

Book review

DURABILITY OF ENGINEERING STRUCTURES.

Jan Bijen. Woodhead Publishing, 2003. ISBN 1 855 73695 0, £115, 258 pp.

This book presents a good grounding on the subject of durability for many engineering structures. The text concentrates on corrosion and electrolytic action on different metals, with an emphasis on the corrosion of steel and steel in reinforced concrete. Students will find that these topics are well covered and will be pleased with the detailed description of the corrosion process from an electrochemical perspective.

The topics covered in the book include: the durability of metals; reinforced concrete; timber; and, newer high-performance materials; and the strategies for durability design, maintenance and repair. Some engineers—particularly those who have to deal with structures that are more than about 100 years old—will be disappointed that the book does not provide any discussion of the durability of stone, brick and other ceramic materials. The durability of any structure is a function of the climate in which it is placed and this is at least as important to the survival of the structure as the corrosion process. A useful addition would have been a coherent review of the effects of climate and micro-climate on the durability of structures.

The topic of corrosion of metals is extensively covered from an electrolytic viewpoint. Practitioners will find much useful information on corrosion but practical guidance on the protection of steel and other metal structures from corrosion is less well covered.

The durability of timber is given less space in the text but the basic mechanisms for decay are well described. Engineers would probably need to look elsewhere for a rather fuller

discussion, particularly for the durability of timbers in tropical areas and areas outside northern Europe. New high-performance materials, given their variety, are described in outline and it is inevitable that this section will be supplemented as research into these materials proceeds.

The durability of reinforced concrete is given the most space and prominence and the principal topic is corrosion of reinforcing steel, which is well described. The strategies for service life prediction also consider reinforced concrete in some detail. Less coverage is given to sulphate attack and other important causes of chemical deterioration, such as acid attack and mechanical disruption leading to cracking and ultimately loss of serviceability.

This reviewer would like to have seen more space given to case studies of durability or of failures to maintain durability. The case studies that have been included tend to present single repair solutions without explicit consideration of alternatives and the likely order of magnitude of costs of alternatives. The practical details illustrated in the text are less convincing.

This book is translated from Dutch and this brings to UK readers the advantage of some cross-pollination of ideas from continental Europe. However, UK readers will find many of the older references to European codes and published works difficult to relate to. In places, thankfully few, the translation uses engineering terms with which native English speakers will not be familiar.

Overall, the book would be a useful addition for engineers who need a reference book on the processes of corrosion and durability strategies for reinforced concrete.

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