

## EASA

Romax partners with EASA to create new App for complex gearbox durability analysis



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**Sebastian Dewhurst,**  
Business Development, EASA

Within the design and development process there are many potential pitfalls or bottlenecks for designers. Often experts are not available to support occasional or inexperienced users who rely on the experts’ expertise to correctly set up models and generate results.

CAD and CAE vendors are to some extent addressing this problem by releasing new simplified, design-oriented, mainstream CAE tools aimed at generalists, and this is a valid approach. Meanwhile, for more specific and repeatable processes there has been a focus on democratization through appification. This approach relies on the creation of simplified, application-specific “apps”. The apps still rely on complex CAE tools, but hide the unnecessary detail from the end user.

Romax Technology, in partnership with EASA, has developed an app which automates the detailed structural and durability analysis of a gearbox and its key rotating components.

The app uses RomaxDESIGNER: a drivetrain specific CAE tool that allows the creation and analysis of parametric

## Challenge

The successful use of Computer Aided Engineering across all manufacturing sectors has grown to the point where access to CAE is now regarded as essential - not just for CAE specialists, but for all designers and engineers. However, most CAE tools were designed with the expert CAE user in mind, and are not well-suited for use by engineers who have little or no experience with the specific tool used to create a particular model.

## Solution

One solution is to create an app that connects to the underlying model. With this approach, the user does not need to be familiar with the underlying analysis software powering the app, nor concern themselves with the modelling details or the analysis processes and settings required to generate reliable results. They simply enter their inputs, execute the model, and a report including output in a variety of formats is automatically generated.

## Benefits

Apps enable companies to exploit valuable knowledge of CAE methods, leveraging it over a much larger user-audience within the organization. Another benefit - CAE analysts are freed up to focus on performing the kind of analyses that absolutely requires an expert.

drivetrain models using a combination of FE structures coupled to bespoke gear and bearing contact models.

The app was built using EASA, a low-code platform designed to enable engineers and scientists to build web-apps with intuitive graphical user interfaces and simplified inputs and outputs, which connect with a version-controlled template of any model on a secure server.

### Simple and straightforward to create

Validated models are built by experienced transmission engineers. The engineer uses the RomaxDESIGNER batch running interface to expose only the required input parameters, analysis actions and results needed by the app. These are accessible via an XML file. All other settings are locked. Using the model file and the batch XML file the model can be run without human interaction. The batch models can easily be run from an Excel spreadsheet which allows easy pasting of large duty cycle data sets and easy results manipulation.

However, as this solution needed to be made available to a significant number of users across multiple locations it was desirable to deliver it as a web application.

### Making complex, state of the art analysis methods widely available

The web app allows the user to select a gearbox from a library of models and simply supply a table of duty cycle data via a web page. When the user selects the run button, EASA updates the spreadsheet and XML data and then runs the analysis. The models, solver and web app are hosted on a remote server and run in the background. A typical RomaxDESIGNER load case will run in a few seconds.

Using the app a sales application engineer can quickly establish whether an existing design will meet the customer's requirements. The damage and safety factor information will enable them to see if any design modifications are required and if alternative components need to be specified.



**This app is a game-changer in its ability to save time for engineers and designers. It allows sales or application engineers more autonomy, to easily select a potential design from a number of existing gearbox models, and then perform a complex analysis to predict the durability of the gearbox over a customer supplied duty cycle (speed, load, temperature and duration). Critically, it's removing potential bottlenecks in the process as well as the need for re-work. This enables CAE experts to use the time saved to focus on innovation and setting the best practices for the future."**

**Kristian Kouumdjieff,**  
Senior Applications Engineer, Romax Technology

These calculations are usually performed by transmission specialists, so the introduction of the app will dramatically accelerate the analysis, enabling the supplier to be much more responsive, whilst reducing the work-load on the CAE experts.



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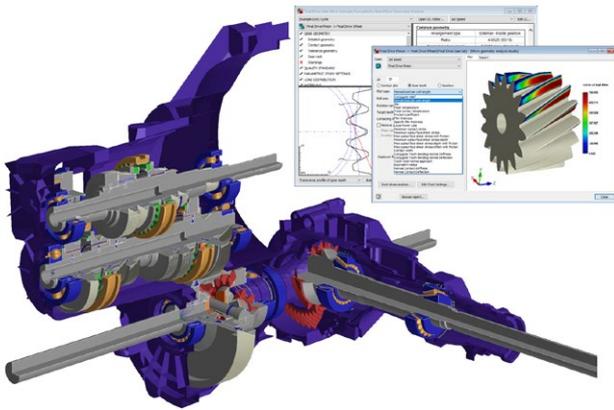


Figure 1: RomaxDESIGNER transmission model

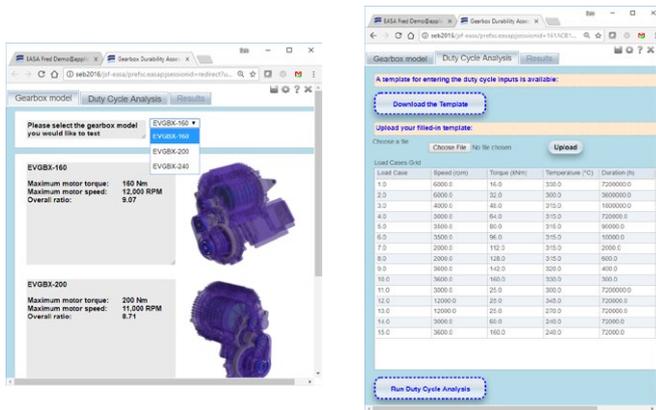
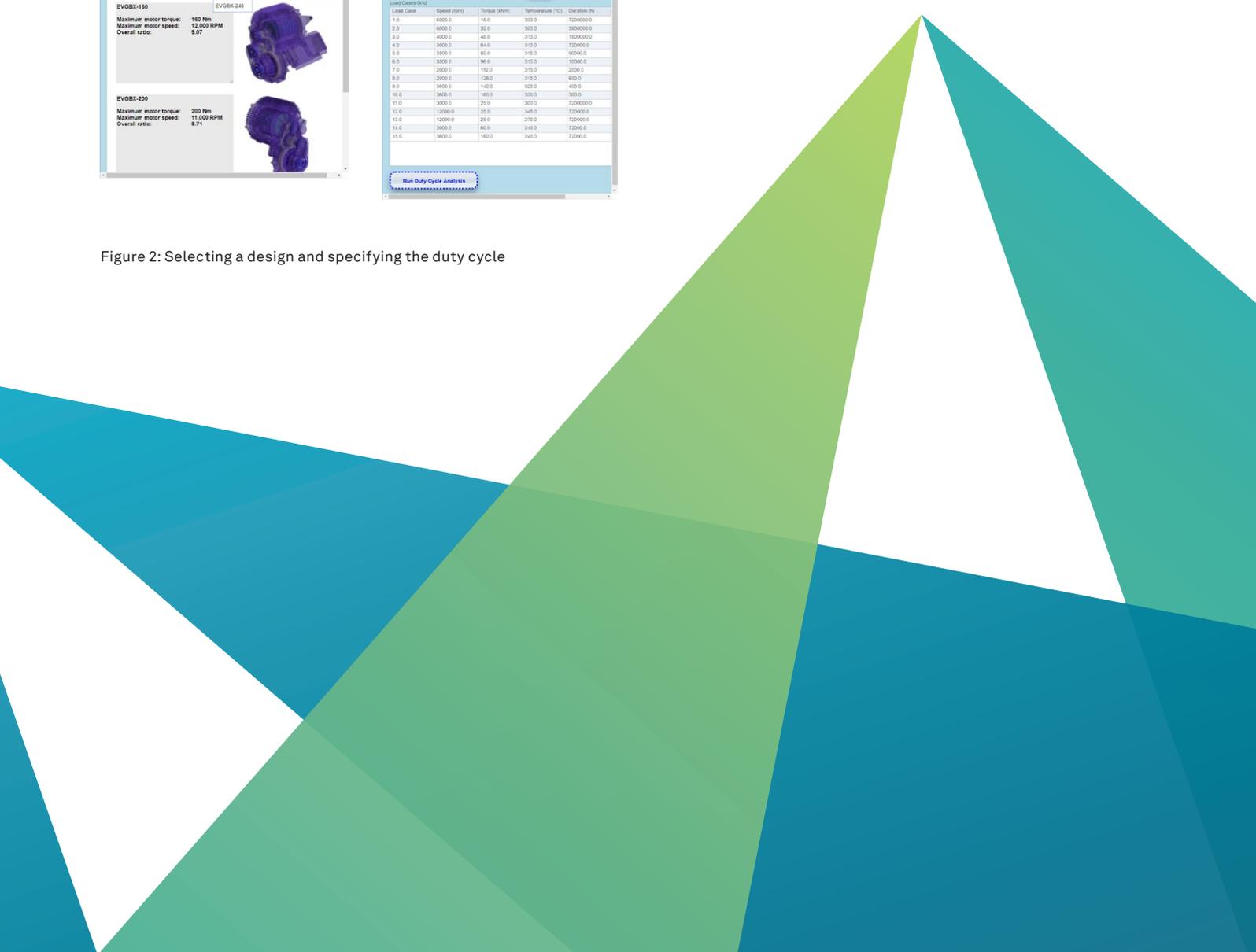


Figure 2: Selecting a design and specifying the duty cycle

Sebastian Dewhurst,  
Business Development, EASA





Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Romax, part of Hexagon's Manufacturing Intelligence division, provides world-leading solutions for the design, analysis, testing and manufacture of gearboxes, drivetrains and bearings. Learn more at [romaxtech.com](https://romaxtech.com). Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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