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Nota di contenuto	Front Cover; Dedication; Laminar Composites; Copyright; Contents; Preface; Chapter 1: Introduction to composite materials; 1.1. Historic and introductory comments; 1.2. Characteristics of a composite material; 1.3. Composite materials classifications; 1.4. Fundamental composite material terminology; 1.5. Advantages afforded by composite materials; 1.6. Selected manufacturing techniques for composites; References; Chapter 2: A review of stress-strain and material behavior; 2.1. Introduction; 2.2. Strain-displacement relations; 2.2.1. Strain transformations 3.2.3.3. Compliance matrix3.3. Thermal and hygral behavior of lamina; 3.3.1. Thermal stress-strain relationships; 3.3.2. Hygral effects; 3.3.2.1. Hygral stress-strain relationships; 3.4. Prediction of lamina properties (micromechanics); 3.4.1. Mechanical properties of lamina; 3.4.1.1. Strength of materials approach; 3.4.1.2. Modifications of E2 approximations; 3.4.1.3. Semiemperical estimates of E2 and G12; 3.4.1.4. Elasticity solutions with contiguity; 3.4.1.5. Halpin-Tsai equations; 3.4.1.6. Additional techniques; 3.4.1.7. Predictive technique summary 3.4.2. Physical properties and strength estimates3.5. Problems; References; Chapter 4: Mechanical test methods for lamina; 4.1. Introduction; 4.2. Strain gages applied to composites; 4.2.1. General

interpretation of strain gage data; 4.2.2. Strain gage misalignment; 4.2.3. Strain gage reinforcing effects; 4.3. Experimental determination of mechanical properties; 4.3.1. Tensile testing; 4.3.2. Compression testing; 4.3.3. Shear tests; 4.3.3.1. Summary of shear test methods; 4.3.4. Flexure tests; 4.3.5. Failure strengths; 4.4. Physical properties; 4.4.1. Density; 4.4.2. Fiber volume fraction
4.4.3. Thermal expansion and moisture swelling coefficients4.5. Material properties of selected composites; 4.6. Testing lamina constituents; 4.7. Problems; References; Chapter 5: Lamina failure theories; 5.1. Introduction; 5.2. Maximum stress theory; 5.3. Maximum strain theory; 5.4. The significance of shear stress; 5.5. Interactive failure theories; 5.5.1. Tsai-Hill (maximum work) theory; 5.5.2. Tsai-Wu tensor theory; 5.5.2.1. Strength ratios; 5.6. Buckling; 5.7. Design examples incorporating failure analysis; 5.7.1. Tsai-Hill criterion; 5.7.2. Tsai-Wu criterion; 5.8. Problems; References
Chapter 6: Laminate analysis

Sommario/riassunto

This reference text provides students and practicing engineers with the theoretical knowledge and practical skills needed to identify, model, and solve structural analysis problems involving continuous fiber laminated composites. The principles are illustrated throughout with numerous examples and case studies, as well as example problems similar in nature to those found in strength of materials texts. A solutions manual is available. Extensive coverage of test methods and experimental techniques distinguished Staab from the many theory-led books on composites, making it ideal for practicing