comparison of sets of data, and the varying approaches taken in data evaluation and in the preparation of "consistent cross sections for various isotopes," all are examined in depth for these vital cross sections, as well as for other data such as resonance parameters and inelastic scattering levels.

The proceedings of this conference represent a valuable addition to the nuclear engineering or neutron physics section of any institutional library. For the active worker in the field, it is a major source of data and analytical results. For the newcomer to research in either neutron data measurement or evaluation, it provides not only an immediate introduction and review, but extensive yet selected bibliographical material. For the graduate student, a sense of appreciation of the uncertainties in both nuclear data measurement and evaluation can be developed.

Ideally, such a conference proceedings might, in the future, include written, post-conference summaries that would provide insight as to the significant technical information reported upon therein, and, more importantly, an evaluation of the impact of new developments on various interested segments of the nuclear community. The panels held at the close of such a conference are interesting, but written "post-mortem" papers, included as part of the proceedings, might prove to be valuable. Also, particularly to aid the relative newcomer or the rather narrow specialist, a rather longer paper which related cross section needs to reactor needs, qualitatively and quantitatively, might warrant consideration.

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Earthquake Engineering for Nuclear Reactor Facilities

Authors	John A. Blume, Roland L. Sharpe, and Garrison Kost
Publisher	John A. Blume & Associates (1971)
Pages	153
Price	$20.00
Reviewer	Craig Smith

I wish I could recommend this report (it is not a book) to the readers of *Nuclear Technology*, because there is a definite need for a comprehensive, up-to-date review of seismic design of nuclear facilities. Unfortunately, this work does not meet these requirements.

The report includes sections on site investigation and preparation of ground motion spectra, analysis of reactor buildings, dry wells, pressure vessels, equipment, piping systems, and hydrodynamics. Short sections dealing with damping and inelastic response are also included.

Chapter II discusses seismology and seismicity, and then describes several methods for estimating maximum ground accelerations and response spectra. In Chaps. III and IV these "inputs" and standard dynamic analysis techniques are used to compute the response of typical BWR and PWR reactor buildings and containment systems. Although the methods are only outlined, results of typical calculations are shown. Chapters V, VI, and VII provide brief discussions of the analysis of reactor vessels, equipment, and piping. Chapter VIII is a three-page treatment of damping; regrettably, no new information is provided on this important subject. Chapter IX is a good treatment of fluids vibrating in tanks. Chapter X is three pages devoted to inelastic response; again it is unfortunate that details of the authors' approach to this question are not included.

In the Foreword (p.iii) the authors state:

> "The authors' firm in mid-1967 prepared a draft summary of "Current Seismic Design Practice for Nuclear Reactor Facilities" which was published in 1969 as TID-25021. Since that time, however, much of the material presented therein has been outdated, inasmuch as the design and analysis of earthquake-resistant structures is a relatively new field which is still developing—and all of the present concepts are not completely defined and understood.
>
> The present book discusses state-of-the-art techniques and procedures, many of which are currently used by groups designing nuclear facilities. . . ."

Although the copyright date of the report is 1971, it actually summarizes the pre-1967 state-of-the-art. The Appendix lists 68 references and bibliographical entries but only three are more recent than 1967. Thus it would appear that the authors failed to achieve their objective (stated above) of updating their earlier work.

Another general comment is that the report has obviously been prepared for someone with knowledge of the field. It is impossible, in such a short work, to deal comprehensively with a field as broad as earthquake engineering. Thus the worker who is new to the field will find most of his questions unanswered after reading the report, while the more experienced reader will not be able to find answers to his more detailed questions either.

The authors do not reference any of the body of experimental work which has been done in recent years at nuclear facilities in the United States and Japan. Not only have vibration tests been made on components and full-scale nuclear power plants, but calculations and analytical models have been compared with actual data from half a dozen small earthquakes.

The report contains no information concerning the February 9,

1971 earthquake, although Blume's firm prepared a damage survey for the AEC in March 1971. Thus we still find (on p. 17) a figure indicating that the maximum acceleration to be expected for a $M = 6.5$ earthquake is about 0.3 g, although a value of 1 g was recorded on February 9 at Pacoima Dam.

It should be mentioned that there is disagreement concerning the validity of the Pacoima Dam record and it is possible that Blume's report was actually published before 1971.

In summary, for those readers of *Nuclear Technology* who are interested in applications of earthquake engineering, a more useful reference might be Wiegel's book, *Earthquake Engineering* (Prentice-Hall, 1970, 518 pp.) which is no more current, but goes into more detail. (Incidentally, it contains an excellent chapter by John Blume.) For information concerning extension of earthquake engineering techniques to nuclear facilities, the reader is probably best advised to consult current literature.

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