
REVIEWED BY L.F. 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 have 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 overriding 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 mind. 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 content is sufficiently complete that the treatment can be considered average is sufficiently complete that the treatment can be considered

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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. The 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.


REVIEWED BY J. W. HUTCHINSON 5

This little book should serve nicely for a first exposure to structural buckling problems for undergraduates oder 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

An 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

(\text{source: Nielsen Book Data}).


\text{El}astic \text{El}astic-plastic.

Introduction to Design of Shell Structures

Shell Design

\text{Resistance}.

\text{Generic classification of structures in terms of characteristic instability types and sensitivity to imperfections} \text{Linear, nonlinear, elastic, plastic models}.

\text{Linear buckling analysis (eigen-buckling)} \text{LBA} \text{Geometrical nonlinear imperfection analysis} \text{GNIA} \text{Geometrical material nonlinear imperfection analysis} \text{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.

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.

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