



PLAN REVIEW MANUAL

BASED ON THE 2009 IBC®

Table of Contents

Preface and Acknowledgments	ix
Chapter 1 Introduction	1
Section	
1-1 General	1
1-2 Qualifications of Plans Examiners	1
1-3 Code Development	2
1-4 Evaluation Reports	2
1-5 Existing Buildings	2
1-6 Plans, Specifications and Engineering Data	3
1-7 Land-Use Zoning	4
1-8 Legal Implications	7
1-9 Preparation for Plan Review	14
Chapter 2 Getting Started	15
Section	
2-1 The Process	15
2-2 The Steps	15
Chapter 3 Occupancy Classification — Step 1	19
Section	
3-1 General	19
3-2 (Step 1a) Occupancy Classification	20
3-3 (Step 1b) Potential Incidental Accessory Occupancies	25
3-4 (Step 1c) Accessory, Nonseparated and Separated Occupancies	26
3-5 (Step 1d) Basic Fire Sprinkler/Fire Area Requirements	26
3-6 (Step 1e) Potential Hazardous Materials	26
Chapter 4 Determine Detailed Building Attributes — Step 2 ...	27
Section	
4-1 General	27
4-2 Building Area per Floor (Step 2a)	27
4-3 Grade Plane (Step 2b)	27
4-4 Height of Building in Feet (Step 2c)	29
4-5 Determine Height in Stories (Step 2d)	30
4-6 Basements (Step 2e)	31
4-7 Mezzanines (Step 2f)	32
4-8 Lowest Level of Fire Department Access (Step 2g)	32
4-9 Determine if the Building is Sprinklered (Step 2h)	33
Chapter 5 Construction Types — Step 3	35
Section	
5-1 General	35
5-2 Table 601 Fire Resistance Rating Requirements for Building Elements (Hours)	36

5-3	Table 602 Fire Rating Requirements for Building Elements (Hours)	36
5-4	Type I Construction	36
5-5	Type II Construction	37
5-6	Type III and IV Construction	37
5-7	Type V Construction	39
5-8	Combustible Materials in Type I and II Construction	39
Chapter 6 Determine Location of Building on Site — Step 4		41
Section		
6-1	General	41
6-2	Determine Amount of Open Frontage (Step 4a)	41
6-3	Determine Fire Resistance of Exterior Walls (Step 4b)	44
6-4	Determine Allowable Area of Exterior Wall Openings (Step 4c)	45
6-5	Determine Location of Assumed Imaginary Lines (Step 4d)	47
6-6	Projections from Exterior Walls (Step 4e)	47
Chapter 7 Allowable Area — Step 5		49
Section		
7-1	General	49
7-2	Calculate Height Increase in Stories (Step 5a)	50
7-3	Calculate Height of Building in Feet (Step 5b)	52
7-4	Calculate Allowable Area Increases (Step 5c)	54
7-5	Determine Allowable Area for Multistory Buildings (Step 6)	61
Chapter 8 Mixed Occupancy Applications		63
Section		
8-1	General (Step 7)	63
8-2	Incidental Accessory Occupancies	63
8-3	Mixed Occupancies	65
8-4	Accessory Occupancies	65
8-5	Nonseparated Occupancies	65
8-6	Separated Occupancies	65
8-7	Mixed Area Ratio	66
8-8	Summary	67
8-9	Compare Actual Conditions against Maximum Allowable (Steps 8a and b)	68
Chapter 9 Review Special Occupancy Provisions — Step 9		69
Section		
9-1	General	69
9-2	Atriums	69
9-3	Motor-Vehicle-Related Occupancies	70
9-4	High-Rise Buildings	71

Chapter 10 Means of Egress — Step 10 75

Section

10-1	General	75
10-2	Means of Egress	75
10-3	Occupant Load	77
10-4	Egress Width	78
10-5	Number of Exits and Separation	80
10-6	Exit Access Travel Distance and Common Path of Travel	81
10-7	Egress Illumination	81
10-8	Exit Signs	82
10-9	Vertical Exit Enclosures	83
10-10	Corridors	83
10-11	Stairways	84
10-12	Doors	84
10-13	Other Means of Egress Elements	84

Chapter 11 Determine Accessibility Requirements — Step 11 . . . 87

Section

11-1	History	87
11-2	General	88
11-3	Accessible Route	89
11-4	Accessible Entrances	90
11-5	Accessible Parking	90
11-6	Passenger Loading Zones	91
11-7	Sleeping Unit and Dwelling Unit Requirements	91
11-8	Special Occupancy Requirements	93
11-9	Other Features	95

Chapter 12 Determine Fire Resistance Ratings of Assemblies — Step 12 99

Section

12-1	General	99
12-2	Exterior Walls	99
12-3	Vertical Separation of Openings in Exterior Walls	99
12-4	Vertical Exposure of Openings in Exterior Walls	99
12-5	Voids at Exterior Walls	101
12-6	Parapets	101
12-7	Opening Protection	101
12-8	Fire Walls	102
12-9	Fire Barriers	102
12-10	Shaft Enclosures	103
12-11	Fire Partitions	103
12-12	Horizontal Assemblies	103
12-13	Other Concerns	104

Chapter 13 Fire Protection Requirements — Step 13	105
Section	
13-1 Type of Sprinkler Systems	105
13-2 Automatic Sprinkler Systems	105
13-3 Standpipe Systems.	107
13-4 Fire Alarm Requirements	108
Chapter 14 Determine Interior Finish Requirements — Step 14. .	109
Section	
14-1 General	109
Chapter 15 Interior Environment — Step 15.	113
Section	
15-1 General	113
15-2 Ventilation	113
15-3 Temperature Control	113
15-4 Lighting	114
15-5 Sound Transmission	114
15-6 Interior Space Requirements.	114
15-7 Surrounding Materials.	114
Chapter 16 Other Detailed Code Provisions — Step 16	115
Section	
16-1 General	115
16-2 Elevator Cabs and Hoistways	115
16-3 Roof Coverings and Rooftop Structures	117
16-4 Glass and Glazing	120
Chapter 17 Structural Plan Review — Step 17.	123
Chapter 18 Structural Considerations—	
Forces, Units, Statics and Equilibrium	135
Section	
18-1 Basic Concepts	135
18-2 Static Forces	139
18-3 Stress Versus Force	140
18-4 Balanced Forces	141
Chapter 19 Direction of Forces — Force Equilibrium	143
Section	
19-1 Balanced Forces	143
19-2 Vectors.	143
19-3 Equilibrium — Translation	147
19-4 Rotation	148
Chapter 20 – Force Systems	153
Section	
20-1 Determinant Versus Indeterminant Systems	153
20-2 Symbols.	153
20-3 Types of Force Systems.	155
20-4 Truss Analysis.	157

20-5	Joint Solution	159
20-6	Graphic Solution	159
Chapter 21 Internal Stresses		163
Section		
21-1	Types of Stresses	163
21-2	Tension and Compression	163
21-3	Flexural Bending Stress	164
21-4	Shear Stress	166
21-5	Shear and Moment Diagrams	168
21-6	Stress-Strain Diagrams	173
Chapter 22 Conventional Wood Construction		175
Section		
22-1	General	175
22-2	Framing	177
22-3	Assigning Stress Values	177
22-4	Commercial Lumber Grades	179
22-5	Use of Span Tables	179
22-6	Other Construction Requirements	186
22-7	Wall Construction	190
22-8	Conventional Foundation System	195
Unit Conversion Tables		200



Preface

This edition of the *Plan Review Manual* intends to provide a step-by-step process for the review of plans under the 2009 edition of the *International Building Code*[®] (IBC[®]). The *Plan Review Manual* is not a substitute for the IBC; rather, it should be used in conjunction with the code. Its primary intent is to provide a better understanding of code requirements so as to apply those requirements in plans preparation or plans examination.

True performance codes will permit an infinite variety of designs—each of which can be made to comply with code requirements. This inherent liberty complicates the ability to provide text examples of all possible design options. Consequently, those that are provided in the manual are subjective and may not have general application. This means that in actual practice the examples in this manual should not be relied on for clarification unless the conditions are identical.

Plan review is generally separated into two categories: nonstructural and structural. The nonstructural portion includes such items as fire-resistance-rated construction, maximum sizes of buildings for particular occupancies, means of egress considerations and automatic sprinkler systems. It also provides basic insight into some of the engineering considerations. This text does not intend to be an engineering text. Those interested in a detailed study of a particular engineering subject should consult supplemental material on the subject.

Acknowledgments

The original *Plan Review Manual* has been revised over the years by qualified professionals to reflect the most current building code provisions. The nonstructural portions of this edition were developed by Carroll Lee Pruitt, FAIA, NCARB, with assistance from William Rakatansky, AIA, CSI, NCARB, LEED AP. Mr. Pruitt is President/CEO of Pruitt Consulting, Inc., Keller, Texas. Mr. Pruitt holds numerous ICC certifications and is a registered architect in Texas, Louisiana and Florida. William Rakatansky is a registered architect in North Carolina, Ohio, Indiana and Kentucky, and works as an in-house code consultant for Freeman White, Inc. in Charlotte, North Carolina. The structural portions of this manual were developed by ICC Principal Staff Engineer John Henry, P.E.