

Book Reviews

The proceedings of a recently concluded *International Conference on Corrosion Protection of Steel in Concrete* are now available from the Conference Secretariat of the University of Sheffield, Department of Mechanical and Process Engineering, Sheffield, UK, S1 3JD. The two-volume, hard cover set, containing 128 reports (over 1500 pages) grouped under six conference themes, is attractively produced.

The papers in the first volume cover two themes: (1) studies on *in-situ* reinforcement corrosion, and (2) testing for corrosion and service-life prediction. The *in-situ* corrosion studies contain useful information from several case histories. There are also two excellent review papers: one by Broomfield on electrochemical corrosion measurement methods, and the other by Rodriguez *et al.* on assessment of structural performance of corrosion-damaged elements. Jones *et al.* authored an excellent report showing the limitations of service-life prediction methods, such as the dependence of chloride diffusion rate on the presence of sulfates and carbonates in concrete.

The papers in the second volume, covering four themes, are in the general area of corrosion protection. The majority of papers are in the area of corrosion protection by the use of chemical and mineral admixtures in concrete. Although most of the information presented is not new, it is confirmed that permeability of concrete, depth of carbonation, and steel corrosion rates are significantly reduced by the application of superplasticizers and mineral admixtures, such as fly ash, granulated blast-furnace slag, natural pozzolans, and silica fume. Also reported are the results of studies on the use of corrosion inhibitors, such as alkanolamines, amino-carboxylates and calcium nitrite.

Corrosion protection through the use of coatings and membranes is discussed in several reports, including a review paper by Fluekiger *et al.* The authors found no correlation between laboratory and *in-situ* tests. The authors also found that, with an increase in cyclic humidity, coatings can be detrimental by varying the chloride levels at the steel surface. However, Tanikawa

and Swamy reported positive results from the use of an acrylic rubber-based coating. Many reports discuss the results of studies on corrosion protection provided by the use of coated and/or non-metallic reinforcement. Most of the papers discuss performance of epoxy-coated steel. Also, there is an excellent report by Short *et al.* on the performance of various zinc alloys, such as Zn–Ni and Zn–Co.

The last group of papers deal with cathodic protection by chloride removal and realkalization of concrete in structures already suffering from chloride corrosion damage. Theoretical and practical considerations are discussed in a review paper by Das and the mechanism of realkalization is discussed by Banfill.

As corrosion of reinforcing steel is a worldwide and serious problem, requiring heavy expenditure for repair and replacement of structures, the wealth of information contained in this publication should prove useful to both researchers and field engineers concerned with the issue. Dr Swamy has done an outstanding job as the editor of the volume. According to him, only a limited number of copies were presented and a few are still available at a cost of £100 (sterling).

P. Kumar Mehta

Materials for Civil & Highway Engineers, 3rd Edition, by Kenneth N. Derucher, George P. Korfiatis and A. Samer Ezeldin. Prentice-Hall Inc., a Paramount Communications Company, Englewood Cliffs, New Jersey, USA, 1994, ISBN 0-13-847831-7. 540 pp. Price US \$60.00.

Engineering materials are extensively used by civil and highway engineers to design and construct their projects. This book provides valuable information about the engineering performance of soil, aggregates, cements, concrete, timber, asphalt, metals, plastics and environmental considerations. Major emphasis is placed on the practical approach. It is very useful for students taking an introduction course in civil engineering materials

and engineers whose responsibilities require basic understanding of the performance of engineering materials.

The book is organized into 13 chapters. Chapter 1 is devoted to soils as used in civil and highway engineering. Subjects covered include soil composition, classification, soil–water interaction, soil compressibility, soil strength and other properties. Chapter 2, entitled ‘Mineral Aggregates’, deals with the use of mineral aggregates in civil and highway applications. The chapter discusses aggregates incorporation as a base-course material, for Portland cements, Portland–pozzolan cements, alumina cements, expansive cements and special Portland cements.

Chapters 4–7 are devoted to behavior and properties of concrete. Chapter 4 includes a presentation of the concrete uniaxial and biaxial behavior. It also covers creep, shrinkage, bond and durability of concrete. Chapter 5 deals with the proportioning of concrete mixes. Chapter 6 provides a discussion on proportioning structural concrete mixtures with fly ash and other pozzolans; the discussion is supplemented by sample computa-

tions. Chapter 7 is devoted to advances in concrete technology. Topics such as chemical admixtures, mineral admixtures, high strength concrete, fiber reinforced cementitious composites and by-products used in concrete are presented and discussed.

Chapter 8 is devoted to timber classifications, physical characteristics, mechanical properties, decay, durability and preservation. Chapter 9 covers asphalt cements and proportioning of asphaltic mixes. Chapters 10 and 11 address the mechanical behavior of metals, ferrous metals and steel manufacturing. Chapter 12 addresses types of plastics and properties of plastics.

Finally, Chapter 13 concentrates on the environmental consideration in construction. It covers the regulatory issues, the materials for construction of waste impoundments and remediation of contaminated soils.

Overall, this is a very useful practical reference for engineers dealing with civil and highway projects.

P. Balaguru