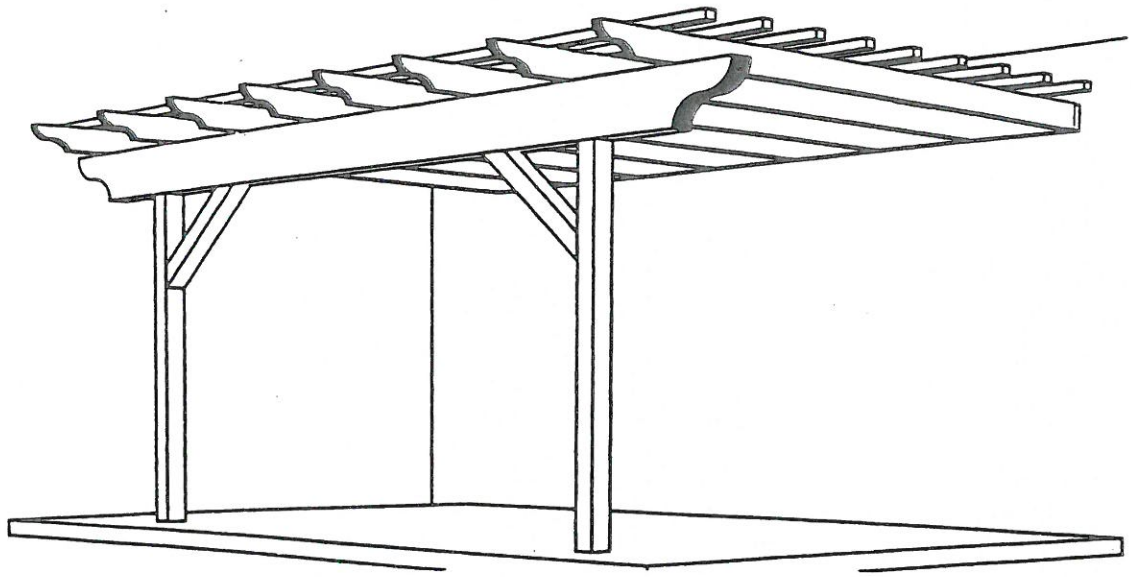
A Better Way of Life

# Patio Covers



1. General: This information summarizes certain portions of the *Uniform Building Code* ™ (U.B.C.). It focuses only on those practices and methods which are most commonly used in this area. This handout is not a replacement for the U.B.C.. It is simply an attempt to make certain parts of it more accessible. Where the details provided here cannot be followed or where other choices are desired, the U.B.C. should be consulted. It may be reviewed at many libraries and at your Building Department. This handout is limited to the construction of light frame patio shade covers. It is not to be used for decks or balconies.

2. Lumber: Use only graded and labeled lumber from a lumber yard. Beams and rafter span tables are provided for #2 Grade or better douglas fir and #2 or better open grain redwood. Check with your Building Department for other materials.

3. Plan ahead: Patio covers are not room additions. They may be built to a lesser standard. If you think that you may want to convert your patio cover to a room someday then this handout is not a suitable starting point.

4. Limits: Patio covers must not exceed 12 feet in height. The open area of the longer wall and one additional wall must be equal to 65% of the area below a minimum of 6 feet 8 inches of each wall, measured from the floor. Openings may be enclosed with insect screening or readily removable plastic that is not more than 0.125 inch thick. Patio covers may not be heated so, even if they are enclosed in plastic, the doors from the house must remain.

5. Connections: In earthquake areas secure all post-beam and post-footing connections with metal t-straps, post bases, etc.

6. Bracing: Install minimum 4x4 diagonal bracing, bolted in place, at post-beam connections. Braces should be installed at a forty-five degree angle and extend at least two feet from the junction of the post and beam. (2'-10" long braces should do nicely.)

7. Lattice vs Solid: Choose plywood or particle board sheathing panels for solid roofs according to their panel identification index and the rafter spacing. This will result in a roof that is safe to walk on during construction. **Lattice will not support your weight during construction or after construction.** Use caution and work from ladders or other firm support.

8. Roofing Materials: In general, shingle, shake and tile type roofing materials require a 3" in 12" sloped roof deck. Hot-mopped or built up roof systems may be used on flatter roofs but maintain at least a 1/4" in 12" slope to avoid ponding of water on the roof. Use only roofing systems that have a minimum class "A" fire rating.

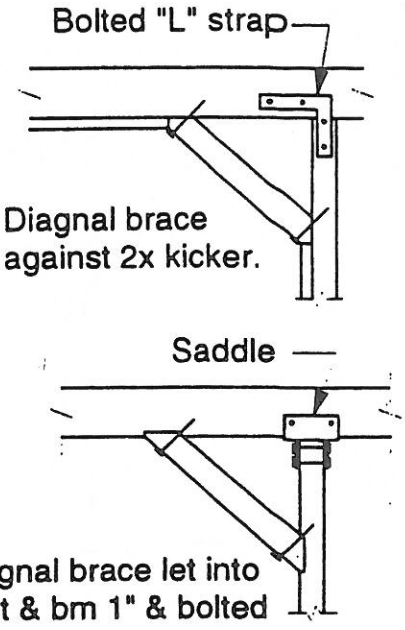
## PATIO FOOTING MINIMUM SIZES

Max Soil Pressure (psf): 1000 — Minimum footing thickness is 12"
Assumed LL (psf): 20 — Minimum footing depth is 12"
Assumed DL (psf): 10 + 13#/ft BM

| Rafter span to (ft) | Square Footing Size In Inches Of End Posts — Beam Span To (ft) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 6 | 12 | 13 | 13 | 14 | 13 | 16 | 16 |
| 8 | 13 | 14 | 15 | 16 | 15 | 17 | 18 |
| 10 | 14 | 15 | 16 | 17 | 16 | 19 | 19 |
| 12 | 15 | 16 | 17 | 18 | 17 | 20 | 21 |
| 14 | 16 | 17 | 18 | 19 | 18 | 21 | 22 |
| 16 | 17 | 18 | 19 | 20 | 19 | 22 | 23 |
| 18 | 17 | 19 | 20 | 21 | 20 | 23 | 24 |
| 20 | 18 | 20 | 21 | 22 | 21 | 24 | 25 |

| Rafter span to (ft) | Square Footing Size in Inches Intermediate Posts — Beam Span To (ft) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 6 | 17 | 18 | 19 | 20 | 19 | 22 | 23 |
| 8 | 18 | 20 | 21 | 22 | 21 | 24 | 25 |
| 10 | 20 | 21 | 23 | 24 | 23 | 26 | 27 |
| 12 | 21 | 23 | 24 | 26 | 24 | 28 | 29 |
| 14 | 22 | 24 | 26 | 27 | 26 | 30 | 31 |
| 16 | 24 | 25 | 27 | 29 | 27 | 31 | 33 |
| 18 | 25 | 27 | 28 | 30 | 28 | 33 | 34 |
| 20 | 26 | 28 | 30 | 31 | 30 | 34 | 36 |

## TYPICAL POST BM CONNECTIONS




## ALLOWABLE SPANS FOR PATIO RAFTERS

Doug Fir: Base Fiber Stress: 825 E: 1600000
Redwood: Base Fiber Stress: 725 E: 1000000
Assumed DL: 10 — LL Deflect. <= span / 240

| Joist Size (in) | Spac -ing (in) | Doug fir Lattice LL: 10 | Doug fir Solid Roof LL: 20 | Redwood Lattice LL: 10 | Redwood Solid Roof LL: 20 |
|---|---|---|---|---|---|
| 2x4 | 12 | 12 - 4 | 9 - 9 | 10 - 6 | 8 - 3 |
| | 16 | 11 - 2 | 8 - 11 | 9 - 6 | 7 - 7 |
| | 24 | 9 - 6 | 7 - 9 | 8 - 3 | 6 - 7 |
| 2x6 | 12 | 19 - 4 | 15 - 4 | 16 - 6 | 13 - 2 |
| | 16 | 17 - 0 | 13 - 11 | 15 - 1 | 11 - 11 |
| | 24 | 13 - 11 | 11 - 4 | 13 - 0 | 10 - 5 |
| 2x8 | 16 | 21 - 7 | 17 - 7 | 19 - 10 | 15 - 8 |
| | 24 | 17 - 7 | 14 - 4 | 16 - 6 | 13 - 6 |
| | 32 | 15 - 3 | 12 - 5 | 14 - 3 | 11 - 8 |
| 4x6 | 24 | 20 - 5 | 16 - 2 | 17 - 5 | 13 - 10 |
| | 32 | 18 - 5 | 14 - 9 | 15 - 10 | 12 - 7 |
| | 36 | 17 - 4 | 14 - 2 | 15 - 3 | 12 - 1 |
| 4x8 | 32 | 24 - 3 | 19 - 5 | 20 - 11 | 16 - 7 |
| | 36 | 22 - 11 | 18 - 8 | 20 - 2 | 15 - 11 |
| | 48 | 19 - 10 | 16 - 2 | 18 - 3 | 14 - 5 |

## ALLOWABLE SPANS FOR LATTICE

Base Fiber Stress: 725 E: 1000000
DL: 10 LL: 10 — LL Deflect. <= span / 240

| Lattice Member size | Spacing (in) | Maximum Span (ft-in) |
|---|---|---|
| 2X2 | 3 | 7 - 1 |
| | 4 | 6 - 6 |
| | 6 | 5 - 7 |
| 2X3 On the flat | 4 | 7 - 8 |
| | 6 | 6 - 8 |
| | 12 | 5 - 3 |

9. Building Attachment: Several choices are provided for supporting one end of the patio cover rafters at the building. Supportin the patio rafter ends with joist hangers which are nailed to a 2x ledger is, perhaps, the most common. Removing the roc overhang and resting patio cover rafters on the top plate of the wall is structurally straight forward. It is often desirable to attac patio cover rafters to the facia or roof rafter tails. This presents special problems. Rafters are typically notched so that they wi rest on the top plate of the wall. This notch or seat cut weakens the rafter at the point where it is most stressed by the weight c a patio cover. In addition, this notch becomes deeper as the rafter becomes steeper. For these reasons the size of a patio cove is limited by the size and steepness of the roof rafters which are used to support it. See the table provided.

**MAXIMUM SPAN OF PATIO RAFTERS WHEN SUPPORTED BY RAFTER TAILS (FEET)**

Assumed fiber stress (psf): 1400 Max roof rafter spacing (in): 24 Verify.

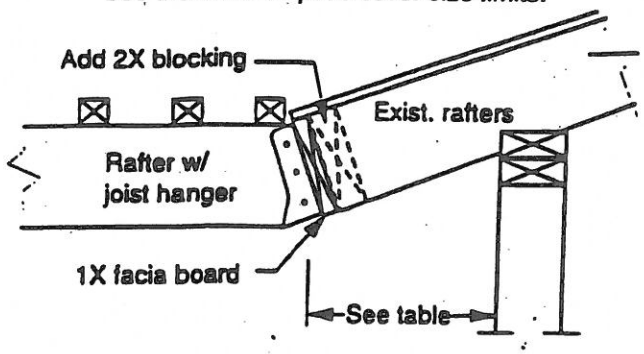
Assumed rafter seat cut is 1/2" deeper than minimum to rest flush on 2x4 plate. Verify.

Assumed dead load plus live load for both roof and patio cover (psf): 30

| 2x4 Rafters | | | | | | 2x6 Rafters | | | | | | 2x8 Rafters | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Roof Slope | Rafter Overhang To (ft) | | | | | Roof Slope | Rafter Overhang To (ft) | | | | | Roof Slope | Rafter Overhang To (ft) | | | | |
| | 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 | | 1 | 2 | 3 | 4 | 5 |
| 2:12 | 9 | 2 | 0 | 0 | 0 | 2:12 | 25 | 15 | 7 | 2 | 0 | 2:12 | 25 | 25 | 19 | 11 | 5 |
| 3:12 | 7 | 0 | 0 | 0 | 0 | 3:12 | 25 | 13 | 5 | 0 | 0 | 3:12 | 25 | 25 | 17 | 9 | 4 |
| 4:12 | 5 | 0 | 0 | 0 | 0 | 4:12 | 25 | 11 | 4 | 0 | 0 | 4:12 | 25 | 25 | 15 | 7 | 2 |
| 5:12 | 3 | 0 | 0 | 0 | 0 | 5:12 | 24 | 9 | 3 | 0 | 0 | 5:12 | 25 | 24 | 13 | 6 | 1 |
| 6:12 | 2 | 0 | 0 | 0 | 0 | 6:12 | 21 | 7 | 2 | 0 | 0 | 6:12 | 25 | 22 | 11 | 5 | 0 |

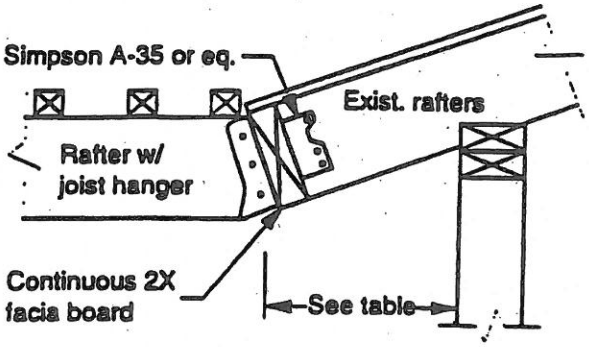
**ATTACH TO 1X FACIA**

See the table for patio cover size limits.

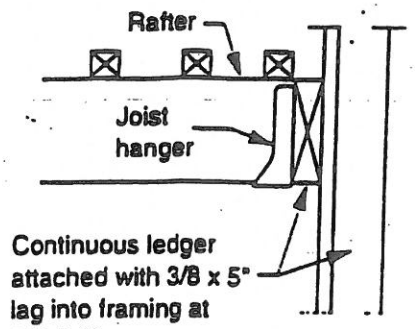



**ATTACH TO 2X FACIA**

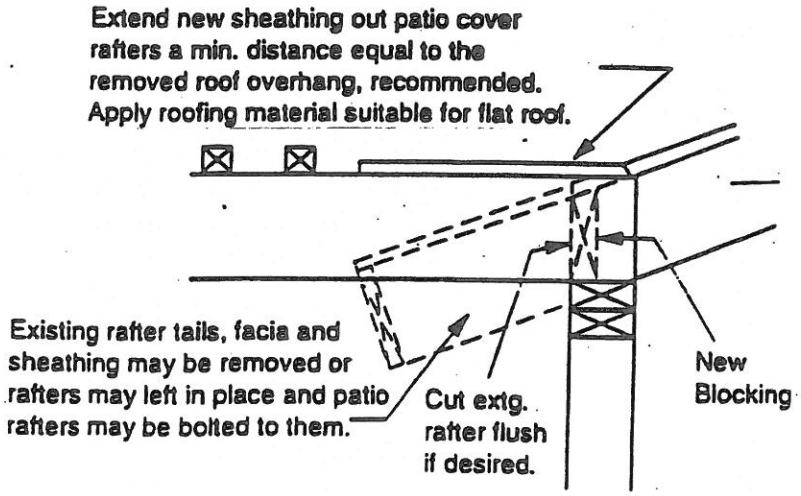
See the table for patio cover size limits.



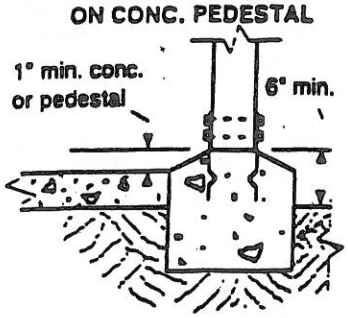

**ATTACH TO EXIST. WALL**



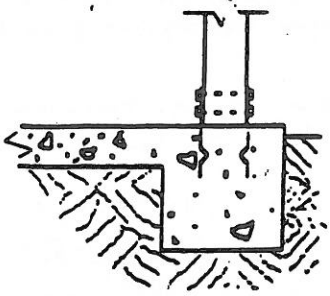

**SUPPORT ON EXISTING WALL PLATE**



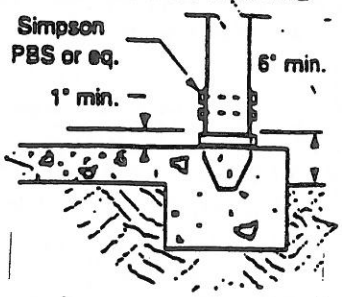
UNTREATED POST
ON CONC. PEDESTAL



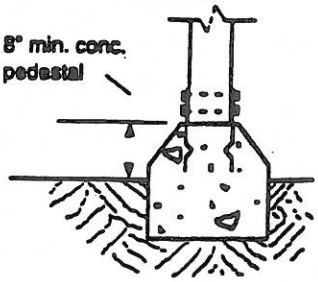

TREATED POST
ON CONC. SLAB



UNTREATED POST
ON METAL PEDESTAL




UNTREATED POST
NO SLAB




## ALLOWABLE SPANS FOR PATIO BEAMS

Doug fir: Base Fiber Stress: 825 E: 1600000 Solid Roof LL: 20
Redwood: Base Fiber Stress: 725 E: 1000000 Lattice LL: 10
TL Def.<= span / 240 Table assumes 2' rafter overhang. Assumed DL: 10 + BM

| Rafter span to (ft) | Solid Roof | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Redwood (ft-in) | | | | | Doug fir (ft-in) | | | | |
| | 4x6 | 4x8 | 4x10 | 4x12 | 4x14 | 4x6 | 4x8 | 4x10 | 4x12 | 4x14 |
| 6 | 8 - 10 | 11 - 7 | 14 - 8 | 17 - 5 | 19 - 5 | 10 - 0 | 13 - 2 | 16 - 1 | 18 - 7 | 20 - 9 |
| 8 | 8 - 4 | 10 - 11 | 13 - 10 | 16 - 0 | 17 - 10 | 9 - 2 | 12 - 1 | 14 - 9 | 17 - 1 | 19 - 1 |
| 10 | 7 - 11 | 10 - 5 | 12 - 10 | 14 - 10 | 16 - 7 | 8 - 6 | 11 - 2 | 13 - 8 | 15 - 10 | 17 - 9 |
| 12 | 7 - 6 | 9 - 10 | 12 - 0 | 13 - 11 | 15 - 7 | 8 - 0 | 10 - 6 | 12 - 10 | 14 - 11 | 16 - 8 |
| 14 | 7 - 1 | 9 - 3 | 11 - 4 | 13 - 2 | 14 - 9 | 7 - 6 | 9 - 11 | 12 - 1 | 14 - 1 | 15 - 9 |
| 16 | 6 - 8 | 8 - 10 | 10 - 9 | 12 - 6 | 14 - 0 | 7 - 2 | 9 - 5 | 11 - 6 | 13 - 4 | 15 - 0 |
| 18 | 6 - 5 | 8 - 5 | 10 - 3 | 11 - 11 | 13 - 5 | 6 - 10 | 9 - 0 | 11 - 0 | 12 - 9 | 14 - 3 |
| 20 | 6 - 1 | 8 - 1 | 9 - 10 | 11 - 6 | 12 - 10 | 6 - 6 | 8 - 7 | 10 - 6 | 12 - 3 | 13 - 8 |

| Rafter span to (ft) | Lattice | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Redwood (ft-in) | | | | | Doug fir (ft-in) | | | | |
| | 4x6 | 4x8 | 4x10 | 4x12 | 4x14 | 4x6 | 4x8 | 4x10 | 4x12 | 4x14 |
| 6 | 10 - 0 | 13 - 2 | 16 - 8 | 20 - 2 | 23 5 | 11 8 | 15 4 | 19 5 | 22 5 | 24 11 |
| 8 | 9 - 5 | 12 - 5 | 15 - 9 | 19 - 1 | 21 7 | 11 1 | 14 7 | 17 10 | 20 7 | 23 0 |
| 10 | 8 - 11 | 11 - 9 | 15 - 1 | 18 - 0 | 20 1 | 10 5 | 13 7 | 16 7 | 19 2 | 21 5 |
| 12 | 8 - 7 | 11 - 3 | 14 - 5 | 16 - 11 | 18 11 | 9 9 | 12 9 | 15 7 | 18 0 | 20 2 |
| 14 | 8 - 4 | 10 - 11 | 13 - 10 | 16 - 0 | 17 10 | 9 2 | 12 1 | 14 9 | 17 1 | 19 1 |
| 16 | 8 - 0 | 10 - 7 | 13 - 1 | 15 - 3 | 17 0 | 8 9 | 11 6 | 14 0 | 16 3 | 18 2 |
| 18 | 7 - 8 | 10 - 2 | 12 - 6 | 14 - 6 | 16 3 | 8 4 | 10 11 | 13 4 | 15 6 | 17 4 |
| 20 | 7 - 6 | 9 - 10 | 12 - 0 | 13 - 11 | 15 7 | 8 0 | 10 6 | 12 10 | 14 11 | 16 8 |