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remarks on Ni-base alloys; 1.5. Lifespan prediction in high-temperature fatigue; 1.5.1. Introduction
1.5.2. Physically-based models 1.5.3. Phenomenological models; 1.6. Conclusions; 1.7. Acknowledgments; 1.8. Bibliography; Chapter 2. Analysis of Elasto-plastic Strains and Stresses Near Notches Subjected to Monotonic and Cyclic Multiaxial Loading Paths; 2.1. Introduction; 2.2. Multiaxial fatigue parameters; 2.2.1. Equivalent parameter methods; 2.2.2. Critical plane methods; 2.2.3. Mean stress effects in multiaxial fatigue; 2.2.4. Predictive capabilities of multiaxial parameter W^* ; 2.3. Elasto-plastic notch-tip stress-strain calculation methods 2.3.1. Uniaxial strain or plane strain states at the notch tip 2.3.2. Multiaxial stress states; 2.4. Comparison of notch stress-strain calculations with numerical data; 2.4.1. Monotonic proportional loading; 2.4.2. Monotonic non-proportional loading; 2.4.3. Proportional multiaxial cyclic loading; 2.5. Conclusion; 2.6. Bibliography; 2.7. Symbols; Chapter 3. Fatigue of Composite Materials; 3.1. Introduction; 3.2. Drastic differences between the fatigue of composites and metals; 3.2.1. Damage at the microscopic level; 3.2.2. Role of plasticity and nonlinear behavior 3.2.3. Shape of the endurance curves of composite materials 3.2.4. Role of the fibers and the matrix; 3.3. Notch effect on fatigue strength; 3.4. Effect of a stress on composite fatigue; 3.4.1. Fatigue under compression; 3.4.2. Fatigue under bending conditions; 3.4.3. Effect of tensile over-loading; 3.5. Fatigue after impact; 3.6. Fatigue damage criteria; 3.6.1. Variation of rigidity; 3.6.2. Variation of residual strength after fatigue; 3.7. Conclusion; 3.8. Bibliography; Chapter 4. Fatigue of Polymers and Elastomers; 4.1. Introduction; 4.2. Life of polymers 4.3. Crack propagation within polymers

Sommario/riassunto

The design of mechanical structures with improved and predictable durability cannot be achieved without a thorough understanding of the mechanisms of fatigue damage and more specifically the relationships between the microstructure of materials and their fatigue properties. Written by leading experts in the field, this book (which is complementary to *Fatigue of Materials and Structures: Application to Damage and Design*, also edited by Claude Bathias and Andre Pineau), provides an authoritative, comprehensive and unified treatment of the mechanics and micromechanisms of fatigue in metals, polym
