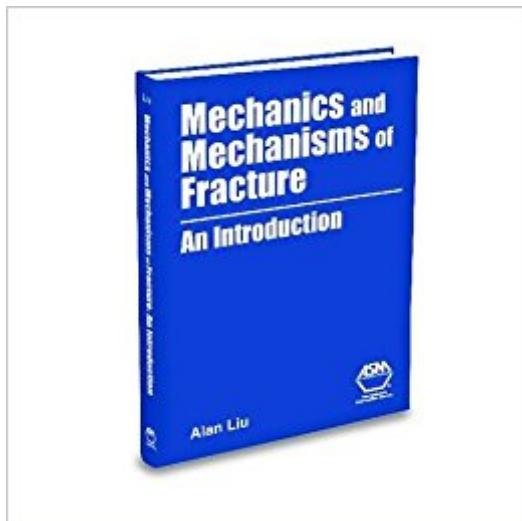


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Mechanics And Mechanisms Of Fracture: An Introduction



Synopsis

This text is for readers who want an introductory overview on the mechanical and material factors of fracture in design analysis, material evaluation, and failure prevention. Both fundamental and practical concepts of fracture are described in terms of stress analysis and the mechanical behavior of materials. The metallurgical aspects of deformation and fracture in metals are also discussed. This book can serve as a desktop reference book, or a self-study book, for engineering students and practicing engineers with some, or without, prior training in solid mechanics and/or mechanical metallurgy. The focus is on how machine (or structural) parts fail, why one piece fails in a certain way and another piece fails differently; and engineering tools for analyzing and, ultimately, preventing failure. Metals occupy the main part of the book, but nonmetallic materials such as ceramics, plastics, and fiber reinforced polymer matrix composites are also included. The first two chapters of this book can be considered as the fundamentals of stress analysis and mechanical behavior of materials. Chapter 1 serves as a crash course (or a refresh course) in strength of materials that prepares the reader with the basic analytical tools for the rest of the book. Topics include: fracture mechanics, fatigue, and failures associated with high-temperature creep, stress-corrosion, corrosion-fatigue, and hydrogen-embrittlement. Numerous examples are given through out this book to illustrate the elastic and plastic behavior of materials at a stress raiser, and how the static, fatigue, and residual strengths of a machine part might have been affected by it.

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