

Description

- Mid-career residential inspectors and plans examiners will find this seminar insightful as will designers looking for a review of high wind requirements for single family homes.
- With a focus on wood construction, this seminar dives into the details for designing and inspecting a home built to resist thunderstorm and hurricane winds.
- Minimum requirements for foundations, walls, roofs and floors are covered as well as a discussion of beyond code minimum options.

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Objectives

- Understand how wind is developed using the IRC.
- Explain how framing and nailing are different in high wind regions to construct a structurally safe dwelling.
- Describe which structural members require special consideration when designing for high winds.
- Identify structural members to design for high winds in a 2-story residential example.

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Outline
Overview
Building Planning and Construction
Loads and Load Path
Walls and Wall Coverings
Boof-Ceilings and Assemblies
Stoof-Ceilings and Assemblies
15 mph Winds, Exposure B
160 mph Winds, Exposure B

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Dwellings
Separate means of egress for each dwelling unit
1 exterior exit door
Egress travel distance not regulated
No size limit
2-family dwellings require fire-resistant separations



















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Climatic and Geographic Design Criteria
IRC adoption: jurisdiction completes table with data applicable























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Hurricanes

- Hurricanes = Typhoons = Cyclones
- Tropical cyclones are powered by heat from the sea
- They are products of a warm tropical ocean and a warm, moist
 atmosphere
- Wind and flood damage possible
- Additionally, remnants of hurricanes strike the Pacific Coast and move across the country as large storms

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| | Description | Number and size of nails | Spacing, location and method |
|--|--|---|--|
| | Stud to stud (not at braced wall panels) | 10d box (3" × 0.128") or 3" × 0.131" nails | 16" o.c. face nail |
| Wall Framing | Stud to stud and abutting studs at intersecting wall corners (at braced wall panels) | 16d box (3½* × 0.135*) or 3* × 0.131* nails | 12" o.c. face nail |
| Fastening | Built-up header (2" to 2" header with ½" spacer) | 16d box (3½* × 0.135*) | 12" o.c. each edge face nail |
| Schodulo | Continuous header to stud | 4 - 10d box (3" × 0.128") | Toe nail |
| Schedule | Top plate to top plate | 10d box (3" × 0.128") or 3" × 0.131" nails | 12" o.c. face nail |
| | Double top plate splice | 12 - 10d box (3" × 0.128") or 12 - 3" × 0.131" nails | Face nail on each side of end joint (minimum 24" lap) |
| | Bottom plate to joist, rim joist, band joist or blocking (not at braced wall panels) | 16d box (3½" × 0.135") or 3" × 0.131" nails | 12" o.c. face nail |
| | Bottom plate to joist, rim joist, band joist or blocking (at braced wall panel) | 3 - 16d box (3½" × 0.135") or 4 - 3" × 0.131" nails | 3 each 16" o.c. face nail 4 each 16" o.c. face nail |
| IRC | Top or bottom plate to stud | 3 - 10d box (3" × 0.128") or 3 - 3" × 0.131" nails | End nail |
| A VARIANT AND A VARIANTA AND A VARI | Top plates, laps at corners and intersections | 3 - 10d box (3" × 0.128") or 3 - 3" × 0.131" nails | Face nail |
| 8 | [Ref. excerpt from Table R602.3(1)] | | |
| | Wind and Single-Family I | Homes | 70 |

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| W | all Coverin | gS g Attachmer | nt | | | |
|-------|------------------|--------------------------|------------------------------|------------------------------|-------------|-------|
| | Cidia a | Nominal | Supp | ort for Siding/Fast | eners | |
| | Siding | (in.) | WSP | Foam | Studs | |
| | Fiber cement lap | 5/16 | 6d common | 6d common | 6d common | |
| | Vinyl | 0.035 | 0.12" dia. w/ 0.313" head | 0.12" dia. w/ 0.313" head | NP | |
| | Wood | Varies | 6d box | 6d box | 8d box | |
| Table | WSP (ext. grade) | 3/8 - 1/2 | 2" x 0.099" | 2.5" x 0.113" | 2" x 0.099" | |
| | | Wind and S | India Samilu Homor | | | enter |





Wall Coverings Alternate Siding Attachment Spacing Application Fasteners RS roofing nail 0.12" dia. 12" o.c. Attachment to WSP with max. 2" foam RS nail 0.148" dia. 15″ o.c. No. 6 screw 12" o.c. No. 8 screw 16" o.c. Table R703.3.3 IRC center

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| Roo | f Framing Fasten | ers | | |
|--------------------|---|-------------------------|-----------------------------|---------|
| | Description | Nails | Spacing/Location | |
| | Pofter or reaf truck to plate | 3-16d box or | 2 toe nails on one side and | |
| | Raiter of foor truss to plate | 3-10d common | 1 toe nail on opposite side | |
| | Roof rafters to ridge, valley | 4-16d | Toe nail | |
| | or hip rafters | 3-16d | End nail | |
| | Ceiling joists to plate | 3-8d common | Toe nail | |
| | Collar tie to rafter, face nail | 3-10d common | Face nail | |
| Table R602.3(1) | Rafter/ceiling joist heel joint connection | Table R802.5.2 | _ | |
| | | | | ■center |
| | Wind | and Single-Family Homes | | 93 |





| | | | Roof Live | Load (psf) | | Ground Sr | now Load (psf) | |
|-------------|------|---------|--|------------|----|------------------|----------------|----|
| | D-4 | Rafter | 2 | 20 | 3 | 0 | 5 | 0 |
| | | Spacing | | | | Roof span (feet) | | |
| | | (in.) | 28 | 36 | 28 | 36 | 28 | 36 |
| | | | 16d common nails per heel joint splice | | | | | |
| | | 12 | 8 | 10 | 8 | 11 | 12 | 15 |
| | 3:12 | 16 | 10 | 13 | 11 | 14 | 15 | 20 |
| | | 24 | 15 | 19 | 16 | 21 | 23 | 30 |
| | | 12 | 5 | 6 | 5 | 7 | 7 | 9 |
| | 5:12 | 16 | 6 | 8 | 7 | 9 | 9 | 12 |
| able | | 24 | 9 | 12 | 10 | 13 | 14 | 18 |
| R802.5.2(1) | | 12 | 4 | 5 | 4 | 5 | 5 | 7 |
| IDC | 7:12 | 16 | 5 | 6 | 5 | 6 | 7 | 9 |
| inc | | 24 | 7 | 9 | 7 | 9 | 10 | 13 |

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| Conn | ections BWP Connection | Requirements to R | oof Framing | |
|-------------|--|---|---|---------|
| | SDC | Distance (bottom of roof sheathing to top of plate) | Blocking | |
| | 0000000 | 9.25" or less | Not required, attach per R602.3(1) | |
| | SDC A, B, C | 9.25" to 15.25" | Per R602.10.8.2.2 Item 1 and Figure R602.10.8.2(1) | |
| | SDC D ₀ , D ₁ , D ₂ | 15.25" or less | Per R602.10.8.2 Item 2 and Figure R602.10.8.2(1) | |
| R602.10.8.2 | All SDCs | 15.25" to 48" | Per R602.10.8.2 Item 3 and Figure R602.10.8.2(2) or R602.10.8.2(3) or engineered design | |
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| | Earthquakes and Single-Family Homes | | | 100 |



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| WSP Nomina Thickness (in | Nail | Edge (in.) | Field (in.) |
|--|--|---|------------------------------|
| 3/8 - 1/2 | 8d common (2-1/2" × 0.131") nail (roof) RSRS-01 (2-3/8" × 0.113") nail (roof) | 6 | 6 ^f |
| 19/32 - 3/4 | 8d common (2-1/2" × 0.131") nail (roof) RSRS-01 (2-3/8" × 0.113") nail (roof) | 6 | 6 ^f |
| 7/8 - 1-1/4 | 10d common (3" × 0.148") nail (2-1/2" × 0.131 × 0.281" head) deformed nail | 6 | 12 |
| Footnote f. For w interr 4 inct Expos | ood structural panel roof sheathing attached to gable end r ediate supports within 48 inches of roof edges, and ridges, es on center where the uitimate design wind speed is great ure 8 or greater than 110 mph in Exposure C. | oof framing ar nails shall be : er than 130 m | nd to spaced at uph in |
| | Wind and Single-Family Homes | | |







Roof Sheathing – Gable Endwall Limits



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Full-Height Studs at Header Given Header <130 mph ≤115 mph Kitchen header span = 9' Span (ft) Exp C Exp B Wind = 115 mph 6 2 1 Exposure Category B 8 2 1 10 Header IRC Requires design including jack Two Full height (king) studs ^Ncenter

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 Braced Walls – WSP

 BWP Connections

 • Perpendicular framing

 • Table R602.3(1)

 Anchor bolts per R403.1.6

 • %*◊ ≤ ć' o.c.

















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WFCM Prescriptive - Wind Wall Design – C&C Loads **Roof and Wall Sheathing Suction Loads** Table 2.4 (For Sheathing and Sheathing Attachment) 700-yr. Wind Speed 3-second gust (mph) 140 150 160 100 105 110 115 95 120 130 Sheathing L Zone 2 (ove IRC cente

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