

FUNDAMENTALS OF ENGINEERING GEOLOGY

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Preface

The impulse to write this book stemmed from a course of geology given by the author to civil engineering undergraduates of the Building and Construction engineering Department at the University of Technology. The course has changed, and I hope improved, during the ten years since I was first involved with it. It was essentially a scaled-down version of an introductory course to science undergraduates. In my opinion, I dissatisfied with the introductory texts in engineering geology that have been available about the last decade, the period in which I have been teaching this subject at the University of Technology. My main thought, as I gradually reshaped the course contents, was to meet the special interests and professional needs of civil engineers. The book deals with both descriptive and quantitative aspects of the subject. My specific complaint was, and still is, the minor amount of computational material contained in these books as though the complexity of the natural world, with its refusal to fit simple models, actually precludes a serious attempt to apply science and mathematics to illuminate specific problems. My experience in teaching indicates that the relevance of subject matter to the desire of those taught usually increases their interest. Furthermore, in engineering curricula which are being crowded by new and professionally useful topics, other apparent digressions from what is obviously relevant may serve a professional purpose. For example, civil engineers must have an insight into how geologists reach conclusions in making a geological map, in order to evaluate the finished map. Similarly, they should appreciate how and why geologists differentiate between different rocks, not because these differences are important for most engineering purposes but so that they can read a geological report sensibly and with the ability to examine the relevant from the irrelevant information.

This course and this book are essentially an introductory text in the fundamentals of Engineering Geology for civil engineers, rather than geology, which is adequate for the needs of their later careers, and on which further courses of engineering geology, soil mechanics or rock mechanics can be based. I have, however, extended the scope of the book beyond what is geology in the strict sense to include engineering applications of geology. This is partly to demonstrate the relevance of geology to engineering, and partly in the expectation that the book will also serve as a useful handbook of facts and methods for qualified engineers and other professionals who use geology, and that I was not the only teacher of geology who felt the need for a textbook tailored to them. There are 222 review questions and problems with answers to 25 problems, also some chapters contain several worked-out examples with total of 37 in all. These have been selected to be neither so simple as to be virtually valueless, nor so hard as to discourage the reader. The topics covered

as those that most undergraduate books on engineering geology cover in at least a semi-quantitative fashion, even if no problems sets are included. The topics covered in 12 chapters are: an introduction to earth sciences; earth structure; minerals; rocks; weathering, erosion and soil formation; structural geology; topographic and geologic maps; physical and engineering properties of rocks; surface water and rivers geologic work; Subsurface water.; site investigation and geophysical techniques; and finally geological problems related to civil engineering.

I am grateful for the many constructive suggestions that have led to major changes of content and arrangement as well as minor amendments. Then, I have ended at the centre of the many opinions that colleagues and friends have kindly given me. At the end of the day I have special interests and views myself, and it is my book. I hope that you will find it useful and readable. It is a pleasure to be indebted to my family for their patience and colleagues for encouragement.

Hussein Hameed Karim
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