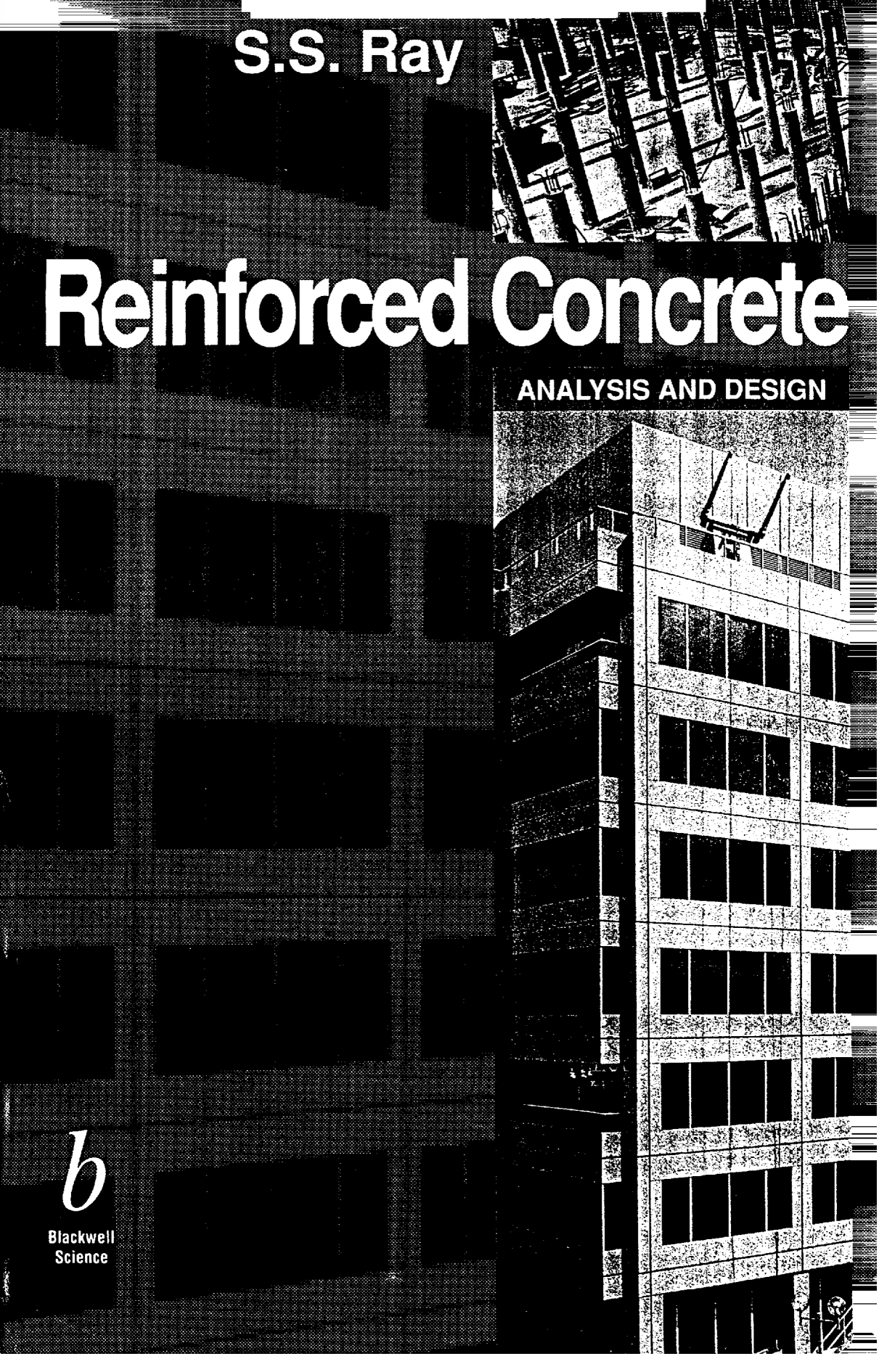
S.S. Ray

Reinforced Concrete

ANALYSIS AND DESIGN



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This book covers the analysis and design of reinforced concrete elements in foundations and superstructures in a logical, step-by-step fashion. The theory of reinforced concrete and the derivation of the code formulae have been clearly explained.

The text is backed up by numerous illustrations, design charts and tables referring frequently to the relevant codes of practice. A large number of worked examples cover almost all types of reinforced concrete elements.

The step-by-step approach will ensure that:

- all design requirements are logically adhered to
- a standardised approach is established in a design office
- a simplified procedure for checking and for quality assurance can be implemented.

REINFORCED CONCRETE

Analysis and Design

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Analysis and Design

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Dedicated to my father Professor K.C. Ray

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Preface

I believe that the contents of this book will prove to be extremely valuable to practising engineers, students and teachers in the field of reinforced concrete design. There are many excellent books available dealing with the design of reinforced concrete elements but, in my opinion, they lack completeness in certain ways. The design of a reinforced concrete member requires many checks in a systematic structured manner and the step-by-step approach adopted in this book is intended to ensure that the design process is complete in all respects. It is my view that the member itself, when fully designed, does not constitute a complete design because it ignores the connections to other members and to the foundation that are needed to provide true completeness of design for the structure. I have attempted here to elucidate the necessary global analysis. Also, most books on reinforced concrete design do not deal with the aspects of soil structure interaction problems and are hence incomplete.

The highly structured step-by-step methodology I have used makes the book fully comprehensive and user-friendly. Accordingly, the task of quality assurance becomes less arduous and the product or output of a design office becomes fully standardised if this approach is strictly followed. For students, the book should prove to be invaluable because the essential elements of the theory of reinforced concrete are discussed, followed by a structured approach to the design of all elements in a building, including foundations and the connections of the reinforced concrete members to each other to create a complete building. The numerous worked examples should be very useful to students and practitioners alike. The book also presents practical advice on designing reinforced concrete elements and the student should benefit from learning the methods adopted in a design consultancy.

My intention has been to illustrate the design principles at each stage by using a profusion of sketches. The book includes many more illustrations than a standard textbook on reinforced concrete because it was felt necessary to clear all ambiguities in the codes of practice by the use of diagrams, an approach which should appeal to both practising engineers and students.

The book includes a lot more new design aids than are usually found in the available books. For instance, the tables and charts included in this book for the design of solid slabs and flat slabs cannot be found in other published textbooks on the subject. References to many published books on the subject of reinforced concrete are also given.

I would like to thank the British Standards Institution for their kind

permission to reproduce some of the essential tables from the codes of practice. I also wish to thank the US Army Armament Research and Development Centre, Picatinny Arsenal, NJ and Amman and Whitney, Consulting Engineers, New York for granting permission to reproduce the extremely useful charts on the yield-line design of slabs in Chapter 3.

Finally this undertaking could not have been successfully achieved without the active encouragement of my wife.

S.S. Ray
Great Bookham
Surrey

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