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diagrams for beams carrying concentrated loads only; 3.3 S.F and B.M. diagrams for uniformly distributed loads; 3.4 S.F. and B.M. diagrams for combined concentrated and uniformly distributed loads; 3.5 Points of contraflexure; 3.6 Relationship between S.F. Q, B.M. M, and intensity of loading w; 3.7 S.F. and B.M. diagrams for an applied couple or moment; 3.8 S.F. and B.M. diagrams for inclined loads; 3.9 Graphical construction of S.F and B.M. diagrams
3.10 S.F. and B.M. diagrams for beams carrying distributed loads of increasing value3.11 S.F. at points of application of concentrated loads; Examples; Problems; Chapter 4. Bending; Summary; Introduction; 4.1 Simple bending theory; 4.2 Neutral axis; 4.3 Section modulus; 4.4 Second moment of area; 4.5 Bending of composite or flitched beams; 4.6 Reinforced concrete beams - simple tension reinforcement; 4.7 Skew loading; 4.8 Combined bending and direct stress-eccentric loading; 4.9 ""Middle-quarter"" and ""middle-third"" rules; 4.10 Shear stresses owing to bending; 4.11 Strain energy in bending
4.12 Limitations of the simple bending theoryExamples; Problems; Chapter 5. Slope and Deflection of Beams; Summary; Introduction; 5.1 Relationship between loading, S.F., B.M., slope and deflection; 5.2 Direct integration method; 5.3 Macaulay's method; 5.4 Macaulay's method for u.d.l's; 5.5 Macaulay's method for beams with u.d.l, applied over part of the beam; 5.6 Macaulay's method for couple applied at a point; 5.7 Mohr 's ""area-moment"" method; 5.8 Principle of superposition; 5.9 Energy method; 5.10 Maxwell 's theorem of reciprocal displacements
5.11 Continuous beams - Clapeyron 's ""three-moment"" equation

Sommario/riassunto

One of the most important subjects for any student of engineering to master is the behaviour of materials and structures under load. The way in which they react to applied forces, the deflections resulting and the stresses and strains set up in the bodies concerned are all vital considerations when designing a mechanical component such that it will not fail under predicted load during its service lifetime.All the essential elements of a treatment of these topics are contained within this course of study, starting with an introduction to the concepts of stress and strain, shear force a