

STRUCTURAL STEEL DESIGN

FIFTH EDITION

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Preface

This textbook has been prepared with the hope that its readers will, as have so many engineers in the past, become interested in structural steel design and want to maintain and increase their knowledge on the subject throughout their careers in the engineering and construction industries. The material was prepared primarily for an introductory course in the junior or senior year but the last several chapters may be used for a graduate class. The authors have assumed that the student has previously taken introductory courses in mechanics of materials and structural analysis.

The authors' major objective in preparing this new edition was to update the text to conform to both the American Institute of Steel Construction (AISC) 2010 Specification for Structural Steel Buildings and the 14th edition of the AISC Steel Construction Manual published in 2011.

WHAT'S NEW IN THIS EDITION

Several changes to the text were made to the textbook in this edition:

1. End of chapter Problems for Solution have been added for Chapter 1 of the textbook.
2. The load factors and load combinations defined in Chapter 2 of the textbook and used throughout the book in example problems and end of chapter problems for solution have been revised to meet those given in the ASCE 7-10 and Part 2 of the AISC Steel Construction Manual.
3. The classification of compression sections for local buckling defined in Chapter 5 of the textbook has been revised to the new definition given in Section B4.1 of the new AISC Specification. For compression, sections are now classified as *non-slender* element or *slender* element sections.
4. The AISC Specification provides several methods to deal with stability analysis and the design of beam-columns. In Chapter 7 of the textbook, the *Effective Length Method (ELM)* is still used, though a brief introduction to the *Direct Analysis Method (DM)* has been added. A more comprehensive discussion of the DM is reserved for Chapter 11 of the text.
5. In Chapter 11 of the textbook, both the *Direct Analysis Method* and the *Effective Length Method* are presented for the analysis and design of beam-columns. This is to address the fact that the presentation of the *Direct Analysis Method* was moved from an appendix to Chapter C of the new AISC Specification while the *Effective Length Method* moved from Chapter C to Appendix 7.
6. Most of the end of chapter *Problems for Solution* for Chapters 2 through 11 have been revised. For Chapters 12 through 18 about half the problems have been revised.
7. Various photos were updated throughout the textbook.

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The authors would like to express appreciation to Dr. Bryant G. Nielson of Clemson University for his assistance in developing the changes to this manuscript and to Sara Elise Roberts, former Clemson University graduate student, for her assistance in the review of the end of chapter problems and their solutions. In addition, the American Institute of Steel Construction was very helpful in providing advance copies of the AISC Specification and Steel Construction Manual revisions. Finally, we would like to thank our families for their encouragement and support in the revising of the manuscript of this textbook.

We also thank the reviewers and users of the previous editions of this book for their suggestions, corrections, and criticisms. We welcome any comments on this edition.

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