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Function; 2.6 Plane Stress Solution of a Simply Supported Beam with a Uniform Load; 2.7 Solutions in Plane Strain and in Plane Stress; 2.8 The Plane Problem in Polar Coordinates
2.9 Thick Wall CylindersReferences; 3 Strain Gages - Introduction to Electrical Strain Gages; 3.1 Strain Measurements - Point Methods; 3.2 Electrical Strain Gages; 3.3 Basics of Electrical Strain Gages; 3.3.1 Backing Material; 3.3.2 Cements; 3.3.3 Application of Gages onto Surfaces; 3.4 Gage Factor; 3.4.1 Derivation of Gage Factor; 3.4.2 Alloys for Strain Gages; 3.4.3 Semiconductor Strain Gages; 3.5 Basic Characteristics of Electrical Strain Gages; 3.5.1 Electrical Resistance; 3.5.2 Temperature Effect; 3.5.3 Corrections for Thermal Output; 3.5.4 Adjusting Thermal Output for Gage Factor
3.6 Errors Due to the Transverse Sensitivity3.6.1 Corrections Due to the Transversal Sensitivity; 3.7 Errors Due to Misalignment of Strain Gages; 3.8 Reinforcing Effect of the Gage; 3.9 Effect of the Resistance to Ground; 3.10 Linearity of the Gages. Hysteresis; 3.11 Maximum Deformations; 3.12 Stability in Time; 3.13 Heat Generation and Dissipation; 3.14 Effect of External Ambient Pressure; 3.14.1 Additional Consideration Concerning the Effect of Pressure on Strain Gages; 3.14.2 Additional Environment Effects to Consider; 3.14.3 Electromagnetic Fields; 3.15 Dynamic Effects
3.15.1 Transient Effects3.15.2 Steady State Response. Fatigue Characteristics of Strain Gauges; References; 4 Strain Gages Instrumentation - The Wheatstone Bridge; 4.1 Introduction; 4.1.1 Derivation of the Wheatstone Equilibrium Condition; 4.1.2 Full Bridge Arrangements in Some Simple Cases of Loadings; 4.1.3 Linearity Errors of the Wheatstone Bridge with Constant Voltage; 4.1.4 Temperature Compensation in the Bridge Circuit; 4.1.5 Leadwire Resistance/Temperature Compensation; 4.1.6 Shunt Calibration of Strain Gage Instrumentation; 4.1.7 Series Resistance Null Balance
4.1.8 Available Commercial Instrumentation

Sommario/riassunto

Experimental solid mechanics is the study of materials to determine their physical properties. This study might include performing a stress analysis or measuring the extent of displacement, shape, strain and stress which a material suffers under controlled conditions. In the last few years there have been remarkable developments in experimental techniques that measure shape, displacement and strains and these sorts of experiments are increasingly conducted using computational techniques. Experimental Mechanics of Solids is a comprehensive introduction to the topics, technologies and m