Shingle Thatch

Steam-bent shingles, curved framing and wave coursing create a roof with character

by Gary Cooke, Mike Lienemann and Barry Huber

In the early 1900s, a new shingling style came into fashion. Known variously as shingle thatch, cottage thatch and thatch-effect, this embellishment was meant to recreate, with shingles, the curved lines and varied textures of reed-thatched roofs (for more on thatching, see *FHB* #22, pp. 72-77). By bending shingles around eaves and gables and by curving course lines and changing exposures, craftsmen simulated the look of real thatch. Many of these old roofs have eyebrow dormers, with the shingle courses undulating gracefully over the curved framing. We've even seen curved ventilation windows in old attic and garage roofs that were shingle-thatched.

In the 1920s, shingle thatch became so popular that the Creo-Dipt Co. of North Tonawanda, N. Y., began selling shingles that were prebent and precut for thatch-effect roofs. Architects and builders who were interested in shingle thatch were encouraged to send their floor plans and elevations to Creo-Dipt so that the company's engineers and designers could draw up appropriate roof-framing plans for shingle thatch. Creo-Dipt didn't charge for this service. They also prestained their shingles, using creosote as a preservative, in five different shades that were matched to various hues of weathered thatch.

Creo-Dipt had smaller competitors in various parts of the country, so shingle-thatch roofs turn up in a lot of different places. One of the most beautiful examples we know of is a large house built in 1921 in our home town of Sioux Falls, South Dakota. As one of the largest roofing companies in the area, we had been called on to bend cedar shingles on occasion. But when it came time to replace the shingle thatch on this old beauty, we really had to rediscover this nearly forgotten craft.

Since then, we've traveled as far as Long Island, N. Y., for replacement and repair jobs. Fortunately, now that some of these original shingle-thatch roofs are beginning to wear out, there seems to be a resurgence of interest in this style. In examining old roofs, we've learned a great deal about the structural and the aesthetic sides of shingle thatch. Recently, we have started to design and build new houses with shingle-thatch roofs.

Design requirements—The wave coursing, curved valleys and rounded-over eaves and rakes (gable-end rafters) are only half the story. Hidden beneath the shingles is a system of curved framing members, 1x lumber and lath strips that are bent to form the curved nailing surface for the shingles. We'll get to these details shortly.

Most old shingle-thatch roofs were pitched to 12-in-12 or steeper to show off the wave coursing. Any shallower, and the workmanship is hard to see. Also, if you use a steeper pitch, the more difficult bends in the shingles at the eaves will be less severe.

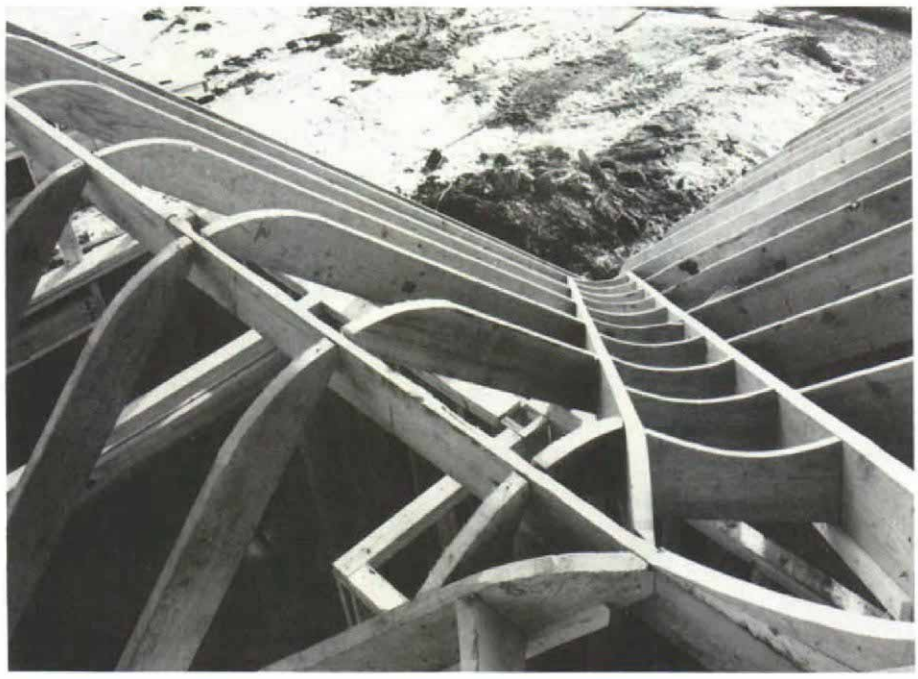
Exposure is constantly changing when you wave-course shingles, but ours averages out to between 2½ in. and 3 in. This means using a lot more shingles than we would for a straight-coursed roof with, say, 5-in. exposure. It also means that the finished roof will be heavier, so the rafters have to be beefed up accordingly. The weight of these shingles per square is usually about 325 lb., as opposed to 200 lb. for a conventional shingle roof with 5-in. exposure. Generally, we use 16-in. perfection-grade western red cedar shingles.

A pneumatic stapler makes the installation of a shingle-thatch roof considerably easier and much faster than conventional nailing. We started using staplers on ordinary shingle and shake jobs, and so naturally brought them along for thatch-effect roofs. Especially when you're bending a shingle around an eave or rake, the stapler lets you form the shingle to the curved framing with one hand and fasten it with the other. We still need to use hot-dipped galvanized nails occasionally to hold awkward bends, but otherwise each shingle gets at least three 1½-in. long staples.

The portable jigsaw is another tool that we find helpful on shingle-thatch jobs. You can usually trim shingles in place with a few passes of the utility knife, but for the occasional curved, cross-grain cut, the jigsaw comes in handy.

Curved framing—The framing for shingle thatch differs considerably from standard roof framing, mainly because you have to build in curves at all ridges, eaves, hips, valleys and rakes (photos below). We do this in two steps, first installing the curved structural members, then skip-sheathing them with 1x lumber. For tight curves, we staple two layers of ⅜-in. thick plasterer's lath to the curved framing.

We find it easiest to cut the curves in most framing members on the bandsaw in our



Creating the curve. **On a shingle-thatch roof, framing members at ridges, eaves, valleys, hips and gables have to be curved. Above, rafters are cut on their top ends to a 12-in. radius before they're nailed to the ridgeboard. Valleys and hips have not one rafter, but two, with curved blocking nailed between them. The curved rake, right, is created by curving the ends of the outlookers. The verge board fits into notches in the outlookers and will be reinforced with blocking. On this rake, the radius of the curve was decreased in ⅜-in. increments from eave to ridge. This imitates the gradually tapered gable found on reed-thatched houses. Facing page, the roof frame is skip-sheathed with 1x nailers for the shingles.**

Photos this page: C&H Roofing

shop. Common rafters are curved at eave and ridge. On the house shown here, the radius of the ridge curve is 12 in. Shingles won't bend as easily across their width as along their length, so curves at ridge and eave shouldn't have a tighter radius than about 8 in.

It's difficult to use standard rafter tables to lay out rafters with curved tops. We usually fuss around on the roof to get a template rafter with accurate plumb and bird's-mouth cuts. Then we cut the rest of the common rafters from this. Valley and hip rafters also are installed with the cut-and-adjust method.

The eaves are curved to a 22-in. radius. We either cut this curve on the rafter ends or nail curved, ¾-in. plywood gussets to rafter tails and eave lookouts.

Hips and valleys contain two rafters apiece. These are located 8 in. on either side of the center line of the hip or valley (photo left, previous page). You can't use standard rafter tables for these rafters either, so we find their lengths and angles by climbing up on the partially complete roof and measuring.

Once a pair of valley rafters is installed, curved 2x blocking is nailed between them to define the concave surface of the valley. Hip-rafter pairs are connected with convex blocking. We cut both types of blocks to a 20-in. radius, and install them on 16-in. centers.

The curved framing at the rake can be done in several ways. We've built rakes with a uniform curve, but on reed-thatched houses the curve at the rake is more pronounced at the ridge than at the eave. We try to duplicate this by gradually changing the curve on the rake outlookers (sometimes called ladder boards) as you move from eave to ridge. As shown on the previous page, rake outlookers near the ridge have a tighter radius than those near the eave. Cut from 2x12s and set on 24-in. centers, they are end-nailed to blocking that is face-nailed to the gable rafter; then they are toenailed into the rafter. Shingles at the rake will be bent around the curve and die into the verge board (or barge rafter), which is nailed to the ends of the outlookers. We strengthen the verge board and the outlookers by bracing the rake from underneath with 2x stock.

Once the structural frame for the roof is complete, we skip-sheathe it. It's possible to use solid sheathing, and even bend several layers of ¼-in. plywood around curved areas, but we have more confidence in skip-sheathing because it allows the roof to breathe. This is an important consideration when you've got four to six layers of shingles covering most of the roof.

We sheathe the main body of the roof with 1x8, 1x10 or 1x12 boards. Because the wavy lines of shingle-thatch create an irregular nailing pattern, it's best to leave no more than a 1-in. airspace between the skip-sheathing. The curved framing at ridges, eaves, hips, valleys and rakes is sheathed with 1x2 boards. These can be kerfed to bend them into moderate curves, or two layers of ⅝-in. lath can be used for tightly radiused areas.

Bending the shingles—We've found that three types of bends are needed on a shingle-thatch roof: bends with the grain, across the grain, and compound bends. Shingles bent with the grain (so the curve is perpendicular to the length of the shingle) are used on val-

Steam bending. **Shingles after steaming are flexible enough to be bent around gables, above, and other curved sections of the roof. A pneumatic stapler speeds the job because the shingler can curve the shingle against the skip-sheathing with one hand and fasten it with the other. Facing page, the steam box sits atop a water-filled 50-gal. drum and has a door on one side for adding and removing shingles. A propane-fired torch underneath the drum generates the steam, which rises into the chamber to saturate the shingles. At left, a worker uses a homemade brake to bend a steamed shingle across its width. The pipe section is fastened securely to the table and acts as a bending platen. A flexible metal strip with one end fastened to the table helps to distribute bending pressure evenly across the face of the shingle.**

leys, hips and gables. We call these gable-bent shingles. This is the easiest type of bend to make, and some shingles are flexible enough to be bent and nailed without steaming.

We call shingles bent across the grain (the bend runs lengthwise along the shingle) eave bends, since this is where most across-the-grain bending is required. Shingles are a lot tougher to bend across the grain, and this is where the steamer and the bending form come into play.

Compound bends are even more difficult, but fortunately the only places they're required are at the bases of valleys, hips and rakes. This combination of with-grain and cross-grain bending requires a shingle that's very flexible, even before it's steamed.

We use a steamer and a bending form for all but the gentlest shingle bending. The steamer makes the wood fibers pliable so that they can be quickly handed up to the roof, formed to the curved framing, and stapled in place (photo above right). This hand-forming technique works fine if you're bending with the grain, across the width of the shingle. For lengthwise bends, shingles usually have to be prebent by means of a bending form, then nailed up.

Our shingle steamer isn't very sophisticated, but it works fine. The hot box, into which the shingles are loaded, is just a sheet-metal chamber fabricated for us by a local tin knocker. One side of the box is a door with a hinge along its bottom edge. The bottom of the box is a heavy metal screen that lets the steam in, and below that, attached to the box, there's a metal ring with a diameter just slightly larger than that of a standard 55-gal. drum. Water in the drum below the box is kept boiling by a propane-fired weed-burner torch (photo facing page).

We usually keep shingles in the steamer for 15 to 20 minutes before either nailing them up or prebending them to be set aside for use later. More steaming time is needed if there's not much water in the drum, if the water is tainted with cedar tannins or if the weather is very cold.

A shingle-bending form can be designed in several ways. It's possible to bend a shingle simply by wedging its butt end between two rolls of roofing felt and forcing the tip one way or the other. We've also heard of hydraulic presses designed specifically for bending shingles the hard way—across the grain. The form we made (photo above left) uses a section of 2½-in. dia. pipe as the bending platen. The pipe is screwed to a small table between two lengths of angle iron that are also screwed to the table. The angle iron visible in the photo simply adds rigidity to the platen. Its counterpart on the other side of the pipe holds an 18-in. wide strap of 24-ga. steel, with a 2x2 handle. This angle iron wedges the shingle butt against the pipe as bending pressure is applied along the length of the strap. Without the compression applied by the metal strap, the wood fibers near the convex side of the bend could tear because of tension failure.

It takes a little while to get a feel for steam-bending shingles, and you have to expect to break a few. Oddly enough, the quartersawn shingles that make up most premium-grade bundles aren't ideal for tight bends across the grain. They tend to break because their

growth rings run straight up and down the thickness of the shingle, directly in line with the stress caused by the curve. A shingle with its growth rings running diagonally across its thickness is better for bending, so we try to sort these out ahead of time. Grain orientation isn't as important for across-the-grain bending. You usually don't know how a shingle will respond in the bending form until you put pressure on it.

Wave coursing—We've come across a number of different styles of wave coursing while studying or working on shingle-thatch projects in different parts of the country. Even on the same roof, it's sometimes possible to tell where one worker stopped and another began, just by the way the courses go.

Wave coursing can be done in two ways. One, used by the Creo-Dipt Company, was to cut the butt ends of the shingles at different angles. Nailing these shingles up edge to edge resulted in an angled course line.

Our wave-coursing method is slightly different. Instead of trimming the shingle butts at different angles, we taper one or both sides of the shingle. When the side-trimmed shingles are butted together, an angled course line is produced. We prefer this method because it allows us to achieve greater angles, since we can trim two edges rather than one. Also, trimming with the grain (as when cutting the sides) is easier than cutting across it (as when cutting the butts).

Using a utility knife and Surform tool, we pretrim a lot of our wave-course shingles on the ground, and classify them as either ups or downs. Ups are cut so that the shingle's butt end is wider than its tip, and cause the course to go up. Downs are V-shaped and move the course down. In between ups and downs, you can use straight, unaltered shingles or slightly angled shingles to make the wave course. To make work on the roof go more quickly, we store the ups, downs and straights in a three-bin box that sits right on the scaffolding (photo below).

Wave coursing doesn't have to be limited to the flat parts of the roof. By trimming the sides of prebent shingles, you can just as easily wave-course rakes and valleys. As shown below, the angle-cut shingles in these areas are usually narrower than those that are used in the field.

Wave coursing can be done in a pattern or completely at random. In the pattern style, the exposure tapers and broadens in gradual waves that align with each other. The random approach is easier and obviously gives the roofer greater freedom. It's even possible to let in a short course that doesn't extend the full length of the roof.

Ridge shingles are bent around the curve of the ridge, and then nailed in place in a single course. Beginning at one end of the house, these shingles overlap one another, and exposure can be fixed or varied, depending on the look that you want. □

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Wave-coursing. **Tapering one or both sides of a shingle with a utility knife and a Surform will allow it to sit with its butt at a slightly different angle from its neighbor, which will turn the course up or down. Wave coursing can be done in a repeating pattern, or at random. Wide shingles can be used to wave-course large expanses of roof. Narrower shingles work better to carry wave coursing around valleys and gables.**