2018 IRC: **Accessory Structures, Decks, Carports & Patio Covers**

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**Course Intent**

- Help building officials and plans examiners to understand how to quickly perform a review of these projects at the counter.
- Clarify requirements that building inspectors and contractors should be looking for in the field.

**Seminar Format**

1. Accessory Structures
2. Residential Decks
3. Carports & Patio Covers

**PART 1**

Accessory Structures

IRC R202: "A structure that is accessory to and incidental to that of the dwelling(s) and that is located on the same lot."
Items Not Covered

- We will not be discussing…

Items to Cover

- A. Conventional Limits
- B. Wall Bracing (Chapter 6)
- C. Examples
- D. Load Path
- E. Handout

A. Conventional Limits

- Prescriptive (i.e. “Cookbook”) method.
- Provided in IRC, IBC Section 2308, WFCM, ICC 400 & AISI S230
- Several limitations, especially in high-seismic or high-wind regions

Wind Limitations (R301.2.1.1):

- Figure R301.2(5)B → > 140mph
A. Conventional Limits

Wind Limitations (cont.):
- Must be designed in accordance with the WFCM, ICC-600, AISI S230, ASCE-7, or the IBC.

Snow Loads (R301.2.3):
- Ground Snow Load (Pg) ≤ 70psf

Seismic Provisions (R301.2.2):
- Applies to Seismic Design Categories D0, D1, & D2.
- Also applies to townhomes in SDC ‘C’.
- SDC ‘E’ shall comply with the IBC.

Other Limitations:
- Floodplain Construction (R301.2.4)
- Weight limitations for concrete, masonry & metal stud
- Irregular Buildings (R301.2.2.2.5)
- Story Height (R301.3): 11'-7” – light-framed
  - In SDC ‘D’ or greater…
    - ≤ 3 stories
    - ≤ 2 stories if Structurally Insulated Panels (SIP)
    - Anchored masonry veneer (R702.1 and R703)
    - Masonry chimneys (Chapter 10)
A. Conventional Limits

- **Weights of Materials:**
  - Roofs ≤ 15psf
    - (*25psf with adjustment*)
  - Floors ≤ 10psf
  - Exterior Walls ≤ 15psf
    - (*Veneer per R703*)
  - Interior Walls ≤ 10psf

- **Live Loads (R301.5):**

<table>
<thead>
<tr>
<th>USE</th>
<th>LIVE LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninhabitable attics without storage1</td>
<td>10</td>
</tr>
<tr>
<td>Uninhabitable attics with limited storage1</td>
<td>20</td>
</tr>
<tr>
<td>Habitable attics and attics served with fixed stairs</td>
<td>30</td>
</tr>
<tr>
<td>Balconies (exterior) and decks1</td>
<td>40</td>
</tr>
<tr>
<td>Fire escapes</td>
<td>40</td>
</tr>
<tr>
<td>Guards and handrails4</td>
<td>200</td>
</tr>
<tr>
<td>Guard in-fill components5</td>
<td>50</td>
</tr>
<tr>
<td>Passenger vehicle garages6</td>
<td>50</td>
</tr>
<tr>
<td>Rooms other than sleeping rooms</td>
<td>40</td>
</tr>
<tr>
<td>Sleeping rooms</td>
<td>30</td>
</tr>
<tr>
<td>Stairs</td>
<td>60</td>
</tr>
</tbody>
</table>

---

Irregular (R301.2.2.2.5)

- **Item #1: Out-of-plane offsets**
Irregular (R301.2.2.2.5)

- Item #2: Floors or roofs without lateral support on all sides.

Irregular (R301.2.2.2.5)

- Item #3: End of braced wall segment occurring more than 1-foot over an opening below.

Irregular (R301.2.2.2.5)

- Item #4: Diaphragm openings exceeding either 12-feet or 50% of the least floor/roof dimension.

Irregular (R301.2.2.2.5)

- Item #5: Floor levels with vertical offsets.
  - Exceptions:
    - Framing must be supported directly by continuous foundations at the perimeter.
    - Floor framing must be lapped or tied together as required by R502.6.1. (i.e. 3" lap and (3)10d face nails, or equivalent)
**Irregular (R301.2.2.2.5)**

- **Item #6**: Braced wall lines that do not occur in two perpendicular directions.

![Regular and Irregular Shapes](image)

**Story Height**

**R301.3: Limitations for Conventional Const.**

- Wood wall framing: **11'-7"**
- Cold formed steel: **11'-7"**
  - **Stud height < 10'-0"**
- Masonry Walls: **13'-7"**
  - **12'-0" Bearing wall height**
  - **+ 8'-0" for gable end walls**
- Insulated concrete forms: **11'-7" (10'-0" Walls)**
- Structural Insulated Panel (SIP) Wall: **11'-7"**
  - **Wall height 10'-0"**

**Engineered Design (R301.1.3):**

- "When a building of otherwise conventional construction contains structural elements exceeding the limits of… (the IRC), these elements shall be designed in accordance with accepted engineering practice."

![Engineered Design](image)
B. Wall Bracing

- Terminology:
  - Wall Bracing
  - Braced Wall Line (BWL)
  - Braced Wall Panel (BWP)
  - Length
  - Spacing

- BWL Length = **the distance between its ends**
  - “The end of a BWL shall be the intersection with a perpendicular BWL, an angled BWL or an exterior wall”

- BWL Spacing:
  - Wind (< 110mph) ≤ 60-feet
  - SDC A – C ➔ Use Wind Bracing
  - SDC D ≤ 25-feet

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**B. Wall Bracing**

**Exception:**
- Spacing can be increased to **35-feet** to accommodate one single room not exceeding **900ft²**.

**B. Wall Bracing**

**Offsets along a BWL (R602.10.1.2.):**
- Up to **4-feet** on either side of BWL

**B. Wall Bracing**

**Angled Walls (R602.10.1.4):**
- Maximum diagonal length of 8-feet
- If > 8-feet, shall be considered a separate BWL

**B. Wall Bracing**

**Braced Wall Lines (cont.):**
B. Wall Bracing

- Braced Wall Lines (R602.10.1):
  - BWL Spacing:

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>CONDITION</th>
<th>BUILDING TYPE</th>
<th>MINIMUM SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>Ultimate design wind speed 70 mph to 110 mph</td>
<td>Detached, townhouse</td>
<td>60 feet</td>
</tr>
<tr>
<td>Seismic</td>
<td></td>
<td>Use wind bracing</td>
<td></td>
</tr>
<tr>
<td>SDC A - C</td>
<td>Detached</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDC A - B</td>
<td>Townhouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDC C</td>
<td>Detached, townhouse</td>
<td>55 feet</td>
<td></td>
</tr>
<tr>
<td>SDC D₁, D₂, D₃</td>
<td>Detached, townhouse, one and two story only</td>
<td>25 feet</td>
<td></td>
</tr>
<tr>
<td>SDC D₁, D₂, D₃</td>
<td>Detached, townhouse</td>
<td>25 feet</td>
<td></td>
</tr>
</tbody>
</table>

- Braced Wall Panels (R602.10.2):
  - Location:
    - w/in 10-feet from each end
    - 2-foot panel on each side
    - 1,800# holdown
    - Spacing ≤ 20-feet

- SDC D: BWP Location (R602.10.2.2.1):
  - Required at each end of a BWL
  - Option #1: Continuously braced wall panel 1,800# holdown
  - Option #2: BWP of any length or one 4-foot BWP
  - Option #3: BWL ≤ 16-feet → 2 BWP of any length or one 4-foot BWP
  - BWL > 16-feet → 2 BWP
### B. Wall Bracing

- Required Length of Bracing (R602.10.3):
  - Min. Length of BWP on each BWL
- Only Table R602.10.3(1) **Wind**
  - SDC A and B - All structures
  - SDC C - Detached structures (acc. or 1 family)
  - Modified by Table R602.10.3(2)
- Both Table R602.10.3(1) and R602.10.3(3)
  - SDC C - Townhouses **Wind and Seismic**
  - SDC D - All structures
  - Modified by Table R602.10.3(2) and R602.10.3(4)

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#### Table R602.10.3

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.4

<table>
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<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.5

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.6

<table>
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<th>Required Length of Bracing</th>
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<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.7

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.8

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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#### Table R602.10.9

<table>
<thead>
<tr>
<th>Category</th>
<th>Required Length of Bracing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>1.5</td>
</tr>
</tbody>
</table>
### B. Wall Bracing

#### Example

- **Assume a BWL Length of 70 ft or 75 ft**

<table>
<thead>
<tr>
<th>BWL Length</th>
<th>Wall Bracing Requirements</th>
<th>Category</th>
<th>Load Factor</th>
<th>Minimum</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWL Length</td>
<td>Wall Bracing Type</td>
<td>BWL</td>
<td>Factor</td>
<td>Length</td>
<td>Length</td>
</tr>
<tr>
<td>70 ft</td>
<td>Force-Resisting</td>
<td>0.70</td>
<td>2.5</td>
<td>10 ft</td>
<td>25 ft</td>
</tr>
<tr>
<td>75 ft</td>
<td>Force-Resisting</td>
<td>0.75</td>
<td>2.7</td>
<td>10 ft</td>
<td>25 ft</td>
</tr>
</tbody>
</table>

#### Table: Wall Bracing Requirements Based on Seismic Design Category

<table>
<thead>
<tr>
<th>Design Category</th>
<th>Wall Location</th>
<th>BWL Length</th>
<th>Load Factor</th>
<th>Minimum</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>Force-Resisting</td>
<td>0.50</td>
<td>1.5</td>
<td>20 ft</td>
<td>40 ft</td>
</tr>
</tbody>
</table>

### B. Wall Bracing

- **C. (Nonfollower only)**

- **Example**

  - **Assume a BWL Length of 70 ft or 75 ft**

<table>
<thead>
<tr>
<th>BWL Length</th>
<th>Wall Bracing Requirements</th>
<th>Category</th>
<th>Load Factor</th>
<th>Minimum</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>BWL Length</td>
<td>Wall Bracing Type</td>
<td>BWL</td>
<td>Factor</td>
<td>Length</td>
<td>Length</td>
</tr>
<tr>
<td>70 ft</td>
<td>Force-Resisting</td>
<td>0.70</td>
<td>2.5</td>
<td>10 ft</td>
<td>25 ft</td>
</tr>
<tr>
<td>75 ft</td>
<td>Force-Resisting</td>
<td>0.75</td>
<td>2.7</td>
<td>10 ft</td>
<td>25 ft</td>
</tr>
</tbody>
</table>

#### Table: Wall Bracing Requirements Based on Seismic Design Category

<table>
<thead>
<tr>
<th>Design Category</th>
<th>Wall Location</th>
<th>BWL Length</th>
<th>Load Factor</th>
<th>Minimum</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>Force-Resisting</td>
<td>0.50</td>
<td>1.5</td>
<td>20 ft</td>
<td>40 ft</td>
</tr>
</tbody>
</table>

---

By: Todd Snider, S.E., C.B.O.
B. Wall Bracing

Braced Wall Panels (R602.10.4):
- Intermittent Bracing (12 methods)
- Continuous Sheathing (4 methods)

Intermittent Bracing (Table R602.10.4):

<table>
<thead>
<tr>
<th>METHOD</th>
<th>MATERIAL</th>
<th>MINIMUM THICKNESS</th>
<th>FIGURE</th>
<th>CONNECTION CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIR</td>
<td>Light-duty nailing</td>
<td>1 in. or approved nail spacing and 1½” or 3” nails</td>
<td>Wood</td>
<td>Wood-per-milboard and framing laths</td>
</tr>
<tr>
<td>DMR</td>
<td>Double-headed nails</td>
<td>1½” or 3”</td>
<td>Wood</td>
<td>Wood-per-milboard and framing laths</td>
</tr>
<tr>
<td>VWP</td>
<td>Wood structural panel</td>
<td>See Section R602.10.4</td>
<td>Wood</td>
<td>Wood-per-milboard and framing laths</td>
</tr>
<tr>
<td>WWP</td>
<td>Wood/Steel Stud Wall Panel with Masonry Veneer</td>
<td>See Section R602.10.4</td>
<td>Wood</td>
<td>Wood-per-milboard and framing laths</td>
</tr>
</tbody>
</table>
B. Wall Bracing

IRC R602.10.6.1- Construction Methods

Requirements for most methods can easily be determined from Table R602.10.4. Some methods are more detailed and are specifically highlighted in the code with construction details.

IRC R602.10.6.1- Construction Methods

- Continuous Sheathing (Table R602.10.4):
  - Mixing Construction Methods
    - Mixing Continuous and Intermittent Methods
    - Mixing different Intermittent Methods
    - Mixing different Continuous Methods

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IRC 602.10.4.1- Mixing Construction Methods

- Mixing (R602.10.4.1):
  - From story to story → Any method
  - From BWL to BWL → Intermittent only
    - Between methods for Accessory Structures SDC A-C
  - Not allowed within a BWL (SDC ‘D’, or above)
B. Wall Bracing

- Braced Wall Panels (R602.10.5):
  - Min. Length:

<table>
<thead>
<tr>
<th>METHOD (See Table R602.10.4)</th>
<th>UMINIMUM LENGTH (inches)</th>
<th>CONTRIBUTING LENGTH (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9 feet</td>
<td>9 feet</td>
</tr>
<tr>
<td>DBR, WSP, SEF, PS, PCP, RS, BV, WSP</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>GB</td>
<td>48</td>
<td>60</td>
</tr>
<tr>
<td>L/F</td>
<td>55</td>
<td>62</td>
</tr>
<tr>
<td>AFW</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Braced Wall Panels (cont.):

<table>
<thead>
<tr>
<th>REQUIREMENTS AMONG BUILDING ENVELOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

- Required Bracing (R602.10.3):
  - Each wall line must be checked for wind & seismic
B. Wall Bracing

8 Steps to Verifying Bracing:

- What bracing method is being used?
- Braced length requirement – Wind
- Apply wind adjustment factors.
- Braced length requirement – Seismic
- Apply seismic adjustment factors.
- What braced wall length controls? (wind or seismic)
- BWL locations & spacing
- BWP locations & spacing

Example #1 – Double Garage

Given:
- 20’x20’ footprint
- 8’ wall height
- 4:12 roof pitch
- Mfr. Trusses
- WSP
- Wind: 115mph, Exposure ‘B’
- SDC ‘D2’

Step 1:
- What bracing method is being used?

Step 2:
- Braced length requirement – Wind

---

B. Wall Bracing

Step 3: Apply Wind Adjustment Factors

- Adjusted Braced Wall Length for Wind:
  \[ LW = 3.5 \times 1.0 \times 0.7 \times 0.9 \times 1.4 = 3.1 / BWL \]

Step 3: Apply Wind Adjustment Factors (cont.)

Exp. B Story Height

No Gypsum Board

Exp. Height

No Lines

Eave-to-Ridge Height

Step 4: Braced length requirement - Seismic

<table>
<thead>
<tr>
<th>Story Location</th>
<th>Wall Length (Feet)</th>
<th>Method LIM</th>
<th>Method GIC</th>
<th>Method Min. PFP</th>
<th>Method Max. PFP</th>
<th>Method Max. WSP</th>
<th>Method Max. WSP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>NP</td>
<td>12.0</td>
<td>12.0</td>
<td>5.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>40</td>
<td>NP</td>
<td>16.0</td>
<td>16.0</td>
<td>10.0</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>50</td>
<td>NP</td>
<td>20.0</td>
<td>20.0</td>
<td>15.0</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
</tr>
</tbody>
</table>

International Code Council, 2018 IRC©, Table R602.10.3(2)
B. Wall Bracing

Step 5: Apply Seismic Adjustment Factors

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>SEASONAL FACTOR</th>
<th>narrative story</th>
<th>SEASONAL FACTOR</th>
<th>table R602.10.3(4) by this factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Story height &gt; 10 ft</td>
<td>Any story</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Building height</td>
<td>Any story</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Building with base less than 18 in.</td>
<td>Any story</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Wall deadload</td>
<td>Any story</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Roof or eave</td>
<td>2- or 3-story building</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Assumes Soil Site Class ‘D’

Example:
- Old Main – Utah State University
  - Site Class ‘D’: $S_{DS} = 0.690g$
  - Site Class ‘C’: $S_{DS} = 0.629g$
  - Reduction Factor = 0.69/0.629 = 0.91
B. Wall Bracing

- **Step 5:** Apply Seismic Adjustment Factors (cont.)
  - Adjusted Braced Wall Length for Seismic:
    - \( LS = 5.0' \times 1.0 \times 1.0 \times 1.0 \times 1.0 \times 1.5 \times 1.0 \times 1.0 = 7.5'/BWL \)

- **Step 6:** What Bracing Length Controls?
  - Wind: Adjusted Length = 3.1'/BWL
  - Seismic: Adjusted Length = 7.5'/BWL
  - \( \rightarrow 7.5'/BWL \) Controls

---

Example #1 – Double Garage

- The last two steps (#7 & #8) are to verify the locations of the braced walls and their spacing.

- **Step 7:** BWL Locations & Spacing
- **Step 8:** BWP Locations & Spacing
B. Wall Bracing

- Portal Frame with Hold-downs (PFH)

Example #1 – Double Garage
- Does this work using the WSP method?
- Can it work using the CS-WSP method?

Example #2 – Simpson
- The Kimball Shed
- Simpson’s “Wall-Bracing Length Calculator”
  www.strongtie.com/webapps/bracedwall/

Example #2 – Simpson
- Wall-Bracing Length Calculator
- www.strongtie.com/webapps/bracedwall/
Example #2 – Simpson

Example #2 – Simpson

Example #2 – Simpson

Example #3 – APA

APA’s calculator → great for designer’s
www.apawood.org/calculator
Example #3 – APA

D. Load Path

- Braced Wall Connections (R602.10.8):
  - Framing perpendicular to BWL

- Braced Wall Connections (cont.):
  - Framing parallel to BWL
D. Load Path

- **Braced Wall Connections (cont.)**
  - Sole plate anchorage:
    - ½"Ø anchor bolts having 7” minimum embedment
    - Two minimum per plate
    - Place within 12” of end but not closer than 7db
    - 3”x3”x0.229” plate washers at braced wall lines
  - Top plate splice → (8) 16d common nails on each side

- **Braced Wall Connections (cont.)**
  - Eave Blocking:
    - Where d ≤ 15-1/4”

![Diagram of eave blocking](image)

- **Fastening - Table R602.3(1):**
  - #1: Blocking to top plate, toe nail (3-10d)
  - #6: Rafter or roof truss to plate, toe nail (3-16d)
  - #8: Built-up studs, face nail (10d @ 16”o.c.)
  - #9: Wall corners, face nail (16d @ 12”o.c.)

![Table of fastening methods](image)
D. Load Path

- Footings/Foundations:
  - Monolithic Footings (R403.1.3.3)
  - 600ft² max. & 10-feet max. eave height (R403.1.4.1)

E. Handout

- Limitations:
  - This handout is provided as an alternative to providing an engineered design for building department approval. The building department takes no responsibility for the design included herein. If the owner wishes to use this handout, they claim full liability.
  - This handout is meant for residential accessory structures only. Said structures are not to exceed 600 square feet and are limited to one-story. The maximum width/length shall be no more than 30-feet. If greater than 20-feet, manufactured trusses must be used in lieu of rafters. The following maximum loads are considered: 50psf ground snow load, 20psf roof dead load, and 20psf attic live load.

- Limitations (cont.):
  - The design laid out in this handout assumes a worst-case ultimate design wind speed of 140mph and a SDC D2. If higher wind or seismic loads exist this handout should not be used.

- Review Handout
PART 2
Residential Decks

Significant changes in the 2018 IRC

Decks (R507.1):
Wood-frame decks shall be in accordance with this section or Section R301 for materials and conditions not prescribed herein. 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. For decks using materials and conditions not prescribed in this section, refer to Section R301.

Decks (R507.8):
- Supported by exterior walls
- Anchored for vertical and lateral loads

No toenails or nails subject to withdrawal
- Where connection “cannot be verified during inspection, decks shall be self-supporting”
- Cantilevered portions shall be designed to resist uplift from full live load specified in Table R301.5.

Deck Ledger to Band Joist – Vertical (R507.9):
- Ledger:
  - Min. 2x8, naturally durable or pressure treated
  - Shall not be supported on veneer
  - Shall not support concentrated loads (prescriptive)
- Band Joist:
  - Min. 2x solid sawn or 1x9.5 LVL
  - Fully supported by a wall or sill plate below
- Fasteners:
  - Hot-dipped galvanized or stainless steel
  - Per Tables R507.9.1.3(1 & 2) and Figures R507.9.1.32.1 (1 & 2).

Deck Ledger to Band Joist – Vertical (cont.):

<table>
<thead>
<tr>
<th>CONNECTION DETAILS</th>
<th>D and less</th>
<th>2&quot; to 3&quot;</th>
<th>3&quot; to 4&quot;</th>
<th>4&quot; to 5&quot;</th>
<th>5&quot; to 6&quot;</th>
<th>6&quot; to 8&quot;</th>
<th>8&quot; to 12&quot;</th>
<th>Greater than 12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ledger diameter lag screw with 0.5&quot; minimum spacing</td>
<td>90</td>
<td>23</td>
<td>18</td>
<td>15</td>
<td>15</td>
<td>11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Ledger diameter lag screw with 0.75&quot; minimum spacing</td>
<td>90</td>
<td>36</td>
<td>34</td>
<td>29</td>
<td>24</td>
<td>21</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Ledger diameter lag screw with 1&quot; minimum spacing</td>
<td>90</td>
<td>36</td>
<td>34</td>
<td>29</td>
<td>24</td>
<td>21</td>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

- Ledger shall be hilled in accordance with Figure R507.9 to prevent water from contacting the lower band joist.
- Ledger shall not be supported in conjunction with low load.
- The top of the lag screw shall fully extend beyond the inner face of the band joist.
- Fasteners shall be fastened in accordance with the manufacturer’s recommendations.

International Code Council, 2018 IRC©, Table R507.9.1.3(1)

Deck Ledger to Band Joist – Vertical (cont.):

<table>
<thead>
<tr>
<th>PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS</th>
<th>MEDIUM END AND EDGE DISTANCES AND SPACINGS BETWEEN ROWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP ROW</td>
<td>BUTTON ROW</td>
</tr>
<tr>
<td>Ledger</td>
<td>2 inches</td>
</tr>
<tr>
<td>Band Joist</td>
<td>2 inches</td>
</tr>
<tr>
<td>Band Joist</td>
<td>2 inches</td>
</tr>
</tbody>
</table>

- Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.8.1.3(1).
- Fasteners shall be installed in accordance with the manufacturer’s recommendations.
- The maximum distance between rows of lag screws or bolts in the top edge of the ledger shall be in accordance with Figure R507.8.1.3(1).

International Code Council, 2018 IRC©, Table R507.8.1.3(2)
Deck Lateral Load Connection (R507.9.2):

- Option #1:
  - Deck Construction
  - 1,500# Min. 2 locations, not more than 24” from end.

Preservative-Treated (R507.2.1 & R317):

- Lumber reduction for incised lumber
- Fasteners shall be galvanized or stainless steel
- Required unless impervious floor covering

Plastic Composite Materials (R507.2.2):

- Deck boards, stair treads, guards and handrails
- Shall be labeled showing compliance w/ ASTM D 7032
- Labels/packaging lists maximum spans
- Flame Spread Index (FSI) < 200
- Decay and termite resistant
- Installation per Mfr instructions
Footings (R507.3):
- Sized to carry loads to ground
- Depth per R403.1.4
  - Exception: Free-standing with joists supported on grade

Footings (cont.):

Posts (R507.4):
- Single-level decks supporting beams sized per R507.5

Deck Post to Footing (R507.4.1):
- Restrained to prevent lateral displacement
  - Per MFR connectors, or...
  - 12-inches embedment in concrete or surrounding soils
Deck Construction

- **Deck Beams (R507.5):**
  - Fasten plies w/ two rows of 10d at 16”o.c. each edge
  - Max. cantilever ≤ ¼ actual adjacent beam span

- **Deck Construction**
  - **Deck Post to Deck Beam (R507.5.1):**
    - Attached per Figures R507.5.1 (1 & 2), or...
    - Other means to resist lateral displacement.
    - All bolts to have washers under head and nut.

- **Deck Joists (R507.6):**
  - Max. cantilever ≤ ¼ actual adjacent joist span

- **Deck Construction**
  - **Deck Joist Bearing (R507.6.1):**
    - Ends shall have ≥ 1.5” bearing
    - Joists into ledger or beam shall use joist hangers

---

**Table R5.5**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SIZE</th>
<th>DECK BEAM SPAN LENGTH (R507.5) (Feet - Inches)</th>
<th>DECK POST SPANS LESS THAN OR EQUAL TO (Feet)</th>
<th>DECK POST SPANS GREATER THAN (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1x) 12 16 18 (2x) 24 30 (3x) 36 42 (4x) 48</td>
<td>(1x) 12 16 18 (2x) 24 30 (3x) 36 42 (4x) 48</td>
<td>(1x) 12 16 18 (2x) 24 30 (3x) 36 42 (4x) 48</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2 x 6</td>
<td>0.94 1.3 1.5</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2 x 8</td>
<td>1.3 1.7 1.9</td>
<td>1.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2 x 10</td>
<td>1.9 2.3 2.5</td>
<td>1.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2 x 12</td>
<td>2.5 3.3 3.9</td>
<td>2.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Douglas fir-larch, balsam fir, western red cedar, purple heart (ck)*</td>
<td>2 x 6</td>
<td>0.8 1.2 1.5</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Douglas fir-larch, balsam fir, western red cedar, purple heart (ck)*</td>
<td>2 x 8</td>
<td>1.2 1.8 2.1</td>
<td>1.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Douglas fir-larch, balsam fir, western red cedar, purple heart (ck)*</td>
<td>2 x 10</td>
<td>1.8 2.7 3.5</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Douglas fir-larch, balsam fir, western red cedar, purple heart (ck)*</td>
<td>2 x 12</td>
<td>2.4 3.5 4.5</td>
<td>3.5</td>
<td>5.6</td>
</tr>
<tr>
<td>Redwood, western cedar, California walnut (ck)*, cedro rouge</td>
<td>2 x 6</td>
<td>0.8 1.2 1.5</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Redwood, western cedar, California walnut (ck)*, cedro rouge</td>
<td>2 x 8</td>
<td>1.2 1.8 2.1</td>
<td>1.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Redwood, western cedar, California walnut (ck)*, cedro rouge</td>
<td>2 x 10</td>
<td>1.8 2.7 3.5</td>
<td>2.5</td>
<td>3.9</td>
</tr>
<tr>
<td>Redwood, western cedar, California walnut (ck)*, cedro rouge</td>
<td>2 x 12</td>
<td>2.4 3.5 4.5</td>
<td>3.5</td>
<td>5.6</td>
</tr>
</tbody>
</table>
Deck Construction

- **Lateral Restraint (R507.6.2):**
  - Restraint at joist ends and bearing

- **Decking (R507.7):**
  - Not less than (2)8d threaded nails or (2)#8 wood screws

---

**Handrails and Guards:**

- Must support...
  - 50psf applied in any direction
  - 200# concentrated load at any point
- Virginia Tech conducted significant testing showing that the several common connections of guards to the band joist are not adequate.

---

**Deck Construction**

- Virginia Tech conducted significant testing showing that the several common connections of guards to the band joist are not adequate.
**Deck Construction**

- **Figure 26. Guard Post to Rim Joint Example**
  - Minimum 2-1/2" diameter thru-bolts and washers
  - 2-1/2" min. and 5" max.

- **SECTION**
- **PLAN VIEWS**

**DCA-6:**
- Prescriptive Residential Wood Deck Construction Guide
- 44 pages
- One-page handout:

**PART 3**

**Carports & Patio Covers**

**Should We Be Concerned?**

- Images of damaged carports and patio covers.
Should We Be Concerned?

Brand New Apartment Complex

February 18, 2013 (Deseret News)

“Early this morning, the Layton City Fire Department responded to an emergency call in which several individuals reported a carport collapsing over a vehicle with a man trapped inside his car. Upon arrival, the responders found a 50 year old man trapped in his vehicle with the carport crushing in the roof. Shortly after the man was pronounced dead.”
Please Be Concerned!

February 5, 2008 (Deseret News)

“Susanne W. Christiansen, 60, was crushed when the weight of snow Monday collapsed her carport and patio at her home on the 700 block of Robins Avenue.” (Ogden, UT)

FAQ’s

As published by Yakima County, WA
- When is a carport permit required?
- If I build a carport under 200 square feet?
- Is engineering required?
- Do I have to pave the floor of the carport?
- Can I build a carport within/on a property line?
- What information do I need to apply for a carport permit?

Items to Cover

A. Code Requirements
B. Wood Carports
C. Steel/Aluminum Carports
D. Patio Covers
E. Enclosing Carports/Patios
A. Code Requirements

IRC Requirements

- IRC R105.2: A permit is not required when...
  - One story detached accessory structures provided floor area does not exceed 200 square feet.

IRC Requirements

- IRC R309.2: Carports shall be open on at least two sides. Carport floor surfaces shall be of approved noncombustible material...

IRC Requirements

- IRC R309.2: Sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.
IRC Requirements

- IRC Table R402.2 (Concrete):
  - Weathering per IRC Figure R301.2(4)

<table>
<thead>
<tr>
<th>TYPE OR LOCATION OF CONCRETE CONSTRUCTION</th>
<th>NEGLIGIBLE</th>
<th>MODERATE</th>
<th>SEVERE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement walls, foundations and other concrete not exposed to the weather</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Basement slabs and interior slabs on grade, except garage floor slabs</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Basement walls, foundation walls, exterior walls and other vertical concrete work exposed to the weather</td>
<td>2,500</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Porches, carport slabs and steps exposed to the weather, and garage floor slabs</td>
<td>2,500</td>
<td>3,000</td>
<td>3,500</td>
</tr>
</tbody>
</table>

IRC Requirements

- IRC R403.3 (Frost Protection):
  - Frost protected shallow foundations “…shall not be used for unheated spaces such as porches, utility rooms, garages and carports…”

IRC Requirements

- That’s it?!!!
- No other reference to carports is made.
- What is the structural system?
- Can this meet conventional construction?

IRC Construction

- IRC R301.1:
  - “The construction of buildings… shall result in a system that provides a complete load path… for the transfer of all loads from their point of origin through the load-resisting elements to the foundation.”
IRC Construction

- IRC R301.1.2:
  - “The requirements of this code are based upon platform and balloon-frame construction for light-frame buildings.”
  - “Other framing systems must have equivalent detailing to ensure force transfer, continuity, and compatible deformations.”

IRC Construction

- IRC R407 (Columns):
  - Shall be protected against decay.
  - Shall be restrained to prevent lateral displacement at the bottom end.
  - Shall not be less than 4”X4” nominal.

IRC Construction

- IRC R502.9 (Fastening):
  - “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.”

IBC Requirements

- A permit is not required when...
- IBC 105.2:
  - “One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided that the floor area is not greater than 120 square feet.”
IBC Requirements

- **IBC 312.1:** U Occupancy
- **IBC406.2.2:** Not less than 7-foot clear height
- **IBC 406.2.4:** Surface shall be of approved noncombustible materials, and shall provide proper drainage
- **IBC 406.2.9.3:** Appliances shall have 6-foot clearance from floor
- **IBC 406.3.1:** No more than 1,000 square feet
- **IBC 406.3.3:** Shall be open on at least 2 sides. Separation is not required between a Group R-3 and U carport

- **Fire Separation Distance (Table 602):**
  - Footnote ‘h’: “…the exterior wall shall not be required to have a fire-resistance rating where the (FSD) is 5 feet or greater.”

- **That’s it?!!!**
  - No other reference to carports is made.
  - How are we supposed to verify that they have been designed correctly?!!!
Loads

- **Applicable Design Loads:**
  - Roof dead load
  - Roof live load
  - Roof snow load
  - Wind loads
  - Earthquake loads
  - Special loads

Dead Loads

- **Roof Dead Load (IBC 1606):**
  - Asphalt shingles = 4.0 psf
  - Sheathing = 2.0 psf
  - Framing = 2.5 psf
  - Assume Roof DL = 10 psf

Live Loads

- **Roof Live Load (IBC 1607):**
  - Typical = 20 psf
  - Assembly = 100 psf
  - Assume Roof LL = 20 psf

Snow Loads

- **Snow Loads (IBC 1608):**
  - Per ASCE 7
  - Key terms:
    - Ground snow load ($P_g$)
    - Roof snow load ($P_f$)
    - Unbalanced snow
    - Sliding snow
Snow Loads

- **Ground Snow Load** ($P_g$):

- **Roof Snow Load** ($P_f$):
  - Per Section 7.3 of ASCE 7
  - $P_f = 0.7 \times C_e \times C_t \times I_s \times P_g$
  - Not 70% of $P_g$!!!

Snow Loads

- **Thermal factor ($C_t$)**:
  - Per Table 7-3 of ASCE 7
  - Carports and patio covers are unheated structures → *20% increase*
  - This is noted in **ICC-ES AC340**

- **Example**:
  - Location: Utah County, UT
  - Elevation ≤ 4,500ft
  - $P_g = 43$psf
  - $I_s = 1.0$
  - $C_e = 1.0$
  - $C_t = 1.2$
  - $P_f = 0.7 \times C_e \times C_t \times I_s \times P_g = 36$psf ← Not 30psf

Snow Loads

- **Unbalanced Snow** (*Section 7.6, ASCE 7*):
  - Essentially equal to ground snow load if rafter length is < 20 feet.
Snow Loads

- Sliding Snow (Section 7.9, ASCE 7):
  - Check for locations where snow is allowed to shed.

Wind Loads

- IBC 1609.1.1 \(\rightarrow\) Per ASCE 7

Earthquake Loads

- IBC 1613.1 \(\rightarrow\) Per ASCE 7

Lateral Loads

- Lateral Loads:
  - In dealing with wind & seismic we need to ensure there is a complete lateral load path.
  - Connections, connections, connections
What is ASCE 7?
- “Minimum Design Loads for Buildings and Other Structures”
- Contains the majority of the structural design provisions of the IBC.

What is the Structural System?
- Typical homes have wood shear walls \( R = 6.5 \)
- Carports or patio covers use cantilevered columns
  - Timber \( R = 1.5 \)
  - Steel \( R = 1.25 \), typical
- Timber frame ≈ 23% capacity
- Steel Frame ≈ 19% capacity

Bearing Wall vs. Building Frame?
- The design of carports and patio covers is very different from the braced wall provisions of the IRC.
- Engineering is required!
Submittals

What should be submitted?
- Permit application
- Plans*
- Structural calculations?
- Soils report?

Construction Plans

What should be on the plans?
- Site plan
- Material info
- Foundation plan
- Roof plan
- Typical cross section(s)
- Elevations
- Ledger size & attachment
- Post/rafter/beam connection details

Site Plan

Site Plan (IRC 106.2 & IBC 107.2.6):
- Size and location of new construction and existing structures on the site
- Distances from lot lines
- *-Established street grades
- *-Proposed finished grades
- *-Flood information

Is this Everything?
Handouts

- Handouts can be very useful!
  - Examples:
    - Colorado Chapter of ICC*
    - AW&PA –DCA 6*
    - CA Housing & Community Development
    - Yakima County, WA
    - Pinal County, AZ
    - Fairfax County, VA

Connections

- Post Footings:
  - IRC R407 requires lateral restraint at base
  - Is a treated post required?
  - Soil Site Class ‘D’?

Connections

- Post Footings:
  - Are we required to go to frost depth? \(\rightarrow\) IRC R403.1.4
  - Exception:
    - Free-standing structures < 600 square feet and maximum eave height of 10 feet

Connections

- Attachment to Structure:
  - Ledger size & attachment
  - How long should the lags be?
  - Will snow drift or sliding snow be an issue?
  - Trusses should be braced
  - Pay special attention to flashing!!!
Connections

- **Diaphragm Attachment:**

  ![Diaphragm Attachment Diagram]

- **IRC R502.9:**
  - Beam-to-beam connection shall resist both lateral and uplift
  - Beam-to-post connection shall resist both lateral and uplift
  - Diagonal bracing should be provided in each direction at free-standing ends

Diagonal Bracing

- **Prescriptive Diagonal Bracing:**
  - **DCA 6:** "Prescriptive Residential Wood Deck Construction Guide"
    - Maximum post height of 14-feet
    - Min. 2X4 diagonal braces
    - Placed at 2-feet from top of and to side of post

Inspections

- **What inspections are required?**
  - Footing/foundation
  - Framing
  - Final
  - Others?
Inspections

- Any particular inspection items to look for?
  - Out-of-plumb framing members
  - Roof diaphragm connections
  - Post requirements
  - Appropriate members & connections

Existing Carports

- Pre-existing non-conforming carports
  - What would you require?
  - City of Cle Elum, WA

THE POLICY: As of January 1, 2009 all pre-manufactured metal buildings / carports require a building permit and site and design review approval to construct and/or place in the City limits of Cle Elum. Because of their construction the plans and specifications must be engineered by a Washington State licensed engineer. Additionally, the plans must state the snow load and wind load capacities and detailed construction methods.

All pre-manufactured metal buildings / carports placed or constructed prior to January 1, 2009 will be treated as pre-existing nonconforming uses, and may not be enlarged, modified, altered or expanded unless doing so would result in the entire structure compliance with applicable building code and engineering requirements.

City of Cle Elum, WA - Carport Handout

Example Carport

- Do you see anything wrong?

Steel/Aluminum

By: Todd Snider, S.E., C.B.O.
Steel/Aluminum Carports

- Not all carports are created equal
  - Google “carport” and see what happens
  - Kits are available everywhere
  - What are some common problems you have seen?

Buy a Carport!

- Pick your size!

Buy a Carport!

- Pick a Roof!

Buy a Carport!

- Pick the Frame!
Buy a Carport!

Pick the Walls!

$1490.00
$90 Delivery Included!

54 Colors

Buy a Carport!

Windows! And Your Done!

$1640.00
$90 Delivery Included!

Submittals

- What should be submitted?
  - Permit application
  - Plans
  - ICC-ES Report*
  - Structural calculations?
  - Soils report?

ICC-ES Reports

- Are ICC-ES reports available?
  - Amerimax Building Products, Inc. (ESR-1398P)*
  - Metals USA Building Products, L.P. (ESR-1953P)
  - United Duralume Products, Inc. (ESR-2676P)

⇒ All are engineered by the same individual

By: Todd Snider, S.E., C.B.O.
ESR-1398P-Plans:
- Submission for a building permit must include...
  - General notes (2 pages)
  - Structural configurations (1 or 2 pages)
  - Rafter span tables
  - Header post spacing, footing size, and post table for live/snow and wind load
  - All appropriate details
  - Other documentation required by local building authority

ICC-ES Memo (AC340) – Approved June 2012:
- The following items must be provided...
  - Design loads (IBC 1603.1.1-IBC 1603.1.8)
  - The MWFRS and SFRS must be specified on the construction documents for each principal direction
  - The importance factor used must equal 1.0
  - Plans need to include details describing the quantity and direction of applied loads added to the existing building
  - Calculations need to be provided for roof snow loads based upon ground snow load

What inspections are required?
- Footing/foundation
- Framing
- Final
- Others?
- Are special inspections required?

Any particular inspection items to look for?
- Out-of-plumb framing members
- Metal deck adequacy
- Appropriate members & connections
**Inspections**

- **Any particular inspection items to look for?**
  - Piers shall have a minimum of 4 vertical bars
    - $\rho_{\text{min}} = 0.005$
    - $\rho = 0.005$
    - $\#4 \leq 14'' \Omega$
    - $\#5 \leq 17'' \Omega$
    - $\#6 \leq 21'' \Omega$
    - $\#7 \leq 24'' \Omega$
  - Enclosed ties shall be provided, spacing shall be:
    - 48d, lateral tie
    - 16d, vertical bar
    - Least dimension of compression member

**Anchors**

- **How will the structure be anchored?**
  - Cast-in place anchors
  - Expansion anchors
  - Epoxy anchor
  - Auger anchors
  - Rock anchors
  - Etc…

**D. Patio Covers**

- Historically, failures often occur.
- May times covered patios also serve as decks.

By: Todd Snider, S.E., C.B.O.
Patio Covers

- January 2, 2015 (The Times-Picayune)
  - Kenner, LA
  - “…fire started when heat radiated from a grill that had been placed underneath a combustible patio cover…”

Warning To Future Consumers:
- “???” is the owner/operator of the patio company we hired to install an aluminum patio on our home. It was an amenity we anticipated would last on our home for YEARS to come. Unfortunately for us, 3 and 1/2 years after purchase/installation, our patio crashed to the ground in the middle of the night. ???” used insufficient/ineffective installation hardware, inadequate application method & procedures, zero support posts, and hired an inexperienced construction crew to come to our home to install our patio - leading to application FAILURE & COLLAPSE.

Warning To Future Consumers (cont.):
- “Luckily for our family, no one was on the patio at the time the roof crashed so no injury/death occurred. ???”s (one) response to our complaints: “I apologize for the INCONVENIENCE you are having with your patio cover. We warranty our work for 2 years and you are well out of the warranty period ... we do stand behind our work but I can’t warranty a patio forever as this would be unrealistic. Thank you.”

Construction Requirements:
- Structural requirements for patio covers are similar to that for carports.
  - **IRC Appendix H & IBC Appendix I**
    - Limited to one-story and 12-feet in height
    - “Shall be used for recreational outdoor living purposes only and not for carports, garages, storage rooms or habitable rooms.”
    - Minimum roof live load = 10psf (*Snow controls)
    - If zero frost line, can be supported directly on 3.5-inch slab provided posts do not support more than 750 pounds
Patio Covers

- Is this everything we need?

Enclosing Carports

- Is it okay to enclose an existing carport or patio cover?
- How often do you see this?
- What are some potential issues?
- What should you require?

Enclosing Carports

- Many websites address how to do this...
- “Enclosing a Carport in Six Easy Steps” - www.doityourself.com
Enclosing Carports

**Step 1: Preparation**

“The first thing that you need to do is prepare the carport to be enclosed. Start by cleaning the entire floor of the carport off. If there is not already a concrete slab in the carport, you will need to pour a solid concrete slab to support the new room. Make a box the size of the carport out of wooden boards. Place rebar in a grid inside the frame. Then the concrete can be poured into this form. Try to ensure that the concrete slab is the same level as the rest of your home.”

**Step 2: Building a Partial Wall**

“Now you need to measure the size of your car port and start building the frames for the walls. The walls can be built using the 2x4 boards. The studs needs to be 16” apart. Place one board on the ground flat, frame the verticals into it, and frame another board flat against the top of the verticals. The frame can be built on the ground then rotated up into place. For long walls make a series of such frames. Frame openings for any doors or windows you want in the walls.”

**Step 3: Fixing the Frames**

“The frames now need to be bolted into the concrete flooring and long screws can be used to screw the existing roof into the new walls at the side of the carport.”

**Step 4: Covering Walls**

“The exterior of the walls can be covered with plywood and then the exterior wall option can be chosen. There are a number of different types of exterior wall covering including siding. Install doors and windows in the openings you left in the framing.”
Enclosing Carports

**Step 5: Electrics**

“Get a qualified electrician to come and wire up any outlets in your new addition. You may be able to do this by yourself in some states. However, you will need to get the work signed off by an electrician to ensure that everything is safe and that you won’t be putting yourself in any danger. If you are allowed to do the electrics in your state then this doesn’t mean you have to. If you don’t feel confident to do this then you can hire a professional.

“Insulation can be added between the wall studs to make it much cheaper to heat.”

Enclosing Carports

Many jurisdictions have handouts for enclosing carports or patio covers.

http://www.coloradochaptericc.org/

FAQ’s

**As published by Yakima County, WA**

- When is a carport permit required?
- If I build a carport under 200 squared feet?
- Is engineering required?
- Do I have to pave the floor of the carport?
- Can I build a carport within/on a property line?
- What information do I need to apply for a carport permit?
- Is it okay to enclose a carport?
Any Questions?

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