

Durability of Fibre Reinforced Polymers in Construction

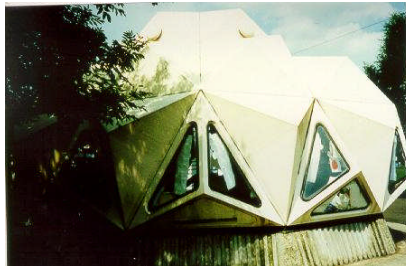
Fibre reinforced polymer (FRP) components have good durability:

- FRP structures perform well where appropriately designed
- several structures in the UK have given over 35 years of service, and are still meeting performance requirements
- fibre/resin combinations can be optimised to meet performance requirements
- additives can be employed to increase service life
- correct material selection, design and manufacture enable design lives of 50-100 years to be achieved.

Structures erected in the early 1970s are still meeting performance requirements



Modular Stores Building
Wollaston



School classroom
Preston



Mondial House
London

Effects of Weathering

All materials of construction change in appearance on extended exposure to the weather.

The effects of outdoor use on structural FRPs such as glass/polyester or carbon/epoxy laminates are confined to the surface and do not often involve a serious threat to their structural integrity. The effects are mainly cosmetic including:

- Colour fading which can be prevented by the appropriate choice of pigment.
- Yellowing which can be prevented by using a more UV-resistant resin and better UV additives, and by ensuring good cure of the resin.
- Blooming which can be removed by polishing as a short term solution. Judicious choice of the pigment should prevent this problem.

Performance in Service

FRPs can be designed to meet even the most challenging service environment. There are continuous improvements in resin technology (new improved varieties of resin tend to be developed around every seven years). FRPs are now being specified for applications designed to last for 50 years without loss of functional effectiveness. The accelerating trend towards using FRPs in bridges and buildings means a further extension of the required lifetime, possibly to over 100 years.

Performance in extreme environments



Vodacom Building
South Africa



Burj al Arab Hotel
Dubai



Sharjah Airport Dome
erected 1970

When does an FRP product have to be replaced?

It is sometimes difficult to determine the end of life of a product. There are three key factors:

- the product must remain safe to use despite the stresses and the external weathering they experience over decades
- it must not become too expensive to maintain
- it must continue to meet performance requirements – structural or aesthetic.

The possibility of repair is an attractive feature of FRPs. Their useful life can often be extended because they are more easily repaired than some other materials. Additionally, they can be used to extend the life of structures originally made from another material, such as concrete or metals.

Network Group for Composites in Construction (NGCC)

The NGCC is the first group to formally bring together the FRP and construction industries in the UK. Through a coordinated approach, NGCC is strengthening the position of the UK industry at an international level. For more information visit www.ngcc.org.uk

Further information on the structures featured on this fact sheet, and similar structures, can be obtained from the material suppliers, designers, consultants and manufacturers listed in the Consultancy database on the NGCC website.