



Design & Display Structures
Specialists in GRP design & build
www.design-and-display.co.uk

CPD presentation

January 2015



Overview

Brief introduction about our company

The services we offer when we are working with architects on projects

History of GRP

The GRP material process

Sustainability

Why use GRP instead of other materials

Building examples using GRP

....followed by Q & A session



Brief introduction about our company

Design & Display was first established in 1966.

Allan Curtis, now owner and MD, joined the industry in 1994.

Graham Hepburn, a trained engineer, took on the Design Manager position in 2003.

The original company began life providing themed features.

As their portfolio of work grew rapidly it became clear that D&D's market leading 'start to finish' skills were ideal for the construction industry.

D&D have production factories in Woolwich and Salisbury. The site team leaders are based primarily in Woolwich.

The design and estimating team work from various remote locations as much of their time is spent travelling between sites and clients.



Primary Contacts:

Allan Curtis

Since joining the construction industry in 1985, Allan has accumulated a wealth of sales, manufacturing and project management skills in his rapid rise to proud owner of a market leading GRP business providing a complete design, manufacture and installation service. Combining genuine enthusiasm, knowledge and passion for developing creative solutions, Allan is well placed to ensure your project receives solid advice, keenly priced tenders and close attention from enquiry stage through to final handover.

Graham Hepburn

Having worked closely with the UK's leading Architects and Main Contractors to produce many highly regarded landmark building features, Graham's abundant experience brings practical, creative solutions to the most complex of projects within budget expectations whilst delivering the Architect's vision. As a mechanical engineer with experience in machine design, Graham's attention to detail and complex 3D CAD modelling skills give his design team the edge over competitors. His 'start to finish' approach, managing both production and installation teams once the design element is completed, ensures the design intent and overall architectural vision is achieved and completed on time.



The services we offer to architects

- Pre tender:
- Attendance at preliminary meetings
 - Concept analysis and initial budget costing
 - Advice on potential solutions and cost savings. Provide material samples.
 - Prepare draft scheme and final costs
 - Formal tender submission
- Post tender:
- Full CAD design detailing and 3D modelling where required
 - Manufacture
 - Installation
 - O&M manuals



The history of GRP

What is commonly known as 'fiberglass' today was invented around 1938 and marketed as an insulation product.

Glass is heated to high temperatures to enable spinning then allowed to cool to become rigid.

Developed in the UK during Second World War as a replacement for the moulded plywood used in aircraft radomes (GRP being transparent to microwaves).

First main civilian application was for building of boats, where it gained acceptance in the 1950s. Since mid-60s sailplanes have been built almost exclusively of GRP.

Advanced manufacturing techniques extended the applications and the tensile strength possible with fibre-reinforced plastics, for example hollow rotor blades of large wind turbines.

Popular in the telecommunications industry for shrouding the visual appearance of antennas and other unattractive structures due to its RF permeability and low signal attenuation properties.



Became attractive as a cladding (or shroud) material due to the ease with which it can be moulded, manufactured, and painted to custom designs, to blend in with existing structures or brickwork.

The material soon captured the imagination of highly creative people such as Dick and through combining practical site knowledge with cutting edge design skills, D&D was formed.

D&D's first offerings to the construction industry in mid 60's:

- Four storey 'brick' cladding to a kitchen duct behind Belgrave Square

- Classical urns to replace 20 No or so missing from Belgrave Square façade parapets

- 'Copper' dome and a series of chimney stacks at Avenue Chambers in Holborn



The GRP material process

Possibilities	From smooth to heavy stipple texture, from gloss to matt finish Flowing, accurate, organic shapes via hand-made pattern work
Fire rating	From general purpose up to that required by a Class '0' structure using Crystic 365PA resin + 65PA gel coat
Step 1: Pattern	Timber with texture applied as required Or CNC high density foam, finished with hard coat spray For low quantity unit production, skip this step and make timber mould Its sometimes possible to take a GRP/rubber mould off existing item
Step 2: Mould	Create a GRP female version of the pattern Or in rubber when complex heavy relief details occur

...continued



Step 3: Production

Gel coat – RAL/BS range, translucent and metallic

Glass fibre – layers and weight

Resin – types and colours

Reinforcement – types, method and when appropriate

The rear face finish – plain or flowcoat, tissue option

Preassembly – to save valuable site time



Production Techniques

Given the vast array of projects we undertake we employ a variety of production methods. In the main these are as follows:

Hand lay-up

Chopped strand mat is the reinforcement most commonly used in contact moulding, though the use of woven roving and various combination materials has grown considerably over the last few years. Once the gel coat has cured sufficiently, a liberal coat of resin is applied as evenly as possible. The first layer of glass is then pressed firmly into place and consolidated using a brush or roller. Further layers of glass and resin are then applied.

Spray Lay-up

This technique involves the use of a spray gun for the simultaneous deposition of chopped glass and catalysed resin onto the gel coat surface which has cured following application to the mould. A chopper unit attached to the spray gun chops glass roving into specified lengths (usually between 20mm and 50mm), and the chopped strands are then directed towards a stream of catalysed resin and it exits the spray gun. Resins which are designed for spray application are generally low in viscosity, so they rapidly wet out the chopped strands. This ensures they are more easily atomised into the desired spray pattern. The rapid wet-out achieved by spray deposition allows faster and easier consolidation than would be achieved with hand-lay methods, but thorough rolling of the laminate is still necessary to ensure complete air removal.

H41 Specification

Refer to our web site for an example.

Optional additional finishes and decoration can be added



Sustainability

Reducing construction costs - Our contribution to reducing global warming

Demolition, removal and recycling opportunities

Polyester resin for building light weight structures

Raw materials – very basic and abundantly available

Production methods – tooling uses sustainable timber

Finished product – ease of handling and reduced transportation costs



Reducing Construction Costs Our Contribution to reducing Global Warming

The strength and light weight of our GRP panels produces significant advantages. When using our product the primary support structures normally required for other traditional heavy building materials can be engineered to considerably reduced weight and complexity. In some cases, for instance refurbishment of existing buildings, GRP may be the only possible material that can be used without rebuilding or strengthening the whole primary structure.

Demolition, Removal and Recycling

The dismantling of a GRP structure is as straightforward as the installation, with the light weight modular panels again being a significant factor. Once dismantled and on the ground the product may be cut up and sent for recycling e.g. shredding for use in road metaling.

Polyester Resin

This material is a product of the petrochemical industry and has vitally important uses in the aircraft, transport, shipping and construction industries where, in combination with glass and carbon fibres, it is used to provide strong light weight materials which replace heavier, more energy consuming materials such as aluminium, steel and concrete.

Raw materials are very basic and abundantly available

Glass and carbon fibres are used as a matrix in combination with polyester and other resins to form a strong, light weight plastic material with a very impressive strength to weight ratios. This means smaller amounts of raw materials are used to obtain the structural results of more traditional materials.



Production Methods - Tooling uses Sustainable Timber

This material is invariably formed in a mould, producing anything from a flat sheet to the most complex of shapes; in size from an item you can hold in your hand to tall tower features and at the other extreme, a Royal Navy mine sweeper. The tooling process usually requires the production of a timber pattern which in form is a replica of the finished item segments. Using the pattern, a GRP mould (or tool) is produced from which a large number of identical items can be efficiently produced. The materials used for the pattern work are sustainable timber and sheet materials.

Handling of Finished Products

The finished products are often large in size, but as a result of being light weight, they are easily handled and the necessity for mechanically driven lifting equipment is minimal. Delivery payloads are likewise reduced and only a fraction of the vehicle weight capacity, thus reducing the carbon costs of delivery to the customer.

Similar savings accrue on site where both manpower and mechanical handling are significantly reduced when compared with the usual heavy building material handling. There are further savings from reduced personnel travelling costs and delivery of plant.



Why use GRP instead of other materials

Polyester resins can be used with a wide variety of glass fibre reinforcements and core materials to produce complex, moulded shapes of virtually unlimited size.

Polyester composites offer many advantages compared with more traditional building materials:

- Lightweight, with an excellent strength to weight ratio, making it easy to assemble on site

- Excellent weathering and water resistance

- Requires little maintenance

- Fire retardant grades available

- Resins are designed to meet regulatory standards

- Extremely strong and durable



Vandal resistant

Structural adhesives such as Crestomer are ideal for many bonding applications

Available translucent or in a wide range of colours

Gel coats can be pigmented to provide body colour, matched to other parts

Polyester resin surfaces can be prepared and over painted to automotive paint finish standards

Sections and mechanical fixings can be bonded into place



Building examples using GRP

Refer to images.

Followed by Q&A session



Design & Display Structures

Specialists in GRP design & build

www.design-and-display.co.uk

grp@design-and-display.co.uk

0844 736 5995 phone

0844 736 5992 fax

07718 320184 mobile