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Engineering : Solid Mechanics

Altenbach, Holm, Öchsner, Andreas (Eds.)

Plasticity of Pressure-Sensitive Materials

- Summarizes new trends and established methods in the field of pressure-sensitive materials
- Presents results of 6 leading research groups
- Offers modeling approaches which are applicable in a wide range of modern engineering

Classical plasticity theory of metals is independent of the hydrostatic pressure. However if the metal contains voids or pores or if the structure is composed of cells, this classical assumption is no more valid and the influence of the hydrostatic pressure must be incorporated in the constitutive description. Looking at the microlevel, metal plasticity is connected with the uniform planes of atoms organized with long-range order. Planes may slip past each other along their close-packed directions. The result is a permanent change of shape within the crystal and plastic deformation. The presence of dislocations increases the likelihood of planes slipping. Nowadays, the theory of pressure sensitive plasticity is successfully applied to many other important classes of materials (polymers, concrete, bones etc.) even if the phenomena on the micro-level are different to classical plasticity of metals. The theoretical background of this phenomenological approach based on observations on the macro-level is described in detail in this monograph and applied to a wide range of different important materials in the last part of this book.

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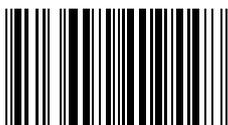
Tiergartenstrasse 15-17

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