

# INSTALLING Suspended Ceilings



**W**hen I was a carpentry foreman at the University of Illinois, my

by Bruce Busboom

crews used to install something like 20,000 square feet of suspended ceiling each year. They loved the stuff. One worker with a rolling scaffold and a few hand tools can put up lot of ceiling in a day, and a team of two — one on the scaffold and one to move it around and hand up materials — can do three times as much.

Suspended ceilings are immune to cracks, nail pops, and other callback-producing defects associated with drywall. They provide access to plumbing, ductwork, and wiring, and their sound-absorbing qualities provide a cozy “feel.” Although grid components can’t be intermixed, different tiles from the same manufacturer often fit a variety of grids, so it’s easy to change the whole appearance of a room by replacing the tiles.

Use a laser and the right layout sequence for a quick, attractive job



**Figure 1.** Suspended ceilings can fit into almost any type of interior. Clockwise from top left: Celebration prefinished metal panels from USG Interiors; Cadre Executive Ceiling Coffers from USG Interiors; and Cirrus Themes Leaves from Armstrong.

Suspended ceilings are available in a vast assortment of styles (see Figure 1), but a couple of general rules apply. First, always go with commercial-grade tile and grid, which is better looking and more durable than the consumer-grade stuff. I prefer standard one-inch grid (it's actually  $15/16$  inch wide), rather than the narrower "superfine" grid, which is harder to measure and cut, and costs about twice as much. (Nevertheless, some clients will prefer the sleeker look, especially in a residential setting, which I don't often work

in.) Finally, I only use square 2-foot tiles, rather than the larger 2x4 tiles, which have a more institutional look. The square tiles also look good for longer, because they don't sag in the middle with age, as the larger tiles do.

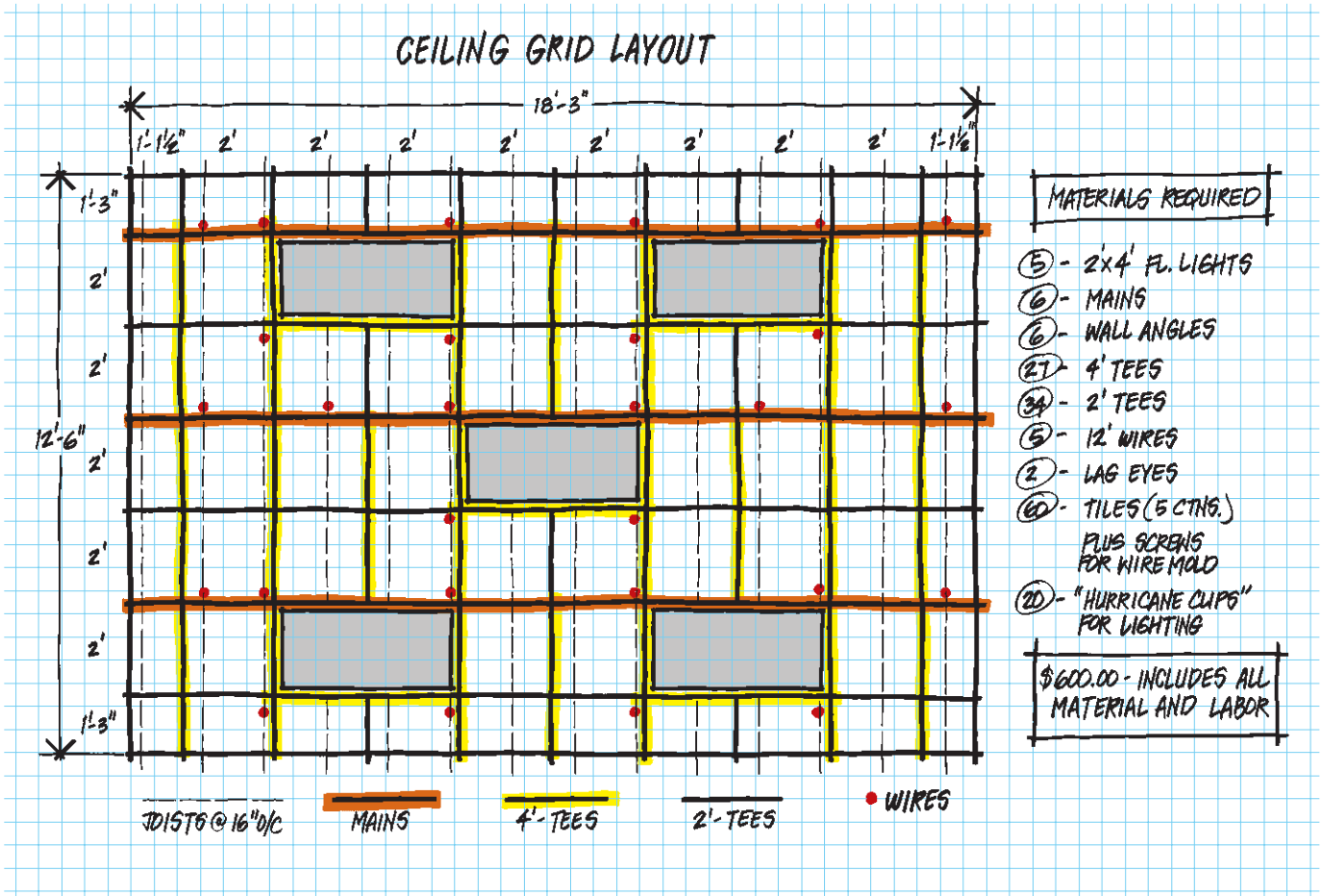
### Start With a Plan

Once the walls have been taped and painted, and all ductwork, pipes, and wiring are roughed in, it's time to lay out the ceiling. I used to do this by making a sketch on graph paper, but I recently began using a computer pro-

gram called Ceiling Planner, available from Armstrong. I plug in the dimensions, and it adjusts the borders, figures the material I need, and lets me print out copies of the plan.

In either case, my main concern is making sure that the borders on opposite sides of the room are equal, using the widest border tiles possible. In a 12-foot 6-inch room, for example, the ceiling could be six tiles wide with a 3-inch border at the edges. But shifting the centerline by a foot — so the ceiling consisted of five full-sized tiles with

# Layout Worksheet



**Figure 2.** An accurate plan makes it easy to estimate materials, and ensures proper spacing of lag eyes or other hangers. Border tiles on opposite sides should be equal, and none should be less than half a tile wide.

15-inch border tiles — results in a better-looking finished product.

In L-shaped rooms, things are a little more complicated. It's always a mistake to start the layout at an outside corner. As a rule, it's best to go for an optimal layout in the most visually prominent section of the room, so that any irregularity will be less evident. Whatever you do, avoid ending up with a one-inch strip of tile somewhere. It always looks awful, and it's difficult to cut and fit such a narrow piece of material.

If I'm working with a hand-drawn

plan, I start by marking the positions of the joists with dotted lines. The main runners — the structural “beams” that bear the weight of the suspended ceiling by means of hanger wires fastened to the main ceiling above — are represented by highlighted lines perpendicular to the joists, spaced 4 feet apart. I use colored dots to mark the positions of the hanger wires that will support the mains, and sketch in the location of the light fixtures (Figure 2).

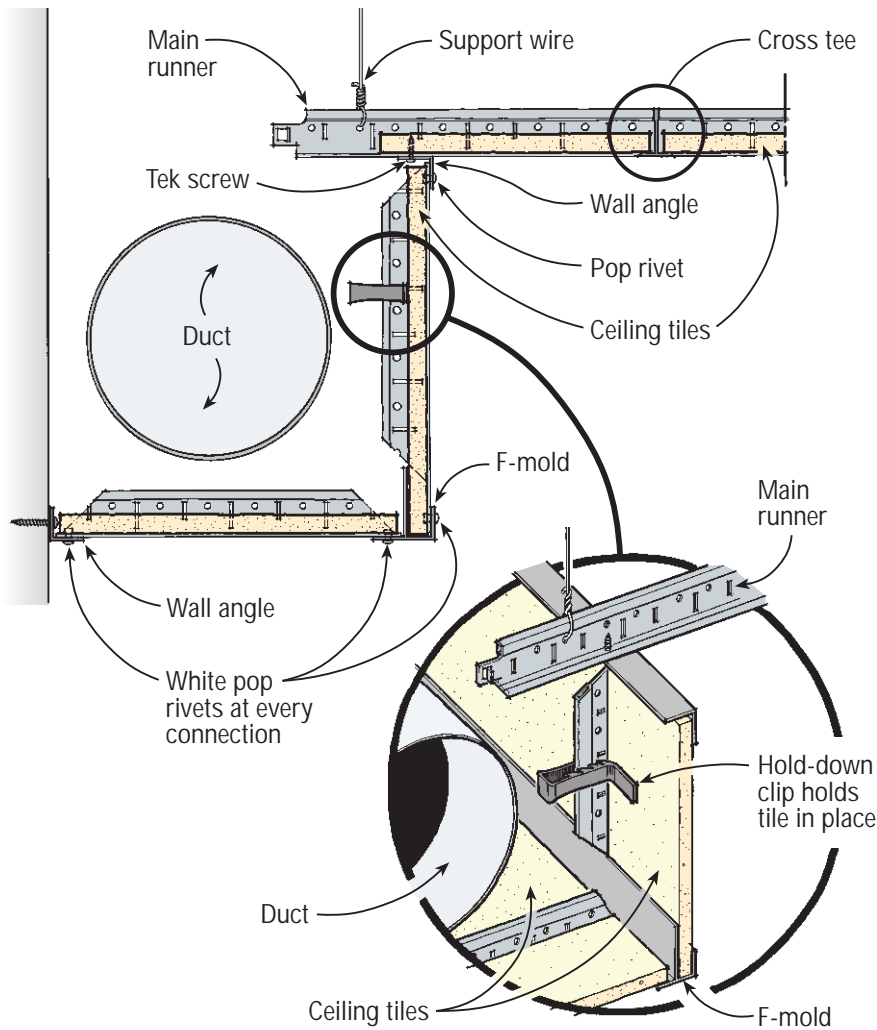
However you figure your material, it's a good idea to order 10% more tile than

you need. That will allow for a few mistakes in cutting and still leave some leftovers for the owner who may need to replace a few tiles someday.

## Wires and Wall Angle

When planning the height of the finished ceiling, it's essential to leave enough space between the base of the ceiling grid and the main ceiling to jockey the tiles into place. If there are no lights or other fixtures to consider, allow at least 2½ inches of clearance. Lay-in fluorescent fixtures increase the

# Building a Soffit



**Figure 3.** Unlike ceiling grid, which snaps together, the soffit gridwork is fastened together with pop rivets and tek screws (right). Special chips hold vertical tiles in place.

**Figure 4.** Factory-made trim pieces make neat work of outside corners.



minimum clearance to 5½ inches. Recessed cans require even more space, unless you can fit them into a space between joists.

**Soffits.** Where possible, I'll enclose a low-lying duct or beam in a soffit, rather than lowering the level of the entire ceiling. Some manufacturers offer prefab soffit systems, but it's not difficult to build your own soffits from sections of tee, wall angle and miter mold, or "F-mold" (Figure 3).

**Installing the wall angle.** Once I know the height of the finished ceiling, I use a laser level to establish the top edge of the wall angle that runs around the perimeter of the room. I use an awl to punch starter holes for wall screws, which are driven through the gypsum and into the studs.

Although some installation manuals recommend mitering the wall molding at corners, this has never made sense to me, since all of the other grid intersections are butt joints. Rather than fuss with miters, I run the first piece of molding tight into the corner and lap the next piece over it, pulling the joint down snug. Outside corners sometimes use a factory-made connector that clips into place (Figure 4). If none is provided, I notch the end of one angle and extend it an inch beyond the corner allowing the next piece to lap over it.

**Screw eyes and hangers.** Once the wall angle is in place, I start hanging the wires that will support the main runners, guided by the plan I drew up earlier. The support wires should be spaced no more than 4 feet apart, with extra wires at the corners of each light fixture. I try to stagger the rows of wires so the ceiling joists share the weight of the ceiling more or less evenly.

For most residential work, the wires hang from "lag eyes" driven into the joists with a screwgun (Figure 5).

Where the ceiling is obstructed by ductwork, I bridge it with a scrap of main hung from two wires, and hang a third wire between them (Figure 6). All

wires should be twisted into place with a square nose side cutter, using three tight wraps. The free ends should hang at least 6 to 8 inches below the finished ceiling line, but I like to bend them up temporarily, because they can poke a hole in you if you're not careful. It's a good idea to wear safety glasses and a hat.

### Assembling the Grid

If I'm working in a closet or other small room, I'll sometimes measure down from the ceiling and hang the grid by eye. But if there's room to set up a laser level, it's the way to go. I start by hanging the laser on a piece of wall angle (Figure 7), so it projects its beam an inch or two below the level of the finished ceiling. That establishes a reference point on each of the hanger wires suspended from the ceiling. It's possible to measure up from that point to where the wires will be bent to receive the mains (the wire slots in the mains are ordinarily about an inch above the finished ceiling level, although this exact figure will depend on the gridwork you're using), but I prefer to use a hand-held laser target as a gauge.

After deciding on the distance between the laser line and the wire bends, I make a penciled reference mark on the edge of the target. I then hold the target against the wire with my left hand, and pull it down taut. When the penciled reference mark lines up with the beam, I reach up with my side cutters, grab the wire at the top edge of the target, and make the required 90-degree bend at exactly the right level. At this point, I'm ready to start assembling the gridwork, following the sequence in Figure 8, next page.

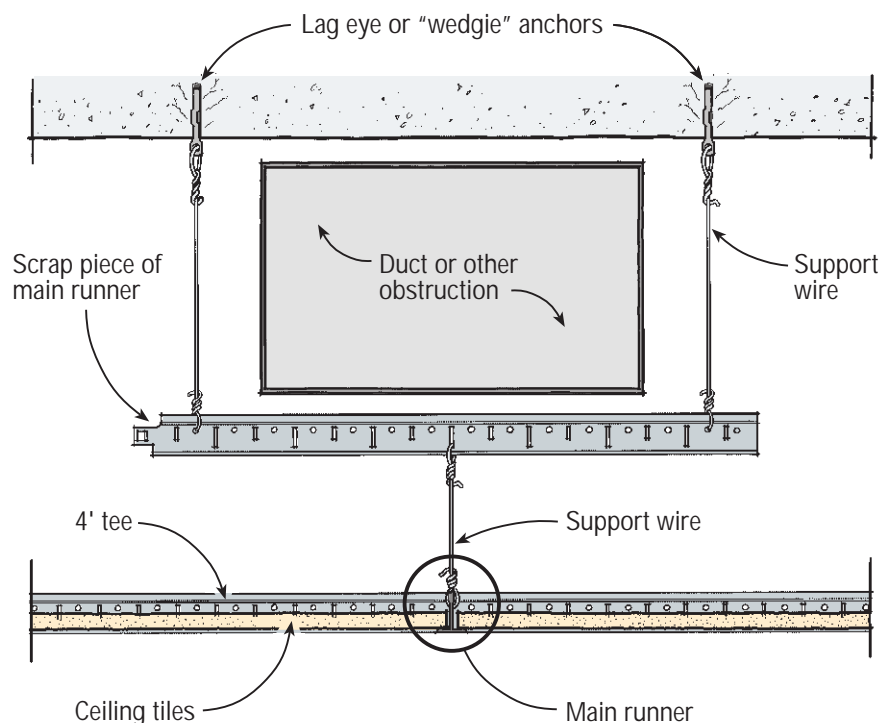
### Installing Tile

Ceiling tile often has a directional pattern of grooves or other markings, and the finished ceiling won't look right if the tiles are placed at random. Some installers prefer to alternate the

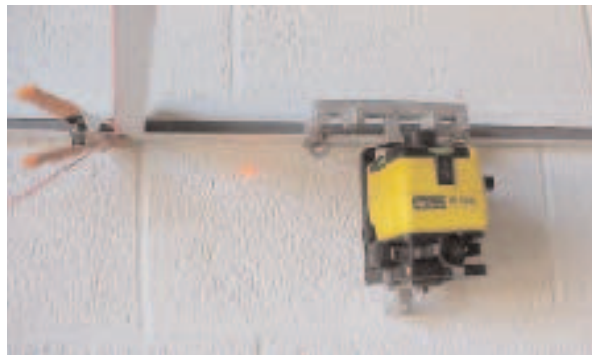


**Figure 5.** Hanger wires are usually attached to lag eyes driven into ceiling joists. In a concrete deck, "wedgie" anchors are driven into predrilled 1/4" holes. Toggle bolts are the usual choice where it's necessary to place anchors between joists.

## Working Around Obstructions

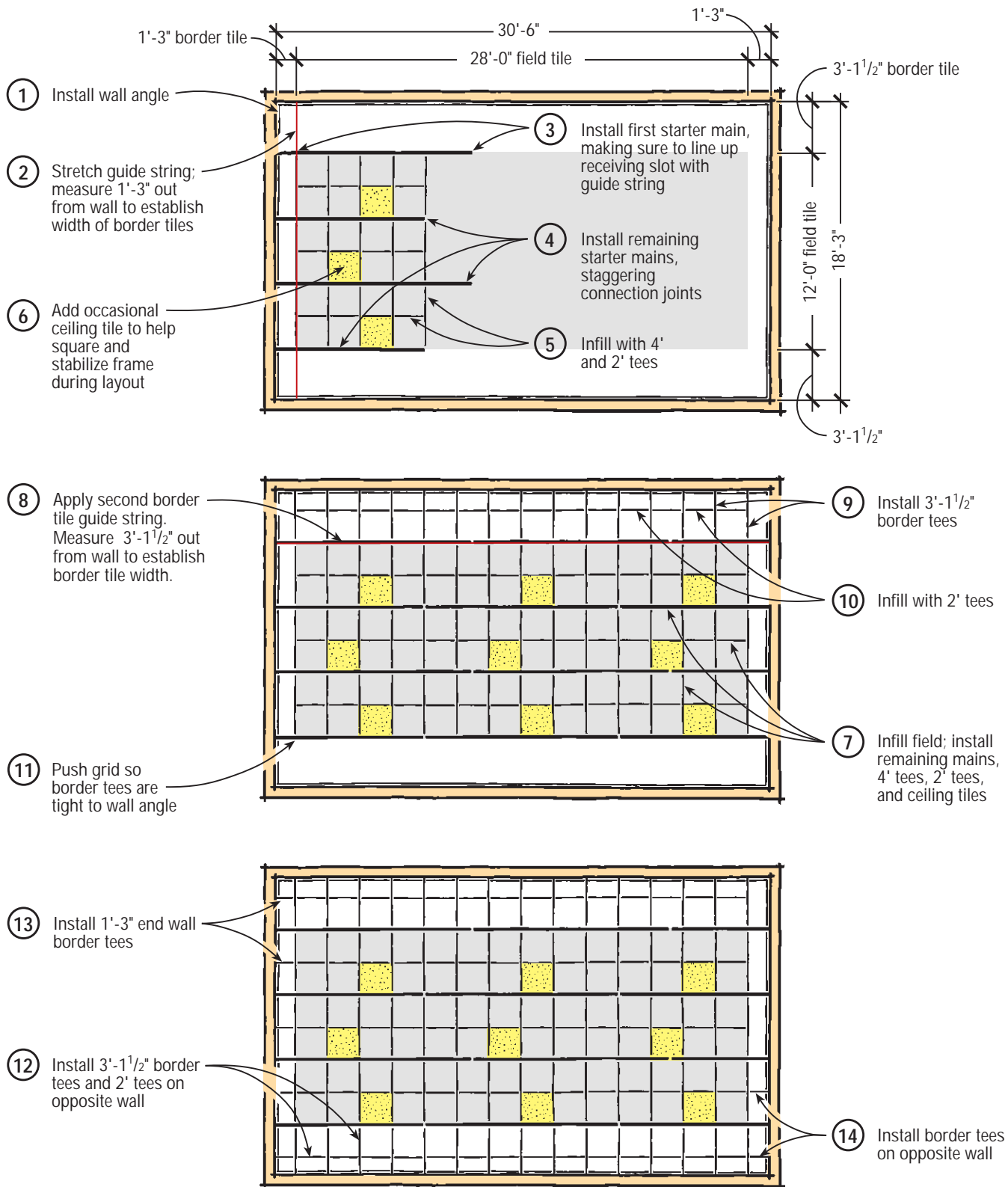


**Figure 6.** Where ductwork or other obstructions make it impossible to attach a hanger wire directly to the ceiling, the author drives a lag eye on either side of the obstruction, then hangs a scrap piece of main runner between them, just below the obstruction. A third wire then runs from the scrap to the ceiling grid below.



**Figure 7.** A laser level mounted on the wall angle makes fast work of locating the bends in the hanger wires that will determine the height of the main runners.

# Hanging the Grid



**Figure 8.** “Starter mains” are cut and installed first, with the joints staggered so they won’t line up across the room later. The 4-foot and 2-foot tees that fit between the mains are snapped in place, and a few field tiles are dropped in to keep the grid stable and square. More lengths of main and additional tees are added to complete everything but the border tees, which must be cut to fit. After cutting and installing the border tees along one sidewall with the aid of a guide string, the author pushes the grid snugly against the completed section of border before installing the border tees along the other side. Finally, the border tees along the end walls — which fit between the mains — are cut and snapped into position.

pattern direction, but I like to orient the long dimension of the pattern perpendicular to the long dimension of the room, because it seems to make the room feel larger. The border tiles come first. If I'm using square-edged tile, I take a measurement, score a cut line with the hook of my tape, then lightly follow the resulting groove with a sharp utility knife. I then make another pass, bearing down harder to cut all the way through.

**Cutting rabbets.** With tegular tiles — which have rabbeted edges to help hide the gridwork — the procedure is slightly different, because the cut edges must be rabbeted to match. Here's how: First measure from the edge of the tee to the leading edge of the wall angle and mark the dimension on the tile. Add 1/2 inch and make a second mark. Lightly score the first line with your knife, using a piece of main for a straightedge, then make another stroke on the same line, cutting about halfway through the tile. Finally, cut all the way through the tile on the second line and cut away the waste between the lines, leaving a clean rabbet (Figure 9).

The care that goes into cutting and fitting the tiles has everything to do with the appearance of the finished ceiling. Tiles are fragile and easily soiled, so I try to avoid handling them more than once. Aluminum tools tend to leave black smudges on your hands, so it's a good idea to wash up frequently. If all else fails, try dabbing scars or smudges with a little white shoe polish.

**Lights and other fixtures.** Once all the border tiles are in place, I install lay-in fluorescent fixtures. According to the 1999 National Electric Code, these must be screwed or clipped to the grid. Recessed can lights and eyeballs look best if they are centered within a tile. After cutting the correct-sized hole in the tile and dropping it in place, I clip the fixture's support bars to the grid and snap on the trim ring from below.

If I'm using tegular tiles, I like to recess them the same thickness as the rabbeted factory edge of the tiles by tracing around them with my knife and carefully carving out the rabbet. This




**Figure 9.** The surface of the rolling scaffold is a convenient surface for cutting tile. Cut edges of tegular tiles — sometimes called “shadow line” tiles — must be rabbeted as shown to fit the grid.



**Figure 10.** Recessing can lights and grills into the tile — leaving a reveal that matches that of the rabbeted edges — is a minor detail that results in a better-looking job.

gives a much more finished appearance to fixtures like diffusers, cans, and speaker grills (Figure 10).

Finally, the rest of the field tiles can be dropped into place. In garages, foyers, or other areas where gusts of air may cause the tiles to lift out, I install hold-down clips — sometimes called “hurricane clips” — to keep them in place. I usually clip all four sides of each tile, but because some of the clips are “shared,” that works out to two clips per tile. I work toward one corner of the room, clipping each tile in place as I go. The last corner tile can't be clipped because there's no way to reach around it, so I weight it down with a scrap of drywall slightly smaller than the tile itself. 

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