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Book review

Review of "Sulfate Attack on Concrete"
By J.P. Skalny, J. Marchand and I. Odler, Spon Press (2002), ISBN 0-419-24550-2

This is the first comprehensive treatment of the topic of sulfate attack since the Swensen book in 1968. It is significant that two further forms of sulfate attack, DEF and damaging thaumasite formation, have been identified since the Swenson volume appeared. The present text is timely in that the manifestations of the various forms of sulfate attack remain of concern.

The book is well organized and provides sufficient background to the topic to be relevant to those concerned with concrete durability but who have not explicitly explored the topics of sulfate attack. The authors have addressed this by providing introductory chapters on concrete chemistry and concrete deterioration. These chapters summarize the important aspects of hydration, microstructural and physical property development. They also discuss mixing and placing of concrete and provide overviews of chemical attack, ASR, freeze–thaw and physical damage. Providing this background places sulfate attack in a context to permit the topic to be appreciated by a wider segment of those concerned with concrete technology.

The centerpiece of the volume is the chapter on sulfate attack. This chapter covers both internal (DEF) and external sulfate attack and the relevant subtopics. The subtopics include discussions of sources of sulfates, types of expansive reactions, ettringite formation, interactions of sulfates with C–S–H, role of the cation and physical sulfate attack. Of particular interest are the summaries of the mechanisms of the various forms of sulfate attack including the role of bacteria.

Following this, the authors discuss the means to prevent sulfate attack. This discussion emphasizes the importance of adhering to the recognized codes and standards and provides useful practical information. This discussion is bifurcated into two chapters with standards being discussed in the closing chapter. However, the presentation is logical in that the sequence with which the information is provided guides the reader to the recognized code requirements as the final chapter in the book.

The authors have also recognized the importance of models as predictive tools and have dedicated a chapter to modeling the progression of sulfate attack. Generally accepted models are reviewed and their relevance in predicting the evolution of the phenomena associated with sulfate attack is summarized.

Using examples of sulfate attack, which have had major effects on the industry, a chapter is devoted to describing several case histories. In particular, these include sulfate attack in homes, DEF in railroad ties and deterioration of bridge foundations due to thaumasite formation.

In summary, I found the to be a well-organized text which covers the pertinent points of sulfate attack. I recommend it strongly.

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