Record Nr. UNINA9910367591803321

Autore Felix Udoeyo

Titolo Structural Analysis / / Felix Udoeyo

Pubbl/distr/stampa [Place of publication not identified]:,: Temple University Press,, 2020

Descrizione fisica 1 online resource (328 pages)

Disciplina 624.171

Soggetti Structural analysis (Engineering)

Lingua di pubblicazione Inglese

Formato Materiale a stampa

Livello bibliografico Monografia

Nota di contenuto

Chapter 1 11 -- Introduction to Structural Analysis 11 -- 1.1 Structural Analysis Defined 11 -- 1.2 Types of Structures and Structural Members 11 -- 1.3 Fundamental Concepts and Principles of Structural Analysis 13 -- 1.4 Units of Measurement . 20 -- Chapter 2 24 -- Structural Loads and Loading System . 24 -- 2.1 Types of Structural Loads . 24 -- 2.2 Load Combinations for Structural Design 42 -- 2.3 Tributary Width and Area . 44 -- 2.4 Influence Areas . 44 --2.5 Live Load Reduction . 45 -- Chapter 3 53 -- Equilibrium Structures, Support Reactions, Determinacy and Stability of Beams and Frames . 53 -- 3.1 Equilibrium of Structures 53 -- 3.2 Types of Supports and Their Characteristics 53 -- 3.3 Determinacy and Stability of Beams and Frames . 54 -- 3.4 Computation of Support Reactions for Planar Structures . 60 -- Chapter 4 91 -- Internal Forces in Beams and Frames 91 -- 4.1 Introduction . 91 -- 4.2 Basic Definitions . 91 -- 4.3 Sign Convention 92 -- 4.4 Relation Among Distributed Load, Shearing Force, and Bending Moment . 93 -- Chapter 5 119 -- Internal Forces in Plane Trusses 119 -- 5.1 Introduction . 119 -- 5.2 Types of Trusses . 120 -- 5.3 Determinacy and Stability of Trusses . 121 -- 5.4 Assumptions in Truss Analysis . 121 -- 5.5 Joint Identification and Member Force Notation 121 -- 5.6 Methods of Truss Analysis . 124 --Chapter 6 139 -- Arches and Cables 139 -- 6.1 Arches. 139 -- 6.2 --Cables 148 -- Chapter 7 166 -- Deflection of Beams: Geometric Methods 166 -- 7.1 Introduction . 166 -- 7.2 Derivation of the Equation of the Elastic Curve of a Beam 166 -- 7.3 Deflection by Method of Double Integration 169 -- 7.4 Deflection by Method of

Singularity Function . 175 -- 7.5 Deflection by Moment-Area Method 183 -- 7.6 Deflection by the Conjugate Beam Method 192 -- Chapter 8 205 -- Deflections of Structures: Work-Energy Methods 205 -- 8.1 Virtual Work Method 205 -- 8.2 Energy Methods 226 -- Chapter 9 240 -- Influence Lines for Statically Determinate Structures .240 -- 9.1 Introduction . 240 -- 9.2 Influence Lines for Statically Determinate Beams by Static Equilibrium Method . 240 -- 9.3 Construction of Influence Lines 243 -- 9.4 Uses of Influence Lines. 263 -- Chapter 10 284 -- Force Method of Analysis of Indeterminate Structures .284 --10.1 Introduction . 284 10.2 Maxwell-Betti Law of Reciprocal Deflections . 286 -- 10.3 Analysis of Indeterminate Beams and Frames 288 -- 10.4 Analysis of Indeterminate Trusses 308 -- Chapter 11 320 -- Slope-Deflection Method of Analysis of Indeterminate Structures 320 -- 11.1 Introduction . 320 -- 11.2 Sign Conventions 320 -- 11.3 Derivation of Slope-Deflection Equations 320 -- 11.4 Modification for Pin-Supported End Span 323 -- 11.5 Analysis of Indeterminate Beams . 324 -- 11.6 Analysis of Indeterminate Frames 325 -- Chapter 12 352 -- Moment Distribution Method of Analysis of Structures .352 -- 12.1 Basic Concepts 352 -- 12.2 Sign Convention 353 -- 12.3 Definitions . 353 -- 12.4 Modification of Member Stiffness 355 -- 12.5 Analysis of Indeterminate Beams . 356 -- 12.6 Analysis of Indeterminate Frames 361 -- Chapter 13 381 -- Influence Lines for Statically Indeterminate Structures 381 -- 13.1 Introduction . 381 -- 13.2 Static Equilibrium Method 381 -- 13.3 Influence Lines for Statically Indeterminate Beams by Kinematic Method . 387 -- Errata. 393.

Sommario/riassunto

Structural Analysis by Felix Udeyo is intended to teach students the methods and techniques for the analysis of structures. A sound knowledge of structures is a prerequisite for their proper design and ensures the structural integrity of civil engineering infrastructural systems. This textbook is comprised of three parts. The first part consists of an overview of structural analysis and introduces several structural loadings that may be considered during the analysis and subsequent design of structures. The second part covers classic methods of the analysis of determinate structures. The final section discusses classic methods for the analysis of indeterminate structures as well as methods for the analysis and construction of influence lines for indeterminate structures. This textbook is designed for upper-level undergraduates studying civil engineering, construction engineering and management, and architecture. It is also useful for construction professionals seeking licensure in their field of practice.