Simple Shade Structure Tames the Sun

Create a handsome pergola with rough-sawn cedar and readily available hardware

Drawing: Vince Babak

BY ROBERT SHAW

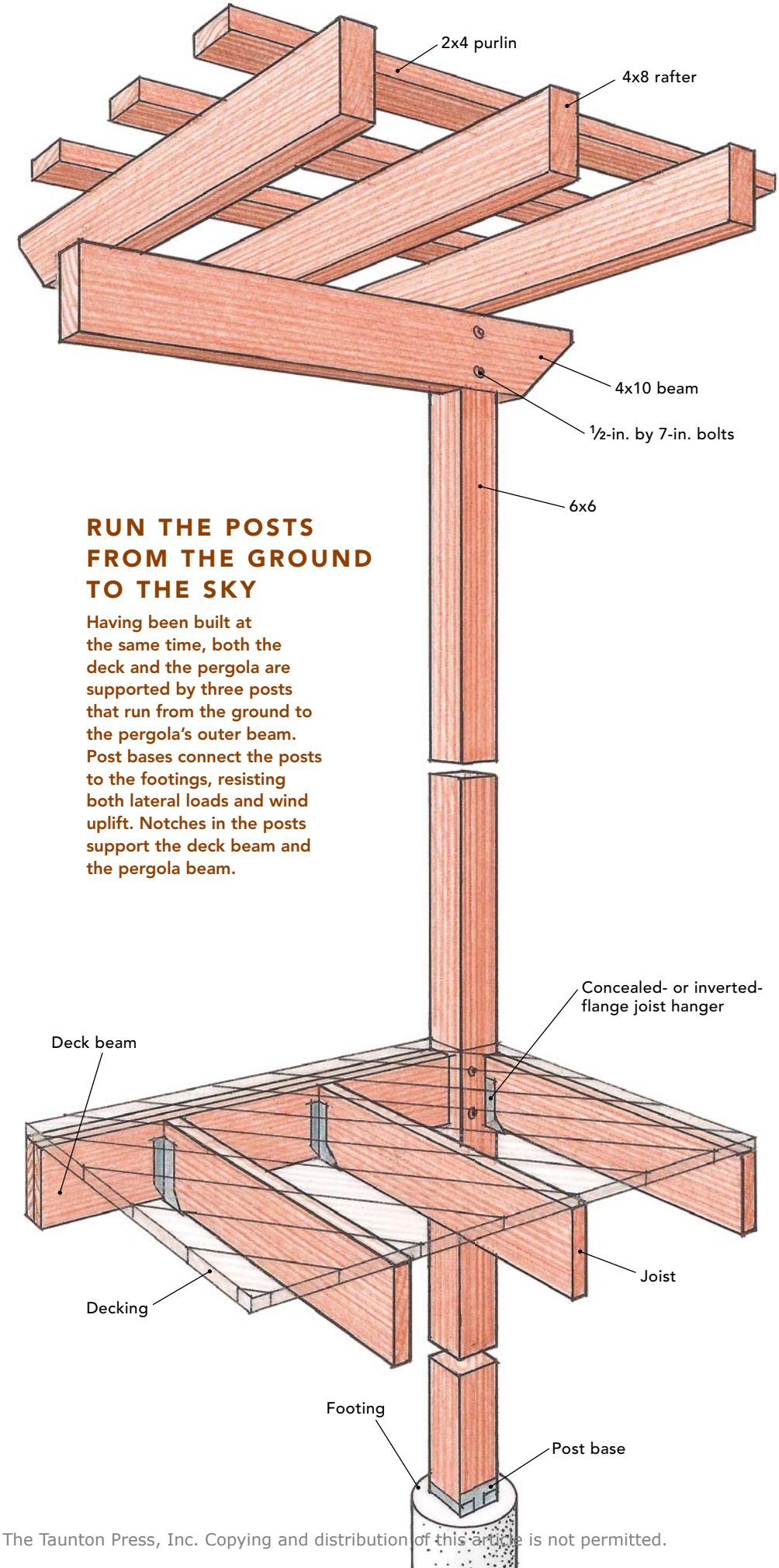
As a contractor who lives at the foot of the Rockies, I spend my days outside building decks and shade structures to help my customers enjoy our great climate. In spring, summer, and fall, the weather and the views call us to be outdoors. Even when it's hot, our low humidity makes being outside a good proposition—if you can find some shade.

This home has a great view of the Front Range, but along with that view comes the western sun. Until it would lower behind a stand of cottonwoods, the mid-afternoon sun used to beat down on the deck and the kitchen just inside, making the spaces too hot to use. When the owners hired me to build a new deck, adding shade was a key part of the project.

Whenever I design a pergola, a lot of factors come into consideration. The more shade desired, for example, the more purlins (the uppermost members) are needed. I don't have a strict formula for determining their size and spacing, but this deck's 2x4 purlins are spaced on 12-in. centers, which is a typical layout I use. If there's any doubt, I place the purlins without fastening them and see how my customer likes the layout.

By spacing the purlins this close together, snow and wind loads become a concern. This is Colorado, and we get a lot of snow, plus the winds coming down from the Rockies can be fierce. Because of these concerns, my engineer designed the pergola for the same loads as a roof. Made from rough-sawn western red-cedar timbers, this pergola fit together attractively in a simple, budget-friendly design that blocks a considerable portion of the sun, making the deck and the kitchen more comfortable by lowering the afternoon temperature in each space.

Robert Shaw owns Colorado Decks and Framing in Colorado Springs, Colo. Photos by Andy Engel.



RUN THE POSTS FROM THE GROUND TO THE SKY

Having been built at the same time, both the deck and the pergola are supported by three posts that run from the ground to the pergola's outer beam. Post bases connect the posts to the footings, resisting both lateral loads and wind uplift. Notches in the posts support the deck beam and the pergola beam.

NOTCH THE POSTS

A trio of cedar 6x6 posts supports the deck, the railing, and the pergola. The posts require careful notching where they will support the deck framing and the 4x10 pergola beam. If the pergola were being added to an existing deck, the floor joists would have been doubled or tripled below the post locations, and a manufactured post base would secure the post to the framing. The posts were finished with deck stain before installation.

Lay out the notches. *The outline of the beams is marked on the posts a consistent distance above the decking. The top of this beam is 8 ft. above the deck.*

A big saw helps. *The 10-in. blade on a Big Foot circular saw cuts most of the way through the 6x6 in one pass. A 7¼-in. saw also can do the job, but it leaves material in the center to be cut by other means.*

Finish with a jigsaw. *Not even the 10-in. saw cuts all the way through. A jigsaw with a coarse-tooth 5-in.-long blade completes the cut.*

Seal the notches. *Even in Colorado's dry climate, it's a good idea to seal end grain and cut areas where water might be trapped and cause rot.*

CUT AND INSTALL THE BEAM

Two 4x10s meet over the center post, forming a beam that runs the width of the pergola. The ends of the beam cantilever 1 ft. beyond the outer posts for looks. All the prep work of cutting, beveling, laying out the rafter locations, and staining is done on the ground. The bolt holes were drilled after the beam was placed.

Find the crown. *Lumber is rarely straight, and beams should be installed with any curve facing up. Finding the curve, or crown, that determines the top requires sighting along the beam.*

Bevel the beam. *One pass with a 10-in. circular saw cuts a decorative 45° angle on the bottom of the 4x10. A 7¼-in. saw would take two passes, and you'd have to clean up the cut with a belt sander.*

Positioning a 4x10 overhead takes help. *For support, the joint in the beam has to land on the center post.*

Bolts lock the joint. *A pair of ½-in. by 7-in. hot-dipped galvanized bolts with nuts and washers tie the beam to the post. An impact driver makes quick work of tightening the nuts. After installation, the exposed metal is painted black to match the rest of the hardware.*

INSTALL THE LEDGER AND THE RAFTERS

As with a deck, the inside of the pergola is supported by a ledger attached to the house. Because of Colorado's dry climate and the generous overhang directly above the ledger, no flashing was required. In most cases, though, pergola ledgers require flashing that's similar to deck-ledger flashing. As with the beam, the 4x8 rafters were cut to length, beveled, laid out, and stained on the ground. Installed on 24-in. centers, they overhang the beam by 24 in.

Screw the ledger to the house. *A pair of 5-in. LedgerLok structural screws driven into each stud secures the rough-sawn 2x8 ledger to the house. LedgerLoks don't require pilot holes, as lags do.*

Nail the rafter to the ledger. *Black-painted Simpson L70 angles connect the rafter and ledger. After installation, dings in the paint are touched up using an artist's brush.*

Raise the rafters in stages. *The outer end of each rafter is placed on the beam, then the inner end is lifted into place.*

Screw the rafters down. *Each rafter is held in place by two 10-in. TimberLok screws driven with an impact driver from above.*

FINISHING TOUCHES

The final bit of carpentry was the installation of the 2x4 rough-sawn purlins atop the rafters. The purlins cantilever 12 in. beyond the last rafter. For more shade, they are spaced 12 in. on center.

Bevel the purlins. *Because of their smaller size, it's faster and easier to use a miter saw to bevel the ends of the purlins that will extend past the last rafters.*

Short pieces are fine. *To make the best use of the available lumber lengths, short lengths were pieced into the center bay. A pair of 3-in. deck screws holds each of the purlins to each rafter.*