About the Author

Stephen A. Van Note is managing director of product development for the International Code Council (ICC), where he is responsible for developing technical resource materials in support of the International Codes. He also manages the review and technical editing of staff-written publications as well as those written by external authors. In addition, Van Note develops and presents *International Residential Code* seminars nationally. Prior to joining ICC in 2006, Van Note was a building official for Linn County, Iowa. He has 15 years of experience in code administration and enforcement, and more than 20 years of experience in the construction field, including project planning and management for residential, commercial, and industrial buildings. A certified building official and plans examiner, Van Note also holds certifications in several inspection categories.
Contents

List of Figures vii
List of Tables xi
Acknowledgments xix
Introduction 1
1 Structural Design Criteria 5
2 Fire Safety 15
3 Safe and Healthy Living Environments 37
4 Foundations 67
5 Floors 83
6 Wall Construction 109
7 Wall Covering 157
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Roof Framing</td>
<td>181</td>
</tr>
<tr>
<td>9</td>
<td>Roof Finishing</td>
<td>199</td>
</tr>
<tr>
<td>10</td>
<td>Chimneys and Fireplaces</td>
<td>205</td>
</tr>
<tr>
<td>11</td>
<td>Energy Efficiency</td>
<td>213</td>
</tr>
<tr>
<td>12</td>
<td>Mechanical Systems</td>
<td>225</td>
</tr>
<tr>
<td>13</td>
<td>Fuel Gas</td>
<td>239</td>
</tr>
<tr>
<td>14</td>
<td>Plumbing</td>
<td>261</td>
</tr>
<tr>
<td>15</td>
<td>Electrical Systems</td>
<td>293</td>
</tr>
<tr>
<td></td>
<td>Epilogue</td>
<td>329</td>
</tr>
<tr>
<td></td>
<td>Notes</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td>Glossary</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td>Index</td>
<td>345</td>
</tr>
</tbody>
</table>
Figures

Chapter 2. Fire Safety
2.1 Exterior wall location near lot line for dwellings without fire sprinklers 17
2.2 Exterior wall location near lot line for dwellings with fire sprinklers 18
2.3 Fire-resistant-rated separation between dwelling units of duplex 20
2.4 Fire-resistant-rated common wall between townhomes 21
2.5 Garage separation from dwelling (habitable space above garage) 24
2.6 Emergency escape and rescue windows 33
2.7 Window well for emergency escape and rescue opening 34

Chapter 3. Safe and Healthy Living Environments
3.1 Landings at exterior doors 39
3.2 Stair tread and riser detail 42
3.3 Stair and handrail 44
3.4 Handrail shapes 46
3.5 Winder treads 47
3.6 Determining required guard locations 49
3.7 Guard dimensions 50
3.8 Window sill height 52
3.9 Minimum bathroom fixture clearances 58
3.10 Safety glazing 60
3.11 Glazing adjacent to stairs and bottom landing of a stairway 61

Chapter 4. Foundations
4.1 Concrete foundation detail 74
4.2 Foundation drain 79

Chapter 5. Floors
5.1 Cutting, notching, and drilling 95
5.2 Placement of lag screws and bolts in ledgers 100
5.3 Deck ledger connection to structure 101
5.4 Deck post to deck beam connection 107

Chapter 6. Wall Construction
6.1 Notching and bored hole limitations for exterior walls and bearing walls 121
6.2 Notching and bored hole limitations for interior nonbearing walls 122
6.3 Top plate framing to accommodate piping 123
6.4 Method PFH: portal frame with hold-downs 143
6.5 Method PFG: portal frame at garage door openings in seismic design categories A, B, and C 145
6.6 Method CS-PF: continuously sheathed portal frame panel construction 147
6.7 Simple bracing 150

Chapter 7. Wall Covering
7.1a Masonry veneer details at foundation and sill 178
7.1b Masonry veneer details at soffit and lintel 179

Chapter 8. Roof Framing
8.1 Cutting, notching, and drilling 192

Chapter 10. Chimneys and Fireplaces
10.1 Chimney height above roof 209
10.2 Chimney cricket 212

Chapter 13. Fuel Gas
13.1 All combustion air from indoors 243
13.2 All combustion air from outdoors 245
13.3 All combustion air from outdoors through one opening 246
13.4 Gas vent termination locations
(for listed caps 12 in. or smaller,
at least 8 ft. from a vertical wall) 255

Chapter 14. Plumbing
14.1 Protection of piping against physical
damage 264
14.2 Air gap 267
14.3 Trap arm length to vent 279
14.4 Island venting 283
14.5 Air admittance valve 284
14.6 Dishwasher drain 288
14.7 Water heater elevation in garage 291

Chapter 15. Electrical Systems
15.1 Service working space and clearances 295
15.2 Receptacle outlet locations 318
15.3 Kitchen counter receptacle outlet
locations 319
15.4 Luminaires in clothes closets 328
Tables

Chapter 1. Structural Design Criteria
1.1 Minimum uniformly distributed live loads 7
1.2 Allowable deflection of structural members 8
1.3 Building material weights 10
1.4 Average weights of building components 11

Chapter 2. Fire Protection
2.1 Minimum net clear width/height combinations for 5.7 sq. ft. emergency escape and rescue openings (in.) 32

Chapter 4. Foundations
4.1 Presumptive load-bearing values and properties of soils 69
4.2 Minimum specified compressive strength of concrete 71
4.3 Minimum width and thickness for concrete footings (in.) 72
Chapter 5. Floors
5.1 Floor joist spans for common lumber species, #2 grade (residential sleeping areas, live load = 30 psf, L/360) 86
5.2 Floor joist spans for common lumber species, #2 grade (residential living areas, live load = 40 psf, L/360) 88
5.3 Cantilever spans for floor joists supporting light-frame exterior bearing wall and roof only 90
5.4 Cantilever spans for floor joists supporting exterior balcony 91
5.5 Deck ledger connection to band joist (deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf) 102
5.6 Deck joist spans for common lumber species (ft.-in.) 104
5.7 Deck beam span lengths (ft.-in.) 105
5.8 Deck post height 108

Chapter 6. Wall Construction
6.1 Fastening schedule 110
6.2 Requirements for wood structural panel wall sheathing used to resist wind pressures 117
6.3 Size, height, and spacing of wood studs 118
6.4 Girder spans and header spans for exterior bearing walls 125
6.5 Girder spans and header spans for interior bearing walls 128
6.6 Bracing methods 134
6.7 Bracing requirements based on wind speed 137
6.8 Minimum length of braced wall panels for continuous sheathing (methods CS-WSP, CS-SFB) 140
6.9 Minimum length of braced wall panels for portal frame methods 141
6.10 Minimum number of bracing units on each side of the circumscribed rectangle 152

Chapter 7. Wall Covering
7.1 Minimum thickness and application of gypsum board 159
7.2 Siding minimum attachment and minimum thickness 164
7.3 Stone or masonry veneer limitations and requirements, wood or steel framing, seismic design categories A, B, and C 173
7.4 Stone or masonry veneer limitations and requirements, one- and two-family detached dwellings, wood framing, seismic design categories D₀, D₁, and D₂ 174
7.5 Allowable spans for lintels supporting masonry veneer 175
Chapter 8. Roof Framing

8.1 Ceiling joist spans for common lumber species, No. 2 grade (uninhabitable attics without storage, live load = 10 psf, L/240) 182

8.2 Ceiling joist spans for common lumber species, No. 2 grade (uninhabitable attics with limited storage, live load = 20 psf, L/240) 183

8.3 Rafter spans for common lumber species, No. 2 grade (roof live load = 20 psf, ceiling not attached to rafters, L/180, dead load = 10 psf) 184

8.4 Rafter spans for common lumber species, No. 2 grade (roof live load = 20 psf, ceiling attached to rafters, L/240, dead load = 10 psf) 185

8.5 Rafter spans for common lumber species, No. 2 grade (ground snow load = 30 psf, ceiling not attached to rafters, L/180, dead load = 10 psf) 186

8.6 Rafter spans for common lumber species, No. 2 grade (ground snow load = 50 psf, ceiling not attached to rafters, L/180, dead load = 10 psf) 187

8.7 Rafter spans for common lumber species, No. 2 grade (ground snow load = 30 psf, ceiling attached to rafters, L/240, dead load = 10 psf) 188
8.8 Rafter spans for common lumber species, No. 2 grade (ground snow load = 50 psf, ceiling attached to rafters, L/240, dead load = 10 psf) 189
8.9 Rafter or truss uplift connection forces from wind (pounds per connection) 194
8.10 Insulation for condensation control above unvented attics 197

Chapter 10. Chimneys and Fireplaces
10.1 Cricket dimensions 211

Chapter 11. Energy Efficiency
11.1 Insulation minimum R-value requirements by component 217
11.2 Fenestration requirements by component 218

Chapter 12. Mechanical Systems
12.1 Dryer exhaust duct fitting equivalent length 232
12.2 Minimum required local exhaust rates 233
12.3 Continuous whole-house mechanical ventilation system airflow rate requirements 235
12.4 Intermittent whole-house mechanical ventilation rate factors 235
Chapter 13. Fuel Gas
13.1 Support of fuel-gas piping 252
13.2 Gas vent termination locations 254

Chapter 14. Plumbing
14.1 Piping support 263
14.2 Minimum air gaps 268
14.3 Fittings for change in direction 271
14.4 Drainage fixture unit (d.f.u.) values for various plumbing fixtures 272
14.5 Maximum fixture units allowed to be connected to branches and stacks 274
14.6 Maximum number of fixture units allowed to be connected to building drain, building drain branches, or building sewer 274
14.7 Maximum distance of fixture trap from vent 278
14.8 Common vent sizes 280
14.9 Wet vent size 280
14.10 Waste stack vent size 282
14.11 Size of traps and trap arms for plumbing fixtures 286

Chapter 15. Electrical Systems
15.1 Minimum service load calculation for single-family dwellings 299
15.2 Service conductor and grounding electrode  
15.3 Branch-circuit requirements  
15.4 Allowable ampacities  
15.5 Conductor proximity adjustment factors  
15.6 Overcurrent protection rating  
15.7 Installation requirements for nonmetallic sheathed cable  
15.8 Minimum cover requirements, burial (in.)