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Chapter 1 Introduction to Carbon Fiber Polymer Composites

This chapter gives a brief introduction to carbon fiber reinforced polymer (CFRP) that is covered in this book. The properties of CFRP are introduced. Subsequently, the degradation of CFRP composite under various environmental conditions are provided. After that, the failure mechanisms are described. Finally, the general

1.1 Basics of Carbon Fiber

CFRP has been recognized as a new material due to its superior properties, such as high strength-to-weight ratio, good fatigue performance, and the shape and tailorability of mechanical properties are mainly resulted from the interface, which are ensured by the effective interfacial bonding between the carbon fiber and the matrix. To meet the quest for materials with high performance in transportation and civil engineering, and traffic loads nowadays require the repair of existing infrastructures and the construction of new ones. While, the CFRP composite materials such as concrete and steel reinforced concrete are non-renewable materials and have limited engineering applications [7–20]. Therefore, it is a good substitute to the conventional materials. The design guidelines and design codes for the applications of CFRP