



WoodWorks Webinar Series

January 16<sup>th</sup>, 2024



# Floors to Exterior Walls

And Other Detailing Challenges in Mid-Rise  
Wood Buildings

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WoodWorks- Wood Products Council

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# Outline

- Allowable Heights, Areas, Number of Stories
  - » Fire Rating Requirements for Exterior Walls
    - » Assembly Asymmetry
    - » Addition of Wood Structural Panel
    - » Bearing vs. Non-bearing
    - » Vertical offsets
  - » Exterior Wall to Floor Intersection
    - » Fire Resistant Continuity
    - » Fire Retardant Continuity
  - » Parapets & Balconies



1430 Q, The HR Group Architects, Buehler Engineering, Greg Folkins Photography



Seattle, WA



Photo: Matt Todd/PB Architects

College Park, MD



Photo: Matt Church

Normal, IL



Image: OKW Architects

Los Angeles, CA



Photo: Lawrence Anderson/Esto

Atlanta, GA



LORD • AECK • S Image: Lord Aeck Sargent



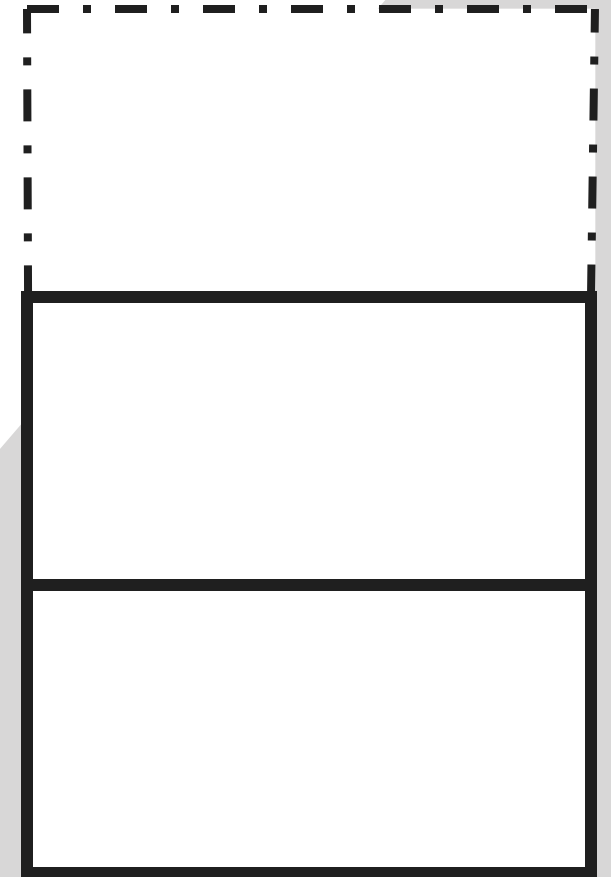
# Allowable Building Height

IBC 2018 Tables 504.3 & 504.4

## Building Height Increase

Buildings equipped throughout with an NFPA 13 or 13R\* sprinkler system are allowed an additional **1 story and 20 ft** over nonsprinklered conditions

\*NFPA 13R limited to 60 ft & 4 stories



# Allowable Building Height

IBC 2018 Table 504.3

Provides base (non-sprinklered) & increased heights

**TABLE 504.3<sup>a</sup>**  
**ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE**

OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS <sup>b</sup>	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
R	NS <sup>d, h</sup>	UL	160	65	55	65	55	65	50	40
	S13R	60	60	60	60	60	60	60	60	60
	S	UL	180	85	75	85	75	85	70	60

**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 (NFPA 13)

**S13R** = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2 (NFPA 13R)

**S13D** (not shown) = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3 (NFPA 13D)

# Allowable Stories

Provides base (non-sprinklered) & increased # of stories

IBC 2018 Table 504.4

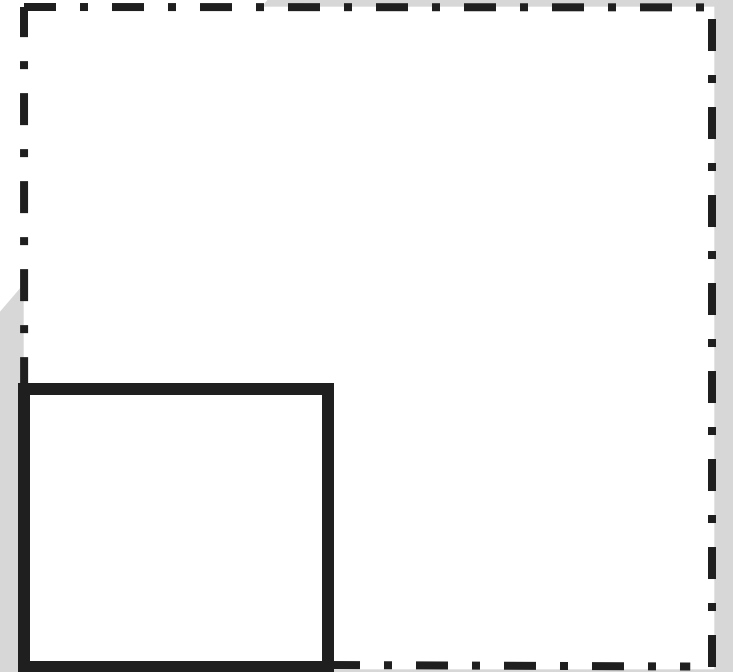
OCCUPANCY CLASSIFICATION	TYPE OF CONSTRUCTION									
	SEE FOOTNOTES	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-2	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
A-3	NS	UL	11	3	2	3	2	3	2	1
	S	UL	12	4	3	4	3	4	3	2
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
R-1	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	2
	S13R	4	4						4	3
	S	UL	12	5	5	5	5	5	4	3
R-2	NS <sup>d, h</sup>	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4					4	3
	S	UL	12	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2

# Allowable Story Area

IBC 2018 Table 506.2

## Floor Area Increase

Buildings equipped throughout with an NFPA 13 sprinkler system can be increased **300% (single story buildings)** or **200% (multi-story buildings)** over nonsprinklered conditions



# Allowable Story Area

IBC 2018 Table 506.2

Provides base (non-sprinklered) & increased areas

**TABLE 506.2<sup>a, b</sup>**  
**ALLOWABLE AREA FACTOR ( $A_t$  = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET**

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-1	NS <sup>d, h</sup>	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000

\*\*Can still increase these areas by the Frontage Factor of Section 506.3

**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 (NFPA 13)

**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 (NFPA 13)

**S13R** = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2 (NFPA 13R)



# Allowable Building Size

IBC 506.2.3

## Total Building Area

Total building allowable area =  
allowable area per floor times:

2 for 2 story building

3 for 3 or more story buildings

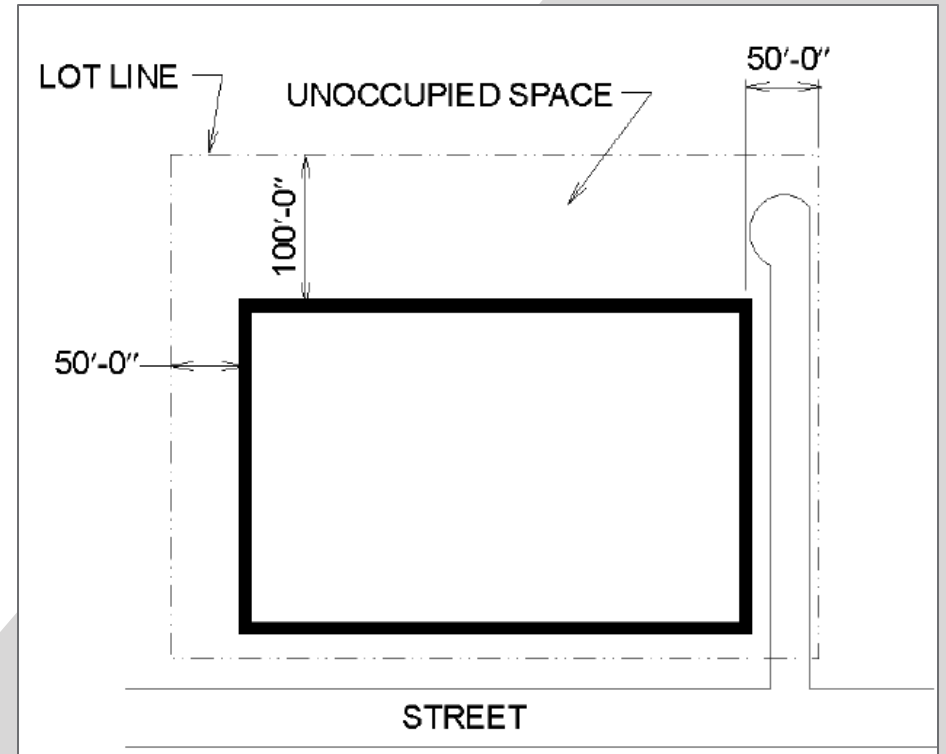


# Allowable Story Area

IBC 506.3

## Area Frontage Increase

Buildings with minimum levels of open frontage can add **up to 75%** of allowable non-sprinklered area to total floor area



# IBC Building Size Limits with Sprinkler

## Residential (R1, R2, and R4) Occupancies

Type IIIA Construction Allowable Limit	NS	S13R	S1	SM	Max Frontage
Stories	4	4	5	5	5
Height (ft)	65	60	85	85	85
Building Area/Story (ft <sup>2</sup> )	24k	24k	96k	72k	90k
Total Building Area* (ft <sup>2</sup> )	72k	96k	96k	216k	270k

\* Assuming max stories built per IBC 506.4

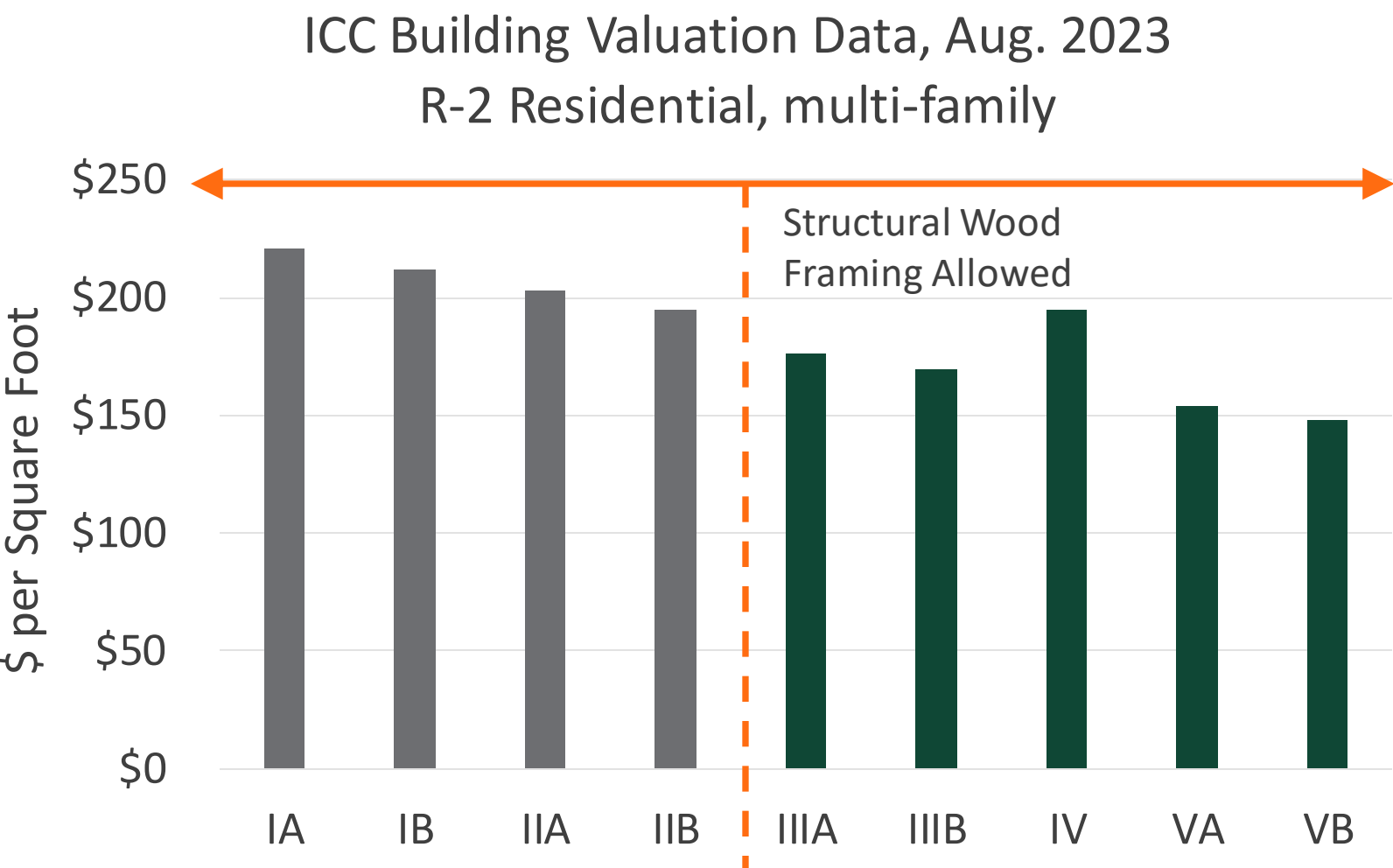
\*\* Maximum frontage increase possible

### *903.2.8 Group R*

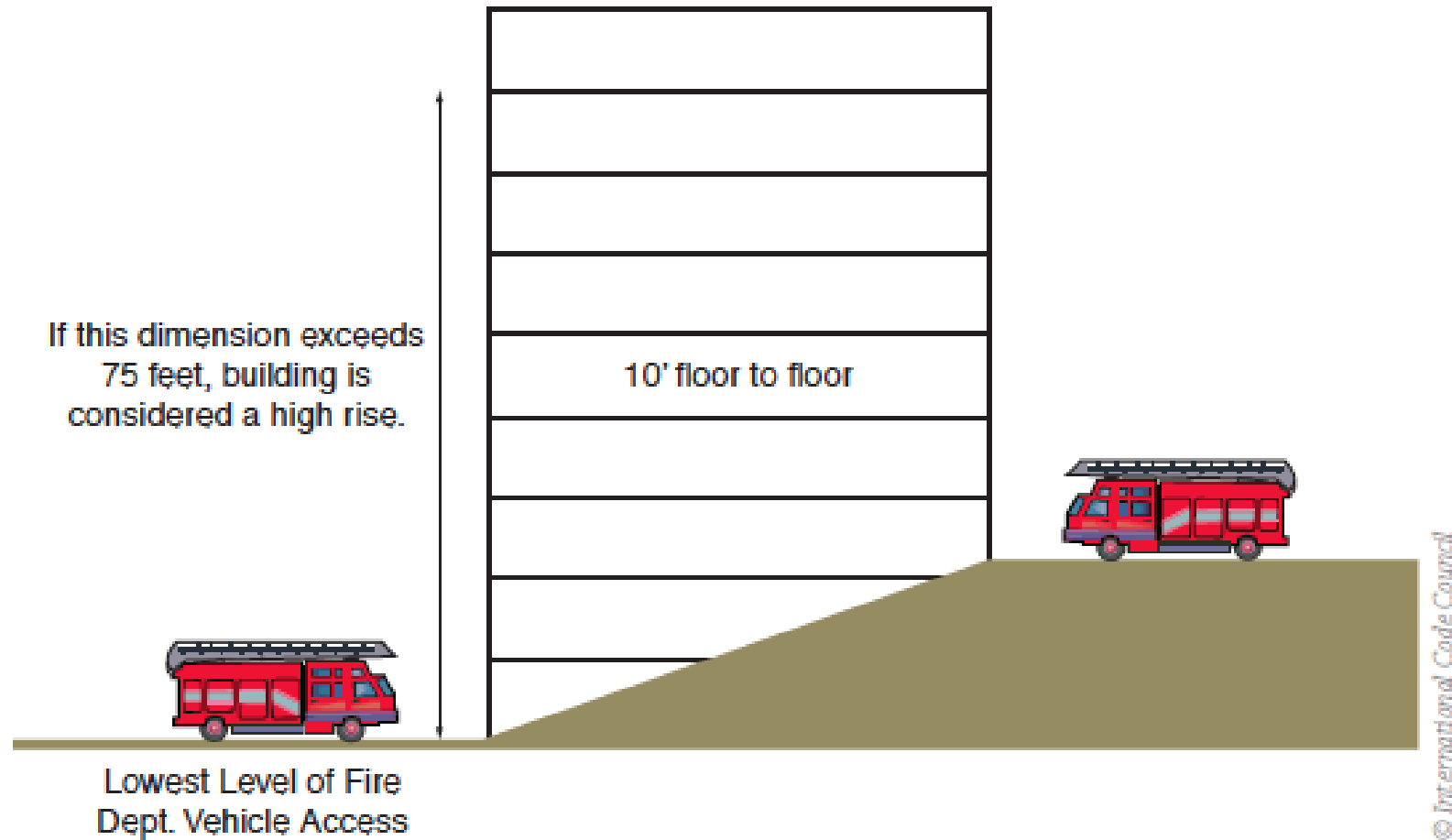
*An automatic sprinkler systems installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area*



# ICC Building Valuation Data



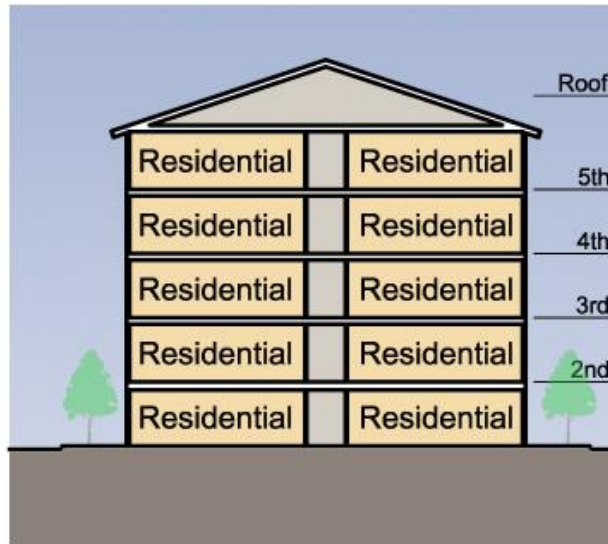
# Mid-Rise vs. High-Rise Definition – IBC 202



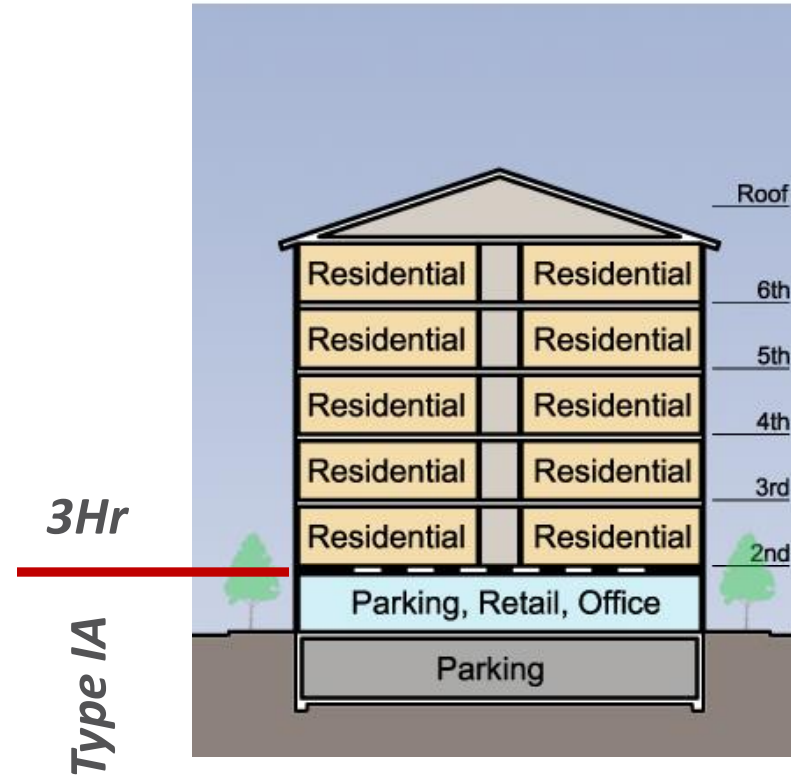
Determination of high-rise building



# IBC Podium Provisions



**5 story Type III Building**



**5 story Type III Building  
On Top of a Type IA Podium**

*See Special Provisions for Podiums in IBC 510.2  
Increases allowable stories... not allowable building height*



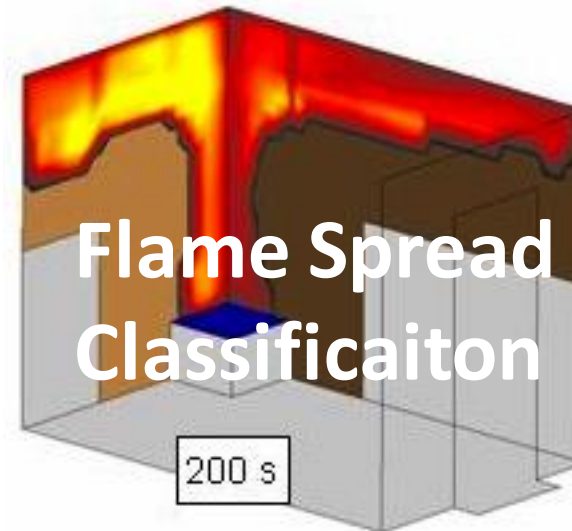
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1430 Q, The HR Group Architects, Buehler Engineering, Greg Folkins Photography

# Fire Performance



# Fire-Resistance Ratings

Key Differences in Fire Ratings for Construction Types			
	IIIA	IIIB	VA
Exterior wall framing	FRT	FRT	non-FRT
Exterior bearing wall fire rating	2 hr	2 hr	1 hr
Interior bearing wall fire rating	1 hr	0 hr	1 hr
Interior non-bearing wall fire rating	0 hr	0 hr	0 hr
Floor assembly fire rating	1 hr	0 hr	1 hr
Fire wall rating	3 hr	3 hr	2 hr

**From IBC Tables 601 & 706.4**

Note: FRT = Fire Retardant Treated

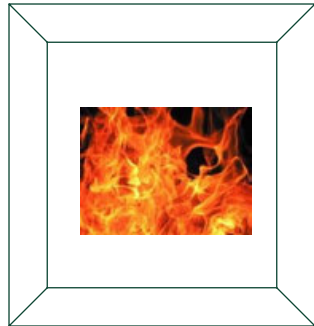


# Fire Resistance-Rated Wall Assemblies

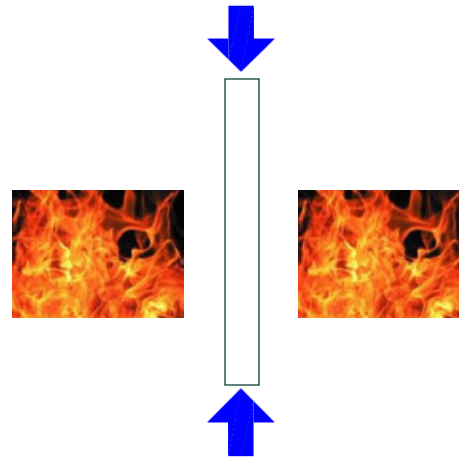
**Fire-Resistance Rating:** The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703.

**Tested under a standardized test fire exposure for a given duration to:**

1. Prevent the passage of flame and temperature rise from one side to the other
2. Continue to provide vertical structural support when exposed to fire and elevated temperatures



**Fire Confinement**



**Structural Performance**

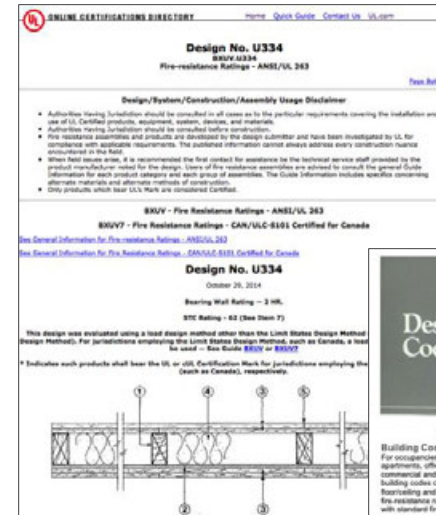
# Choosing Fire Rated Assemblies

Common tested assemblies (ASTM E119) per IBC 703.2:

- » UL Listings
- » Gypsum Catalog
- » Proprietary Manufacturer Tests
- » Industry Documents: such as AWC's DCA3

Alternate Methods per IBC 703.3

- » Prescriptive designs per IBC 721.1
- » Calculated Fire Resistance per IBC 722
- » Fire-resistance designs documented in sources
- » Engineering analysis based on a comparison
- » Fire-resistance designs certified by an approved agency



# Unique to Exterior Walls

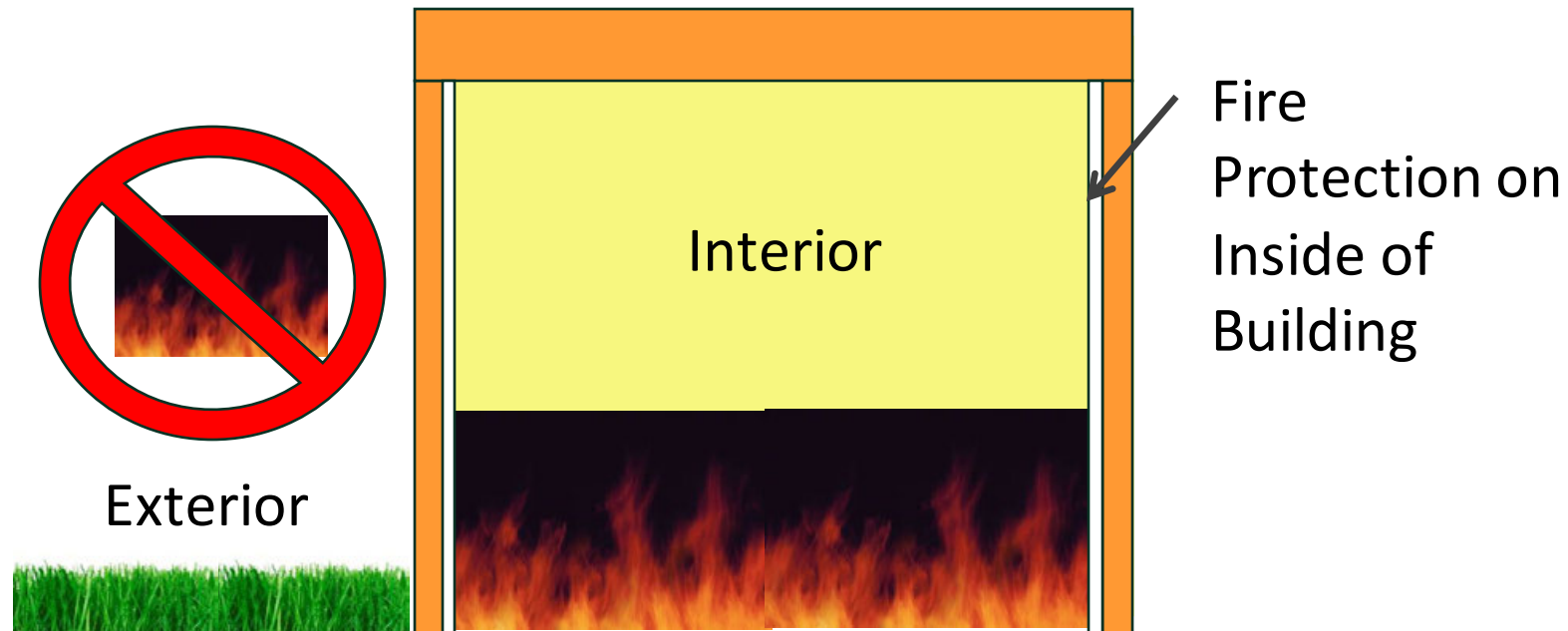
Exterior walls differ from other light frame fire assemblies in three basic ways:

- » Hourly rating requirements per Tables 601 vs 602
- » Structural stability requirements
- » Non-combustible exception



# Exterior Walls – IBC 705

Basic assumption is that fires begin at the interior and rated wall assemblies are not required *from* the exterior unless close to another structure.



# Exterior Walls – Fire Separation Distance

**705.5 Fire Resistance Ratings:** Exterior walls shall be fire-resistance rated in accordance with Tables 601 and 602 and this section. The required fire-resistance rating of exterior walls with a fire separation distance of greater than 10 feet shall be rated for exposure to fire from the inside. The required fire-resistance rating of exterior walls with a fire separation distance of less than or equal to 10 feet shall be rated for exposure to fire from both sides.

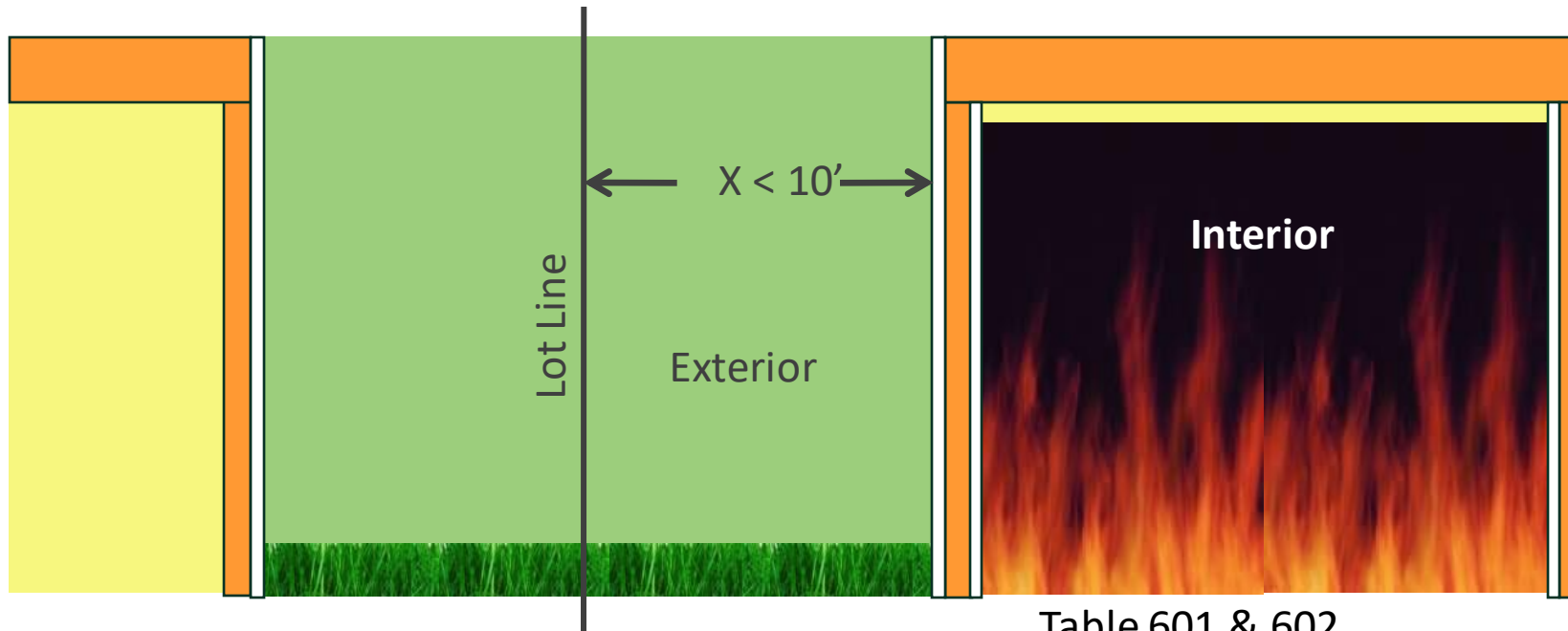


Table 601 & 602

# Exterior Wall Fire Resistance

**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>f</sup> (see Section 202)	3 <sup>a, b</sup>	2 <sup>a, b</sup>	1 <sup>b</sup>	0	1 <sup>b</sup>	0	HT	1 <sup>b</sup>	0
Bearing walls									
Exterior <sup>c, f</sup>	3	2	1	0	2	2	2	1	0
Interior	3 <sup>a</sup>	2 <sup>a</sup>	1	0	1	0	1/HT	1	0
Nonbearing walls and partitions	See Table 602								
Exterior									
Nonbearing walls and partitions							See		
Interior <sup>d</sup>	0	0	0	0	0	0	Section	0	0
							2304.11.2		
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	1 <sup>1/2</sup> <sup>b</sup>	1 <sup>b, c</sup>	1 <sup>b, c</sup>	0 <sup>c</sup>	1 <sup>b, c</sup>	0	HT	1 <sup>b, c</sup>	0

**TABLE 602**  
**FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE<sup>a, d, g</sup>**

FIRE SEPARATION DISTANCE = X (feet)	TYPE OF CONSTRUCTION	OCCUPANCY GROUP H <sup>e</sup>	OCCUPANCY GROUP F-1, M, S-1 <sup>f</sup>	OCCUPANCY GROUP A, B, E, F-2, I, R, S-2, U <sup>h</sup>
X < 5 <sup>b</sup>	All	3	2	1
5 ≤ X < 10	IA	3	2	1
	Others	2	1	1
10 ≤ X < 30	IA, IB	2	1	1 <sup>c</sup>
	IIB, VB	1	0	0
	Others	1	1	1 <sup>c</sup>
X ≥ 30	All	0	0	0

# Type V Exterior Walls: Fire Rating Requirements

Fire Rating of Structural Elements	VA		VB	
For occupancy groups A, B, E, F-2, I, R, S-2, U	Int. face of wall	Ext. face of wall	Int. face of wall	Ext. face of wall
FSD ≥ 30 ft				
Exterior bearing walls (hrs)	1	0	0	0
Exterior Nonbearing walls (hrs)	0	0	0	0
10 ft < FSD < 30 ft				
Exterior bearing walls (hrs)	1	0	0	0
Exterior Nonbearing walls (hrs)	1	0	0	0
FSD ≤ 10 ft				
Exterior bearing walls (hrs)	1	1	1	1
Exterior Nonbearing walls (hrs)	1	1	1	1

# Type III Exterior Walls: Fire Rating Requirements

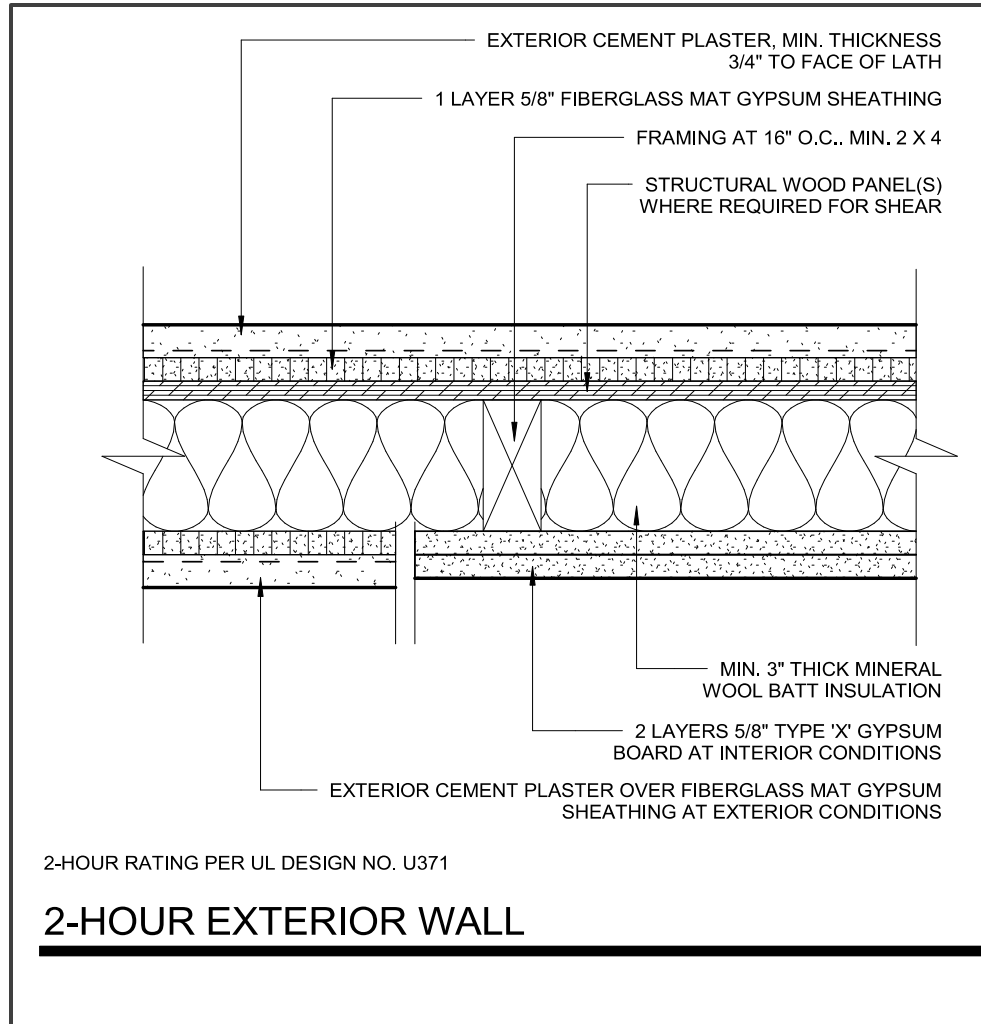
Fire Rating of Structural Elements	IIIA		IIIB	
For occupancy groups A, B, E, F-2, I, R, S-2, U	Int. face of wall	Ext. face of wall	Int. face of wall	Ext. face of wall
<b>FSD ≥ 30 ft</b>				
Exterior bearing walls (hrs)	2	0	2	0
Exterior Nonbearing walls (hrs)	0	0	0	0
<b>10 ft &lt; FSD &lt; 30 ft</b>				
Exterior bearing walls (hrs)	2	0	2	0
Exterior Nonbearing walls (hrs)	1	0	0	0
<b>FSD ≤ 10 ft</b>				
Exterior bearing walls (hrs)	2	2	2	2
Exterior Nonbearing walls (hrs)	1	1	1	1



# Exterior Wall Fire Ratings

- » Using the provisions of section 705.5 and Tables 601 and 602 could result in requiring a 1-hour or 2-hour rating on the inside face of exterior walls, while no rating is required on the exterior face of exterior walls.
- » How do we specify such an asymmetric assembly?
- » This is where prescriptive code methodology begins to break down; procedural data does not align with requirements. Most building jurisdictions understand that this is a deficiency of the system and will recognize one tested assembly for the outside and a second for the inside.

# Exterior Walls – Asymmetry



Common issues with tested assemblies:

- Assembly asymmetry: separate assemblies for each side

# Exterior Walls – 1-hr Int; 0-hr Ext

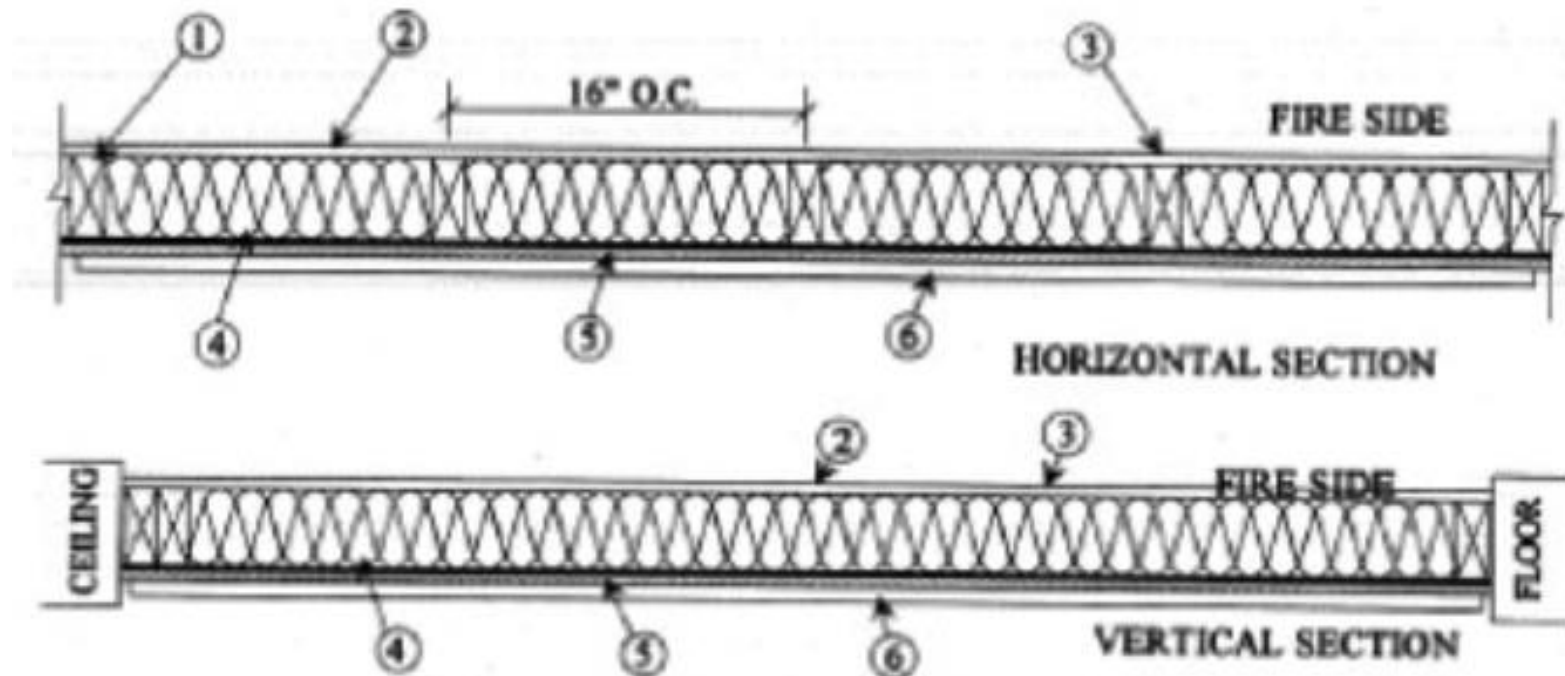
## Design No. U348

April 01, 2013

**Bearing Wall Rating — 1 Hr**

**(EXPOSED TO FIRE ON INTERIOR FACE ONLY)**

**Finish Rating — 23 min**



# Exterior Walls – 1-hr Int; 0-hr Ext

IBC Table 721.1(2)

16. Exterior walls rated for fire resistance from the inside only in accordance with Section 705.5.	16-1.1 <sup>a</sup>	2" × 4" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $\frac{5}{8}$ " Type X gypsum wallboard, 4" wide, applied horizontally unblocked, and fastened with $2\frac{1}{4}$ " Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Exterior covered with $\frac{3}{8}$ " wood structural panels, applied vertically, horizontal joints blocked and fastened with 6d common nails (bright) — 12" on center in the field, and 6" on center panel edges. Cavity to be filled with $3\frac{1}{2}$ " mineral wool insulation. Rating established for exposure from interior side only.	—	—	—	$4\frac{1}{2}$
	16-1.2 <sup>a</sup>	2" × 6" wood studs at 16" centers with double top plates, single bottom plate; interior side covered with $\frac{5}{8}$ " Type X gypsum wallboard, 4" wide, applied horizontally or vertically with vertical joints over studs and fastened with $2\frac{1}{4}$ " Type S drywall screws, spaced 12" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound, exterior side covered with $\frac{7}{16}$ " wood structural panels fastened with 6d common nails (bright) spaced 12" on center in the field and 6" on center along the panel edges. Cavity to be filled with $5\frac{1}{2}$ " mineral wool insulation. Rating established from the gypsum-covered side only.	—	—	—	$6\frac{9}{16}$
	16-1.3 <sup>a</sup>	2" × 6" wood studs at 16" centers with double top plates, single bottom plates; interior side covered with $\frac{5}{8}$ " Type X gypsum wallboard, 4" wide, applied vertically with all joints over framing or blocking and fastened with $2\frac{1}{4}$ " Type S drywall screws spaced 7" on center. Joints to be covered with tape and joint compound. Exterior covered with $\frac{3}{8}$ " wood structural panels, applied vertically with edges over framing or blocking and fastened with 6d common nails (bright) at 12" on center in the field and 6" on center on panel edges. R-19 mineral fiber insulation installed in stud cavity. Rating established from the gypsum-covered side only.	—	—	—	$6\frac{1}{2}$

# Exterior Walls – 2-hr Int; 0-hr Ext

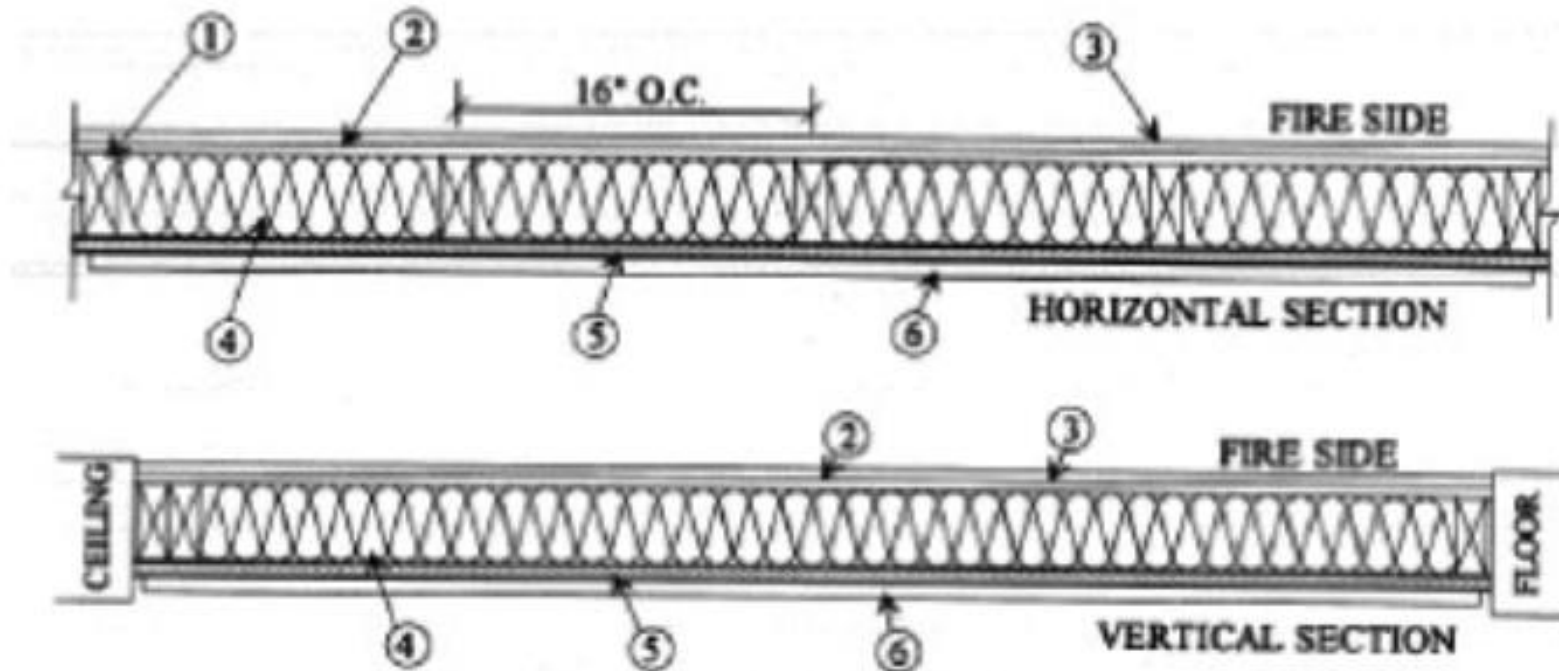
## Design No. U349

August 21, 2013

Bearing Wall Rating — 2 Hr


(EXPOSED TO FIRE ON INTERIOR FACE ONLY)

For Wood Studs, Finish Rating — 55 min





# Exterior Walls – Using FRT Studs

 **ONLINE CERTIFICATIONS DIRECTORY** [Home](#) [Quick Guide](#) [Contact Us](#) [UL.com](#)

**BXUV.GuideInfo**  
**Fire Resistance Ratings - ANSI/UL 263**

[View Listings](#) [Page Bottom](#)

[Guide Information for Fire](#)

The Design Information S

- I. INTRODUCTION
- II. GENERAL
- III. FLOOR-CEILING
- IV. BEAMS
- V. COLUMNS**
- VI. WALLS AND PARTITIONS

*“Wood stud walls may contain fire-retardant-treated studs as well as untreated wood studs. The use of fire-retardant-treated plywood (wood structural panels) may be used in Designs that contain use of untreated plywood when all other specified attributes are equivalent to the wood structural panel used in the Design.”*

# Exterior Walls – Addition of Wood Structural Panel

Can include WSP in assemblies which were tested without them:

- » ESR 2586
- » AWC's DCA4
- » Gypsum Association Manual

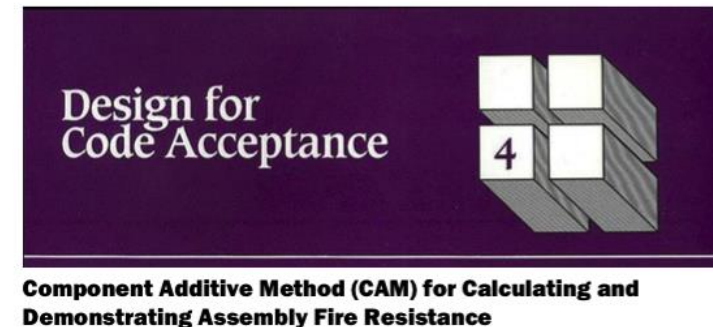
ESR 2586:

## 4.7 Fire-resistive Construction:

Structural-use panels may be installed between the fire protection and the wood studs on either the interior or exterior side of fire-resistance-rated wood frame wall and partition assemblies described in the applicable code, provided the length of fasteners is adjusted for the added thickness of the panel.

GA Fire Resistance Design Manual  
Item 23, Section 1 of the General  
Explanatory Notes:

*“When not specified as a component of a fire- resistance rated wall or partition system, wood structural panels shall be permitted to be added to one or both sides.”*



# Exterior Walls – Bearing vs. Nonbearing

Non load-bearing exterior walls may have lower fire resistance rating requirements than bearing walls in certain situations. IBC Chapter 2 defines load bearing walls as:

**[BS] WALL, LOAD-BEARING.** Any wall meeting either of the following classifications:

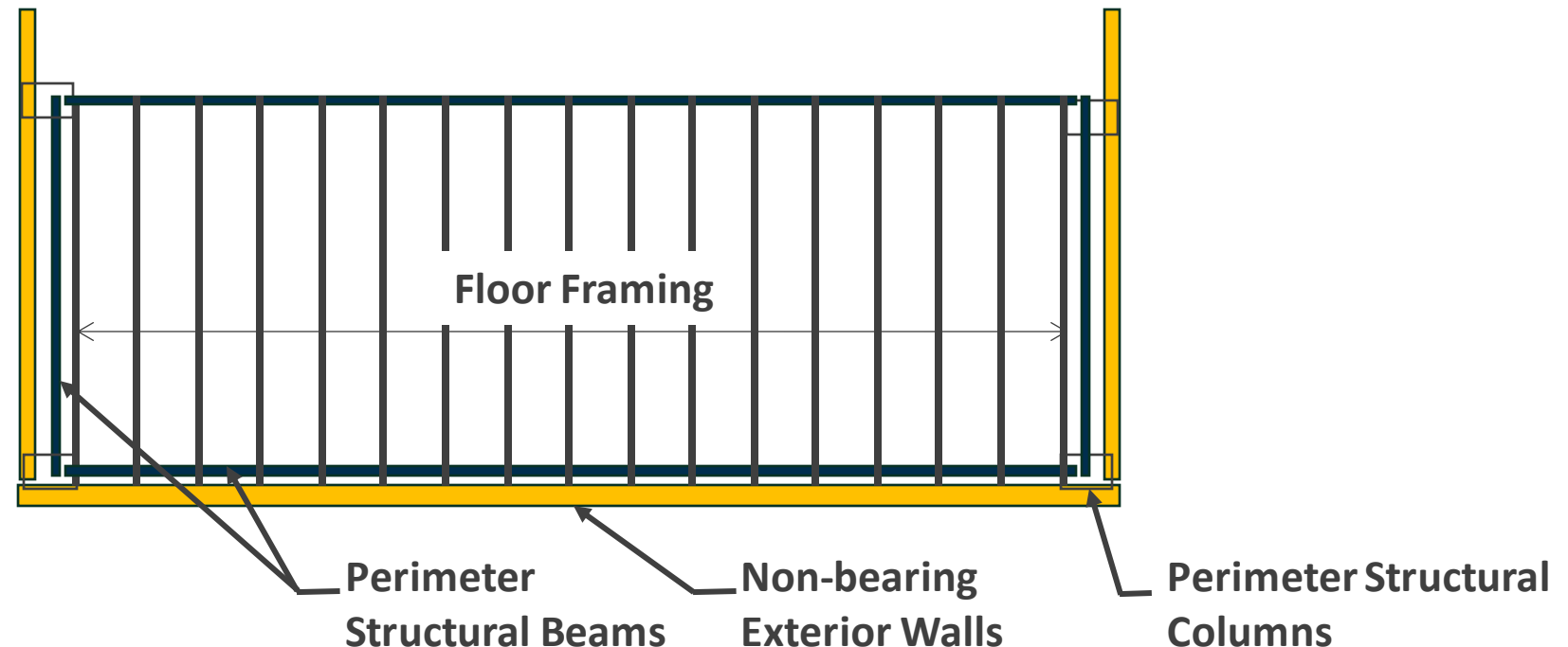
1. Any metal or wood stud wall that supports more than 100 pounds per linear foot (1459 N/m) of vertical load in addition to its own weight.

**[BS] WALL, NONLOAD-BEARING.** Any wall that is not a *load-bearing wall*.

# Exterior Walls – Bearing vs. Non-Bearing

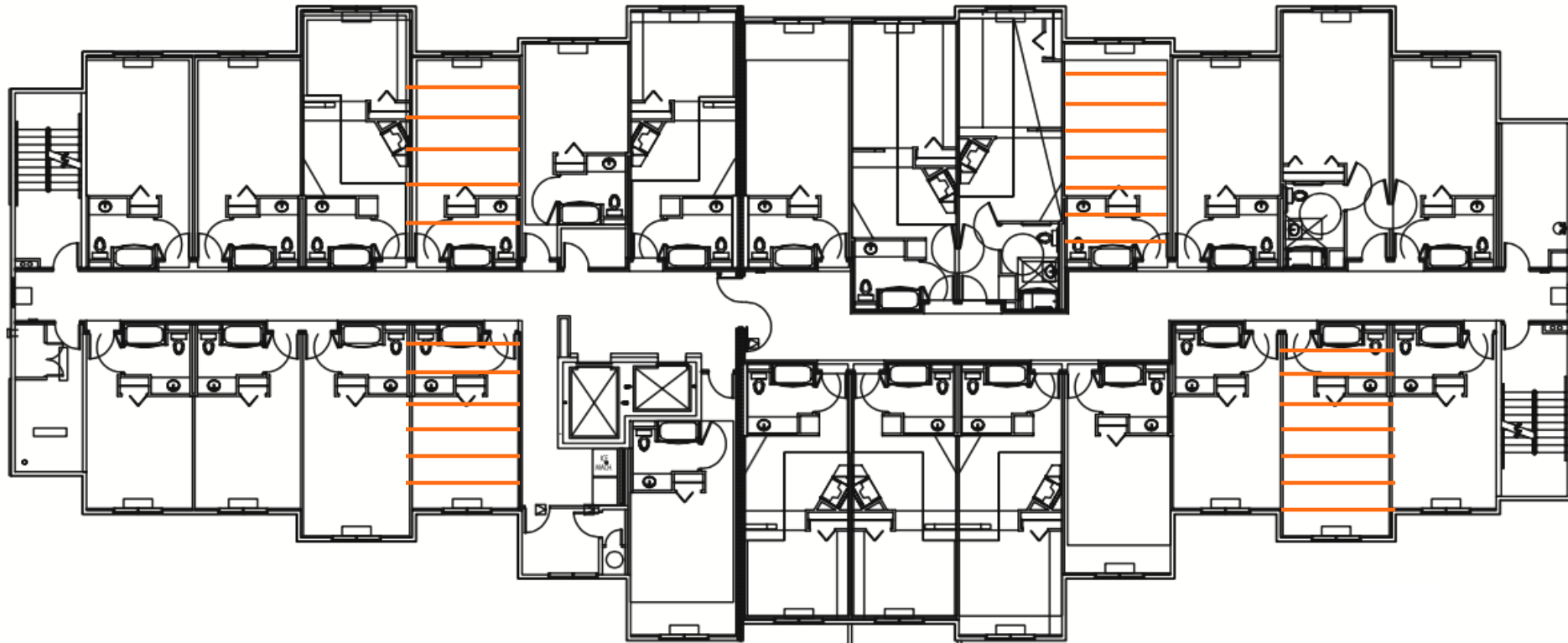
Utilization of structural beams in-board or directly over exterior walls can make walls non-bearing and reduce required fire resistance rating to 1-hr or 0-hr (IBC Table 602)

Note: Beams & Columns will most likely be considered “Primary Structural Frame” & require individual encasement per IBC 704



# Exterior Walls – Bearing vs. Non-Bearing

If framing parallel to long exterior walls is possible, minimizes area of load bearing exterior walls

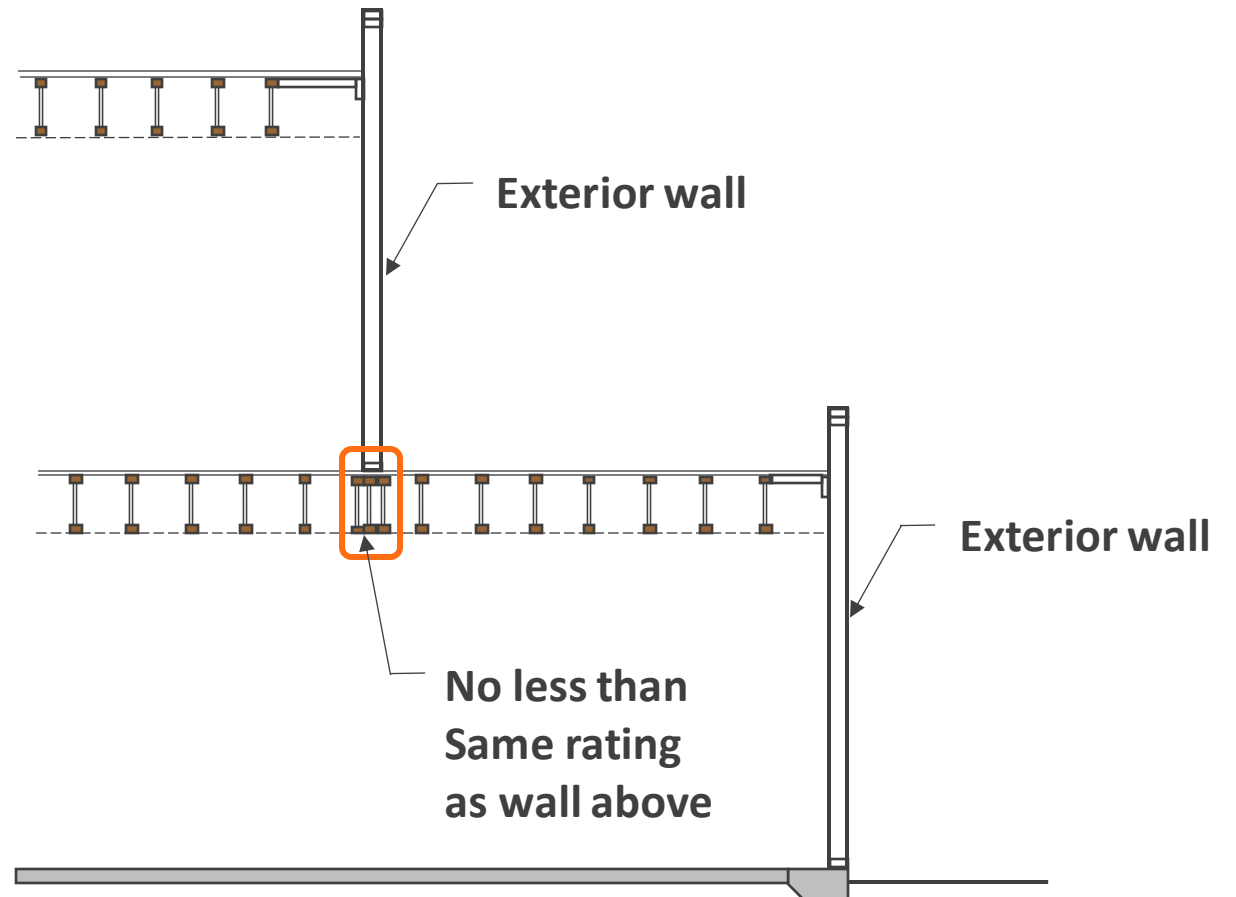




# Exterior Walls – Vertical Offsets

There is no requirement for an exterior wall to extend to the foundation in a stepped building.

Posts, beams or walls, that support a rated exterior wall must be fire-resistance rated not less than the rating of the supported wall (IBC 704.1)



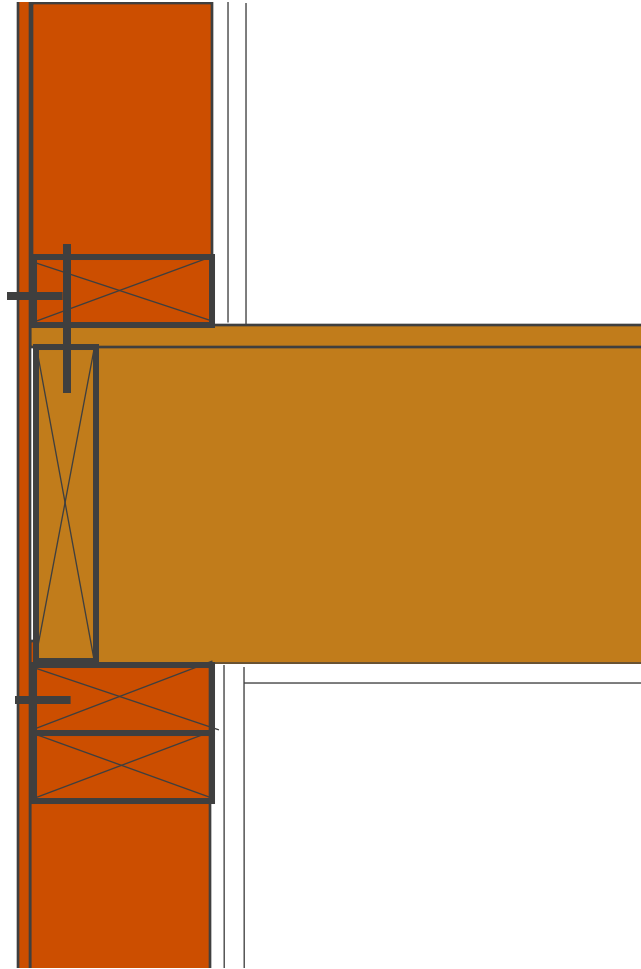
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1430 Q, The HR Group Architects, Buehler Engineering, Greg Folkins Photography

# Platform Framing



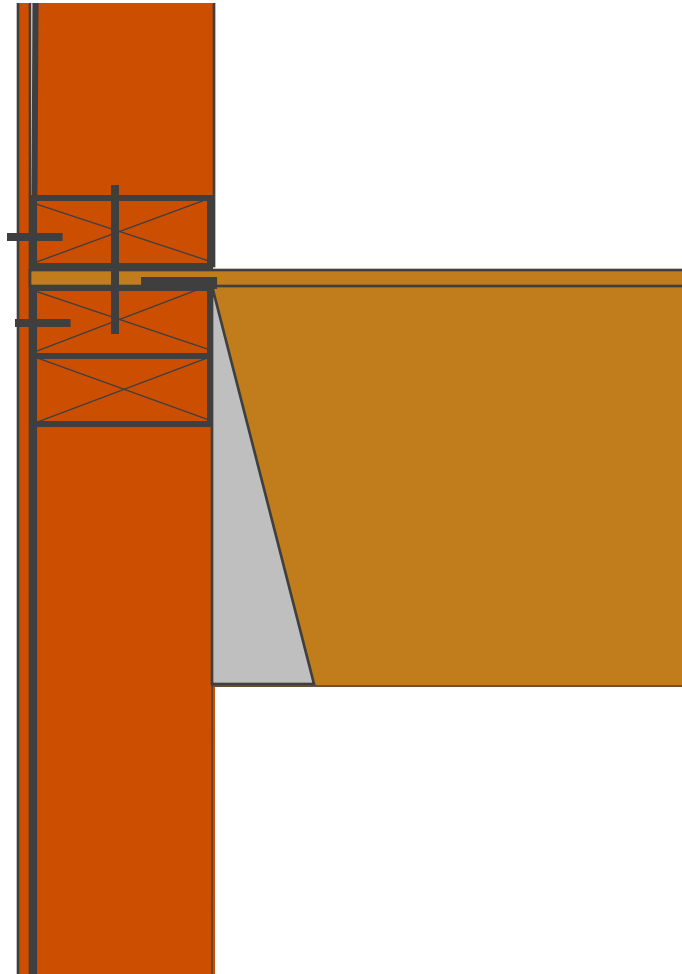
## Structural

- » Direct bearing/no additional hardware
- » May require load transfer blocking for concentrated loads from above
- » Wall sill/sole plate and floor sheathing crushing may need to be considered

## Constructability

- » Framing can be completed before drywall and insulation are installed
- » Common length studs

# Semi-balloon Framing



## **Structural**

- » Additional hardware/no direct bearing
- » No load transfer blocking required

## **Rated Assemblies**

- » May accommodate continuity in exterior walls in type III construction

## **Constructability**

- » Framing can be completed before drywall and insulation are installed
- » Custom length studs
- » Can help minimize building shrinkage

# Intersection of Assemblies – Ratings

Key Differences in Fire Ratings for Construction Types			
	IIIA	IIIB	VA
Exterior wall framing	FRT	FRT	non-FRT
Exterior bearing wall fire rating	2 hr	2 hr	1 hr
Floor assembly fire rating	1 hr	0 hr	1 hr

From IBC Table 601

Note: FRT = Fire Retardant Treated



# Intersection of Tested Assemblies

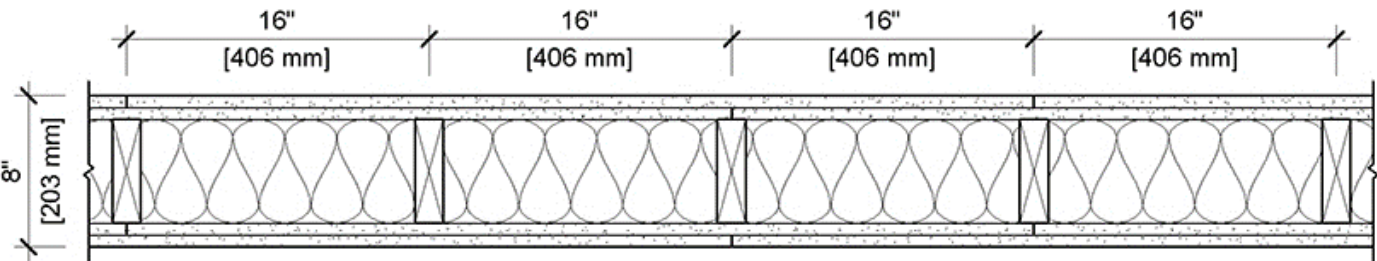
2 Hour Wall

## Design No. U301

May 20, 2015

Bearing Wall Rating — 2 HR.

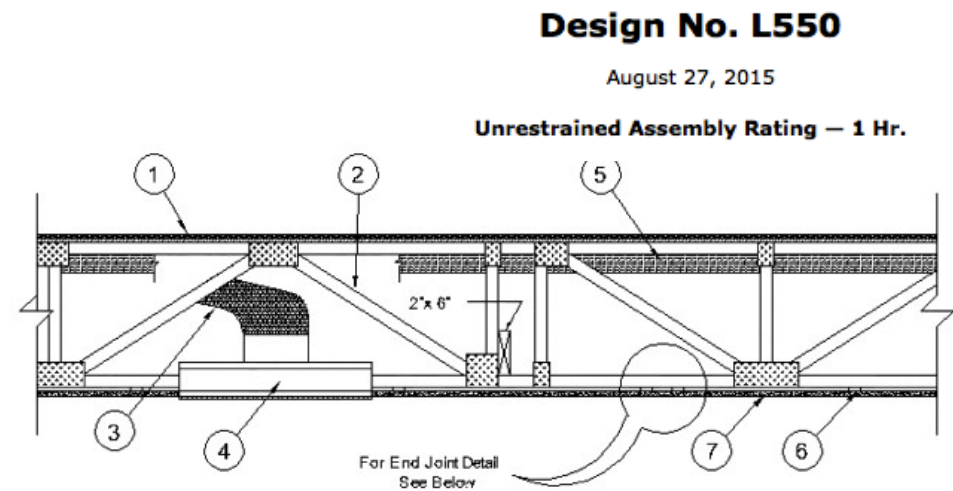
Finish Rating — 66 Min.

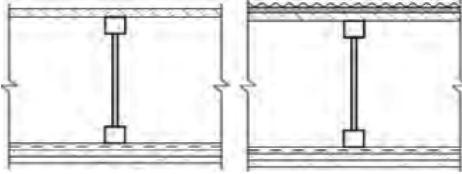


GA FILE NO. WP 4135	GENERIC	2 HOUR FIRE	40 to 44 STC SOUND
<b>GYPSUM WALLBOARD, WOOD STUDS</b>			
<b>Base</b> layer 5/8" type X gypsum wallboard or gypsum veneer base applied at right angles to each side of 2 x 4 wood studs 24" o.c. with 6d coated nails, 1 7/8" long, 0.085" shank, 1/4" heads, 24" o.c. <b>Face</b> layer 5/8" type X gypsum wallboard or gypsum veneer base applied at right angles to each side with 8d coated nails, 2 3/8" long, 0.100" shank, 1/4" heads, 8" o.c.			
Joints staggered 24" each layer and side. Sound tested with studs 16" o.c. and with nails for <b>base</b> layer spaced 6" o.c. ( <b>LOAD-BEARING</b> )		Thickness: 6 1/8"	
		Approx. Weight: 12 psf	
		Fire Test: FM WP 360, 9-27-74	
		Sound Test: NGC 2363, 4-1-70	

# Intersection of Tested Assemblies

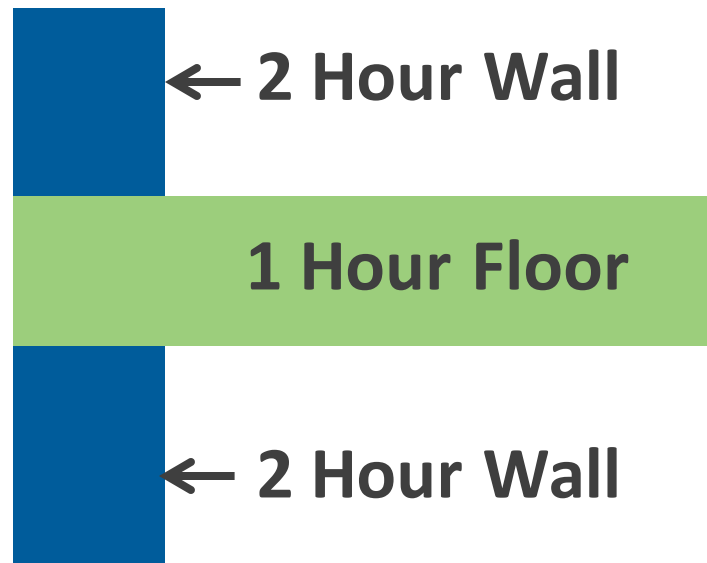
1 Hour Floor



FLOOR-CEILING SYSTEMS, WOOD FRAMED			
GA FILE NO. FC 5111	GENERIC	1 HOUR FIRE	50 to 54 STC SOUND
<b>WOOD I-JOISTS, GYPSUM WALLBOARD, RESILIENT CHANNELS</b>			
<p><b>Base</b> layer 1/2" type X gypsum wallboard applied at right angles to resilient channels 16" o.c. with 1 1/4" Type S drywall screws 12" o.c. Resilient channels applied at right angles to minimum 9 1/2" deep wood I-joists, with minimum 1 1/4" deep x 1 1/2" wide flanges and minimum 3/8" webs, 24" o.c. with 1 1/4" Type W drywall screws. <b>Face</b> layer 1/2" type X gypsum wallboard applied at right angles to channels with 1 5/8" Type S drywall screws 12" o.c. Face layer end joints located midway between channels and attached to base layer with 1 1/2" Type G screws 12" o.c. Edge joints offset 24" from base layer edge joints. Wood I-joists supporting 5/8" oriented strand board applied at right angles to I-joists with 8d common nails 12" o.c.</p> <p>STC and IIC tested with 40 oz carpet over 1/4" foam pad.</p>			
		<p>Approx. Ceiling Weight: 5 psf Fire Test: NRCC A-4440.1 (Revised), 6-24-97 Sound Test: NRCC B-3150.2, 6-30-00 IIC &amp; Test: (68 C &amp; P) NRCC B-3150.2, 6-30-00</p>	

# Intersection of Tested Assemblies

- » Many options are available for fire resistance tested floor assemblies and wall assemblies
- » No tested intersection details exist
- » We must understand the intent of the code, provide a rationale that meets the code's intent, and utilize available information and testing results



# Type III Exterior Walls – FRT

## **Type III and IV-HT Construction - IBC Section 602.3:**

Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less

What does this FRT requirement include?

- » Wall Framing (Studs & Plates) – **Yes**
- » Wall Sheathing – **Yes**
- » Floor sheathing - **?**
- » Rim boards **?**
- » Floor Joists- **?**

# Exterior Walls – Intersecting Floors

Some have interpreted the allowance of FRT framing in exterior walls of type III construction as not including FRT wall sheathing. The inclusion of wall sheathing is intended in the allowance of FRT framing.

Changes in the 2018 IBC clarify this.

## **602.3 Type III.**

Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing and sheathing complying with Section 2303.2 shall be permitted within *exterior wall* assemblies of a 2-hour rating or less.

## **602.4 Type IV.**

Type IV construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid wood, laminated wood, heavy timber (HT) or structural composite lumber (SCL) without concealed spaces. The minimum dimensions for permitted materials including solid timber, glued-laminated timber, structural composite lumber (SCL), and cross-laminated timber and details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.1 or 602.4.2 shall be permitted. Interior walls and partitions not less than 1-hour fire-resistance rating or heavy timber complying with Section 2304.11.2.2 shall be permitted.

Relocated

### **602.4.1 Fire-retardant-treated wood in exterior walls.**

Fire-retardant-treated wood framing and sheathing complying with Section 2303.2 shall be permitted within exterior wall assemblies not less than 6 inches (152 mm) in thickness with a 2-hour rating or less.

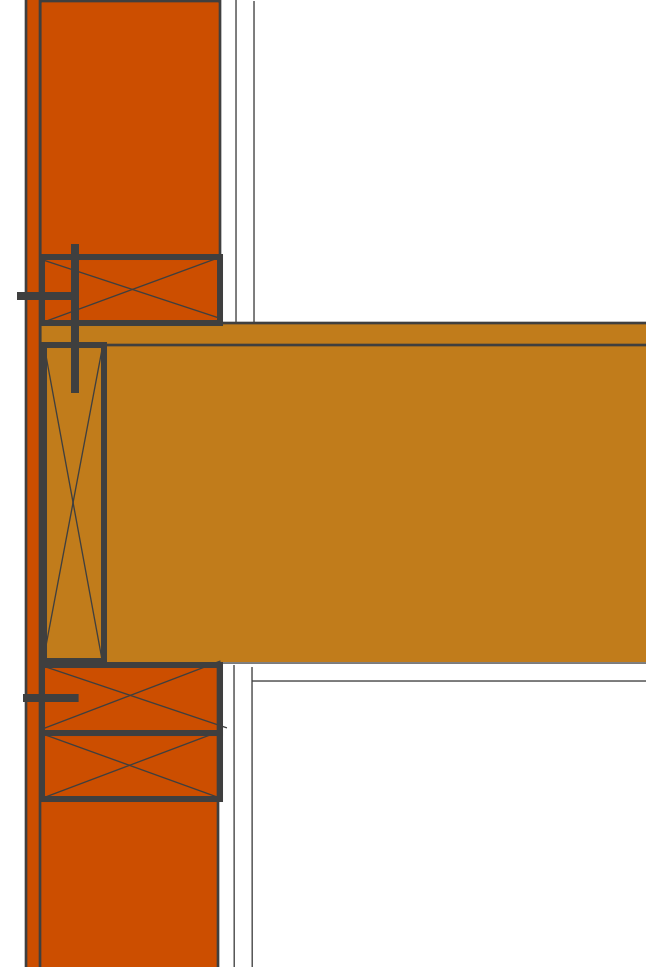


# Exterior Walls – Structural Stability

## **IBC 705.6 Structural Stability:**

Exterior walls shall extend to the height required by 705.11.

Interior structural elements that brace the exterior wall but that are not located within the plane of the exterior wall shall have the minimum fire resistance rating required in Table 601 for that structural element. Structural elements that brace the exterior wall but are located outside of the exterior wall or within the plane of the exterior wall shall have the minimum fire resistance rating required in Tables 601 or 602 (IBC 2018 and previous) or 705.5 (IBC 2021 & 2024) for the exterior wall.



# Code Commentary – 2018 IBC 705.6

- ❖ Structural stability of fire-resistance-rated construction is an important concern. Section 705.6 requires elements providing bracing support to be fire-resistance-rated for the same duration of time as the exterior wall. In light-frame platform construction, require that the band joist or beam supporting the floor and the wall above to also be of fire-resistance-rated construction. Although the floor construction may not be required to be of fire-resistance-rated construction in Type IIB and VB construction, effort must be made to ensure that the floor joists, at least at the exterior wall, are of fire-resistance-rated construction. Although the floor framing acts as lateral support for the exterior wall, this section does not require that the entire floor system be of fire-resistance-rated construction. To state otherwise would prohibit Type IIB and VB buildings with an FSD of less than 10 feet (3048 mm). Only the structural element within the floor system that supports the vertical load of the wall must be of fire-resistance-rated construction.

“In light-frame platform construction, this will require that the **band joist or beam supporting the floor and the wall above to also be of fire-resistant construction....**

Although the floor framing acts as a lateral support for the exterior wall, **this section does not require that the entire floor system be of fire-resistance rated construction.”**

# Exterior Walls – Intersecting Floors

## Disclaimer:

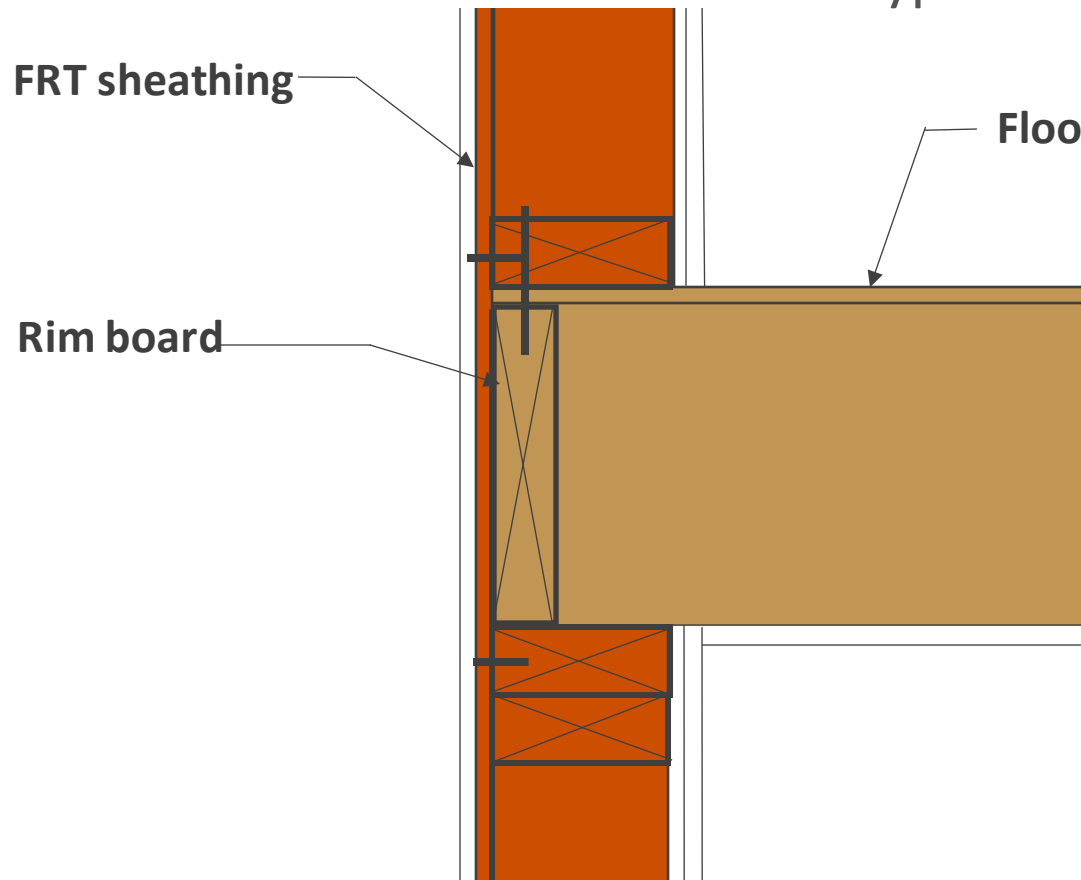
Please note that the following details are examples of what we have seen used on projects and do not necessarily represent details that will be accepted and applicable in all jurisdictions and to all projects.

These details are not intended as recommendations for universally accepted details. Local product availability and manufacturer specifications should also be considered for each project.

The Architect of Record and Engineer of Record should verify acceptance of the details used on their project with all provisions of the building code, including local amendments, with the local Authority Having Jurisdiction.

# Exterior Walls – Intersecting Floors

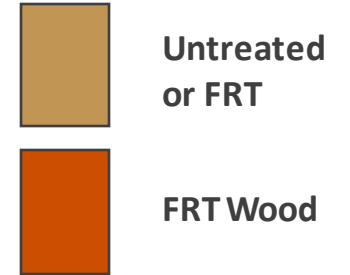
Type III Construction: 2-hr Wall, 1-hr Floor  
Typical Platform Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend



## Considerations:

» Shrinkage of rim, plates, joists

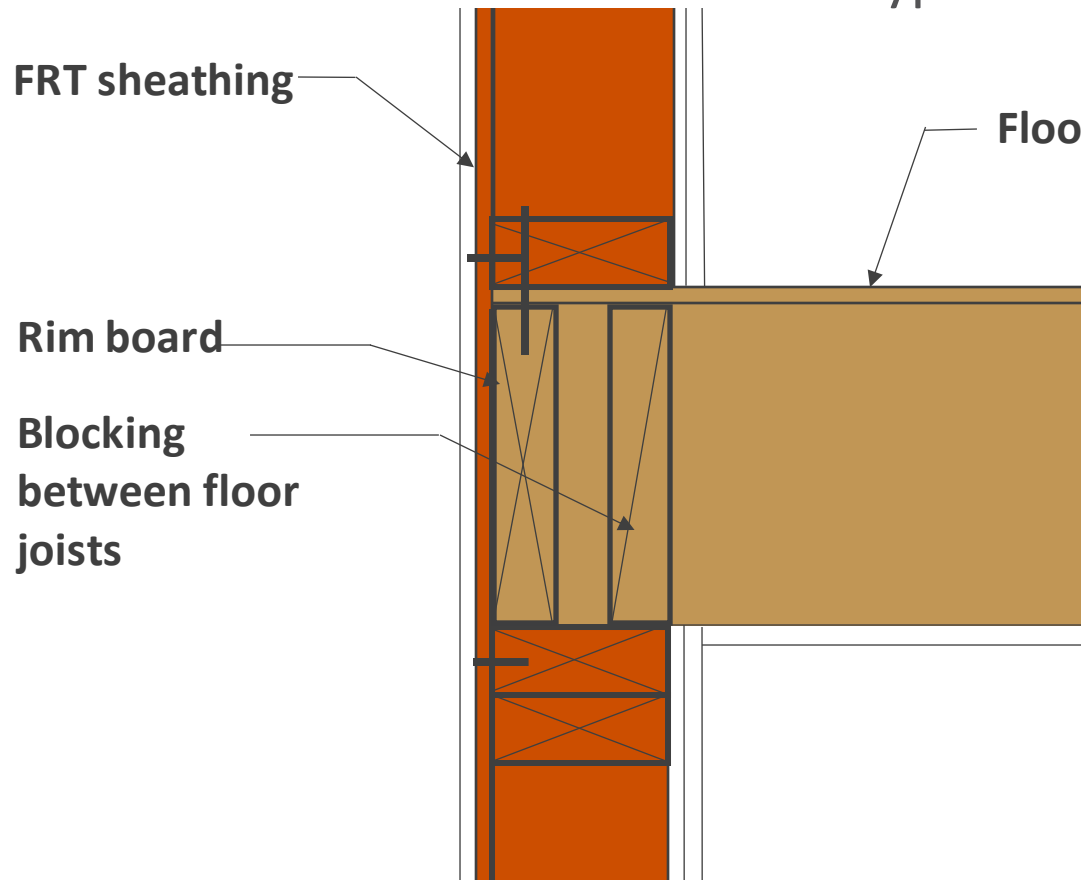
» Protection of rim for fire

## Rationale for detail approval:

» Intersection of rated assemblies (wall & floor) considered sufficient

# Exterior Walls – Intersecting Floors

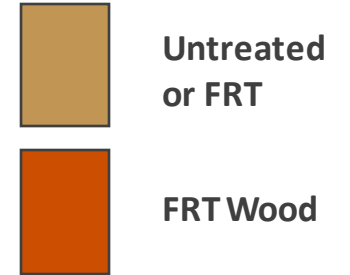
Type III Construction: 2-hr Wall, 1-hr Floor  
Typical Platform Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend



## Considerations:

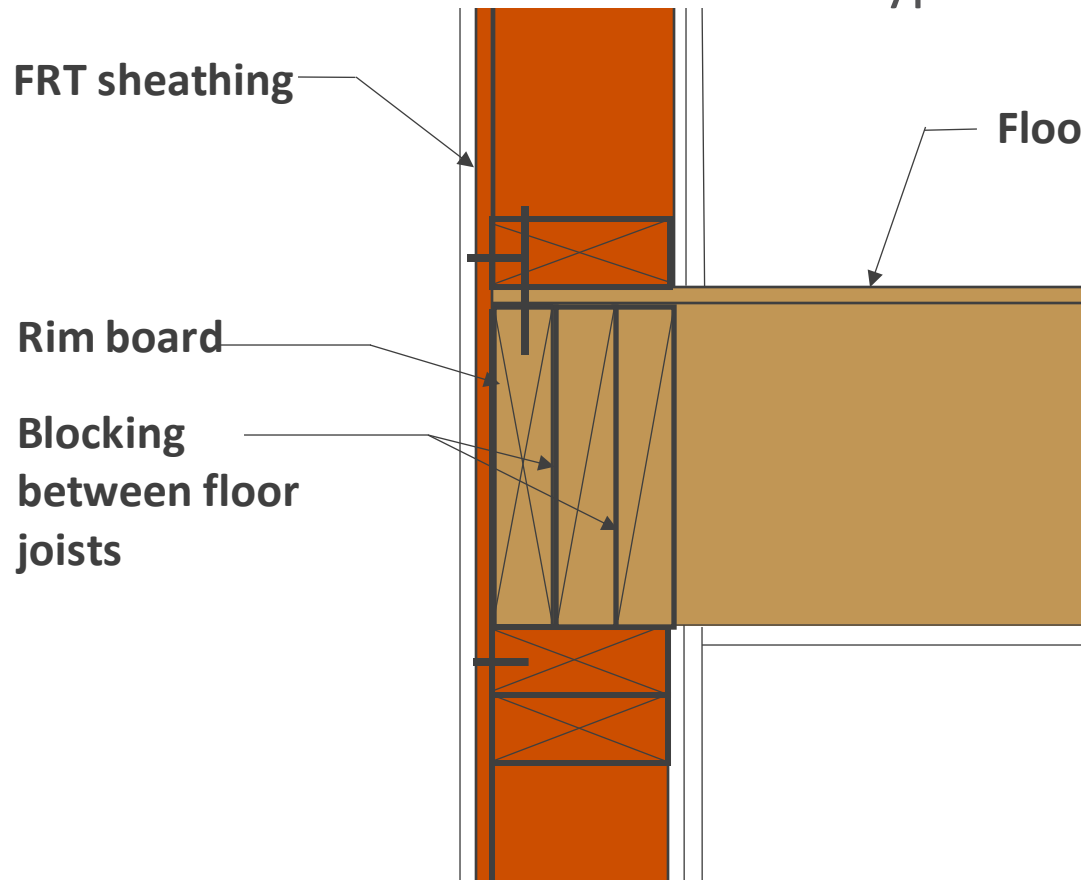
- » Shrinkage of rim, plates, joists

## Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity, ceiling provides 1 hour
- » 1 layer of blocking provides 2<sup>nd</sup> hr through char calculations

# Exterior Walls – Intersecting Floors

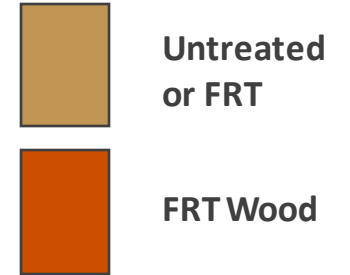
Type III Construction: 2-hr Wall, 1-hr Floor  
Typical Platform Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend



## Considerations:

» Shrinkage of rim, plates, joists

## Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity, 2 layers of blocking provide 2-hr protection through char calculations

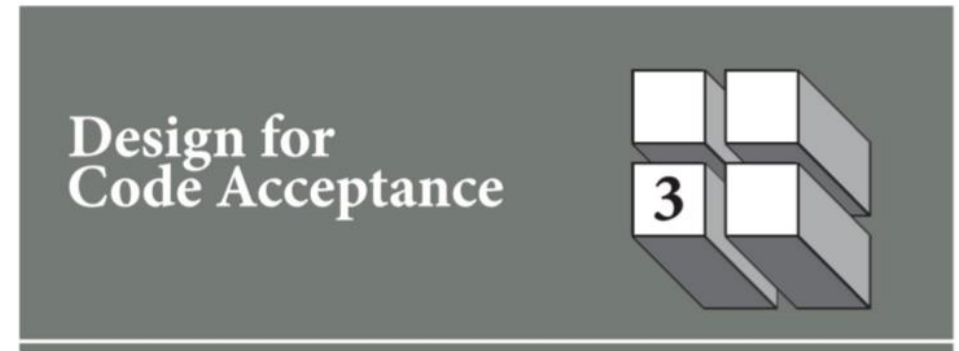


# Exterior Walls – Intersecting Floors

AWC's DCA3 provides floor to wall intersection detailing options

Addresses both continuity provisions and requirements for FRT elements in exterior wall plane

<https://awc.org/codes-standards/publications/dca3>



## Fire-Resistance-Rated Wood-Frame Wall and Floor/Ceiling Assemblies

### Building Code Requirements

For occupancies such as stores, apartments, offices, and other commercial and industrial uses, building codes commonly require floor/ceiling and wall assemblies to be fire-resistance rated in accordance with standard fire tests. This document is intended to aid in the design of various wood-frame walls and wood-frame floor/ceiling assemblies, where such assemblies are required by code to be fire-resistance-rated.

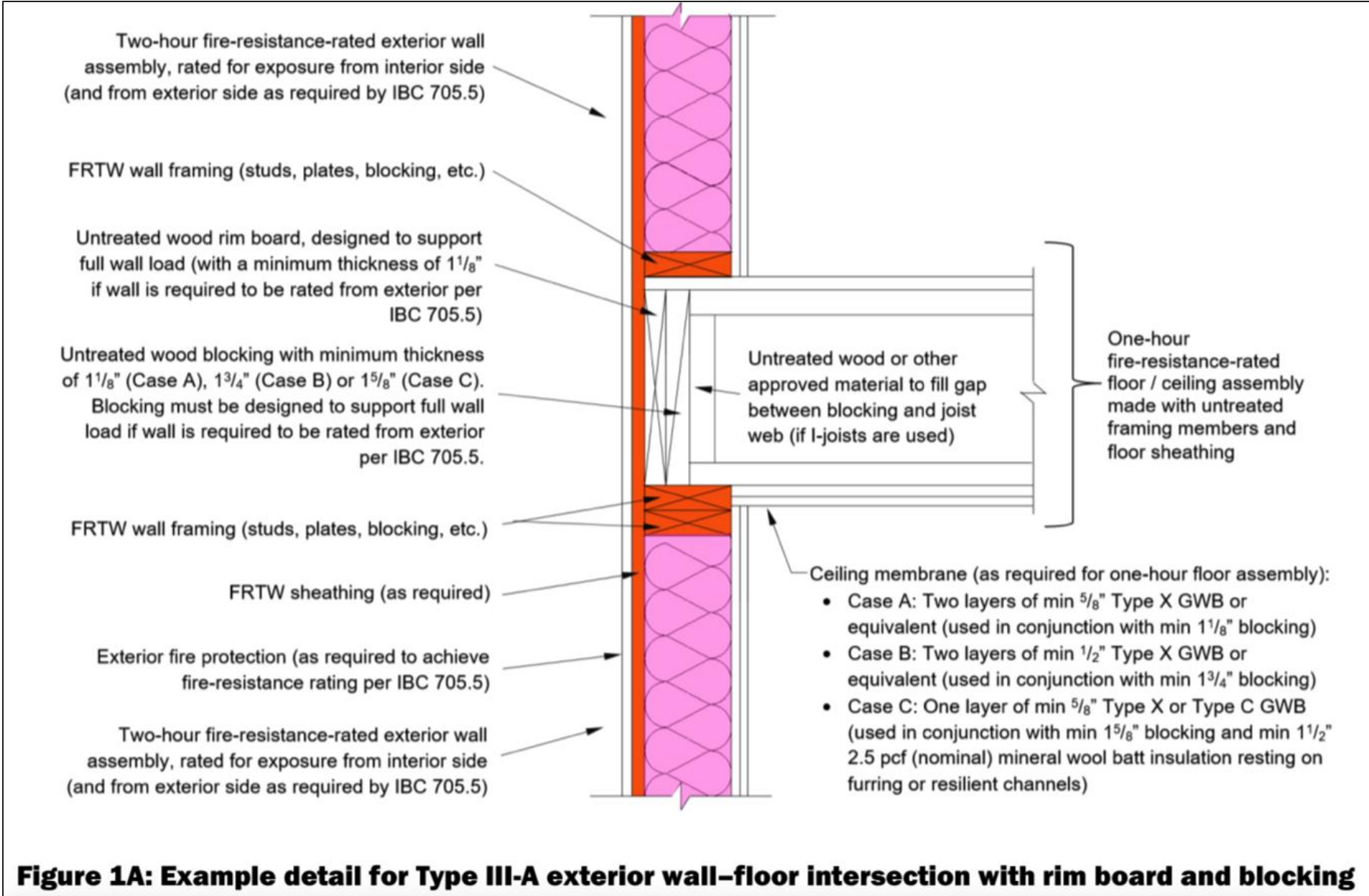
Depending on the application, wall assemblies may need to be fire-resistance-rated for exposure from either one side or both sides. Exterior walls are required to be rated for both interior and exterior fire exposure where the wall has a fire separation distance of 10 feet or less. For exterior walls with a fire separation distance of greater than 10 feet, the required fire-resistance-rating applies only to exposure from the interior. The designer should note that some state and local building code amendments may require fire resistance rating for exposure from both sides of exterior walls, regardless of fire separation distance; however, the solutions and example details provided in this doc-

### Fire Tested Assemblies

Fire-resistance-rated wood-frame assemblies can be found in a number of sources including the *International Building Code (IBC)*, Underwriters Laboratories (UL) *Fire Resistance Directory*, Intertek Testing Services' *Directory of Listed Products*, and the Gypsum Association's *Fire Resistance Design Manual* (GA 600). The American Wood Council (AWC) and its members have tested a number of wood-frame fire-resistance-rated assemblies (see photos). Descriptions of successfully tested lumber wall assemblies are provided in [Table 1](#) for one-hour fire-resistance-rated wall assemblies and [Table 2](#) for two-hour fire-resistance-rated wall assemblies. Lumber shall be identified by the grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with the *American Softwood Lumber Standard (PS 20)*. The fire-resistance-rated assemblies described in this document, as well as those listed in other sources are not species- or grade-specific unless specifically noted as such.

Descriptions of successfully tested I-joint floor as-

# Exterior Walls – Intersecting Floors



# Exterior Walls – Intersecting Floors

Two-hour fire-resistance-rated exterior wall



## Methodology:

### Fire-resistance for exposure from interior side:

- Case A: Minimum  $1\frac{1}{8}$ -inch-thick inner rim board plus two layers of minimum  $\frac{5}{8}$  in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 40 minutes for each layer of  $\frac{5}{8}$  in. Type X GWB (per IBC Table 722.6.2(1)).
- Case B: Minimum  $1\frac{3}{4}$ -inch-thick inner rim board plus two layers of minimum  $\frac{1}{2}$  in. Type X GWB in the ceiling membrane provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface plus 25 minutes for each layer of  $\frac{1}{2}$  in. Type X GWB (per IBC Table 722.6.2(1)).
- Case C: Minimum  $1\frac{5}{8}$ -inch-thick inner rim board plus one layer of minimum  $\frac{5}{8}$  in. Type X GWB in the ceiling membrane plus minimum  $1\frac{1}{2}$ -inch-thick, 2.5 pcf (nominal) mineral wool batt insulation provides 2 hours of protection to the outer rim board, based on the NDS-calculated time for the char depth to reach the inner rim board / outer rim board interface, plus 40 minutes for the  $\frac{5}{8}$  in. Type X GWB (per IBC Table 722.6.2(1)), plus 15 minutes for the mineral wool insulation.

The outer rim board must be designed to support the load from the wall above.

Fire-resistance for exposure from exterior side (where required per IBC Section 705.5): A combination of exterior fire protection, FRTW sheathing, and minimum  $1\frac{1}{8}$ -inch-thick outer rim board is used to provide two hours of protection to the inner rim board. Layers to the exterior of the outer rim board (e.g., exterior fire protection, FRTW sheathing, etc.) must be sufficient to provide at least 80 minutes of protection to the outer rim board. The inner rim board must be designed to support the load from the wall above.

**Figure 1A: Example detail for Type III-A exterior wall-floor intersection with rim board and blocking**

# Calculated Fire Resistance of Wood

For Exposed Wood Members: IBC 722.1 References AWC's NDS Chapter 16 (AWC's TR 10 is a design aid to NDS Chapter 16)

NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION 149

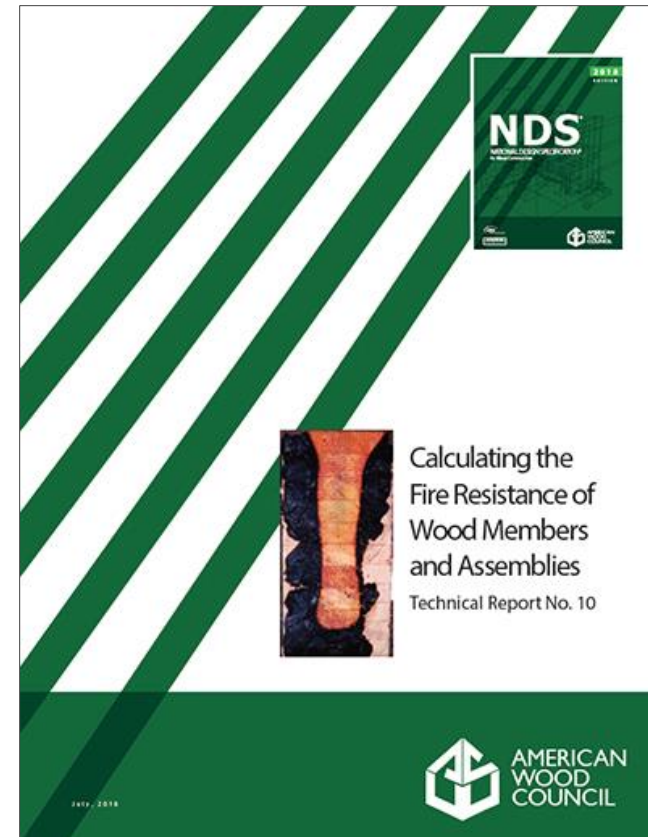
## FIRE DESIGN OF WOOD MEMBERS

16.1 General	150
16.2 Design Procedures for Exposed Wood Members	150
16.3 Wood Connections	151

Table 16.2.1 Effective Char Rates and Char Layer Thicknesses (for $\beta_e = 1.5 \text{ in./hr.}$ )	150
Table 16.2.2 Adjustment Factors for Fire Design	151

16

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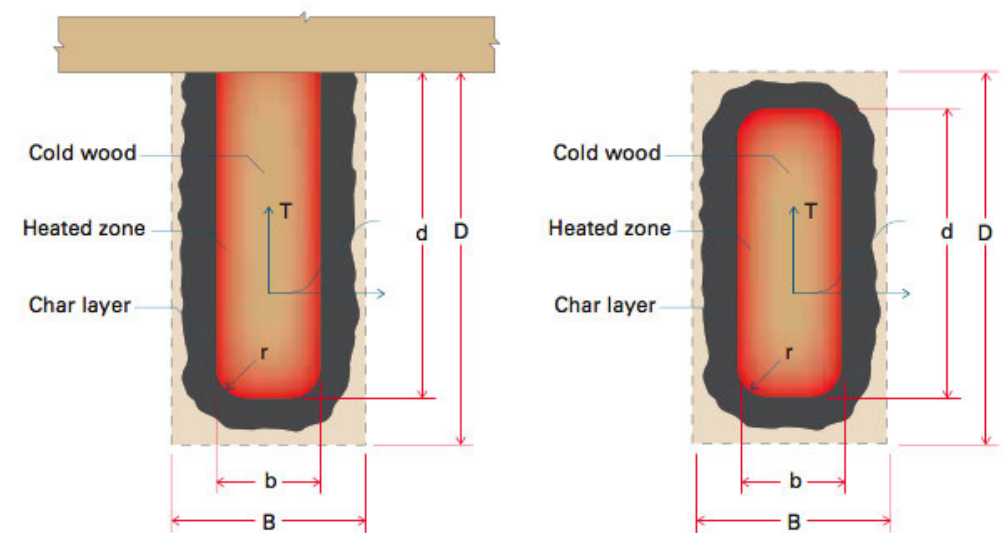


# Equations for Calculating Fire Endurance

Assumptions:

- » Nominal assumed char rate = 1.5"/hr.
- » Uses ultimate strength for design check

Structurally spanning members: reduced section checked for capacity vs. demand

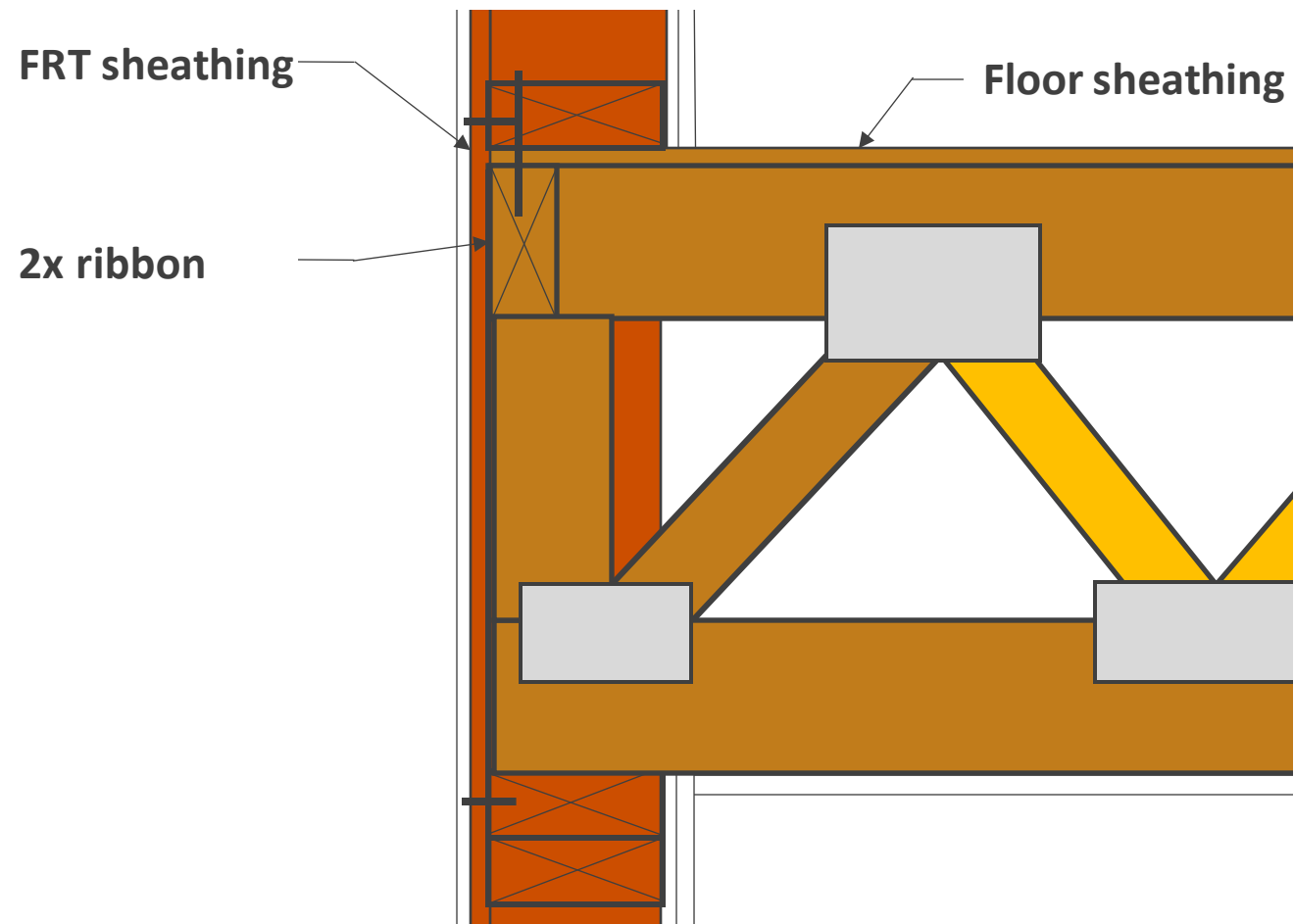


**Figure 1-1** Reduction in member breadth and depth over time,  $t$




Source: AWC's TR 10

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Bottom Chord Bearing



## Legend

	Untreated or FRT
	FRT Wood
	Untreated

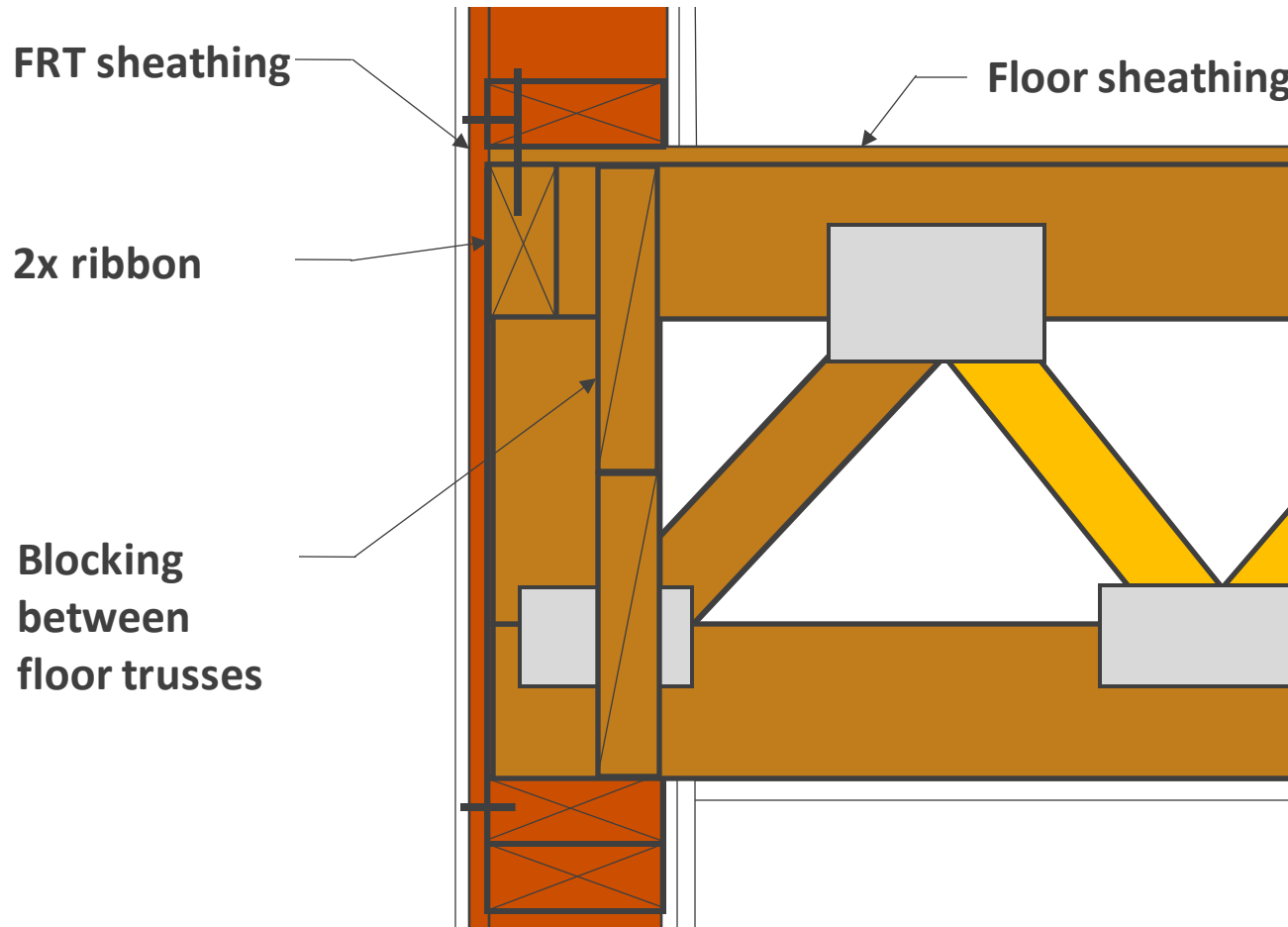
Rationale for detail approval:

- » Intersection of rated assemblies (wall & floor) considered sufficient

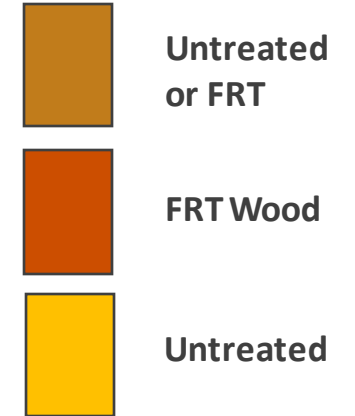


# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Bottom Chord Bearing



## Legend

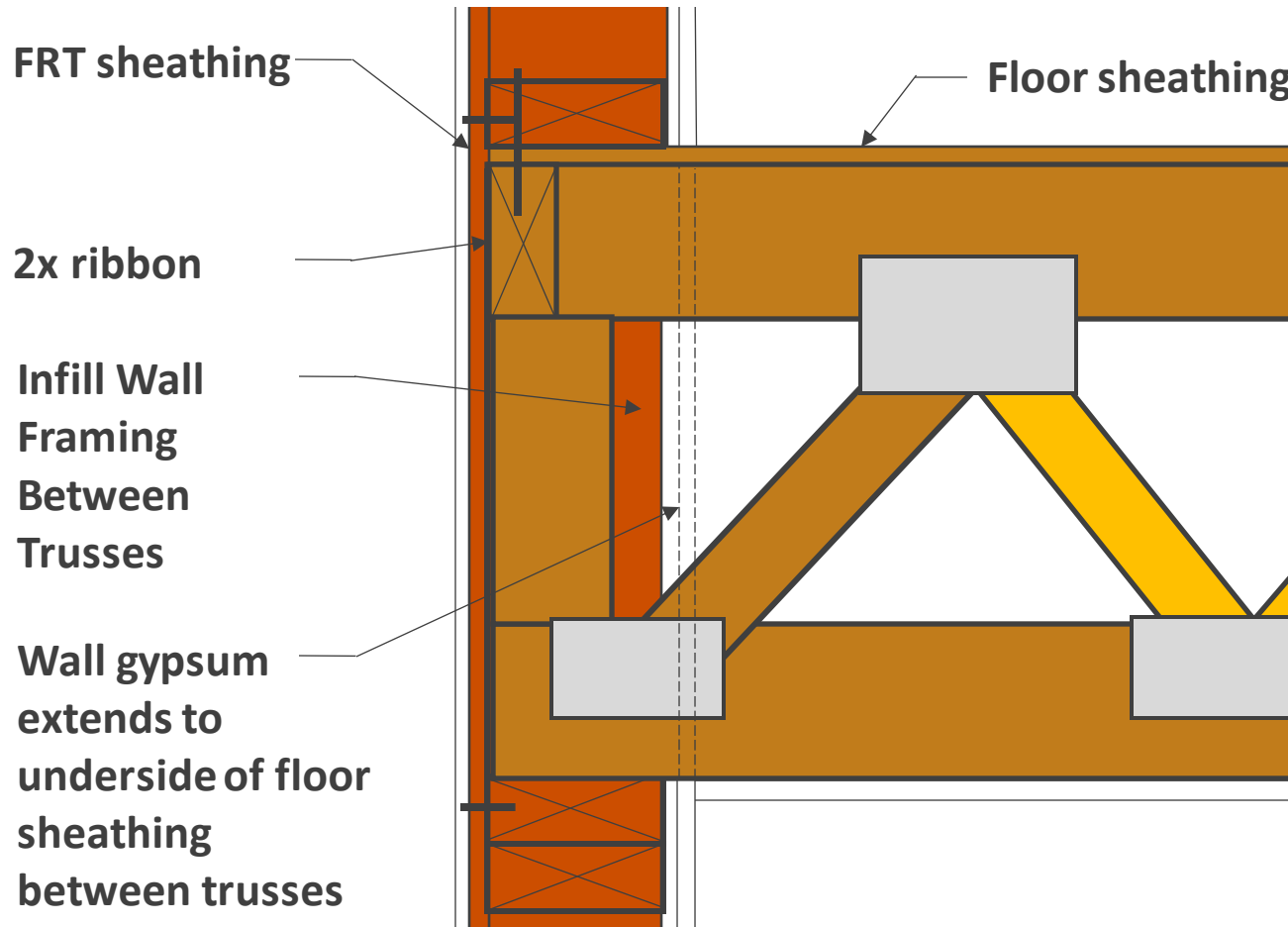


Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity, blocking in wall provides 1 hr
- » Ceiling provides 2<sup>nd</sup> hr

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Bottom Chord Bearing



## Legend



Rationale for detail approval:

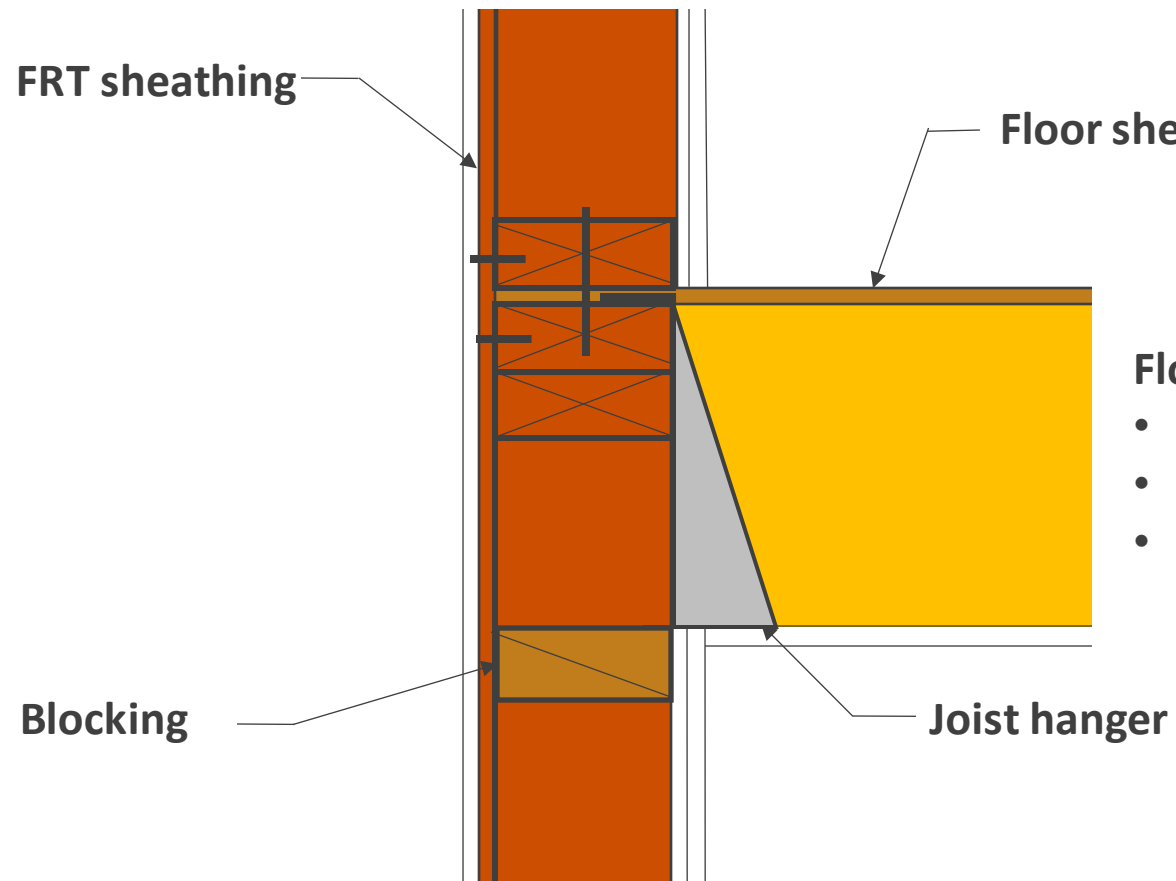
- » Membranes on both side of wall provide fire resistance via their approved assembly

# Exterior Walls – Intersecting Floors



# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend

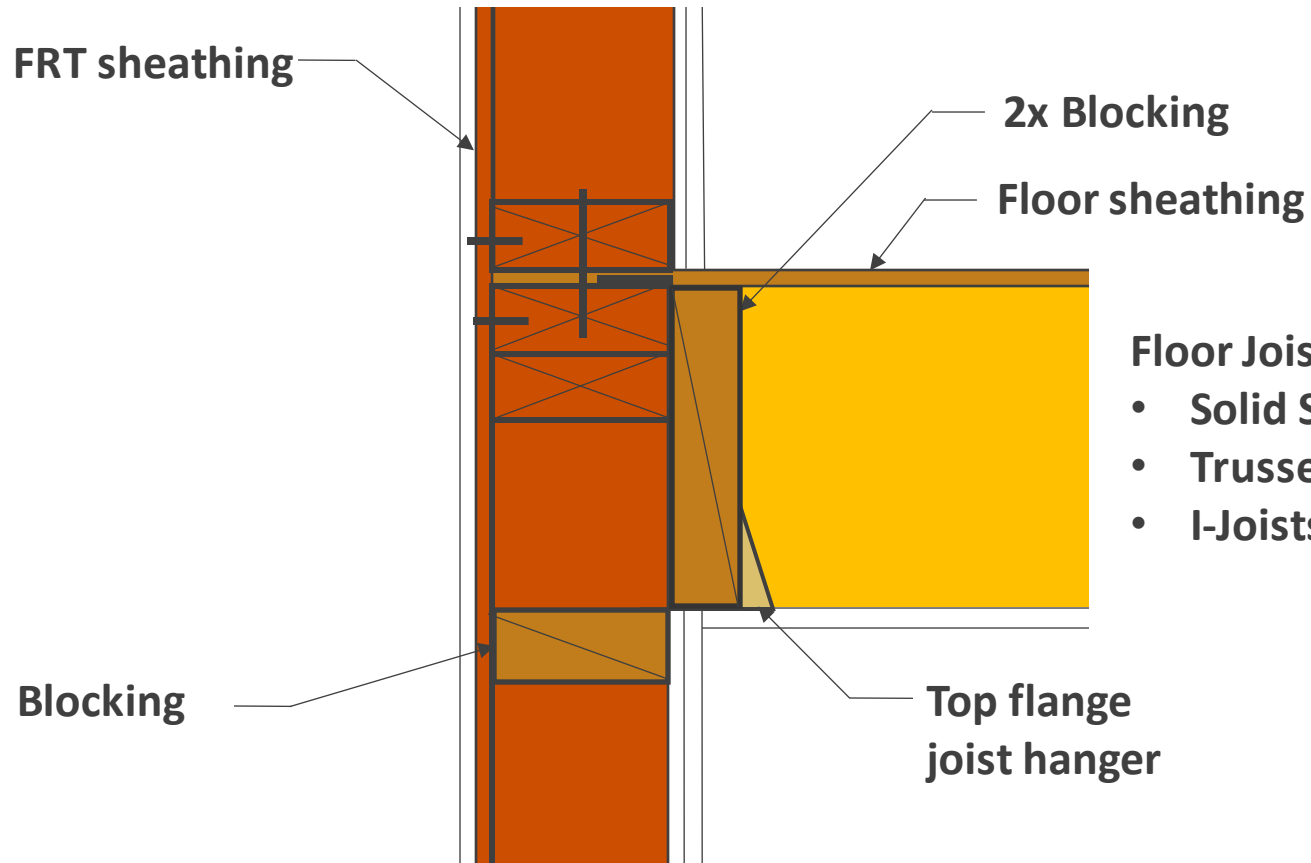


Rationale for detail approval:

- » Intersection of rated assemblies (wall & floor) considered sufficient

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing



## Legend

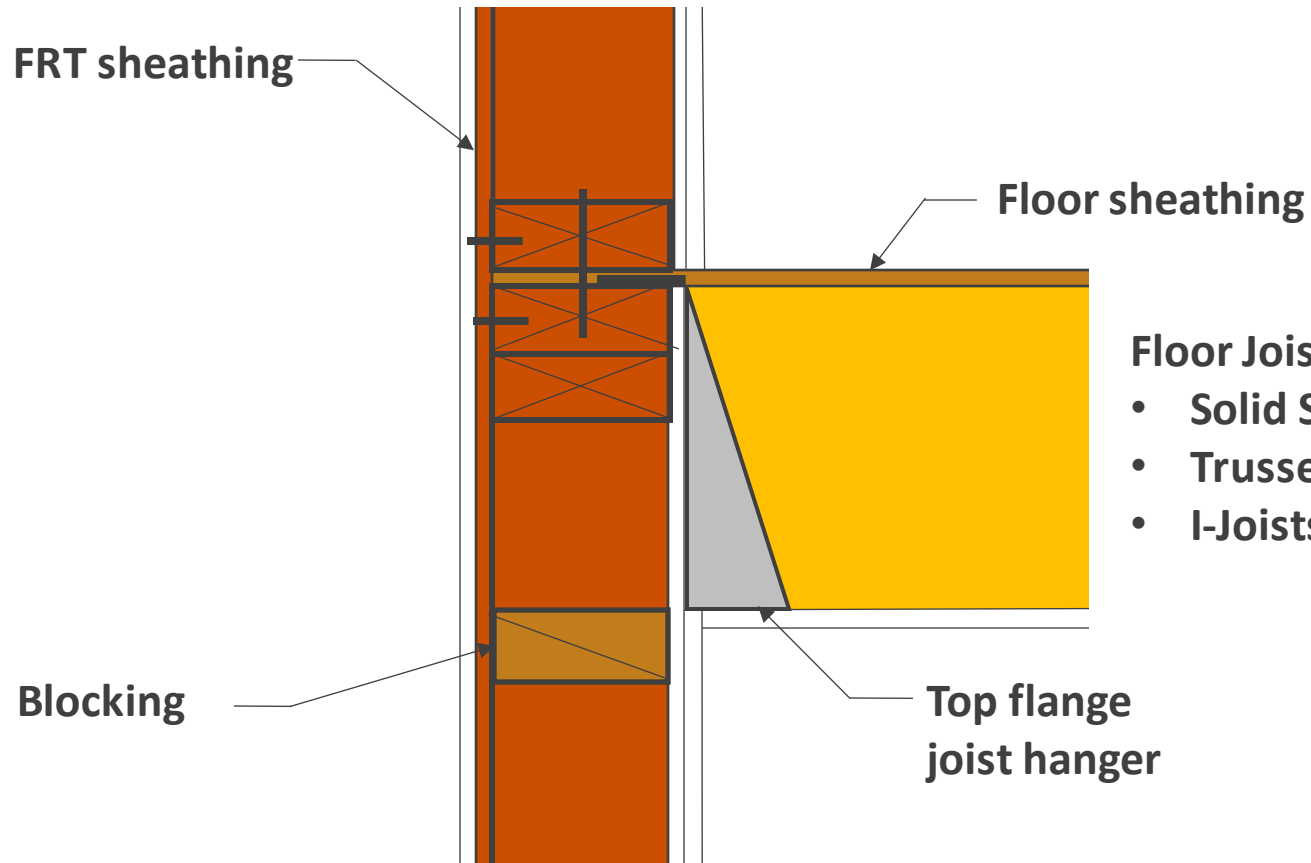


Rationale for detail approval:

- » Ceiling membrane provides 1-hr protection
- » Blocking between joists provides 2<sup>nd</sup> hr through char calculations

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend



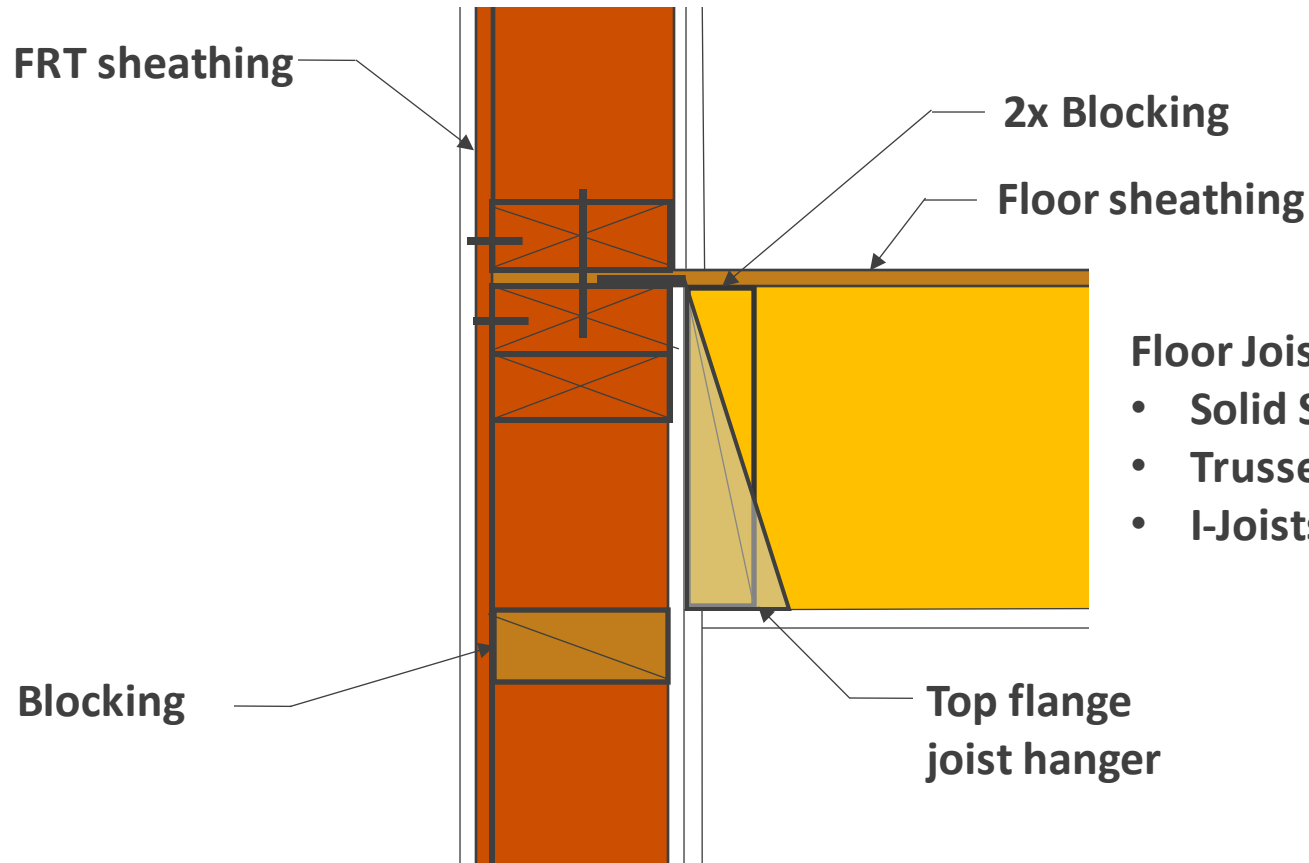
Rationale for detail approval:

- » Ceiling membrane provides 1-hr protection
- » 1 layer of wall membrane provides 2<sup>nd</sup> hr



# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend

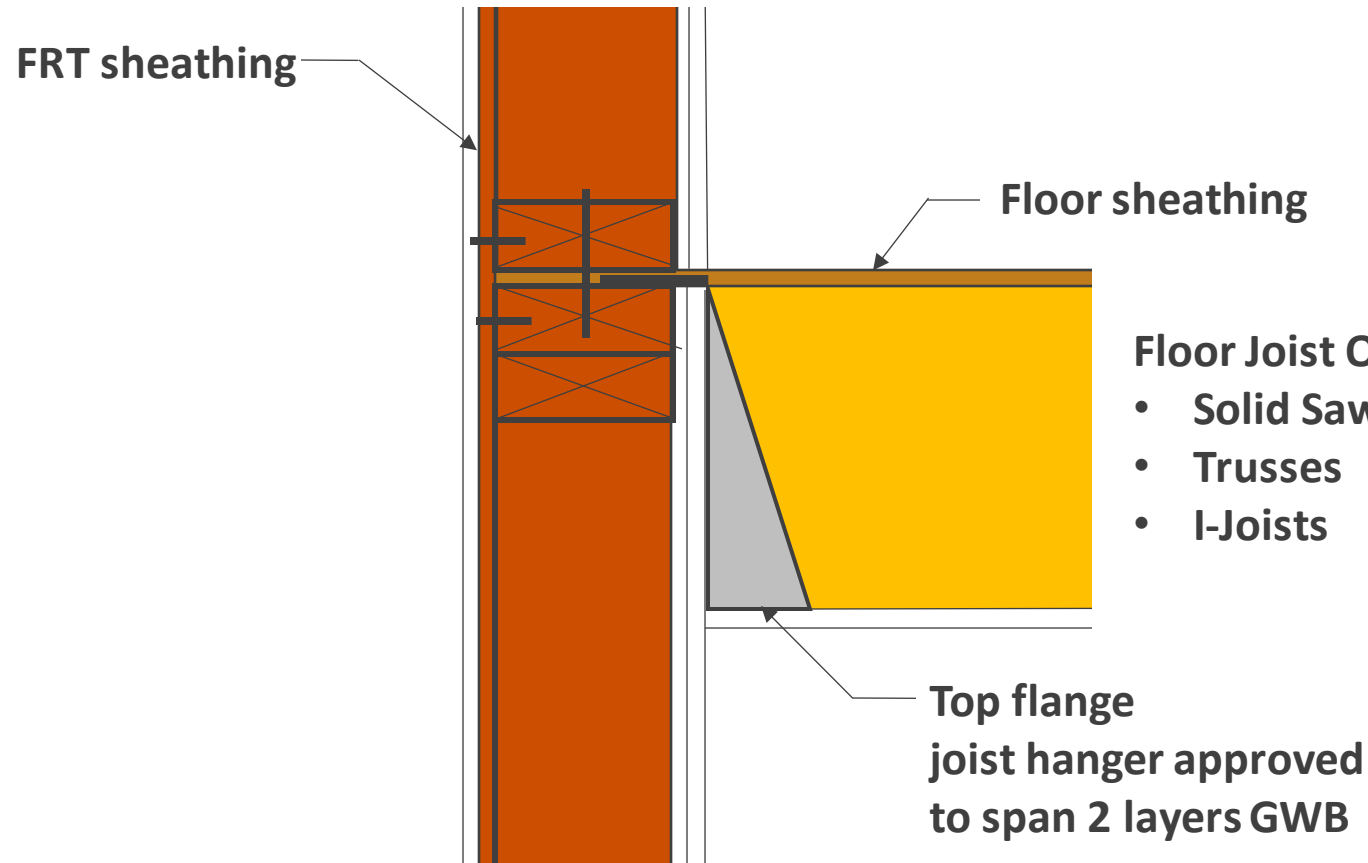


Rationale for detail approval:

- » 1 layer of wall membrane provides 1-hr protection
- » Blocking between joists provides 2<sup>nd</sup> hr through char calculations

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing



## Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend

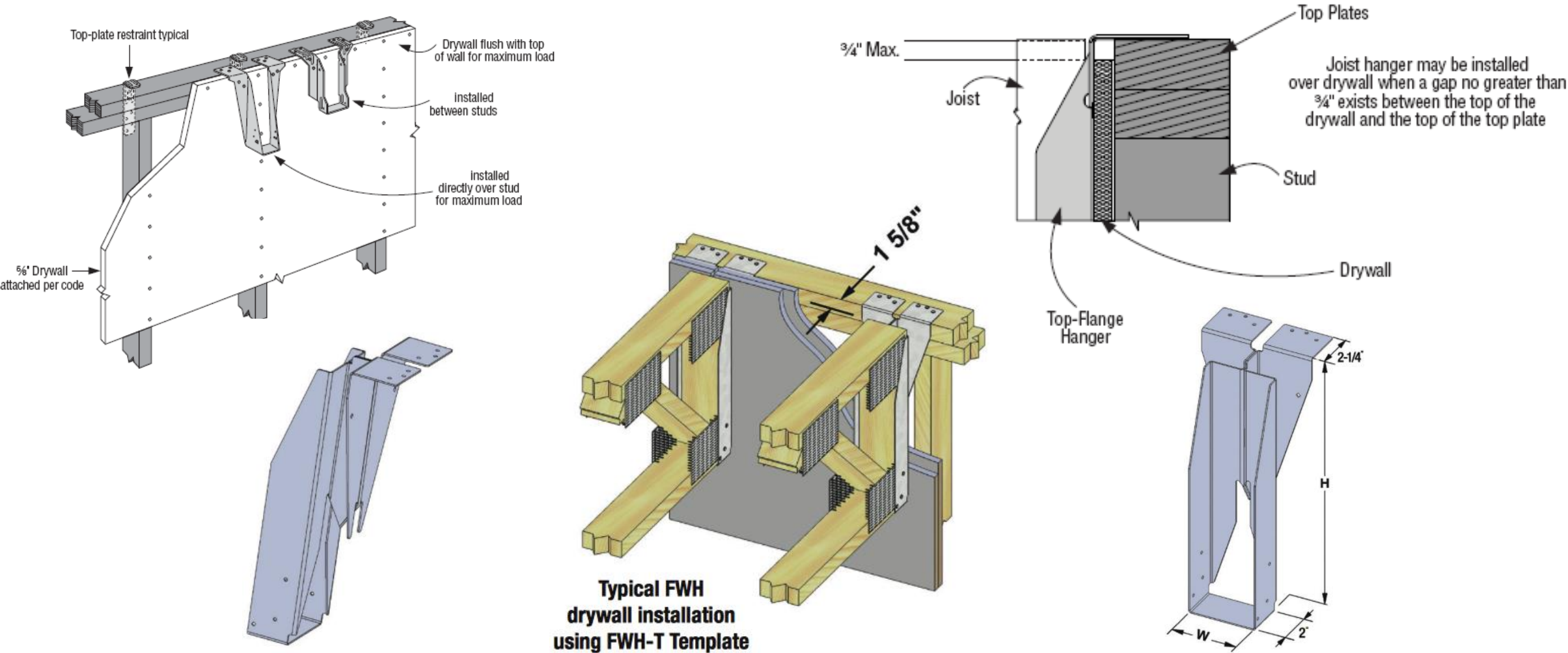


Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly

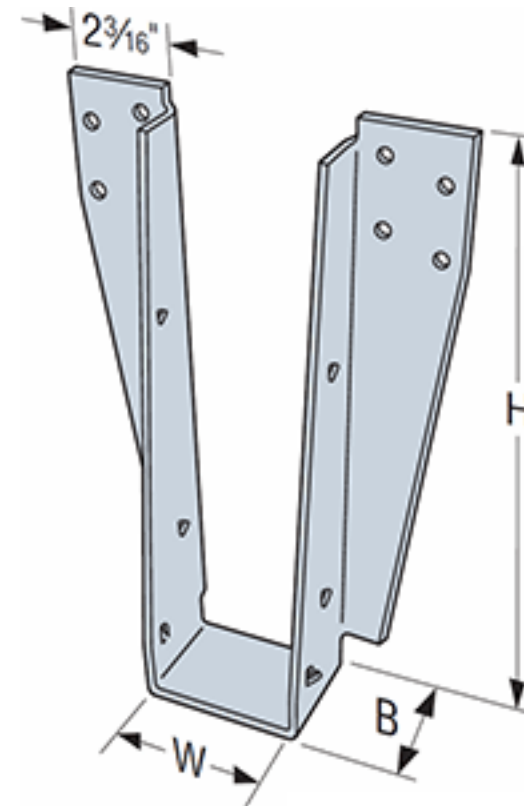
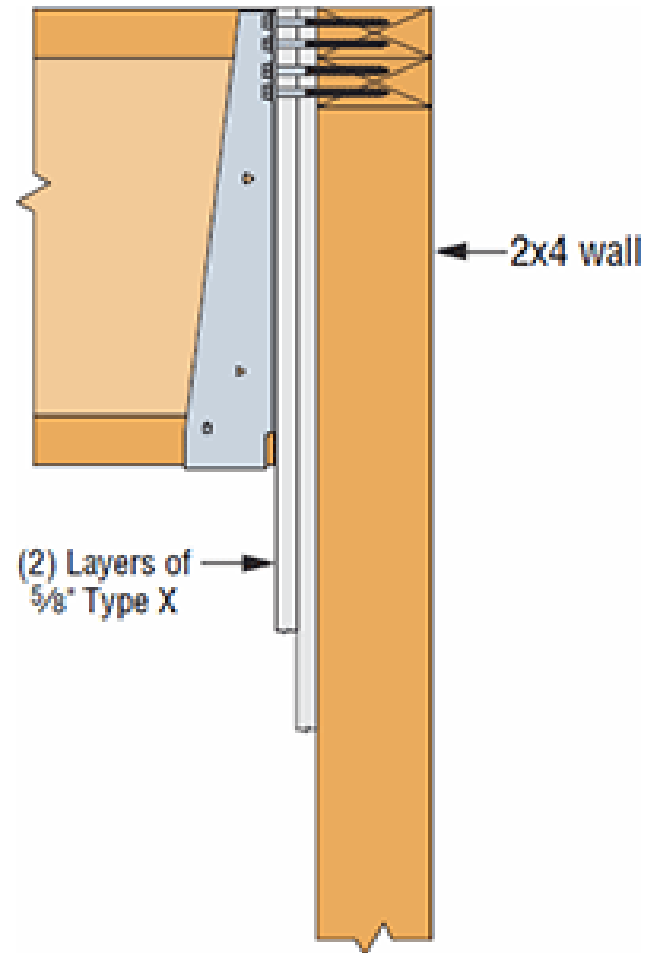
# Over Gypsum Hangers

Commonly called Fire Wall or Drywall Hangers



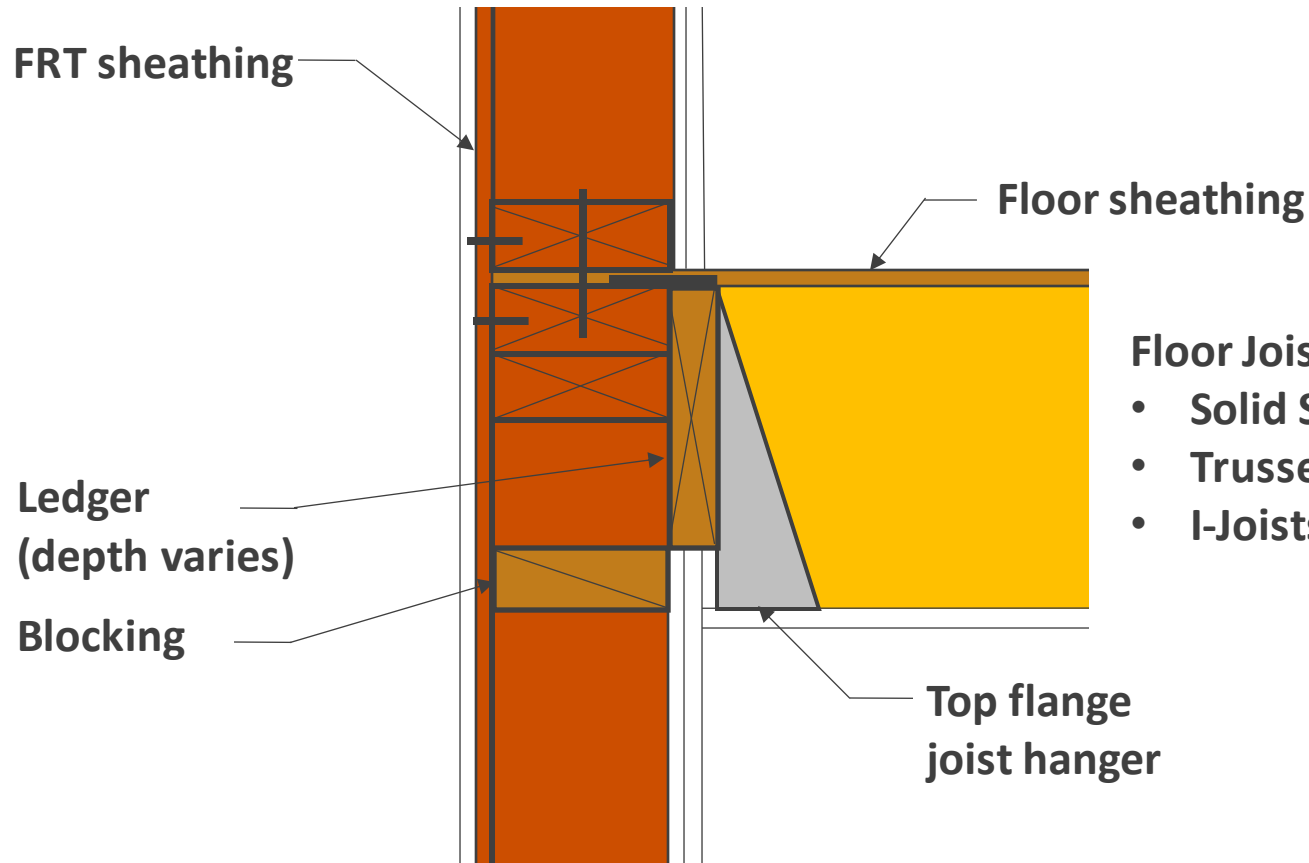
# Over Gypsum Hangers

Top Flange Hangers & Face Mount Hangers Available



# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing w/ Ledger



Floor Joist Options:

- Solid Sawn
- Trusses
- I-Joists

## Legend



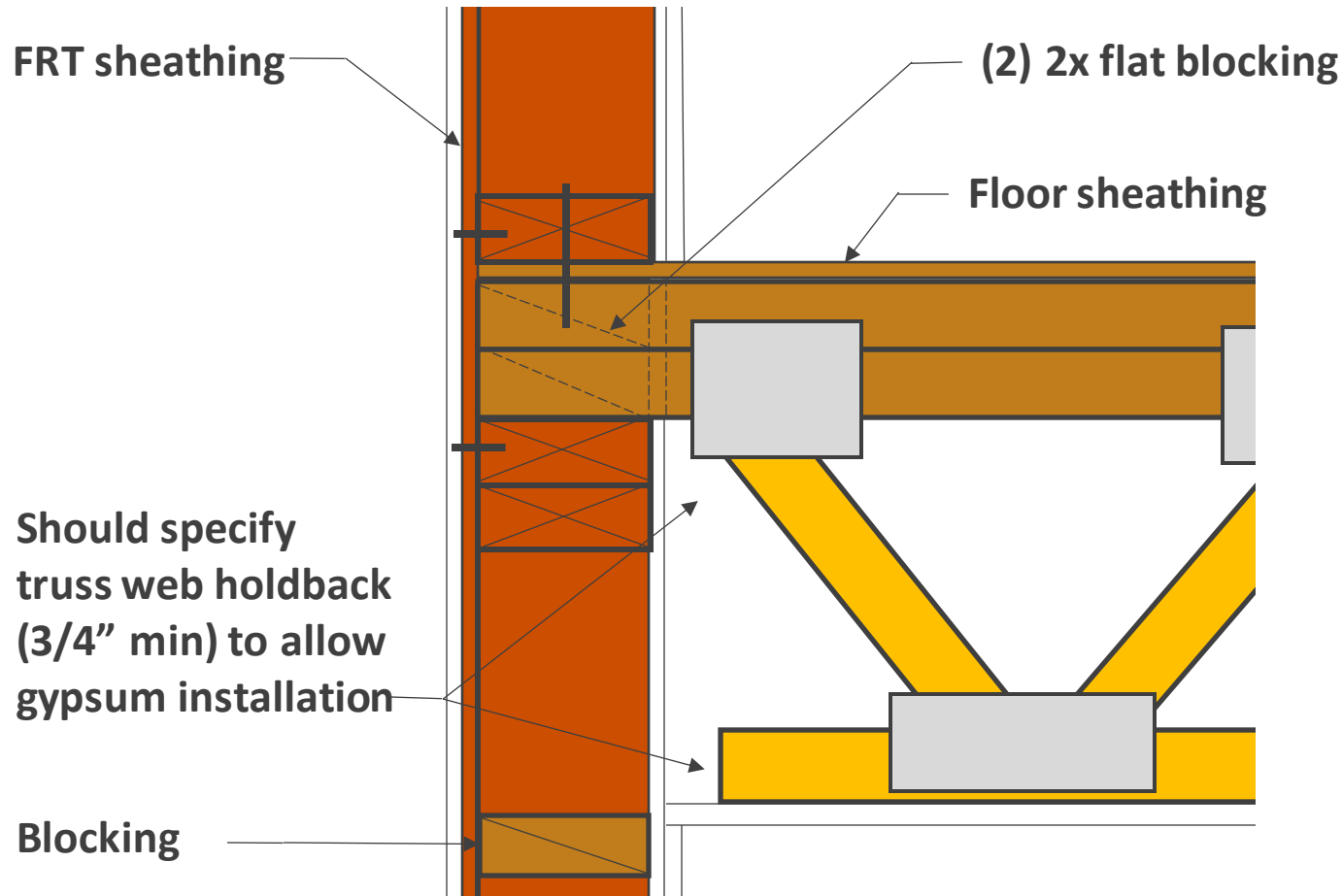
**This detail is often used with a balcony; ledger is thru-bolted**

Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor, ceiling membrane provides 1 hr
- » Blocking provides 2nd hr & maintains FRT continuity

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Top Chord Bearing



## Legend



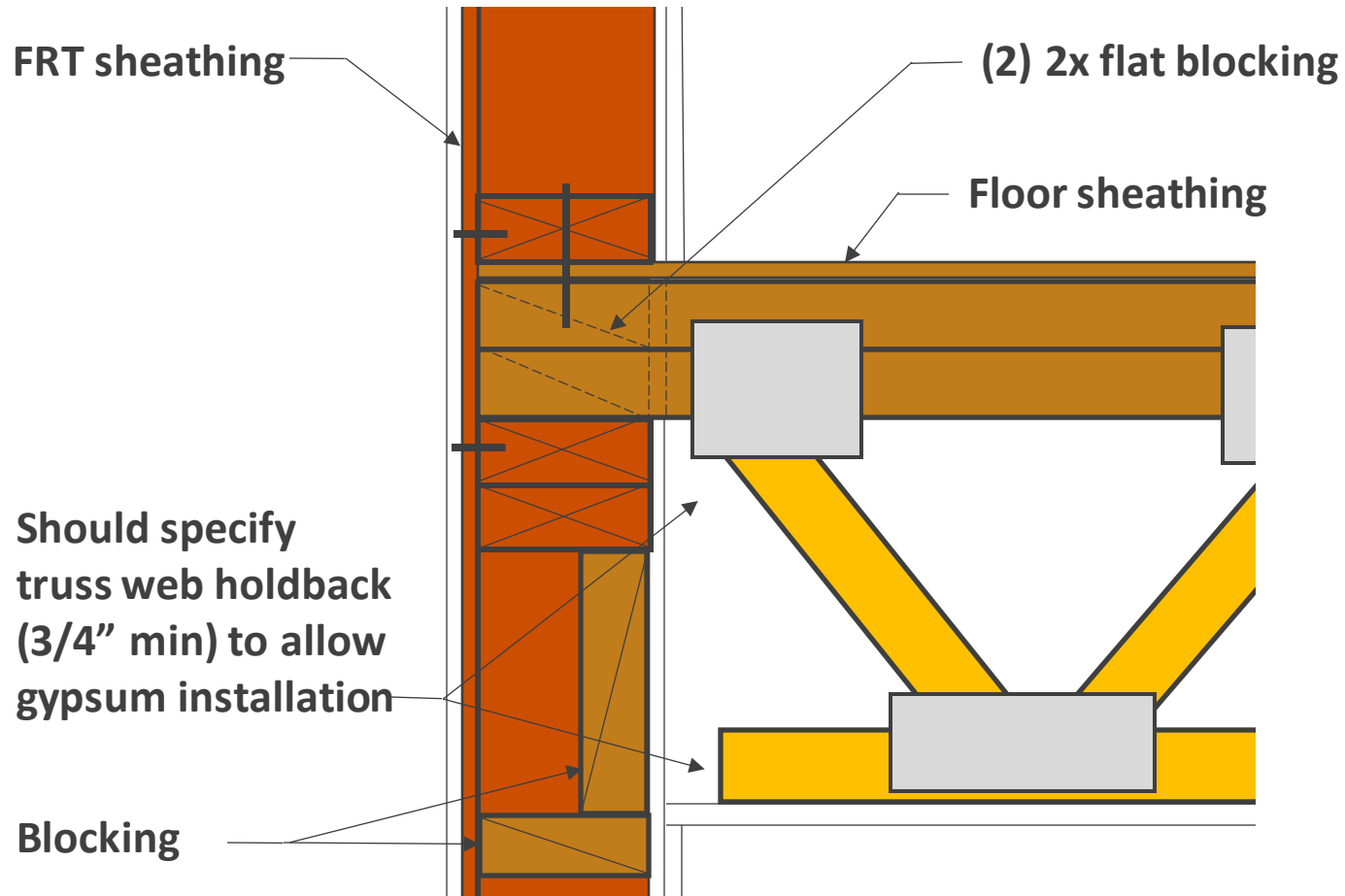
Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity ceiling membrane provides 1 hr
- » 1 layer of wall membrane provides 2<sup>nd</sup> hr



# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Top Chord Bearing



## Legend

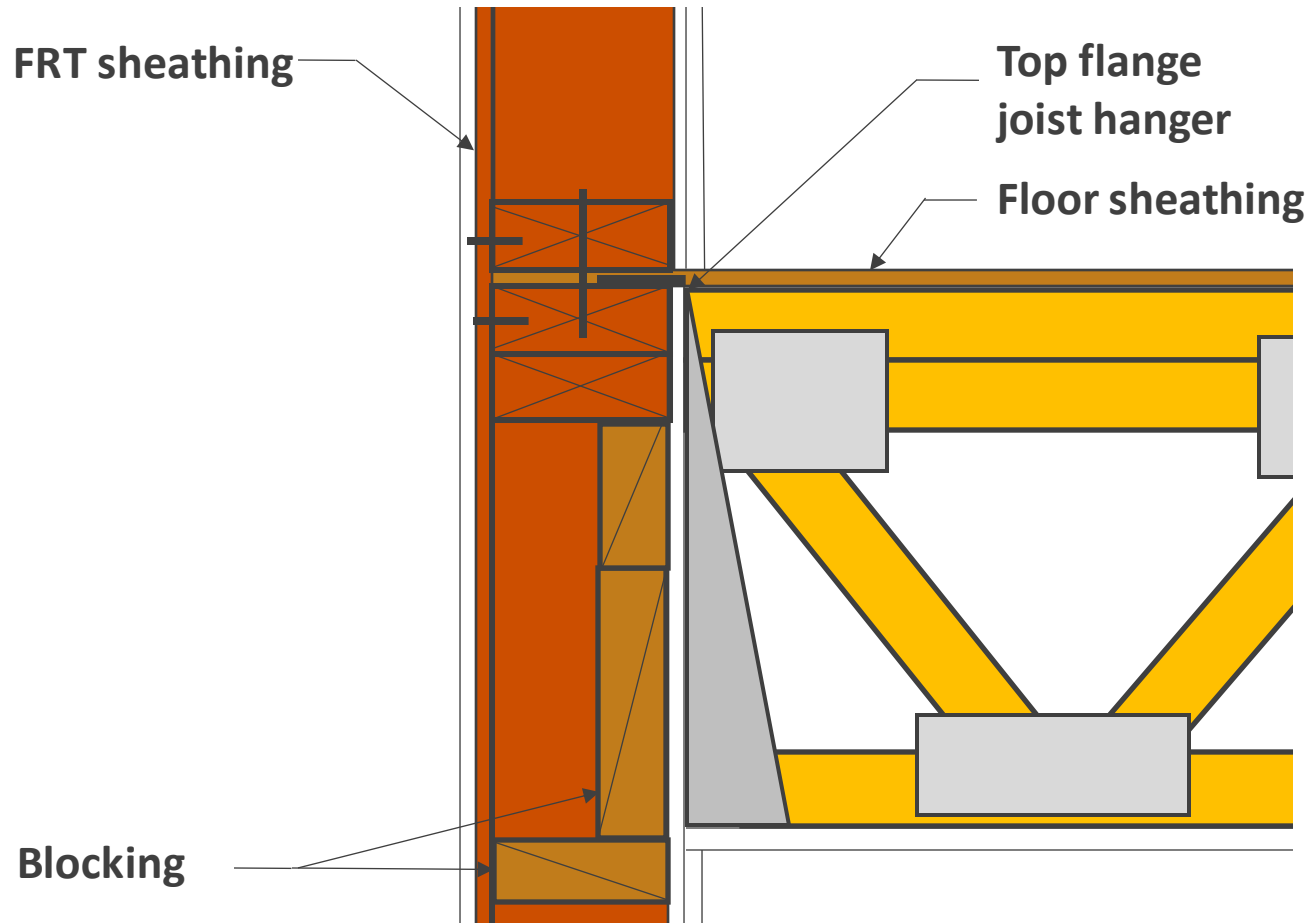


Rationale for detail approval:

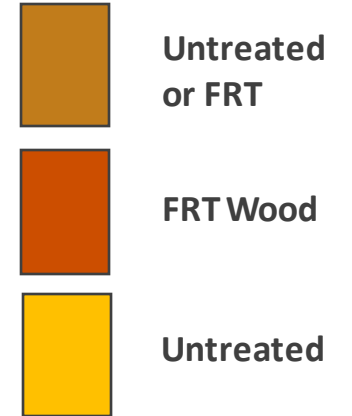
- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity, blocking in wall provides 1 hr
- » 1 layer of wall membrane provides 2<sup>nd</sup> hr

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Semi-Balloon Framing w/ Hangers



## Legend

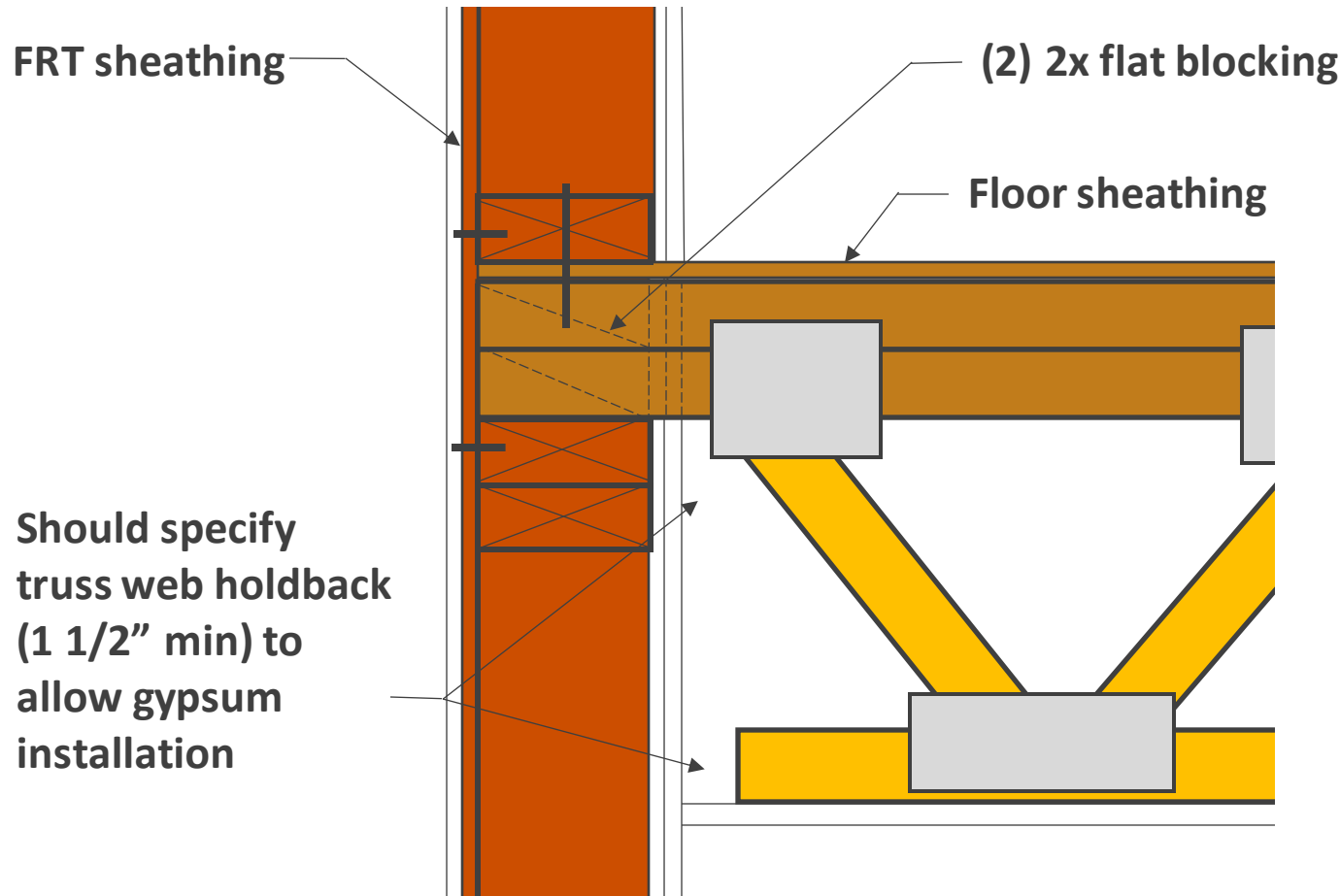


Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly
- » At floor cavity, blocking in wall provides 1 hr
- » 1 layer of wall membrane provides 2<sup>nd</sup> hr

# Exterior Walls – Intersecting Floors

Type III Construction: 2-hr Wall, 1-hr Floor  
Platform Framing w/ Top Chord Bearing



## Legend

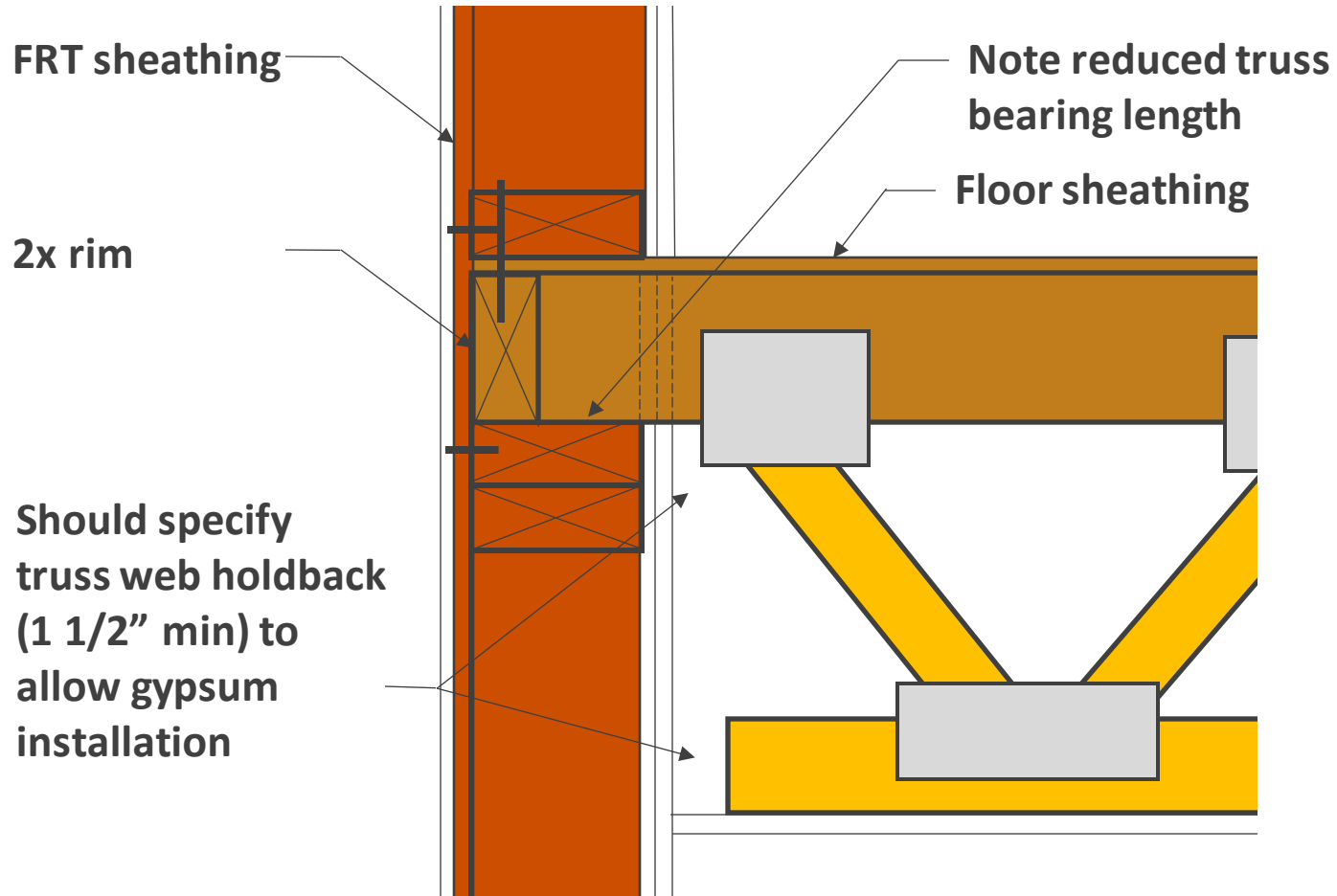


Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly

## Exterior Walls – Intersecting Floors

## Type III Construction: 2-hr Wall, 1-hr Floor Platform Framing w/ Top Chord Bearing



### Legend



### Rationale for detail approval:

- » Membranes on both side of wall provide fire resistance via their approved assembly

# Exterior Walls – Intersecting Floors





# Exterior Walls – Intersecting Floors



Gaps between end of truss members and wall to allow gypsum install after



# IBC 2024 Changes: Floor to Wall Intersections

Two key changes that have been approved for inclusion in the 2024 IBC clarify platform framed floor to wall details

Code change 1: clarifies fire-resistance continuity requirements for exterior walls:

## 2021 International Building Code

**705.6 Continuity** . The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ~~one-hour fire-resistance-rated floor/ceiling or roof/ceiling assembly~~. assembly having a fire-resistance rating equal to or greater than the exterior wall and the fire separation distance is greater than 10 feet .

# IBC 2024 Changes: Floor to Wall Intersections

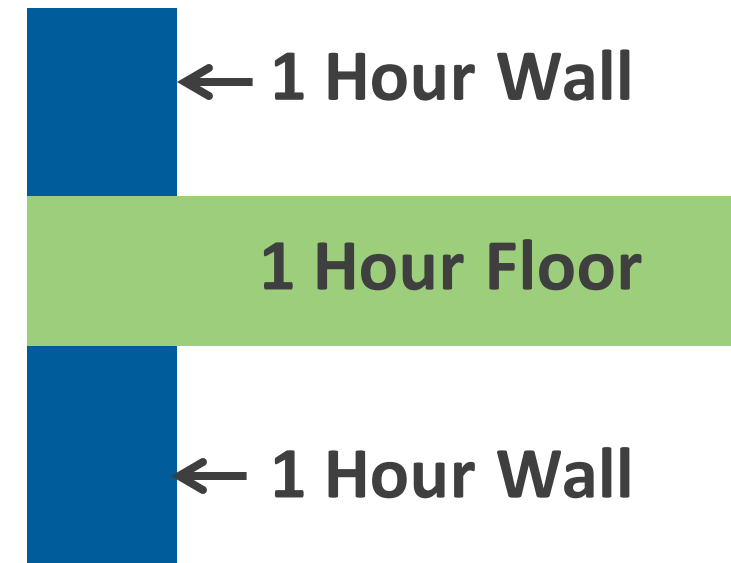
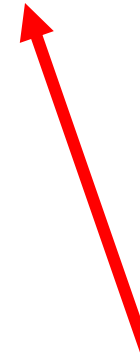
## 2021 International Building Code

**705.6 Continuity** . The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ~~one-hour fire-resistance-rated floor/ceiling or roof/ceiling assembly~~ assembly having a fire-resistance rating equal to or greater than the exterior wall and the fire separation distance is greater than 10 feet .

**Example 1:** Type VA Construction, Group R-2  
1-hour exterior wall, 1-hour floor

Fire-resistance rating extends from the top of the floor/ceiling assembly below to the underside of an assembly having a fire-resistance rating equal to the exterior wall



# IBC 2024 Changes: Floor to Wall Intersections

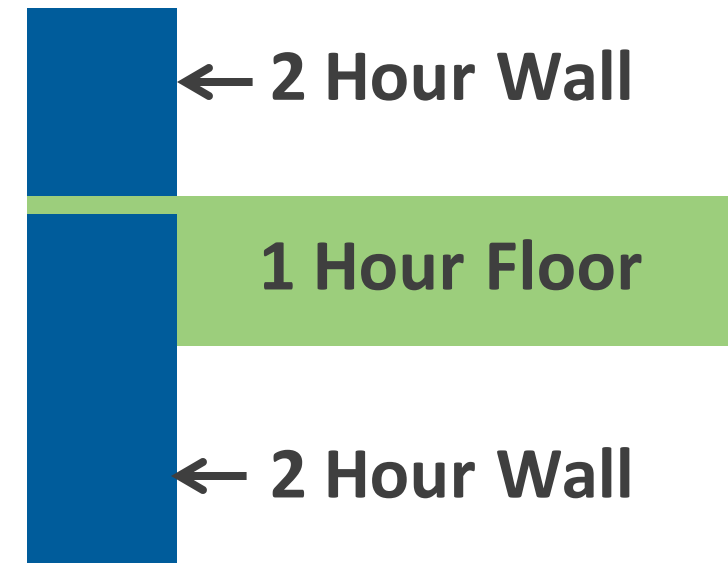
## 2021 International Building Code

**705.6 Continuity** . The fire-resistance rating of exterior walls shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ~~one-hour fire-resistance-rated floor/ceiling or roof/ceiling assembly~~ assembly having a fire-resistance rating equal to or greater than the exterior wall and the fire separation distance is greater than 10 feet .

**Example 2:** Type IIIA Construction, Group R-2  
2-hour exterior wall, 1-hour floor

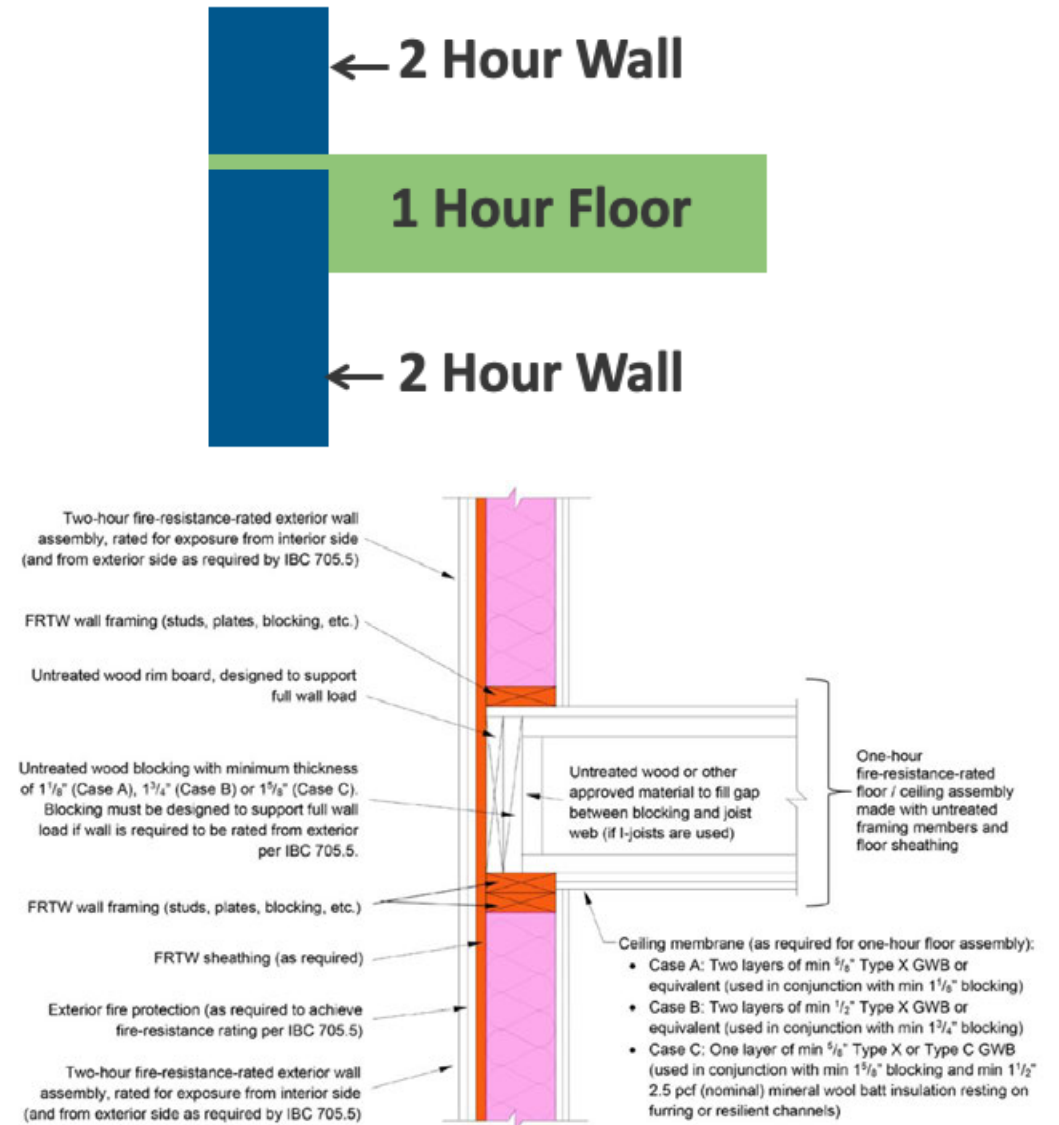
Fire-resistance rating extends from the top of the floor/ceiling assembly below to the underside of the floor sheathing above



# IBC 2024 Changes: Floor to Wall Intersections

**Example 2:** Type IIIA Construction, Group R-2  
2-hour exterior wall, 1 hour floor

Since FRR of exterior wall is greater than FRR of floor, the exterior wall's FRR must extend to the underside of the floor sheathing. As noted previously, this doesn't mean that the wall needs to fully bypass the floor, but we do need to demonstrate the wall's 2-hour FRR through the depth of the floor.



# IBC 2024 Changes: Floor to Wall Intersections

Two key changes that have been approved for inclusion in the 2024 IBC clarify platform framed floor to wall details.

Code change 2: clarifies material requirements for floor construction at exterior walls intersections (i.e. does floor sheathing, joists, rim board at exterior walls in Type III Construction need to be FRT?):

**705.6.1 Supporting construction Floor Assemblies in Type III Construction** . ~~Construction that~~ In Type III construction where a floor assembly supports gravity loads from fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire resistance of the supporting construction. — an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.



# IBC 2024 Changes: Floor to Wall Intersections

**705.6.1 ~~Supporting construction~~ Floor Assemblies in Type III Construction** . ~~Construction that~~ In Type III construction where a floor assembly supports gravity loads from fire-resistance-rated exterior walls shall have a fire-resistance rating that is equal to or greater than the required fire resistance rating of the supported wall. ~~For achieving the required fire resistance rating for exposure from the interior of the building, ceiling materials shall be permitted to contribute to the required fire resistance of the supporting construction.~~ an exterior wall, the fire-resistance rating of the portion of the floor assembly that supports the exterior wall shall not be less than the fire-resistance rating required for the exterior wall in Table 601. The fire-resistance rating provided by the portion of the floor assembly supporting and within the plane of the exterior wall shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to, rim joists, rim boards, and blocking, shall be in accordance with the requirements for interior building elements of Type III Construction.

Where a floor assembly supports gravity loads from an exterior wall, the building elements of the floor construction within the plane of the exterior wall, including but not limited to rim joists, rim boards, and blocking shall be in accordance with the requirements for interior building elements of Type III Construction.

Interior building elements (floor construction) in Type III is not required to be FRTW



# Outline

- » Allowable Heights, Areas, Number of Stories
- » Fire Rating Requirements for Exterior Walls
  - » Assembly Asymmetry
  - » Addition of Wood Structural Panel
  - » Bearing vs. Non-bearing
  - » Vertical offsets
- » Exterior Wall to Floor Intersection
  - » Fire Resistant Continuity
  - » Fire Retardant Continuity

## » Balconies



1430 Q, The HR Group Architects, Buehler Engineering, Greg Folkins Photography

# Balconies – IBC 705.2.3.1

Balconies of combustible construction and non-FRT shall be:

- » Rated in accordance w/ Table 601 for floors
- » Or be of Type IV
- » And shall not exceed 50% of bldg perimeter

Exceptions

- » Balconies in Type III, IV and V can be of type V construction and shall not have fire resistance rating if sprinkler protection provided
- » Non-FRT wood is permitted for rails and guardrails

# Balconies – IBC 705.2.3.1

So....

For Type III or V balcony options are:

1. **Non-combustible**: no sprinklers, no fire rating
2. **FRT**: no fire sprinklers, no fire rating
3. **Type IV**: no fire sprinklers, no fire rating
4. Non-FRT: **with fire sprinkler**, no fire rating
5. Non-FRT: no sprinkler, **fire rated per 601**



Disclaimer: These options are allowed by code for meeting construction type and fire-resistance rating requirements. They do not address durability considerations. Other code requirements may apply.



# 2018 IBC Balcony Code Changes



Broadstone Apartments on 5<sup>th</sup>, Fort Worth, TX

# 2018 IBC Balcony Code Changes

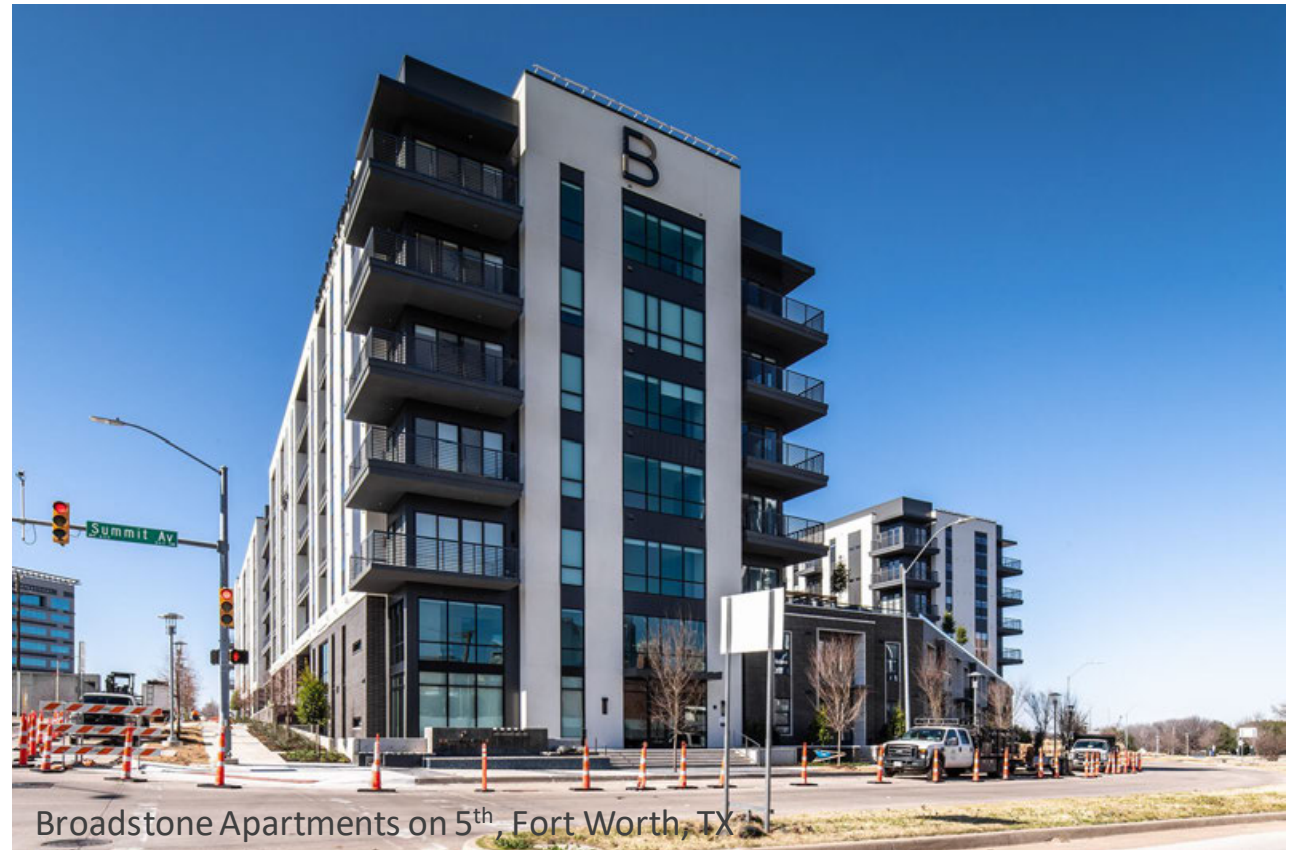
As a result of the Berkeley balcony collapse in 2015, several code changes were implemented in the 2018 IBC relative to balcony durability, inspections, ventilation and moisture protection

Changes Included:

Impervious moisture barrier system changes:

- Thorough documentation on construction documents
- Inspections
- Positive drainage

Ventilation requirements



Broadstone Apartments on 5<sup>th</sup>, Fort Worth, TX



# 2018 IBC Balcony Code Changes

Documentation of impervious moisture barrier system on the construction documents, IBC 107.2.5 (new section)

**IBC 107.2.5 Exterior balcony and elevated walking surfaces.** Where balcony or other elevated walking surfaces are exposed to water from direct or blowing rain, snow, or irrigation, and the structural framing is protected by an impervious moisture barrier, the construction documents shall include details for all elements of the impervious moisture barrier system. The construction documents shall include manufacturer's installation instructions.



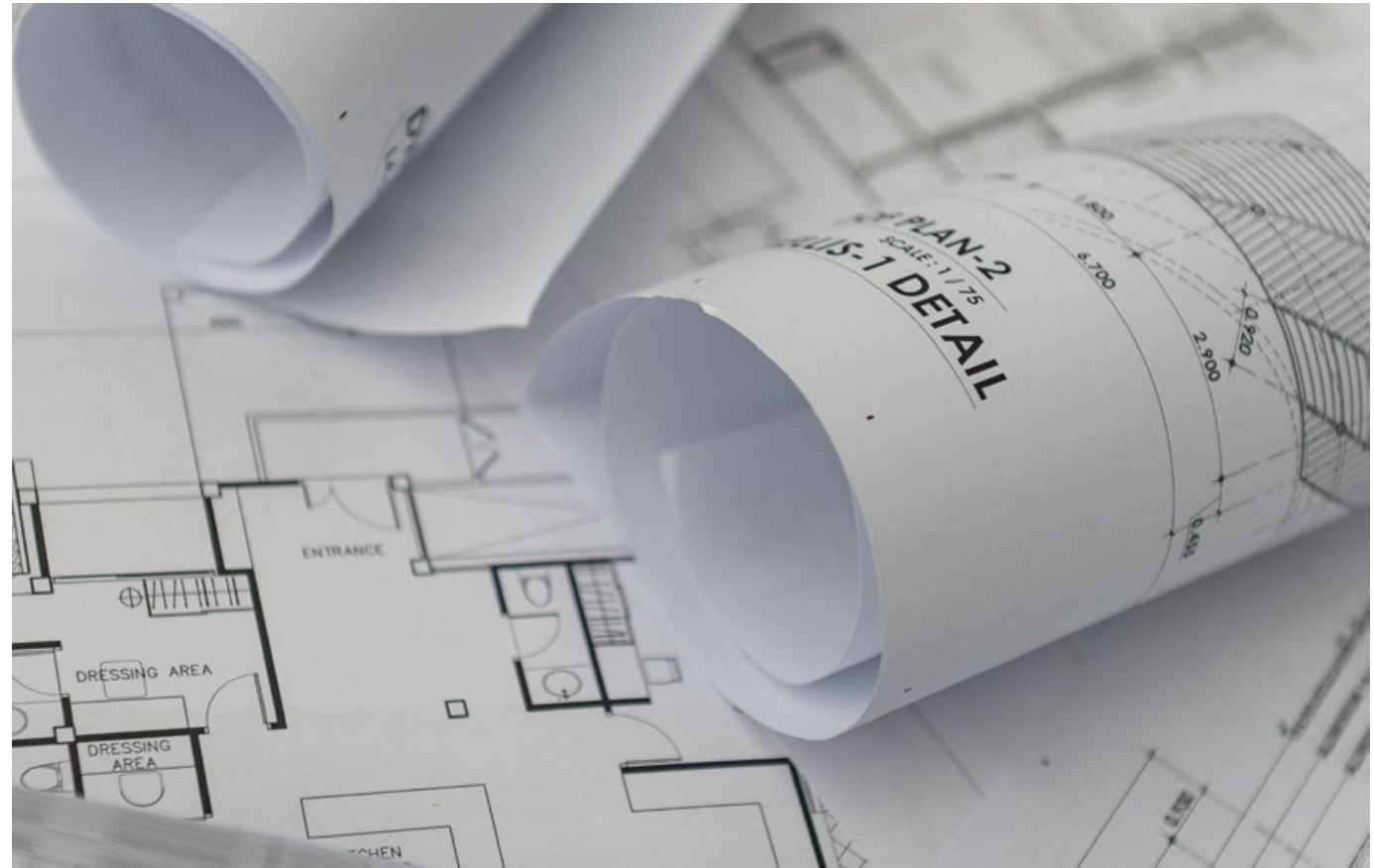
Credit: Larry Harwell



# 2018 IBC Balcony Code Changes

Documentation of impervious moisture barrier system on the construction documents, IBC 107.2.5 (new section)

Purpose: ensure that all installation details and system components are fully documented to enable proper installation techniques and material use



# 2018 IBC Balcony Code Changes

Required inspection of impervious moisture barrier system, IBC 110.3.6 (new section)

**IBC 110.3.6 Weather exposed balcony and walking surface waterproofing.** Where balcony or other elevated walking surfaces are exposed to water from direct or blowing rain, snow, or irrigation, and the structural framing is protected by an impervious moisture barrier, all elements of the impervious moisture barrier system shall be not be concealed until inspected and approved.

Exception: Where special inspections are provided in accordance with Section 1705.1.1, Item 3.



# 2018 IBC Balcony Code Changes

Required inspection of impervious moisture barrier system, IBC 110.3.6 (new section)

Purpose: ensure that an inspection of the impervious moisture barrier system takes place prior to enclosing the space.

A further step toward ensuring that systems are installed in the intended manner with the ability to function as designed





# 2018 IBC Balcony Code Changes

Positive drainage for impervious moisture barrier systems, IBC 2304.12.2.5  
(added language underlined)

**IBC 2304.12.2.5 Supporting members for permeable floors and roofs.** Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or preservative treated wood unless separated from such floors or roofs by an impervious moisture barrier. The impervious moisture barrier system protecting the structure supporting floors shall provide positive drainage of water that infiltrates the moisture-permeable floor topping.



# 2018 IBC Balcony Code Changes

So what are the options?

When wood balcony framing is covered with a moisture permeable topping such as a concrete slab, the wood framing must meet one of the following criteria:

- Be preservative-treated or naturally decay resistant wood
- or
- Be covered with an impervious moisture barrier system **with positive drainage**



Credit: Larry Harwell



# 2018 IBC Balcony Code Changes

If the impervious moisture barrier system does not have positive drainage, water that infiltrates the topping can remain stagnant over the impervious moisture barrier system, creating hydrostatic pressure

Positive drainage components commonly include a drainage mat above a waterproof membrane

**Some feel that using both PT wood and an impervious moisture barrier system with positive drainage is the best approach, even though it exceeds 'code minimums'**



Walter Huntington Apartments



# 2018 IBC Balcony Code Changes

Enclosed balconies must be ventilated, IBC 2304.12.2.6 (new section)

**IBC 2304.12.2.6 Ventilation required beneath balcony or elevated walking surfaces.** Enclosed framing in exterior balconies and elevated walking surfaces that are exposed to rain, snow, or drainage from irrigation, shall be provided with openings that provide a net free cross ventilation area not less than 1 /150 of the area of each separate space.



Credit: Balcony Inspection Vents

# 2018 IBC Balcony Code Changes

What's the purpose of ventilating enclosed balcony framing spaces?

No matter how well detailed and installed the balcony moisture protection system is, moisture may still find its way into enclosed spaces. There needs to be a way for this moisture to exit – the ventilation strategy aims to solve that



Credit: Balcony Inspection Vents