

Project: Revolutionising Enclosed Car Trailer Manufacturing with GRP Fibreglass.

Introduction

In the evolving landscape of automotive transportation, the demand for lighter, stronger, and more durable materials has become increasingly important. One of the most significant shifts has been the adoption of GRP (Glass Reinforced Plastic) fibreglass in the manufacturing of trailers.

This case study focuses on how Quantum Mouldings successfully partnered with a leading trailer manufacturer to develop a next-generation enclosed car trailer using advanced GRP technologies.

It is believed that this is still one of the largest RTM parts made.



Background

Enclosed car trailers serve a vital role in protecting high-value vehicles during transport. Whether moving classic cars, high-performance sports cars, or luxury vehicles, these trailers must provide secure, stable, and weather-resistant environments.

Traditionally, materials such as aluminium, steel, and wood have been used to construct trailers.

While strong, these materials often present limitations:

- Excessive weight, leading to increased fuel consumption and wear on towing vehicles
- Susceptibility to corrosion and weathering
- Limited design flexibility for aerodynamic or aesthetic detailing
- Time-consuming manufacturing processes

Recognising the opportunity for innovation, the customer approached Quantum Mouldings to explore the feasibility of using GRP fibreglass for the outer structure of a new enclosed trailer product.

The goal was to create a lightweight, stiff, and weatherproof body that maintained strength and longevity without the drawbacks of metal or timber.

Design Innovation

From the outset, Quantum Mouldings was involved in the project as a strategic manufacturing partner.



The trailer design required a large, single-piece moulding. This panel needed to be not only strong and lightweight but also allow for the integration of features such as light fittings, hinges, windows, and door frames.

Working closely with the client's engineers, Quantum helped to refine the structure for production using advanced CAD modelling and tooling development. Several considerations were central to the design:

- Creating smooth aerodynamic curves to reduce drag and improve towing efficiency
- Including structural ribbing for stiffness without adding unnecessary mass
- Incorporating detailing and fixing points directly into the moulds for ease of assembly
- Ensuring all GRP components aligned precisely during final trailer assembly

Material Selection

GRP (Glass Reinforced Plastic) is a composite material made from a plastic matrix reinforced with fine glass fibres. Known for its combination of low weight and high tensile strength, GRP has been used across industries such as marine, automotive, aerospace, and construction.

The key benefits for this application included:

- **Reduced weight:** GRP is significantly lighter than aluminium or steel, enabling improved towing efficiency and reduced vehicle emissions.
- **Corrosion resistance:** Unlike metals, GRP does not rust, rot, or corrode, ensuring a longer service life in all weather conditions.
- **Design versatility:** Complex curves and aerodynamic profiles are easier to achieve using GRP moulding techniques.
- **High strength-to-weight ratio:** Provides rigidity and resistance to flex under load without adding bulk.

- Low maintenance: GRP requires minimal upkeep and can have a UV resistant finish and waterproof.

Manufacturing Process

Quantum Mouldings employed the Resin Transfer Moulding (RTM) process to produce the large GRP panel. RTM is a closed-mould technique in which dry fibreglass matting is placed into a mould, the 2nd mould added with resin injected under pressure, ensuring complete impregnation of the fibres.

Each panel had structural ribs (some made from foam cores with others a GRP layup) bonded into place. These internal ribs provided the torsional stiffness needed to prevent the trailer body from flexing during use.



Numerous sensors were used during the prototyping stage to ensure the correct thickness of part and that the mat was fully wetted through giving a strong part upon curing.

Challenges

While the benefits of using GRP were clear, the project did present several challenges:

- Custom resin development: A specialist resin system was formulated with an extended “wet time” and lower viscosity, allowing the resin to flow into every corner of the mould before beginning to cure.
- Scale of mouldings: Producing panels over 5 metres long required large-scale tooling and careful handling to prevent deformation.
- Weight vs. stiffness: The team had to balance weight savings with the need for structural integrity, particularly in load-bearing and high-stress areas.
- Production efficiency: To keep the trailers commercially viable, production processes had to be optimised for repeatability and minimal manual finishing.

Through iterative testing and close collaboration with the trailer manufacturer, Quantum Mouldings successfully overcame each of these obstacles.

Sustainability and Longevity

In addition to performance benefits, the use of GRP also supported long-term sustainability goals. GRP trailers require less maintenance, reducing the frequency of repairs and part replacements. Their corrosion resistance means they retain appearance and structural integrity for many years, lowering the overall lifecycle cost.

Outcomes and Benefits

The collaboration between Quantum Mouldings and the trailer manufacturer demonstrates how GRP fibreglass can transform traditional vehicle transport solutions.

By combining design innovation with advanced moulding techniques, the team created a next-generation enclosed car trailer that is lighter, stronger, more durable, and visually superior to previous designs.

This project stands as a testament to the capabilities of GRP in commercial applications and the value of expert manufacturing partnerships.

As more sectors demand high-performance, low-weight, and corrosion-resistant solutions, GRP will continue to play a vital role in shaping the future of specialist transport products.

About Quantum Mouldings

Quantum Mouldings is a UK-based manufacturer of high-quality GRP components, offering various Production methods to suit a wide range of industries.

With a focus on quality, innovation, and collaborative engineering, Quantum delivers reliable composite solutions tailored to each client's needs.

Specialising in higher volume Production within the following markets:

- Industrial
- Marine
- Renewable Energy
- Leisure
- Healthcare
- Automotive