

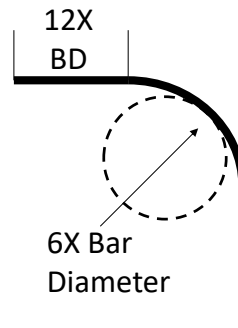
2021 IRC - Part 3 Handout

Wisdom and Associates, Inc.

Chapter 4 - Foundations

Hooks D0, D1, D3 (R403.1.3.1)

- Concrete and masonry wall vertical reinforcement must have a standard hook



#4 Bar - 3" bend / 6" hook
#5 Bar - 3.75" bend / 7.5" hook

Reinforcement Location (R403.1.3.5.2)

- Vertical reinforcement located in the center of the wall
- Minimum 3" cover for cast against earth (footings)
- Minimum 1.5" cover for cast in removable forms (foundation) #5 bar and smaller
- Minimum ¾" cover for ICF (forms stay in place)

Reinforcement - Lap Splices (R403.1.1-3)

- Non-contact lap splice no more than 1/5 the lap splice length or 6"

	40KPSI Steel	60KPSI Steel
• #4	20"	30"
• #5	25"	38"
• #6	30"	45"

Foundation Anchorage (R403.1.6)

- Minimum ½" diameter bolts
- Minimum 7" embedment
- Maximum 6' on center
- Minimum 2 bolts per plate
- Between 7 bolt diameters and 12" from plate ends
- Wet set permitted
- Bolts located in the middle third of the plate
- Plates 24" or shorter may have only one bolt in the middle third
- Plates 12" or shorter bolts not required
- Mono slab interior walls not part of a braced wall line anchored with *approved* fasteners

Foundation Anchorage D0, D1, D2 (R403.1.6.1)

- Additional requirements:
- 3" X 3" Plate washers (slotted allowed)
- Maximum 4' on center for two stories
- Interior bearing walls (not just braced walls) bolted maximum 6' on center

Chapter 4 - Foundations

Masonry Foundations (R404.1.2.1, R404.1.4.1, R403.1.3.2)

- Must be reinforced if in seismic zones D0, D1, D2
- Over 8 feet in height
- Over 4 feet of unbalanced backfill
- Minimum one #4 bar 48" o.c. vertical
- Must have hook on bottom
- Must extend 14" out of top of footing
- Minimum one #4 bar in top 12" of wall horizontally
- Masonry stem walls shall be solidly grouted

8" Masonry Wall Reinforcement				
Wall Height	Unbalanced Backfill Height	Minimum Vertical Reinforcement		
		GW, GP, SW and SP soils	GM, GC, SM, SM-SC and ML	SC, ML-CL and inorganic CL soils
6 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet 8 inches	#4 at 48	#5 at 48	#6 at 48
7 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet 4 inches	#5 at 48	#6 at 48	#6 at 40
8 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#5 at 48	#6 at 48	#6 at 32
8 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#6 at 48	#6 at 40	#6 at 24
9 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#6 at 48	#6 at 40	#6 at 24
	9 feet 4 inches	#6 at 40	#6 at 24	#6 at 16
10 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 32
	8 feet	#6 at 48	#6 at 32	#6 at 24
	9 feet	#6 at 40	#6 at 24	#6 at 16
	10 feet	#6 at 32	#6 at 16	#6 at 16

Chapter 4 - Foundations

Concrete Foundations D0, D1, D2 (R404.1.3.1)

- Minimum one #4 bar 48" o.c. vertical
- Must have hook on bottom
- Must extend 14" out of bottom of footing
- Minimum one #4 bar in top 12" of wall horizontally

Reinforcement of Wall Openings (R404.1.3.3.7.3)

- Wall openings that interrupt required vertical reinforcement must have an additional vertical on each side of the opening within 12" of the opening

Horizontal Reinforcement for Concrete Basement Walls	
Maximum Height of Wall	Reinforcement Requirements
Less Than or Equal to 8 Feet	One #4 bar within the top 12 inches of the wall and one #4 bar near mid-height
More Than 8 Feet	One #4 bar within the top 12 inches of the wall and one #4 bar at third points

6" Concrete Wall Reinforcement				
Wall Height	Unbalanced Backfill Height	Minimum Vertical Reinforcement		
		GW, GP, SW and SP soils	GM, GC, SM, SM-SC and ML	SC, ML-CL and inorganic CL soils
8 feet	4	NR	NR	NR
	5	NR	6 @ 39	6 @ 48
	6	5 @ 39	6 @ 48	6 @ 35
	7	6 @ 48	6 @ 34	6 @ 25
	8	6 @ 39	6 @ 25	6 @ 18
9 feet	4	NR	NR	NR
	5	NR	5 @ 37	6 @ 48
	6	5 @ 36	6 @ 44	6 @ 32
	7	6 @ 47	6 @ 30	6 @ 22
	8	6 @ 34	6 @ 22	6 @ 16
	9	6 @ 27	6 @ 17	DR
10 feet	4	NR	NR	NR
	5	NR	5 @ 35	6 @ 48
	6	6 @ 48	6 @ 41	6 @ 30
	7	6 @ 43	6 @ 28	6 @ 20
	8	6 @ 31	6 @ 20	DR
	9	6 @ 24	6 @ 15	DR
	10	6 @ 19	DR	DR

Chapter 4 - Foundations

8" Concrete Wall Reinforcement				
Wall Height	Unbalanced Backfill Height	Minimum Vertical Reinforcement		
		GW, GP, SW and SP soils	GM, GC, SM, SM-SC and ML	SC, ML-CL and inorganic CL soils
8 feet	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 37
	7	NR	6 @ 36	6 @ 35
	8	6 @ 41	6 @ 35	6 @ 26
9 feet	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 32
	8	6 @ 36	6 @ 32	6 @ 23
	9	6 @ 35	6 @ 25	6 @ 18
10 feet	4	NR	NR	NR
	5	NR	NR	NR
	6	NR	NR	6 @ 35
	7	NR	6 @ 35	6 @ 29
	8	6 @ 35	6 @ 29	6 @ 21
	9	6 @ 34	6 @ 22	6 @ 16
	10	6 @ 27	6 @ 17	6 @ 13

Wood Foundations (R401.1)

- Limited to two floors and a roof
- Maximum 50 feet between interior basement walls
- Seismic Design Category D0 , D1 or D2 shall be designed in accordance with accepted engineering practice

Wood Foundation Fasteners (R401.1)

- Exterior side plywood attachment must be stainless fasteners below grade
- Above grade may be stainless, bronze, hot dipped galvanized
- Electro galvanized nails and galvanized steel staples not allowed

Wood Foundation Studs (R401.1)

- Minimum 2X6, 16 inches on center
- Maximum 4' unbalanced backfill

Chapter 4 - Foundations

Drainage (R405.1)

- Foundation drainage required where enclosing habitable or usable space unless Group 1 soils
- Drain tiles, gravel, crushed stone, perf pipe installed at or below floor level
- Discharge to approved drainage system
- Pipe must be wrapped in filter fabric
- Crushed stone topped with filter fabric
- Crushed stone extends 1' beyond footing and 6" above the top of the footing
- Tiles or pipe on a 2" bed of washed gravel or crushed rock, covered by 6" of the same

Waterproofing (R406.1-2)

- All foundation walls that enclose interior space or floors below grade must be at least damp-proofed
- Foundations in areas of high water table or severe soil-water conditions must be waterproofed
- From finished grade to footing or 6" below basement floor

Ventilated Crawlspace (R408.2)

- Underfloor space must be ventilated or conditioned
- Minimum 1 square foot per 150 square feet of floor space
- Vapor retarder installed: 1 square foot per 1500 square feet of floor space
- Openings within 3 feet of each [external](#) corner of the [underfloor space](#)
- Openings must be screened
- [Operational louvers permitted](#)
- [Openings only required to provide cross ventilation where there is a vapor retarder](#)

Vapor Retarder Classes

- Class 1: 0.1 perms or less
 - Sheet polyethylene, unperforated aluminum foil
- Class II: 0.1 to 1 perms
 - Kraft faced fiberglass batts
- Class III: 1 to 10 perms
 - Latex or enamel paint

Mechanically Vented Crawlspace (R408.3)

- Class 1 vapor retarder, seams overlapped 6 inches and sealed, extends 6 inches up the stemwall
- One of the following:
 1. 1 CFM exhaust per 50 square feet of floor space, perimeter walls insulated
 2. 1 CFM conditioned air supplied per 50 square feet of floor space, perimeter walls insulated
 3. Underfloor space used as a plenum
 4. Dehumidification, [per manufacturer specs](#)
- [Alaska Energy Code: Applies to all inspected homes. Sealed vapor retarder on crawlspace floor required](#)
- [Wood foundation vapor retarder must be sealed at the bottom and not continuous to the crawlspace floor](#)
- [Crawlspaces with insulated walls cannot be vented to the outside \(crawlspace inside the thermal envelope\)](#)

Access (R408.4)

- Minimum 18" X 24" opening to underfloor areas
- Minimum 16" X 24" through perimeter walls

Chapter 5 - Floors

Grading (R502.1.1,4)

- All lumber must be graded
- Structural log members must be graded
- No “rough-cut”

Floor Joist Spans (R502.3.1,2)

- Sleeping rooms and stair-accessible attics = 30 PSF
- All other areas = 40 PSF

Joist Spans for SPF Lumber 30 PSF – Sleeping Rooms & Habitable Attics									
Spacing	Grade	Dead Load = 10 PSF				Dead Load = 20 PSF			
		2X6	2X8	2X10	2X12	2X6	2X8	2X10	2X12
16" o.c.	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-4
	#1	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	#2	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
24" o.c.	SS	9-2	12-1	15-5	18-9	9-2	12-1	15-0	17-5
	#1	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7
	#2	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7
	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0

Joist Spans for SPF Lumber 40 PSF – Residential Living Areas									
Spacing	Grade	Dead Load = 10 PSF				Dead Load = 20 PSF			
		2X6	2X8	2X10	2X12	2X6	2X8	2X10	2X12
16" o.c.	SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	#1	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
	#2	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
24" o.c.	SS	8-4	11-0	14-0	17-0	8-4	11-0	13-8	15-11
	#1	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	#2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1

Chapter 5 - Floors

Deflection

- 1/360 per code

Load Bearing Cantilevers (R502.3.3)

- Floor cannot exceed the depth of the joist
- Wall cantilevers for exterior bearing walls follow Table R502.3.3(1)

Cantilever Spans – Bearing Wall & Roof Only						
	50 PSF Snow Load			70 PSF Snow Load		
	RoofWidth			RoofWidth		
Member & Spacing	24'	32'	40'	24'	32'	40'
2X10 @ 16" o.c.	20"	-	-	-	-	-
2X10 @ 12" o.c.	26"	-	-	19"	-	-
2X12 @ 16" o.c.	29"	20"	-	23"	-	-
2X12 @ 12" o.c.	36"	27"	17"	31"	19"	-
3 to 1 backspan required See Irregular Building section 301.2.2.6 in seismic design categories D0-D2						

Balcony Cantilevers (R502.3.3)

- No roof or exterior wall load
- Balcony cantilevers follow Table R502.3.3(2)

Cantilever Spans for Exterior Balconies			
Member Size	Spacing	Maximum Cantilever Span	
		Ground Snow Load	
		50 PSF	70 PSF
2X10	16" o.c.	49"	42"
2X10	24" o.c.	40"	34"
2X12	16" o.c.	67"	57"
2X12	24" o.c.	54"	47"
2 to 1 backspan required			

Chapter 5 - Floors

Joists Under Bearing Partitions (R502.4)

- Must be of adequate size
- If separated for utilities, must be 2X blocked every 4'
- Cannot be offset more than the depth of the joists

Joist Bearing (R502.3.1,2)

- Minimum 1.5" bearing on wood or metal
- Minimum 3" bearing on concrete or masonry
- Minimum 3" lap over bearing support, or equivalent

Lateral Restraint (R502.7)

- Joists must be blocked or nailed to rim joist or adjoining stud at ends
- Must be blocked at intermediate bearing in seismic categories D0, D1, and D2

I Joist Lateral Restraint

- Must be blocked with bearing load above
- Must be blocked in seismic categories D0, D1, and D2
- I joist material required as blocking

Bridging (R502.7.1)

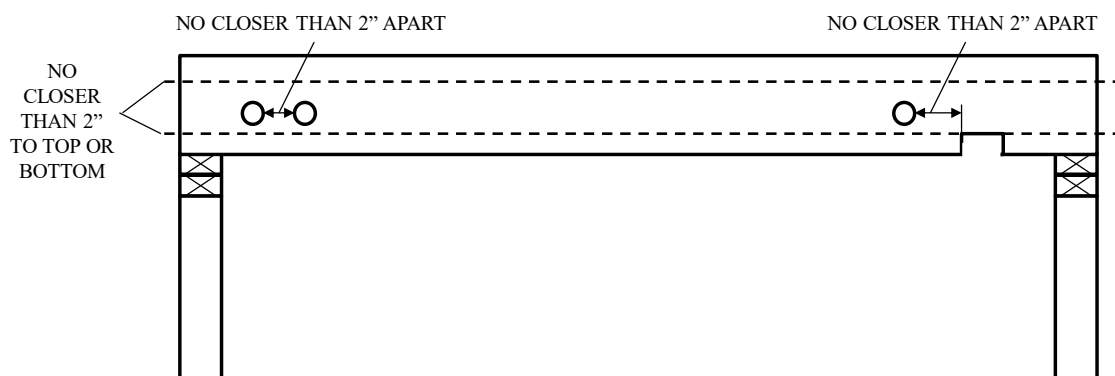
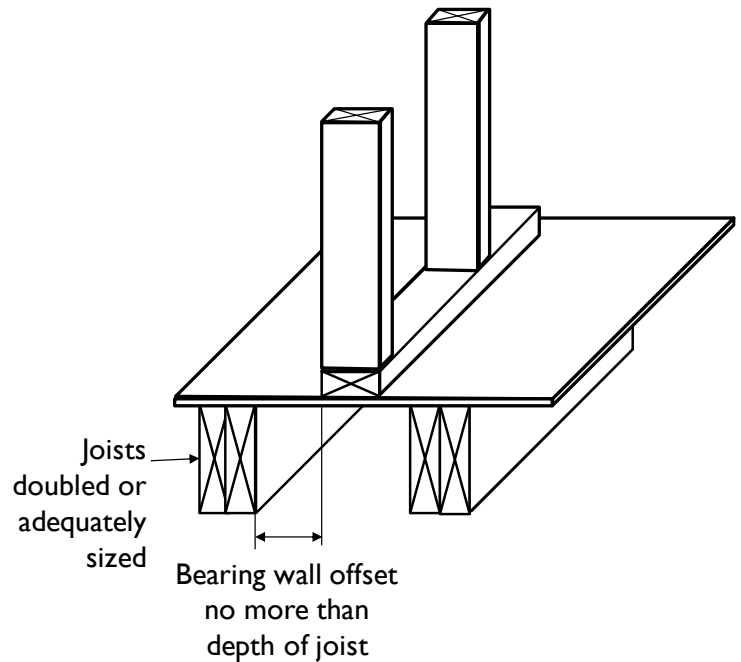
- Joists exceeding 2X12 must be blocked, bridged, or 1X3 strip nailed to the bottom every 8 feet

Cutting, Drilling, & Notching (R502.8)

- Dimensional lumber follow the code
- Engineered lumber follows manufacturer specifications

Drilling of Joists (R502.8.1)

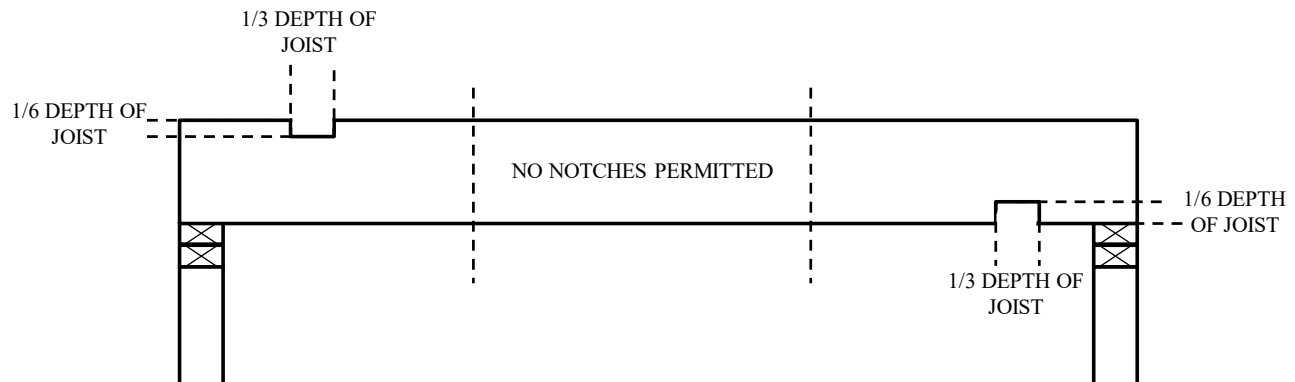
- Holes cannot be closer than 2" apart
- Holes cannot be closer than 2" to a notch
- No closer than 2" to top or bottom of joist
- Maximum of 1/3 joist depth



Chapter 5 - Floors

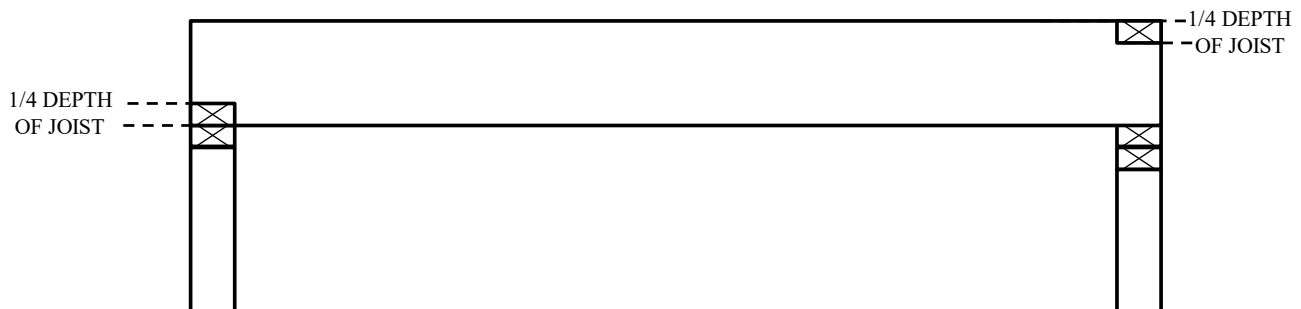
Notching of Joists - Center Cuts - (R502.8.1)

- No notches in the center 1/3 of the joist
- Length of notch 1/3 of joist depth
- Depth of notch 1/6 of joist depth



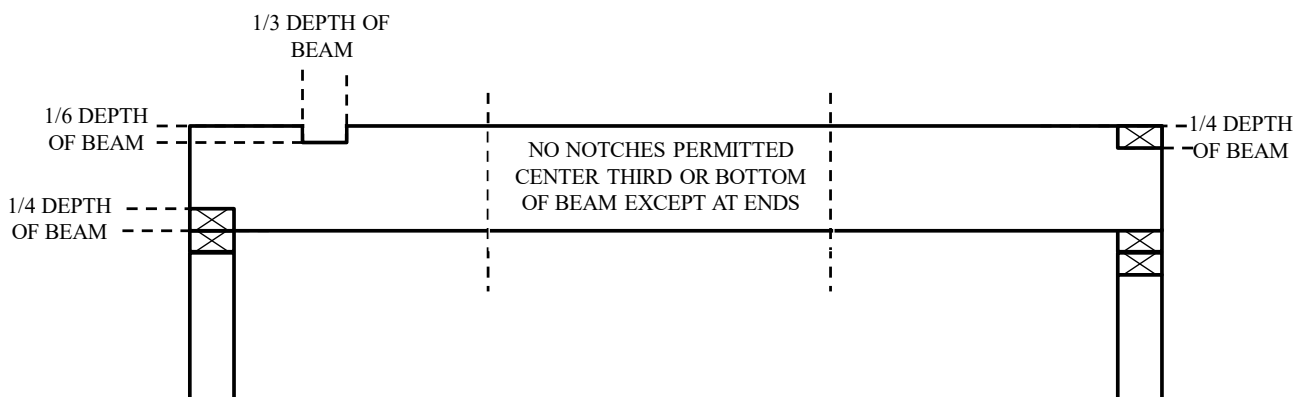
Notching of Joists - End Cuts (R502.8.1)

- 1/4 depth of the joist
- No wider than bearing support



Notching of Beams (R502.8.1)

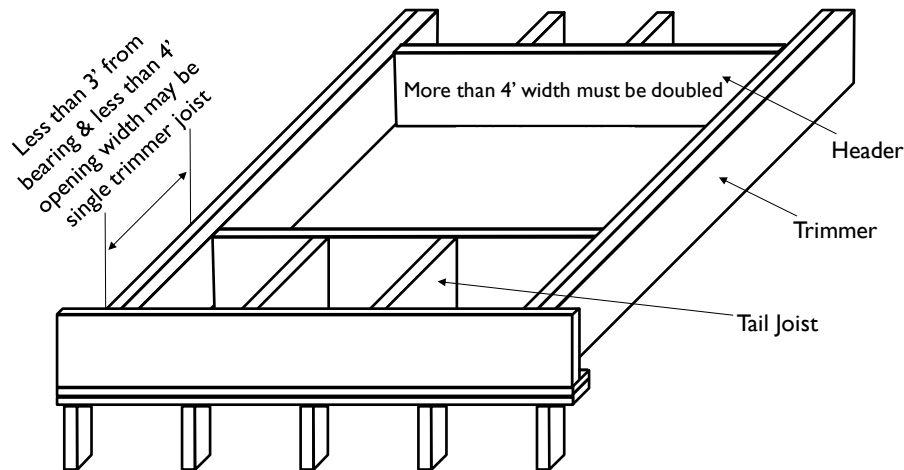
- 4X or greater thickness
- Top Side:
 - Length of notch 1/3 of joist depth
 - Depth of notch 1/6 of joist depth
- Bottom (tension) side:
 - Only notched at ends



Chapter 5 - Floors

Framing of Openings (R502.10)

- Floor openings must have double trimmers if opening is greater than 4 feet, or more than 3 feet from bearing



Concrete Floors on Ground (R506.1-2.3)

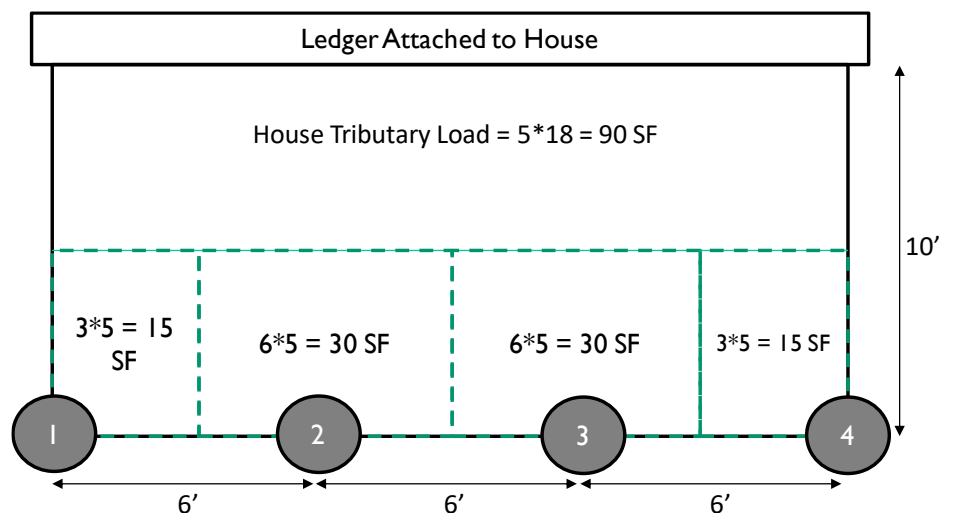
- Minimum 3.5" thickness
- 10 mil vapor retarder or equivalent
- Joints lapped 6 inches
- Vapor retarder not required:
 - Garage, utility building, other unheated accessory structures
 - Unheated storage rooms less than 70 SF
 - Carports
 - Driveways, walks, patios etc. not likely to be enclosed and heated later
 - Where approved by building official

Decks (R507.3.1-3)

- Footings sized per Table R507.3.1
- Footing extends below frost line
- Not less than 12" below undisturbed ground
- Not required for freestanding decks supported on grade
- Not required for decks on pre-cast concrete blocks, less than 200 SF, less than 20" above grade

Tributary Area (R507.3.1)

- How much each support carries



Chapter 5 - Floors

Deck Footing Sizes - (R507.4)

Deck Footing Sizes										
Snow Load	Tributary Area	1500 PSF Soils			2000 PSF Soils			3000 PSF Soils		
		Side of Square (inches)	Round (Diameter inches)	Thickness (inches)	Side of Square (inches)	Round (Diameter inches)	Thickness (inches)	Side of Square (inches)	Round (Diameter inches)	Thickness (inches)
50 PSF	5	7	8	6	7	8	6	7	8	6
	20	11	13	6	10	11	6	8	9	6
	40	15	17	6	13	15	6	11	13	6
	60	19	21	6	16	18	6	13	15	6
	80	21	24	8	19	21	6	15	17	6
	100	24	27	9	21	23	7	17	19	6
	120	26	30	10	23	26	8	19	21	6
	140	28	32	11	25	28	9	20	23	7
	160	30	34	12	26	30	10	21	24	8
70 PSF	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	13	6	9	10	6
	40	18	20	6	15	17	6	12	14	6
	60	21	24	8	19	21	6	15	17	6
	80	25	28	9	21	24	8	18	20	6
	100	28	31	11	24	27	9	20	22	7
	120	30	34	12	26	30	10	21	24	8
	140	33	37	13	28	32	11	23	26	9
	160	35	40	15	30	34	12	25	28	9

Deck Post Height (R507.4)

- Deck post height in accordance with Table R507.4

Deck Post Height										
Snow Load	Post Species	Post Size	Tributary Area, Square Feet							
			20	40	60	80	100	120	140	160
			Maximum Deck Post Height							
50 PSF	Doug Fir Hem Fir Spruce Pine Fir	4 × 4	14-0	12-1	9-8	8-2	7-1	6-2	5-3	4-2
		4 × 6	14-0	14-0	12-4	10-7	9-4	8-4	7-7	6-11
		6 × 6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	12-10
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
70 PSF	Doug Fir Hem Fir Spruce Pine Fir	4 × 4	14-0	10-1	7-11	6-6	5-3	3-7	NP	NP
		4 × 6	14-0	12-10	10-3	8-9	7-7	6-8	5-10	4-11
		6 × 6	14-0	14-0	14-0	14-0	14-0	12-2	9-9	5-9
		8 × 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

Chapter 5 - Floors

Deck Post to Footing Connection (R507.4.1)

- Manufactured connectors
- 12" embedment

Deck Beams (R507.5)

- Built up beams fastened with two rows 10d nails 16" o.c. each edge
- Beams may cantilever $\frac{1}{4}$ actual beam span
- Minimum 1.5" bearing on wood and 3" on concrete

Deck Beam Connections (R507.5.1)

- Attachments to resist horizontal and vertical loads
- Double $\frac{1}{2}$ " through bolts
- Washer under bolt head and nut
- Manufactured connector permitted

Deck Joist Span Tables (R507.6)

- [Follow span tables](#)
- Minimum 1.5" bearing on wood and 3" on concrete
- Joists on top of single ply beam or ledger - attached by mechanical connector
- Lateral resistance required (blocking or mechanical)

Maximum Deck Joist Spans												
Snow Load	Joist Species	Joist Size	Joist Span		Joist Back Span Maximum Cantilever							
			16" o.c.	24" o.c.	4	6	8	10	12	14	16	18
50 PSF	Doug Fir Hem Fir Spruce Pine Fir	2 × 6	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2 × 8	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2 × 10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2 × 12	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
70 PSF	Doug Fir Hem Fir Spruce Pine Fir	2 × 6	7-1	5-9	1-0	1-6	NP	NP	NP	NP	NP	NP
		2 × 8	9-5	7-8	1-0	1-6	2-0	2-1	NP	NP	NP	NP
		2 × 10	11-6	9-5	1-0	1-6	2-0	2-6	2-8	NP	NP	NP
		2 × 12	13-4	10-11	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP

Chapter 5 - Floors

Deck Joist Lateral Restraint - (R507.7.6.2)

- Hangers or blocking 60% of joist depth
- 3 – 10ds or 3 – 3" wood screws through rim joist.

Decking - (R507.7.6.2)

- Follow span tables
- Attached at each support with 2 threaded nails or screws

Wood Decking Joist Spacing				
Deck Material	Perpendicular to Joists		Diagonal to Joists	
	Single Span	Multiple Span	Single Span	Multiple Span
1.25" thick	12	16	8	12
2" thick	24	24	18	24

Deck Supports - (R507.8)

- Decks positively anchored to the primary structure
- Toenails not allowed
- Pressure treated 2X8 minimum ledger size
- Band joists minimum 2X or 1" LVL
- Hot dipped galvanized or stainless fasteners
- Table R507.9.1.3(1) Deck ledger connection

Ledger to Rim Joist Connection				
Snow Load	O.C. Spacing of Fasteners in Inches			
	Joist Span	1/2" Lag Scew + 1/2" Sheathing	1/2" Lag Bolt + 1/2" Sheathing	1/2" Lag Scew + 1" Sheathing
50 PSF	6	29	36	36
	8	22	36	35
	10	17	33	28
	12	14	27	23
	14	12	23	20
	16	11	20	17
	18	9	18	15
70 PSF	6	22	36	35
	8	16	31	26
	10	13	25	21
	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

Lateral Connection - (R507.9.2)

- Where required, minimum 2 holddown tension devices within 24" of each end of the deck
- Minimum 1500 lbs capacity each
- Or 4 holddown tension devices
- Minimum 750 lbs capacity each
- Code doesn't specify when required, refers to accepted engineering practice (commentary)

Exterior Guards (R507.10)

- Where guards are connected to the interior or exterior side of a deck joist or beam, the joist or beam shall be connected to the adjacent joists to prevent rotation of the joist or beam.
- Connections relying only on fasteners in end grain withdrawal are not permitted
- Guards mounted to the top of the deck must connect to deck framing or blocking
- 4X4 wood posts cannot be notched at the connection to the deck

Chapter 6 - Walls

Fastener Schedule (R602.3)

Changes to Fastening Schedule				
Item	Description	Number & Type of Fasteners	Spacing & Location	
1	Blocking between ceiling joists, rafters or trusses to top plate or other framing below	4-8d box (2½" × 0.113"); or 3-8d common (2½" × 0.131"); or 3-10d box (3" × 0.128"); or 3-3" × 0.131" nails	Toe nail	
	Blocking between rafters or truss not at the wall top plates, to rafter or truss	2-8d common (2½" × 0.131"); or 2-3" × 0.131" nails	Each end toe nail	
		2-16d common (3½" × 0.162"); or 3-3" × 0.131" nails	End nail	
	Flat blocking to truss and web filler	16d common (3½" × 0.162"); or 3" × 0.131" nails	6" o.c. face nail	
12	Adjacent full-height stud to end of header	4-16d box (3½" × 0.135"); or 3-16d common (3½" × 0.162"); or 4-10d box (3" × 0.128"); or 4-3" × 0.131" nails	End nail	
30	Bridging or blocking to joist, rafter or truss	2-10d box (3" × 0.128"); or 2-8d common (2½" × 0.131"); or 3" × 0.131" nails	Each end, toe nail	
Item	Description	Number & Type of Fasteners	Edge	Field
31	3/8" – 1/2"	6d common or deformed (2" × 0.113" × 0.266" head); or 2³/₈" × 0.113" × 0.266" head nail (subfloor, wall) ⁱ	6	6 ^f
		8d common (2½" × 0.131") nail (roof); or RSRS-01 (2³/₈" × 0.113") nail (roof) ^b	6	6 ^f
32	19/32" – 3/4"	8d common (2-2½" × 0.131") nail (subfloor, wall)	6	12
		8d common (2½" × 0.131") nail (roof); or RSRS-01; (2³/₈" × 0.113") nail (roof) ^b	6	6 ^f
		Deformed 2³/₈" × 0.113" × 0.266" head (wall or subfloor)	6	12
33	7/8" – 1¼"	10d common (3" × 0.148") nail; or (2½" × 0.131" × 0.281" head) deformed nail	6	12

Chapter 6 - Walls

Top Plates - (R603.2.3)

- Double top plate overlapped at corners
- Plate ends offset at least 24"
- Minimum 2X material
- Single top plate allowed if:
 - Plate ends tied with splice
 - Rafters or joists bear over studs

Drilling & Notching - Top Plate (R602.6.1)

- Notch in exterior or load bearing walls exceeds 50% of top plate width
- 1.5" wide metal tie extending 6" beyond each side of notch

Drilling & Notching - Exterior & Bearing Walls - (R602.6)

- Max notch 25% of stud width
- Max hole 40% of stud width
- Max hole 60% of stud width for no more than 2 studs in a row
- Holes must be more than 5/8" from stud edge
- Hole and notch cannot be in same cross-section

Drilling & Notching - Interior and Non Bearing Walls (R602.6)

- Max notch 40% of stud width
- Max hole 60% of stud width
- Holes must be more than 5/8" from stud edge
- Hole and notch cannot be in same cross-section

Full Height Studs At Headers (R602.7.5)

Number of Full Height Studs for Exterior Wall Headers		
Max Header Span	Ultimate Design Wind Speed & Exposure Category	
	< 140 mph, Exposure B or < 130 mph, Exposure C	≤ 115 mph, Exposure B
4	1	1
6	2	1
8	2	1
10	3	2
12	3	2
14	3	2
16	4	2
18	4	2

Chapter 7 - Wall Coverings

Vapor Retarders - (R702.7)

- Interior side of wall, or approved design
- Exceptions:
 - Basement walls
 - Below grade portion of any wall
 - Freezing will not damage

Water Resistive Barrier - (703.2)

- Barrier must be applied over studs or sheathing of all exterior walls
- Continuous to the top of the walls
- Terminated at penetrations and building appendages

Flashing at Exterior Windows & Doors - (703.2)

- Flashing must extend to the exterior wall finish
- Interior air sealing required
- Follow window or flashing specs
- Pan flashing required

Panel Siding - (703.5.2)

- 3/8" wood structural panel siding limited to 16" o.c.
- Alaska Amendment:
- Exterior type plywood siding with a grooved pattern shall not be installed horizontally and used as the weather resistant siding

Chapter 8 - Roof / Ceiling Construction

Roof Drainage - (R801.3)

- Expansive soils – gutters required, discharge 5 feet from foundation or to drain

Rafter Framing Details - (R802.3-4)

- Rafters not offset more than 1.5" from each other
- Ridge board minimum 1X material
- Ridge board depth at least the cut end of rafters

Rafter Connections - (R802.3)

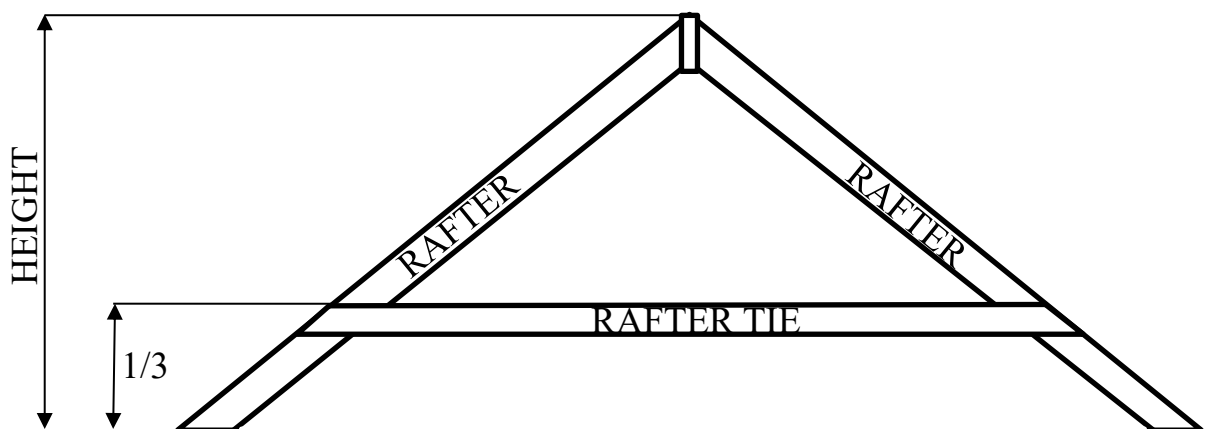
- Ceiling joists or rafter ties required
- Rafter ties minimum 2X4
- No ceiling joists or rafter ties, ridge must be supported by a beam or bearing wall

Rafter Supports - (R802.4.4)

- Less than 3/12 pitch – designed as beams

Rafter Span Adjustment - (R802.4.1(9))

Rafter Span Adjustment Factor	
Height Above Bearing	Rafter Span Adjustment Factor
1/3	67%
1/4	76%
1/5	83%
1/6	90%
1/7.5	100%



Example: When a rafter tie is 1/3 of the total height above the bearing point, the span is multiplied by 67%. A 10 foot span in the table becomes 6 feet 8 inches.

Chapter 8 - Roof / Ceiling Construction

Rafter Spans SPF Lumber 50 PSF – Ceiling Attached											
Spacing	Grade	Dead Load = 10 PSF					Dead Load = 20 PSF				
		2X4	2X6	2X8	2X10	2X12	2X4	2X6	2X8	2X10	2X12
16" o.c.	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-8	19-4
	#1	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	#2	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
24" o.c.	SS	5-8	8-10	11-8	14-8	17-1	5-8	8-10	11-2	13-7	15-9
	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Rafter Spans SPF Lumber 70 PSF – Ceiling Attached											
Spacing	Grade	Dead Load = 10 PSF					Dead Load = 20 PSF				
		2X4	2X6	2X8	2X10	2X12	2X4	2X6	2X8	2X10	2X12
16" o.c.	SS	5-9	9-1	11-11	15-3	18-1	5-9	9-1	11-11	14-8	17-1
	#1	5-8	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	#2	5-8	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
24" o.c.	SS	5-0	7-11	10-5	12-9	14-9	5-0	7-9	9-10	12-0	12-11
	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Chapter 8 - Roof / Ceiling Construction

Roof Framing Details - (R802.4.6)

- Ridge straps – 1.25" X 20 gage
- 3 – 10ds no closer than 2-3/8" from rafter end
- Gusset Plate/Collar Tie
- 1X4 , upper third, 48" o.c.

Roof Ventilation - (R806.1-3)

- Attic/rafter spaces that are ventilated
- Openings protected from rain and snow
- Openings must be screened
- 1/16 inch to 1/4 inch openings
- Minimum 1 SF of ventilation per 150 SF of area
- Minimum 1 in 300 SF if 40-50% of ventilation is in the upper portion of the attic
- Minimum 1" air space between insulation and roof sheathing

Attic Access - (R806.2)

- Access required where there is at least 30 SF of attic space with at least 30" headroom
- Minimum 22" X 30" opening

Chapter 9 - Roof Coverings

Ice Shield - (R905.1.2)

- In areas with a history of ice forming and causing water backup
- 2 layers of underlayment or self-adhering bitumen installed at eave
- Lowest point to 24" inside exterior wall line

Drip Edge - (R905.2.8.5)

- Drip edge required at all eaves and rakes for shingles
- Fastened 12" o.c.
- 2 inch overlap at joints
- Alaska Amendment
- Roofs with a slope equal or greater than four units vertical in 12 units horizontal (4:12) a full length fascia and/or a 1" by 2" continuous cedar block may be used as a drip edge

Roof Replacement - (R908.3.1.1)

- Old roof covering must be removed, unless:
- Specifically approved by manufacturer for that application
- Metal over wood shake permitted
- Roof coatings permitted
- Old roof covering must be removed if:
- Old roof covering is water soaked or deteriorated
- Existing roof is slate, clay, cement
- There are two or more applications of any type of existing roof coverings

Chapter 9 - Roof Coverings

