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1. Tension, Compression, and Shear Introduction to Mechanics of Materials. Problem-Solving Approach. Statics Review. Normal Stress and Strain. Mechanical Properties of Materials. Elasticity, Plasticity, and Creep. Linear Elasticity. Hooke's Law, and Poisson's Ratio. Shear Stress and Strain. Allowable Stresses and Allowable Loads. Design for Axial Loads and Direct Shear. 2. Axially Loaded Members Introduction. Changes in Lengths of Axially Loaded Members. Changes in Lengths under Nonuniform Conditions. Statically Indeterminate Structures. Thermal Effects, Misfits, and Prestraints. Stresses on Inclined Sections. Strain Energy. Impact Loading. Repeated Loading and Fatigue. Stress Concentrations. Nonlinear Behavior. Elastoplastic Analysis 3. Torsion Introduction. Torsional Deformations of a Circular Bar. Circular Bars of Linearly Elastic Materials. Nonuni-form Torsion. Stresses and Strains in Pure Shear. Relationship Between Moduli of Elasticity E and G. Trans-mission of Power by Circular Shafts. Statically Indeterminate Torsional Members. Strain Energy in Torsion and Pure Shear. 4. Shear Forces and Bending Moments Introduction. Types of Beams, Loads, and Reactions. Shear Forces and Bending Moments. Relationships Among Loads, Shear Forces, and Bending Moments. Shear-Force and Bending-Moment Diagrams. 5. Stresses in Beams (Basic Topics) Introduction. Pure Bending and Nonuniform Bending. Curvature of a Beam. Longitudinal Strains in Beams. Normal Stress in Beams (Linearly Elastic Materials). Design of Beams for Bending Stresses. Nonprismatic Beams. Shear Stresses in Beams of Rectangular Cross Section. 6. Stresses in Beams (Advanced Topics) Introduction. Composite Beams. Transformed-Section Method. Doubly Symmetric Beams with Inclined Loads. Bending of Unsymmetric Beams. The Shear-Center Concept. Shear Stresses in Beams of Thin-Walled Open Cross Sections. 7. Analysis of Stress and Strain Introduction. Plane Stress. Principal Stresses and Maximum Shear Stresses. Mohr's Circle for Plane Stress. Hooke's Law for Plane Stress. Triaxial Stress. Plane Strain. 8. Applications of Plane Stress (Pressure Vessels, Beams, and Combined Loadings) Introduction. Spherical Pressure Vessels. Cylindrical Pressure Vessels. Maximum Stresses in Beams. Combined Loadings. 9. Deflections of Beams Introduction. Differential Equations of the Deflection Curve. Deflections by Integration of the Bending-Moment Equation. Deflections by Integration of the Shear-Force and Load Equations. Method of Superposition. Moment-Area Method. Nonprismatic Beams. Strain Energy of Bending. 10. Statically Indeterminate Beams Introduction. Types of Statically Indeterminate Beams. Analysis by the Differential Equations of the Deflection Curve. Method of Superposition. Temperature Effects. Longitudinal Displacements at the Ends of a Beam. 11. Columns Introduction. Buckling and Stability. Columns with Pinned Ends. Columns with Other Support Conditions. A comprehensive guide to column behavior is presented in the following chapters: Axial Loads, The Secant Formula for Columns, Elastic and Inelastic Column Behavior, and Inelastic Buckling. Additionally, design formulas for columns are provided. The book also features several appendices, including Systems of Units and Conversion Factors, Problem Solving, Mathematical Formulas, Review of Centroids and Moments Of Inertia, Properties Of Plane Areas, Properties of Structural-Steel Shapes, Properties of Structural Lumber, Deflections and Slopes of Beams, and Properties of Materials. The authors, Barry J. Goodno and James M. Gere, are renowned experts in their field. Dr. Goodno is a Professor of Civil and Environmental Engineering at Georgia Institute of Technology, with extensive experience in earthquake engineering and structural dynamics. He has held various leadership positions within ASCE and SEI, and has received several awards for his contributions to the field. Dr. Gere was a distinguished educator and researcher who spent 34 years teaching at Stanford University. He co-founded the John A. Blume Earthquake Engineering Center and authored nine textbooks on engineering subjects, including the influential book "MECHANICS OF MATERIALS." Dr. Gere's legacy continues to inspire engineers through his work. The authors' combined expertise and experience make this guide an invaluable resource for students and professionals seeking a deeper understanding of column behavior and design. Dr. Gere, a renowned expert in structural design, left a lasting legacy through his work and personal achievements. He co-authored several influential texts on elastic stability, matrix analysis of framed structures, moment distribution, earthquake tables, and terra non firma. In 1986, he embarked on an adventurous trek to Mount Everest's base camp, where he heroically saved the life of a fellow hiker. This edition of the book offers a comprehensive introduction to structural design, featuring concise chapter objectives that outline key learning goals. The new four-step problem-solving approach is demonstrated throughout with updated examples, highlighting the importance of systematically analyzing and solving problems. Fresh graphics, photographs, and illustrations enhance clarity and interest, while new end-of-chapter problems offer homework assignment options. The book's introductory problems begin each section, followed by representative problems in increasing order of difficulty. Advanced and computer problems are included where relevant. Each chapter concludes with a detailed summary and review, making it an invaluable study aid for mid-term and final exams. In addition to its accuracy and thorough presentation, this edition includes over 1,200 multi-part problems ideal for homework assignments and classroom discussions. The author team has invested significant effort in designing, checking, and proofreading both the explanatory text and all supporting examples and problems. The book uses both SI and USCS units in examples and problems, allowing students to become proficient in using both systems. It includes photographs and illustrations that show the practical applications of engineering concepts in various fields. The homework management system provides flexibility and control, with over 1,200 end-of-chapter problems that progress from basic to complex challenges. The text also features clear and engaging explanations, as well as detailed solutions for all problems. Answers are provided at the back of the book, while detailed solutions are available in an instructor's manual. Supplements such as a companion website and e-book are also available.

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