2023

Celebrating 20 years of GRM

Aims of OED2023

Enjoy day of presentations and network sessions

Celebrate 20 years of GRM with us

Meet new people and learn something new in engineering

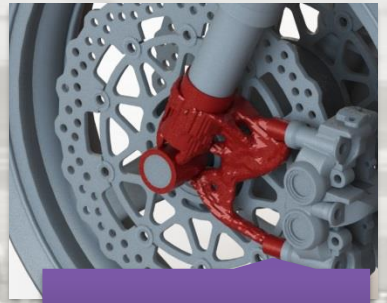
Learn something about GRM you didn't know yesterday

OED 2023
Celebrating 20 years of GRM

GRM IN 2023

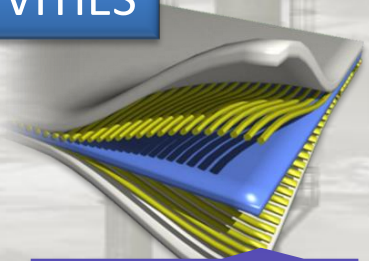
CONSULTING KEY DISCIPLINES

CORE ACTIVITIES

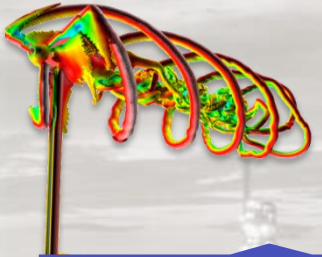


Optimisation

FEA Simulation



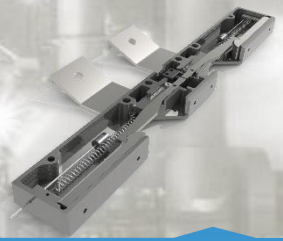
Composites



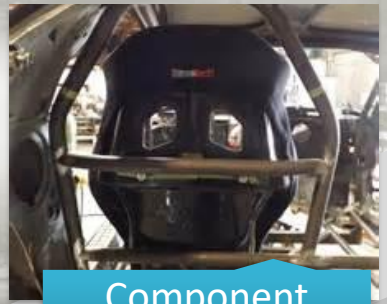
CFD

Methods & Software Development

Product Design



Prototype Manufacture



Component Testing

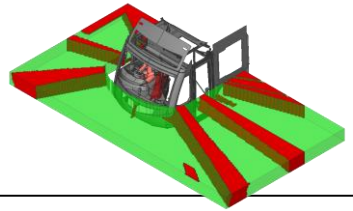
GRM OPTIMISED ENGINEERING DESIGN

www.grm-consulting.co.uk

Unique Services

GRM is the only UK supplier of ROPS simulation services approved by the FIA.

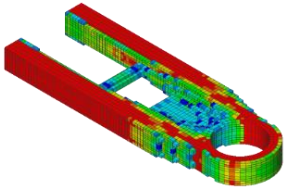
We are the de facto provider of Vision Assessment and scoring services for Transport for London.



We have a unique capability and history with Blast simulation for Defence applications and are verified to access and retain protectively marked material.

With our test laboratory, GRM is able to supply models calibrated to their own tests. Our CAE engineers are able to fully understand the mechanics of their simulation models.

Unique Services

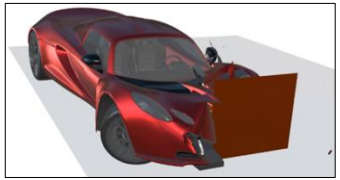


Acknowledged experts in the application of design optimisation methods in all industries.

GRM developed and utilises the only Digital Twin of the RailSafe Dummy for GM/RT2100

GRM is the only organisation retained by BSI and TRL as the authority on approving simulations of roadside barriers to EN1317 and EN16303

We have a extensive experience in composite structure development & crash simulations, having trained F1 teams and Hypercar OEMs

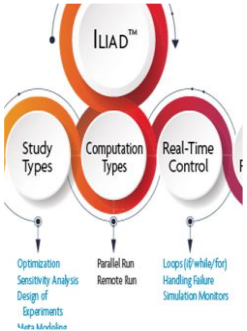


2023 Software Products

Design Exploration

Iliad

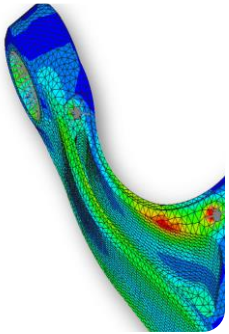
Process Automation
Design of Experiments
Multi-attribute Optimisation



Structural

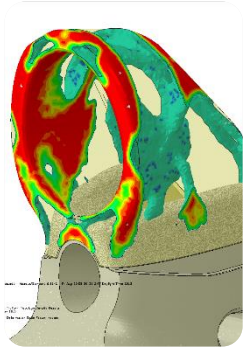
Genesis

The most comprehensive Structural optimisation solution, with 30 years of industry applied development.



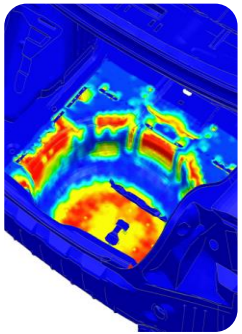
TruForm for Abaqus

Efficient, dedicated Topology Optimisation for Abaqus



OptiAssist for Simcenter 3D

Structural optimisation and automation tools for NX / Simcenter 3D users

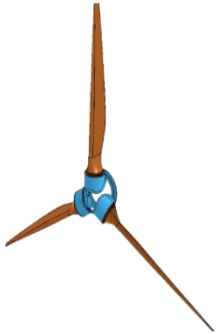


Composites

OptiAssist for GENESIS

Complete Composite Simulation & Optimisation Environment

- Composite draping, optimisation, analysis and ply book reporting

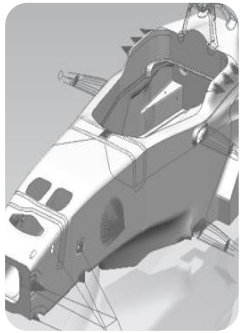


OptiAssist for Simcenter 3D

Laminate Design for NX / Simcenter 3D users:

-Ply Shape Optimisation

- Detailed Laminate Optimisation

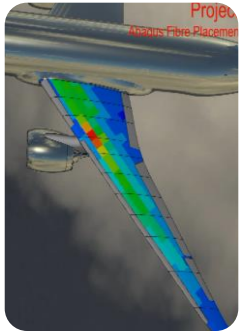


OptiAssist for Abaqus

Laminate Design for Abaqus users:

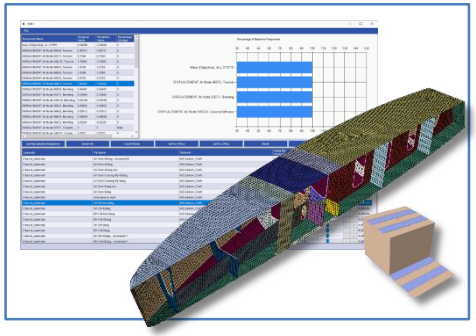
-Ply Shape Optimisation

- Detailed Laminate Optimisation



Continual Development of Optimisation Methods

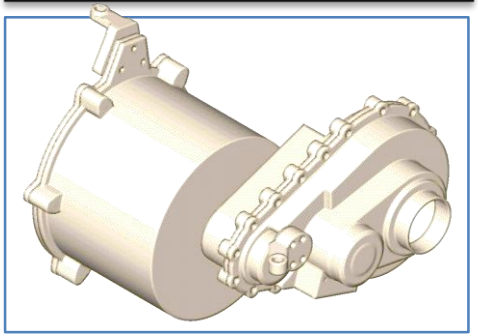
Real Time Response



From a single simulation,

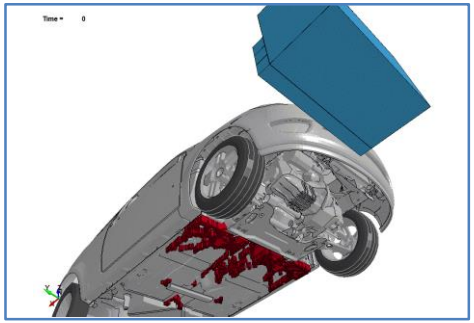
- Perform live predictions of laminate changes.
- Rank plies & parts in order of importance
- Evaluate design options before running further Abaqus studies

EDISON Co-Simulation



- Meeting the ever increasing demands for reduced transmission noise, the EDISON co-simulation optimiser couples structural housing optimisation to ROMAX transmission simulation

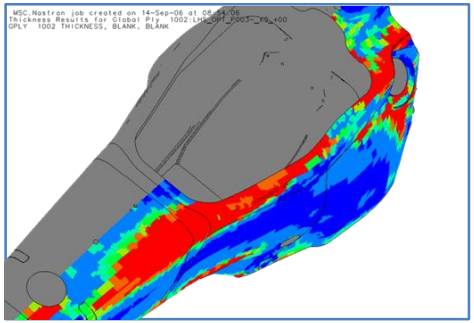
RDM® DYNA



- Combining the technologies of RDM® and ESL DYNA, RDM DYNA identifies areas to reinforce in impact models
- Workflow developed to support all LS-DYNA models, requiring no previous GENESIS experience

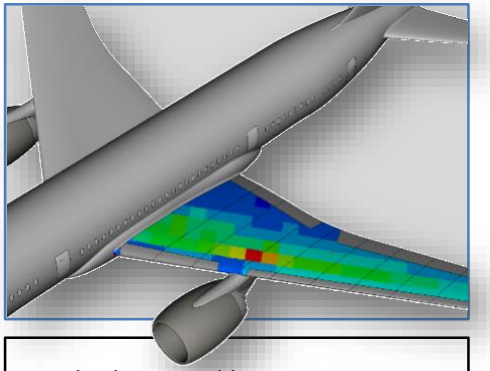
OptiAssist for Simulation

For GENESIS



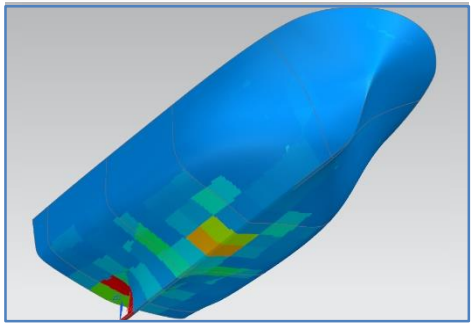
- Comprehensive toolset for composite analysis, optimisation & manufacturing simulation
- Proven over almost 20 years of industrial applications
- Continually developing

For ABAQUS



- Ply shape and laminate optimisation for SIMULIA Abaqus users
- Utilises powerful & proven GENESIS optimisation
- Directly works with Abaqus models & results

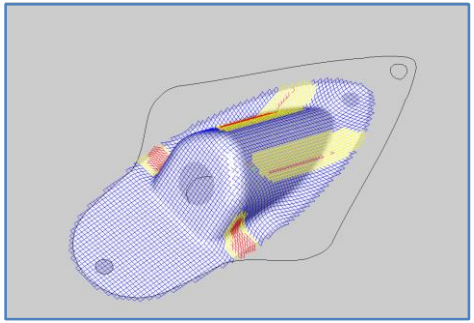
For SIMCENTER 3D



- Ply shape and laminate optimisation for Siemens NX/Simcenter users
- Fully integrated into the Simcenter 3D environment
- Extends both composites and non-composite optimisation

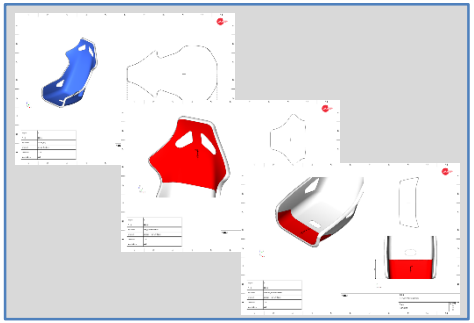
OptiAssist for Manufacture

Ply Draping Feasibility



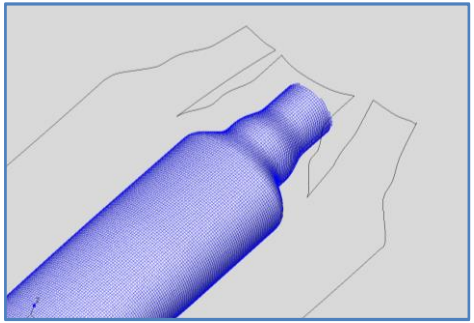
- Evaluate the feasibility of ply placement and coverage
- Auto-drape FE generated plies to draped plies
- Develop manufacturable laminate schedules

Ply Book Creation



- Interactively generate plybooks with:
- Laminate schedules
- Ply placement and orientation
- Flat Pattern Display

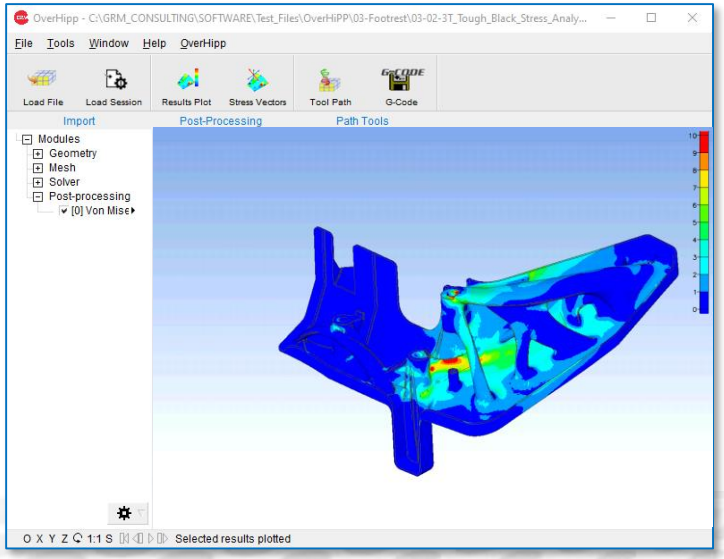
Flat Pattern Calculation



- Export flat patterns to DXF for cutting machines

OverHIPP – Solutions for 3D Printed Designs

- OverHiPP (Overprinting with High Performance Polymers) is a 2 year long Innovate UK funded project.
- New GRM solutions to improve FEA accuracy of 3D printed parts.



- The aim of the project is to develop and optimise a new hybrid manufacturing technique for overprinting 3D printed material onto composite sheets.

Innovate UK

Q5D

FDM Digital SOLUTIONS

victrex

LEHVOSS United Kingdom

GRM OPTIMISED ENGINEERING DESIGN

- In August 2021 GRM signed the Climate Pledge, committing to becoming carbon neutral by 2040, 10 years ahead of the Paris agreement.
- Whilst not the largest company, if we can make the right steps, maybe more will follow.

THE CLIMATE PLEDGE

Commitments

Companies and organizations that sign The Climate Pledge agree to three areas of action:

ONE

Measure and report greenhouse gas emissions on a regular basis

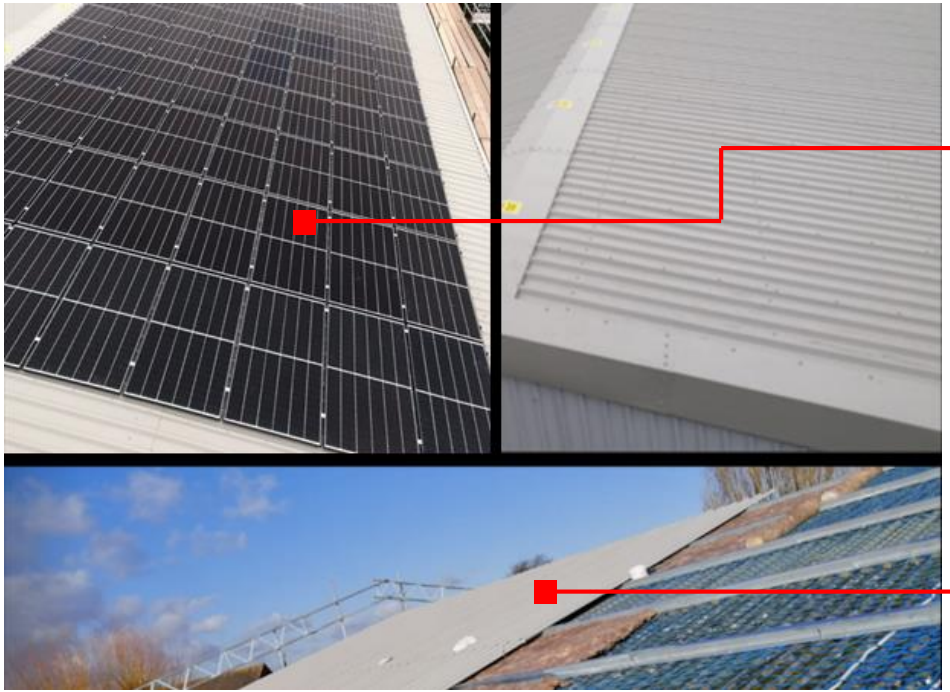
TWO

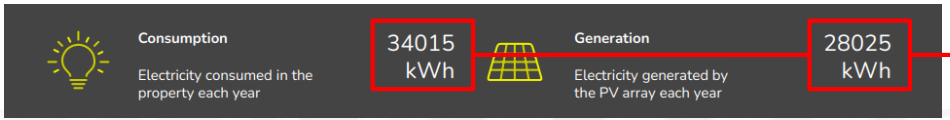
Implement decarbonization strategies in line with the Paris Agreement through business changes and innovations, including efficiency improvements, renewable energy, materials reductions, and other carbon emission elimination strategies

THREE

Neutralize any remaining emissions with additional, quantifiable, permanent, and socially-beneficial offsets to achieve net-zero annual carbon emissions by 2040

Sustainability





- In 2021 we re-roofed our building to improve insulation.
- In 2022 we installed a 33kW solar array capable of over-producing on our electricity demands at peak production.
- System produces a net 84% of GRM's annual electricity consumption.
- We know we're not alone in taking steps as we'll see in some of today's presentation.

SOLIDSOLUTIONS

SOLIDSOLUTIONS

80%+

TRIMECH GROUP

SOLIDSOLUTIONS

GRM OPTIMISED ENGINEERING DESIGN

SOLIDPRINT REINVENT MANUFACTURING

3DPRINTUK ADDITIVE MANUFACTURE

dte DESKTOP ENGINEERING

SOLID PEOPLE

CADTEK

DESIGNRULE

NTCADCAM

TRIMECH

Javelin A TriMech Company

Adaptive Corporation A TriMech Company

interpro™ Additive

FORWARD VISION A TriMech Company

United Kingdom | Ireland | United States | Canada

TRIMECH GROUP

GRM OPTIMISED ENGINEERING DESIGN

GRM Engineering Services

- Existing services remain unchanged
- GRM has access to wider design, simulation and 3D print resources

GRM Software Solutions

- Our focus on optimisation, composites and work with OmniQuest will continue
- Complimentary overlaps exist (SIMULIA Abaqus, 3D Printing)

SOLIDSOLUTIONS

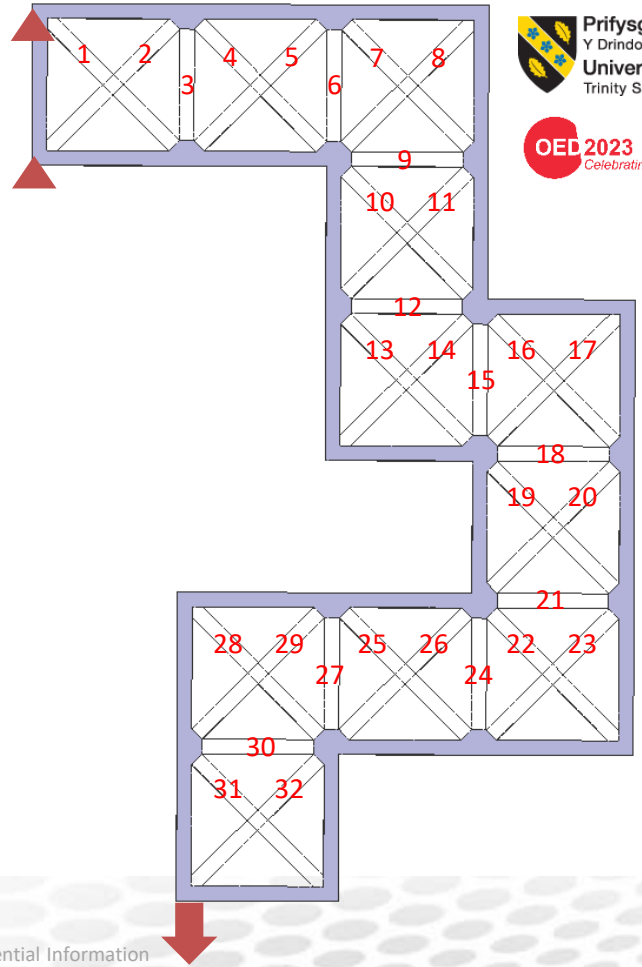
50+
Locations across four countries

250+
Technical Specialists

30k+
International Clients

United Kingdom | Ireland | United States | Canada

OED2023 Optimisation Challenge



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

OED 2023
Celebrating 20 years of GRM

- The image opposite shows an existing bracket in grey that is rigidly fixed at the two corners at the top of the image and loaded by hanging a weight from the bottom of the bracket.
- The challenge is to select **10** of the **32** possible reinforcing beam locations to achieve a maximum stiffness
- To enter, scan the QR code in your delegate pack and complete the form
- **Entries will close at the end of the lunch break**
- Prize: **SONOS Roam SL Portable Speaker**

2023

Celebrating 20 years of GRM

Agenda

9:50	**Roly Whear & Kevin Allin - Jaguar Land Rover** Delivering Multi-Platform and Attribute Differential Mounting System Design through Optimisation, Engineering and Collaboration
10:20	**Aeron Lloyd - Safety Devices International** Using Digital Twins to Improve Roll Cage Design
10:45 to 11:15 – Break	
11:15	**Hannes Schwart - Team Sonnenwagen Aachen** Designing the Sonnenwagen 4 for the world solar challenge
11:40	**Riza Jamaluddin - Hexagon Software** EDISON - Electric Drivetrain integration by Simulation and OptimisatioN
12:05	**Lewis Butler - Mahindra Racing** Formula E Race Car Engineering
12:30 to 13:45 - Lunch and Museum Tour	
13:45	**Dave Jonson - BAR Technologies / INEOS Team UK** Simulation of Dynamic Loads for Marine Vessels: The AC75 Class Yacht – A Case Study
14:15	**Adam Hargreaves - GRM Consulting KK (Japan Office)** Creating a Superior Sounding Guitar with Topology Optimisation
14:40	**Kelvin Lake - University of Wales Trinity St. David** Optimisation Challenge Results
14:45 to 15:15 – Break	
15:15	**Mike Cromarty - Polestar** The Zero Concept – A Complete Supply-Chain Solution to CO2e
15:40	**Mahdi Beghal - GRM** OverHIPP - Accurately Simulating 3D Printed Structures
16:05	**Conference Wrap Up**
16:15 onwards - 20th Anniversary Celebratory Drinks	