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Book Review

Cement-Based Composites: Materials, Mechanical Properties and Performance, by A.M. Brandt Published by Routledge Ltd (incorporating E & F N Spon) Cheriton House, North Way, Andover, Hampshire, SP10 5BE, UK, ISBN 0 419 19110 0, 470 PP

Concrete is an international construction material. Whatever be its limitations, it is perceived as a material suitable for a wide range of infrastructure applications to enhance the quality of life all over the world. The last three decades have seen many new developments in the composition and structure of these materials, and the emergence of a whole series of new cement-based composites which can be tailored to the requirements and specifications of the engineer. There are at the moment very few books that examine these materials in depth in a meaningful and rational manner to highlight their intricacies in a simple and authoritative way and emphasize their properties and performance characteristics. The author of this book, Dr. Brandt, has brought together his long and close association with these materials to produce a very readable, comprehensive and clearly explained treatise which every engineer and materials scientist will find easy to follow and understand.

The book deals with both traditional and new cement-based composite materials and develops in a systematic manner their structure and composition leading to the nature of their behaviour under load, and the resulting cracking characteristics, the role of the interfacial zone, and their fracture and failure processes. The book presents a detailed and critical examination of these materials interrelating their structure, properties and failure modes. Such an interactive treatment gives a better understanding of materials, and their advantages and limitations, which is essential for their effective and efficient use in practice.

There are 15 chapters devoted to the subject. The first three chapters set the scene to the book, and

describe the structure and composition of a wide range of composites that are currently used in the construction industry. One cannot fully understand cement composites without a detailed description of their constituents, the reinforcement details and their distribution, and the bonding forces that hold them together. These are ably characterized in the following four chapter with a significant emphasis on the nature and role of the interfaces between the constituents. The strength and deformation behaviour under load, cracking and crack propagation and fracture and failure are then extensively discussed. Fracture energy and fracture toughness of these composites are very much influenced by their structure and composition, type of loading and their internal interfaces, and three chapters comprehensively analyse the influence of these characteristics on the performance of the composites. Behaviour under dynamic loads, fatigue, effects of sustained load, thermal changes, and durability are all adequately covered in one chapter. The final chapters then deal with design, optimization, special tailor-made composites, and the development and application of these composites in practice.

The value of this book lies in the systematic and planned development of the subject of cement-based composites, with a thorough and critical evaluation and examination of the interaction of the structure and composition of the composites with their properties and performance under load. Modelling of these composites and their behaviour is fully discussed and interrelated to their engineering behaviour – aspects that are vitally important to optimise and extend both the type of composite and its application. Undergraduates, postgraduates and practising engineers will all find this book a valuable basis and guide to advance the use and performance of cement composites.

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