About the Authors

Douglas W. Thornburg, AIA, is the Vice President and Technical Director of Product Development and Education, where he provides leadership in the technical development and positioning of support products, educational activities, and certification programs for the Code Council (ICC). Prior to joining the ICC in 2004, Mr. Thornburg served as a code consultant and educator for building codes. He has been involved extensively in building code activities since 1980.

John R. Henry, P.E., is the Principal Staff Engineer with the International Code Council (ICC) and has been with the association since 1997. During his tenure with ICC, he has worked for the code development department, technical services, government relations, training and education, and product development. Mr. Henry is currently responsible for the research, development, and authoring of technical resources related to the structural engineering provisions of the IBC and IRC and is an instructor of structural and framing seminars for the Code Council.

About the International Code Council

The International Code Council® (ICC®) is a member-focused association dedicated to helping the building safety community and construction industry provide safe, sustainable and affordable construction through the development of codes and standards used in the design, build and compliance process. Most U.S. communities and many global markets choose the International Codes. ICC Evaluation Service (ICC-ES), a subsidiary of the International Code Council, has been the industry leader in performing technical evaluations for code compliance fostering safe and sustainable design and construction.

Headquarters: 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001-2070
District Offices: Birmingham, AL; Chicago, IL; Los Angeles, CA
1-888-422-7233
www.iccsafe.org
Information contained in this work has been obtained by McGraw-Hill Education, LLC from sources believed to be reliable. However, neither McGraw-Hill Education, the International Code Council, nor its authors guarantee the accuracy or completeness of any information published herein, and neither McGraw-Hill Education nor its authors shall be responsible for any errors, omissions, or damages arising out of use of this information. This work is published with the understanding that McGraw-Hill Education and its authors are supplying information but are not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought.
Dedication

This book is dedicated to the memory of the late James E. Bihr, P.E., past chief executive officer of the International Conference of Building Officials (one of the three legacy founding members of the International Code Council) and past chairman of the board of directors of ASTM International (formerly the American Society of Testing and Materials). Mr. Bihr provided tremendous vision and leadership in various roles during his long and distinguished career. His integrity, professionalism, and compassion provided support and inspiration to the authors as well as so many others.
Online Bonus Resources

Enhance Your 2012 IBC Handbook Reading Experience. The 2012 International Building Code® Handbook includes a variety of helpful bonus resources just right for you. These online bonus resources are designed to enhance your expertise and knowledge of various building code provisions, including:

- FEMA/NEHRP/NIST Publications related to earthquake safety and seismic design
- Articles by expert engineers on changes to the latest structural material standards
- ATC Wind Speed site provides site specific wind speeds for use with ASCE 7-10
- ICC Guidelines for acoustics and commissioning
- Helpful Articles from ICC’s Building Safety Journal
- Helpful ICC YouTube Videos on various code related topics
- Resources related to accessible means of egress and fire protection
Contents

Foreword .............................................. xv
Preface ............................................... xvii
Acknowledgments ................................. xix

Chapter 1
Scope and Administration ...................... 1
  □ Section 101  General ........................... 2
  □ Section 102  Applicability .................... 4
  □ Section 103  Department of Building Safety ... 5
  □ Section 104  Duties and Powers of Building Official ... 6
  □ Section 105  Permits ............................ 9
  □ Section 107  Submittal Documents ............. 11
  □ Section 108  Temporary Structures and Uses ... 12
  □ Section 109  Fees ............................... 12
  □ Section 110  Inspections ...................... 13
  □ Section 111  Certificate of Occupancy ...... 14
  □ Section 112  Service Utilities ................. 15
  □ Section 113  Board of Appeals ............... 15
  □ Section 114  Violations ...................... 15
  □ Section 115  Stop Work Order ............... 16
  □ Section 116  Unsafe Structures and Equipment ... 17
  □ KEY POINTS .................................... 17

Chapter 2
Definitions ........................................ 19
  □ Section 201  General ........................... 20
  □ Section 202  Definitions ...................... 20
  □ KEY POINTS .................................... 45

Chapter 3
Use and Occupancy Classification .......... 47
  □ Section 302  Classification .................... 48
  □ Section 303  Assembly Group A ............... 50
  □ Section 304  Business Group B ............... 54
  □ Section 305  Educational Group E ............ 55
  □ Section 306  Factory Group F ................ 56
  □ Section 307  High-Hazard Group H .......... 57
  □ Section 308  Institutional Group I ............ 63
  □ Section 309  Mercantile Group M ............ 65
  □ Section 310  Residential Group R ............ 66
  □ Section 311  Storage Group S ................ 68
  □ Section 312  Utility and Miscellaneous Group U ... 69
  □ KEY POINTS .................................... 69

Chapter 4
Special Detailed Requirements
Based on Use and Occupancy .............. 71
  □ Section 402  Covered Mall and Open Mall Buildings ... 72
  □ Section 403  High-Rise Buildings ............ 81
  □ Section 404  Atriums .......................... 88
  □ Section 405  Underground Buildings .......... 90
  □ Section 406  Motor-Vehicle-Related Occupancies .... 92
  □ Section 407  Group I-2 ........................ 96
  □ Section 408  Group I-3 ........................ 100
  □ Section 409  Motion-Picture Projection Rooms .... 101
  □ Section 410  Stages, Platforms, and Technical Production Areas ...... 101
  □ Section 411  Special Amusement Buildings ....... 104
  □ Section 412  Aircraft-Related Occupancies ...... 105
  □ Section 413  Combustible Storage ............. 106
  □ Section 414  Hazardous Materials ............. 107
  □ Section 415  Groups H-1, H-2, H-3, H-4, and H-5 ...... 110
  □ Section 416  Application of Flammable Finishes .... 114
  □ Section 417  Drying Rooms ................... 114
  □ Section 418  Organic Coatings ................ 114
  □ Section 419  Live/Work Units ................. 115
  □ Section 420  Groups I-1, R-1, R-2, and R-3 ........ 116
  □ Section 422  Ambulatory Care Facilities ....... 117
  □ Section 423  Storm Shelters ................... 119
  □ Section 424  Children’s Play Structures ....... 119
  □ KEY POINTS .................................... 120
### Chapter 5
**General Building Heights and Areas**... 123
- Section 501 General .................................. 124
- Section 503 General Building Height and Area Limitations ........ 124
- Section 504 Building Height ................. 128
- Section 505 Mezzanines and Equipment Platforms .......... 130
- Section 506 Building Area Modifications ............... 135
- Section 507 Unlimited-Area Buildings ............ 148
- Section 508 Mixed Use and Occupancy ............... 155
- Section 509 Incidental Uses .................... 165
- Section 510 Special Provisions .................. 168
- KEY POINTS ........................................ 172

### Chapter 6
**Types of Construction** ................... 175
- Section 602 Construction Classification .......... 176
- Section 603 Combustible Material in Type I and II Construction .......... 186
- KEY POINTS ........................................ 188

### Chapter 7
**Fire and Smoke Protection Features** .... 189
- Section 703 Fire-Resistance Ratings and Fire Tests .......... 190
- Section 704 Fire-Resistance Rating of Structural Members .... 197
- Section 705 Exterior Walls ...................... 201
- Section 706 Fire Walls ....................... 215
- Section 707 Fire Barriers ..................... 226
- Section 708 Fire Partitions .................... 228
- Section 709 Smoke Barriers ................... 231
- Section 710 Smoke Partitions ................. 232
- Section 711 Horizontal Assemblies ............. 232
- Section 712 Vertical Openings ................ 235
- Section 713 Shaft Enclosures ................ 237
- Section 714 Penetrations .................... 241
- Section 715 Joint Systems .................. 249
- Section 716 Opening Protectives ............... 250
- Section 717 Ducts and Air Transfer Openings .......... 255
- KEY POINTS ........................................ 255

### Chapter 8
**Interior Finishes** ......................... 275
- Section 801 General ......................... 276
- Section 803 Wall and Ceiling Finishes .......... 276
- Section 804 Interior Floor Finish .......... 279
- Section 805 Combustible Materials in Types I and II Construction .......... 280
- Section 806 Decorative Materials and Trim .......... 281
- KEY POINTS ........................................ 281

### Chapter 9
**Fire Protection Systems** ................. 283
- Section 901 General ......................... 284
- Section 903 Automatic Sprinkler Systems .......... 286
- Section 904 Alternative Automatic Fire-Extinguishing Systems .......... 304
- Section 905 Standpipe Systems ................. 305
- Section 907 Fire Alarm and Detection Systems .......... 310
- Section 908 Emergency Alarm Systems .......... 317
- Section 909 Smoke-Control Systems .......... 317
- Section 910 Smoke and Heat Vents .......... 320
- Section 911 Fire Command Center .......... 322
- Section 914 Emergency Responder Safety Features .......... 322
- KEY POINTS ........................................ 323
Chapter 10
Means of Egress ........................................ 325
□ Section 1001 Administration .................. 327
□ Section 1002 Definitions ......................... 327
□ Section 1003 General Means of Egress ....... 327
□ Section 1004 Occupant Load .................... 332
□ Section 1005 Means of Egress Size ............ 344
□ Section 1006 Means of Egress Illumination .. 351
□ Section 1007 Accessible Means of Egress ... 353
□ Section 1008 Doors, Gates, and Turnstiles .. 358
□ Section 1009 Stairways .......................... 376
□ Section 1010 Ramps ............................... 387
□ Section 1011 Exit Signs ......................... 390
□ Section 1012 Handrails ............................ 393
□ Section 1013 Guards .............................. 400
□ Section 1014 Exit Access .......................... 405
□ Section 1015 Exit and Exit Access Doorways . 408
□ Section 1016 Exit Access Travel Distance ....... 414
□ Section 1017 Aisles ............................... 416
□ Section 1018 Corridors ......................... 417
□ Section 1019 Egress Balconies ................. 423
□ Section 1020 Exits ................................. 423
□ Section 1021 Number of Exits and Exit ... 424
□ Section 1022 Interior Exit Stairways and ... 428
□ Section 1023 Exit Passageways ................. 432
□ Section 1024 Luminous Egress Path Markings . 434
□ Section 1025 Horizontal Exits .................. 435
□ Section 1026 Exterior Exit Stairways and ... 439
□ Section 1027 Exit Discharge ...................... 441
□ Section 1028 Assembly ............................ 444
□ Section 1029 Emergency Escape and ......... 457
□ KEY POINTS ........................................ 460

Chapter 11
Accessibility ............................................. 463
□ Section 1101 General ............................. 466
□ Section 1102 Definitions ......................... 466
□ Section 1103 Scoping Requirements ............ 467
□ Section 1104 Accessible Route ................. 469
□ Section 1105 Accessible Entrances .......... 470
□ Section 1106 Parking and Passenger Loading Facilities .... 472
□ Section 1107 Dwelling Units and Sleeping Units ....... 473
□ Section 1108 Special Occupancies ......... 476
□ Section 1109 Other Features and Facilities .... 478
□ Section 1110 Signage .............................. 481
□ KEY POINTS ........................................ 482

Chapter 12
Interior Environment .................................. 483
□ Section 1203 Ventilation ......................... 484
□ Section 1204 Temperature Control .......... 488
□ Section 1205 Lighting ........................... 488
□ Section 1206 Yards or Courts .................. 489
□ Section 1207 Sound Transmission .......... 490
□ Section 1208 Interior Space Dimensions ...... 490
□ Section 1209 Access to Unoccupied Spaces .......... 491
□ Section 1210 Toilet and Bathroom Requirements ....... 492
□ KEY POINTS ........................................ 493

Chapter 13
Energy Efficiency ...................................... 495

Chapter 14
Exterior Walls .......................................... 497
□ Section 1402 Definitions ......................... 498
□ Section 1403 Performance Requirements ....... 498
□ Section 1404 Materials ........................... 499
□ Section 1405 Installation of Wall Coverings ....... 499
□ Section 1406 Combustible Materials on the Exterior Side of Exterior Walls ....... 505
□ Section 1407 Metal Composite Materials .......... 505
□ KEY POINTS ........................................ 506

### Chapter 15
#### Roof Assemblies and Roof Structures
- Section 1502 Definitions .......................... 508
- Section 1503 Weather Protection ............... 508
- Section 1504 Performance Requirements ....... 509
- Section 1505 Fire Classification ................ 511
- Section 1506 Materials ............................ 512
- Section 1507 Requirements for Roof Coverings .... 513
- Section 1508 Roof Insulation ..................... 519
- Section 1509 Rooftop Structures ............... 519
- Section 1510 Reroofing ............................ 521
- KEY POINTS ...................................... 522

### Introduction to the Structural Provisions
Structural Design (Chapter 16):
- Nonseismic ......................................... 524
- Structural Design (Chapter 16): Seismic ... 525
- Structural Design (Chapter 16): Load Combinations ... 527

### Chapter 16
#### Structural Design
- Introduction ....................................... 530
- Section 1601 General ............................. 530
- Section 1602 Definitions and Notations ....... 531
- Section 1603 Construction Documents ........ 531
- Section 1604 General Design Requirements .... 532
- Section 1605 Load Combinations ............... 539
- Section 1606 Dead Loads ......................... 541
- Section 1607 Live Loads .......................... 541
- Section 1608 Snow Loads ........................ 552
- Section 1609 Wind Loads .......................... 555
- Section 1610 Soil Lateral Loads ................. 562
- Section 1611 Rain Loads ........................... 563
- Section 1612 Flood Loads ........................ 563
- Section 1613 Earthquake Loads ................. 565
- Section 1614 Atmospheric Ice Loads ............ 570
- Section 1615 Structural Integrity ................. 570
- KEY POINTS ...................................... 571

### Chapter 16
- Example 16-1 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Strength Design) .............................. 573
- Example 16-2 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Allowable Stress Design Using Basic Load Combinations) ................. 574
- Example 16-3 Design Axial Force, Shear Force, and Bending Moment for Shear Wall Due to Lateral and Gravity Loads (Allowable Stress Design Using Alternate Basic Load Combinations) .................. 575
- Example 16-4 Calculations of Live Load Reduction ......... 576

### Chapter 17
#### Structural Tests and Special Inspections
- Introduction ....................................... 580
- Section 1701 General ............................. 581
- Section 1702 Definitions ............................ 582
- Section 1703 Approvals ............................ 584
- Section 1704 Special Inspections, Contractor Responsibility, and Structural Observations .................. 590
- Section 1705 Required Verification and Inspection ............ 596
- Section 1706 Design Strengths of Materials ........ 612
- Section 1707 Alternate Test Procedures .......... 612
- Section 1708 TestSafe Load ....................... 612
- Section 1709 In Situ Load Tests ................... 613
- Section 1710 Preconstruction Load Tests .......... 613
- Section 1711 Material and Test Standards .......... 614
- KEY POINTS ...................................... 618

### Chapter 18
#### Soils and Foundations
- Introduction ....................................... 622
- Section 1801 General ............................. 622
## Chapter 19
### Concrete .......................... 683
- Introduction .......................... 684
- Section 1901 General .................. 684
- Section 1902 Definitions ............. 685
- Section 1903 Specifications for Tests and Materials .......... 685
- Section 1904 Durability Requirements .......... 691
- Section 1905 Modifications to ACI 318 .......... 692
- Section 1906 Structural Plain Concrete .......... 696
- Section 1907 Minimum Slab Provisions ............ 696
- Section 1908 Anchorage to Concrete—Allowable Stress Design .......... 697
- Section 1909 Anchorage to Concrete—Strength Design .......... 698
- Section 1910 Shotcrete .................... 699
- Section 1911 Reinforced Gypsum Concrete .......... 700
- Section 1912 Concrete-Filled Pipe Columns .......... 700
- KEY POINTS .......................... 701

## Chapter 20
### Aluminum .......................... 705
- Introduction .......................... 706
- Section 2002 Materials ................. 706
- KEY POINTS .......................... 707

## Chapter 21
### Masonry ............................. 709
- Introduction .......................... 710
- Section 2101 General .................. 711
- Section 2102 Definitions and Notations ............ 714
- Section 2103 Masonry Construction Materials .......... 714
- Section 2104 Construction ................ 717
- Section 2105 Quality Assurance .......... 718
- Section 2106 Seismic Design ............ 718
- Section 2107 Allowable Stress Design .......... 723
- Section 2108 Strength Design of Masonry .......... 725
- Section 2109 Empirical Design of Masonry .......... 727
- Section 2110 Glass Unit Masonry .......... 728
- Section 2111 Masonry Fireplaces .......... 728
- Section 2112 Masonry Heaters .......... 729
- Section 2113 Masonry Chimneys .......... 729
- KEY POINTS .......................... 729

## Chapter 22
### Steel ................................. 733
- Introduction .......................... 734
- Section 2201 General .................. 734
- Section 2202 Definitions ................ 734
- Section 2203 Identification and Protection of Steel for Structural Purposes .......... 734
- Section 2204 Connections ............... 735
- Section 2205 Structural Steel ............ 737
- Section 2206 Composite Structural Steel and Concrete Structures .......... 739
- Section 2207 Steel Joists ............... 739
- Section 2208 Steel Cable Structures .......... 741
- Section 2209 Steel Storage Racks .......... 742
- Section 2210 Cold-Formed Steel .......... 742
- Section 2211 Cold-Formed Steel Light-Framed Construction .......... 745
- KEY POINTS .......................... 747

## Chapter 23
### Wood ................................. 749
- Introduction .......................... 750
- Section 2301 General .................. 750
Chapter 26
Plastic  ............................................. 861
□ Section 2603  Foam Plastic Insulation  .......... 862
□ Section 2604  Interior Finish and Trim .......... 868
□ Section 2605  Plastic Veneer ..................... 869
□ Section 2606  Light-Transmitting Plastics ...... 869
□ Section 2607  Light-Transmitting Plastic Wall Panels .... 870
□ Section 2608  Light-Transmitting Plastic Glazing ... 870
□ Section 2609  Light-Transmitting Plastic Roof Panels .... 870
□ Section 2610  Light-Transmitting Plastic Skylight Glazing .... 871
□ KEY POINTS  ............................................. 871

Chapter 27
Electrical  ............................................ 873
□ Section 2702  Emergency and Standby Power Systems .... 874

Chapter 28
Mechanical  ........................................... 877

Chapter 29
Plumbing  ............................................ 879
□ Section 2902  Minimum Plumbing Facilities .... 880
□ KEY POINTS  ............................................. 883

Chapter 30
Elevators and Conveying Systems  ............. 885
□ Section 3002  Hoistway Enclosures .... 886
□ Section 3003  Emergency Operations ........ 888
□ Section 3004  Hoistway Venting ........... 889
□ Section 3006  Machine Rooms ............ 889
□ Section 3007  Fire Service Access Elevator .... 889
□ Section 3008  Occupant Evacuation Elevators .................. 891
Chapter 31
Special Construction .................. 893
☐ Section 3102  Membrane Structures . .894
☐ Section 3104  Pedestrian Walkways and Tunnels . . .895
☐ Section 3105  Awnings and Canopies . . .896
☐ Section 3106  Marquees . . .896
☐ Section 3109  Swimming Pool Enclosures and Safety Devices . .896
☐ KEY POINTS ........................... 898

Chapter 32
Encroachments in the Public Right-of-Way .................. 899
☐ Section 3201  General . .900
☐ Section 3202  Encroachments . .900

Chapter 33
Safeguards During Construction ........... 905
☐ Section 3302  Construction Safeguards . .906
☐ Section 3303  Demolition . .906
☐ Section 3304  Site Work . .906
☐ Section 3306  Protection of Pedestrians . .908
☐ Section 3307  Protection of Adjoining Property . .910
☐ Section 3308  Temporary Use of Streets, Alleys and Public Property . .911
☐ Section 3309  Fire Extinguishers . .911
☐ Section 3310  Means of Egress . .911
☐ Section 3311  Standpipes . .911
☐ KEY POINTS ........................... 912

Chapter 34
Existing Structures ...................... 913
☐ Section 3404  Alterations . .914
☐ Section 3408  Change of Occupancy . .915

☐ Section 3411  Accessibility for Existing Buildings . . .915
☐ Section 3412  Compliance Alternatives . . .916
☐ KEY POINTS ........................... 917

Chapter 35
Referenced Standards ...................... 919

Appendixes .............................. 921
☐ Appendix A  Employee Qualifications . .922
☐ Appendix B  Board of Appeals . . .922
☐ Appendix C  Group U Agricultural Buildings . . .923
☐ Appendix D  Fire Districts . . .923
☐ Appendix E  Supplementary Accessibility Requirements . . .925
☐ Appendix F  Rodentproofing . . .925
☐ Appendix G  Flood-Resistant Construction . .926
☐ Appendix H  Signs . .926
☐ Appendix I  Patio Covers . .926
☐ Appendix J  Grading . . .927
☐ Appendix K  Administrative Provisions . . .927
☐ Appendix L  Earthquake Recording Instrumentation . . .927
☐ Appendix M  Tsunami-Generated Flood Hazard . . .927

Metric Conversion Table .................... 929
☐ Metric Units, System International (SI) . . .930
☐ Soft Metrication ....................... 930
☐ Hard Metrication ....................... 930

Index ........................................ 937
Foreword

How often have you heard these questions when discussing building codes: “What is the intent of this section?” or, “How do I apply this provision?” This publication offers the code user a resource that addresses much of the intent and application principles of the major provisions of the 2012 International Building Code® (IBC®).

It is impossible for building codes and similar regulatory documents to contain enough information, both prescriptive and explanatory narrative, to remove all doubt as to the intent of the various provisions. If such a document were possible, it would be so voluminous that it would be virtually useless.

Because the IBC must be reasonably brief and concise in its provisions, the user must have knowledge of the intent and background of these provisions to apply their intent appropriately. The IBC places great reliance on the judgment of the building official and design professional for the specific application of its provisions. Where the designer and building official have knowledge of the rationale behind the provisions, the design and enforcement of the code will be based on informed judgment rather than arbitrariness or rote procedure.

The information that this handbook provides, coupled with the design professional’s and building official’s experience and education, will result in better use of the IBC and more uniformity in its application. As lengthy as this document may seem, it still cannot provide all of the answers to questions of code intent, that is why the background, training, and experience of the reader must also be called on to properly apply, interpret, and enforce the code provisions.

The preparation of a document of this nature requires consulting a large number of publications, organizations, and individuals. Even so, the intent of many code provisions is not completely documented. Sometimes the discussion is subjective; therefore, individuals may disagree with the conclusions presented. It is, however, important to note that the explanatory narratives are based on many decades of experience by the authors and the other contributors to the manuscript.
Preface

Internationally, code officials and design professionals recognize the need for a modern, up-to-date building code addressing the design and installation of building systems through requirements emphasizing performance. The *International Building Code*® (IBC®) meets those needs by providing model code regulations that safeguard the public health and safety in all communities, large and small. The *IBC Handbook* is a valuable resource for those who design, plan, review, inspect, or construct buildings or other structures regulated by the 2012 IBC.

The IBC is one of a family of codes published by the International Code Council® (ICC®) that establishes comprehensive minimum regulations for building systems using prescriptive and performance-related provisions. It is founded on broad-based principles that use new materials and new building designs. Additionally, the IBC is compatible with the entire family of *International Codes®* published by the ICC.

There are three major subdivisions to the IBC:

1. The text of the IBC
2. The referenced standards listed in Chapter 35
3. The appendices

The first 34 chapters of the IBC contain both prescriptive and performance provisions that are to be applied. Chapter 35 contains those referenced standards that, although promulgated and published by separate organizations, are considered as a part of the IBC as applicable. The provisions of the appendix do not apply unless specifically included in the adoption ordinance of the jurisdiction enforcing the code.

The 2012 *IBC Handbook* is designed to present commentary only for those portions of the code for which commentary is helpful in furthering the understanding of the provision and its intent. This handbook uses many drawings and figures to help clarify the application and intent of many code provisions.

This handbook examines the intent and application of many code provisions for both the nonstructural- and structural-related aspects of the IBC. It addresses in detail many requirements that are considered as “fire- and life-safety” provisions of the code. Found in IBC Chapters 3 through 10, these provisions focus on the important considerations of occupancy and type of construction classification, allowable building size, fire and smoke protection features, fire protection systems, interior finishes, and means of egress.

The discussion of the structural provisions in this handbook is intended to help code users understand and properly apply the requirements in Chapters 16 through 23 of the 2012 IBC. Although the discussion is useful to a broad range of individuals, the discussion of the structural provisions was written primarily so that building officials, plans reviewers, architects, and engineers can get a general understanding of the IBC’s structural requirements and gain some insight into their underlying basis and intent. To that end, the numerous figures, tables, and examples are intended to illustrate and help clarify the proper application of many structural provisions of the IBC.

As the IBC adopts many national standards by reference rather than transcribing the structural provisions of the standards into the code itself, in some cases the discussion in this handbook pertains to the provisions found in the referenced standard such as
Preface

ASCE 7 and ACI 318 rather than the IBC. The structural provisions addressed focus on the general design requirements related to structural load effects; special inspection and verification, structural testing, and structural observation; foundations and soils; and specific structural materials design requirements for concrete, masonry, steel, and wood.

Questions or comments concerning this handbook are encouraged. Please direct any correspondence to handbook@iccunsafe.org.
Acknowledgments

The publication of this handbook is based on many decades of experience by the authors and other contributors. Since its initial publication, the handbook has become a living document subject to changes and refinements as newer code editions are released. This latest edition reflects extensive modifications based on the requirements found in the 2012 International Building Code.

The initial handbook, on which the nonstructural portions of this document are based, was published in 1988. It was authored by Vincent R. Bush. In developing the discussions of intent, Mr. Bush drew heavily on his 25 years of experience in building safety regulation. Mr. Bush, a structural engineer, was intimately involved in code development work for many years.

In addition to the expertise of Mr. Bush, major contributions were made by John F. Behrens. Mr. Behrens’ qualifications were as impressive as the original author’s. He had vast experience as a building official, code consultant, and seminar instructor. Mr. Behrens provided the original manuscript of the means of egress chapter and assisted in the preparation of many other chapters.

Revisions to the handbook occurred regularly over the years, with content based on the provisions of the International Building Code authored by Doug Thornburg, AIA, C.B.O. Mr. Thornburg, a certified building official and registered architect, has over 32 years of experience in the building regulatory profession. Previously a building inspector, plans reviewer, building code administrator, seminar instructor, and code consultant, he is currently vice-president and technical director/Product Development and Education for the International Code Council (ICC). In his present role, Mr. Thornburg develops and reviews technical publications, reference books, resource materials, and educational programs relating to the International Codes. He continues to present building code seminars nationally and has developed numerous educational texts, including Significant Changes to the IBC, 2012 Edition. Mr. Thornburg was presented with ICC’s inaugural Educator of the Year Award in 2008, recognizing his outstanding contributions in education and training.

The basis of the discussion on the 2012 structural requirements is the 2000 IBC Handbook—Structural Provisions, authored by S. K. Ghosh, Ph.D., and Robert Chittenden, S.E. Both authors have extensive knowledge, expertise, and experience in the development of many of the structural provisions of the IBC. Dr. Ghosh initially authored Chapters 16 and 19, and Mr. Chittenden authored Chapters 17, 18, 20, 21, 22, and 23. John Henry, ICC principal staff engineer, is the author of the current commentary addressing IBC Chapters 16 through 23. Mr. Henry, a registered civil engineer and certified plans examiner, has over 25 years of experience in structural-related aspects of building code safety including responsibilities as a design engineer in private practice, plans check engineer, and code consultant. A member of the Product Development group within the ICC, he provides technical support for the International Building Code and has developed and presented many seminars on the structural provisions of the IBC. Mr. Henry was presented with ICC’s John Nosse Award for Technical Excellence in 2011, recognizing his outstanding contributions and technical expertise.

Special acknowledgement goes to Alan Carr, S.E., ICC senior staff engineer/Codes and Standards, who updated and contributed a significant portion of the discussion in Chapters 16 and 19, and to Sandra Hyde, P.E., ICC staff engineer/Product Development, who updated the discussion in Chapter 18. Such recognition also goes to Scott Stookey,
Acknowledgments

engineering associate for the Austin, Texas, Fire Department, and ICC product Development group member Jay Woodward, senior staff architect, for their contributions to discussions of Chapters 9 and 10, respectively.

The information and opinions expressed in this handbook are those of the present and past authors, as well as the many contributors, and do not necessarily represent the official position of the International Code Council. Additionally, the opinions may not represent the viewpoint of any enforcing agency. Opinions expressed in this handbook are only intended to be a resource in the application of the IBC, and the building official is not obligated to accept such opinions. The building official is the final authority in rendering interpretations of the code.