

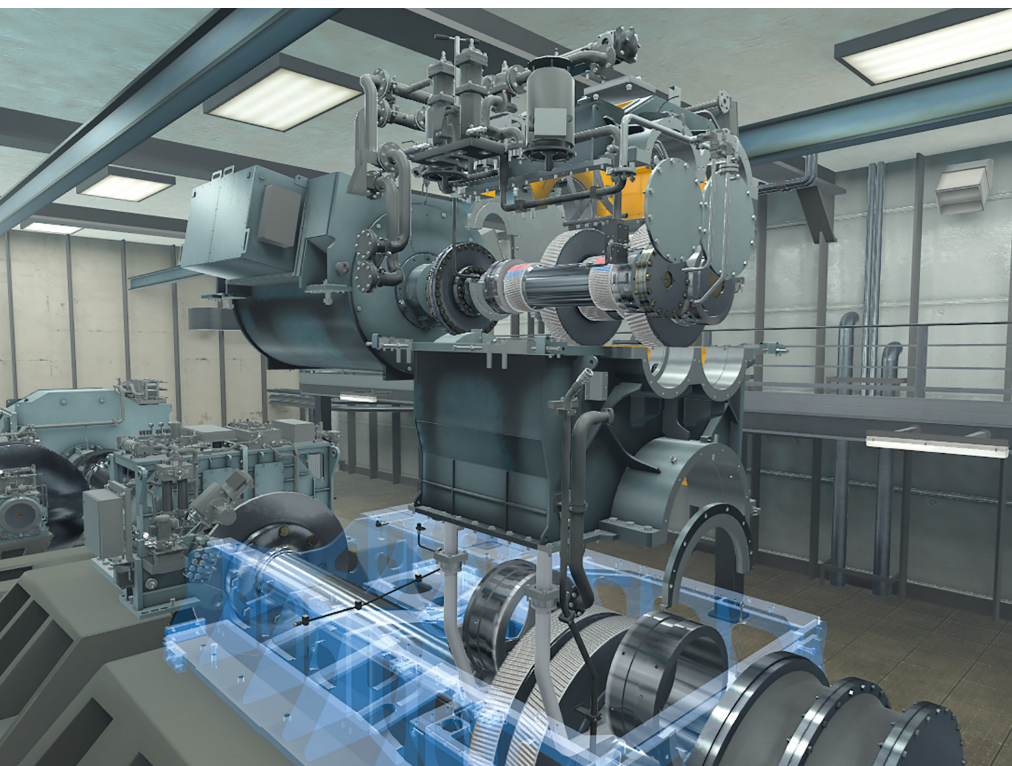
Global Update – Ship Design & Construction

Mirko Uetzmann*)

Virtual Reality/Augmented Reality in the Shipbuilding Environment

Focus on Extended Reality for Training, Monitoring and Maintenance

Features



◁ RENK benefits from in-depth knowledge of its Canadian partner Modest Tree in the field of VR/AR.
(Photo: RENK AG)

Boosting the Availability of Condition Monitoring

RENK Digital Services includes RENK VibMonitor, a condition monitoring system specially developed and tailored to the needs of the individual customer. Its availability allows permanent inspections of the corresponding technical equipment. According to RENK, this process enables automatic reporting when a specific part needs to be replaced. Thanks to this condition-based maintenance, the replacement time depends on the actual status of the respective component – and not on the duration of operation as before. Disruptions can thus be detected before they are visible; this process reduces time and the procurement of spare parts is always tailored to the needs and with pinpoint accuracy. RENK condition monitoring forms the basis for performance-based logistics (PBL) to offer customers tailor-made support while reducing operating costs.

“Here, too, we create state-of-the-art solutions through the use of new technology and artificial intelligence (AI), which not only significantly speed up and simplify the processes, but also make them safer and more economical,” Hofbauer explains.

Another ground-breaking competence of RENK is the transfer of knowledge and practical experience from VR to AR, and thus into the real world. In this way, it is possible that an installer with AR glasses approaches a gear-box and (supported by condition monitoring) automatically displays technical problems as they appear, which are not even visible on the product itself. Such impressions will help fulfil every day’s work in the future: “loosen this screw, then lift the lid, now take out the seal.”

Shipbuilders and marine equipment suppliers view virtual reality and augmented reality as real advances. The German engineering company RENK significantly expanded its expertise in the field of virtual/augmented reality through its participation in the Canadian software start-up Modest Tree. With this combination, the company offers completely new approaches for crew training, as well as monitoring and servicing complete propulsion systems.

En Route to Quality

Both virtual reality (VR) and augmented reality (AR) add real value to the shipbuilding industry. These advances are set to continue as new shipbuilding technologies are brought to bear. RENK owns over 140 years of experience and represents a global leader when it

comes to control powertrains for marine/naval applications. Although digitisation plays an important role in this context, RENK argues that it is not just digitising its processes, but is taking a decisive step further: “By investing in Modest Tree, we are participating in a young, dynamic start-up that approaches digitisation with radical approaches and a completely different perspective”, says **Florian Hofbauer**, CEO of RENK. He confirms that the roots of the Modest Tree founders are in the gaming industry. On this basis, the firm constantly sets new standards in the usability and graphic resolution of both VR and AR. “We combine these two technologies into extended reality (XR), using this extraordinary know-how for practical industrial integration,” says Hofbauer. “This makes us pioneers in digital communication solutions.”

Working with Modest Tree, RENK provides very innovative training and support services, explores new opportunities and delivers creative minds for its customers, not just limited to the transmission, but to the entire powertrain.

Trend Setting: Artificial Intelligence Creates Efficiency

RENK VibMonitor analyses the powertrain and anticipates evolving problems. In the future, it will probably be able to do much more. Thus, the monitoring system will be able to

learn independently with each new service deployment; collected knowledge is stored in the company's brain. Thanks to the support of artificial intelligence (AI), new employees could benefit directly from the valuable knowledge of their experienced colleagues as the following practical example indicates: nearly 90 percent of all service technicians who worked for RENK for more than ten years have changed their gasket when they changed pumps because they knew that it would be defective within six to nine months. Based on these findings, AI could automatically recommend the replacement of the seal to the new service technician when carrying out a pump replacement; this includes instructions for ordering spare parts in advance and for practical implementation. It is little wonder then that AI can do more: it not only makes maintenance and repair much more efficient; it also provides the user of the drive system with all relevant information at the right time and in the right place via the appropriate software. In addition, the data and insights gained through this process can be incorporated into the development of new product designs and the optimisation of system integration.

“Upon request, RENK advises its customers on complex requirements or about detailed status reports. In this event, we supply the software and install the corresponding sensors,” says Hofbauer. “One thing that RENK always focuses on is data security and data availability, taking into account specific customer and industry requirements.”

Boosting Flexible Training with e-learning

Clearly, RENK also uses VR for tailor-made education and training of its customers. This training on demand offers a wide range of practical and economic benefits. It can be performed at anytime and anywhere in the

world “at the touch of a button” and can take place – with or without a trainer – as needed by the customer. This not only saves costs, but also allows permanent and constructive live exchange of information between RENK and its customers. In addition, the e-learning service includes the automatic evaluation of the training results and the certification of the participants in terms of safety, operation and maintenance as to the respective transmission or entire drive system.

But what are the benefits when operating a modern frigate? *First*, e-learning makes it possible to train the ship's crewmembers at the highest level – long before they go on board. *Second*, using interactive VR training, they can demonstrate their operational skills in advance, including the simulation of complex installation. *Third*, thanks to these flexible training options, which are flexible in terms of time and place, every crewmember can be prepared for the next mission “on land” but under extremely realistic conditions. This adaptability pays off when a ship has several alternating crews, or the next shipyard visit is planned in two or more years. Because maintenance and repair of the drivetrain can take place virtually on the high seas at any time, VR makes it possible to effectively train the crew.

Information Consistency is the Challenge

Especially with regard to future developments in mechanical engineering, system integration is one of RENK's key business areas. The company will be able to ensure the consistency of the information through both VR and AR, condition monitoring and an increasing focus on system concepts. This information quality and quantity in turn forms the basis for high availability and reliability of RENK products with low life-cycle costs. The

optimisation of the facilities during their use is a continuing process, according to RENK, which is facilitated through appropriate PBL contracts tailored to the customer.

“By participating with the VR/AR specialist Modest Tree, we are able to present and explain our expertise in this area precisely,” says Hofbauer. “We involve our customers from the beginning and use VR to map the entire powertrain, including, for example, drive units. This means that even complex drive systems can be inspected during the configuration phase in ‘real size’ and put into the engine room.” He describes this as a “true innovation and optimisation of the design process,” which sets the ultimate basis for later use by the operator.

In view of the company's diverse possibilities and thanks to the latest investment in Modest Tree, Hofbauer sees his company well prepared for challenges and new approaches in the future. The Canadian partner offers the extremely innovative and creative spirit most typical of the gaming industry, and thus completely new perspectives and a “breath of fresh air” into the industrial world.

“By leveraging the in-depth knowledge of our Canadian partner in the field of VR/AR, we can now offer state-of-the-art service models that are economically attractive and therefore marketable to our customers,” Hofbauer concludes.

Saman Sannandeji, founder and Managing Director of Modest Tree, is also convinced about the success of cooperation: “The close cooperation with our strong partner RENK enables us to accelerate the development of our software products and to respond to the increasingly demanding requirements of the mechanical engineering industry.” **NAFO**

*) Mirko Uetzmann is Head of Marine Gear Logistic Support at RENK AG in Augsburg, Germany.