

Preface

Concrete is the most used man-made material in the world since its invention. Worldwide, about three tonnes of concrete are used annually per person. Concrete comprises three major fractions, aggregate: binder and water. The aggregate fraction in concrete is about 75 % of its total volume and therefore it plays a vital role in the overall performance of concrete. However, traditionally, more attention has been paid to develop novel binding phases of concrete as it is widely thought that the innovation in binder materials can help to develop innovative concrete materials. In fact, a significant improvement has been seen recently in this field such as the development of ultra-high strength concrete and self-compacting concrete.

It is common knowledge that the aggregates are the inert material in concrete, however, being their major constituents, their proper selection is very important to accomplish innovation in concrete production. In fact, the proper selection of aggregates and the manipulation of their size distribution are very important steps for the development of almost all types of special concrete. Moreover, the preparation of some types of concrete such as light and heavyweight concrete, concrete resistant to sound/vibration can only be achieved with proper selection of aggregates. They must not contain significant contents of deleterious components such as chlorides or sulphates, and they must also have proper shape and size to obtain a good quality concrete.

Another important recent developmental aspect in the field of cement and concrete science is the use of various types of recycled waste materials as fuel and raw material in cement production, as well as the use of these materials as aggregate in the production of various types of concrete. Cement and concrete production can consume a substantial percentage of the total generated waste materials, which can alleviate the acute environmental impact of these materials and also partly help to achieve the much needed sustainability in cement and concrete production. The use of waste materials as aggregate in concrete can consume vast amounts of them taking into account the scale of concrete production all over the world as well as the percentage of aggregate in the overall concrete volume.

Recycled Aggregate in Concrete is a recent development in the use of various types of waste materials in concrete production. The information that is scattered in various journals and conference proceedings published up to the end of March 2012 has been taken into consideration. The comprehensive information presented in the book will be helpful to graduate students, researchers and concrete technologists. It is also expected that the data presented in this book will be an essential reference for practicing engineers who face several problems concerning the use of these materials in concrete production.

The book can be divided into two parts: the compilation of varied literature data related to the use of various types of industrial waste as aggregates in concrete and the information related to the use of construction and demolition waste as aggregate in concrete. In the book, the properties of the aggregate and their effect on various concrete properties are presented separately. One chapter is devoted to describing a quantitative procedure to estimate the properties of concrete containing construction and demolition waste as aggregates. The current codes and practices developed in various countries to use construction and demolition waste as aggregates in concrete are discussed in the last chapter of the book. Moreover, several issues related to the sustainability of cement and concrete production are highlighted in the first chapter.

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Jorge de Brito
Nabajyoti Saikia

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de Brito, J.; Saikia, N.
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