1. Record Nr. UNISA996202757503316 Autore Marti Peter Titolo Theory of structures [[electronic resource]]: fundamentals, framed structures, plates and shells / / Peter Marti Berlin, : Ernst & Sohn, 2013 Pubbl/distr/stampa **ISBN** 3-433-60261-1 3-433-60263-8 1-299-40740-4 3-433-60260-3 Descrizione fisica 1 online resource (697 p.) Disciplina 624.171 Soggetti Structural analysis (Engineering) Structural engineering Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Description based upon print version of record. Note generali Nota di bibliografia Includes bibliographical references and indexes. Preface; Contents; APPENDIX; I INTRODUCTION; 1 THE PURPOSE AND Nota di contenuto SCOPE OF THEORY OF STRUCTURES; 1 1 General; 1.2 The basis of theory of structures; 1.3 Methods of theory of structures; 1.4 Statics and structural dynamics; 1.5 Theory of structures and structural engineering; 2 BRIEF HISTORICAL BACKGROUND; II FUNDAMENTALS; 3 DESIGN OF STRUCTURES; 3.1 General; 3.2 Conceptual design; 3.3 Service criteria agreement and basis of design; 3.4 Summary; 3.5 Exercises; 4 STRUCTURAL ANALYSIS AND DIMENSIONING; 4.1 General; 4.2 Actions: 4.2.1 Actions and action effects 4.2.2 Models of actions and representative values 4.3 Structural models; 4.4 Limit states; 4.5 Design situations and load cases; 4.6 Verifications; 4.6.1 Verification concept; 4.6.2 Design values; 4.6.3 Verification of structural safety; 4.6.4 Verification of serviceability; 4.7 Commentary; 4.8 Recommendations for the structural calculations; 4.9 Recommendations for the technical report; 4.10 Summary; 4.11 Exercises; 5 STATIC RELATIONSHIPS; 5.1 Force systems and equilibrium; 5.1.1 Terminology; 5.1.2 Force systems; 5.1.3 Equilibrium;

5.1.4 Overall stability; 5.1.5 Supports; 5.1.6 Hinges

5.1.7 Stress resultants5.2 Stresses; 5.2.1 Terminology; 5.2.2 Uniaxial

stress state; 5.2.3 Coplanar stress states; 5.2.4 Three-dimensional stress states; 5.3 Differential structural elements; 5.3.1 Straight bars; 5.3.2 Bars in single curvature; 5.4 Summary; 5.5 Exercises; 6 KINEMATIC RELATIONSHIPS; 6.1 Terminology; 6.2 Coplanar deformation; 6.3 Three-dimensional deformation state; 6.4 Summary; 6.5 Exercises; 7 CONSTITUTIVE RELATIONSHIPS; 7.1 Terminology; 7.2 Linear elastic behaviour; 7.3 Perfectly plastic behaviour; 7.3.1 Uniaxial stress state; 7.3.2 Three-dimensional stress states 7.3.3 Yield conditions 7.4 Time-dependent behaviour; 7.4.1 Shrinkage; 7.4.2 Creep and relaxation; 7.5 Thermal deformations; 7.6 Fatigue; 7.6.1 General; 7.6.2 S-N curves; 7.6.3 Damage accumulation under fatigue loads; 7.7 Summary; 7.8 Exercises; 8 ENERGY METHODS; 8.1 Introductory example; 8.1.1 Statically determinate system; 8.1.2 Statically indeterminate system; 8.1.3 Work equation; 8.1.4 Commentary: 8.2 Variables and operators: 8.2.1 Introduction: 8.2.2 Plane framed structures; 8.2.3 Spatial framed structures; 8.2.4 Coplanar stress states; 8.2.5 Coplanar strain state; 8.2.6 Slabs 8.2.7 Three-dimensional continua8.2.8 Commentary; 8.3 The principle of virtual work; 8.3.1 Virtual force and deformation variables; 8.3.2 The principle of virtual deformations; 8.3.3 The principle of virtual forces; 8.3.4 Commentary: 8.4 Elastic systems: 8.4.1 Hyperelastic materials: 8.4.2 Conservative systems; 8.4.3 Linear elastic systems; 8.5 Approximation methods; 8.5.1 Introduction; 8.5.2 The RITZ method; 8.5.3 The GALERKIN method; 8.6 Summary; 8.7 Exercises; III LINEAR ANALYSIS OF FRAMED STRUCTURES; 9 STRUCTURAL ELEMENTS AND TOPOLOGY; 9.1 General; 9.2 Modelling of structures 9.3 Discretised structural models

Sommario/riassunto

This book provides the reader with a consistent approach to theory of structures on the basis of applied mechanics. It covers framed structures as well as plates and shells using elastic and plastic theory, and emphasizes the historical background and the relationship to practical engineering activities. This is the first comprehensive treatment of the school of structures that has evolved at the Swiss Federal Institute of Technology in Zurich over the last 50 years. The many worked examples and exercises make this a textbook ideal for in-depth studies. Each chapter concludes with a