Code Mapping for Designers

Code Reference: 2009 IBC

Revised: Draft 10.23.13

*The nature of a **design solution** is related to how a problem is interpreted, defined and articulated.*

The Design Process requires the collection of as much critical and relevant data and information as possible concerning any particular design problem and from this information you can begin to formulate your intentions and ideas. The more information and knowledge you have gathered of the design issues and parameters, the greater the potential for a fluid, efficient and realizable project.

Code Mapping for Designers, is intended to help guide you through the complex and confusing IBC. This mapping is from a designer's point of view and will help you account for and integrate applicable regulations in a timely fluid manner which is directly related to the design process. The mapping organizes the basic required codes into an accessible list with section references that will support and strengthen your designs.

Knowledge of the applicable codes will affect your early intentions, ideas, concepts and design decisions. It is imperative for you to integrate these basic regulations into your design thinking strategies so that your creativity is grounded in the applicable regulations and requirements, which will then allow your creativity to flourish without major design flaws showing themselves later in the design process, causing you to make major design adjustments or possibly worse.

Account for regulations

Interpret application

Accommodate within schematic

Integrate into design

"Codes act as boundaries for design options that can be considered. Therefore, full awareness of all codes is a crucial foundational element to solid design decisions for any client."
Botti-Salitsky, pg. 124, Programming and Research

Your design is required to respond to, integrate and fulfill all applicable codes and regulations governing the project. The regulations are absolutes unless you can prove them otherwise. They have been developed by experts in the field through research and evidence and are there to protect the public's life safety, health and welfare. We need to think of these regulations as working for us and not against our creativity. To adjust our thinking that they are there to serve our creative thinking, just like gravity, heat, wind, rain, etc.

*Think of these regulations as a process of **assembling, layering, interlocking** and **penetrating**.*

The more experience and knowledge you have of the regulations will allow you to save time and money.

Mapping Process:

- Determine **Occupancy/s Classifications**: Section 302
  Mix Use and Occupancy: Section 508
- Select **Occupant Load Factors**: Table 1004.1.1
  Floor Area /load factor = Quantity of Occupants
  Quantity of Occupants = See Means of Egress Requirements: Chapter 10
- Determine **'Occupancy Separation'** requirements: Table 508.4 = Fire Assembly Req.
  Separation of Accessory Occupancies (Max. 10% of story floor area): Section 508.2.4

- Determine **Allowable Height & Building Area** based on Type of Construction : Table 503
  (Based on Occupancy Type + Type of Construction)
  (A) Protected (rated) structure = more area + more ht.
  (B) Unprotected (nonrated) structure = less area & less ht.
  (Allowable Increases = sprinklers and/or street frontage: Section 506)

- Determine **Type of Construction**: Section 602, see diagram fig 3-3.
  (A) Protected, (B) Unprotected
  Type I & II: Most restrictive
  1. Exterior & Interior walls: mostly steel & concrete = non combustible,
  2. Difference is hourly rating of structure.

  Type III: Mix of combustible & non combustible material.
  1. Exterior structural walls = masonry, concrete and/or steel
  2. Interior structural walls , floors & roof = wood

  Type IV: Heavy Timber: Table 602.4
  1. Exterior structural walls = masonry, concrete and/or steel
  2. Floors & roof = heavy timbers

  (Char created from a fire results in a natural fire resistance to the structure).

  Type V: Most combustible - Basically all Wood Structure

- **Fire-Resistant Assemblies (1 to 4 hours)**: See Chapter 7; Table 720.1(1)
  1. Combustible Material in Type I & II Construction: Section 603
  2. Gypsum Fire Resistance Design Manual = Approved Fire & Sound Assemblies
  3. UL listed Fire Resistance Directory: Rated Assemblies

- Determine **Building (framing) Elements** Fire-Resistance Rating (hours) Requirements: Table 601

- Determine **Exterior Walls** Fire-Resistance Rating (hours) Requirements based on Fire Separation Distance: Table 602
    1. Determine Allowable **Projections** from Exterior Walls: Section 705.2
    2. Determine Allowable **Encroachments** into the Public Right-of-Way: Section 3202
    3. Determine if **Fire Walls** are required: Section 706, Table 706.4

- Determine Maximum Area of Exterior **Wall Openings** based on Fire Separation Distance and Degree of Opening Protection: Table 705.8
    1. **Emergency Escape & Rescue**: Section 1029.1
    2. **Ventilation**: Section 1203.4, 1206.1
    3. **Safety Glazing**: Section 2406

- Opening Protectives: Section 715
    1. **Fire Door** and Fire Shutter Fire Protection Ratings: Table 715.4, 7.15.5.4
    2. **Fire Window** Assembly Fire Protection Ratings: Table 715.5

Determine the Means of Egress Requirements: Chapter 10 - This chapter controls the design, construction and arrangement of the *means of egress components* required to provide an *approved means of egress* from the structures and portions thereof.

- Determine **Means of Egress Components** Requirements: Section 1002-Definitions **Exit Access** Section 1012 (corridors, aisles, intervening rooms) - **Exits** Section 1020 (exit doors, area of refuge exit stairs, horizontal exit, exit passageways) -**Exit Discharge** - **Public Way**: See Fig. 4.1
    1. Determine **Corridor Fire-Resistance Rating**: Table 1018.1
    2. Determine **Minimum Height** of Egress components: Section 1003
    3. Determine **Intervening Rooms** requirements: Section1014.2
    4. Determine **Area of Refuge** requirements: Section 1007.9, 2010 ADA Standard
    5. Determine **Exit Enclosures** Requirements: Section 1022
    6. Determine **Horizontal Exit** requirements: Section 405, 1025
    7. Determine **Exit Passageway** requirements: Section 1023
    8. Determine **Exit Discharge** requirements: Section 1027

- Determine **Quantity of required Exits**: Section 1021,
    1. Min. Number of Exits for Occupant Load: Table 1021.1, Table 1004.1.1
    2. Stories with One Exit: Tables 1021.2
    3. Spaces with One Exit or Exit Access Doorway: Table 1015.1

- Determine **Exit Access Travel Distance**: Section 1016
    1. Arrangement of Exits: (1/2 to 1/3 diagonal) distance between: Section 1015.2.1
    2. Exit Access Travel Distance: Table 1016.1

3. Maximum length (20'-50') of Dead end corridor: Section 1018.4

- Determine **Minimum Egress Width** of Corridors: Section 1005, Section 1018.2, Table 1018.1
- Determine **Aisles** requirements: Section 1017

- Determine **Accessible Path of Travel**: Section 1007, 1104, 2010 ADA Standard Chpt. 4
    1. Common (Accessible) Path of Egress Travel: Section 1002.1, 1014.3
        1. Determine **Door requirements**: Section 1008, Table 715.4, 2010 ADA Section 404
        2. Determine **Door Clearance** requirements: 2010 ADA Standard Section 404

    2. Determine **Stairway** requirements: Section 1007.3, Section 1009, 2010 ADA Standard Section 504
        1. Determine if **Rated Enclosures** are required: Section 708, 1022
        2. Determine **Handrail & Guardrail** requirements: Section 1012,1013, 2010 ADA Standard Section 505

    3. Determine if **Ramp** is required: Section 1010, 2010 ADA Section 405
    4. Determine if **Elevator** is required: 2010 ADA Standards Section 36.404, Section 407

- Determine Minimum **Interior Space** Dimensions: Section 1208
    1. Determine Accessibility requirements: 2010 ADA Standard
        1. Chpt. 3: Building Blocks
        2. Chpt. 8: Special Rooms, Spaces, and Elements
        3. Chpt. 9: Built-In Elements

- Determine Minimum **Plumbing Fixture** Quantity: Table 2902.1
    1. Determine Accessibility Clearance requirements: 2010 ADA Standard Chpt. 6

Fire-Resistant Assemblies, Materials & Finishes: Depending on Occupancy & Type of Construction: (exits, exit access, corridors, other rooms or spaces)

1. Determine if **Fire Walls** are required: Section 706, Table 705.4
2. Determine if **Fire Barriers** are required: Section 707, Table 707.3.9
3. Determine if **Fire Partitions** are required: Section 709
4. Determine if **Smoke Barriers** are required: Section 710
5. Determine if **Smoke Partitions** are required: Section 711
6. Determine **Shaft** Protection Rating: Section 708.4
7. Determine **Corridor Rating**: Table 1018.1
8. Determine **Exit and Exit Access Doorways**: Section 1015

- **Fire-Resistant Assemblies: (**1- 4 hour Rating): See Chapter 7; Table 720.1(1)
    1. Combustible Material in Type l & ll Construction: Section 603
    2. Gypsum Fire Resistance Design Manual = Approved Fire & Sound Assemblies
    3. UL listed Fire Resistance Directory: Rated Assemblies

- **Wall & Ceiling Finishes**: Class A, B & C : Chapter 8 Interior Finishes, Section 803, Table 803.9
  Flame Spread:
  Class A = 0-25, smoke developed =0-450
  Class B =26-75, smoke developed =0-450
  Class C = 76-200, smoke developed =0-450

- **Floor Finishes**: Class l & ll: Section 804, 805
  Class l: critical radiant flux, not less than 0.45W/cm^2
  Class ll: critical radiant flux, not more than 0.22W/cm^2, but less than 0.45W/cm^2