus reduces the overall budget for shipbuilding. »We are happy that our efforts have been worthwhile,« says a delighted Anthon Knoops. »In Bachmann electronic and Controllab we have found some competent partners with whom we have jointly created an innovative and as yet unique system in the shipbuilding sector.«



Controllab was founded at the University of Twente, Netherlands, in 1995. The company develops and sells simulation software for industry and shipbuilding.

[www.controllab.nl](http://www.controllab.nl)