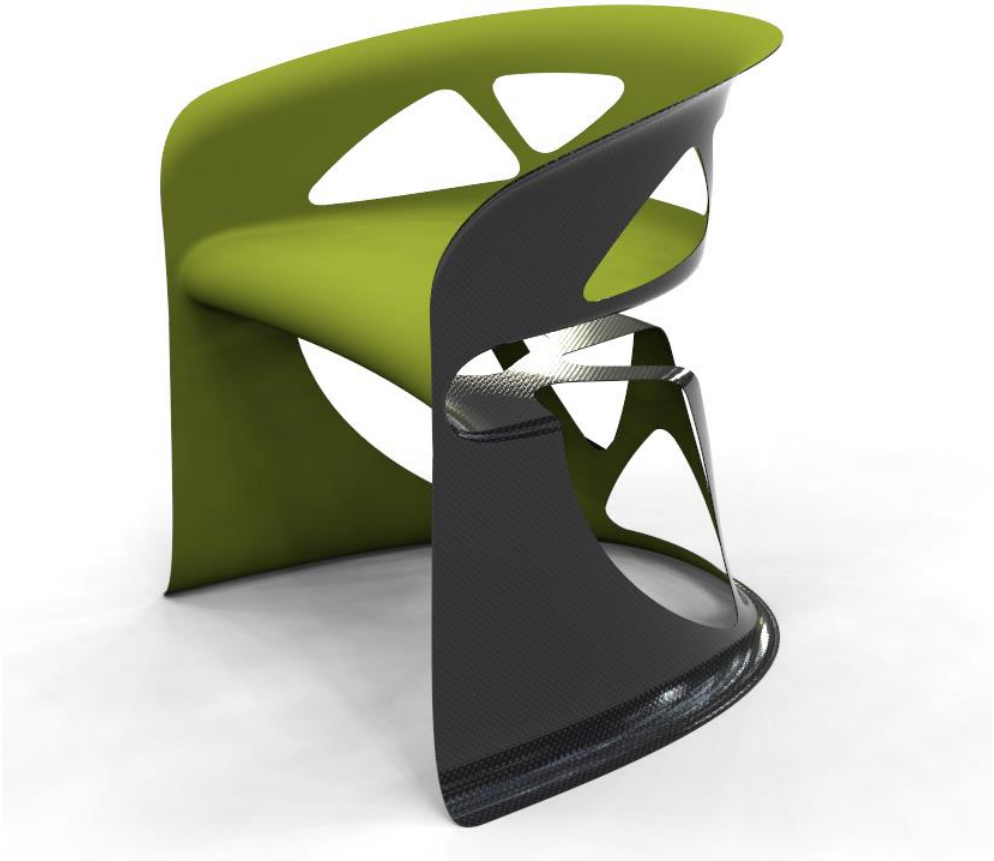
OptiAssist for Genesis



SUMMARY

The feedback from our customers is that GRM's composite software tools have been developed by people who clearly understand the day-to-day challenges of efficiently analysing and developing composites. For over 16 years, GRM have developed the OptiAssist product, combining the analysis & optimisation capabilities of OmniQuest Genesis with a composite focussed user interface. OptiAssist provides a complete FEA suite of tools to laminate, analyse, optimise, understand and communicate your developing composite designs.

OptiAssist Improves What Engineers can Deliver:

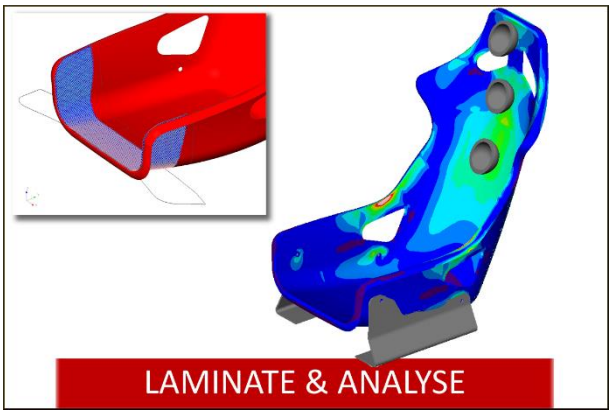
– "GRM are very proud to have supplied GENESIS & OptiAssist to the Formula 1® Team winning the driver's Championship for 14 of the last 15 years."

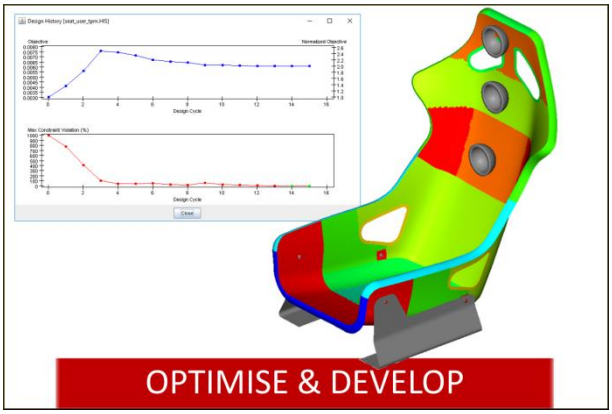
– Martin Gambling, Managing Director, GRM

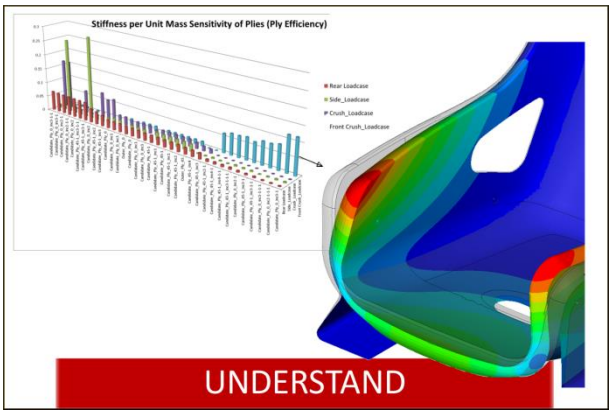
Tel +44(0)1926 915050
Email: info@grm-consulting.co.uk
www.grm-consulting.co.uk

Key Software Processes

CAITO's enterprise software toolset, OptiAssist, provides composite engineers with a complete FEA analysis, laminate development and manufacturing reporting suite of tools. At its core, is the industry leading structural analysis and optimisation code, OmniQuest Genesis.







Through the OptiAssist interface, composite engineers are able to efficiently develop laminates, working through the following key stages:

Laminate & Analyse – Using the Composite Modeller, develop your laminates in the FEA environment. Evaluate manufacturing feasibility through ply draping. Manage the creation of complex analysis property data and manipulate plies using efficient functions; split, merge, map & duplicate. Using the GENESIS FEA solver, analyse and interrogate the performance of your designs.

Optimise & Develop – Utilise ply shape and detailed laminate optimisation tools, seamlessly integrated into the analysis and laminate development environment. OptiAssist's unique strength is its combination of powerful optimisation tools with an engineer-led laminate development process, harnessing optimisation whilst creating manufacturable layups.

Understand & Explore – OptiAssist's Sensitivity Plotter & Real-Time Response tools automatically manage the assessment of your laminate, allowing live investigations into laminate changes.

Export & Report – Allowing direct communication of analysis generated laminates to composite designers and manufacturing, Composite Reporter automatically generates editable plybooks, allowing markup, dimensioning and annotation of each ply. Flat pattern export to DXF CAD format and direct export to .layup format is also supported.

Tel +44(0)1926 915050
Email: info@grm-consulting.co.uk
www.grm-consulting.co.uk

A Pedigree of Success in Formula 1®

Developed through 15 years of continual work with leading Formula 1® teams, OptiAssist's laminate optimisation and development techniques have been refined to be robust and efficient. Working with teams such as Red Bull[1], Renault F1[2], Force India[3] and Caterham F1[4], OptiAssist has been used by the Formula 1® Team winning the driver's Championship for 13 of the last 14 years.

*1 - **Development Of Composite Laminate Optimisation Techniques Using Topometry Optimisation In Genesis**, Lewis Butler, Red Bull Racing Ltd, 2006*
*2 - **Optimised Roll Hoop Design Methods**, Richard Whilte, Renault F1, 2016*
*3 - **A Comparison Of Optimisers In The Application Of Formula 1 Monocoque Design**, Dr. Simon Gardner, Force India, 2008*
*4 - **Case Studies in Composite Laminate Optimisation**, Adam Moore, Caterham F1, 2013*

OptiAssist, Design Studio & Genesis provide complete composite and non-composite analysis functionality, supporting the following:

- Statics
- Dynamic Modal and Frequency Responses
- Linear Buckling
- Heat Transfer
- Random Vibration Response

When analysing composites, the post-processing tools allow rapid identification and understanding of structural issues through review of:

- Identification of maximum failure index and layer of maximum failure index
- Through thickness failure index review
- Plotting of normalised fibre stress components to determine causes of high failure index

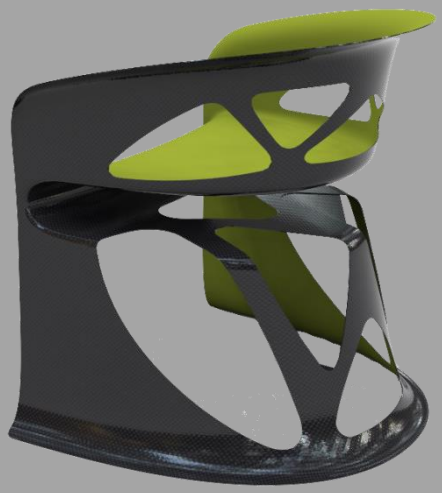
Compatibility

Recognising that companies often have several, established tools and procedures for analysing and developing composite laminates, OptiAssist is compatible with the following data:

- Nastran PCOMPG native data
- Laminate Tools/CATIA Layup File
- Simulia Abaqus .inp file import

Tel +44(0)1926 915050
Email: info@grm-consulting.co.uk
www.grm-consulting.co.uk

Case Study : CFRP Chair



OptiAssist is used around the world as a tool to help showcase the capabilities of the latest composite materials. GRM's Japan office teamed up with Sakai Sangyo with the aim of developing a CFRP chair to demonstrate the new manufacturing possibilities of their latest materials. Enlisting the help of Mirai Ringyo to produce the concept surface designs, OptiAssist and Genesis were used heavily throughout the development process. By using the advanced user topometry methods within OptiAssist a laminate was developed for the chair, based upon a variety of durability and strength loadcases. The optimisation process also identified many areas where it was possible to create holes, which were added in a second design iteration to create extra impact in the design. The final result was a lightweight CFRP chair capable of withstanding the stringent JIS regulatory loads with a safety factor of 1.3. Throughout the 2 week laminate development process, OptiAssist Composite Reporter was used to quickly and efficiently communicate the laminate designs back to the project partners for easy feedback - bridging the gap between design, manufacture and analysis.

The final prototype was manufactured and displayed at "8th Highly Functional Material Week" in Osaka during May 2019.

サカイ産業株式会社 未来輪業

Benefits of using CAITO® Optimisation Software Products

- Shorten laminate development times and reduce engineers iteration overhead
- Maximise potential of composite materials through optimisation
- Understand the performance of your laminates
- Report and communicate your CAE developed designs

Tel +44(0)1926 915050
Email: info@grm-consulting.co.uk
www.grm-consulting.co.uk