systems, i.e., systems subjected to one independent loading parameter. Postbuckling behavior is analyzed and the corresponding influences of imperfections are examined. A chapter on simultaneous buckling is also included. Although this first part of the book is self-contained and is itself interesting reading, its primary purpose is to serve as an introduction to Part 2, which is devoted to multiple-parameter systems. It is this second part of the book which contains new and stimulating material. Here, the stability behavior of structures subjected to more than one independent loading parameter is explored. This subject matter is not included in other recent books on elastic stability (e.g., Thompson and Hunt) and thus makes Huseyin's monograph an excellent complement to these texts.

In Part 2, a systematic stability analysis based on the "multiple-parameter perturbation technique" is presented and applied to structures under combined loading. It is also shown how a multiple-parameter analysis may be useful even for systems subjected to only one independent loading parameter. Some fundamental theorems are developed, for example, concerning the convexity of the stability boundary, and shown to have important practical applications in the estimation of bounds to this boundary.

This book will be a useful reference for persons interested in elastic stability theory. However, its extremely specialized content limits its suitability as a textbook for a graduate course on structural stability.

Formulas for Stress and Strain. By R. J. Roark and W. C. Young. McGraw-Hill. vi + 625 pp. Cost $19.50.

REVIEWED BY R. PLUNKETT[5]

Most readers of this journal have probably used previous editions of this very handy compilation. The coverage remains encyclopaedic and the presentation lucid. The formulas are now presented in such a way as to make them more useful for computer calculations than was the case in previous editions. One major change is the use of singularity functions and the addition of a large number of discontinuous deformation cases for beams and plates which are useful for matrix-stiffness analysis of complex structures.

The chapter headings are almost identical to those of previous editions but the contents have been greatly revised. They are almost self-explanatory:

1 Definitions, 14 pp.
2 Behavior of Bodies Under Stress, 25 pp. (Hooke's law, plasticity, failure criteria).
3 Principles and Analytical Methods, 8 pp.
4 Experimental Methods, 9 pp.
5 Properties of a Plane Area, 12 pp.
6 Tension, Compression, Shear, and Combined Stress, 16 pp.
7 Beams; Flexure of Straight Bars, 120 pp.
8 Curved Beams, 77 pp.
9 Torsion, 38 pp. (mainly Saint Venant but some helical).
10 Flat Plates, 90 pp. (mainly circular plates).
11 Columns and other Compression Members, 31 pp.
12 Shells of Revolution, 58 pp.
13 Bodies Under Direct Bearing and Shear Stress, 18 pp. (contact, rivets, and pins).
14 Elastic Stability (reasonable coverage of idealized cases), 33 pp.
15 Dynamic and Temperature Stress, 25 pp. (a short compilation of impact, centrifugal stress cases, natural frequencies, very elementary temperature stresses).

The formulas for stresses and deflections of beams and plates as a function of position cover more cases and are necessarily more complicated, which has doubled the number of pages in the corresponding chapters.

The way in which one presents material of this sort, the coverage, the order, and the grouping are largely a matter of taste and there is little point in commenting on the details of such presentation. The compendium itself is useful, is carefully done, and is accurate in every case I have sampled. There is no need to make a long list of the really good features of this outstanding handbook; the large number of illustrative examples should help the novice.

In order to validate my reviewer's licence, I feel impelled to mention a couple of minor points which annoy me, some of them carried over from previous editions. The definitions and symbols would be more useful if they agreed with ANSI standards. The first six short chapters are so superficial as to be misleading. In particular, the references for chapters three and four are few and, in many cases, obsolete. For example, it is doubtful if anyone would use the membrane, hydrodynamic or electrical analogies for Poisson's equation when numerical methods using digital computers are routine. Most of the formulas for flat plates give explicit references to the original sources so that the assumptions, constraints, and methods may be checked; the same should have been done for all cases.

Enough, my franchise is safe, I need do no more nit-picking. This is a reasonably priced book that belongs on the shelf or desk of every engineer who does stress analysis of real machines or structures. The new edition continues the fine tradition started by the late R. J. Roark and our profession owes a vote of thanks to his hardworking and able successor.

Three-Dimensional Crack Problems. By M. K. Kassir and G. C. Sih. *Noordhoff International Publishing, Leyden.* 1975. Cost $55.73. About 400 Pages.

REVIEWED BY J. R. RICE[6]

This book is the second in a Noordhoff series on the *Mechanics of Fracture* edited by Sih. The authors treat linear elastic three-dimensional crack problems and limit themselves, for the most part, to those static problems that are amenable to exact solution. These include variously loaded internal and external cracks in infinite solids with elliptical and, especially, circular crack fronts, cracks on dissimilar material interfaces and in nonhomogeneous bodies, cracks in anisotropic bodies, and cracks in bodies with finite boundaries (solved usually to some order of approximation in terms of proximity of the boundary).

There is a remarkably large store of results in the area, enough to fill over 400 rather tightly written pages in the present summary, and the great majority of literature references that the authors cite, while traceable to earlier work by Sneddon (1946) and Green and Sneddon (1950), have appeared within the last decade. Indeed, Kassir and Sih have been major contributors to this literature.

Although the barest outline of the methods used for developing solutions are given in most cases, the book should be viewed more as a "handbook" or "catalog" of known solutions than as a study on methods of elastic crack analysis. The presentation is not without a few misprints and a few formulas, checked by the reviewer for consistency with known limiting cases, seem to be wrong (specifically, those for concentrated forces near external circular cracks as given in the Appendix of Chapter 2). Thus the reader may well be advised to rederive important results and to check the references given, but this is sensible in the use of any such book, and should not be construed as detracting from the excellent job that Kassir and Sih have done.

Those interested in mathematical solutions for practical surface flaw geometries, e.g., for part-through surface cracks in plates or shells, for corner cracks from rivet holes, etc., will be somewhat disappointed.

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