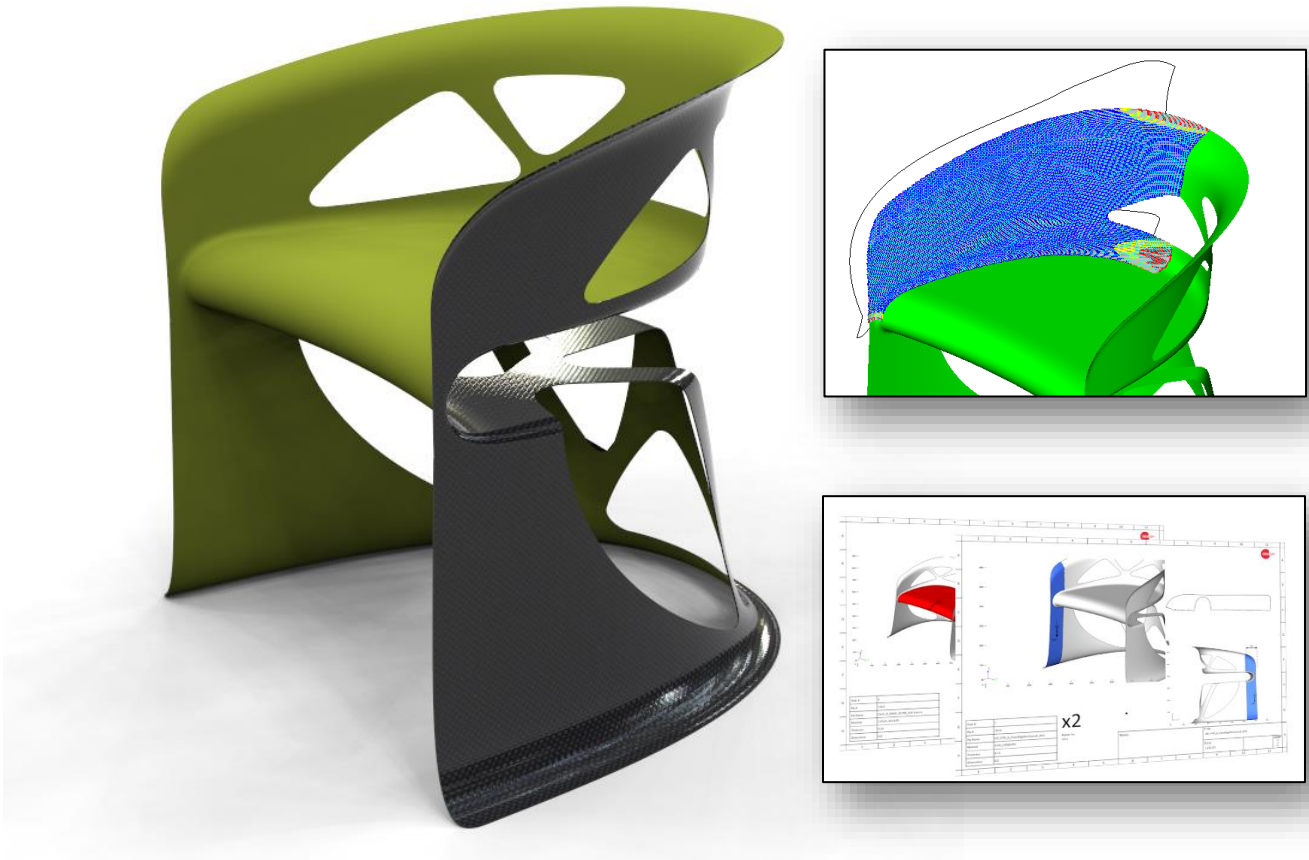


Draping, Flat Patterns & Interactive Plybooks



SUMMARY

Powerful, yet lightweight and efficient tools for customers focussed on design and manufacturing of long-fibre composite structures. OptiAssist’s design and manufacturing tools provide an affordable solution for the creation of plybooks, flat pattern templates and draping feasibility assessment.

Available separately or as part of OptiAssist & Genesis’ complete analysis and optimisation solution set, laminate data can be generated directly or imported from major FEA and design platforms.

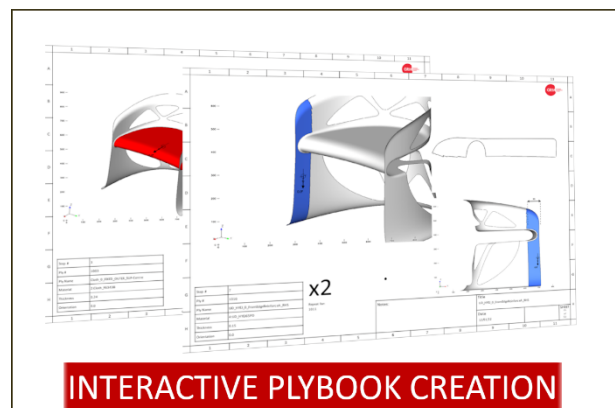
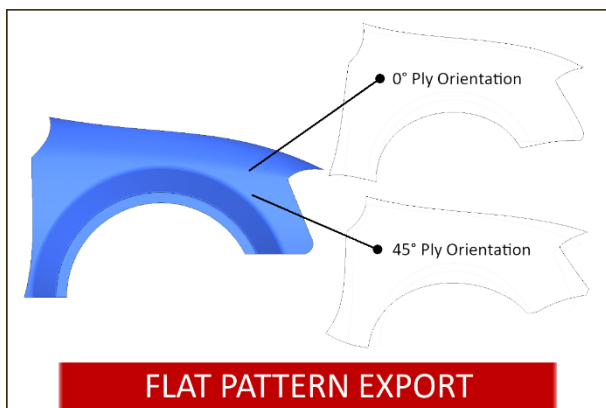
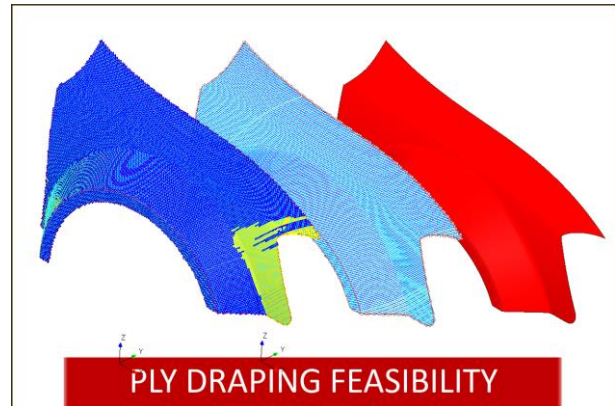
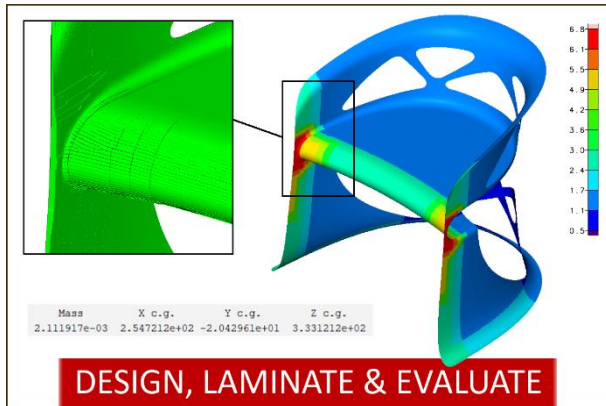
OptiAssist provides tailored solutions for your composite workflow:

– “GRM’s responsiveness to enhancement requests and improvements is unmatched. This is why we chose OptiAssist to communicate our laminate designs to manufacturing”

– **Matthew Hicks, Engineering Director, D2H**

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. Available as a product subset, design and manufacturing tools include:



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

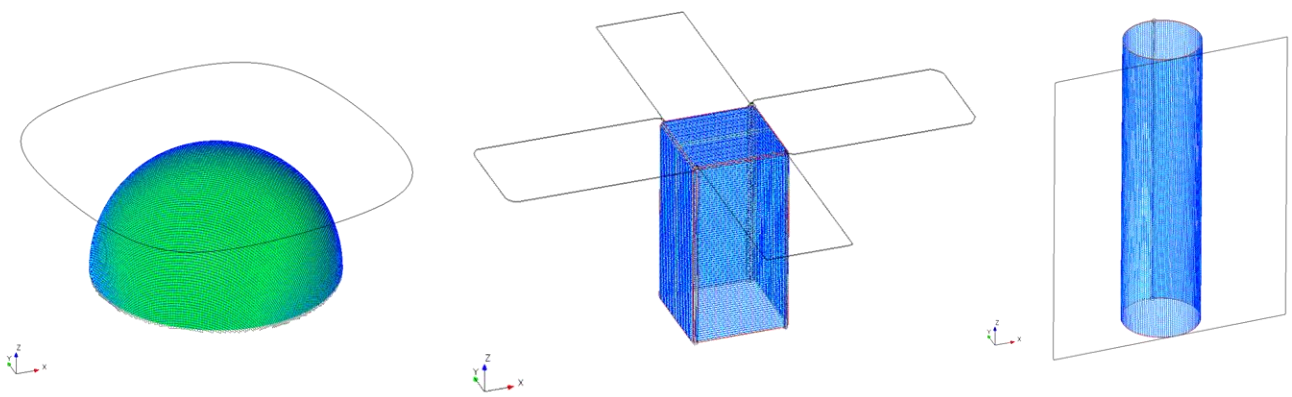
Design, Laminate & Evaluate – Develop your laminate designs directly with ply-based modelling techniques. Evaluate part mass, laminate thickness distribution and visualise thickness to confirm part feasibility. Working with rapid ply coverage techniques or considering draping feasibility, understand and explore your laminate.

Ply Draping Feasibility – Evaluate the feasibility of ply placement and coverage. Utilise OptiAssist's 'Auto-Drape' functionality to rapidly convert FE generated plies to draped plies. The primary draping algorithm is geodesic, using a fishnet algorithm. Additional methods include slide, shear locking, path and projection. Evaluate material shear issues and resolve through ply editing, adding cuts and refining the application start position.

Flat Pattern Calculation, Ply Shape Placement Creation & Export – Automatically calculate flat pattern geometry based upon draped plies. Export to DXF format for transfer directly to manufacturing. Additionally, ply shapes can be automatically exported as STL or IGES format in their 'in-situ' position to allow communication back to CAD design.

Interactive & Customisable Ply Book Creation – Delivering total flexibility in ply book creation, OptiAssist allows users to interactively create ply books in Microsoft PowerPoint format. Following the ply book builder wizard, select standard page layouts or customize ply pages to include additional views. In built ply book features include:

- Introductory page
- Ply list summary
- Material summary table
- Page per ply with 1 to 4 images
- Ply image annotation and dimensioning tools
- Additional operation notes page
- Colour plies by material type or orientation based upon manufacturing procedures
- Customisable PowerPoint template to allow customer specific ply book look and feel

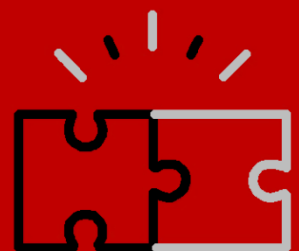


Benchmark Draping Samples

Compatibility

Recognising that companies often have several, established tools or need to communicate with third parties, OptiAssist is compatible with the following formats:

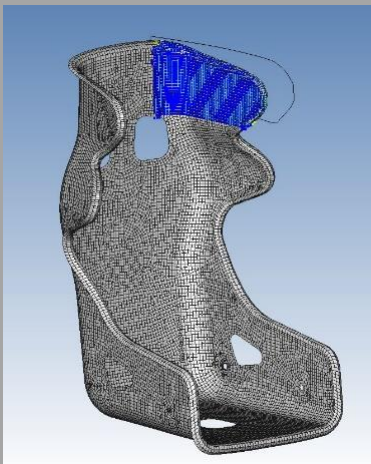
- CATIA Layup File Format (.layup) import and export. Also compatible with Laminate Tools
- FEA Model Laminate Data Import:
 - Siemens NX/Simcenter Laminate Composites data format
 - HyperMesh PCOMPP & STACK data format
 - ANSA Laminate data
 - SIMULIA Abaqus model and layup data
 - Nastran PCOMPG native data



CASE STUDY : FIA MOTORSPORT SEAT – D2H ADVANCED TECHNOLOGIES

When motorsport governing body, the FIA, sought to update the safety standard of seats used in closed-cockpit cars, they turned to D2H to help improve the construction of the most popular seat in the world of motorsport.

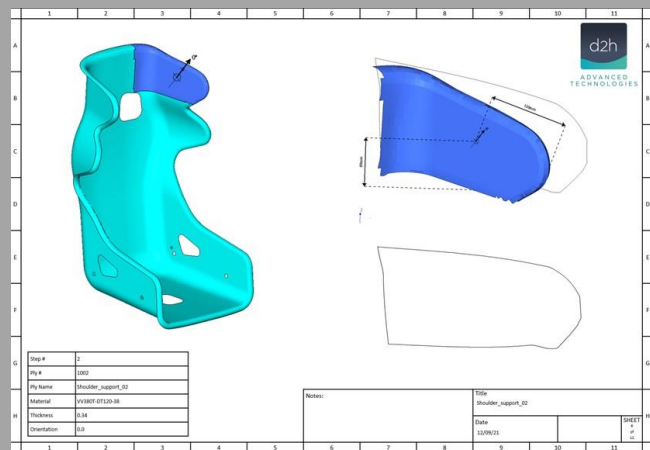
Their work delivered an entirely new design that is substantially stronger and safer than the previous standard, issued over 20 years ago, but at a cost that remains affordable for competitors at all levels. The development emphasis was on optimising the fibre laying-up configuration to deliver the best result structural performance.



Ensuring the easy manufacture and communicating this design to production was key to ensuring a repeatable production process. D2H was able to apply OptiAssist's ply draping to assess and develop the feasibility of each ply. Based upon the completed design, flat patterns were automatically calculated and generated using the draped ply definitions.

These were exported in dxf format for communication to cutting machines.

The application of OptiAssist in the development and production of the greatly improved FIA seat ensured the excellent repeatability of the manufactured design.



BENEFITS OF USING OPTIASSIST OPTIMISATION & MANUFACTURING SOFTWARE PRODUCTS

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