



## Chicago Building Code Modernization & Impacts on Wood Construction

James B. Smith, P.E.  
Midwest Regional Manager  
American Wood Council



1

### COURSE DESCRIPTION & LEARNING OBJECTIVES



This presentation/course is a very quick (25 minutes) and therefore very basic look at the Chicago Building Code Modernization effort and how that effort impacts Wood Construction. At the end of the presentation attendees will:

- Understand the background/history that lead up to the "the first comprehensive revision in 70 years" to the City of Chicago Building Code
- Know when they will have the option to use the "Modernized" City of Chicago Building Code for their projects.
- Know some of the general improvements associated with the "Modernized" City of Chicago Building Code
- Know the positive impacts associated with the Occupancies and Types of Construction that are popular for "commercial" wood construction projects

Chicago Building Code Modernization & Impacts on Wood Construction

2

2

## CITY OF CHICAGO BUILDING CODE - MODERNIZATION

The City of Chicago Building Code (CBC) is getting its first significant update since 1949, or as in their own words “the first comprehensive revision in 70 years”. The updated or “Modernized” City of Chicago Building Code (ModCBC) will look more familiar to IBC users, as well as present some new opportunities for wood construction . . . . and I will be telling you all about it in 25 minutes . . . .



Chicago Building Code Modernization & Impacts on Wood Construction

3

## MODERNIZED CITY OF CHICAGO BUILDING CODE OPTION

The modernization of the City of Chicago Building Code (CBC) was finalized in April 2019 as Phase 2 of their Building Code Modernization project. As one might imagine that involved considerable effort on the part of the International Code Council (ICC) and more than 150 volunteer technical experts and industry leaders in addition to City staff.

Effective December 1, 2019, new construction in Chicago has the option to be evaluated using the Modernized City of Chicago Building Code (ModCBC). The new code is a modified version of ICC’s 2018 International Building Code (IBC), representing a major step forward for the City, as well as for wood construction.

The Modernized City of Chicago Building Code will be mandatory for permit applications started on or after August 1, 2020

Chicago Building Code Modernization & Impacts on Wood Construction

4

4

## OVERVIEW – PHASE 2

The March 2019 construction code modernization ordinance builds upon the Chicago Electrical Code (Title 14E), adopted in September 2017, and Chicago Conveyance Device Code (Title 14C), adopted in March 2018 (Phase 1), to bring Chicago’s core requirements for the construction, renovation, and maintenance of buildings into much closer alignment with widely-adopted national standards. The ordinance adds five substantive titles to the Municipal Code: the Chicago Construction Codes Administrative Provisions (Title 14A), Chicago Building Code (Title 14B), Chicago Energy Conservation Code (Title 14N), Chicago Building Rehabilitation Code (Title 14R), and Chicago Minimum Requirements for Existing Buildings (Title 14X). The ordinance also makes conforming amendments to many other provisions of the Municipal Code that refer to construction or building maintenance-related requirements in Titles 13 and 15.

Future ordinances will be put in place to cover subjects like requirements related to plumbing, mechanical ventilation, refrigeration, natural gas, and fire prevention in hazardous occupancies . . .

5

## PERSPECTIVE



While sizes of wood buildings permitted in the Modernized City of Chicago Building Code (ModCBC) are smaller than those allowed in the 2018 IBC, there are now significant opportunities for the increased use of wood products that did not previously exist in the current City of Chicago Building Code (CBC). For that reason, I will try to focus this presentation on the differences between the CBC and the ModCBC . . .

As you have already figuring out, I will be using the acronym “CBC” when referring to the existing City of Chicago Building Code and the acronym “ModCBC” when referring to the Modernized City of the Chicago Building Code.

6

## OPPORTUNITIES



Changes in the ModCBC are extensive, so for the purpose of this presentation only a few of the more noteworthy opportunities for wood are going to be presented . . . I will start with a few basics opportunities that are not necessarily linked to detailed wood opportunities:

- The ModCBC is in the style and format familiar to users of the IBC.
- The ModCBC uses the IBC's Types of Construction, significantly different than those found in the CBC.
- ModCBC includes updates to referenced standards. For example, the CBC references the 1991 edition of our National Design Specification For Wood Construction (ANSI/NFoPA/NDS-91), the 1986 Plywood Design Specification, and 1985 Design Specifications for Metal Plate Connected Wood Trusses (TPI-85). The ModCBC references the most current version of each.
- ModCBC uses formulas aligned with the IBC for determining heights and areas, as well as increases allowed for sprinkler protection or frontage.

7

## OPPORTUNITIES FOR WOOD

The following are a few examples of the opportunities that have arisen specifically for wood products when comparing the old code to the new. These examples are based on the use of NFPA 13 sprinkler systems without frontage increases:

- Single-story allowable areas for wood frame (Type V) construction is doubled for residential and business occupancies.
- Single-story allowable areas for heavy timber (Type IV) construction is doubled for residential occupancies.
- 3-story unprotected wood frame (Type V-B) residential occupancies are now permitted.
- 4-story protected wood frame (Type V-A) residential occupancies are now permitted.
- 5-story heavy timber (Type IV) residential occupancies are now permitted.
- 6-story heavy timber (Type IV) business occupancies are now permitted.

8

## TYPES OF CONSTRUCTION

The types of construction used in the CBC were historically different than those in the IBC . . . .

What is commonly referred to as "Heavy Timber" and Type IV construction in the IBC is classified as Type III-A construction in the CBC.

Type III-B and III-C types of construction in the CBC are similar to the IBC types III-A and III-B.

Light frame construction is classed as Type V-A and V-B in both the CBC and the IBC.



Chicago Building Code Modernization & Impacts on Wood Construction

## TYPES OF CONSTRUCTION - Derived From Table 13-60-100

Type of Construction The Minimum Ratings Derived From Table 13-60-100

Description	Type I Non-Combustible			Type II Non-Combustible	Type III Heavy Timber	Type III-A Heavy Timber	Type III-B Heavy Timber	Type III-C Heavy Timber	Type IV Combustible Frame
	Type I-A	Type I-B	Type I-C	Type II	Type III-A	Type III-B	Type III-C	Type III-C	Type IV
A. Exterior-bearing walls	4	4	4	N.C.	4	4	4	4	4
A. Interior	4	4	4	N.C.	4	4	4	4	4
Nonbearing walls & partitions	2	2	2	N.C.	2	2	2	2	2
Roof	2	2	2	N.C.	2	2	2	2	2
Other occupancy	2	2	2	N.C.	2	2	2	2	2
B. Exterior	4	4	4	N.C.	4	4	4	4	4
B. Interior	4	4	4	N.C.	4	4	4	4	4
C. Exterior	4	4	4	N.C.	4	4	4	4	4
C. Interior	4	4	4	N.C.	4	4	4	4	4
D. Exterior	4	4	4	N.C.	4	4	4	4	4
D. Interior	4	4	4	N.C.	4	4	4	4	4
E. Exterior	4	4	4	N.C.	4	4	4	4	4
E. Interior	4	4	4	N.C.	4	4	4	4	4
F. Exterior	4	4	4	N.C.	4	4	4	4	4
F. Interior	4	4	4	N.C.	4	4	4	4	4
G. Exterior	4	4	4	N.C.	4	4	4	4	4
G. Interior	4	4	4	N.C.	4	4	4	4	4

And then there are footnotes . . . Not quite from A to Z, but (a) to (p) are covered. Examples:

- (a) Storage, industrial and hazardous occupancies.
- (b) Business and mercantile occupancies.
- (p) Fire protection shall not be required for roof construction including columns, beams, girders, and trusses supporting the roof only of areas classified per Chapter 15-16 as "light hazard occupancy" in business, residential and assembly (other than exhibition halls) occupancies in buildings equipped with a supervised standard automatic sprinkler system as defined in Chapter 15-16 of this code.



Chicago Building Code Modernization & Impacts on Wood Construction

## MODCCBC TABLE 601 – TYPES OF CONSTRUCTION



TABLE 601  
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
	A	B	A	B	A	B	HT	A	B	
Primary structural frame <sup>a</sup>	3 <sup>b</sup>	2 <sup>b,c</sup>	1 <sup>b</sup>	0	1 <sup>b</sup>	0	HT	1 <sup>b</sup>	0	
Bearing walls										
Exterior <sup>d,e</sup>	3	2	1	0	2	2	2	1	0	
Interior	2 <sup>b</sup>	2 <sup>b</sup>	1	0	1	0	1 <sup>b,f</sup>	1	0	
Nonbearing walls and partitions - Exterior	See Table 602									
Nonbearing walls and partitions - Interior <sup>g</sup>	0	0	0	0	0	0	Note <sup>h</sup>	0	0	
Floor construction and associated secondary members	2	2	1	0	1 <sup>b</sup>	0	HT	1 <sup>b</sup>	0	
Roof construction and associated secondary members	1.5 <sup>b</sup>	1 <sup>b</sup>	1 <sup>b</sup>	0 <sup>b</sup>	1 <sup>b,i,j</sup>	0	HT	1 <sup>b,i,j</sup>	0	

- For 10' to 20'0" span.
- Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
  - Except in Group R-1, R-1M and R-2 occupancies, the protection of structural members in roof construction shall not be required, including protection of primary structural frame members, roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below.
  - In all occupancies, heavy timber complying with Section 2204.11 shall be allowed where a 1 hour or less fire-resistance rating is required.
  - Not less than the fire-resistance rating required by other sections of this code.
  - Not less than the fire-resistance rating based on the separation distance (see Table 602).
  - Not less than the fire-resistance rating as referenced in Section 704.10.
  - In single-family dwellings, the floor construction over basements and unenclosed spaces below the first story above grade shall not be required to have a fire-resistance rating.
  - In buildings of occupancy Group R-1, R-2, R-3 or R-4 occupancy with no more than four stories above grade above, the required fire-resistance rating of roof construction and associated secondary members shall be reduced to 30 minutes.
  - See Section 2204.11.2.



## TYPE OF CONSTRUCTION (CONT)

There were no significant modifications to the tabular fire resistance ratings from IBC Table 602, but there were some footnote changes included within the ModCBC.

Of more significance, the provisions within Types III and IV construction that permitted the use of fire-retardant treated materials for some exterior wall applications is deleted from the ModCBC. Also, the ability to allow the use of cross-laminated timber (CLT) in the exterior walls of Type IV construction was deleted.



## HEIGHTS IN STORIES AND AREAS

The comparison of Height in Stories and Areas included on the next slide is very limited in scope.

The Table created only covers three occupancy groups (R-1, R-2 and B) and three types of construction (V-B, V-A, & IV), two that typically account for a large percentage of the wood construction in "commercial" (not single-family, two-family or three-family dwellings) buildings plus the heavy timber Type IV.

For purposes of the comparisons, no frontage increase was included, but the values were based on each being protected by an NFPA 13 sprinkler system.

The values shown will be increased if the building is situated on the property such that a frontage increase is allowed.



13

## HEIGHTS IN STORIES AND AREAS

The comparison of Height in Stories and Areas included on the next slide is very limited in scope.

The Table created only covers three occupancy groups (R-1, R-2 and B) that typically account for a large percentage of the wood construction in "commercial" buildings, and three types of construction (V-B, V-A, & IV). Two Types that typically account for a large percentage of the wood construction in "commercial" (not single-family, two-family or three-family dwellings) buildings plus the heavy timber Type IV.



For purposes of the comparisons, no frontage increase was included, but the values were based on each being protected by an NFPA 13 sprinkler system.

The values shown will be increased if the building is situated on the property such that a frontage increase is allowed.

14



## STORY/AREA COMPARISON USED TO HIGHLIGHT THE "OPPORTUNITIES" FOR WOOD CONSTRUCTION...

*IBC = International Building Code*

*CBC = Current City of Chicago Building Code*

*ModCBC = 2018 IBC modified to be the Modernized City of Chicago Building Code*

*\* = 4 story limit per Equation 5-2. Allowable area per story must be adjusted when 5 or more stories.*

*\*\* = 3 story limit per Chicago modified Equation 5-2. Allowable area per story must be adjusted when 4 or more stories.*

Type of Const. CBC/IBC	No. of Stories	Occupancy	Sprinkler Syst	Max. Allowable Area S.F. per Single Story CBC/IBC/ModCBC	Total Allowable Area S.F. per Building CBC/IBC/ModCBC
IV-B/V-B	1	Residential R-1 or R-2	NFPA 13	6,000/28,000/12,000	6,000/28,000/12,000
IV-B/V-B	1	Business B	NFPA 13	8,000/36,000/16,000	8,000/36,000/16,000
IV-A/V-A	1	Residential R-1 or R-2	NFPA 13	10,000/48,000/20,000	10,000/48,000/20,000
IV-A/V-A	1	Business B	NFPA 13	12,000/72,000/24,000	12,000/72,000/24,000
III-A(HT)/IV(HT)	1	Residential R-1 or R-2	NFPA 13	20,000/82,000/40,000	20,000/82,000/40,000
III-A(HT)/IV(HT)	1	Business B	NFPA 13	30,000/144,000/40,000	30,000/144,000/40,000
IV-B/V-B	3	Residential R-1 or R-2	NFPA 13	NP/21,000/9,000	NP/63,000/27,000
IV-B/V-B	3	Business B	NFPA 13	NP/27,000/NP	NP/81,000/NP
IV-A/V-A	4	Residential R-1 or R-2	NFPA 13	NP/36,000/15,000	NP/144,000/45,000**
IV-A/V-A	4	Business B	NFPA 13	NP/54,000/NP	NP/216,000/NP
III-A(HT)/IV(HT)	5	Residential R-1 or R-2	NFPA 13	NP/61,500/30,000	NP/246,000*/90,000**
III-A(HT)/IV(HT)	6	Business B	NFPA 13	NP/108,000/30,000	NP/432,000*/90,000**

Chicago Building Code Modernization & Impacts on Wood Construction

15

15

Type of Const. CoCBC/IBC	No. of Stories	Occupancy	Sprinkler Syst	Max. Allowable Area S.F. per Single Story CBC/IBC/ModCBC	Total Allowable Area S.F. per Building CBC/IBC/ModCBC
IV-B/V-B	1	Residential R-1 or R-2	NFPA 13	6,000/28,000/12,000	6,000/28,000/12,000
IV-B/V-B	1	Business B	NFPA 13	8,000/36,000/16,000	8,000/36,000/16,000
IV-A/V-A	1	Residential R-1 or R-2	NFPA 13	10,000/48,000/20,000	10,000/48,000/20,000
IV-A/V-A	1	Business B	NFPA 13	12,000/72,000/24,000	12,000/72,000/24,000
III-A(HT)/IV(HT)	1	Residential R-1 or R-2	NFPA 13	20,000/82,000/40,000	20,000/82,000/40,000
III-A(HT)/IV(HT)	1	Business B	NFPA 13	30,000/144,000/40,000	30,000/144,000/40,000
IV-B/V-B	3	Residential R-1 or R-2	NFPA 13	NP/21,000/9,000	NP/63,000/27,000
IV-B/V-B	3	Business B	NFPA 13	NP/27,000/NP	NP/81,000/NP
IV-A/V-A	4	Residential R-1 or R-2	NFPA 13	NP/36,000/15,000	NP/144,000/45,000**
IV-A/V-A	4	Business B	NFPA 13	NP/54,000/NP	NP/216,000/NP
III-A(HT)/IV(HT)	5	Residential R-1 or R-2	NFPA 13	NP/61,500/30,000	NP/246,000*/90,000**
III-A(HT)/IV(HT)	6	Business B	NFPA 13	NP/108,000/30,000	NP/432,000*/90,000**

Chicago Building Code Modernization & Impacts on Wood Construction

16

16



### NUMBER OF STORIES TABLE DERIVED FROM THE MODCBC TABLE 504.4



*S13D = Sprinkler Protection by NFPA 13D system*

*S13R = Sprinkler Protection by NFPA 13R system*

*S-13 = Sprinkler Protection by NFPA 13 system*

All new construction for R-1, R-2, R-3 and R-4 require sprinkler protection. The NS value for the Residential occupancy groups is only provided for use in the evaluation of existing buildings using the International Existing Building Code.

Occupancy	III-A	III-B	IV (HT)	V-A	V-B
Residential R-1 NS	4	2	4	2	1
Residential R-1 S13R	4	2	4	2	1
Residential R-1 S-13	5	3	5	3	2
Residential R-2 NS	4	2	4	2	1
Residential R-2 S13R	4	2	4	4	2
Residential R-2 S-13	5	3	5	4	2
Residential R-3 NS	4	2	4	2	1
Residential R-3 S13D	3	2	3	3	2
Residential R-3 S13R	4	3	4	4	2
Residential R-3 S-13	5	3	5	4	2
Residential R-4 NS	4	2	4	NP	NP
Residential R-4 S13D	3	2	3	3	2
Residential R-4 S13R	4	3	4	3	2
Residential R-4 S-13	5	3	5	3	2
Business NS	4	2	5	1	NP
Business S-13	5	3	6	2	1

17

### MODCBC TABLE 504.4



TABLE 504.4 ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE 1\*\*

OCCUPANCY CLASSIFICATION	SEE NOTES	TYPE OF CONSTRUCTION									
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	A	B	A	B
A-1	NS	10	8	4	3	2	2	NP	2	1	NP
A-1	S-13	10	8	4	3	2	2	NP	2	1	NP
A-2	NS	10	8	4	3	2	2	NP	2	1	NP
A-2	S-13	10	8	4	3	2	2	NP	2	1	NP
A-3	NS	10	8	4	3	2	2	NP	2	1	NP
A-3	S-13	10	8	4	3	2	2	NP	2	1	NP
A-4	NS	10	8	4	3	2	2	NP	2	1	NP
A-4	S-13	10	8	4	3	2	2	NP	2	1	NP
A-5	NS	10	8	4	3	2	2	NP	2	1	NP
A-5	S-13	10	8	4	3	2	2	NP	2	1	NP
B	NS	10	8	4	3	2	2	NP	2	1	NP
B	S-13	10	8	4	3	2	2	NP	2	1	NP
B-1	NS	10	8	4	3	2	2	NP	2	1	NP
B-1	S-13	10	8	4	3	2	2	NP	2	1	NP
B-2	NS	10	8	4	3	2	2	NP	2	1	NP
B-2	S-13	10	8	4	3	2	2	NP	2	1	NP
B-3	NS	10	8	4	3	2	2	NP	2	1	NP
B-3	S-13	10	8	4	3	2	2	NP	2	1	NP
B-4	NS	10	8	4	3	2	2	NP	2	1	NP
B-4	S-13	10	8	4	3	2	2	NP	2	1	NP
B-5	NS	10	8	4	3	2	2	NP	2	1	NP
B-5	S-13	10	8	4	3	2	2	NP	2	1	NP
B-6	NS	10	8	4	3	2	2	NP	2	1	NP
B-6	S-13	10	8	4	3	2	2	NP	2	1	NP
B-7	NS	10	8	4	3	2	2	NP	2	1	NP
B-7	S-13	10	8	4	3	2	2	NP	2	1	NP
B-8	NS	10	8	4	3	2	2	NP	2	1	NP
B-8	S-13	10	8	4	3	2	2	NP	2	1	NP
B-9	NS	10	8	4	3	2	2	NP	2	1	NP
B-9	S-13	10	8	4	3	2	2	NP	2	1	NP
B-10	NS	10	8	4	3	2	2	NP	2	1	NP
B-10	S-13	10	8	4	3	2	2	NP	2	1	NP
B-11	NS	10	8	4	3	2	2	NP	2	1	NP
B-11	S-13	10	8	4	3	2	2	NP	2	1	NP
B-12	NS	10	8	4	3	2	2	NP	2	1	NP
B-12	S-13	10	8	4	3	2	2	NP	2	1	NP
B-13	NS	10	8	4	3	2	2	NP	2	1	NP
B-13	S-13	10	8	4	3	2	2	NP	2	1	NP
B-14	NS	10	8	4	3	2	2	NP	2	1	NP
B-14	S-13	10	8	4	3	2	2	NP	2	1	NP
B-15	NS	10	8	4	3	2	2	NP	2	1	NP
B-15	S-13	10	8	4	3	2	2	NP	2	1	NP
B-16	NS	10	8	4	3	2	2	NP	2	1	NP
B-16	S-13	10	8	4	3	2	2	NP	2	1	NP
B-17	NS	10	8	4	3	2	2	NP	2	1	NP
B-17	S-13	10	8	4	3	2	2	NP	2	1	NP
B-18	NS	10	8	4	3	2	2	NP	2	1	NP
B-18	S-13	10	8	4	3	2	2	NP	2	1	NP
B-19	NS	10	8	4	3	2	2	NP	2	1	NP
B-19	S-13	10	8	4	3	2	2	NP	2	1	NP
B-20	NS	10	8	4	3	2	2	NP	2	1	NP
B-20	S-13	10	8	4	3	2	2	NP	2	1	NP
B-21	NS	10	8	4	3	2	2	NP	2	1	NP
B-21	S-13	10	8	4	3	2	2	NP	2	1	NP
B-22	NS	10	8	4	3	2	2	NP	2	1	NP
B-22	S-13	10	8	4	3	2	2	NP	2	1	NP
B-23	NS	10	8	4	3	2	2	NP	2	1	NP
B-23	S-13	10	8	4	3	2	2	NP	2	1	NP
B-24	NS	10	8	4	3	2	2	NP	2	1	NP
B-24	S-13	10	8	4	3	2	2	NP	2	1	NP
B-25	NS	10	8	4	3	2	2	NP	2	1	NP
B-25	S-13	10	8	4	3	2	2	NP	2	1	NP
B-26	NS	10	8	4	3	2	2	NP	2	1	NP
B-26	S-13	10	8	4	3	2	2	NP	2	1	NP
B-27	NS	10	8	4	3	2	2	NP	2	1	NP
B-27	S-13	10	8	4	3	2	2	NP	2	1	NP
B-28	NS	10	8	4	3	2	2	NP	2	1	NP
B-28	S-13	10	8	4	3	2	2	NP	2	1	NP
B-29	NS	10	8	4	3	2	2	NP	2	1	NP
B-29	S-13	10	8	4	3	2	2	NP	2	1	NP
B-30	NS	10	8	4	3	2	2	NP	2	1	NP
B-30	S-13	10	8	4	3	2	2	NP	2	1	NP
B-31	NS	10	8	4	3	2	2	NP	2	1	NP
B-31	S-13	10	8	4	3	2	2	NP	2	1	NP
B-32	NS	10	8	4	3	2	2	NP	2	1	NP
B-32	S-13	10	8	4	3	2	2	NP	2	1	NP
B-33	NS	10	8	4	3	2	2	NP	2	1	NP
B-33	S-13	10	8	4	3	2	2	NP	2	1	NP
B-34	NS	10	8	4	3	2	2	NP	2	1	NP
B-34	S-13	10	8	4	3	2	2	NP	2	1	NP
B-35	NS	10	8	4	3	2	2	NP	2	1	NP
B-35	S-13	10	8	4	3	2	2	NP	2	1	NP
B-36	NS	10	8	4	3	2	2	NP	2	1	NP
B-36	S-13	10	8	4	3	2	2	NP	2	1	NP
B-37	NS	10	8	4	3	2	2	NP	2	1	NP
B-37	S-13	10	8	4	3	2	2	NP	2	1	NP
B-38	NS	10	8	4	3	2	2	NP	2	1	NP
B-38	S-13	10	8	4	3	2	2	NP	2	1	NP
B-39	NS	10	8	4	3	2	2	NP	2	1	NP
B-39	S-13	10	8	4	3	2	2	NP	2	1	NP
B-40	NS	10	8	4	3	2	2	NP	2	1	NP
B-40	S-13	10	8	4	3	2	2	NP	2	1	NP
B-41	NS	10	8	4	3	2	2	NP	2	1	NP
B-41	S-13	10	8	4	3	2	2	NP	2	1	NP
B-42	NS	10	8	4	3	2	2	NP	2	1	NP
B-42	S-13	10	8	4	3	2	2	NP	2	1	NP
B-43	NS	10	8	4	3	2	2	NP	2	1	NP
B-43	S-13	10	8	4	3	2	2	NP	2	1	NP
B-44	NS	10	8	4	3	2	2	NP	2	1	NP
B-44	S-13	10	8	4	3	2	2	NP	2	1	NP
B-45	NS	10	8	4	3	2	2	NP	2	1	NP
B-45	S-13	10	8	4	3	2	2	NP	2	1	NP
B-46	NS	10	8	4	3	2	2	NP	2	1	NP
B-46	S-13	10	8	4	3	2	2	NP	2	1	NP
B-47	NS	10	8	4	3	2	2	NP	2	1	NP
B-47	S-13	10	8	4	3	2	2	NP	2	1	NP
B-48	NS	10	8	4	3	2	2	NP	2	1	NP
B-48	S-13	10	8	4	3	2	2	NP	2	1	NP
B-49	NS	10	8	4	3	2	2	NP	2	1	NP
B-49	S-13	10	8	4	3	2	2	NP	2	1	NP
B-50	NS	10	8	4	3	2	2	NP	2	1	

## FOOTNOTES FOR TABLE 504.4 . . .

TABLE 504.4 - continued

- UL = Unlimited  
 NP = Not permitted.  
 NS = Buildings not equipped throughout with an automatic sprinkler system.  
 S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.  
 S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.  
 S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.
- See Chapters 4 and 5 for specific exceptions to the allowable number of stories above grade plane in this table.
  - See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
  - New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
  - The NS value is only for use in evaluation of existing buildings in accordance with the Chicago Building Rehabilitation Code.
  - New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
  - New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and the Chicago Minimum Requirements for Existing Buildings.
  - For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
  - New Group R-1, R-3 and R-4 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.



## ALLOWABLE AREAS TABLE IS DERIVED FROM THE MODCBC TABLE 506.2

Occupancy	III-A	III-B	IV (HT)	V-A	V-B
Residential R-1 NS	10,000	8,000	10,000	5,000	3,000
Residential R-1 S13R	20,000	16,000	20,000	10,000	6,000
Residential R-1 S1	40,000	32,000	40,000	20,000	12,000
Residential R-1 SM	30,000	24,000	30,000	15,000	9,000
Residential R-2 NS	10,000	8,000	10,000	5,000	3,000
Residential R-2 S13R	20,000	16,000	20,000	10,000	6,000
Residential R-2 S1	40,000	32,000	40,000	20,000	12,000
Residential R-2 SM	30,000	24,000	30,000	15,000	9,000
Residential R-3 NS	10,000	8,000	10,000	5,000	3,000
Residential R-3 S13D	20,000	16,000	20,000	10,000	6,000
Residential R-3 S13R	20,000	16,000	20,000	10,000	6,000
Residential R-3 S1	40,000	32,000	40,000	20,000	12,000
Residential R-3 SM	30,000	24,000	30,000	15,000	9,000
Residential R-4 NS	10,000	8,000	10,000	5,000	3,000
Residential R-4 S13D	20,000	16,000	20,000	10,000	6,000
Residential R-4 S13R	20,000	16,000	20,000	10,000	6,000
Residential R-4 S1	40,000	32,000	40,000	20,000	12,000
Residential R-4 SM	30,000	24,000	30,000	15,000	9,000
Business NS	10,000	8,000	10,000	6,000	4,000
Business S1	UL	32,000	40,000	24,000	16,000
Business SM	30,000	24,000	30,000	NP	NP



## MODCBC TABLE 506.2 .....

... for your use and reference



**TABLE 506.2**  
ALLOWABLE AREA FACTOR (A = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET<sup>1,2</sup>

OCCUPANCY CLASSIFICATION	SEE NOTES	CONSTRUCTION TYPE									
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	HT	A	B	
A-1	NS	UL	UL	16,000	8,500	5,000	NP	6,000	3,000	NP	
	S1	UL	UL	64,000	34,000	24,000	15,000	24,000	12,000	NP	
	SM	UL	UL	48,000	25,500	18,000	NP	18,000	NP	NP	
A-2	NS	UL	UL	16,000	8,500	5,000	5,000	6,000	3,000	NP	
	S1	UL	UL	64,000	34,000	24,000	20,000	24,000	12,000	NP	
	SM	UL	UL	48,000	25,500	18,000	NP	18,000	NP	NP	
A-3	NS	UL	UL	16,000	8,500	5,000	5,000	6,000	3,000	NP	
	S1	UL	UL	64,000	34,000	24,000	20,000	24,000	12,000	NP	
	SM	UL	UL	48,000	25,500	18,000	NP	18,000	NP	NP	
A-4	NS	UL	UL	16,000	8,500	5,000	5,000	6,000	3,000	NP	
	S1	UL	UL	64,000	34,000	24,000	20,000	24,000	12,000	NP	
	SM	UL	UL	48,000	25,500	18,000	NP	18,000	NP	NP	
A-5	NS	UL	UL	20,000	6,000	10,000	8,000	10,000	6,000	4,000	
	S1	UL	UL	UL	UL	UL	UL	UL	UL	UL	
	SM	UL	UL	UL	UL	UL	UL	UL	UL	UL	
B	NS	UL	UL	20,000	6,000	10,000	8,000	10,000	6,000	4,000	
	S1	UL	UL	UL	UL	UL	UL	UL	UL	UL	
	SM	UL	UL	60,000	18,000	30,000	24,000	30,000	NP	NP	
E-1	NS	UL	UL	16,000	5,000	8,000	3,000	10,000	3,000	NP	
	S1	UL	UL	64,000	20,000	32,000	12,000	40,000	12,000	NP	
	SM	UL	UL	48,000	15,000	24,000	NP	30,000	NP	NP	
E-2	NS	UL	UL	16,000	5,000	8,000	3,000	10,000	3,000	NP	
	S1	UL	UL	64,000	20,000	32,000	12,000	40,000	12,000	NP	
	SM	UL	UL	48,000	15,000	24,000	NP	30,000	NP	NP	

(table continues on following page)

Chicago Building Code Modernization & Impacts on Wood Construction

21

21

## ... AND MORE FOR REFERENCE



**TABLE 506.2 (continued)**

OCCUPANCY CLASSIFICATION	SEE NOTES	CONSTRUCTION TYPE									
		TYPE I		TYPE II		TYPE III		TYPE IV		TYPE V	
		A	B	A	B	A	B	HT	A	B	
F-1	NS	UL	UL	16,000	4,000	8,000	4,000	8,000	5,000	3,000	
	S1	UL	UL	UL	UL	32,000	16,000	32,000	20,000	12,000	
	SM	UL	UL	48,000	12,000	24,000	12,000	24,000	NP	NP	
F-2	NS	UL	UL	20,000	10,000	10,000	6,000	10,000	6,000	4,000	
	S1	UL	UL	UL	UL	40,000	24,000	40,000	24,000	16,000	
	SM	UL	UL	60,000	30,000	30,000	18,000	30,000	NP	NP	
H-1	NS <sup>1,2</sup>	21,000	16,500	11,000	6,000	9,500	5,000	10,500	5,000	NP	
	S1	21,000	16,500	11,000	6,000	9,500	5,000	10,500	5,000	NP	
	SM	NP	NP	NP	NP	NP	NP	NP	NP	NP	
H-2	NS <sup>1,2</sup>	21,000	16,500	11,000	6,000	9,500	5,000	10,500	NP	NP	
	S1	21,000	16,500	11,000	6,000	9,500	5,000	10,500	NP	NP	
	SM	42,000	16,500	11,000	NP	9,500	NP	NP	NP	NP	
H-3	NS <sup>1,2</sup>	UL	60,000	20,000	6,000	10,000	5,000	10,000	NP	NP	
	S1	UL	60,000	20,000	6,000	10,000	5,000	10,000	NP	NP	
	SM	UL	80,000	20,000	NP	10,000	5,000	10,000	NP	NP	
H-4	NS <sup>1,2</sup>	UL	UL	20,000	6,000	10,000	8,000	10,000	6,000	NP	
	S1	UL	UL	80,000	24,000	40,000	32,000	40,000	24,000	NP	
	SM	UL	UL	60,000	18,000	30,000	24,000	30,000	NP	NP	
H-5	NS <sup>1,2</sup>	UL	UL	16,000	4,000	8,000	4,000	8,000	NP	NP	
	S1	UL	UL	64,000	16,000	32,000	16,000	32,000	NP	NP	
	SM	UL	UL	48,000	NP	24,000	12,000	24,000	NP	NP	
I-1	NS <sup>1,2</sup>	UL	55,000	16,000	4,000	6,000	4,000	6,000	3,000	NP	
	S1	UL	220,000	64,000	16,000	24,000	16,000	24,000	12,000	NP	
	SM	UL	166,000	48,000	12,000	NP	18,000	NP	NP		

(table continues on following page)

Chicago Building Code Modernization & Impacts on Wood Construction

22

22

... AND MORE FOR REFERENCE



TABLE 506.2 (continued)

OCCUPANCY CLASSIFICATION	SEE NOTES	CONSTRUCTION TYPE									
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V		
		A	B	A	B	A	B	HT	A	B	
I-2	NS <sup>1</sup>	UL	UL	12,000	6,000	6,000	NP	6,500	3,000	NP	
	S1	UL	UL	48,000	24,000	24,000	NP	24,000	12,000	NP	
	SM	UL	UL	36,000	NP	NP	NP	NP	NP	NP	
I-3	NS <sup>1</sup>	UL	UL	12,000	6,000	6,000	NP	6,500	3,000	NP	
	S1	UL	UL	48,000	24,000	24,000	NP	24,000	12,000	NP	
	SM	UL	UL	36,000	NP	NP	NP	NP	NP	NP	
I-4	NS <sup>1</sup>	UL	UL	55,000	16,000	4,000	6,000	4,000	6,000	3,000	NP
	S1	UL	UL	220,000	64,000	16,000	24,000	NP	24,000	12,000	NP
	SM	UL	UL	165,000	48,000	NP	NP	NP	NP	NP	NP
M	NS	UL	UL	16,000	6,000	8,000	8,000	8,000	5,000	3,000	
	S1	UL	UL	UL	UL	UL	UL	24,000	32,000	20,000	12,000
	SM	UL	UL	48,000	18,000	24,000	18,000	24,000	NP	NP	
R-1*	NS <sup>1</sup>	UL	UL	24,000	10,000	10,000	8,000	10,000	5,000	3,000	
	S13R	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S1	UL	UL	96,000	40,000	40,000	32,000	40,000	20,000	12,000	
R-2	NS	UL	UL	24,000	10,000	10,000	8,000	10,000	5,000	3,000	
	S13R	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S1	UL	UL	96,000	40,000	40,000	32,000	40,000	20,000	12,000	
R-3*	NS	UL	UL	24,000	10,000	10,000	8,000	10,000	5,000	3,000	
	S13D	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S1	UL	UL	96,000	40,000	40,000	32,000	40,000	20,000	12,000	

(table continues on following page)

Chicago Building Code Modernization & Impacts on Wood Construction

23

23

... AND MORE FOR REFERENCE



TABLE 506.2 (continued)

OCCUPANCY CLASSIFICATION	SEE NOTES	CONSTRUCTION TYPE									
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V		
		A	B	A	B	A	B	HT	A	B	
R-4*	NS <sup>1</sup>	UL	UL	24,000	10,000	10,000	8,000	10,000	5,000	3,000	
	S13D	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S13R	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
R-5	S1	UL	UL	96,000	40,000	40,000	32,000	40,000	20,000	12,000	
	SM	UL	UL	72,000	30,000	30,000	24,000	30,000	15,000	9,000	
	NS	UL	UL	24,000	10,000	10,000	8,000	10,000	5,000	3,000	
S-1	S13D	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S13R	UL	UL	48,000	20,000	20,000	16,000	20,000	10,000	6,000	
	S1	UL	UL	96,000	40,000	40,000	32,000	40,000	20,000	12,000	
S-2	SM	UL	UL	72,000	30,000	30,000	24,000	30,000	15,000	9,000	
	NS	UL	UL	35,500	19,000	8,500	14,000	8,000	18,000	5,000	3,000
	S1	UL	UL	UL	UL	UL	96,000	32,000	72,000	20,000	12,000
U	SM	UL	UL	106,500	57,000	25,500	42,000	24,000	54,000	NP	NP
	NS	UL	UL	79,000	28,500	13,000	21,000	10,000	27,000	6,000	4,000
	S1	UL	UL	UL	UL	UL	84,000	40,000	108,000	24,000	16,000
U	SM	UL	UL	237,000	85,500	39,000	63,000	30,000	81,000	NP	NP
	NS	UL	UL	30,000	16,000	6,000	8,000	6,000	8,000	5,000	1,000
	S1	UL	UL	120,000	64,000	24,000	32,000	24,000	32,000	20,000	4,000
SM	UL	UL	90,000	48,000	NP	24,000	18,000	24,000	NP	NP	

(table continues on following page)

Chicago Building Code Modernization & Impacts on Wood Construction

24

24

## . . . AND OF COURSE, THE FOOTNOTES



TABLE 506.2 (continued)

For SI: 1 square foot = 0.0929 m<sup>2</sup>.

UL = Unlimited.

NP = Not permitted.

NS = Buildings not equipped throughout with an automatic sprinkler system.

S1 = Buildings a maximum of one story above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

SM = Buildings two or more stories above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2.

S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

- a. See Chapters 4 and 5 for specific exceptions to the allowable area factor in this table.
- b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
- c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
- d. The NS value is only for use in evaluation of existing buildings in accordance with the Chicago Building Rehabilitation Code.
- e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
- f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the Chicago Fire Prevention Code.
- g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.6.
- h. New Group R-1, R-3 and R-4 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.

Footnotes are often more important than a Table . . . Details, details, details

## FIRE LIMITS – CBC


The City of Chicago has fire limits. Within the fire limits portion of the city there are added restrictions. The fire limits consist of that portion of the city bounded on the west by Halsted Street, on the north by Division Street, on the east by Lake Michigan, and on the south by Roosevelt Road. The following are just a few of the restrictions in the CBC code that may affect wood construction:

- Except as otherwise provided in Section 13-116-130, no building or structure of Type II (Type II is noncombustible with no fire resistive rating) or Type IV (Type IV is light frame) construction shall be erected within the fire limits, as defined in Section 13-116-010 nor shall wood or other combustible veneers be permitted on building or structures within such limits.
- Within the fire limits no building or structure of wood frame construction or of unprotected noncombustible construction shall be increased in height.

## FIRE LIMITS - MODCBC



In the newest iteration of the CBC, the provisions of IBC Appendix D regarding Fire Districts are adopted with one modification being that every reference to "fire district" be replaced by the Chicago term "fire limits."

Within the fire limits, every building hereafter erected shall be either Type IA, IB, IIA, IIIA or IV except as permitted in Section D105 

As can be seen by the map, a large segment of the city is not allowed to have new buildings constructed of Types II-B (except per item 14 in the list included on the next slides), III-B, V-A or VB.

Within the Fire Limits, the use of wood for other than Type III-A and Type IV construction is limited to the 15 conditions from Section D105

## FIRE LIMITS MODERNIZED – 15 PERMITTED CONDITIONS (1-7)

Fifteen Permitted Conditions in the fire limits per D105.1:



1. Temporary tents, canopies, platforms, stages reviewing stands and similar structures.
2. Trailers used in connection with duly authorized construction.
3. A detached private garage, not more than one story and 12 feet (3658 mm) in height, nor more than 500 square feet (60 m<sup>2</sup>) in area, located on the same lot with a building of Group R-5 occupancy.
4. Fences not over 10 feet (3048 mm) above adjoining grade.
5. Coal and material bins, water towers and trestles of Type IV construction.
6. Water tanks and cooling towers conforming to Sections 1509.3 and 1509.
7. Weather-protected entries not more than 12 feet (3658 mm) high and not more than 50 square feet (4.6 m<sup>2</sup>) in area.



## **FIRE LIMITS MODERNIZED – 15 PERMITTED CONDITIONS (8-11)**

8. Greenhouses less than 15 feet (4572 mm) high and less than 400 square feet (37.2 m<sup>2</sup>) in area.
9. Porches on dwellings not over one story in height, and not over 10 feet (3048 mm) wide from the face of the building, provided that such porch does not come within 3 feet (914 mm) of any interior property line and is not joined to more than one building.
10. Sheds open on a long side not over 15 feet (4572 mm) high and 400 square feet (37.2 m<sup>2</sup>) in area.
11. Buildings of Group R-5 occupancy, where of a type of construction not permitted in the fire limits, can be extended 25 percent of the floor area existing at the time of inclusion in the fire limits by any type of construction permitted by this code.



## **FIRE LIMITS MODERNIZED – 15 PERMITTED CONDITIONS (12-15)**

12. Wood or other combustible veneers on exterior walls conforming to Section 1404.5, not extending above the first story above grade plane.
13. Fire-retardant treated wood veneers conforming to Section 1404.5 not extending above the second story above grade plane.
14. Single-story buildings of Type IIB construction not exceeding 5,000 square feet (465 m<sup>2</sup>) in area. Exterior walls with a fire separation distance of less than 30 feet (9144 mm) shall have a fire-resistance rating of not less than 1 hour.
15. Roofs over parking lots and bus stations of Type IIB construction where the roof is at least 10 feet (3048 mm) above the floor and every 40 feet (12.2 m) there is an open roof ventilation area at least 6 feet (1829 mm) wide extending either the full length of the roof or the full



## FIRE LIMITS MAP



The fire limits consist of that portion of the city bounded on the west by Halsted Street, on the north by Division Street, on the east by Lake Michigan, and on the south by Roosevelt Road.



Chicago Building Code Modernization & Impacts on Wood Construction

31

31

## IN SUMMARY!? – IMPROVEMENTS/OPPORTUNITIES FOR WOOD; CBC TO MODCBC

- The existing CBC was last significantly updated in 1949 and has its own style and format that is unlike the IBC format. **The ModCBC uses a style and format familiar to IBC users.**
- Types of Construction in the existing CBC are significantly different than those types found in the IBC. **The ModCBC adopts the Types of Construction in the IBC.**



Chicago Building Code Modernization & Impacts on Wood Construction

32

32

### IN SUMMARY!?! – IMPROVEMENTS/OPPORTUNITIES FOR WOOD; CBC TO MODCBC

- The current CBC references standards that are significantly out of date. As an example, the existing CBC referenced the 1991 National Design Specification for Wood Construction (ANSI/NFoPA/NDS-91) and the 1991 Design Value for Wood Construction Supplement, the 1990 Structural Glued Laminated Timber (ANSI/AITC A190.1-90), the 1986 Plywood Design Specification (APA-86), and the 1985 Design Specifications for Metal Plate Connected Wood Trusses (TPI-85). **The ModCBC references the most current version of each standard.**



Chicago Building Code Modernization & Impacts on Wood Construction

33

33

### IN SUMMARY!?! – IMPROVEMENTS/OPPORTUNITIES FOR WOOD; CBC TO MODCBC

- The heights and areas as well as the increases allowed for sprinkler protection or frontage increases in the current CBC are different. **The ModCBC uses formulas more aligned with the current IBC.**
- In the current CBC, height and area limitations for the various occupancies and Types of Construction are in a different format than used in the IBC. **Users of the ModCBC will see the familiar tabular formats for IBC Table 504.4 (Allowable No. of Stories Above Grade Plane) and IBC Table 506.2 (Allowable Area Factor in Square Feet).**

Chicago Building Code Modernization & Impacts on Wood Construction

34

34

## IN SUMMARY!? – IMPROVEMENTS/OPPORTUNITIES FOR WOOD; MODCBC TO CBC

These Opportunities are specific to certain Types of Construction common to wood and the (B)Business and (R)Residential Occupancies. These examples are based on protection with an NFPA 13 Sprinkler System and frontage increases are NOT included.

- Single story allowable areas for wood frame (Type V) construction is doubled for residential and business occupancies.
- Single story allowable areas for heavy timber (Type IV) construction is doubled for residential occupancies.
- 3 story unprotected wood frame (Type V-B) residential occupancies are now permitted.
- 4 story protected wood frame (Type V-A) residential occupancies are now permitted.
- 5 story heavy timber (Type IV) residential occupancies are now permitted.
- 6 story heavy timber (Type IV) business occupancies are now permitted.

35

## CLOSING – THANK YOU

- Last, but not least, Although Phase 3 is coming and will include many fire safety requirements, I wanted to share information on a great website and group that is focused on construction site fire safety. That is the Construction Fire Safety Coalition



- Website address - <https://constructionfiresafety.org/>

- Thank you!

James B. Smith, P.E.

Midwest Reg. Manager

American Wood Council

608-635-6635

[jsmith@awc.org](mailto:jsmith@awc.org)

36

James B. Smith, P.E.  
Midwest Regional Manager  
AMERICAN WOOD COUNCIL  
Office/Cell: 608-635-6635  
Email: [jsmith@awc.org](mailto:jsmith@awc.org)



AMERICAN WOOD COUNCIL

[info@awc.org](mailto:info@awc.org) | [www.awc.org](http://www.awc.org)

This presentation is protected by US and International Copyright laws. Reproduction, distribution, display and use of the presentation without written permission of American Wood Council (AWC) is prohibited. © American Wood Council 2020