

STRUCTURAL STRENGTHENING



design ■

structural assessment ■

pultruded plate installation ■

FRP composite wrap installation ■

CRL IS A SPECIALIST contractor for the design and installation of fibre reinforced polymer (FRP) composite strengthening schemes for steel, concrete, masonry and cast iron structures. We have been established since 1955 and operate across the UK through a network of 5 regional offices.

CRL was the first company in the UK to use FRP composites for strengthening concrete in 1996. We have played a key role in developing the technique and assisted with the development of standards and guidance documents for the design, installation and management of composite systems published by the Concrete Society as Technical Reports 55 & 57. We provide the construction industry with innovative strengthening techniques using FRP composite materials which comply with current Eurocodes.

- Condition survey of the structure
- Structural analysis
- FRP strengthening design
- Pultruded plate installation
- Ultra High Modulus plate installation
- Wet & dry lay wrap systems
- Near surface mounted (NSM) strengthening
- Quality control testing of adhesives
- Fire protection
- Overlays
- Load testing
- Post installation monitoring



FRP COMPOSITES are a combination of fibres and polymer based resin which form a structural material which is both lightweight and durable. The resin transfers the stress between the fibres and also protects

them. There are a variety of generic resins and fibres which can be used but primarily carbon or aramid fibres are used with epoxy resins. Compared to steel plate

strengthening the equivalent carbon fibre plates are 15% of the cross sectional area and 3% of the dead load. These materials provide sustainable engineering solutions and have been successfully used in many industries for over 60 years.

FIBRE-REINFORCED POLYMER COMPOSITES

THERE ARE TWO methods for composite strengthening:

1. Plate bonding where the composite plates, which are usually carbon fibre reinforced, are manufactured off site and then bonded to the structure using epoxy adhesives.
2. FRP wrap where on site the dry fibre fabric is either rolled into the wet resin on the structure surface (dry lay) or the resin is applied to the fibre fabric which is then applied to the structure (wet lay).

Understandably quality control is easier with plates manufactured off site but for strengthening around beams and columns the wrap system is the only solution. In both cases there are strict quality control procedures to follow. CRL is qualified to design and install using both techniques and approved by the leading material suppliers.



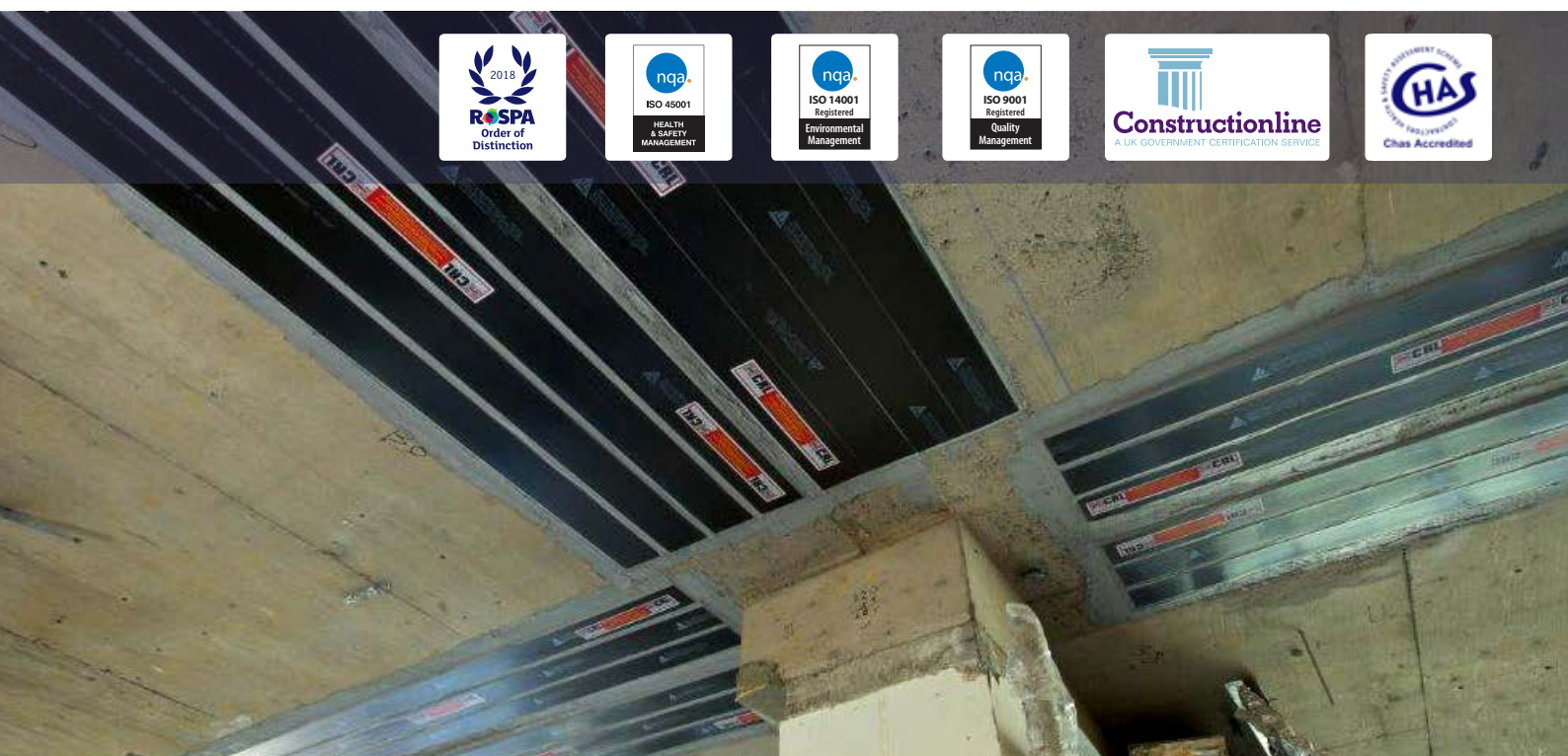
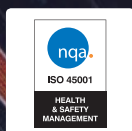
CRL CONTINUE to lead the construction industry in the innovative use of FRP composites. We have strengthened many concrete, steel, masonry and cast iron structures in the last 20 years using a combination of techniques and worked closely with Universities to enhance our knowledge and understanding of these materials and their long term performance. Our largest project has been the installation of 15 KM of CFRP plates to strengthen floors in an office building. Recently we have started to develop the use of FRP composites for new bridge structures and replacement decks. These are lightweight, manufactured off site, quick to install and durable. A sustainable solution for the modern construction industry.



INDUSTRY LEADING EXPERTS

Amey LG	Northumbrian Water
Clancy Dowra	Oceanography Centre Southampton
EON UK	Persimmon Homes
Hampshire County Council	Total Petroleum
Headrow Shopping Centre	Transport for London
Highways Agency	Transport Scotland
London Underground	Tube Lines Ltd
Morrison Construction	Walsall MBC
Nestle	Wates Construction
Network Rail	Wellcome Trust
North Lanarkshire Council	Welsh Government

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