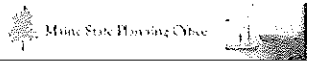



SPO  Maine State Housing Office

Commercial Building Code of Maine



Michael Lessard

Agenda

- o Title 16 Department of Public Safety
- o 635 (new) Bureau of Building Codes and Standards
- o Course time 12 hours
- o Overview of the Commercial Building Code
- o Certification Process
- o Timeline
- o Enforcement
- o Resources for Information
- o Navigating the Code

The New Standard

Title 16 Department of Public Safety
635 (new) Bureau of Building Codes and Standards -
Maine Uniform Building and Energy Code

Chapter 3 Commercial Building Code of Maine

Overview of the International Building Code (IBC)

MUBEC?

- Purpose and Scope
- Authority
- Incorporated by Reference
- Excluded from Adoption
- Codes that Continue in Effect

Commercial Building Code

Establishes Commercial Building code component of the Maine Uniform Building and Energy Code (MUBEC)

The provisions of this chapter are based on a nationally recognized model building code published by the International Code Council, Inc., and is made part of the MUBEC through incorporation by reference.

This chapter also contains requirements for the enforcement of the Commercial Building code by local building officials in municipalities with a population of more than 4,000 residents.

Purpose and Scope

- o All building construction in Maine, with some exceptions, is governed by the MUBEC, which is adopted by the Technical Building Codes and Standards Board pursuant to 10 M.R.S. Chapter 1103.

The primary objective of the Board is to establish a uniform building code throughout the State of Maine.

Purpose and Scope

- Chapter 3 sets forth the standards for the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building or structure, with the exception of detached one- and two-family dwellings and townhouses.

Authority

- The authority for this Chapter is 10 M.R.S. 9722, which provides that the Maine Technical Building Codes and Standards Board shall promulgate rules which adopt, amend, and maintain the Maine Uniform Building and Energy Code.

Adopted Codes and Standards

The Commercial Building Code of Maine has adopted the following:


- International Building Code – 2009 (in part – details to follow)

To download rules that detail the amendments to the code, go to www.maine.gov/dps/bbcs

Incorporation by Reference

The following Chapters of the 2009 International Building Code, published by the International Code Council, Inc., are hereby adopted and incorporated by reference:


- Chapter 1 Administration
- Chapter 2 Definitions
- Chapter 3 Use and Occupancy Classifications
- Chapter 4 Special Detailed Requirements Based on Use and Occupancy
- Chapter 5 General Building Height and Areas
- Chapter 6 Types of Construction
- Chapter 7 Fire-Resistance-Rated Construction
- Chapter 8 Interior Finishes
- Chapter 9 Fire Protection Systems
- Chapter 10 Means of Egress



Incorporation by Reference

The following Chapters of the 2009 International Building Code, published by the International Code Council, Inc., are hereby adopted and incorporated by reference:


- Chapter 12 Interior Environment
- Chapter 13 Energy Efficiency
- Chapter 14 Exterior Walls
- Chapter 15 Roof Assemblies and Rooftop Structures
- Chapter 16 Structural Design
- Chapter 17 Structural Tests and Special Inspections
- Chapter 18 Soils and Foundations
- Chapter 19 Concrete
- Chapter 20 Aluminum
- Chapter 21 Masonry



Incorporation by Reference


The following Chapters of the 2009 International Building Code, published by the International Code Council, Inc., are hereby adopted and incorporated by reference:

- Chapter 22 Steel
- Chapter 23 Wood
- Chapter 24 Glass and Glazing
- Chapter 25 Gypsum Board and Plaster
- Chapter 26 Plastic
- Chapter 27 Electrical
- Chapter 31 Special Construction
- Chapter 32 Encroachments into the Public Right of Way
- Chapter 33 Safeguards During Construction
- Chapter 34 Existing Structures
- Chapter 35 Referenced Standards



Excluded from Adoption

- Chapter 11 Accessibility
- Chapter 28 Mechanical Systems
- Chapter 29 Plumbing Systems
- Chapter 30 Elevators and Conveying Systems
- Appendix A - K



Alternative Approaches

The International Existing Building Code (IEBC) provides alternative approaches to remodeling, repair, and/or alteration of existing commercial buildings

in lieu of complying with the IBC requirements.

Alternative Approaches

Any outside training that you receive on the IEBC will be recognized by the SPO for recertification credit in the IBC.

Certification Standards

Certification Standards

For Building Officials and Third Party Inspectors

The training and certification committee of the Technical Building Codes and Standards Board shall determine the standards for certifying building officials and third-party inspectors.

Standards shall enumerate the knowledge and training required to ensure that building officials and third-party inspectors have the basic understanding needed to apply the MUBEC and the ongoing education needed to stay current with code changes and amendments.

Certification Standards

There are six new standards in which building officials may be certified.

- o International Residential Code (IRC)
- o International Building Code (IBC)
- o Residential Energy Code (IECC)
- o Commercial Energy Code (IECC)
- o Residential Ventilation Code
- o Commercial Ventilation Code

o Radon - Registration now required

Advisory Rulings and Technical Support

The interpretation and enforcement of this Code are the responsibility of the local municipality.

However, the Bureau is available to provide advisory rulings and technical support for the administration of this Code, amendments, conflict resolutions, and interpretations. This support includes but is not limited to:

Advisory Rulings and Technical Support

Written Request

Upon written request of any interested person or entity, the Bureau may provide a nonbinding advisory interpretation with respect to the applicability of any statute, rule or code administered by the Bureau, on that person or entity, or the property of that person or entity, or actual state of facts.

The written request shall be made on the official Bureau form and shall include the following information:

Written Request Shall Include:

- o Specific identification of the subject code or codes with a description of the questioned application or perceived conflict.
- o Relevant construction documents to fully illustrate the issue upon which an advisory interpretation is sought.
- o The Bureau may request additional documentation or information required to issue an advisory interpretation or to provide technical support. All requested information shall be provided within 30 days of request, or the request for advisory interpretation or support may be deemed abandoned.

Advisory Rulings and Technical Support

The technical support shall also include:

Written, non binding advisory interpretation

Other Considerations

- o Procedure for code amendment
- o Procedures for identifying and resolving conflicts between this Code and the Fire Safety Codes and standards.
- o Experimental buildings
- o Native lumber

MUBEC does not apply to

- o Log homes or manufactured homes defined in Chapter 951.
- o Post and beam or timber frame construction.
- o Warehouses or silos used to store crops.
- o Seasonally restricted cottages.


Timeline

Timeline

On December 1, 2010, this code shall be applicable statewide.

No later than December 1, 2010, this Code must be enforced in a municipality with a population of 4,000 residents or more that had previously adopted any building code on or before August 1, 2008.

Timeline



No later than July 1, 2012, this Code must be enforced in a municipality with a population of 4,000 residents or more that had not adopted any building code on or before August 1, 2008.

Timeline

The provisions of the MUBEC do not apply to municipalities with a population of less than 4,000 residents, except to the extent that the municipality has adopted that code.

MUBEC Components

Maine Uniform Building Code – That portion of the MUBEC that does not contain energy code requirements as determined by the board pursuant to section 9722, subsection 6, paragraph L.

Maine Uniform Energy Code – That portion of the MUBEC that contains only energy code requirements as determined by the board pursuant to section 9722, subsection 6, paragraph L.

Municipalities Under 4,000

Effective September 2011, all towns under 4,000 in population have the following options:

1. Chose to adopt and enforce the MUBEC.
2. Choose to adopt and enforce MUBC only.
3. Choose to adopt and enforce MUEC only.
4. Choose to have no code.

Timeline

Effective December 1, 2010, except as provided in 10 M.R.S. 9724(4) and 9725, any ordinance regarding any building code of any political subdivision of the State that is inconsistent with the MUBEC is void, with the following exception:

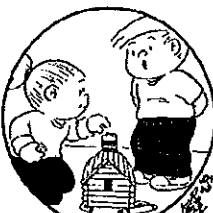
This provision does not apply to any adopted fire & life safety code, fire safety ordinance or any land use ordinance, including Land Use Regulatory Commission rules.

Enforcement

Enforcement

Pursuant to 26 M.R.S. 2373, in municipalities with a population over 4,000, enforcement of the provisions of the MUBEC shall be the responsibility of the municipality and shall be accomplished by one or more of the following means:

Enforcement



Building Officials

Inspections performed by building officials certified pursuant to 30-A M.R.S. 4451.

"The building code doesn't allow a Lego chimney on a Lincoln Log cabin."

Enforcement

Inspections by Virtue of Inter-local Agreements

Inspections performed by virtue of inter-local agreements with other municipalities, that share the use of building officials, certified in building standards pursuant to 30-A M.R.S. 4451.

Enforcement

Contractual Agreements

Inspections performed by virtue of contractual agreements with one or more municipalities, or county or regional authorities, that share the use of building officials certified in building standards pursuant to 10 M.R.S. 9723.

Enforcement

Third Party Inspection by Report

Inspections performed and verified by reports from a TPI, certified pursuant to 10 M.R.S. 9723.

Enforcement

If the municipality does not elect one or more of the four options listed above, then the applicant shall elect to have an inspection performed by a TPI at their own cost.

Required Inspections

110.2 Preliminary Inspection (prior to issuance of permit)
 110.3 Required Inspections

- 110.3.1 Footing and Foundations
- 110.3.2 Concrete Slab and Under Floor
- 110.3.3 Lowest Floor Elevation
- 110.3.4 Frame
- 110.3.5 Lath and Gypsum Board
- 110.3.6 Fire and Smoke Resistant Penetrations
- 110.3.7 Energy Efficiency
- 110.3.8 Other Inspections
- 110.3.9 Special Inspections
(Section 1704 Structural and Special Inspections)
- 110.3.10 Final Inspection

Required Inspections

110.4 Inspection Agencies

The building official is authorized to accept reports of approved agencies, provided such agencies satisfy the requirements as to qualifications and reliability.

Required Inspections

1110.5 Inspection Requests

It shall be the duty of the permit holder or their agent to notify the building official that such work is ready for inspection.

It shall be the duty of the person requesting any inspections required by this code to provide access to and means for inspection of such work.

Required Inspections

110.6 Approval Required

Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the building official.

Resources for Information

Resources for Information

International Code Council

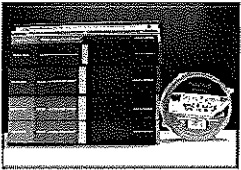
The International Residential Code (IRC), 2009 edition.
500 New Jersey Avenue, NW, 6th Floor
Washington, DC 20001
1-888-ICC-SAFE (422-7233)

www.iccsafe.org

Navigating the Code

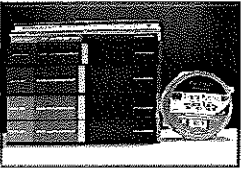
Navigating the Code

The ICC codes and ASHRAE standards contain a substantial amount of information and updates for the new building code program



Navigating the Code

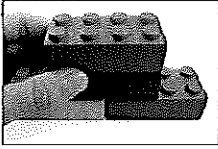
International Building Code



Clearly, we won't be able to teach you all of the IBC today, however...

Navigating the Code

We can break it down into manageable parts, and show you how to find the information that you need.



Quickly!
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Chapters

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The books are broken down into Chapters to discuss major categories of information

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To save lot's of time in the future, you should highlight the chapters that are included in the MUBEC

General Comments

Part - Administrative

Chapter 1: Scope and Administration

Each chapter starts with some general comments about the material that will be covered.

This information can be helpful to when interpreting code or trying to explain details to others.

General Comments

Part - Administrative

Chapter 1: Scope and Administration

The comments also provide a briefing on each section in the chapter.

This gives you a speedy snapshot of what is covered in each section.

General Comments

Part - Administrative

Chapter 1: Scope and Administration

Finally, a purpose statement is provided to give specific meaning and importance of the chapter

Sections

Sections are further broken down into sub-sections, according to more specific topics

A screenshot of a code book page showing various sections. Arrows point to specific sections: R308.1, R308.2, R308.2.1, R308.3, and R308.3.1. The text is dense and technical, typical of a building code.

Commentary

The commentary follows many of the code references

A screenshot of a commentary page. A callout box states: "The commentary is advisory only and does not state why the requirement commands the conditions set forth." The main text provides detailed explanations for the code sections.

Commentary

The commentary is advisory only. Only the code is enforceable

A screenshot of a commentary page. A callout box states: "The commentary is advisory only. Only the code is enforceable." The main text provides detailed explanations for the code sections.

Revisions to the IBC

Not all of the text in all sections are adopted by the State of Maine.

A slide titled "Revisions to the IBC" with the text: "Not all of the text in all sections are adopted by the State of Maine."

A screenshot of a code book page with a diagonal banner that reads: "The following changes should be made to the text." The banner is placed over the code text.

Revisions to the IECC

For up to date listings of all changes to the MUBEC, go to

www.maine.gov/dps/bbcs

- FINAL ADOPTION CHAPTER 1 - ADMINISTRATION
- FINAL ADOPTION CHAPTER 2 - TITLED PARTY INSPECTORS
- FINAL ADOPTION CHAPTER 3 - IBC (2009) International Building Code
- FINAL ADOPTION CHAPTER 4 - IECC (2009) International Existing Building Code
- FINAL ADOPTION CHAPTER 5 - IRC (2009) International Residential Code
- FINAL ADOPTION CHAPTER 6 - IECC (2009) International Energy Conservation Code

A slide titled "Revisions to the IECC" with the text: "For up to date listings of all changes to the MUBEC, go to www.maine.gov/dps/bbcs" and a list of final adoption chapters.

Revisions to the IBC

The following additions, insertions, deletions, and other changes are hereby made to the 2009 International Building Code:

Generally all sections
Delete "International Mechanical Code"
Insert "applicable state codes and statues"

Section 101.1
Delete [NAME OF JURISDICTION]; and
Insert "State of Maine" in its place.

Revisions to the IBC

Section 101.4.1
Delete "International Fuel Gas Code and insert "NFPA 54 National Fuel Gas Code: Fire and safety codes and standards adopted pursuant to Title 25, 2452 and 2465" in its place.

Section 101.4.2
Delete Section 101.4.1 "Mechanical" in its entirety, without substitution.

Revisions to the IBC

Section 101.4.3
Delete "International Plumbing Code and insert "Maine State Plumbing Code, adopted pursuant to Title 32, 3404-B" in its place.

Delete "International Private Sewage Disposal Codes", and
Insert "Maine State Plumbing Code, adopted pursuant to Title 32, 3404-B" in its place.

Revisions to the IBC

Section 101.4.4
Delete Section 101.4.4 "Property Maintenance" in it's entirety, without substitution.

Revisions to the IBC

Section 101.4.5
Delete "International Fire Code" and insert NFPA #1: Fire codes and standards adopted pursuant to Title 25, 2452 and 2465" in its place.

Revisions to the IBC

Section 102.6
Delete "International Property Maintenance Code or the International Fire Code"; and insert "NFPA #1; Fire Safety Codes and standards adopted pursuant to Title 25, 2452 and 2465" in its place.

Revisions to the IBC

Section 103
Delete Section R103 "Department of Building Safety" in its entirety, without substitution.

Revisions to the IBC

Sections 104, 105, 106, 107, 108, 110, 111, 112, 115 and 116 and any amendments thereto shall only be applicable:

A. In a municipality with a population of 4,000 or more residents, beginning:

- (1) No later than December 1, 2010, if the municipality had previously adopted any building code on or before August 1, 2008; or
- (2) No later than July 1, 2012, if the municipality had not adopted any building code on or before August 1, 2008.

B. In a municipality with a population of less than 4,000 residents, if the municipality voluntarily elects to enforce the MUBEC.

Revisions to the IBC

Section 105.1
Insert "where required by municipal ordinance" at the end of the paragraph.

Section 105.2
Insert "Structures exempt from permits shall be located in compliance with zoning and floodplain regulations" at the end of the paragraph.

Revisions to the IBC

Section 109
Delete Section R109 "Fees" in its entirety, without substitution.

Revisions to the IBC

Sections R113 and R114
Delete Section R113 "Board of Appeals" and Section R114 "Violations" in their entirety, without substitution.

Revisions to the IBC

Section 308.5.2
Delete Section 308.5.2 and the exceptions thereto, in its entirety, with substitution.

Section 404.6
Delete all language in Section 404.6 and insert "See NFPA 101 8.6.7 (2009 edition)" in its place.

Revisions to the IBC

Section 715.4.8.1.1
 Insert a new Section 715.4.8.1.1 to read: "Every door assembly in a stair enclosure serving more than four (4) stories shall permit re-entry from the enclosure to the interior of the building.

Exception: An automatic release that is actuated with the initiation of the building fire alarm or fire detection system shall be provided to unlock all stair enclosure door assemblies to allow re-entry.

Revisions to the IBC

Section 716.5.3
 Delete "and smoke" in the first sentence.

Section 1004.1.1, Exception
 Delete "Exception: Where approved by the building official, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by calculation, shall be permitted to be used in the determination of the design occupant load."

Revisions to the IBC

Section 1005.1
 Insert: (within the paragraph; after) The means of egress width shall not be less than required by this section. The total width of means of egress in inches(mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.3 inches (7.61 mm) per occupant for stairways.

Exception: Board and Care 0.4; Health Care – Sprinkled 0.3; Health Care Non-sprinkled 0.6.

Revisions to the IBC

Section 1005.1 (continued)
 Delete: "and by 0.2 inches (5.08 mm) per occupant for other egress components"

Insert: The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.2 inches (5.08 mm) per occupant for other egress components.

Exception: Board and Care 0.2; Health Care Sprinkled 0.2; Health Care Non-sprinkled 0.5.

Revisions to the IBC

Section 1008.1.9.8
 Delete "E" from the Group reference in two (2) locations in the first paragraph.

Section 1014.3
 Delete all language in Section 1014.3 and insert "See NFPA 101-2009 Table A7.6" in it's place.

Revisions to the IBC

Section 1015.2.1
 Insert: "and exit discharge"

Where two *exits* or *exit access doorways* are required from any portion of the *exit access*, the *exit doors* or *exit access doorways* and *exit discharge* shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between *exit doors* or *exit access doorways* and *exit discharge*.

Revisions to the IBC

Section 1016, Table 1016.1

1. Delete "E" from the occupancy column as one of the use groups.
2. Insert a new row in the column titled "Single Use"
3. Insert "E" in the Single Use occupancy column
4. Insert "150" in the without sprinkler system (feet) column
5. Insert "200" in the sprinkling system (feet) column

Revisions to the IBC

Section 1016, Table 1016.1 (continued)

1. Delete "S-1 and S-2" from the occupancy column
2. Insert "S-1 and S-2" in the occupancy column as a new row
3. Insert "See NFPA 101-2009 Table A7.6"

Tables and Figures

Table 307.1(2)
RELATIONS BETWEEN
FUELS AND FIRE ENDURANCE

Table 307.1(2)
RELATIONS BETWEEN
FUELS AND FIRE ENDURANCE

There are many tables and figures, conveniently numbered by the sub-sections that they apply to

Some tables contain numerous notes and conditions which must be considered to arrive at an accurate determination of the data

←

Be careful and sure to apply all notes and conditions as required!

Using Tables and Figures

Let's take a look at Table 307.1(2)

- o The (2) indicates that the table is the second table in the 307.1 sub-section.

1. What is the maximum allowable quantity in gallons of highly toxic material that may be in use in the control area before having to classify part (or the entire) building as a high-hazard occupancy?

Using Tables and Figures

Let's take a look at Table 1018.1

1. The owner is proposing a multiunit residential building with the exit served by a corridor. The proposed occupancy is 12. The fire-resistance rating of the corridor is .5 hour?

Is this permissible?

Using Tables and Figures

Let's take a look at Table 1405.3.1

1. Is insulated sheathing with R-value ≥ 3.75 over 2x8 wall permissible in Bar Harbor, Maine?

OK... Got the hang of it?

Let's do an overview of the code

Chapter 1 Overview

Administration

Chapter 1 Administration

In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures are covered.

Chapter 1 Administration

The Building Official charged with the administration and enforcement of building regulations has a great responsibility.

A responsibility that will impact the buildings and citizens long after the Code Official is gone!

Chapter 1 Scope and Administration

The Building Official has the responsibility to establish that the homes in which the citizens of the community reside, and the buildings in which they work are designed and constructed to be structurally stable with adequate means of egress, light and ventilation.

Chapter 1 Scope and Administration

He or she must also assure that the buildings will provide a minimum acceptable level of protection to life and property from fire.

Chapter 1 Scope and Administration

Chapter 1 contains two parts:

- o Part 1 – Scope and Application

Contains all issues related to the scope and intent of the code, as well as the applicability of this code relative to other standards and laws that might also be applicable on a given building project, such as federal or state.

Chapter 1 Scope and Administration

Chapter 1 contains two parts:

- o Part 2 – Administration and Enforcement


Contains all issues related to the duties and powers of the Building Official, the issuance of permits and certificates of occupancy, and other related operational items.

Chapter 1 Scope and Administration

- ~~SECTION 101~~ Title, Scope and References to Other Codes
- ~~SECTION 102~~ Applicability and Existing Structures
- ~~SECTION 103~~ Establishes Department of Building Safety
- ~~SECTION 104~~ Duties and Authority of the Building Official
- ~~SECTION 105~~ Requirements for Permits
- ~~SECTION 106~~ Posting Live Loads Greater Than 50 psf
- ~~SECTION 107~~ Requirements for Construction Documents

Chapter 1 Scope and Administration

- ~~SECTION 108~~ Temporary Structures and Uses
- ~~SECTION 109~~ Fees. *No more fees!*
- ~~SECTION 110~~ Inspection Duties
- ~~SECTION 111~~ Certificates of Occupancy
- ~~SECTION 112~~ Utility Connections
- ~~SECTION 113~~ Board of Appeals
- ~~SECTION 114~~ Violations of the Code



Chapter 1 Scope and Administration

- ~~SECTION 115~~ Stop Work Orders
- ~~SECTION 116~~ Unsafe Structures and Equipment

Quiz

True or False?

The code is in part, intended to preclude innovative ideas and the advancement of technology by prohibiting the use of alternate materials, designs and methods of construction.

Quiz

Work being completed that does not require a permit need not comply with the provisions of the code.

True or False?

Quiz

Every permit issued shall become invalid unless the work on the site authorized by such permit is commenced within ____ days after it's issuance.

Quiz


"The Building Official, upon notification, shall make the inspections set forth in the code."

There are a total of ____ required inspections.

- A. 3
- B. 6
- C. 10

Chapter 1 Scope and Administration

Questions?
Comments?
Discussion?



Chapter 2 Overview

Definitions

Chapter 2 Definitions

There are two distinct methodologies used in the definitions contained in Chapter 2

All terms defined in the code are listed in the chapter.

The actual definitions are located as follows:

Chapter 2 Definitions

The actual definitions are located as follows:

Where a term is used in more than one chapter...
it's definition appears in Chapter 2.

Where a term is unique or primarily pertains to a single chapter...
it's definition appears within that chapter.

Chapter 2 Definitions

Where that occurs, the definition could appear in either the section or the subsection.

The terms listed in Chapter 2 will direct you to the correct Section or Subsection where the definition is found.

Example: Fire Resistance. See Section 702.1.

Chapter 2 Definitions

Also...

Where a word in the text of the code is *(italized)* that word is a defined term in the definitions.

Example:
406.1.5 Automatic garage door openers. Automatic garage door openers, if provided, shall be *(listed)* in accordance with UL325.

Chapter 2 Definitions

Codes, by nature are highly technical documents.

As such, every word, term, and punctuation mark can impact the meaning of the intended result.

Chapter 2 Definitions

This code, with its broad scope of applicability, includes terms that are used in a variety of construction trades.

These terms often have multiple meanings, depending on the context or discipline of the current discussion.

Chapter 2 Definitions

For these reasons, it is critical that we all share a common core of understanding of the terms that define our work.

Quiz

Let's look up the definition of "building".

Any structure used or intended for supporting or sheltering any use or occupancy.


Quiz

The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative is known as the

- A. Code Enforcement Officer
- B. Municipal Inspector
- C. Building Official

Chapter 2 Definitions

Questions? Comments? Discussion?



Chapter 3 Overview

Use and Occupancy Classification

Chapter 3 Use and Occupancy Classification

Chapter 3 provides for the classification of buildings, structures and parts thereof based on the purpose or purposes for which they are used.

Chapter 3 Use and Occupancy Classification

For the most part, it is really about fire safety.

Chapter 3 Use and Occupancy Classification

In early code development, the primary focus was to protect the building from fire.

The train of thought was if the building was protected, so would be the occupants.

Chapter 3 Use and Occupancy Classification

More modern evolutions involve the concept of "equivalent risk".

This concept recognizes that an acceptable level of risk against fire damage can be achieved by limiting the height and area of buildings according to the occupancy and construction types.

Chapter 3 Use and Occupancy Classification

The concept of equivalent risk involves three interdependent considerations:

1. The level of fire hazard associated with the occupancy.
2. The level of fire hazard reduction by limiting floor areas and building heights based on fuel loads.
3. Level of fire resistance provided by the type of construction.

Chapter 3 Use and Occupancy Classification

This can be seen by reviewing Tables 601 and 602.

These indicate fire-resistance ratings of major building assemblies in relation to five classifications for types of construction.

Chapter 3 Use and Occupancy Classification

"These indicate fire-resistance ratings of major building assemblies in relation to five classifications for types of construction."

Type I construction requires the highest fire-resistance rating for structural elements.

Type V construction, which is designated as a combustible type of construction, requires the least amount of fire-resistance-rated structural elements.

Chapter 3 Use and Occupancy Classification

TABLE 503
ALLOWABLE BUILDING HEIGHTS AND AREAS¹
Building height limitations shown in feet above grade plane shall not include values in stories above grade plane
Building area limitations shown in square feet shall be increased by the amount of area allowed for entry

| GROUP | HEIGHT | TYPE I | | | | | | TYPE II | | | | | |
|-------|--------|--------|------|---------|--------|--------|---------|---------|------|---------|--------|--------|---------|
| | | A | | | B | | | A | | | B | | |
| | | HEIGHT | AREA | STORIES | HEIGHT | AREA | STORIES | HEIGHT | AREA | STORIES | HEIGHT | AREA | STORIES |
| A-1 | 5 | 10,000 | 3 | 10,000 | 3 | 10,000 | 3 | 10,000 | 3 | 10,000 | 3 | 10,000 | 3 |
| A-2 | 10 | 10,000 | 4 | 10,000 | 4 | 10,000 | 4 | 10,000 | 4 | 10,000 | 4 | 10,000 | 4 |
| A-3 | 15 | 10,000 | 5 | 10,000 | 5 | 10,000 | 5 | 10,000 | 5 | 10,000 | 5 | 10,000 | 5 |
| B-1 | 20 | 10,000 | 6 | 10,000 | 6 | 10,000 | 6 | 10,000 | 6 | 10,000 | 6 | 10,000 | 6 |
| B-2 | 25 | 10,000 | 7 | 10,000 | 7 | 10,000 | 7 | 10,000 | 7 | 10,000 | 7 | 10,000 | 7 |
| B-3 | 30 | 10,000 | 8 | 10,000 | 8 | 10,000 | 8 | 10,000 | 8 | 10,000 | 8 | 10,000 | 8 |
| C-1 | 35 | 10,000 | 9 | 10,000 | 9 | 10,000 | 9 | 10,000 | 9 | 10,000 | 9 | 10,000 | 9 |
| C-2 | 40 | 10,000 | 10 | 10,000 | 10 | 10,000 | 10 | 10,000 | 10 | 10,000 | 10 | 10,000 | 10 |
| C-3 | 45 | 10,000 | 11 | 10,000 | 11 | 10,000 | 11 | 10,000 | 11 | 10,000 | 11 | 10,000 | 11 |
| D-1 | 50 | 10,000 | 12 | 10,000 | 12 | 10,000 | 12 | 10,000 | 12 | 10,000 | 12 | 10,000 | 12 |
| D-2 | 55 | 10,000 | 13 | 10,000 | 13 | 10,000 | 13 | 10,000 | 13 | 10,000 | 13 | 10,000 | 13 |
| D-3 | 60 | 10,000 | 14 | 10,000 | 14 | 10,000 | 14 | 10,000 | 14 | 10,000 | 14 | 10,000 | 14 |
| E-1 | 65 | 10,000 | 15 | 10,000 | 15 | 10,000 | 15 | 10,000 | 15 | 10,000 | 15 | 10,000 | 15 |
| E-2 | 70 | 10,000 | 16 | 10,000 | 16 | 10,000 | 16 | 10,000 | 16 | 10,000 | 16 | 10,000 | 16 |
| E-3 | 75 | 10,000 | 17 | 10,000 | 17 | 10,000 | 17 | 10,000 | 17 | 10,000 | 17 | 10,000 | 17 |

If we look at Table 503, this relationship between group classification, allowable heights and areas, and types of construction become apparent.

Chapter 3 Use and Occupancy Classification

Save that thought!

More on this later!

Chapter 3 Use and Occupancy Classification

In modern code development, the focus has shifted from protecting the building to protecting life.

Even so, occupancy classification plays a key role in organizing and prescribing appropriate protective measures in buildings.

Chapter 3 Use and Occupancy Classification

As you may have guessed...

The purpose of this chapter is to classify a building, structure or part thereof into a group based on the specific purpose for which it is designed or occupied.

Chapter 3 Use and Occupancy Classification

Take a look at your handout...

| Use and Occupancy Classifications | See code book for details |
|--|---|
| Assembly | See Section 303 Examples |
| Production and viewing of performing arts | Group A-1 Motion picture theater, symphony/concert hall, TV/radio studios with audience, theaters |
| Food and/or drink consumption | Group A-2 Banquet halls, night clubs, restaurants, taverns/bars |
| Worship, recreation or amusement and other uses not class.ified elsewhere in group A | Group A-3 Amusement arcades, art galleries, bowling, community halls, coal rooms, dance halls, exhibition halls, funeral parlors, gymnasiums (without spectator seating), indoor swimming pools, etc. |

Chapter 3 Use and Occupancy Classification

- SECTION 301** Scope
- SECTION 302** Classification / Occupancy Groups
- SECTION 303** Assembly (Gatherings)
- SECTION 304** Business
- SECTION 305** Educational
- SECTION 306** Factory and Industrial
- SECTION 307** High Hazard

Chapter 3 Use and Occupancy Classification

- SECTION 308** Institutional
- SECTION 309** Mercantile
- SECTION 310** Residential
- SECTION 311** Storage
- SECTION 312** Utility and Miscellaneous

Quiz

Under the occupancy classifications, a college would be considered

- A. an Educational Group
- B. an Institutional Group
- C. a Business Group

Quiz

Which of the following is considered to be a moderate hazard in the Factory Group?


- A. A foundry
- B. Metal fabrication
- C. A bakery

Quiz

What is the maximum amount (liquid gallons) of Class III organic peroxide that may be in use in an open production system?

Chapter 3 Use and Occupancy Classification

Questions?
Comments?
Discussion?



Chapter 4 Overview

Special Detailed Requirements Based On Use And Occupancy

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

The provisions of Chapter 4 are supplemental to the remainder of the code.

This chapter contains provisions that may alter the requirements found elsewhere in the code.

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

However, the general requirements of the code still apply unless modified within this chapter.

The provisions of Chapter 4 are supplemental to the remainder of the code.

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

In other words, the provisions in Chapter 4 supersede the requirements of all other Sections.

The provisions of Chapter 4 are supplemental to the remainder of the code.

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

In addition to all of this...

Other fire codes, such as NFPA, may contain provisions applicable to the storage, handling and use of hazardous substances, materials or devices.

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

Those requirements (other codes) must also be complied with when addressing such occupancies in this code that involve flammable and combustible liquids.

The same could hold true for instances involving plumbing codes, mechanical codes, etc. as they may involve

- o piping for hazardous materials or;
- o exhaust ducting for hazardous materials.

Chapter 4 Special Detailed Requirements Based On Use And Occupancy

So the overall purpose of the chapter is to provide one-stop shopping for the provisions of the code that are applicable to special uses and occupancies.

It also serves to identify which groups, uses, and occupancies demand special consideration to protect the building and occupants, and to meet the spirit of the code.

Chapter 4 Special Detailed Requirements Based On Use and Occupancy

- SECTION 401** Scope
- SECTION 402** Covered Mall and Open Mall Buildings
- SECTION 403** High-Rise Buildings
- SECTION 404** Atriums
- SECTION 405** Underground Buildings
- SECTION 406** Motor Vehicle Related Occupancies
- SECTION 407** Group I-2 (Institutional)

Chapter 4 Special Detailed Requirements Based On Use and Occupancy

- SECTION 408** Group I-3 (Correctional Centers)
- SECTION 409** Motion Picture Projection Rooms
- SECTION 410** Stages and Platforms
- SECTION 411** Special Amusement Buildings
- SECTION 412** Aircraft Related Occupancies
- SECTION 413** Combustible Storage
- SECTION 414** Hazardous Materials

Chapter 4 Special Detailed Requirements Based On Use and Occupancy

- SECTION 416** Groups H-1, H-2, H-3, H-4 and H-5 (High Hazard)
- SECTION 416** Application of Flammable Finishes
- SECTION 417** Drying Rooms
- SECTION 418** Organic Coatings
- SECTION 419** Live / Work Units
- SECTION 420** Groups I-1, R-1, R-2, R-3 (Institutional/Residential)
- SECTION 421** Hydrogen Cutoff Rooms

Chapter 4 Special Detailed Requirements Based On Use and Occupancy

- SECTION 422** Ambulatory Health Care Facilities
- SECTION 423** Storm Shelters

Quiz

In determining the required means of egress for a covered mall, the number of occupants for whom means of egress are to be provided shall be based on

- A. number of parking spaces available.
- B. gross leasable area and occupant load.
- C. limitations of flow in the automatic sprinkler system.

Quiz

True or False?

In a high-rise building, the emergency power system must provide power for illumination of exterior fire escape systems.

Quiz

True or False?

When fabricating scenery and other items used as props and stage decorations, any material may be used as the uses of these are only temporary in nature.


Quiz

A residential aircraft hangar shall have a minimum of ____ means of egress.

- A. one
- B. two
- C. three

Chapter 4 Special Detailed Requirements Based On Use and Occupancy

Questions?
Comments?
Discussion?



Chapter 5 Overview
General Building Heights and Areas

Chapter 5 General Building Heights and Areas

The main purpose of Chapter 5 is to regulate the size of structures based on


1. the specific hazards associated with their occupancy and;
2. the materials of which they are constructed.

Chapter 5 General Building Heights and Areas

Chapter 5 also provides for adjustments to the allowable areas and heights, based on the presence of fire protection systems for building occupants and fire service personnel in the event of a fire.

Chapter 5 General Building Heights and Areas

Chapter 5 is one of the most important chapters in the code because many other code requirements depend on the establishment of a minimum required type of construction for a building.



Chapter 5 General Building Heights and Areas

The code review for the design of any building begins with Chapter 5...

...with the determination of the minimum required type of construction based on the use and size of the building.

Chapter 5 General Building Heights and Areas

The code review for the design of any building begins with Chapter 5...

Misapplication of Chapter 5 can result in a multitude of related errors in subsequent code application, since many code requirements depend on the type of construction that is required for the building.

Chapter 5 General Building Heights and Areas

- SECTION 501** Scope
- SECTION 502** Definitions
- SECTION 503** General Building Height and Area Limitations
- SECTION 504** Building Height
- SECTION 505** Mezzanines
- SECTION 506** Building Area Modifications
- SECTION 507** Unlimited Area Buildings

Chapter 5 General Building Heights and Areas

- SECTION 508** Mixed Use and Occupancy
- SECTION 509** Special Provisions

Quiz

A basement is defined as a story that is

- A. at least 50% below the finished grade
- B. does not have a full daylight walk out
- C. is not a story above grade plane

Quiz

The purpose of Section 504 is to provide for increases in allowable building heights

True or False?


Quiz

True or False?

Regardless of where they are located, mezzanines are always allowed to utilize a single means of egress.

Chapter 5 General Building Heights and Areas

Questions?
Comments?
Discussion?



Chapter 6 Overview

Types of Construction

Chapter 6 Types of Construction

Chapter 6 contains the requirements to classify buildings into one of five types of construction.

Chapter 6 Types of Construction

Correct classification of a building by its type of construction is essential.

If a building is placed in an incorrect construction classification (for example, one that is too restrictive), its owner may be penalized by the increased construction costs.

Chapter 6 Types of Construction

On the other hand...

If a building is placed in a classification that is too lenient, it will not be constructed in a manner that accounts for the relative risks associated with its size or function.

Chapter 6 Types of Construction

- o The provisions Chapter 6
- o Chapter 3 and 5, and
- o Tables 601 and 602

All combine to establish the basis for the "Equivalent Risk Theory" on which the entire code is based.

Chapter 6 Types of Construction

The purpose of classifying buildings or structures by their type of construction is to account for the response or participation that a buildings structure will have in a fire.

(i.e., its resistance or contribution to the fire)

Chapter 6 Types of Construction

The code requires every building to be classified as one of five possible types of construction.

1. Type I
2. Type II
3. Type III
4. Type IV
5. Type V

Chapter 6 Types of Construction

1. Type I
2. Type II
3. Type III
4. Type IV
5. Type V

Each type of construction denotes the kinds of materials that are used.

- o Noncombustible steel
- o Concrete
- o Masonry
- o Combustible (wood, plastic, etc.)
- o Heavy timber

Chapter 6 Types of Construction

Also considered are the minimum fire-resistance ratings of the structural elements in the building having that rating.

1. 0 hours
2. 1 hour
3. 1 ½ hours
4. 2 hours
5. 3 hours

Chapter 6 Types of Construction

- ➔ Type I and II construction have building elements that are noncombustible.
- ➔ Type III construction has noncombustible exterior walls and combustible or noncombustible interior elements.
- ➔ Type IV construction has noncombustible exterior walls and heavy timber interior elements.
- ➔ Type V construction has building elements that are combustible.

Chapter 6 Types of Construction

Type I, II, III, and V are further subdivided into two categories:

1. Type I IA and IB
2. Type II IIA and IIB
3. Type III IIIA and IIIB
4. Type IV
5. Type V VA and VB

Chapter 6 Types of Construction

- SECTION 601** Scope
- SECTION 602** Construction Classification
- SECTION 603** Combustible Material in Type I and II Construction

Chapter 5 Types of Construction

- SECTION 601** Scope
- SECTION 602** Construction Classification
- SECTION 603** Combustible Material in Type I and II Construction

To get a better look at the Types and Categories, let's have a look at Table 601.

Table 601

Fire Resistance Rating Requirements for Building Elements

| BUILDING ELEMENT | TYPE I | | TYPE II | | TYPE III | | TYPE IV | | TYPE V | |
|------------------------------|--------|-------|---------|---|----------|---|---------|---|--------|---|
| | A | B | A | B | A | B | A | B | A | B |
| Exterior walls | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Interior walls | 1 | 2 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 0 |
| Roof/ceiling | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Structural steel members | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structural concrete members | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Other non-structural members | 1 1/2 | 1 1/2 | 1 1/2 | 0 | 1 1/2 | 0 | 1 1/2 | 0 | 1 1/2 | 0 |

Table 601 has three components...

1. Top row lists the Types of construction and the categories
2. Left column list the regulated building elements
3. Each cell contains the minimum required fire-resistance rating

Table 601

Fire Resistance Rating Requirements for Building Elements

| BUILDING ELEMENT | TYPE I | | TYPE II | | TYPE III | | TYPE IV | | TYPE V | |
|------------------------------|--------|-------|---------|---|----------|---|---------|---|--------|---|
| | A | B | A | B | A | B | A | B | A | B |
| Exterior walls | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Interior walls | 1 | 2 | 1 | 0 | 2 | 2 | 1 | 1 | 1 | 0 |
| Roof/ceiling | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Structural steel members | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Structural concrete members | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Other non-structural members | 1 1/2 | 1 1/2 | 1 1/2 | 0 | 1 1/2 | 0 | 1 1/2 | 0 | 1 1/2 | 0 |

Category A and B are not defined in the code.

The designations simply refer to the hourly fire-resistance rating required for that building element.

Table 601 Fire Resistance Rating Requirements for Building Elements

| BUILDING ELEMENT | TYPE I | | TYPE II | | TYPE III | | TYPE IV | | TYPE V | |
|---|---------------|-------|---------|-------|----------|-------|---------|-------|--------|-------|
| | A | B | A | B | A | B | A | B | A | B |
| Primary structural frame (See Section 602) | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 |
| Roofing walls Exterior | 1 | 0 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 0 |
| Roofing Exterior | 1 | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 0 |
| Nonbearing walls and partitions Exterior | See Table 602 | | | | | | | | | |
| Nonbearing walls and partitions Interior | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Partitions and secondary enclosures (See Section 602) | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Roof construction and secondary enclosures (See Section 602) | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |

Category A always has a higher fire-resistance rating than Category B.

Table 601 Fire Resistance Rating Requirements for Building Elements

| BUILDING ELEMENT | TYPE I | | TYPE II | | TYPE III | | TYPE IV | | TYPE V | |
|---|---------------|-------|---------|-------|----------|-------|---------|-------|--------|-------|
| | A | B | A | B | A | B | A | B | A | B |
| Primary structural frame (See Section 602) | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 |
| Roofing walls Exterior | 1 | 0 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 0 |
| Roofing Exterior | 1 | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 0 |
| Nonbearing walls and partitions Exterior | See Table 602 | | | | | | | | | |
| Nonbearing walls and partitions Interior | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Partitions and secondary enclosures (See Section 602) | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Roof construction and secondary enclosures (See Section 602) | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |

Sometimes Category A and B are referred to as "Protected" and "Unprotected" construction respectively.

Please note these terms do not refer to whether the building is equipped with automatic sprinklers.

Table 601 Fire Resistance Rating Requirements for Building Elements

| BUILDING ELEMENT | TYPE I | | TYPE II | | TYPE III | | TYPE IV | | TYPE V | |
|---|---------------|-------|---------|-------|----------|-------|---------|-------|--------|-------|
| | A | B | A | B | A | B | A | B | A | B |
| Primary structural frame (See Section 602) | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 |
| Roofing walls Exterior | 1 | 0 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 0 |
| Roofing Exterior | 1 | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 0 |
| Nonbearing walls and partitions Exterior | See Table 602 | | | | | | | | | |
| Nonbearing walls and partitions Interior | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Partitions and secondary enclosures (See Section 602) | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Roof construction and secondary enclosures (See Section 602) | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 | 1 1/2 |

Please note that we have left the notes (a through g) off from these slides simply for clarity.

As with any table or chart, these must be applied to arrive at the correct result.

Let's see how all of this works

The Occupancy Groups detail the uses and functions occurring inside the building, and limits construction based on use.

Let's see how all of this works

So what are these "limits"?

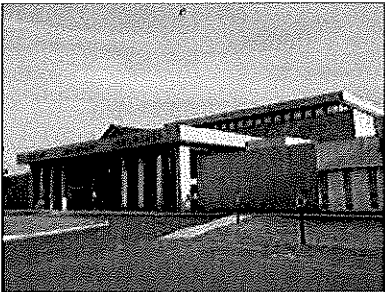
Let's see how all of this works

Again, the Construction Types are:


1. Type I Non combustible high-rise
2. Type II Non combustible low-rise
3. Type III Noncombustible exterior walls and combustible or noncombustible interior elements
4. Type IV Noncombustible exterior walls and heavy timber interior elements
5. Type V Building elements that are combustible

Type I or II Construction

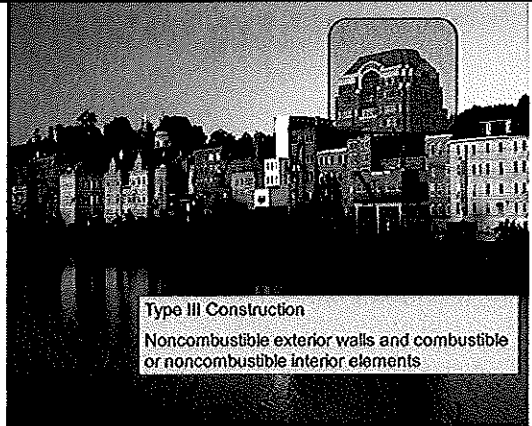
Type II Construction - Noncombustible



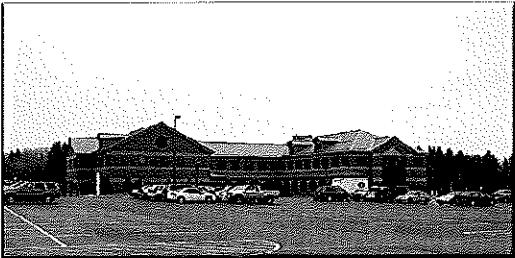
This building similar to Type I except for height



Type II – Noncombustible low-rise

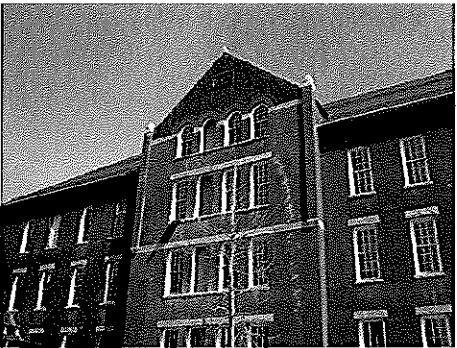


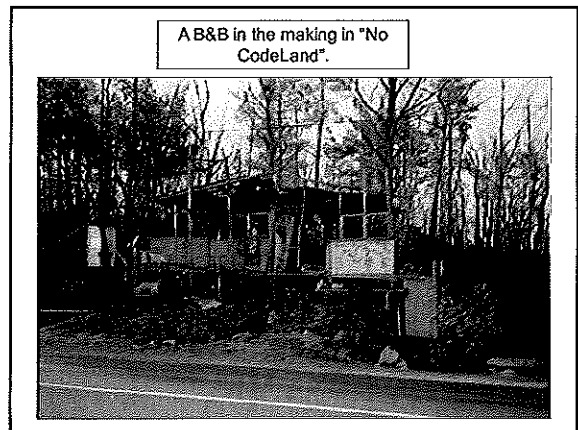
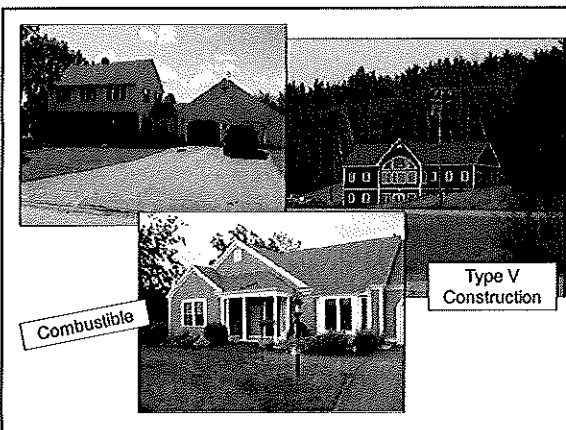
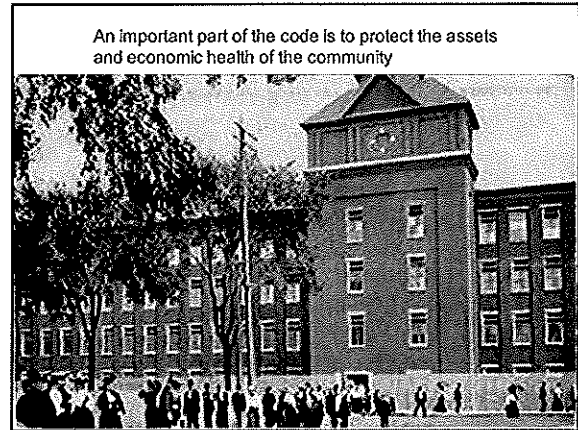
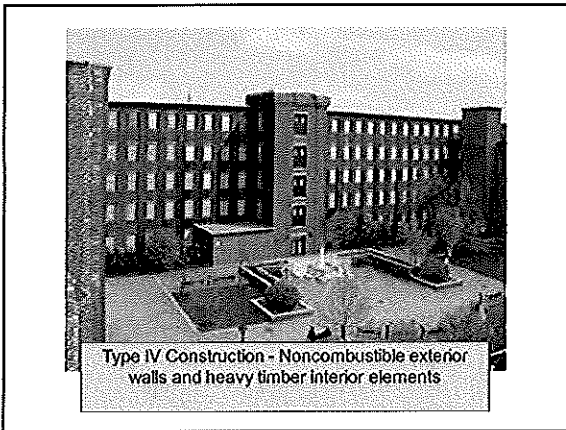
Type III Construction
Noncombustible exterior walls and combustible or noncombustible interior elements



UMA Student Center – Type III Construction
Actually three buildings separated by fire walls

Type IV Construction - Noncombustible exterior walls and heavy timber interior elements





The code sets limits on

- o Use
- o Area
- o Height
- o Construction Type
- o Loads

Loads
(Section 16)

- o GENERAL DESIGN REQUIREMENTS
- o LOAD COMBINATIONS
- o DEAD LOADS
- o LIVE LOADS
- o SNOW LOADS
- o WIND LOADS
- o SOIL LATERAL LOADS
- o RAIN LOADS
- o FLOOD LOADS
- o EARTHQUAKE LOADS
- o STRUCTURAL INTEGRITY

Loads

(Section 16)

Good designers and building officials have the insight to advise clients to plan for future needs and uses.

A good example of this is floor loads. What if a future use would require a higher load capacity than what is proposed in the construction documents?

So what else do we need to consider?

We have talked about building planning, occupancy groups and uses, and limitations to prevent losses from fires within the building.

Fire can attack a building from one of two places...

- o It can originate from inside the building, or
- o It can spread from an adjacent building or other outside source.

Table 602 establishes the minimum fire-resistance rating for all exterior walls, based on separation distance. The required ratings are based on:

- o Fuel load
- o Probable fire intensity of the various occupancy classifications
- o Fire separation distance

Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A*}

| FIRE SEPARATION DISTANCE | TYPE OF CONSTRUCTION | OCCUPANCY GROUP | | |
|--------------------------|----------------------|-----------------|---|---|
| | | A | B | C |
| 0 | II | 2 | 2 | 1 |
| 1 | II, III | 2 | 1 | 1 |
| | IV, V | 2 | 1 | 1 |
| 2 | II, III | 1 | 0 | 0 |
| | IV, V | 1 | 1 | 1 |
| 3 | II | 0 | 0 | 0 |

To use the table, you must first determine first determine Occupancy Classification and Fire Separation Distance.

For Fire Separation Distance, see Figure 602(1) and 602(2).

Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A*}

| FIRE SEPARATION DISTANCE | TYPE OF CONSTRUCTION | OCCUPANCY GROUP | | |
|--------------------------|----------------------|-----------------|---|---|
| | | A | B | C |
| 0 | II | 3 | 2 | 1 |
| 1 | II, III | 2 | 2 | 1 |
| | IV, V | 2 | 1 | 1 |
| 2 | II, III | 1 | 0 | 0 |
| | IV, V | 1 | 1 | 1 |
| 3 | II | 0 | 0 | 0 |

Once determined, the required fire-resistance rating is obtained by referring to the appropriate rows and columns.

Please note the fire-resistance rating requirements of Table 601 (based on construction type) also apply.

Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A,E}

Exterior load bearing walls must comply with the *higher of the two ratings* specified in Tables 601 and 602.

Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A,E}

Where there are two buildings on the same lot, an imaginary property line must be assumed between the buildings in accordance with Section 705.3




Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A,E}

The imaginary line may be at any location between the structures.

Wherever the line is established, fire separation distance for each wall must be measured from the line, and wall and wall opening protection based on the distance to the assumed location.

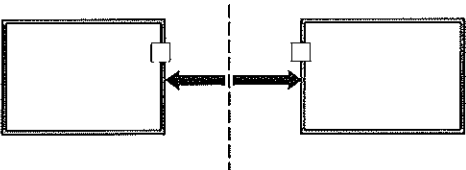


Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A,E}

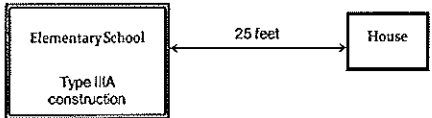
| FIRE SEPARATION DISTANCE - s (feet) | TYPE OF CONSTRUCTION | CEILING GROUP (CEILING) | WALL AND GROUP (WALL) | CEILING GROUP (CEILING) |
|-------------------------------------|----------------------|-------------------------|-----------------------|-------------------------|
| 0-4 | II | 1 | 2 | 1 |
| 5-9 < 12 | II | 2 | 2 | 1 |
| | Other | 2 | 1 | 1 |
| 12-17 < 30 | II, B | 2 | 1 | 2 |
| | Other | 1 | 0 | 2 |
| 30-33 | II | 1 | 1 | 2 |
| 3-33 | II | 0 | 0 | 3 |

As with all tables and charts, be sure to apply the notes and conditions that are published on the chart to arrive at the correct result.

Table 602 Fire-Resistance Rating Requirements for exterior Walls Based on Fire Separation Distance ^{A,E}

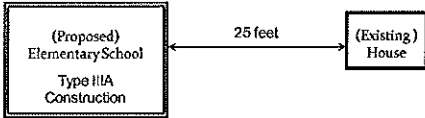
| FIRE SEPARATION DISTANCE - s (feet) | TYPE OF CONSTRUCTION | CEILING GROUP (CEILING) | WALL AND GROUP (WALL) | CEILING GROUP (CEILING) |
|-------------------------------------|----------------------|-------------------------|-----------------------|-------------------------|
| 0-4 | II | 1 | 2 | 1 |
| 5-9 < 12 | II | 2 | 2 | 1 |
| | Other | 2 | 1 | 1 |
| 12-17 < 30 | II, B | 2 | 1 | 2 |
| | Other | 1 | 0 | 2 |
| 30-33 | II | 1 | 1 | 2 |
| 3-33 | II | 0 | 0 | 3 |

Let's try it out!



Quiz

What is the minimum fire-resistance rating for the exterior bearing wall of the school?



Quiz

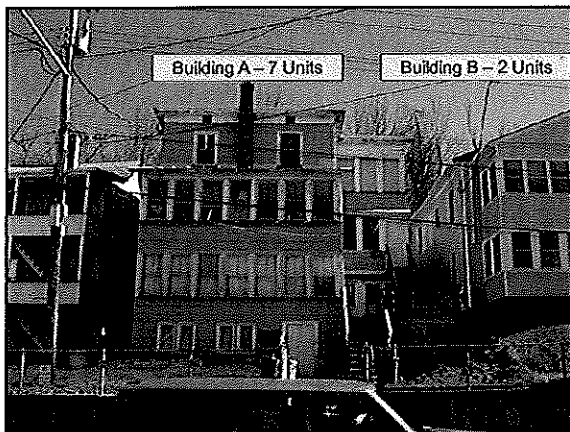
If our elementary school was to be of Type I construction, could we use fire-retardant-treated wood in a nonbearing exterior wall where no fire rating is required?

Yes or No?

So why is all of this so important?

We can't always go back and change what we did years before.

But we can make things better and safer going forward!



So let's put all of this to use

An applicant proposes a new building for a planned business

The family is proposing to build a small store:

They will be selling paint and wallpaper, along with the supplies and equipment that their customers will need.

They want to supply contractors in the area as well, and expect to stock ladders, staging and the usual variety of tools and equipment the contractor will be interested in.

There needs to be an office, a display area and storage area, including a covered outside storage area for ladders, staging etc.

They own a five acre lot that has no other structures on it, and do not intend to add any other use in the future.

What is the Occupancy Group for this business?

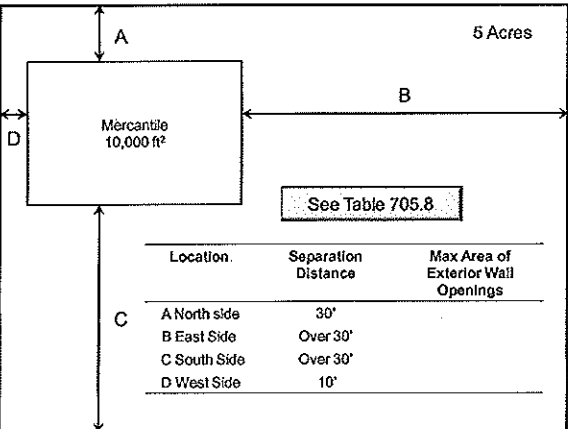
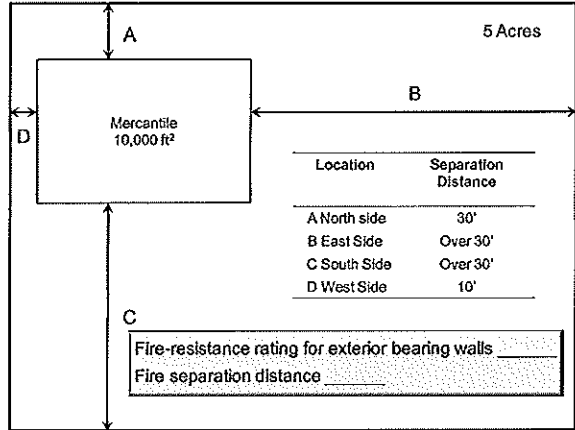
If the applicant is planning on 10,000 ft², what construction type can the designer recommend?

| HEIGHT (feet) | TYPE I | | TYPE II | | TYPE III | | TYPE IV | TYPE V | | |
|---------------|--------|----|---------|--------|----------|--------|---------|--------|--------|-------|
| | A | B | A | B | A | B | HT | A | B | |
| UL | 150 | 65 | 55 | 65 | 55 | 65 | 50 | 40 | | |
| GROUP | S | UL | U | 4 | 2 | 4 | 2 | 4 | 3 | 1 |
| M | A | UL | UL | 21,500 | 12,500 | 18,500 | 12,500 | 20,500 | 14,000 | 9,000 |

STORIES(S) AREA (A)

All construction types except Type VB can provide the desired 10,000 ft².

What about fire-resistance ratings and separation distances?



Chapter 6 Types of Construction

Questions?
Comments?
Discussion?

Chapter 7 Overview

Fire-Resistance-Rated Construction

Chapter 7 Fire-Resistance-Rated Construction

Chapter 7 provides detailed requirements for fire-resistance-rated construction, including structural members, walls, partitions, and horizontal assemblies.

Chapter 7 Fire-Resistance-Rated Construction

Other parts of the code tell us when certain fire-resistance-rated elements are required.

This chapter specifies how these elements are constructed, how openings in walls and partitions are protected, and how penetrations of such elements are protected.

Chapter 7 Fire-Resistance-Rated Construction

Fire-resistance-rated construction is often referred to as "passive protection".

These building elements provide resistance to the advance of fire, as opposed to active fire protection systems, such as automatic sprinklers which serve to suppress a fire.

Chapter 7 Fire-Resistance-Rated Construction

Fire-resistance-rated construction is often referred to as "passive protection".

The construction features that are addressed in this chapter that are required to have some degree of fire resistance include:

Chapter 7 Fire-Resistance-Rated Construction

- SECTION 701** Scope
- SECTION 702** Definitions
- SECTION 703** Fire-Resistance Ratings and Fire Tests
- SECTION 704** Fire-Resistance Rating of Structural Members
- SECTION 705** Exterior Walls
- SECTION 706** Fire Walls
- SECTION 707** Fire Barriers

Chapter 7 Fire-Resistance-Rated Construction

- SECTION 708** Shaft Enclosures
- SECTION 709** Fire Partitions
- SECTION 710** Smoke Barriers
- SECTION 711** Smoke Partitions
- SECTION 712** Horizontal Assemblies
- SECTION 713** Penetrations
- SECTION 714** Fire-Resistant Joint Systems

Chapter 7 Fire-Resistance-Rated Construction

- SECTION 715** Opening Protectives
- SECTION 716** Ducts and Air Transfer Openings
- SECTION 717** Concealed Spaces
- SECTION 718** Fire-Resistance Requirements for Plaster
- SECTION 719** Thermal and Sound Insulating Materials
- SECTION 720** Prescriptive Fire Resistance
- SECTION 721** Calculated Fire Resistance

Quiz

True or False?

The fire-resistance rating of a floor assembly separating mixed occupancies is the same regardless of occupancy classifications on either side of the floor assembly.

Quiz

Fire barriers shall be constructed of

- A. Steel, masonry or concrete only
- B. Materials permitted in the building type of construction
- C. Gypsum based products


Quiz

So long as it is properly protected, an opening for a laundry chute may be located in any room or space in the building.

True or False?

Chapter 7 Fire-Resistance-Rated Construction

**Questions?
Comments?
Discussion?**



Chapter 8 Overview

Interior Finishes

Chapter 8 Interior Finishes

Past fire experience has shown that interior finish and decorative materials are key elements in the development and spread of fire.

These materials often become involved in the early stages of the fire, and contribute to early growth and spread of the fire.

Chapter 8 Interior Finishes

The provisions of Chapter 8 require materials used as interior finishes and decorations to have a flame spread index or meet certain flame propagation criteria based on the relative fire hazard associated with the occupancy.

Chapter 8 Interior Finishes

The design professional or applicant is responsible for determining and providing data to support the permit application.

The Building Official will evaluate the information to ascertain that compliance is achieved.

Chapter 8 Interior Finishes

Chapter 8 contains the performance requirements for controlling fire growth within buildings by restricting interior finish and decorative materials.

Chapter 8 Interior Finishes

- SECTION 801** Scope
- SECTION 802** Definitions
- SECTION 803** Wall and Ceiling Finishes
- SECTION 804** Interior Floor Finish
- SECTION 805** Combustible Materials in Types I and II Construction

Chapter 8 Interior Finishes

SECTION 806 Decorative Materials and Trim
SECTION 807 Insulation
SECTION 808 Acoustical Ceiling Systems

Quiz

True or False?

All materials, including wall paper are required to be tested for flame spread and smoke-developed index in accordance with Chapter 8.

Quiz

Where a minimum of Class B material is required as an interior finish,


- A. A class C material may be substituted.
- B. A class A material may be substituted.
- C. No substitute materials are permissible.

Quiz

In an factory occupancy classification, what is the interior wall and ceiling finish requirement for a non-sprinkled corridor?

Chapter 8 Interior Finishes

Questions?
Comments?
Discussion?



Chapter 9 Overview
Fire Protection Systems

Chapter 9 Fire Protection Systems

Fire protection systems may serve one or more purposes in providing adequate protection from fire and hazardous materials exposure.

Chapter 9 Fire Protection Systems

The purpose of Chapter 9 is to prescribe the minimum requirements for an active system or systems of fire protection to perform the following functions:

- A. To detect the fire
- B. To alert the occupants or fire department
- C. To control smoke
- D. To control or extinguish the fire

Chapter 9 Fire Protection Systems

Generally, the requirements are based on the occupancy and the height and area of the building.

These are the factors that most affect fire-fighting capabilities and the relative hazard of a specific space or area.

Chapter 9 Fire Protection Systems

Generally, the requirements are based on the occupancy and the height and area of the building.

The provisions of Chapter 9 are just one aspect of the overall fire protection system of a building or structure.

Chapter 9 Fire Protection Systems

All fire protection requirements contained in the code must be considered as a package, or overall system.

Non compliance with any part of it may have catastrophic consequences on the other parts of the system.

Chapter 9 Fire Protection Systems

All fire protection requirements contained in the code must be considered as a package, or overall system.

Failure to install the system in accordance with provisions of the code and/or manufacturers instructions may result in loss of life and property, due to loss of performance of the fire protection system.

Chapter 9 Fire Protection Systems

The requirements found in Chapter 9 should be considered active fire safety provisions.

They are directed at containing and abating the fire once it has erupted.

It looks kind of like this...

Chapter 9 Fire Protection Systems

- SECTION 901** Scope
- SECTION 902** Definitions
- SECTION 903** Automatic Sprinkler Systems
- SECTION 904** Alternative Automatic Fire Extinguishing Systems
- SECTION 905** Standpipe Systems
- SECTION 906** Portable Fire Extinguishers
- SECTION 907** Fire Alarm and Detection Systems

Chapter 9 Fire Protection Systems

- SECTION 908** Emergency Alarm Systems
- SECTION 909** Smoke Control Systems
- SECTION 910** Smoke and Heat Vents
- SECTION 911** Fire Command Center
- SECTION 912** Fire Department Connections
- SECTION 913** Fire Pumps
- SECTION 914** Emergency Responder Safety Features

Chapter 9 Fire Protection Systems

- SECTION 915** Emergency Responder Radio Coverage

Quiz

In group H occupancies, manual fire alarms, automatic fire extinguishing, and emergency alarm systems

- A. Shall be monitored by an approved supervising station
- B. Shall be tested by a certifying agency
- C. Are not required

Quiz

Portable fire extinguishers having a gross weight of more than 40 pounds

- A. Shall be monitored by an approved supervising station.
- B. Shall be installed so their tops are not more than 3.5 feet above the floor.
- C. Shall not be used.

Quiz


Manual fire alarm boxes shall be either red or yellow in color.

True or False?

Chapter 9

Fire Protection Systems

Questions? Comments? Discussion?



Chapter 10 Overview

Means of Egress

Chapter 10

Means of Egress

As you can see by now, a primary focus of this code is to safeguard life in the presence of fire.

Integral to this purpose, is a path of egress for occupants to escape and avoid a fire.

Chapter 10

Means of Egress

Means of egress can be considered the lifeline of a building.

The principles on which means of egress are based and that form the fundamental criteria for requirements are to provide a system:

Chapter 10

Means of Egress

The principles on which means of egress are based and that form the fundamental criteria for requirements are to provide a system:

- o That will give occupants alternative paths of travel to a place of safety to avoid fire.
- o That will shelter occupants from fire and the products of combustion.

Chapter 10 Means of Egress

The principles on which means of egress are based and that form the fundamental criteria for requirements are to provide a system:

- o That will accommodate all occupants of the structure.
- o That is clear, unobstructed, well marked and illuminated and in which all components are under the control of the user without requiring any tools, keys or special knowledge or effort.

Chapter 10 Means of Egress

If we look at history, we can clearly see that many instances that have resulted in loss of life were directly attributable to failures in the above mentioned strategies.

Chapter 10 Means of Egress

Life safety is a function of time...

- o Time for detection
- o Time for notification
- o Time for safe egress

The fire spread over time is also a critical factor in the equation.

Chapter 10 Means of Egress

This chapter addresses the means available to relocate or evacuate the building occupants.

There are three main components of any egress system.

- o Exit access
- o Exit
- o Exit discharge

Chapter 10 Means of Egress

There are three main components of any egress system.

- o Exit access
- o Exit
- o Exit discharge

A zonal approach to egress provides a general basis of the chapters format through regulation of these three components.

Chapter 10 Means of Egress

- SECTION 1001** Administration
- SECTION 1002** Definitions
- SECTION 1003** General Means of Egress
- SECTION 1004** Occupant Load
- SECTION 1005** Egress Width
- SECTION 1006** Means of Egress Illumination
- SECTION 1007** Accessible Means of Egress

Chapter 10 Means of Egress

- SECTION 1008** Doors, Gates and Turnstiles
- SECTION 1009** Stairways
- SECTION 1010** Ramps
- SECTION 1011** Exit Signs
- SECTION 1012** Handrails
- SECTION 1013** Guards
- SECTION 1014** Exit Access (See NFPA 101-2009 Table A 7.6)

Chapter 10 Means of Egress

- SECTION 1015** Exit and Exit Access Doorways
- SECTION 1016** Exit Access Travel Distance
- SECTION 1017** Aisles
- SECTION 1018** Corridors
- SECTION 1019** Egress Balconies
- SECTION 1020** Exits
- SECTION 1021** Number of Exits and Continuity

Chapter 10 Means of Egress

- SECTION 1022** Exit Enclosures
- SECTION 1023** Exit Passageways
- SECTION 1024** Luminous Egress Path Markings
- SECTION 1025** Horizontal Exits
- SECTION 1026** Exterior Exit Ramps and Stairways
- SECTION 1027** Exit Discharge
- SECTION 1028** Assembly

Chapter 10 Means of Egress

- SECTION 1029** Emergency Escape and Rescue

And we're finally done!

**This Time, You Get To Ask
the Questions!**

Questions?
Comments?
Discussion?

