

**Pressure Vessel Design: Nuclear and Chemical Applications.** By John F. Harvey. D. Van Nostrand Co., Inc., Princeton, N. J., (1963). 274 pp. 177 figures. \$9.75.

According to the preface, it is the intent of the book to present a text from a designer's viewpoint to take students or engineering graduates through the first practical design considerations encountered in pressure-vessel design for nuclear and chemical process applications.

After an introductory chapter there follows a lucid treatment of elementary topics of elastic-stress analysis of pressure vessels, including the most frequently encountered discontinuity-stress problems, which shows well the author's practical experience in teaching. The clear readability should enable a beginner, acquainted only with elementary strength of materials and simple calculus, to learn the subject with reasonable ease from the text alone. The relevant chapters are concluded by a series of problems with some guidance to the solution and indication of the results.

A further chapter deals with the properties of pressure-vessel materials: behavior beyond the elastic limit; effect of cold-working, elevated temperatures and irradiation on material properties; mechanical and thermal stress fatigue; corrosion and surface coatings; etc. The descriptive treatment given to each of these diverse, important topics is a bit too concise, to be well balanced with the presentation in the other parts of the book. However, this is counterbalanced in that this chapter is better equipped with well-chosen references than the other parts of the book.

The following chapter on design-construction features draws the attention of the prospective designer by giving due emphasis to the meaning of stress-concentration factors encountered in vessels at openings, pipe attachments, supports, etc. However, students certainly will be disappointed by the scarcity of typical illustrative design examples of structural details of actual pressure vessels for nuclear and chemical process purposes. An introduction to economic considerations in the design of pressure vessels, discussing simple techniques for first design approaches, and a short description of fabrication methods closes the book.

No book can satisfy everybody in every respect, and thus the reviewer desists from listing a series of minor complaints, which may be categorized as only a matter of his personal taste. However, there are two particular points of displeasure which shall not be concealed. First, engineers already experienced in conventional pressure-vessel design and searching for specific information on nuclear applications, who may be attracted by the

word "nuclear" in the subtitle, will be disappointed. The character of the book is that of a general introductory treatment of pressure-vessel design with only occasional glimpses of the peculiar pressure-vessel problems arising in nuclear power-plant design. The subtitle, though in no way wrong, nevertheless may be considered as somewhat misleading.

The second point is, that the book gives only limited aid to more keenly interested readers in the pursuit of further information. It would, of course, be wrong to expect a book essentially designed as a text to have simultaneously the character of a reference work with an extensive bibliography. But even a list of advanced or specialized books encompassing about a dozen entries would have served the purpose; the comprehensive book of S. B. Kantorowitsch *Die Festigkeit der Apparate und Maschinen für die chemische Industrie* Moscow 1952 and Berlin 1955, M. Esslinger's book *Statische Berechnung von Kesselböden* Berlin 1959, two volumes of the Springer-Series on chemical engineering, recent British books dealing with reactor pressure vessels, are such examples. The failure to include such hints to the international literature is inconsistent with the advice given to the designer (on p. 249) to keep abreast of literature, since "the cheapest research is that which has already been done." (Believe it or not, aside from several modern areas of engineering science, there are more classical fields of engineering in which quite useful literature has been published outside the United States. Despite this fact, it is a rather general feature of American books on engineering to breed in the average student or engineer a pronounced opinion of national self-sufficiency.)

Despite the mentioned deficiencies, the reviewer wholeheartedly recommends this text-book to students as a well organized, clearly written and self-contained introduction to pressure-vessel design, excellently suited for self-study. Without doubt, teachers in this field also will find the book of valuable aid. It certainly deserves widespread use. The book is very well illustrated.

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During recent years he has worked at the Institute for Reactor Development of the Nuclear Research Center at Jülich. At present he holds a

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