



Theory Of Structures: Fundamentals Framed Structures Plates And Shells, 1/e

Peter Marti

2013

696 pp

Hardback

ISBN: 9783433029916

Price: 9,648.00

About the Book

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 summary that highlights the most important aspects in concise form. Specialist terms are defined in the appendix.

There is an extensive index befitting such a work of reference. The structure of the content and highlighting in the text make the book easy to use. The notation, properties of materials and geometrical properties of sections plus brief outlines of matrix algebra, tensor calculus and calculus of variations can be found in the appendices.

This publication should be regarded as a key work of reference for students, teaching staff and practising engineers. Its purpose is to show readers how to model and handle structures appropriately, to support them in designing and checking the structures within their sphere of responsibility.

Table of Contents

I INTRODUCTION

Purpose and scope of theory of structures

Historical background

II FUNDAMENTALS

Structural design

Structural analysis and dimensioning

Static relationships

Kinematic relationships

Constitutive relationships

Energy methods

III STATICALLY DETERMINATE FRAMED STRUCTURES

Structural elements and topology

Determining the forces

Stress resultants and state diagrams

Influence lines

IV DEFORMATIONS OF FRAMED STRUCTURES

Elementary deformations

Single deformations

Deformation diagrams

V STATICALLY INDETERMINATE FRAMED STRUCTURES

Force method

Displacement method

Continua

Discontinua

VI NON-LINEAR ANALYSIS OF FRAMED STRUCTURES

Elastic-plastic systems

Limit analysis

Stability

VII PLATES AND SHELLS

Plates

Slabs

Folded plates

Shells

APPENDIX

A1 Definitions

A2 Notation

A3 Properties of materials

A4 Geometrical properties of sections

A5 Matrix algebra

A6 Tensor calculus

A7 Calculus of variations

REFERENCES

INDEX

About the Author

Peter Marti :- Prof. Dr. sc. techn. Peter Marti has been professor for theory of structures and structural design at the Swiss Federal Institute of Technology in Zurich since 1990, lecturing in theory of structures and reinforced concrete. Peter Marti has served as chairman on various technical commissions, e.g. ACI-ASCE Joint Committee 445 Shear and Torsion and fib Commission 4 Modelling of Structural Behaviour and Design. He was also president of Swiss standards commission SIA 162 Concrete construction, project manager for Swisscodes and president of the Society for the Art of Civil Engineering. In his role as consulting engineer, reviewer and jury member for competitions, he is responsible for many challenging building, bridge and tunnel projects.