

# Review



Practising engineers will find this well-structured book an excellent resource, writes **Tim Stratford**, with case studies and data presenting the latest international research and practice.

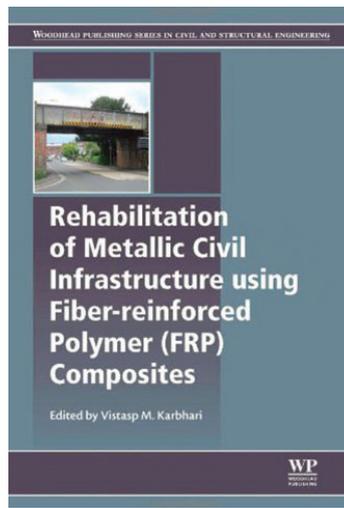
## Rehabilitation of Metallic Civil Infrastructure using Fiber-reinforced Polymer (FRP) Composites

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The application of fibre-reinforced polymer (FRP) composites to strengthen, restore or improve the performance of structures is a maturing technology. The most widespread applications involve bonding carbon FRP onto concrete bridges or buildings using an epoxy adhesive. Usually the aim is to increase or restore the strength of a structure, but that is only one of the applications for bonded FRP. This book focuses on the rehabilitation of metallic structures using FRP; it is an excellent compilation of the current state-of-the-art in both research and application, and is highly recommended as such.

The book has four sections:

- **Introduction and overview**, which is a thorough exploration of the method of bonding FRP to metallic structures, and correctly devotes space to an in-depth examination of the critical adhesive joint and its durability
- **Application to components**, which describes how FRP can be applied to steel tension members, to address stability problems in thin-walled steel sections, or to repair aluminium components
- **Fatigue performance**, which examines the fatigue performance of the strengthened system, and how FRP can be used to extend the fatigue life of steel structures

- **Application to infrastructure systems**, describing how FRP has been applied to a range of steel, cast iron and wrought iron structures, with many of the case studies drawn from UK projects

The book follows Woodhead Publishing's proven format of chapters written by international specialists in the field which have been chosen and structured by an expert editor. The selection of subject material and its order have been well thought out in this book. This is not simply a sequence of chapters reporting each author's own research: each of the chapters gives a genuine insight into the topic, and each chapter also brings a perspective from a different part of the world. There is some inevitable overlap and difference in approach between the chapters, but this is a strength in a book that compiles the latest international research and practice. There is a smattering of typographic and

presentation errors (with a very few small factual errors); however, none of these detract from the technical material presented.

The book does not pretend to set out design methods, but it is a very useful resource for a practising engineer to draw upon, because it collates a large range of research results, case studies and data that would not otherwise be easily accessible. That includes, for example, a description of how aluminium aircraft are repaired using FRP, the use of FRP for bridge deck replacement, and applications of FRP to strengthen offshore infrastructure and pipes. The book complements, rather than replaces, the 'first generation' design guidance on the subject published by the Institution of Civil Engineers' and the Construction Industry Research and Information Association (CIRIA)<sup>2</sup>, because it focuses on research and applications that have taken place since those guides were published over 10 years ago.

It is fitting that this book is dedicated to the late Professor Len Hollaway MStructE, FICE – a former Professor of Composite Structures at the University of Surrey. He was a pioneer of FRP composites in structural engineering, and his enthusiasm for the subject shows in Chapter 12, which he contributed to this book.

### References

- ▶ 1) Moy S. S. J. (ed.) (2001) *ICE Design and Practice Guide: FRP composites – Life extension and strengthening of metallic structures*, London, UK: Thomas Telford
- ▶ 2) Cadei J. M. C., Stratford T. J., Hollaway L. C. and Duckett W. H. (2004) *Report C595: Strengthening metallic structures using externally-bonded fibre-reinforced composites*, London, UK: CIRIA

### Tim Stratford

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