

Inelastic Analysis of Structures

By Milan Jirásek, Zdenek P. Bazant

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The modeling of mechanical properties of materials and structures is a complex and wide-ranging subject. In some applications, it is sufficient to assume that the material remains elastic, i.e. that the deformation process is fully reversible and the stress is a unique function of strain. However, such a simplified assumption is appropriate only within a limited range, and in general must be replaced by a more realistic approach that takes into account the inelastic processes such as plastic yielding or cracking.

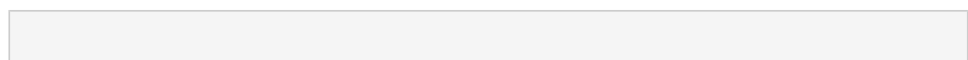
This book presents a comprehensive treatment of the most important areas of plasticity and of time-dependent inelastic behavior (viscoplasticity of metals, and creep and shrinkage of concrete). It covers structural aspects such as:

- * incremental analysis
- * limit analysis
- * shakedown analysis
- * optimal design
- * beam structures subjected to bending and torsion
- * yield line theory of plates
- * slip line theory
- * size effect in structures
- * creep and shrinkage effects in concrete structures.

The following aspects of the advanced material modeling are presented:

- * yield surfaces for metals and plastic-frictional materials
- * hardening and softening
- * stress-return algorithms
- * large-strain formulations
- * thermodynamic framework
- * microplane models
- * localization of plastic strain.

Inelastic Analysis of Structures is a textbook for basic and advanced courses on plasticity, with a slight emphasis on structural engineering applications, but with a wealth of material for geotechnical, mechanical, aerospace, naval, petroleum and nuclear engineers. The text is constructed in a very didactical way, while the mathematics has been kept rigorous.



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Inelastic Analysis of Structures By Milan Jirasek, Zdenek P. Bazant Bibliography

- Sales Rank: #2680085 in Books
- Published on: 2001-11-12
- Original language: English
- Number of items: 1
- Dimensions: 9.65" h x 1.88" w x 6.97" l, 2.55 pounds
- Binding: Hardcover
- 722 pages

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Editorial Review

Review

"...Overall the book is well written and the presentation of each subject is systematic and coherent..."
(Structural & Multidisciplinary Optimization)

From the Back Cover

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