

Review



This is a useful book giving insights into special horizontal loadings on building structures, suitable structural resistance systems and current US design office practice, says **John Lyness**.

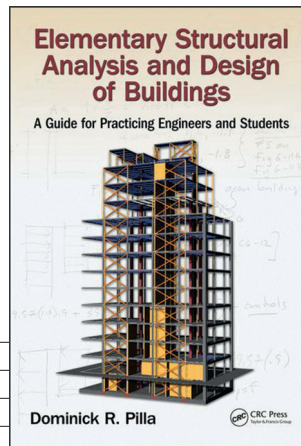
Elementary structural analysis and design of buildings: a guide for practicing engineers and students

Author: Dominick R. Pilla

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The title of this book contains the word 'elementary', but it does not parallel the well-known UK textbooks on the design of building structural elements in different materials. The author is the principal of a New York structural design consultancy. He is also a teacher of structural engineering practice.

The US licensing of structural engineers requires the successful completion of the National Council of Examiners for Engineering and Surveyors (NCEES) initial Fundamentals of Engineering exam and then, after further experience, the Principles and Practice of Engineering (PE) exam for structural engineers. The latter exam comprises four parts, each of four hours' duration. These cover vertical loading (in breadth), horizontal loading (in breadth), vertical loading (in depth) and horizontal loading (in depth).

This book assists with preparation for the last four-hour exam, horizontal loading (in depth) and the design of suitable structural horizontal load-resisting systems in different structural materials. The horizontal loadings especially considered in the USA are seismic loads (on the West Coast), snow loads (in the north-eastern states) and thermal loads due to large daily and seasonal temperature ranges (in the southern central states).

Some prerequisites are unstated, such

as familiarity with the frequency domain characterisation of earthquakes, knowledge of the US customary system, and the use of the LRFD (load and resistance factor design) and ASD (allowable stress design) philosophies.

The author suggests that the book makes a useful desk reference for practising engineers and engineering students.

The book comprises 11 chapters. The first five deal with loads and force resistance analysis: Chapters 1 and 2 provide background on vertical and horizontal loads; Chapters 3 and 4 cover methods of analysis of forces on structures; Chapter 5 describes structural systems for the resistance of horizontal forces.

There are then five chapters giving design examples, in different structural materials, for structural systems resisting horizontal loads. Chapter 6 gives steel design examples, Chapter 7 reinforced concrete design examples, Chapter 8 wood (timber) design examples, Chapter 9 masonry design examples, and Chapter 10 foundations and retaining structure design examples. Detailed design calculations are given with the relevant design standard citations for each example.

Unusually, for a structural design text, there is a chapter on the choices of code-compliant structural inspection regimes (Chapter 11).

Following the text, there are full descriptions

of the codes and references used.

As noted before, the book is not a comprehensive guide to elemental design. It does not cover detailed joint design, design for fire or structural detailing, but it gives a good introduction to some special features of building structure design in the USA.

The topics of most benefit to readers are the choice and use of the IBC (International Building Code) design loading combinations, the design examples using the US seismic codes for load resistance, the examples of the use of the building structure SDC (Seismic Design Category), the assessment of seismic loads and the associated design methods, the snow load calculations, the emphasis throughout on lateral load-resisting structural systems, the nutshell outline design steps given at the outset for each structural material, and the citing of the various relevant US codes for loads, analysis method and material design.

As part of the assessment of seismic loads on building structures, the author gives some practical guidance on the choices to be made between manual calculation methods and computer-based analysis.

In some designs, where appropriate, ASD is used instead of LRFD, e.g. in the design of nailed plywood shear panels.

The narrative approach adopted is good and easily readable, but perhaps a more realistic layout of calculations might have improved the text. Also, some of the shorthand superscript abbreviations could be made clearer.

But, in summary, this is a useful book giving insights into special horizontal loadings on building structures, suitable structural resistance systems and current US design office practice.

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