

Highway Engineering Composite Material and Its Application

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Preface

With the vigorous development of highway, more strict requirements have been put forward on the material performance. It is difficult for traditional single material to meet the comprehensive performance requirements and high index requirements. The development of composite materials has become an inevitable trend in civil engineering. With a dozen years of wide application of highway composite materials, there have recently been a large number of scientific research results. Theoretical and technological levels have been further improved. A dozen of years of teaching and research experience has been accumulated in this course. Large materials which are related to composite materials at home and abroad have been collected. Based on the original *Highway Engineering Composite Material and Its Application* edited by Jialiang Yao, Zhigang Zhou, Jiejun Tang of CSUST, this book is compiled and finished.

The basic concept, composite principle and requirements, material properties, mix proportion design, and engineering application of main composite materials used in highway engineering are systematically introduced in this book. The development, definition and classification, strengthening theory, damp-heat effect, interface, design content and methods of composite materials, the compatibility of matrix and reinforcement, and the wettability are mainly introduced in the first chapter. The engineering characteristics, interfacial friction characteristics and their functions, and the main applications of geosynthetics in engineering are mainly introduced in the second chapter. The material and process characteristics, reinforcement mechanism, interfacial properties, the properties, mix proportion design, construction process, and application of steel fiber-reinforced cement concrete in engineering are mainly introduced in the third chapter. The concept and classification of modified asphalt, modifier and modified asphalt pavement performance, the selection of polymer modifier and modification effect evaluation, modified asphalt technical indices and standards, modified asphalt production process, the basic concept, formation mechanism, characteristics, material requirements, mix proportion design process, pavement construction, and quality inspection of Stone Mastic Asphalt are introduced in the fourth chapter. The polymer matrix, polymer concrete, and other applications of polymer in concrete are mainly introduced in the

fifth chapter. The concrete pavement, functional layer composite materials of asphalt pavement, and preventive maintenance engineering materials of pavement are introduced in the sixth chapter.

It can be used as a textbook for postgraduates or a textbook of optional course for undergraduates. It can also be used as a training textbook and a reference book for technical personnel with foreign projects in engineering.

Due to our limited level and the rapid development of highway composite materials, some mechanisms are still to be studied. Please kindly correct it if there is any mistake.

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Changsha, China
November 2017

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About This Book

This book is edited mainly according to research results of composite materials of highway engineering and application experience of practical engineering at School of Traffic and Transportation Engineering of Changsha University of Science & Technology in recent years. Geosynthetics, steel fiber-reinforced concrete, modified asphalt and asphalt mixtures, polymer composite materials, pavement functional layer materials and preventive maintenance materials, engineering properties, selection requirements, and engineering application technology which are widely used in highway engineering are introduced in detail.

It is closely linked with the actual engineering. It can be used as a training textbook and a reference book for technical personnel with foreign projects in engineering. It can also be used as a textbook for postgraduates or a textbook of optional course for undergraduates.

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