

Book Review

EARTHQUAKE ENGINEERING

by Robert L. Wiegel : 518 pp., illus.

(Prentice-Hall, Inc. 1970, N.Z. Price \$30-00)

"Earthquake Engineering" is a collection of articles developed by a group of America's foremost experts from material they presented at a 1965 seminar at Berkeley. Contributions as they appear in the book have been revised to include accounts of recent developments and cross referred where necessary.

The clarity of the writing, the dramatic impact of parts of the book and the eminence of the authors make this attractive to all who have an interest in earthquake engineering.

The balance of volume is tilted more towards geological, geophysical and oceanographic background material than to practical engineering, though one would not expect this from the title. Some of the background sections require more mathematical skill than most practical engineers may have; but the writing here is subtly organised to carry readers along, rather than to expose their weakness.

The practical design sections are well written and presented, generally helpful and always authoritative. To each (as to all other sections) is appended a comprehensive, up to date list of further reading which, occasionally, readers may be obliged to consult for techniques not described in detail. Thus the chapter on soil behaviour, while excellently written and illustrated, offers no information for quantitative work, and the account of elastic design of prestressed frames is not completely satisfying.

There is some repetition of material, notably in articles by Housner, Hudson, Clough and Newmark, inevitable in a collection of this sort, and probably more often helpful than annoying to the reader. But more care should have been taken to ensure that, in one publication, a symbol or term should not have a different meaning in different sections. Thus Housner (page 89) discussing spectral intensity, uses "RMS" for root mean square with its ordinary engineering meaning; but Newmark (page 415 and elsewhere), discussing the total response of elastic structures, uses "RMS" to mean the square root of the sum of the squares.

For a book which is relatively expensive, intending purchasers will want to know the contents. There are twenty chapters as follows:

1. Elastic Waves in the Vicinity of the Earthquake Source by Bruce A. Bolt, Professor of Seismology and Director of the Seismographic Stations, University of California, Berkeley. - 20 pages.
2. Causes of Earthquakes by Bruce A. Bolt. - 25 pages.
3. Surface Faulting and Related Effects by M. G. Bonilla, Geologist, U.S. Geological Survey - 28 pages.
4. Strong Ground Motion by G. W. Housner, Division of Engineering and Applied Science, California Institute of Technology - 17 pages.
5. Design Spectrum by G. W. Housner - 14 pages.
6. Ground Motion Measurements by Donald E. Hudson, Division of Engineering and Applied Science, California Institute of Technology - 19 pages.
7. Dynamic Tests of Full Scale Structures by Donald E. Hudson - 23 pages.
8. Dynamic Testing and the Formulation of Mathematical Models by J. G. Bouwkamp and Dixon Rea, Department of Civil Engineering, University of California, Berkeley - 15 pages.
9. Earthquake Damage and Structural Performance in the United States by Karl V. Steinbrugge, Pacific Fire Rating Bureau, San Francisco, California - 60 pages.
10. Soil Problems and Soil Behaviour by H. Bolton Seed, Department of Civil Engineering, University of California, Berkeley, - 25 pages.
11. Tsunamis by Robert L. Wiegel, Department of Civil Engineering, University of California, Berkeley - 54 pages.
12. Earthquake Response of Structures by Ray W. Clough, Department of Civil Engineering, University of California, Berkeley - 28 pages.
13. Application of Random Vibration Theory by Joseph Penzien, Professor of Civil Engineering and Director, Earthquake Engineering Research Centre, University of California, Berkeley - 13 pages.
14. Soil Pile Foundation Interaction by Joseph Penzien - 33 pages.
15. Earth Slope Stability During Earthquakes by H. Bolton Seed - 19 pages.
16. Current Trends in the Seismic Analysis and Design of High-Rise Structures by Nathan M. Newmark, University of Illinois, Urbana - 22 pages.
17. Design of Earthquake-Resistant Structures - Steel Frame Structures by Henry J. Degenkolb, President, H. J. Degenkolb and Associates, San Francisco, California - 23 pages.
18. Design of Earthquake-Resistant Poured-in-place Concrete Structures by John A. Blume, President, John A. Blume and Associates, Engineers, San Francisco, California, - 26 pages.
19. Prestressed and Precast Concrete Structures by T. Y. Lin, Department of Civil Engineering, University of California, Berkeley - 20 pages.
20. Design of Earthquake-Resistant Structures : Towers and Chimneys by John E. Rinne, Standard Oil Company of California, San Francisco - 11 pages.

A suitable text book is still needed, but until it is published "Earthquake Engineering" will remain the best available substitute. It is recommended as a valuable reference for practising engineers.