**Elements of the Mechanical Behavior of Solids.** By Nam P. Suh and Arthur P. L. Turner. Scripta Book Co., Washington, and McGraw-Hill Book Company, New York. 1975. xiii-615 Pages.

REVIEWED BY LF. COFFIN, JR. [3]

The practicing mechanical engineer has long recognized that real materials problems generally result from the closely coupled interplay between continuum mechanics, microstructure, basic deformation, and fracture processes and the environment. It is unfortunate that the traditional discipline approaches in our academic structure has impeded the development of this unified view in the minds of students at the formative stages of their engineering education. The availability of a text designed for the classroom and aimed at this interdisciplinary approach is indeed refreshing.

The stated purpose of this book, according to authors Suh and Turner is to provide mechanical engineers with a basic knowledge of the mechanical behavior of common structural materials. An overlying order is felt to exist which ties materials engineering together. Connecting links exist between the three major regimes of the study of materials—the atomistic, the microstructural, and the continuum. It is the authors' aim to develop and strengthen these connecting links so as to achieve a more unified view of the subject in the student's minds. This, they feel, can be done by relating the fundamentals of the subject matter to real problems and applications.

Subjects covered in the text include continuum mechanics, elastic behavior, plastic response (continuum treatment), atomistic basis of plastic behavior, visco-elastic-plastic deformation of polymers, time-dependent plastic deformation of metals (creep), ductile and brittle fracture, fatigue, and surface phenomenon. The level of continuum mechanics employed requires as a prerequisite an introductory course in applied mechanics. No prior exposure is needed to those topics dealing with physical processes. The book has been used in a preliminary version in a one-semester junior-level course at M.I.T. for at least three years.

An attractive feature of the book is the large number of clearly explained examples. Problems, too, are numerous and deal with all phases of the subject matter. They appear either as specifically directed to the subject matter at hand or in an open-ended form. In the latter case, the instructors' background of experience may be challenged. The text is some 600 pages in length, well illustrated, referenced, and indexed. It is difficult to find its comparison in current publications. One might consider it to be an undergraduate version of McClintock and Argon's classic, "Mechanical Behavior of Materials." It contains a wealth of subject matter of use to the practicing engineer, which it presents in a clear, informative style. The book would also appeal to those who wish to update themselves in this important field.

Because the book ventures into new territory, it is easy to find omissions. While continuum and atomistic topics are given considerable attention, the student is provided with little information on the influence of the microstructure or of the environment on mechanical behavior. The metallurgical aspects associated with achieving or controlling the microstructure for strength, hardness, ductility, creep resistance, or defect tolerance should also be introduced quite early into an interdisciplinary course in mechanical properties. A similar comment applies to the influence of gaseous and aqueous environments on fracture and fatigue. Hopefully this book will endure, so that in further editions these important topics can be included. Despite these comments, I would strongly recommend this book for inclusion in any curriculum on the mechanical behavior of solids.

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**Photoplasticity.** By Jan Javornicky. Published in co-edition with Academia, Publishing House of the Czechoslovak Academy of Sciences and Elsevier Scientific Publishing Co., Amsterdam—London—New York. 1974. 312 Pages. $34.75.

REVIEWED BY J. W. DALLY [4]

The author, a chief research scientist at the Institute of Theoretical and Applied Mechanics and a lecturer in experimental mechanics on the Faculty of Civil Engineering in Prague, Czechoslovakia, has prepared an excellent book on photoplasticity. The coverage is sufficiently complete that the treatment can be considered a treatise on photoplasticity and will be of immense value to the investigators performing research in this area. The treatment also nicely spans the entire range from the theoretical concepts to the practical applications and thus, the book will serve as a useful reference to the experimentalists working in the field of plasticity.

The book is divided into four parts. Part I contains a well-written treatment of inelastic deformations covering 70 pages including: deformation behavior and mechanisms of plastic deformation, theories of viscoelasticity, viscosity and plasticity, and modeling problems in plasticity. This discussion is well integrated and nicely covers the mechanics of material deformation and provides the theoretical foundation necessary for subsequent experimental developments.

The main contribution of this text is in Part II, where photoplasticity experiments with amorphous model materials is treated. This part covers 127 pages and is the most complete treatment of classical photoplasticity available today. The author develops the topic systematically—treating first the correlation between the structure of polymers and their mechanical behavior. Next, birefringence is discussed and an excellent chapter (6) on model materials is included. The theory of photoplasticity is covered and then procedures for experiments in plasticity, viscoelasticity, viscoplasticity, and viscous flow are outlined. The coverage is completed by a chapter describing many of the known applications to engineering problems.

The study of plasticity in polycrystalline model materials is the subject of an extremely interesting treatment in Part III. Again the coverage is logical, systematic and complete, and this part of the treatise should provide exciting reading to those researchers trying to model slip, grain boundary effects, and material texture.

The last part of the text is a brief treatment of the applications of birefringent coatings to the plasticity problem. The coverage in this section is more than adequate, and the application of these methods to practical engineering problems is evident; however, much of the material covered is routine.

The text is very well referenced with 422 titles listed in the bibliography. References to Russian work not well known in the U. S. are particularly valuable. Th : text, translated by Dr. S. Tryml, has not suffered in the process since it is easily read and understood.

Photoplasticity by Javornicky is a substantial contribution to experimental mechanics and should be studied by every serious worker in the field.

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**An Introduction to the Elastic Stability of Structures.** By George J. Simitses. Published by Prentice-Hall, Inc. 1976. 253 Pages. Cost $18.95 cloth copy.

REVIEWED BY J. W. HUTCHINSON [5]

This little book should serve nicely for a first exposure to structural buckling problems for undergraduates or beginning graduate students. It starts out slowly and clearly with several simple models. Right from the start the author introduces the student to the various

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An Introduction to Stability Analysis of Elastic Structural Systems Introduction A Review of the Common Approaches to Stability Analysis in Structural Engineering A Review of the Energy Criteria of Stability for Finite Degrees of Freedom Systems Conclusions References A Review of Some Functional Analysis Concepts Introduction Metric Spaces, Normed Spaces, and Branch Spaces Finite and Infinite Dimensional Normed Spaces-- Equivalence and.Â  (source: Nielsen Book Data). Summary. Theory of Stability of Continuous Elastic Structures presents an applied mathematical treatment of the stability of civil engineering structures. â€¢ Elastic â€¢ Elastic-plastic. Introduction to Design of Shell Structures Shell Design. â€¢ Resistance.Â  â€¢ Generic classification of structures in terms of characteristic instability types and sensitivity to imperfections â€¢ Linear, nonlinear, elastic, plastic models. â€¢ Linear buckling analysis (eigen-buckling) â€“ LBA â€¢ Geometrical nonlinear imperfection analysis â€“ GNIA â€¢ Geometrical material nonlinear imperfection analysis â€“ GMNIA. The many developments and clarifications in the theory of elasticity and its applications which Intelligence Analysis for Tomorrow: Advances from the Behavioral and Social Sciences. 116 PagesÂ·2011Â·554 KBÂ·21,643 DownloadsÂ·New!Â  going to be some kind of life preserver or crutch for your emotional stability chemistry just He's Not That Com A consumer's guide to the economics of electric utility ratemaking. 245 PagesÂ·1980Â·3.78 MBÂ·3,493 DownloadsÂ·New! structure. The final chapter discusses a number of current issues regarding electric utilities, mainly Knowledge and Diplomacy. 121 PagesÂ·2002Â·1.56 MBÂ·10,245 DownloadsÂ·New!