
BOOK REVIEW

Chemical Admixtures for Concrete

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REFERENCE: Rixom, R. and Mailvaganam, N., *Chemical Admixtures for Concrete*, 3rd ed., E. & F. Spoon Ltd., 11 Fetter Lane, London EC4P 4EE, 1999.

A most useful accomplishment of this book is that it provides a one-stop source of information about the identities and functions of the active ingredients in the various types of chemical admixtures that is user-friendly for concrete technologists, educators, and practicing engineers, who generally do not have a detailed knowledge of chemistry. The authors attempt to explain in fairly simple terms how and why each of these active ingredients acts in cement pastes. In doing so, they help fill the information gap that is so blatantly evident in almost all the product description literature put out by the manufacturers of chemical admixtures, which tends to perpetuate an aura of mystery about their products and is generally devoid of anything that is technically or scientifically substantive. Unfortunately, as the authors themselves point out in several places in the book, even they are prevented by proprietary secrecy from communicating more about the composition and functioning of some of the newer more interesting products, let alone some of the well-known mainstream ones.

The mainstream admixture types, water-reducing, retarding, accelerating, air-entraining, etc., are comprehensively covered in Chapters 1, 3, and 5, and dampproofing admixtures intended to enhance water repellency are described in Chapter 4. However, despite the authors' claim of a general update of references and developments in all chapters, the degree of updating of these chapters from the previous edition seems minimal with only 4 of 120 references 1980 or later in Chapter 1 on water-reducers and retarders, and none of 47 references 1980 or later in Chapter 3 on air-entraining agents. Chapter 5 on accelerators shows more evidence of post-1980 updating, with the information on nonchloride products particularly relevant to current codes of practice and more widespread use in precast and cold-weather applications. The new chapter on superplasticizers, Chapter 2, is a welcome addition to the topic coverage, but its scope is limited to their function with cement alone.

Their use in conjunction with fly ash, slag, or silica fume along with related air entrainment problems and the development of more effective air-entraining admixtures to address these problems is hardly mentioned at this point. In particular, the synergistic benefit of combining superplasticizers with silica fume is much broader in actual and potential application than just in shotcrete as described in Chapter 6. Fortunately, many of these apparent omissions are addressed later in Chapter 7 on applications of admixtures.

The last two chapters of the book contain much that is new and probably not widely known. Chapter 6 is particularly valuable since it provides information on the myriad of relatively new and unfamiliar special purpose admixtures not yet part of the mainstream, which offer interesting possibilities for more technically and environmentally advanced utilization of concrete. Their functions include expansion-reducing for reactive aggregates, shrinkage-reducing to offset the effects of drying shrinkage, antifreeze for low-temperature construction, antiwashout for underwater placement, corrosion-inhibiting to protect embedded steel, expansion-inducing for shrinkage compensation or prestress, and recycling of waste such as surplus fresh concrete or truck wash residues. Admixtures for shotcrete and polymer-modified mixtures are also discussed.

The concluding chapter, entitled "Applications of Admixtures," addresses many issues that seem to be simply extensions or updates of the earlier chapters dealing with the composition and functioning of the admixtures in concrete. This is important information that supplements the basics given in the earlier chapters. In addition, it is interwoven with details of admixture-specific applications and case histories that illustrate the problems that can and have been encountered when using chemical admixtures, how to minimize or avoid them, and how to assess the technical and economic merits of using a particular admixture or combination of admixtures in a practical application.

Editorially, the book needs some minor corrections to make reference numbering consistent with source descriptions and to clarify apparent discrepancies in the identification of nitrite admixtures as nitrate or vice versa. Overall, the book is a valuable information source for those who specify or approve concrete admixtures or who seek to produce more technically or economically advanced concrete products for the construction industry.

