

Finish Stairs With Finesse

BY TUCKER WINDOVER

One of the most frustrating aspects of stair building is that many stair frames, the rough stringers, are built wrong. Perhaps the framer didn't get the correct information about finish-floor height, an increasingly common problem since the advent of laminated hardwood flooring. Or maybe the framer made mistakes in math and layout. Sometimes it is just plain carelessness. Even if the frame is perfect when the framer leaves, the dimensional lumber often shrinks after installation.

For finish carpenters like me, the frustration starts when we chase these inaccuracies. To meet the building code, the maximum variation between risers is $\frac{3}{8}$ in. I prefer to keep any difference between two adjacent risers to less than $\frac{1}{8}$ in. Without a fixed point of reference, any adjustment I make to one riser height affects the height of the rise above and below it, until I reach the top of the staircase, where there is no more room for adjustment. In a typical staircase, three or four rough stringers carry 14 treads per flight, which means there are potentially 56 places to fine-tune. If I am to be confident that the stairs won't squeak, the treads need to be sitting on a flat, level plane supported by these stringers.

The solution to this problem is to ignore the rough frame and lay out the tread and riser locations on the finish skirts. I then use the inner skirtboard as an index to position the riser dadoses and as a reference to make necessary adjustments to the rough frame. With an accurate layout, the incremental inaccuracies do not accumulate. It's an efficient process that assures me that each riser is exactly the same height and that each tread is dead level.

Tucker Windover is a finish carpenter in Arlington, Mass. Photos by Charles Bickford.

Carefully planned skirts and a couple of tricks make trimming stairs an easier job, no matter how bad the framing





THE SKIRTBOARDS ARE THE KEY

Made of wide stock (typically 1x12), the inner and outer skirtboards are carefully laid out to create a staircase that can be superimposed over original, imperfect framing.

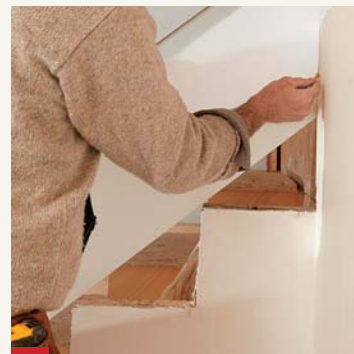
1 Orient the board. Start by laying the skirtboard along the top of the inside stringer so that the board's bottom corner is resting on the floor.



2 Mark the upper notch at the top of the stairs. First, draw a plumb line on the board. Next, measure up from the landing the height of one riser, and mark it on the plumb line. Draw a level line that intersects the plumb line.



3 Scribe the bottom. Draw a level line across the skirt from the bottom stringer's first notch. Without changing the board's position, mark its intersection with the door casing, and draw a plumb line. Marking the waste side of the cuts helps you to visualize the finished skirt.



4 Repeat the process with the outer skirt. With the board in place, scribe the top vertical line against the drywall, then mark the level line at the bottom. The bottom plumb cut is made after the skirt is laid out.

MARK THE RISER LOCATIONS ON THE INNER SKIRTBOARD ...

A routed inner skirt offers a more secure and stable joint for the riser than does a butt joint. The dado also creates a positive lock reference for plumb and square. The treads are not dadoed into the skirt because the staircase is drywalled below, making access for shimming and adjusting treads impossible.



1 **Locate the risers.** With the notched inside skirt in place, level across the top landing to establish the height of the top riser. Scribe a piece of scrap riser to the skirt to establish the location of the face of the riser. Repeat at the bottom of the stairs. The two points, top and bottom, should be the same distance from the top of the skirt. They form the top and bottom points of the layout line.



2 **Check the measurements.** Using a combination square, measure the distance from the top edge of the skirt to the upper riser mark. Next, compare the first measurement to the riser mark at the bottom of the stairs (photo right). Adjust the skirt position by trimming the level cut to compensate for any substantial difference ($\frac{1}{4}$ in. or more) between the two.

3 **Establish a base-line.** Draw a straight line from the front edge of the top riser to the same point on the bottom riser. Divide that line equally by the number of risers between the two. Use a construction calculator to avoid accumulated error caused by bad math or inaccurate measuring. Next, make a pitch block (photo below) with the specific rise, run, and rake of the staircase. Align the rake side to the base-line; the template's rise represents the front face of each riser. The risers will be plumb by necessity of geometry.



PITCH
BLOCK

TREAD = $\frac{1}{8}$

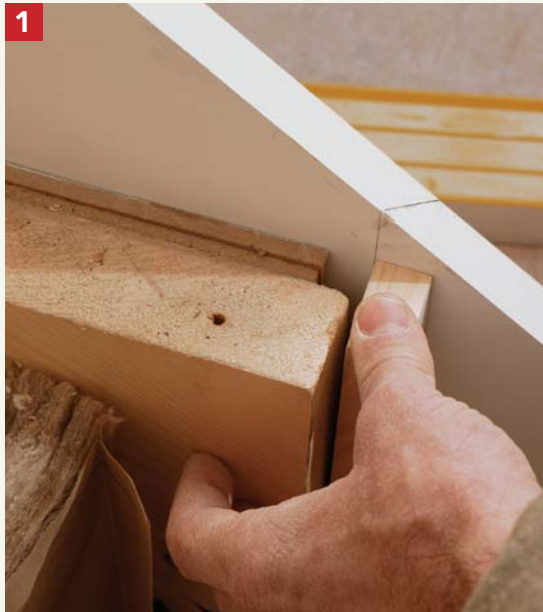
RISER = $\frac{7}{8}$



4 **Rely on a simple jig.** Make a jig from $\frac{1}{4}$ -in. and $\frac{1}{2}$ -in. plywood. The thinner plywood forms a base. The rectangular cutout in the $\frac{1}{2}$ -in. plywood top guides the base of the router. With a $\frac{3}{4}$ -in.-dia. straight bit, make an initial plunge cut in the jig base. At each riser position, the jig now can be lined up with the pencil lines and clamped into place. The depth of the dado should be half the thickness of the stringer stock.

... AND THE OUTER SKIRTBOARD

Unlike the inner skirtboard, the outer skirtboard is positioned so that its level cuts support the treads and its plumb cuts are mitered to the risers. Before layout can be completed, it's important to fine-tune the position of the skirt.



1 **The outer skirt's top forms the baseline.** Tack the outer skirt in place, and locate the top and bottom riser positions with scrap riser stock. Adjust the height of the skirt by trimming the bottom level cut and/or the top plumb cut until the faces of the risers align with the top of the skirt.



4 **It's always good to check your work.** Before cutting, tack the outer skirt in place, and make sure that the layout lines are plumb and level.



2 **Start on the same page.** Use the dadoed inner skirtboard as a layout template by aligning the outer skirtboard's top edge to the inner skirt's baseline and transferring each riser location to the outer skirt.



5 **Miter first, from the front.** With the skirtboard's top edge against the saw fence, cut the riser miters with a sliding compound-miter saw. (You also can use a circular saw.) Don't let the sawkerf extend more than 1/2 in. past the intersection of the tread line.



3 **Keep it accurate with a template.** Using the same pitch block made for the inner skirt, lay out the treads and risers. To avoid confusion, it's a good idea to mark the direction of the miters.



6 **Finish with straight cuts.** Cut the tread line to the miter with a circular saw. Finish the cuts with a handsaw.

ADJUST THE ROUGH STRINGERS

The whole point of this exercise is to remove the stringers' influence on the layout. However, the stringers are still needed for support, so they have to be fine-tuned into compliance. The inner and outer skirts are tacked in place, and the first and last risers are installed. Now the skirts define the accurate position of the risers and treads, and the rough stringers can be brought into compliance by adding or subtracting as needed.



TOO HIGH

If the stringer protrudes beyond the intended tread position, use an angle grinder or a random-orbit sander fitted with a 40-grit pad to remove the stock.



TOO LOW

If stringers are below the level of the risers, glue and screw a piece of plywood to the stringer at the correct height.



LOCK IT IN

Screws driven into the upper and lower edges of the riser have better holding power than nails and are concealed by the trim above and tread below, respectively.



INSTALL THE TREADS

Once the risers are nailed off and the stringers are adjusted, it's time to fit and fasten the treads. To keep exposed fasteners to a minimum, secure the front of the treads with screws that will be hidden by the molding.

1 **Scribing tip.** To get an accurate finished cut along the inner skirt, rough-cut the tread within $\frac{1}{2}$ in. of the final length, place the tread across the stringers, and insert a small block of $\frac{3}{4}$ -in. stock between the nosing return and the outer skirt. Use a similar block as a scribing guide on the opposite end of the tread, and trim to the scribed line.



2 **Rabbeted edges and hidden fasteners anchor the treads.** Manufactured tread stock includes a rabbeted back edge that locks into a precut groove on the riser. At the nosings, desktop fasteners attach the tread to the riser. (They're available from most hardware catalogs.) Using #6 $\frac{3}{4}$ -in. screws, attach a fastener to the top of the riser at each stringer. Mark the locations of the fasteners on the tread's underside, and use a $\frac{1}{4}$ -in. Forstner bit to bore a $\frac{1}{4}$ -in.-deep hole. Be sure that the hole is centered so that it won't show after the cove molding is installed. Apply a bead of construction adhesive to each stringer, push the tread tight against the inner skirt, and seat the tread into the riser's groove. Attach the tread to the fasteners with #6 screws.

