

CONTENTS

Preface to the Sixth Edition	xi
Preface to the First Edition	xv
Introduction	1
1 Structural Uses of Wood	12
1.1 Sources of Wood / 13	
1.2 Tree Growth / 13	
1.3 Density of Wood / 14	
1.4 Defects in Lumber / 15	
1.5 Seasoning of Wood / 16	
1.6 Nominal and Dressed Sizes / 17	
1.7 Use Classification of Structural Lumber / 17	
1.8 Grading of Structural Lumber / 18	
1.9 Fabricated Wood Products / 18	

2	Design Issues and Methods	20
2.1	Design Goals / 20	
2.2	Methods of Investigation and Design / 23	
2.3	Choice of Design Method / 25	
3	Structural Investigation	27
3.1	General Concerns / 27	
3.2	Forces and Loads / 28	
3.3	Direct Stress / 30	
3.4	Kinds of Stress / 31	
3.5	Deformation / 32	
3.6	Elastic Response and Limit / 32	
3.7	Inelastic Behavior and Ultimate Strength / 33	
3.8	Modulus of Elasticity / 33	
3.9	Permissible Values for Design / 35	
4	Design Data and Criteria	36
4.1	General Concerns / 36	
4.2	Reference Design Values for Allowable Stress Design (ASD) / 37	
4.3	Adjustment of Design Values / 41	
4.4	Modification for Loading with Relation to Grain Direction / 45	
4.5	Design Controls for LRFD / 47	
5	Beam Functions	50
5.1	General Considerations / 50	
5.2	Moments / 52	
5.3	Beam Loads and Reaction Forces / 57	
5.4	Beam Shear / 60	
5.5	Bending Moment / 65	
5.6	Tabulated Values for Beam Behavior / 78	
5.7	Multiple-Span Beams / 82	
6	Behavior of Beams	86
6.1	Shear in Beams / 86	
6.2	Bending in Beams / 93	
6.3	Deflection / 97	

6.4	Bearing / 101	
6.5	Buckling of Beams / 103	
6.6	Unsymmetrical Bending / 105	
6.7	Behavior Considerations for LRFD / 109	
7	Design of Beams	117
7.1	Design Procedure / 117	
7.2	Beam Design Examples / 118	
7.3	Joists and Rafters / 121	
7.4	Alternative Spanning Elements / 126	
8	Wood Decks	129
8.1	Board Decks / 129	
8.2	Wood Fiber Decks / 132	
8.3	Plywood Decks / 132	
8.4	Spanning Capability of Decks / 133	
9	Wood Columns	135
9.1	Slenderness Ratio for Columns / 135	
9.2	Compression Capacity of Simple Solid Columns / 136	
9.3	Column Load Capacity, LRFD / 145	
9.4	Round Columns / 147	
9.5	Stud Wall Construction / 148	
9.6	Spaced Columns / 150	
9.7	Built-Up Columns / 154	
9.8	Columns with Bending / 155	
10	Connections for Wood Structures	166
10.1	Bolted Joints / 166	
10.2	Nailed Joints / 176	
10.3	Screws / 179	
10.4	Mechanically Driven Fasteners / 181	
10.5	Shear Developers / 181	
10.6	Split-Ring Connectors / 182	
10.7	Formed Steel Framing Elements / 189	
10.8	Concrete and Masonry Anchors / 192	
10.9	Plywood Gussets / 192	
10.10	Investigation of Connections, LRFD / 194	

11	Trusses	196
11.1	General Considerations / 196	
11.2	Types of Trusses / 199	
11.3	Bracing for Trusses / 199	
11.4	Loads on Trusses / 201	
11.5	Investigation for Internal Forces in Planar Trusses / 203	
11.6	Design Forces for Truss Members / 221	
11.7	Combined Actions in Truss Members / 221	
11.8	Truss Members and Joints / 222	
11.9	Timber Trusses / 223	
11.10	Manufactured Trusses / 224	
12	Miscellaneous Wood Products and Elements	226
12.1	Engineered Wood Products / 226	
12.2	Glued Laminated Structural Members / 227	
12.3	Structural Composite Lumber / 229	
12.4	Wood Structural Panels / 231	
12.5	Plywood / 232	
12.6	Prefabricated Wood I-Joists / 237	
12.7	Built-Up Panel and Lumber Beams / 238	
12.8	Flitched Beams / 239	
12.9	Pole Structures / 244	
13	Wood Structures for Lateral Bracing	246
13.1	Application of Wind and Earthquake Forces / 247	
13.2	Horizontal Diaphragms / 250	
13.3	Vertical Diaphragms (Shear Walls) / 262	
13.4	Investigation and Design of Wood-Framed Shear Walls / 270	
13.5	Trussed Bracing for Wood Frames / 277	
13.6	Special Lateral Bracing / 284	
14	General Considerations for Building Structures	288
14.1	Choice of Building Construction / 288	
14.2	Structural Design Standards / 289	
14.3	Loads for Structural Design / 289	
14.4	Dead Loads / 290	
14.5	Building Code Requirements for Structures / 292	
14.6	Live Loads / 294	

14.7	Lateral Loads (Wind and Earthquake) /	297
14.8	Load Combinations and Factors /	301
14.9	Determination of Design Loads /	302
14.10	Structural Planning /	302
14.11	Building Systems Integration /	303
14.12	Economics /	303
15	Building Design Examples	306
15.1	Building One: Single-Story Light Wood Frame /	307
15.2	Building Two: Multistory Light Wood Frame /	327
15.3	Building Three: Masonry and Timber Structure /	334
15.4	Building Four: Steel and Wood Structure /	351
	Appendix A: Properties of Sections	354
	Appendix B: Study Aids	369
	Appendix C: Answers to Problems	381
	Glossary	387
	References	390
	Index	393