



Concrete

Edition: 2nd

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ISBN10: 0130646326, ISBN13: 9780130646323

Format: Hardcover

Number of Pages: 644

Published: 2003

Publisher: Prentice Hall, Pearson Education, Inc. Upper Saddle River, NJ 07458, U.S.A.

List Price \$139.00

This 2003 Prentice Hall textbook provides a solid and updated information about concrete, the most widely used construction material. It highlights the technological progress made since the publication of the first edition of Concrete written by Sidney Mindess and J. Francis Young in 1981.

After a short **introduction to concrete** as a building material, its nature, advantages and limitations in use, the authors present a short **history of the development of cement and concrete** (non-hydraulic cements, hydraulic limes, development of Portland cement, concrete admixtures).

Other chapters are concerned with concrete components, proportioning of concrete mixtures, concrete construction practices, curing concrete, the response of concrete to stress, testing of concrete, its physical properties and durability, and special concrete types. Each chapter lists the relevant bibliography and problems to be solved. The ability to answer them indicates the knowledge, the reader has achieved.

Two chapters address various kinds of **cements** (their production, types of composition, testing) and their **hydration** properties (chemistry of hydration and hydration products, microstructure and physical properties of hardened cement paste).

The chapter on **mineral admixtures and blended cements** provides information about pozzolanic materials and blast furnace slag, and their effect on the properties of cement and concrete.

Water is characterized as a concrete component and the demands concerning its quality are discussed in the following chapter.

The importance of knowledge about the properties and durability of aggregates is emphasized in the **Aggregates** chapter.

Serious attention is paid to **chemical admixtures**. It is hard to imagine today's high performance concrete production without the usage of admixtures such as water-reducing, air-entraining or set-controlling chemicals.

A special chapter is dedicated to **fresh concrete**, specifically to issues of workability, setting and testing. In a relevant chapter, the **proportioning of concrete mixes** includes the basic considerations, fundamentals and the American Concrete Institute (ACI) method(s) of mixture design.

The chapter on **Concrete construction practices** deals with batching, mixing, transportation, placement and finishing of fresh concrete and the special handling of concrete (hot weather and cold weather concreting).

The chapter on **Curing** presents important information on concrete curing at ambient and elevated temperatures, respectively.

The chapter on the **Response of concrete to stress** provides important information about the interfacial transition zone, modulus of elasticity, tension, compression, fracture, cycling loading, multiaxial states of stress, and factors affecting the strength of concrete.

The **Testing of hardened concrete** chapter deals with the need for standard tests, tests of compressive strength and other properties, and assessment of concrete quality.

The next two chapters deal with **time-dependent deformations** (shrinkage and creep) and **other properties**, such as thermal properties and the resistance to wear.

The chapter on **Durability** offers details about permeability of concrete, various forms of chemical and physical attacks, cracking, and repair and maintenance of concrete.

The last four chapters pay attention to **high-strength concrete** (compounds, proportioning, properties), **concretes for special applications** (lightweight, heavy-weight, architectural concretes), **fiber-reinforced concrete** and **cement-polymer composites** (latex-modified concrete, polymer-impregnated concrete, organo-ceramics).

This second edition of *Concrete* is a comprehensive reference book. The book was prepared for an audience consisting of undergraduate students in material engineering, researchers, and professional engineers. The book provides a good introduction to a deeper

understanding of concrete as a material. It contains valuable, up-to-date information on concrete. The book includes the latest ASTM (American Society for Testing and Materials) and CSA (Canadian Standard Association) specifications. Unfortunately, European standards were not taken into consideration, and there is no information about self-compacting concrete. The exercises at the end of each chapter give the reader the opportunity to assess his/her knowledge of the field.

Compared to the first edition, the new chapters on cements, aggregates, chemical admixtures, concrete construction practices and durability have undergone major revisions. The fields of mineral admixtures and special concretes (high-strength concrete, cement-polymer composites and fiber-reinforced concrete) are discussed in separate chapters.

The book can be ordered:

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