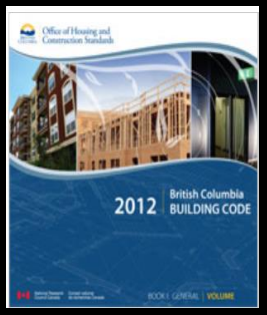
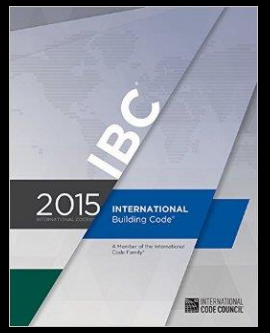
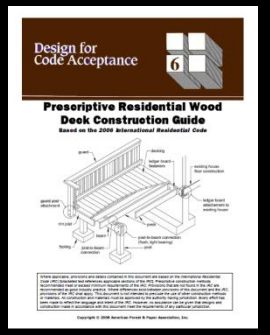
SIMPSON Strong-Tie®

Deck & Hand Rail Connections Presentation

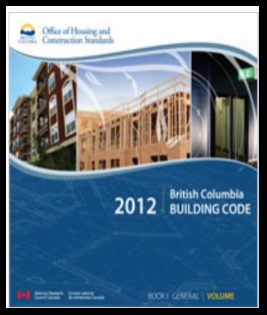


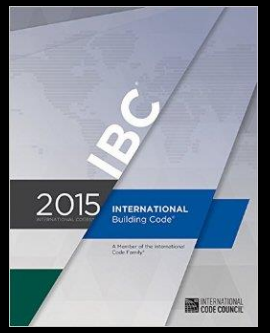


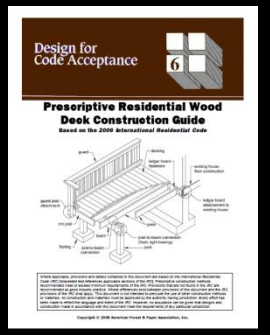


Objectives

- Select, specify, install & inspect structural connections for deck construction
- Identify areas of concern and provide solutions for proper fastening
- Identify core code requirements for multiple deck connections

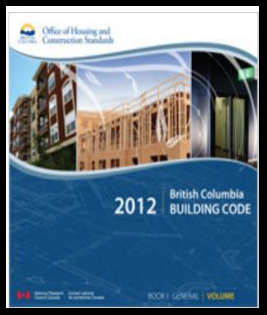


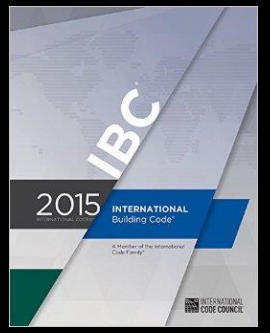


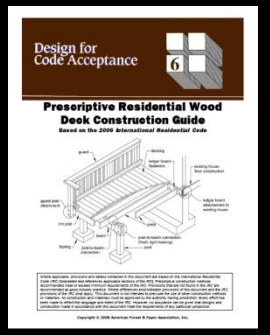


Outline

- Introduction & Overview
- Decks In the News
- Code References & Standards
  - Canada (BCBC & NBCC)
  - USA (IRC / IBC)
- Code Requirements
- Review & Discussion







…But It's Just a Deck!

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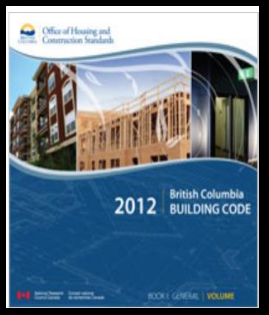
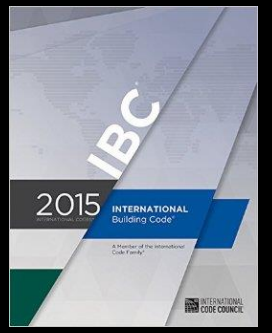
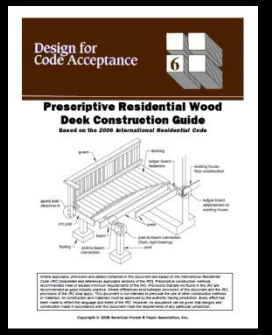
Why all the fuss?



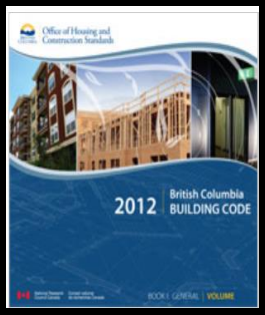


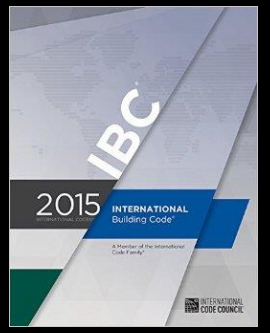


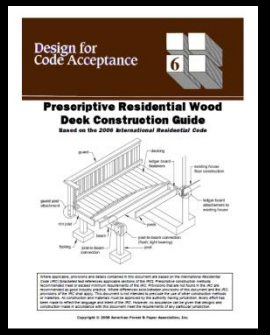
Decks In The News

- Yarmouth, N.S. (June 12, 2015)

Yarmouth area deck collapse sends 12 teens to hospital



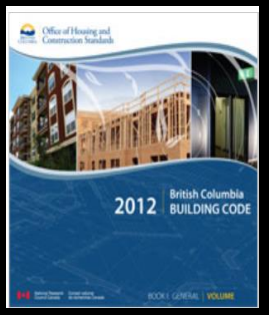


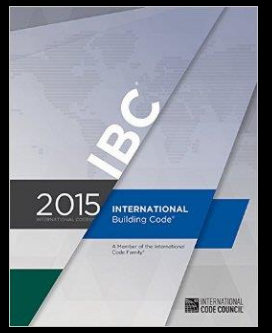


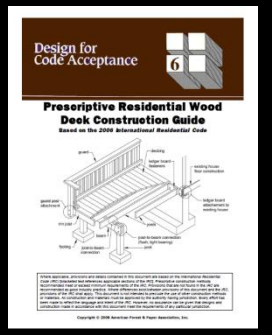
Decks In The News

- Halifax, N.B. (September 27, 2014)

Deck collapse in south-end Halifax sends 6 to hospital



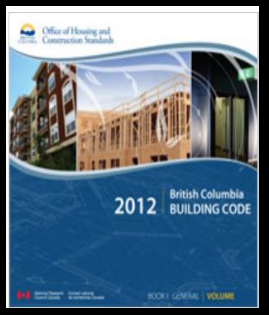


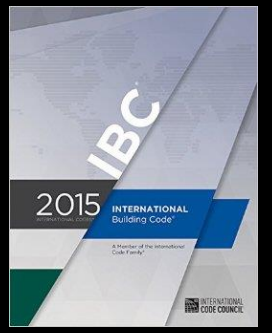


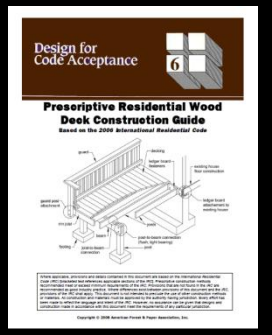
Decks In The News

- Brome Lake, QC (August 6, 2014)

Incident in Brome Lake raises questions about building inspection rules

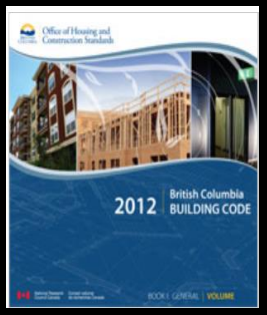


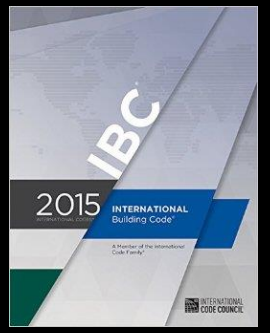


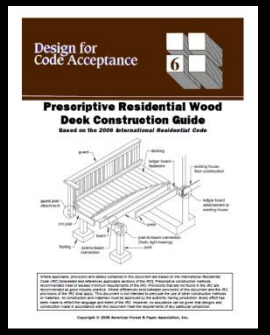


Decks In The News

- Teen Injured While Having Prom Pictures Taken
  - Savannah, GA
- City Investigates Railing Collapses
  - Chicago, IL
- Deck Collapse Injures Children
  - Chula Vista, AL
- Fourteen Hurt In Deck Collapse During Party
  - Christiana, DE







Decks In The News

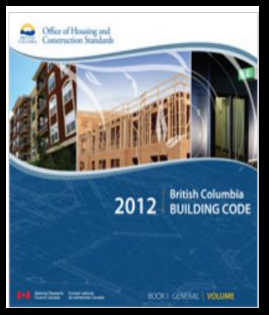
Ipsos poll reveals Canadian homeowners ignoring deck safety inspections that can prevent potentially fatal collapses

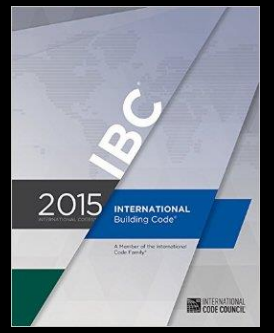
Highlites:

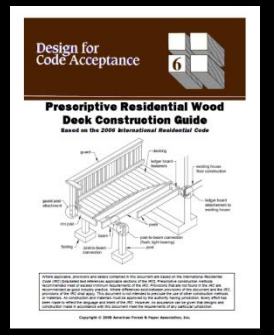
- 60% of home owners have a wooden deck
- 25% of those admit not inspecting them for safety

ABOUT THE IPSOS POLL

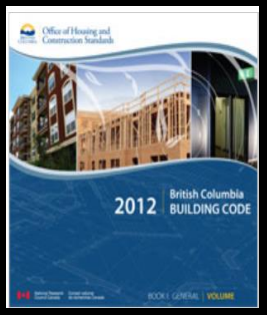
The Ipsos poll was conducted between April 6th and 8th, 2015 on behalf of SigmaDek. A sample of 1,005 Canadian homeowners (including 615 who have a wooden deck) from Ipsos' Canadian online panel was interviewed online. Weighting was then employed to balance demographics to ensure that the sample's composition reflects that of the adult population according to Census data. The precision of Ipsos online polls is measured using a credibility interval. In this case, the poll is accurate to within +/ - 3.5 percentage points, 19 times out of 20, had all Canadian homeowners been polled.

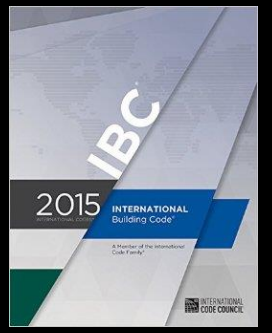


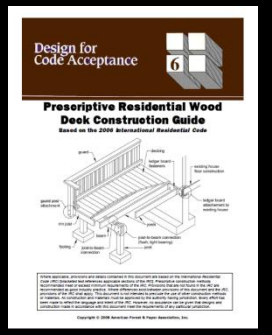




CODE REFERENCES & STANDARDS



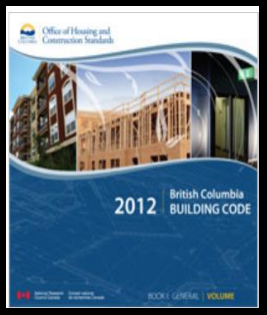


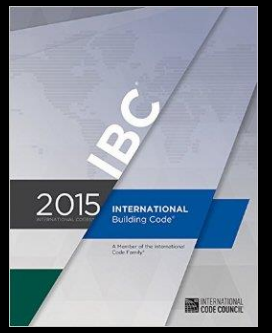


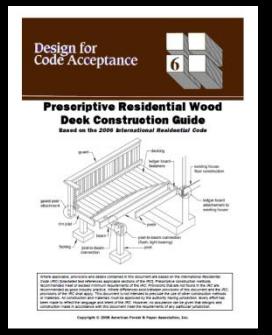
What Does the Code Address?

Specifically Addresses

- Deck Attachment
- Deck Cantilevers
- Joist & Beam Connections
- Guard & Hand Rail Connections
- Stair Tread & Stringer Connections
- Fasteners for PTW
- Continuous Load Path







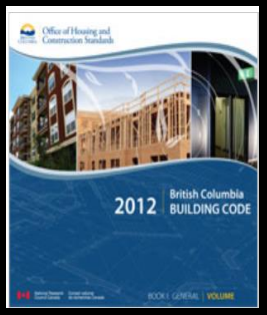
Deck Compliance

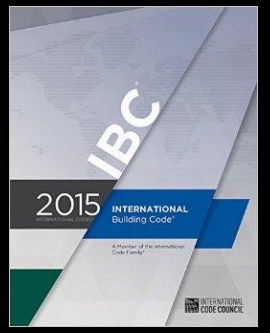
How do I meet the requirements?

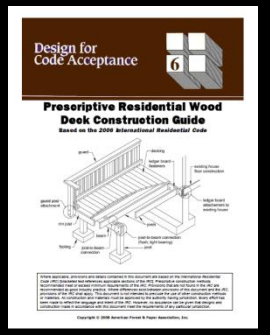
Are there guidelines available?

For USA

- *Deck Construction Based on the 2009 IRC*
- AF&PA Prescriptive Residential Deck Construction Guide (DCA6)
- *Manual for the Inspection of Residential Wood Decks & Balconies* (Va. Tech)
- Simpson Strong-Tie Deck Framing Connection Guide (F-DECKCODE13)







Deck Compliance

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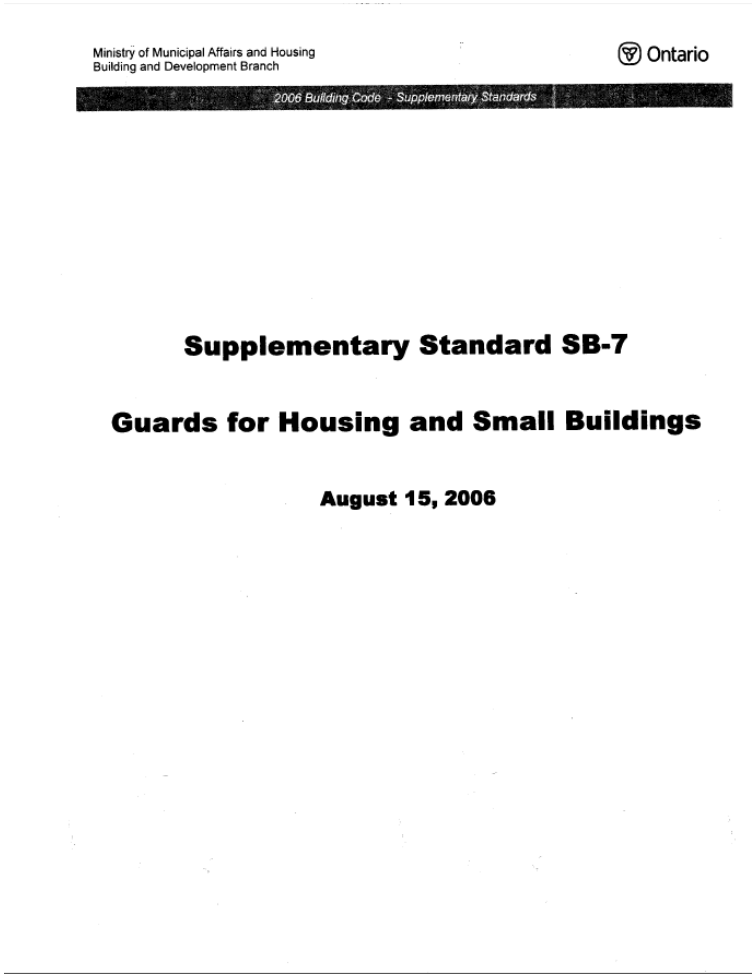
How do I meet the requirements?

For Canada (Building)

- BC Building Code 2012
  - Supplementary Standard SB-7


Ministry of Municipal Affairs and Housing
Building and Development Branch

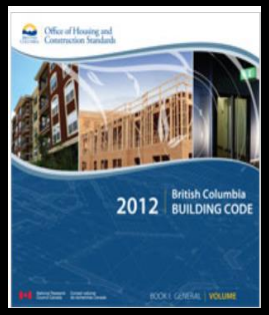
Ontario

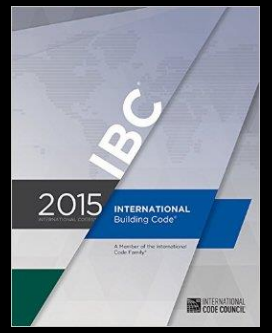
2006 Building Code - Supplementary Standards

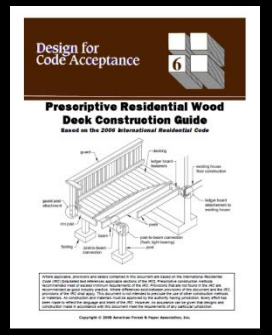
Supplementary Standard SB-7

Guards for Housing and Small Buildings

August 15, 2006



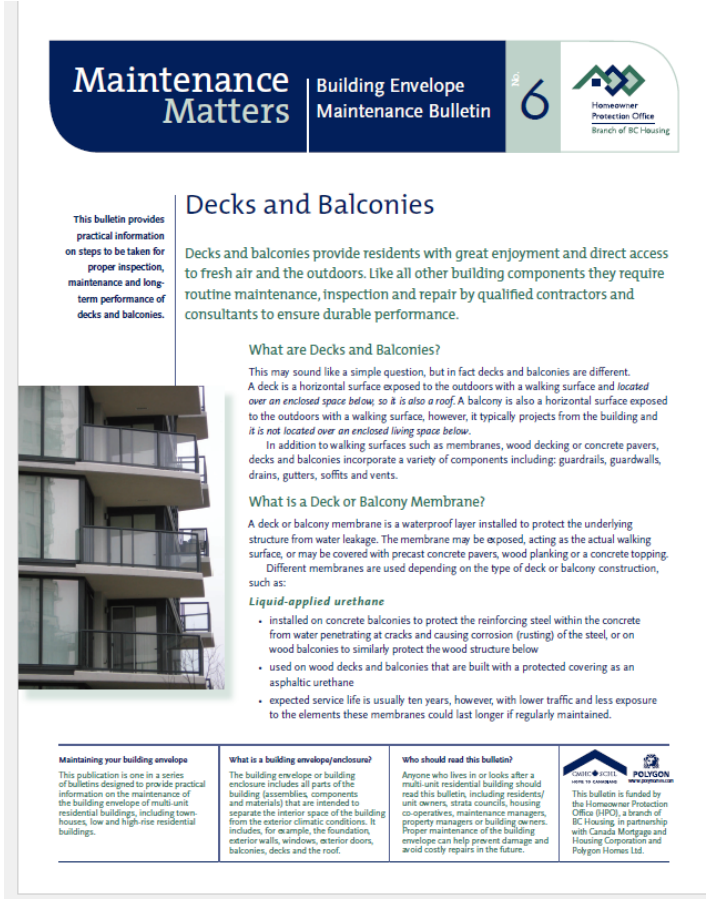




Deck Compliance

How do I meet the requirements?

- Home Owners Protection Office
  - Maintenance Matters #6



Maintenance Matters | Building Envelope Maintenance Bulletin | No. 6

Homeowner Protection Office, Branch of BC Housing

This bulletin provides practical information on steps to be taken for proper inspection, maintenance and long-term performance of decks and balconies.

Decks and Balconies

Decks and balconies provide residents with great enjoyment and direct access to fresh air and the outdoors. Like all other building components they require routine maintenance, inspection and repair by qualified contractors and consultants to ensure durable performance.

What are Decks and Balconies?

This may sound like a simple question, but in fact decks and balconies are different. A deck is a horizontal surface exposed to the outdoors with a walking surface and *located over an enclosed space below, so it is also a roof.* A balcony is also a horizontal surface exposed to the outdoors with a walking surface, however, it typically projects from the building and *it is not located over an enclosed living space below.*

In addition to walking surfaces such as membranes, wood decking or concrete pavers, decks and balconies incorporate a variety of components including: guardrails, guardwalls, drains, gutters, soffits and vents.

What is a Deck or Balcony Membrane?

A deck or balcony membrane is a waterproof layer installed to protect the underlying structure from water leakage. The membrane may be exposed, acting as the actual walking surface, or may be covered with precast concrete pavers, wood planking or a concrete topping.

Different membranes are used depending on the type of deck or balcony construction, such as:

Liquid-applied urethane

- installed on concrete balconies to protect the reinforcing steel within the concrete from water penetrating at cracks and causing corrosion (rusting) of the steel, or on wood balconies to similarly protect the wood structure below
- used on wood decks and balconies that are built with a protected covering as an asphaltic urethane
- expected service life is usually ten years, however, with lower traffic and less exposure to the elements these membranes could last longer if regularly maintained.

Maintaining your building envelope

This publication is one in a series of bulletins designed to provide practical information on the maintenance of the building envelope of multi-unit residential buildings, including town-houses, low and high-rise residential buildings.

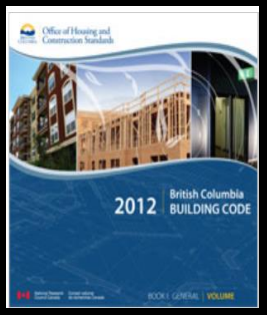
What is a building envelope/enclosure?

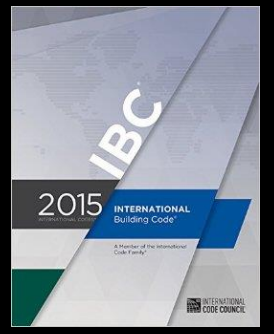
The building envelope or building enclosure includes all parts of the building (assemblies, components and materials) that are intended to separate the interior space of the building from the exterior climatic conditions. It includes, for example, the foundation, exterior walls, windows, exterior doors, balconies, decks and the roof.

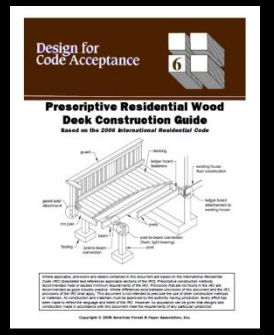
Who should read this bulletin?

Anyone who lives in or looks after a multi-unit residential building should read this bulletin, including residents/unit owners, strata councils, housing co-operatives, maintenance managers, property managers or building owners. Proper maintenance of the building envelope can help prevent damage and avoid costly repairs in the future.

This bulletin is funded by the Homeowner Protection Office (HPO), a branch of BC Housing, in partnership with Canada Mortgage and Housing Corporation and Polygon Homes Ltd.



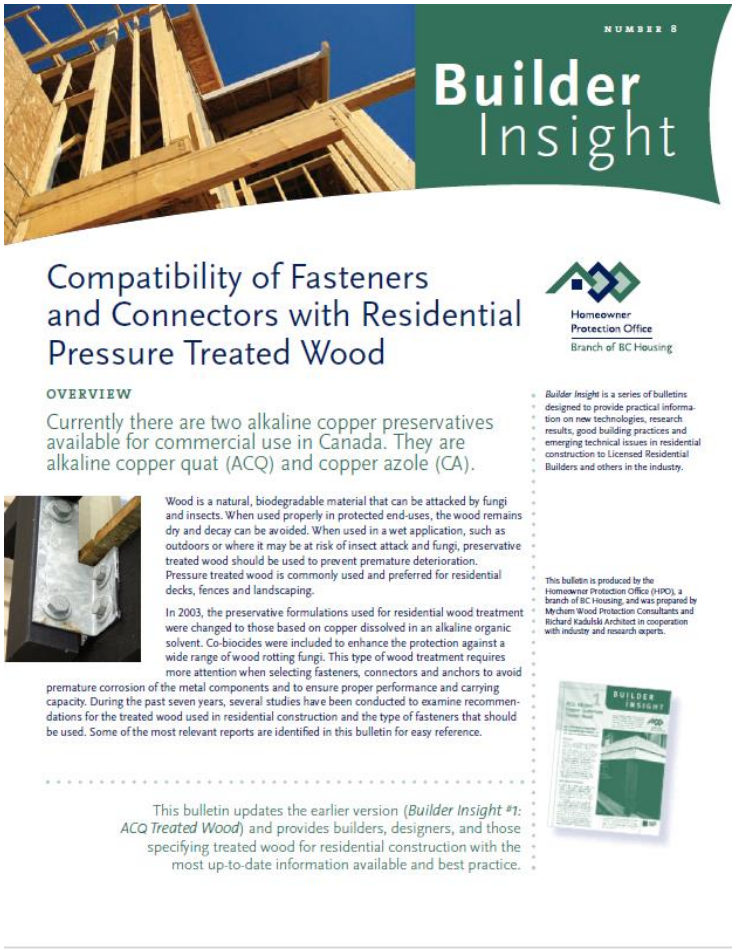


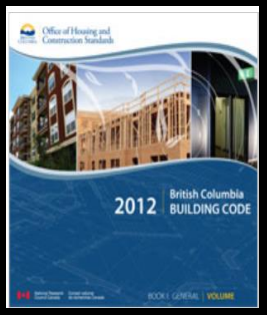


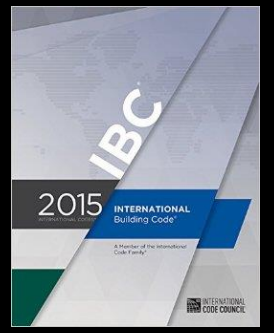
Deck Compliance

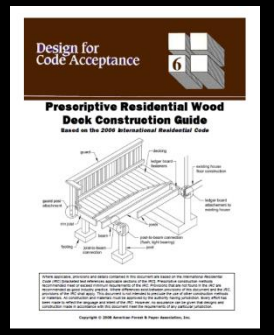
How do I meet the requirements?

- Home Owners Protection Office
  - Builder Insight #8









A Collection of Requirements

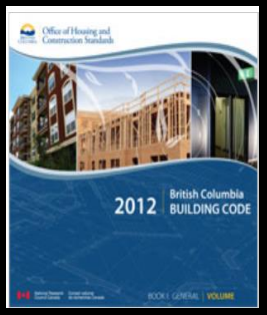
SIMPSON Strong-Tie®

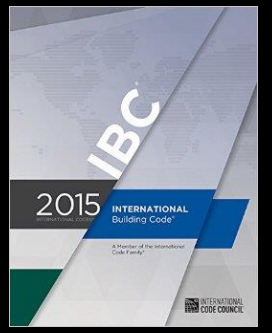
SIMPSON Strong-Tie

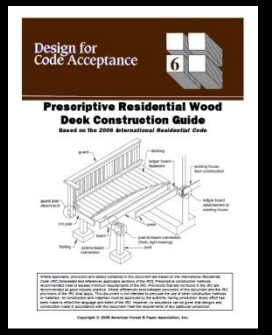
Deck Connection and Fastening Guide

RECOMMENDATIONS FOR THE CONSTRUCTION OF CODE-COMPLIANT DECKS

800-999-5099 | www.strongtie.com







Where to Begin?

Use the guide to learn about requirements and how to meet them.

"The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation."

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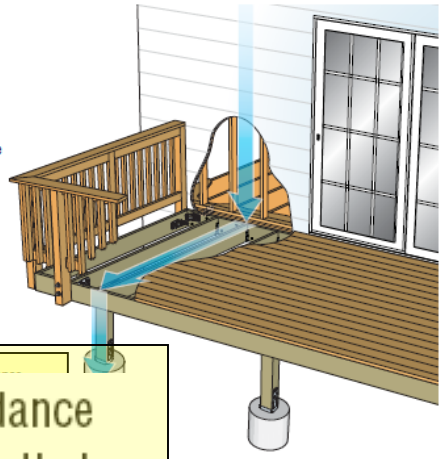
Code Concerns

Do Decks Really Need to Meet Code Requirements?

Because they look relatively simple to build, many people do not realize that decks are structures that need to be designed to adequately resist certain stresses. Like a house, or any other building, a deck must be designed to support the weight of people and objects placed on them, as well as lateral and uplift loads that can act on the deck as a result of occupant movement, wind or seismic activity. The 2009/2012 versions of both the IBC and IRC contain language outlining the general design requirements of structures. This excerpt from the 2009/2012 IRC (Section R301.1) represents a summary of the intent of both codes:



nnections within the structure of
g structure *(commonly a building)*.
s. This continuous load path is
e wood members together.

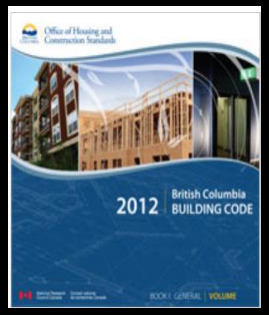
uction:

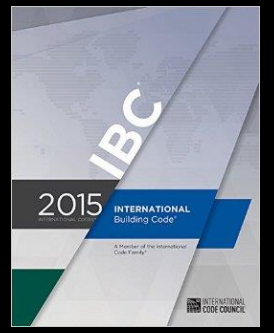
toenails or nails subject to withdrawal" when making this connection, yet a number of deck failures result due to using these or other types of improper fasteners.

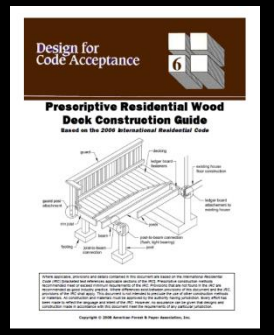
2. **Proper fastening of guardrails to the deck**
The IRC requires the guardrail to resist a 200-pound load. This load applied at the top of the guardrail, creates a large leverage force where the guardrail attaches to the deck framing.

3. **Post-base connections**
The IRC requires posts "be restrained to prevent lateral displacement at the bottom end". This requirement is important as most decks cannot safely support part or all of its structure, if a post is removed.

4. **Openings in guards and stair railings**
The building code places a limit on the size of openings, for the occupant's safety in case of tripping or falling, or the safety of small children.







What Does the Guide Cover?

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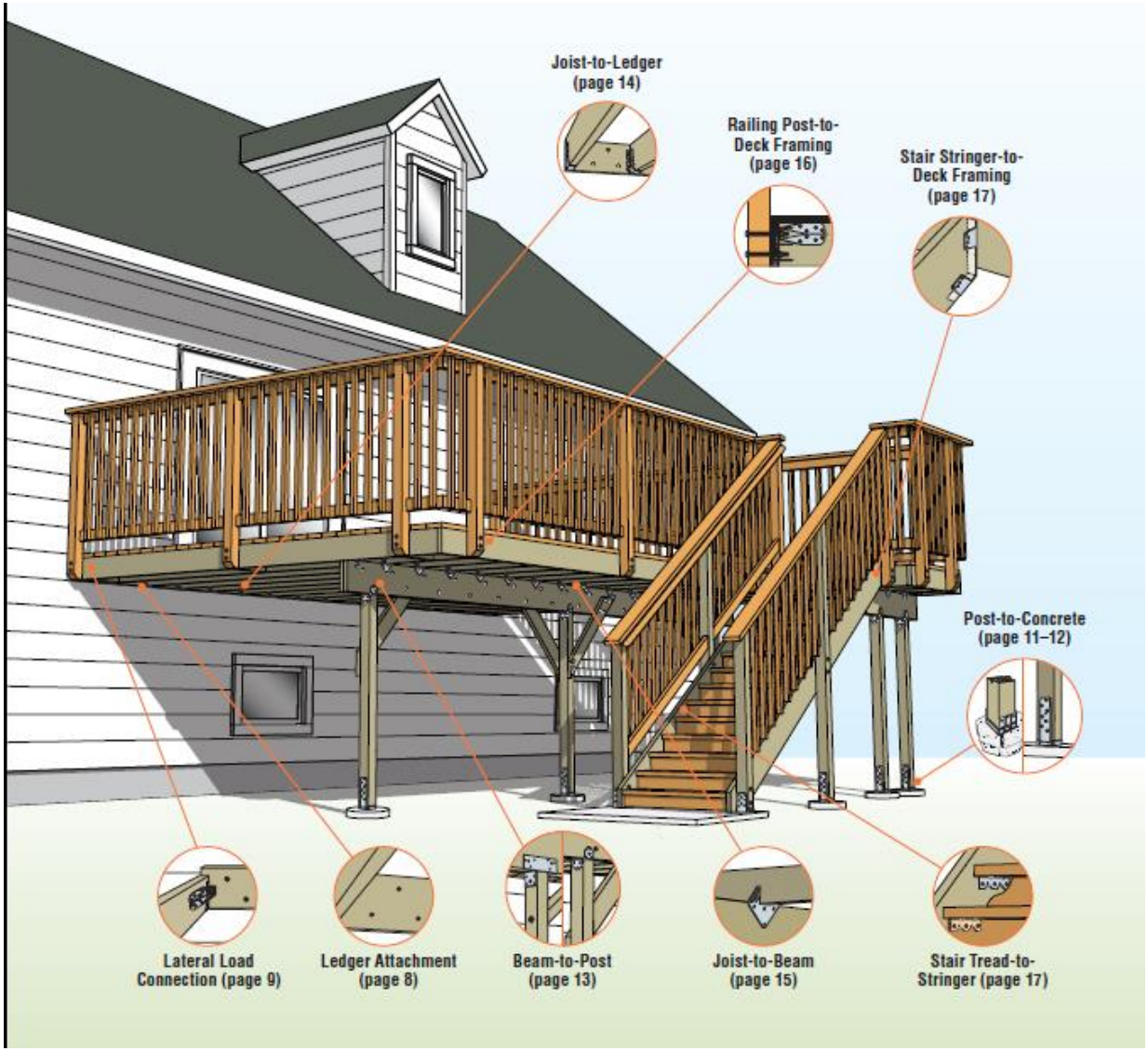

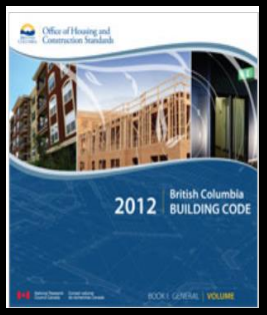

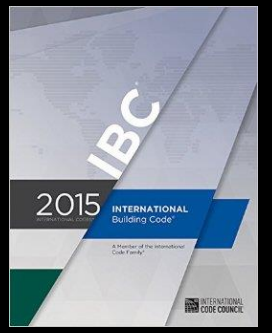

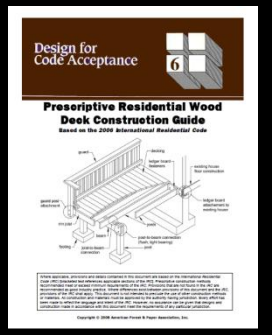

Retrofit or Replace?

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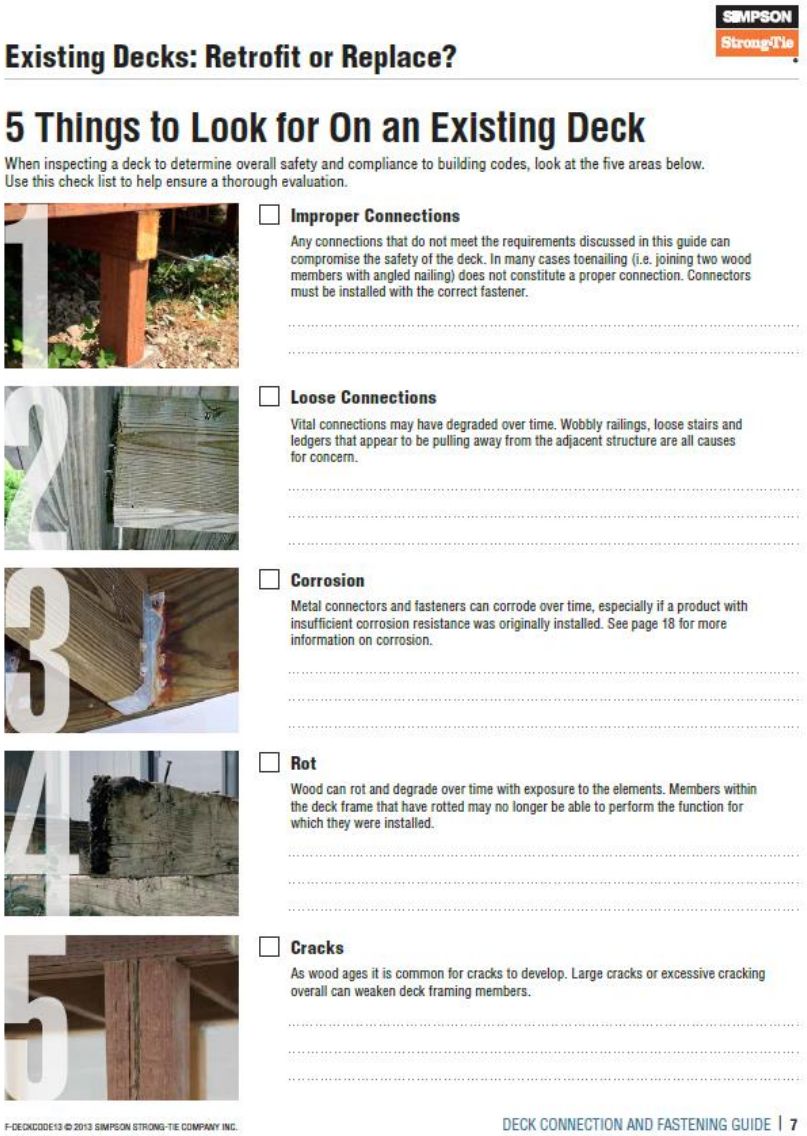
Five Things to Look For:

1. Improper Connections
2. Loose Connections
3. Corrosion
4. Rot
5. Cracks



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Existing Decks: Retrofit or Replace?

5 Things to Look for On an Existing Deck

When inspecting a deck to determine overall safety and compliance to building codes, look at the five areas below. Use this check list to help ensure a thorough evaluation.

1

☐ **Improper Connections**

Any connections that do not meet the requirements discussed in this guide can compromise the safety of the deck. In many cases toenailing (i.e. joining two wood members with angled nailing) does not constitute a proper connection. Connectors must be installed with the correct fastener.

2

☐ **Loose Connections**

Vital connections may have degraded over time. Wobbly railings, loose stairs and ledgers that appear to be pulling away from the adjacent structure are all causes for concern.

3

☐ **Corrosion**

Metal connectors and fasteners can corrode over time, especially if a product with insufficient corrosion resistance was originally installed. See page 18 for more information on corrosion.

4

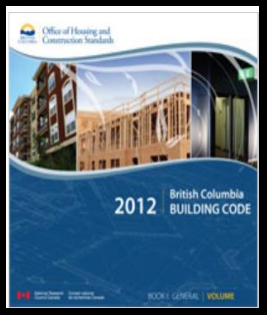
☐ **Rot**

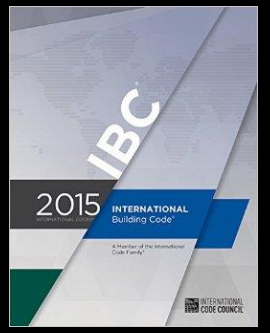
Wood can rot and degrade over time with exposure to the elements. Members within the deck frame that have rotted may no longer be able to perform the function for which they were installed.

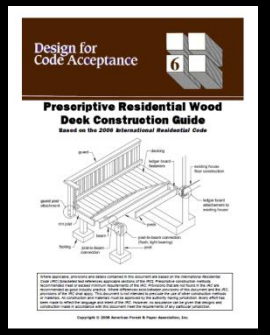
5

☐ **Cracks**

As wood ages it is common for cracks to develop. Large cracks or excessive cracking overall can weaken deck framing members.







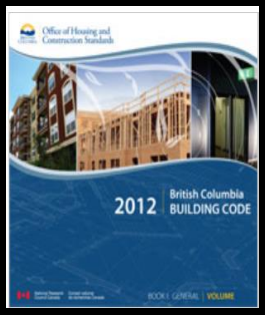
Retrofit or Replace?

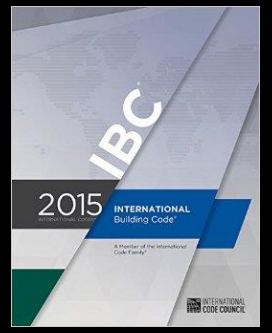
- HPO Deck and Balconies (Checklist)

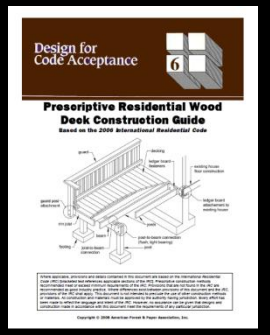
Checklist of Common Deck and Balcony Maintenance Items

This list can be used by building residents to become familiar with some inspection and maintenance items. While some of the items can be carried out by residents, most should be coordinated by the building manager. In most cases, a building envelope consulant will need to be involved.

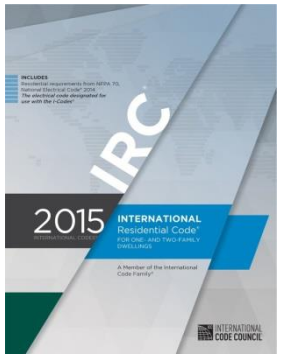
Inspection/ Mainenance Items	Description	Suggested Action/Who Should be Involved
Dirt, leaves, twigs and moss	Lack of cleaning can cause clogs and blockages leading to moisture build-up or ponding that can damage the deck or balcony.	Residents could sweep, clean and remove debris on their decks and balconies. Gutters cleaning should be organized by the building manager.
Water ponding on the deck or balcony floor	Ponding could indicate that the drainage hole is blocked, there is not enough slope on the deck or balcony, or that sagging or settlement of the structure has occured.	Residents should check drainage holes or scuppers and remove debris. If water is still ponding, the deck or balcony should be inspected by a building envelope consultant. The task should be coordinated by the building manager.
Clogged soffit and vent perforations	Keep vents clear of dirt and debris to ensure adequate ventilation is achieved. Clothes dryers that vent to the underside of a balcony can clog soffit and vent perforations with lint.	Contact your building manager to coordinate the clean up of soffits and vents.
Delamination or peeling of deck or balcony membrane from the wall	The membrane is debonding or pulling away from the wall.	Inspection, repair and replacement require the services of a qualified contractor, and some cases, may require inspection by a building envelope consultant.
Seam failure of the deck or balcony sheet membrane	The membrane has failed at the lap joint. In this case it may be possible to repair the joint and the balance of the membrane can remain. Early detection and repair of this type of defect can extend the life of the membrane, avoid water leakage and preserve the structure from major repair.	Inspection, repair and replacement require the services of a qualified contractor, and some cases, may require inspection by a building envelope consultant.
Corroded, loose, unstable guardrails,or bolts and steel connectors on guardwalls	These are safety hazards because they may fail when they are needed to prevent someone from falling.	Report conditions to building manager to contact a building envelope consultant for adequate inspection.
Concrete spalling and cracking, rusting of reinforcing steel	The presence of spalling, where pieces of concrete are flaking off or cracking on your deck or balcony, may be a serious problem and needs to be inspected by an expert.	Report to building manager to contact a building envelope consultant.





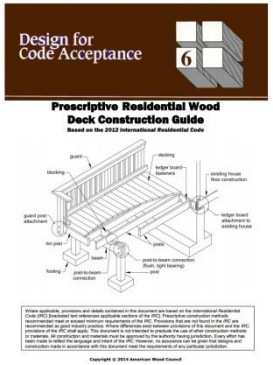


Code References & Standards



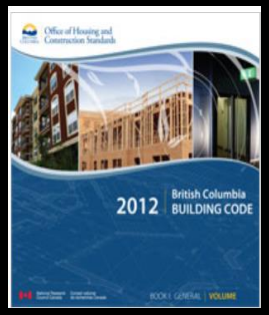
IRC: R507 Exterior Decks

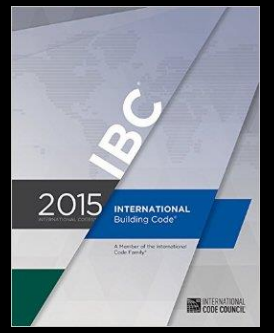
- R507 covers many elements
- Guards, footings, and other parts found in other chapters

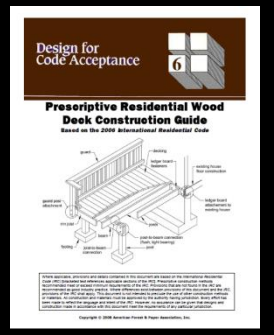


DCA 6 by AWC

- One document covering all components of deck design & construction
- Used by many jurisdictions



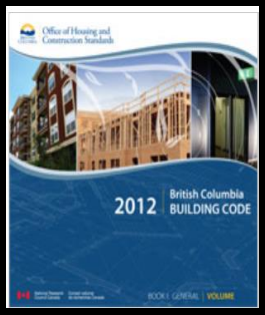


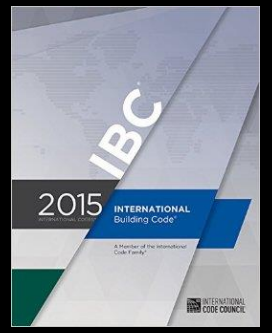


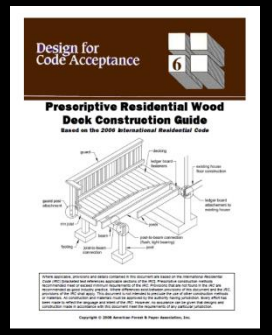
IRC Corrosion Requirements

R317.3 Fasteners and connectors in contact with PT and FRT wood. Fasteners, including nuts and washers, and connectors in contact with PTW and FRT wood shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153.

Exception: One-half inch diameter or larger steel bolts.



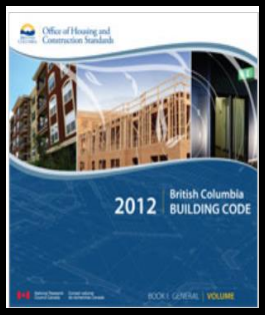


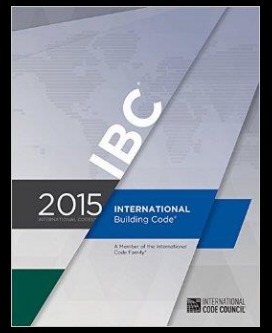


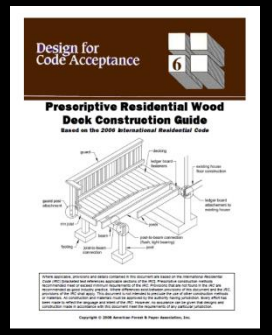
IRC Corrosion Requirements

R317.3.1 Fasteners for preservative-treated wood. Fasteners, including nuts and washers, for PTW shall be of hot-dipped, zinc-coated galvanized steel, stainless tell, silicon bronze, or copper. Coatings types and weights…in accordance with the mfg's recommendations. In the absence…a minimum of ASTM A653 type G185 or equivalent.

Exception: One-half inch diameter or larger steel bolts.

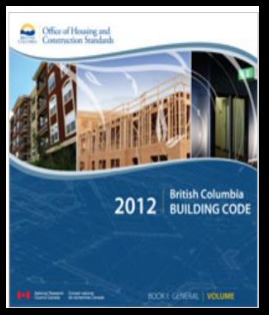


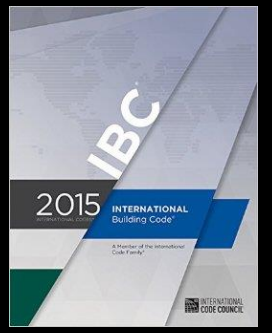


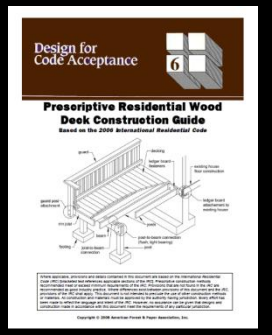


Corrosion Protection

How do we protect something valuable?







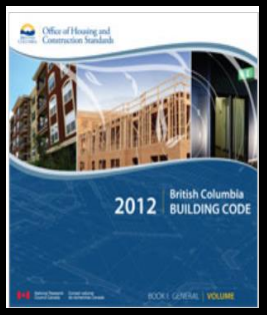
Corrosion Protection

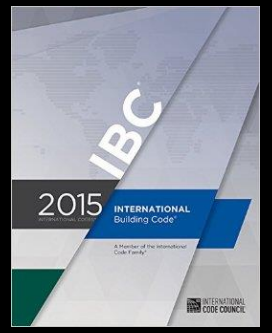
How do we protect something valuable?

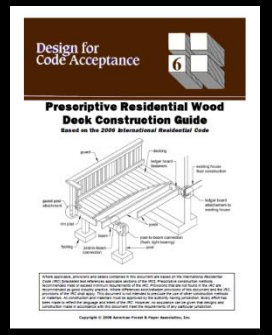
- Give it a protective wrapping/coating
- What happens when it's scratched?

Zinc works 2 ways:

1. Protective coating
2. Sacrificial material – zinc oxidizes first



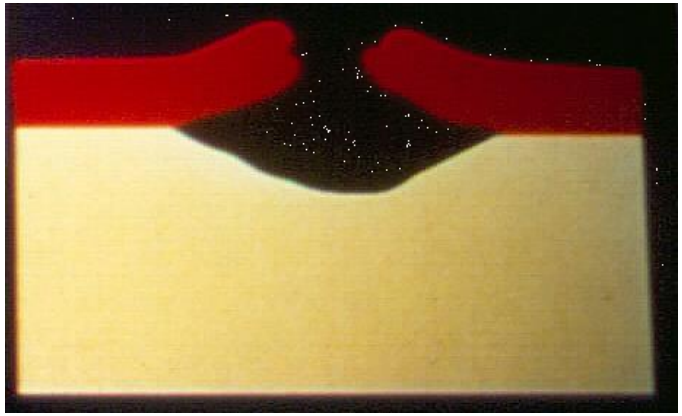


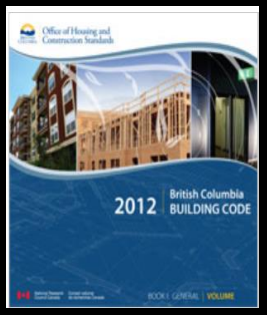


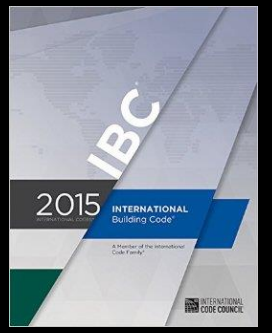
Scratches

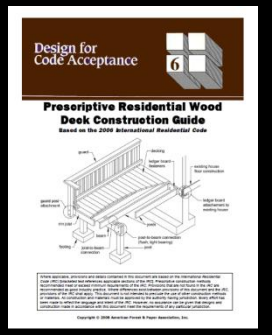
On Galvanized Steel

On Painted Steel



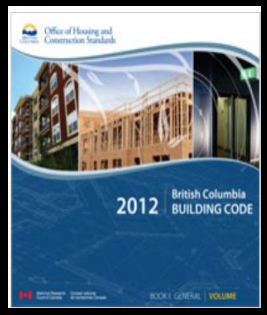


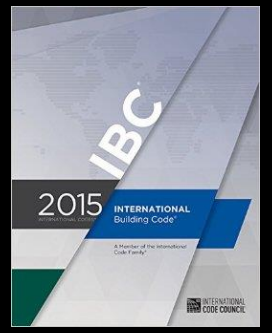


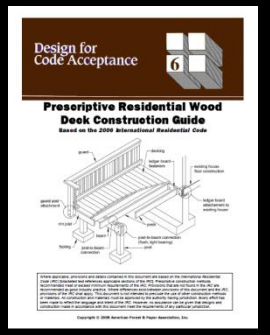


Comparison of Galvanizing Specs

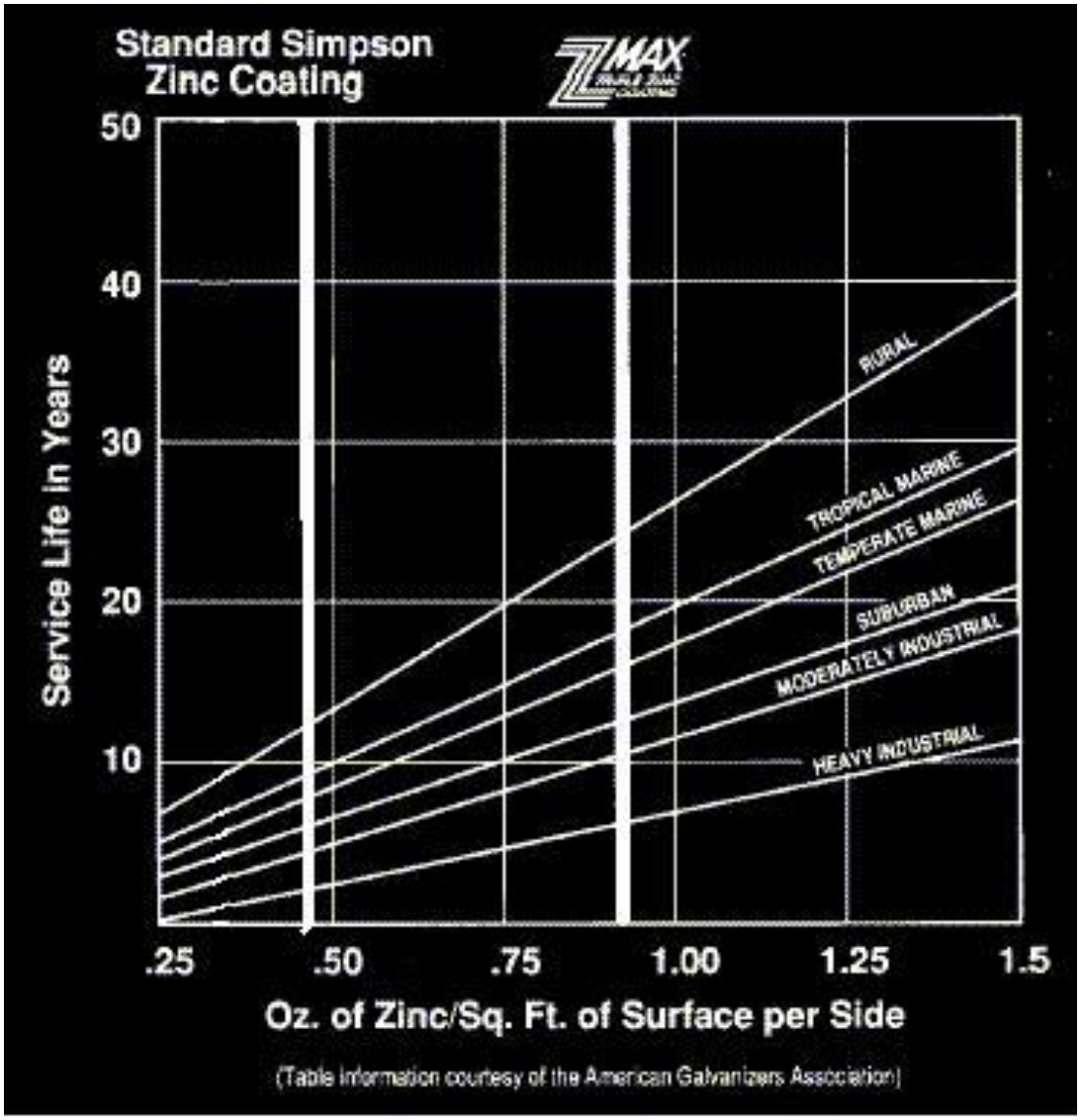
ASTM Specification	Coating Thickness
Connector Steel Specifications	
ASTM A653 G185 *Continuously Galvanized Sheet Steel*	1.85 oz/ft^2 (total)
ASTM A123 *Post Hot-Dipped Steel (<1/16" thick)*	2.0 oz/ft^2 (total)
Fastener Specifications	
ASTM A153 *≤3/8" thick*	2.0 oz/ft^2 (total)
ASTM B695 *Machine Galvanized (Class 50)*	2.2 oz/ft^2 (total)

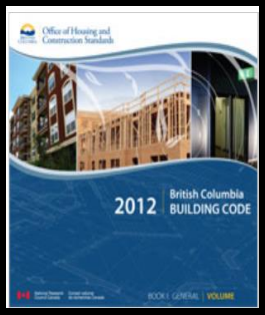


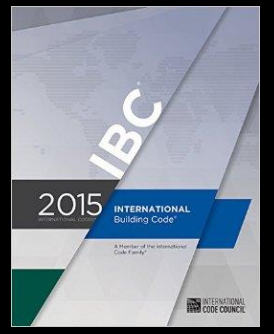


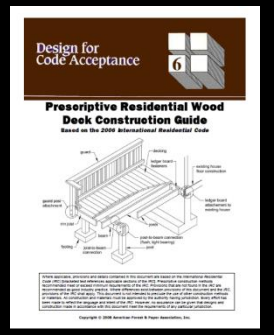


Service Life vs. Thickness of Galvanizing







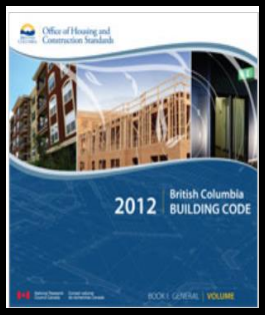


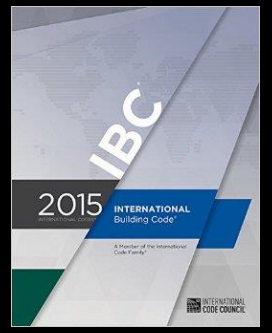
Corrosion Recommendations

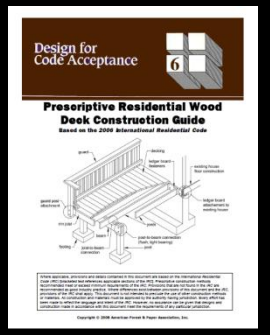
R317.3 Fasteners for pressure-preservative and fire-retardant-treated wood shall be in accordance… The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153.

CORROSION RESISTANCE RECOMMENDATIONS			
Low	**Medium**	**High**	**Severe**
FASTENERS			
Phosphate (gray, black), Clear (bright) zinc (ASTM F1941), Heavy electro-galvanized (ASTM A641-Class 1), Yellow zinc (ASTM F1941), Electrocoat (E-coat), Type 410 stainless steel	Mechanically galvanized (AS 3566.2-C3, N2000, ASTM B695-Class 55), Quik Guard® coating, Hot-dip galvanized (ASTM A153-Class D), Double-barrier coating, Type 410 stainless steel with protective top coat	Type 304 stainless steel, Type 305 stainless steel	Type 316 stainless steel, Hot-dip galvanized (ASTM A153-Class C), Silicon bronze, Copper
CONNECTORS			
Simpson Strong-Tie® gray paint Powder coating Standard G90 zinc coating	ZMAX® (G185) Hot-dip galvanized (ASTM A153 - Class D)	Type 316L stainless steel	Type 316L stainless steel

CORROSION RESISTANCE CLASSIFICATIONS							
Environment	**Material To Be Fastened**						
	Untreated Wood or Other Material	**Preservative-Treated Wood**					**FRT Wood**
		SBX-DOT Zinc Borate	**Chemical Retention ≤ AWPA, UC4A**	**Chemical Retention > AWPA, UC4A**	**ACZA**	**Other or Uncertain**	
Dry Service	Low	Low	Low	High	High	High	Med
Wet Service	Med	N/A	Med	High	High	High	High
Elevated Service	High	N/A	Severe	Severe	High	Severe	N/A
Uncertain	High	High	High	Severe	High	Severe	High
Ocean/Water Front	Severe	N/A	Severe	Severe	Severe	Severe	N/A

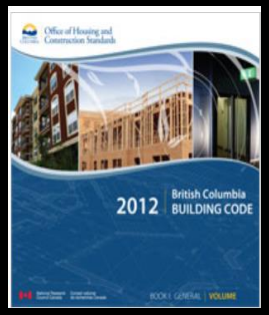


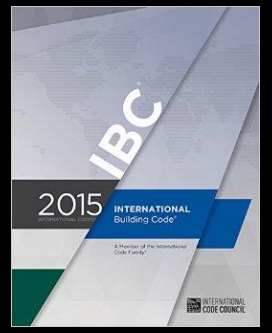


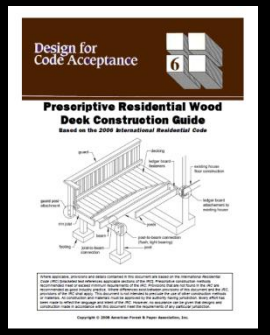


Finishes – Match Properly

CONNECTORS	FASTENERS
Stainless	Stainless
Galvanized (G90)	Electro-Galvanized /Bright
HDG/ZMAX (G185)	HDG
Paint	HDG Equivalent



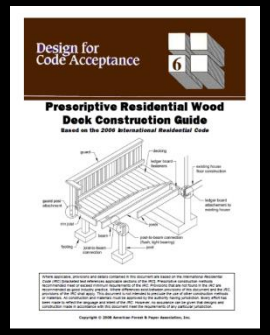




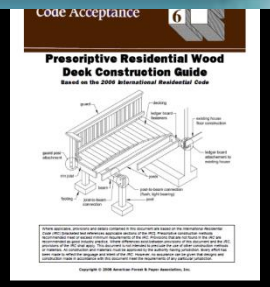
Corrosion – SST Idendtification

Product Stamp

Product Labels



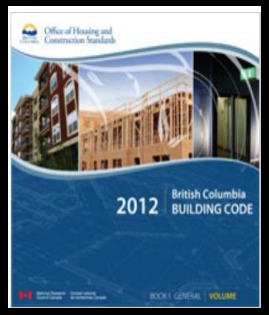
Corrosion – SST Idendtification

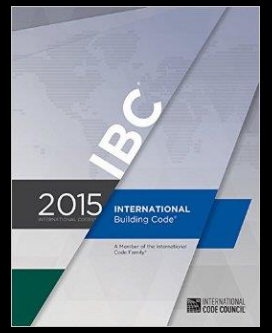


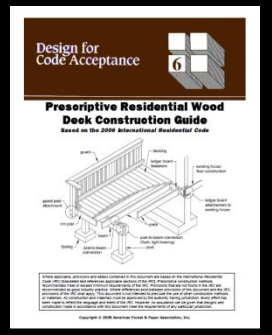
Corrosion – Evaluate the Situation

Apartment complex

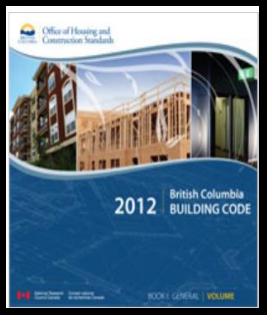
- Will walkways be salted during winter?

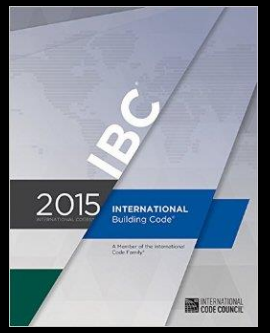


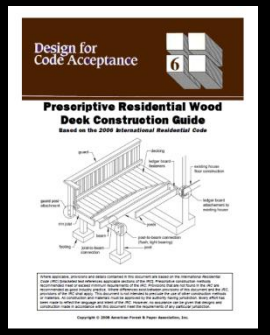




Structural Requirements



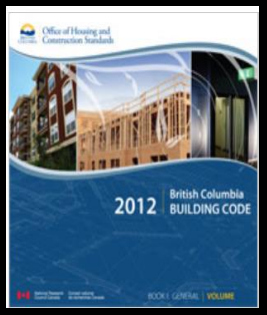


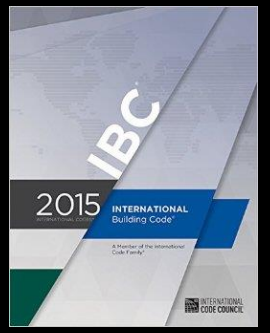


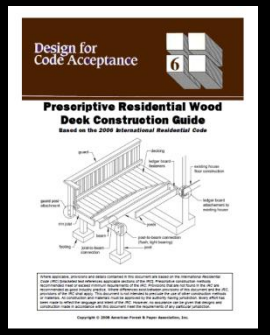
Structural Requirements

What are the requirements for deck construction?

- 2015 IRC Section R507 Exterior Decks
- Also other chapters with requirements
  - Guards
  - Footings
- AF&PA's DCA 6 Guideline

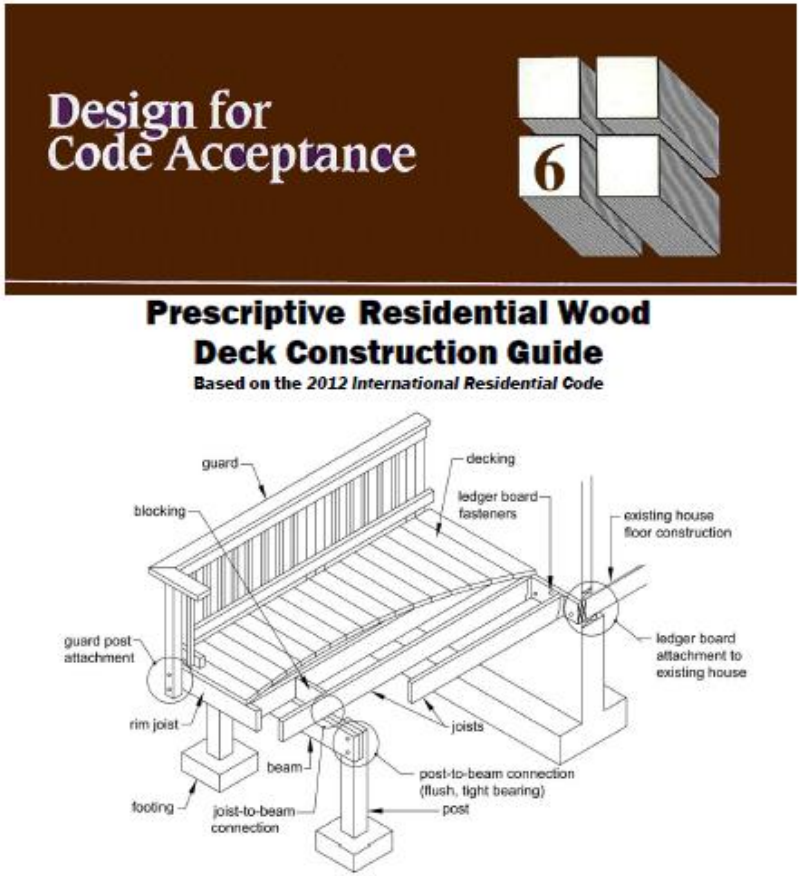


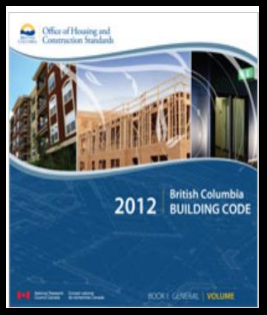


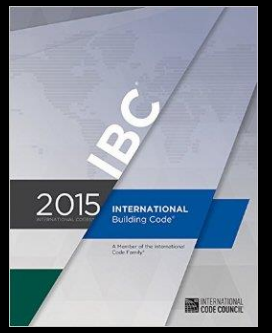


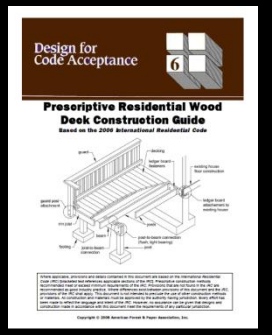
DCA6 – Design for Code Acceptance (2012 now available)

SIMPSON Strong-Tie®



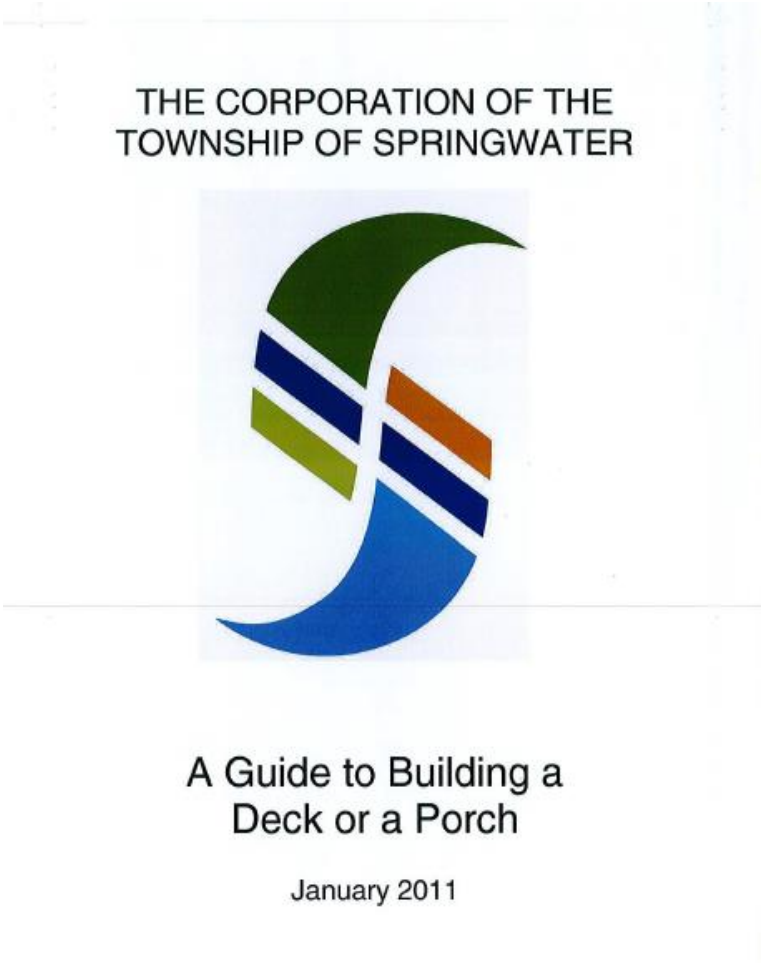


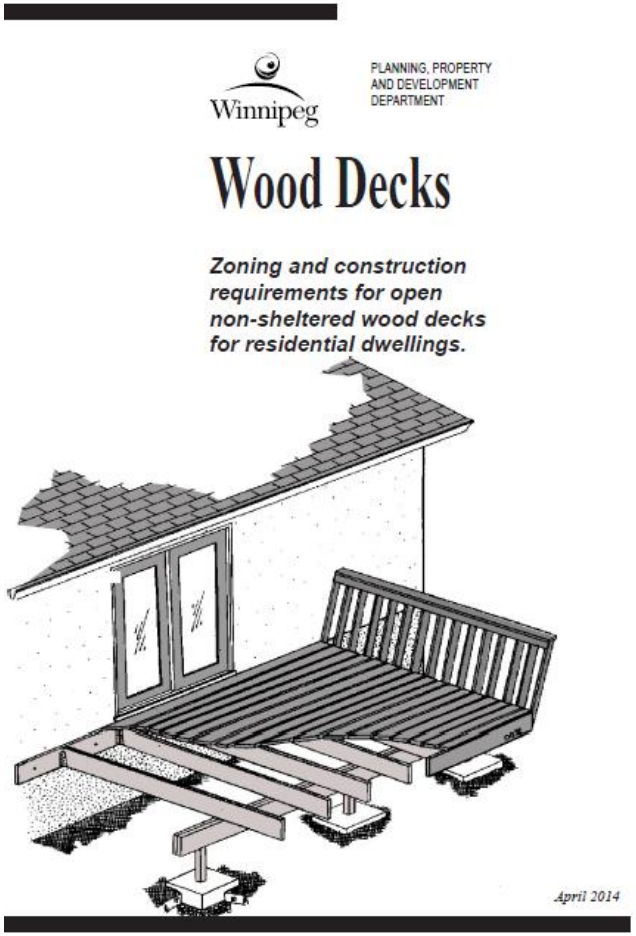


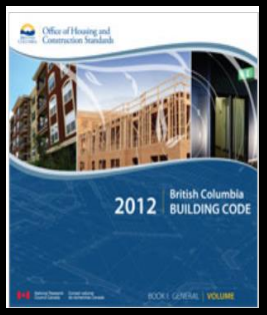


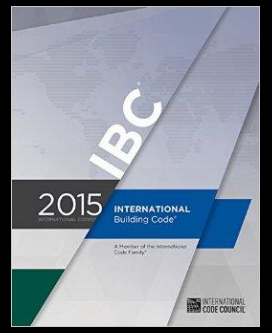
What about a DCA for Canada?

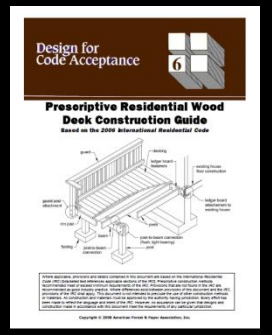
SIMPSON Strong-Tie®









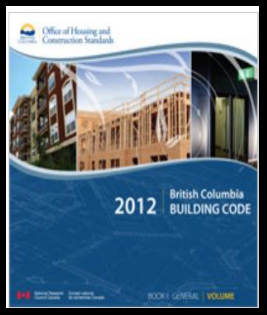


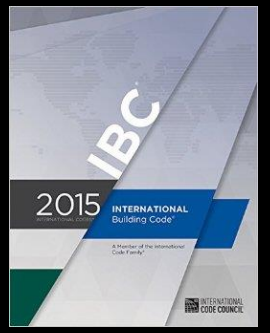
DCA6 – Design for Code Acceptance

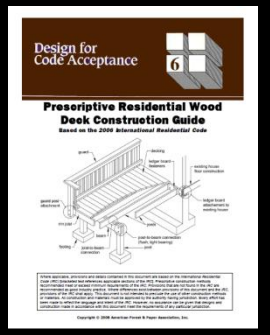
SIMPSON Strong-Tie®

What is it?

- Prescriptive residential wood deck construction guide
- Free document by AF&PA
  - Includes Appendix
- www.awc.org
- Covers items such as
  - Joist spans
  - Joist/beam connections
  - Hangers
  - Ledger attachment
  - Guards/Stairs

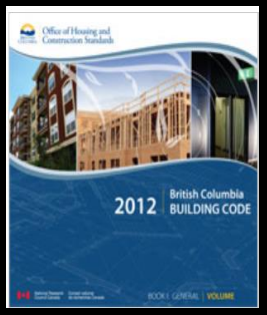


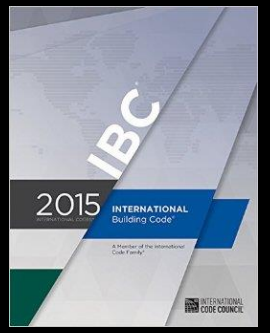


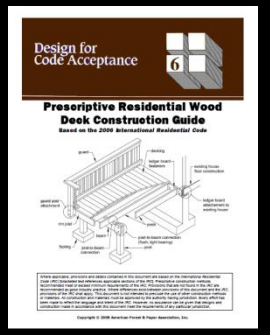


Connections

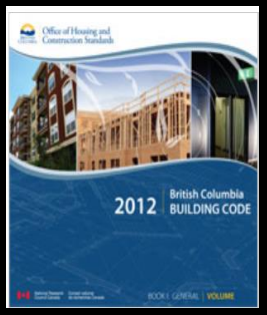
Let’s look at all of the structural requirements for connection points throughout the construction of a deck.

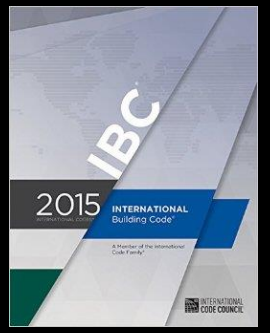


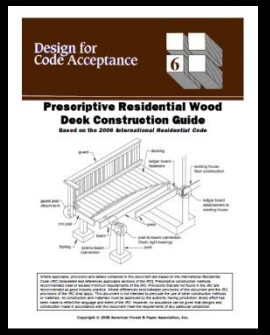




Ledger/Band Board Connections

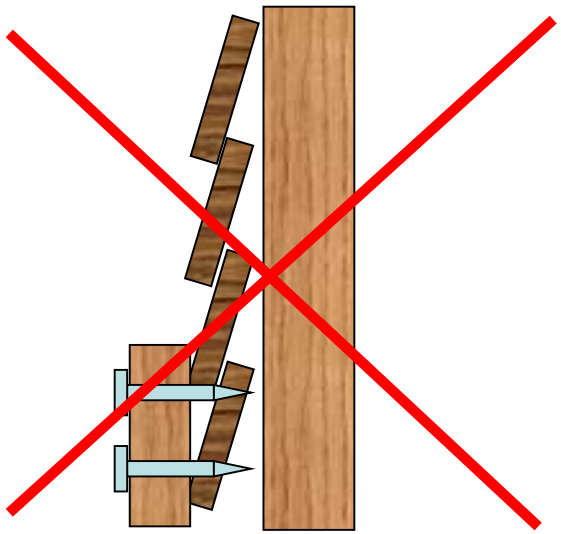


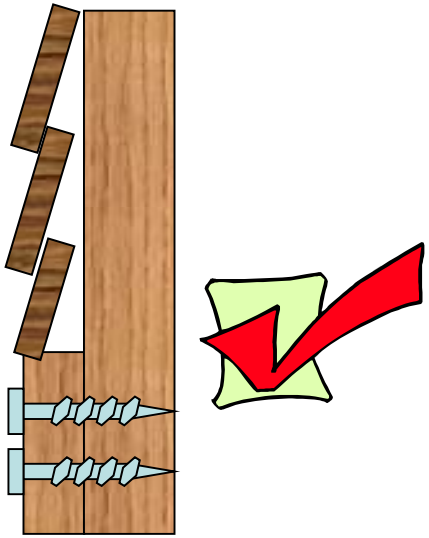


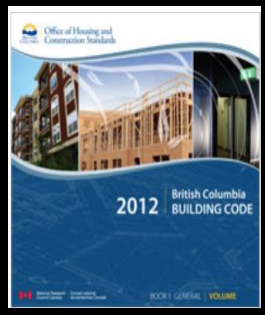


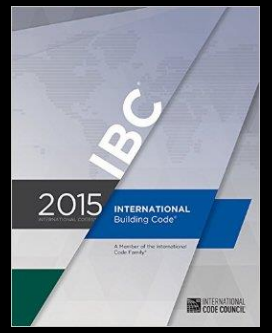
IRC R507.1 Decks

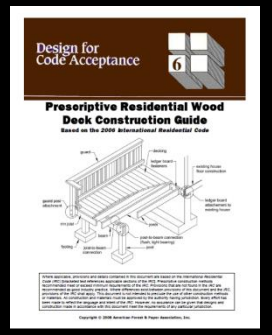
Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal.









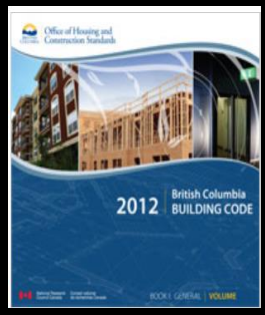


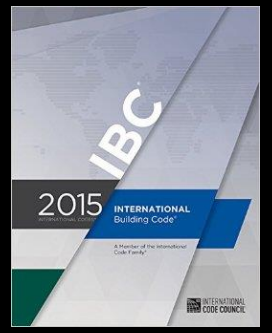
IRC R507.2 Deck Ledger

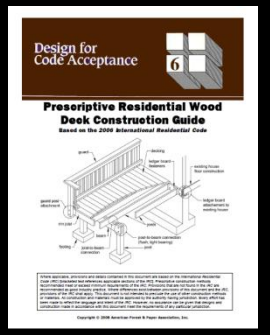
Table R507.2
Deck Ledger Connection to Band Joist

JOIST SPAN	6’ & Less	6’1” to 8’	8’1” to 10’	10’1” to 12’	12’1” to 14’	14’1” to 16’	16’1” to 18’
Connection Details	**On-center spacing of fasteners**						
½ inch diameter lag screw with 15/32 inch maximum sheathing	30	23	18	15	13	11	10
½ inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
½ inch diameter bolt with 15/32 inch maximum sheathing and ½ inch stacked washers	36	36	29	24	21	18	16

- Deck live load = 40 psf, deck dead load = 10psf
- Minimum 2x8 PT #2 ledger or better
- Maximum gap between face of the ledger board and the face of the wall sheathing shall be ½”





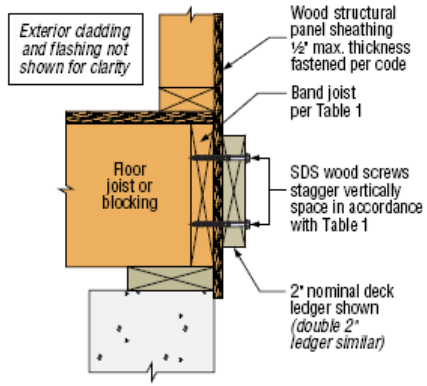


Alternate Ledger Attachment

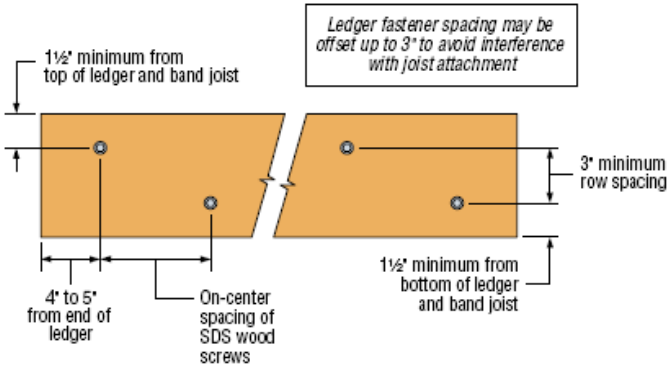
SIMPSON Strong-Tie®

Loading Condition	Ledger Nominal Size (in.)	SDS Screw Length (in.)	Band Joist Material and Size	Maximum Deck Joist Span						
				Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
				Maximum On-Center Spacing of Fasteners (in.)						
40 psf Live 10 psf Dead	2x	3½	2" Nominal Sawn Lumber	13"	10"	8"	6"	5"	5"	4"
	2-2x3	5								
	2x	3½	1" Min. Oriented Strand Board (OSB) Rim Board	12"	9"	7"	6"	5"	4"	4"
	2x	3½	1⅛" Min. Oriented Strand Board (OSB) Rim Board or 1¼" Min. Structural Composite Lumber	15"	11"	9"	7"	6"	5"	5"
60 psf Live 10 psf Dead	2x	3½	2" Nominal Sawn Lumber	9"	7"	5"	4"	4"	3"	3"
	2-2x3	5								
	2x	3½	1" Min. Oriented Strand Board (OSB) Rim Board	8"	6"	5"	4"	3"	3"	2"
	2x	3½	1⅛" Min. Oriented Strand Board (OSB) Rim Board or 1¼" Min. Structural Composite Lumber	10"	8"	6"	5"	4"	4"	3"

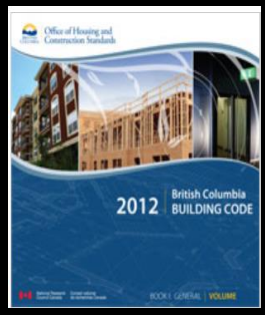
1. Solid-sawn band joists shall be Spruce-Pine-Fir, Hem-Fir, Douglas Fir-Larch, or Southern Pine species. Ledger shall be Hem-Fir, Douglas Fir-Larch, or Southern Pine species.
2. Fastener spacings are based on single fastener testing of the Strong-Drive® SDS screw with a safety factor of 5.0 and include NDS wet service adjustment factor.
3. Multiple ledger plies shall be fastened together per code independent of the SDS screws.

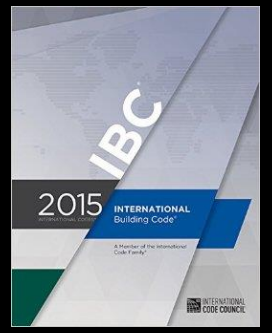


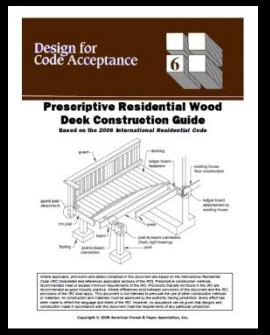
Ledger-to-Band Joist Assembly
(Wood-framed lower floor acceptable, concrete wall shown for illustration purposes)



SDS Screw Spacing Detail





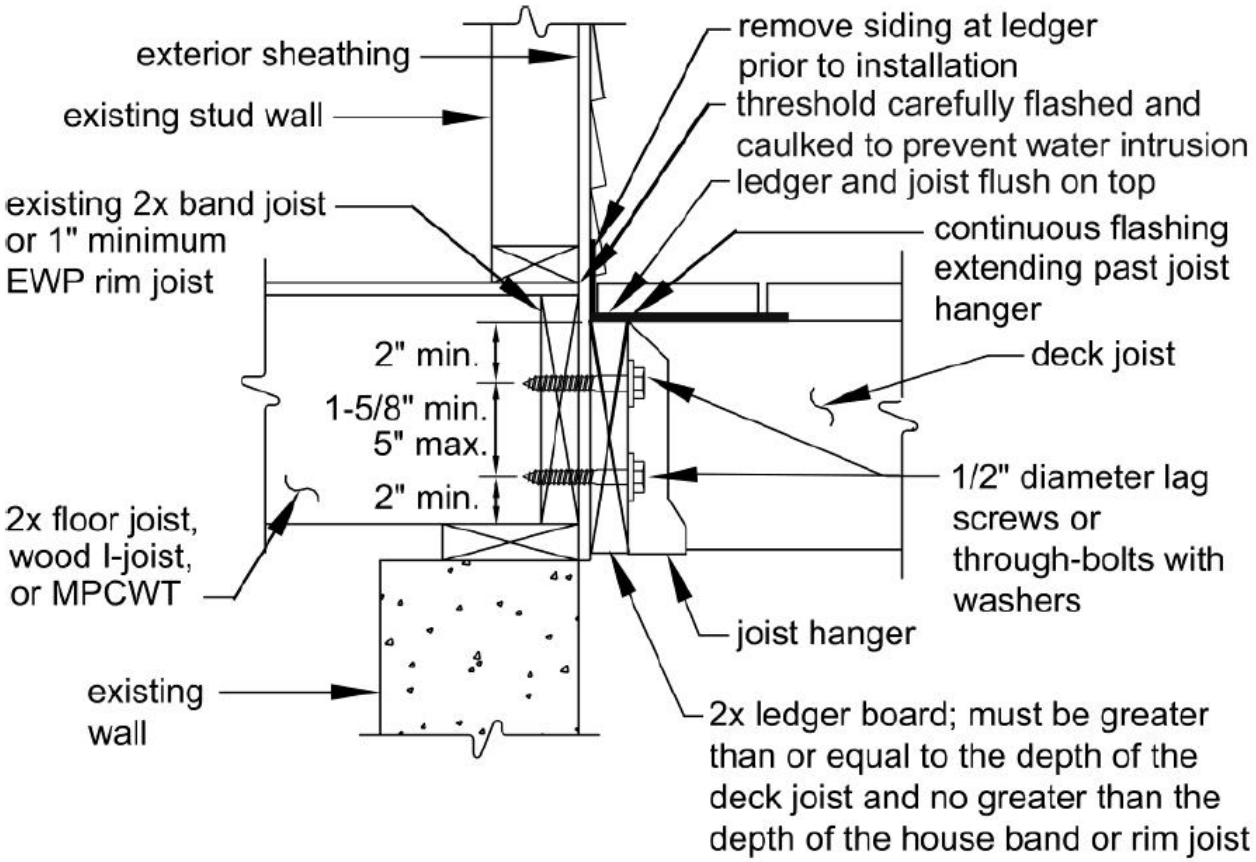


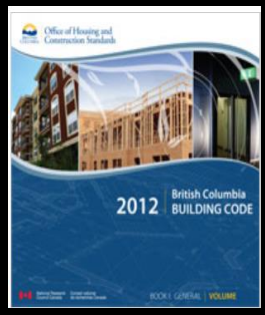
DCA 6 Ledger Attachment

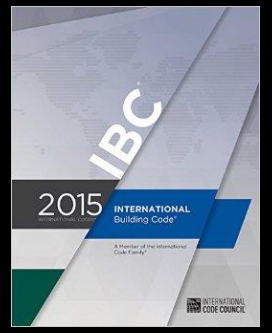
SIMPSON Strong-Tie®

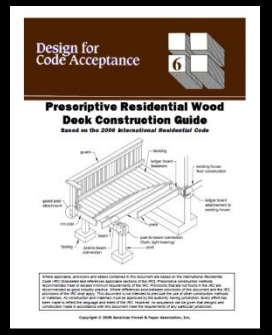
3 Options (to wood, concrete, masonry)

Figure 14: General Attachment of Ledger Board to Band Joist or Rim Joist





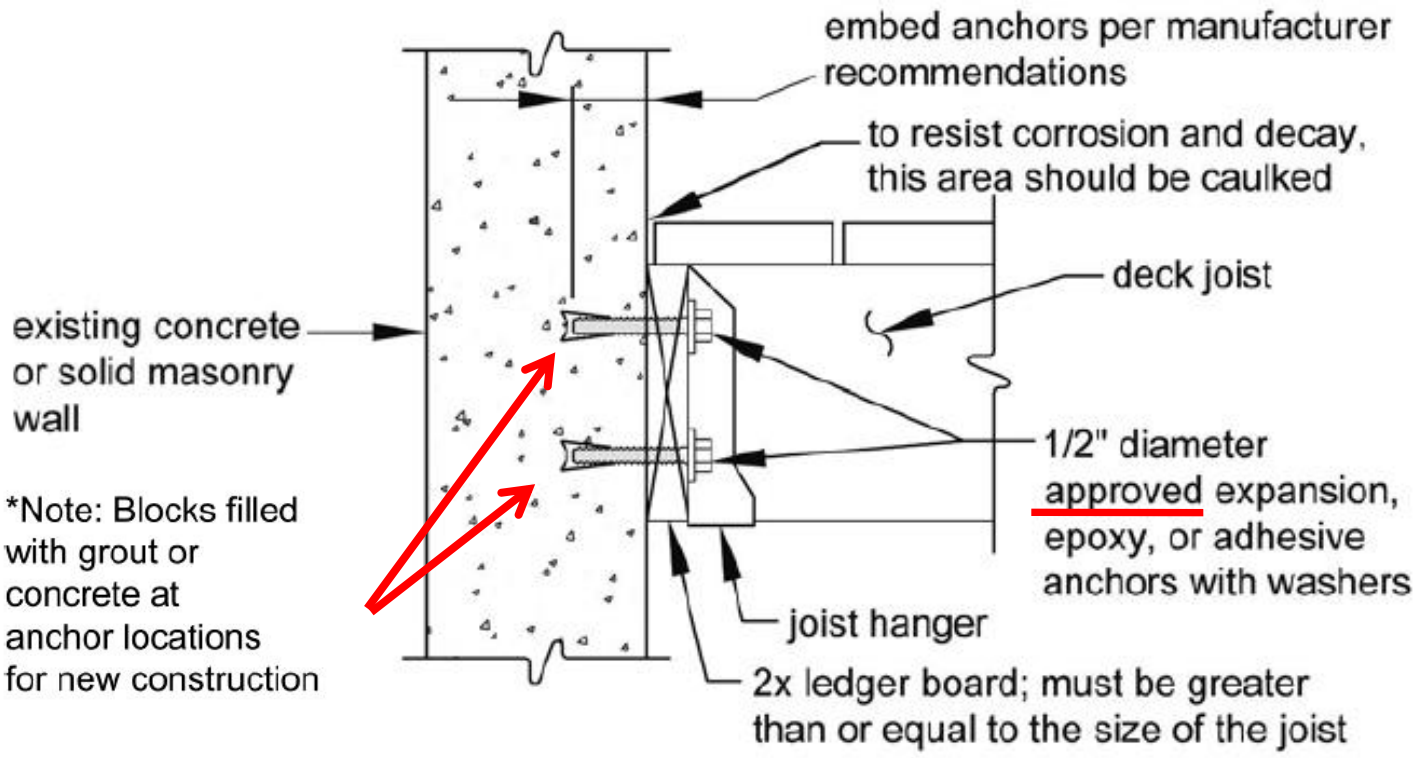


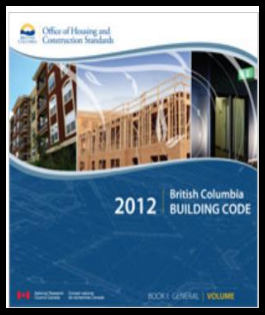


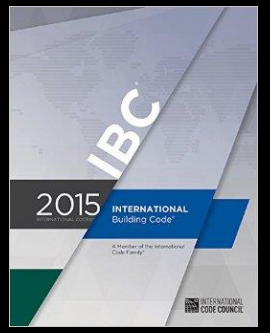
DCA 6 Ledger Attachment

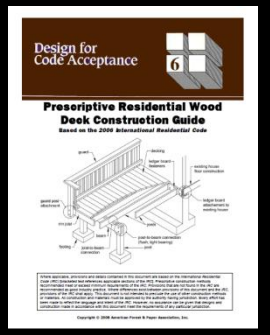
SIMPSON Strong-Tie®

Figure 15: Attach to Concrete





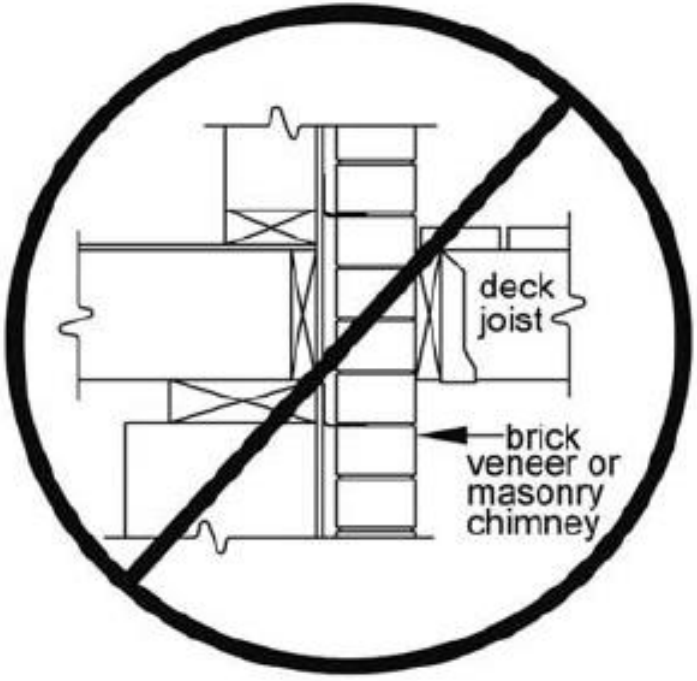




Ledger Attachment

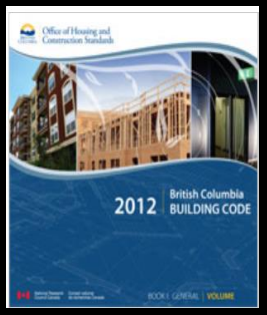
SIMPSON Strong-Tie®

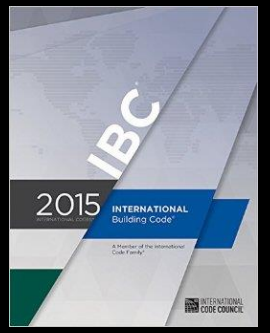
Figure 17 & 18: Prohibited Attachments

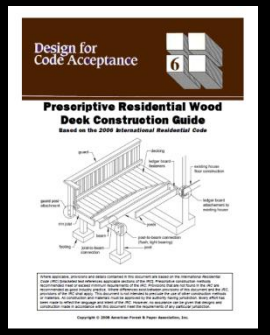


Brick Veneer

Overhang/Bay Window







Attachment to Brick

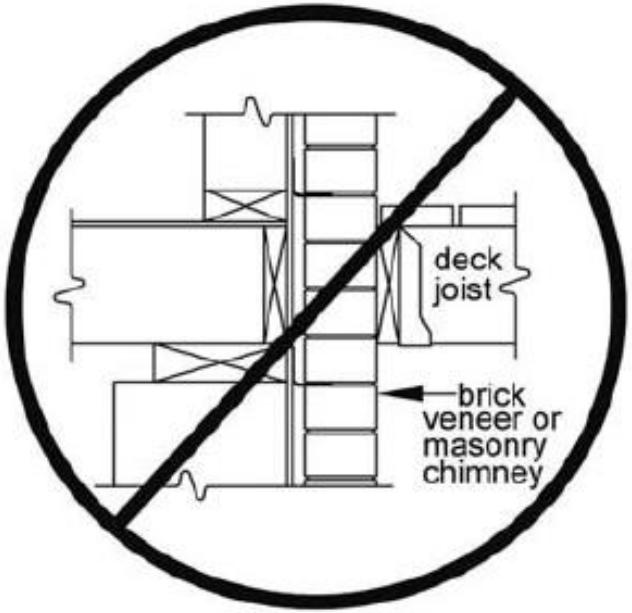
SIMPSON Strong-Tie®

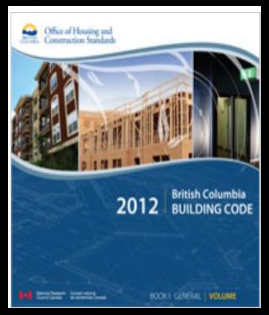
Is This a Structural Connection?

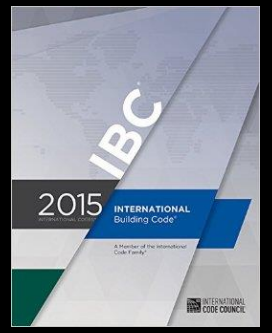
- What attaches the brick veneer to the structure?
- Wall ties are prescriptive to prevent brick veneer from falling
- No load value

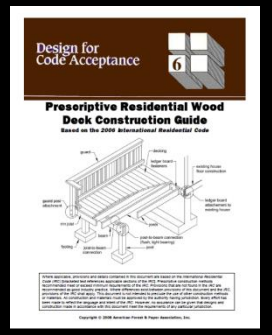
DCA 6 Figure 17

No attachment to or through exterior veneers (brick, masonry, stone)



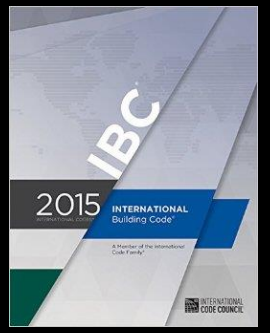


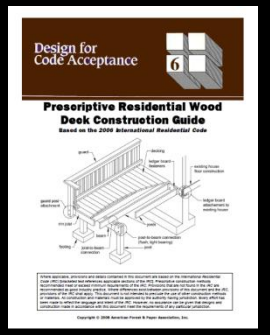




Lateral Attachment

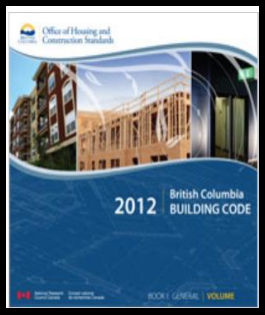
SIMPSON Strong-Tie®

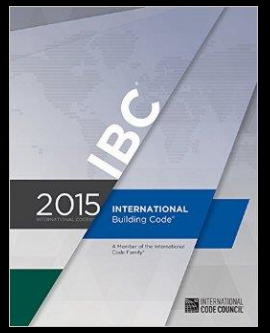


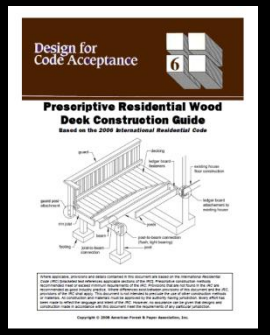


Lateral Attachment

SIMPSON Strong-Tie®

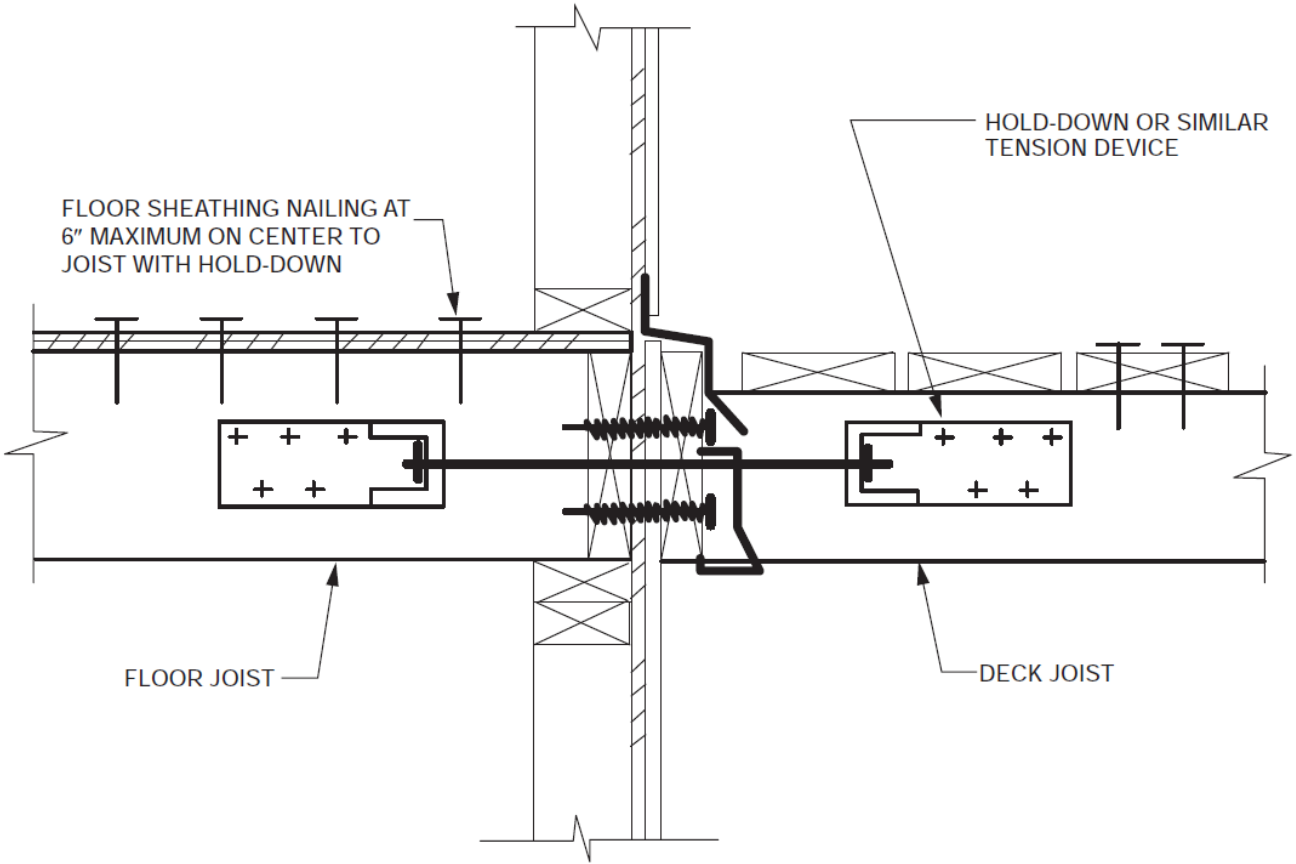


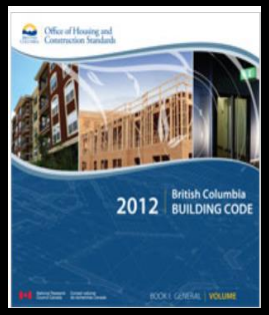


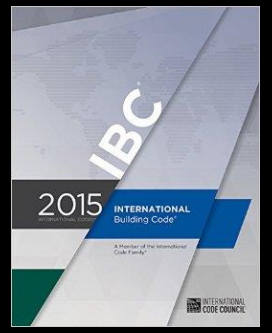


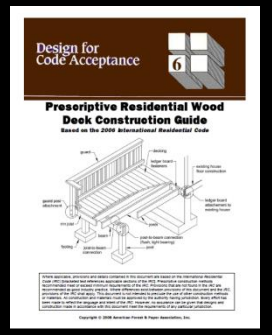
2015 IRC R507.2.4 Deck lateral load connection

The lateral load connection required by Section R507.1 shall be permitted to be in accordance with **Figure R507.2.3(1)** or R507.2.3(2).





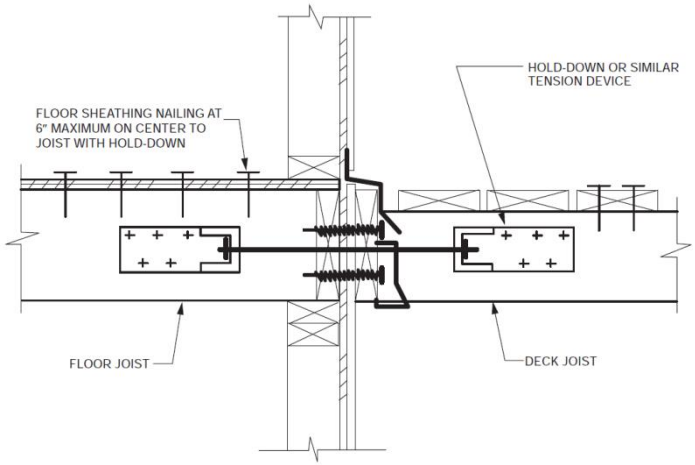


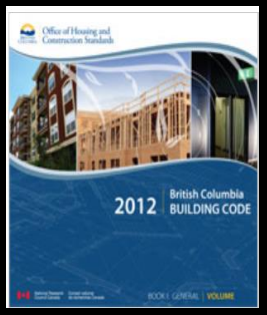


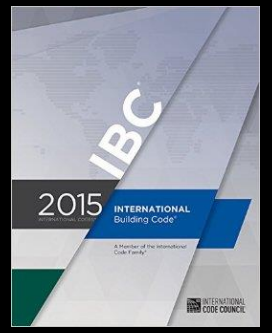
2015 IRC R507.2.4 Deck lateral load connection

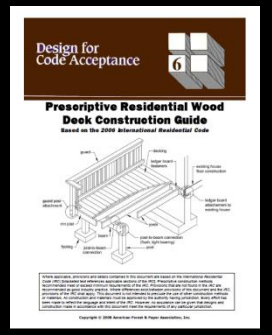
The lateral load connection required by Section R507.1 shall be permitted to be in accordance with **Figure R507.2.3(1)** or R507.2.3(2).

- 1500 # capacity
- Not less than 2 locations
- Within 24” of each end of deck
- Ties deck joist to interior joist









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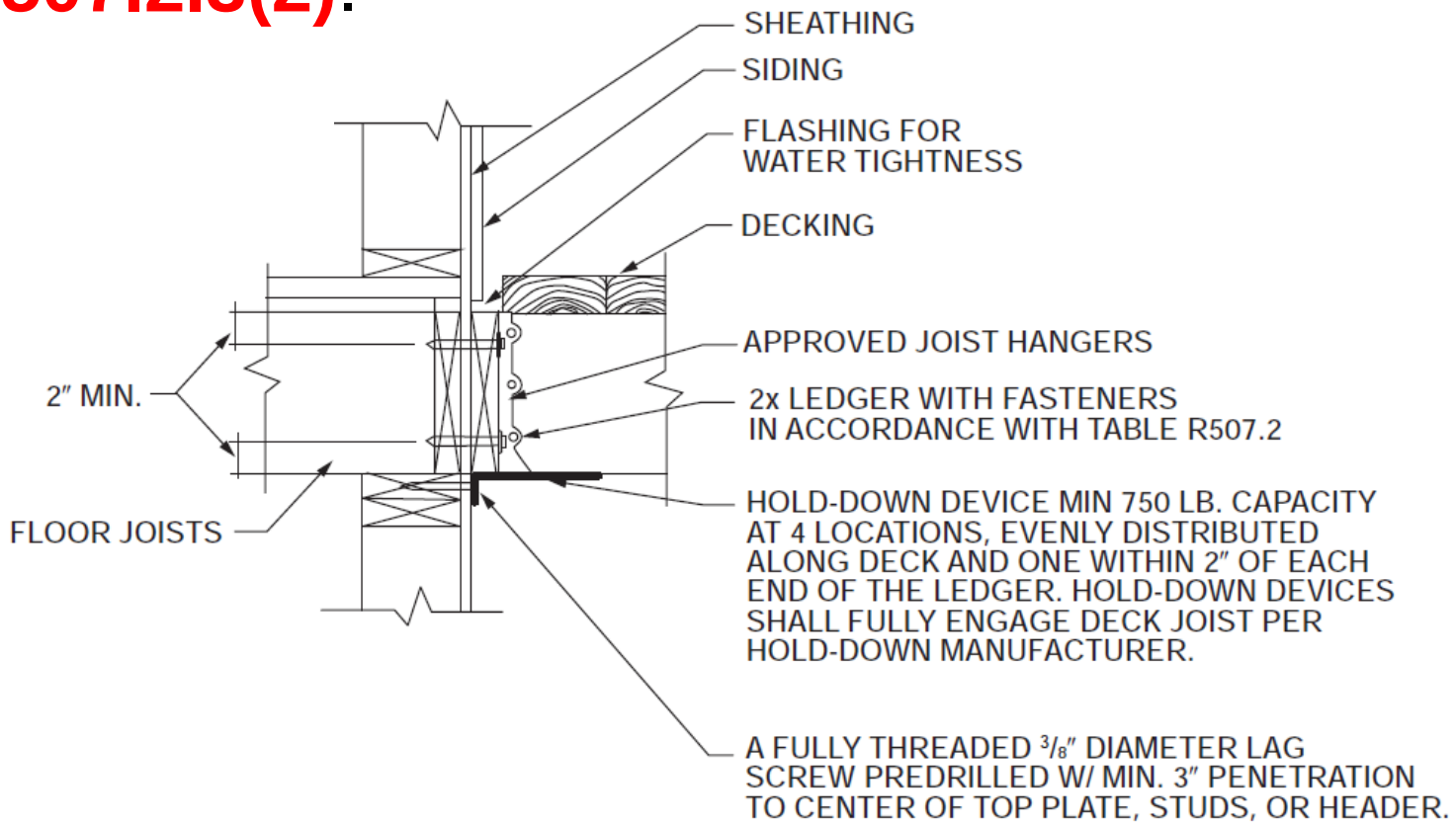
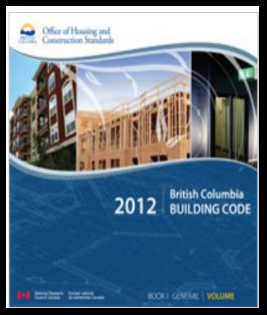
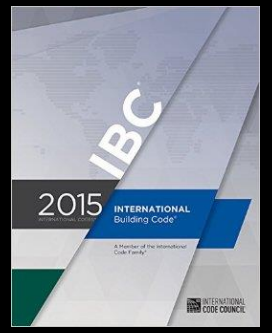
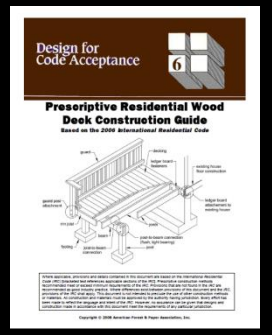




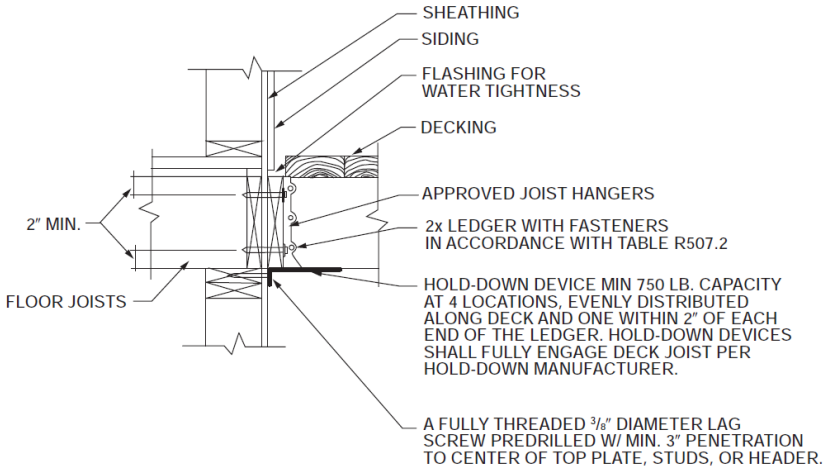


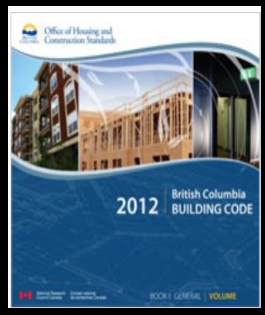


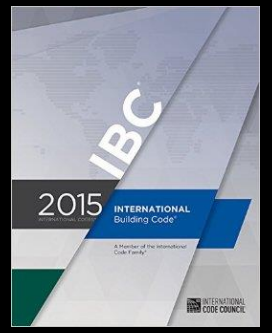
2015 IRC R507.2.4 Deck lateral load connection

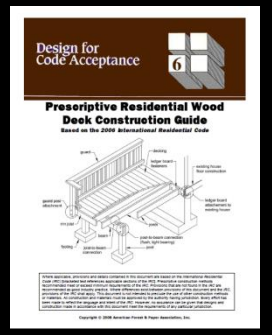
The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3(1) or **R507.2.3(2)**.

- 750 # capacity
- Not less than 4 locations
- Within 24” of each end of deck
- Ties deck joist to top plate, studs, or header









DCA 6 Lateral Load – Joists Parallel

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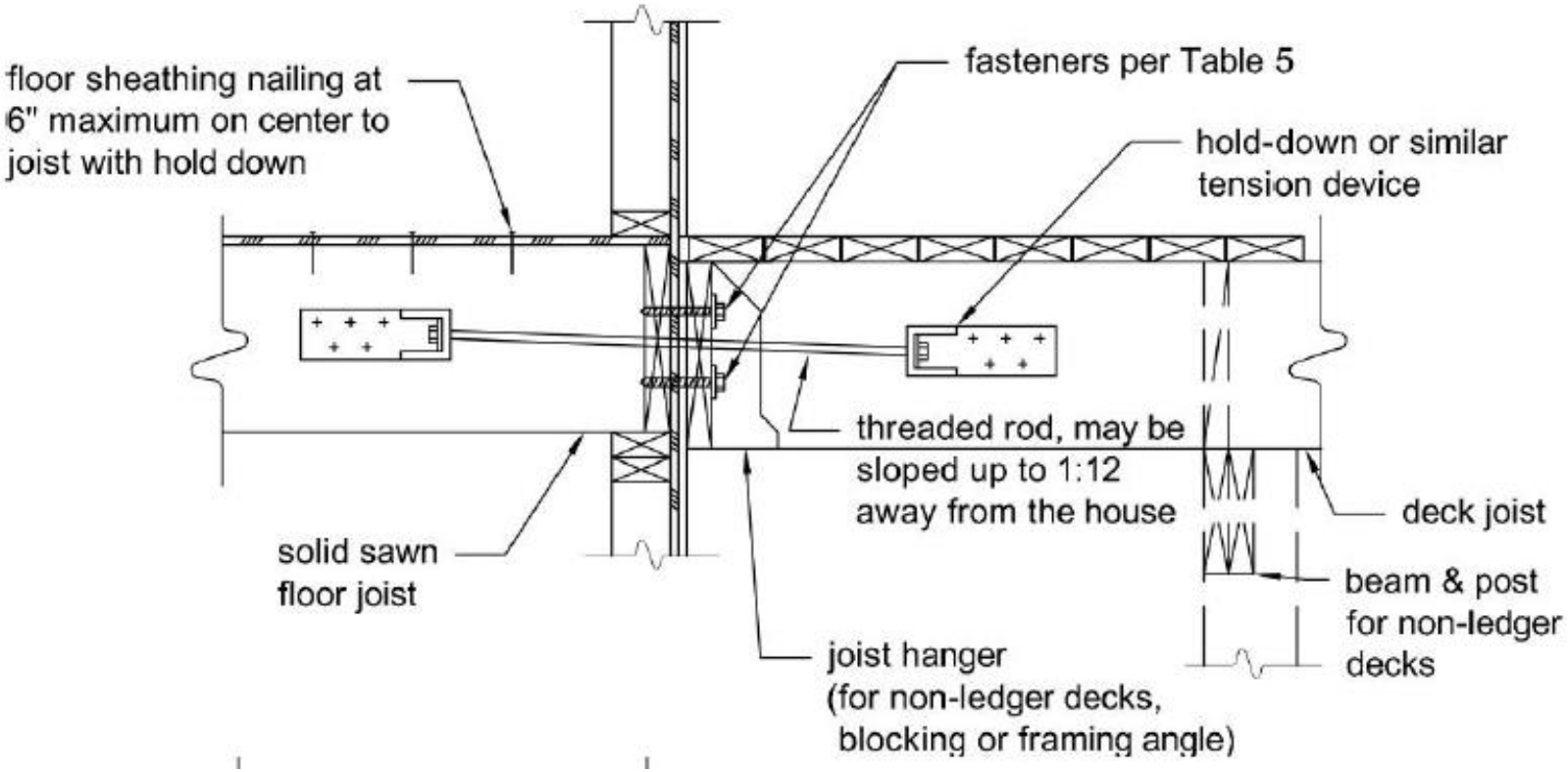
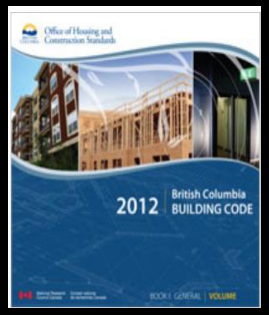
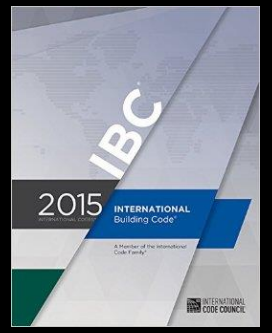
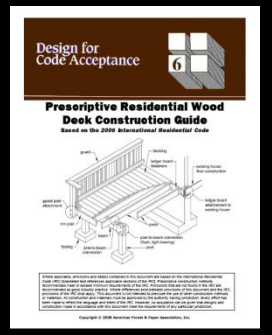
Figure 22. Lateral Load





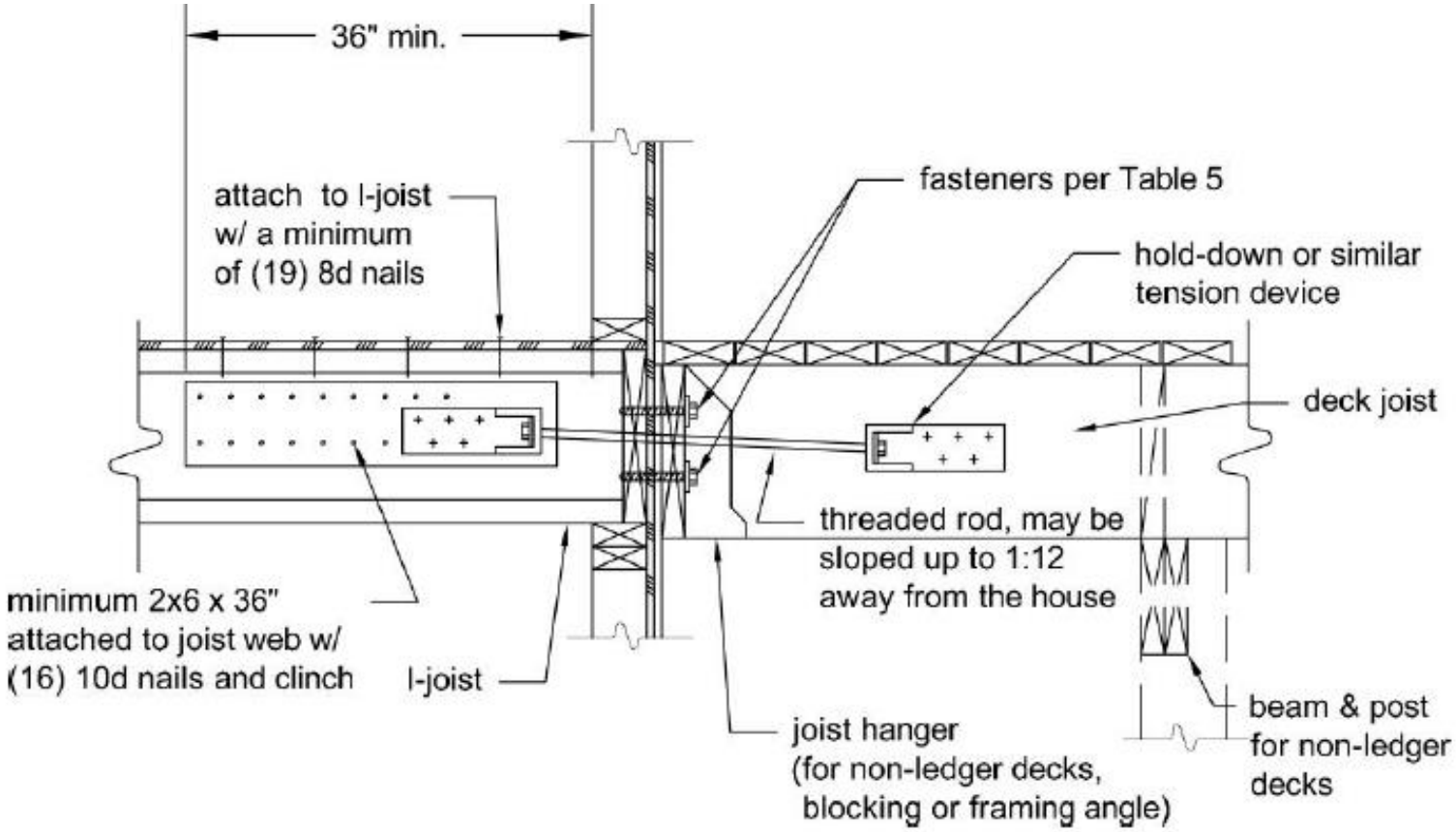


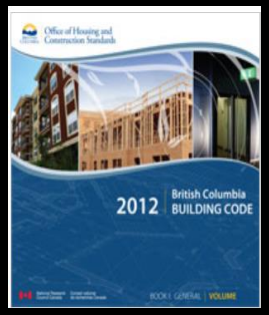


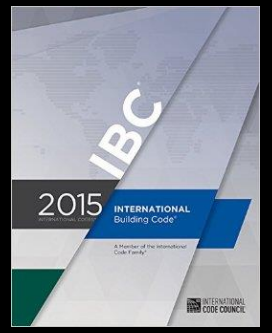
DCA 6 Lateral Load – Joists Parallel

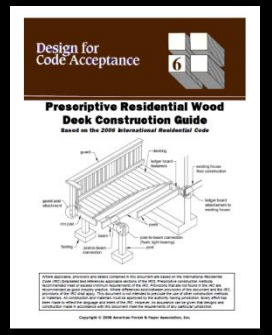
SIMPSON Strong-Tie®

Figure 22. Lateral Load





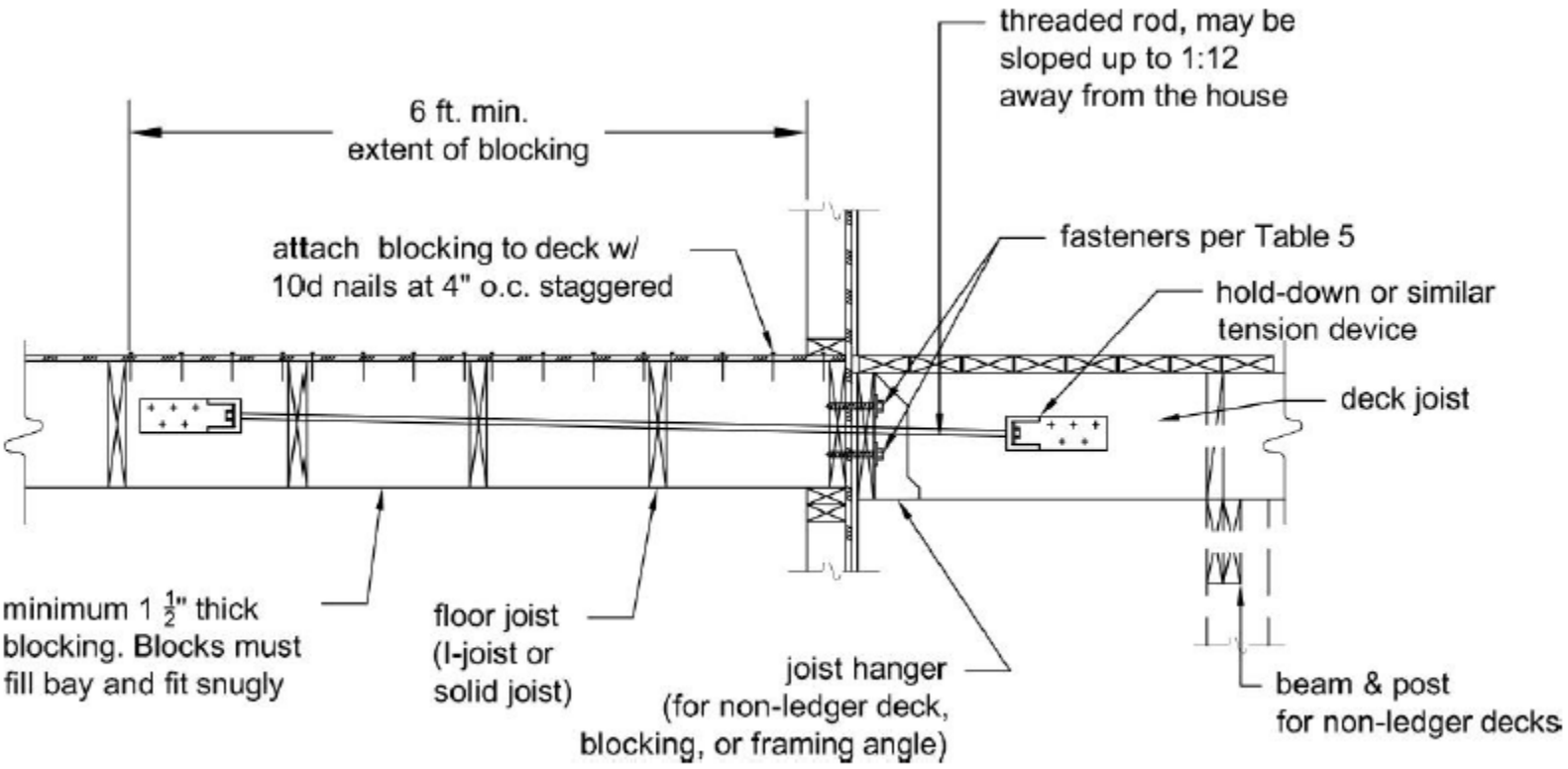


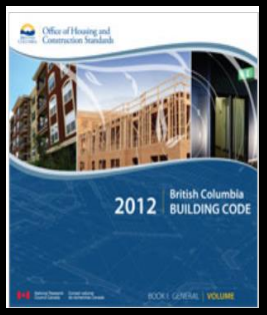


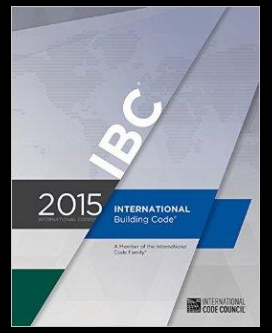
DCA 6 Lateral Load – Joists Perp

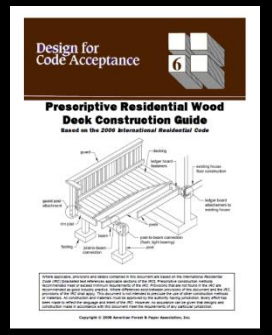
SIMPSON Strong-Tie

Figure 23. Lateral Load

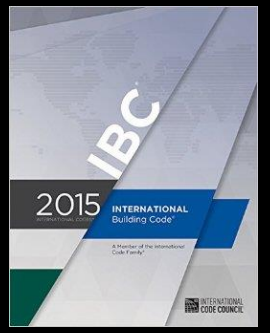


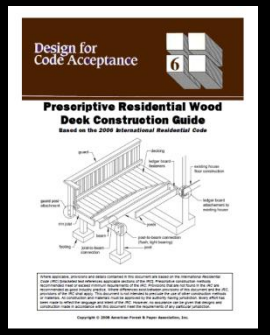






Footings

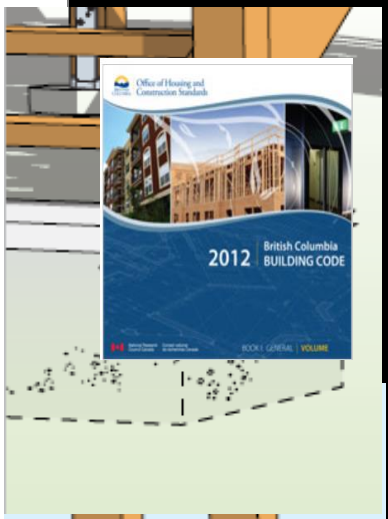

IBC
2015
INTERNATIONAL
Building Code

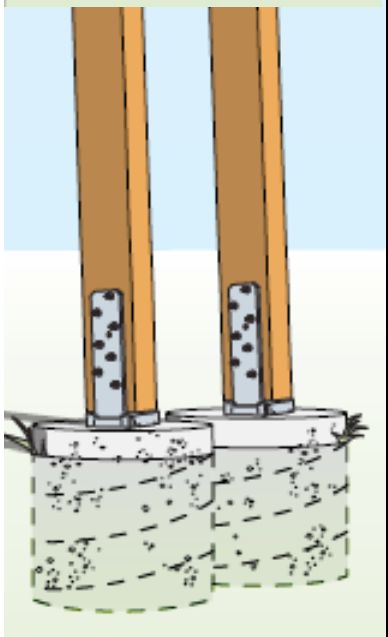

Design for
Code Acceptance
6
Prescriptive Residential Wood
Deck Construction Guide
Based on the 2009 International Residential Code

IRC Footings

IRC 2015 Section R403

The building codes include specific requirements regarding footing size that are dependent upon factors such as the dead and live loads the deck is designed to resist as well as soil conditions.





18” or below frost- line Canada

<u>Minimum Footing Depths:</u>

R403.1.4

- Footings shall be at least 12” below the undisturbed ground surface

R403.1.1

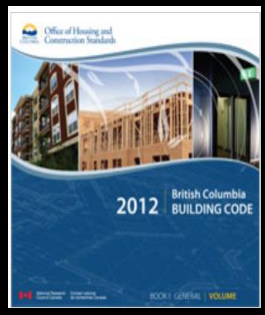
- …The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1.

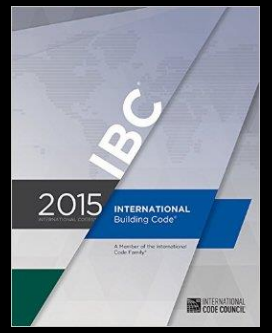
DCA 6 Footing Details

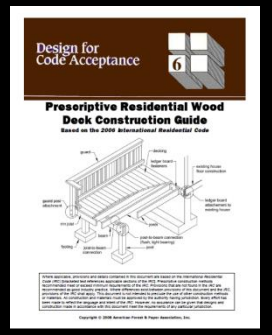
SIMPSON Strong-Tie®

Table 4 Footing Sizes for Joists up to 18’

Beam Span, L_B	Joist Span L_J	Post Heights[1]					Footing Sizes[2]		
		Southern Pine	Douglas Fir-Larch[3]	Hem-Fir[3], Western Cedars	Redwood	Ponderosa Pine, Red Pine, SPF[3]	Round Footing Diameter	Square Footing	Footing Thickness[4]
6'	≤10'	14'	14'	14'	14'	14'	18"	16"x16"	7"
	≤14'	14'	14'	14'	14'	14'	21"	18"x18"	8"
	≤18'	14'	14'	12'	14'	11'	24"	21"x21"	10"
8'	≤10'	14'	14'	14'	14'	14'	20"	18"x18"	8"
	≤14'	14'	14'	14'	14'	11'	24"	21"x21"	10"
	≤18'	14'	13'	11'	12'	8'	27"	24"x24"	11"

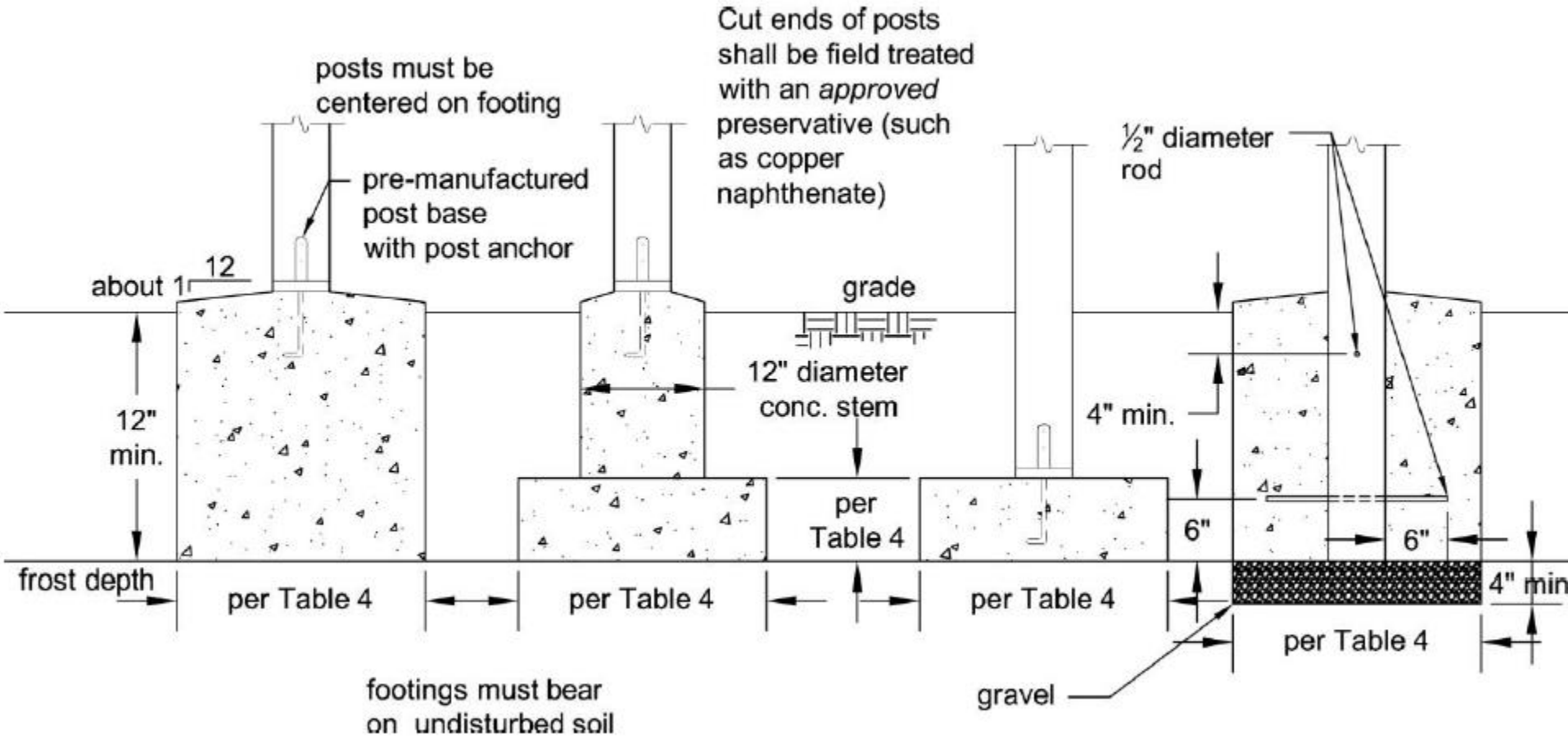




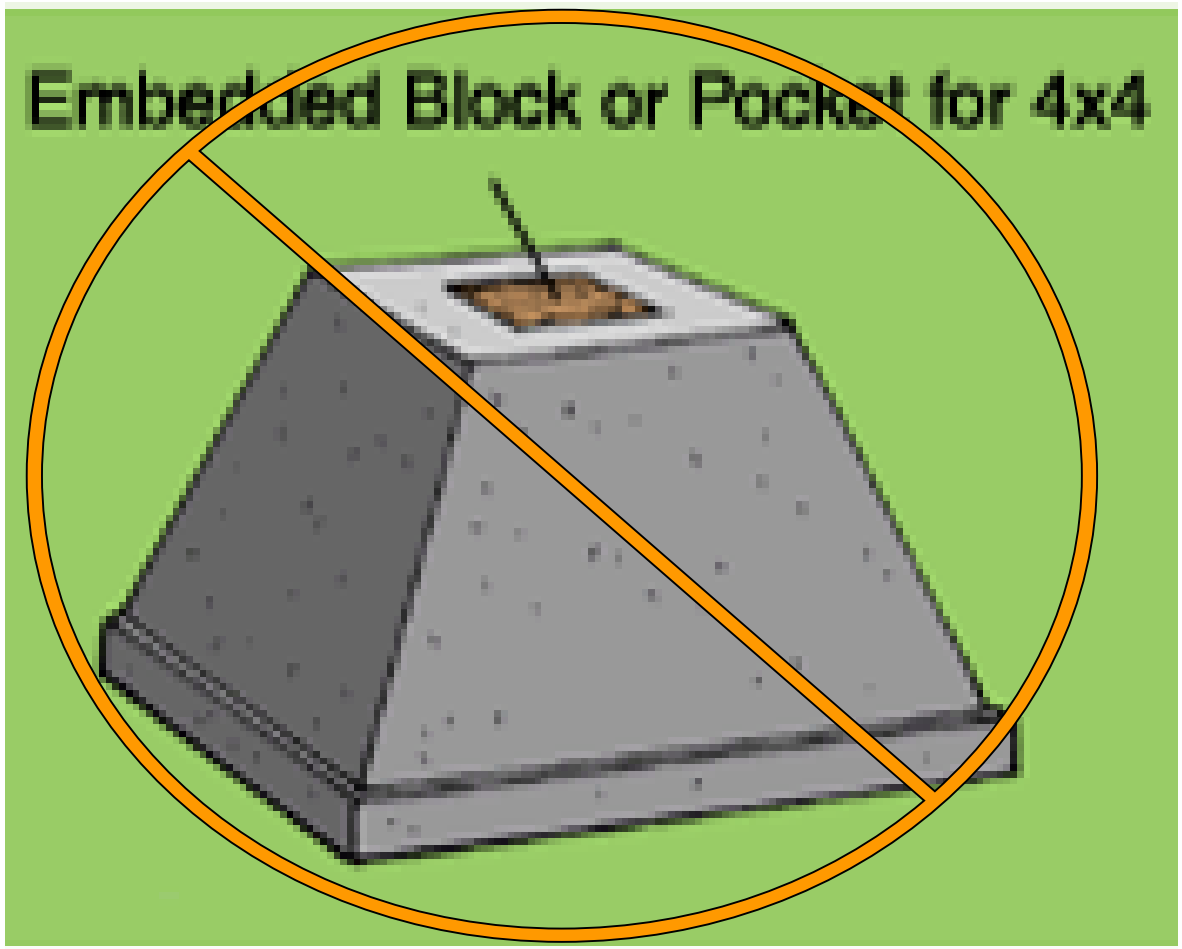


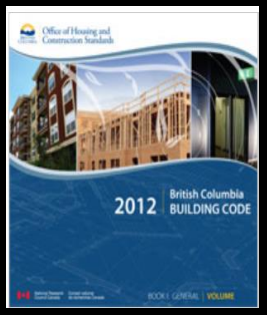
DCA 6 Footing Details

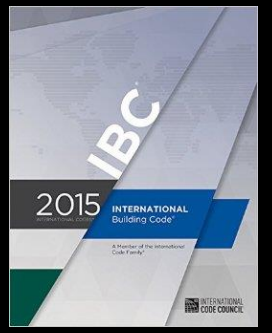
Figure 12 Typical Footing Options

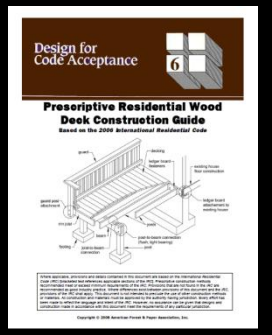


Footings


Embedded Block or Pocket for 4x4


Office of Housing and Construction Standards
2012
British Columbia
BUILDING CODE

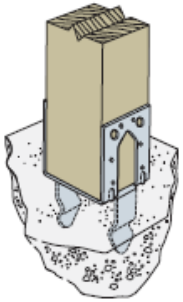

IBC
2015
INTERNATIONAL
Building Code
INTERNATIONAL CODE COUNCIL


Design for
Code Acceptance
6
Prescriptive Residential Wood
Deck Construction Guide
Based on the 2009 International Residential Code

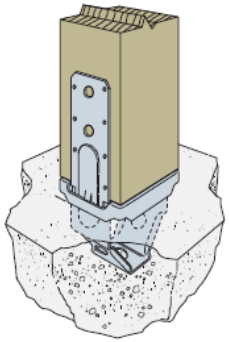
Post Bases

SIMPSON Strong-Tie®

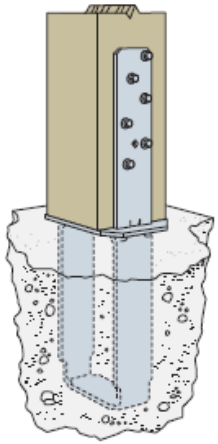
Cast-in-place:



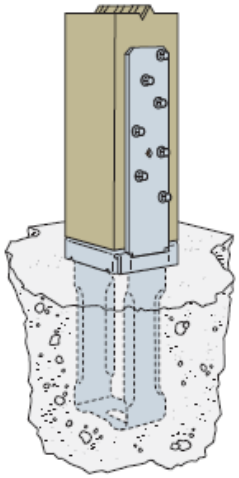
PBZ Post Base: For use with decay resistant or preservative treated wood.



PBS Post Base with Standoff:

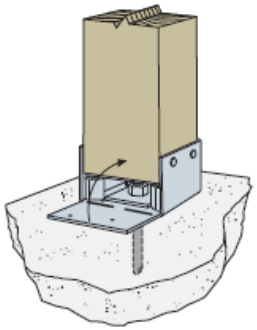


CBQZ Column Base: Installs with SDS wood screws.

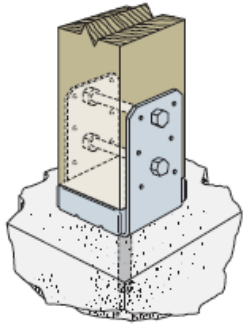


CBSQ Column Base:

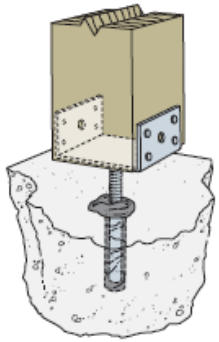
Post-installed:



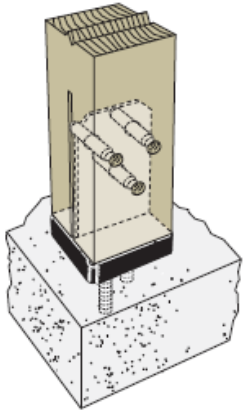
ABW Adjustable Post Base with Standoff



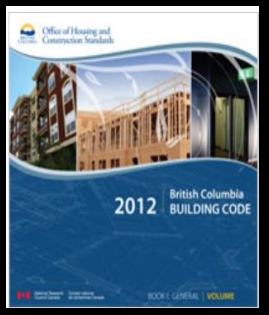
ABU Adjustable Post Base with Standoff

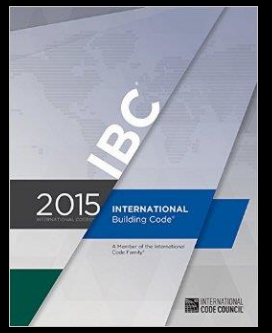


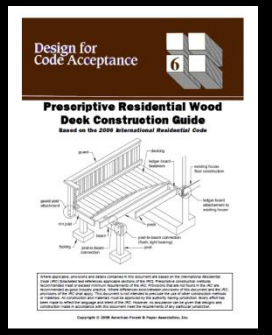
EPB44PHDG Elevated Post Base



CPTZ Concealed Post Tie

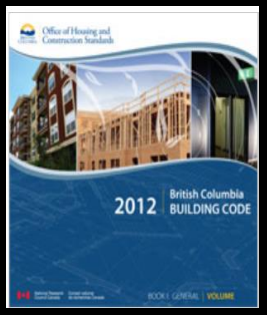


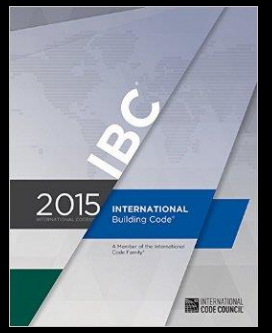


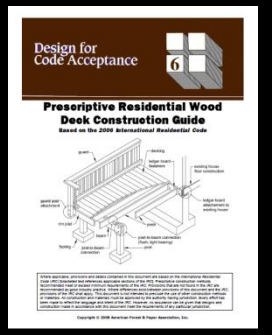


Post Bases

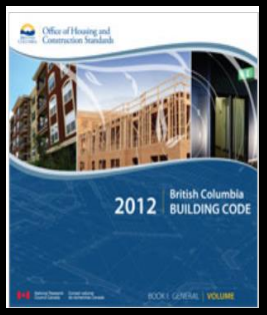
No post to foundation/footing connection.

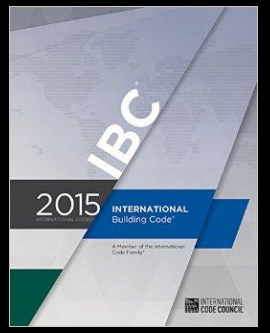


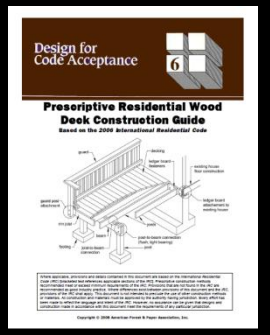




Post Connections







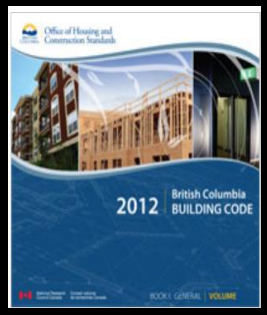
IRC Post Connections

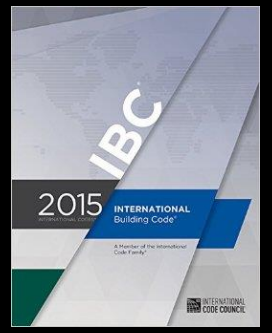
IRC R407.3

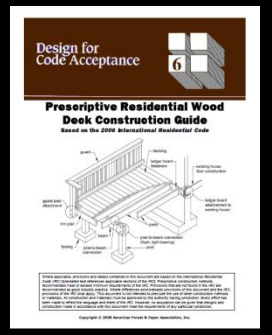
- Columns shall be restrained to prevent lateral displacement at the bottom end. Wood columns shall not be less in nominal size than 4”x4”.

IRC R502.9

- Floor framing shall be nailed in accordance with TableR602.3(1). Where posts and beam or girder construction is used to support floor framing, positive connections shall be provided to ensure against uplift and lateral displacement.





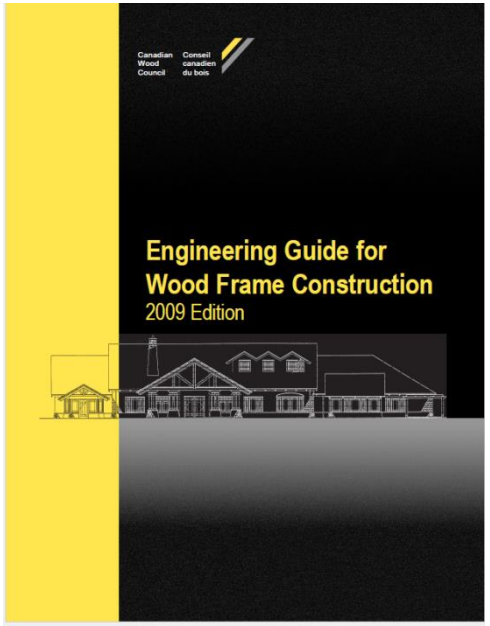


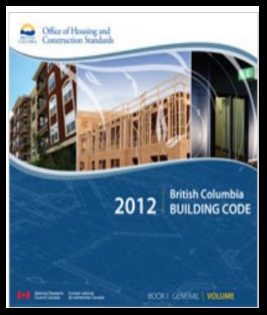
DCA 6 Post Connections

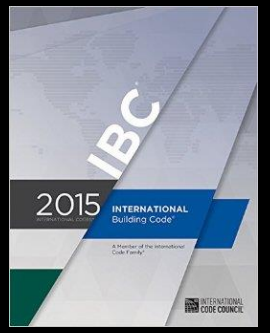
Engineered guide to Wood Frame Construction (2009)

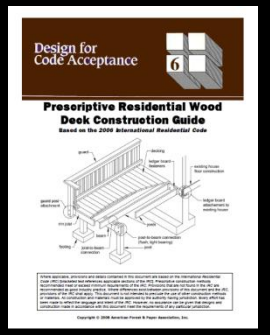
- Clause 8.4.2
  - Columns at top and bottom to resist short term impart load of 1.3 kN

- BCBC2012 Clause 9.23.6.2
  - Columns and post to resist uplift and lateral movement



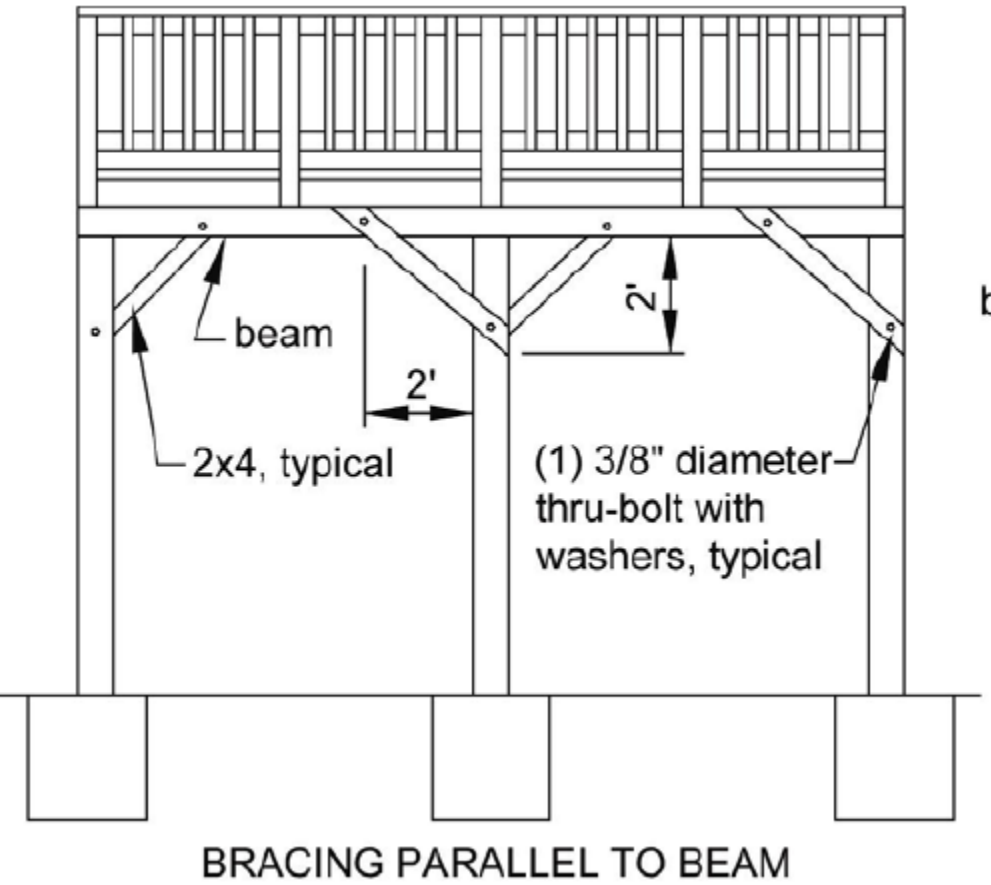




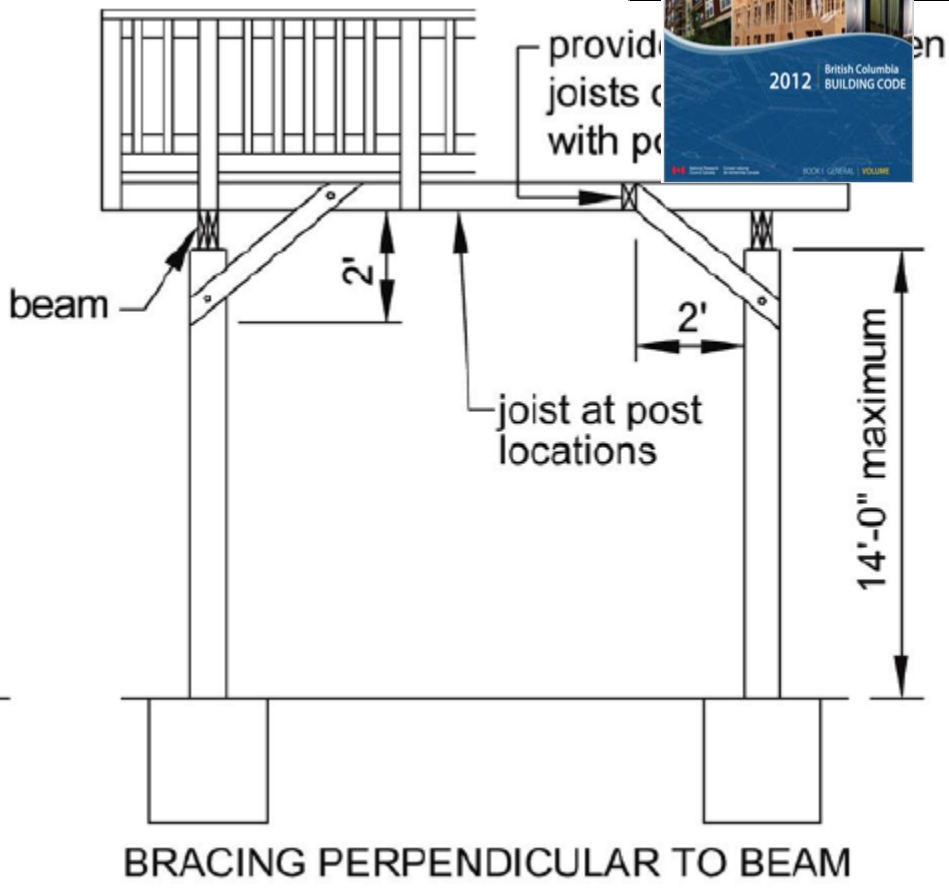


DCA 6 Post Connections

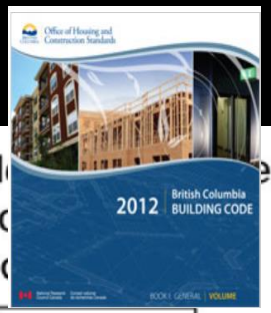
- Lateral stability
  - Figure 22



BRACING PARALLEL TO BEAM



BRACING PERPENDICULAR TO BEAM



DCA 6 Post Connections

SIMPSON Strong-Tie®

Figure 8A

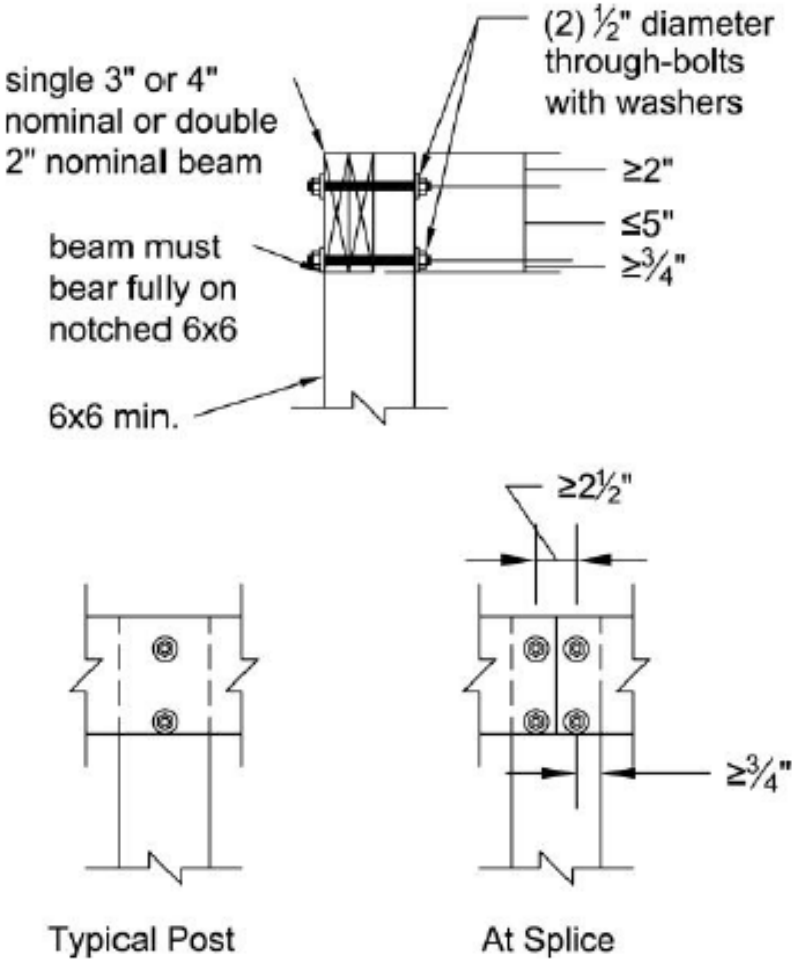
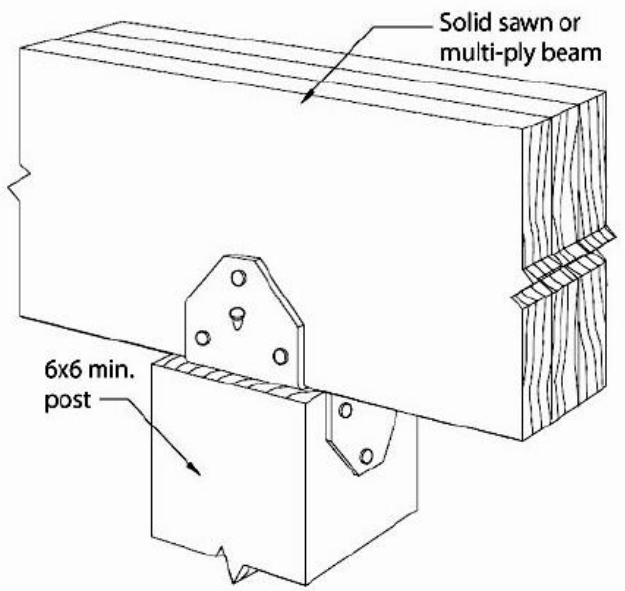
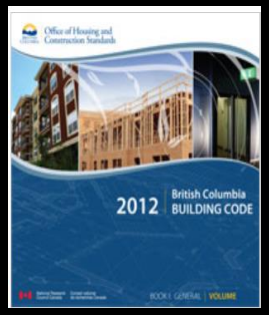
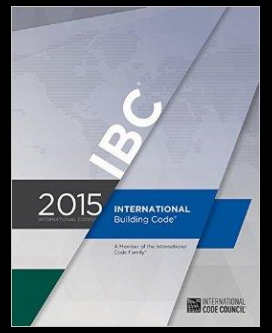
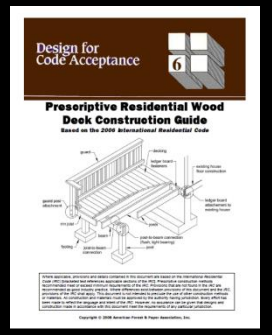


Figure 8B



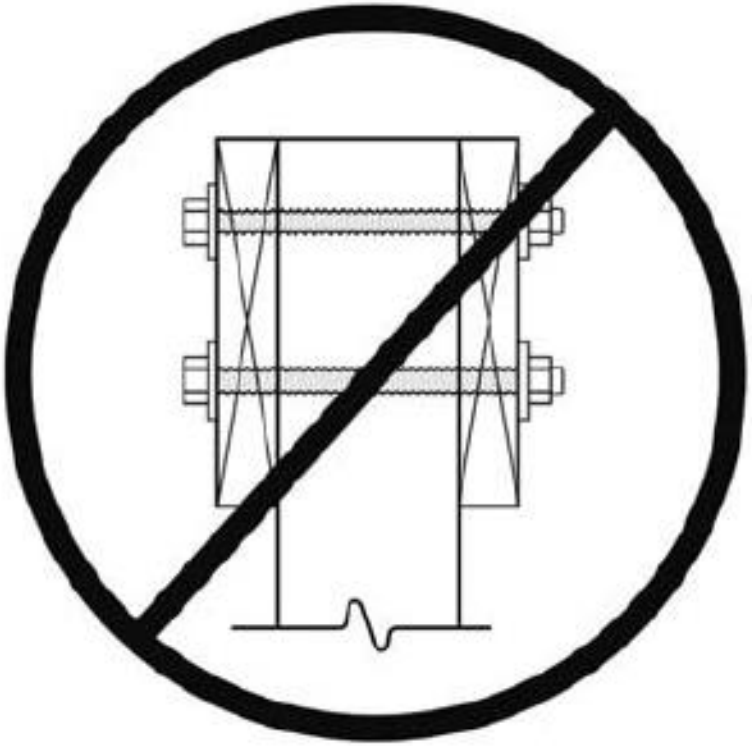


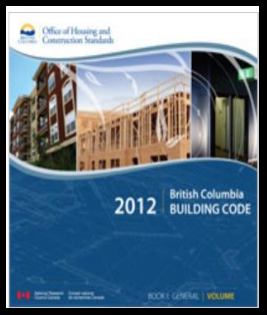


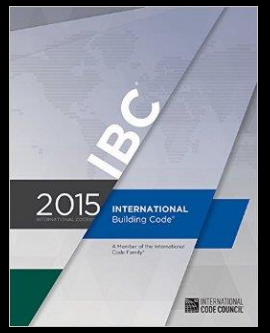


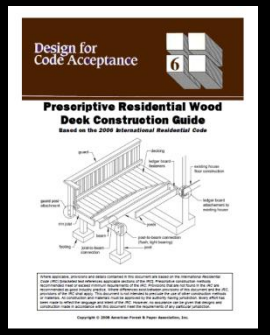
DCA 6 Post Connections

- Post must be either notched or attached with post cap (Figure 9)



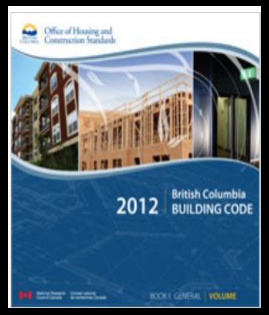


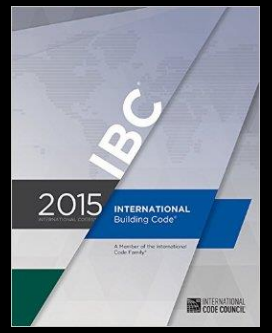


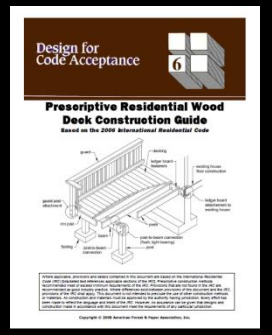


Beam to Post Connection

SIMPSON Strong-Tie®



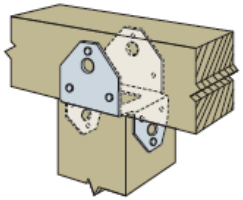




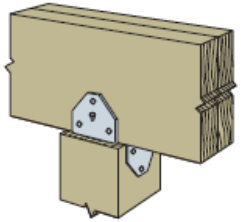
Beam-to-Post Connections

SIMPSON Strong-Tie®

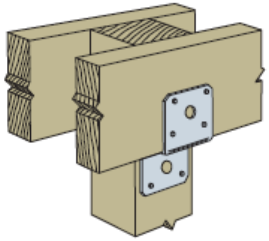
Post Caps & Connectors:



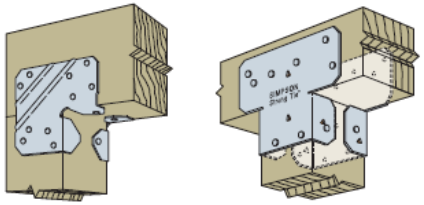
BC Post Cap: For single-member solid sawn beams. ZMAX® coating or stainless steel recommended.



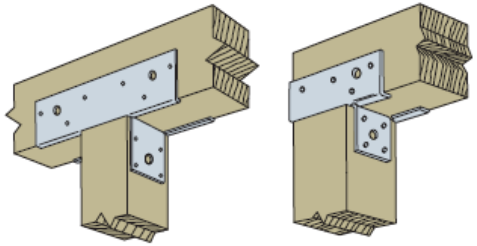
BCS Post Cap: Connects double 2x's to a 4x post or triple 2x's to a 6x post. ZMAX coating or stainless steel recommended.



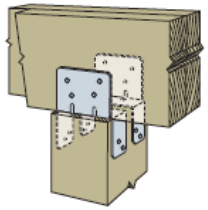
DJT14: Connects beams at the side of the post. ZMAX coating or stainless steel recommended.



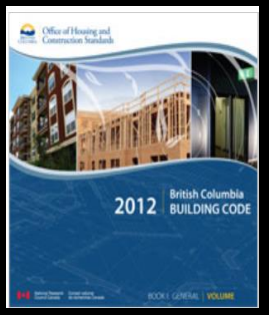
LCE/AC Retrofit Post Caps: Two-piece cap may be installed before or after lumber is in place when the sides of the post and beam are flush. ZMAX coating or stainless steel recommended.

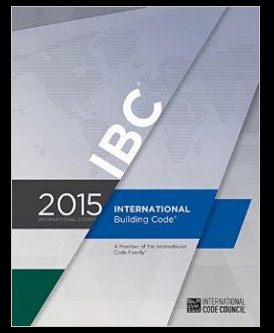


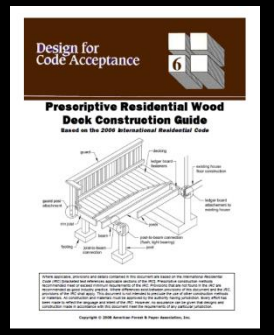
PC/EPC Post Caps: Connects beams at the top of the post. ZMAX coating recommended.



LPC Post Cap: Two-piece cap adjusts for beams smaller than post width. Features a ZMAX coating.

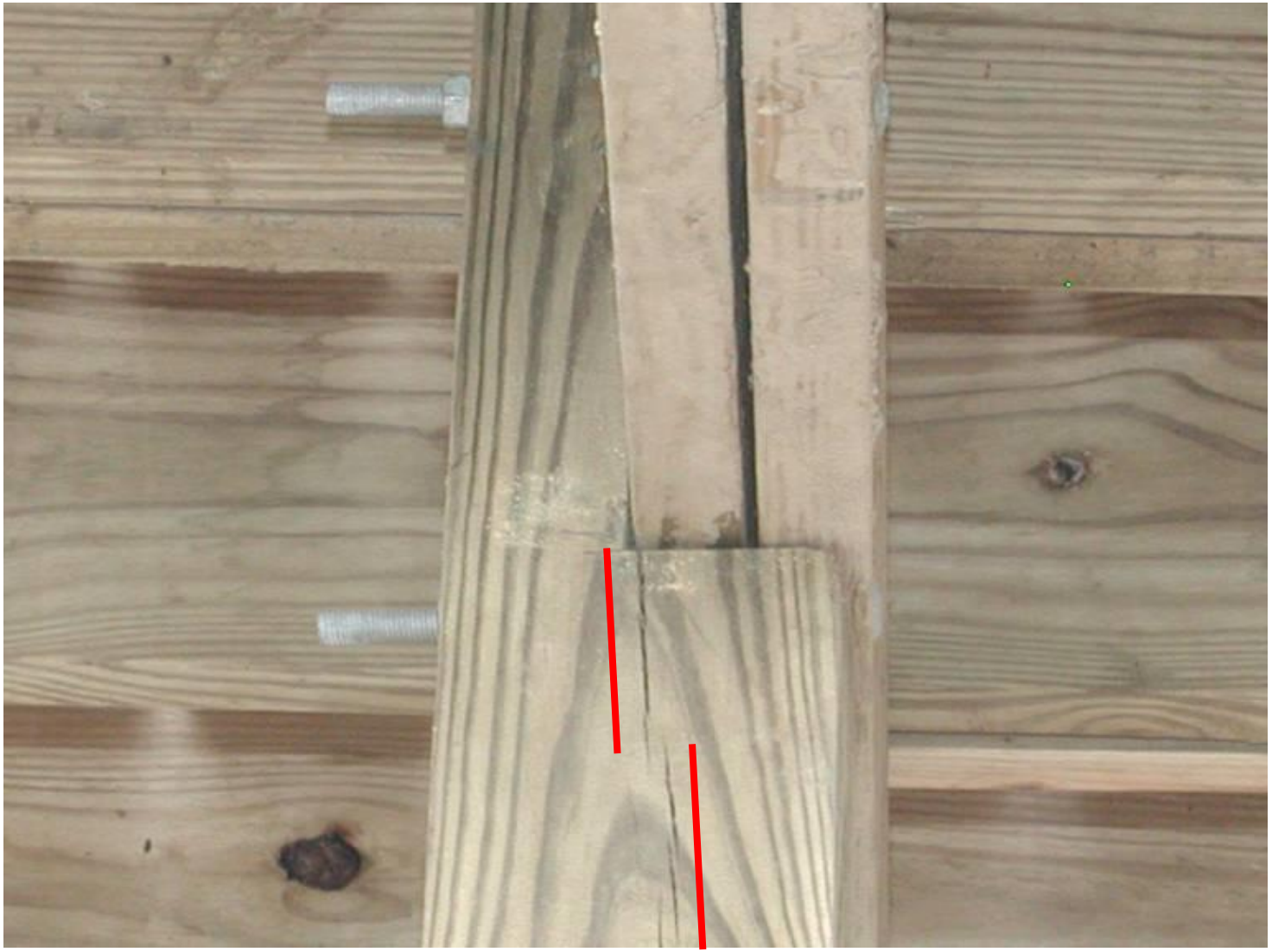


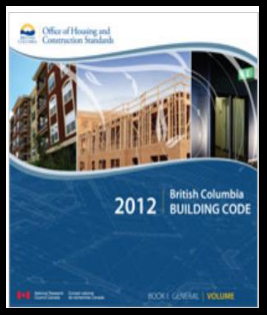


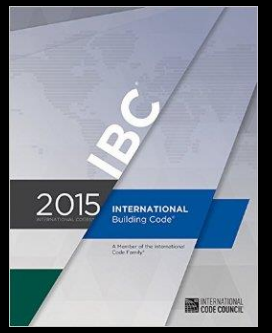


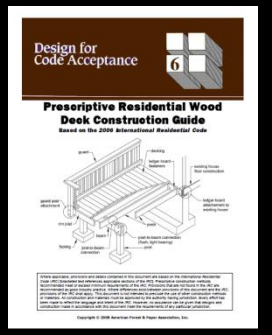
Notched Posts May Split/Crack

SIMPSON Strong-Tie®



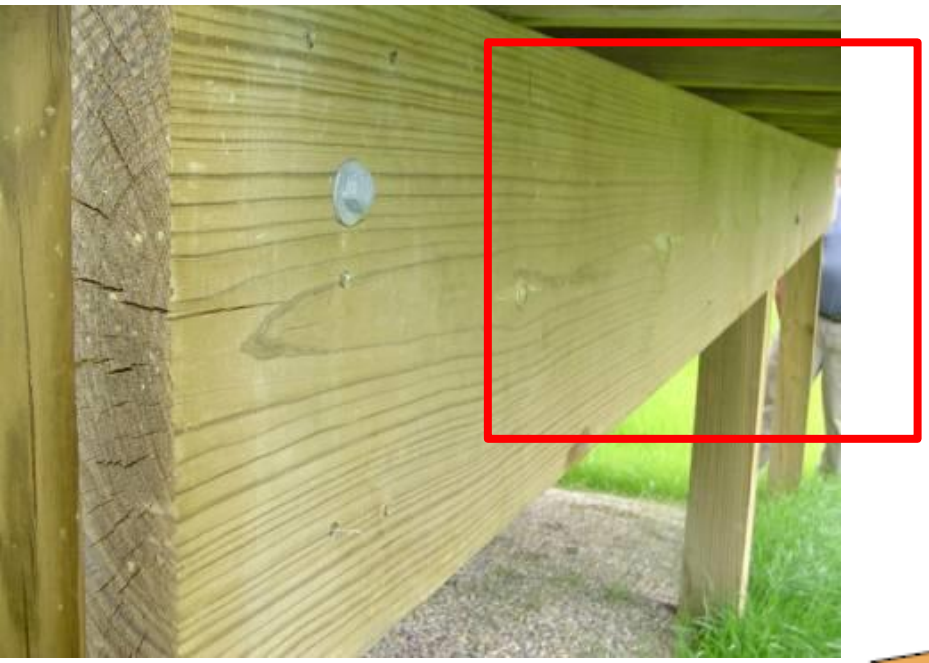






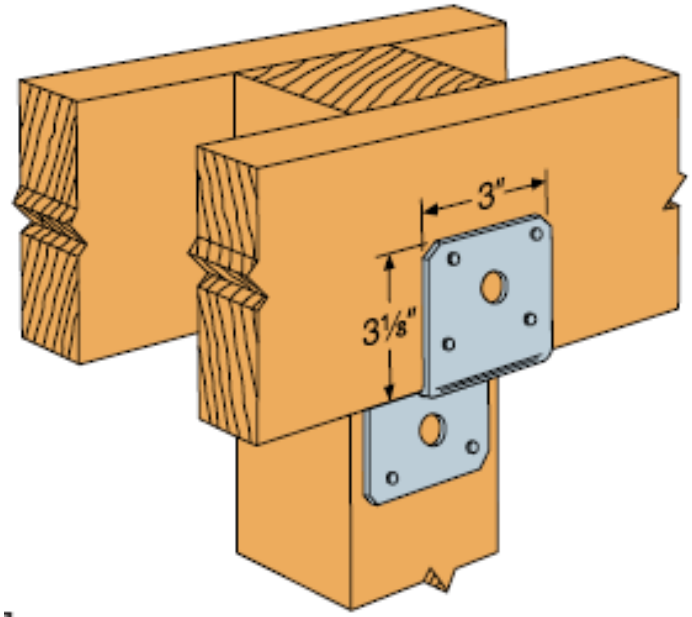
Notched Posts May Split/Crack

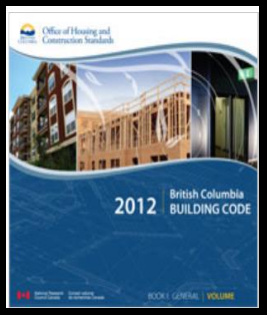
Other Beam to Post Options

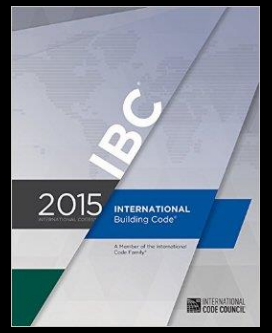


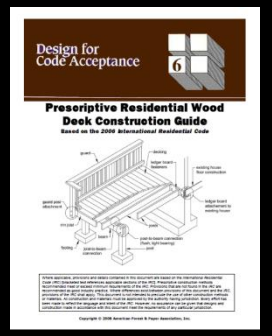
DJT14Z

Beam/girder to post connection.

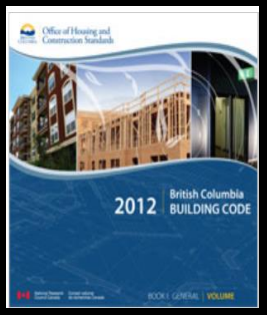


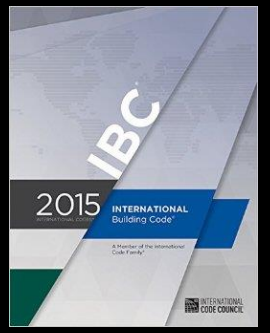


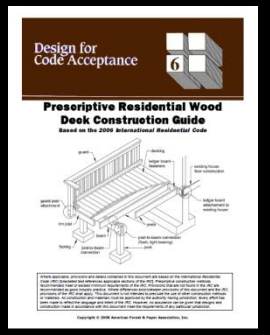




Joist Connections







IRC Joist-to-Ledger

Bearing:

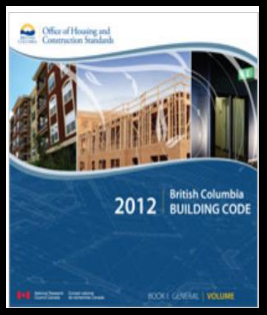
IRC R502.6.2

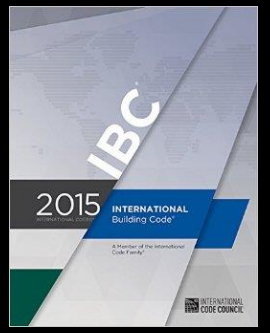
- Joists framing into the side of a wood girder shall be supported by approved framing anchors or on ledger strips not less than nominal 2 inches by 2 inches

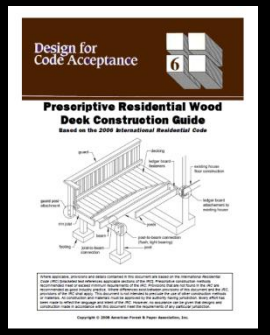
Cantilever:

IRC R507.5

- Deck joists shall be permitted to cantilever not greater than ¼ of the actual, adjacent joist span.

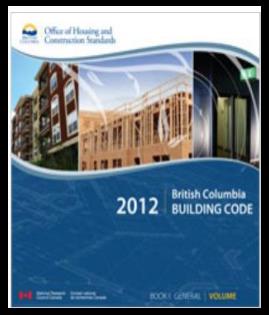


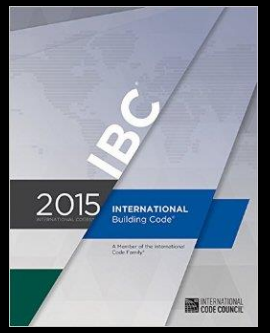


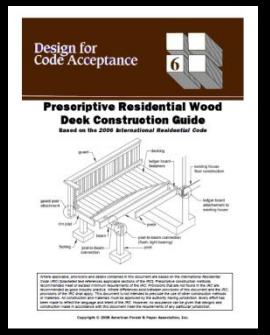


IRC R507.1 Decks

- For decks with cantilevered framing members, connections to exterior walls or other framing members, shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck.
- Joist hangers provide uplift & download

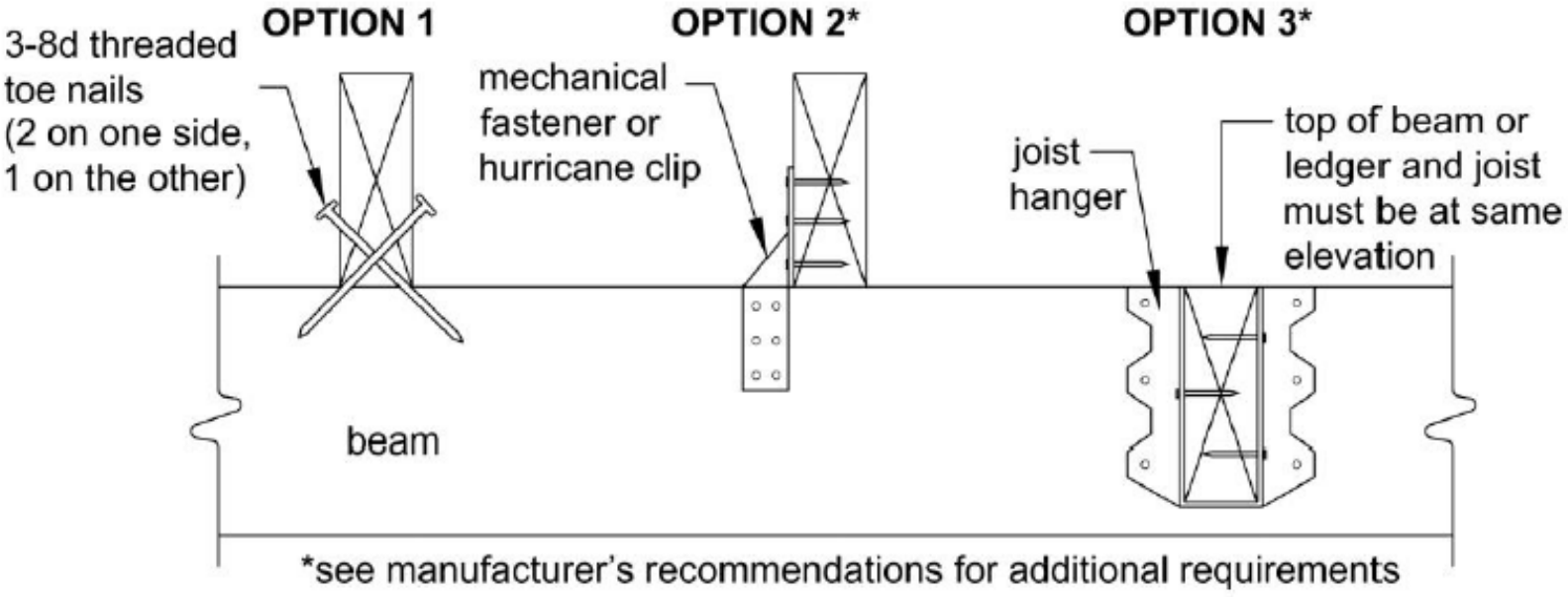


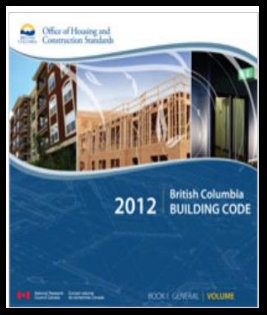


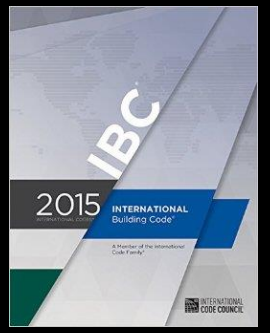


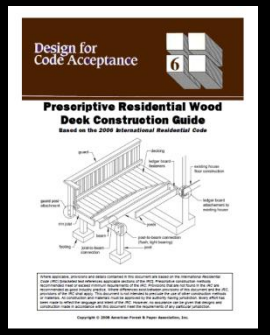
DCA 6 Joist Connections

- 3 options (Figure 6):
  - Toenail
  - H-clip
  - Joist hanger





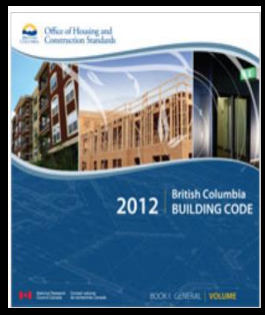


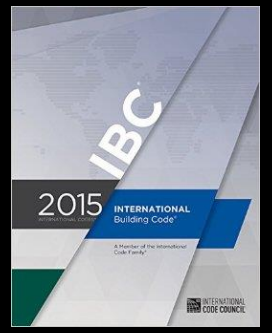


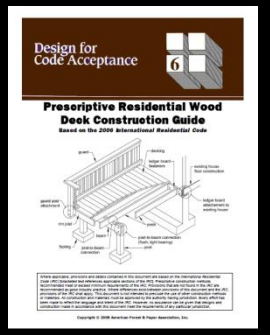
DCA 6 Joist Connections

- Use joist hangers with inside flanges when clearances to the edge of the beam or ledger dictate. **Do not use clip angles or brackets or pressure blocks to support joists.**

Joist or Rafter	Factored Shear Resistance (V_r)			
	D.Fir-L		S-P-F	
	(K_D = 1.00)	(K_D = 1.15)	(K_D = 1.00)	(K_D = 1.15)
	lbs	lbs	lbs	lbs
	kN	kN	kN	kN
2x4	1470	1695	1160	1335
	6.54	7.54	5.18	5.95
2x6	1900	2200	1505	1730
	8.51	9.79	6.71	7.71
2x8	2150	2475	1695	1945
	9.59	11.02	7.54	8.67
2x10	2515	2895	1985	2280
	11.21	12.89	8.83	10.16
2x12	2785	3205	2195	2525
	12.41	14.27	9.78	11.25

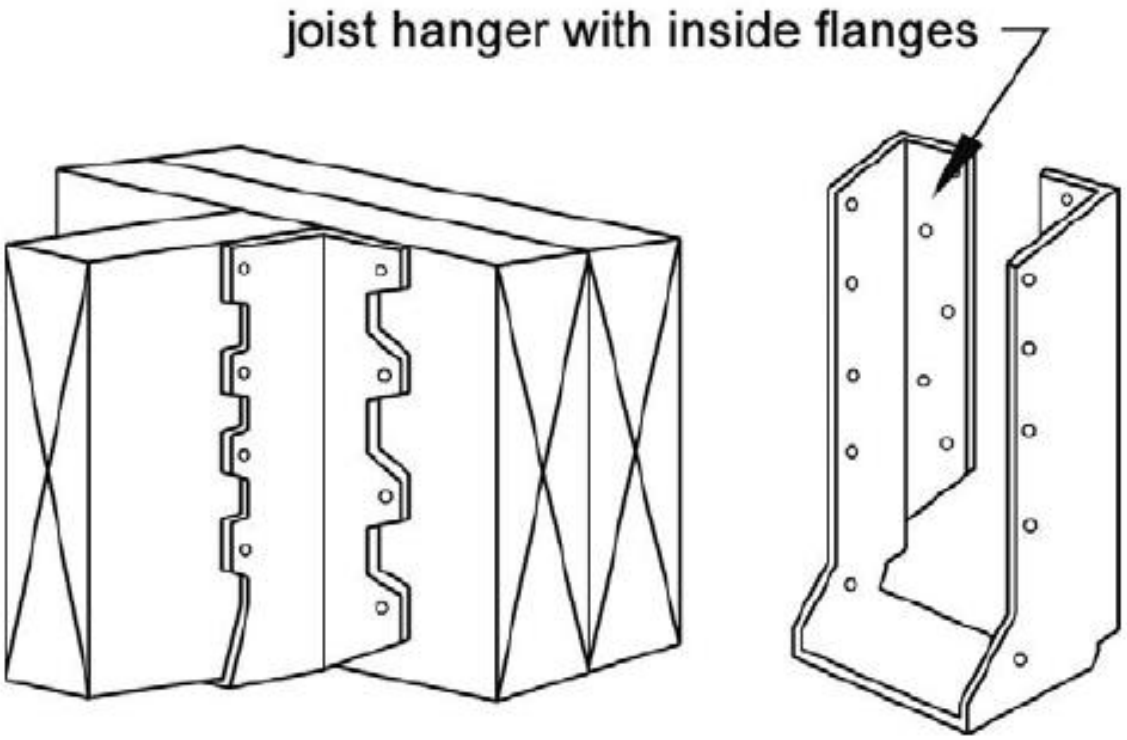


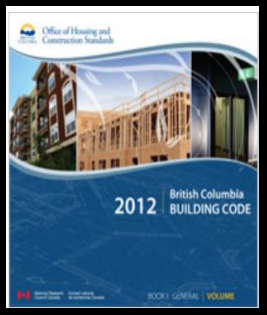


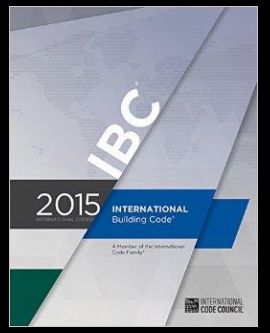


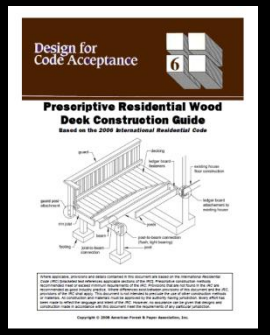
DCA 6 Joist Connections

Figure 7 Typical Joist Hangers



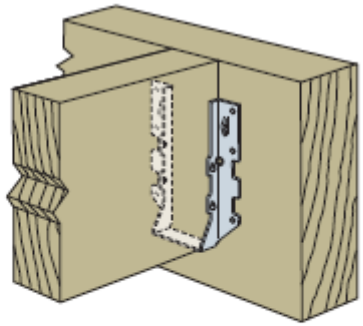




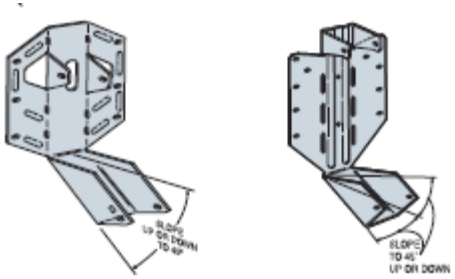


Joist-to-Ledger

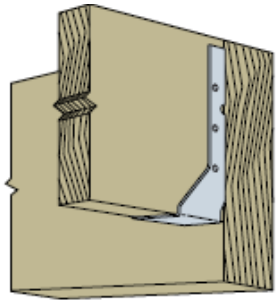
SIMPSON Strong-Tie®



LUS Joist Hanger: Provides bearing and uplift resistance, features double-shear nailing for added strength. ZMAX® coating or stainless steel recommended.



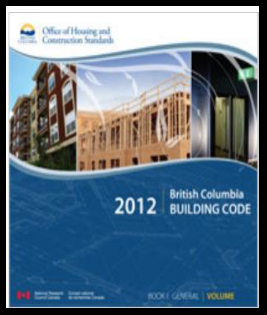
LSU26Z/LSSU210Z Field Skewable Joist Hanger: Field skewable right or left up to 45°, provides bearing and uplift resistance. Also field slopeable up or down to 45°.

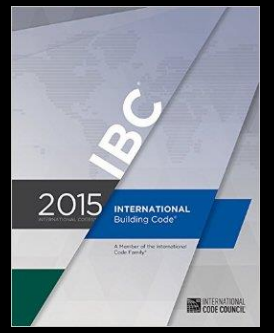


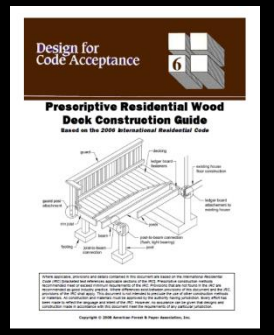
LUC Concealed Flange Joist Hanger: Provides bearing and uplift resistance, concealed flanges for cleaner look and for end conditions. ZMAX coating or stainless steel recommended.

Joist Hangers:

- Provide min. of 1 ½” bearing
- Provide download and uplift capacity
- Concealed flange available
- Slope &/or skew available



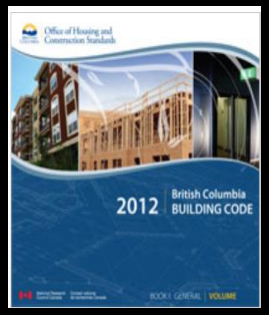


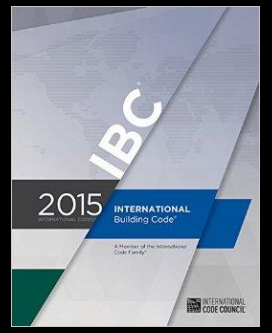


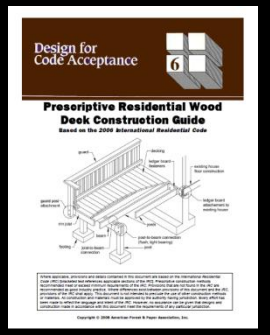
Joist-to-Ledger – End Condition

Flatten the hanger?

- **LUCZ** Hanger
- Single 2x concealed flange



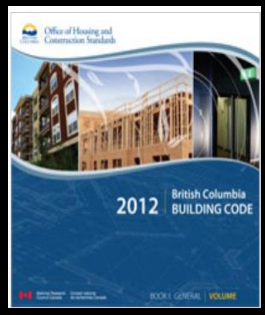


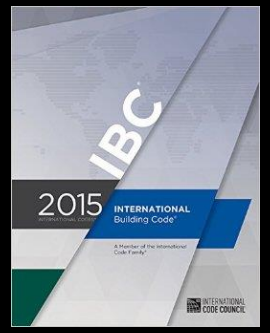


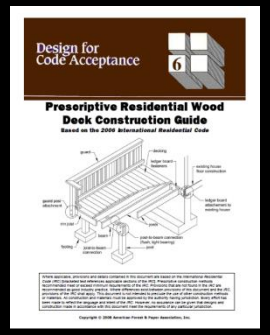
Screws? With Hangers?

- Joist hangers depend on the shear capacity of nails
- Screws perform well in tension, but typically lack in shear
  - Smaller diameter
  - Hardened = brittle

- Simpson has never supported hanger (connector) installations with generic screws like deck screws

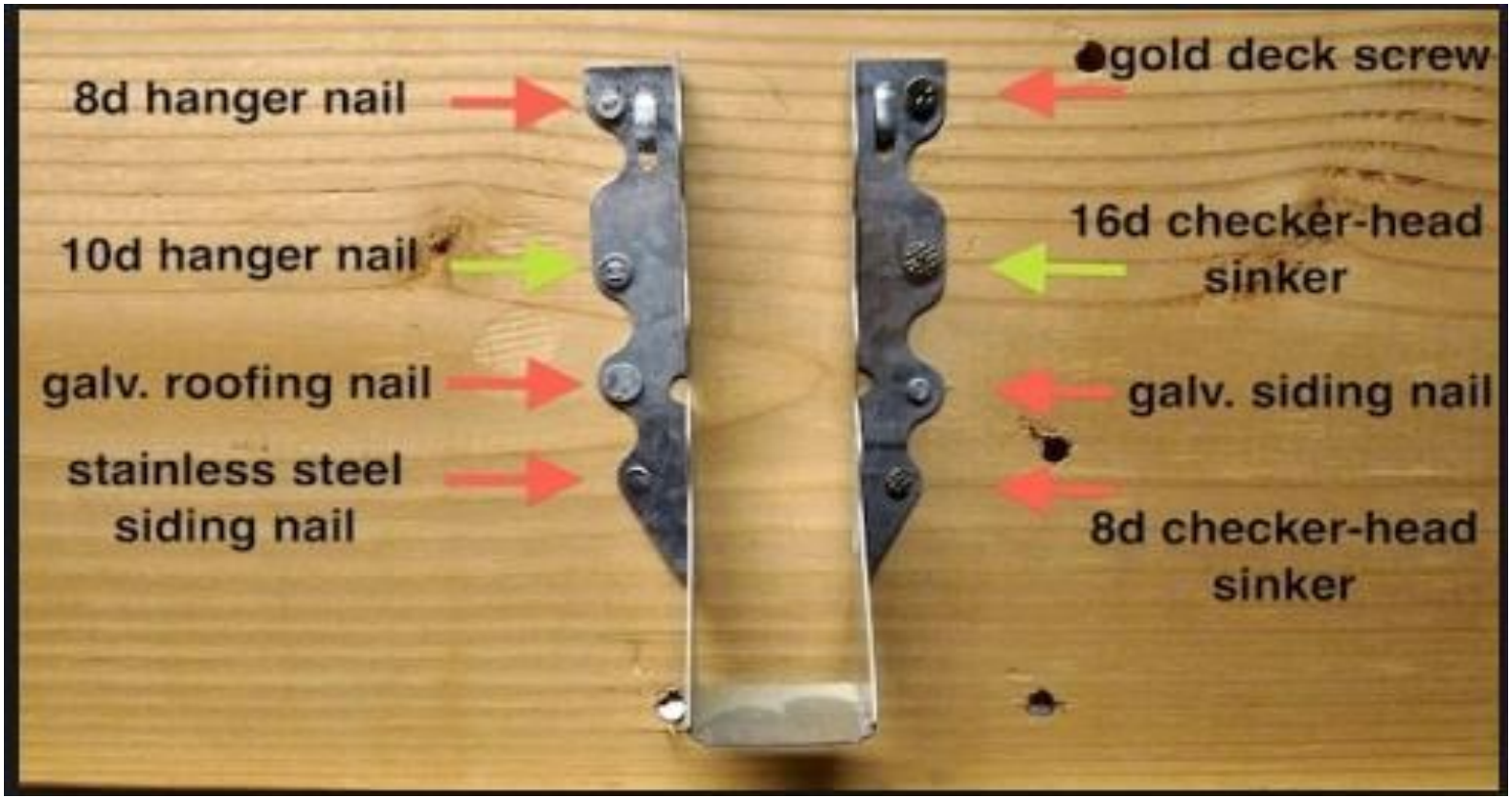


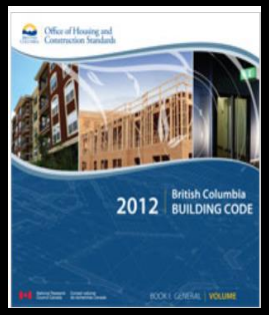


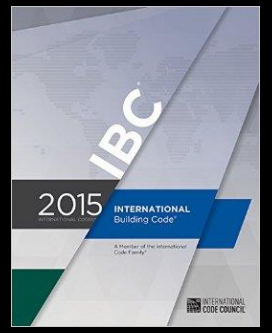


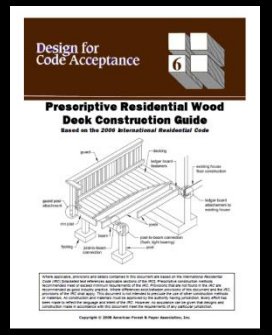
Screws? With Hangers?

SIMPSON Strong-Tie®





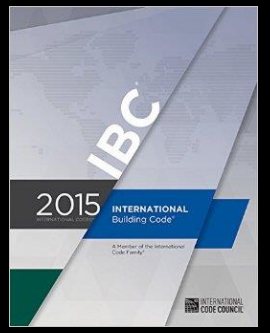


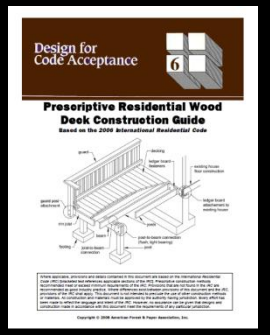


SD Screws

Strong-Drive Screw

- Designed for connectors
- #9 and #10 diameters
- 1 ½” and 2 ½” lengths
- Nail substitute for ***many*** connectors
- Corrosion resistant
- Icon indicates product approved for screws

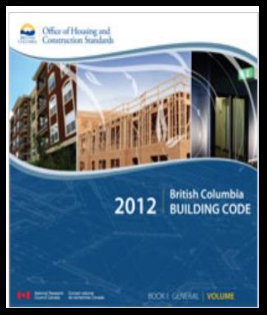


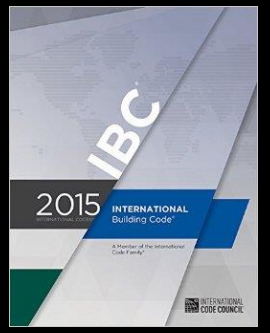


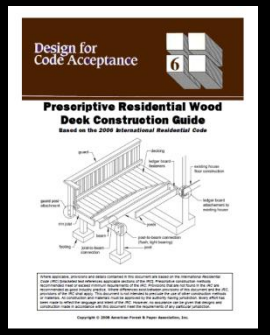
Joist-to-Beam

IRC R507.5.1

- Joist ends and bearing locations shall be provided with lateral restraint to prevent rotation
- Can be joist hanger or wood blocking
  - Depth shall equal not less than 60 percent of joist depth
- Supported by rim joist
  - Not less than (3) 10d (3” x .128”) nails or (3) #10 x 3” long wood screws



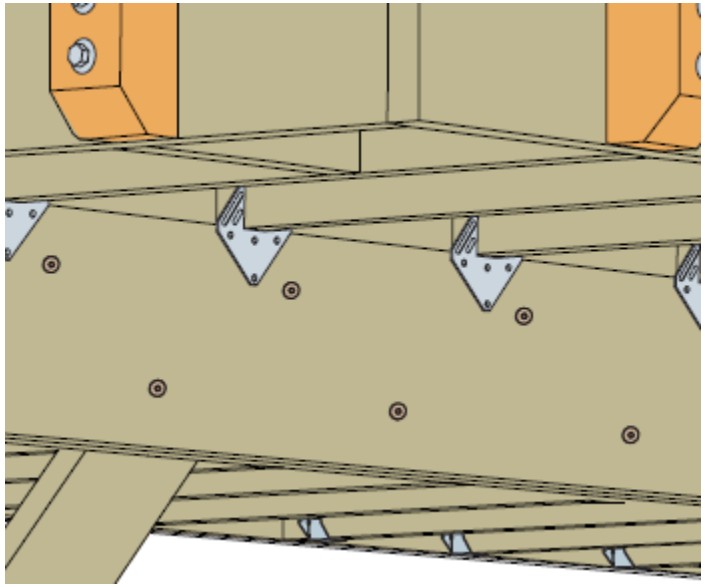


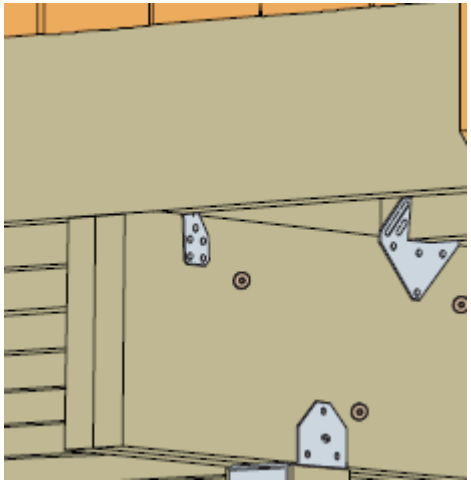


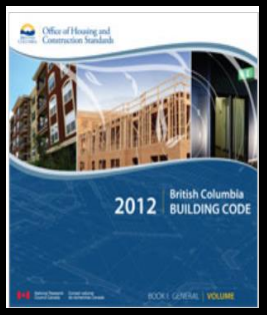
Joist-to-Beam

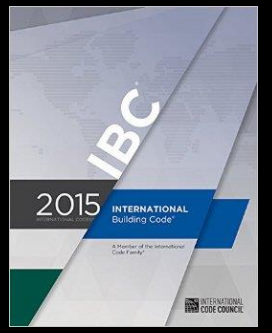
– Hurricane ties resist uplift and lateral loads.

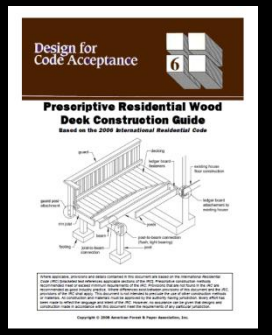
– Lateral restraint (blocking) required to prevent rollover at bearing points (high seismic)



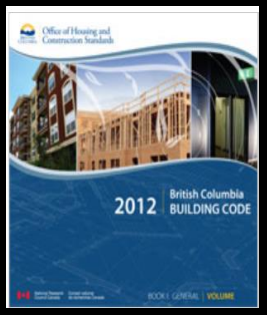


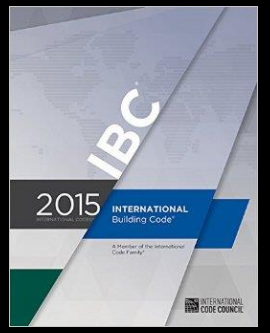


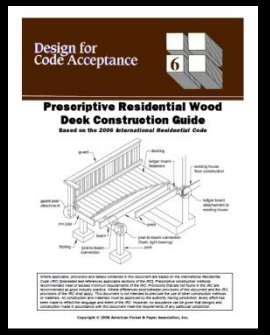




Guardrails & Guard Posts







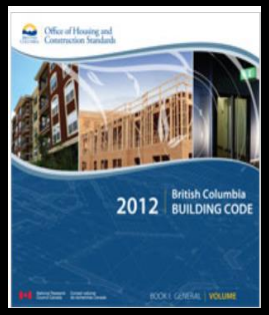
IRC Railing Post Connection

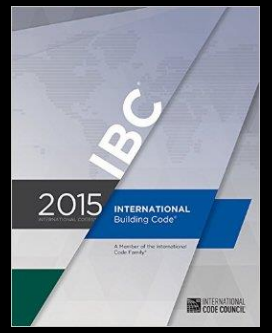
IRC R312.1.1 Guards shall be located along open-sided walking surfaces, porches, balconies, or raised floor surfaces more than 30” above the floor or grade below

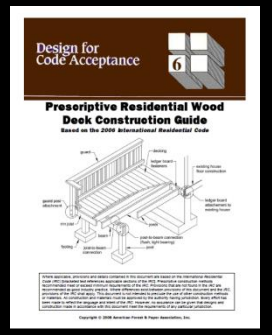
**Insect screening shall not be considered as a guard

IRC R312.1.2 Guards shall be a minimum of 36” tall

42” in Canada

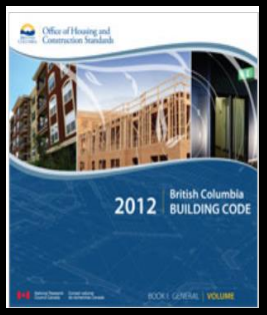


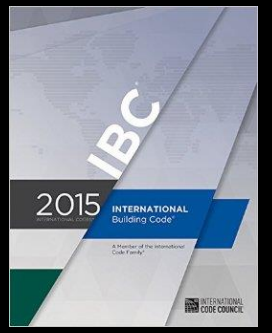


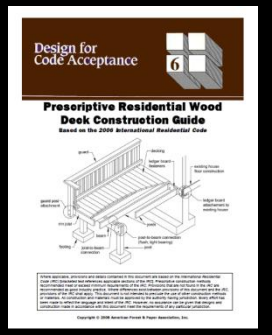


DCA 6 Guard Detail

- Addresses many connections & details
  - Post spacing (6’ max.)
  - Rail cap (2x6 or 5/4 board)
  - Top & bottom guard attachment to post (2x4 with 2-8d common (HDG) or 2-#8 wood screws)
  - Guard post connection
  - DO NOT NOTCH

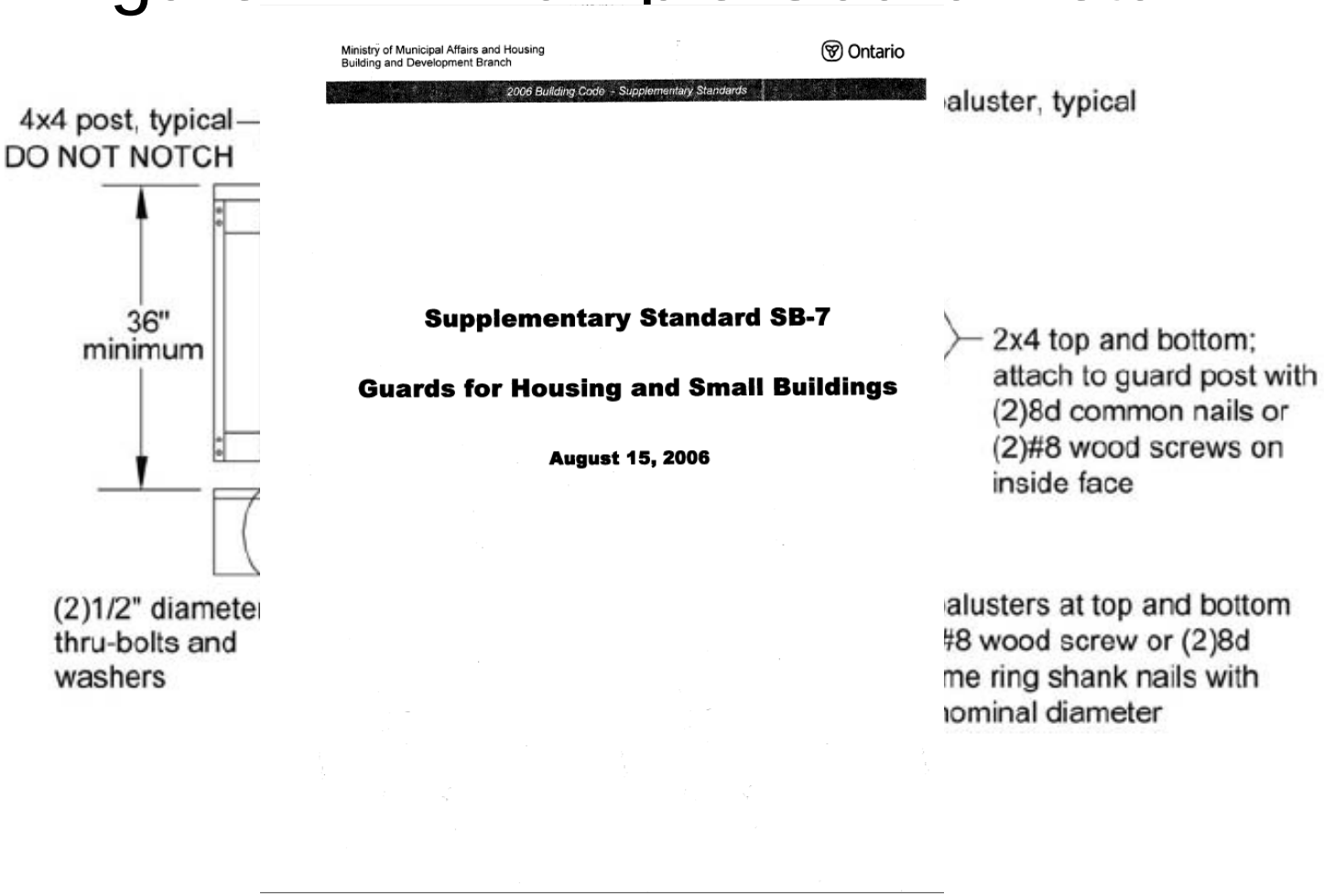


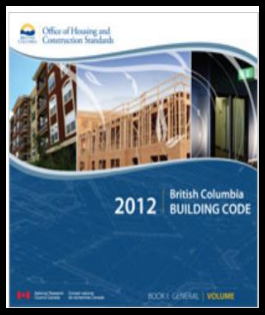


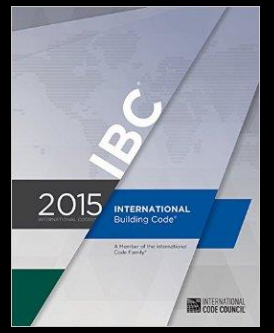


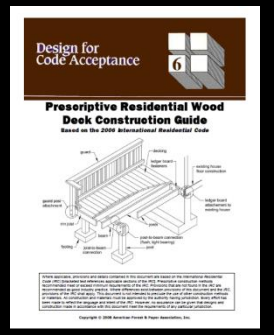
DCA 6 Guard Detail

- Figure 24: Example Guard Detail









DCA 6 Guard Detail

Figure 25: Post to Outside Joist

guard posts may be located on either side of the outside-joist

guard post

(2)1/2" dia. thru-bolts and washers

2" min.

2-1/2" min. and 5" max.

2" min.

outside-j

Ministry of Municipal Affairs and Housing
Building and Development Branch

Ontario

2006 Building Code - Supplementary Standards

Supplementary Standard SB-7

Guards for Housing and Small Buildings

August 15, 2006

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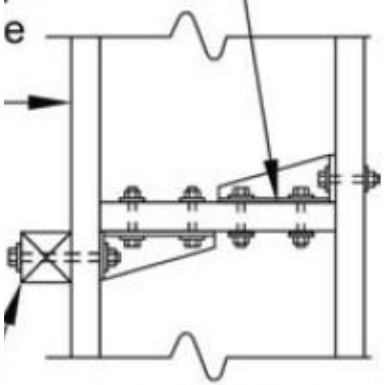
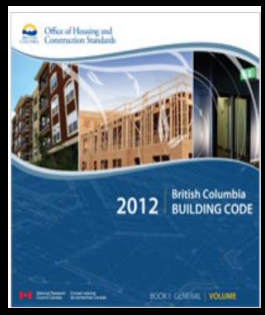
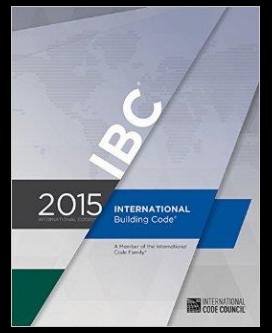
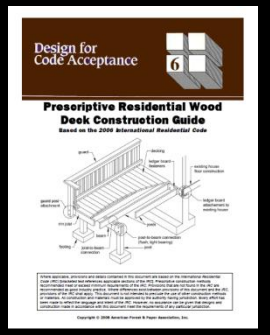


PLAN VIEW

*gu ure 26 (between joists) if blocking is installed as shown above within 12" of each side of the post

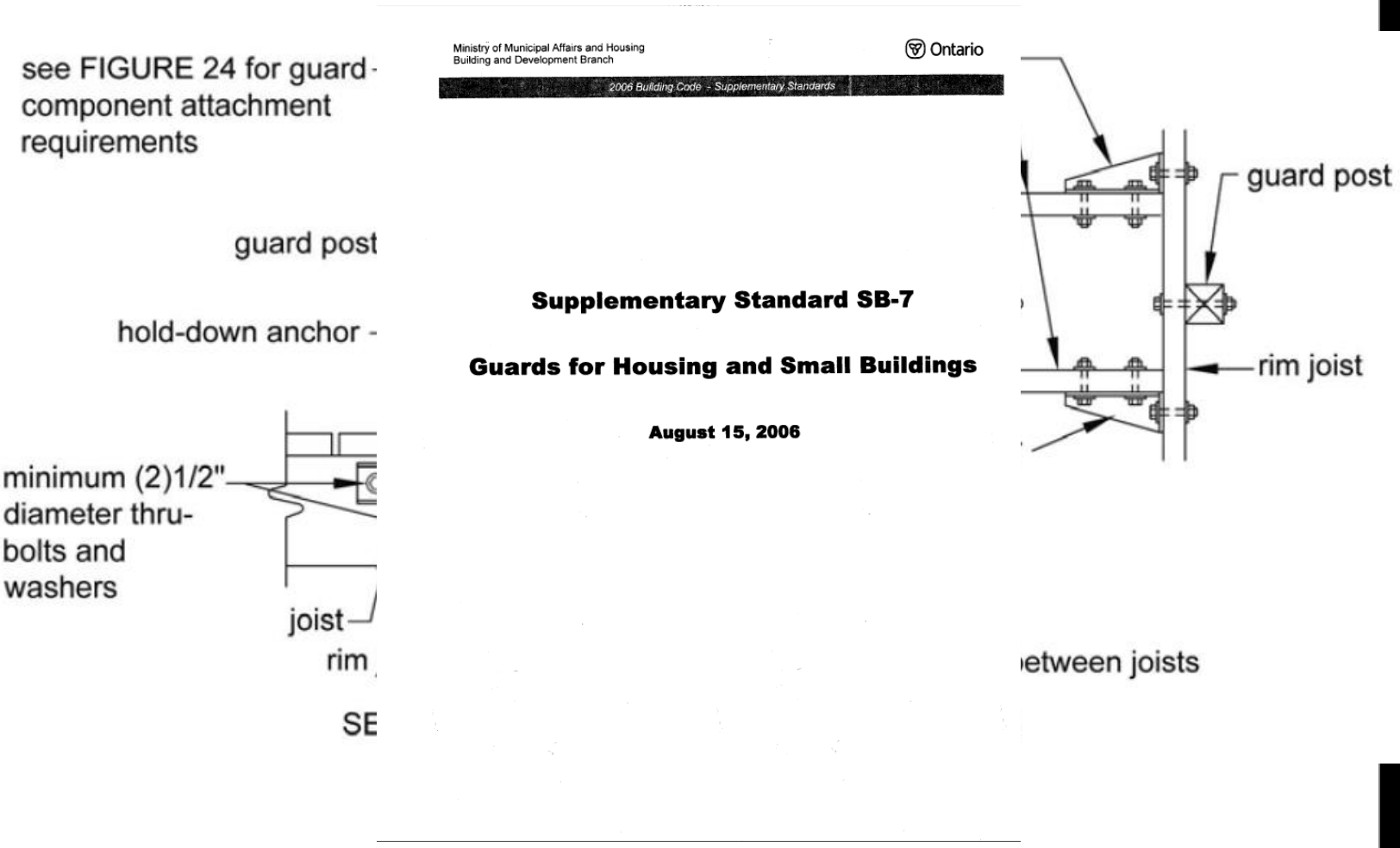






DCA 6 Guard Detail

Figure 26: Post to Rim Joist



Ministry of Municipal Affairs and Housing
Building and Development Branch

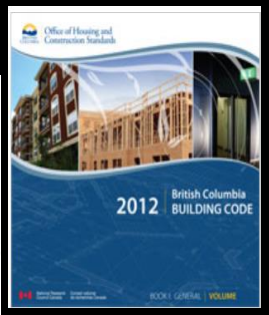
Ontario

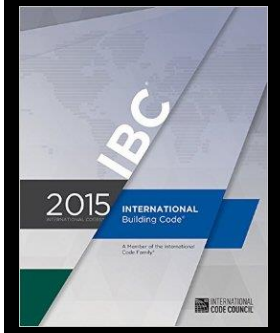
2006 Building Code - Supplementary Standards

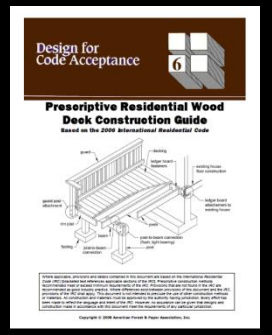
Supplementary Standard SB-7

Guards for Housing and Small Buildings

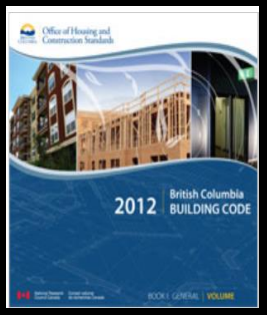
August 15, 2006

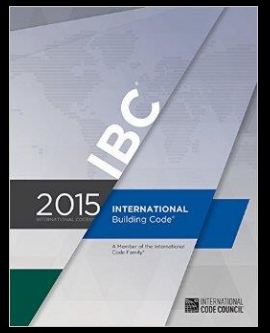


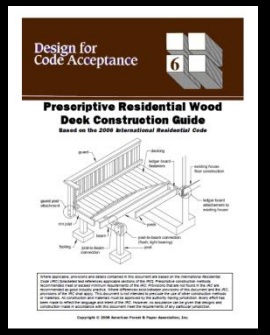




Railing Post Connection







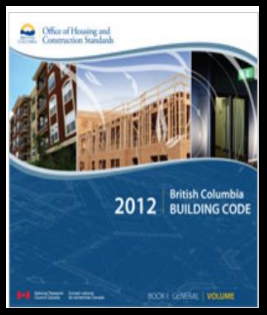
Railing Post Connection

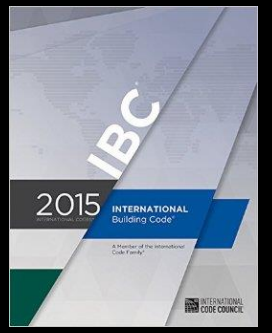
SIMPSON Strong-Tie®

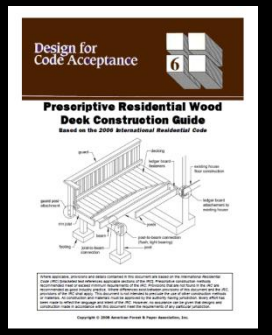
TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

USE	LIVE LOAD
Attics with limited storage[b, g, h]	20
Attics without storage[b]	10
Decks[e]	40
Exterior balconies	60
Fire escapes	40
Guardrails and handrails[d]	200[i]
Guardrails in–fill components[f]	50[i]

d. A single concentrated load applied in any direction at any point along the top.

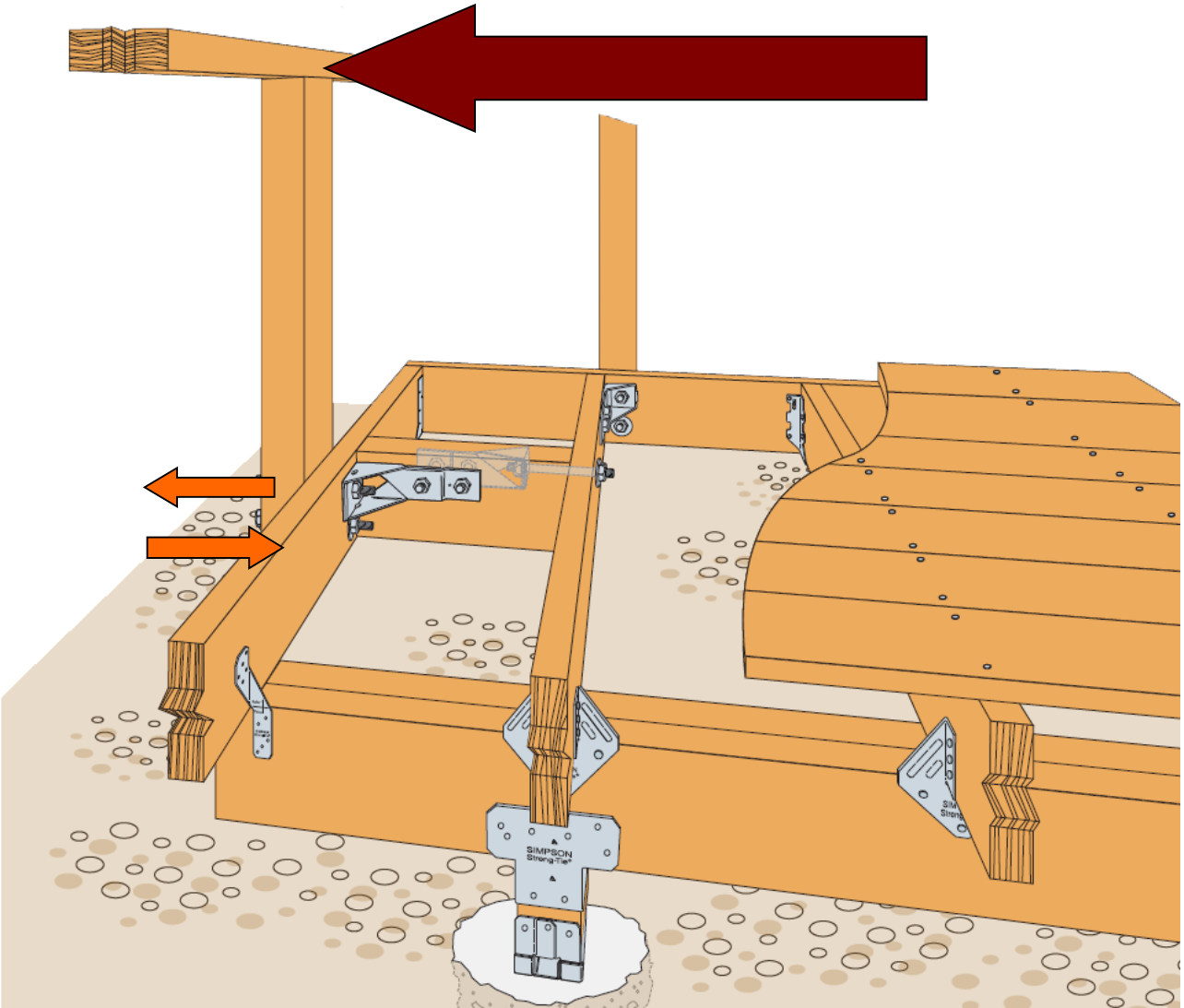


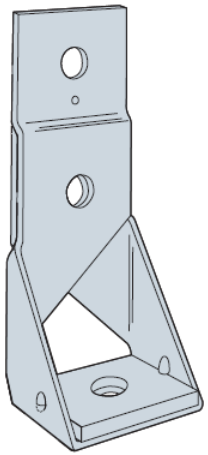




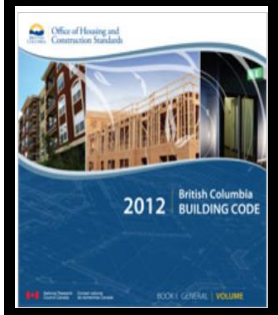
Railing Post Connection

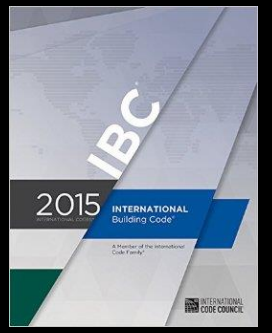
SIMPSON Strong-Tie®

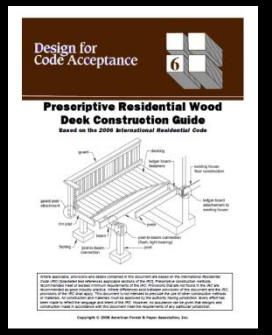




HD2AHDG Holdown:
Horizontal Application



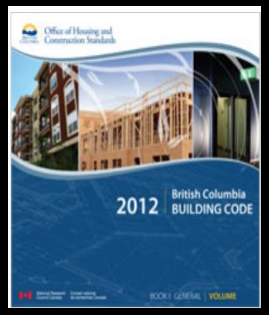


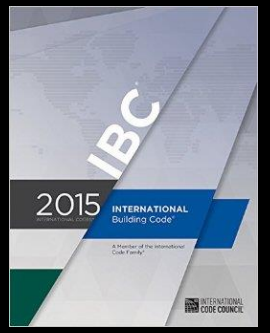


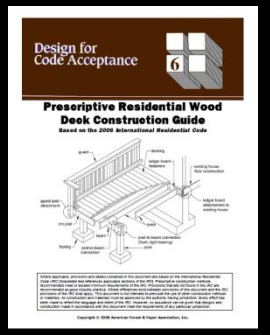
Railing Post Connection

SIMPSON Strong-Tie®

- This is one of the more crucial connections pertaining to safety.
- Many groups have done testing to determine capacity of various connection methods such as
  - Lags
  - Bolts
  - Holdowns



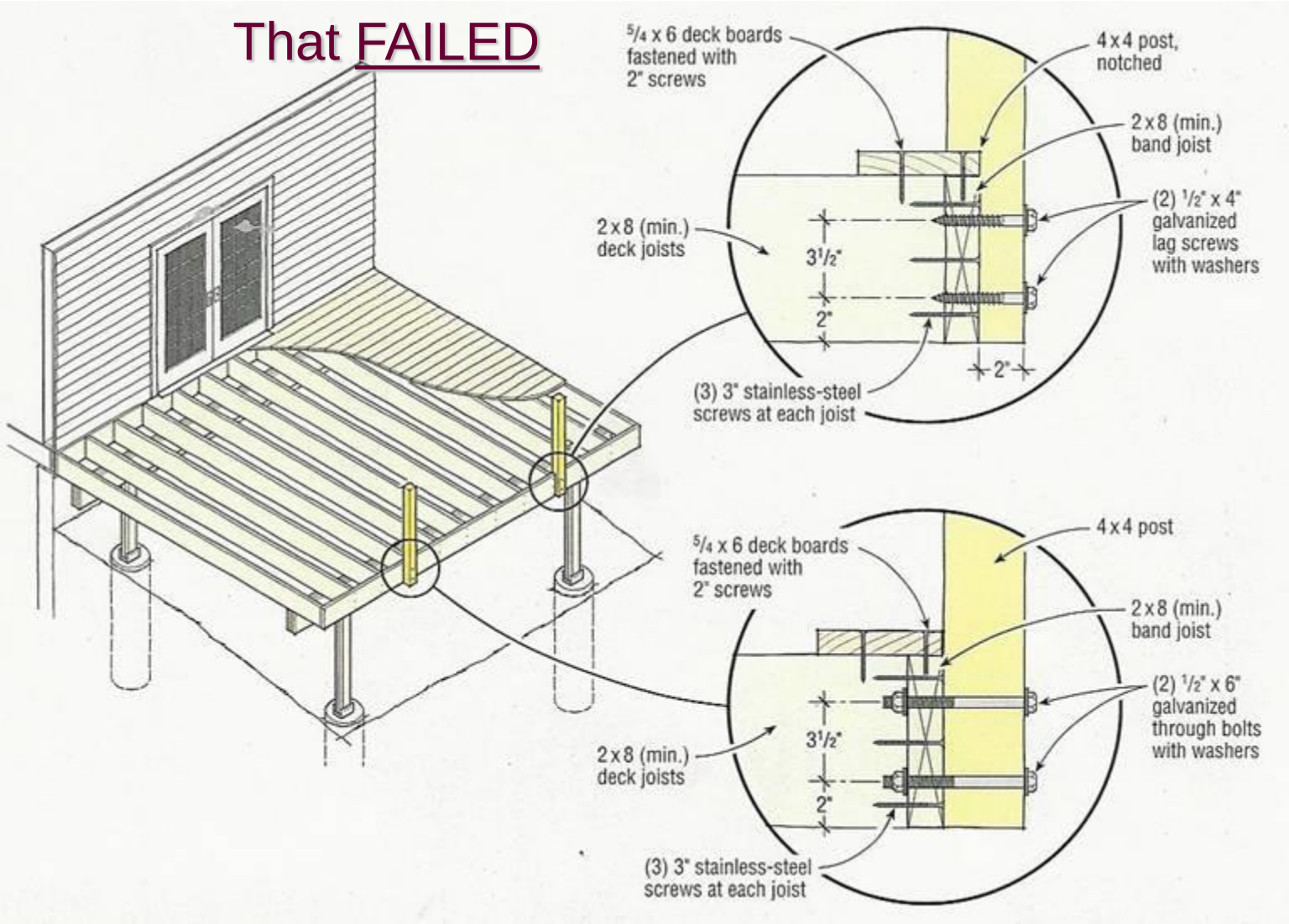


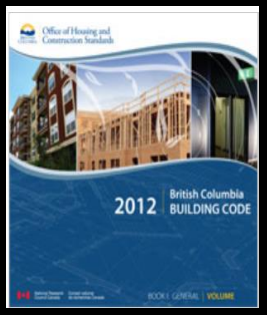


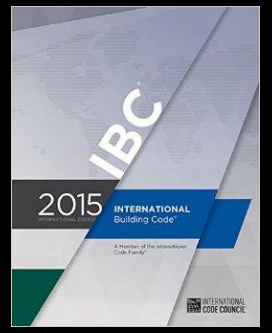
Railing Post Connection

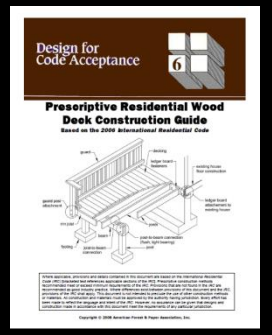
SIMPSON Strong-Tie®

Tested Post Connections That FAILED

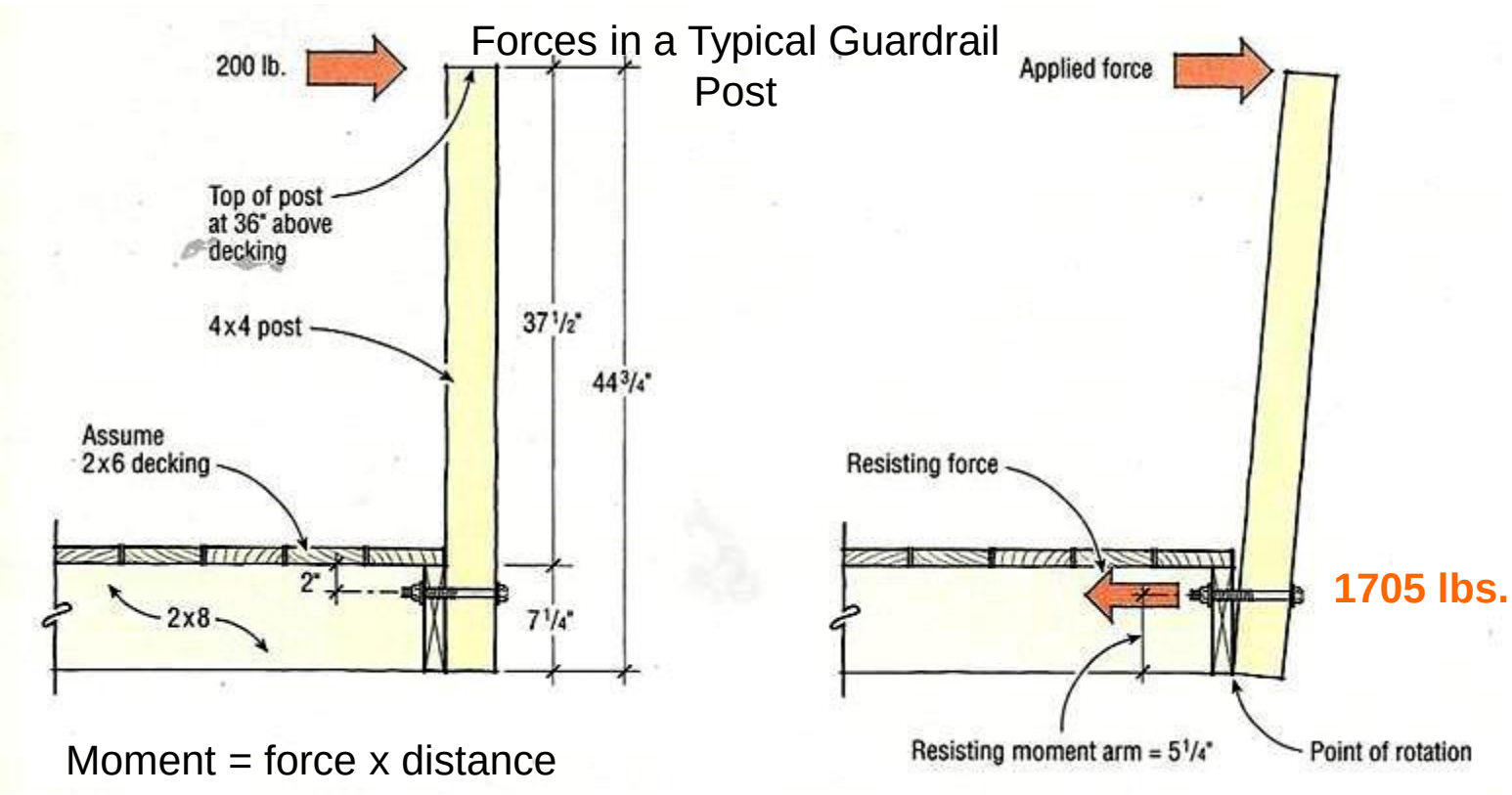


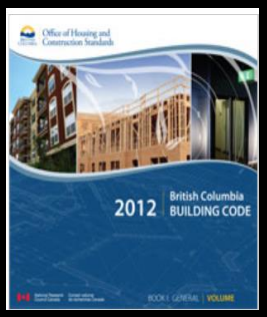


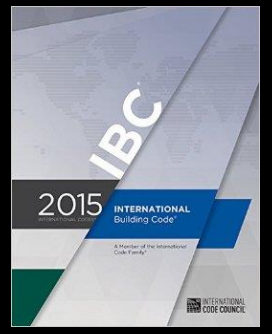


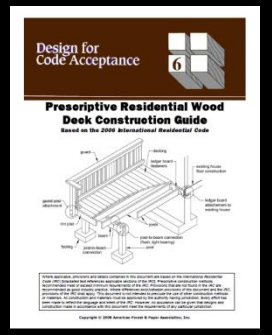


Railing Post Connection









Moment = force x distance

Applied moment = resisting moment

Applied moment = 200 lb. x 44.75 in. = 8,950 inch-pounds at base of post

Resisting moment = ? lbs. x 5.25 in.

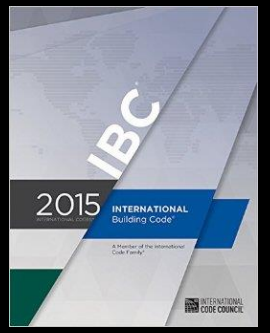
(5.25 in. is the distance from the bottom of joist to bolt centerline)

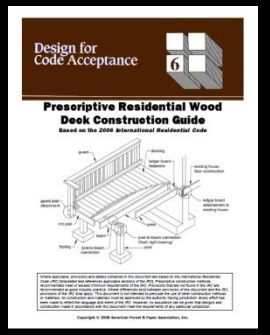
Resisting force = 8,950 inch-pounds / 5.25 in. = 1,705 lbs.

Railing Post Connection

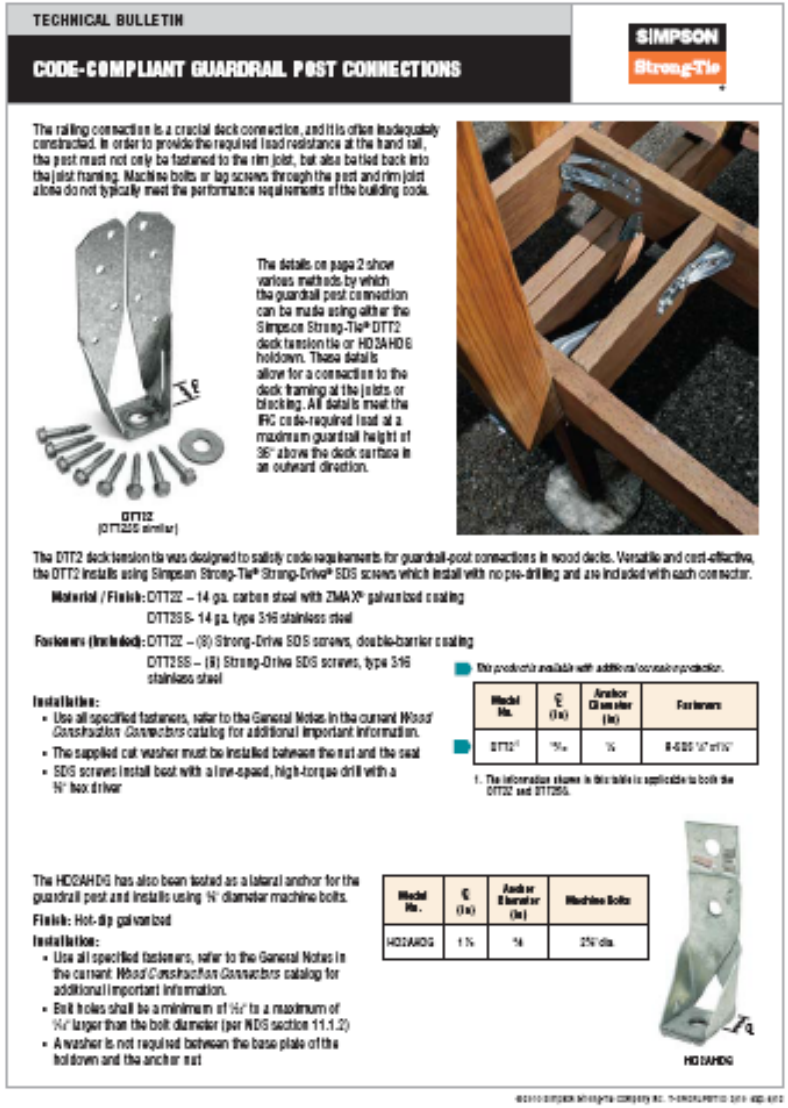
Acceptance Criteria for Handrails and Guards – AC273 (Section 4.2.4)

- 500 pound test criteria
- Deflection limit:
  - When the load reaches 200 lbs., the deflection at the point of loading shall be recorded.
  - The allowable deflection at 200 lbs. shall **NOT** exceed:
    - The sum of : {h (height in inches of the guard) ÷ 24} + {l (length between posts) ÷ 96}





Railing Post Connection



TECHNICAL BULLETIN

CODE-COMPLIANT GUARDRAIL POST CONNECTIONS

SIMPSON Strong-Tie

The railing connection is a crucial deck connection, and it is often inadequately constructed. In order to provide the required load resistance at the hand rail, the post must not only be fastened to the rim joist, but also be tied back into the joist framing. Machine bolts or lag screws through the post and rim joist alone do not typically meet the performance requirements of the building code.

DTT2Z (DTT2SS similar)

The details on page 2 show various methods by which the guardrail post connection can be made using either the Simpson Strong-Tie® DTT2 deck tension tie or HDSAHDG holddown. These details allow for a connection to the deck framing at the joists or blocking. All details meet the IRC code-required load at a maximum guardrail height of 36" above the deck surface in an outward direction.

The DTT2 deck tension tie was designed to satisfy code requirements for guardrail-post connections in wood decks. Versatile and cost-effective, the DTT2 installs using Simpson Strong-Tie® Strong-Drive® SDS screws which install with no pre-drilling and are included with each connector.

Material / Finish: DTT2Z – 14 ga. carbon steel with ZMAX® galvanized coating
DTT2SS- 14 ga. type 316 stainless steel

Fasteners (Included): DTT2Z – (8) Strong-Drive SDS screws, double-barrier coating
DTT2SS – (8) Strong-Drive SDS screws, type 316 stainless steel

Installation:
- Use all specified fasteners, refer to the General Notes in the current *Wood Construction Connectors* catalog for additional important information.
- The supplied cut washer must be installed between the nut and the seat
- SDS screws install best with a low-speed, high-torque drill with a ½" hex driver

This product is available with additional corrosion protection.

Model No.	℄ (in.)	Anchor Diameter (in.)	Fasteners
DTT2[1]	15/16	⅝	8-SDS ¼" x 1½"

1. The information shown in this table is applicable to both the DTT2Z and DTT2SS.

The HDSAHDG has also been tested as a lateral anchor for the guardrail post and installs using ¾" diameter machine bolts.

Finish: Hot-dip galvanized

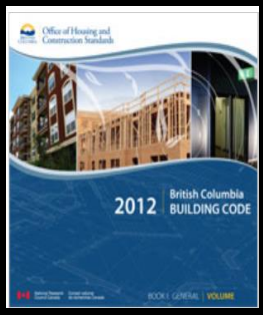
Installation:
- Use all specified fasteners, refer to the General Notes in the current *Wood Construction Connectors* catalog for additional important information.
- Bolt holes shall be a minimum of 1/16" to a maximum of 1/8" larger than the bolt diameter (per NDS section 11.1.2)
- A washer is not required between the base plate of the holdown and the anchor nut

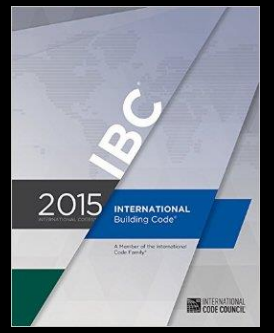
Model No.	℄ (in.)	Anchor Diameter (in.)	Machine Bolts
HDSAHDG	1 ⅞	⅝	2⅝" dia.

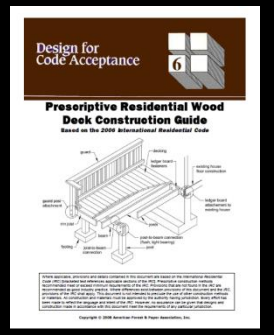
HDSAHDG

T-GRDRLPST10

- Railing connection bulletin
- Code requirements
- Testing values
- Connection details





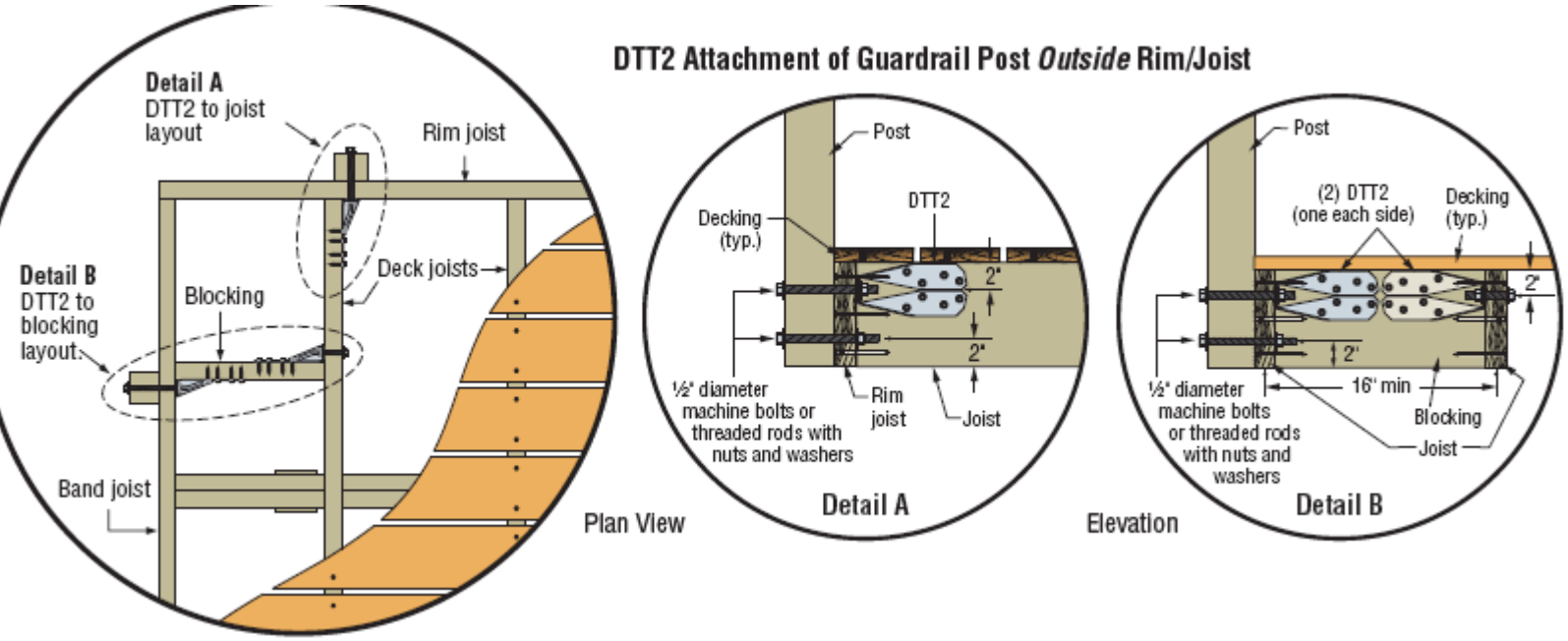


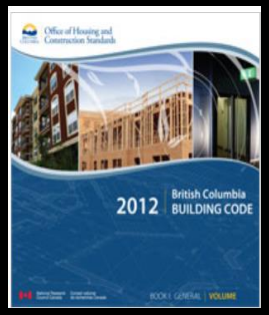
Railing Post Connection

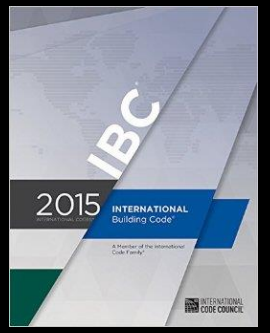
SIMPSON Strong-Tie®

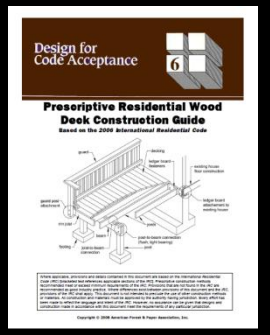
T-GRDRLPST10

Post outside Rim/joist







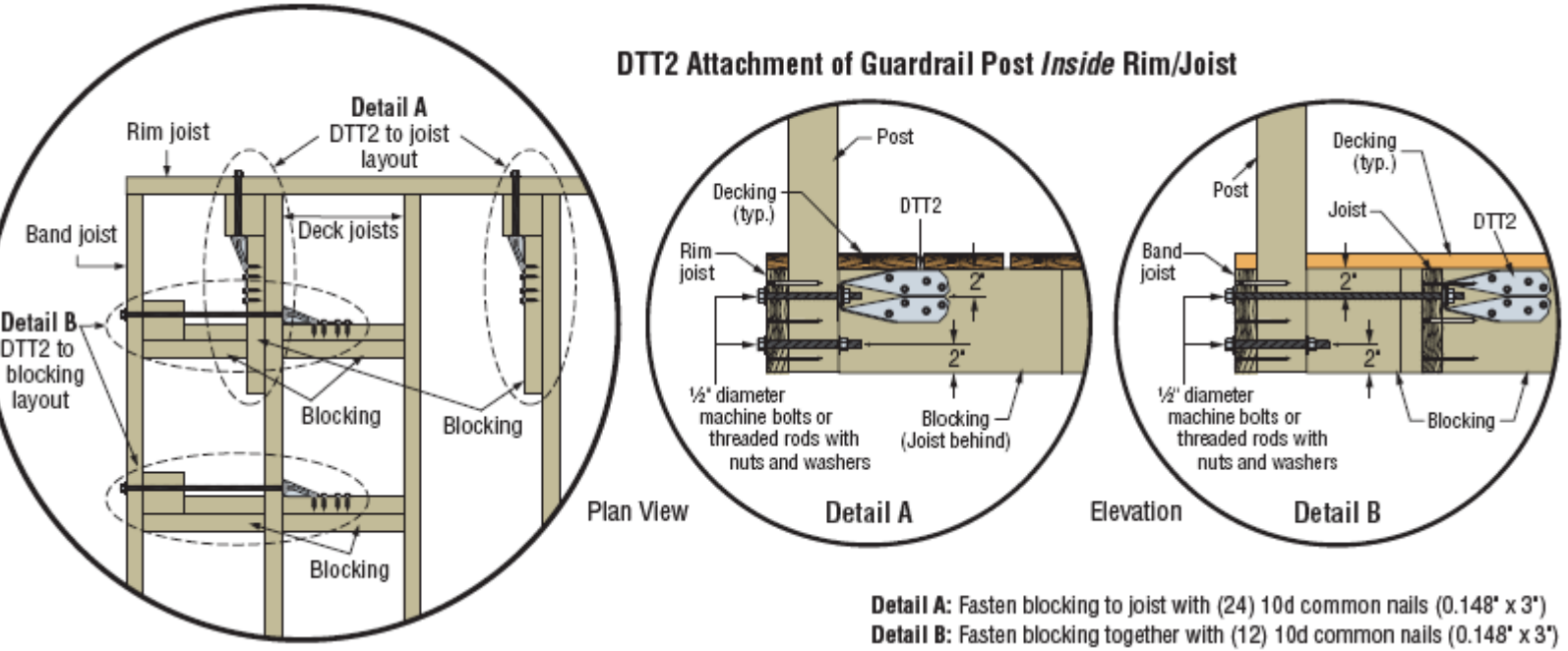


Railing Post Connection

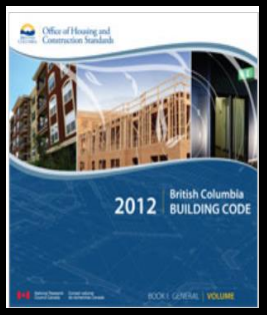
SIMPSON Strong-Tie®

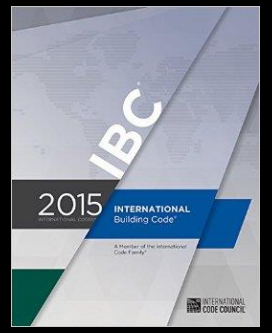
T-GRDRLPST10

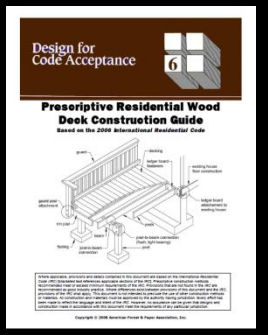
Post inside Rim/joist



Detail A: Fasten blocking to joist with (24) 10d common nails (0.148" x 3")
Detail B: Fasten blocking together with (12) 10d common nails (0.148" x 3")

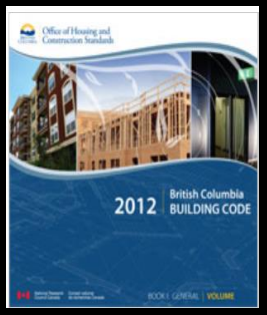


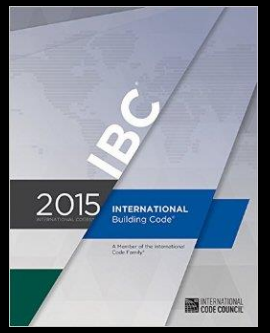


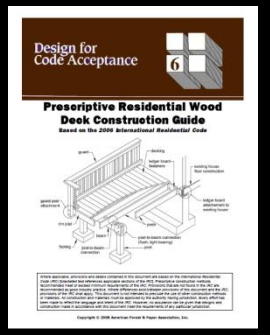


DTT2Z – Deck Tension Tie

- The DTT2Z tension tie
- Installs with SDS1/4” x 1 ½” screws
- Single or double 2x
- Meets the DCA6 requirement for guard-rails

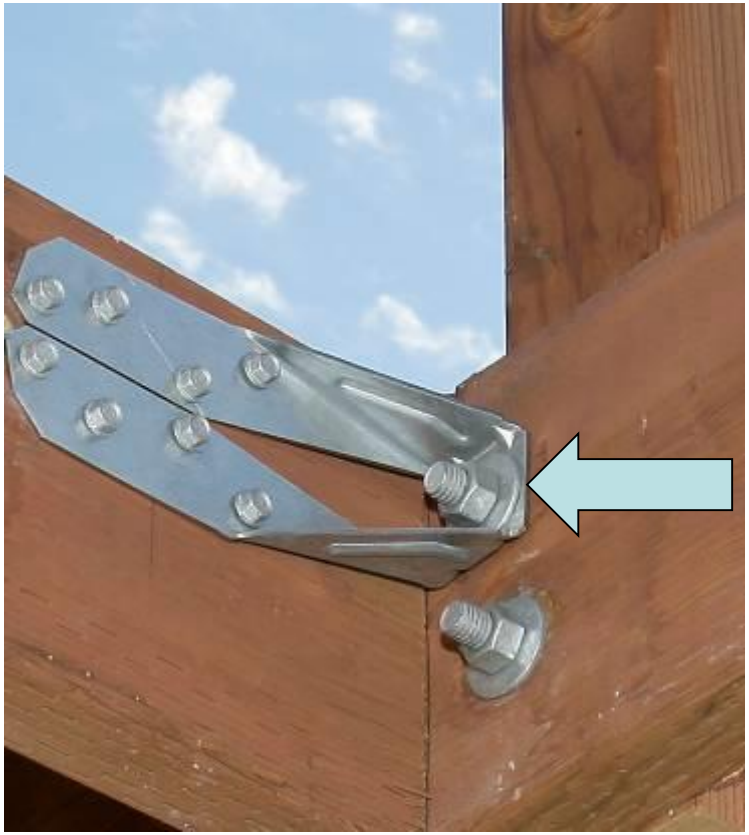




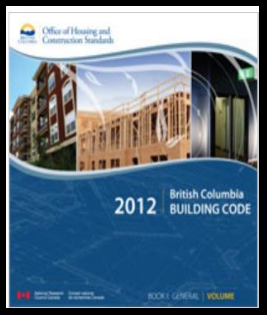


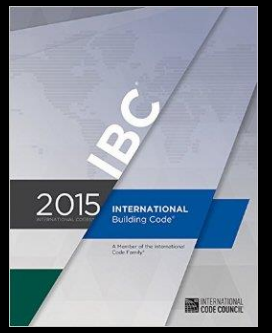
DTT2Z – Deck Tension Tie

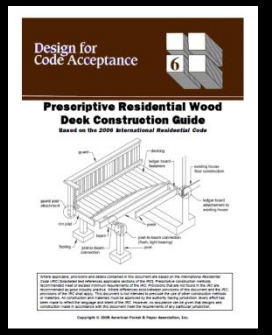
- Guardrail to post connection
- Ledger to house connection



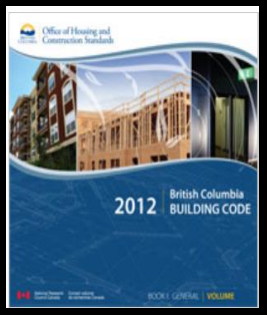
Standard cut washer required (supplied with part)

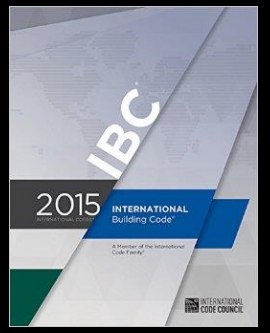


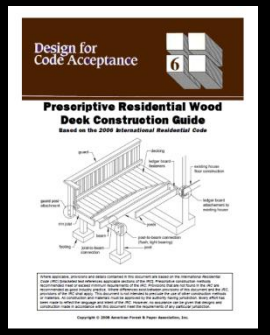




Stair Connections







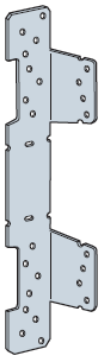
Stair Stringer-to-Deck

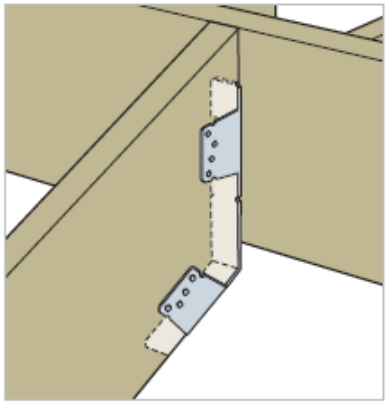
SIMPSON Strong-Tie®

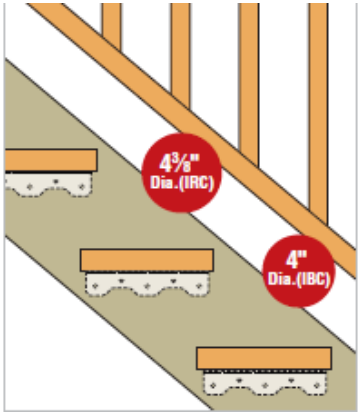
TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

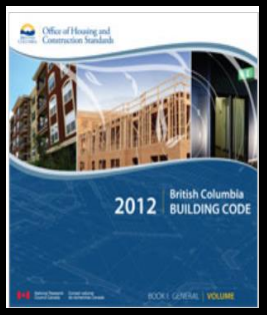
USE	LIVE LOAD
Attics with limited storage[b, g, h]	20
Attics without storage[b]	10
Decks[e]	40
Stairs	40[c]

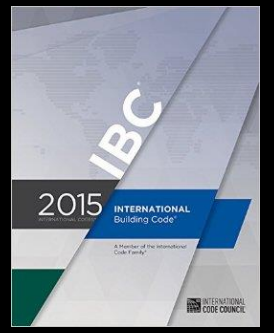
c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

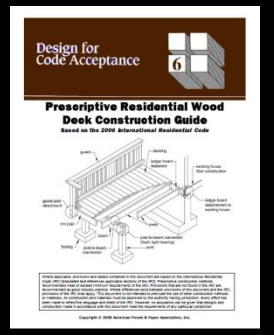

LSC





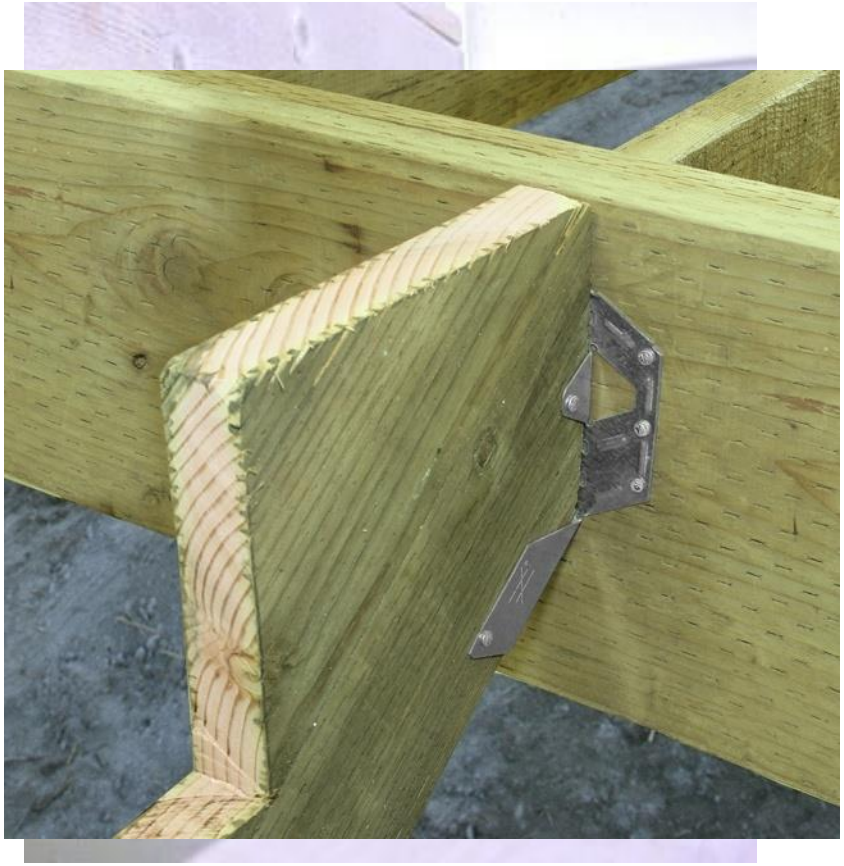


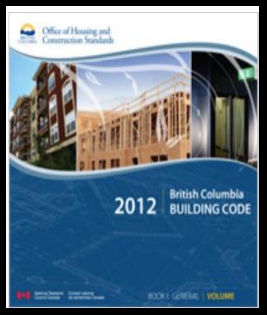


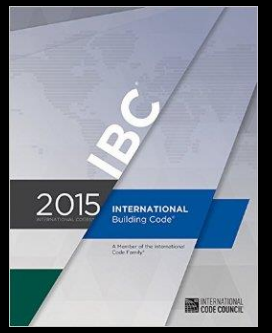


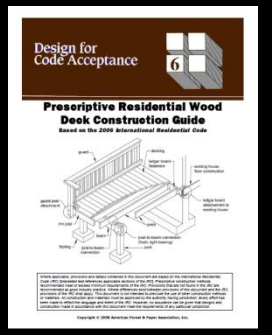
LSUZ – Stair Stringer Hanger

- Field adjustable
- Meets/exceeds required capacity
- Corrosion resistant





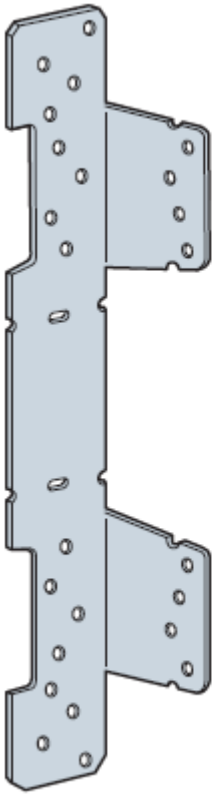




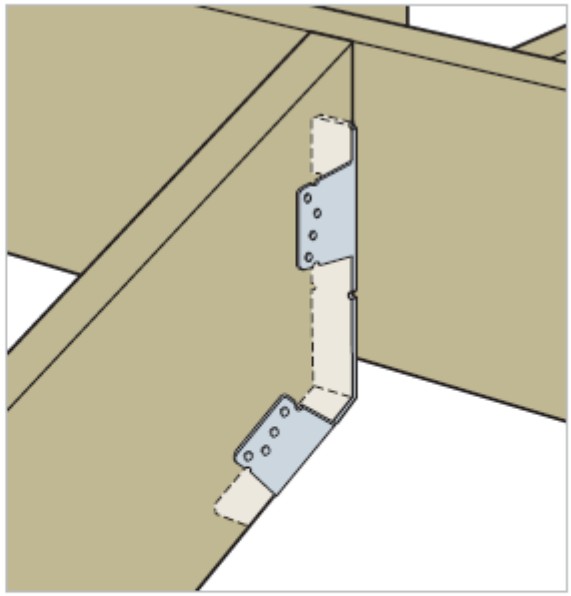
Stair Stringer-to-Deck

- **LSCZ Hanger**

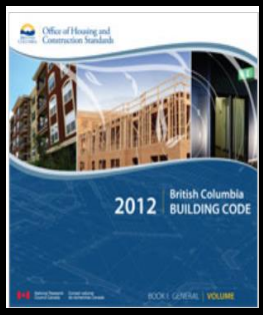
- Field adjustable
- Works flush to the end
- Z-max coating

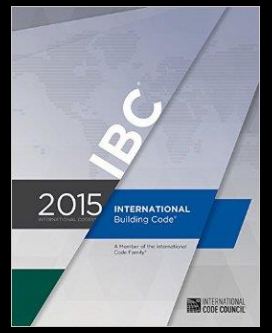


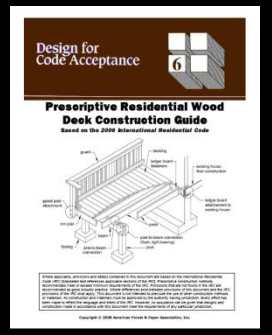
LSC



LSC Adjustable Stair Stringer Connector: Field slopable to almost any angle, the LSC is ideal for attaching the staircase stringer to the deck. Suitable for solid and notched stringers. ZMAX® coating or stainless steel coating recommended







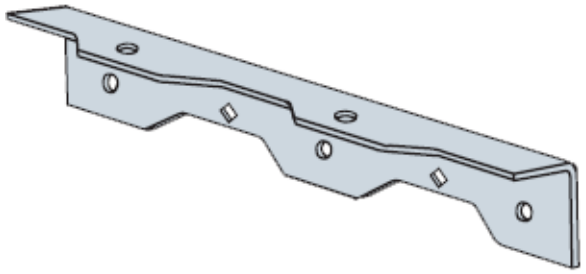
Stair Tread-to-Stringer

SIMPSON Strong-Tie®

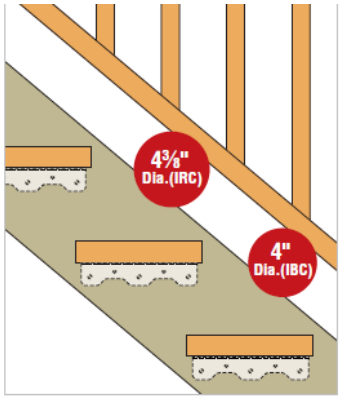
TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)

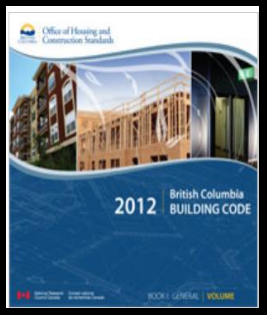
USE	LIVE LOAD
Attics with limited storage[b, g, h]	20
Attics without storage[b]	10
Decks[e]	40
Stairs	40[c]

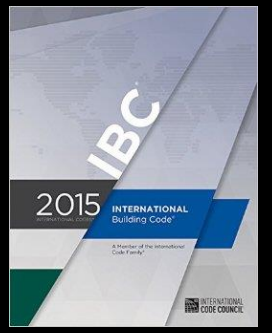
c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

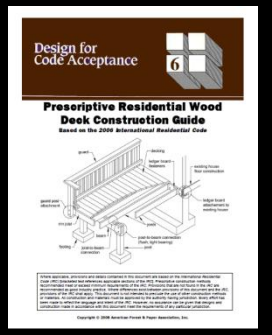


TAZ Staircase Angle:



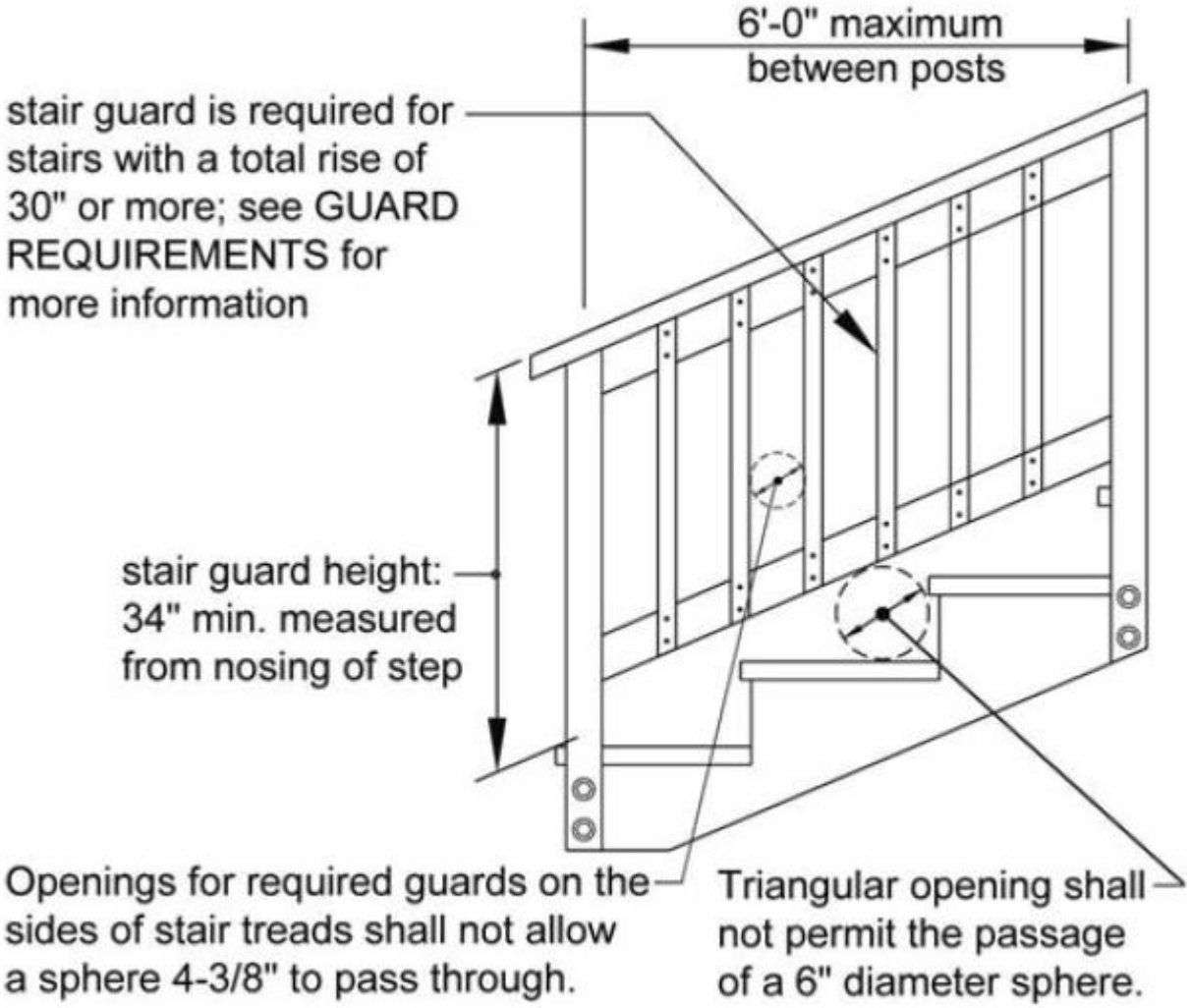


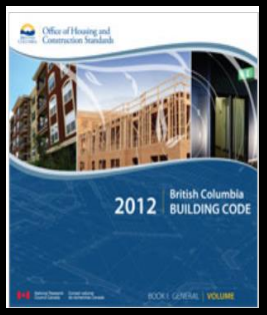


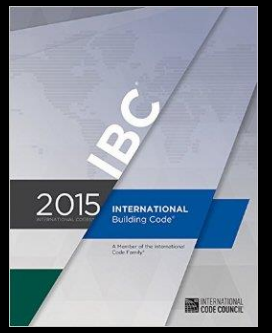


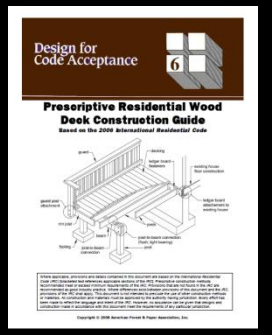
DCA 6 Stringer Opening

Figure 30: Stair Guard Requirements





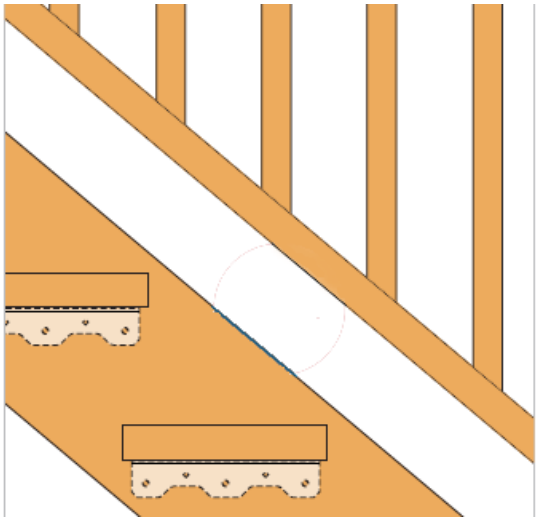


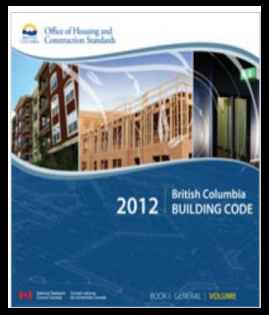


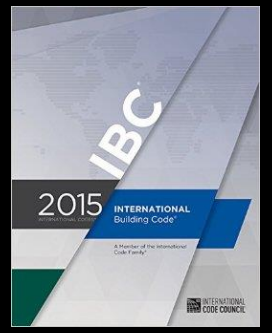
IRC Stringer Opening

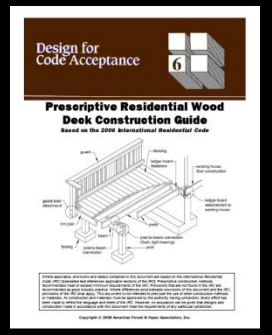
IRC R312.1.3 Opening Limitations

- Railing to Stringer Opening
  - The triangular openings formed by the riser, tread and bottom rail of the guard at the open side of a stairway shall be a maximum size so as not to allow a sphere 6” in diameter to pass through

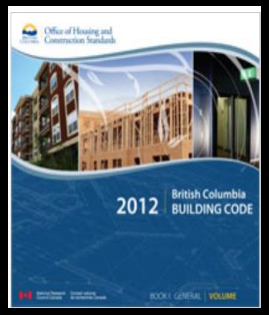


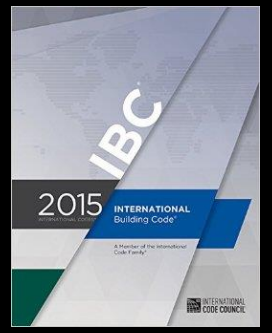


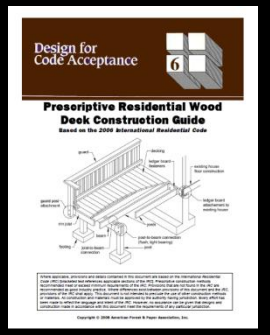




Deck summary







Questions?

Thank you!