Book review

USE OF FIBRE REINFORCED POLYMERS IN BRIDGE CONSTRUCTION

T. Keller. International Association for Bridge and Structural Engineering, 2003. ISBN 3 85748 105 0, CHF80, 131 pp.

There are many books concerned with composites in construction, and which focus on composite theory, characterisation of mechanical and in-service properties and the fabrication techniques of the material. This book takes a different approach, presenting a state-of-the-art report and reviewing the progress made worldwide on most aspects of fibre-reinforced polymers (FRP) in bridge construction up to the end of the year 2000. The Swiss Federal Roads Office commissioned the Swiss Federal Institute of Technology in Lausanne, to prepare this work.

Although the book and in particular the introductory chapter refers to bridge engineering specifically, its contents are equally relevant to FRP composites in civil engineering. Each of the 12 chapters commences with a very short review of the subject area dealt with in that chapter. Chapter 2 (two pages) is concerned with the classification of FRP composites. Chapter 3 (ten pages) briefly mentions the properties of fibres and of polymer and cement matrices and their combination, and the durability, sustainability and fire characteristics of FRP composites. Chapter 4 (14 pages) discusses FRP composite tensile elements, including straps, bars and cables, and states specific manufacturers of the various products. Chapter 5 (16 pages) introduces structural components and systems used in construction, and gives examples of specific developed systems. A section on the joining technology of these systems is also included. Chapter 7 (five pages) deals with the state-of-the-art in repair and strengthening in specific areas of the world. Chapter 8 (six pages) is divided into two sections, both giving the state of the art with practical examples on: (a) hybrid bridges with external FRP cables; and (b) material-adapted

hybrid concepts. Chapter 9 (five pages) introduces all-composite new structures, discusses briefly the state-of-the-art of these systems, and provides some information on structures built between the years 1996 and 2000. Chapter 10 (three pages) mentions design codes and guidelines currently available. Chapter 11 (five pages) briefly discusses the results of a survey concerned with the applications of FRP in bridge engineering. A limited number of experts took part in the survey, which was undertaken during the writing of the book. There are two sections in this chapter, one dealing with the results of the survey and the other concerned with the author's own assessment of the application of FRP composites to bridge construction compared with traditional materials. Chapter 12 (seven pages) is divided into two sections: (a) general research requirements; and (b) research recommendations for Switzerland. The book includes two appendices: the first contains statistics of 29 case studies utilising FRP composites in bridge engineering in Denmark, Japan, Switzerland, the UK and the USA, and the second provides a very limited number of proceedings, books and reports on the topics dealt with in the book and an advertisement section on the Structural Engineering Documents (SED) of IABSE's series of book-length monographs.

The book is well written and easy to read; it has provided a state-of-the-art report on the use of FRP in bridge construction with corresponding applications and research recommendations. It is a useful supplement to the conventional textbooks on the subject. My one concern is that the book is very brief, to the extent that some of the impact of the subject area is lost; the reader must have a fundamental knowledge of FRP composites in construction to gain the full benefit of the book.

L. HOLLAWAY