

FVA-Workbench Drives Progress in Marine Transmissions at Reintjes



A calculation platform suitable for all areas of gearbox development

FVA GmbH



Reintjes is an internationally recognized marine powertrain specialist. Reintjes focuses on customer-oriented requests and special requirements in the development of their drive solutions. To provide this level of specialized services to customers, management places great importance on the flexibility of Reintjes catalogs. This continually poses new challenges for the drive specialists at Reintjes, such as adapting auxiliary systems for existing drives, developing retrofitting solutions, and offering flexibly configurable drives. This ensures that Reintjes is already able to offer hybrid drives as standard solutions. Klaus Deleroi, managing director at Reintjes, confirms: "As a globally operating mid-sized company, it is not always easy to react flexibly to the market. However, with the tools that the *FVA-Workbench* provides us, we are well equipped!"

Automation Simplifies Processes and Saves Time at Reintjes

Developing a new gearbox series is costly and time-consuming. This is especially true in marine propulsion, as classification society certifications must be achieved in addition to the required verifications. For this reason, Reintjes offers the same drives for various types of ships. In gearbox development, this means that each application requires different loads and usage profiles, with different service lives and maintenance intervals. Thus, each drive must be designed and calculated with advance consideration of every possible profile.

These calculations can be completely automated with the *FVA-Workbench*. Easy-to-use scripting functions can be implemented and combined for fast automation of processes without previous experience. First, the usage profiles are loaded from the database. Scripts then apply loads to the gearbox and perform automated calculations. Finally, the results are compiled and output.

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New power density requirements, power take-off/take-in options (PTO/PTI), and special customer requests make it necessary to update the Reintjes catalogs in ever-faster cycles. The *FVA-Workbench* is perfect for this task. Gear data is read from a database and the gearbox models are automatically adapted in an automated calculation process. The loads are then applied, and the calculation is started. As a result, the catalog data can be exported. This makes updating the catalogs fast and easy.

Before the *FVA-Workbench* was implemented, updating the catalogs was a manual process in which models were adapted by hand and the results were copied into a table. Updating the entire catalog kept several people occupied for an entire week. Thanks to the available scripts in the *FVA-Workbench*, this has been reduced to a few hours. It also ensures that there are no copying errors, a source of error that could never be completely avoided with manual work. Dr. Hagen Birkholz, head of development at Reintjes, confirms: “The *FVA-Workbench* makes it easy to create automations. The resulting cost and time savings allow our experts to focus on other things, which in turn benefits our customers.”

Design Department Calculations

To capitalize on synergies in the development process, Reintjes uses the *FVA-Workbench* for design as well as technical calculations. As the external dimensions and bearing arrangements are key to the design process, a switch was added at Reintjes’ request to simplify gear calculations. The influence of load distribution on the shaft bending line is typically considered in the *FVA-Workbench*, and the microgeometry design plays a decisive role. The new switch makes it possible to assume constant gear loads during the design process, based on the assumption that a suitable microgeometry design is already available. This allows the design department to calculate the bearing life using the same tool as the technical calculations, which not only guarantees consistent results but also makes continuous and seamless product development processes possible. Furthermore, the same databases and scripts for creating technical calculation models can also be used. This makes it quick and easy to perform design changes, such as adding a new gear ratio to an existing gearbox.

This close contact with customers is important to the *FVA-Workbench* development team. This makes it possible for them to respond quickly and easily to customer requests and help.

Report Templates Streamline Classification Society Certifications

To be insured, all critical marine technology products must be certified by a classification society. This includes the gearbox, propulsion device, and more. The classification society rules specify calculation approaches and minimum safety levels for gearboxes. For example, the port entry of a yacht and a working vessel clearly have different gearbox requirements. Of course, these calculation approaches are also integrated into the *FVA-Workbench*. This greatly simplifies the design of marine transmissions.

The customizable reporting system in the *FVA-Workbench* supports companies like Reintjes in the certification of their products. This integrated feature makes it easy to create report templates that include all required information for certifications. Instead of sorting through cumbersome PDF output files, the visualization of outputs in the *FVA-Workbench* provides a clear and simple overview.

Conclusion

The automation options in the *FVA-Workbench* make it easy to perform recurring processes. Models can automatically be built, mass calculations can be configured, and results can be exported. Simple workflows as well as complex processes can be automated with well-documented and easy-to-use scripting commands. This creates additional time for innovation.

The *FVA-Workbench* calculation platform is suitable for all areas of gearbox development. With simple standardized component calculations and detailed simulations, the *FVA-Workbench* can already be used during the design phase. This saves time, allowing errors to be detected and corrected earlier in the process, and eliminates interface problems.

Furthermore, the large number of calculation approaches in the *FVA-Workbench* makes it possible to quickly design drive systems per requirements. This is of particular interest to the shipbuilding industry, as it makes it easy to apply the extensive classification society rules.

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