

Mechanics of failure mechanisms in structures

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Abstrak

This book focuses on the mechanisms and underlying mechanics of failure in various classes of materials such as metallic, ceramic, polymeric, composite and bio-material. Topics include tensile and compressive fracture, crack initiation and growth, fatigue and creep rupture in metallic materials, matrix cracking and delamination and environmental degradation in polymeric composites, failure of bio-materials such as prosthetic heart valves and prosthetic hip joints, failure of ceramics and ceramic matrix composites, failure of metallic matrix composites, static and dynamic buckling failure, dynamic excitations and creep buckling failure in structural systems. Chapters are devoted to failure mechanisms that are characteristic of each of the materials.

The work also provides the basic elements of fracture mechanics and studies in detail several niche topics such as the effects of toughness gradients, variable amplitude loading effects in fatigue, small fatigue cracks, and creep induced brittleness. Furthermore, the book reviews a large number of experimental results on these failure mechanisms.