Book reviews

Earthquake resistant design

A manual for engineers and architects

D. J. Dowrick

Published by John Wiley & Sons, London, New York, Sydney and Toronto, 1977. Type-set, illustrated, hard-back. 238 × 158 mm. pp. 374. ISBN 0 471 99433 2. Price: £2·50, US $25·00.

The book under review was originally written for the guidance of architects and engineers employed in the international practice of the Ove Arup Partnership. Let it be said at once that it was a good idea to make it more widely available.

The first three chapters deal with the causes of earthquakes and the ground movements that can be expected to result from them. The many variables involved are introduced, and the complex judgements required in deciding upon a suitable design earthquake for a given site are indicated. A short chapter follows on the determination of structural form.

An extensive chapter then covers the response of structures to earthquakes. The problem of response to dynamic loading is introduced at a fundamental level by way of simple examples, avoiding detailed mathematical explanation. The various techniques for assessing response are introduced and critically assessed. The inadequacies of the equivalent static force analysis are described, reference being made in particular to the low design values for static force specified in current codes of practice. The complexity and cost of the step-by-step integration procedure for dynamic analysis is pointed out.

The simplifications introduced in normal mode analysis and the response spectrum technique for dynamic analysis are described, and the potential errors arising from their use are indicated. Some basic theory is given, but the reader is rightly referred to appropriate technical papers for full details. The chapter moves on to cover more specific areas such as the dynamics of soils and soil–structure interaction, problems particular to earth-retaining structures, coupled-sheet-wall structures and finally the interaction between forms and infill panels.

The next chapter, which takes up about one-quarter of the book, is devoted to structural design and details. Reinforced concrete, prestressed concrete, masonry, steel and timber construction are dealt with. Sketches and drawings are provided to illustrate practical details.

The final chapters deal with the design of services and architectural details. The necessity for services to be designed for loadings higher than the surrounding building is highlighted. For architectural details, the necessity to decide whether they should be made to work with the structure in resisting the earthquake or isolated from the effects of the likely response is emphasized.

Appendixes are provided in which problems peculiar to particular types of structure are highlighted and other miscellaneous information is included.

In the Foreword, Professor Ray W. Clough of the University of Berkeley, California, emphasizes that understanding of the response of structures to earthquakes is essential for good design, and commends the book as one which will markedly assist designers to attain that understanding. This reviewer can only echo that commendation. This an excellent book.

W. B. CRANSTON